

LLL	IIIIIIIIII	BBBBBBBBBBBB	RRRRRRRRRRR	TTTTTTTTTTTTTTTT	LLL
LLL	IIIIIIIIII	BBBBBBBBBBBB	RRRRRRRRRRR	TTTTTTTTTTTTTTTT	LLL
LLL	IIIIIIIIII	BBBBBBBBBBBB	RRRRRRRRRRR	TTTTTTTTTTTTTTTT	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLL	III	BBB	RRR	RRR	LLL
LLLLLLLLLLLLLLLL	IIIIIIIIII	BBBBBBBBBBBB	RRR	RRR	LLLLLLLLLLLLLLLL
LLLLLLLLLLLLLLLL	IIIIIIIIII	BBBBBBBBBBBB	RRR	RRR	LLLLLLLLLLLLLLLL
LLLLLLLLLLLLLLLL	IIIIIIIIII	BBBBBBBBBBBB	RRR	RRR	LLLLLLLLLLLLLLLL

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LL          IIIIII 88888888 LL          UU          UU  NN          NN
LL          IIIIII 88888888 LL          UU          UU  NN          NN
LL          II     88      88 LL          UU          UU  NN          NN
LL          II     88      88 LL          UU          UU  NN          NN
LL          II     88      88 LL          UU          UU  NN          NN
LL          II     88      88 LL          UU          UU  NN          NN
LL          II     88      88 LL          UU          UU  NN          NN
LL          II     88      88 LL          UU          UU  NN          NN
LL          II     88      88 LL          UU          UU  NN          NN
LL          II     88      88 LL          UU          UU  NN          NN
LLLLLLLLLLL IIIIII 88888888 LLLLLLLLLLLL UUUUUUUUUU NN          NN
LLLLLLLLLLL IIIIII 88888888 LLLLLLLLLLLL 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
LLLLLLLLLLL IIIIII  SSSSSSSS
LLLLLLLLLLL IIIIII  SSSSSSSS

```

(2)	56
(3)	106
(4)	195

DECLARATIONS
LIB\$GET_LUN - Allocate one logical unit number
LIB\$FREE_LUN - Deallocate one logical unit number

.....

```
0000 1 .TITLE LIB$LUN - Resource allocator for logical unit numbers
0000 2 .IDENT /1-005/ ; File: LIBLUN.MAR Edit: MDL1005
0000 3
0000 4
0000 5 :*****
0000 6 :*
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0000 23 :* SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.
0000 24 :*
0000 25 :*
0000 26 :*****
0000 27 :
0000 28 :
0000 29 :++
0000 30 : FACILITY: General Utility Library
0000 31 :
0000 32 : ABSTRACT:
0000 33 :
0000 34 : Two routines for allocating and deallocating logical unit
0000 35 : numbers. Using these routines allows use of logical
0000 36 : unit number by multiple procedures without conflicts.
0000 37 :
0000 38 : ENVIRONMENT: User Mode, AST Reentrant
0000 39 :
0000 40 : --
0000 41 : AUTHOR: R. Reichert, CREATION DATE: 04-JUN-79
0000 42 :
0000 43 : MODIFIED BY:
0000 44 :
0000 45 : 1-001 Original. RKR 04-JUNE-79
0000 46 : 1-002 Removed entry point LIB$RESERVE_LUN and return status
0000 47 : LIB$LUNALRRRES (Lun already reserved). RKR 20-JULY-79
0000 48 : 1-003 Comment clean up. Made compares against LOW_LUN and HIGH_LUN
0000 49 : CMPL's. Made all references to LUN_POOL be G^LUN_POOL.
0000 50 : RKR. 24-JULY-79
0000 51 : 1-004 Add a first time flag, and set up initial mask based on that, in order
0000 52 : to allow the linker to perform demand-zero compression. MDL 6-Jul-1984
0000 53 : 1-005 Change interpretation of bits in LUN_POOL to eliminate need for a
0000 54 : first time flag and thus restore AST re-entrancy. MDL 7-Aug-1984
```

```
0000 56 .SBTTL DECLARATIONS
0000 57 :
0000 58 : INCLUDE FILES:
0000 59 :
0000 60 :
0000 61 :
0000 62 : EXTERNAL DECLARATIONS:
0000 63 :
0000 64 .DSABL GBL ; Prevent undeclared
0000 65 ; symbols from being
0000 66 ; automatically global.
0000 67 :
0000 68 : Error codes
0000 69 :
0000 70 .EXTRN LIB$_INSLUN ; Insufficient luns
0000 71 .EXTRN LIB$_LUNALRFRE ; Lun already free
0000 72 .EXTRN LIB$_LUNRESSYS ; Lun reserved to system
0000 73 :
0000 74 :
0000 75 : MACROS:
0000 76 :
0000 77 : NONE
0000 78 :
0000 79 :
0000 80 : EQUATED SYMBOLS:
0000 81 :
00000004 0000 82 LUN_NUMBER = 4 ; logical unit number parameter
00000077 0000 83 HIGH_LUN = 119 ; highest unit number dispensed
00000064 0000 84 LOW_LUN = 100 ; lowest unit number dispensed
0000 85 :
0000 86 : OWN STORAGE:
0000 87 :
00000000 0000 88 .PSECT _LIB$DATA RD, WRT, NOEXE, NOSHR, PIC, LONG, -
0000 89 CON, LCL, REL, USR
0000 90 :
00000000 0000 91 LUN_POOL: ; Pool of available logical unit numbers
0000 92 .LONG 0
0004 93 ; Low order bit represents logical
0004 94 ; unit number 119, high order bit
0004 95 ; logical unit number 88 .
0004 96 ; Only unit numbers 119 to 100 are
0004 97 ; dispensed by this routine.
0004 98 :
0004 99 :
0004 100 : PSECT DECLARATIONS:
0004 101 :
0004 102 .PSECT _LIB$CODE PIC, USR, CON, REL, LCL, SHR, -
00000000 103 EXE, RD, NCWRT, LONG
0000 104
```

```
0000 106 .SBTTL LIB$GET_LUN - Allocate one logical unit number
0000 107 :++
0000 108 : FUNCTIONAL DESCRIPTION:
0000 109 :
0000 110 : LIB$GET_LUN allocates one logical unit number from a process-wide
0000 111 : pool. If a lun is available for use, its number is returned
0000 112 : to the caller. If no luns are available, an error is returned
0000 113 : as the function value.
0000 114 :
0000 115 : CALLING SEQUENCE:
0000 116 :
0000 117 : status.wlc.v = LIB$GET_LUN (LUN_NUMBER.wl.r)
0000 118 :
0000 119 : INPUT PARAMETERS:
0000 120 :
0000 121 : NONE
0000 122 :
0000 123 : IMPLICIT INPUTS:
0000 124 :
0000 125 : LUN_POOL, a table of available logical unit numbers in OWN
0000 126 : storage.
0000 127 :
0000 128 : OUTPUT PARAMETERS:
0000 129 :
0000 130 : LUN_NUMBER - The number of the logical unit number allocated
0000 131 : or -1 if none were available.
0000 132 :
0000 133 : IMPLICIT OUTPUTS:
0000 134 :
0000 135 : If successful, an entry is made into LUN_POOL indicating that
0000 136 : a logical unit number has been reserved.
0000 137 :
0000 138 : FUNCTION VALUE:
0000 139 : COMPLETION CODES:
0000 140 :
0000 141 : SSS_NORMAL - Routine successfully completed.
0000 142 :
0000 143 : LIB$_INSLUN - Insufficient logical unit numbers. There were no
0000 144 : more logical unit numbers available for allocation.
0000 145 : If this error is returned, lun number is
0000 146 : also set to -1 in case the caller does not
0000 147 : check for failure.
0000 148 :
0000 149 : SIDE EFFECTS:
0000 150 :
0000 151 : NONE
0000 152 :
0000 153 : --
0000 154 :
4000 0000 155 .ENTRY LIB$GET_LUN, ^M<IV> ; Save nothing
0002 156 :
0002 157 :+
0002 158 : Scan LUN_POOL for first available logical unit number
0002 159 :-
0002 160 :
50 00000000'GF 14 00 EB 0002 161 SCAN:
0002 162 FFC #0, #20, G^LUN_POOL, R0 ; Look at the first 20 bits in LUN_POOL.
```

```

15 13 000B 163 ; They represent LUNs 119-100.
      000B 164 BEQL ALL_OUT ; Not found
      000D 165
      000D 166 :+
      000D 167 Now recheck and set the bit in an uninterruptable fashion,
      000D 168 in case someone has set it at AST level in the meantime.
      000D 169 :-
      000D 170
      000D 171 FOUND:
ED 00000000'GF 50 E2 000D 172 BBSS R0, G^LUN_POOL, SCAN ; Repeat scan if already set
      0015 173
      0015 174 :+
      0015 175 Return success with logical unit number in lun_number.
      0015 176 :-
      0015 177
04 BC 00000077 8F 50 C3 0015 178 SUBL3 R0, #HIGH_LUN, @LUN_NUMBER(AP) ; Subtract from HIGH_LUN
      001E 179 ; because lo order table bit is
      001E 180 ; lun 'high_lun'.
      001E 181
      50 01 D0 001E 182 MOVL #1, R0 ; $$$ NORMAL
      04 0021 183 RET ; Exit
      0022 184
      0022 185 :+
      0022 186 Return error since no logical unit numbers available
      0022 187 :-
      0022 188
      0022 189 ALL_OUT:
      0022 190 MNEGL #1, @LUN_NUMBER(AP) ; Set LUN_NUMBER to -1
50 04 BC 01 CE 0022 191 MOVL #LIB$_INSLUN, R0 ; Insufficient logical unit numbers
      0026 192 RET ; Exit
      04 002D 193
      002E 193

```

```

002E 195 .SBTTL LIB$FREE_LUN - Deallocate one logical unit number
002E 196 :++
002E 197 : FUNCTIONAL DESCRIPTION:
002E 198 :
002E 199 : LIB$FREE_LUN is the complement of LIB$GET_LUN. When a routine
002E 200 : called LIB$GET_LUN to allocate a logical unit number, and no
002E 201 : longer needs it, LIB$FREE_LUN should be called to free the
002E 202 : logical unit number for use by other routines.
002E 203 :
002E 204 : CALLING SEQUENCE:
002E 205 :
002E 206 : status.wlc.v = LIB$FREE_LUN (LUN_NUMBER.rl.r)
002E 207 :
002E 208 : INPUT PARAMETERS:
002E 209 :
002E 210 : LUN_NUMBER - The number of the logical unit to be
002E 211 : deallocated. This is the value returned
002E 212 : to the user by LIB$GET_LUN.
002E 213 :
002E 214 : IMPLICIT INPUTS:
002E 215 :
002E 216 : LUN_POOL, a table of available logical unit numbers in OWN
002E 217 : storage.
002E 218 :
002E 219 : OUTPUT PARAMETERS:
002E 220 :
002E 221 : NONE
002E 222 :
002E 223 : IMPLICIT OUTPUTS:
002E 224 :
002E 225 : An entry is made in LUN_POOL indicating that the logical unit
002E 226 : number is free for use.
002E 227 :
002E 228 : FUNCTION VALUE:
002E 229 : COMPLETION CODES:
002E 230 :
002E 231 : SSS_NORMAL - Routine successfully completed.
002E 232 :
002E 233 : LIB$_LUNALRFRE - Logical unit number already free.
002E 234 :
002E 235 : LIB$_LUNRESSYS - Logical unit number reserved to system. This
002E 236 : occurs if lun_number is outside the range
002E 237 : of 'LOW_LUN' and 'HIGH_LUN'.
002E 238 :
002E 239 : SIDE EFFECTS:
002E 240 :
002E 241 : NONE
002E 242 :
002E 243 : --
002E 244 :
4000 002E 245 : .ENTRY LIB$FREE_LUN, ^M<IV> ; Save nothing
0030 246 :
0030 247 : +
0030 248 : Check to see if lun_number is in the proper range.
0030 249 : -
0030 250 :
0000077 8F 04 BC D1 0030 251 Cmpl @LUN_NUMBER(AP), #HIGH_LUN ; Bigger than high_lun?

```



```

00000064 8F 04 1F 14 0038 252 BGTR RES_SYS_1 ; Yes, error
00000064 8F 04 BC D1 003A 253 CMPL @LUN_NUMBER(AP), #LOW_LUN ; Less than lowest ?
00000064 8F 04 15 19 0072 254 BLSS RES_SYS_1 ; Yes, error
0044 255
0044 256 :+
0044 257 :+
0044 258 :-
0044 259 :-
0044 260 OK_1:
50 00000077 8F 04 BC C3 0044 261 SUBL3 @LUN_NUMBER(AP), #HIGH_LUN, R0 ; Convert to bit offset
OC 00000000'GF 50 E5 004D 262 BBCC R0, G^LUN_POOL, ALR_FRE ; Clear but error if
0055 263 ; already clear.
0055 264
0055 265 :+
0055 266 :-
0055 267 :-
0055 268
50 01 D0 0055 269 MOVL #1, R0 ; $$$_NORMAL
04 0058 270 RET
0059 271
0059 272 :+
0059 273 :-
0059 274 :-
0059 275 :-
0059 276
50 00000000'8F D0 0059 277 RES_SYS_1:
04 0060 278 MOVL #LIB$_LUNRESSYS, R0 ; Logical unit number reserved
0061 279 RET
0061 280
0061 281 :+
0061 282 :-
0061 283 :-
0061 284
50 00000000'8F D0 0061 285 ALR_FRE:
04 0068 286 MOVL #LIB$_LUNALRFRE, R0 ; Logical unit number already free
0069 287 RET
0069 288
0069 289 .END

```

LIB\$LUN
Symbol table

- Resource allocator for logical unit ^{L 8} nu 16-SEP-1984 00:12:59 VAX/VMS Macro V04-00
6-SEP-1984 11:08:55 [LIBRTL.SRC]LIBLUN.MAR;1

Page 7
(4)

```

ALL_OUT      00000022 R   02
ALR_FRE     00000061 R   02
FOUND      00000000 R   02
HIGH_LUN    = 00000077
LIB$FREE_LUN 0000002E RG  02
LIB$GET_LUN 00000000 RG  02
LIB$INSLUN ***** X   00
LIB$_LUNALRFRE ***** X   00
LIB$_LUNRESSYS ***** X   00
LOW_LUN     = 00000064
LUN_NUMBER  = 00000004
LUN_POOL    00000000 R   01
OK_T        00000044 R   02
RES_SYS_1   00000059 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
_LIB\$DATA	00000004 (4.)	01 (1.)	PIC USR CON REL LCL NOSHR NOEXE RD WRT NOVEC LONG
_LIB\$CODE	00000069 (105.)	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	00:00:00.68
Command processing	114	00:00:00.32	00:00:02.36
Pass 1	71	00:00:00.38	00:00:02.04
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	62	00:00:00.36	00:00:02.77
Symbol table output	3	00:00:00.01	00:00:00.01
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	283	00:00:01.12	00:00:07.87

The working set limit was 900 pages.
3030 bytes (6 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 15 non-local and 0 local symbols.
289 source lines were read in Pass 1, producing 16 object records in Pass 2.
0 pages of virtual memory were used to define 0 macros.

! Macro library statistics !

Macro library name	Macros defined
_\$255\$DUA28:[SYSLIB]STARLET.MLB;2	0

0 GETS were required to define 0 macros.

LIBSLUN
VAX-11 Macro Run Statistics

- Resource allocator for logical unit nu 16-SEP-1984 00:12:59 VAX/VMS Macro V04-00
6-SEP-1984 11:08:55 [LIBRTL.SRC]LIBLUN.MAR;1

Page 8
(4)

LI
1-

There were no errors, warnings or information messages.

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

0208 AH-BT13A-SE
VAX/VMS V4.0

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A grid of 100 terminal window screenshots, each displaying a different library-related command and its output. The windows are arranged in a 10x10 grid. The following table lists the visible library names and their corresponding LIS (Library Information System) identifiers from the screenshots:

Library Name	LIS Identifier
LIBLOC	LIS
LIBUN	LIS
LIBMOV3	LIS
LIBMOVTC	LIS
LIBPOLYF	LIS
LIBINSQT	LIS
LIBINTOVE	LIS
LIBLEXICA	LIS
LIBMATCH	LIS
LIBPOLYD	LIS
LIBLOOKUP	LIS
LIB_PLTNE	LIS
LIBMOVC	LIS
LIBEN	LIS
LIBMSG	LIS
LIBINSV	LIS
LIBMATCH	LIS
LIBMOVTC	LIS