D 8

```
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                 IIIIIIIII     BBBBBBBBBBBB     RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBB         BBB  RRR         RRR        TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBBBBBBBBBBB     RRRRRRRRRRRR           TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR   RRR              TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLL                    III        BBB         BBB  RRR      RRR           TTT        LLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
LLLLLLLLLLLLLLL     IIIIIIIII     BBBBBBBBBBBB     RRR         RRR        TTT        LLLLLLLLLLLLLLL
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```
**FILE**ID**LIBGETOPC                                   G 11
```

```
LL            IIIIII    BBBBBBBB      GGGGGGGG  EEEEEEEEEE  TTTTTTTTTT    OOOOOO    PPPPPPPP      CCCCCCCC
LL            IIIIII    BBBBBBBB      GGGGGGGG  EEEEEEEEEE  TTTTTTTTTT    OOOOOO    PPPPPPPP      CCCCCCCC
LL              II      BB      BB  GG          EE              TT      OO      OO  PP      PP  CC
LL              II      BB      BB  GG          EE              TT      OO      OO  PP      PP  CC
LL              II      BB      BB  GG          EE              TT      OO      OO  PP      PP  CC
LL              II      BBBBBBBB    GG          EEEEEEEE        TT      OO      OO  PPPPPPPP    CC
LL              II      BBBBBBBB    GG          EEEEEEEE        TT      OO      OO  PPPPPPPP    CC
LL              II      BB      BB  GG  GGGGGG  EE              TT      OO      OO  PP          CC
LL              II      BB      BB  GG  GGGGGG  EE              TT      OO      OO  PP          CC
LL              II      BB      BB  GG      GG  EE              TT      OO      OO  PP          CC              ....
LL              II      BB      BB  GG      GG  EE              TT      OO      OO  PP          CC              ....
LLLLLLLLLL    IIIIII    BBBBBBBB      GGGGGG    EEEEEEEEEE      TT        OOOOOO    PP            CCCCCCCC      ....
LLLLLLLLLL    IIIIII    BBBBBBBB      GGGGGG    EEEEEEEEEE      TT        OOOOOO    PP            CCCCCCCC      ....

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
```

Table of contents

```
0000          .TITLE  LIB$GET_OPCODE - Get opcode from debugger
0000          .IDENT  /1-001/                 ; File: LIBGETOPC.MAR Edit: SBL1001
0000
0000  ;
0000  ;****************************************************************************
0000  ;*                                                                          *
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0000  ;*                                                                          *
0000  ;*                                                                          *
0000  ;****************************************************************************
0000  ;
0000
0000  ;++
0000  ; FACILITY: General Utility Library
0000  ;
0000  ; ABSTRACT:
0000  ;
0000  ;       This module contains a procedure which asks the debugger if
0000  ;       a particular instruction has been modified by it.
0000  ;
0000  ; ENVIRONMENT: Runs at any access mode, AST Reentrant
0000  ;
0000  ; AUTHOR: Steven B. Lionel, CREATION DATE: 04-Dec-1981
0000  ;
0000  ; MODIFIED BY:
0000  ;
0000  ; 1-001 - Original. SBL 04-DEC-1981
0000  ;--
```

```
    0000          .SBTTL  DECLARATIONS
    0000  ;
    0000  ; LIBRARY MACRO CALLS:
    0000  ;
    0000          $SSDEF                  ; SS$_ symbols
    0000          $CHFDEF                 ; Condition handling facility symbols
    0000  ;
    0000  ; EXTERNAL DECLARATIONS:
    0000  ;
    0000          .DSABL  GBL             ; Force all external symbols to be declared
    0000          .EXTRN  LIB$SIGNAL      ; Signal exception
    0000
    0000  ;
    0000  ; MACROS:
    0000  ;
    0000          NONE
    0000  ;
    0000  ; EQUATED SYMBOLS:
    0000  ;
    0000          NONE
    0000  ;
    0000  ; OWN STORAGE:
    0000  ;
    0000          NONE
    0000  ;
    0000  ; PSECT DECLARATIONS:
    0000  ;
00000000          .PSECT _LIB$CODE PIC, USR, CON, REL, LCL, SHR, -
    0000                          EXE, RD, NOWRT, LONG
    0000
```

```
          0000          .SBTTL  LIB$GET_OPCODE
          0000  ;++
          0000  ; FUNCTIONAL DESCRIPTION:
          0000  ;
          0000  ;       LIB$GET__OPCODE returns as its function value the opcode of
          0000  ;       an instruction which may have been replaced by a debugger.
          0000  ;       For example, VAX-11 DEBUG replaces instructions for which
          0000  ;       breakpoints have been set with BPT. It is designed to be
          0000  ;       used from condition handlers which understand instruction
          0000  ;       faults and which need to know the original contents of the
          0000  ;       instruction stream.
          0000  ;
          0000  ;       LIB$GET__OPCODE is called implicitly from LIB$DECODE__FAULT,
          0000  ;       LIB$EMULATE, LIB$FIXUP__FLT and LIB$SIM__TRAP.  Therefore,
          0000  ;       it should only be used from fault handlers which do not
          0000  ;       employ LIB$DECODE__FAULT.
          0000  ;
          0000  ;       LIB$GET__OPCODE determines the original opcode by signalling
          0000  ;       the special exception "SS$__DBGOPCREQ, debugger opcode
          0000  ;       request".  This success-severity exception is signalled with
          0000  ;       two FAO arguments: the first is the PC of the instruction
          0000  ;       for which the request is being made, the second is the
          0000  ;       address of a 16-bit word where the original instruction is
          0000  ;       to be placed.  If the debugger is being used, it has a
          0000  ;       handler in the primary exception vector.  This handler
          0000  ;       recognizes SS$__DBGOPCREQ as a request for the original
          0000  ;       opcode for the indicated PC.  If the debugger has changed
          0000  ;       the instruction at that PC, it stores the original opcode at
          0000  ;       the location given as the second FAO argument. If the
          0000  ;       debugger has modified only one byte of the instruction
          0000  ;       stream, it will only write one byte to the destination. The
          0000  ;       debugger's handler then returns SS$__CONTINUE, causing
          0000  ;       execution to continue after the signal.
          0000  ;
          0000  ;       If no debugger is present, the error will be resignalled and
          0000  ;       will be intercepted by a handler inside LIB$GET__OPCODE,
          0000  ;       which will then return SS$__CONTINUE.  LIB$GET__OPCODE
          0000  ;       copies the instructioı to the destination location before
          0000  ;       signalling so that the original instruction is returned if
          0000  ;       not modified by the debugger.
          0000  ;
          0000  ; CALLING SEQUENCE:
          0000  ;
          0000  ;       opcode.wwu.v = LIB$GET__OPCODE (instruction.rzi.r)
          0000  ;
          0000  ; FORMAL PARAMETERS:
          0000  ;
00000004  0000          instruction = 4         ; The PC of the instruction
          0000                                  ; which is to be inquired about.
          0000  ;
          0000  ; IMPLICIT INPUTS:
          0000  ;
          0000  ;       NONE
          0000  ;
          0000  ; IMPLICIT OUTPUTS:
          0000  ;
          0000  ;       NONE
```

```
                              0000     ;
                              0000     ; ROUTINE VALUE:
                              0000     ;
                              0000     ;       The original instruction.
                              0000     ;
                              0000     ; SIDE EFFECTS:
                              0000     ;
                              0000     ;       NONE
                              0000     ;
                              0000     ;--
                              0000
                        0000  0000             .ENTRY  LIB$GET_OPCODE, ^M<>      ; Entry point
         50   04 AC      D0   0002             MOVL    instruction(AP), R0       ; Get instruction PC
            7E   60      9A   0006             MOVZBL  (R0), -(SP)               ; Push instruction in stack
         FD 8F   6E      91   0009             CMPB    (SP), #^XFD               ; 2-byte opcode?
                 03      1F   000D             BLSSU   10$                       ; Skip if not
            6E   60      3C   000F             MOVZWL  (R0), (SP)                ; Get 2-byte instruction
                 5E      DD   0012     10$:    PUSHL   SP                        ; Push address of saved instruction
                 50      DD   0014             PUSHL   R0                        ; Push instruction PC
       000006A1  8F      DD   0016             PUSHL   #SS$_DBGOPCREQ            ; Push "debugger opcode request" message
         6D   2B'AF      9E   001C             MOVAB   B^HANDLER, (FP)           ; Enable local handler
    00000000'GF  03      FB   0020             CALLS   #3, G^LIB$SIGNAL          ; Signal SS$_DBGOPCREQ
            50   8E      D0   0027             MOVL    (SP)+, R0                 ; Get "original" opcode in R0
                         04   002A             RET                               ; Return to caller
```

```
                                002B   159 ;++
                                002B   160 ; Local handler which does a SS$_CONTINUE if SS$_DBGOPCREQ seen.
                                002B   161 ;--
                                002B   162
                                002B   163 HANDLER:
                         0000   002B   164         .WORD   0       ; Save nothing
             50    01      9A   002D   165         MOVZBL  #SS$_CONTINUE, R0       ; Assume continue
            51   04 AC     D0   0030   166         MOVL    CHF$L_SIGARGLST(AP), R1 ; Get signal arguments list
 000006A1 8F     04 A1     D1   0034   167         CMPL    CHF$L_SIG_NAME(R1), #SS$_DBGOPCREQ ; Is it SS$_DBGOPCREQ?
                    05     13   003C   168         BEQL    10$                     ; Skip if yes
      50    0918 8F        3C   003E   169         MOVZWL  #SS$_RESIGNAL, R0       ; Resignal all other exceptions
                           04   0043   170 10$:    RET                             ; Return to condition handling
                                0044   171
                                0044   172         .END                            ; End of module LIB$GET_OPCODE
```

```
CHF$L_SIGARGLST                = 00000004
CHF$L_SIG_NAME                 = 00000004
HANDLER                          0000002B R      02
INSTRUCTION                    = 00000004
LIB$GET_OPCODE                   00000000 RG     02
LIB$SIGNAL                       ********    X   00
SS$_CONTINUE                   = 00000001
SS$_DBGOPCREQ                  = 000006A1
SS$_RESIGNAL                   = 00000918

                                              +----------------+
                                              ! Psect synopsis !
                                              +----------------+

PSECT name                      Allocation           PSECT No.  Attributes
----------                      ----------           ---------  ----------
.  ABS  .                       0000000C  (    0.)  00 (   0.)  NOPIC    USR    CON    ABS    LCL NOSHR NOEXE NORD   NOWRT NOVEC BYTE
$ABS$                           00000000  (    0.)  01 (   1.)  NOPIC    USR    CON    ABS    LCL NOSHR   EXE   RD     WRT NOVEC BYTE
_LIB$CODE                       00000044  (   68.)  02 (   2.)    PIC    USR    CON    REL    LCL   SHR   EXE   RD   NOWRT NOVEC LONG

                                           +------------------------+
                                           ! Performance indicators !
                                           +------------------------+

Phase                     Page faults    CPU Time       Elapsed Time
-----                     -----------    --------       ------------
Initialization                     29    00:00:00.04    00:00:01.79
Command processing                114    00:00:00.32    00:00:01.61
Pass 1                            191    00:00:02.59    00:00:11.68
Symbol table sort                   0    00:00:00.42    00:00:02.05
Pass 2                             47    00:00:00.55    00:00:02.72
Symbol table output                 3    00:00:00.02    00:00:00.02
Psect synopsis output               2    00:00:00.01    00:00:00.01
Cross-reference output              0    00:00:00.00    00:00:00.00
Assembler run totals              388    00:00:03.97    00:00:19.90

The working set limit was 900 pages.
21140 bytes (42 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 424 non-local and 2 local symbols.
172 source lines were read in Pass 1, producing 13 object records in Pass 2.
9 pages of virtual memory were used to define 8 macros.

                                          +--------------------------+
                                          ! Macro library statistics !
                                          +--------------------------+

Macro library name                        Macros defined
------------------                        --------------
_$255$DUA28:[SYSLIB]STARLET.MLB;2                    5

486 GETS were required to define 5 macros.

There were no errors, warnings or information messages.

MACRO/ENABLE=SUPPRESSION/DISABLE=(GLOBAL,TRACEBACK)/LIS=LIS$:LIBGETOPC/OBJ=OBJ$:LIBGETOPC MSRC$:LIBGETOPC/UPDATE=(ENH$:LIBGETOPC)
```

0207 AH-BT13A-SE
VAX/VMS V4.0

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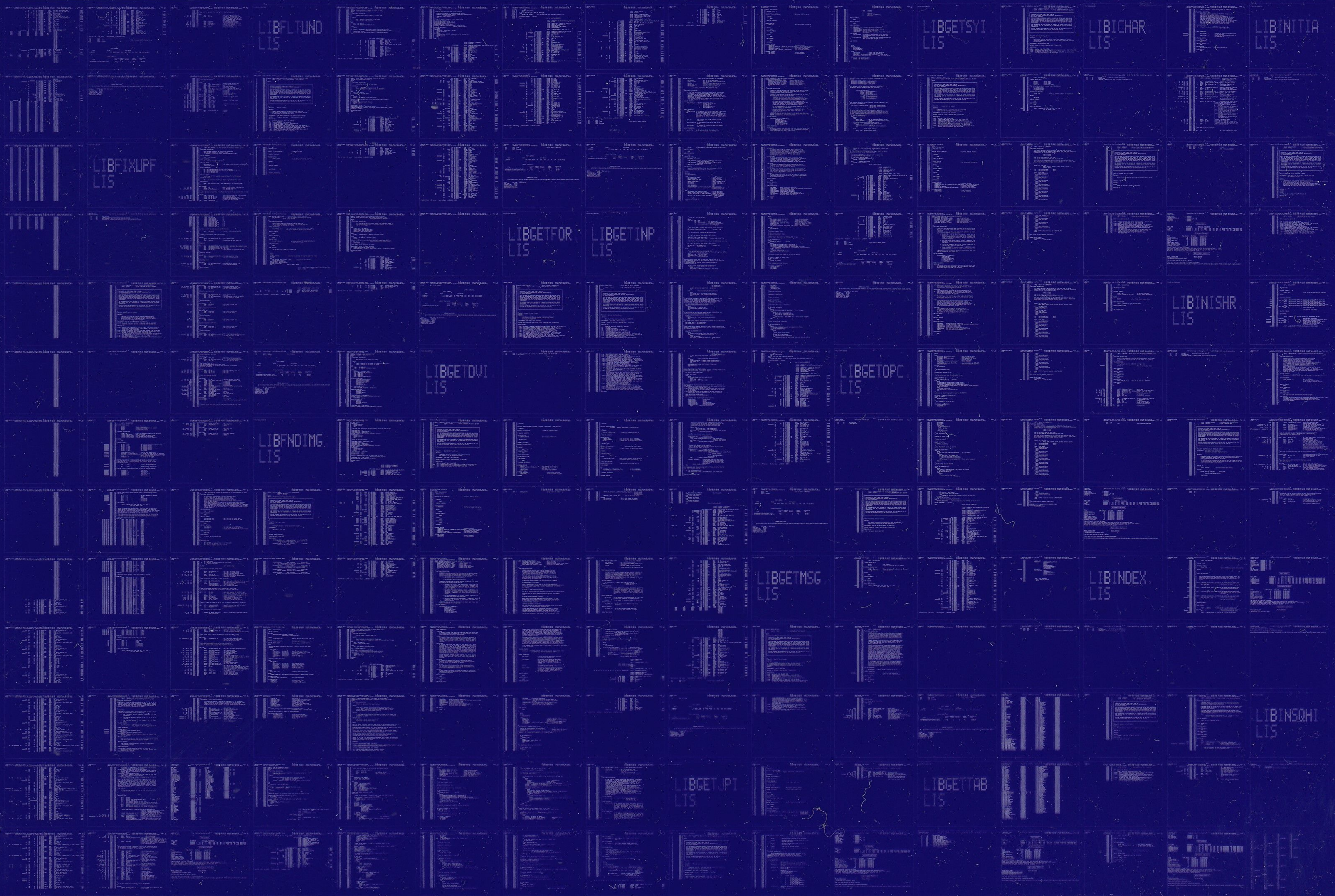

LIBFLTUND
LIS

LIBGETSYI
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LIBICHAR
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LIBINITIA
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LIBFIXUPF
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