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        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
```

FILEID**OTSLUN   N 14

```
  000000    TTTTTTTTTT    SSSSSSSS  LL          UU      UU  NN      NN
  000000    TTTTTTTTTT    SSSSSSSS  LL          UU      UU  NN      NN
00       00     TT      SS          LL          UU      UU  NN      NN
00       00     TT      SS          LL          UU      UU  NN      NN
00       00     TT      SS          LL          UU      UU  NNNN    NN
00       00     TT      SS          LL          UU      UU  NNNN    NN
00       00     TT        SSSSSS    LL          UU      UU  NN  NN  NN
00       00     TT        SSSSSS    LL          UU      UU  NN  NN  NN
00       00     TT              SS  LL          UU      UU  NN    NNNN
00       00     TT              SS  LL          UU      UU  NN    NNNN
00       00     TT              SS  LL          UU      UU  NN      NN      ....
00       00     TT              SS  LL          UU      UU  NN      NN      ....
  000000        TT      SSSSSSSS    LLLLLLLLLL  UUUUUUUUUU  NN      NN      ....
  000000        TT      SSSSSSSS    LLLLLLLLLL  UUUUUUUUUU  NN      NN      ....

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

```
    (2)        50         DECLARATIONS
    (3)        84         OTS$$GET_LUN - Allocate one logical unit number
    (4)       168         OTS$$FREE_LUN - Deallocate one logical unit number
    (5)       252         OTS$$TAKE_LUN - Take a particular LUN
```

```
0000            .TITLE  OTS$$LUN - Resource allocator for logical unit numbers
0000            .IDENT  /1-003/                 ; File: OTSLUN.MAR
0000
0000    ;
0000    ;****************************************************************************
0000    ;*                                                                          *
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0000    ;*                                                                          *
0000    ;*                                                                          *
0000    ;****************************************************************************
0000    ;
0000
0000    ;++
0000    ; FACILITY: Language-independent language support
0000    ;
0000    ; ABSTRACT:
0000    ;
0000    ;       Three routines for allocating and deallocating logical unit
0000    ;       numbers.  Using these routines allows use of logical unit
0000    ;       numbers by multiple procedures without conflicts.
0000    ;
0000    ; ENVIRONMENT: User Mode, AST Reentrant
0000    ;
0000    ;--
0000    ; AJTHOR: John Sauter, CREATION DATE: 26-JAN-1979
0000    ;
0000    ; MODIFIED BY:
0000    ;
0000
0000    ; 1-001 - Original from LIB$EF.  JBS 26-JAN-1979
0000    ; 1-002 - Don't try to use FFC with a 100-bit size.  JBS 26-JAN-1979
0000    ; 1-003 - Allocate 100 bits, not 99.  JBS 27-JAN-1979
```

```
                                       0000           .SBTTL  DECLARATIONS
                                       0000   ;
                                       0000   ; INCLUDE FILES:
                                       0000   ;
                                       0000           $LUBDEF                 ; Define LUB$K_LUN_MAX
                                       0000   ;
                                       0000   ; EXTERNAL DECLARATIONS:
                                       0000   ;
                                       0000           .DSABL  GBL                             ; Prevent undeclared
                                       0000                                                   ; symbols from being
                                       0000                                                   ; automatically global.
                                       0000   ;
                                       0000   ; MACROS:
                                       0000   ;
                                       0000           NONE
                                       0000   ;
                                       0000   ; EQUATED SYMBOLS:
                                       0000   ;
                             00000004  0000           lun = 4                 ; LUN parameter
                                       0000   ;
                                       0000   ; OWN STORAGE:
                                       0000   ;
                                   00000000           .PSECT  _OTS$DATA RD, WRT, NOEXE, NOSHR, PIC, LONG, -
                                       0000                           CON, LCL, REL, USR
                                       0000
                                       0000  LUN_POOL:                     ; Pool of available LUNs
00'00'00'00'00'00'00'00'00'00'00'00'   0000           .BYTE   0[<LUB$K_LUN_MAX-LUB$K_LUN_MIN+8>/8]
                          00'00'00'    000C
                                       000F   ;
                                       000F   ; PSECT DECLARATIONS:
                                       000F   ;
                                       000F           .PSECT _OTS$CODE PIC, USR, CON, REL, LCL, SHR, -
                                   00000000                           EXE, RD, NOWRT, LONG
                                       0000
```

```
                                      0000          .SBTTL  OTS$$GET_LUN - Allocate one logical unit number
                                      0000    ;++
                                      0000    ; FUNCTIONAL DESCRIPTION:
                                      0000    ;
                                      0000    ;       OTS$$GET_LUN allocates one logical unit number from a process-wide
                                      0000    ;       pool.  If a LUN is available for use, its number is returned
                                      0000    ;       to the caller.  If no LUNs are available, an error is returned
                                      0000    ;       as the function value.
                                      0000    ;
                                      0000    ; CALLING SEQUENCE:
                                      0000    ;
                                      0000    ;       status.wlc.v = OTS$$GET_LUN (LUN.wl.r)
                                      0000    ;
                                      0000    ; INPUT PARAMETERS:
                                      0000    ;
                                      0000    ;       NONE
                                      0000    ;
                                      0000    ; IMPLICIT INPUTS:
                                      0000    ;
                                      0000    ;       LUN_POOL, a table of available logical unit numbers in
                                      0000    ;       OWN storage
                                      0000    ;
                                      0000    ; OUTPUT PARAMETERS:
                                      0000    ;
                                      0000    ;       LUN.wl.r        - The LUN allocated, or -1 if none were available.
                                      0000    ;
                                      0000    ; IMPLICIT OUTPUTS:
                                      0000    ;
                                      0000    ;       If successful, an entry is made into LUN_POOL indicating that
                                      0000    ;       a logical unit number has been reserved.
                                      0000    ;
                                      0000    ; FUNCTION VALUE:
                                      0000    ; COMPLETION CODES:
                                      0000    ;
                                      0000    ;       1 = success, 0 = failure
                                      0000    ; SIDE EFFECTS:
                                      0000    ;
                                      0000    ;       NONE
                                      0000    ;
                                      0000    ;--
                                      0000
                              4000    0000          .ENTRY OTS$$GET_LUN, ^M<IV>     ; Save nothing
                                      0002
                                      0002    ;+
                                      0002    ;       Scan LUN_POOL for first available LUN
                                      0002    ;-
                                      0002
                                      0002    SCAN:
00000000'EF    0F    FF 8F      3B    0002          SKPC    #255, #<LUB$K_LUN_MAX+8>/8, LUN_POOL
                        2B      13    000B          BEQL    ALL_OUT                 ; None available
          50    0F      50      C3    000D          SUBL3   R0, #<LUB$K_LUN_MAX+8>/8, R0
          50    50      03      78    0011          ASHL    #3, R0, R0              ; Approximate LUN
     51   61    08      00      EB    0015          FFC     #0, #8, (R1), R1        ; Find exact LUN
                        E6      13    001A          BEQL    SCAN                    ; An AST took all in this byte
                50      51      C0    001C          ADDL2   R1, R0                  ; Exact LUN
      00000077 8F       50      D1    001F          CMPL    R0, #LUB$K_LUN_MAX      ; Is it too big?
                        10      14    0026          BGTR    ALL_OUT                 ; Yes, all LUNs are reserved
```

```
                                 0028
                                 0028  ;+
                                 0028  ;         Now recheck and set the bit under interlock, in case someone
                                 0028  ;         has set it at AST level in the meantime.
                                 0028  ;-
                                 0028
                                 0028  FOUND:
      D2 00000000'EF    50   E2  0028            BBSS    R0, LUN_POOL, SCAN       ; Repeat scan if already set
                                 0030
                                 0030  ;+
                                 0030  ;         Return success with logical unit number in LUN.
                                 0030  ;-
                                 0030
               04 BC    50   D0  0030            MOVL    R0, @lun(AP)                  ; Store LUN
                  50    01   D0  0034            MOVL    #1, R0                        ; SS$_NORMAL
                             04  0037            RET                                   ; Exit
                                 0038
                                 0038  ;+
                                 0038  ;         Return error since no LUNs available
                                 0038  ;-
                                 0038
                                 0038  ALL_OUT:
               04 BC    01   CE  0038            MNEGL   #1, @lun(AP)                  ; Set LUN to -1
                        50   D4  003C            CLRL    R0                            ; Insufficient LUNs
                             04  003E            RET                                   ; Exit
                                 003F
```

```
                              003F          .SBTTL  OTS$$FREE_LUN - Deallocate one logical unit number
                              003F    ;++
                              003F    ; FUNCTIONAL DESCRIPTION:
                              003F    ;
                              003F    ;       OTS$$FREE_LUN is the complement of OTS$$GET_LUN.  When a routine
                              003F    ;       called OTS$$GET_LUN to allocate a LUN, and no
                              003F    ;       longer needs it, OTS$$FREE_LUN should be called to free the
                              003F    ;       LUN for use by other routines.
                              003F    ;
                              003F    ; CALLING SEQUENCE:
                              003F    ;
                              003F    ;       status.wlc.v = OTS$$FREE_LUN (LUN.rl.r)
                              003F    ;
                              003F    ; INPUT PARAMETERS:
                              003F    ;
                              003F    ;       LUN.rl.r        - The logical unit number to be
                              003F    ;                         deallocated.  This is the value returned
                              003F    ;                         to the user by OTS$$GET_LUN.
                              003F    ;
                              003F    ; IMPLICIT INPUTS:
                              003F    ;
                              003F    ;       LUN_POOL, a table of available logical unit numbers in OWN
                              003F    ;       storage.
                              003F    ;
                              003F    ; OUTPUT PARAMETERS:
                              003F    ;
                              003F    ;       NONE
                              003F    ;
                              003F    ; IMPLICIT OUTPUTS:
                              003F    ;
                              003F    ;       An entry is made in LUN_POOL indicating that the LUN
                              003F    ;       is free for use.
                              003F    ;
                              003F    ; FUNCTION VALUE:
                              003F    ; COMPLETION CODES:
                              003F    ;
                              003F    ;       1 = success, 0 = failure
                              003F    ; SIDE EFFECTS:
                              003F    ;
                              003F    ;       NONE
                              003F    ;
                              003F    ;--
                              003F
                        4000  003F          .ENTRY OTS$$FREE_LUN, ^M<IV>    ; Save nothing
                              0041
                              0041    ;+
                              0041    ;       Check to see if LUN is in the proper range.
                              0041    ;-
                              0041
    00000077 8F    04 BC   D1  0041          CMPL    @lun(AP), #LUB$K_LUN_MAX ; Bigger than 99?
                      12   14  0049          BGTR    RES_SYS_1                ; Yes, error
                   04 BC   D5  004B          TSTL    @lun(AP)                 ; Less than 0?
                      0D   19  004E          BLSS    RES_SYS_1                ; Yes, error
                              0050    ;+
                              0050    ;       LUN is in range.  Now, unset the bit.
                              0050    ;-
                              0050
```

```
      07 00000000'EF    04 BC    E5  0050    225            BBCC    @lun(AP), LUN_POOL, ALR_FRE     ; Clear but error if
                                     0059    226                                                    ; already clear.
                                     0059    227
                                     0059    228 ;+
                                     0059    229 ;          Return success
                                     0059    230 ;-
                                     0059    231
                        50    01    D0  0059    232            MOVL    #1, R0                      ; SS$_NORMAL
                                  04  005C    233            RET
                                     005D    234
                                     005D    235 ;+
                                     005D    236 ;          Error if LUN is not in the proper range
                                     005D    237 ;-
                                     005D    238
                                     005D    239 RES_SYS_1:
                              50    D4  005D    240            CLRL    R0                          ; LUN invalid
                                  04  005F    241            RET
                                     0060    242
                                     0060    243 ;+
                                     0060    244 ;          Error if LUN already free.
                                     0060    245 ;-
                                     0060    246
                                     0060    247 ALR_FRE:
                              50    D4  0060    248            CLRL    R0                          ; LUN already free
                                  04  0062    249            RET
                                     0063    250
```

```
                                0063   252          .SBTTL  OTS$$TAKE_LUN - Take a particular LUN
                                0063   253 ;++
                                0063   254 ; FUNCTIONAL DESCRIPTION:
                                0063   255 ;
                                0063   256 ;        OTS$$TAKE_LUN is used when a routine wants to allocate
                                0063   257 ;        a particular Lu..  This is different
                                0063   258 ;        from OTS$$GET_LUN which allocates an arbitrary LUN.
                                0063   259 ;
                                0063   260 ;        To deallocate an LUN reserved with OTS$$TAKE_LUN
                                0063   261 ;        use OTS$$FREE_LUN.
                                0063   262 ;
                                0063   263 ; CALLING SEQUENCE:
                                0063   264 ;
                                0063   265 ;        status.wlc.v = OTS$$TAKE_LUN (LUN.rl.r)
                                0063   266 ;
                                0063   267 ; INPUT PARAMETERS:
                                0063   268 ;
                                0063   269 ;        LUN     - The logical unit number desired to be
                                0063   270 ;                        allocated.
                                0063   271 ;
                                0063   272 ; IMPLICIT INPUTS:
                                0063   273 ;
                                0063   274 ;        LUN_POOL, a table of available LUNs located in OWN
                                0063   275 ;        storage.
                                0063   276 ;
                                0063   277 ; OUTPUT PARAMETERS:
                                0063   278 ;
                                0063   279 ;        NONE
                                0063   280 ;
                                0063   281 ; IMPLICIT OUTPUTS:
                                0063   282 ;
                                0063   283 ;        An entry is made in LUN_POOL indicating that the LUN
                                0063   284 ;        is allocated.
                                0063   285 ;
                                0063   286 ; FUNCTION VALUE:
                                0063   287 ; COMPLETION CODES:
                                0063   288 ;
                                0063   289 ;        1 = success, 0 = failure
                                0063   290 ; SIDE EFFECTS:
                                0063   291 ;
                                0063   292 ;        NONE
                                0063   293 ;
                                0063   294 ;--
                                0063   295
                          4000  0063   296          .ENTRY OTS$$TAKE_LUN, ^M<IV>    ; Save nothing
                                0065   297
                                0065   298 ;+
                                0065   299 ;        First check to see if LUN is in range.
                                0065   300 ;-
                                0065   301
      00000077 8F    04 BC   D1  0065   302          CMPL    @lun(AP), #LUB$K_LUN_MAX ; Greater than 99?
                        12   14  006D   303          BGTR    RES_SYS_2                ; Yes, error
                     04 BC   D5  006F   304          TSTL    @lun(AP)                 ; Less than 0?
                        0D   19  0072   305          BLSS    RES_SYS_2                ; Yes, error
                                0074   306 ;+
                                0074   307 ;        Now attempt to allocate that LUN
                                0074   308 ;-
```

```
                                  0074
      07 00000000'EF   04 BC  E2  0074          BBSS    @lun(AP), LUN_POOL, ALR_RES ; Reserve it, but error
                                  007D                                      ; if already reserved.
                                  007D
                                  007D     ;+
                                  007D     ;       Return success
                                  007D     ;-
                                  007D
                       50   01  D0  007D        MOVL    #1, R0              ; SS$_NORMAL
                                04  0080        RET                         ; Exit
                                  0081
                                  0081     ;+
                                  0081     ;       Error if LUN out of range
                                  0081     ;-
                                  0081
                                  0081     RES_SYS_2:
                            50  D4  0081        CLRL    R0                  ; Invalid logical unit number
                                04  0083        RET                         ; Exit
                                  0084
                                  0084     ;+
                                  0084     ;       Error if already allocated.
                                  0084     ;-
                                  0084
                                  0084     ALR_RES:
                            50  D4  0C84        CLRL    R0                  ; Logical unit number taken already
                                04  0086        RET                         ; Exit
                                  0087
                                  0087          .END
```

```
ALL_OUT                          00000038 R      02
ALR_FRE                          00000060 R      02
ALR_RES                          00000084 R      02
FOUND                            00000028 R      02
LUB$K_LUN_MAX                  = 00000077
LUB$K_LUN_MIN                  = 00000000
LUN                            = 00000004
LUN_POOL                         00000000 R      01
OTS$$FREE_LUN                    0000003F RG     02
OTS$$GET_LUN                     00000000 RG     02
OTS$$TAKE_LUN                    00000063 RG     02
RES_SYS_1                        0000005D R      02
RES_SYS_2                        00000081 R      02
SCAN                             00000002 R      02

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

PSECT name                      Allocation          PSECT No.  Attributes
----------                      ----------          ---------  ----------
.  ABS  .                       00000000  (    0.)  00 (  0.)  NOPIC   USR   CON   ABS   LCL NOSHR NOEXE NORD   NOWRT NOVEC BYTE
_OTS$DATA                       0000000F  (   15.)  01 (  1.)    PIC   USR   CON   REL   LCL NOSHR NOEXE   RD     WRT NOVEC LONG
_OTS$CODE                       00000087  (  135.)  02 (  2.)    PIC   USR   CON   REL   LCL   SHR   EXE   RD   NOWRT NOVEC LONG

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

Phase                    Page faults    CPU Time       Elapsed Time
-----                    -----------    --------       ------------
Initialization                  31    00:00:00.05    00:00:00.59
Command processing             149    00:00:00.38    00:00:02.68
Pass 1                         118    00:00:00.82    00:00:03.13
Symbol table sort                0    00:00:00.08    00:00:00.68
Pass 2                          67    00:00:00.45    00:00:02.05
Symbol table output              3    00:00:00.01    00:00:00.01
Psect synopsis output            3    00:00:00.02    00:00:00.02
Cross-reference output           0    00:00:00.00    00:00:00.00
Assembler run totals           373    00:00:01.81    00:00:09.16

The working set limit was 1050 pages.
7533 bytes (15 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 146 non-local and 0 local symbols.
336 source lines were read in Pass 1, producing 18 object records in Pass 2.
6 pages of virtual memory were used to define 1 macro.

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

Macro library name                           Macros defined
------------------                           --------------
_$255$DUA28:[LIBRTL.OBJ]LIBRTL.MLB;1                 1
_$255$DUA28:[SYSLIB]STARLET.MLB;2                    0
TOTALS (all libraries)                               1
```

```
136 GETS were required to define 1 macros.

There were no errors, warnings or information messages.

MACRO/ENABLE=SUPPRESSION/DISABLE=(GLOBAL,TRACEBACK)/LIS=LIS$:OTSLUN/OBJ=OBJ$:OTSLUN MSRC$:OTSLUN/UPDATE=(ENH$:OTSLUN)+LIB$:LIBRTL/LI
```

0212 AH-BT13A-SE
VAX/VMS V4.0

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