


```

000000  TTTTTTTTT  SSSSSSSS  MM      MM  000000  VV      VV  EEEEEEEEE
000000  TTTTTTTTT  SSSSSSSS  MM      MM  000000  VV      VV  EEEEEEEEE
00      00    SS      SSSSSSS  MMMM  MMMM  00      00  VV      VV  EE
00      00    SS      SSSSSSS  MMMM  MMMM  00      00  VV      VV  EE
00      00    SS      SSSSSSS  MM      MM  00      00  VV      VV  EE
00      00    SS      SSSSSSS  MM      MM  00      00  VV      VV  EEEEEEE
00      00    SS      SSSSSSS  MM      MM  00      00  VV      VV  EEEEEEE
00      00    SS      SSSSSSS  MM      MM  00      00  VV      VV  EE
00      00    SS      SSSSSSS  MM      MM  00      00  VV      VV  EE
00      00    SS      SSSSSSS  MM      MM  00      00  VV      VV  EE
00      00    SS      SSSSSSS  MM      MM  00      00  VV      VV  EE
00      00    SS      SSSSSSS  MM      MM  00      00  VV      VV  EE
000000  TT      SSSSSSSS  MM      MM  000000  VV      VV  EEEEEEEEE
000000  TT      SSSSSSSS  MM      MM  000000  VV      VV  EEEEEEEEE

```

```

LL      LL  SSSSSSSS
LL      LL  SSSSSSSS
LL      LL  SS
LL      LL  SS
LL      LL  SS
LL      LL  SS
LL      LL  SSSSSSS
LL      LL  SSSSSSS
LL      LL  SS
LL      LL  SS
LL      LL  SS
LL      LL  SS
LLLLLLLLLLLL  IIIIIII  SSSSSSSS
LLLLLLLLLLLL  IIIIIII  SSSSSSSS

```

(2)	50
(3)	78
(4)	128
(5)	226
(6)	286

DECLARATIONS
OTSSMOVE3 - Move characters without fill
OTSSMOVE3_R5 - Move characters without fill
OTSSMOVE5 - Move characters with fill
OTSSMOVE5_R5 - Move characters with fill

OTSSMOVE3
OTSSMOVE3_R5
OTSSMOVE5
OTSSMOVE5_R5

```

0000 1 .TITLE OTSSMOVE - Move characters
0000 2 .IDENT /1-005/ ; File: OTSMOVE.MAR Edit: SBL1005
0000 3
0000 4
0000 5 :*****
0000 6 :*
0000 7 :* COPYRIGHT (c) 1978, 1980, 1982, 1984 BY
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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: Language-independent Compiled Code Support
0000 31 :
0000 32 : ABSTRACT:
0000 33 :
0000 34 : This module contains a procedure which moves up to 2**31-1
0000 35 : characters.
0000 36 :
0000 37 : ENVIRONMENT: Runs at any access mode, AST Reentrant
0000 38 :
0000 39 : AUTHOR: Steven B. Lionel, CREATION DATE: 14-SEP-1981
0000 40 :
0000 41 : MODIFIED BY:
0000 42 :
0000 43 : 1-001 - Original. SBL 14-SEP-1981
0000 44 : 1-002 - Code improvement. SBL 8-Dec-1981
0000 45 : 1-003 - Add OTSSMOVE5 and OTSSMOVE5_R5 entry points
0000 46 : 1-004 - Fix problem with just filling of >65K bytes. SBL 27-July-1982
0000 47 : 1-005 - Fix register-saving bug with backwards copy. SBL 17-May-1983
0000 48 :--

```

```
0000 50 .SBTTL DECLARATIONS
0000 51 :
0000 52 : LIBRARY MACRO CALLS:
0000 53 :
0000 54 : NONE
0000 55 :
0000 56 : EXTERNAL DECLARATIONS:
0000 57 :
0000 58 : NONE
0000 59 :
0000 60 : MACROS:
0000 61 :
0000 62 : NONE
0000 63 :
0000 64 : EQUATED SYMBOLS:
0000 65 :
0000 66 : NONE
0000 67 :
0000 68 : OWN STORAGE:
0000 69 :
0000 70 : NONE
0000 71 :
0000 72 : PSECT DECLARATIONS:
0000 73 :
00000000 74 .PSECT _OTSS$CODE PIC,USR,CON,REL,LCL,SHR,-
0000 75 EXE,RD,NOWRT, LONG
0000 76
```

```

0000 78      .SBTTL  OTSS$MOVE3 - Move characters without fill
0000 79      :++
0000 80      : FUNCTIONAL DESCRIPTION:
0000 81      :
0000 82      : This procedure moves up to 2**31-1 characters from a specified
0000 83      : source address to a specified destination address. Overlapping
0000 84      : fields are handled correctly.
0000 85      :
0000 86      : CALLING SEQUENCE:
0000 87      :
0000 88      : CALL OTSS$MOVE3 (length.rl.v, source.rbu.ra, dest.wbu.ra)
0000 89      :
0000 90      : FORMAL PARAMETERS:
0000 91      :
0000 92      :
00000004 0000 93      length = 4      ; Number of bytes to move, passed by
0000 94      ; immediate value. Value may range from
0000 95      ; 0 through 2147483647.
0000 96      :
00000008 0000 97      source = 8      ; Characters to move, passed by reference.
0000 98      :
0000000C 0000 99      dest = 12     ; Area to receive moved characters, passed
0000 100     ; by reference.
0000 101     :
0000 102     : IMPLICIT INPUTS:
0000 103     :
0000 104     : NONE
0000 105     :
0000 106     : IMPLICIT OUTPUTS:
0000 107     :
0000 108     : NONE
0000 109     :
0000 110     : FUNCTION VALUE:
0000 111     :
0000 112     : NONE
0000 113     :
0000 114     : SIDE EFFECTS:
0000 115     :
0000 116     : NONE
0000 117     :
0000 118     :
0000 119     :--
0000 120     :
003C 0000 121     .ENTRY  OTSS$MOVE3, ^M<R2,R3,R4,R5>
0002 122     :
50  04 AC 7D 0002 123     MOVQ  length(AP), R0      ; Get length and source address
52  0C AC D0 0006 124     MOVL  dest(AP), R2      ; Get destination address
    01 10 000A 125     BSBB  OTSS$MOVE3_R5    ; Do the move
    04 000C 126     RET      ; Return to caller

```

```

000D 128 .SBTTL OTSSMOVE3_R5 - Move characters without fill
000D 129 :++
000D 130 : FUNCTIONAL DESCRIPTION:
000D 131 :
000D 132 : This procedure moves up to 2**31-1 characters from a specified
000D 133 : source address to a specified destination address. Overlapping
000D 134 : fields are handled correctly.
000D 135 :
000D 136 : CALLING SEQUENCE:
000D 137 :
000D 138 : JSB OTSSMOVE3_R5 (length.rl.v, source.rbu.ra, dest.wbu.ra)
000D 139 :
000D 140 : FORMAL PARAMETERS:
000D 141 :
000D 142 :
000D 143 : length = R0 ; Number of bytes to move. Value may range
000D 144 : ; from 0 through 2147483647.
000D 145 :
000D 146 : source = R1 ; Address of characters to move.
000D 147 :
000D 148 : dest = R2 ; Address of area to receive moved characters.
000D 149 :
000D 150 :
000D 151 : IMPLICIT INPUTS:
000D 152 :
000D 153 : NONE
000D 154 :
000D 155 : IMPLICIT OUTPUTS:
000D 156 :
000D 157 : R0 = 0
000D 158 : R1 = Address of one byte beyond the source string.
000D 159 : R2 = 0
000D 160 : R3 = Address of one byte beyond the destination string.
000D 161 : R4 = 0
000D 162 : R5 = 0
000D 163 :
000D 164 : FUNCTION VALUE.
000D 165 :
000D 166 : NONE
000D 167 :
000D 168 : SIDE EFFECTS:
000D 169 :
000D 170 : NONE
000D 171 :
000D 172 : --
000D 173 :
000D 174 : OTSSMOVE3_R5::
000D 175 :
000D 176 : CMPL R0, #65535 ; Is length greater than 65535?
000D 177 : BGTR BIGSTRING ; If so, can't do simple move.
000D 178 : MOVC3 R0, (R1), (R2) ; Simple case; do the move
000D 179 : RSB
000D 180 :
000D 181 : BIGSTRING:
000D 182 : CMPL R1, R2 ; Check for overlap that would prevent
000D 183 : BGEQU FORWARDS ; a forward copy.
000D 184 : SUBL3 R1, R2, R3 ; Get distance between start points
0000FFFF 8F 50 D1 000D 176
62 61 05 14 0014 177
50 28 0016 173
05 001A 179
001B 180
52 51 D1 001B 182
48 1E 001E 183
53 52 51 C3 0020 184

```

- Move characters
OTSSMOVE3_R5 - Move characters without f

```

50 53 D1 0024 185      CMPL   R3, R0      ; and compare it to string size.
    42 1E 0027 186      BGEQU  FORWARDS    ; If distance larger than string size,
    0029 187              ; ok.
    0029 188
    0029 189 :+
    0029 190 : Come here if we have to do the copy from right to left because of
    0029 191 : overlap.
    0029 192 :-
    0029 193
    0029 194 BACKWARDS:
53 52 50 C1 0029 195      ADDL3  R0, R2, R3    ; R3 points past end of dest
    51 50 C0 002D 196      ADDL2  R0, R1      ; R1 points past end of source
    0B BB 0030 197      PUSHR  #^M<R0,R1,R3> ; Save length remaining, drc and dest end
    0032 198 10$:      MOV C3  #65535, -65535(R1), - ; Move a segment
    FFFF0001 E1 FFFF 8F 28 0032 199      ; R1 and R3 get set by the MOV C3
    FFFF0001 E3 003B 200      ; to point past the source and dest.
    0040 201              ; Get new source address
51 0000FFFF 8F C2 0040 202      SUBL2  #65535, R1      ; Get new dest address
53 0000FFFF 8F C2 0047 203      SUBL2  #65535, R3      ; Get new dest address
6E FFFF0001 8F 00010000 8F F1 004E 204      ACBL  #65536, #-65535, (SP), 10$ ; Loop until <65536 bytes left
    FF D6 005A 205
    50 8E DO 005C 205      MOVL  (SP)+, R0      ; Get length remaining in R0
    52 50 CE 005F 206      MNEGL R0, R2      ; Get -length in R2
6342 6142 50 28 0062 207      MOV C3  R0, (R1)[R2], (R3)[R2] ; Do the final move
    0A BA 0068 208      POPR  #^M<R1,R3>    ; Set R1 and R3 to proper end values
    05 006A 209      RSB
    006B 210
    006B 211 :+
    006B 212 : Come here if it's ok to do the copy from left to right.
    006B 213 :-
    006B 214
    006B 215 FORWARDS:
    50 DD 006B 216      PUSHL  R0      ; Save length remaining
    53 52 DO 006D 217      MOVL  R2, R3      ; Move dest address to R3
63 61 FFFF 8F 28 0070 218 10$:      MOV C3  #65535, (R1), (R3) ; Move a segment. R1 and R3 get
    0076 219      ; updated with new source and dest
    0076 220      ; addresses.
6E FFFF0001 8F 00010000 8F F1 0076 221      ACBL  #65536, #-65535, (SP), 10$ ; Repeat until <65536 bytes left
    FF EC 0082 222
    50 DO 0084 222      MOVL  (SP)+, R0      ; Get final length
63 61 50 28 0087 223      MOV C3  R0, (R1), (R3) ; Do the final move
    05 008B 224      RSB      ; Return

```



```

008C 226      .SBTTL OTSS$MOVE5 - Move characters with fill
008C 227      :++
008C 228      : FUNCTIONAL DESCRIPTION:
008C 229      :
008C 230      : This procedure moves up to 2**31-1 characters from a specified
008C 231      : source address to a specified destination address, with separate
008C 232      : source and destination lengths, and with fill. Overlapping
008C 233      : fields are handled correctly.
008C 234      :
008C 235      : CALLING SEQUENCE:
008C 236      :
008C 237      : CALL OTSS$MOVE5 (srclen.rl.v, source.rbu.ra, fill.rbu.v,
008C 238      : dstlen.rl.v, dest.wbu.ra)
008C 239      :
008C 240      : FORMAL PARAMETERS:
008C 241      :
008C 242      :
00000004 008C 243      srclen = 4          ; Number of bytes in the source, passed by
008C 244      : immediate value. Value may range from
008C 245      : 0 through 2147483647.
008C 246      :
00000008 008C 247      source = 8         ; Characters to move, passed by reference.
008C 248      :
0000000C 008C 249      fill = 12        ; Fill byte to use when the srclen is less than
008C 250      : dstlen. Passed by immediate value.
008C 251      :
00000010 008C 252      dstlen = 16       ; Number of bytes in the destination, passed by
008C 253      : immediate value. Value may range from
008C 254      : 0 through 2147483647.
008C 255      :
00000014 008C 256      dest = 20         ; Area to receive moved characters, passed
008C 257      : by reference.
008C 258      :
008C 259      :
008C 260      : IMPLICIT INPUTS:
008C 261      :
008C 262      : NONE
008C 263      :
008C 264      : IMPLICIT OUTPUTS:
008C 265      :
008C 266      : NONE
008C 267      :
008C 268      : FUNCTION VALUE:
008C 269      :
008C 270      : NONE
008C 271      :
008C 272      : SIDE EFFECTS:
008C 273      :
008C 274      : NONE
008C 275      :
008C 276      :--
008C 277      :
003C 008C 278      .ENTRY OTSS$MOVE5, ^M<R2,R3,R4,R5>
008E 279      :
50 04 AC 7D 008E 280      MOVQ srclen(AP), R0      ; Get source length and address
52 0C AC 7D 0092 281      MOVQ fill(AP), R2       ; Get fill and destination length
54 14 AC D0 0096 282      MOVL dest(AP), R4     ; Get destination address

```

OTSS\$MOVE
1-005

- Move characters
OTSS\$MOVE5 - Move characters with fill

H 16

16-SEP-1984 00:32:51 VAX/VMS Macro V04-00
8-SEP-1984 11:15:07 [LIBRTL.SRC]OTSS\$MOVE.MAR;1

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(5)

01	10	009A	283	BSBB	OTSS\$MOVE5_R5	; Do the move
	04	009C	284	RET		; Return to caller

```
009D 286 .SBTTL OTSSMOVE5_R5 - Move characters with fill
009D 287 :++
009D 288 : FUNCTIONAL DESCRIPTION:
009D 289 :
009D 290 : This procedure moves up to 2**31-1 characters from a specified
009D 291 : source address to a specified destination address, with separate
009D 292 : source and destination lengths, and with fill. Overlapping
009D 293 : fields are handled correctly.
009D 294 :
009D 295 : CALLING SEQUENCE:
009D 296 :
009D 297 : JSB OTSSMOVE5_R5 (srclen.rl.v, source.rbu.ra, fill.rbu.v,
009D 298 : dstlen.rl.v, dest.wbu.ra)
009D 299 :
009D 300 : FORMAL PARAMETERS:
009D 301 :
009D 302 : srclen = R0 ; Number of bytes in the source
009D 303 : ; Value may range from
009D 304 : ; 0 through 2147483647.
009D 305 :
009D 306 : source = R1 ; Address of characters to move
009D 307 :
009D 308 : fill = R2 ; Fill byte to use when the srclen is less than
009D 309 : ; dstlen.
009D 310 :
009D 311 : dstlen = R3 ; Number of bytes in the destination.
009D 312 : ; Value may range from
009D 313 : ; 0 through 2147483647.
009D 314 :
009D 315 : dest = R4 ; Address of area to receive moved characters.
009D 316 :
009D 317 :
009D 318 :
009D 319 : IMPLICIT INPUTS:
009D 320 :
009D 321 : NONE
009D 322 :
009D 323 : IMPLICIT OUTPUTS:
009D 324 :
009D 325 : R0 = Number of unmoved bytes remaining in source string.
009D 326 : R1 = Address of one byte beyond the source string.
009D 327 : R2 = 0
009D 328 : R3 = Address of one byte beyond the destination string.
009D 329 : R4 = 0
009D 330 : R5 = 0
009D 331 :
009D 332 : FUNCTION VALUE:
009D 333 :
009D 334 : NONE
009D 335 :
009D 336 : SIDE EFFECTS:
009D 337 :
009D 338 : NONE
009D 339 :
009D 340 : --
009D 341 :
009D 342 OTSSMOVE5_R5::
```

- Move characters

OTSSMOVE3_R5 - Move characters with fill

```

0000FFFF 8F 50 D1 009D 343
10 14 00A4 344 CMPL R0, #65535 ; Is srclen greater than 65535?
0000FFFF 8F 53 D1 00A6 345 BGTR BIG5 ; If so, can't do simple move.
07 14 00AD 346 CMPL R3, #65535 ; Is dstlen greater than 65535?
64 53 52 61 50 2C 00AF 347 BGTR BIG5 ; If so, can't do simple move.
05 00B5 348 MOVCS R0, (R1), R2, R3, (R4) ; Simple case; do the move
00B6 349 RSB
00B6 350
00B6 351 BIG5:
7E 53 50 C3 00B6 352 SUBL3 R0, R3, -(SP) ; Fill, exact or truncate?
0F 14 00BA 353 BGTR NEED_FILL ; Move with fill
03 13 00BC 354 BEQL EXACT ; Same length source and dest?
50 53 D0 00BE 355 MOVL R3, R0 ; Truncate - use dstlen
00C1 356 EXACT: ; If exact, use source length
52 54 D0 00C1 357 MOVL R4, R2 ; Get dest address
FF46 30 00C4 358 BSBW OTSSMOVE3_R5 ; Just move the characters
50 8E D0 00C7 359 MOVL (SP)+, R0 ; Restore unmoved source bytes
05 00CA 360 RSB ; Return
00CB 361
00CB 362 ;+
00CB 363 ; We get here if we have to do some filling. Save the information we need
00CB 364 ; to do the fill, use OTSSMOVE3_R5 to do the data copy, then do the fill.
00CB 365 ;-
00CB 366 NEED_FILL:
7E 7E 52 D0 00CB 367 MOVL R2, -(SP) ; Save fill byte
53 50 C3 00CE 368 SUBL3 R0, R3, -(SP) ; Length of fill
52 54 D0 00D2 369 MOVL R4, R2 ; Get destination address
53 54 D0 00D5 370 MOVL R4, R3 ; In case we're just filling
50 D5 00D8 371 TSTL R0 ; Just fill?
03 13 00DA 372 BEQL 10$ ; If so, skip the move
FF2E 30 00DC 373 BSBW OTSSMOVE3_R5 ; Move <srclen> characters - R3 has next byt
08 AE 53 D0 00DF 374 10$: MOVL R3, 8(SP) ; Save end-of-source pointer
0000FFFF 8F 6E D1 00E3 375 CMPL (SP), #65535 ; More than 65535 characters of fill?
17 15 00EA 376 BLEQ 30$ ; If not, just fill the rest
00EC 377
63 FFFF 8F 04 AE 6E 00 2C 00EC 378 20$: MOVCS #0, (SP), 4(SP), #65535, (R3) ; Fill 65535 bytes
6E FFFF0001 8F 00010000 8F F1 00F5 379 ACBL #65536, #-65535, (SP), 20$ ; Loop until <65536 bytes left
FFE9 0101
63 50 51 50 8E 7D 0103 380 30$: MOVQ (SP)+, R0 ; Pop length and fill byte
6E 00 2C 0106 381 MOVCS #0, (SP), R1, R0, (R3) ; Fill the rest
51 8E D0 010C 382 MOVL (SP)+, R1 ; Restore end-of-source pointer
05 010F 383 RSB ; Return
0110 384
0110 385 .END ; End of module OTSSMOVE

```

OTSSMOVE
Symbol table

- Move characters

K 16

16-SEP-1984 00:32:51 VAX/VMS Macro V04-00
6-SEP-1984 11:15:07 [LIBRTL.SRC]OTSSMOVE.MAR;1

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(6)

BACKWARDS	000J0029	R	01
BIG5	000000B6	R	01
BIGSTRING	0000001B	R	01
DEST	= 00000014		
EXACT	000000C1	R	01
FILL	= 0000000C		
FORWARDS	0000006B	R	01
LENGTH	= 00000004		
NEED FILL	000000CB	R	01
OTSSMOVE3	00000000	RG	01
OTSSMOVE3_R5	0000000D	RG	01
OTSSMOVE5	0000008C	RG	01
OTSSMOVE5_R5	0000009D	RG	01
SRCLEN	= 00000004		

! Psect synopsis !

PSECT name	Allocation	PSECT No.	Attributes											
ABS	00000000 (0.)	00 (0.)	NOPIC	USR	CON	ABS	LCL	NOSHR	NOEXE	NORD	NOWRT	NOVEC	BY.E	
_OTSSCODE	00000110 (272.)	01 (1.)	PIC	USR	CON	REL	LCL	SHR	EXE	RD	NOWRT	NOVEC	'JNG	

! Performance indicators !

Phase	Page faults	CPU Time	Elapsed Time
Initialization	29	00:00:00.05	00:00:00.89
Command processing	114	00:00:00.33	00:00:02.22
Pass 1	76	00:00:00.51	00:00:03.07
Symbol table sort	0	00:00:00.01	00:00:00.01
Pass 2	76	00:00:00.47	00:00:01.34
Symbol table output	2	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	302	00:00:01.40	00:00:07.56

The working set limit was 750 pages.
5152 bytes (11 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 16 non-local and 5 local symbols.
385 source lines were read in Pass 1, producing 14 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.

There were no errors, warnings or information messages.

OTSSMOVE
VAX-11 Macro Run Statistics

- Move characters

L 16

16-SEP-1984 00:32:51 VAX/VMS Macro V04-00
6-SEP-1984 11:15:07 [LIBRTL.SRC]OTSMOVE.MAR;1

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

