

PAS
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PPPPPPPP      AAAAAA      SSSSSSSS      CCCCCCCC      AAAAAA      RRRRRRRR      DDDDDDDD      222222
PPPPPPPP      AAAAAA      SSSSSSSS      CCCCCCCC      AAAAAA      RRRRRRRR      DDDDDDDD      222222
PP      PP      AA      AA      SS      CC      AA      AA      RR      RR      DD      DD      22      22
PP      PP      AA      AA      SS      CC      AA      AA      RR      RR      DD      DD      22      22
PP      PP      AA      AA      SS      CC      AA      AA      RR      RR      DD      DD      22      22
PP      PP      AA      AA      SS      CC      AA      AA      RR      RR      DD      DD      22      22
PPPPPPPP      AA      AA      SSSSSS      CC      AA      AA      RRRRRRRR      DD      DD      22
PPPPPPPP      AA      AA      SSSSSS      CC      AA      AA      RRRRRRRR      DD      DD      22
PP      AAAAAAAAAA      SS      CC      AAAAAAAAAA      RR      RR      DD      DD      22
PP      AAAAAAAAAA      SS      CC      AAAAAAAAAA      RR      RR      DD      DD      22
PP      AA      AA      SS      CC      AA      AA      RR      RR      DD      DD      22
PP      AA      AA      SS      CC      AA      AA      RR      RR      DD      DD      22
PP      AA      AA      SSSSSSSS      CCCCCCCC      AA      AA      RR      RR      DDDDDDDD      2222222222
PP      AA      AA      SSSSSSSS      CCCCCCCC      AA      AA      RR      RR      DDDDDDDD      2222222222

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LL      IIIIII      SSSSSSSS
LL      III:II      SSSSSSSS
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
LLLLLLLLLLLL      IIIIII      SSSSSSSS
LLLLLLLLLLLL      IIIIII      SSSSSSSS

```

PASSCARD2
Table of contents

- Return cardinality of set

G 13

16-SEP-1984 01:22:06 VAX/VMS Macro V04-00

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DECLARATIONS
PASSCARD2 - Return cardinality of set

```

0000 1 .TITLE PAS$CARD2 - Return cardinality of set
0000 2 .IDENT /1-001/ ; File: PAS$CARD2.MAR Edit: SBL1001
0000 3
0000 4
0000 5
0000 6
0000 7 *****
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0000 24 *
0000 25 *
0000 26 *****
0000 27
0000 28
0000 29 :++
0000 30 : FACILITY: Pascal Language Support
0000 31
0000 32 : ABSTRACT:
0000 33
0000 34 : This module contains PAS$CARD2, which implements the Pascal
0000 35 : CARD function.
0000 36
0000 37 : ENVIRONMENT: User mode, AST Reentrant
0000 38
0000 39 : AUTHOR: Steven B. Lionel, CREATION DATE: 6-July-1981
0000 40
0000 41 : MODIFIED BY:
0000 42
0000 43 : 1-001 - Original. SBL 6-July-1981
0000 44 :--

```

```

0000 46 .SBTTL DECLARATIONS
0000 47 :
0000 48 : LIBRARY MACRO CALLS:
0000 49 :
0000 50 : NONE
0000 51 :
0000 52 : EXTERNAL DECLARATIONS:
0000 53 :
0000 54 : .DSABL GBL ; Force all external symbols to be declared
0000 55 :
0000 56 : NONE
0000 57 :
0000 58 : MACROS:
0000 59 :
0000 60 : NONE
0000 61 :
0000 62 : EQUATED SYMBOLS:
0000 63 :
0000 64 : NONE
0000 65 :
0000 66 : PSECT DECLARATIONS:
0000 67 :
0000 68 : .PSECT _PASSCODE PIC, USR, CON, REL, LCL, SHR, -
0000 69 : EXE, RD, NOWRT, LONG
0000 70 :
0000 71 : OWN STORAGE:
0000 72 :
0000 73 :
0000 74 :+
0000 75 : NBITS_TABLE is a 256-element table which, when indexed by a byte value,
0000 76 : gives the number of "1" bits in that byte value.
0000 77 :-
0000 78 :
0000 79 NBITS_TABLE:
03 02 02 01 03 02 02 01 02 01 01 00 0000 80 .BYTE 0,1,1,2,1,2,2,3,1,2,2,3,2,3,3,4 ; 0-15
04 03 03 02 04 03 03 02 03 02 02 01 000C 81 .BYTE 1,2,2,3,2,3,3,4,2,3,3,4,3,4,4,5 ; 16-31
04 03 03 02 04 03 03 02 03 02 02 01 001C 82 .BYTE 1,2,2,3,2,3,3,4,2,3,3,4,3,4,4,5 ; 32-47
05 04 04 03 05 04 04 03 04 03 03 02 002C 83 .BYTE 2,3,3,4,3,4,4,5,3,4,4,5,4,5,5,6 ; 48-63
04 03 03 02 04 03 03 02 03 02 02 01 003C 84 .BYTE 1,2,2,3,2,3,3,4,2,3,3,4,3,4,4,5 ; 64-79
05 04 04 03 05 04 04 03 04 03 03 02 004C 85 .BYTE 2,3,3,4,3,4,4,5,3,4,4,5,4,5,5,6 ; 80-95
05 04 04 03 05 04 04 03 04 03 03 02 005C 86 .BYTE 2,3,3,4,3,4,4,5,3,4,4,5,4,5,5,6 ; 96-111
06 05 05 04 06 05 05 04 05 04 04 03 006C 87 .BYTE 3,4,4,5,4,5,5,6,4,5,5,6,5,6,6,7 ; 112-127
04 03 03 02 04 03 03 02 03 02 02 01 007C 88 .BYTE 1,2,2,3,2,3,3,4,2,3,3,4,3,4,4,5 ; 128-143
05 04 04 03 05 04 04 03 04 03 03 02 008C 89 .BYTE 2,3,3,4,3,4,4,5,3,4,4,5,4,5,5,6 ; 144-159
05 04 04 03 05 04 04 03 04 03 03 02 009C 90 .BYTE 2,3,3,4,3,4,4,5,3,4,4,5,4,5,5,6 ; 160-175
06 05 05 04 06 05 05 04 06 05 05 04 00AC 91 .BYTE 3,4,4,5,4,5,5,6,4,5,5,6,5,6,6,7 ; 176-191
06 05 05 04 06 05 05 04 05 04 04 03 00B0

```



```

0100 99 .SBTTL PASSCARD2 - Return cardinality of set
0100 100 :++
0100 101 : FUNCTIONAL DESCRIPTION:
0100 102 :
0100 103 : PASSCARD2 returns as its function value the cardinality of
0100 104 : its argument, a Pascal set. Cardinality of a set is the
0100 105 : number of "1" bits currently on in the set value.
0100 106 :
0100 107 : CALLING SEQUENCE:
0100 108 :
0100 109 : card.wl.v = PASSCARD2 (set_size.rl.v, set.rbu.ra)
0100 110 :
0100 111 : FORMAL PARAMETERS:
0100 112 :
00000004 0100 113 : set_size = 4 ; The size of the set in bytes. It is
0100 114 : ; assumed that all sets are stored as an
0100 115 : ; integral number of bytes, with unused bits
0100 116 : ; stored as zero.
00000008 0100 117 : set = 8 ; The address of the set.
0100 118 :
0100 119 : IMPLICIT INPUTS:
0100 120 :
0100 121 : NONE
0100 122 :
0100 123 : IMPLICIT OUTPUTS:
0100 124 :
0100 125 : NONE
0100 126 :
0100 127 : ROUTINE VALUE:
0100 128 :
0100 129 : The number of "1" bits in the set.
0100 130 :
0100 131 : SIDE EFFECTS:
0100 132 :
0100 133 :
0100 134 : $$$ INTOVF, integer overflow, if the number of "1" bits is greater than
0100 135 : greater than 2**31-1
0100 136 :
0100 137 :--
0100 138 :
400C 0100 139 :.ENTRY PASSCARD2, ^M<R2,R3,IV> ; Entry point
0102 140 :
51 50 D4 0102 141 CLRL R0 ; Set initial cardinality value
08 AC D0 0104 142 MOVL set(AP), R1 ; Get address of set
52 04 AC D0 0108 143 MOVL set_size(AP), R2 ; Get set length
OF 13 010C 144 BEQL 90$ ; If zero length, return value of zero
010E 145 :
53 53 81 9A 010E 146 10$: MOVZBL (R1)+, R3 ; Get next byte of set
FEEA CF43 9A 0111 147 MOVZBL NBITS_TABLE[R3], R3 ; Get number of "1" bits in set byte
50 53 C0 0117 148 ADDL2 R3, R0 ; Add to cumulative total
F1 52 F5 011A 149 SOBGTR R2, 10$ ; Integer overflow possible
011D 150 ; Loop until all bytes examined
04 011D 152 90$: RET ; Return to caller with cardinality
011E 153 ; value in R0
011E 154 :
011E 155 .END ; End of module PASSCARD2

```

PASSCARD2
Symbol table

- Return cardinality of set

L 13

16-SEP-1984 01:22:06
6-SEP-1984 11:30:04

VAX/VMS Macro V04-00
[PASRTL.SRC]PASCARD2.MAR;1

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(3)

PA
1-

NBITS_TABLE 00000000 R 01
PASSCARD2 00000100 RG 01
SET = 00000008
SET_SIZE = 00000004

! Psect synopsis !

PSECT name	Allocation	PSECT No.	Attributes
ABS	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
_PASSCODE	0000011E (286.)	01 (1.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC LONG

! Performance indicators !

Phase	Page faults	CPU Time	Elapsed Time
Initialization	28	00:00:00.09	00:00:00.61
Command processing	71	00:00:00.66	00:00:02.92
Pass 1	64	00:00:00.61	00:00:02.35
Symbol table sort	0	00:00:00.01	00:00:00.01
Pass 2	45	00:00:00.36	00:00:01.45
Symbol table output	1	00:00:00.01	00:00:00.01
Psect synopsis output	3	00:00:00.02	00:00:00.04
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	215	00:00:01.78	00:00:07.40

The working set limit was 750 pages.
3067 bytes (6 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 4 non-local and 2 local symbols.
155 source lines were read in Pass 1, producing 10 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.

MACRO/ENABLE=SUPPRESSION/DISABLE=(GLOBAL,TRACEBACK)/LIS=LIS\$:PASCARD2/OBJ=OBJ\$:PASCARD2 MSRC\$:PASCARD2/UPDATE=(ENH\$:PASCARD2)

