```
NNN           NNN   MMM           MMM   LLL
NNN           NNN   MMM           MMM   LLL
NNN           NNN   MMM           MMM   LLL
NNN           NNN   MMMMMM    MMMMMM   LLL
NNN           NNN   MMMMMM    MMMMMM   LLL
NNN           NNN   MMMMMM    MMMMMM   LLL
NNNNNN        NNN   MMM   MMM   MMM   LLL
NNNNNN        NNN   MMM   MMM   MMM   LLL
NNNNNN        NNN   MMM   MMM   MMM   LLL
NNN   NNN     NNN   MMM         MMM   LLL
NNN   NNN     NNN   MMM         MMM   LLL
NNN   NNN     NNN   MMM         MMM   LLL
NNN       NNNNNN   MMM         MMM   LLL
NNN       NNNNNN   MMM         MMM   LLL
NNN       NNNNNN   MMM         MMM   LLL
NNN          NNN   MMM         MMM   LLL
NNN          NNN   MMM         MMM   LLL
NNN          NNN   MMM         MMM   LLL
NNN          NNN   MMM         MMM   LLLLLLLLLLLLLLL
NNN          NNN   MMM         MMM   LLLLLLLLLLLLLLL
NNN          NNN   MMM         MMM   LLLLLLLLLLLLLLL
```

FILEID**NMLNODFIL

```
NN      NN  MM      MM  LL          NN      NN    000000    DDDDDDDD    FFFFFFFFFF    IIIIII    LL
NN      NN  MM      MM  LL          NN      NN    000000    DDDDDDDD    FFFFFFFFFF    IIIIII    LL
NN      NN  MMMM  MMMM  LL          NN      NN  00      00  DD      DD  FF              II      LL
NN      NN  MMMM  MMMM  LL          NN      NN  00      00  DD      DD  FF              II      LL
NNNN    NN  MM  MM  MM  LL          NNNN    NN  00      00  DD      DD  FF              II      LL
NNNN    NN  MM  MM  MM  LL          NNNN    NN  00      00  DD      DD  FF              II      LL
NN  NN  NN  MM      MM  LL          NN  NN  NN  00      00  DD      DD  FFFFFFFF        II      LL
NN  NN  NN  MM      MM  LL          NN  NN  NN  00      00  DD      DD  FFFFFFFF        II      LL
NN    NNNN  MM      MM  LL          NN    NNNN  00      00  DD      DD  FF              II      LL
NN    NNNN  MM      MM  LL          NN    NNNN  00      00  DD      DD  FF              II      LL
NN      NN  MM      MM  LL          NN      NN  00      00  DD      DD  FF              II      LL          ....
NN      NN  MM      MM  LL          NN      NN  00      00  DD      DD  FF              II      LL          ....
NN      NN  MM      MM  LLLLLLLLLL  NN      NN    000000    DDDDDDDD    FF          IIIIII    LLLLLLLLLL  ....
NN      NN  MM      MM  LLLLLLLLLL  NN      NN    000000    DDDDDDDD    FF          IIIIII    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 %TITLE  'Node File Routines for Network Management'
;  2     0002  0 MODULE NMLNODFIL (
;  3     0003  0                 LANGUAGE (BLISS32),
;  4     0004  0                 ADDRESSING_MODE (NONEXTERNAL=GENERAL),
;  5     0005  0                 ADDRESSING_MODE (EXTERNAL=GENERAL),
;  6     0006  0                 IDENT = 'V04-000'
;  7     0007  0                 ) =
;  8     0008  1 BEGIN
;  9     0009  1
; 10     0010  1 !
; 11     0011  1 !**********************************************************************
; 12     0012  1 !*                                                                    *
; 13     0013  1 !*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                           *
; 14     0014  1 !*  DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS.            *
; 15     0015  1 !*  ALL RIGHTS RESERVED.                                              *
; 16     0016  1 !*                                                                    *
; 17     0017  1 !*  THIS SOFTWARE IS FURNISHED UNDER A LICENSE AND MAY BE USED AND COPIED  *
; 18     0018  1 !*  ONLY IN  ACCORDANCE WITH  THE  TERMS  OF  SUCH  LICENSE  AND WITH THE  *
; 19     0019  1 !*  INCLUSION OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE OR  ANY  OTHER  *
; 20     0020  1 !*  COPIES THEREOF MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE TO ANY  *
; 21     0021  1 !*  OTHER PERSON.  NO TITLE TO AND OWNERSHIP OF  THE  SOFTWARE IS  HEREBY  *
; 22     0022  1 !*  TRANSFERRED.                                                       *
; 23     0023  1 !*                                                                    *
; 24     0024  1 !*  THE INFORMATION IN THIS SOFTWARE IS  SUBJECT TO CHANGE WITHOUT NOTICE  *
; 25     0025  1 !*  AND  SHOULD  NOT  BE  CONSTRUED AS  A COMMITMENT BY DIGITAL EQUIPMENT  *
; 26     0026  1 !*  CORPORATION.                                                       *
; 27     0027  1 !*                                                                    *
; 28     0028  1 !*  DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE  OR  RELIABILITY OF ITS  *
; 29     0029  1 !*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.            *
; 30     0030  1 !*                                                                    *
; 31     0031  1 !*                                                                    *
; 32     0032  1 !**********************************************************************
; 33     0033  1 !
; 34     0034  1
; 35     0035  1 !++
; 36     0036  1 ! FACILITY:     DECnet Network Management Listener (NML)
; 37     0037  1 !
; 38     0038  1 ! ABSTRACT:
; 39     0039  1 !
; 40     0040  1 !       This module contains routines which manage the node permanent database
; 41     0041  1 !       files used by network management.  This file contains permanent data
; 42     0042  1 !       about the configuration of nodes in the network.
; 43     0043  1 !
; 44     0044  1 !       When AREA support was added to DECnet, the node database grew to a
; 45     0045  1 !       size that made the old database too slow (a SHOW NODE FOO searched
; 46     0046  1 !       through the database reading one record at a time, until FOO was
; 47     0047  1 !       found.  This module was created to use a four keyed file that
; 48     0048  1 !       allows single $GETs and $PUTs for each node, which is much faster.
; 49     0049  1 !       All other entities permanent databases have been left in the old
; 50     0050  1 !       format.
; 51     0051  1 !
; 52     0052  1 ! ENVIRONMENT:  VAX/VMS Operating System
; 53     0053  1 !
; 54     0054  1 ! AUTHOR:       Kathy Perko     , CREATION DATE:  6-July-1983
; 55     0055  1 !
; 56     0056  1 ! MODIFIED BY:
; 57     0057  1 !       V03-005 MKP0005         Kathy Perko             2-July-1984
```

```
;    58          0058  1 !                 Fix previous fix so that PURGE KNOWN NODES works.  The
;    59          0059  1 !                 RFA is cleared when a record is deleted, so the check
;    60          0060  1 !                 to see if the RFA has changed between passes, and the subsequent
;    61          0061  1 !                 $GET gets an EOF.  Enhance the RFA check to skip the
;    62          0062  1 !                 $GET if the RFA is zero.
;    63          0063  1 !
;    64          0064  1 !       V03-004 MKP0004         Kathy Perko             23-April-1984
;    65          0065  1 !                 Change NML$READ_KNOWN_NODE_REC to save the RFA (record file
;    66          0066  1 !                 address) in case an intermediate operation (between the
;    67          0067  1 !                 sequential reads) moves the "next record".  If the RFA
;    68          0068  1 !                 has changed, do a $GET before reading the next node
;    69          0069  1 !                 record.
;    70          0070  1 !
;    71          0071  1 !       V03-003 MKP0003         Kathy Perko             31-Mar-1984
;    72          0072  1 !                 Move the node database conversion to the upgrade module
;    73          0073  1 !                 (NMLUPGRAD)
;    74          0074  1 !
;    75          0075  1 !       V03-002 MKP0002         Kathy Perko             2-Mar-1984
;    76          0076  1 !                 Fix node file create to use default name string of
;    77          0077  1 !                 SYS$SYSTEM:.DAT.
;    78          0078  1 !
;    79          0079  1 !       V03-001 MKP0001         Kathy Perko             7-Feb-1984
;    80          0080  1 !                 When converting the node database from the old format
;    81          0081  1 !                 to the new, do the conversion to a temporary file in case
;    82          0082  1 !                 the system crashes part way through.  Rename the file to
;    83          0083  1 !                 it's correct name when done.
;    84          0084  1 !
;    85          0085  1 !--
```

```
;    87          0086  1 %SBTTL  'Definitions'
;    88          0087  1
;    89          0088  1 !
;    90          0089  1 ! TABLE OF CONTENTS:
;    91          0090  1 !
;    92          0091  1
;    93          0092  1 FORWARD ROUTINE
;    94          0093  1     NML$OPEN_NODE_FILE,                 ! Open node database file
;    95          0094  1     NML$CLOSE_NODE_FILE,                ! Close node database file
;    96          0095  1     NML$READ_NODE_REC,                  ! Read a record from node database file
;    97          0096  1     NML$WRITE_NODE_REC,                 ! Write a record from node database file
;    98          0097  1     NML$DELETE_NODE_REC,                ! Delete a record from node database file
;    99          0098  1     NML_MAP_KEYS,                       ! Set up key used to access node db.
;   100          0099  1     NML$READ_LOOPNODE,                  ! Get a loopnode for a specified circuit
;   101          0100  1     NML$READ_KNOWN_NODE_REC,            ! Read known records from node
;   102          0101  1                                         !       database file
;   103          0102  1     NML$CREATE_NODE_DB,                 ! Create new node database file
;   104          0103  1     NML$CONNECT_NODE_RAB;               ! Connect RAB for node database file
;   105          0104  1 !
;   106          0105  1 ! INCLUDE FILES:
;   107          0106  1 !
;   108          0107  1
;   109          0108  1 LIBRARY 'LIB$:NMLLIB.L32';
;   110          0109  1 LIBRARY 'SHRLIB$:NMALIBRY.L32';
;   111          0110  1 LIBRARY 'SYS$LIBRARY:STARLET.L32';
;   112          0111  1
;   113          0112  1 !
;   114          0113  1 ! OWN STORAGE:
;   115          0114  1 !
;   116          0115  1 OWN
;   117          0116  1     nml$a_netnode_fab:          $FAB_DECL,
;   118          0117  1     nml$a_netnode_rab:          $RAB_DECL,
;   119          0118  1     nml$a_protection_xab:       $XABPRO_DECL,
;   120          0119  1     nml$a_summary_xab:          $XABSUM_DECL,
;   121          0120  1     nml$a_node_address_xab:     $XABKEY_DECL,
;   122          0121  1     nml$a_node_name_xab:        $XABKEY_DECL,
;   123          0122  1     nml$a_node_type_xab:        $XABKEY_DECL,
;   124          0123  1     nml$a_node_list_xab:        $XABKEY_DECL,
;   125          0124  1     nml$t_key_value:            VECTOR [3, WORD];
;   126          0125  1
;   127          0126  1 GLOBAL
;   128          0127  1     nml$gq_node_file_dsc        : VECTOR [2]
;   129          0128  1                 INITIAL (%CHARCOUNT ('NETNODE'),
;   130          0129  1                          UPLIT BYTE ('NETNODE'));
;   131          0130  1
;   132          0131  1 EXTERNAL LITERAL
;   133          0132  1     nml$_nodcvterr;
;   134          0133  1
;   135          0134  1 !
;   136          0135  1 ! Declare common NML external references.
;   137          0136  1 !
;   138          0137  1 $nml_extdef;
;   139          0138  1
;   140          0139  1 EXTERNAL ROUTINE
;   141          0140  1     nma$searchfld,
;   142          0141  1     nml$chkfileio,
;   143          0142  1     nml$upgrade_perm_dbs,
```

```
;  144     0143  1     nml$debug_txt,
;  145     0144  1     nml$logfileop,
;  146     0145  1     nml$logrecordop;
;  147     0146  1
```

```
;  149          0147  1 %SBTTL 'nml$open_node_file  Open node permanent database file'
;  150          0148  1 GLOBAL ROUTINE nml$open_node_file =
;  151          0149  1
;  152          0150  1 !++
;  153          0151  1 ! FUNCTIONAL DESCRIPTION:
;  154          0152  1 !       This routine opens the node permanant database file.
;  155          0153  1 !
;  156          0154  1 ! FORMAL PARAMETERS:
;  157          0155  1 !       None
;  158          0156  1 !
;  159          0157  1 ! ROUTINE VALUE:
;  160          0158  1 ! COMPLETION CODES:
;  161          0159  1 !       Failure or RMS error
;  162          0160  1 !
;  163          0161  1 !--
;  164          0162  1
;  165          0163  2 BEGIN
;  166          0164  2
;  167          0165  2 LOCAL
;  168          0166  2     fab:        REF BBLOCK,
;  169          0167  2     status;
;  170          0168  2
;  171          0169  2 status = rms$_suc;
;  172          0170  2 fab = nml$a_netnode_fab;
;  173          0171  2 IF .fab [fab$w_ifi] EQL 0 THEN          ! If file isn't open, do it.
;  174          0172  3     BEGIN
;  175          0173  3     !
;  176          0174  3     ! Open node database.  If there isn't one, create a new node database
;  177          0175  3     ! file.  If the open succeeds, but the file only has one key, it's the
;  178          0176  3     ! old node database format, so convert it.
;  179          0177  3     !
;  180        P 0178  3     $FAB_INIT ( FAB = .fab,
;  181        P 0179  3                 FAC = (GET,PUT,UPD,DEL),
;  182        P 0180  3                 DNM = 'SYS$SYSTEM:.DAT',          ! Default filename string
;  183        P 0181  3                 FNA = .nml$gq_node_file_dsc [1],
;  184        P 0182  3                 FNS = .nml$gq_node_file_dsc [0],
;  185        P 0183  3                 SHR = (UPD, PUT, GET, DEL),       ! File sharing options
;  186        P 0184  3                 XAB = nml$a_summary_xab           ! XAB Chain
;  187          0185  3                 );
;  188          0186  3     $XABSUM_INIT (XAB = nml$a_summary_xab);       ! XAB address
;  189          0187  3
;  190          0188  3     status = $OPEN (FAB = .fab);
;  191          0189  3     IF .status THEN
;  192          0190  4         BEGIN
;  193          0191  4         !
;  194          0192  4         ! If the node file has one key, it's the old node database format,
;  195          0193  4         ! so do a conversion to the new format.
;  196          0194  4         !
;  197          0195  4         IF .nml$a_summary_xab [xab$b_nok] EQL 1 THEN
;  198          0196  5             BEGIN
;  199          0197  5             !
;  200          0198  5             ! Close old permanent database (which was opened using the
;  201          0199  5             ! new permanent database XABs, etc.).
;  202          0200  5             !
;  203          0201  5             nml$close_node_file ();
;  204          0202  5             !
;  205          0203  5             ! Do a V4.0 upgrade on the permanent database files.  The upgrade
```

```
;  206          0204  5              ! procedure will force this call.  The procedure involves converting
;  207          0205  5              ! area 0 to either a customer supplied area number or area 1, and
;  208          0206  5              ! it involves converting the node database to a faster format.
;  209          0207  5              !
;  210          0208  5              status = nml$upgrade_perm_dbs ();
;  211          0209  5              IF .status THEN
;  212          0210  6                  BEGIN
;  213          0211  6                  nml$a_netnode_fab [fab$l_fna] = .nml$gq_node_file_dsc [1];
;  214          0212  6                  nml$a_netnode_fab [fab$b_fns] = .nml$gq_node_file_dsc [0];
;  215          0213  6                  status = $OPEN (FAB = .fab);
;  216          0214  5                  END;
;  217          0215  4              END;
;  218          0216  4          END
;  219          0217  3      ELSE
;  220          0218  3          !
;  221          0219  3          ! If the node database doesn't already exist, create one and
;  222          0220  3          ! connect the RAB record stream.
;  223          0221  3          !
;  224          0222  3          IF .status EQL rms$_fnf THEN
;  225          0223  3              status = nml$create_node_db (nml$gq_node_file_dsc, fab);
;  226          0224  3      !
;  227          0225  3      ! Connect the RAB to the file.
;  228          0226  3      ! If NML$LOG is defined with file io bit set, log a "file opened"
;  229          0227  3      ! message.
;  230          0228  3      !
;  231          0229  3      IF .status THEN
;  232          0230  4          BEGIN
;  233          0231  4          status = nml$connect_node_rab ();
;  234          0232  4          nml$logfileop (dbg$c_fileio,
;  235          0233  4                         nma$c_opn_node,
;  236          0234  4                         $ASCID ('file opened.'));
;  237          0235  3          END;
;  238          0236  2      END;
;  239          0237  2 RETURN .status;
;  240          0238  2
;  241          0239  1 END;                ! of NML$OPEN_NODE_FILE


                                                        .TITLE  NMLNODFIL Node File Routines for Network Manage
                                                                ment
;                                                       .IDENT  \V04-000\

                                                        .PSECT  $PLIT$,NOWRT,NOEXE,2

                                    45  44  4F  4E  54  45  4E  00000 P.AAA:   .ASCII  \NETNODE\                          ;
54  41  44  2E  3A  4D  45  54  53  59  53  24  53  59  53  00007 P.AAB:   .ASCII  \SYS$SYSTEM:.DAT\                     ;
            2E  64  65  6E  65  70  6F  20  65  6C  69  66  00016 P.AAD:   .ASCII  \file opened.\                        ;
                                                        00022           .BLKB   2
                                            0000000C    00024 P.AAC:    .LONG   12                                      ;
                                            00000000'   00028           .ADDRESS P.AAD                                 ;

                                                        .PSECT  $GWN$,NOEXE,2

                                                    00000 NML$A_NETNODE_FAB:
                                                                .BLKB   80
                                                    00050 NML$A_NETNODE_RAB:
                                                                .BLKB   68
```

```
                                00094 NML$A_PROTECTION_XAB:
                                              .BLKB   88
                                000EC NML$A_SUMMARY_XAB:
                                              .BLKB   12
                                000F8 NML$A_NODE_ADDRESS_XAB:
                                              .BLKB   76
                                00144 NML$A_NODE_NAME_XAB:
                                              .BLKB   76
                                00190 NML$A_NODE_TYPE_XAB:
                                              .BLKB   76
                                001DC NML$A_NODE_LIST_XAB:
                                              .BLKB   76
                                00228 NML$T_KEY_VALUE:
                                              .BLKB   6

                                              .PSECT  $GLOBAL$,NOEXE,2

                        00000007  00000 NML$GQ_NODE_FILE_DSC::
                                              .LONG   7
                        00000000' 00004       .ADDRESS P.AAA                                                    ;
                                                                                                                ;

                                      $RMS_PTR=           NML$A_SUMMARY_XAB
                                              .EXTRN  NML$_NODCVTERR, NML$GB_EVTSRCTYP
                                              .EXTRN  NML$GQ_EVTSRCDSC
                                              .EXTRN  NML$GW_EVTCLASS
                                              .EXTRN  NML$GB_EVTMSKTYP
                                              .EXTRN  NML$GQ_EVTMSKDSC
                                              .EXTRN  NML$GW_EVTSNKADR
                                              .EXTRN  NML$GW_ACP_CHAN
                                              .EXTRN  NML$GL_LOGMASK, NML$GQ_ENTSTRDSC
                                              .EXTRN  NML$AB_QIOBUFFER
                                              .EXTRN  NML$GQ_QIOBFDSC
                                              .EXTRN  NML$AB_EXEBUFFER
                                              .EXTRN  NML$GL_EXEDATPTR
                                              .EXTRN  NML$GQ_EXEDATDSC
                                              .EXTRN  NML$GQ_EXEBFDSC
                                              .EXTRN  NML$AB_RCVBUFFER
                                              .EXTRN  NML$GQ_RCVBFDSC
                                              .EXTRN  NML$AB_SNDBUFFER
                                              .EXTRN  NML$GQ_SNDBFDSC
                                              .EXTRN  NML$GL_RCVDATLEN
                                              .EXTRN  NML$AB_CPTABLE, NML$AB_MSGBLOCK
                                              .EXTRN  NML$AB_ENTITY_ID
                                              .EXTRN  NML$AB_QUALIFIER_ID
                                              .EXTRN  NML$AB_ENTITYDATA
                                              .EXTRN  NML$AB_NML_NMV, NML$AB_PRMSEM
                                              .EXTRN  NML$AB_RECBUF, NML$AL_ENTINFTAB
                                              .EXTRN  NML$AL_PERMINFTAB
                                              .EXTRN  NML$AW_PRM_DES, NML$GB_CMD_VER
                                              .EXTRN  NML$GB_ENTITY_CODE
                                              .EXTRN  NML$GB_ENTITY_FORMAT
                                              .EXTRN  NML$GL_QUALIFIER_PST
                                              .EXTRN  NML$GB_QUALIFIER_FORMAT
                                              .EXTRN  NML$GB_FUNCTION
                                              .EXTRN  NML$GB_INFO, NML$GB_OPTIONS
                                              .EXTRN  NML$GL_PRMCODE, NML$GL_PRS_FLGS
                                              .EXTRN  NML$GL_NML_ENTITY
```

```
                                                                .EXTRN  NML$GQ_NETNAMDSC
                                                                .EXTRN  NML$GQ_RECBFDSC
                                                                .EXTRN  NML$GW_PRMDESCNT
                                                                .EXTRN  NMA$SEARCHFLD, NML$CHKFILEIO
                                                                .EXTRN  NML$UPGRADE_PERM_DBS
                                                                .EXTRN  NML$DEBUG_TST, NML$LOGFILEOP
                                                                .EXTRN  NML$LOGRECORDOP
                                                                .EXTRN  SYS$OPEN

                                                                .PSECT  $CODE$,NOWRT,2

                                                07FC 00000      .ENTRY  NML$OPEN_NODE_FILE, Save R2,R3,R4,R5,R6,R7,-; 0148
                                                                        R8,R9,R10
                                    5A 00000000G   00   9E 00002        MOVAB   SYS$OPEN, R10                               ;
                                    59 00000000'   00   9E 00009        MOVAB   NML$GQ_NODE_FILE_DSC, R9                    ;
                                    58 00000000'   00   9E 00010        MOVAB   NML$A_SUMMARY_XAB, R8                       ;
                                    57 00010001    8F   D0 00017        MOVL    #65537, STATUS                              ; 0169
                                         FF14      C8   9F 0001E        PUSHAB  NML$A_NETNODE_FAB                           ; 0170
                                    56             6E   D0 00022        MOVL    FAB, R6                                     ; 0171
                                                02 A6   B5 00025        TSTW    2(R6)                                       ;
                                                   03   13 00028        BEQL    1$                                          ;
                                                 00A6   31 0002A        BRW     5$                                          ;
    0050    8F          00          6E             00   2C 0002D 1$:     MOVC5   #0, (SP), #0, #80, (R6)                     ; 0185
                                                   66       00034                                                           ;
                                    66         5003   8F   B0 00035        MOVW    #20483, (R6)                                ;
                                 16 A6         0F0F   8F   B0 0003A        MOVW    #3855, 22(R6)                               ;
                                 1F A6                02   90 00040        MOVB    #2, 31(R6)                                  ;
                                 24 A6                68   9E 00044        MOVAB   NML$A_SUMMARY_XAB, 36(R6)                   ;
                                 2C A6           04   A9   D0 00048        MOVL    NML$GQ_NODE_FILE_DSC+4, 44(R6)              ;
                                 30 A6 00000000'      00   9E 0004D        MOVAB   P.AAB, 48(R6)                               ;
                                 34 A6                69   90 00055        MOVB    NML$GQ_NODE_FILE_DSC, 52(R6)                ;
                                 35 A6                0F   90 00059        MOVB    #15, 53(R6)                                 ;
        0C          00          6E                 00   2C 0005D        MOVC5   #0, (SP), #0, #12, $RMS_PTR                 ; 0186
                                                   68       00062                                                           ;
                                    68         0C16   8F   B0 00063        MOVW    #3094, $RMS_PTR                             ;
                                    56                DD   00068        PUSHL   R6                                          ; 0188
                                    6A                01   FB 0006A        CALLS   #1, SYS$OPEN                                ;
                                    57                50   D0 0006D        MOVL    R0, STATUS                                  ;
                                    2C                57   E9 00070        BLBC    STATUS, 2$                                  ; 0189
                                    01           09   A8   91 00073        CMPB    NML$A_SUMMARY_XAB+9, #1                     ; 0195
                                                      3D   12 00077        BNEQ    4$                                          ;
                              00000000V         00        00   FB 00079        CALLS   #0, NML$CLOSE_NODE_FILE                 ; 0201
                              00000000G         00        00   FB 00080        CALLS   #0, NML$UPGRADE_PERM_DBS                ; 0208
                                                57        50   D0 00087        MOVL    R0, STATUS                              ;
                                                46        57   E9 0008A        BLBC    STATUS, 5$                              ; 0209
                                   FF40         C8   A9   04   D0 0008D        MOVL    NML$GQ_NODE_FILE_DSC+4, -               ; 0211
                                                                                NML$A_NETNODE_FAB+44
                                   FF48         C8        69   90 00093        MOVB    NML$GQ_NODE_FILE_DSC, NML$A_NETNODE_FAB+52 ; 0212
                                                          56   DD 00098        PUSHL   R6                                      ; 0213
                                                          6A   FB 0009A        CALLS   #1, SYS$OPEN                            ;
                                                          14   11 0009D        BRB     3$                                      ;
                              00018292          8F        57   D1 0009F 2$:     CMPL    STATUS, #98962                          ; 0222
                                                          0E   12 000A6        BNEQ    4$                                      ;
                                                4200      8F   BB 000A8        PUSHR   #^M<R9,SP>                              ; 0223
                              00000000V         00        02   FB 000AC        CALLS   #2, NML$CREATE_NODE_DB                  ;
                                                57        50   D0 000B3 3$:     MOVL    R0, STATUS                              ;
                                                1A        57   E9 000B6 4$:     BLBC    STATUS, 5$                              ; 0229
```

```
                    00000000V  00              00  FB 000B9          CALLS   #0, NML$CONNECT_NODE_RAB                 ; 0231
                               57              50  D0 000C0          MOVL    R0, STATUS                              ;
                                    00000000'  00  9F 000C3          PUSHAB  P.AAC                                   ; 0234
                               7E              01  7D 000C9          MOVQ    #1, -(SP)                               ; 0232
                    00000000G  00              03  FB 000CC          CALLS   #3, NML$LOGFILEOP                       ;
                               50              57  D0 000D3 5$:      MOVL    STATUS, R0                              ; 0237
                                               04  000D6            RET                                             ; 0239

; Routine Size:  215 bytes,    Routine Base:  $CODE$ + 0000
```

```
;  243          0240  1 %SBTTL 'nml$close_node_file  Close node permanent database file'
;  244          0241  1 GLOBAL ROUTINE nml$close_node_file  =
;  245          0242  1
;  246          0243  1 !++
;  247          0244  1 ! FUNCTIONAL DESCRIPTION:
;  248          0245  1 !
;  249          0246  1 !       This routine closes the node permanant database file.
;  250          0247  1 !
;  251          0248  1 ! FORMAL PARAMETERS:
;  252          0249  1 !       None
;  253          0250  1 !
;  254          0251  1 ! ROUTINE VALUE:
;  255          0252  1 ! COMPLETION CODES:
;  256          0253  1 !
;  257          0254  1 !       Failure or RMS error
;  258          0255  1 !
;  259          0256  1 !--
;  260          0257  1
;  261          0258  2 BEGIN
;  262          0259  2
;  263          0260  2 LOCAL
;  264          0261  2     fab :       REF BBLOCK,
;  265          0262  2     status;
;  266          0263  2
;  267          0264  2 status = nma$_success;
;  268          0265  2 !
;  269          0266  2 ! If the file isn't open, don't try to close it.
;  270          0267  2 !
;  271          0268  2 fab = nml$a_netnode_fab;
;  272          0269  2 IF .fab [fab$w_ifi] NEQ 0 THEN
;  273          0270  3     BEGIN
;  274          0271  3     status = $CLOSE (FAB = nml$a_netnode_fab);
;  275          0272  3     !
;  276          0273  3     ! If NML$LOG is defined with file io bit set, log a "file closed"
;  277          0274  3     ! message.
;  278          0275  3     !
;  279          0276  3     IF .status THEN
;  280          0277  4         nml$logfileop (dbg$c_fileio,
;  281          0278                        nma$c_opn_node,
;  282          0279                        $ASCID ('file closed'));
;  283          0280  3     END;
;  284          0281  2 RETURN .status;
;  285          0282  1 END;                ! of    nml$close_node_file


                                                                .PSECT  $PLIT$,NOWRT,NOEXE,2

64  65  73  6F  6C  63  20  65  6C  69  66  0002C P.AAF:       .ASCII  \file closed\                   ;
                                            00037               .BLKB   1
                                0000000B    00038 P.AAE:       .LONG   11                              ;
                                00000000'   0003C               .ADDRESS P.AAF                          ;

                                                                .EXTRN  SYS$CLOSE

                                                                .PSECT  $CODE$,NOWRT,2
```

```
                                    000C 00000          .ENTRY  NML$CLOSE_NODE_FILE, Save R2,R3                 ; 0241
                          53 00000000'  00   9E 00002   MOVAB   NML$A_NETNODE_FAB, R3                          ;
                          52            01   D0 00009   MOVL    #1, STATUS                                     ; 0264
                          50            63   9E 0000C   MOVAB   NML$A_NETNODE_FAB, FAB                        ; 0268
                                02      A0   B5 0000F   TSTW    2(FAB)                                         ; 0269
                                        1F   13 00012   BEQL    1$                                             ;
                                        53   DD 00014   PUSHL   R3                                             ; 0271
                00000000G       00      01   FB 00016   CALLS   #1, SYS$CLOSE                                  ;
                                52      50   D0 0001D   MOVL    R0, STATUS                                     ;
                                10      52   E9 00020   BLBC    STATUS, 1$                                     ; 0276
                                   00000000'  00   9F 00023   PUSHAB  P.AAE                                     ; 0279
                                7E      01   7D 00029   MOVQ    #1, -(SP)                                      ; 0277
                00000000G       00      03   FB 0002C   CALLS   #3, NML$LOGFILEOP                              ;
                                50      52   D0 00033 1$:    MOVL    STATUS, R0                                 ; 0281
                                        04   00036   RET                                                       ; 0282

; Routine Size:  55 bytes,    Routine Base:  $CODE$ + 00D7
```

```
;  287     0283  1 %SBTTL 'nml$read_node_rec   Get a Record in the Node File'
;  288     0284  1 GLOBAL ROUTINE nml$read_node_rec (key, key_value_dsc,
;  289     0285  1                                   node_type,
;  290     0286  1                                   buffer_dsc, data_dsc) =
;  291     0287  1
;  292     0288  1 !++
;  293     0289  1 ! FUNCTIONAL DESCRIPTION:
;  294     0290  1 !
;  295     0291  1 !       This routine performs $GETs to the node permanent database.  The
;  296     0292  1 !       database is organized with one record per node, four keys per
;  297     0293  1 !       record.  The four keys are:
;  298     0294  1 !                       node type (executor, remote node, loop node)
;  299     0295  1 !                       node address
;  300     0296  1 !                       node name
;  301     0297  1 !                       list node (node address concatenated with node type -
;  302     0298  1 !                               used for LISTing nodes).
;  303     0299  1 !
;  304     0300  1 ! FORMAL PARAMETERS:
;  305     0301  1 !
;  306     0302  1 !       key             key to use to identify the node's record.
;  307     0303  1 !       key_value_dsc   Descriptor of key value to use to identify the
;  308     0304  1 !                               node's record.
;  309     0305  1 !       node_type       Address for returning node type key value
;  310     0306  1 !       buffer_dsc      Address of a descriptor of a buffer to use
;  311     0307  1 !       data_dsc        Address of a descriptor to return descriptor of data
;  312     0308  1 !                               read.
;  313     0309  1 !
;  314     0310  1 ! ROUTINE VALUE:
;  315     0311  1 ! COMPLETION CODES:
;  316     0312  1 !
;  317     0313  1 !       NMA or RMS error status
;  318     0314  1 !
;  319     0315  1 !--
;  320     0316  1
;  321     0317  2 BEGIN
;  322     0318  2
;  323     0319  2 MAP
;  324     0320  2     buffer_dsc: REF VECTOR,             ! Buffer to use for record
;  325     0321  2     data_dsc: REF VECTOR;               ! Return data descriptor
;  326     0322  2
;  327     0323  2 LOCAL
;  328     0324  2     ptr:        REF BBLOCK,
;  329     0325  2     fab:        REF BBLOCK,
;  330     0326  2     rab:        REF BBLOCK,
;  331     0327  2     buf_ptr:    REF BBLOCK,
;  332     0328  2     local_dsc:  VECTOR [2],
;  333     0329  2     status;
;  334     0330  2
;  335     0331  2 fab = nml$a_netnode_fab;
;  336     0332  2 IF .fab [fab$w_ifi] EQL 0 THEN          ! If the node file isn't open
;  337     0333  2     RETURN .fab [fab$l_sts];            !       return open failure status.
;  338     0334  2 !
;  339     0335  2 ! Map the input key parameter to the key of reference number for that
;  340     0336  2 ! parameter.  If the key being used for this operation is different from the
;  341     0337  2 ! one the RAB is set up for, switch keys.
;  342     0338  2 !
;  343     0339  2 status = nml_map_keys (nmn$c_get_rec, .key, .key_value_dsc);
```

```
;  344          0340  2 IF .status THEN
;  345          0341  3     BEGIN
;  346          0342  3     rab = nml$a_netnode_rab;
;  347          0343  3     buf_ptr = .buffer_dsc [1];
;  348          0344  3     rab [rab$w_usz] = .buffer_dsc [0];
;  349          0345  3     rab [rab$l_ubf] = .buf_ptr;
;  350          0346  3
;  351          0347  3     status = $GET (RAB = .rab);
;  352          0348  2     END;
;  353          0349  2
;  354          0350  2 IF .status THEN
;  355          0351  3     BEGIN
;  356          0352  3     !
;  357          0353  3     ! Don't include keys in descriptor returned to caller.  Just return the
;  358          0354  3     ! NICE parameters and values.
;  359          0355  3     !
;  360          0356  3     data_dsc [0] = .rab [rab$w_rsz] - nmn$k_node_keys_len;
;  361          0357  3     data_dsc [1] = .buf_ptr + nmn$k_node_keys_len;
;  362          0358  3     !
;  363          0359  3     ! Return the node entity type since this is the only key that isn't
;  364          0360  3     ! duplicated in the NICE parameters.
;  365          0361  3     !
;  366          0362  3     .node_type =
;  367          0363  4         (SELECTONEU .buf_ptr [nmn$w_key_typ] OF
;  368          0364  4             SET
;  369          0365  4             [nmn$c_typ_remote]:         nml$c_node;
;  370          0366  4             [nmn$c_typ_exec]:           nml$c_executor;
;  371          0367  4             [nmn$c_typ_loopnode]:       nml$c_loopnode;
;  372          0368  3             TES);
;  373          0369  3     local_dsc [0] = .rab [rab$w_rsz];
;  374          0370  3     local_dsc [1] = .buf_ptr;
;  375          0371  3     nml$logrecordop (dbg$c_fileio,
;  376          0372  3                      nma$c_opn_node,
;  377          0373  3                      $ASCID ('record read'),
;  378          0374  3                      local_dsc);
;  379          0375  2     END;
;  380          0376  2 RETURN .status;
;  381          0377  1 END;                ! Of    nml$read_node_rec


                                                                .PSECT  $PLIT$,NOWRT,NOEXE,2

64 61 65 72 20 64 72 6F 63 65 72  00040 P.AAH:  .ASCII  \record read\                          ;
                                   0004B        .BLKB   1
                          0000000B 0004C P.AAG:  .LONG   11                                    ;
                          00000000' 00050        .ADDRESS P.AAH                                ;

                                                .EXTRN  SYS$GET

                                                .PSECT  $CODE$,NOWRT,2

                                   001C 00000   .ENTRY  NML$READ_NODE_REC, Save R2,R3,R4      ; 0284
                             5E    08  C2 00002 SUBL2   #8, SP                               ;
                          50 00000000' 00  9E 00005 MOVAB   NML$A_NETNODE_FAB, FAB           ; 0331
                                    02 A0  B5 0000C TSTW    2(FAB)                           ; 0332
                                       05  12 0000F BNEQ    1$                               ;
```

```
                        50        08    A0  D0 00011          MOVL    8(FAB), R0                          ; 0333
                                        04  00015          RET                                         ;
                        7E        04    AC  7D 00016 1$:     MOVQ    KEY, -(SP)                          ; 0339
                                        04  DD 0001A          PUSHL   #4                                  ;
                00000000V       00      03  FB 0001C          CALLS   #3, NML_MAP_KEYS                    ;
                        54              50  D0 00023          MOVL    R0, STATUS                          ;
                        78              54  E9 00026          BLBC    STATUS, 6$                          ; 0340
                        52  00000000'   00  9E 00029          MOVAB   NML$A_NETNODE_RAB, RAB              ; 0342
                        50        10    AC  D0 00030          MOVL    BUFFER_DSC, R0                      ; 0343
                        53        04    A0  D0 00034          MOVL    4(R0), BUF_PTR                      ;
                    20  A2              60  B0 00038          MOVW    (R0), 32(RAB)                       ; 0344
                    24  A2              53  D0 0003C          MOVL    BUF_PTR, 36(RAB)                    ; 0345
                                        52  DD 00040          PUSHL   RAB                                 ; 0347
                00000000G       00      01  FB 00042          CALLS   #1, SYS$GET                         ;
                        54              50  D0 00049          MOVL    R0, STATUS                          ;
                        52              54  E9 0004C          BLBC    STATUS, 6$                          ; 0350
                        50        14    AC  D0 0004F          MOVL    DATA_DSC, R0                        ; 0356
                        60        22    A2  3C 00053          MOVZWL  34(RAB), (R0)                       ;
                        60              0A  C2 00057          SUBL2   #10, (R0)                           ;
                    04  A0        0A    A3  9E 0005A          MOVAB   10(R3), 4(R0)                       ; 0357
                        50        02    A3  3C 0005F          MOVZWL  2(BUF_PTR), R0                      ; 0363
                        01              50  B1 00063          CMPW    R0, #1                              ; 0365
                                        05  12 00066          BNEQ    2$                                  ;
                        50              03  D0 00068          MOVL    #3, R0                              ;
                                        16  11 0006B          BRB     5$                                  ;
                                        50  D5 0006D 2$:      TSTL    R0                                  ; 0366
                                        05  12 0006F          BNEQ    3$                                  ;
                        50              07  D0 00071          MOVL    #7, R0                              ;
                                        0D  11 00074          BRB     5$                                  ;
                        02              50  B1 00076 3$:      CMPW    R0, #2                              ; 0367
                                        05  13 00079          BEQL    4$                                  ;
                        50              01  CE 0007B          MNEGL   #1, R0                              ;
                                        03  11 0007E          BRB     5$                                  ;
                        50              05  D0 00080 4$:      MOVL    #5, R0                              ;
                    0C  BC              50  D0 00083 5$:      MOVL    R0, @NODE_TYPE                      ; 0363
                        6E        22    A2  3C 00087          MOVZWL  34(RAB), LOCAL_DSC                  ; 0369
                    04  AE              53  D0 0008B          MOVL    BUF_PTR, LOCAL_DSC+4                ; 0370
                                        5E  DD 0008F          PUSHL   SP                                  ; 0371
                            00000000'   00  9F 00091          PUSHAB  P.AAG                               ; 0373
                        7E              01  7D 00097          MOVQ    #1, -(SP)                           ; 0371
                00000000G       00      04  FB 0009A          CALLS   #4, NML$LOGRECORDOP                 ;
                        50              54  D0 000A1 6$:      MOVL    STATUS, R0                          ; 0376
                                        04  000A4          RET                                         ; 0377

; Routine Size:  165 bytes,    Routine Base:  $CODE$ + 010E
```

```
;  383          0378  1 %SBTTL 'nml$write_node_rec     Write a Record to the Node File'
;  384          0379  1 GLOBAL ROUTINE nml$write_node_rec (write_type, node_type, buffer_dsc) =
;  385          0380  1
;  386          0381  1 !++
;  387          0382  1 ! FUNCTIONAL DESCRIPTION:
;  388          0383  1 !
;  389          0384  1 !       This routine performs $PUTs to the node permanent database.  The
;  390          0385  1 !       database is organized with one record per node, four keys per
;  391          0386  1 !       record.  The four keys are:
;  392          0387  1 !                       node type (executor, remote node, loop node)
;  393          0388  1 !                       node address
;  394          0389  1 !                       node name
;  395          0390  1 !                       list node (node address concatenated with node type -
;  396          0391  1 !                               used for LISTing nodes in order by address).
;  397          0392  1 !
;  398          0393  1 ! FORMAL PARAMETERS:
;  399          0394  1 !       write_type      nmn$c_put_rec - do a $PUT
;  400          0395  1 !                       nmn$c_update_rec - do a $UPDATE
;  401          0396  1 !       node_type       Node entity type - in case it's changed.
;  402          0397  1 !       buffer_dsc      Address of a descriptor of the buffer to write.
;  403          0398  1 !                       This descriptor does not include the keys - only
;  404          0399  1 !                       the NICE parameters.
;  405          0400  1 !
;  406          0401  1 ! ROUTINE VALUE:
;  407          0402  1 ! COMPLETION CODES:
;  408          0403  1 !
;  409          0404  1 !       NMA or RMS error status
;  410          0405  1 !
;  411          0406  1 !--
;  412          0407  1
;  413          0408  2 BEGIN
;  414          0409  2
;  415          0410  2 MAP
;  416          0411  2     buffer_dsc: REF VECTOR;             ! Buffer to use for record
;  417          0412  2
;  418          0413  2 LOCAL
;  419          0414  2     buf_ptr:    REF BBLOCK,
;  420          0415  2     fab:        REF BBLOCK,
;  421          0416  2     rab:        REF BBLOCK,
;  422          0417  2     local_dsc:  VECTOR [2],
;  423          0418  2     param_dsc:  VECTOR [2],
;  424          0419  2     old_node_del_key,
;  425          0420  2     old_node_dsc:VECTOR [2],
;  426          0421  2     status;
;  427          0422  2
;  428          0423  2 fab = nml$a_netnode_fab;
;  429          0424  2 IF .fab [fab$w_ifi] EQL 0 THEN          ! If the node file isn't open
;  430          0425  2     RETURN .fab [fab$l_sts];           !       return open failure status.
;  431          0426  2 local_dsc [0] = .buffer_dsc [0] + nmn$k_node_keys_len;
;  432          0427  2 local_dsc [1] = .buffer_dsc [1] - nmn$k_node_keys_len;
;  433          0428  2 buf_ptr = .local_dsc [1];
;  434          0429  2 !
;  435          0430  2 ! First, get the node address from the NICE parameters in the permanent database
;  436          0431  2 ! record.  The node address is the primary key into the node permanent
;  437          0432  2 ! database.  Therefore, if it has changed the old record must be deleted
;  438          0433  2 ! before the new one can be written (since primary keys cannot be modified).
;  439          0434  2 !
```

```
;  440     0435  2 param_dsc [1] = 0;
;  441     0436  2 IF NOT nma$searchfld (.buffer_dsc, nma$c_pcno_add, param_dsc [0], param_dsc [1]) THEN
;  442     0437  2     param_dsc [1] = UPLIT (0);
;  443     0438  2 IF .buf_ptr [nmn$w_key_add] NEQ .(.param_dsc [1])<0,16> THEN
;  444     0439  3     BEGIN
;  445     0440  3     !
;  446     0441  3     ! If it's a brand new node, don't try to delete the old address's record.
;  447     0442  3     !
;  448     0443  3     IF .write_type NEQ nmn$c_put_rec THEN
;  449     0444  3         !
;  450     0445  3         ! It isn't a brand new node.  Delete the node using the address key if
;  451     0446  3         ! it's a remote node.  Use the type key if it's the exec - in case it
;  452     0447  3         ! has an address of 0 which could be confused with a loopnode.  Loopnodes
;  453     0448  3         ! never change addresses, so you never get here for loopnode operations.
;  454     0449  3         !
;  455     0450  4         BEGIN
;  456     0451  4         IF .buf_ptr [nmn$w_key_typ] EQL nmn$c_typ_exec THEN
;  457     0452  5             BEGIN
;  458     0453  5             old_node_del_key = nmn$c_typ_key_ref;
;  459     0454  5             old_node_dsc [0] = nmn$c_typ_key_len;
;  460     0455  5             old_node_dsc [1] = uplit (nml$c_executor);
;  461     0456  5             END
;  462     0457  4         ELSE
;  463     0458  5             BEGIN
;  464     0459  5             old_node_del_key = nma$c_pcno_add;
;  465     0460  5             old_node_dsc [0] = nmn$c_add_key_len;
;  466     0461  5             old_node_dsc [1] = .buf_ptr;
;  467     0462  4             END;
;  468     0463  4         nml$delete_node_rec (.old_node_del_key,
;  469     0464  4                              old_node_dsc);
;  470     0465  4         write_type = nmn$c_put_rec;
;  471     0466  3         END;
;  472     0467  3     buf_ptr [nmn$w_key_add] = .(.param_dsc [1]);        ! Put new address key
;  473     0468  3                                                         !       into record.
;  474     0469  2     END;
;  475     0470  2 !
;  476     0471  2 ! In case the node name, address or type has changed as a result of the
;  477     0472  2 ! NICE command being processed, change the corresponding key values as well.
;  478     0473  2 ! Now, get the node name from the NICE parameters.  If there isn't one,
;  479     0474  2 ! set up a null name.
;  480     0475  2 !
;  481     0476  2 param_dsc [1] = 0;
;  482     0477  2 IF nma$searchfld (.buffer_dsc, nma$c_pcno_nna, param_dsc [0], param_dsc [1]) THEN
;  483     0478  2     CH$COPY (.param_dsc [0], .param_dsc [1],
;  484     0479  2              %C' ',
;  485     0480  2              nmn$s_key_nam,
;  486     0481  2              buf_ptr [nmn$t_key_nam])
;  487     0482  2 ELSE
;  488     0483  2     CH$FILL (%C' ', nmn$s_key_nam, buf_ptr [nmn$t_key_nam]);
;  489     0484  2 !
;  490     0485  2 ! The third key is the node type.  The three node types are executor,
;  491     0486  2 ! remote, and loop node.
;  492     0487  2 !
;  493     0488  2 buf_ptr [nmn$w_key_typ] =
;  494     0489  3     (SELECTONEU .node_type OF
;  495     0490  3         SET
;  496     0491  3         [nml$c_nodebyname, nml$c_node]: nmn$c_typ_remote;
```

```
;   497          0492  3          [nml$c_executor]:               nmn$c_typ_exec;
;   498          0493  3          [nml$c_loopnode]:               nmn$c_typ_loopnode;
;   499          0494  2          TES);
;   500          0495  2
;   501          0496  2      !
;   502          0497  2      ! Set up the buffer size and address to include the keys.
;   503          0498  2      !
;   504          0499  2      rab = nml$a_netnode_rab;
;   505          0500  2      rab [rab$w_rsz] = .local_dsc [0];
;   506          0501  2      rab [rab$l_rbf] = .local_dsc [1];
;   507          0502  2
;   508          0503  2      IF .write_type EQL nmn$c_put_rec THEN
;   509          0504  3          status = $PUT (RAB = .rab)
;   510          0505  2      ELSE
;   511          0506  2          status = $UPDATE (RAB = .rab);
;   512          0507  2
;   513          0508  2      IF .status THEN
;   514          0509  3          BEGIN
;   515          0510  3          nml$logrecordop (dbg$c_fileio,
;   516          0511  3                           nma$c_opn_node,
;   517          0512  3                           $ASCID ('record written'),
;   518          0513  3                           local_dsc);
;   519          0514  2          END;
;   520          0515  2      RETURN .status;
;   521          0516  1      END;                ! Of    nml$write_node_rec


                                                          .PSECT  $PLIT$,NOWRT,NOEXE,2

                                                00000000  00054 P.AAI:  .LONG   0                                                ;
                                                00000007  00058 P.AAJ:  .LONG   7                                                ;
6E  65  74  74  69  72  77  20  64  72  6F  63  65  72    0005C P.AAL:  .ASCII  \record written\                                   ;
                                                          0006A         .BLKB   2
                                                0000000E  0006C P.AAK:  .LONG   14                                               ;
                                                00000000' 00070         .ADDRESS P.AAL                                          ;

                                                          .EXTRN  SYS$PUT, SYS$UPDATE

                                                          .PSECT  $CODE$,NOWRT,2

                                                    01FC  00000         .ENTRY  NML$WRITE_NODE_REC, Save R2,R3,R4,R5,R6,R7,-;  0379
                                                                                R8                                              ;
                                      58 00000000G  00    9E  00002         MOVAB   NMA$SEARCHFLD, R8                           ;
                                      57 00000000'  00    9E  00009         MOVAB   P.AAI, R7                                   ;
                                      5E            18    C2  00010         SUBL2   #24, SP                                     ;
                                      50 00000000'  00    9E  00013         MOVAB   NML$A_NETNODE_FAB, FAB                      ;  0423
                                                02  A0    B5  0001A         TSTW    2(FAB)                                      ;  0424
                                                05  12    0001D             BNEQ    1$                                          ;
                                      50        08  A0    D0  0001F         MOVL    8(FAB), R0                                  ;  0425
                                                    04    00023             RET                                                 ;
                                      52        0C  AC    D0  00024 1$:     MOVL    BUFFER_DSC, R2                              ;  0426
                                10    62            0A    C1  00028         ADDL3   #10, (R2), LOCAL_DSC                        ;
                                14    AE        04  A2    0A  C3  0002D     SUBL3   #10, 4(R2), LOCAL_DSC+4                     ;  0427
                                      56        14  AE    D0  00033         MOVL    LOCAL_DSC+4, BUF_PTR                        ;  0428
                                                0C  AE    D4  00037         CLRL    PARAM_DSC+4                                 ;  0435
                                                0C  AE    9F  0003A         PUSHAB  PARAM_DSC+4                                 ;  0436
```

```
                                    0C   AE  9F 0003D          PUSHAB  PARAM_DSC                                                ;
                                7E  01F6   8F  3C 00040          MOVZWL  #502, -(SP)                                              ;
                                    52     DD  00045          PUSHL   R2                                                       ;
                                68         04  FB 00047          CALLS   #4, NMA$SEARCHFLD                                        ;
                                04         50  E8 0004A          BLBS    R0, 2$                                                   ;
                             0C AE         67  9E 0004D          MOVAB   P.AAI, PARAM_DSC+4                                       ; 0437
                             0C BE         66  B1 00051 2$:     CMPW    (BUF_PTR), @PARAM_DSC+4                                  ; 0438
                                           34  13 00055          BEQL    6$                                                       ;
                                01     04   AC  D1 00057          CMPL    WRITE_TYPE, #1                                           ; 0443
                                           2A  13 0005B          BEQL    5$                                                       ;
                                6E         02  D0 0005D          MOVL    #2, OLD_NODE_DSC                                         ; 0454
                                     02    A6  B5 00060          TSTW    2(BUF_PTR)                                               ; 0451
                                           0A  12 00063          BNEQ    3$                                                       ;
                                50         01  D0 00065          MOVL    #1, OLD_NODE_DEL_KEY                                     ; 0453
                             04 AE     04   A7  9E 00068          MOVAB   P.AAJ, OLD_NODE_DSC+4                                    ; 0455
                                           09  11 0006D          BRB     4$                                                       ; 0451
                                50   01F6   8F  3C 0006F 3$:     MOVZWL  #502, OLD_NODE_DEL_KEY                                   ; 0459
                             04 AE         56  D0 00074          MOVL    BUF_PTR, OLD_NODE_DSC+4                                  ; 0461
                                4001       8F  BB 00078 4$:     PUSHR   #^M<R0,SP>                                               ; 0463
                   00000000V 00            02  FB 0007C          CALLS   #2, NML$DELETE_NODE_REC                                  ;
                          04 AC            01  D0 00083          MOVL    #1, WRITE_TYPE                                           ; 0465
                                66     0C   BE  B0 00087 5$:     MOVW    @PARAM_DSC+4, (BUF_PTR)                                  ; 0467
                                       0C   AE  D4 0008B 6$:     CLRL    PARAM_DSC+4                                              ; 0476
                                       0C   AE  9F 0008E          PUSHAB  PARAM_DSC+4                                              ; 0477
                                       0C   AE  9F 00091          PUSHAB  PARAM_DSC                                                ;
                                7E     01F4   8F  3C 00094          MOVZWL  #500, -(SP)                                              ;
                                       52     DD  00099          PUSHL   R2                                                       ;
                                68             04  FB 0009B          CALLS   #4, NMA$SEARCHFLD                                        ;
                                08             50  E9 0009E          BLBC    R0, 7$                                                   ;
06                 20        0C   BE     08   AE  2C 000A1          MOVC5   PARAM_DSC, @PARAM_DSC+4, #32, #6, -                      ; 0481
                                           04   A6     000A8                  4(BUF_PTR)                                               ;
                                           07  11 000AA          BRB     8$                                                       ;
06                 20                 6E         00  2C 000AC 7$:     MOVC5   #0, (SP), #32, #6, 4(BUF_PTR)                            ; 0483
                                           04   A6     000B1                                                                   ;
                                50         08  AC  D0 000B3 8$:     MOVL    NODE_TYPE, R0                                            ; 0489
                                03             50  D1 000B7          CMPL    R0, #3                                                   ; 0491
                                               0A  1F 000BA          BLSSU   9$                                                       ;
                                04             50  D1 000BC          CMPL    R0, #4                                                   ;
                                               05  1A 000BF          BGTRU   9$                                                       ;
                                50             01  D0 000C1          MOVL    #1, R0                                                   ;
                                               16  11 000C4          BRB     12$                                                      ;
                                07             50  D1 000C6 9$:     CMPL    R0, #7                                                   ; 0492
                                               04  12 000C9          BNEQ    10$                                                      ;
                                               50  D4 000CB          CLRL    R0                                                       ;
                                               0D  11 000CD          BRB     12$                                                      ;
                                05             50  D1 000CF 10$:     CMPL    R0, #5                                                   ; 0493
                                               05  13 000D2          BEQL    11$                                                      ;
                                50             01  CE 000D4          MNEGL   #1, R0                                                   ;
                                               03  11 000D7          BRB     12$                                                      ;
                                50             02  D0 000D9 11$:     MOVL    #2, R0                                                   ;
                             02 A6             50  B0 000DC 12$:     MOVW    R0, 2(BUF_PTR)                                           ; 0489
                                50 00000000'   00  9E 000E0          MOVAB   NML$A_NETNODE_RAB, RAB                                   ; 0499
                             22 A0         10   AE  B0 000E7          MOVW    LOCAL_DSC, 34(RAB)                                       ; 0500
                             28 A0         14   AE  D0 000EC          MOVL    LOCAL_DSC+4, 40(RAB)                                     ; 0501
                                01     04   AC  D1 000F1          CMPL    WRITE_TYPE, #1                                           ; 0503
                                           0B  12 000F5          BNEQ    13$                                                      ;
                                           50  DD 000F7          PUSHL   RAB                                                      ; 0504
```

```
                    00000000G  00          01  FB  000F9          CALLS   #1, SYS$PUT                             ;
                                            09  11  00100          BRB     14$                                     ;
                                            50  DD  00102  13$:     PUSHL   RAB                                     ; 0506
                    00000000G  00          01  FB  00104          CALLS   #1, SYS$UPDATE                          ;
                               52          50  D0  0010B  14$:     MOVL    R0, STATUS                              ;
                               10          52  E9  0010E          BLBC    STATUS, 15$                             ; 0508
                                       10  AE  9F  00111          PUSHAB  LOCAL_DSC                               ; 0510
                                       18  A7  9F  00114          PUSHAB  P.AAK                                   ; 0512
                               7E          01  7D  00117          MOVQ    #1, -(SP)                               ; 0510
                    00000000G  00          04  FB  0011A          CALLS   #4, NML$LOGRECORDOP                     ;
                               50          52  D0  00121  15$:     MOVL    STATUS, R0                              ; 0515
                                           04  00124              RET                                             ; 0516

; Routine Size:  293 bytes,    Routine Base:  $CODE$ + 01B3
```

```
;   523          0517  1 %SBTTL 'nml$delete_node_rec     Delete a Record from the Node File'
;   524          0518  1 GLOBAL ROUTINE nml$delete_node_rec (key, key_value_dsc) =
;   525          0519  1
;   526          0520  1 !++
;   527          0521  1 ! FUNCTIONAL DESCRIPTION:
;   528          0522  1 !
;   529          0523  1 !       This routine performs $DELETEs on the node permanent database.  The
;   530          0524  1 !       database is organized with one record per node, four keys per
;   531          0525  1 !       record.  The four keys are:
;   532          0526  1 !                       node type (executor, remote node, loop node)
;   533          0527  1 !                       node address
;   534          0528  1 !                       node name
;   535          0529  1 !                       list node - node type concatenated with node address -
;   536          0530  1 !                               used for LISTing nodes.
;   537          0531  1 !
;   538          0532  1 ! FORMAL PARAMETERS:
;   539          0533  1 !
;   540          0534  1 !       key             Value mapped to the key of reference to use to
;   541          0535  1 !                       identify the node's record.
;   542          0536  1 !       key_value_dsc   Descriptor of key value to use to identify the
;   543          0537  1 !                               node's record.
;   544          0538  1 !
;   545          0539  1 ! ROUTINE VALUE:
;   546          0540  1 ! COMPLETION CODES:
;   547          0541  1 !
;   548          0542  1 !       NMA or RMS error status
;   549          0543  1 !
;   550          0544  1 !--
;   551          0545  1
;   552          0546  2 BEGIN
;   553          0547  2
;   554          0548  2 LOCAL
;   555          0549  2     rab: REF BBLOCK,
;   556          0550  2     status;
;   557          0551  2
;   558          0552  2 !
;   559          0553  2 ! Map the input key parameter to the key of reference number for that
;   560          0554  2 ! parameter.  If the key being used for this operation is different from the
;   561          0555  2 ! one the RAB is set up for, switch keys.
;   562          0556  2 !
;   563          0557  2 rab = nml$a_netnode_rab;
;   564          0558  2 status = rms$_suc;
;   565          0559  2 IF .key_value_dsc NEQ 0 THEN
;   566          0560  2     status = nml_map_keys (nmn$c_delete_rec, .key, .key_value_dsc);
;   567          0561  2 IF .status THEN
;   568          0562  2     status = $DELETE (RAB = .rab);
;   569          0563  2
;   570          0564  2 IF .status THEN
;   571          0565  3     BEGIN
;   572          0566  3     IF .key_value_dsc NEQ 0 THEN
;   573          0567  3         nml$logrecordop (dbg$c_fileio,
;   574          0568  3                          nma$c_opn_node,
;   575          0569  3                          $ASCID ('record deleted'),
;   576          0570  3                          .key_value_dsc)
;   577          0571  3     ELSE
;   578          0572  3         nml$debug_txt (dbg$c_fileio, $ASCID ('record deleted'));
;   579          0573  2     END;
```

```
;  580          0574  2 RETURN .status;
;  581          0575  1 END;                ! Of    nml$delete_node_rec


                                                                        .PSECT  $PLIT$,NOWRT,NOEXE,2

    64  65  74  65  6C  65  64  20  64  72  6F  63  65  72  00074 P.AAN:  .ASCII  \record deleted\                                ;
                                                                00082       .BLKB   2
                                                        0000000E 00084 P.AAM:  .LONG   14                                       ;
                                                        00000000' 00088        .ADDRESS P.AAN                                   ;
    64  65  74  65  6C  65  64  20  64  72  6F  63  65  72  0008C P.AAP:  .ASCII  \record deleted\                                ;
                                                                0009A       .BLKB   2
                                                        0000000E 0009C P.AAO:  .LONG   14                                       ;
                                                        00000000' 000A0        .ADDRESS P.AAP                                   ;

                                                                        .EXTRN  SYS$DELETE

                                                                        .PSECT  $CODE$,NOWRT,2

                                                            003C 00000          .ENTRY  NML$DELETE_NODE_REC, Save R2,R3,R4,R5       ; 0518
                                    55 00000000'    00      9E 00002            MOVAB   NML$A_NETNODE_RAB, RAB                      ; 0557
                                    54 00010001     8F      D0 00009            MOVL    #65537, STATUS                              ; 0558
                                    52          08  AC      D0 00010            MOVL    KEY_VALUE_DSC, R2                           ; 0559
                                                    53      D4 00014            CLRL    R3                                          ;
                                                    52      D5 00016            TSTL    R2                                          ;
                                                    13      13 00018            BEQL    1$                                          ;
                                                    53      D6 0001A            INCL    R3                                          ;
                                                    52      DD 0001C            PUSHL   R2                                          ; 0560
                                                04  AC      DD 0001E            PUSHL   KEY                                         ;
                                                    03      DD 00021            PUSHL   #3                                          ;
                                00000000V   00      03      FB 00023            CALLS   #3, NML_MAP_KEYS                            ;
                                            54      50      D0 0002A            MOVL    R0, STATUS                                  ;
                                            35      54      E9 0002D 1$:        BLBC    STATUS, 3$                                  ; 0561
                                                    55      DD 00030            PUSHL   RAB                                         ; 0562
                                00000000G   00      01      FB 00032            CALLS   #1, SYS$DELETE                              ;
                                            54      50      D0 00039            MOVL    R0, STATUS                                  ;
                                            26      54      E9 0003C            BLBC    STATUS, 3$                                  ; 0564
                                            14      53      E9 0003F            BLBC    R3, 2$                                      ; 0566
                                                    52      DD 00042            PUSHL   R2                                          ; 0570
                                        00000000'   00      9F 00044            PUSHAB  P.AAM                                       ; 0569
                                            7E      01      7D 0004A            MOVQ    #1, -(SP)                                   ; 0567
                                00000000G   00      04      FB 0004D            CALLS   #4, NML$LOGRECORDOP                         ;
                                                    0F      11 00054            BRB     3$                                          ;
                                        00000000'   00      9F 00056 2$:        PUSHAB  P.AAO                                       ; 0572
                                                    01      DD 0005C            PUSHL   #1                                          ;
                                00000000G   00      02      FB 0005E            CALLS   #2, NML$DEBUG_TXT                           ;
                                            50      54      D0 00065 3$:        MOVL    STATUS, R0                                  ; 0574
                                                            04 00068            RET                                                 ; 0575

; Routine Size:  105 bytes,    Routine Base:  $CODE$ + 02D8
```

```
;  583          0576  1 %SBTTL 'nml_map_keys              Switch key used to access node database'
;  584          0577  1 ROUTINE nml_map_keys (function, key_param, key_value_dsc) =
;  585          0578  1
;  586          0579  1 !++
;  587          0580  1 ! FUNCTIONAL DESCRIPTION:
;  588          0581  1 !       This routine is called whenever a record in the node permanent
;  589          0582  1 !       database is accessed.  It sets up the key reference, length, and
;  590          0583  1 !       value so the next RMS operation is done on the correct record.
;  591          0584  1 !
;  592          0585  1 ! FORMAL PARAMETERS:
;  593          0586  1 !       function        nmn$c_put_rec = doing a put.
;  594          0587  1 !                       nmn$c_get_rec = doing a read.
;  595          0588  1 !                       nmn$c_delete_rec = deleteing a record.
;  596          0589  1 !                       nmn$c_update_rec = updating a record.
;  597          0590  1 !       key_param       Value mapped to the key of reference to use to
;  598          0591  1 !                       identify the node's record.
;  599          0592  1 !       key_value_dsc   Descriptor of key value to use to identify the
;  600          0593  1 !                               node's record.
;  601          0594  1 !
;  602          0595  1 ! ROUTINE VALUE:
;  603          0596  1 ! COMPLETION CODES:
;  604          0597  1 !
;  605          0598  1 !       Failure or RMS error
;  606          0599  1 !
;  607          0600  1 !--
;  608          0601  1
;  609          0602  2 BEGIN
;  610          0603  2
;  611          0604  2 MAP
;  612          0605  2     key_value_dsc: REF VECTOR;          ! Descriptor for key value
;  613          0606  2
;  614          0607  2 LOCAL
;  615          0608  2     rab: REF BBLOCK,
;  616          0609  2     fab: REF BBLOCK,
;  617          0610  2     key_ref,
;  618          0611  2     key_addr,
;  619          0612  2     key_len,
;  620          0613  2     name_buf: BBLOCK [nmn$c_nam_key_len],
;  621          0614  2     do_find,
;  622          0615  2     status;
;  623          0616  2
;  624          0617  2 rab = nml$a_netnode_rab;
;  625          0618  2 fab = nml$a_netnode_fab;
;  626          0619  2 IF .fab [fab$w_ifi] EQL 0 THEN           ! If the node file isn't open
;  627          0620  2     status = .fab [fab$l_sts]           !       return open failure status.
;  628          0621  2 ELSE
;  629          0622  3     BEGIN
;  630          0623  3     !
;  631          0624  3     ! Fill in key value.  This identifies the specific node record to get, put,
;  632          0625  3     ! or delete.  Also, set up the buffer size and address.
;  633          0626  3     !
;  634          0627  3     key_len = .key_value_dsc [0];
;  635          0628  3     rab [rab$l_kbf] = nml$t_key_value;
;  636          0629  3     rab [rab$v_kge] = 0;
;  637          0630  3     SELECTONEU .key_param OF
;  638          0631  3         SET
;  639          0632  3         !
```

```
;  640          0633  3          ! If the key is list node or node type, map it to the key values used
;  641          0634  3          ! in the node database file.  The value is passed to this routine as
;  642          0635  3          ! an 'NML$C_' node entity type.  The list key overlaps with the node
;  643          0636  3          ! address key to allow the LIST command to get nodes by type and,
;  644          0637  3          ! within type, sequentially by address.  The list key value contains
;  645          0638  3          ! a zero for the node address; hence when you do a $GET of (type OR 0)
;  646          0639  3          ! with a match type of GTR, it will get the first node of that type
;  647          0640  3          ! in the file.  Subsequent sequential reads will return the nodes of
;  648          0641  3          ! that type in ascending order by address.
;  649          0642  3          !
;  650          0643  3          [nmn$c_typ_key_ref,nmn$c_lis_key_ref]:
;  651          0644  4              BEGIN
;  652          0645  5              key_addr = (SELECTONEU .(.key_value_dsc [1]) OF
;  653          0646  5                  SET
;  654          0647  5                  [nml$c_nodebyname,
;  655          0648  5                   nml$c_node]:           UPLIT WORD (0, nmn$c_typ_remote);
;  656          0649  5                  [nml$c_executor]:      UPLIT WORD (0, nmn$c_typ_exec);
;  657          0650  5                  [nml$c_loopnode]:      UPLIT WORD (0, nmn$c_typ_loopnode);
;  658          0651  4                  TES);
;  659          0652  4              IF .key_param EQL nmn$c_typ_key_ref THEN
;  660          0653  4                  key_addr = .key_addr + 2
;  661          0654  4              ELSE
;  662          0655  4                  rab [rab$v_kge] = 1;
;  663          0656  4              key_ref = .key_param;
;  664          0657  3              END;
;  665          0658  3          [nma$c_pcno_add]:
;  666          0659  4              BEGIN
;  667          0660  4              key_ref = nmn$c_add_key_ref;
;  668          0661  4              key_addr = .key_value_dsc [1];
;  669          0662  3              END;
;  670          0663  3          [nma$c_pcno_nna]:
;  671          0664  4              BEGIN
;  672          0665  4              key_ref = nmn$c_nam_key_ref;
;  673          0666  4              key_addr = name_buf;
;  674          0667  4              key_len = nmn$c_nam_key_len;
;  675          0668  4              CH$COPY (.key_value_dsc [0], .key_value_dsc [1], %C' ',
;  676          0669  4                  nmn$c_nam_key_len, name_buf);
;  677          0670  3              END;
;  678          0671  3          TES;
;  679          0672  3
;  680          0673  3          ! If doing an update or delete operation, check to see if the
;  681          0674  3          ! key from the last operation is different (DEF EXEC NAME requires
;  682          0675  3          ! that the name be checked, so an intermediate read is done between
;  683          0676  3          ! the $GET of the executor node entry, and the $UPDATE).  If the key
;  684          0677  3          ! is different, do a $FIND so that RMS has the correct current record
;  685          0678  3          ! for the update or delete.
;  686          0679  3          !
;  687          0680  3          IF .function EQL nmn$c_update_rec OR
;  688          0681  3             .function EQL nmn$c_delete_rec THEN
;  689          0682  4              BEGIN
;  690          0683  4              IF .key_ref NEQ .rab [rab$b_krf] OR
;  691          0684  4                 CH$NEQ (.key_len, .key_addr,
;  692          0685  4                         .rab [rab$b_ksz], .rab [rab$l_kbf], %C' ') THEN
;  693          0686  4                  do_find = true
;  694          0687  4              ELSE
;  695          0688  4                  do_find = false;
;  696          0689  3              END;
```

```
;  697          0690  3     !
;  698          0691  3     ! Put the new key reference, key size, and key value into the RAB.  These
;  699          0692  3     ! are the fields that identify the node record to RMS.
;  700          0693  3     !
;  701          0694  3     rab [rab$b_krf] = .key_ref;
;  702          0695  3     rab [rab$b_ksz] = .key_len;
;  703          0696  3     rab [rab$l_kbf] = nml$t_key_value;
;  704          0697  3     CH$MOVE (.key_len, .key_addr, nml$t_key_value);
;  705          0698  3     status = rms$_suc;
;  706          0699  3     IF .do_find THEN
;  707          0700  3         status = $FIND (RAB = .rab);
;  708          0701  2     END;
;  709          0702  2 RETURN .status;
;  710          0703  1 END;                ! of   nml_map_keys


                                                        .PSECT  $PLIT$,NOWRT,NOEXE,2

                                        0001  0000  000A4 P.AAQ:  .WORD   0, 1                                              ;
                                        0000  0000  000A8 P.AAR:  .WORD   0, 0                                              ;
                                        0002  0000  000AC P.AAS:  .WORD   0, 2                                              ;

                                                        .EXTRN  SYS$FIND

                                                        .PSECT  $CODE$,NOWRT,2

                                            0FFC 00000 NML_MAP_KEYS:
                                                        .WORD   Save R2,R3,R4,R5,R6,R7,R8,R9,R10,R11                    ; 0577
                                    5E              08  C2 00002        SUBL2   #8, SP                                  ;
                                    56 00000000'    00  9E 00005        MOVAB   NML$A_NETNODE_RAB, RAB                  ; 0617
                                    50 00000000'    00  9E 0000C        MOVAB   NML$A_NETNODE_FAB, FAB                  ; 0618
                                               02   A0  B5 00013        TSTW    2(FAB)                                  ; 0619
                                                    07  12 00016        BNEQ    1$                                      ;
                                    5B         08   A0  D0 00018        MOVL    8(FAB), STATUS                          ; 0620
                                                00EA 31  0001C        BRW     16$                                     ;
                                    50         0C   AC  D0 0001F 1$:     MOVL    KEY_VALUE_DSC, R0                       ; 0627
                                    5A              60  D0 00023        MOVL    (R0), KEY_LEN                           ;
                                30  A6 00000000'    00  9E 00026        MOVAB   NML$T_KEY_VALUE, 48(RAB)                ; 0628
                                06  A6              20  8A 0002E        BICB2   #32, 6(RAB)                             ; 0629
                                    52         08   AC  D0 00032        MOVL    KEY_PARAM, R2                           ; 0630
                                    01              52  D1 00036        CMPL    R2, #1                                  ; 0643
                                                    05  13 00039        BEQL    2$                                      ;
                                    03              52  D1 0003B        CMPL    R2, #3                                  ;
                                                    49  12 0003E        BNEQ    9$                                      ;
                                    51         04   B0  D0 00040 2$:     MOVL    @4(R0), R1                              ; 0645
                                    03              51  D1 00044        CMPL    R1, #3                                  ; 0647
                                                    0E  1F 00047        BLSSU   3$                                      ;
                                    04              51  D1 00049        CMPL    R1, #4                                  ;
                                                    09  1A 0004C        BGTRU   3$                                      ;
                                    57 00000000'    00  9E 0004E        MOVAB   P.AAQ, KEY_ADDR                         ; 0648
                                                    1F  11 00055        BRB     6$                                      ;
                                    07              51  D1 00057 3$:     CMPL    R1, #7                                  ; 0649
                                                    09  12 0005A        BNEQ    4$                                      ;
                                    57 00000000'    00  9E 0005C        MOVAB   P.AAR, KEY_ADDR                         ;
                                                    11  11 00063        BRB     6$                                      ;
                                    05              51  D1 00065 4$:     CMPL    R1, #5                                  ; 0650
```

```
                                                05  13 00068          BEQL    5$                                          ;
                                        57      01  CE 0006A          MNEGL   #1, KEY_ADDR                               ;
                                                07  11 0006D          BRB     6$                                          ;
                                        57 00000000'    00  9E 0006F 5$:      MOVAB   P.AAS, KEY_ADDR                     ;
                                        01              52  D1 00076 6$:      CMPL    R2, #1                              ; 0652
                                                        05  12 00079          BNEQ    7$                                  ;
                                        57              02  C0 0007B          ADDL2   #2, KEY_ADDR                        ; 0653
                                                        04  11 0007E          BRB     8$                                  ;
                                    06  A6              20  88 00080 7$:      BISB2   #32, 6(RAB)                         ; 0655
                                        58              52  D0 00084 8$:      MOVL    R2, KEY_REF                         ; 0656
                                                        2A  11 00087          BRB     11$                                 ; 0630
                                000001F6    8F          52  D1 00089 9$:      CMPL    R2, #502                            ; 0658
                                                        08  12 00090          BNEQ    10$                                 ;
                                                        58  D4 00092          CLRL    KEY_REF                             ; 0660
                                        57      04      A0  D0 00094          MOVL    4(R0), KEY_ADDR                     ; 0661
                                                        19  11 00098          BRB     11$                                 ; 0630
                                000001F4    8F          52  D1 0009A 10$:     CMPL    R2, #500                            ; 0663
                                                        10  12 000A1          BNEQ    11$                                 ;
                                        58              02  D0 000A3          MOVL    #2, KEY_REF                         ; 0665
                                        57              6E  9E 000A6          MOVAB   NAME_BUF, KEY_ADDR                  ; 0666
                                        5A              06  D0 000A9          MOVL    #6, KEY_LEN                         ; 0667
    06          20      04      B0                      60  2C 000AC          MOVC5   (R0), @4(R0), #32, #6, NAME_BUF     ; 0668
                                                        6E      000B2                                                       ;
                                        02      04      AC  D1 000B3 11$:     CMPL    FUNCTION, #2                        ; 0680
                                                        06  13 000B7          BEQL    12$                                 ;
                                        03      04      AC  D1 000B9          CMPL    FUNCTION, #3                        ; 0681
                                                        1C  12 000BD          BNEQ    15$                                 ;
    58      35  A6              08                      00  ED 000BF 12$:     CMPZV   #0, #8, 53(RAB), KEY_REF            ; 0683
                                                        0D  12 000C5          BNEQ    13$                                 ;
                                        50      34      A6  9A 000C7          MOVZBL  52(RAB), R0                         ; 0685
    50          20                  67                  5A  2D 000CB          CMPC5   KEY_LEN, (KEY_ADDR), #32, R0, @48(RAB) ; 0684
                                                30      B6      000D0                                                       ;
                                                        05  13 000D2          BEQL    14$                                 ;
                                        59              01  D0 000D4 13$:     MOVL    #1, DO_FIND                         ; 0686
                                                        02  11 000D7          BRB     15$                                 ;
                                                        59  D4 000D9 14$:     CLRL    DO_FIND                             ; 0688
                                    35  A6              58  90 000DB 15$:     MOVB    KEY_REF, 53(RAB)                    ; 0694
                                    34  A6              5A  90 000DF          MOVB    KEY_LEN, 52(RAB)                    ; 0695
                                    30  A6  00000000'    00  9E 000E3          MOVAB   NML$T_KEY_VALUE, 48(RAB)            ; 0696
        00000000'   00              67                  5A  28 000EB          MOVC3   KEY_LEN, (KEY_ADDR), NML$T_KEY_VALUE ; 0697
                                        5B  00010001    8F  D0 000F3          MOVL    #65537, STATUS                      ; 0698
                                        0C              59  E9 000FA          BLBC    DO_FIND, 16$                        ; 0699
                                                        56  DD 000FD          PUSHL   RAB                                 ; 0700
                            00000000G   00              01  FB 000FF          CALLS   #1, SYS$FIND                        ;
                                        5B              50  D0 00106          MOVL    R0, STATUS                          ;
                                        50              5B  D0 00109 16$:     MOVL    STATUS, R0                          ; 0702
                                                            04 0010C          RET                                         ; 0703

; Routine Size:  269 bytes,    Routine Base:  $CODE$ + 0341
```

```
;  712          0704  1 %SBTTL 'nml$read_loopnode       Get a loopnode in the Node File'
;  713          0705  1 GLOBAL ROUTINE nml$read_loopnode (the_circuit_dsc,
;  714          0706  1                                  buffer_dsc, data_dsc) =
;  715          0707  1
;  716          0708  1 !++
;  717          0709  1 ! FUNCTIONAL DESCRIPTION:
;  718          0710  1 !
;  719          0711  1 !       This routine searches through the node permanent database for
;  720          0712  1 !       a loopnode on the specified circuit.  Loopnodes must be set up
;  721          0713  1 !       with unique circuit ids.
;  722          0714  1 !       This routine is called for such functions as:
;  723          0715  1 !               LIST CIRCUIT    - in case the circuit is set up as a loopnode,
;  724          0716  1 !                                 to get the loopnode name.
;  725          0717  1 !               DEFINE NODE node-id CIRCUIT circuit-id   - to make sure there
;  726          0718  1 !                                 isn't already a loopnode on that circuit.
;  727          0719  1 !
;  728          0720  1 ! FORMAL PARAMETERS:
;  729          0721  1 !
;  730          0722  1 !       the_circuit_dsc Address of descriptor of circuit ID to look for.
;  731          0723  1 !       buffer_dsc      Address of a descriptor of a buffer to use for
;  732          0724  1 !                       returning the loopnode data.
;  733          0725  1 !       data_dsc        Address of a descriptor to return descriptor of data
;  734          0726  1 !                       read.
;  735          0727  1 !
;  736          0728  1 ! ROUTINE VALUE:
;  737          0729  1 ! COMPLETION CODES:
;  738          0730  1 !
;  739          0731  1 !       NMA or RMS error status
;  740          0732  1 !
;  741          0733  1 !--
;  742          0734  1
;  743          0735  2 BEGIN
;  744          0736  2
;  745          0737  2 MAP
;  746          0738  2     the_circuit_dsc: REF VECTOR;
;  747          0739  2
;  748          0740  2 LOCAL
;  749          0741  2     a_circuit_dsc: VECTOR [2],
;  750          0742  2     rewind_flag,
;  751          0743  2     status;
;  752          0744  2
;  753          0745  2 !
;  754          0746  2 ! Read through the known loopnodes in the node permanent database, looking
;  755          0747  2 ! for a loopnode on the circuit specified by the input parameter.
;  756          0748  2 !
;  757          0749  2 rewind_flag = true;
;  758          0750  2 WHILE status = nml$read_known_node_rec (nml$c_loopnode,
;  759          0751  2                                         .buffer_dsc,
;  760          0752  2                                         .data_dsc,
;  761          0753  2                                         .rewind_flag) DO
;  762          0754  2
;  763          0755  3     BEGIN
;  764          0756  3     rewind_flag = false;
;  765          0757  3     a_circuit_dsc [0] = 0;
;  766          0758  3     a_circuit_dsc [1] = 0;
;  767          0759  3     !
;  768          0760  3     ! Find the circuit ID for this loopnode, and, if it matches the
```

```
;  769          0761  3     ! circuit I'm looking for, return the loopnode data to the caller.
;  770          0762  3     !
;  771          0763  3     IF nma$searchfld (.data_dsc,
;  772          0764  3                       nma$c_pcno_nli,
;  773          0765  3                       a_circuit_dsc [0],
;  774          0766  3                       a_circuit_dsc [1]) AND
;  775          0767  3         CH$EQL (.the_circuit_dsc [0], .the_circuit_dsc [1],
;  776          0768  3                 .a_circuit_dsc [0], .a_circuit_dsc [1]) THEN
;  777          0769  3         EXITLOOP;
;  778          0770  2     END;
;  779          0771  2 RETURN .status;
;  780          0772  1 END;                ! of nml$read_loopnode


                                                003C 00000         .ENTRY  NML$READ_LOOPNODE, Save R2,R3,R4,R5                 ; 0705
                                    5E          08  C2 00002         SUBL2   #8, SP                                              ;
                                    54          01  D0 00005         MOVL    #1, REWIND_FLAG                                     ; 0749
                                                54  DD 00008 1$:      PUSHL   REWIND_FLAG                                         ; 0753
                                    7E      08      AC  7D 0000A     MOVQ    BUFFER_DSC, -(SP)                                   ; 0751
                                                05  DD 0000E         PUSHL   #5                                                  ; 0750
                                00000000V   00          04  FB 00010     CALLS   #4, NML$READ_KNOWN_NODE_REC                     ;
                                    55              50  D0 00017         MOVL    R0, STATUS                                      ;
                                    2A              55  E9 0001A         BLBC    STATUS, 2$                                      ;
                                                    54  D4 0001D         CLRL    REWIND_FLAG                                     ; 0756
                                                    6E  7C 0001F         CLRQ    A_CIRCUIT_DSC                                   ; 0757
                                                04  AE  9F 00021         PUSHAB  A_CIRCUIT_DSC+4                                 ; 0766
                                                04  AE  9F 00024         PUSHAB  A_CIRCUIT_DSC                                   ; 0765
                                    7E      01F5    8F  3C 00027         MOVZWL  #501, -(SP)                                     ; 0763
                                              0C    AC  DD 0002C         PUSHL   DATA_DSC                                        ;
                                00000000G   00          04  FB 0002F     CALLS   #4, NMA$SEARCHFLD                               ;
                                    CF              50  E9 00036         BLBC    R0, 1$                                          ;
                                    50          04  AC  D0 00039         MOVL    THE_CIRCUIT_DSC, R0                             ; 0767
        6E              00      04  B0              60  2D 0003D         CMPC5   (R0), @4(R0), #0, A_CIRCUIT_DSC, -              ;
                                                04  BE      00043                 @A_CIRCUIT_DSC+4                                ;
                                                    C1  12 00045         BNEQ    1$                                              ;
                                    50              55  D0 00047 2$:      MOVL    STATUS, R0                                      ; 0771
                                                        04 0004A         RET                                                     ; 0772

; Routine Size:  75 bytes,    Routine Base:  $CODE$ + 044E
```

```
;  782          0773  1 %SBTTL 'nml$read_known_node_rec   Get a known Record in the Node File'
;  783          0774  1 GLOBAL ROUTINE nml$read_known_node_rec (node_type,
;  784          0775  1                                       buffer_dsc,
;  785          0776  1                                       data_dsc,
;  786          0777  1                                       rewind_flag) =
;  787          0778  1
;  788          0779  1 !++
;  789          0780  1 ! FUNCTIONAL DESCRIPTION:
;  790          0781  1 !
;  791          0782  1 !       This routine performs sequential $GETs to the node permanent
;  792          0783  1 !       database.  The  database is organized with one record per node,
;  793          0784  1 !       The four keys are:
;  794          0785  1 !                       node type (executor, remote node, loop node)
;  795          0786  1 !                       node address
;  796          0787  1 !                       node name
;  797          0788  1 !                       list node - node type concatenated with node address -
;  798          0789  1 !                               used for LISTing nodes.
;  799          0790  1 !       If the node key and value are different from the last time
;  800          0791  1 !       this routine was called, do the $GET with a record access mode
;  801          0792  1 !       of keyed.  If they are the same, do the $GET with a record access
;  802          0793  1 !       mode of sequential.  The latter will cause RMS to return the
;  803          0794  1 !       next record in the file greater which matches the key and is
;  804          0795  1 !       greater than the key value.  This is useful for KNOWN NODES and
;  805          0796  1 !       KNOWN LOOPNODES operations.
;  806          0797  1 !
;  807          0798  1 ! FORMAL PARAMETERS:
;  808          0799  1 !
;  809          0800  1 !       node_type       Node entity type
;  810          0801  1 !       buffer_dsc      Address of a descriptor of a buffer to use
;  811          0802  1 !       data_dsc        Address of a descriptor to return descriptor of data
;  812          0803  1 !                               read.
;  813          0804  1 !       rewind_flag     Set if the caller wants to begin reading at the
;  814          0805  1 !                       beginning of the node file.
;  815          0806  1 !
;  816          0807  1 ! ROUTINE VALUE:
;  817          0808  1 ! COMPLETION CODES:
;  818          0809  1 !
;  819          0810  1 !       NMA or RMS error status
;  820          0811  1 !
;  821          0812  1 !--
;  822          0813  1
;  823          0814  2 BEGIN
;  824          0815  2
;  825          0816  2 MAP
;  826          0817  2     buffer_dsc: REF VECTOR,             ! Buffer to use for record
;  827          0818  2     data_dsc: REF VECTOR;               ! Return data descriptor
;  828          0819  2
;  829          0820  2 LOCAL
;  830          0821  2     rab: REF BBLOCK,
;  831          0822  2     key_value_dsc:      VECTOR [2],     ! Descriptor for key value
;  832          0823  2     rec_node_type,
;  833          0824  2     status;
;  834          0825  2
;  835          0826  2 OWN
;  836          0827  2     last_RFA0,                          ! Record file address of last record
;  837          0828  2     last_RFA4 : WORD;                   !       read by this routine.
;  838          0829  2
```

```
;  839          0830  2 rab = nml$a_netnode_rab;
;  840          0831  2 key_value_dsc [0] = nmn$c_lis_key_len;
;  841          0832  2 key_value_dsc [1] = node_type;
;  842          0833  2 status = nml$_sts_suc;
;  843          0834  2 !
;  844          0835  2 ! Known nodes are found using the Type and Address keys with a search type
;  845          0836  2 ! of "greater than or equal to".  If the last operation was to a node in the
;  846          0837  2 ! middle of the type being LISTed, RMS's "next record" will cause it to start
;  847          0838  2 ! reading node records from there.  So, do a $REWIND so RMS starts at the
;  848          0839  2 ! beginning of the file.
;  849          0840  2 !
;  850          0841  2 IF .rewind_flag THEN
;  851          0842  3     BEGIN
;  852          0843  3     last_RFA0 = 0;
;  853          0844  3     last_RFA4 = 0;
;  854          0845  3     status = $REWIND (RAB = .rab);
;  855          0846  2     END;
;  856          0847  2 IF .status THEN
;  857          0848  3     BEGIN
;  858          0849  3     !
;  859          0850  3     ! If this is the second (or later) time this routine is being called to
;  860          0851  3     ! find a node record, set up the RAB to do the next read sequentially.
;  861          0852  3     !
;  862          0853  3     IF NOT .rewind_flag THEN
;  863          0854  4         BEGIN
;  864          0855  4         !
;  865          0856  4         ! Some operations, such as LIST KNOWN NODES CHARACTERISTICS, must
;  866          0857  4         ! read random node records between the sequential operations done
;  867          0858  4         ! by this routine.  For example, when listing a node which has the HOST
;  868          0859  4         ! parameter set, the HOST node's record must be read in to determine
;  869          0860  4         ! the host node's name to include in the LIST response.  If the Record
;  870          0861  4         ! File Address in the RAB has moved, do a $GET to get back to where
;  871          0862  4         ! we were.
;  872          0863  4         !
;  873          0864  4         ! PURGE KNOWN NODES ALL deletes a record between each call to this
;  874          0865  4         ! routine.  In this case the RFA is zeroed, so check for that too
;  875          0866  4         ! before doing the $GET.
;  876          0867  4         !
;  877          0868  5         IF (.last_RFA0 NEQ .rab [rab$l_rfa0] OR
;  878          0869  5            .last_RFA4 NEQ .rab [rab$w_rfa4])
;  879          0870  4                       AND
;  880          0871  5            (.rab [rab$l_rfa0] NEQ 0 OR
;  881          0872  5             .rab [rab$w_rfa4] NEQ 0)
;  882          0873  4         THEN
;  883          0874  5             BEGIN
;  884          0875  5             rab [rab$b_rac] = rab$c_rfa;
;  885          0876  5             rab [rab$l_rfa0] = .last_RFA0;
;  886          0877  5             rab [rab$w_rfa4] = .last_RFA4;
;  887          0878  5             rab [rab$w_usz] = .buffer_dsc [0];
;  888          0879  5             rab [rab$l_ubf] = .buffer_dsc [1];
;  889          0880  5             status = $GET (RAB = .rab);
;  890          0881  4             END;
;  891          0882  4         rab [rab$b_rac] = rab$c_seq;
;  892          0883  3         END;
;  893          0884  3     !
;  894          0885  3     ! Get the record from the node file.
;  895          0886  3     !
```

```
;  896          0887  3     IF .status THEN
;  897          0888  3         status = nml$read_node_rec (nmn$c_lis_key_ref,
;  898          0889  3                                     key_value_dsc,
;  899          0890  3                                     rec_node_type,
;  900          0891  3                                     .buffer_dsc, .data_dsc);
;  901          0892  3     !
;  902          0893  3     ! Restore record access mode to keyed in case this is the last time this
;  903          0894  3     ! routine is called for a known record.
;  904          0895  3     !
;  905          0896  3     rab [rab$b_rac] = rab$c_key;
;  906          0897  3     last_RFA0 = .rab [rab$l_rfa0];
;  907          0898  3     last_RFA4 = .rab [rab$w_rfa4];
;  908          0899  3     IF .node_type NEQ .rec_node_type OR
;  909          0900  3        .status EQL rms$_eof OR
;  910          0901  3        .status EQL rms$_rnf THEN
;  911          0902  3         RETURN rms$_eof;
;  912          0903  3     END;
;  913          0904  2 RETURN nml$chkfileio (nma$c_sts_fio,
;  914          0905  2                       .status);
;  915          0906  1 END;                ! Of    nml$read_known_node_rec


                                                        .PSECT  $OWN$,NOEXE,2

                                                0022E           .BLKB   2
                                                00230 LAST_RFA0:
                                                        .BLKB   4
                                                00234 LAST_RFA4:
                                                        .BLKB   2

                                                        .EXTRN  SYS$REWIND

                                                        .PSECT  $CODE$,NOWRT,2

                                                000C 00000      .ENTRY  NML$READ_KNOWN_NODE_REC, Save R2,R3             ; 0774
                    53 00000000'    00  9E 00002        MOVAB   LAST_RFA4, R3                                   ;
                    5E              0C  C2 00009        SUBL2   #12, SP                                         ;
                    52          FE1C    C3 0000C        MOVAB   NML$A_NETNODE_RAB, RAB                          ; 0830
                04  AE                 04  D0 00011        MOVL    #4, KEY_VALUE_DSC                           ; 0831
                08  AE                 04  AC 00015        MOVAB   NODE_TYPE, KEY_VALUE_DSC+4                  ; 0832
                    50                  01  D0 0001A        MOVL    #1, STATUS                                  ; 0833
                    0E              10  AC E9 0001D        BLBC    REWIND_FLAG, 1$                             ; 0841
                                    FC  A3 D4 00021        CLRL    LAST_RFA0                                   ; 0843
                                        63 B4 00024        CLRW    LAST_RFA4                                   ; 0844
                                        52 DD 00026        PUSHL   RAB                                         ; 0845
00000000G       00                      01 FB 00028        CALLS   #1, SYS$REWIND                              ;
                    03                  50 E8 0002F 1$:    BLBS    STATUS, 2$                                  ; 0847
                                    0084    31 00032        BRW     9$                                          ;
                    3F              10  AC E8 00035 2$:    BLBS    REWIND_FLAG, 6$                             ; 0853
                    51              FC  A3 D0 00039        MOVL    LAST_RFA0, R1                               ; 0868
                10  A2                  51 D1 0003D        CMPL    R1, T6(RAB)                                 ;
                                        06 12 00041        BNEQ    3$                                          ;
                14  A2                  63 B1 00043        CMPW    LAST_RFA4, 20(RAB)                          ; 0869
                                        2C 13 00047        BEGL    5$                                          ;
                                    10  A2 D5 00049 3$:    TSTL    16(RAB)                                     ; 0871
                                        05 12 0004C        BNEQ    4$                                          ;
```

```
                                    14   A2  B5 0004E          TSTW    20(RAB)                                 ; 0872
                                         22  13 00051          BEQL    5$                                      ;
                                         02  90 00053  4$:     MOVB    #2, 30(RAB)                             ; 0875
                                    1E   A2  51 00057          MOVL    R1, 16(RAB)                             ; 0876
                                    10   A2  63 0005B          MOVW    LAST_RFA4, 20(RAB)                      ; 0877
                                    14   A2  DO 0005F          MOVL    BUFFER_DSC, R1                          ; 0878
                                         51  61 00063          MOVW    (R1), 32(RAB)                           ;
                                    08   AC  04 A1 00067       MOVL    4(R1), 36(RAB)                          ; 0879
                                    20   A2  52 DD 0006C       PUSHL   RAB                                     ; 0880
                                         01  FB 0006E          CALLS   #1, SYS$GET                             ;
                                    24   A2  94 00075  5$:     CLRB    30(RAB)                                 ; 0882
                                         50  E9 00078  6$:     BLBC    STATUS, 7$                              ; 0887
                                    00000000G  00  7D 0007B    MOVQ    BUFFER_DSC, -(SP)                       ; 0891
                                    11   08  AC  9F 0007F      PUSHAB  REC_NODE_TYPE                           ; 0888
                                    7E   08  AE  9F 00082      PUSHAB  KEY_VALUE_DSC                           ;
                                         10  AE  03 DD 00085   PUSHL   #3                                      ;
                                         03  FB 00087          CALLS   #5, NML$READ_NODE_REC                   ;
                                    FBE9 CF  01  90 0008C  7$:     MOVB    #1, 30(RAB)                         ; 0896
                                    1E   A2  10  A2 DO 00090      MOVL    16(RAB), LAST_RFA0                  ; 0897
                                    FC   A3  14  A2 BO 00095      MOVW    20(RAB), LAST_RFA4                  ; 0898
                                         63  04  AC D1 00099      CMPL    NODE_TYPE, REC_NODE_TYPE            ; 0899
                                         6E      12 12 0009D      BNEQ    8$                                  ;
                                    0001827A  8F     50 D1 0009F      CMPL    STATUS, #98938                  ; 0900
                                                     09 13 000A6      BEQL    8$                              ;
                                    000182B2  8F     50 D1 000A8      CMPL    STATUS, #98994                  ; 0901
                                                     08 12 000AF      BNEQ    9$                              ;
                                         50  0001827A  8F  DO 000B1  8$:     MOVL    #98938, R0              ; 0902
                                                     04 000B8         RET                                     ;
                                                     50 DD 000B9  9$:     PUSHL   STATUS                      ; 0905
                                         7E          12 CE 000BB      MNEGL   #18, -(SP)                      ; 0904
                                    00000000G  00    02 FB 000BE      CALLS   #2, NML$CHKFILEIO               ;
                                                     04 000C5         RET                                     ; 0906

; Routine Size:  198 bytes,    Routine Base:  $CODE$ + 0499
```

```
;  917          0907  1 %SBTTL 'nml$create_node_db                Create node permanent database file'
;  918          0908  1 GLOBAL ROUTINE nml$create_node_db (file_name_dsc, fab) =
;  919          0909  1
;  920          0910  1 !++
;  921          0911  1 ! FUNCTIONAL DESCRIPTION:
;  922          0912  1 !       This routine is called to create a new node database file under two
;  923          0913  1 !       conditions:
;  924          0914  1 !             - None already exists.
;  925          0915  1 !             - If the node permanent database has only 1 key - it's the
;  926          0916  1 !               old node database format, and must be converted to four
;  927          0917  1 !               keys (this conversion is for performance reasons).  Create
;  928          0918  1 !               the file here, convert it later.
;  929          0919  1 !
;  930          0920  1 ! FORMAL PARAMETERS:
;  931          0921  1 !       FILE_NAME_DSC   Descriptor of name of file.  Used because, when
;  932          0922  1 !                       converting from the old database format to the new,
;  933          0923  1 !                       the new file is given a temporary file name until
;  934          0924  1 !                       complete.
;  935          0925  1 !       FAB             Address at which to return address of FAB.
;  936          0926  1 !
;  937          0927  1 ! ROUTINE VALUE:
;  938          0928  1 ! COMPLETION CODES:
;  939          0929  1 !
;  940          0930  1 !       Failure or RMS error
;  941          0931  1 !
;  942          0932  1 !--
;  943          0933  1
;  944          0934  2 BEGIN
;  945          0935  2
;  946          0936  2 MAP
;  947          0937  2     file_name_dsc: REF VECTOR;
;  948          0938  2
;  949          0939  2 LOCAL
;  950          0940  2     status;
;  951          0941  2
;  952          0942  2 .fab = nml$a_netnode_fab;
;  953        P 0943  2 $FAB_INIT (       FAB = nml$a_netnode_fab,
;  954        P 0944  2                   ALQ = 60,                           ! Initial file block size.
;  955        P 0945  2                   BKS = 3,                            ! Bucket size
;  956        P 0946  2                   FAC = (UPD, PUT, GET, DEL),         ! File access options
;  957        P 0947  2                   DNM = 'SYS$SYSTEM:.DAT',            ! Default filename string
;  958        P 0948  2                   FNA = .file_name_dsc [1],           ! File name
;  959        P 0949  2                   FNS = .file_name_dsc [0],           ! File name size
;  960        P 0950  2                   FOP = (CBT,MXV),                    ! File Options (contiguous best
;  961        P 0951  2                                                       !       try, max versions)
;  962        P 0952  2                   ORG = IDX,                          ! Organization = indexed
;  963        P 0953  2                   RFM = VAR,                          ! Record format = variable
;  964        P 0954  2                   SHR = (UPD, PUT, GET, DEL),         ! File sharing options
;  965          0955  2                   XAB = nml$a_node_address_xab);      ! XAB Chain
;  966          0956  2 !
;  967          0957  2 ! Set up the XABs to describe the four keys which will be used
;  968          0958  2 ! to get information from the file.
;  969          0959  2 !
;  970          0960  2 !
;  971          0961  2 ! First, initialize primary key XAB with key = node address.  Allow duplicates
;  972          0962  2 ! for this key because any loopnode can have an address of zero.
;  973          0963  2 !
```

```
;  974        P 0964  2 $XABKEY_INIT (XAB = nml$a_node_address_xab,     ! XAB address
;  975        P 0965  2                 DTP = BN2,                     ! Key data type = 2 byte binary
;  976        P 0966  2                 FLG = (DUP, DAT_NCMPR, IDX_NCMPR,
;  977        P 0967  2                        KEY_NCMPR),             ! Key flags
;  978        P 0968  2                 KREF = nmn$c_add_key_ref,      ! Key reference number
;  979        P 0969  2                 POS = 0,                       ! Key position in record
;  980        P 0970  2                 SIZ = nmn$c_add_key_len,       ! Key size in record
;  981           0971  2                 NXT = nml$a_node_type_xab);    ! XAB chain pointer
;  982           0972  2 !
;  983           0973  2 ! Next, initialize key XAB with key = node type (executor, remote, loop).
;  984           0974  2 !
;  985        P 0975  2 $XABKEY_INIT (XAB = nml$a_node_type_xab,        ! XAB address
;  986        P 0976  2                 DTP = BN2,                     ! Key data type = 2 byte binary
;  987        P 0977  2                 FLG = (CHG, DUP, IDX_NCMPR),   ! Key flags
;  988        P 0978  2                 KREF = nmn$c_typ_key_ref,      ! Key reference number
;  989        P 0979  2                 POS = 2,                       ! Key position in record
;  990        P 0980  2                 SIZ = nmn$c_typ_key_len,       ! Key size in record
;  991           0981  2                 NXT = nml$a_node_name_xab);    ! XAB chain
;  992           0982  2
;  993           0983  2 !
;  994           0984  2 ! Initialize key XAB with key = node name
;  995           0985  2 !
;  996        P 0986  2 $XABKEY_INIT (XAB = nml$a_node_name_xab,        ! XAB address
;  997        P 0987  2                 DTP = STG,                     ! Key data type = string
;  998        P 0988  2                 FLG = (CHG, NUL, IDX_NCMPR),   ! Key flags
;  999        P 0989  2                 KREF = nmn$c_nam_key_ref,      ! Key reference number
; 1000        P 0990  2                 POS = 4,                       ! Key position in record
; 1001        P 0991  2                 SIZ = nmn$c_nam_key_len,       ! Key size in record
; 1002        P 0992  2                 NUL = %C' ',                   ! Null key = blank
; 1003           0993  2                 NXT = nml$a_node_list_xab);    ! XAB chain
; 1004           0994  2
; 1005           0995  2 !
; 1006           0996  2 ! Initialize key XAB with key = list node.
; 1007           0997  2 ! This key concatenates the the node address key with the node type key to
; 1008           0998  2 ! allow the LIST command to get nodes by type and, within type, sequentially
; 1009           0999  2 ! by address.  The list key value must be set up with a zero for the node
; 1010           1000  2 ! address; hence when you do a $GET of (type OR 0) with a match type of GTR,
; 1011           1001  2 ! it will get the first node of that type in the file.  Subsequent sequential
; 1012           1002  2 ! reads will return the nodes of that type in ascending order by address.
; 1013           1003  2 !
; 1014        P 1004  2 $XABKEY_INIT (XAB = nml$a_node_list_xab,        ! XAB address
; 1015        P 1005  2                 DTP = BN4,                     ! Key data type = 4 byte binary
; 1016        P 1006  2                 FLG = (CHG, DUP, IDX_NCMPR),   ! Key flags
; 1017        P 1007  2                 KREF = nmn$c_lis_key_ref,      ! Key reference number
; 1018        P 1008  2                 POS = 0,                       ! Key position in record
; 1019        P 1009  2                 SIZ = nmn$c_lis_key_len,       ! Key size in record
; 1020           1010  2                 NXT = nml$a_protection_xab);   ! XAB chain
; 1021           1011  2
; 1022        P 1012  2 $XABPRO_INIT (XAB = nml$a_protection_xab,       ! XAB address
; 1023        P 1013  2                 UIC = (1, 4),                  ! UIC of owner
; 1024           1014  2                 PRO = (RWED, RWED, , ));       ! Protection (group and world
; 1025           1015  2                                                !       no access)
; 1026           1016  2
; 1027           1017  2
; 1028           1018  2 status = $CREATE (FAB = nml$a_netnode_fab);
; 1029           1019  2
; 1030           1020  2 IF .status THEN
```

```
;  1031          1021  2     nml$logfileop (dbg$c_fileio,
;  1032          1022  2                   nma$c_opn_node,
;  1033          1023  2                   $ASCID ('file created'));
;  1034          1024  2 RETURN .status;
;  1035          1025  2
;  1036          1026  1 END;              ! of            nml$create_node_db


                                                                .PSECT  $PLIT$,NOWRT,NOEXE,2

54  41  44  2E  3A  4D  45  54  53  59  53  24  53  59  53  000B0 P.AAT:  .ASCII  \SYS$SYSTEM:.DAT\                          ;
            64  65  74  61  65  72  63  20  65  6C  69  66  000BF P.AAV:  .ASCII  \file created\                            ;
                                                            000CB        .BLKB   1
                                                    0000000C 000CC P.AAU:  .LONG   12                                      ;
                                                    00000000' 000D0        .ADDRESS P.AAV                                  ;

                                                                $RMS_PTR=           NML$A_NETNODE_FAB
                                                                $RMS_PTR=           NML$A_NODE_ADDRESS_XAB
                                                                $RMS_PTR=           NML$A_NODE_TYPE_XAB
                                                                $RMS_PTR=           NML$A_NODE_NAME_XAB
                                                                $RMS_PTR=           NML$A_NODE_LIST_XAB
                                                                $RMS_PTR=           NML$A_PROTECTION_XAB
                                                                .EXTRN  SYS$CREATE

                                                                .PSECT  $CODE$,NOWRT,2

                                                        007C 00000      .ENTRY  NML$CREATE_NODE_DB, Save R2,R3,R4,R5,R6      ; 0908
                                    56 00000000'    00   9E 00002      MOVAB   NML$A_NETNODE_FAB, R6                        ;
                                08  BC              66   9E 00009      MOVAB   NML$A_NETNODE_FAB, @FAB                      ; 0942
    0050    8F          00          6E              00   2C 0000D      MOVC5   #0, (SP), #0, #80, $RMS_PTR                  ; 0955
                                                    66   00014                                                           ;
                                66      5003        8F   B0 00015      MOVW    #20483, $RMS_PTR                             ;
                              04    A6  00200002      8F   D0 0001A      MOVL    #2097154, $RMS_PTR+4                         ;
                              10    A6                3C   D0 00022      MOVL    #60, $RMS_PTR+T6                             ;
                              16    A6      0F0F      8F   B0 00026      MOVW    #3855, $RMS_PTR+22                           ;
                              1D    A6                20   90 0002C      MOVB    #32, $RMS_PTR+29                             ;
                              1F    A6                02   90 00030      MOVB    #2, $RMS_PTR+31                              ;
                              24    A6      00F8      C6   9E 00034      MOVAB   NML$A_NODE_ADDRESS_XAB, $RMS_PTR+36           ;
                                    50        04      AC   D0 0003A      MOVL    FILE_NAME_DSC, R0                            ;
                              2C    A6        04      A0   D0 0003E      MOVL    4(R0), $RMS_PTR+44                           ;
                              30    A6  00000000'     00   9E 00043      MOVAB   P.AAT, $RMS_PTR+48                           ;
                              34    A6                60   90 0004B      MOVB    (R0), $RMS_PTR+52                            ;
                              35    A6                0F   90 0004F      MOVB    #15, $RMS_PTR+53                             ;
                              3E    A6                03   90 00053      MOVB    #3, $RMS_PTR+62                              ;
    004C    8F          00          6E              00   2C 00057      MOVC5   #0, (SP), #0, #76, $RMS_PTR                  ; 0971
                                                00F8    C6   0005E                                                           ;
                            00F8    C6      4C15        8F   B0 00061      MOVW    #19477, $RMS_PTR                             ;
                            00FC    C6      0190        C6   9E 00068      MOVAB   NML$A_NODE_TYPE_XAB, $RMS_PTR+4              ;
                            010A    C6      02C9        8F   B0 0006F      MOVW    #713, $RMS_PTR+T8                            ;
                                            010F        C6   94 00076      CLRB    $RMS_PTR+23                                  ;
                                  0126  C6                  02   90 0007A      MOVB    #2, $RMS_PTR+46                      ;
    004C    8F          00          6E              00   2C 0007F      MOVC5   #0, (SP), #0, #76, $RMS_PTR                  ; 0981
                                                0190    C6   00086                                                           ;
                            0190    C6      4C15        8F   B0 00089      MOVW    #19477, $RMS_PTR                             ;
                            0194    C6      0144        C6   9E 00090      MOVAB   NML$A_NODE_NAME_XAB, $RMS_PTR+4              ;
                            01A2    C6      020B        8F   B0 00097      MOVW    #523, $RMS_PTR+T8                            ;
```

```
                         01A7   C6              01  90 0009E          MOVB    #1, $RMS_PTR+23                          ;
                         01AE   C6              02  B0 000A3          MOVW    #2, $RMS_PTR+30                          ;
                         01BE   C6              02  90 000A8          MOVB    #2, $RMS_PTR+46                          ;
    004C   8F      00           6E              00  2C 000AD          MOVC5   #0, (SP), #0, #76, $RMS_PTR              ; 0993
                                        0144    C6     000B4
                         0144   C6      4C15    8F  B0 000B7          MOVW    #19477, $RMS_PTR
                         0148   C6      01DC    C6  9E 000BE          MOVAB   NML$A_NODE_LIST_XAB, $RMS_PTR+4
                         0156   C6              0E  B0 000C5          MOVW    #14, $RMS_PTR+18
                         0159   C6              20  90 000CA          MOVB    #32, $RMS_PTR+21
                         015B   C6              02  90 000CF          MOVB    #2, $RMS_PTR+23
                         0162   C6              04  B0 000D4          MOVW    #4, $RMS_PTR+30
                         0172   C6              06  90 000D9          MOVB    #6, $RMS_PTR+46
    004C   8F      00           6E              00  2C 000DE          MOVC5   #0, (SP), #0, #76, $RMS_PTR              ; 1010
                                        01DC    C6     000E5
                         01DC   C6      4C15    8F  B0 000E8          MOVW    #19477, $RMS_PTR
                         01E0   C6      0094    C6  9E 000EF          MOVAB   NML$A_PROTECTION_XAB, $RMS_PTR+4
                         01EE   C6      040B    8F  B0 000F6          MOVW    #1035, $RMS_PTR+18
                         01F3   C6              03  90 000FD          MOVB    #3, $RMS_PTR+23
                         020A   C6              04  90 00102          MOVB    #4, $RMS_PTR+46
    0058   8F      00           6E              00  2C 00107          MOVC5   #0, (SP), #0, #88, $RMS_PTR              ; 1014
                                        0094    C6     0010E
                         0094   C6      5813    8F  B0 00111          MOVW    #22547, $RMS_PTR
                         009C   C6      FF00    8F  B0 00118          MOVW    #-256, $RMS_PTR+8
                         00A0   C6  00010004    8F  D0 0011F          MOVL    #65540, $RMS_PTR+12
                                                56  DD 00128          PUSHL   R6                                       ; 1018
                00000000G        00            01  FB 0012A          CALLS   #1, SYS$CREATE
                                 52            50  D0 00131          MOVL    R0, STATUS
                                 10            52  E9 00134          BLBC    STATUS, 1$                               ; 1020
                                     00000000'  00  9F 00137          PUSHAB  P.AAU                                    ; 1023
                                 7E            01  7D 0013D          MOVQ    #1, -(SP)                                ; 1021
                00000000G        00            03  FB 00140          CALLS   #3, NML$LOGFILEOP
                                 50            52  D0 00147 1$:      MOVL    STATUS, R0                               ; 1024
                                               04  0014A          RET                                              ; 1026

; Routine Size:  331 bytes,    Routine Base:  $CODE$ + 055F
```

```
;  1038          1027  1 %SBTTL 'nml$connect_node_rab    Open node permanent database file'
;  1039          1028  1 GLOBAL ROUTINE nml$connect_node_rab  =
;  1040          1029  1
;  1041          1030  1 !++
;  1042          1031  1 ! FUNCTIONAL DESCRIPTION:
;  1043          1032  1 !       This builds a RAB for accessing the node database file and
;  1044          1033  1 !       issues a connect.
;  1045          1034  1 !
;  1046          1035  1 ! FORMAL PARAMETERS:
;  1047          1036  1 !       NONE
;  1048          1037  1 !
;  1049          1038  1 ! ROUTINE VALUE:
;  1050          1039  1 ! COMPLETION CODES:
;  1051          1040  1 !       Failure or RMS error
;  1052          1041  1 !
;  1053          1042  1 !--
;  1054          1043  1
;  1055          1044  2 BEGIN
;  1056          1045  2
;  1057          1046  2 !
;  1058          1047  2 ! Initialize most of RAB here.  Init it to use the primary key
;  1059          1048  2 ! (node address) to begin with.  This is changed when other keys
;  1060          1049  2 ! are needed.
;  1061          1050  2 !
;  1062        P 1051  2 $RAB_INIT (RAB = nml$a_netnode_rab,
;  1063        P 1052  2               FAB = nml$a_netnode_fab,
;  1064        P 1053  2               KRF = nmn$c_add_key_ref,     ! primary key = node address
;  1065        P 1054  2               MBF = 10,
;  1066        P 1055  2               RAC = KEY,
;  1067          1056  2               ROP = UIF);
;  1068          1057  2
;  1069          1058  2 !
;  1070          1059  2 ! Connect RMS record stream.
;  1071          1060  2 !
;  1072          1061  2 RETURN $CONNECT (RAB = nml$a_netnode_rab);
;  1073          1062  1 END;                ! of   nml$connect_node_rab


                                                                $RMS_PTR=           NML$A_NETNODE_RAB
                                                                        .EXTRN  SYS$CONNECT

                                                                        .ENTRY  NML$CONNECT_NODE_RAB, Save R2,R3,R4,R5,R6   ; 1028
                                                                MOVAB   $RMS_PTR, R6
    0044   8F            00                                    MOVC5   #0, (SP), #0, #68, $RMS_PTR                         ; 1056
                                                                MOVW    #17409, $RMS_PTR
                                                                MOVL    #16, $RMS_PTR+4
                                                                MOVB    #1, $RMS_PTR+30
                                                                MOVW    #2560, $RMS_PTR+53
                                                                MOVAB   NML$A_NETNODE_FAB, $RMS_PTR+60
                                                                PUSHL   R6                                                  ; 1061
                                                                CALLS   #1, SYS$CONNECT                                     ; 1062
                                                                RET

; Routine Size:  51 bytes,    Routine Base:  $CODE$ + 06AA
```

```
;  1074          1063  1
;  1075          1064  1 END                                   ! End of module
;  1076          1065  1
;  1077          1066  0 ELUDOM
```

```
;                                PSECT SUMMARY

;       Name                    Bytes                           Attributes

;    $OWN$                        566  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;    $PLIT$                       212  NOVEC,NOWRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;    $GLOBAL$                       8  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;    $CODE$                      1757  NOVEC,NOWRT,  RD ,  EXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
```

```
;                             Library Statistics

;                                      -------- Symbols --------      Pages       Processing
;       File                           Total    Loaded   Percent      Mapped      Time

;    _$255$DUA28:[NML.OBJ]NMLLIB.L32;1     341        45        13          27        00:00.1
;    _$255$DUA28:[SHRLIB]NMALIBRY.L32;1    887         6         0          47        00:00.2
;    _$255$DUA28:[SYSLIB]STARLET.L32;1    9776       151         1         581        00:02.1
```

```
;                                  COMMAND QUALIFIERS

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

; Size:          1757 code + 786 data bytes
; Run Time:         00:40.9
; Elapsed Time:     01:25.8
; Lines/CPU Min:     1565
; Lexemes/CPU-Min: 32825
; Memory Used:  219 pages
; Compilation Complete
```

NML_PURGE
LIS

NML_PARINI
LIS

NML_NODFIL
LIS

NML_READ
LIS

NML_PARPRM
LIS

NML_MANIP
LIS