```
PPPPPPPPPPPP        AAAAAAAAA        SSSSSSSSSSS     CCCCCCCCCCC     AAAAAAAAA     LLL
PPPPPPPPPPPP        AAAAAAAAA        SSSSSSSSSSS     CCCCCCCCCCC     AAAAAAAAA     LLL
PPPPPPPPPPPP        AAAAAAAAA        SSSSSSSSSSS     CCCCCCCCCCC     AAAAAAAAA     LLL
PPP         PPP    AAA       AAA    SSS             CCC             AAA       AAA   LLL
PPP         PPP    AAA       AAA    SSS             CCC             AAA       AAA   LLL
PPP         PPP    AAA       AAA    SSS             CCC             AAA       AAA   LLL
PPP         PPP    AAA       AAA    SSS             CCC             AAA       AAA   LLL
PPP         PPP    AAA       AAA    SSS             CCC             AAA       AAA   LLL
PPPPPPPPPPPP       AAA       AAA      SSSSSSSS      CCC             AAA       AAA   LLL
PPPPPPPPPPPP       AAA       AAA      SSSSSSSS      CCC             AAA       AAA   LLL
PPPPPPPPPPPP       AAA       AAA      SSSSSSSS      CCC             AAA       AAA   LLL
PPP                AAAAAAAAAAAAAAA          SSS     CCC             AAAAAAAAAAAAAAA   LLL
PPP                AAAAAAAAAAAAAAA          SSS     CCC             AAAAAAAAAAAAAAA   LLL
PPP                AAAAAAAAAAAAAAA          SSS     CCC             AAAAAAAAAAAAAAA   LLL
PPP                AAA       AAA            SSS     CCC             AAA       AAA     LLL
PPP                AAA       AAA            SSS     CCC             AAA       AAA     LLL
PPP                AAA       AAA            SSS     CCC             AAA       AAA     LLL
PPP                AAA       AAA    SSSSSSSSSSS       CCCCCCCCCCC   AAA       AAA     LLLLLLLLLLLLLLL
PPP                AAA       AAA    SSSSSSSSSSS       CCCCCCCCCCC   AAA       AAA     LLLLLLLLLLLLLLL
PPP                AAA       AAA    SSSSSSSSSSS       CCCCCCCCCCC   AAA       AAA     LLLLLLLLLLLLLLL
```

FILEID**PASRT4

```
PPPPPPPP      AAAAAA      SSSSSSSS  RRRRRRRR    TTTTTTTTTT  44    44
PPPPPPPP      AAAAAA      SSSSSSSS  RRRRRRRR    TTTTTTTTTT  44    44
PP      PP   AA      AA  SS        RR      RR      TT      44    44
PP      PP   AA      AA  SS        RR      RR      TT      44    44
PP      PP   AA      AA  SS        RR      RR      TT      44    44
PP      PP   AA      AA  SS        RR      RR      TT      44    44
PPPPPPPP     AA      AA    SSSSSS  RRRRRRRR        TT      4444444444
PPPPPPPP     AA      AA    SSSSSS  RRRRRRRR        TT      4444444444
PP           AAAAAAAAAA          SS RR  RR         TT            44
PP           AAAAAAAAAA          SS RR  RR         TT            44
PP           AA      AA          SS RR    RR       TT            44        ....
PP           AA      AA          SS RR    RR       TT            44        ....
PP           AA      AA  SSSSSSSS   RR      RR     TT            44        ....
PP           AA      AA  SSSSSSSS   RR      RR     TT            44        ....

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
```

```
0000     1 ;
0000     2 ;*****************************************************************************
0000     3 ;*                                                                           *
0000     4 ;*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                  *
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0000    17 ;*  CORPORATION.                                                             *
0000    18 ;*                                                                           *
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0000    20 ;*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                  *
0000    21 ;*                                                                           *
0000    22 ;*                                                                           *
0000    23 ;*****************************************************************************
0000    24 ;*                                                                           *
0000    25 ;*                              PAS$RT_FUNC                                  *
0000    26 ;*                RUNTIME SUPPORT MODULE FOR PASCAL -- SECTION 4             *
0000    27 ;*                                                                           *
0000    28 ;*                           VERSION V1.0-1 -- OCTOBER 1979                  *
0000    29 ;*                                                                           *
0000    30 ;*   This module defines the following routines:                             *
0000    31 ;*                                                                           *
0000    32 ;*      pas$<math>:  a number of routines to convert call by value           *
0000    33 ;*                   to call by name for mathematical library functions      *
0000    34 ;*                                                                           *
0000    35 ;*   Written by: Hellmut Golde 15-Feb-79                                     *
0000    36 ;*                                                                           *
0000    37 ;*   Revision history:                                                       *
0000    38 ;*                                                                           *
0000    39 ;*      1-001   5/14/80: Paul Hohensee: add a .psect directive for the code section
0000    40 ;*                                                                           *
0000    41 ;       1-002   11-Aug-81       Paul Hohensee. Change to general addressing of exter
0000    42 ;
0000    43 ;*****************************************************************************
0000    44          .title  pas$rt_func
0000    45          .ident  'V04-000'
0000    46
00000000    47          .psect  _pas$code,pic,shr,exe,nowrt
0000    48 ;
0000    49 ;   ROUTINES TO CONVERT CALL BY VALUE (IMMEDIATE) TO CALL BY NAME
0000    50 ;   FOR MATHEMATICAL LIBRARY FUNCTIONS
0000    51 ;
0000    52          .macro  libsngl p1                  ; macro to make definitions
0000    53          .entry  pas$'p1,^m<>
0000    54          pushl   4(ap)                       ; move value to stack
0000    55          pushal  (sp)                        ; and address on stack
0000    56          calls   #1,G^mth$'p1                ; call library routine
0000    57          ret
```

```
                        0000     58          .endm   libsngl
                        0000     59 ;
                        0000     60 ;   Macro calls to create entry points for math library functions
                        0000     61 ;
                        0000     62          libsngl SIN
                        000F     63          libsngl COS
                        001E     64          libsngl EXP
                        002D     65          libsngl SQRT
                        003C     66          libsngl ALOG
                        004B     67          libsngl ATAN
                        005A     68 ;
                        005A     69 ;    Entry points for various Pascal standard functions--used only when
                        005A     70 ;    functions are passed as parameters
                        005A     71 ;
                  0000  005A     72          .entry  pas$immABSint,^m<>
50    04 AC       D0    005C     73          movl    4(ap),r0
03 50    1F       E1    0060     74          bbc     #31,r0,10$
   50    50       CE    0064     75          mnegl   r0,r0
                 04    0067     76 10$:     ret
                        0068     77 ;
                  0000  0068     78          .entry  pas$immABSreal,^m<>
50    04 AC       50    006A     79          movf    4(ap),r0
03 50    0F       E1    006E     80          bbc     #15,r0,10$
   50    50       52    0072     81          mnegf   r0,r0
                 04    0075     82 10$:     ret
                        0076     83 ;
                  0000  0076     84          .entry  pas$ABSdoub,^m<>
50    04 BC       70    0078     85          movd    @4(ap),r0
03 50    0F       E1    007C     86          bbc     #15,r0,10$
   50    50       72    0080     87          mnegd   r0,r0
                 04    0083     88 10$:     ret
                        0084     89 ;
                  0000  0084     90          .entry  pas$immSQRint,^m<>
50    04 AC    04 AC    C5    0086     91          mull3   4(ap),4(ap),r0
                 04    008C     92          ret
                        008D     93 ;
                  0000  008D     94          .entry  pas$immSQRreal,^m<>
50    04 AC    04 AC    45    008F     95          mulf3   4(ap),4(ap),r0
                 04    0095     96          ret
                        0096     97 ;
                  0000  0096     98          .entry  pas$SQRdoub,^m<>
50    04 BC    04 BC    65    0098     99          muld3   @4(ap),@4(ap),r0
                 04    009E    100          ret
                        009F    101 ;
                  0000  009F    102          .entry  pas$immORD,^m<>
         50    04 AC       D0    00A1    103          movl    4(ap),r0
                 04    00A5    104          ret
                        00A6    105 ;
                  0000  00A6    106          .entry  pas$immCHR,^m<>
         50    04 AC       D0    00A8    107          movl    4(ap),r0
                 04    00AC    108          ret
                        00AD    109 ;
                  0000  00AD    110          .entry  pas$immPRED,^m<>
      50    04 AC    01    C3    00AF    111          subl3   #1,4(ap),r0
                 04    00B4    112          ret
                        00B5    113 ;
                  0000  00B5    114          .entry  pas$immSUCC,^m<>
```

```
                50   04 AC   01   C1  00B7   115          addl3   #1,4(ap),r0
                                04  00BC   116          ret
                                    00BD   117 ;
                               0000 00BD   118          .entry  pas$immODD,^m<>
           50   04 AC   01   00   EF  00BF   119          extzv   #0,#1,4(ap),r0
                                04  00C5   120          ret
                                    00C6   121 ;
                               0000 00C6   122          .entry  pas$SNGL,^m<>
                     50   04 BC   76  00C8   123          cvtdf   @4(ap),r0
                                04  00CC   124          ret
                                    00CD   125 ;
                               0000 00CD   126          .entry  pas$refABSint,^m<>
                     50   04 BC   D0  00CF   127          movl    @4(ap),r0
                     03   50   1F   E1  00D3   128          bbc     #31,r0,10$
                          50   50   CE  00D7   129          mnegl   r0,r0
                                04  00DA   130 10$:       ret
                                    00DB   131 ;
                               0000 00DB   132          .entry  pas$refABSreal,^m<>
                     50   04 BC   50  00DD   133          movf    @4(ap),r0
                     03   50   0F   E1  00E1   134          bbc     #15,r0,10$
                          50   50   52  00E5   135          mnegf   r0,r0
                                04  00E8   136 10$:       ret
                                    00E9   137 ;
                               0000 00E9   138          .entry  pas$refSQRint,^m<>
           50   04 BC   04 BC   C5  00EB   139          mull3   @4(ap),@4(ap),r0
                                04  00F1   140          ret
                                    00F2   141 ;
                               0000 00F2   142          .entry  pas$refSQRreal,^m<>
           50   04 BC   04 BC   45  00F4   143          mulf3   @4(ap),@4(ap),r0
                                04  00FA   144          ret
                                    00FB   145 ;
                               0000 00FB   146          .entry  pas$refORD,^m<>
                     50   04 BC   D0  00FD   147          movl    @4(ap),r0
                                04  0101   148          ret
                                    0102   149 ;
                               0000 0102   150          .entry  pas$refCHR,^m<>
                     50   04 BC   D0  0104   151          movl    @4(ap),r0
                                04  0108   152          ret
                                    0109   153 ;
                               0000 0109   154          .entry  pas$refPRED,^m<>
                50   04 BC   01   C3  010B   155          subl3   #1,@4(ap),r0
                                04  0110   156          ret
                                    0111   157 ;
                               0000 0111   158          .entry  pas$refSUCC,^m<>
                50   04 BC   01   C1  0113   159          addl3   #1,@4(ap),r0
                                04  0118   160          ret
                                    0119   161 ;
                               0000 0119   162          .entry  pas$refODD,^m<>
           50   04 BC   01   00   EF  011B   163          extzv   #0,#1,@4(ap),r0
                                04  0121   164          ret
                                    0122   165          .end
```

MTH$ALOG	********	X	01
MTH$ATAN	********	X	01
MTH$COS	********	X	01
MTH$EXP	********	X	01
MTH$SIN	********	X	01
MTH$SQRT	********	X	01
PAS$ABSDOUB	00000076	RG	01
PAS$ALOG	0000003C	RG	01
PAS$ATAN	0000004B	RG	01
PAS$COS	0000000F	RG	01
PAS$EXP	0000001E	RG	01
PAS$IMMABSINT	0000005A	RG	01
PAS$IMMABSREAL	00000068	RG	01
PAS$IMMCHR	000000A6	RG	01
PAS$IMMODD	000000BD	RG	01
PAS$IMMORD	0000009F	RG	01
PAS$IMMPRED	000000AD	RG	01
PAS$IMMSQRINT	00000084	RG	01
PAS$IMMSQRREAL	0000008D	RG	01
PAS$IMMSUCC	000000B5	RG	01
PAS$REFABSINT	000000CD	RG	01
PAS$REFABSREAL	000000DB	RG	01
PAS$REFCHR	00000102	RG	01
PAS$REFODD	00000119	RG	01
PAS$REFORD	000000FB	RG	01
PAS$REFPRED	00000109	RG	01
PAS$REFSQRINT	000000E9	RG	01
PAS$REFSQRREAL	000000F2	RG	01
PAS$REFSUCC	00000111	RG	01
PAS$SIN	00000000	RG	01
PAS$SNGL	000000C6	RG	01
PAS$SQRDOUB	00000096	RG	01
PAS$SQRT	0000002D	RG	01

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
_PAS$CODE	00000122 (290.)	01 (1.)	PIC USR CON REL LCL SHR EXE RD NOWRT NOVEC BYTE

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	36	00:00:00.07	00:00:00.42
Command processing	127	00:00:00.48	00:00:01.88
Pass 1	82	00:00:00.62	00:00:01.21
Symbol table sort	0	00:00:00.02	00:00:00.02
Pass 2	46	00:00:00.50	00:00:01.42
Symbol table output	4	00:00:00.04	00:00:00.04
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              300     00:00:01.75     00:00:05.03

The working set limit was 900 pages.
3625 bytes (8 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 33 non-local and 5 local symbols.
165 source lines were read in Pass 1, producing 89 object records in Pass 2.
1 page of virtual memory was used to define 1 macro.

                                    +----------------------------+
                                    ! 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/DISABLE=TRACE/LIS=LIS$:PASRT4/OBJ=OBJ$:PASRT4 MSRC$:PASRT4/UPDATE=(ENH$:PASRT4)
```

PASRT1
LIS

PASMACROS
REQ

PASFCB
SDL

PASPROLOG
REQ

PASOPEDEF
REQ

PASABSL
LIS

PASCARD2
LIS

PASRTL

PASBUGCOD
REQ

PASCLOSE2
LIS

PASRT2
LIS

PASRT3
LIS

PASRTL
MAP

PASIO4
LIS

PASEXTERN
REQ

PASKDB
REQ

PASPFD
REQ

PASCONVER
LIS

PASLIB
REQ

PASPFV
REQ

PASBIN
LIS

PASCLOCK2
LIS

PASRT4
LIS