```
FFFFFFFFFFFFFFF     000000000     RRRRRRRRRRRR     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
FFFFFFFFFFFFFFF     000000000     RRRRRRRRRRRR     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
FFFFFFFFFFFFFFF     000000000     RRRRRRRRRRRR     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
FFF              000         000  RRR         RRR  RRR         RRR        TTT        LLL
FFF              000         000  RRR         RRR  RRR         RRR        TTT        LLL
FFF              000         000  RRR         RRR  RRR         RRR        TTT        LLL
FFF              000         000  RRR         RRR  RRR         RRR        TTT        LLL
FFF              000         000  RRR         RRR  RRR         RRR        TTT        LLL
FFF              000         000  RRR         RRR  RRR         RRR        TTT        LLL
FFFFFFFFFFFF     000         000  RRRRRRRRRRRR     RRRRRRRRRRRR           TTT        LLL
FFFFFFFFFFFF     000         000  RRRRRRRRRRRR     RRRRRRRRRRRR           TTT        LLL
FFFFFFFFFFFF     000         000  RRRRRRRRRRRR     RRRRRRRRRRRR           TTT        LLL
FFF              000         000  RRR   RRR        RRR   RRR              TTT        LLL
FFF              000         000  RRR   RRR        RRR   RRR              TTT        LLL
FFF              000         000  RRR   RRR        RRR   RRR              TTT        LLL
FFF              000         000  RRR      RRR     RRR      RRR           TTT        LLL
FFF              000         000  RRR      RRR     RRR      RRR           TTT        LLL
FFF              000         000  RRR      RRR     RRR      RRR           TTT        LLL
FFF                 000000000     RRR         RRR  RRR         RRR        TTT        LLLLLLLLLLLLLLL
FFF                 000000000     RRR         RRR  RRR         RRR        TTT        LLLLLLLLLLLLLLL
FFF                 000000000     RRR         RRR  RRR         RRR        TTT        LLLLLLLLLLLLLLL
```

FILEID**FORUDFWF

J 11

```
FFFFFFFFFF    OOOOOO    RRRRRRRR    UU      UU  DDDDDDDD    FFFFFFFFFF  WW      WW  FFFFFFFFFF
FFFFFFFFFF    OOOOOO    RRRRRRRR    UU      UU  DDDDDDDD    FFFFFFFFFF  WW      WW  FFFFFFFFFF
FF          OO      OO  RR      RR  UU      UU  DD      DD  FF          WW      WW  FF
FF          OO      OO  RR      RR  UU      UU  DD      DD  FF          WW      WW  FF
FF          OO      OO  RR      RR  UU      UU  DD      DD  FF          WW      WW  FF
FF          OO      OO  RR      RR  UU      UU  DD      DD  FF          WW      WW  FF
FFFFFFFF    OO      OO  RRRRRRRR    UU      UU  DD      DD  FFFFFFFF    WW      WW  FFFFFFFF
FFFFFFFF    OO      OO  RRRRRRRR    UU      UU  DD      DD  FFFFFFFF    WW      WW  FFFFFFFF
FF          OO      OO  RR  RR      UU      UU  DD      DD  FF          WW  WW  WW  FF
FF          OO      OO  RR  RR      UU      UU  DD      DD  FF          WW  WW  WW  FF
FF          OO      OO  RR    RR    UU      UU  DD      DD  FF          WWWW  WWWW  FF              ....
FF          OO      OO  RR    RR    UU      UU  DD      DD  FF          WWWW  WWWW  FF              ....
FF            OOOOOO    RR      RR  UUUUUUUUUU  DDDDDDDD    FF          WW      WW  FF              ....
FF            OOOOOO    RR      RR  UUUUUUUUUU  DDDDDDDD    FF          WW      WW  FF              ....

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
```

FOR
2-0

```
0 MODULE FOR$$UDF_WF (%TITLE 'FORTRAN Write Formatted UDF'
0                 IDENT = '2-058'          ! File: FORUDFWF.B32  Edit: SBL2058
0                 ) =
1 BEGIN
1 !
1 !****************************************************************************
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1 !*                                                                          *
1 !****************************************************************************
1
1 !++
1 ! FACILITY:  FORTRAN Support Library - not user callable
1 !
1 ! ABSTRACT:
1 !
1 !       This module implements FORTRAN Write Formatted I/O
1 !       statements (sequential access - S, direct access - D,
1 !       ENCODE - M) at the User data Formatter level of
1 !       abstraction (UDF level is 2nd level). This module
1 !       calls the Read/Write independent format
1 !       interpreter (FOR$$FMT_INTRPx) to decode the compiled format
1 !       statement. This module calls the appropriate write record
1 !       routine at the record handling level of abstraction (REC
1 !       level is 3rd level) to write a record.
1 !
1 ! ENVIRONMENT:  User access mode; reentrant AST level or not.
1 !
1 ! AUTHOR:  Thomas N. Hastings;   CREATION DATE: 20-Feb-77
1 !
1 ! MODIFIED BY:
1 !       Thomas N. Hastings, 12-Mar-77: Version 01
1 !       Richard Grove, 19-Aug-77: Version 2
1 ! [Previous edit history removed.  SBL 1-Nov-1982]
1 ! 2-049 - Instead of checking for a zero ELEM_SIZE to determine an
1 !         end-of-list call from FOR$$UDF_WF9 use a zero ELEM_TYPE.
1 !         This allows a zero-length string to be formatted properly.
1 !         SPR 11-30127  SBL 22-May-1980
1 ! 2-050 - Convert FOR$$FMT_INTRP1 to JSB linkage.  29-Jul-1981  JAW
1 ! 2-051 - Use non-character moves when possible to fill buffer to high-
```

```
;    58          0058  1 !            water mark, avoiding a call to BLANK_FILL.  JAW 29-Jul-1981
;    59          0059  1 ! 2-052 - Correct error in edit 2-051.  JAW 05-Aug-1981
;    60          0060  1 ! 2-053 - Combine handling of Hollerith and alphanumeric, to get the
;    61          0061  1 !            benefit of non-character moves for Hollerith, and recast CASE
;    62          0062  1 !            for slightly better code.  JAW 05-Aug-1981
;    63          0063  1 ! 2-054 - Add require file FORMSG.B32 in preparation for enhanced error
;    64          0064  1 !            reporting.  JAW 10-Aug-1981
;    65          0065  1 ! 2-055 - Check for zero-length buffer before changing the carriage
;    66          0066  1 !            control character in DO_WRITE.  JAW 10-Aug-1981
;    67          0067  1 ! 2-056 - Set ISB$V_ERR_OFLO for format codes XE and XG.  SPR 11-38351.
;    68          0068  1 !            JAW 13-Aug-1981
;    69          0069  1 ! 2-057 - Ignore $ if carriage control is not FTN.  JAW 28-Aug-1981
;    70          0070  1 ! 2-058 - Reflect changes needed for separate FORRTL shareable image.  Primarily,
;    71          0071  1 !            we can't have self-relative tables for the conversion routines.
;    72          0072  1 !            SBL 1-Nov-1982
;    73          0073  1 !--
;    74          0074  1
;    75          0075  1 !<BLF/PAGE>
```

```
      0076  1 !
      0077  1 ! PROLOGUE FILE:
      0078  1 !
      0079  1
      0080  1 REQUIRE 'RTLIN:FORPROLOG';                          ! FOR$ definitions
      0146  1 SWITCHES ZIP;                                       ! Optimize for speed
      0147  1
      0148  1 !
      0149  1 ! TABLE OF CONTENTS:
      0150  1 !
      0151  1
      0152  1 FORWARD ROUTINE
      0153  1     FOR$$UDF_WF0 : JSB_UDF0 NOVALUE,                ! initialization
      0154  1     FOR$$UDF_WF1 : CALL_CCB NOVALUE,                ! format one user I/O list element
      0155  1     FOR$$UDF_WF9 : JSB_UDF9 NOVALUE,                ! end of user I/O list - finish
      0156  1     BLANK_FILL,                                     ! fill string with blanks
      0157  1     MOVE_CHAR : NOVALUE,                            ! move characters
      0158  1     DO_WRITE : JSB_DO_WRITE NOVALUE;                ! do per-record formatting and write
      0159  1
      0160  1 !
      0161  1 ! MACROS:
      0162  1 !
      0163  1
      0164  1 MACRO                                               ! Field definitions for action table
    M 0165  1     WF_EOLST =
      0166  1  0,7,1,0%,                                         ! Check for end of user i/o list
    M 0167  1     WF_CHECKW =
      0168  1  0,6,1,0%,                                         ! Check there are w postions available in output buffer
    M 0169  1     WF_SETDSC =
      0170  1  0,5,1,0%,                                         ! Set up a string descriptor for output field
    M 0171  1     WF_DISPAT =
      0172  1  0,0,4,0%;                                         ! CASE index for dispatch
      0173  1
      0174  1 MACRO                                               ! Attributes-packing macro for attributes table
    M 0175  1     A (E, W, D, NDX) =
      0176  1  (E^7 + W^6 +D^5 + NDX)%;
      0177  1
      0178  1 !
      0179  1 ! EQUATED SYMBOLS:
      0180  1 !
      0181  1 !   NONE
      0182  1 !
      0183  1 ! OWN STORAGE:
      0184  1 !
      0185  1
      0186  1 BIND
      0187  1     WF_ACT =                                        ! Action table for UDF_WF1, UDF_WF9 format codes
      0188  1         UPLIT BYTE(
      0189  1
      0190  1 !                 E C S
      0191  1 !                 O H E
      0192  1 !                 L E T
      0193  1 !                 S C D
      0194  1 !                 T K S
      0195  1 !                   W C
      0196  1                   A(1,0,0, 0),    ! ER    = 0,    ! 00    ! format syntax error
      0197  1                   A(0,0,0, 0),    ! LP    = 1,    ! 01    ! ( - format reversion point
;  134        0198  1                      A(0,0,0, 0),     ! NLP    = 2,     ! 02     ! n( - left paran of repeat group
;  135        0199  1                      A(0,0,0, 0),     . )      = 3,     ! 03     ! ) - right paren of repeat group
;  136        0200  1                                       . MAINTENANCE NOTE: the above should not be seen by this module, except look
;  137        0201  1                      A(1,0,0, 1),     . EOF    = 4,     ! 04     ! ) - End of format
;  138        0202  1                      A(0,0,0, 1),     ! SLS    = 5,     ! 05     ! / - Record separator
;  139        0203  1                      A(0,0,0, 2),     ! DLR    = 6,     ! 06     ! $ - Dollar sign: terminal I/O
;  140        0204  1                      A(1,0,0, 0),     ! CLN    = 7,     ! 07     ! : - Colon: terminate if end of list
;  141        0205  1                      0,0,0,0,         ! UNUSED  8:11
;  142        0206  1                      A(0,0,0, 0),     ! _P     = 12,    ! 0C     ! sP - signed scale factor
;  143        0207  1                      A(0,0,0, 0),     ! _T     = 13,    ! 0D     ! Tn - Tab Set
;  144        0208  1                                       ! The above is seen by lookahead only
;  145        0209  1                      A(0,1,0, 4),     ! _X     = 14,    . 0E     ! nX - Skip n columns
;  146        0210  1                      A(0,1,0, 7),     ! _H     = 15,    ! 0F     ! nHcccc - Hollerith
;  147        0211  1                                       ! MAINTENANCE NOTE: This routine assumes that
;  148        0212  1                                       ! only format codes _A and _H use action 7.
;  149        0213  1                                       ! See the CASE ... FROM 0 TO 9.
;  150        0214  1                      0,0,             ! UNUSED  16:17
;  151        0215  1                      A(0,0,0, 0),     ! TL     = 18     ! 12     ! TLn - Tab left n
;  152        0216  1                      A(0,0,0, 0),     ! TR     = 19     ! 13     ! TRn - Tab right n
;  153        0217  1                                       ! The above two are seen by lookahead only
;  154        0218  1                      A(1,0,0, 6),     ! _Q     = 20,    ! 14     ! Q
;  155        0219  1                      A(1,1,0, 7),     ! _A     = 21,    ! 15     ! nAw - Alpha numeric
;  156        0220  1                      A(1,1,1, 8),     ! _L     = 22,    ! 16     ! nLw - Logical
;  157        0221  1                      A(1,1,1, 8),     ! _O     = 23,    ! 17     ! nOw - Octal
;  158        0222  1                      A(1,1,1, 8),     ! _I     = 24,    ! 18     ! nIw - Integer
;  159        0223  1                      A(1,1,1, 8),     ! _Z     = 25,    ! 19     ! nZw - Hexadecimal
;  160        0224  1                      A(1,1,1, 8),     ! XO     = 26     ! 1A     ! nOw.m
;  161        0225  1                      A(1,1,1, 8),     ! XI     = 27     ! 1B     ! nIw.m
;  162        0226  1                      A(1,1,1, 8),     ! XZ     = 28     ! 1C     ! nZw.m
;  163        0227  1                      0,               ! UNUSED  29
;  164        0228  1                      A(1,1,1, 9),     ! _F     = 30,    ! 1E     ! nFw.d - Fixed format
;  165        0229  1                      A(1,1,1, 9),     ! _E     = 31,    ! 1F     ! nEw.d - Scientific notation format
;  166        0230  1                      A(1,1,1, 9),     ! _G     = 32,    ! 20     ! nGw.d - General format
;  167        0231  1                      A(1,1,1, 9),     ! _D     = 33,    ! 21     ! nDw.d - Double Precision format
;  168        0232  1                      A(1,1,1, 9),     ! XE     = 34     ! 22     ! nEw.dEe
;  169        0233  1                      A(1,1,1, 9),     ! XG     = 35     ! 23     ! nGw.dEe
.  170        0234  1                                       ! The following codes are used for lookahead only
;  171        0235  1                      0,0,0,0,0,       ! UNUSED  36:40
;  172        0236  1                      A(1,0,0, 0),     ! _DA    = 41     ! 29     ! nA - default A
;  173        0237  1                      A(1,0,0, 0),     ! _DL    = 42     ! 2A     ! nL - default L
;  174        0238  1                      A(1,0,0, 0),     ! _DO    = 43     ! 2B     ! nO - default O
;  175        0239  1                      A(1,0,0, 0),     ! _DI    = 44     ! 2C     ! nI - default I
;  176        0240  1                      A(1,0,0, 0),     ! _DZ    = 45     ! 2D     ! nZ - default Z
;  177        0241  1                      0,0,0,0,         ! UNUSED  46:49
;  178        0242  1                      A(1,0,0, 0),     ! _DF    = 50     ' 32     ! nF - default F
;  179        0243  1                      A(1,0,0, 0),     ! _DE    - 51     ! 33     ! nE - default E
;  180        0244  1                      A(1,0,0, 0),     ! _DG    = 52     ! 34     ! nG - default G
;  181        0245  2                      A(1,0,0, 0)      ! _DD    = 53     ! 35     ! rD - default D
;  182        0246  1          ) : VECTOR [54, BYTE];
;  183        0247  1
;  184        0248  1 BIND SPACES = UPLIT('    ');
;  185        0249  1
;  186        0250  1 !+
;  187        0251  1 ! Table of conversion routines for integers, indexed by format code (L,O,I,Z).
;  188        0252  1 !-
;  189        0253  1
;  190        0254  1 OWN
;  191        0255  1       AA_OUT_FIX: VECTOR [4, LONG];
;  192        0256  1
;  193        0257  1  !+
;  194        0258  1  ! Table of conversion routines for reals, indexed by datatype (F,D,G,H) and
;  195        0259  1  ! by format code (F,E,G,D).  Another table is used to map the DSC$K datatype
;  196        0260  1  ! code into the index for this table.
;  197        0261  1  !-
;  198        0262  1
;  199        0263  1  LITERAL
;  200        0264  1       TYP_F = 0,
;  201        0265  1       TYP_D = 1,
;  202        0266  1       TYP_G = 2,
;  203        0267  1       TYP_H = 3,
;  204        0268  1       FMT_F = 0,
;  205        0269  1       FMT_E = 1,
;  206        0270  1       FMT_G = 2,
;  207        0271  1       FMT_D = 3;
;  208        0272  1
;  209        0273  1  STRUCTURE
;  210        0274  1       FLT_ARRAY_ST [T, F; M, N] =
;  211        0275  1           [M*N*%UPVAL]
;  212        0276  1           (FLT_ARRAY_ST+(T*N+F)*%UPVAL);
;  213        0277  1
;  214        0278  1  OWN
;  215        0279  1       AA_OUT_FLT: FLT_ARRAY_ST [4,4];
;  216        0280  1
;  217        0281  1  !+
;  218        0282  1  ! Table that converts DSC$K datatype codes to TYP_ codes for addressing
;  219        0283  1  ! AA_OUT_FLT.
;  220        0284  1  !-
;  221        0285  1
;  222        0286  1  OWN
;  223        0287  1       DTP_TO_TYP: VECTOR [DSC$K_DTYPE_H+1, BYTE] PSECT (_FOR$CODE)
;  224        0288  1           INITIAL (REP 10 OF BYTE(0),
;  225        0289  1           BYTE(TYP_F),
;  226        0290  1           BYTE(TYP_D),
;  227        0291  1           REP 15 OF BYTE(0),
;  228        0292  1           BYTE(TYP_G),
;  229        0293  1           BYTE(TYP_H));
;  230        0294  1
;  231        0295  1  OWN
;  232        0296  1       CVT_INIT: INITIAL(0);                          ! Initialization flag
;  233        0297  1
;  234        0298  1  !
;  235        0299  1  ! EXTERNAL REFERENCES:
;  236        0300  1  !
;  237        0301  1
;  238        0302  1  EXTERNAL
;  239        0303  1       FOR$$AA_REC_PR0 : VECTOR,                 ! PIC array of record processor
;  240        0304  1                                                 ! procedure-initializations in REC
;  241        0305  1                                                 ! level of abstraction. Indexed by
;  242        0306  1                                                 ! I/O statement type (ISB$B_STTM_TYPE)
;  243        0307  1       FOR$$AA_REC_PR1 : VECTOR,                 ! PIC array of record processor procedures
;  244        0308  1                                                 ! Write a record in REC level of
;  245        0309  1                                                 ! abstraction. Indexed by I/O statement
;  246        0310  1                                                 ! type (ISB$B_STTM_TYPE)
;  247        0311  1       FOR$$AA_REC_PR9 : VECTOR;                 ! PIC array of record processor procedures
;  248          0312  1
;  249          0313  1                                                    ! Write last record in REC level of
;  250          0314  1                                                    . abstraction. Inde ed by I/O
;  251          0315  1                                                    . statement type (IOB$R_STTM_TYPE)
;  252          0316  1
;  253          0317  1 EXTERNAL ROUTINE
;  254          0318  1     FOR$$FMT_INTRP0 : JSB_FMT0 NOVALUE,           ! initialize format interpreter
;  255          0319  1     FOR$$FMT_INTRP1 : JSB_FMT1 NOVALUE,           ! get next data format code
;  256          0320  1     ! or input-output format code
;  257          0321  1     ! error # and SIGNAL
;  258          0322  1     FOR$$SIGNAL : NOVALUE,                         ! convert FORTRAN err # to
;  259          0323  1                                                    ! VAX error # and SIGNAL
;  260          0324  1     FOR$$SIGNAL_STO : NOVALUE,                     ! convert FORTRAN err # to
;  261          0325  1                                                    ! VAX error # and SIGNAL_STOP
;  262          0326  1     FOR$CVT_F_TD,                                  ! F to text, D format
;  263          0327  1     FOR$CVT_F_TE,                                  ! F to text, E format
;  264          0328  1     FOR$CVT_F_TF,                                  ! F to text, F format
;  265          0329  1     FOR$CVT_F_TG,                                  ! F to text, G format
;  266          0330  1     FOR$CVT_D_TD,                                  ! D to text, D format
;  267          0331  1     FOR$CVT_D_TE,                                  ! D to text, E format
;  268          0332  1     FOR$CVT_D_TF,                                  ! D to text, F format
;  269          0333  1     FOR$CVT_D_TG,                                  ! D to text, G format
;  270          0334  1     FOR$CVT_G_TD,                                  ! G to text, D format
;  271          0335  1     FOR$CVT_G_TE,                                  ! G to text, E format
.  272          0336  1     FOR$CVT_G_TF,                                  ! G to text, F format
;  273          0337  1     FOR$CVT_G_TG,                                  ! G to text, G format
;  274          0338  1     FOR$CVT_H_TD,                                  ! H to text, D format
;  275          0339  1     FOR$CVT_H_TE,                                  ! H to text, E format
;  276          0340  1     FOR$CVT_H_TF,                                  ! H to text, F format
;  277          0341  1     FOR$CVT_H_TG,                                  ! H to text, G format
;  278          0342  1     OTS$CVT_L_TL,                                  ! L to text, L format
;  279          0343  1     OTS$CVT_L_TO,                                  ! L to text, O format
;  280          0344  1     OTS$CVT_L_TI,                                  ! L to text, I format
;  281          0345  1     OTS$CVT_L_TZ;                                  ! L to text, Z format
;  282          0346  1
```

```
1 GLOBAL ROUTINE FOR$$UDF_WFO                          . Write formatted UDF initialization
1     : JSB_UDFO NOVALUE =
1
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 ! Initialize Write Formatted User data formatter (UDF)
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       JSB FOR$$UDF_WFO
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       CCB                     Pointer to current logical unit block
1 !       ISB$B_STTM_TYPE         I/O statement type code - set by
1 !                               each I/O statement initialization
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       LUB$A_BUF_BEG           Adr. of first byte of output data buffer
1 !       LUB$A_BUF_PTR           Adr. of next byte of output
1 !                               data buffer
1 !       LUB$A_BUF_HIGH          Adr. of high water byte in output buffer on this
1 !                               I/O statement
1 !       LUB$A_BUF_END           Adr. +1 of last char position allocated
1 !                               to output buffer
1 !       AA_OUT_FIX              Integer conversion routine addresses
1 !       AA_OUT_FLT              Floating conversion routine addresses
1 !
1 ! ROUTINE VALUE:
1 !
1 !       NONE
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !
1 !--
1
2     BEGIN
2
2     EXTERNAL REGISTER
2         CCB : REF $FOR$CCB_DECL;
2
2     !+
2     ! Initialize Record processing level of abstraction.
2     ! Set pointer to current (LUB$A_BUF_PTR)  and last+1
2     ! (LUB$A_BUF_END) character position for user data in
2     ! output buffer
2     !-
2
2     JSB_RECO (FOR$$AA_REC_PRO + .FOR$$AA_REC_PRO [.CCB [ISB$B_STTM_TYPE] - ISB$K_FORSTTYLO + 1]);
```

```
2
2          !+
2          ! Initialize character pointer to first position for user
2          ! data in output buffer - needed only for T AND $ formats
2          !-
2
2          CCB [LUB$A_BUF_BEG] = .CCB [LUB$A_BUF_PTR];
2
2          !+
2          ! Initialize character pointer to highest position
2          ! written in user data buffer for this record - needed for
2          ! T format which can position to the left
2          !-
2
2          CCB [LUB$A_BUF_HIGH] = .CCB [LUB$A_BUF_PTR];
2
2          !+
2          ! Initialize Format interpreter
2          !-
2
2          FOR$$FMT_INTRP0 ();
2
2          !+
2          ! All other ISB locations and flags have already been
2          ! initialized to 0 or a specified value by the I/O statement
2          ! initialization for this I/O statement.
2          !-
2
2          !+
2          ! Initialize conversion routine tables, if necessary.
2          !-
2
2          IF NOT .CVT_INIT
2          THEN
3              BEGIN
3              AA_OUT_FIX [_L-_L] = OTS$CVT_L_TL;
3              AA_OUT_FIX [_O-_L] = OTS$CVT_L_TO;
3              AA_OUT_FIX [_I-_L] = OTS$CVT_L_TI;
3              AA_OUT_FIX [_Z-_L] = OTS$CVT_L_TZ;
3              AA_OUT_FLT [TYP_F, FMT_F] = FOR$CVT_F_TF;
3              AA_OUT_FLT [TYP_F, FMT_E] = FOR$CVT_F_TE;
3              AA_OUT_FLT [TYP_F, FMT_G] = FOR$CVT_F_TG;
3              AA_OUT_FLT [TYP_F, FMT_D] = FOR$CVT_F_TD;
3              AA_OUT_FLT [TYP_D, FMT_F] = FOR$CVT_D_TF;
3              AA_OUT_FLT [TYP_D, FMT_E] = FOR$CVT_D_TE;
3              AA_OUT_FLT [TYP_D, FMT_G] = FOR$CVT_D_TG;
3              AA_OUT_FLT [TYP_D, FMT_D] = FOR$CVT_D_TD;
3              AA_OUT_FLT [TYP_G, FMT_F] = FOR$CVT_G_TF;
3              AA_OUT_FLT [TYP_G, FMT_E] = FOR$CVT_G_TE;
3              AA_OUT_FLT [TYP_G, FMT_G] = FOR$CVT_G_TG;
3              AA_OUT_FLT [TYP_G, FMT_D] = FOR$CVT_G_TD;
3              AA_OUT_FLT [TYP_H, FMT_F] = FOR$CVT_H_TF;
3              AA_OUT_FLT [TYP_H, FMT_E] = FOR$CVT_H_TE;
3              AA_OUT_FLT [TYP_H, FMT_G] = FOR$CVT_H_TG;
3              AA_OUT_FLT [TYP_H, FMT_D] = FOR$CVT_H_TD;
3              CVT_INIT = 1;
2              END;
```

```
;  398          0461  2     RETURN;
;  399          0462  1     END;                                            ! End of FOR$$UDF_WFO routine

                                                                          .TITLE  FOR$$UDF_WF FORTRAN Write Formatted UDF
                                                                          .IDENT  \2-058\

                                                                          .PSECT  _FOR$DATA,NOEXE,  PIC,2

                                                            00000 AA_OUT_FIX:
                                                                          .BLKB   16
                                                            00010 AA_OUT_FLT:
                                                                          .BLKB   64
                                                  00000000  00050 CVT_INIT:
                                                                          .LONG   0                                            ;

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

44  00  00  00  00  00  00  80  02  01  81  00  00  00  80  00000 P.AAA:  .BYTE   -128, 0, 0, 0, -127, 1, 2, -128, 0, 0, 0, - ;
00  E8  E8  E8  E8  E8  E8  E8  C7  86  00  00  00  00  47  0000F                 0, 0, 0, 68, 71, 0, 0, 0, 0, -122, -57, -    ;
80  80  80  80  00  00  00  00  00  E9  E9  E9  E9  E9  E9  0001E                 -24, -24, -24, -24, -24, -24, -24, 0, -      ;
                        80  80  80  80  00  00  00  00  80  0002D                 -23, -23, -23, -23, -23, -23, 0, 0, 0, 0, - ;
                                                                                  0, -128, -128, -128, -128, -128, 0, 0, 0, - ;
                                                                                  0, -128, -128, -128, -128                    ;
                                                            00036         .BLKB   2
                                            20  20  20  20  00038 P.AAB:  .ASCII  \    \                                       ;
                                                        00# 0003C DTP_TO_TYP:
                                                                          .BYTE   0[10]                                        ;
                                                        00  00046         .BYTE   0                                            ;
                                                        01  00047         .BYTE   1                                            ;
                                                        00# 00048         .BYTE   0[15]                                        ;
                                                        02  00057         .BYTE   2                                            ;
                                                        03  00058         .BYTE   3                                            ;

                                                                  WF_ACT=             P.AAA
                                                                  SPACES=             P.AAB
                                                                          .EXTRN  FOR$$AA_REC_PR0
                                                                          .EXTRN  FOR$$AA_REC_PR1
                                                                          .EXTRN  FOR$$AA_REC_PR9
                                                                          .EXTRN  FOR$$FMT_INTRP0
                                                                          .EXTRN  FOR$$FMT_INTRP1
                                                                          .EXTRN  FOR$$SIGNAL, FOR$$SIGNAL_STO
                                                                          .EXTRN  FOR$CVT_F_TD, FOR$CVT_F_TE
                                                                          .EXTRN  FOR$CVT_F_TF, FOR$CVT_F_TG
                                                                          .EXTRN  FOR$CVT_D_TD, FOR$CVT_D_TE
                                                                          .EXTRN  FOR$CVT_D_TF, FOR$CVT_D_TG
                                                                          .EXTRN  FOR$CVT_G_TD, FOR$CVT_G_TE
                                                                          .EXTRN  FOR$CVT_G_TF, FOR$CVT_G_TG
                                                                          .EXTRN  FOR$CVT_H_TD, FOR$CVT_H_TE
                                                                          .EXTRN  FOR$CVT_H_TF, FOR$CVT_H_TG
                                                                          .EXTRN  OTS$CVT_L_TL, OTS$CVT_L_TO
                                                                          .EXTRN  OTS$CVT_L_TI, OTS$CVT_L_TZ

                                       50      FF71   CB   9A 00000 FOR$$UDF_WF0::
                                                                          MOVZBL  -143(CCB), R0                                ; 0403
                                       50 00000000G0040   D0 00005        MOVL    FOR$$AA_REC_PR0[R0], R0                      ;
                                          00000000G0040   16 0000D        JSB     FOR$$AA_REC_PR0[R0]                          ;
```

```
                          BC    AB         B0    AB   D0 00014        MOVL    -80(CCB), -68(CCB)                    ; 0410
                          C0    AB         B0    AB   D0 00019        MOVL    -80(CCB), -64(CCB)                    ; 0418
                                   00000000G    00   16 0001E        JSB     FOR$$FMT_INTRP0                       ; 0424
                                01 00000000'    EF   E9 00024        BLBC    CVT_INIT, 1$                          ; 0436
                                                      05 0002B        RSB                                           ;
                   00000000'    EF 00000000G    00   9E 0002C 1$:    MOVAB   OTS$CVT_L_TL, AA_OUT_FIX              ; 0439
                   00000000'    EF 00000000G    00   9E 00037        MOVAB   OTS$CVT_L_TO, AA_OUT_FIX+4            ; 0440
                   00000000'    EF 00000000G    00   9E 00042        MOVAB   OTS$CVT_L_TI, AA_OUT_FIX+8            ; 0441
                   00000000'    EF 00000000G    00   9E 0004D        MOVAB   OTS$CVT_L_TZ, AA_OUT_FIX+12           ; 0442
                   00000000'    EF 00000000G    00   9E 00058        MOVAB   FOR$CVT_F_TF, AA_OUT_FLT              ; 0443
                   00000000'    EF 00000000G    00   9E 00063        MOVAB   FOR$CVT_F_TE, AA_OUT_FLT+4            ; 0444
                   00000000'    EF 00000000G    00   9E 0006E        MOVAB   FOR$CVT_F_TG, AA_OUT_FLT+8            ; 0445
                   00000000'    EF 00000000G    00   9E 00079        MOVAB   FOR$CVT_F_TD, AA_OUT_FLT+12           ; 0446
                   00000000'    EF 00000000G    00   9E 00084        MOVAB   FOR$CVT_D_TF, AA_OUT_FLT+16           ; 0447
                   00000000'    EF 00000000G    00   9E 0008F        MOVAB   FOR$CVT_D_TE, AA_OUT_FLT+20           ; 0448
                   00000000'    EF 00000000G    00   9E 0009A        MOVAB   FOR$CVT_D_TG, AA_OUT_FLT+24           ; 0449
                   00000000'    EF 00000000G    00   9E 000A5        MOVAB   FOR$CVT_D_TD, AA_OUT_FLT+28           ; 0450
                   00000000'    EF 00000000G    00   9E 000B0        MOVAB   FOR$CVT_G_TF, AA_OUT_FLT+32           ; 0451
                   00000000'    EF 00000000G    00   9E 000BB        MOVAB   FOR$CVT_G_TE, AA_OUT_FLT+36           ; 0452
                   00000000'    EF 00000000G    00   9E 000C6        MOVAB   FOR$CVT_G_TG, AA_OUT_FLT+40           ; 0453
                   00000000'    EF 00000000G    00   9E 000D1        MOVAB   FOR$CVT_G_TD, AA_OUT_FLT+44           ; 0454
                   00000000'    EF 00000000G    00   9E 000DC        MOVAB   FOR$CVT_H_TF, AA_OUT_FLT+48           ; 0455
                   00000000'    EF 00000000G    00   9E 000E7        MOVAB   FOR$CVT_H_TE, AA_OUT_FLT+52           ; 0456
                   00000000'    EF 00000000G    00   9E 000F2        MOVAB   FOR$CVT_H_TG, AA_OUT_FLT+56           ; 0457
                   00000000'    EF 00000000G    00   9E 000FD        MOVAB   FOR$CVT_H_TD, AA_OUT_FLT+60           ; 0458
                   00000000'    EF               01   D0 00108        MOVL    #1, CVT_INIT                          ; 0459
                                                      05 0010F        RSB                                           ; 0462

; Routine Size:  272 bytes,    Routine Base:  _FOR$CODE + 0059


;  400          0463  1
;  402          0464   1 GLOBAL ROUTINE FOR$$UDF_WF1 (                      ! Format one user output element
;  403          0465   1         ELEM_TYPE,                                 ! Type code of user I/O list element
;  404          0466   1         ELEM_SIZE,                                 ! No. of addressable units in element
;  405          0467   1         ELEM_ADR)                                  ! Adr. of element
;  406          0468   1    : CALL_CCB NOVALUE =
;  407          0469   1
;  408          0470   1 !++
;  409          0471   1 ! FUNCTIONAL DESCRIPTION:
;  410          0472   1 !
;  411          0473   1 !       FOR$$UDF_WF1 formats a single user I/O list element
;  412          0474   1 !       and places it in the current output buffer, truncating
;  413          0475   1 !       if necessary to fit. It and the format interpreter,
;  414          0476   1 !       (FOR$$FMT_INTRP1) interprets all format codes until the
;  415          0477   1 !       first I/O list element transmitting format code is
;  416          0478   1 !       encountered.  It then continues executing format codes until
;  417          0479   1 !       lookahead shows that the next format code would be a data
;  418          0480   1 !       transmitter or end-of-list type.
;  419          0481   1 !
;  420          0482   1 !       FOR$$UDF_WF1 is also called when the user I/O list
;  421          0483   1 !       had no elements. This is indicated with .ELEM_TYPE=0
;  422          0484   1 !       FOR$$UDF_WF1 and FOR$$FMT_INTRP1 interpret all format
;  423          0485   1 !       codes up to the first data formatting one, :,
;  424          0486   1 !       or end of format.
;  425          0487   1 !
;  426          0488   1 ! CALLING SEQUENCE:
;  427          0489   1 !
;  428          0490   1 !       CALL FOR$$UDF_WF1 (elem_type.rlu.v, elem_size.rlu.v, elem_adr.rx.r)
;  429          0491   1 !
;  430          0492   1 ! FORMAL PARAMETERS:
;  431          0493   1 !
;  432          0494   1 !       ELEM_TYPE.rlu.v         Type code of user I/O list
;  433          0495   1 !                               element. Form: ELEM_TYPE_x
;  434          0496   1 !                               x = B,W,L,WU,LU,F,D,FC or T.
;  435          0497   1 !                               If zero, this is an end-of-list call.
;  436          0498   1 !       ELEM_SIZE.rlu.v         Size of user I/O list element
;  437          0499   1 !                               in addressable machine units
;  438          0500   1 !       ELEM_ADR.rx.r           Adr. of user I/O list element
;  439          0501   1 !                               x = b, w, l, wu, lu, f, d, fc,
;  440          0502   1 !                                 t, g, h, dc or gc.
;  441          0503   1 !
;  442          0504   1 ! IMPLICIT INPUTS:
;  443          0505   1 !
;  444          0506   1 !       CCB                     Pointer to current logical unit block
;  445          0507   1 !       ISB$B_STTM_TYPE         I/O statement type code - set by each
;  446          0508   1 !                               I/O statement initialization
;  447          0509   1 !
;  448          0510   1 ! The following ISB locations are set only by previous calls to
;  449          0511   1 ! FOR$$UDF_WF{0,1}, i.e., are effectively OWN.
;  450          0512   1 !
;  451          0513   1 !       LUB$A_BUF_BEG           Pointer to first char. position in
;  452          0514   1 !                               user data part of output buffer
;  453          0515   1 !       LUB$A_BUF_PTR           Pointer to next char. position
;  454          0516   1 !                               in user data part of output buffer
;  455          0517   1 !       LUB$A_BUF_HIGH          Pointer to highest char. position
;  456          0518   1 !                               written so far on any T format code
;  457          0519   1 !       LUB$A_BUF_END           Pointer to last+1 char. position
;  458          0520   1 !                               in user data part of output buffer
```

```
1 !          ISB$V_DOLLAR              Dollar sign seen in format for this
1 !                                    record, if 1. Change carriage
1 !                                    control SP (space) to $, + to Null (0).
1 !     The following ISB locations are set by the format interpreter
1 !     (FOR$$FMT_INTRP1) which this module calls:
1 !
1 !          ISB$A_FMT_PTR             Pointer to next char. position
1 !                                    in user data part of output buffer
1 !                                    Used only in H format.
1 !          ISB$W_FMT_W               Field width (w)
1 !          ISB$B_FMT_D               No. of fraction digits (d)
1 !          ISB$B_FMT_E               No. of exponent characters (e)
1 !          ISB$B_FMT_P               Signed scale factor (p)
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !          ISB$A_FMT_PTR             Pointer to next char. position
1 !                                    in compiled format character string
1 !                                    Changed only for H format.
1 !
1 ! The following ISB locations are set only by previous calls
1 ! to FOR$$UDF_WF{0,1}, i.e., are effectively OWN.
1 !
1 .          LUB$A_BUF_PTR             Pointer to next char. position
1 !                                    in user data part of output buffer
1 !          LUB$A_BUF_HIGH            Pointer to highest char. position
1 !                                    written so far on any T format code
1 !          ISB$V_DOLLAR              Dollar sign seen in format for this
1 !                                    record, if 1. Change carriage
1 !                                    control SP to $, + to Null.
1 !
1 ! FUNCTIONAL VALUE:
1 !
1 !          NONE
1 !
1 ! SIDE EFFECTS:
1 !
1 !          SIGNAL_STOPs FOR$_OUTSTAOVE (66='OUTPUT STATEMENT OVERFLOWED RECORD')
1 !          if user attampts to write beyond the end of the record buffer.
1 !          SIGNALS FOR$_OUTCONERR (63='OUTPUT CONVERSION ERROR') -
1 !              overflowed field is filled with *'s.
1 !          SIGNALS FOR$_FORVARMIS (61='FORMAT/VARIABLE-TYPE MISMATCH')
1 !--
1
2       BEGIN
2
2       EXTERNAL REGISTER
2           CCB : REF $FOR$CCB_DECL;
2
2       MAP
2           ELEM_ADR : REF VECTOR;                    ! element is call-by-reference
2
2       GLOBAL REGISTER
2           EL_SIZE = 10,                             ! Element size
2           DT_SEEN = 9,                              ! Data transmitter seen
2           FMT_CODE = 8 : BLOCK [1, LONG];           ! Format code
2
```

```
;  516          0578  2      LOCAL
;  517          0579  2          ACT : BLOCK [1, LONG],                   ! Action table entry for format code
;  518          0580  2          BUF_PTR,                                 ! Output buffer pointer from ISB
;  519          0581  2          FMT_W,                                   ! Output field width from ISB
;  520          0582  2          DSC : BLOCK [8, BYTE];                   ! Static string desciptor for output field
;  521          0583  2
;  522          0584  2      EL_SIZE = .ELEM_SIZE;
;  523          0585  2
;  524          0586  2      !+
;  525          0587  2      !  If ELEM_TYPE is zero, then we must be in end-of-list processing.
;  526          0588  2      !  If so, set DT_SEEN to 1 so that we won't try executing a data
;  527          0589  2      !  transmitter.  If not, set DT_SEEN to zero.
;  528          0590  2      !-
;  529          0591  2
;  530          0592  2      IF .ELEM_TYPE EQL 0 THEN DT_SEEN = 1 ELSE DT_SEEN = 0;
;  531          0593  2
;  532          0594  2      !+
;  533          0595  2      ! Perform loop beginning with a call to the format
;  534          0596  2      ! interpreter and continue processing until we get
;  535          0597  2      ! a format code for transmitting the user I/O list data
;  536          0598  2      ! element (i.e., Q,A,L,O,Z,I,F,E,G,D) in which case perform
;  537          0599  2      ! the output conversion and return to the user program.
;  538          0600  2      ! For other formats which do output without reference to
;  539          0601  2      ! the user I/O list, perform output formatting and continue
;  540          0602  2      ! loop (i.e., EOF, /, $, :, T, X, H)
;  541          0603  2      !-
;  542          0604  2
;  543          0605  2      WHILE 1 DO
;  544          0606  2
;  545          0607  2      !+
;  546          0608  2      ! Get next format code requiring output interpretation:
;  547          0609  2      !     1. If repeating an explicit format code, the code
;  548          0610  2      !         is simply obtained from the B_FMT_CODE field of the ISB.
;  549          0611  2      !
;  550          0612  2      !     2. In other cases it is necessary to call FOR$$FMT_INTRP1
;  551          0613  2      !
;  552          0614  2      ! Dispatch on format code and select appropriate actions.
;  553          0615  2      !-
;  554          0616  2
;  555          0617  3          BEGIN
;  556          0618  3
;  557          0619  3          IF .CCB [ISB$W_FMT_REP] GTR 1 AND .CCB [ISB$B_FMT_CODE] LSSU _DA
;  558          0620  3          THEN
;  559          0621  4              BEGIN
;  560          0622  4              FMT_CODE = .CCB [ISB$B_FMT_CODE];
;  561          0623  4              ACT = .WF_ACT [.FMT_CODE];
;  562          0624  4
;  563          0625  4              IF .DT_SEEN
;  564          0626  4              THEN
;  565          0627  4
;  566          0628  4                  IF .ACT [WF_EOLST] THEN EXITLOOP;
;  567          0629  4
;  568          0630  4              CCB [ISB$W_FMT_REP] = .CCB [ISB$W_FMT_REP] - 1;
;  569          0631  4              END
;  570          0632  3          ELSE
;  571          0633  4              BEGIN
;  572          0634  4
```

```
4           !+
4           ! If DT_SEEN is true, then we only want to krow if the next
4           ! format code would transmit a data item.  Rather than have
4           ! the high overhead of calling the format interpreter, we
4           ! can look ahead into the format for this information.  We
4           ! can't make a 100% determination, so if the format is not
4           ! an "EOLST" type, call the format interpreter anyway.
4           ! This is a speed optimization.  If necessary, the code
4           ! between the "!**"s can be removed with no functionality loss.
4           !-
4
4           !**
4
4           IF .DT_SEEN
4           THEN
5               BEGIN
5
5               LOCAL
5                   P;                              ! Pointer into format
5
5               P = .CCB [ISB$A_FMT_PTR];
5               FMT_CODE = CH$RCHAR (.P);           ! Get next format code
5               FMT_CODE [V_FMT_REPRE] = 0;         ! Clear bit for comparison
5               ACT = .WF_ACT [.FMT_CODE];
5
5               IF .ACT [WF_EOLST] THEN EXITLOOP;          ! End of list type
5
4               END;
4
4           !**
4
4           FOR$$FMT_INTRP1 ();             ! Call format interpreter.
4                                           ! Implicit arguments are EL_SIZE
4                                           ! and DT_SEEN.  Implicit result
4                                           ! is FMT_CODE.
4
4           ACT = .WF_ACT [.FMT_CODE];
4
4           !+
4           ! If DT_SEEN was set, and the next format character was
4           ! an "end of list", the format interpreter returned a format
4           ! code of zero, without evaluating VFE's or advancing the
4           ! pointer.  Therefore, if we have now seen a data transmitter
4           ! and this is an "end of list" format code, we can exit.
4           !-
4
4           IF .DT_SEEN AND .ACT [WF_EOLST] THEN EXITLOOP;
4
3           END;
3
3       !+
3       ! Check for field extending beyond end of output buffer.
3       ! SIGNAL_STOP FOR$_OUTSTAOVE if the buffer is exceeded.
3       ! Advance buffer pointer in ISB.
3       !-
3
3       BUF_PTR = .CCB [LUB$A_BUF_PTR];
```

```
;  630        0692  3         FMT_W = .CCB [ISB$W_FMT_W];
;  631        0693  3
;  632        0694  3         IF .ACT [WF_CHECKW]
;  633        0695  3         THEN
;  634        0696  4             BEGIN
;  635        0697  4             CCB [LUB$A_BUF_PTR] = .BUF_PTR + .FMT_W;
;  636        0698  4
;  637        0699  5             IF (.CCB [LUB$A_BUF_PTR] GTR .CCB [LUB$A_BUF_END])
;  638        0700  4             THEN
;  639        0701  5                 BEGIN
;  640        0702  5                 FOR$$SIGNAL_STO (FOR$K_OUTSTAOVE);
;  641        0703  5                 RETURN;
;  642        0704  4                 END;
;  643        0705  4
;  644        0706  4             !+
;  645        0707  4             ! Fill with blanks between high water mark and here, if
;  646        0708  4             ! "here" is higher.
;  647        0709  4             !-
;  648        0710  4
;  649        0711  5             BEGIN
;  650        0712  5             LOCAL T;
;  651        0713  5             T = .CCB [LUB$A_BUF_HIGH];
;  652        0714  6             IF (.BUF_PTR GTRA .T)
;  653        0715  5             THEN
;  654        0716  6                 BEGIN
;  655        0717  6                 CASE (CH$DIFF (.BUF_PTR, .T)) FROM 1 TO 8 OF
;  656        0718  6                     SET
;  657        0719  6                         [8] :
;  658        0720  7                             BEGIN
;  659        0721  7                             T = CH$MOVE (4, SPACES, .T);
;  660        0722  7                             T = CH$MOVE (4, SPACES, .T);
;  661        0723  6                             END;
;  662        0724  6
;  663        0725  6                         [4] :
;  664        0726  7                             BEGIN
;  665        0727  7                             T = CH$MOVE (4, SPACES, .T);
;  666        0728  6                             END;
;  667        0729  6
;  668        0730  6                         [7] :
;  669        0731  7                             BEGIN
;  670        0732  7                             T = CH$MOVE (4, SPACES, .T);
;  671        0733  7                             T = CH$MOVE (2, SPACES, .T);
;  672        0734  7                             T = CH$MOVE (1, SPACES, .T);
;  673        0735  6                             END;
;  674        0736  6
;  675        0737  6                         [3] :
;  676        0738  7                             BEGIN
;  677        0739  7                             T = CH$MOVE (2, SPACES, .T);
;  678        0740  7                             T = CH$MOVE (1, SPACES, .T);
;  679        0741  6                             END;
;  680        0742  6
;  681        0743  6                         [6] :
;  682        0744  7                             BEGIN
;  683        0745  7                             T = CH$MOVE (4, SPACES, .T);
;  684        0746  7                             T = CH$MOVE (2, SPACES, .T);
;  685        0747  6                             END;
;  686        0748  6
;  687      0749  6                         [2] :
;  688      0750  7                             BEGIN
;  689      0751  7                             T = CH$MOVE (2, SPACES, .T);
;  690      0752  6                             END;
;  691      0753  6
;  692      0754  6                         [5] :
;  693      0755  7                             BEGIN
;  694      0756  7                             T = CH$MOVE (4, SPACES, .T);
;  695      0757  7                             T = CH$MOVE (1, SPACES, .T);
;  696      0758  6                             END;
;  697      0759  6
;  698      0760  6                         [1] :
;  699      0761  7                             BEGIN
;  700      0762  7                             T = CH$MOVE (1, SPACES, .T);
;  701      0763  6                             END;
;  702      0764  6
;  703      0765  6                         [OUTRANGE] :
;  704      0766  6                             T = BLANK_FILL (CH$DIFF (.BUF_PTR, .T), .T);                      ; R
;  705      0767  6                     TES;
;  706      0768  6                 CCB [LUB$A_BUF_HIGH] = .T + .FMT_W;
;  707      0769  6                 END                                                                           ; 1
;  708      0770  6 !
;  709      0771  6 !
;  710      0772  5             ELSE
;  711      0773  5
;  712      0774  5             !+
;  713      0775  5             ! Set new high water mark if any
;  714      0776  5             !-
;  715      0777  5
;  716      0778  5                 IF .CCB [LUB$A_BUF_PTR] GTRA .CCB [LUB$A_BUF_HIGH]
;  717      0779  5                 THEN
;  718      0780  5                     CCB [LUB$A_BUF_HIGH] = .CCB [LUB$A_BUF_PTR];
;  719      0781  4             END;
;  720      0782  4
;  721      0783  4             !+
;  722      0784  4             ! Construct a string descriptor for output field if necessary.
;  723      0785  4             !-
;  724      0786  4
;  725      0787  4             IF .ACT [WF_SETDSC]
;  726      0788  4             THEN
;  727      0789  5                 BEGIN
;  728      0790  5                 DSC [DSC$B_DTYPE] = DSC$K_DTYPE_T;
;  729      0791  5                 DSC [DSC$B_CLASS] = DSC$K_CLASS_S;
;  730      0792  5                 DSC [DSC$W_LENGTH] = .FMT_W;
;  731      0793  5                 DSC [DSC$A_POINTER] = .BUF_PTR;
;  732      0794  4                 END;
;  733      0795  4
;  734      0796  3             END;
;  735      0797  3
;  736      0798  3         !+
;  737      0799  3         ! Dispatch to a format-code-specific action
;  738      0800  3         !-
;  739      0801  3
;  740      0802  3         CASE .ACT [WF_DISPAT] FROM 0 TO 9 OF
;  741      0803  3             SET
;  742      0804  3
;  743      0805  3             [0] :

        !+
        ! No action required on format code (e.g. Colon)
        !-

    ;

    [1] :

        !+
        ! EOF,SLS
        ! Write record for end of format or / format codes
        ! Do per-record formatting and write record.  Note that
        ! we now allow more than one record on direct writes.
        ! Initialize all output buffer pointer for next record
        ! in this I/O statement, e.g., ISB$A_BUF_{BEG,PTR,END,HIGH}
        ! and ISB$V_DOLLAR = 0.
        !-

        DO_WRITE (FOR$$AA_REC_PR1 + .FOR$$AA_REC_PR1 [.CCB [ISB$B_STTM_TYPE] - ISB$K_FORSTTYLO + 1])

    [2] :

        !+
        ! DLR
        ! Dollar sign: set dollar sign encountered in this
        ! record flag (ISB$V_DOLLAR). Checked when record
        ! written to determine whether to change
        ! carriage control for terminal.
        !-

        CCB [ISB$V_DOLLAR] = 1;

    [3] :

        !+
        ! No longer used.
        !-

    ;

    [4] :

        !+
        ! nX: output n spaces (n in FMT_W)
        !-

        BLANK_FILL (.FMT_W, .BUF_PTR);

    [5] :

        !+
        ! No longer used.
        !-

        ;

```

```
3              [6] :
3
3                  !+
3                  ! Q format - ignore on output but use up I/O list element
3                  ! Just exit loop and return to user program
3                  !-
3
3                  DT_SEEN = 1;
3
3              [7] :
3
3                  !+
3                  ! nA (alphanumeric) and nH (Hollerith):
3                  !
3                  ! For nA, output right-justified string in field.
3                  ! Insert leading spaces or truncate on right as
3                  ! necessary. Then exit loop and return to user program.
3                  !
3                  ! For nH, copy n (FMT_W) characters from format to
3                  ! output buffer.  Update format character pointer.
3                  !-
4                  BEGIN
4
4                  LOCAL
4                      ELEM_PTR;
4
4                  IF .FMT_CODE EQLU _A            ! Alphanumeric
4                  THEN
5                      BEGIN
5
5                      ELEM_PTR = .ELEM_ADR;
5                      IF .EL_SIZE LSSU .FMT_W
5                      THEN
5
5                          !+
5                          ! User I/O list element is smaller than
5                          ! field width w (FMT_W). Fill with
5                          ! leading spaces.
5                          !-
5
6                          BEGIN
6                          BUF_PTR = BLANK_FILL (.FMT_W - .EL_SIZE, .BUF_PTR);
6                          FMT_W = .EL_SIZE;
5                          END;
5                      DT_SEEN = 1;
5                      END
4                  ELSE                            ! Hollerith
5                      BEGIN
5                      ELEM_PTR = .CCB [ISB$A_FMT_PTR];
5                      CCB [ISB$A_FMT_PTR] = .CCB [ISB$A_FMT_PTR] + .FMT_W;
4                      END;
4
4                  !+
4                  ! Copy the correct number of bytes.  Use non-character
4                  ! moves if reasonable.
4                  !-
```

```
;  858          0920  4
;  859          0921  4                 CASE .FMT_W FROM 0 TO 8 OF
;  860          0922  4                     SET
;  861          0923  4
;  862          0924  4                     [8] :
;  863          0925  5                         BEGIN
;  864          0926  5                         COPY_QUAD_A (ELEM_PTR, BUF_PTR);
;  865          0927  4                         END;
;  866          0928  4
;  867          0929  4                     [4] :
;  868          0930  5                         BEGIN
;  869          0931  5                         COPY_LONG_A (ELEM_PTR, BUF_PTR);
;  870          0932  4                         END;
;  871          0933  4
;  872          0934  4                     [7] :
;  873          0935  5                         BEGIN
;  874          0936  5                         COPY_LONG_A (ELEM_PTR, BUF_PTR);
;  875          0937  5                         COPY_WORD_A (ELEM_PTR, BUF_PTR);
;  876          0938  5                         COPY_BYTE_A (ELEM_PTR, BUF_PTR);
;  877          0939  4                         END;
;  878          0940  4
;  879          0941  4                     [3] :
;  880          0942  5                         BEGIN
;  881          0943  5                         COPY_WORD_A (ELEM_PTR, BUF_PTR);
;  882          0944  5                         COPY_BYTE_A (ELEM_PTR, BUF_PTR);
;  883          0945  4                         END;
;  884          0946  4
;  885          0947  4                     [6] :
;  886          0948  5                         BEGIN
;  887          0949  5                         COPY_LONG_A (ELEM_PTR, BUF_PTR);
;  888          0950  5                         COPY_WORD_A (ELEM_PTR, BUF_PTR);
;  889          0951  4                         END;
;  890          0952  4
;  891          0953  4                     [2] :
;  892          0954  5                         BEGIN
;  893          0955  5                         COPY_WORD_A (ELEM_PTR, BUF_PTR);
;  894          0956  4                         END;
;  895          0957  4
;  896          0958  4                     [5] :
;  897          0959  5                         BEGIN
;  898          0960  5                         COPY_LONG_A (ELEM_PTR, BUF_PTR);
;  899          0961  5                         COPY_BYTE_A (ELEM_PTR, BUF_PTR);
;  900          0962  4                         END;
;  901          0963  4
;  902          0964  4                     [1] :
;  903          0965  5                         BEGIN
;  904          0966  5                         COPY_BYTE_A (ELEM_PTR, BUF_PTR);
;  905          0967  4                         END;
;  906          0968  4
;  907          0969  4                     [0] :
;  908          0970  4                         ;
;  909          0971  4
;  910          0972  4                     [OUTRANGE] :
;  911          0973  4                         MOVE_CHAR (.FMT_W, .ELEM_PTR, .BUF_PTR);
;  912          0974  4                     TES;
;  913          0975  4
;  914          0976  3                 END;
;  915        0977  3
;  916        0978  3              [8] :
;  917        0979  3
;  918        0980  3                  !+
;  919        0981  3                  ! All integer formats (L,O,I,Z) output:
;  920        0982  3                  ! 1) Check data type. If user I/O list element is not integer (B,W,L,WU,LU),
;  921        0983  3                  ! and is not O or Z format,
;  922        0984  3                  ! SIGNAL FOR$_FORVARMIS (61='FORMAT VARIABLE-TYPE MISMATCH').
;  923        0985  3                  ! Then exit loop and return to user program.
;  924        0986  3                  !-
;  925        0987  3
;  926        0988  4                  BEGIN
;  927        0989  4
;  928        0990  4                  LOCAL
;  929        0991  4                      S;                          ! No. of addressable units in user I/O list
;  930        0992  4
;  931        0993  4                  ! element.
;  932        0994  4
;  933        0995  4                  !+
;  934        0996  4                  ! Compensate for extended format codes.
;  935        0997  4                  !-
;  936        0998  4
;  937        0999  4                  IF .FMT_CODE GEQU XO
;  938        1000  4                  THEN
;  939        1001  5                      FMT_CODE = .FMT_CODE - (_L + (XO - _O))
;  940        1002  4                  ELSE
;  941        1003  5                      BEGIN
;  942        1004  5                      FMT_CODE = .FMT_CODE - _L;
;  943        1005  5                      CCB [ISB$B_FMT_D] = 1;      ! Digits in integer part
;  944        1006  4                      END;
;  945        1007  4
;  946        1008  5                  IF .ELEM_TYPE GEQU DSC$K_DTYPE_Q AND (.FMT_CODE EQLU (_I - _L) OR .FMT_CODE EQLU (_L - _L))
;  947        1009  4                  THEN
;  948        1010  5                      BEGIN
;  949        1011  5                      CCB [ISB$B_ERR_NO] = FOR$K_FORVARMIS;
;  950        1012  5                      S = %UPVAL;                 ! treat as if long
;  951        1013  5                      END
;  952        1014  4                  ELSE
;  953        1015  4                      S = .EL_SIZE;
;  954        1016  4
;  955        1017  4                  !+
;  956        1018  4                  ! Call appropriate conversion routine.  If it doesn't fit,
;  957        1019  4                  ! signal FOR$_OUTCONERR.
;  958        1020  4                  !-
;  959        1021  4
;  960        1022  4                  IF NOT (.AA_OUT_FIX [.FMT_CODE]) (.ELEM_ADR, DSC, .CCB [ISB$B_FMT_D], .S,
;  961        1023  4                          .CCB [ISB$B_OUT_FLAGS])
;  962        1024  4                  THEN
;  963        1025  4                      CCB [ISB$B_ERR_NO] = FOR$K_OUTCONERR;
;  964        1026  4
;  965        1027  4                  DT_SEEN = 1;
;  966        1028  3                  END;
;  967        1029  3
;  968        1030  3              [9] :
;  969        1031  3
;  970        1032  3                  !+
;  971        1033  3                  ! Determine correct conversion routine for datatype.
```

```
3           ! If value is not floating, signal FOR$_FORVARMIS.
3           ! Set scale factor and number of integer digits
3           ! appropriately and convert.
3           !-
4           BEGIN
4
4           LOCAL
4               SCALE,                          ! True scale factor
4               INT_DIGITS;                     ! Number of integer digits
4
4           !+
4           ! Adjust format code for extended formats and offset
4           ! to first floating format code.  Also set flag
4           ! indicating that exponent field width overflow is an
4           ! error for extended formats.
4           !-
4
4           IF .FMT_CODE GEQU XE
4           THEN
5               BEGIN
5               FMT_CODE = .FMT_CODE - (3 + _F);
5               CCB [ISB$V_ERR_OFLO] = 1;
5               END
4           ELSE
5               BEGIN
5               FMT_CODE = .FMT_CODE - _F;
5               CCB [ISB$V_ERR_OFLO] = 0;
4               END;
4
4
4           !+
4           ! Now do the conversion.  Set locals for scale factor and
4           ! number of integer digits based on the format code.
4           !-
4
5           IF .FMT_CODE EQLU (_F - _F)      ! _F was subtracted above
4           THEN
5               BEGIN
5               SCALE = .CCB [ISB$B_FMT_P];
5               INT_DIGITS = 0;
5               END
4           ELSE
5               BEGIN
5               SCALE = 0;
5               INT_DIGITS = .CCB [ISB$B_FMT_P];
4               END;
4
4           !+
4           ! Choose proper conversion routine and do the conversion.
4           ! If not a floating type, then use F_floating conversion.
4           !-
4
5               BEGIN
5
5               LOCAL
5                   CVT_TYPE;
```

```
: 1029          1091  5
: 1030        P 1092  5                     IF NOT ONE_OF (.ELEM_TYPE, DSC$K_DTYPE_F, DSC$K_DTYPE_D,
: 1031          1093  6                         DSC$K_DTYPE_G, DSC$K_DTYPE_H)
: 1032          1094  5                     THEN
: 1033          1095  6                         BEGIN
: 1034          1096  6                         CVT_TYPE = TYP_F;
: 1035          1097  6                         CCB [ISB$B_ERR_NO] = FOR$K_FORVARMIS;
: 1036          1098  6                         END
: 1037          1099  5                     ELSE
: 1038          1100  5                         CVT_TYPE = .DTP_TO_TYP [.ELEM_TYPE];
: 1039          1101  5                     IF NOT (.AA_OUT_FLT [.CVT_TYPE, .FMT_CODE]) (.ELEM_ADR,
: 1040          1102  5                         DSC, .CCB [ISB$B_FMT_D], .SCALE, .INT_DIGITS,
: 1041          1103  5                         .CCB [ISB$B_FMT_E], .CCB [ISB$B_OUT_FLAGS])
: 1042          1104  5                     THEN
: 1043          1105  5                         CCB [ISB$B_ERR_NO] = FOR$K_OUTCONERR;
: 1044          1106  5
: 1045          1107  4                     END;
: 1046          1108  4
: 1047          1109  4                 !+
: 1048          1110  4                 ! Exit loop and return to user program
: 1049          1111  4                 !-
: 1050          1112  4
: 1051          1113  4                 DT_SEEN = 1;
: 1052          1114  3                 END;                             ! End of F,E,G,D output
: 1053          1115  3             TES;                                 ! End of CASE
: 1054          1116  3
: 1055          1117  2         END;                                     ! End of processing loop
: 1056          1118  2
: 1057          1119  2     RETURN;                                      ! Return from FOR$$UDF_WF1 routine
: 1058          1120  1     END;                                         ! End of FOR$$UDF_WF1



                                                      07FC 00000          .ENTRY  FOR$$UDF_WF1, Save R2,R3,R4,R5,R6,R7,R8,R9,-; 0464
                                                                                  R10                                          :
                                        5E              08 C2 00002          SUBL2   #8, SP                                       :
                                        5A      08      AC D0 00005          MOVL    ELEM_SIZE, EL_SIZE                           ; 0584
                                        55      04      AC D0 00009          MOVL    ELEM_TYPE, R5                                ; 0592
                                                        03 12 0000D          BNEQ    1$                                           :
                                                      0272 31 0000F          BRW     53$                                          :
                                                        59 D4 00012 1$:      CLRL    DT_SEEN                                      :
                                        01      8D      AB B1 00014 2$:      CMPW    -115(CCB), #1                                ; 0619
                                                        1D 15 00018          BLEQ    4$                                           :
                                        29      8F      AB 91 0001A          CMPB    -113(CCB), #41                               :
                                                        17 1E 0001E          BGEQU   4$                                           :
                                        58      8F      AB 9A 00020          MOVZBL  -113(CCB), FMT_CODE                          ; 0622
                                        57    FE6E    CF48 9A 00024          MOVZBL  WF_ACT[FMT_CODE], ACT                        ; 0623
                                        05              59 E9 0002A          BLBC    DT_SEEN, 3$                                  ; 0625
                                                        57 95 0002D          TSTB    ACT                                          ; 0628
                                                        01 18 0002F          BGEQ    3$                                           :
                                                           04 00031          RET                                                  :
                                                8D      AB B7 00032 3$:      DECW    -115(CCB)                                    ; 0630
                                                        2D 11 00035          BRB     6$                                           ; 0619
                                        16              59 E9 00037 4$:      BLBC    DT_SEEN, 5$                                  ; 0648
                                        50      80      AB D0 0003A          MOVL    -128(CCB), P                                 ; 0655
```

```
                                  58           60 9A 0003E        MOVZBL   (P), FMT_CODE                         ; 0656
                                  58     80    8F 8A 00041        BICB2    #128, FMT_CODE                        ; 0657
                                  57   FE4D  CF48 9A 00045        MOVZBL   WF_ACT[FMT_CODE], ACT                 ; 0658
                                               57 95 0004B        TSTB     ACT                                   ; 0660
                                               01 18 0004D        BGEQ     5$                                    ;
                                                  04 0004F        RET                                            ;
                                  00000000G    00 16 00050 5$:    JSB      FOR$$FMT_INTRP1                       ; 0666
                                  57   FE3C  CF48 9A 00056        MOVZBL   WF_ACT[FMT_CODE], ACT                 ; 0671
                                  05           59 E9 0005C        BLBC     DT_SEEN, 6$                           ; 0681
                                               57 95 0005F        TSTB     ACT                                   ;
                                               01 18 00061        BGEQ     6$                                    ;
                                                  04 00063        RET                                            ;
                                  54     B0    AB D0 00064 6$:    MOVL     -80(CCB), BUF_PTR                     ; 0691
                                  56     89    AB 3C 00068        MOVZWL   -119(CCB), FMT_W                      ; 0692
                     03           57           06 E0 0006C        BBS      #6, ACT, 7$                           ; 0694
                                             0096 31 00070        BRW      21$                                   ;
               B0    AB           54           56 C1 00073 7$:    ADDL3    FMT_W, BUF_PTR, -80(CCB)              ; 0697
                            B4    AB     B0    AB D1 00078        CMPL     -80(CCB), -76(CCB)                    ; 0699
                                               0C 15 0007D        BLEQ     8$                                    ;
                                  7E     42    8F 9A 0007F        MOVZBL   #66, -(SP)                            ; 0702
                     00000000G    00           01 FB 00083        CALLS    #1, FOR$$SIGNAL_STO                   ;
                                                  04 0008A        RET                                            ; 0701
                                  50     C0    AB D0 0008B 8$:    MOVL     -64(CCB), T                           ; 0713
                                  50           54 D1 0008F        CMPL     BUF_PTR, T                            ; 0714
                                               58 1B 00092        BLEQU    19$                                   ;
                     51           54           50 C3 00094        SUBL3    T, BUF_PTR, R1                        ; 0717
                     07           01           51 CF 00098        CASEL    R1, #1, #7                            ;
      0020         002C         0038         0044    0009C 9$:    .WORD    17$-9$,-                              ;
      001B         0027         0033         003F    000A4                 15$-9$,-                              ;
                                                                           13$-9$,-                              ;
                                                                           11$-9$,-                              ;
                                                                           16$-9$,-                              ;
                                                                           14$-9$,-                              ;
                                                                           12$-9$,-                              ;
                                                                           10$-9$                                ;
                                               50 DD 000AC        PUSHL    T                                     ; 0766
                                               51 DD 000AE        PUSHL    R1                                    ;
                         0000V    CF           02 FB 000B0        CALLS    #2, BLANK_FILL                        ;
                                               2E 11 000B5        BRB      18$                                   ;
                                  80   FE14    CF D0 000B7 10$:   MOVL     SPACES, (T)+                          ; 0721
                                  80   FE0F    CF D0 000BC 11$:   MOVL     SPACES, (T)+                          ; 0727
                                               22 11 000C1        BRB      18$                                   ; 0717
                                  80   FE08    CF D0 000C3 12$:   MOVL     SPACES, (T)+                          ; 0732
                                  80   FE03    CF B0 000C8 13$:   MOVW     SPACES, (T)+                          ; 0739
                                               11 11 000CD        BRB      17$                                   ; 0740
                                  80   FDFC    CF D0 000CF 14$:   MOVL     SPACES, (T)+                          ; 0745
                                  80   FDF7    CF B0 000D4 15$:   MOVW     SPACES, (T)+                          ; 0751
                                               0A 11 000D9        BRB      18$                                   ; 0717
                                  80   FDF0    CF D0 000DB 16$:   MOVL     SPACES, (T)+                          ; 0756
                                  80   FDEB    CF 90 000E0 17$:   MOVB     SPACES, (T)+                          ; 0762
               C0    AB           50           56 C1 000E5 18$:   ADDL3    FMT_W, T, -64(CCB)                    ; 0768
                                               0C 11 000EA        BRB      20$                                   ; 0714
                            C0    AB     B0    AB D1 000EC 19$:   CMPL     -80(CCB), -64(CCB)                    ; 0778
                                               05 1B 000F1        BLEQU    20$                                   ;
                            C0    AB     B0    AB D0 000F3        MOVL     -80(CCB), -64(CCB)                    ; 0780
                     0D           57           05 E1 000F8 20$:   BBC      #5, ACT, 21$                          ; 0787
                            02    AE   010E    8F B0 000FC        MOVW     #270, DSC+2                           ; 0790
                         6E            56 B0 00102       MOVW    FMT_W, DSC                         ; 0792
                    04   AE            54 D0 00105       MOVL    BUF_PTR, DSC+4                     ; 0793
      53      57         04            00 EF 00109 21$:  EXTZV   #0, #4, ACT, R3                    ; 0802
              09         00            53 CF 0010E       CASEL   R3, #0, #9                         ;
    FF02    0032       0017          FF02    00112 22$:  .WORD   2$-22$,-                           ;
    0045    0172       FF02          0039    0011A               23$-22$,-                          ;
                       0105          00B9    00122               24$-22$,-                          ;
                                                                 2$-22$,-                           ;
                                                                 25$-22$,-                          ;
                                                                 2$-22$,-                           ;
                                                                 53$-22$,-                          ;
                                                                 26$-22$,-                          ;
                                                                 39$-22$,-                          ;
                                                                 45$-22$                            ;
                                     FEEB 31 00126       BRW     2$                                 ;
                         50     FF71   CB 9A 00129 23$:  MOVZBL  -143(CCB), R0                      ; 0825
                         50 00000000G0040 D0 0012E       MOVL    FOR$$AA_REC_PR1[R0], R0            ;
                         50 00000000G0040 9E 00136       MOVAB   FOR$$AA_REC_PR1[R0], R0            ;
                                    0000V 30 0013E       BSBW    DO_WRITE                           ;
                                     FED0 31 00141       BRW     2$                                 ;
                    96   AB            04 88 00144 24$:  BISB2   #4, -106(CCB)                      ; 0837
                                     FEC9 31 00148       BRW     2$                                 ;
                                       54 DD 0014B 25$:  PUSHL   BUF_PTR                            ; 0853
                                       56 DD 0014D       PUSHL   FMT_W                              ;
                 0000V   CF            02 FB 0014F       CALLS   #2, BLANK_FILL                     ;
                                     FEBD 31 00154       BRW     2$                                 ;
                         15            58 D1 00157 26$:  CMPL    FMT_CODE, #21                      ; 0890
                                       1F 12 0015A       BNEQ    28$                                ;
                         52       0C   AC D0 0015C       MOVL    ELEM_ADR, ELEM_PTR                 ; 0894
                         56            5A D1 00160       CMPL    EL_SIZE, FMT_W                     ; 0895
                                       11 1E 00163       BGEQU   27$                                ;
                                       54 DD 00165       PUSHL   BUF_PTR                            ; 0905
              7E         56            5A C3 00167       SUBL3   EL_SIZE, FMT_W, -(SP)              ;
                 0000V   CF            02 FB 0016B       CALLS   #2, BLANK_FILL                     ;
                         54            50 D0 00170       MOVL    R0, BUF_PTR                        ;
                         56            5A D0 00173       MOVL    EL_SIZE, FMT_W                     ; 0906
                         59            01 D0 00176 27$:  MOVL    #1, DT_SEEN                        ; 0908
                                       08 11 00179       BRB     29$                                ; 0890
                         52       80   AB D0 0017B 28$:  MOVL    -128(CCB), ELEM_PTR                ; 0912
                    80   AB            56 C0 0017F       ADDL2   FMT_W, -128(CCB)                   ; 0913
              08         00            56 CF 00183 29$:  CASEL   FMT_W, #0, #8                      ; 0921
    002D    0035       003E          FE8D    00187 30$:  .WORD   2$-30$,-                           ;
    002A    0032       003B          0024    0018F               38$-30$,-                          ;
                                     001E    00197               36$-30$,-                          ;
                                                                 34$-30$,-                          ;
                                                                 32$-30$,-                          ;
                                                                 37$-30$,-                          ;
                                                                 35$-30$,-                          ;
                                                                 33$-30$,-                          ;
                                                                 31$-30$                            ;
                                       14 BB 00199       PUSHR   #^M<R2,R4>                         ; 0973
                                       56 DD 0019B       PUSHL   FMT_W                              ;
                 0000V   CF            03 FB 0019D       CALLS   #3, MOVE_CHAR                      ;
                                     FE6F 31 001A2       BRW     2$                                 ;
                         84            82 7D 001A5 31$:  MOVQ    (ELEM_PTR)+, (BUF_PTR)+            ; 0926
                                     FE69 31 001A8       BRW     2$                                 ; 0921
                         84            82 D0 001AB 32$:  MOVL    (ELEM_PTR)+, (BUF_PTR)+            ; 0931
```

```
                          FE63  31 001AE        BRW     2$                                    ; 0921
             84             82  D0 001B1 33$:   MOVL    (ELEM_PTR)+, (BUF_PTR)+               ; 0936
             84             82  B0 001B4 34$:   MOVW    (ELEM_PTR)+, (BUF_PTR)+               ; 0943
                            0C  11 001B7        BRB     38$                                   ; 0944
             84             82  D0 001B9 35$:   MOVL    (ELEM_PTR)+, (BUF_PTR)+               ; 0949
             84             82  B0 001BC 36$:   MOVW    (ELEM_PTR)+, (BUF_PTR)+               ; 0955
                          FE52  31 001BF        BRW     2$                                    ; 0921
             84             82  D0 001C2 37$:   MOVL    (ELEM_PTR)+, (BUF_PTR)+               ; 0960
             84             82  90 001C5 38$:   MOVB    (ELEM_PTR)+, (BUF_PTR)+               ; 0966
                          FE49  31 001C8        BRW     2$                                    ; 0921
             1A             58  D1 0U1CB 39$:   CMPL    FMT_CODE, #26                         ; 0999
                            05  1F 001CE        BLSSU   40$                                   ;
             58             19  C2 001D0        SUBL2   #25, FMT_CODE                         ; 1001
                            07  11 001D3        BRB     41$                                   ;
             58             16  C2 001D5 40$:   SUBL2   #22, FMT_CODE                         ; 1004
       8B    AB             01  90 001D8        MOVB    #1, -117(CCB)                         ; 1005
             09             55  D1 001DC 41$:   CMPL    R5, #9                                ; 1008
                            13  1F 001DF        BLSSU   43$                                   ;
             02             58  D1 001E1        CMPL    FMT_CODE, #2                          ;
                            04  13 001E4        BEQL    42$                                   ;
                            58  D5 001E6        TSTL    FMT_CODE                              ;
                            0A  12 001E8        BNEQ    43$                                   ;
     FF70    CB             3D  90 001EA 42$:   MOVB    #61, -144(CCB)                        ; 1011
             50             04  D0 001EF        MOVL    #4, S                                 ; 1012
                            03  11 001F2        BRB     44$                                   ; 1008
             50             5A  D0 001F4 43$:   MOVL    EL_SIZE, S                            ; 1015
             51 00000000'EF48   D0 001F7 44$:   MOVL    AA_OUT_FIX[FMT_CODE], R1              ; 1022
             7E        94   AB  9A 001FF        MOVZBL  -108(CCB), -(SP)                      ; 1023
                            50  DD 00203        PUSHL   S                                     ; 1022
             7E        8B   AB  9A 00205        MOVZBL  -117(CCB), -(SP)                      ;
                       0C   AE  9F 00209        PUSHAB  DSC                                   ;
                       0C   AC  DD 0020C        PUSHL   ELEM_ADR                              ;
             61             05  FB 0020F        CALLS   #5, (R1)                              ;
             6A             50  E9 00212        BLBC    R0, 52$                               ;
                            6D  11 00215        BRB     53$                                   ; 1027
             22             58  D1 00217 45$:   CMPL    FMT_CODE, #34                         ; 1052
                            09  1F 0021A        BLSSU   46$                                   ;
             58             21  C2 0021C        SUBL2   #33, FMT_CODE                         ; 1055
       94    AB             02  88 0021F        BISB2   #2, -108(CCB)                         ; 1056
                            07  11 00223        BRB     47$                                   ; 1052
             58             1E  C2 00225 46$:   SUBL2   #30, FMT_CODE                         ; 1060
       94    AB             02  8A 00228        BICB2   #2, -108(CCB)                         ; 1061
                            58  D5 0022C 47$:   TSTL    FMT_CODE                              ; 1070
                            08  12 0022E        BNEQ    48$                                   ;
             52        88   AB  98 00230        CVTBL   -120(CCB), SCALE                      ; 1073
                            51  D4 00234        CLRL    INT_DIGITS                            ; 1074
                            06  11 00236        BRB     49$                                   ; 1070
                            52  D4 00238 48$:   CLRL    SCALE                                 ; 1078
             51        88   AB  98 0023A        CVTBL   -120(CCB), INT_DIGITS                 ; 1079
 50 00300018 8F             55  78 0023E 49$:   ASHL    R5, #3145752, R0                      ; 1093
                            09  19 00246        BLSS    50$                                   ;
                            50  D4 00248        CLRL    CVT_TYPE                              ; 1096
     FF70    CB             3D  90 0024A        MOVB    #61, -144(CCB)                        ; 1097
                            06  11 0024F        BRB     51$                                   ; 1092
             50      FC7D CF45  9A 00251 50$:   MOVZBL  DTP_TO_TYP[R5], CVT_TYPE              ; 1100
             50           6840  DE 00257 51$:   MOVAL   (FMT_CODE)[CVT_TYPE], R0              ; 1101
             50 00000000'EF40   D0 0025B        MOVL    AA_OUT_FLT[R0], R0                    ;
```

```
                         7E      94  AB  9A 00263           MOVZBL  -108(CCB), -(SP)                     ; 1103
                         7E      8C  AB  9A 00267           MOVZBL  -116(CCB), -(SP)                     ;
                                     51  DD 0026B           PUSHL   INT_DIGITS                           ; 1102
                                     52  DD 0026D           PUSHL   SCALE                                ;
                         7E      8B  AB  9A 0026F           MOVZBL  -117(CCB), -(SP)                     ;
                                 14  AE  9F 00273           PUSHAB  DSC                                  ; 1101
                                 0C  AC  DD 00276           PUSHL   ELEM_ADR                             ;
                         60          07  FB 00279           CALLS   #7, (R0)                             ;
                         05          50  E8 0027C           BLBS    R0, 53$                              ;
                  FF70   CB          3F  90 0027F 52$:      MOVB    #63, -144(CCB)                       ; 1105
                         59          01  D0 00284 53$:      MOVL    #1, DT_SEEN                          ; 1113
                                   FD8A  31 00287           BRW     2$                                   ; 0605
                                         04 0028A           RET                                          ; 1120

; Routine Size:  651 bytes,    Routine Base:  _FOR$CODE + 0169


; 1059          1121  1
```

```
1 ROUTINE DO_WRITE (                                  ! do per-record formatting and write record
1         FOR$$REC_xn)                                ! adr. or record processing routine
1     : JSB_DO_WRITE NOVALUE =
1 !+
1 !FUNCTIONAL DESCRIPTION:
1 !
1 !       DO_WRITE is a local routine which performs any per-record
1 !       formatting (as distinguished from per I/O list element formatting)
1 !       and then output the record by calling the appropriate
1 !       record processing routine depending on the statement type
1 !       (ISB$BSTTM_TYPE) and formal parameter FOR$$REC_xn which
1 !       is either (1) FOR$$REC_x1 if this is not the last record
1 !       of the I/o statement or (2) FOR$$REC_x9 if the is the last
1 !       record of the I/O statement, i.e., this is the end of I/O list call.
1 !       Note: DO_WRITE is also called directly from FOR$$UDF_WF9 on end of
1 !       I/O list if at end of format too.  Therefore, all end of
1 !       list processing should be kept here in DO_WRITE.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       JSB DO_WRITE (R0=for$$rec_xn.s.ar)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       FOR$$REC_xn.s.ar        Adr. of record processing routine
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       CCB                     Pointer to current logical unit block
1 !
1 ! The following locations are set only by previous calls to
1 ! FOR$$UDF_WF{0,1}, i.e., are effectively OWN for this module.
1 !
1 !       LUB$A_BUF_BEG           Pointer to first char. position in
1 !                               user data part of output buffer
1 !       LUB$A_BUF_PTR           Pointer to next char. position
1 !                               in user data part of output buffer
1 !       LUB$A_BUF_HIGH          Pointer to highest char. position
1 !                               written so far on any T format code
1 !       LUB$A_BUF_END           Pointer to last+1 char. position
1 !                               in user data part of output buffer
1 !       ISB$V_DOLLAR            Dollar sign seen in format for this
1 !                               record, if 1. Change carriage
1 !                               control SP to $, + to Null.
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 ! The following locations are set only by previous calls
1 ! to FOR$$UDF_WF{0,1}, i.e., are effectively OWN for this module.
1 !
1 !       LUB$A_BUF_BEG           Pointer: set to first char. position
1 !                               of next output buffer to be filled.
1 !       LUB$A_BUF_PTR           Pointer: set to first char. position
1 !                               in user data part of output buffer to be filled
1 !       LUB$A_BUF_HIGH          Pointer: set to first char. position
1 !                               of user data part of output buffer to be filled
1 !       ISB$V_DOLLAR            Set to 0
```

```
; 1118          1179  1 !--
; 1119          1180  1
; 1120          1181  2     BEGIN
; 1121          1182  2
; 1122          1183  2     EXTERNAL REGISTER
; 1123          1184  2         CCB : REF $FOR$CCB_DECL;
; 1124          1185  2
; 1125          1186  2     !+
; 1126          1187  2     ! 1) If $ seen in format for current record (ISB$V_DOLLAR=1),
; 1127          1188  2     ! and carriage control is FORTRAN, and buffer contains at least one
; 1128          1189  2     ! character, change carriage control character space to $
; 1129          1190  2     ! or + to Null for terminal dialog no CR's
; 1130          1191  2     ! and/or LF's.
; 1131          1192  2     !-
; 1132          1193  2
; 1133          1194  2     IF .CCB [ISB$V_DOLLAR]
; 1134          1195  2     THEN
; 1135          1196  2         IF .CCB [LUB$V_FTN]
; 1136          1197  2         THEN
; 1137          1198  2             IF .CCB [LUB$A_BUF_END] - .CCB [LUB$A_BUF_BEG] GTR 0
; 1138          1199  2             THEN
; 1139          1200  3                 BEGIN
; 1140          1201  3
; 1141          1202  3                 IF CH$RCHAR (.CCB [LUB$A_BUF_BEG]) EQL %C' ' THEN CH_WCHAR (.CCB [LUB$A_BUF_BEG]) = %C'$';
; 1142          1203  3
; 1143          1204  3                 IF CH$RCHAR (.CCB [LUB$A_BUF_BEG]) EQL %C'+' THEN CH_WCHAR (.CCB [LUB$A_BUF_BEG]) = 0;
; 1144          1205  3
; 1145          1206  2                 END;
; 1146          1207  2
; 1147          1208  2     !+
; 1148          1209  2
; 1149          1210  2     !+
; 1150          1211  2     ! 2) Set buffer pointer to the high water mark.  The REC level will
; 1151          1212  2     ! then fill with blanks from there to the end of the buffer.
; 1152          1213  2     !-
; 1153          1214  2
; 1154          1215  2     CCB [LUB$A_BUF_PTR] = .CCB [LUB$A_BUF_HIGH];
; 1155          1216  2     JSB_REC1 (.FOR$$REC_xn);
; 1156          1217  2
; 1157          1218  2     !+
; 1158          1219  2     ! 3) Initialize beginning and highest pointer
; 1159          1220  2     ! (T format) and dollar-sign-seen-this-record flag
; 1160          1221  2     !-
; 1161          1222  2
; 1162          1223  2     CCB [LUB$A_BUF_BEG] = .CCB [LUB$A_BUF_PTR];
; 1163          1224  2     CCB [LUB$A_BUF_HIGH] = .CCB [LUB$A_BUF_PTR];
; 1164          1225  2     CCB [ISB$V_DOLLAR] = 0;
; 1165          1226  2     RETURN;                                 ! Return from DO_WRITE routine
; 1166          1227  1     END;                                    ! End of DO_WRITE routine



                    1E       96   AB            02  E1 00000 DO_WRITE:
                                                                  BBC     #2, -106(CCB), 2$                         ; 1194
                                            A0    AB  95 00005    TSTB    -96(CCB)                                  ; 1196
```

```
                                     19  18 00008          BGEQ     2$                                    ;
                          51    BC   AB  D0 0000A          MOVL     -68(CCB), R1                          ; 1198
                          51    B4   AB  D1 0000E          CMPL     -76(CCB), R1                          ;
                                     0F  15 00012          BLEQ     2$                                    ;
                          20         61  91 00014          CMPB     (R1), #32                             ; 1202
                                     03  12 00017          BNEQ     1$                                    ;
                          61         24  90 00019          MOVB     #36, (R1)                             ;
                          2B         61  91 0001C  1$:     CMPB     (R1), #43                             ; 1204
                                     02  12 0001F          BNEQ     2$                                    ;
                                     61  94 00021          CLRB     (R1)                                  ;
                    B0    AB    C0   AB  D0 00023  2$:     MOVL     -64(CCB), -80(CCB)                    ; 1215
                                     60  16 00028          JSB      (FOR$$REC_XN)                         ; 1216
                    BC    AB    B0   AB  D0 0002A          MOVL     -80(CCB), -68(CCB)                    ; 1223
                    C0    AB    B0   AB  D0 0002F          MOVL     -80(CCB), -64(CCB)                    ; 1224
                    96    AB         04  8A 00034          BICB2    #4, -106(CCB)                         ; 1225
                                         05 00038          RSB                                            ; 1227

; Routine Size:  57 bytes,    Routine Base:  _FOR$CODE + 03F4


; 1167          1228  1
```

```
1 GLOBAL ROUTINE FOR$$UDF_WF9                       ! Formatted output - end of I/O list call
1     : JSB_UDF9 NOVALUE =
1
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !         FOR$$UDF_WF9 performs end of I/O list output formatting.
1 !         All format codes are processed until a data transmitting
1 !         format code is encountered (or colon) or end of format.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !         JSB FOR$$UDF_WF9 ()
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !         NONE
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !         See FOR$$UDF_WF1
1 !
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !         See FOR$$UDF_WF1
1 !
1 ! FUNCTION VALUE:
1 !
1 !         NONE
1 !
1 ! SIDE EFFECTS:
1 !
1 !         See FOR$$UDF_WF1
1 !--
1
2     BEGIN
2
2     EXTERNAL REGISTER
2         CCB : REF $FOR$CCB_DECL;
2
2     !+
2     ! If there are no items in I/O list, current format code is 0.
2     ! Call data transmit entry point with element type of 0 as
2     ! a flag. Return as soon as a data transmitting format code,
2     ! colon, or End of Format code is encountered.
2     !-
2
2     IF .CCB [ISB$B_FMT_CODE] EQL 0 THEN FOR$$UDF_WF1 (0, 0, 0);
2
2     !+
2     ! Do the final write
2     !-
2
2     DO_WRITE (FOR$$AA_REC_PR9 + .FOR$$AA_REC_PR9 [.CCB [ISB$B_STTM_TYPE] - ISB$K_FORSTTYLO + 1]);
2     RETURN;
1     END;                                          ! End of FOR$$UDF_WF9 Routine
```

```
                         8F    AB  95 00000 FOR$$UDF_WF9::
                                                  TSTB     -113(CCB)                              ; 1277
                               09  12 00003       BNEQ     1$                                     ;
                               7E  7C 00005       CLRQ     -(SP)                                  ;
                               7E  D4 00007       CLRL     -(SP)                                  ;
             FD2E   CF         03  FB 00009       CALLS    #3, FOR$$UDF_WF1                       ;
                    50    FF71 CB  9A 0000E 1$:   MOVZBL   -143(CCB), R0                          ; 1283
                    50 00000000G0040  D0 00013    MOVL     FOR$$AA_REC_PR9[R0], R0                ;
                    50 00000000G0040  9E 0001B    MOVAB    FOR$$AA_REC_PR9[R0], R0                ;
                               A2  11 00023       BRB      DO_WRITE                               ;

; Routine Size:  37 bytes,    Routine Base:  _FOR$CODE + 042D


; 1226         1286  1
; 1228          1287  1 ROUTINE BLANK_FILL (                                   ! Fill a string with blanks
; 1229          1288  1         LEN,                                           ! Fill length
; 1230          1289  1         ADDR)                                          . Buffer address
; 1231          1290  1     =
; 1232          1291  1
; 1233          1292  1 !++
; 1234          1293  1 ! FUNCTIONAL DESCRIPTION:
; 1235          1294  1 !
; 1236          1295  1 !       BLANK_FILL fills a string with blanks.  It is identical to
; 1237          1296  1 !       a CH$FILL with a first argument of %C' '.  A separate called
; 1238          1297  1 !       routine is used so that registers R0 through R5 are free in
; 1239          1298  1 !       the calling routine.
; 1240          1299  1 !
; 1241          1300  1 ! CALLING SEQUENCE:
; 1242          1301  1 !
; 1243          1302  1 !       pointer.rlu.v = BLANK_FILL (len.rlu.v, addr.wbu.r)
; 1244          1303  1 !
; 1245          1304  1 ! FORMAL PARAMETERS:
; 1246          1305  1 !
; 1247          1306  1 !       len             Number of bytes to blank fill.
; 1248          1307  1 !       addr            Address of string to fill.
; 1249          1308  1 !
; 1250          1309  1 ! IMPLICIT INPUTS:
; 1251          1310  1 !
; 1252          1311  1 !       NONE
; 1253          1312  1 !
; 1254          1313  1 ! IMPLICIT OUTPUTS:
; 1255          1314  1 !
; 1256          1315  1 !       NONE
; 1257          1316  1 !
; 1258          1317  1 ! FUNCTION VALUE:
; 1259          1318  1 !
; 1260          1319  1 !       The address of the nex. byte past the blank-filled string.
; 1261          1320  1 !
; 1262          1321  1 ! SIDE EFFECTS:
; 1263          1322  1 !
; 1264          1323  1 !       NONE
; 1265          1324  1 !
; 1266          1325  1
; 1267          1326  1 !++
; 1268          1327  2     BEGIN
; 1269          1328  2     RETURN CH$FILL (%C' ', .LEN, .ADDR);
; 1270          1329  1     END;



                                              003C 00000 BLANK_FILL:
                                                               .WORD   Save R2,R3,R4,R5                          ; 1287
     04   AC          20          6E          00  2C 00002     MOVC5   #0, (SP), #32, LEN, @ADDR                 ; 1328
                                        08    BC     00008
                                  50          53  D0 0000A     MOVL    R3, R0                                    ;
                                                  04 0000D     RET                                               ; 1329

; Routine Size:  14 bytes,    Routine Base:  _FOR$CODE + 0452
```

```
; 1272          1330  1 ROUTINE MOVE_CHAR (                                   ! Move characters
; 1273          1331  1         LEN,                                          ! Fill length
; 1274          1332  1         SOURCE,                                       ! Source address
; 1275          1333  1         DEST)                                         ! Destination address
; 1276          1334  1     : NOVALUE =
; 1277          1335  1
; 1278          1336  1 !++
; 1279          1337  1 ! FUNCTIONAL DESCRIPTION:
; 1280          1338  1 !
; 1281          1339  1 !       MOVE_CHAR moves characters from one string to another.  It is
; 1282          1340  1 !       identical to CH$MOVE except that it does not return a value.
; 1283          1341  1 !       A separate called routine is used so that registers R0 through
; 1284          1342  1 !       R5 are free in the calling routine.
; 1285          1343  1 !
; 1286          1344  1 ! CALLING SEQUENCE:
; 1287          1345  1 !
; 1288          1346  1 !       CALL MOVE_CHAR (len.rwu.v, source.rbu.r, dest.wbu.r)
; 1289          1347  1 !
; 1290          1348  1 ! FORMAL PARAMETERS:
; 1291          1349  1 !
; 1292          1350  1 !       len             Number of bytes to move.
; 1293          1351  1 !       source          Address of string to move from.
; 1294          1352  1 !       dest            Address of string to move to.
; 1295          1353  1 !
; 1296          1354  1 ! IMPLICIT INPUTS:
; 1297          1355  1 !
; 1298          1356  1 !       NONE
; 1299          1357  1 !
; 1300          1358  1 ! IMPLICIT OUTPUTS:
; 1301          1359  1 !
; 1302          1360  1 !       NONE
; 1303          1361  1 !
; 1304          1362  1 ! FUNCTION VALUE:
; 1305          1363  1 !
; 1306          1364  1 !       NONE
; 1307          1365  1 !
; 1308          1366  1 ! SIDE EFFECTS:
; 1309          1367  1 !
; 1310          1368  1 !       NONE
; 1311          1369  1 !
; 1312          1370  1
; 1313          1371  1 !++
; 1314          1372  2     BEGIN
; 1315          1373  2     CH$MOVE (.LEN, .SOURCE, .DEST);
; 1316          1374  1     END;



                                                  003C 00000 MOVE_CHAR:
                                                                  .WORD   Save R2,R3,R4,R5                              ; 1330
                 0C   BC       08   BC       04   AC  28 00002        MOVC3   LEN, @SOURCE, @DEST                           ; 1373
                                                      04 00009        RET                                                   ; 1374

; Routine Size:  10 bytes,    Routine Base:  _FOR$CODE + 0460
; 1317          1375  1 END                                                  ! End of FOR$$UDF_WF Module
; 1318          1376  1
; 1319          1377  0 ELUDOM



;                                       PSECT SUMMARY
;
;       Name                        Bytes                       Attributes
;
;  _FOR$CODE                         1130  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(2)
;  _FOR$DATA                           84  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,  PIC,ALIGN(2)



;                              Library Statistics
;
;                                                 -------- Symbols --------       Pages        Processing
;       File                                      Total     Loaded   Percent      Mapped       Time
;
;  _$255$DUA28:[SYSLIB]STARLET.L32;1               9776         11         0         581         00:01.1
;  _$255$DUA28:[FORRTL.OBJ]FORLIB.L32;1             711        210        29          52         00:00.5
;  _$255$DUA28:[FORRTL.OBJ]RTLLIB.L32;1              36          0         0           8         00:00.1



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

; Size:          1041 code + 173 data bytes
; Run Time:         00:28.7
; Elapsed Time:     01:07.5
; Lines/CPU Min:      2880
; Lexemes/CPU-Min: 17175
; Memory Used:  353 pages
; Compilation Complete
```

0184 AH-BT13A-SE
VAX/VMS V4.0

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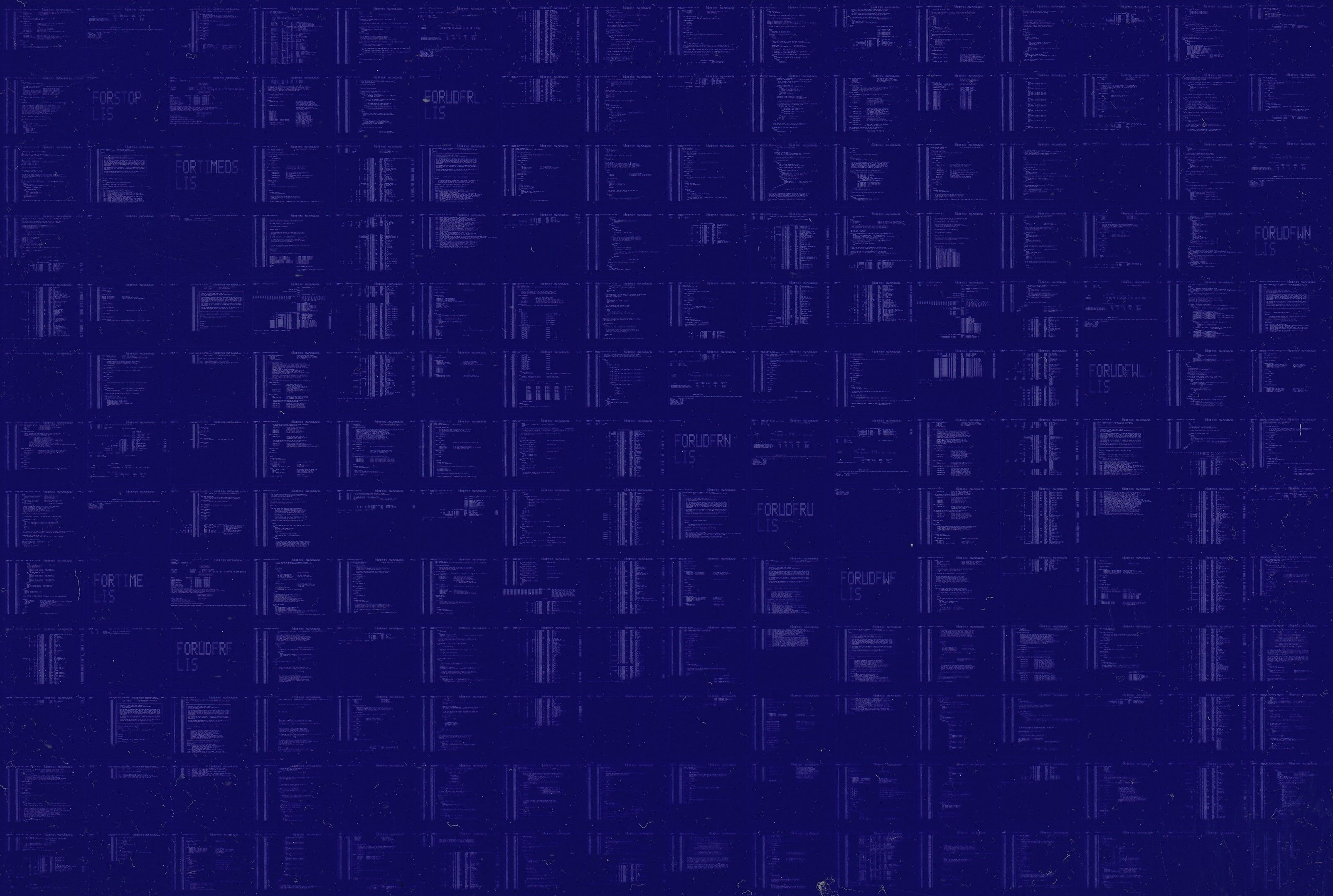
FORSTOP
LIS

FORUDFRL
LIS

FORTIMEDS
LIS

FORUDFWN
LIS

FORUDFWL
LIS

FORUDFRN
LIS

FORUDFRU
LIS

FORTIME
LIS

FORUDFWF
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FORUDFRF
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