```
M 1

BBBBBBBBBBBB        AAAAAAAAA        SSSSSSSSSSSS  RRRRRRRRRRR      TTTTTTTTTTTTTTT  LLL
BBBBBBBBBBBB        AAAAAAAAA        SSSSSSSSSSSS  RRRRRRRRRRR      TTTTTTTTTTTTTTT  LLL
BBBBBBBBBBBB        AAAAAAAAA        SSSSSSSSSSSS  RRRRRRRRRRR      TTTTTTTTTTTTTTT  LLL
BBB         BBB  AAA         AAA  SSS              RRR         RRR        TTT        LLL
BBB         BBB  AAA         AAA  SSS              RRR         RRR        TTT        LLL
BBB         BBB  AAA         AAA  SSS              RRR         RRR        TTT        LLL
BBB         BBB  AAA         AAA  SSS              RRR         RRR        TTT        LLL
BBB         BBB  AAA         AAA  SSS              RRR         RRR        TTT        LLL
BBB         BBB  AAA         AAA  SSS              RRR         RRR        TTT        LLL
BBBBBBBBBBBB     AAA         AAA     SSSSSSSSS     RRRRRRRRRRR            TTT        LLL
BBBBBBBBBBBB     AAA         AAA     SSSSSSSSS     RRRRRRRRRRR            TTT        LLL
BBBBBBBBBBBB     AAA         AAA     SSSSSSSSS     RRRRRRRRRRR            TTT        LLL
BBB         BBB  AAAAAAAAAAAAAAA              SSS  RRR   RRR              TTT        LLL
BBB         BBB  AAAAAAAAAAAAAAA              SSS  RRR   RRR              TTT        LLL
BBB         BBB  AAAAAAAAAAAAAAA              SSS  RRR   RRR              TTT        LLL
BBB         BBB  AAA         AAA              SSS  RRR      RRR           TTT        LLL
BBB         BBB  AAA         AAA              SSS  RRR      RRR           TTT        LLL
BBB         BBB  AAA         AAA              SSS  RRR      RRR           TTT        LLL
BBBBBBBBBBBB     AAA         AAA  SSSSSSSSSSSS     RRR         RRR        TTT        LLLLLLLLLLLLLLL
BBBBBBBBBBBB     AAA         AAA  SSSSSSSSSSSS     RRR         RRR        TTT        LLLLLLLLLLLLLLL
BBBBBBBBBBBB     AAA         AAA  SSSSSSSSSSSS     RRR         RRR        TTT        LLLLLLLLLLLLLLL
```

```
**FILE**ID**BASINIGSB                                            H 3




          BBBBBBBB      AAAAAA      SSSSSSSS    IIIIII    NN      NN    IIIIII      GGGGGGGG    SSSSSSSS  BBBBBBBB
          BBBBBBBB      AAAAAA      SSSSSSSS    IIIIII    NN      NN    IIIIII      GGGGGGGG    SSSSSSSS  BBBBBBBB
          BB      BB  AA      AA  SS              II      NN      NN      II      GG          SS          BB      BB
          BB      BB  AA      AA  SS              II      NN      NN      II      GG          SS          BB      BB
          BB      BB  AA      AA  SS              II      NNNN    NN      II      GG          SS          BB      BB
          BB      BB  AA      AA  SS              II      NNNN    NN      II      GG          SS          BB      BB
          BBBBBBBB    AA      AA    SSSSSS        II      NN   NN NN      II      GG            SSSSSS    BBBBBBBB
          BBBBBBBB    AA      AA    SSSSSS        II      NN   NN NN      II      GG            SSSSSS    BBBBBBBB
          BB      BB  AAAAAAAAAA          SS      II      NN    NNNN      II      GG  GGGGGG          SS  BB      BB
          BB      BB  AAAAAAAAAA          SS      II      NN    NNNN      II      GG  GGGGGG          SS  BB      BB
          BB      BB  AA      AA          SS      II      NN      NN      II      GG      GG          SS  BB      BB      ....
          BB      BB  AA      AA          SS      II      NN      NN      II      GG      GG          SS  BB      BB      ....
          BBBBBBBB    AA      AA  SSSSSSSS      IIIIII    NN      NN    IIIIII      GGGGGG    SSSSSSSS    BBBBBBBB        ....
          BBBBBBBB    AA      AA  SSSSSSSS      IIIIII    NN      NN    IIIIII      GGGGGG    SSSSSSSS    BBBBBBBB        ....



          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
```

```
0 MODULE BAS$INIT_GOSUB (                                  !
0                 IDENT = '1-003'                          ! File: BASINIGSB.B32
0                 ) =
1 BEGIN
1 !
1 !****************************************************************************
1 !*                                                                          *
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1 !*                                                                          *
1 !*                                                                          *
1 !****************************************************************************
1 !
1 !
1
1 !++
1 ! FACILITY:  BASIC-PLUS-2 Frame Support
1 !
1 ! ABSTRACT:
1 !
1 !       These routines set up and tear down frames for BASIC-PLUS-2.
1 !       Frames are used for main routines, external functions,
1 !       external subroutines, internal functions (both DEFs and DEF*s)
1 !       internal subroutines (GOSUBs) and condition handlers.
1 !
1 ! ENVIRONMENT:  VAX-11 user mode
1 !
1 ! AUTHOR: John Sauter, CREATION DATE: 10-Oct-78
1 !
1 ! MODIFIED BY:
1 !
1 ! 1-001 - Original.
1 ! 1-002 - Change BAS$ prefix to BAS$ for stack frame names.  JBS 08-FEB-1979
1 ! 1-003 - Set the IV bit in the PSW if called for.  JBS 11-SEP-1979
1 !--
1
1 !
1 !<BLF/PAGE>
```

```
;    55          0054   1 !
;    56          0055   1 ! SWITCHES:
;    57          0056   1 !
;    58          0057   1
;    59          0058   1 SWITCHES ADDRESSING_MODE (EXTERNAL = GENERAL, NONEXTERNAL = WORD_RELATIVE);
;    60          0059   1
;    61          0060   1 !
;    62          0061   1 ! LINKAGES:
;    63          0062   1 !
;    64          0063   1
;    65          0064   1 LINKAGE
;    66          0065   1     BAS$GOSUB_LINK = CALL (STANDARD) :              !
;    67          0066   1     GLOBAL (BSF$A_MAJOR_STG = 11, BSF$A_MINOR_STG = 10, BSF$A_TEMP_STG = 9),
;    68          0067   1 !
;    69          0068   1     BAS$GOSUB_JSB = JSB :                           !
;    70          0069   1     GLOBAL (BSF$A_MAJOR_STG = 11, BSF$A_MINOR_STG = 10, BSF$A_TEMP_STG = 9)      !
;    71          0070   1     NOTUSED (8, 7, 6, 5, 4, 3, 2)
;    72          0071   1     NOPRESERVE (1, 0);
;    73          0072   1
;    74          0073   1 !
;    75          0074   1 ! TABLE OF CONTENTS:
;    76          0075   1 !
;    77          0076   1
;    78          0077   1 FORWARD ROUTINE
;    79          0078   1     BAS$INIT_GOSUB : BAS$GOSUB_LINK NOVALUE;     ! start GOSUB
;    80          0079   1
;    81          0080   1 !
;    82          0081   1 ! INCLUDE FILES:
;    83          0082   1 !
;    84          0083   1
;    85          0084   1 REQUIRE 'RTLIN:RTLPSECT';                          ! macros for defing psects
;    86          0179   1
;    87          0180   1 REQUIRE 'RTLIN:BASFRAME';                          ! Define frame structure
;    88          0383   1
;    89          0384   1 LIBRARY 'RTLSTARLE';                               ! System symbols
;    90          0385   1
;    91          0386   1 !
;    92          0387   1 ! MACROS:
;    93          0388   1 !
;    94          0389   1 !      NONE
;    95          0390   1 !
;    96          0391   1 ! EQUATED SYMBOLS:
;    97          0392   1 !
;    98          0393   1 !      NONE
;    99          0394   1 !
;   100          0395   1 ! PSECTS:
;   101          0396   1 !
;   102          0397   1 DECLARE_PSECTS (BAS);                              ! declare psects for BAS$ facility
;   103          0398   1 !
;   104          0399   1 ! OWN STORAGE:
;   105          0400   1 !
;   106          0401   1 !      NONE
;   107          0402   1 !
;   108          0403   1 ! EXTERNAL REFERENCES:
;   109          0404   1 !
;   110          0405   1
;   111          0406   1 EXTERNAL ROUTINE
;  112          0407  1       BAS$$SIGNAL : NOVALUE,                            ! signals error
;  113          0408  1       BAS$HANDLER;                                      ! handles signals
;  114          0409  1
;  116          0410  1 GLOBAL ROUTINE BAS$INIT_GOSUB (                          ! start GOSUB
;  117          0411  1         NEW_PC                                           ! place to start
;  118          0412  1     ) : BAS$GOSUB_LINK NOVALUE =
;  119          0413  1
;  120          0414  1 !++
;  121          0415  1 ! FUNCTIONAL DESCRIPTION:
;  122          0416  1 !
;  123          0417  1 !       Set up a frame for a BASIC-PLUS-2 GOSUB.  The frame is allocated
;  124          0418  1 !       on the stack.  R11, R10 and R9 are not touched.
;  125          0419  1 !
;  126          0420  1 ! FORMAL PARAMETERS:
;  127          0421  1 !
;  128          0422  1 !       NEW_PC.ra.v     PC of the GOSUB target line.
;  129          0423  1 !
;  130          0424  1 ! IMPLICIT INPUTS:
;  131          0425  1 !
;  132          0426  1 !       NONE
;  133          0427  1 !
;  134          0428  1 ! IMPLICIT OUTPUTS:
;  135          0429  1 !
;  136          0430  1 !       NONE
;  137          0431  1 !
;  138          0432  1 ! ROUTINE VALUE:
;  139          0433  1 !
;  140          0434  1 !       NONE
;  141          0435  1 !
;  142          0436  1 ! COMPLETION CODES:
;  143          0437  1 !
;  144          0438  1 !       NONE
;  145          0439  1 !
;  146          0440  1 ! SIDE EFFECTS:
;  147          0441  1 !
;  148          0442  1 !       Leaves lots of things on the stack for use by the compiled
;  149          0443  1 !       BASIC-PLUS-2 code.  These things will be removed by
;  150          0444  1 !       BAS$END_GSB_R8.
;  151          0445  1 !
;  152          0446  1 !--
;  153          0447  1
;  154          0448  2     BEGIN
;  155          0449  2 !+
;  156          0450  2 ! The following external registers are mearly passed through to
;  157          0451  2 ! the compiled code.
;  158          0452  2 !-
;  159          0453  2
;  160          0454  2     EXTERNAL REGISTER
;  161          0455  2         BSF$A_MAJOR_STG,
;  162          0456  2         BSF$A_MINOR_STG,
;  163          0457  2         BSF$A_TEMP_STG;
;  164          0458  2
;  165          0459  2     BUILTIN
;  166          0460  2         FP,
;  167          0461  2         SP,
;  168          0462  2         BISPSW;
;  169          0463  2
;  170          0464  2 !+
;  171          0465  2 ! Define local variables as registers.  We connot have any stack
;  172          0466  2 ! locals since we manipulate the stack pointer in this routine.
```

```
2 !-
2
2     REGISTER
2         FMP : REF BLOCK [0, BYTE] FIELD (BSF$FCD),       ! pointer to FCD
2         PREV_FMP : REF BLOCK [0, BYTE] FIELD (BSF$FCD);  ! points to previous frame
2
2 !+
2 ! Allocate frame control data.
2 !-
2     FMP = .FP;
2     SP = .FMP - BSF$K_LENFCDGSB;
2 !+
2 ! Initialize the parts of the fcd relavent to a gosub.
2 !-
2     FMP [BSF$A_MARK] = 0;
2     FMP [BSF$A_BASE_SP] = .SP;
2     FMP [BSF$A_BASE_R11] = .BSF$A_MAJOR_STG;
2     FMP [BSF$A_BASE_R10] = .BSF$A_MINOR_STG;
2     FMP [BSF$A_BASE_R9] = .BSF$A_TEMP_STG;
2 !+
2 ! The "PROCEDURE ID" is the address of the start of the GOSUB.
2 !-
2     FMP [BSF$A_PROC_ID] = .NEW_PC;
2 !+
2 ! Copy the frame flags from the previous frame.  The previous
2 ! frame had better be a basic frame.
2 !-
2     PREV_FMP = .FMP [BSF$A_SAVED_FP];
2     FMP [BSF$W_FCD_FLAGS] = .PREV_FMP [BSF$W_FCD_FLAGS];
2 !+
2 ! Mark this as a "GOSUB" frame.  Such frames are removed very easily
2 !  when, for example, returning from a condition handler.  This is
2 !  because GOSUB has no lexical scope, and so we cannot enforce
2 !  well-structured programming practives which involve it.
2 !-
2     FMP [BSF$B_PROC_CODE] = BSF$K_PROC_GOSB;
2 !+
2 ! Set the frame length field.
2 !-
2     FMP [BSF$B_LEN_FCD] = BSF$K_LENFCDGSB;
2 !+
2 ! Set the integer overflow interrupt enable bit in the PSW if the parent
2 ! frame has it set.
2 !-
2
2     IF ((.FMP [BSF$W_FCD_FLAGS] AND BSF$M_FCD_IV) NEQ 0) THEN BISPSW (%REF (PSW$M_IV));
2
2 !+
2 ! Set up the handler address to mark this as a BASIC frame and for
2 ! VAX/VMS CHF.
2 !-
2 !
2     FMP [BSF$A_HANDLER] = BAS$HANDLER;
2 !+
2 ! Branch to the compiled code.  This code will call BAS$END_GSB_R8
2 ! rather than returning.
2 !-
```

```
;  230          0524  2     BAS$GOSUB_JSB (.NEW_PC);
;  231          0525  1     END;                                        ! of BAS$INIT_GOSUB

                                                                  .TITLE  BAS$INIT_GOSUB
                                                                  .IDENT  \1-003\

                                                                  .EXTRN  BAS$$SIGNAL, BAS$HANDLER

                                                                  .PSECT  _BAS$CODE,NOWRT,  SHR,  PIC,2

                                         0000 00000               .ENTRY  BAS$INIT_GOSUB, Save nothing                  ; 0410
                       50           5D    D0 00002                MOVL    FP, FMP                                        ; 0476
                       5E      E0   A0    9E 00005                MOVAB   -32(R0), SP                                    ; 0477
                               FC   A0    D4 00009                CLRL    -4(FMP)                                        ; 0481
                 F8    A0           5E    D0 0000C                MOVL    SP, -8(FMP)                                    ; 0482
                 F0    A0           5A    7D 00010                MOVQ    BSF$A_MINOR_STG, -16(FMP)                      ; 0484
                 EC    A0           59    D0 00014                MOVL    BSF$A_TEMP_STG, -20(FMP)                       ; 0485
                 E8    A0      04   AC    D0 00018                MOVL    NEW_PC, -24(FMP)                               ; 0489
                       51      0C   A0    D0 0001D                MOVL    12(FMP), PREV_FMP                              ; 0494
                 E6    A0      E6   A1    B0 00021                MOVW    -26(PREV_FMP), -26(FMP)                        ; 0495
                 E4    A0    0620   8F    B0 00026                MOVW    #1568, -28(FMP)                                ; 0506
          02     E6    A0           0B    E1 0002C                BBC     #11, -26(FMP), 1$                              ; 0512
                                    20    B8 00031                BISPSW  #32                                            ;
                       60 00000000G 00    9E 00033 1$:            MOVAB   BAS$HANDLER, (FMP)                             ; 0519
                               04   BC    16 0003A                JSB     @NEW_PC                                        ; 0524
                                          04 0003D                RET                                                    ; 0525

; Routine Size:  62 bytes,    Routine Base:  _BAS$CODE + 0000


;  232          0526  1
;  233          0527  1 END
;  234          0528  1
;  235          0529  0 ELUDOM



;                              PSECT SUMMARY
;
;      Name                  Bytes                  Attributes
;
;   _BAS$CODE                      62  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(2)



;                       Library Statistics
;
;                                       -------- Symbols --------        Pages        Processing
;      File                             Total    Loaded    Percent      Mapped        Time
;
;   _$255$DUA28:[SYSLIB]STARLET.L32;1    9776        1          0        581          00:01.1
;                                     COMMAND QUALIFIERS

;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/NOTRACE/LIS=LIS$:BASINIGSB/OBJ=OBJ$:BASINIGSB MSRC$:BASINIGSB/UPDATE=(ENH$:BASINIGSB
;        )

; Size:          62 code + 0 data bytes
; Run Time:          00:05.5
; Elapsed Time:      00:12.0
; Lines/CPU Min:      5813
; Lexemes/CPU-Min: 19758
; Memory Used:  59 pages
; Compilation Complete
```

0024 AH-BT13A-SE
VAX/VMS V4.0

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