fig-FORTH FOR 8080

ASSEMBLY SOURCE LISTING

RELEASE 1.1

WITH COMPILER SECURITY

AND

VARIABLE LENGTH NAMES

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79 SEP 15

8080 fig-FORTH Release 1.1

This release of 8080 fig-FORTH has been integrated with the CP/M operating system. This is a convenience to users, but NOT a requirement of Forth. The previous FIG release operated in 'native mode' with a Northstar disk. Non-CP/M users may patch the terminal in/out and disk word R/W per the Installation Manual.

Release 1.1 is significantly improved from 1.0. The following is a summary of the changes:

1) fig-FORTH may run in memory above address 8000H.

2) Code routines are re-entrant; e.g. use of the 'N' scratch area has been eliminated. However, the systems is not ROMable as some parameters in the dictionary are altered during execution.

3) LOOP and +LOOP now work according to the glossary, i.e. indexes may be negative and +LOOPs increment may be negative.

4) EMIT increments OUT for output formatting. VLIST uses this property.

5) CMOVE and FILL store nothing if the number of bytes input parameter is zero.

6) U* and U/ are several times faster and the code is shorter!

7) Several definitions have been added:
RP@ 2DUP D@ D! NOOP C/L U< P@ @!

8) < now works correctly even of the difference between the compared values is greater than 32,767.

9) The stack pointer SP now gets initialized in CLD on a COLD start.

10) This disc interface now matches the FIG model. As listed, it uses CP/M BDOS service routines for single and double density 8" diskettes. It is properly parameterized so that the #Bytes/Sector, buffer size, and number of screens may be changed with assembly equates.

11) All nontrivial CODE words (in assembly language) are now commented.

A list of assembly language labels is included. If you have entered 8080 fig-FORTH Release 1.0, this list will serve as a check list for your updating. In this list, 'fixed' means an error was corrected. 'changed' means some improvement was made. Changes preceeded by '*' are manditory.

INSTALLATION INSTRUCTIONS

Memory configuration:

Set ORG (before ORIG) to the lowest memory address FORTH will use.
Set EM to the highest memory address+1.
A minimum of 10,000 bytes is required to run.
Set NSCR to the number of 1023 byte screens for editing and disc buffers.
Also set KBBUF equal to number of data bytes per buffer; this should be a multiple of 128. There must be 2 or more disc buffers (NBUF>1).

Set BSIN and BSOUT to your terminals backspace characters.
Modify the terminal drivers (RDTECH, WTTECH) as needed for your installation.

The above is the minimun needed to bring up this program without disc I-O. To bring up the disc I-O section (labels DRIVE to LOAD), set BPS to the number of bytes per disc sector and MXDRV to the number of drives you have. Check the disc capacity equates (SPTn and TRKSn). Modify or relace the CP/M interface routines.

Substitute or alter IOS, SETIO, SETDRV, DISKR, DISKW and TSCALC if not using CP/M.

Assemble and load the program.
Type in (compile) the text editor in screens 87 through 92 of the fig-FORTH model (from the Installation Manual) ommitting FLUSH, (which is alread present). The string edting portion requires MATCH to be written in high-level or assembly language.

Using the EDITOR, edit the error messages given in the Model Screens 4 and 5 onto your screens 4 and 5, onto a fresh (!!) disk. Set the cold start values of WARNING to 1 to now use these error messages by typing: HEX 1 1A +ORIGIN !

If you can SAVE a memory copy of the system using your operating system, on disk for later loading, then you may include the editor and any other additions by typing in the lines 10 thru 15 of Screen #97 of the model. This re-configures the boot load to include your additions. You need SAVE only memory from ORIG up thru HERE.

ADDENDA to Glossary for
8080 fig-FORTH Release 1.1

#BUF --- n
A constant returning the number of disk buffers allocated. For the disk I-O routines to work correctly #BUF must be greater than 1.

.CPU
Prints the processor name (i.e. 8080) from ORIG+22H encoded as a 32 bit, base 36 integer.

2! nlow nhigh addr ---
32 bit store. nhigh is stored at addr; nlow is stored at addr+2.

2@ addr --- nlow nhigh
32 bit fetch. nhigh is fetched from addr; nlow is fetched from addr+2.

2DUP n2 n1 --- n2 n1 n2 n1
Duplicates the top two values on the stack. Equivalent to OVER OVER.

C/L --- n
Constant leaving the number of characters per line; used by the editor.

DENSITY --- addr
A variable used by the disk interface.
0 = single density; 1 = double density.

DISK-ERROR --- addr
A variable used by the disk interface, containing the disk status for the last sector read or written. 0 means no error.

DRIVE --- addr
A variable used by disk interface, containing the disk drive number (0 to MXDRV) used on the last sector read or written.

FLUSH
Write all UPDATEd disk buffers to disk. Should be used after editing, before dismounting a disk, or before exiting FORTH.

NOOP
A Forth 'no operation'.

P! b port# ---
8080 or Z-80 I-O port store. Outputs byte b to port#.

P@ port# --- b
8080 or Z-80 I-O port fetch. Inputs byte b from port#.

RP@ --- addr
Leaves the current value in the return stack pointer register.

SEC --- addr
A variable used by the disk interface, containing the sector number last read or written relative to the last drive used.

SEC-READ

Reads a disc sector (BPS bytes) into memory. All parameters must have been set by SET-DRIVE and SET-IO. The status on completion is stored in DISK-ERROR.

SEC-WRITE

Writes a disk-sector (BPS bytes) from memory. All parameters must have been set by SET-DRIVE and SET-IO. The status on completion is stored in DISK-ERROR.

SET-DRIVE

A CP/M service call which makes subsequent disk reads and writes use the drive designated in DRIVE. T&SCALC is usually used to set DRIVE and call SET-DRIVE. 0 = first drive to MXDRV

SET-IO

A CP/M service call which makes subsequent disc reads and writes use the drive last set by SET-DRIVE, the memory address in variable USE, the sector number in SEC, and the track number in TRACK. T&SCALC is usually used to set these variables.

T&SCALC n ---

Track & Sector and drive calculation for disk IO. n is the total sector dispacement from the first logical drive to the desired sector.

n = (block# + OFFSET) * SEC/BLK

The corresponding drive, track, and sector numbers are calculated. If the drive number is different from the contents of DRIVE, the new drive number is stored in DRIVE and SET-DRIVE is executed.

The track number is stored in TRACK; the sector number is stored in SEC. T&SCALC is usually executed before SET-DRIVE.

TRACK --- addr

A variable used by disk I-O. Contains the track number last read or written relative to the current drive.

U< u1 u2 --- f

Leave the boolean value of an unsigned less-than comparison. Leaves f = 1 for u1 < u2; otherwise leaves 0. This function must be used when comparing memory addresses. u1 and u2 are unsigned 16 bit integers.

CHANGES IN 8080 FIG-FORTH FROM RELEASE 1.0 TO 1.1:
15SEP79

*	EQUATES	SEVERAL CHANGES & ADDITIONS NSCR = # 1KBYTE SCREENS RTS ENLARGED
*	ORIG AREA	ADDITIONS
	N	DELETED
	DEBUG SUPPORT	ADDED
	NEXT	CHANGED WPUSH, HPUSH, NEXT1 ADDED
	EXEC	CHANGED
	BRAN	CHANGED
*	XLOOP	FIXED, FASTER
*	XPLOO	CHANGED
	XDO	CHANGED
*	DIGIT	FIXED
	ENCL	CHANGED
*	EMIT	FIXED
*	CMOVE	FIXED
	USTAR	CHANGED, FASTER
	USLAS	CHANGED, FASTER
*	RPAT	ADDED
	TOR	CHANGED
	RR	CHANGED
	DPLUS	CHANGED
	DMINU	CHANGED
*	TDUP	ADDED
*	TAT	ADDED
*	TSTOR	ADDED
*	COLON	FIXED
*	SEMI	FIXED
	NOOP	ADDED
*	CSLL	ADDED
	FIRST	CHANGED
	BBUF	CHANGED
	BSCR	CHANGED
	SUBB	CHANGED
*	LESS	FIXED
*	ULESS	ADDED
*	RBRAC	FIXED
*	PSCOD	FIXED
	SEMIC	CHANGED
*	DOES	FIXED
	EXPEC	CHANGED
*	FILL	FIXED
	ERROR	CHANGED
*	CREAT	FIXED
*	QSTAC	FIXED
*	ABORT	FIXED
*	WRM	ADDED
*	WARM	FIXED
*	CLD	ADDED
*	COLD	FIXED
	MIN	CHANGED
	MAX	CHANGED
	MSTAR	CHANGED
*	PLINE	RELINKED
	PTAT	ADDED
	PTSTO	ADDED
*	DISK INTERFACE:	
*	EQUATES	ADDED
*	DRIVE	ADDED
*	SEC	ADDED
*	TRACK	ADDED
*	USE	ADDED
*	PREV	ADDED
*	SPBLK	ADDED
*	NOBUF	ADDED
	DENSTY	ADDED
*	DSKERR	ADDED
*	PBUF	ADDED
*	UPDAT	ADDED
*	MTBUF	ADDED
*	DRZER	ADDED
*	DRONE	ADDED
*	BUFFE	ADDED
*	BLOCK	ADDED
	IOS	ADDED
	SETIO	ADDED
	SETDRV	ADDED
	TSCALC	ADDED
	SECRD	ADDED
	SECWT	ADDED
*	RSLW	ADDED
*	FLUSH	ADDED
*	LOAD	FIXED
*	ARROW	RELINKED
	TERMINAL & PRINTER INTERFACE:	
	CSTAT	ADDED
	CIN	ADDED
	COUT	ADDED
	POUT	ADDED
	CPOUT	ADDED
	PQTER	CHANGED
	PKEY	CHANGED
	PEMIT	CHANGED
	PCR	CHANGED
*	ELSEE	FIXED
*	EDIGS	FIXED
*	VLIST	FIXED
	BYE	ADDED
*	LIST	ADDED
*	INDEX	ADDED
*	TRIAD	ADDED
*	DOTCPU	ADDED
*	TASK	RELINKED

CHANGES MARKED BY * ARE MANDATORY.

```
CP/M MACRO ASSEM 2.0    #001    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
                        TITLE   '8080 FIG-FORTH 1.1 VERSION A0 15SEP79'
                ;
                ;       FIG-FORTH  RELEASE 1.1  FOR THE 8080 PROCESSOR
                ;
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                ;               ROBT. D. VILLWOCK
                ;
                ;-----------------------------------------------------
                ;       LABELS USED WHICH DIFFER FROM FIG-FORTH PUBLISHED
                ;       8080 LISTING 1.0:
                ;
                ;       REL 1.1         REL 1.0
                ;       -------         -------
                ;       ANDD            AND
                ;       CSPP            CSP
                ;       ELSEE           ELSE
                ;       ENDD            END
                ;       ENDIFF          ENDIF
                ;       ERASEE          ERASE
                ;       IDO             I
                ;       IFF             IF
                ;       INN             IN
                ;       MODD            MOD
                ;       ORR             OR
                ;       OUTT            OUT
                ;       RR              R
                ;       RPP             RP
                ;       SUBB            SUB
                ;       XORR            XOR
                ;
                ;       SEE ALSO:
                ;               RELEASE & VERSION NUMBERS
                ;               ASCII CHARACTER EQUATES
                ;               MEMORY ALLOCATION
                ;               DISK INTERFACE
                ;               CONSOLE & PRINTER INTERFACE
                ;
                        PAGE                                    7
```

```
                ;
                ;-------------------------------------------------------
                ;
                ;       RELEASE & VERSION NUMBERS
                ;
0001 =          FIGREL  EQU     1       ; FIG RELEASE #
0001 =          FIGREV  EQU     1       ; FIG REVISION #
0000 =          USRVER  EQU     0       ; USER VERSION #
                ;
                ;       ASCII CHARACTERS USED
                ;
0020 =          ABL     EQU     20H     ; SPACE
000D =          ACR     EQU     0DH     ; CARRIAGE RETURN
002E =          ADOT    EQU     02EH    ; PERIOD
0007 =          BELL    EQU     07H     ; (^G)
007F =          BSIN    EQU     7FH     ; INPUT BACKSPACE CHR = RUBOUT
0008 =          BSOUT   EQU     08H     ; OUTPUT BACKSPACE (^H)
0010 =          DLE     EQU     10H     ; (^P)
000A =          LF      EQU     0AH     ; LINE FEED
000C =          FF      EQU     0CH     ; FORM FEED (^L)
                ;
                ;       MEMORY ALLOCATION
                ;
4000 =          EM      EQU     4000H   ; TOP OF MEMORY + 1 = LIMIT
0001 =          NSCR    EQU     1       ; NUMBER OF 1024 BYTE SCREENS
0080 =          KBBUF   EQU     128     ; DATA BYTES PER DISK BUFFER
0040 =          US      EQU     40H     ; USER VARIABLES SPACE
00A0 =          RTS     EQU     0A0H    ; RETURN STACK & TERM BUFF SPACE
                ;
0084 =          CO      EQU     KBBUF+4 ; DISK BUFFER + 2 HEADER + 2 TAIL
0008 =          NBUF    EQU     NSCR*400H/KBBUF ; NUMBER OF BUFFERS
3BE0 =          BUF1    EQU     EM-CO*NBUF      ; ADDR FIRST DISK BUFFER
3BA0 =          INITR0  EQU     BUF1-US         ; (R0)
3B00 =          INITS0  EQU     INITR0-RTS      ; (S0)
                ;
                        PAGE
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```
                ;
                ;-------------------------------------------------
                ;
0100                    ORG     100H
0100 00         ORIG    NOP
0101 C38F10             JMP     CLD     ; VECTOR TO COLD START
0104 00                 NOP
0105 C37A10             JMP     WRM     ; VECTOR TO WARM START
0108 01                 DB      FIGREL  ; FIG RELEASE #
0109 01                 DB      FIGREV  ; FIG REVISION #
010A 00                 DB      USRVER  ; USER VERSION #
010B 0E                 DB      0EH     ; IMPLEMENTATION ATTRIBUTES
010C 7D1A               DW      TASK-7  ; TOPMOST WORD IN FORTH VOCABULARY
010E 7F00               DW      BSIN    ; BKSPACE CHARACTER
0110 A03B               DW      INITR0  ; INIT (UP)
                ;<<<<<< FOLLOWING USED BY COLD;
                ;       MUST BE IN SAME ORDER AS USER VARIABLES
0112 003B               DW      INITS0  ; INIT (S0)
0114 A03B               DW      INITR0  ; INIT (R0)
0116 003B               DW      INITS0  ; INIT (TIB)
0118 2000 1F00          DW      20H 1FH         ; INIT (WIDTH)
011A 0000               DW      0               ; INIT (WARNING)
011C 881A               DW      INITDP          ; INIT (FENCE)
011E 881A               DW      INITDP          ; INIT (DP)
0120 F80E FA0F          DW      FORTH+6 +8      ; INIT (VOC-LINK)
                ;<<<<<< END DATA USED BY COLD
0122 050020B3           DW      5H,0B320H       ; CPU NAME      ( HW,LW )
                ;                                 ( 32 BIT, BASE 36 INTEGER )
                ;
                ;
                ;                       I---------------I
                ;       B +ORIGIN       I . . .W:I.E.B.AI       IMPLEMENTATION
                ;                       I---------------I       ATTRIBUTES
                ;                             ^ ^ ^ ^ ^
                ;                             I I I I +-- PROCESSOR ADDR =
                ;                             I I I I     [ 0 BYTE \ 1 WORD ]
                ;                             I I I +---- HIGH BYTE AT
                ;                             I I I       [ 0 LOW ADDR \
                ;                             I I I         1 HIGH ADDR ]
                ;                             I I +------ ADDR MUST BE EVEN
                ;                             I I         [ 0 YES \ 1 NO ]
                ;                             I +-------- INTERPRETER IS
                ;                             I           [ 0 PRE \ 1 POST ]
                ;                             I           INCREMENTING
                ;                             +---------- [ 0 ABOVE SUFFICIENT
                ;                                           \ 1 OTHER DIFFER-
                ;                                           ENCES EXIST ]
                ;
                        PAGE
```

```
                ;
                ;-------------------------------------------------
                ;
                ;       FORTH REGISTERS
                ;
                ;       FORTH   8080    FORTH PRESERVATION RULES
                ;       -----   ----    -----------------------
                ;       IP      BC      SHOULD BE PRESERVED ACROSS
                ;                         FORTH WORDS
                ;       W       DE      SOMETIMES OUTPUT FROM NEXT
                ;                       MAY BE ALTERED BEFORE JMP'ING TO NEXT
                ;                       INPUT ONLY WHEN 'DPUSH' CALLED
                ;       SP      SP      SHOULD BE USED ONLY AS DATA STACK
                ;                         ACROSS FORTH WORDS
                ;                       MAY BE USED WITHIN FORTH WORDS
                ;                         IF RESTORED BEFORE 'NEXT'
                ;               HL      NEVER OUTPUT FROM NEXT
                ;                       INPUT ONLY WHEN 'HPUSH' CALLED
                ;
0126 A03B       UP      DW      INITR0  ; USER AREA POINTER
0128 A03B       RPP     DW      INITR0  ; RETURN STACK POINTER
                ;
                ;-------------------------------------------------
                ;
                ;       COMMENT CONVENTIONS:
                ;
                ;       =       MEANS   "IS EQUAL TO"
                ;       <-      MEANS   ASSIGNMENT
                ;
                ;       NAME    =       ADDRESS OF NAME
                ;       (NAME)  =       CONTENTS AT NAME
                ;       ((NAME))=       INDIRECT CONTENTS
                ;
                ;       CFA     =       ADDRESS OF CODE FIELD
                ;       LFA     =       ADDRESS OF LINK FIELD
                ;       NFA     =       ADDR OF START OF NAME FIELD
                ;       PFA     =       ADDR OF START OF PARAMETER FIELD
                ;
                ;       S1      =       ADDR OF 1ST WORD OF PARAMETER STACK
                ;       S2      =       ADDR OF 2ND WORD OF PARAMETER STACK
                ;       R1      =       ADDR OF 1ST WORD OF RETURN STACK
                ;       R2      =       ADDR OF 2ND WORD OF RETURN STACK
                ;       ( ABOVE STACK POSITIONS VALID BEFORE & AFTER EXECUTION
                ;       OF ANY WORD, NOT DURING. )
                ;
                ;       LSB     =       LEAST SIGNIFICANT BIT
                ;       MSB     =       MOST SIGNIFICANT BIT
                ;       LB      =       LOW BYTE
                ;       HB      =       HIGH BYTE
                ;       LW      =       LOW WORD
                ;       HW      =       HIGH WORD
                ;       ( MAY BE USED AS SUFFIX TO ABOVE NAMES )
                ;
                        PAGE
```

```
                ;
                ;-------------------------------------------------
                ;       DEBUG SUPPORT
                ;
                ;       TO USE:
                ;       (1)     SET 'BIP' TO IP VALUE TO HALT, CANNOT BE CFA
                ;       (2)     SET MONITOR'S BREAKPOINT PC TO 'BREAK'
                ;                       OR PATCH 'HLT' INSTR. THERE
                ;       (3)     PATCH A 'JMP TNEXT' AT 'NEXT'
                ;       WHEN (IP) = (BIP) CPU WILL HALT
                ;
012A 0000       BIP     DW      0       ; BREAKPOINT ON IP VALUE
                ;
012C 212A01     TNEXT   LXI     H,BIP
012F 7E                 MOV     A,M     ; LB
0130 B9                 CMP     C
0131 C23D01             JNZ     TNEXT1
0134 23                 INX     H
0135 7E                 MOV     A,M     ; HB
0136 B8                 CMP     B
0137 C23D01             JNZ     TNEXT1
013A 00         BREAK   NOP             ; PLACE BREAKPOINT HERE
013B 00                 NOP
013C 00                 NOP
013D 0A         TNEXT1  LDAX    B
013E 03                 INX     B
013F 6F                 MOV     L,A
0140 C34801             JMP     NEXT+3
                ;
                ;-------------------------------------------------
                ;
                ;       NEXT, THE FORTH ADDRESS INTERPRETER
                ;         ( POST INCREMENTING VERSION )
                ;
0143 D5         DPUSH   PUSH    D
0144 E5         HPUSH   PUSH    H
0145 0A         NEXT    LDAX    B       ;(W) <- ((IP))
0146 03                 INX     B       ;(IP) <- (IP)+2
0147 6F                 MOV     L,A
0148 0A                 LDAX    B
0149 03                 INX     B
014A 67                 MOV     H,A     ; (HL) <- CFA
014B 5E         NEXT1:  MOV     E,M     ;(PC) <- ((W))
014C 23                 INX     H
014D 56                 MOV     D,M
014E EB                 XCHG
014F E9                 PCHL            ; NOTE: (DE) = CFA+1
                ;
                        PAGE
```

```
                ;
                ;               FORTH DICTIONARY
                ;
                ;
                ;       DICTIONARY FORMAT:
                ;
                ;                                       BYTE
                ;       ADDRESS NAME                    CONTENTS
                ;       ------- ----                    --------
                ;                                               ( MSB=1
                ;                                               ( P=PRECEDENCE BIT
                ;                                               ( S=SMUDGE BIT
                ;       NFA     NAME FIELD              1PS<LEN>  < NAME LENGTH
                ;                                       0<1CHAR>  MSB=0, NAME'S 1ST CHAR
                ;                                       0<2CHAR>
                ;                                         ...
                ;                                       1<LCHAR>  MSB=1, NAME'S LAST CHR
                ;       LFA     LINK FIELD              <LINKLB>  = PREVIOUS WORD'S NFA
                ;                                       <LINKHB>
                ;LABEL: CFA     CODE FIELD              <CODELB>  = ADDR CPU CODE
                ;                                       <CODEHB>
                ;       PFA     PARAMETER               <1PARAM>  1ST PARAMETER BYTE
                ;               FIELD                   <2PARAM>
                ;                                         ...
                ;
                ;
0150 83         DP0:    DB      83H     ; LIT
0151 4C49               DB      'LI'
0153 D4                 DB      'T'+80H
0154 0000               DW      0       ; (LFA)=0 MARKS END OF DICTIONARY
0156 5801       LIT     DW      $+2     ;(S1) <- ((IP))
0158 0A                 LDAX    B       ; (HL) <- ((IP)) = LITERAL
0159 03                 INX     B       ; (IP) <- (IP) + 2
015A 6F                 MOV     L,A     ; LB
015B 0A                 LDAX    B       ; HB
015C 03                 INX     B
015D 67                 MOV     H,A
015E C34401             JMP     HPUSH   ; (S1) <- (HL)
                ;
0161 87                 DB      87H     ; EXECUTE
0162 4558454355         DB      'EXECUT'
0168 C5                 DB      'E'+80H
0169 5001               DW      LIT-6
016B 6D01       EXEC    DW      $+2
016D E1                 POP     H       ; (HL) <- (S1) = CFA
016E C34B01             JMP     NEXT1
                ;
0171 86                 DB      86H     ; BRANCH
0172 4252414E43         DB      'BRANC'
0177 C8                 DB      'H'+80H
0178 6101               DW      EXEC-0AH
017A 7C01       BRAN    DW      $+2     ;(IP) <- (IP) + ((IP))
017C 60         BRAN1   MOV     H,B     ; (HL) <- (IP)
017D 69                 MOV     L,C
017E 5E                 MOV     E,M     ; (DE) <- ((IP)) = BRANCH OFFSET
```

```
CP/M MACRO ASSEM 2.0     #007    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 017F 23                 INX     H
 0180 56                 MOV     D,M
 0181 2B                 DCX     H
 0182 19                 DAD     D       ; (HL) <- (HL) + ((IP))
 0183 4D                 MOV     C,L     ; (IP) <- (HL)
 0184 44                 MOV     B,H
 0185 C34501             JMP     NEXT
                ;
 0188 87                 DB      87H     ; 0BRANCH
 0189 304252414E         DB      'OBRANC'
 018F C8                 DB      'H'+80H
 0190 7101               DW      BRAN-9
 0192 9401       ZBRAN   DW      $+2
 0194 E1                 POP     H
 0195 7D                 MOV     A,L
 0196 B4                 ORA     H
 0197 CA7C01             JZ      BRAN1   ; IF (S1)=0 THEN BRANCH
 019A 03                 INX     B       ; ELSE SKIP BRANCH OFFSET
 019B 03                 INX     B
 019C C34501             JMP     NEXT
                ;
 019F 86                 DB      86H     ; (LOOP)
 01A0 284C4F4F50         DB      '(LOOP'
 01A5 A9                 DB      ')'+80H
 01A6 8801               DW      ZBRAN-0AH
 01A8 AA01       XLOOP   DW      $+2
 01AA 110100             LXI     D,1     ; (DE) <- INCREMENT
 01AD 2A2801     XLO01   LHLD    RPP     ; ((HL)) = INDEX
 01B0 7E                 MOV     A,M     ; INDEX <- INDEX + INCR
 01B1 83                 ADD     E
 01B2 77                 MOV     M,A
 01B3 5F                 MOV     E,A
 01B4 23                 INX     H
 01B5 7E                 MOV     A,M
 01B6 8A                 ADC     D
 01B7 77                 MOV     M,A
 01B8 23                 INX     H       ; ((HL)) = LIMIT
 01B9 14                 INR     D
 01BA 15                 DCR     D
 01BB 57                 MOV     D,A     ; (DE) <- NEW INDEX
 01BC FAC701             JM      XLO02   ; IF INCR > 0
 01BF 7B                 MOV     A,E
 01C0 96                 SUB     M       ; THEN (A) <- INDEX - LIMIT
 01C1 7A                 MOV     A,D
 01C2 23                 INX     H
 01C3 9E                 SBB     M
 01C4 C3CC01             JMP     XLO03
 01C7 7E         XLO02   MOV     A,M     ; ELSE (A) <- LIMIT - INDEX
 01C8 93                 SUB     E
 01C9 23                 INX     H
 01CA 7E                 MOV     A,M
 01CB 9A                 SBB     D
                ;                       ; IF (A) < 0
 01CC FA7C01     XLO03   JM      BRAN1   ; THEN LOOP AGAIN
 01CF 23                 INX     H       ; ELSE DONE
 01D0 222801             SHLD    RPP     ; DISCARD R1 & R2
```

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CP/M MACRO ASSEM 2.0     #008    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 01D3 03                 INX     B       ; SKIP BRANCH OFFSET
 01D4 03                 INX     B
 01D5 C34501             JMP     NEXT
                 ;
 01D8 87                 DB      87H     ; (+LOOP)
 01D9 282B4C4F4F         DB      '(+LOOP'
 01DF A9                 DB      ')'+80H
 01E0 9F01               DW      XLOOP-9
 01E2 E401       XPLOO   DW      $+2
 01E4 D1                 POP     D       ; (DE) <- INCR
 01E5 C3AD01             JMP     XLOO1
                 ;
 01E8 84                 DB      84H     ; (DO)
 01E9 28444F             DB      '(DO'
 01EC A9                 DB      ')'+80H
 01ED D801               DW      XPLOO-0AH
 01EF F101       XDO     DW      $+2
 01F1 2A2801             LHLD    RPP     ; (RP) <- (RP) - 4
 01F4 2B                 DCX     H
 01F5 2B                 DCX     H
 01F6 2B                 DCX     H
 01F7 2B                 DCX     H
 01F8 222801             SHLD    RPP
 01FB D1                 POP     D       ; (R1) <- (S1) = INIT INDEX
 01FC 73                 MOV     M,E
 01FD 23                 INX     H
 01FE 72                 MOV     M,D
 01FF D1                 POP     D       ; (R2) <- (S2) = LIMIT
 0200 23                 INX     H
 0201 73                 MOV     M,E
 0202 23                 INX     H
 0203 72                 MOV     M,D
 0204 C34501             JMP     NEXT
                 ;
 0207 81                 DB      81H     ; I
 0208 C9                 DB      'I'+80H
 0209 E801               DW      XDO-7
 020B 0D02       IDO     DW      $+2     ;(S1) <- (R1) , (R1) UNCHANGED
 020D 2A2801             LHLD    RPP
 0210 5E                 MOV     E,M     ; (DE) <- (R1)
 0211 23                 INX     H
 0212 56                 MOV     D,M
 0213 D5                 PUSH    D       ; (S1) <- (DE)
 0214 C34501             JMP     NEXT
                 ;
 0217 85                 DB      85H     ; DIGIT
 0218 44494749           DB      'DIGI'
 021C D4                 DB      'T'+80H
 021D 0702               DW      IDO-4
 021F 2102       DIGIT   DW      $+2
 0221 E1                 POP     H       ; (L) <- (S1)LB = ASCII CHR TO BE
                 ;                         CONVERTED
 0222 D1                 POP     D       ; (DE) <- (S2) = BASE VALUE
 0223 7B                 MOV     A,E
 0224 D630               SUI     30H     ; IF CHR > "0"
 0226 FA4002             JM      DIGI2
```

```
CP/M MACRO ASSEM 2.0     #009     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0229 FE0A               CPI      0AH      ; AND IF CHR > "9"
 022B FA3502             JM       DIGI1
 022E D607               SUI      7
 0230 FE0A               CPI      0AH      ; AND IF CHR >= "A"
 0232 FA4002             JM       DIGI2
                  ;                         ; THEN VALID NUMERIC OR ALPHA CHR
 0235 BD          DIGI1  CMP      L        ; IF < BASE VALUE
 0236 F24002             JP       DIGI2
                  ;                         ; THEN VALID DIGIT CHR
 0239 5F                 MOV      E,A      ; (S2) <- (DE) = CONVERTED DIGIT
 023A 210100             LXI      H,1      ; (S1) <- TRUE
 023D C34301             JMP      DPUSH
                  ;                         ; ELSE INVALID DIGIT CHR
 0240 6C          DIGI2  MOV      L,H      ; (HL) <- FALSE
 0241 C34401             JMP      HPUSH    ; (S1) <- FALSE
                  ;
 0244 86                 DB       86H      ; (FIND)  (2-1)FAILURE
 0245 2846494E44         DB       '(FIND'  ; (2-3)SUCCESS
 024A A9                 DB       ')'+80H
 024B 1702               DW       DIGIT-8
 024D 4F02        PFIND  DW       $+2
 024F D1                 POP      D        ; (DE) <- NFA
 0250 E1          PFIN1  POP      H        ; (HL) <- STRING ADDR
 0251 E5                 PUSH     H        ; SAVE STRING ADDR FOR NEXT ITERATION
 0252 1A                 LDAX     D
 0253 AE                 XRA      M        ; CHECK LENGTHS & SMUDGE BIT
 0254 E63F               ANI      3FH
 0256 C27B02             JNZ      PFIN4    ; LENGTHS DIFFERENT
                  ;                         ; LENGTHS MATCH, CHECK EACH CHR
 0259 23          PFIN2  INX      H        ; (HL) <- ADDR NEXT CHR IN STRING
 025A 13                 INX      D        ; (DE) <- ADDR NEXT CHR IN NF
 025B 1A                 LDAX     D
 025C AE                 XRA      M        ; IGNORE MSB
 025D 87                 ADD      A
 025E C27802             JNZ      PFIN3    ; NO MATCH
 0261 D25902             JNC      PFIN2    ; MATCH SO FAR, LOOP AGAIN
 0264 210500             LXI      H,5      ; STRING MATCHES
 0267 19                 DAD      D        ; ((SP)) <- PFA
 0268 E3                 XTHL
                  ;                         ; BACK UP TO LENGTH BYTE OF NF = NFA
 0269 1B          PFIN6  DCX      D
 026A 1A                 LDAX     D
 026B B7                 ORA      A
 026C F26902             JP       PFIN6    ; IF MSB = 1 THEN (DE) = NFA
 026F 5F                 MOV      E,A      ; (DE) <- LENGTH BYTE
 0270 1600               MVI      D,0
 0272 210100             LXI      H,1      ; (HL) <- TRUE
 0275 C34301             JMP      DPUSH    ; RETURN, NF FOUND
                  ;      ABOVE NF NOT A MATCH, TRY ANOTHER
 0278 DA8102      PFIN3  JC       PFIN5    ; IF NOT END OF NF
 027B 13          PFIN4  INX      D        ; THEN FIND END OF NF
 027C 1A                 LDAX     D
 027D B7                 ORA      A
 027E F27B02             JP       PFIN4
 0281 13          PFIN5  INX      D        ; (DE) <- LFA
 0282 EB                 XCHG
```

```
CP/M MACRO ASSEM 2.0     #010    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0283 5E                 MOV     E,M     ; (DE) <- (LFA)
 0284 23                 INX     H
 0285 56                 MOV     D,M
 0286 7A                 MOV     A,D
 0287 B3                 ORA     E       ; IF (LFA) <> 0
 0288 C25002             JNZ     PFIN1   ; THEN TRY PREVIOUS DICT. DEF.
                 ;                       ; ELSE END OF DICTIONARY
 028B E1                 POP     H       ; DISCARD STRING ADDR
 028C 210000             LXI     H,0     ; (HL) <- FALSE
 028F C34401             JMP     HPUSH   ; RETURN, NO MATCH FOUND
                 ;
 0292 87                 DB      87H     ; ENCLOSE
 0293 454E434C4F         DB      'ENCLOS'
 0299 C5                 DB      'E'+80H
 029A 4402               DW      PFIND-9
 029C 9E02       ENCL    DW      $+2
 029E D1                 POP     D       ; (DE) <- (S1) = DELIMITER CHAR
 029F E1                 POP     H       ; (HL) <- (S2) = ADDR TEXT TO SCAN
 02A0 E5                 PUSH    H       ; (S4) <- ADDR
 02A1 7B                 MOV     A,E
 02A2 57                 MOV     D,A     ; (D) <- DELIM CHR
 02A3 1EFF               MVI     E,-1    ; INITIALIZE CHR OFFSET COUNTER
 02A5 2B                 DCX     H       ; (HL) <- ADDR-1
                 ;                       ; SKIP OVER LEADING DELIMITER CHRS
 02A6 23         ENCL1   INX     H
 02A7 1C                 INR     E
 02A8 BE                 CMP     M       ; IF TEXT CHR = DELIM CHR
 02A9 CAA602             JZ      ENCL1   ; THEN LOOP AGAIN
                 ;                       ; ELSE NON-DELIM CHR FOUND
 02AC 1600               MVI     D,0     ; (S3) <- (E) = OFFSET TO 1ST NON-DELIM
 02AE D5                 PUSH    D
 02AF 57                 MOV     D,A     ; (D) <- DELIM CHR
 02B0 7E                 MOV     A,M     ; IF 1ST NON-DELIM = NULL
 02B1 A7                 ANA     A
 02B2 C2BE02             JNZ     ENCL2
 02B5 1600               MVI     D,0     ; THEN (S2) <- OFFSET TO BYTE
 02B7 1C                 INR     E       ;   FOLLOWING NULL
 02B8 D5                 PUSH    D
 02B9 1D                 DCR     E       ; (S1) <- OFFSET TO NULL
 02BA D5                 PUSH    D
 02BB C34501             JMP     NEXT
                 ;                       ; ELSE TEXT CONTAINS NON-DELIM &
                 ;                         NON-NULL CHR
 02BE 7A         ENCL2   MOV     A,D     ; (A) <- DELIM CHR
 02BF 23                 INX     H       ; (HL) <- ADDR NEXT CHR
 02C0 1C                 INR     E       ; (E) <- OFFSET TO NEXT CHR
 02C1 BE                 CMP     M       ; IF NEXT CHR <> DELIM CHR
 02C2 CAD102             JZ      ENCL4
 02C5 7E                 MOV     A,M     ; AND IF NEXT CHR <> NULL
 02C6 A7                 ANA     A
 02C7 C2BE02             JNZ     ENCL2   ; THEN CONTINUE SCAN
                 ;                       ; ELSE CHR = NULL
 02CA 1600       ENCL3   MVI     D,0     ; (S2) <- OFFSET TO NULL
 02CC D5                 PUSH    D
 02CD D5                 PUSH    D       ; (S1) <- OFFSET TO NULL
 02CE C34501             JMP     NEXT
```

```
                ;                               ; ELSE CHR = DELIM CHR
02D1 1600       ENCL4   MVI     D,0             ; (S2) <- OFFSET TO BYTE
                ;                                 FOLLOWING TEXT
02D3 D5                 PUSH    D
02D4 1C                 INR     E               ; (S1) <- OFFSET TO 2 BYTES AFTER
                ;                                   END OF WORD
02D5 D5                 PUSH    D
02D6 C34501             JMP     NEXT
                ;
02D9 84                 DB      84H             ; EMIT
02DA 454D49             DB      'EMI'
02DD D4                 DB      'T'+80H
02DE 9202               DW      ENCL-0AH
02E0 1106       EMIT    DW      DOCOL
02E2 9E16               DW      PEMIT
02E4 97066E07           DW      ONE,OUTT
02E8 72054704           DW      PSTOR,SEMIS
                ;
02EC 83                 DB      83H             ; KEY
02ED 4B45               DB      'KE'
02EF D9                 DB      'Y'+80H
02F0 D902               DW      EMIT-7
02F2 F402       KEY     DW      $+2
02F4 C38616             JMP     PKEY
                ;
02F7 89                 DB      89H             ; ?TERMINAL
02F8 3F5445524D         DB      '?TERMINA'
0300 CC                 DB      'L'+80H
0301 EC02               DW      KEY-6
0303 0503       QTERM   DW      $+2
0305 210000             LXI     H,0
0308 C37816             JMP     PQTER
                ;
030B 82                 DB      82H             ; CR
030C 43                 DB      'C'
030D D2                 DB      'R'+80H
030E F702               DW      QTERM-0CH
0310 1203       CR      DW      $+2
0312 C3AA16             JMP     PCR
                ;
0315 85                 DB      85H             ; CMOVE
0316 434D4F56           DB      'CMOV'
031A C5                 DB      'E'+80H
031B 0B03               DW      CR-5
031D 1F03       CMOVE   DW      $+2
031F 69                 MOV     L,C             ; (HL) <- (IP)
0320 60                 MOV     H,B
0321 C1                 POP     B               ; (BC) <- (S1) = #CHRS
0322 D1                 POP     D               ; (DE) <- (S2) = DEST ADDR
0323 E3                 XTHL                    ; (HL) <- (S3) = SOURCE ADDR
                ;                               ; (S1) <- (IP)
0324 C32C03             JMP     CMOV2           ; RETURN IF #CHRS = 0
0327 7E         CMOV1   MOV     A,M             ; ((DE)) <- ((HL))
0328 23                 INX     H               ; INC SOURCE ADDR
0329 12                 STAX    D
032A 13                 INX     D               ; INC DEST ADDR
```

```
CP/M MACRO ASSEM 2.0     #012     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 032B 0B                 DCX      B        ; DEC #CHRS
 032C 78          CMOV2  MOV      A,B
 032D B1                 ORA      C
 032E C22703             JNZ      CMOV1    ; REPEAT IF #CHRS <> 0
 0331 C1                 POP      B        ; RESTORE (IP) FROM (S1)
 0332 C34501             JMP      NEXT
                  ;
 0335 82                 DB       82H      ; U*    16X16 UNSIGNED MULTIPLY
 0336 55                 DB       'U'      ; AVG EXECUTION TIME = 994 CYCLES
 0337 AA                 DB       '*'+80H
 0338 1503               DW       CMOVE-8
 033A 3C03        USTAR  DW       $+2
 033C D1                 POP      D        ; (DE) <- MPLIER
 033D E1                 POP      H        ; (HL) <- MPCAND
 033E C5                 PUSH     B        ; SAVE IP
 033F 44                 MOV      B,H
 0340 7D                 MOV      A,L      ; (BA) <- MPCAND
 0341 CD5803             CALL     MPYX     ; (AHL)1 <- MPCAND.LB * MPLIER
                  ;                                 1ST PARTIAL PRODUCT
 0344 E5                 PUSH     H        ; SAVE (HL)1
 0345 67                 MOV      H,A
 0346 78                 MOV      A,B
 0347 44                 MOV      B,H      ; SAVE (A)1
 0348 CD5803             CALL     MPYX     ; (AHL)2 <- MPCAND.HB * MPLIER
                  ;                                 2ND PARTIAL PRODUCT
 034B D1                 POP      D        ; (DE) <- (HL)1
 034C 4A                 MOV      C,D      ; (BC) <- (AH)1
                  ;       FORM SUM OF PARTIALS:
                  ;                           (AHL) 1
                  ;                         + (AHL)  2
                  ;                         --------
                  ;                           (AHLE)
 034D 09                 DAD      B        ; (HL) <- (HL)2 + (AH)1
 034E CE00               ACI      0        ; (AHLE) <- (BA) * (DE)
 0350 55                 MOV      D,L
 0351 6C                 MOV      L,H
 0352 67                 MOV      H,A      ; (HLDE) <- MPLIER * MPCAND
 0353 C1                 POP      B        ; RESTORE IP
 0354 D5                 PUSH     D        ; (S2) <- PRODUCT.LW
 0355 C34401             JMP      HPUSH    ; (S1) <- PRODUCT.HW
                  ;
                  ;       MULTIPLY PRIMITIVE
                  ;                (AHL) <- (A) * (DE)
                  ;       #BITS =  24       8     16
 0358 210000      MPYX   LXI      H,0      ; (HL) <- 0 = PARTIAL PRODUCT.LW
 035B 0E08               MVI      C,8      ; LOOP COUNTER
 035D 29          MPYX1  DAD      H        ; LEFT SHIFT (AHL) 24 BITS
 035E 17                 RAL
 035F D26503             JNC      MPYX2    ; IF NEXT MPLIER BIT = 1
 0362 19                 DAD      D        ; THEN ADD MPCAND
 0363 CE00               ACI      0
 0365 0D          MPYX2  DCR      C        ; IF NOT LAST MPLIER BIT
 0366 C25D03             JNZ      MPYX1    ; THEN LOOP AGAIN
 0369 C9                 RET               ; ELSE DONE
                  ;
 036A 82                 DB       82H      ; U/
```

```
CP/M MACRO ASSEM 2.0    #013    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 036B 55                DB      'U'
 036C AF                DB      '/'+80H
 036D 3503              DW      USTAR-5
 036F 7103      USLAS   DW      $+2
 0371 210400            LXI     H,4
 0374 39                DAD     SP      ; ((HL)) <- NUMERATOR.LW
 0375 5E                MOV     E,M     ; (DE) <- NUMER.LW
 0376 71                MOV     M,C     ; SAVE IP ON STACK
 0377 23                INX     H
 0378 56                MOV     D,M
 0379 70                MOV     M,B
 037A C1                POP     B       ; (BC) <- DENOMINATOR
 037B E1                POP     H       ; (HL) <- NUMER.HW
 037C 7D                MOV     A,L
 037D 91                SUB     C       ; IF NUMER >= DENOM
 037E 7C                MOV     A,H
 037F 98                SBB     B
 0380 DA8C03            JC      USLA1
 0383 21FFFF            LXI     H,0FFFFH        ; THEN OVERFLOW
 0386 11FFFF            LXI     D,0FFFFH        ; SET REM & QUOT TO MAX
 0389 C3B703            JMP     USLA7
 038C 3E10      USLA1   MVI     A,16    ; LOOP COUNTER
 038E 29        USLA2   DAD     H       ; LEFT SHIFT (HLDE) THRU CARRY
 038F 17                RAL
 0390 EB                XCHG
 0391 29                DAD     H
 0392 D29703            JNC     USLA3
 0395 13                INX     D
 0396 A7                ANA     A
 0397 EB        USLA3   XCHG            ; SHIFT DONE
 0398 1F                RAR             ; RESTORE 1ST CARRY
 0399 F5                PUSH    PSW     ; SAVE COUNTER
 039A D2A603            JNC     USLA4   ; IF CARRY = 1
 039D 7D                MOV     A,L     ; THEN (HL) <- (HL) - (BC)
 039E 91                SUB     C
 039F 6F                MOV     L,A
 03A0 7C                MOV     A,H
 03A1 98                SBB     B
 03A2 67                MOV     H,A
 03A3 C3B103            JMP     USLA5
 03A6 7D        USLA4   MOV     A,L     ; ELSE TRY (HL) <- (HL) - (BC)
 03A7 91                SUB     C
 03A8 6F                MOV     L,A
 03A9 7C                MOV     A,H
 03AA 98                SBB     B       ; (HL) <- PARTIAL REMAINDER
 03AB 67                MOV     H,A
 03AC D2B103            JNC     USLA5
 03AF 09                DAD     B       ; UNDERFLOW, RESTORE
 03B0 1B                DCX     D
 03B1 13        USLA5   INX     D       ; INC QUOT
 03B2 F1        USLA6   POP     PSW     ; RESTORE COUNTER
 03B3 3D                DCR     A       ; IF COUNTER > 0
 03B4 C28E03            JNZ     USLA2   ; THEN LOOP AGAIN
 03B7 C1        USLA7   POP     B       ; ELSE DONE, RESTORE IP
 03B8 E5                PUSH    H       ; (S2) <- REMAINDER
 03B9 D5                PUSH    D       ; (S1) <- QUOTIENT
```

```
CP/M MACRO ASSEM 2.0     #014     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 03BA C34501             JMP      NEXT
                 ;
 03BD 83                 DB       83H      ; AND
 03BE 414E               DB       'AN'
 03C0 C4                 DB       'D'+80H
 03C1 6A03               DW       USLAS-5
 03C3 C503       ANDD    DW       $+2      ; (S1) <- (S1) AND (S2)
 03C5 D1                 POP      D
 03C6 E1                 POP      H
 03C7 7B                 MOV      A,E
 03C8 A5                 ANA      L
 03C9 6F                 MOV      L,A
 03CA 7A                 MOV      A,D
 03CB A4                 ANA      H
 03CC 67                 MOV      H,A
 03CD C34401             JMP      HPUSH
                 ;
 03D0 82                 DB       82H      ; OR
 03D1 4F                 DB       'O'
 03D2 D2                 DB       'R'+80H
 03D3 BD03               DW       ANDD-6
 03D5 D703       ORR     DW       $+2      ; (S1) <- (S1) OR (S2)
 03D7 D1                 POP      D
 03D8 E1                 POP      H
 03D9 7B                 MOV      A,E
 03DA B5                 ORA      L
 03DB 6F                 MOV      L,A
 03DC 7A                 MOV      A,D
 03DD B4                 ORA      H
 03DE 67                 MOV      H,A
 03DF C34401             JMP      HPUSH
                 ;
 03E2 83                 DB       83H      ; XOR
 03E3 584F               DB       'XO'
 03E5 D2                 DB       'R'+80H
 03E6 D003               DW       ORR-5
 03E8 EA03       XORR    DW       $+2      ; (S1) <- (S1) XOR (S2)
 03EA D1                 POP      D
 03EB E1                 POP      H
 03EC 7B                 MOV      A,E
 03ED AD                 XRA      L
 03EE 6F                 MOV      L,A
 03EF 7A                 MOV      A,D
 03F0 AC                 XRA      H
 03F1 67                 MOV      H,A
 03F2 C34401             JMP      HPUSH
                 ;
 03F5 83                 DB       83H      ; SP@
 03F6 5350               DB       'SP'
 03F8 C0                 DB       '@'+80H
 03F9 E203               DW       XORR-6
 03FB FD03       SPAT    DW       $+2      ;(S1) <- (SP)
 03FD 210000             LXI      H,0
 0400 39                 DAD      SP       ; (HL) <- (SP)
 0401 C34401             JMP      HPUSH    ; (S1) <- (HL)
                 ;
```

```
CP/M MACRO ASSEM 2.0     #015    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0404 83                 DB      83H     ; STACK POINTER STORE
 0405 5350               DB      'SP'
 0407 A1                 DB      '!'+80H
 0408 F503               DW      SPAT-6
 040A 0C04       SPSTO   DW      $+2     ;(SP) <- (S0) ( USER VARIABLE )
 040C 2A2601             LHLD    UP      ; (HL) <- USER VAR BASE ADDR
 040F 110600             LXI     D,6
 0412 19                 DAD     D       ; (HL) <- S0
 0413 5E                 MOV     E,M     ; (DE) <- (S0)
 0414 23                 INX     H
 0415 56                 MOV     D,M
 0416 EB                 XCHG
 0417 F9                 SPHL            ; (SP) <- (S0)
 0418 C34501             JMP     NEXT
                ;
 041B 83                 DB      83H     ; RP@
 041C 5250               DB      'RP'
 041E C0                 DB      '@'+80H
 041F 0404               DW      SPSTO-6
 0421 2304       RPAT    DW      $+2     ;(S1) <- (RP)
 0423 2A2801             LHLD    RPP
 0426 C34401             JMP     HPUSH
                ;
 0429 83                 DB      83H     ; RETURN STACK POINTER STORE
 042A 5250               DB      'RP'
 042C A1                 DB      '!'+80H
 042D 1B04               DW      RPAT-6
 042F 3104       RPSTO   DW      $+2     ;(RP) <- (R0) ( USER VARIABLE )
 0431 2A2601             LHLD    UP      ; (HL) <- USER VARIABLE BASE ADDR
 0434 110800             LXI     D,8
 0437 19                 DAD     D       ; (HL) <- R0
 0438 5E                 MOV     E,M     ; (DE) <- (R0)
 0439 23                 INX     H
 043A 56                 MOV     D,M
 043B EB                 XCHG
 043C 222801             SHLD    RPP     ; (RP) <- (R0)
 043F C34501             JMP     NEXT
                ;
 0442 82                 DB      82H     ; ;S
 0443 3B                 DB      ';'
 0444 D3                 DB      'S'+80H
 0445 2904               DW      RPSTO-6
 0447 4904       SEMIS   DW      $+2     ;(IP) <- (R1)
 0449 2A2801             LHLD    RPP
 044C 4E                 MOV     C,M     ; (BC) <- (R1)
 044D 23                 INX     H
 044E 46                 MOV     B,M
 044F 23                 INX     H
 0450 222801             SHLD    RPP     ; (RP) <- (RP) + 2
 0453 C34501             JMP     NEXT
                ;
 0456 85                 DB      85H     ; LEAVE
 0457 4C454156           DB      'LEAV'
 045B C5                 DB      'E'+80H
 045C 4204               DW      SEMIS-5
 045E 6004       LEAVE   DW      $+2     ;LIMIT <- INDEX
```

```
CP/M MACRO ASSEM 2.0     #016     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0460 2A2801             LHLD     RPP
 0463 5E                 MOV      E,M      ; (DE) <- (R1) = INDEX
 0464 23                 INX      H
 0465 56                 MOV      D,M
 0466 23                 INX      H
 0467 73                 MOV      M,E      ; (R2) <- (DE) = LIMIT
 0468 23                 INX      H
 0469 72                 MOV      M,D
 046A C34501             JMP      NEXT
                ;
 046D 82                 DB       82H      ; >R
 046E 3E                 DB       '>'
 046F D2                 DB       'R'+80H
 0470 5604               DW       LEAVE-8
 0472 7404       TOR     DW       $+2      ;(R1) <- (S1)
 0474 D1                 POP      D        ; (DE) <- (S1)
 0475 2A2801             LHLD     RPP
 0478 2B                 DCX      H        ; (RP) <- (RP) - 2
 0479 2B                 DCX      H
 047A 222801             SHLD     RPP
 047D 73                 MOV      M,E      ; ((HL)) <- (DE)
 047E 23                 INX      H
 047F 72                 MOV      M,D
 0480 C34501             JMP      NEXT
                ;
 0483 82                 DB       82H      ; R>
 0484 52                 DB       'R'
 0485 BE                 DB       '>'+80H
 0486 6D04               DW       TOR-5
 0488 8A04       FROMR   DW       $+2      ;(S1) <- (R1)
 048A 2A2801             LHLD     RPP
 048D 5E                 MOV      E,M      ; (DE) <- (R1)
 048E 23                 INX      H
 048F 56                 MOV      D,M
 0490 23                 INX      H
 0491 222801             SHLD     RPP      ; (RP) <- (RP) + 2
 0494 D5                 PUSH     D        ; (S1) <- (DE)
 0495 C34501             JMP      NEXT
                ;
 0498 81                 DB       81H      ; R
 0499 D2                 DB       'R'+80H
 049A 8304               DW       FROMR-5
 049C 0D02       RR      DW       IDO+2
                ;
 049E 82                 DB       82H      ; 0=
 049F 30                 DB       '0'
 04A0 BD                 DB       '='+80H
 04A1 9804               DW       RR-4
 04A3 A504       ZEQU    DW       $+2
 04A5 E1                 POP      H        ; (HL) <- (S1)
 04A6 7D                 MOV      A,L
 04A7 B4                 ORA      H        ; IF (HL) = 0
 04A8 210000             LXI      H,0      ; THEN (HL) <- FALSE
 04AB C2AF04             JNZ      ZEQU1
 04AE 23                 INX      H        ; ELSE (HL) <- TRUE
 04AF C34401     ZEQU1   JMP      HPUSH    ; (S1) <- (HL)
```

```
                ;
04B2 82                 DB      82H     ; 0<
04B3 30                 DB      '0'
04B4 BC                 DB      '<'+80H
04B5 9E04               DW      ZEQU-5
04B7 B904       ZLESS   DW      $+2
04B9 E1                 POP     H       ; (HL) <- (S1)
04BA 29                 DAD     H       ; IF (HL) >= 0
04BB 210000             LXI     H,0     ; THEN (HL) <- FALSE
04BE D2C204             JNC     ZLES1
04C1 23                 INX     H       ; ELSE (HL) <- TRUE
04C2 C34401     ZLES1   JMP     HPUSH   ; (S1) <- (HL)
                ;
04C5 81                 DB      81H     ; +
04C6 AB                 DB      '+'+80H
04C7 B204               DW      ZLESS-5
04C9 CB04       PLUS    DW      $+2     ;(S1) <- (S1) + (S2)
04CB D1                 POP     D
04CC E1                 POP     H
04CD 19                 DAD     D
04CE C34401             JMP     HPUSH
                ;
04D1 82                 DB      82H     ; D+    (4-2)
04D2 44                 DB      'D'     ; XLW XHW  YLW YHW  ---  SLW SHW
04D3 AB                 DB      '+'+80H ; S4  S3   S2  S1        S2  S1
04D4 C504               DW      PLUS-4
04D6 D804       DPLUS   DW      $+2
04D8 210600             LXI     H,6
04DB 39                 DAD     SP      ; ((HL)) = XLW
04DC 5E                 MOV     E,M     ; (DE) = XLW
04DD 71                 MOV     M,C     ; SAVE IP ON STACK
04DE 23                 INX     H
04DF 56                 MOV     D,M
04E0 70                 MOV     M,B
04E1 C1                 POP     B       ; (BC) <- YHW
04E2 E1                 POP     H       ; (HL) <- YLW
04E3 19                 DAD     D
04E4 EB                 XCHG            ; (DE) <- YLW + XLW = SUM.LW
04E5 E1                 POP     H       ; (HL) <- XHW
04E6 7D                 MOV     A,L
04E7 89                 ADC     C
04E8 6F                 MOV     L,A     ; (HL) <- YHW + XHW + CARRY
04E9 7C                 MOV     A,H
04EA 88                 ADC     B
04EB 67                 MOV     H,A
04EC C1                 POP     B       ; RESTORE IP
04ED D5                 PUSH    D       ; (S2) <- SUM.LW
04EE C34401             JMP     HPUSH   ; (S1) <- SUM.HW
                ;
04F1 85                 DB      85H     ; MINUS
04F2 4D494E55           DB      'MINU'
04F6 D3                 DB      'S'+80H
04F7 D104               DW      DPLUS-5
04F9 FB04       MINUS   DW      $+2     ;(S1) <- -(S1)  ( 2'S COMPLEMENT )
04FB E1                 POP     H
04FC 7D                 MOV     A,L
```

```
CP/M MACRO ASSEM 2.0    #018    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 04FD 2F                CMA
 04FE 6F                MOV     L,A
 04FF 7C                MOV     A,H
 0500 2F                CMA
 0501 67                MOV     H,A
 0502 23                INX     H
 0503 C34401            JMP     HPUSH
                ;
 0506 86                DB      86H     ; DMINUS
 0507 444D494E55        DB      'DMINU'
 050C D3                DB      'S'+80H
 050D F104              DW      MINUS-8
 050F 1105      DMINU   DW      $+2
 0511 E1                POP     H       ; (HL) <- HW
 0512 D1                POP     D       ; (DE) <- LW
 0513 97                SUB     A
 0514 93                SUB     E       ; (DE) <- 0 - (DE)
 0515 5F                MOV     E,A
 0516 3E00              MVI     A,0
 0518 9A                SBB     D
 0519 57                MOV     D,A
 051A 3E00              MVI     A,0
 051C 9D                SBB     L       ; (HL) <- 0 - (HL)
 051D 6F                MOV     L,A
 051E 3E00              MVI     A,0
 0520 9C                SBB     H
 0521 67                MOV     H,A
 0522 D5                PUSH    D       ; (S2) <- LW
 0523 C34401            JMP     HPUSH   ; (S1) <- HW
                ;
 0526 84                DB      84H     ; OVER
 0527 4F5645            DB      'OVE'
 052A D2                DB      'R'+80H
 052B 0605              DW      DMINU-9
 052D 2F05      OVER    DW      $+2
 052F D1                POP     D
 0530 E1                POP     H
 0531 E5                PUSH    H
 0532 C34301            JMP     DPUSH
                ;
 0535 84                DB      84H     ; DROP
 0536 44524F            DB      'DRO'
 0539 D0                DB      'P'+80H
 053A 2605              DW      OVER-7
 053C 3E05      DROP    DW      $+2
 053E E1                POP     H
 053F C34501            JMP     NEXT
                ;
 0542 84                DB      84H     ; SWAP
 0543 535741            DB      'SWA'
 0546 D0                DB      'P'+80H
 0547 3505              DW      DROP-7
 0549 4B05      SWAP    DW      $+2
 054B E1                POP     H
 054C E3                XTHL
 054D C34401            JMP     HPUSH
```

```
                ;
0550 83                 DB      83H     ; DUP
0551 4455               DB      'DU'
0553 D0                 DB      'P'+80H
0554 4205               DW      SWAP-7
0556 5805       DUP     DW      $+2
0558 E1                 POP     H
0559 E5                 PUSH    H
055A C34401             JMP     HPUSH
                ;
055D 84                 DB      84H     ; 2DUP
055E 324455             DB      '2DU'
0561 D0                 DB      'P'+80H
0562 5005               DW      DUP-6
0564 6605       TDUP    DW      $+2
0566 E1                 POP     H
0567 D1                 POP     D
0568 D5                 PUSH    D
0569 E5                 PUSH    H
056A C34301             JMP     DPUSH
                ;
056D 82                 DB      82H     ; PLUS STORE
056E 2B                 DB      '+'
056F A1                 DB      '!'+80H
0570 5D05               DW      TDUP-7
0572 7405       PSTOR   DW      $+2     ;((S1)) <- ((S1)) + (S2)
0574 E1                 POP     H       ; (HL) <- (S1) = ADDR
0575 D1                 POP     D       ; (DE) <- (S2) = INCR
0576 7E                 MOV     A,M     ; ((HL)) <- ((HL)) + (DE)
0577 83                 ADD     E
0578 77                 MOV     M,A
0579 23                 INX     H
057A 7E                 MOV     A,M
057B 8A                 ADC     D
057C 77                 MOV     M,A
057D C34501             JMP     NEXT
                ;
0580 86                 DB      86H     ; TOGGLE
0581 544F47474C         DB      'TOGGL'
0586 C5                 DB      'E'+80H
0587 6D05               DW      PSTOR-5
0589 8B05       TOGGL   DW      $+2     ;((S2)) <- ((S2)) XOR (S1)LB
058B D1                 POP     D       ; (E) <- BYTE MASK
058C E1                 POP     H       ; (HL) <- ADDR
058D 7E                 MOV     A,M
058E AB                 XRA     E
058F 77                 MOV     M,A     ; (ADDR) <- (ADDR) XOR (E)
0590 C34501             JMP     NEXT
                ;
0593 81                 DB      81H     ; @
0594 C0                 DB      '@'+80H
0595 8005               DW      TOGGL-9
0597 9905       AT      DW      $+2     ;(S1) <- ((S1))
0599 E1                 POP     H       ; (HL) <- ADDR
059A 5E                 MOV     E,M     ; (DE) <- (ADDR)
059B 23                 INX     H
```

```
CP/M MACRO ASSEM 2.0     #020    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 059C 56                 MOV     D,M
 059D D5                 PUSH    D       ; (S1) <- (DE)
 059E C34501             JMP     NEXT
                ;
 05A1 82                 DB      82H     ; C@
 05A2 43                 DB      'C'
 05A3 C0                 DB      '@'+80H
 05A4 9305               DW      AT-4
 05A6 A805       CAT     DW      $+2     ;(S1) <- ((S1))LB
 05A8 E1                 POP     H       ; (HL) <- ADDR
 05A9 6E                 MOV     L,M     ; (HL) <- (ADDR)LB
 05AA 2600               MVI     H,0
 05AC C34401             JMP     HPUSH
                ;
 05AF 82                 DB      82H     ; 2@
 05B0 32                 DB      '2'
 05B1 C0                 DB      '@'+80H
 05B2 A105               DW      CAT-5
 05B4 B605       TAT     DW      $+2
 05B6 E1                 POP     H       ; (HL) <- ADDR HW
 05B7 110200             LXI     D,2
 05BA 19                 DAD     D       ; (HL) <- ADDR LW
 05BB 5E                 MOV     E,M     ; (DE) <- LW
 05BC 23                 INX     H
 05BD 56                 MOV     D,M
 05BE D5                 PUSH    D       ; (S2) <- LW
 05BF 11FDFF             LXI     D,-3    ; (HL) <- ADDR HW
 05C2 19                 DAD     D
 05C3 5E                 MOV     E,M     ; (DE) <- HW
 05C4 23                 INX     H
 05C5 56                 MOV     D,M
 05C6 D5                 PUSH    D       ; (S1) <- HW
 05C7 C34501             JMP     NEXT
                ;
 05CA 81                 DB      81H     ; STORE
 05CB A1                 DB      '!'+80H
 05CC AF05               DW      TAT-5
 05CE D005       STORE   DW      $+2     ;((S1)) <- (S2)
 05D0 E1                 POP     H       ; (HL) <- (S1) = ADDR
 05D1 D1                 POP     D       ; (DE) <- (S2) = VALUE
 05D2 73                 MOV     M,E     ; ((HL)) <- (DE)
 05D3 23                 INX     H
 05D4 72                 MOV     M,D
 05D5 C34501             JMP     NEXT
                ;
 05D8 82                 DB      82H     ; C STORE
 05D9 43                 DB      'C'
 05DA A1                 DB      '!'+80H
 05DB CA05               DW      STORE-4
 05DD DF05       CSTOR   DW      $+2     ;((S1))LB <- (S2)LB
 05DF E1                 POP     H       ; (HL) <- (S1) = ADDR
 05E0 D1                 POP     D       ; (DE) <- (S2) = BYTE
 05E1 73                 MOV     M,E     ; ((HL))LB <- (E)
 05E2 C34501             JMP     NEXT
                ;
 05E5 82                 DB      82H     ; 2 STORE
```

```
CP/M MACRO ASSEM 2.0     #021     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 05E6 32                 DB       '2'
 05E7 A1                 DB       '!'+80H
 05E8 D805               DW       CSTOR-5
 05EA EC05       TSTOR   DW       $+2
 05EC E1                 POP      H        ; (HL) <- ADDR
 05ED D1                 POP      D        ; (DE) <- HW
 05EE 73                 MOV      M,E      ; (ADDR) <- HW
 05EF 23                 INX      H
 05F0 72                 MOV      M,D
 05F1 23                 INX      H        ; (HL) <- ADDR LW
 05F2 D1                 POP      D        ; (DE) <- LW
 05F3 73                 MOV      M,E      ; (ADDR+2) <- LW
 05F4 23                 INX      H
 05F5 72                 MOV      M,D
 05F6 C34501             JMP      NEXT
                 ;
 05F9 C1                 DB       0C1H     ; :
 05FA BA                 DB       ':'+80H
 05FB E505               DW       TSTOR-5
 05FD 1106       COLON   DW       DOCOL
 05FF AA09               DW       QEXEC
 0601 6509               DW       SCSP
 0603 9D07               DW       CURR
 0605 9705               DW       AT
 0607 9007               DW       CONT
 0609 CE05               DW       STORE
 060B 7F0E               DW       CREAT
 060D 2F0A               DW       RBRAC
 060F 820A               DW       PSCOD
 0611 2A2801     DOCOL   LHLD     RPP
 0614 2B                 DCX      H        ; (R1) <- (IP)
 0615 70                 MOV      M,B
 0616 2B                 DCX      H        ; (RP) <- (RP) - 2
 0617 71                 MOV      M,C
 0618 222801             SHLD     RPP
 061B 13                 INX      D        ; (DE) <- CFA+2 = (W)
 061C 4B                 MOV      C,E      ; (IP) <- (DE) = (W)
 061D 42                 MOV      B,D
 061E C34501             JMP      NEXT
                 ;
 0621 C1                 DB       0C1H     ; ;
 0622 BB                 DB       ';'+80H
 0623 F905               DW       COLON-4
 0625 1106       SEMI    DW       DOCOL
 0627 D409               DW       QCSP
 0629 0B0A               DW       COMP
 062B 4704               DW       SEMIS
 062D 440A               DW       SMUDG
 062F 210A               DW       LBRAC
 0631 4704               DW       SEMIS
                 ;
 0633 84                 DB       84H      ; NOOP
 0634 4E4F4F             DB       'NOO'
 0637 D0                 DB       'P'+80H
 0638 2106               DW       SEMI-4
 063A 1106       NOOP    DW       DOCOL
```

```
CP/M MACRO ASSEM 2.0     #022     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 063C 4704               DW       SEMIS
                  ;
 063E 88                 DB       88H      ; CONSTANT
 063F 434F4E5354         DB       'CONSTAN'
 0646 D4                 DB       'T'+80H
 0647 3306               DW       NOOP-7
 0649 1106       CON     DW       DOCOL
 064B 7F0E               DW       CREAT
 064D 440A               DW       SMUDG
 064F 1F08               DW       COMMA
 0651 820A               DW       PSCOD
 0653 13         DOCON   INX      D        ; (DE) <- PFA
 0654 EB                 XCHG
 0655 5E                 MOV      E,M      ; (DE) <- (PFA)
 0656 23                 INX      H
 0657 56                 MOV      D,M
 0658 D5                 PUSH     D        ; (S1) <- (PFA)
 0659 C34501             JMP      NEXT
                  ;
 065C 88                 DB       88H      ; VARIABLE
 065D 5641524941         DB       'VARIABL'
 0664 C5                 DB       'E'+80H
 0665 3E06               DW       CON-0BH
 0667 1106       VAR     DW       DOCOL
 0669 4906               DW       CON
 066B 820A               DW       PSCOD
 066D 13         DOVAR   INX      D        ; (DE) <- PFA
 066E D5                 PUSH     D        ; (S1) <- PFA
 066F C34501             JMP      NEXT
                  ;
 0672 84                 DB       84H      ; USER
 0673 555345             DB       'USE'
 0676 D2                 DB       'R'+80H
 0677 5C06               DW       VAR-0BH
 0679 1106       USER    DW       DOCOL
 067B 4906               DW       CON
 067D 820A               DW       PSCOD
 067F 13         DOUSE   INX      D        ; (DE) <- PFA
 0680 EB                 XCHG
 0681 5E                 MOV      E,M      ; (DE) <- USER VARIABLE OFFSET
 0682 1600               MVI      D,0
 0684 2A2601             LHLD     UP       ; (HL) <- USER VARIABLE BASE ADDR
 0687 19                 DAD      D        ; (HL) <- (HL) + (DE)
 0688 C34401             JMP      HPUSH    ; (S1) <- BASE + OFFSET
                  ;
 068B 81                 DB       81H      ; 0
 068C B0                 DB       '0'+80H
 068D 7206               DW       USER-7
 068F 5306       ZERO    DW       DOCON
 0691 0000               DW       0
                  ;
 0693 81                 DB       81H      ; 1
 0694 B1                 DB       '1'+80H
 0695 8B06               DW       ZERO-4
 0697 5306       ONE     DW       DOCON
 0699 0100               DW       1
```

```
                ;
069B 81                 DB      81H     ; 2
069C B2                 DB      '2'+80H
069D 9306               DW      ONE-4
069F 5306       TWO     DW      DOCON
06A1 0200               DW      2
                ;
06A3 81                 DB      81H     ; 3
06A4 B3                 DB      '3'+80H
06A5 9B06               DW      TWO-4
06A7 5306       THREE   DW      DOCON
06A9 0300               DW      3
                ;
06AB 82                 DB      82H     ; BL
06AC 42                 DB      'B'
06AD CC                 DB      'L'+80H
06AE A306               DW      THREE-4
06B0 5306       BL      DW      DOCON
06B2 2000               DW      20H
                ;
06B4 83                 DB      83H     ; C/L ( CHARACTERS/LINE )
06B5 432F               DB      'C/'
06B7 CC                 DB      'L'+80H
06B8 AB06               DW      BL-5
06BA 5306       CSLL    DW      DOCON
06BC 4000               DW      64
                ;
06BE 85                 DB      85H     ; FIRST
06BF 46495253           DB      'FIRS'
06C3 D4                 DB      'T'+80H
06C4 B406               DW      CSLL-6
06C6 5306       FIRST   DW      DOCON
06C8 E03B               DW      BUF1
                ;
06CA 85                 DB      85H     ; LIMIT
06CB 4C494D49           DB      'LIMI'
06CF D4                 DB      'T'+80H
06D0 BE06               DW      FIRST-8
06D2 5306       LIMIT   DW      DOCON
06D4 0040               DW      EM
                ;
06D6 85                 DB      85H     ; B/BUF ( BYTES/BUFFER )
06D7 422F4255           DB      'B/BU'
06DB C6                 DB      'F'+80H
06DC CA06               DW      LIMIT-8
06DE 5306       BBUF    DW      DOCON
06E0 8000               DW      KBBUF
                ;
06E2 85                 DB      85H     ; B/SCR ( BUFFERS/SCREEN )
06E3 422F5343           DB      'B/SC'
06E7 D2                 DB      'R'+80H
06E8 D606               DW      BBUF-8
06EA 5306       BSCR    DW      DOCON
06EC 0800               DW      400H/KBBUF
                ;
06EE 87                 DB      87H     ; +ORIGIN
```

```
CP/M MACRO ASSEM 2.0     #024     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 06EF 2B4F524947         DB       '+ORIGI'
 06F5 CE                 DB       'N'+80H
 06F6 E206               DW       BSCR-8
 06F8 1106       PORIG   DW       DOCOL
 06FA 5601               DW       LIT
 06FC 0001               DW       ORIG
 06FE C904               DW       PLUS
 0700 4704               DW       SEMIS
                 ;
                 ;       USER VARIABLES
                 ;
 0702 82                 DB       82H      ; SO
 0703 53                 DB       'S'
 0704 B0                 DB       '0'+80H
 0705 EE06               DW       PORIG-0AH
 0707 7F06       SZERO   DW       DOUSE
 0709 0600               DW       6
                 ;
 070B 82                 DB       82H      ; R0
 070C 52                 DB       'R'
 070D B0                 DB       '0'+80H
 070E 0207               DW       SZERO-5
 0710 7F06       RZERO   DW       DOUSE
 0712 0800               DW       8
                 ;
 0714 83                 DB       83H      ; TIB
 0715 5449               DB       'TI'
 0717 C2                 DB       'B'+80H
 0718 0B07               DW       RZERO-5
 071A 7F06       TIB     DW       DOUSE
 071C 0A                 DB       0AH
                 ;
 071D 85                 DB       85H      ; WIDTH
 071E 57494454           DB       'WIDT'
 0722 C8                 DB       'H'+80H
 0723 1407               DW       TIB-6
 0725 7F06       WIDTH   DW       DOUSE
 0727 0C                 DB       0CH
                 ;
 0728 87                 DB       87H      ; WARNING
 0729 5741524E49         DB       'WARNIN'
 072F C7                 DB       'G'+80H
 0730 1D07               DW       WIDTH-8
 0732 7F06       WARN    DW       DOUSE
 0734 0E                 DB       0EH
                 ;
 0735 85                 DB       85H      ; FENCE
 0736 46454E43           DB       'FENC'
 073A C5                 DB       'E'+80H
 073B 2807               DW       WARN-0AH
 073D 7F06       FENCE   DW       DOUSE
 073F 10                 DB       10H
                 ;
 0740 82                 DB       82H      ; DP
 0741 44                 DB       'D'
 0742 D0                 DB       'P'+80H
```

```
CP/M MACRO ASSEM 2.0     #025    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0743 3507               DW      FENCE-8
 0745 7F06       DP      DW      DOUSE
 0747 12                 DB      12H
                 ;
 0748 88                 DB      88H     ; VOC-LINK
 0749 564F432D4C         DB      'VOC-LIN'
 0750 CB                 DB      'K'+80H
 0751 4007               DW      DP-5
 0753 7F06       VOCL    DW      DOUSE
 0755 1400               DW      14H
                 ;
 0757 83                 DB      83H     ; BLK
 0758 424C               DB      'BL'
 075A CB                 DB      'K'+80H
 075B 4807               DW      VOCL-0BH
 075D 7F06       BLK     DW      DOUSE
 075F 16                 DB      16H
                 ;
 0760 82                 DB      82H     ; IN
 0761 49                 DB      'I'
 0762 CE                 DB      'N'+80H
 0763 5707               DW      BLK-6
 0765 7F06       INN     DW      DOUSE
 0767 18                 DB      18H
                 ;
 0768 83                 DB      83H     ; OUT
 0769 4F55               DB      'OU'
 076B D4                 DB      'T'+80H
 076C 6007               DW      INN-5
 076E 7F06       OUTT    DW      DOUSE
 0770 1A                 DB      1AH
                 ;
 0771 83                 DB      83H     ; SCR
 0772 5343               DB      'SC'
 0774 D2                 DB      'R'+80H
 0775 6807               DW      OUTT-6
 0777 7F06       SCR     DW      DOUSE
 0779 1C                 DB      1CH
                 ;
 077A 86                 DB      86H     ; OFFSET
 077B 4F46465345         DB      'OFFSE'
 0780 D4                 DB      'T'+80H
 0781 7107               DW      SCR-6
 0783 7F06       OFSET   DW      DOUSE
 0785 1E                 DB      1EH
                 ;
 0786 87                 DB      87H     ; CONTEXT
 0787 434F4E5445         DB      'CONTEX'
 078D D4                 DB      'T'+80H
 078E 7A07               DW      OFSET-9
 0790 7F06       CONT    DW      DOUSE
 0792 20                 DB      20H
                 ;
 0793 87                 DB      87H     ; CURRENT
 0794 4355525245         DB      'CURREN'
 079A D4                 DB      'T'+80H
```

```
CP/M MACRO ASSEM 2.0    #026    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 079B 8607              DW      CONT-0AH
 079D 7F06      CURR    DW      DOUSE
 079F 22                DB      22H
                ;
 07A0 85                DB      85H     ; STATE
 07A1 53544154          DB      'STAT'
 07A5 C5                DB      'E'+80H
 07A6 9307              DW      CURR-0AH
 07A8 7F06      STATE   DW      DOUSE
 07AA 24                DB      24H
                ;
 07AB 84                DB      84H     ; BASE
 07AC 424153            DB      'BAS'
 07AF C5                DB      'E'+80H
 07B0 A007              DW      STATE-8
 07B2 7F06      BASE    DW      DOUSE
 07B4 26                DB      26H
                ;
 07B5 83                DB      83H     ; DPL
 07B6 4450              DB      'DP'
 07B8 CC                DB      'L'+80H
 07B9 AB07              DW      BASE-7
 07BB 7F06      DPL     DW      DOUSE
 07BD 28                DB      28H
                ;
 07BE 83                DB      83H     ; FLD
 07BF 464C              DB      'FL'
 07C1 C4                DB      'D'+80H
 07C2 B507              DW      DPL-6
 07C4 7F06      FLD     DW      DOUSE
 07C6 2A                DB      2AH
                ;
 07C7 83                DB      83H     ; CSP
 07C8 4353              DB      'CS'
 07CA D0                DB      'P'+80H
 07CB BE07              DW      FLD-6
 07CD 7F06      CSPP    DW      DOUSE
 07CF 2C                DB      2CH
                ;
 07D0 82                DB      82H     ; R#
 07D1 52                DB      'R'
 07D2 A3                DB      '#'+80H
 07D3 C707              DW      CSPP-6
 07D5 7F06      RNUM    DW      DOUSE
 07D7 2E                DB      2EH
                ;
 07D8 83                DB      83H     ; HLD
 07D9 484C              DB      'HL'
 07DB C4                DB      'D'+80H
 07DC D007              DW      RNUM-5
 07DE 7F06      HLD     DW      DOUSE
 07E0 3000              DW      30H
                ;
                ;       END OF USER VARIABLES
                ;
 07E2 82                DB      82H     ; 1+
```

```
CP/M MACRO ASSEM 2.0    #027    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 07E3 31                DB      '1'
 07E4 AB                DB      '+'+80H
 07E5 D807              DW      HLD-6
 07E7 1106      ONEP    DW      DOCOL
 07E9 9706              DW      ONE
 07EB C904              DW      PLUS
 07ED 4704              DW      SEMIS
                ;
 07EF 82                DB      82H     ; 2+
 07F0 32                DB      '2'
 07F1 AB                DB      '+'+80H
 07F2 E207              DW      ONEP-5
 07F4 1106      TWOP    DW      DOCOL
 07F6 9F06              DW      TWO
 07F8 C904              DW      PLUS
 07FA 4704              DW      SEMIS
                ;
 07FC 84                DB      84H     ; HERE
 07FD 484552            DB      'HER'
 0800 C5                DB      'E'+80H
 0801 EF07              DW      TWOP-5
 0803 1106      HERE    DW      DOCOL
 0805 4507              DW      DP
 0807 9705              DW      AT
 0809 4704              DW      SEMIS
                ;
 080B 85                DB      85H     ; ALLOT
 080C 414C4C4F          DB      'ALLO'
 0810 D4                DB      'T'+80H
 0811 FC07              DW      HERE-7
 0813 1106      ALLOT   DW      DOCOL
 0815 4507              DW      DP
 0817 7205              DW      PSTOR
 0819 4704              DW      SEMIS
                ;
 081B 81                DB      81H     ; ,
 081C AC                DB      ','+80H
 081D 0B08              DW      ALLOT-8
 081F 1106      COMMA   DW      DOCOL
 0821 0308              DW      HERE
 0823 CE05              DW      STORE
 0825 9F06              DW      TWO
 0827 1308              DW      ALLOT
 0829 4704              DW      SEMIS
                ;
 082B 82                DB      82H     ; C,
 082C 43                DB      'C'
 082D AC                DB      ','+80H
 082E 1B08              DW      COMMA-4
 0830 1106      CCOMM   DW      DOCOL
 0832 0308              DW      HERE
 0834 DD05              DW      CSTOR
 0836 9706              DW      ONE
 0838 1308              DW      ALLOT
 083A 4704              DW      SEMIS
                ;
```

```
                ;       SUBROUTINE USED BY - AND <
                ;                               ; (HL) <- (HL) - (DE)
 083C 7D        SSUB    MOV     A,L             ; LB
 083D 93                SUB     E
 083E 6F                MOV     L,A
 083F 7C                MOV     A,H             ; HB
 0840 9A                SBB     D
 0841 67                MOV     H,A
 0842 C9                RET
                ;
 0843 81                DB      81H             ; -
 0844 AD                DB      '-'+80H
 0845 2B08              DW      CCOMM-5
 0847 4908      SUBB    DW      $+2
 0849 D1                POP     D               ; (DE) <- (S1) = Y
 084A E1                POP     H               ; (HL) <- (S2) = X
 084B CD3C08            CALL    SSUB
 084E C34401            JMP     HPUSH           ; (S1) <- X - Y
                ;
 0851 81                DB      81H             ; =
 0852 BD                DB      '='+80H
 0853 4308              DW      SUBB-4
 0855 1106      EQUAL   DW      DOCOL
 0857 4708              DW      SUBB
 0859 A304              DW      ZEQU
 085B 4704              DW      SEMIS
                ;
 085D 81                DB      81H             ; <
 085E BC                DB      '<'+80H                 ; X  <  Y
 085F 5108              DW      EQUAL-4                 ; S2    S1
 0861 6308      LESS    DW      $+2
 0863 D1                POP     D               ; (DE) <- (S1) = Y
 0864 E1                POP     H               ; (HL) <- (S2) = X
 0865 7A                MOV     A,D             ; IF X & Y HAVE SAME SIGNS
 0866 AC                XRA     H
 0867 FA6D08            JM      LES1
 086A CD3C08            CALL    SSUB            ; (HL) <- X - Y
 086D 24        LES1    INR     H               ; IF (HL) >= 0
 086E 25                DCR     H
 086F FA7808            JM      LES2
 0872 210000            LXI     H,0             ; THEN X >= Y
 0875 C34401            JMP     HPUSH           ; (S1) <- FALSE
 0878 210100    LES2    LXI     H,1             ; ELSE X < Y
 087B C34401            JMP     HPUSH           ; (S1) <- TRUE
                ;
 087E 82                DB      82H             ; U< ( UNSIGNED < )
 087F 55                DB      'U'
 0880 BC                DB      '<'+80H
 0881 5D08              DW      LESS-4
 0883 11066405  ULESS   DW      DOCOL,TDUP
 0887 E803B704          DW      XORR,ZLESS
 088B 92010C00          DW      ZBRAN,ULES1-$   ; IF
 088F 3C05B704          DW      DROP,ZLESS
 0893 A304              DW      ZEQU
 0895 7A010600          DW      BRAN,ULES2-$
 0899 4708B704  ULES1   DW      SUBB,ZLESS      ; ELSE
```

```
089D 4704       ULES2   DW      SEMIS           ; ENDIF
                ;
089F 81                 DB      81H     ; >
08A0 BE                 DB      '>'+80H
08A1 7E08               DW      ULESS-5
08A3 1106       GREAT   DW      DOCOL
08A5 4905               DW      SWAP
08A7 6108               DW      LESS
08A9 4704               DW      SEMIS
                ;
08AB 83                 DB      83H     ; ROT
08AC 524F               DB      'RO'
08AE D4                 DB      'T'+80H
08AF 9F08               DW      GREAT-4
08B1 B308       ROT     DW      $+2
08B3 D1                 POP     D
08B4 E1                 POP     H
08B5 E3                 XTHL
08B6 C34301             JMP     DPUSH
                ;
08B9 85                 DB      85H     ; SPACE
08BA 53504143           DB      'SPAC'
08BE C5                 DB      'E'+80H
08BF AB08               DW      ROT-6
08C1 1106       SPACE   DW      DOCOL
08C3 B006               DW      BL
08C5 E002               DW      EMIT
08C7 4704               DW      SEMIS
                ;
08C9 84                 DB      84H     ; -DUP
08CA 2D4455             DB      '-DU'
08CD D0                 DB      'P'+80H
08CE B908               DW      SPACE-8
08D0 1106       DDUP    DW      DOCOL
08D2 5605               DW      DUP
08D4 9201               DW      ZBRAN   ; IF
08D6 0400               DW      DDUP1-$
08D8 5605               DW      DUP     ; ENDIF
08DA 4704       DDUP1   DW      SEMIS
                ;
08DC 88                 DB      88H     ; TRAVERSE
08DD 5452415645         DB      'TRAVERS'
08E4 C5                 DB      'E'+80H
08E5 C908               DW      DDUP-7
08E7 1106       TRAV    DW      DOCOL
08E9 4905               DW      SWAP
08EB 2D05       TRAV1   DW      OVER    ; BEGIN
08ED C904               DW      PLUS
08EF 5601               DW      LIT
08F1 7F00               DW      7FH
08F3 2D05               DW      OVER
08F5 A605               DW      CAT
08F7 6108               DW      LESS
08F9 9201               DW      ZBRAN   ; UNTIL
08FB F0FF               DW      TRAV1-$
08FD 4905               DW      SWAP
```

```
CP/M MACRO ASSEM 2.0    #030    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 08FF 3C05              DW      DROP
 0901 4704              DW      SEMIS
                ;
 0903 86                DB      86H     ; LATEST
 0904 4C41544553        DB      'LATES'
 0909 D4                DB      'T'+80H
 090A DC08              DW      TRAV-0BH
 090C 1106      LATES   DW      DOCOL
 090E 9D07              DW      CURR
 0910 9705              DW      AT
 0912 9705              DW      AT
 0914 4704              DW      SEMIS
                ;
 0916 83                DB      83H     ; LFA
 0917 4C46              DB      'LF'
 0919 C1                DB      'A'+80H
 091A 0309              DW      LATES-9
 091C 1106      LFA     DW      DOCOL
 091E 5601              DW      LIT
 0920 0400              DW      4
 0922 4708              DW      SUBB
 0924 4704              DW      SEMIS
                ;
 0926 83                DB      83H     ; CFA
 0927 4346              DB      'CF'
 0929 C1                DB      'A'+80H
 092A 1609              DW      LFA-6
 092C 1106      CFA     DW      DOCOL
 092E 9F06              DW      TWO
 0930 4708              DW      SUBB
 0932 4704              DW      SEMIS
                ;
 0934 83                DB      83H     ; NFA
 0935 4E46              DB      'NF'
 0937 C1                DB      'A'+80H
 0938 2609              DW      CFA-6
 093A 1106      NFA     DW      DOCOL
 093C 5601              DW      LIT
 093E 0500              DW      5
 0940 4708              DW      SUBB
 0942 5601              DW      LIT
 0944 FFFF              DW      -1
 0946 E708              DW      TRAV
 0948 4704              DW      SEMIS
                ;
 094A 83                DB      83H     ; PFA
 094B 5046              DB      'PF'
 094D C1                DB      'A'+80H
 094E 3409              DW      NFA-6
 0950 1106      PFA     DW      DOCOL
 0952 9706              DW      ONE
 0954 E708              DW      TRAV
 0956 5601              DW      LIT
 0958 0500              DW      5
 095A C904              DW      PLUS
 095C 4704              DW      SEMIS
```

```
                ;
095E 84                 DB      84H     ; STORE CSP
095F 214353             DB      '!CS'
0962 D0                 DB      'P'+80H
0963 4A09               DW      PFA-6
0965 1106       SCSP    DW      DOCOL
0967 FB03               DW      SPAT
0969 CD07               DW      CSPP
096B CE05               DW      STORE
096D 4704               DW      SEMIS
                ;
096F 86                 DB      86H     ; ?ERROR
0970 3F4552524F         DB      '?ERRO'
0975 D2                 DB      'R'+80H
0976 5E09               DW      SCSP-7
0978 1106       QERR    DW      DOCOL
097A 4905               DW      SWAP
097C 9201               DW      ZBRAN   ; IF
097E 0800               DW      QERR1-$
0980 130E               DW      ERROR
0982 7A01               DW      BRAN    ; ELSE
0984 0400               DW      QERR2-$
0986 3C05       QERR1   DW      DROP    ; ENDIF
0988 4704       QERR2   DW      SEMIS
                ;
098A 85                 DB      85H     ; ?COMP
098B 3F434F4D           DB      '?COM'
098F D0                 DB      'P'+80H
0990 6F09               DW      QERR-9
0992 1106       QCOMP   DW      DOCOL
0994 A807               DW      STATE
0996 9705               DW      AT
0998 A304               DW      ZEQU
099A 5601               DW      LIT
099C 1100               DW      11H
099E 7809               DW      QERR
09A0 4704               DW      SEMIS
                ;
09A2 85                 DB      85H     ; ?EXEC
09A3 3F455845           DB      '?EXE'
09A7 C3                 DB      'C'+80H
09A8 8A09               DW      QCOMP-8
09AA 1106       QEXEC   DW      DOCOL
09AC A807               DW      STATE
09AE 9705               DW      AT
09B0 5601               DW      LIT
09B2 1200               DW      12H
09B4 7809               DW      QERR
09B6 4704               DW      SEMIS
                ;
09B8 86                 DB      86H     ; ?PAIRS
09B9 3F50414952         DB      '?PAIR'
09BE D3                 DB      'S'+80H
09BF A209               DW      QEXEC-8
09C1 1106       QPAIR   DW      DOCOL
09C3 4708               DW      SUBB
```

```
CP/M MACRO ASSEM 2.0     #032    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 09C5 5601               DW      LIT
 09C7 1300               DW      13H
 09C9 7809               DW      QERR
 09CB 4704               DW      SEMIS
                 ;
 09CD 84                 DB      84H     ; ?CSP
 09CE 3F4353             DB      '?CS'
 09D1 D0                 DB      'P'+80H
 09D2 B809               DW      QPAIR-9
 09D4 1106       QCSP    DW      DOCOL
 09D6 FB03               DW      SPAT
 09D8 CD07               DW      CSPP
 09DA 9705               DW      AT
 09DC 4708               DW      SUBB
 09DE 5601               DW      LIT
 09E0 1400               DW      14H
 09E2 7809               DW      QERR
 09E4 4704               DW      SEMIS
                 ;
 09E6 88                 DB      88H     ; ?LOADING
 09E7 3F4C4F4144         DB      '?LOADIN'
 09EE C7                 DB      'G'+80H
 09EF CD09               DW      QCSP-7
 09F1 1106       QLOAD   DW      DOCOL
 09F3 5D07               DW      BLK
 09F5 9705               DW      AT
 09F7 A304               DW      ZEQU
 09F9 5601               DW      LIT
 09FB 1600               DW      16H
 09FD 7809               DW      QERR
 09FF 4704               DW      SEMIS
                 ;
 0A01 87                 DB      87H     ; COMPILE
 0A02 434F4D5049         DB      'COMPIL'
 0A08 C5                 DB      'E'+80H
 0A09 E609               DW      QLOAD-0BH
 0A0B 1106       COMP    DW      DOCOL
 0A0D 9209               DW      QCOMP
 0A0F 8804               DW      FROMR
 0A11 5605               DW      DUP
 0A13 F407               DW      TWOP
 0A15 7204               DW      TOR
 0A17 9705               DW      AT
 0A19 1F08               DW      COMMA
 0A1B 4704               DW      SEMIS
                 ;
 0A1D C1                 DB      0C1H    ; [
 0A1E DB                 DB      '['+80H
 0A1F 010A               DW      COMP-0AH
 0A21 1106       LBRAC   DW      DOCOL
 0A23 8F06               DW      ZERO
 0A25 A807               DW      STATE
 0A27 CE05               DW      STORE
 0A29 4704               DW      SEMIS
                 ;
 0A2B 81                 DB      81H     ; ]
```

```
CP/M MACRO ASSEM 2.0    #033    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0A2C DD                DB      ']'+80H
 0A2D 1D0A              DW      LBRAC-4
 0A2F 1106      RBRAC   DW      DOCOL
 0A31 5601C000          DW      LIT,0C0H
 0A35 A807CE05          DW      STATE,STORE
 0A39 4704              DW      SEMIS
                ;
 0A3B 86                DB      86H     ; SMUDGE
 0A3C 534D554447        DB      'SMUDG'
 0A41 C5                DB      'E'+80H
 0A42 2B0A              DW      RBRAC-4
 0A44 1106      SMUDG   DW      DOCOL
 0A46 0C09              DW      LATES
 0A48 5601              DW      LIT
 0A4A 2000              DW      20H
 0A4C 8905              DW      TOGGL
 0A4E 4704              DW      SEMIS
                ;
 0A50 83                DB      83H     ; HEX
 0A51 4845              DB      'HE'
 0A53 D8                DB      'X'+80H
 0A54 3B0A              DW      SMUDG-9
 0A56 1106      HEX     DW      DOCOL
 0A58 5601              DW      LIT
 0A5A 1000              DW      10H
 0A5C B207              DW      BASE
 0A5E CE05              DW      STORE
 0A60 4704              DW      SEMIS
                ;
 0A62 87                DB      87H     ; DECIMAL
 0A63 444543494D        DB      'DECIMA'
 0A69 CC                DB      'L'+80H
 0A6A 500A              DW      HEX-6
 0A6C 1106      DEC     DW      DOCOL
 0A6E 5601              DW      LIT
 0A70 0A00              DW      0AH
 0A72 B207              DW      BASE
 0A74 CE05              DW      STORE
 0A76 4704              DW      SEMIS
                ;
 0A78 87                DB      87H     ; (;CODE)
 0A79 283B434F44        DB      '(;CODE'
 0A7F A9                DB      ')'+80H
 0A80 620A              DW      DEC-0AH
 0A82 1106      PSCOD   DW      DOCOL
 0A84 8804              DW      FROMR
 0A86 0C09              DW      LATES
 0A88 5009              DW      PFA
 0A8A 2C09              DW      CFA
 0A8C CE05              DW      STORE
 0A8E 4704              DW      SEMIS
                ;
 0A90 C5                DB      0C5H    ; ;CODE
 0A91 3B434F44          DB      ';COD'
 0A95 C5                DB      'E'+80H
 0A96 780A              DW      PSCOD-0AH
```

```
CP/M MACRO ASSEM 2.0    #034    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0A98 1106      SEMIC   DW      DOCOL
 0A9A D409              DW      QCSP
 0A9C 0B0A              DW      COMP
 0A9E 820A              DW      PSCOD
 0AA0 210A              DW      LBRAC
 0AA2 3A06      SEMI1   DW      NOOP    ; ( ASSEMBLER )
 0AA4 4704              DW      SEMIS
                ;
 0AA6 87                DB      87H     ; <BUILDS
 0AA7 3C4255494C        DB      '<BUILD'
 0AAD D3                DB      'S'+80H
 0AAE 900A              DW      SEMIC-8
 0AB0 1106      BUILD   DW      DOCOL
 0AB2 8F06              DW      ZERO
 0AB4 4906              DW      CON
 0AB6 4704              DW      SEMIS
                ;
 0AB8 85                DB      85H     ; DOES>
 0AB9 444F4553          DB      'DOES'
 0ABD BE                DB      '>'+80H
 0ABE A60A              DW      BUILD-0AH
 0AC0 1106      DOES    DW      DOCOL
 0AC2 8804              DW      FROMR
 0AC4 0C09              DW      LATES
 0AC6 5009              DW      PFA
 0AC8 CE05              DW      STORE
 0ACA 820A              DW      PSCOD
 0ACC 2A2801    DODOE   LHLD    RPP     ; (HL) <- (RP)
 0ACF 2B                DCX     H
 0AD0 70                MOV     M,B     ; (R1) <- (IP) = PFA = (SUBSTITUTE CFA)
 0AD1 2B                DCX     H
 0AD2 71                MOV     M,C
 0AD3 222801            SHLD    RPP     ; (RP) <- (RP) - 2
 0AD6 13                INX     D       ; (DE) <- PFA = (SUBSTITUTE CFA)
 0AD7 EB                XCHG
 0AD8 4E                MOV     C,M     ; (IP) <- (SUBSTITUTE CFA)
 0AD9 23                INX     H
 0ADA 46                MOV     B,M
 0ADB 23                INX     H
 0ADC C34401            JMP     HPUSH   ; (S1) <- PFA+2 = SUBSTITUTE PFA
                ;
 0ADF 85                DB      85H     ; COUNT
 0AE0 434F554E          DB      'COUN'
 0AE4 D4                DB      'T'+80H
 0AE5 B80A              DW      DOES-8
 0AE7 1106      COUNT   DW      DOCOL
 0AE9 5605              DW      DUP
 0AEB E707              DW      ONEP
 0AED 4905              DW      SWAP
 0AEF A605              DW      CAT
 0AF1 4704              DW      SEMIS
                ;
 0AF3 84                DB      84H     ; TYPE
 0AF4 545950            DB      'TYP'
 0AF7 C5                DB      'E'+80H
 0AF8 DF0A              DW      COUNT-8
```

```
CP/M MACRO ASSEM 2.0    #035    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0AFA 1106      TYPE    DW      DOCOL
 0AFC D008              DW      DDUP
 0AFE 9201              DW      ZBRAN   ; IF
 0B00 1800              DW      TYPE1-$
 0B02 2D05              DW      OVER
 0B04 C904              DW      PLUS
 0B06 4905              DW      SWAP
 0B08 EF01              DW      XDO     ; DO
 0B0A 0B02      TYPE2   DW      IDO
 0B0C A605              DW      CAT
 0B0E E002              DW      EMIT
 0B10 A801              DW      XLOOP   ; LOOP
 0B12 F8FF              DW      TYPE2-$
 0B14 7A01              DW      BRAN    ; ELSE
 0B16 0400              DW      TYPE3-$
 0B18 3C05      TYPE1   DW      DROP    ; ENDIF
 0B1A 4704      TYPE3   DW      SEMIS
                ;
 0B1C 89                DB      89H     ; -TRAILING
 0B1D 2D54524149        DB      '-TRAILIN'
 0B25 C7                DB      'G'+80H
 0B26 F30A              DW      TYPE-7
 0B28 1106      DTRA1   DW      DOCOL
 0B2A 5605              DW      DUP
 0B2C 8F06              DW      ZERO
 0B2E EF01              DW      XDO     ; DO
 0B30 2D05      DTRA1   DW      OVER
 0B32 2D05              DW      OVER
 0B34 C904              DW      PLUS
 0B36 9706              DW      ONE
 0B38 4708              DW      SUBB
 0B3A A605              DW      CAT
 0B3C B006              DW      BL
 0B3E 4708              DW      SUBB
 0B40 9201              DW      ZBRAN   ; IF
 0B42 0800              DW      DTRA2-$
 0B44 5E04              DW      LEAVE
 0B46 7A01              DW      BRAN    ; ELSE
 0B48 0600              DW      DTRA3-$
 0B4A 9706      DTRA2   DW      ONE
 0B4C 4708              DW      SUBB    ; ENDIF
 0B4E A801      DTRA3   DW      XLOOP   ; LOOP
 0B50 E0FF              DW      DTRA1-$
 0B52 4704              DW      SEMIS
                ;
 0B54 84                DB      84H     ; (.")
 0B55 282E22            DB      '(."'
 0B58 A9                DB      ')'+80H
 0B59 1C0B              DW      DTRA1-0CH
 0B5B 1106      PDOTQ   DW      DOCOL
 0B5D 9C04              DW      RR
 0B5F E70A              DW      COUNT
 0B61 5605              DW      DUP
 0B63 E707              DW      ONEP
 0B65 8804              DW      FROMR
 0B67 C904              DW      PLUS
```

```
CP/M MACRO ASSEM 2.0     #036     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0B69 7204                DW       TOR
 0B6B FA0A                DW       TYPE
 0B6D 4704                DW       SEMIS
                  ;
 0B6F C2                  DB       0C2H     ; ."
 0B70 2E                  DB       '.'
 0B71 A2                  DB       '"'+80H
 0B72 540B                DW       PDOTQ-7
 0B74 1106        DOTQ    DW       DOCOL
 0B76 5601                DW       LIT
 0B78 2200                DW       22H
 0B7A A807                DW       STATE
 0B7C 9705                DW       AT
 0B7E 9201                DW       ZBRAN    ; IF
 0B80 1400                DW       DOTQ1-$
 0B82 0B0A                DW       COMP
 0B84 5B0B                DW       PDOTQ
 0B86 E50C                DW       WORD
 0B88 0308                DW       HERE
 0B8A A605                DW       CAT
 0B8C E707                DW       ONEP
 0B8E 1308                DW       ALLOT
 0B90 7A01                DW       BRAN     ; ELSE
 0B92 0A00                DW       DOTQ2-$
 0B94 E50C        DOTQ1   DW       WORD
 0B96 0308                DW       HERE
 0B98 E70A                DW       COUNT
 0B9A FA0A                DW       TYPE     ; ENDIF
 0B9C 4704        DOTQ2   DW       SEMIS
                  ;
 0B9E 86                  DB       86H      ; EXPECT
 0B9F 4558504543          DB       'EXPEC'
 0BA4 D4                  DB       'T'+80H
 0BA5 6F0B                DW       DOTQ-5
 0BA7 1106        EXPEC   DW       DOCOL
 0BA9 2D05                DW       OVER
 0BAB C904                DW       PLUS
 0BAD 2D05                DW       OVER
 0BAF EF01                DW       XDO      ; DO
 0BB1 F202        EXPE1   DW       KEY
 0BB3 5605                DW       DUP
 0BB5 5601                DW       LIT
 0BB7 0E00                DW       0EH
 0BB9 F806                DW       PORIG
 0BBB 9705                DW       AT
 0BBD 5508                DW       EQUAL
 0BBF 9201                DW       ZBRAN    ; IF
 0BC1 2A00                DW       EXPE2-$
 0BC3 3C05                DW       DROP
 0BC5 5605                DW       DUP
 0BC7 0B02                DW       IDO
 0BC9 5508                DW       EQUAL
 0BCB 5605                DW       DUP
 0BCD 8804                DW       FROMR
 0BCF 9F06                DW       TWO
 0BD1 4708                DW       SUBB
```

```
CP/M MACRO ASSEM 2.0    #037    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0BD3 C904              DW      PLUS
 0BD5 7204              DW      TOR
 0BD7 9201              DW      ZBRAN   ; IF
 0BD9 0A00              DW      EXPE6-$
 0BDB 5601              DW      LIT
 0BDD 0700              DW      BELL
 0BDF 7A01              DW      BRAN    ; ELSE
 0BE1 0600              DW      EXPE7-$
 0BE3 5601      EXPE6   DW      LIT
 0BE5 0800              DW      BSOUT   ; ENDIF
 0BE7 7A01      EXPE7   DW      BRAN    ; ELSE
 0BE9 2800              DW      EXPE3-$
 0BEB 5605      EXPE2   DW      DUP
 0BED 5601              DW      LIT
 0BEF 0D00              DW      0DH
 0BF1 5508              DW      EQUAL
 0BF3 9201              DW      ZBRAN   ; IF
 0BF5 0E00              DW      EXPE4-$
 0BF7 5E04              DW      LEAVE
 0BF9 3C05              DW      DROP
 0BFB B006              DW      BL
 0BFD 8F06              DW      ZERO
 0BFF 7A01              DW      BRAN    ; ELSE
 0C01 0400              DW      EXPE5-$
 0C03 5605      EXPE4   DW      DUP     ; ENDIF
 0C05 0B02      EXPE5   DW      IDO
 0C07 DD05              DW      CSTOR
 0C09 8F06              DW      ZERO
 0C0B 0B02              DW      IDO
 0C0D E707              DW      ONEP
 0C0F CE05              DW      STORE   ; ENDIF
 0C11 E002      EXPE3   DW      EMIT
 0C13 A801              DW      XLOOP   ; LOOP
 0C15 9CFF              DW      EXPE1-$
 0C17 3C05              DW      DROP
 0C19 4704              DW      SEMIS
                ;
 0C1B 85                DB      85H     ; QUERY
 0C1C 51554552          DB      'QUER'
 0C20 D9                DB      'Y'+80H
 0C21 9E0B              DW      EXPEC-9
 0C23 1106      QUERY   DW      DOCOL
 0C25 1A07              DW      TIB
 0C27 9705              DW      AT
 0C29 5601              DW      LIT
 0C2B 5000              DW      50H
 0C2D A70B              DW      EXPEC
 0C2F 8F06              DW      ZERO
 0C31 6507              DW      INN
 0C33 CE05              DW      STORE
 0C35 4704              DW      SEMIS
                ;
 0C37 C1                DB      0C1H    ; 0 (NULL)
 0C38 80                DB      80H
 0C39 1B0C              DW      QUERY-8
 0C3B 1106      NULL    DW      DOCOL
```

```
CP/M MACRO ASSEM 2.0    #038    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0C3D 5D07              DW      BLK
 0C3F 9705              DW      AT
 0C41 9201              DW      ZBRAN   ; IF
 0C43 2A00              DW      NULL1-$
 0C45 9706              DW      ONE
 0C47 5D07              DW      BLK
 0C49 7205              DW      PSTOR
 0C4B 8F06              DW      ZERO
 0C4D 6507              DW      INN
 0C4F CE05              DW      STORE
 0C51 5D07              DW      BLK
 0C53 9705              DW      AT
 0C55 EA06              DW      BSCR
 0C57 9706              DW      ONE
 0C59 4708              DW      SUBB
 0C5B C303              DW      ANDD
 0C5D A304              DW      ZEQU
 0C5F 9201              DW      ZBRAN   ; IF
 0C61 0800              DW      NULL2-$
 0C63 AA09              DW      QEXEC
 0C65 8804              DW      FROMR
 0C67 3C05              DW      DROP    ; ENDIF
 0C69 7A01      NULL2   DW      BRAN    ; ELSE
 0C6B 0600              DW      NULL3-$
 0C6D 8804      NULL1   DW      FROMR
 0C6F 3C05              DW      DROP    ; ENDIF
 0C71 4704      NULL3   DW      SEMIS
                ;
 0C73 84                DB      84H     ; FILL
 0C74 46494C            DB      'FIL'
 0C77 CC                DB      'L'+80H
 0C78 370C              DW      NULL-4
 0C7A 7C0C      FILL    DW      $+2
 0C7C 69                MOV     L,C
 0C7D 60                MOV     H,B
 0C7E D1                POP     D
 0C7F C1                POP     B
 0C80 E3                XTHL
 0C81 EB                XCHG
 0C82 78        FILL1   MOV     A,B     ; BEGIN
 0C83 B1                ORA     C
 0C84 CA8E0C            JZ      FILL2   ; WHILE
 0C87 7D                MOV     A,L
 0C88 12                STAX    D
 0C89 13                INX     D
 0C8A 0B                DCX     B
 0C8B C3820C            JMP     FILL1   ; REPEAT
 0C8E C1        FILL2   POP     B
 0C8F C34501            JMP     NEXT
                ;
 0C92 85                DB      85H     ; ERASE
 0C93 45524153          DB      'ERAS'
 0C97 C5                DB      'E'+80H
 0C98 730C              DW      FILL-7
 0C9A 1106      ERASEE  DW      DOCOL
 0C9C 8F06              DW      ZERO
```

```
CP/M MACRO ASSEM 2.0     #039    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0C9E 7A0C               DW      FILL
 0CA0 4704               DW      SEMIS
                 ;
 0CA2 86                 DB      86H     ; BLANKS
 0CA3 424C414E4B         DB      'BLANK'
 0CA8 D3                 DB      'S'+80H
 0CA9 920C               DW      ERASEE-8
 0CAB 1106       BLANK   DW      DOCOL
 0CAD B006               DW      BL
 0CAF 7A0C               DW      FILL
 0CB1 4704               DW      SEMIS
                 ;
 0CB3 84                 DB      84H     ; HOLD
 0CB4 484F4C             DB      'HOL'
 0CB7 C4                 DB      'D'+80H
 0CB8 A20C               DW      BLANK-9
 0CBA 1106       HOLD    DW      DOCOL
 0CBC 5601               DW      LIT
 0CBE FFFF               DW      -1
 0CC0 DE07               DW      HLD
 0CC2 7205               DW      PSTOR
 0CC4 DE07               DW      HLD
 0CC6 9705               DW      AT
 0CC8 DD05               DW      CSTOR
 0CCA 4704               DW      SEMIS
                 ;
 0CCC 83                 DB      83H     ; PAD
 0CCD 5041               DB      'PA'
 0CCF C4                 DB      'D'+80H
 0CD0 B30C               DW      HOLD-7
 0CD2 1106       PAD     DW      DOCOL
 0CD4 0308               DW      HERE
 0CD6 5601               DW      LIT
 0CD8 4400               DW      44H
 0CDA C904               DW      PLUS
 0CDC 4704               DW      SEMIS
                 ;
 0CDE 84                 DB      84H     ; WORD
 0CDF 574F52             DB      'WOR'
 0CE2 C4                 DB      'D'+80H
 0CE3 CC0C               DW      PAD-6
 0CE5 1106       WORD    DW      DOCOL
 0CE7 5D07               DW      BLK
 0CE9 9705               DW      AT
 0CEB 9201               DW      ZBRAN   ; IF
 0CED 0C00               DW      WORD1-$
 0CEF 5D07               DW      BLK
 0CF1 9705               DW      AT
 0CF3 2114               DW      BLOCK
 0CF5 7A01               DW      BRAN    ; ELSE
 0CF7 0600               DW      WORD2-$
 0CF9 1A07       WORD1   DW      TIB
 0CFB 9705               DW      AT      ; ENDIF
 0CFD 6507       WORD2   DW      INN
 0CFF 9705               DW      AT
 0D01 C904               DW      PLUS
```

```
CP/M MACRO ASSEM 2.0     #040    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0D03 4905               DW      SWAP
 0D05 9C02               DW      ENCL
 0D07 0308               DW      HERE
 0D09 5601               DW      LIT
 0D0B 2200               DW      22H
 0D0D AB0C               DW      BLANK
 0D0F 6507               DW      INN
 0D11 7205               DW      PSTOR
 0D13 2D05               DW      OVER
 0D15 4708               DW      SUBB
 0D17 7204               DW      TOR
 0D19 9C04               DW      RR
 0D1B 0308               DW      HERE
 0D1D DD05               DW      CSTOR
 0D1F C904               DW      PLUS
 0D21 0308               DW      HERE
 0D23 E707               DW      ONEP
 0D25 8804               DW      FROMR
 0D27 1D03               DW      CMOVE
 0D29 4704               DW      SEMIS
                  ;
 0D2B 88                 DB      88H     ; (NUMBER)
 0D2C 284E554D42         DB      '(NUMBER'
 0D33 A9                 DB      ')'+80H
 0D34 DE0C               DW      WORD-7
 0D36 1106       PNUMB   DW      DOCOL
 0D38 E707       PNUM1   DW      ONEP    ; BEGIN
 0D3A 5605               DW      DUP
 0D3C 7204               DW      TOR
 0D3E A605               DW      CAT
 0D40 B207               DW      BASE
 0D42 9705               DW      AT
 0D44 1F02               DW      DIGIT
 0D46 9201               DW      ZBRAN   ; WHILE
 0D48 2C00               DW      PNUM2-$
 0D4A 4905               DW      SWAP
 0D4C B207               DW      BASE
 0D4E 9705               DW      AT
 0D50 3A03               DW      USTAR
 0D52 3C05               DW      DROP
 0D54 B108               DW      ROT
 0D56 B207               DW      BASE
 0D58 9705               DW      AT
 0D5A 3A03               DW      USTAR
 0D5C D604               DW      DPLUS
 0D5E BB07               DW      DPL
 0D60 9705               DW      AT
 0D62 E707               DW      ONEP
 0D64 9201               DW      ZBRAN   ; IF
 0D66 0800               DW      PNUM3-$
 0D68 9706               DW      ONE
 0D6A BB07               DW      DPL
 0D6C 7205               DW      PSTOR   ; ENDIF
 0D6E 8804       PNUM3   DW      FROMR
 0D70 7A01               DW      BRAN    ; REPEAT
 0D72 C6FF               DW      PNUM1-$
```

```
0D74 8804       PNUM2   DW      FROMR
0D76 4704               DW      SEMIS
                ;
0D78 86                 DB      86H     ; NUMBER
0D79 4E554D4245         DB      'NUMBE'
0D7E D2                 DB      'R'+80H
0D7F 2B0D               DW      PNUMB-0BH
0D81 1106       NUMB    DW      DOCOL
0D83 8F06               DW      ZERO
0D85 8F06               DW      ZERO
0D87 B108               DW      ROT
0D89 5605               DW      DUP
0D8B E707               DW      ONEP
0D8D A605               DW      CAT
0D8F 5601               DW      LIT
0D91 2D00               DW      2DH
0D93 5508               DW      EQUAL
0D95 5605               DW      DUP
0D97 7204               DW      TOR
0D99 C904               DW      PLUS
0D9B 5601               DW      LIT
0D9D FFFF               DW      -1
0D9F BB07       NUMB1   DW      DPL     ; BEGIN
0DA1 CE05               DW      STORE
0DA3 360D               DW      PNUMB
0DA5 5605               DW      DUP
0DA7 A605               DW      CAT
0DA9 B006               DW      BL
0DAB 4708               DW      SUBB
0DAD 9201               DW      ZBRAN   ; WHILE
0DAF 1600               DW      NUMB2-$
0DB1 5605               DW      DUP
0DB3 A605               DW      CAT
0DB5 5601               DW      LIT
0DB7 2E00               DW      2EH
0DB9 4708               DW      SUBB
0DBB 8F06               DW      ZERO
0DBD 7809               DW      QERR
0DBF 8F06               DW      ZERO
0DC1 7A01               DW      BRAN    ; REPEAT
0DC3 DCFF               DW      NUMB1-$
0DC5 3C05       NUMB2   DW      DROP
0DC7 8804               DW      FROMR
0DC9 9201               DW      ZBRAN   ; IF
0DCB 0400               DW      NUMB3-$
0DCD 0F05               DW      DMINU   ; ENDIF
0DCF 4704       NUMB3   DW      SEMIS
                ;
0DD1 85                 DB      85H     ; -FIND (0-3) SUCCESS
0DD2 2D46494E           DB      '-FIN'  ; (0-1) FAILURE
0DD6 C4                 DB      'D'+80H
0DD7 780D               DW      NUMB-9
0DD9 1106       DFIND   DW      DOCOL
0DDB B006               DW      BL
0DDD E50C               DW      WORD
0DDF 0308               DW      HERE
```

```
CP/M MACRO ASSEM 2.0     #042    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0DE1 9007               DW      CONT
 0DE3 9705               DW      AT
 0DE5 9705               DW      AT
 0DE7 4D02               DW      PFIND
 0DE9 5605               DW      DUP
 0DEB A304               DW      ZEQU
 0DED 9201               DW      ZBRAN   ; IF
 0DEF 0A00               DW      DFIN1-$
 0DF1 3C05               DW      DROP
 0DF3 0308               DW      HERE
 0DF5 0C09               DW      LATES
 0DF7 4D02               DW      PFIND   ; ENDIF
 0DF9 4704       DFIN1   DW      SEMIS
                 ;
 0DFB 87                 DB      87H     ; (ABORT)
 0DFC 2841424F52         DB      '(ABORT'
 0E02 A9                 DB      ')'+80H
 0E03 D10D               DW      DFIND-8
 0E05 1106       PABOR   DW      DOCOL
 0E07 5810               DW      ABORT
 0E09 4704               DW      SEMIS
                 ;
 0E0B 85                 DB      85H     ; ERROR'
 0E0C 4552524F           DB      'ERRO'
 0E10 D2                 DB      'R'+80H
 0E11 FB0D               DW      PABOR-0AH
 0E13 1106       ERROR   DW      DOCOL
 0E15 3207               DW      WARN
 0E17 9705               DW      AT
 0E19 B704               DW      ZLESS
 0E1B 9201               DW      ZBRAN   ; IF
 0E1D 0400               DW      ERRO1-$
 0E1F 050E               DW      PABOR   ; ENDIF
 0E21 0308       ERRO1   DW      HERE
 0E23 E70A               DW      COUNT
 0E25 FA0A               DW      TYPE
 0E27 5B0B               DW      PDOTQ
 0E29 02                 DB      2
 0E2A 3F20               DB      '? '
 0E2C 7012               DW      MESS
 0E2E 0A04               DW      SPSTO
                 ;       CHANGE FROM FIG MODEL
                 ;       DW      INN,AT,BLK,AT
 0E30 5D079705           DW      BLK,AT
 0E34 D008               DW      DDUP
 0E36 92010800           DW      ZBRAN,ERRO2-$   ; IF
 0E3A 65079705           DW      INN,AT
 0E3E 4905               DW      SWAP            ; ENDIF
 0E40 2B10       ERRO2   DW      QUIT
                 ;
 0E42 83                 DB      83H     ; ID.
 0E43 4944               DB      'ID'
 0E45 AE                 DB      '.'+80H
 0E46 0B0E               DW      ERROR-8
 0E48 1106       IDDOT   DW      DOCOL
 0E4A D20C               DW      PAD
```

```
CP/M MACRO ASSEM 2.0     #043     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0E4C 5601               DW       LIT
 0E4E 2000               DW       20H
 0E50 5601               DW       LIT
 0E52 5F00               DW       5FH
 0E54 7A0C               DW       FILL
 0E56 5605               DW       DUP
 0E58 5009               DW       PFA
 0E5A 1C09               DW       LFA
 0E5C 2D05               DW       OVER
 0E5E 4708               DW       SUBB
 0E60 D20C               DW       PAD
 0E62 4905               DW       SWAP
 0E64 1D03               DW       CMOVE
 0E66 D20C               DW       PAD
 0E68 E70A               DW       COUNT
 0E6A 5601               DW       LIT
 0E6C 1F00               DW       1FH
 0E6E C303               DW       ANDD
 0E70 FA0A               DW       TYPE
 0E72 C108               DW       SPACE
 0E74 4704               DW       SEMIS
                  ;
 0E76 86                 DB       86H      ; CREATE
 0E77 4352454154         DB       'CREAT'
 0E7C C5                 DB       'E'+80H
 0E7D 420E               DW       IDDOT-6
 0E7F 1106       CREAT   DW       DOCOL
 0E81 D90D               DW       DFIND
 0E83 9201               DW       ZBRAN    ; IF
 0E85 1000               DW       CREA1-$
 0E87 3C05               DW       DROP
 0E89 3A09               DW       NFA
 0E8B 480E               DW       IDDOT
 0E8D 5601               DW       LIT
 0E8F 0400               DW       4
 0E91 7012               DW       MESS
 0E93 C108               DW       SPACE    ; ENDIF
 0E95 0308       CREA1   DW       HERE
 0E97 5605               DW       DUP
 0E99 A605               DW       CAT
 0E9B 2507               DW       WIDTH
 0E9D 9705               DW       AT
 0E9F 4911               DW       MIN
 0EA1 E707               DW       ONEP
 0EA3 1308               DW       ALLOT
 0EA5 5605               DW       DUP
 0EA7 5601               DW       LIT
 0EA9 A000               DW       0A0H
 0EAB 8905               DW       TOGGL
 0EAD 0308               DW       HERE
 0EAF 9706               DW       ONE
 0EB1 4708               DW       SUBB
 0EB3 5601               DW       LIT
 0EB5 8000               DW       80H
 0EB7 8905               DW       TOGGL
 0EB9 0C09               DW       LATES
```

```
CP/M MACRO ASSEM 2.0     #044     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0EBB 1F08               DW       COMMA
 0EBD 9D07               DW       CURR
 0EBF 9705               DW       AT
 0EC1 CE05               DW       STORE
 0EC3 0308               DW       HERE
 0EC5 F407               DW       TWOP
 0EC7 1F08               DW       COMMA
 0EC9 4704               DW       SEMIS
                  ;
 0ECB C9                 DB       0C9H     ; [COMPILE]
 0ECC 5B434F4D50         DB       '[COMPILE'
 0ED4 DD                 DB       ']'+80H
 0ED5 760E               DW       CREAT-9
 0ED7 1106       BCOMP   DW       DOCOL
 0ED9 D90D               DW       DFIND
 0EDB A304               DW       ZEQU
 0EDD 8F06               DW       ZERO
 0EDF 7809               DW       QERR
 0EE1 3C05               DW       DROP
 0EE3 2C09               DW       CFA
 0EE5 1F08               DW       COMMA
 0EE7 4704               DW       SEMIS
                  ;
 0EE9 C7                 DB       0C7H     ; LITERAL
 0EEA 4C49544552         DB       'LITERA'
 0EF0 CC                 DB       'L'+80H
 0EF1 CB0E               DW       BCOMP-0CH
 0EF3 1106       LITER   DW       DOCOL
 0EF5 A807               DW       STATE
 0EF7 9705               DW       AT
 0EF9 9201               DW       ZBRAN    ; IF
 0EFB 0800               DW       LITE1-$
 0EFD 0B0A               DW       COMP
 0EFF 5601               DW       LIT
 0F01 1F08               DW       COMMA    ; ENDIF
 0F03 4704       LITE1   DW       SEMIS
                  ;
 0F05 C8                 DB       0C8H     ; DLITERAL
 0F06 444C495445         DB       'DLITERA'
 0F0D CC                 DB       'L'+80H
 0F0E E90E               DW       LITER-0AH
 0F10 1106       DLITE   DW       DOCOL
 0F12 A807               DW       STATE
 0F14 9705               DW       AT
 0F16 9201               DW       ZBRAN    ; IF
 0F18 0800               DW       DLIT1-$
 0F1A 4905               DW       SWAP
 0F1C F30E               DW       LITER
 0F1E F30E               DW       LITER    ; ENDIF
 0F20 4704       DLIT1   DW       SEMIS
                  ;
 0F22 86                 DB       86H      ; ?STACK
 0F23 3F53544143         DB       '?STAC'
 0F28 CB                 DB       'K'+80H
 0F29 050F               DW       DLITE-0BH
 0F2B 1106       QSTAC   DW       DOCOL
```

```
CP/M MACRO ASSEM 2.0    #045    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0F2D FB03              DW      SPAT
 0F2F 0707              DW      SZERO
 0F31 9705              DW      AT
 0F33 4905              DW      SWAP
 0F35 8308              DW      ULESS
 0F37 9706              DW      ONE
 0F39 7809              DW      QERR
 0F3B FB03              DW      SPAT
 0F3D 0308              DW      HERE
 0F3F 5601              DW      LIT
 0F41 8000              DW      80H
 0F43 C904              DW      PLUS
 0F45 8308              DW      ULESS
 0F47 5601              DW      LIT
 0F49 0700              DW      7
 0F4B 7809              DW      QERR
 0F4D 4704              DW      SEMIS
                ;
 0F4F 89                DB      89H     ; INTERPRET
 0F50 494E544552        DB      'INTERPRE'
 0F58 D4                DB      'T'+80H
 0F59 220F              DW      QSTAC-9
 0F5B 1106      INTER   DW      DOCOL
 0F5D D90D      INTE1   DW      DFIND   ; BEGIN
 0F5F 9201              DW      ZBRAN   ; IF
 0F61 1E00              DW      INTE2-$
 0F63 A807              DW      STATE
 0F65 9705              DW      AT
 0F67 6108              DW      LESS
 0F69 9201              DW      ZBRAN   ; IF
 0F6B 0A00              DW      INTE3-$
 0F6D 2C09              DW      CFA
 0F6F 1F08              DW      COMMA
 0F71 7A01              DW      BRAN    ; ELSE
 0F73 0600              DW      INTE4-$
 0F75 2C09      INTE3   DW      CFA
 0F77 6B01              DW      EXEC    ; ENDIF
 0F79 2B0F      INTE4   DW      QSTAC
 0F7B 7A01              DW      BRAN    ; ELSE
 0F7D 1C00              DW      INTE5-$
 0F7F 0308      INTE2   DW      HERE
 0F81 810D              DW      NUMB
 0F83 BB07              DW      DPL
 0F85 9705              DW      AT
 0F87 E707              DW      ONEP
 0F89 9201              DW      ZBRAN   ; IF
 0F8B 0800              DW      INTE6-$
 0F8D 100F              DW      DLITE
 0F8F 7A01              DW      BRAN    ; ELSE
 0F91 0600              DW      INTE7-$
 0F93 3C05      INTE6   DW      DROP
 0F95 F30E              DW      LITER   ; ENDIF
 0F97 2B0F      INTE7   DW      QSTAC   ; ENDIF
 0F99 7A01      INTE5   DW      BRAN    ; AGAIN
 0F9B C2FF              DW      INTE1-$
                ;
```

```
CP/M MACRO ASSEM 2.0    #046    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 0F9D 89                DB      89H     ; IMMEDIATE
 0F9E 494D4D4544        DB      'IMMEDIAT'
 0FA6 C5                DB      'E'+80H
 0FA7 4F0F              DW      INTER-0CH
 0FA9 1106      IMMED   DW      DOCOL
 0FAB 0C09              DW      LATES
 0FAD 5601              DW      LIT
 0FAF 4000              DW      40H
 0FB1 8905              DW      TOGGL
 0FB3 4704              DW      SEMIS
                ;
 0FB5 8A                DB      8AH     ; VOCABULARY
 0FB6 564F434142        DB      'VOCABULAR'
 0FBF D9                DB      'Y'+80H
 0FC0 9D0F              DW      IMMED-0CH
 0FC2 1106      VOCAB   DW      DOCOL
 0FC4 B00A              DW      BUILD
 0FC6 5601              DW      LIT
 0FC8 81A0              DW      0A081H
 0FCA 1F08              DW      COMMA
 0FCC 9D07              DW      CURR
 0FCE 9705              DW      AT
 0FD0 2C09              DW      CFA
 0FD2 1F08              DW      COMMA
 0FD4 0308              DW      HERE
 0FD6 5307              DW      VOCL
 0FD8 9705              DW      AT
 0FDA 1F08              DW      COMMA
 0FDC 5307              DW      VOCL
 0FDE CE05              DW      STORE
 0FE0 C00A              DW      DOES
 0FE2 F407      DOVOC   DW      TWOP
 0FE4 9007              DW      CONT
 0FE6 CE05              DW      STORE
 0FE8 4704              DW      SEMIS
                ;
 0FEA C5                DB      0C5H    ; FORTH
 0FEB 464F5254          DB      'FORT'
 0FEF C8                DB      'H'+80H
 0FF0 B50F              DW      VOCAB-0DH
 0FF2 CC0A      FORTH   DW      DODOE
 0FF4 E20F              DW      DOVOC
 0FF6 81A0              DW      0A081H
 0FF8 7D1A              DW      TASK-7  ; COLD START VALUE ONLY
                ;                       CHANGED EACH TIME A DEF IS APPENDED
                ;                       TO THE FORTH VOCABULARY
 0FFA 0000              DW      0       ; END OF VOCABULARY LIST
                ;
 0FFC 8B                DB      8BH     ; DEFINITIONS
 0FFD 444546494E        DB      'DEFINITION'
 1007 D3                DB      'S'+80H
 1008 EA0F              DW      FORTH-8
 100A 1106      DEFIN   DW      DOCOL
 100C 9007              DW      CONT
 100E 9705              DW      AT
 1010 9D07              DW      CURR
```

```
CP/M MACRO ASSEM 2.0    #047    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 1612 CE05              DW      STORE
 1614 4704              DW      SEMIS
                ;
 1616 C1                DB      0C1H    ; (
 1617 A8                DB      '('+80H
 1618 FC0F              DW      DEFIN-0EH
 161A 1106      PAREN   DW      DOCOL
 161C 5601              DW      LIT
 161E 2900              DW      29H
 1620 E50C              DW      WORD
 1622 4704              DW      SEMIS
                ;
 1624 84                DB      84H     ; QUIT
 1625 515549            DB      'QUI'
 1628 D4                DB      'T'+80H
 1629 1610              DW      PAREN-4
 162B 1106      QUIT    DW      DOCOL
 162D 8F06              DW      ZERO
 162F 5D07              DW      BLK
 1631 CE05              DW      STORE
 1633 210A              DW      LBRAC
 1635 2F04      QUIT1   DW      RPSTO   ; BEGIN
 1637 1003              DW      CR
 1639 230C              DW      QUERY
 163B 5B0F              DW      INTER
 163D A807              DW      STATE
 163F 9705              DW      AT
 1641 A304              DW      ZEQU
 1643 9201              DW      ZBRAN   ; IF
 1645 0700              DW      QUIT2-$
 1647 5B0B              DW      PDOTQ
 1649 02                DB      2
 164A 4F4B              DB      'OK'    ; ENDIF
 164C 7A01      QUIT2   DW      BRAN    ; AGAIN
 164E E7FF              DW      QUIT1-$
                ;
 1650 85                DB      85H     ; ABORT
 1651 41424F52          DB      'ABOR'
 1655 D4                DB      'T'+80H
 1656 2410              DW      QUIT-7
 1658 1106      ABORT   DW      DOCOL
 165A 0A04              DW      SPSTO
 165C 6C0A              DW      DEC
 165E 2B0F              DW      QSTAC
 1660 1003              DW      CR
 1662 5F1A              DW      DOTCPU
 1664 5B0B              DW      PDOTQ
 1666 0D                DB      0DH
 1667 4649472D46        DB      'FIG-FORTH '
 1671 312E31            DB      FIGREL+30H,ADOT,FIGREV+30H
 1674 F20F              DW      FORTH
 1676 0A10              DW      DEFIN
 1678 2B10              DW      QUIT
                ;
 167A 018010    WRM     LXI     B,WRM1
 167D C34501            JMP     NEXT
```

```
CP/M MACRO ASSEM 2.0    #048    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 1080 8910      WRM1    DW      WARM
                ;
 1082 84                DB      84H     ; WARM
 1083 574152            DB      'WAR'
 1086 CD                DB      'M'+80H
 1087 5010              DW      ABORT-8
 1089 1106      WARM    DW      DOCOL
 108B 9013              DW      MTBUF
 108D 5810              DW      ABORT
                ;
 108F 019910    CLD     LXI     B,CLD1
 1092 2A1201            LHLD    ORIG+12H
 1095 F9                SPHL
 1096 C34501            JMP     NEXT
 1099 A210      CLD1    DW      COLD
                ;
 109B 84                DB      84H     ; COLD
 109C 434F4C            DB      'COL'
 109F C4                DB      'D'+80H
 10A0 8210              DW      WARM-7
 10A2 1106      COLD    DW      DOCOL
 10A4 9013              DW      MTBUF
 10A6 8F062513          DW      ZERO,DENSTY
 10AA CE05              DW      STORE
 10AC 5601E03B          DW      LIT,BUF1
 10B0 F212CE05          DW      USE,STORE
 10B4 5601E03B          DW      LIT,BUF1
 10B8 FD12CE05          DW      PREV,STORE
 10BC A413              DW      DRZER
 10BE 56010000          DW      LIT,0
 10C2 56014316          DW      LIT,EPRINT
 10C6 CE05              DW      STORE
                ;
 10C8 5601              DW      LIT
 10CA 1201              DW      ORIG+12H
 10CC 5601              DW      LIT
 10CE 2601              DW      UP
 10D0 9705              DW      AT
 10D2 5601              DW      LIT
 10D4 0600              DW      6
 10D6 C904              DW      PLUS
 10D8 5601              DW      LIT
 10DA 1000              DW      10H
 10DC 1D03              DW      CMOVE
 10DE 5601              DW      LIT
 10E0 0C01              DW      ORIG+0CH
 10E2 9705              DW      AT
 10E4 5601              DW      LIT
 10E6 F80F              DW      FORTH+6
 10E8 CE05              DW      STORE
 10EA 5810              DW      ABORT
                ;
 10EC 84                DB      84H     ; S->D
 10ED 532D3E            DB      'S->'
 10F0 C4                DB      'D'+80H
 10F1 9B10              DW      COLD-7
```

```
CP/M MACRO ASSEM 2.0    #049    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 10F3 F510      STOD    DW      $+2
 10F5 D1                POP     D
 10F6 210000            LXI     H,0
 10F9 7A                MOV     A,D
 10FA E680              ANI     80H
 10FC CA0011            JZ      STOD1
 10FF 2B                DCX     H
 1100 C34301    STOD1   JMP     DPUSH
                ;
 1103 82                DB      82H     ; +-
 1104 2B                DB      '+'
 1105 AD                DB      '-'+80H
 1106 EC10              DW      STOD-7
 1108 1106      PM      DW      DOCOL
 110A B704              DW      ZLESS
 110C 9201              DW      ZBRAN   ; IF
 110E 0400              DW      PM1-$
 1110 F904              DW      MINUS   ; ENDIF
 1112 4704      PM1     DW      SEMIS
                ;
 1114 83                DB      83H     ; D+-
 1115 442B              DB      'D+'
 1117 AD                DB      '-'+80H
 1118 0311              DW      PM-5
 111A 1106      DPM     DW      DOCOL
 111C B704              DW      ZLESS
 111E 9201              DW      ZBRAN   ; IF
 1120 0400              DW      DPM1-$
 1122 0F05              DW      DMINU   ; ENDIF
 1124 4704      DPM1    DW      SEMIS
                ;
 1126 83                DB      83H     ; ABS
 1127 4142              DB      'AB'
 1129 D3                DB      'S'+80H
 112A 1411              DW      DPM-6
 112C 1106      ABS     DW      DOCOL
 112E 5605              DW      DUP
 1130 0811              DW      PM
 1132 4704              DW      SEMIS
                ;
 1134 84                DB      84H     ; DABS
 1135 444142            DB      'DAB'
 1138 D3                DB      'S'+80H
 1139 2611              DW      ABS-6
 113B 1106      DABS    DW      DOCOL
 113D 5605              DW      DUP
 113F 1A11              DW      DPM
 1141 4704              DW      SEMIS
                ;
 1143 83                DB      83H     ; MIN
 1144 4D49              DB      'MI'
 1146 CE                DB      'N'+80H
 1147 3411              DW      DABS-7
 1149 11066405  MIN     DW      DOCOL,TDUP
 114D A308              DW      GREAT
 114F 9201              DW      ZBRAN   ; IF
```

```
CP/M MACRO ASSEM 2.0     #050     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 1151 0400               DW       MIN1-$
 1153 4905               DW       SWAP     ; ENDIF
 1155 3C05       MIN1    DW       DROP
 1157 4704               DW       SEMIS
                 ;
 1159 83                 DB       83H      ; MAX
 115A 4D41               DB       'MA'
 115C D8                 DB       'X'+80H
 115D 4311               DW       MIN-6
 115F 11066405   MAX     DW       DOCOL,TDUP
 1163 6108               DW       LESS
 1165 9201               DW       ZBRAN    ; IF
 1167 0400               DW       MAX1-$
 1169 4905               DW       SWAP     ; ENDIF
 116B 3C05       MAX1    DW       DROP
 116D 4704               DW       SEMIS
                 ;
 116F 82                 DB       82H      ; M*
 1170 4D                 DB       'M'
 1171 AA                 DB       '*'+80H
 1172 5911               DW       MAX-6
 1174 11066405   MSTAR   DW       DOCOL,TDUP
 1178 E803               DW       XORR
 117A 7204               DW       TOR
 117C 2C11               DW       ABS
 117E 4905               DW       SWAP
 1180 2C11               DW       ABS
 1182 3A03               DW       USTAR
 1184 8804               DW       FROMR
 1186 1A11               DW       DPM
 1188 4704               DW       SEMIS
                 ;
 118A 82                 DB       82H      ; M/
 118B 4D                 DB       'M'
 118C AF                 DB       '/'+80H
 118D 6F11               DW       MSTAR-5
 118F 1106       MSLAS   DW       DOCOL
 1191 2D05               DW       OVER
 1193 7204               DW       TOR
 1195 7204               DW       TOR
 1197 3B11               DW       DABS
 1199 9C04               DW       RR
 119B 2C11               DW       ABS
 119D 6F03               DW       USLAS
 119F 8804               DW       FROMR
 11A1 9C04               DW       RR
 11A3 E803               DW       XORR
 11A5 0811               DW       PM
 11A7 4905               DW       SWAP
 11A9 8804               DW       FROMR
 11AB 0811               DW       PM
 11AD 4905               DW       SWAP
 11AF 4704               DW       SEMIS
                 ;
 11B1 81                 DB       81H      ; *
 11B2 AA                 DB       '*'+80H
```

```
CP/M MACRO ASSEM 2.0     #051     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 11B3 8A11               DW       MSLAS-5
 11B5 1106       STAR    DW       DOCOL
 11B7 7411               DW       MSTAR
 11B9 3C05               DW       DROP
 11BB 4704               DW       SEMIS
                 ;
 11BD 84                 DB       84H      ; /MOD
 11BE 2F4D4F             DB       '/MO'
 11C1 C4                 DB       'D'+80H
 11C2 B111               DW       STAR-4
 11C4 1106       SLMOD   DW       DOCOL
 11C6 7204               DW       TOR
 11C8 F310               DW       STOD
 11CA 8804               DW       FROMR
 11CC 8F11               DW       MSLAS
 11CE 4704               DW       SEMIS
                 ;
 11D0 81                 DB       81H      ; /
 11D1 AF                 DB       '/'+80H
 11D2 BD11               DW       SLMOD-7
 11D4 1106       SLASH   DW       DOCOL
 11D6 C411               DW       SLMOD
 11D8 4905               DW       SWAP
 11DA 3C05               DW       DROP
 11DC 4704               DW       SEMIS
                 ;
 11DE 83                 DB       83H      ; MOD
 11DF 4D4F               DB       'MO'
 11E1 C4                 DB       'D'+80H
 11E2 D011               DW       SLASH-4
 11E4 1106       MODD    DW       DOCOL
 11E6 C411               DW       SLMOD
 11E8 3C05               DW       DROP
 11EA 4704               DW       SEMIS
                 ;
 11EC 85                 DB       85H      ; */MOD
 11ED 2A2F4D4F           DB       '*/MO'
 11F1 C4                 DB       'D'+80H
 11F2 DE11               DW       MODD-6
 11F4 1106       SSMOD   DW       DOCOL
 11F6 7204               DW       TOR
 11F8 7411               DW       MSTAR
 11FA 8804               DW       FROMR
 11FC 8F11               DW       MSLAS
 11FE 4704               DW       SEMIS
                 ;
 1200 82                 DB       82H      ; */
 1201 2A                 DB       '*'
 1202 AF                 DB       '/'+80H
 1203 EC11               DW       SSMOD-8
 1205 1106       SSLA    DW       DOCOL
 1207 F411               DW       SSMOD
 1209 4905               DW       SWAP
 120B 3C05               DW       DROP
 120D 4704               DW       SEMIS
                 ;
```

```
CP/M MACRO ASSEM 2.0     #052     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 120F 85                 DB       85H      ; M/MOD
 1210 4D2F4D4F           DB       'M/MO'
 1214 C4                 DB       'D'+80H
 1215 0012               DW       SSLA-5
 1217 1106       MSMOD   DW       DOCOL
 1219 7204               DW       TOR
 121B 8F06               DW       ZERO
 121D 9C04               DW       RR
 121F 6F03               DW       USLAS
 1221 8804               DW       FROMR
 1223 4905               DW       SWAP
 1225 7204               DW       TOR
 1227 6F03               DW       USLAS
 1229 8804               DW       FROMR
 122B 4704               DW       SEMIS
                  ;
                  ;       BLOCK MOVED DOWN 2 PAGES
                  ;
                  ;
 122D 86                 DB       86H      ; (LINE)
 122E 284C494E45         DB       '(LINE'
 1233 A9                 DB       ')'+80H
 1234 0F12               DW       MSMOD-8
 1236 1106       PLINE   DW       DOCOL
 1238 7204               DW       TOR
 123A 5601               DW       LIT
 123C 4000               DW       40H
 123E DE06               DW       BBUF
 1240 F411               DW       SSMOD
 1242 8804               DW       FROMR
 1244 EA06               DW       BSCR
 1246 B511               DW       STAR
 1248 C904               DW       PLUS
 124A 2114               DW       BLOCK
 124C C904               DW       PLUS
 124E 5601               DW       LIT
 1250 4000               DW       40H
 1252 4704               DW       SEMIS
                  ;
 1254 85                 DB       85H      ; .LINE
 1255 2E4C494E           DB       '.LIN'
 1259 C5                 DB       'E'+80H
 125A 2D12               DW       PLINE-9
 125C 1106       DLINE   DW       DOCOL
 125E 3612               DW       PLINE
 1260 280B               DW       DTRAI
 1262 FA0A               DW       TYPE
 1264 4704               DW       SEMIS
                  ;
 1266 87                 DB       87H      ; MESSAGE
 1267 4D45535341         DB       'MESSAG'
 126D C5                 DB       'E'+80H
 126E 5412               DW       DLINE-8
 1270 1106       MESS    DW       DOCOL
 1272 3207               DW       WARN
 1274 9705               DW       AT
```

```
1276 9201              DW      ZBRAN   ; IF
1278 1E00              DW      MESS1-$
127A D008              DW      DDUP
127C 9201              DW      ZBRAN   ; IF
127E 1400              DW      MESS2-$
1280 5601              DW      LIT
1282 0400              DW      4
1284 8307              DW      OFSET
1286 9705              DW      AT
1288 EA06              DW      BSCR
128A D411              DW      SLASH
128C 4708              DW      SUBB
128E 5C12              DW      DLINE
1290 C108              DW      SPACE   ; ENDIF
1292 7A01      MESS2   DW      BRAN    ; ELSE
1294 0D00              DW      MESS3-$
1296 5B0B      MESS1   DW      PDOTQ
1298 06                DB      6
1299 4D53472023        DB      'MSG # '
129F 1A19              DW      DOT     ; ENDIF
12A1 4704      MESS3   DW      SEMIS
                       PAGE
```

```
                ;----------------------------------------
                ;
                ;       8080 PORT FETCH AND STORE
                ;       ( SELF MODIFYING CODE, NOT REENTRANT )
                ;
12A3 82                 DB      82H     ; P@ "PORT @"
12A4 50                 DB      'P'
12A5 C0                 DB      '@'+80H
12A6 6612               DW      MESS-0AH
12A8 AA12       PTAT:   DW      $+2
12AA D1                 POP     D       ;E <- PORT#
12AB 21B012             LXI     H,$+5
12AE 73                 MOV     M,E
12AF DB00               IN      0       ;( PORT# MODIFIED )
12B1 6F                 MOV     L,A     ;L <- (PORT#)
12B2 2600               MVI     H,0
12B4 C34401             JMP     HPUSH
                ;
12B7 82                 DB      82H     ; "PORT STORE"
12B8 50                 DB      'P'
12B9 A1                 DB      '!'+80H
12BA A312               DW      PTAT-5
12BC BE12       PTSTO:  DW      $+2
12BE D1                 POP     D       ;E <- PORT#
12BF 21C612             LXI     H,$+7
12C2 73                 MOV     M,E
12C3 E1                 POP     H       ;H <- CDATA
12C4 7D                 MOV     A,L
12C5 D300               OUT     0       ;( PORT# MODIFIED )
12C7 C34501             JMP     NEXT
                        PAGE
```

```
                ;-------------------------------------------------
                ;       CP/M DISK INTERFACE
                ;
                ;       CP/M BIOS CALLS USED
                ;       ( NOTE EQU'S ARE 3 LOWER THAN DOCUMENTED OFFSETS
                ;         BECAUSE BASE ADDR IS BIOS+3 )
                ;
0027 =          RITSEC  EQU     39
0024 =          RDSEC   EQU     36
0021 =          SETDMA  EQU     33
001E =          SETSEC  EQU     30
001B =          SETTRK  EQU     27
0018 =          SETDSK  EQU     24
                ;
                ;       DOUBLE DENSITY 8" FLOPPY CAPACITIES
0034 =          SPT2    EQU     52      ; SECTORS PER TRACK
004D =          TRKS2   EQU     77      ; NUMBER OF TRACKS
0FA4 =          SPDRV2  EQU     SPT2*TRKS2      ; SECTORS/DRIVE
                ;       SINGLE DENSITY 8" FLOPPY CAPACITIES
001A =          SPT1    EQU     26      ; SECTORS/TRACK
004D =          TRKS1   EQU     77      ; # TRACKS
07D2 =          SPDRV1  EQU     SPT1*TRKS1      ; SECTORS/DRIVE
                ;
0080 =          BPS     EQU     128     ; BYTES PER SECTOR
0002 =          MXDRV   EQU     2       ; MAX # DRIVES
                ;
                ;       FORTH VARIABLES AND CONSTANTS USED IN DISK INTERFACE
                ;
12CA 85                 DB      85H     ; DRIVE ( CURRENT DRIVE # )
12CB 44524956           DB      'DRIV'
12CF C5                 DB      'E'+80H
12D0 B712               DW      PTSTO-5
12D2 6D060000   DRIVE   DW      DOVAR,0
                ;
12D6 83                 DB      83H     ; SEC   ( SECTOR # )
12D7 5345               DB      'SE'
12D9 C3                 DB      'C'+80H
12DA CA12               DW      DRIVE-8
12DC 6D06       SEC:    DW      DOVAR
12DE 0000               DW      0
                ;
12E0 85                 DB      85H     ; TRACK ( TRACK # )
12E1 54524143           DB      'TRAC'
12E5 CB                 DB      'K'+80H
12E6 D612               DW      SEC-6
12E8 6D060000   TRACK:  DW      DOVAR,0
                ;
12EC 83                 DB      83H     ; USE   ( ADDR OF NEXT BUFFER TO USE )
12ED 5553               DB      'US'
12EF C5                 DB      'E'+80H
12F0 E012               DW      TRACK-8
12F2 6D06       USE:    DW      DOVAR
12F4 E03B               DW      BUF1
                ;
12F6 84                 DB      84H     ; PREV
```

```
                ;                       ( ADDR OF PREVIOUSLY USED BUFFER )
12F7 505245             DB      'PRE'
12FA D6                 DB      'V'+80H
12FB EC12               DW      USE-6
12FD 6D06       PREV    DW      DOVAR
12FF E03B               DW      BUF1
                ;
1301 87                 DB      87H     ; SEC/BLK ( # SECTORS/BLOCK )
1302 5345432F42         DB      'SEC/BL'
1308 CB                 DB      'K'+80H
1309 F612               DW      PREV-7
130B 5306       SPBLK   DW      DOCON
130D 0100               DW      KBBUF/BPS
                ;
130F 85                 DB      85H     ; #BUFF  ( NUMBER OF BUFFERS )
1310 23425546           DB      '#BUF'
1314 C6                 DB      'F'+80H
1315 0113               DW      SPBLK-10
1317 53060800   NOBUF   DW      DOCON,NBUF
                ;
131B 87                 DB      87H     ; DENSITY ( 0 = SINGLE , 1 = DOUBLE )
131C 44454E5349         DB      'DENSIT'
1322 D9                 DB      'Y'+80H
1323 0F13               DW      NOBUF-8
1325 6D06       DENSTY  DW      DOVAR
1327 0000               DW      0
                ;
1329 8A                 DB      8AH     ; DISK-ERROR  ( DISK ERROR STATUS )
132A 4449534B2D         DB      'DISK-ERRO'
1333 D2                 DB      'R'+80H
1334 1B13               DW      DENSTY-10
1336 6D060000   DSKERR  DW      DOVAR,0
                ;
                ;       DISK INTERFACE HIGH-LEVEL ROUTINES
                ;
133A 84                 DB      84H     ; +BUF  ( ADVANCE BUFFER )
133B 2B4255             DB      '+BU'
133E C6                 DB      'F'+80H
133F 2913               DW      DSKERR-13
1341 1106       PBUF    DW      DOCOL
1343 56018400           DW      LIT,C0
1347 C9045605           DW      PLUS,DUP
134B D2065508           DW      LIMIT,EQUAL
134F 92010600           DW      ZBRAN,PBUF1-$
1353 3C05C606           DW      DROP,FIRST
1357 5605FD12   PBUF1:  DW      DUP,PREV
135B 97054708           DW      AT,SUBB
135F 4704               DW      SEMIS
                ;
1361 86                 DB      86H     ; UPDATE
1362 5550444154         DB      'UPDAT'
1367 C5                 DB      'E'+80H
1368 3A13               DW      PBUF-7
136A 1106FD12   UPDAT   DW      DOCOL,PREV
136E 97059705           DW      AT,AT
1372 56010080           DW      LIT,8000H
```

```
CP/M MACRO ASSEM 2.0    #057    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 1376 D503              DW      ORR
 1378 FD129705          DW      PREV,AT
 137C CE054704          DW      STORE,SEMIS
                ;
 1380 8D                DB      8DH     ; EMPTY-BUFFERS
 1381 454D505459        DB      'EMPTY-BUFFER'
 138D D3                DB      'S'+80H
 138E 6113              DW      UPDAT-9
 1390 1106C606  MTBUF   DW      DOCOL,FIRST
 1394 D2062D05          DW      LIMIT,OVER
 1398 47089A0C          DW      SUBB,ERASEE
 139C 4704              DW      SEMIS
                ;
 139E 83                DB      83H     ; DR0
 139F 4452              DB      'DR'
 13A1 B0                DB      '0'+80H
 13A2 8013              DW      MTBUF-16
 13A4 11068F06  DRZER   DW      DOCOL,ZERO
 13A8 8307CE05          DW      OFSET,STORE
 13AC 4704              DW      SEMIS
                ;
 13AE 83                DB      83H     ; DR1
 13AF 4452              DB      'DR'
 13B1 B1                DB      '1'+80H
 13B2 9E13              DW      DRZER-6
 13B4 1106      DRONE   DW      DOCOL
 13B6 25139705          DW      DENSTY,AT
 13BA 92010A00          DW      ZBRAN,DRON1-$
 13BE 5601A40F          DW      LIT,SPDRV2
 13C2 7A010600          DW      BRAN,DRON2-$
 13C6 5601D207  DRON1   DW      LIT,SPDRV1
 13CA 8307CE05  DRON2   DW      OFSET,STORE
 13CE 4704              DW      SEMIS
                ;
 13D0 86                DB      86H     ; BUFFER
 13D1 4255464645        DB      'BUFFE'
 13D6 D2                DB      'R'+80H
 13D7 AE13              DW      DRONE-6
 13D9 1106F212  BUFFE:  DW      DOCOL,USE
 13DD 97055605          DW      AT,DUP
 13E1 7204              DW      TOR
 13E3 4113      BUFF1   DW      PBUF            ; WON'T WORK IF SINGLE BUFFER
 13E5 9201FCFF          DW      ZBRAN,BUFF1-$
 13E9 F212CE05          DW      USE,STORE
 13ED 9C049705          DW      RR,AT
 13F1 B704              DW      ZLESS
 13F3 92011400          DW      ZBRAN,BUFF2-$
 13F7 9C04F407          DW      RR,TWOP
 13FB 9C049705          DW      RR,AT
 13FF 5601FF7F          DW      LIT,7FFFH
 1403 C3038F06          DW      ANDD,ZERO
 1407 8815              DW      RSLW
 1409 9C04CE05  BUFF2   DW      RR,STORE
 140D 9C04FD12          DW      RR,PREV
 1411 CE058804          DW      STORE,FROMR
 1415 F4074704          DW      TWOP,SEMIS
```

```
                    ;
1419 85                     DB      85H     ; BLOCK
141A 424C4F43               DB      'BLOC'
141E CB                     DB      'K'+80H
141F D013                   DW      BUFFE-9
1421 11068307       BLOCK   DW      DOCOL,OFSET
1425 9705C904               DW      AT,PLUS
1429 7204FD12               DW      TOR,PREV
142D 97055605               DW      AT,DUP
1431 97059C04               DW      AT,RR
1435 4708                   DW      SUBB
1437 5605C904               DW      DUP,PLUS
143B 92013400               DW      ZBRAN,BLOC1-$
143F 4113A304       BLOC2   DW      PBUF,ZEQU
1443 92011400               DW      ZBRAN,BLOC3-$
1447 3C059C04               DW      DROP,RR
144B D9135605               DW      BUFFE,DUP
144F 9C049706               DW      RR,ONE
1453 8815                   DW      RSLW
1455 9F064708               DW      TWO,SUBB
1459 56059705       BLOC3   DW      DUP,AT
145D 9C044708               DW      RR,SUBB
1461 5605C904               DW      DUP,PLUS
1465 A304                   DW      ZEQU
1467 9201D6FF               DW      ZBRAN,BLOC2-$
146B 5605FD12               DW      DUP,PREV
146F CE05                   DW      STORE
1471 88043C05       BLOC1   DW      FROMR,DROP
1475 F4074704               DW      TWOP,SEMIS
                    ;
                    ;
                    ;       CP/M INTERFACE ROUTINES
                    ;
                    ;               SERVICE REQUEST
                    ;
1479 2A0100         IOS     LHLD    1       ; (HL) <- BIOS TABLE ADDR+3
147C 19                     DAD     D       ; + SERVICE REQUEST OFFSET
147D E9                     PCHL            ; EXECUTE REQUEST
                    ;       RET FUNCTION PROVIDED BY CP/M
                    ;
147E 86                     DB      86H     ; SET-IO
                    ;                       ( ASSIGN SECTOR, TRACK FOR BDOS )
147F 5345542D49             DB      'SET-I'
1484 CF                     DB      'O'+80H
1485 1914                   DW      BLOCK-8
1487 8914           SETIO:  DW      $+2
1489 C5                     PUSH    B       ; SAVE (IP)
148A 2AF412                 LHLD    USE+2   ; (BC) <- ADDR BUFFER
148D 44                     MOV     B,H
148E 4D                     MOV     C,L
148F 112100                 LXI     D,SETDMA ; SEND BUFFER ADDR TO CP/M
1492 CD7914                 CALL    IOS
                    ;
1495 2ADE12                 LHLD    SEC+2   ; (BC) <- (SEC) = SECTOR #
1498 4D                     MOV     C,L
1499 111E00                 LXI     D,SETSEC        ; SEND SECTOR # TO CP/M
```

```
CP/M MACRO ASSEM 2.0     #059     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 149C CD7914             CALL     IOS
                  ;
 149F 2AEA12             LHLD     TRACK+2 ; (BC) <- (TRACK) = TRACK #
 14A2 44                 MOV      B,H
 14A3 4D                 MOV      C,L
 14A4 111B00             LXI      D,SETTRK
 14A7 CD7914             CALL     IOS
                  ;
 14AA C1                 POP      B       ; RESTORE (IP)
 14AB C34501             JMP      NEXT
                  ;
 14AE 89                 DB       89H     ; SET-DRIVE
 14AF 5345542D44         DB       'SET-DRIV'
 14B7 C5                 DB       'E'+80H
 14B8 7E14               DW       SETIO-9
 14BA BC14       SETDRV: DW       $+2
 14BC C5                 PUSH     B       ; SAVE (IP)
 14BD 3AD412             LDA      DRIVE+2 ; (C) <- (DRIVE) = DRIVE #
 14C0 4F                 MOV      C,A
 14C1 111800             LXI      D,SETDSK        ; SEND DRIVE # TO CP/M
 14C4 CD7914             CALL     IOS
 14C7 C1                 POP      B       ; RESTORE (IP)
 14C8 C34501             JMP      NEXT
                  ;
                  ;       T&SCALC         ( CALCULATES DRIVE#, TRACK#, & SECTOR# )
                  ;       STACK INPUT: SECTOR-DISPLACEMENT = BLK# * SEC/BLK
                  ;       OUTPUT: VARIABLES DRIVE, TRACK, & SEC
                  ;
 14CB 87                 DB       87H     ; T&SCALC
 14CC 5426534341         DB       'T&SCAL'
 14D2 C3                 DB       'C'+80H
 14D3 AE14               DW       SETDRV-12
 14D5 11062513   TSCALC: DW       DOCOL,DENSTY
 14D9 9705               DW       AT
 14DB 92013800           DW       ZBRAN,TSCALS-$
 14DF 5601A40F           DW       LIT,SPDRV2
 14E3 C411               DW       SLMOD
 14E5 56010200           DW       LIT,MXDRV
 14E9 4911               DW       MIN
 14EB 5605D212           DW       DUP,DRIVE
 14EF 97055508           DW       AT,EQUAL
 14F3 92010800           DW       ZBRAN,TSCAL1-$
 14F7 3C05               DW       DROP
 14F9 7A010800           DW       BRAN,TSCAL2-$
 14FD D212CE05   TSCAL1  DW       DRIVE,STORE
 1501 BA14               DW       SETDRV
 1503 56013400   TSCAL2  DW       LIT,SPT2
 1507 C411E812           DW       SLMOD,TRACK
 150B CE05E707           DW       STORE,ONEP
 150F DC12CE05           DW       SEC,STORE
 1513 4704               DW       SEMIS
                  ;       SINGLE DENSITY
 1515 5601D207   TSCALS  DW       LIT,SPDRV1
 1519 C411               DW       SLMOD
 151B 56010200           DW       LIT,MXDRV
 151F 4911               DW       MIN
```

```
CP/M MACRO ASSEM 2.0     #060    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 1521 5605D212           DW      DUP,DRIVE
 1525 97055508           DW      AT,EQUAL
 1529 92010800           DW      ZBRAN,TSCAL3-$
 152D 3C05               DW      DROP
 152F 7A010800           DW      BRAN,TSCAL4-$
 1533 D212CE05  TSCAL3   DW      DRIVE,STORE
 1537 BA14               DW      SETDRV
 1539 56011A00  TSCAL4   DW      LIT,SPT1
 153D C411E812           DW      SLMOD,TRACK
 1541 CE05E707           DW      STORE,ONEP
 1545 DC12CE05           DW      SEC,STORE
 1549 4704               DW      SEMIS
                ;
                ;       SEC-READ
                ;       ( READ A SECTOR SETUP BY 'SET-DRIVE' & 'SETIO' )
                ;
 154B 88                 DB      88H     ; SEC-READ
 154C 5345432D52         DB      'SEC-REA'
 1553 C4                 DB      'D'+80H
 1554 CB14               DW      TSCALC-10
 1556 5815       SECRD   DW      $+2
 1558 C5                 PUSH    B       ; SAVE (IP)
 1559 112400             LXI     D,RDSEC ; ASK CP/M TO READ SECTOR
 155C CD7914             CALL    IOS
 155F 323813             STA     DSKERR+2        ; (DSKERR) <- ERROR STATUS
 1562 C1                 POP     B       ; RESTORE (IP)
 1563 C34501             JMP     NEXT
                ;
                ;       SEC-WRITE
                ;       ( WRITE A SECTOR SETUP BY 'SET-DRIVE' & 'SETIO' )
                ;
 1566 89                 DB      89H     ; SEC-WRITE
 1567 5345432D57         DB      'SEC-WRIT'
 156F C5                 DB      'E'+80H
 1570 4B15               DW      SECRD-11
 1572 7415       SECWT   DW      $+2
 1574 C5                 PUSH    B       ; SAVE (IP)
 1575 112700             LXI     D,RITSEC        ; ASK CP/M TO WRITE SECTOR
 1578 CD7914             CALL    IOS
 157B 323813             STA     DSKERR+2        ; (DSKERR) <- ERROR STATUS
 157E C1                 POP     B       ; RESTORE (IP)
 157F C34501             JMP     NEXT
                ;
 1582 83                 DB      83H     ; R/W   ( FORTH DISK PRIMATIVE )
 1583 522F               DB      'R/'
 1585 D7                 DB      'W'+80H
 1586 6615               DW      SECWT-12
 1588 1106       RSLW    DW      DOCOL
 158A F2129705           DW      USE,AT
 158E 7204               DW      TOR
 1590 49050B13           DW      SWAP,SPBLK
 1594 B511B108           DW      STAR,ROT
 1598 F212CE05           DW      USE,STORE
 159C 0B138F06           DW      SPBLK,ZERO
 15A0 EF01               DW      XDO
 15A2 2D052D05  RSLW1    DW      OVER,OVER
```

```
CP/M MACRO ASSEM 2.0     #061     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 15A6 D5148714           DW       TSCALC,SETIO
 15AA 92010800           DW       ZBRAN,RSLW2-$
 15AE 5615               DW       SECRD
 15B0 7A010400           DW       BRAN,RSLW3-$
 15B4 7215       RSLW2   DW       SECWT
 15B6 E707       RSLW3   DW       ONEP
 15B8 56018000           DW       LIT,80H
 15BC F2127205           DW       USE,PSTOR
 15C0 A801E0FF           DW       XLOOP,RSLW1-$
 15C4 3C053C05           DW       DROP,DROP
 15C8 8804F212           DW       FROMR,USE
 15CC CE054704           DW       STORE,SEMIS
                  ;
                  ;-------------------------------------------------
                  ;
                  ;       ALTERNATIVE R/W FOR NO DISK INTERFACE
                  ;
                  ;RSLW   DW       DOCOL,DROP,DROP,DROP,SEMIS
                  ;
                  ;-------------------------------------------------
                  ;
 15D0 85                  DB       85H      ; FLUSH
 15D1 464C5553            DB       'FLUS'
 15D5 C8                  DB       'H'+80H
 15D6 8215                DW       RSLW-6
 15D8 1106       FLUSH    DW       DOCOL
 15DA 1713E707            DW       NOBUF,ONEP
 15DE 8F06EF01            DW       ZERO,XDO
 15E2 8F06D913   FLUS1    DW       ZERO,BUFFE
 15E6 3C05                DW       DROP
 15E8 A801F8FF            DW       XLOOP,FLUS1-$
 15EC 4704                DW       SEMIS
                  ;
 15EE 84                  DB       84H      ; LOAD
 15EF 4C4F41              DB       'LOA'
 15F2 C4                  DB       'D'+80H
 15F3 D015                DW       FLUSH-8
 15F5 11065D07   LOAD     DW       DOCOL,BLK
 15F9 97057204            DW       AT,TOR
 15FD 65079705            DW       INN,AT
 1601 72048F06            DW       TOR,ZERO
 1605 6507CE05            DW       INN,STORE
 1609 EA06B511            DW       BSCR,STAR
 160D 5D07CE05            DW       BLK,STORE        ; BLK <- SCR * B/SCR
 1611 5B0F                DW       INTER            ; INTERPRET FROM OTHER SCREEN
 1613 88046507            DW       FROMR,INN
 1617 CE05                DW       STORE
 1619 88045D07            DW       FROMR,BLK
 161D CE05                DW       STORE
 161F 4704                DW       SEMIS
                  ;
 1621 C3                  DB       0C3H     ; -->
 1622 2D2D                DB       '--'
 1624 BE                  DB       '>'+80H
 1625 EE15                DW       LOAD-7
 1627 1106       ARROW    DW       DOCOL
```

```
CP/M MACRO ASSEM 2.0     #062     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 1629 F109               DW       QLOAD
 162B 8F06               DW       ZERO
 162D 6507               DW       INN
 162F CE05               DW       STORE
 1631 EA06               DW       BSCR
 1633 5D07               DW       BLK
 1635 9705               DW       AT
 1637 2D05               DW       OVER
 1639 E411               DW       MODD
 163B 4708               DW       SUBB
 163D 5D07               DW       BLK
 163F 7205               DW       PSTOR
 1641 4704               DW       SEMIS
                  ;
                         PAGE
```

```
                ;-----------------------------------------------
                ;
                ;       CP/M CONSOLE & PRINTER INTERFACE
                ;
                ;       CP/M BIOS CALLS USED
                ;       ( NOTE: BELOW OFFSETS ARE 3 LOWER THAN CP/M
                ;         DOCUMENTATION SINCE BASE ADDR = BIOS+3 )
                ;
0003 =          KCSTAT  EQU     3       ; CONSOLE STATUS
0006 =          KCIN    EQU     6       ; CONSOLE INPUT
0009 =          KCOUT   EQU     9       ; CONSOLE OUTPUT
000C =          KPOUT   EQU     0CH     ; PRINTER OUTPUT
                ;
1643 0000       EPRINT  DW      0       ; ENABLE PRINTER VARIABLE
                ;                       ; 0 = DISABLED, 1 = ENABLED
                ;
                ;       BELOW BIOS CALLS USE 'IOS' IN DISK INTERFACE
                ;
1645 C5         CSTAT   PUSH    B       ; CONSOLE STATUS
1646 110300             LXI     D,KCSTAT  ; CHECK IF ANY CHR HAS BEEN TYPED
1649 CD7914             CALL    IOS
164C C1                 POP     B       ; IF CHR TYPED THEN (A) <- 0FFH
164D C9                 RET             ; ELSE (A) <- 0
                ;                       ; CHR IGNORED
                ;
164E C5         CIN     PUSH    B       ; CONSOLE INPUT
164F 110600             LXI     D,KCIN  ; WAIT FOR CHR TO BE TYPED
1652 CD7914             CALL    IOS     ; (A) <- CHR, (MSB) <- 0
1655 C1                 POP     B
1656 C9                 RET
                ;
1657 E5         COUT    PUSH    H       ; CONSOLE OUTPUT
1658 110900             LXI     D,KCOUT ; WAIT UNTIL READY
165B CD7914             CALL    IOS     ; THEN OUTPUT (C)
165E E1                 POP     H
165F C9                 RET
                ;
1660 110C00     POUT    LXI     D,KPOUT ; PRINTER OUTPUT
1663 CD7914             CALL    IOS     ; WAIT UNTIL READY
1666 C9                 RET             ; THEN OUTPUT (C)
                ;
1667 CD5716     CPOUT   CALL    COUT    ; OUTPUT (C) TO CONSOLE
166A EB                 XCHG
166B 214316             LXI     H,EPRINT
166E 7E                 MOV     A,M     ; IF (EPRINT) <> 0
166F B7                 ORA     A
1670 CA7716             JZ      CPOU1
1673 4B                 MOV     C,E     ; THEN OUTPUT (C) TO PRINTER
1674 CD6016             CALL    POUT
1677 C9         CPOU1   RET
                ;
                ;       FORTH TO CP/M SERIAL IO INTERFACE
                ;
1678 CD4516     PQTER   CALL    CSTAT   ; IF CHR TYPED
167B 210000             LXI     H,0
```

```
CP/M MACRO ASSEM 2.0     #064    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 167E B7                 ORA     A
 167F CA8316             JZ      PQTE1
 1682 2C                 INR     L       ; THEN (S1) <- TRUE
 1683 C34401     PQTE1   JMP     HPUSH   ; ELSE (S1) <- FALSE
                 ;
 1686 CD4E16     PKEY    CALL    CIN     ; READ CHR FROM CONSOLE
 1689 FE10               CPI     DLE     ; IF CHR = (^P)
 168B 5F                 MOV     E,A
 168C C29816             JNZ     PKEY1
 168F 214316             LXI     H,EPRINT  ; THEN TOGGLE (EPRINT)LSB
 1692 1E20               MVI     E,ABL   ; CHR <- BLANK
 1694 7E                 MOV     A,M
 1695 EE01               XRI     1
 1697 77                 MOV     M,A
 1698 6B         PKEY1   MOV     L,E
 1699 2600               MVI     H,0
 169B C34401             JMP     HPUSH   ; (S1)LB <- CHR
                 ;
 169E A016       PEMIT   DW      $+2     ; (EMIT)        ORPHAN
 16A0 E1                 POP     H       ; (L) <- (S1)LB = CHR
 16A1 C5                 PUSH    B       ; SAVE (IP)
 16A2 4D                 MOV     C,L
 16A3 CD6716             CALL    CPOUT   ; OUTPUT CHR TO CONSOLE
                 ;                       ; & MAYBE PRINTER
 16A6 C1                 POP     B       ; RESTORE (IP)
 16A7 C34501             JMP     NEXT
                 ;
 16AA C5         PCR     PUSH    B       ; SAVE (IP)
 16AB 0E0D               MVI     C,ACR   ; OUTPUT (CR) TO CONSOLE
 16AD 69                 MOV     L,C
 16AE CD6716             CALL    CPOUT   ; & MAYBE TO PRINTER
 16B1 0E0A               MVI     C,LF    ; OUTPUT (LF) TO CONSOLE
 16B3 69                 MOV     L,C
 16B4 CD6716             CALL    CPOUT   ; & MAYBE TO PRINTER
 16B7 C1                 POP     B       ; RESTORE (IP)
 16B8 C34501             JMP     NEXT
                 ;
                 ;-------------------------------------------------
                         PAGE
```

```
                        ;
16BB C1                 DB      0C1H    ; '     ( TICK )
16BC A7                 DB      0A7H
16BD 2116               DW      ARROW-6
16BF 1106       TICK    DW      DOCOL
16C1 D90D               DW      DFIND
16C3 A304               DW      ZEQU
16C5 8F06               DW      ZERO
16C7 7809               DW      QERR
16C9 3C05               DW      DROP
16CB F30E               DW      LITER
16CD 4704               DW      SEMIS
                        ;
16CF 86                 DB      86H     ; FORGET
16D0 464F524745         DB      'FORGE'
16D5 D4                 DB      'T'+80H
16D6 BB16               DW      TICK-4
16D8 1106       FORG    DW      DOCOL
16DA 9D07               DW      CURR
16DC 9705               DW      AT
16DE 9007               DW      CONT
16E0 9705               DW      AT
16E2 4708               DW      SUBB
16E4 5601               DW      LIT
16E6 1800               DW      18H
16E8 7809               DW      QERR
16EA BF16               DW      TICK
16EC 5605               DW      DUP
16EE 3D07               DW      FENCE
16F0 9705               DW      AT
16F2 6108               DW      LESS
16F4 5601               DW      LIT
16F6 1500               DW      15H
16F8 7809               DW      QERR
16FA 5605               DW      DUP
16FC 3A09               DW      NFA
16FE 4507               DW      DP
1700 CE05               DW      STORE
1702 1C09               DW      LFA
1704 9705               DW      AT
1706 9007               DW      CONT
1708 9705               DW      AT
170A CE05               DW      STORE
170C 4704               DW      SEMIS
                        ;
170E 84                 DB      84H     ; BACK
170F 424143             DB      'BAC'
1712 CB                 DB      'K'+80H
1713 CF16               DW      FORG-9
1715 1106       BACK    DW      DOCOL
1717 0308               DW      HERE
1719 4708               DW      SUBB
171B 1F08               DW      COMMA
171D 4704               DW      SEMIS
                        ;
```

```
CP/M MACRO ASSEM 2.0     #066     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 171F C5                 DB       0C5H     ; BEGIN
 1720 42454749           DB       'BEGI'
 1724 CE                 DB       'N'+80H
 1725 0E17               DW       BACK-7
 1727 1106       BEGIN   DW       DOCOL
 1729 9209               DW       QCOMP
 172B 0308               DW       HERE
 172D 9706               DW       ONE
 172F 4704               DW       SEMIS
                 ;
 1731 C5                 DB       0C5H     ; ENDIF
 1732 454E4449           DB       'ENDI'
 1736 C6                 DB       'F'+80H
 1737 1F17               DW       BEGIN-8
 1739 1106       ENDIFF  DW       DOCOL
 173B 9209               DW       QCOMP
 173D 9F06               DW       TWO
 173F C109               DW       QPAIR
 1741 0308               DW       HERE
 1743 2D05               DW       OVER
 1745 4708               DW       SUBB
 1747 4905               DW       SWAP
 1749 CE05               DW       STORE
 174B 4704               DW       SEMIS
                 ;
 174D C4                 DB       0C4H     ; THEN
 174E 544845             DB       'THE'
 1751 CE                 DB       'N'+80H
 1752 3117               DW       ENDIFF-8
 1754 1106       THEN    DW       DOCOL
 1756 3917               DW       ENDIFF
 1758 4704               DW       SEMIS
                 ;
 175A C2                 DB       0C2H     ; DO
 175B 44                 DB       'D'
 175C CF                 DB       'O'+80H
 175D 4D17               DW       THEN-7
 175F 1106       DO      DW       DOCOL
 1761 0B0A               DW       COMP
 1763 EF01               DW       XDO
 1765 0308               DW       HERE
 1767 A706               DW       THREE
 1769 4704               DW       SEMIS
                 ;
 176B C4                 DB       0C4H     ; LOOP
 176C 4C4F4F             DB       'LOO'
 176F D0                 DB       'P'+80H
 1770 5A17               DW       DO-5
 1772 1106       LOOP    DW       DOCOL
 1774 A706               DW       THREE
 1776 C109               DW       QPAIR
 1778 0B0A               DW       COMP
 177A A801               DW       XLOOP
 177C 1517               DW       BACK
 177E 4704               DW       SEMIS
                 ;
```

```
CP/M MACRO ASSEM 2.0     #067     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 1780 C5                 DB       0C5H     ; +LOOP
 1781 2B4C4F4F           DB       '+LOO'
 1785 D0                 DB       'P'+80H
 1786 6B17               DW       LOOP-7
 1788 1106       PLOOP   DW       DOCOL
 178A A706               DW       THREE
 178C C109               DW       QPAIR
 178E 0B0A               DW       COMP
 1790 E201               DW       XPLOO
 1792 1517               DW       BACK
 1794 4704               DW       SEMIS
                  ;
 1796 C5                 DB       0C5H     ; UNTIL
 1797 554E5449           DB       'UNTI'
 179B CC                 DB       'L'+80H
 179C 8017               DW       PLOOP-8
 179E 1106       UNTIL   DW       DOCOL
 17A0 9706               DW       ONE
 17A2 C109               DW       QPAIR
 17A4 0B0A               DW       COMP
 17A6 9201               DW       ZBRAN
 17A8 1517               DW       BACK
 17AA 4704               DW       SEMIS
                  ;
 17AC C3                 DB       0C3H     ; END
 17AD 454E               DB       'EN'
 17AF C4                 DB       'D'+80H
 17B0 9617               DW       UNTIL-8
 17B2 1106       ENDD    DW       DOCOL
 17B4 9E17               DW       UNTIL
 17B6 4704               DW       SEMIS
                  ;
 17B8 C5                 DB       0C5H     ; AGAIN
 17B9 41474149           DB       'AGAI'
 17BD CE                 DB       'N'+80H
 17BE AC17               DW       ENDD-6
 17C0 1106       AGAIN   DW       DOCOL
 17C2 9706               DW       ONE
 17C4 C109               DW       QPAIR
 17C6 0B0A               DW       COMP
 17C8 7A01               DW       BRAN
 17CA 1517               DW       BACK
 17CC 4704               DW       SEMIS
                  ;
 17CE C6                 DB       0C6H     ; REPEAT
 17CF 5245504541         DB       'REPEA'
 17D4 D4                 DB       'T'+80H
 17D5 B817               DW       AGAIN-8
 17D7 1106       REPEA   DW       DOCOL
 17D9 7204               DW       TOR
 17DB 7204               DW       TOR
 17DD C017               DW       AGAIN
 17DF 8804               DW       FROMR
 17E1 8804               DW       FROMR
 17E3 9F06               DW       TWO
 17E5 4708               DW       SUBB
```

```
CP/M MACRO ASSEM 2.0    #068    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 17E7 3917              DW      ENDIFF
 17E9 4704              DW      SEMIS
                ;
 17EB C2                DB      0C2H    ; IF
 17EC 49                DB      'I'
 17ED C6                DB      'F'+80H
 17EE CE17              DW      REPEA-9
 17F0 1106      IFF     DW      DOCOL
 17F2 0B0A              DW      COMP
 17F4 9201              DW      ZBRAN
 17F6 0308              DW      HERE
 17F8 8F06              DW      ZERO
 17FA 1F08              DW      COMMA
 17FC 9F06              DW      TWO
 17FE 4704              DW      SEMIS
                ;
 1800 C4                DB      0C4H    ; ELSE
 1801 454C53            DB      'ELS'
 1804 C5                DB      'E'+80H
 1805 EB17              DW      IFF-5
 1807 1106      ELSEE   DW      DOCOL
 1809 9F06              DW      TWO
 180B C109              DW      QPAIR
 180D 0B0A              DW      COMP
 180F 7A01              DW      BRAN
 1811 0308              DW      HERE
 1813 8F06              DW      ZERO
 1815 1F08              DW      COMMA
 1817 4905              DW      SWAP
 1819 9F06              DW      TWO
 181B 3917              DW      ENDIFF
 181D 9F06              DW      TWO
 181F 4704              DW      SEMIS
                ;
 1821 C5                DB      0C5H    ; WHILE
 1822 5748494C          DB      'WHIL'
 1826 C5                DB      'E'+80H
 1827 0018              DW      ELSEE-7
 1829 1106      WHILE   DW      DOCOL
 182B F017              DW      IFF
 182D F407              DW      TWOP
 182F 4704              DW      SEMIS
                ;
 1831 86                DB      86H     ; SPACES
 1832 5350414345        DB      'SPACE'
 1837 D3                DB      'S'+80H
 1838 2118              DW      WHILE-8
 183A 1106      SPACS   DW      DOCOL
 183C 8F06              DW      ZERO
 183E 5F11              DW      MAX
 1840 D008              DW      DDUP
 1842 9201              DW      ZBRAN   ; IF
 1844 0C00              DW      SPAX1-$
 1846 8F06              DW      ZERO
 1848 EF01              DW      XDO     ; DO
 184A C108      SPAX2   DW      SPACE
```

```
CP/M MACRO ASSEM 2.0    #069    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 184C A801              DW      XLOOP   ; LOOP  ENDIF
 184E FCFF              DW      SPAX2-$
 1850 4704      SPAX1   DW      SEMIS
                ;
 1852 82                DB      82H     ; <#
 1853 3C                DB      '<'
 1854 A3                DB      '#'+80H
 1855 3118              DW      SPACS-9
 1857 1106      BDIGS   DW      DOCOL
 1859 D20C              DW      PAD
 185B DE07              DW      HLD
 185D CE05              DW      STORE
 185F 4704              DW      SEMIS
                ;
 1861 82                DB      82H     ; #>
 1862 23                DB      '#'
 1863 BE                DB      '>'+80H
 1864 5218              DW      BDIGS-5
 1866 1106      EDIGS   DW      DOCOL
 1868 3C05              DW      DROP
 186A 3C05              DW      DROP
 186C DE07              DW      HLD
 186E 9705              DW      AT
 1870 D20C              DW      PAD
 1872 2D05              DW      OVER
 1874 4708              DW      SUBB
 1876 4704              DW      SEMIS
                ;
 1878 84                DB      84H     ; SIGN
 1879 534947            DB      'SIG'
 187C CE                DB      'N'+80H
 187D 6118              DW      EDIGS-5
 187F 1106      SIGN    DW      DOCOL
 1881 B108              DW      ROT
 1883 B704              DW      ZLESS
 1885 9201              DW      ZBRAN   ; IF
 1887 0800              DW      SIGN1-$
 1889 5601              DW      LIT
 188B 2D00              DW      2DH
 188D BA0C              DW      HOLD    ; ENDIF
 188F 4704      SIGN1   DW      SEMIS
                ;
 1891 81                DB      81H     ; #
 1892 A3                DB      '#'+80H
 1893 7818              DW      SIGN-7
 1895 1106      DIG     DW      DOCOL
 1897 B207              DW      BASE
 1899 9705              DW      AT
 189B 1712              DW      MSMOD
 189D B108              DW      ROT
 189F 5601              DW      LIT
 18A1 0900              DW      9
 18A3 2D05              DW      OVER
 18A5 6108              DW      LESS
 18A7 9201              DW      ZBRAN   ; IF
 18A9 0800              DW      DIG1-$
```

```
CP/M MACRO ASSEM 2.0     #070    8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 18AB 5601               DW      LIT
 18AD 0700               DW      7
 18AF C904               DW      PLUS    ; ENDIF
 18B1 5601       DIG1    DW      LIT
 18B3 3000               DW      30H
 18B5 C904               DW      PLUS
 18B7 BA0C               DW      HOLD
 18B9 4704               DW      SEMIS
                 ;
 18BB 82                 DB      82H     ; #S
 18BC 23                 DB      '#'
 18BD D3                 DB      'S'+80H
 18BE 9118               DW      DIG-4
 18C0 1106       DIGS    DW      DOCOL
 18C2 9518       DIGS1   DW      DIG     ; BEGIN
 18C4 2D05               DW      OVER
 18C6 2D05               DW      OVER
 18C8 D503               DW      ORR
 18CA A304               DW      ZEQU
 18CC 9201               DW      ZBRAN   ; UNTIL
 18CE F4FF               DW      DIGS1-$
 18D0 4704               DW      SEMIS
                 ;
 18D2 83                 DB      83H     ; D.R
 18D3 442E               DB      'D.'
 18D5 D2                 DB      'R'+80H
 18D6 BB18               DW      DIGS-5
 18D8 1106       DDOTR   DW      DOCOL
 18DA 7204               DW      TOR
 18DC 4905               DW      SWAP
 18DE 2D05               DW      OVER
 18E0 3B11               DW      DABS
 18E2 5718               DW      BDIGS
 18E4 C018               DW      DIGS
 18E6 7F18               DW      SIGN
 18E8 6618               DW      EDIGS
 18EA 8804               DW      FROMR
 18EC 2D05               DW      OVER
 18EE 4708               DW      SUBB
 18F0 3A18               DW      SPACS
 18F2 FA0A               DW      TYPE
 18F4 4704               DW      SEMIS
                 ;
 18F6 82                 DB      82H     ; .R
 18F7 2E                 DB      '.'
 18F8 D2                 DB      'R'+80H
 18F9 D218               DW      DDOTR-6
 18FB 1106       DOTR    DW      DOCOL
 18FD 7204               DW      TOR
 18FF F310               DW      STOD
 1901 8804               DW      FROMR
 1903 D818               DW      DDOTR
 1905 4704               DW      SEMIS
                 ;
 1907 82                 DB      82H     ; D.
 1908 44                 DB      'D'
```

```
1909 AE                 DB      '.'+80H
190A F618               DW      DOTR-5
190C 1106       DDOT    DW      DOCOL
190E 8F06               DW      ZERO
1910 D818               DW      DDOTR
1912 C108               DW      SPACE
1914 4704               DW      SEMIS
                ;
1916 81                 DB      81H     ; .
1917 AE                 DB      '.'+80H
1918 0719               DW      DDOT-5
191A 1106       DOT     DW      DOCOL
191C F310               DW      STOD
191E 0C19               DW      DDOT
1920 4704               DW      SEMIS
                ;
1922 81                 DB      81H     ; ?
1923 BF                 DB      '?'+80H
1924 1619               DW      DOT-4
1926 1106       QUES    DW      DOCOL
1928 9705               DW      AT
192A 1A19               DW      DOT
192C 4704               DW      SEMIS
                ;
192E 82                 DB      82H     ; U.
192F 55                 DB      'U'
1930 AE                 DB      '.'+80H
1931 2219               DW      QUES-4
1933 1106       UDOT    DW      DOCOL
1935 8F06               DW      ZERO
1937 0C19               DW      DDOT
1939 4704               DW      SEMIS
                ;
193B 85                 DB      85H     ; VLIST
193C 564C4953           DB      'VLIS'
1940 D4                 DB      'T'+80H
1941 2E19               DW      UDOT-5
1943 1106       VLIST   DW      DOCOL
1945 5601               DW      LIT
1947 8000               DW      80H
1949 6E07               DW      OUTT
194B CE05               DW      STORE
194D 9007               DW      CONT
194F 9705               DW      AT
1951 9705               DW      AT
1953 6E07       VLIS1   DW      OUTT    ; BEGIN
1955 9705               DW      AT
1957 BA06               DW      CSLL
1959 A308               DW      GREAT
195B 9201               DW      ZBRAN   ; IF
195D 0A00               DW      VLIS2-$
195F 1003               DW      CR
1961 8F06               DW      ZERO
1963 6E07               DW      OUTT
1965 CE05               DW      STORE   ; ENDIF
1967 5605       VLIS2   DW      DUP
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CP/M MACRO ASSEM 2.0     #072     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 1969 480E               DW       IDDOT
 196B C108               DW       SPACE
 196D C108               DW       SPACE
 196F 5009               DW       PFA
 1971 1C09               DW       LFA
 1973 9705               DW       AT
 1975 5605               DW       DUP
 1977 A304               DW       ZEQU
 1979 0303               DW       QTERM
 197B D503               DW       ORR
 197D 9201               DW       ZBRAN    ; UNTIL
 197F D4FF               DW       VLIS1-$
 1981 3C05               DW       DROP
 1983 4704               DW       SEMIS
                  ;
                  ;------ EXIT CP/M ----------------------
                  ;
 1985 83                 DB       83H      ; BYE
 1986 4259               DB       'BY'
 1988 C5                 DB       'E'+80H
 1989 3B19               DW       VLIST-8
 198B 8D19       BYE     DW       $+2
 198D C30000             JMP      0
                  ;-----------------------------------------------
                  ;
 1990 84                 DB       84H      ; LIST
 1991 4C4953             DB       'LIS'
 1994 D4                 DB       'T'+80H
 1995 8519               DW       BYE-6
 1997 11066C0A   LIST    DW       DOCOL,DEC
 199B 10035605           DW       CR,DUP
 199F 7707CE05           DW       SCR,STORE
 19A3 5B0B               DW       PDOTQ
 19A5 0653435220         DB       6,'SCR # '
 19AC 1A19               DW       DOT
 19AE 56011000           DW       LIT,10H
 19B2 8F06EF01           DW       ZERO,XDO
 19B6 10030B02   LIST1   DW       CR,IDO
 19BA 56010300           DW       LIT,3
 19BE FB18C108           DW       DOTR,SPACE
 19C2 0B027707           DW       IDO,SCR
 19C6 97055C12           DW       AT,DLINE
 19CA 0303               DW       QTERM            ; ?TERMINAL
 19CC 92010400           DW       ZBRAN,LIST2-$    ; IF
 19D0 5E04               DW       LEAVE            ; LEAVE
 19D2 A801E2FF   LIST2   DW       XLOOP,LIST1-$    ; ENDIF
 19D6 10034704           DW       CR,SEMIS
                  ;
 19DA 85                 DB       85H      ; INDEX
 19DB 494E4445           DB       'INDE'
 19DF D8                 DB       'X'+80H
 19E0 9019               DW       LIST-7
 19E2 1106       INDEX   DW       DOCOL
 19E4 56010C00           DW       LIT,FF
 19E8 E0021003           DW       EMIT,CR
 19EC E7074905           DW       ONEP,SWAP
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CP/M MACRO ASSEM 2.0     #073     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
 19F0 EF01                DW      XDO
 19F2 10030B02  INDE1     DW      CR,IDO
 19F6 56010300            DW      LIT,3
 19FA FB18C108            DW      DOTR,SPACE
 19FE 8F060B02            DW      ZERO,IDO
 1A02 5C120303            DW      DLINE,QTERM
 1A06 92010400            DW      ZBRAN,INDE2-$
 1A0A 5E04                DW      LEAVE
 1A0C A801E4FF  INDE2     DW      XLOOP,INDE1-$
 1A10 4704                DW      SEMIS
                  ;
 1A12 85                  DB      85H     ; TRIAD
 1A13 54524941            DB      'TRIA'
 1A17 C4                  DB      'D'+80H
 1A18 DA19                DW      INDEX-8
 1A1A 1106      TRIAD     DW      DOCOL
 1A1C 56010C00            DW      LIT,FF
 1A20 E002                DW      EMIT
 1A22 56010300            DW      LIT,3
 1A26 D411                DW      SLASH
 1A28 56010300            DW      LIT,3
 1A2C B511                DW      STAR
 1A2E 56010300            DW      LIT,3
 1A32 2D05C904            DW      OVER,PLUS
 1A36 4905EF01            DW      SWAP,XDO
 1A3A 10030B02  TRIA1     DW      CR,IDO
 1A3E 9719                DW      LIST
 1A40 0303                DW      QTERM           ; ?TERMINAL
 1A42 92010400            DW      ZBRAN,TRIA2-$   ; IF
 1A46 5E04                DW      LEAVE           ; LEAVE
 1A48 A801F0FF  TRIA2     DW      XLOOP,TRIA1-$   ; ENDIF
 1A4C 1003                DW      CR
 1A4E 56010F00            DW      LIT,15
 1A52 70121003            DW      MESS,CR
 1A56 4704                DW      SEMIS
                  ;
 1A58 84                  DB      84H     ; .CPU
 1A59 2E4350              DB      '.CP'
 1A5C D5                  DB      'U'+80H
 1A5D 121A                DW      TRIAD-8
 1A5F 1106      DOTCPU    DW      DOCOL
 1A61 B2079705            DW      BASE,AT
 1A65 56012400            DW      LIT,36
 1A69 B207CE05            DW      BASE,STORE
 1A6D 56012200            DW      LIT,22H
 1A71 F806B405            DW      PORIG,TAT
 1A75 0C19                DW      DDOT
 1A77 B207CE05            DW      BASE,STORE
 1A7B 4704                DW      SEMIS
                  ;
 1A7D 84                  DB      84H     ; TASK
 1A7E 544153              DB      'TAS'
 1A81 CB                  DB      'K'+80H
 1A82 581A                DW      DOTCPU-7
 1A84 1106      TASK      DW      DOCOL
 1A86 4704                DW      SEMIS
```

```
CP/M MACRO ASSEM 2.0     #074     8080 FIG-FORTH 1.1 VERSION A0 15SEP79
                         ;
 1A88                    INITDP: DS       EM-$     ;CONSUME MEMORY TO LIMIT
                         ;
                                 PAGE
```

```
                ;
                ;               MEMORY MAP
                ;       ( THE FOLLOWING EQUATES ARE NOT REFERENCED ELSEWHERE )
                ;
                ;               LOCATION        CONTENTS
                ;               --------        --------
0100 =          MCOLD   EQU     ORIG            ;JMP TO COLD START
0104 =          MWARM   EQU     ORIG+4          ;JMP TO WARM START
0108 =          MA2     EQU     ORIG+8          ;COLD START PARAMETERS
0126 =          MUP     EQU     UP              ;USER VARIABLES' BASE 'REG'
0128 =          MRP     EQU     RPP             ;RETURN STACK 'REGISTER'
                ;
012A =          MBIP    EQU     BIP             ;DEBUG SUPPORT
0143 =          MDPUSH  EQU     DPUSH           ;ADDRESS INTERPRETER
0144 =          MHPUSH  EQU     HPUSH
0145 =          MNEXT   EQU     NEXT
                ;
0150 =          MDP0    EQU     DP0             ;START FORTH DICTIONARY
12D2 =          MDIO    EQU     DRIVE             ;CP/M DISK INTERFACE
1643 =          MCIO    EQU     EPRINT            ;CONSOLE & PRINTER INTERFACE
1A88 =          MIDP    EQU     INITDP          ;END INITIAL FORTH DICTIONARY
                ;                                 = COLD (DP) VALUE
                ;                                 = COLD (FENCE) VALUE
                ;                                 I  NEW
                ;                                 I  DEFINITIONS
                ;                                 V
                ;
                ;                                 ^
                ;                                 I  DATA
                ;                                 I  STACK
3B00 =          MIS0    EQU     INITS0          ;  = COLD (SP) VALUE = (S0)
                ;                                    = (TIB)
                ;                                 I  TERMINAL INPUT
                ;                                 I  BUFFER
                ;                                 V
                ;
                ;                                 ^
                ;                                 I  RETURN
                ;                                 I  STACK
3BA0 =          MIR0    EQU     INITR0          ;START USER VARIABLES
                ;                                   = COLD (RP) VALUE = (R0)
                ;                                   = (UP)
                ;                               ;END USER VARIABLES
3BE0 =          MFIRST  EQU     BUF1            ;START DISK BUFFERS
                ;                                   = FIRST
3FFF =          MEND    EQU     EM-1            ;END DISK BUFFERS
4000 =          MLIMIT  EQU     EM              ;LAST MEMORY LOC USED + 1
                ;                                   = LIMIT
                ;
                ;
4000                    END     ORIG

A.x
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0020 ABL	1058 ABORT	112C ABS	000D ACR	002E ADOT
17C0 AGAIN	0813 ALLOT	03C3 ANDD	1627 ARROW	0597 AT
1715 BACK	07B2 BASE	06DE BBUF	0ED7 BCOMP	1857 BDIGS
1727 BEGIN	0007 BELL	012A BIP	06B0 BL	0CAB BLANK
075D BLK	1471 BLOC1	143F BLOC2	1459 BLOC3	1421 BLOCK
0080 BPS	017A BRAN	017C BRAN1	013A BREAK	06EA BSCR
007F BSIN	0008 BSOUT	3BE0 BUF1	13E3 BUFF1	1409 BUFF2
13D9 BUFFE	0AB0 BUILD	198B BYE	05A6 CAT	0830 CCOMM
092C CFA	164E CIN	108F CLD	1099 CLD1	0327 CMOV1
032C CMOV2	031D CMOVE	0084 CO	10A2 COLD	05FD COLON
081F COMMA	0A0B COMP	0649 CON	0790 CONT	0AE7 COUNT
1657 COUT	1677 CPOU1	1667 CPOUT	0310 CR	0E95 CREA1
0E7F CREAT	06BA CSLL	07CD CSPP	1645 CSTAT	05DD CSTOR
079D CURR	113B DABS	18D8 DDOTR	190C DDOT	08D0 DDUP
08DA DDUP1	0A6C DEC	100A DEFIN	1325 DENSTY	0DF9 DFIN1
0DD9 DFIND	18B1 DIG1	0235 DIGI1	0240 DIGI2	021F DIGIT
1895 DIG	18C0 DIGS	18C2 DIGS1	0010 DLE	125C DLINE
0F20 DLIT1	0F10 DLITE	050F DMINU	0611 DOCOL	0653 DOCON
0ACC DODOE	175F DO	0AC0 DOES	1A5F DOTCPU	0B74 DOTQ
0B94 DOTQ1	0B9C DOTQ2	191A DOT	18FB DOTR	067F DOUSE
066D DOVAR	0FE2 DOVOC	0150 DP0	07BB DPL	04D6 DPLUS
0745 DP	111A DPM	1124 DPM1	0143 DPUSH	12D2 DRIVE
13C6 DRON1	13CA DRON2	13B4 DRONE	053C DROP	13A4 DRZER
1336 DSKERR	0B30 DTRA1	0B4A DTRA2	0B4E DTRA3	0B28 DTRAI
0556 DUP	1866 EDIGS	1807 ELSEE	4000 EM	02E0 EMIT
029C ENCL	02A6 ENCL1	02BE ENCL2	02CA ENCL3	02D1 ENCL4
17B2 ENDD	1739 ENDIFF	1643 EPRINT	0855 EQUAL	0C9A ERASEE
0E21 ERRO1	0E40 ERRO2	0E13 ERROR	016B EXEC	0BB1 EXPE1
0BEB EXPE2	0C11 EXPE3	0C03 EXPE4	0C05 EXPE5	0BE3 EXPE6
0BE7 EXPE7	0BA7 EXPEC	073D FENCE	000C FF	0001 FIGREL
0001 FIGREV	0C7A FILL	0C82 FILL1	0C8E FILL2	06C6 FIRST
07C4 FLD	15E2 FLUS1	15D8 FLUSH	16D8 FORG	0FF2 FORTH
0488 FROMR	08A3 GREAT	0803 HERE	0A56 HEX	07DE HLD
0CBA HOLD	0144 HPUSH	0E48 IDDOT	020B IDO	17F0 IFF
0FA9 IMMED	19F2 INDE1	1A0C INDE2	19E2 INDEX	1A88 INITDP
3BA0 INITR0	3B00 INITS0	0765 INN	0F5D INTE1	0F7F INTE2
0F75 INTE3	0F79 INTE4	0F99 INTE5	0F93 INTE6	0F97 INTE7
0F5B INTER	1479 IOS	0080 KBBUF	0006 KCIN	0009 KCOUT
0003 KCSTAT	02F2 KEY	000C KPOUT	090C LATES	0A21 LBRAC
045E LEAVE	086D LES1	0878 LES2	0861 LESS	000A LF
091C LFA	06D2 LIMIT	1997 LIST	19B6 LIST1	19D2 LIST2
0156 LIT	0F03 LITE1	0EF3 LITER	15F5 LOAD	1772 LOOP
0108 MA2	115F MAX	116B MAX1	012A MBIP	1643 MCIO
0100 MCOLD	12D2 MDIO	0150 MDP0	0143 MDPUSH	3FFF MEND
1270 MESS	1296 MESS1	1292 MESS2	12A1 MESS3	3BE0 MFIRST
0144 MHPUSH	1A88 MIDP	1149 MIN	1155 MIN1	04F9 MINUS
3BA0 MIR0	3B00 MIS0	4000 MLIMIT	0145 MNEXT	11E4 MODD
0358 MPYX	035D MPYX1	0365 MPYX2	0128 MRP	118F MSLAS
1217 MSMOD	1174 MSTAR	1390 MTBUF	0126 MUP	0104 MWARM
0002 MXDRV	0008 NBUF	0145 NEXT	014B NEXT1	093A NFA
1317 NOBUF	063A NOOP	0001 NSCR	0C3B NULL	0C6D NULL1
0C69 NULL2	0C71 NULL3	0D81 NUMB	0D9F NUMB1	0DC5 NUMB2
0DCF NUMB3	0783 OFSET	0697 ONE	07E7 ONEP	0100 ORIG

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03D5 ORR        076E OUTT       052D OVER       0E05 PABOR      0CD2 PAD
101A PAREN      1341 PBUF       1357 PBUF1      16AA PCR        0B5B PDOTQ
169E PEMIT      0950 PFA        0250 PFIN1      0259 PFIN2      0278 PFIN3
027B PFIN4      0281 PFIN5      0269 PFIN6      024D PFIND      1686 PKEY
1698 PKEY1      1236 PLINE      1788 PLOOP      04C9 PLUS       1108 PM
1112 PM1        0D38 PNUM1      0D74 PNUM2      0D6E PNUM3      0D36 PNUMB
06F8 PORIG      1660 POUT       1683 PQTE1      1678 PQTER      12FD PREV
0A82 PSCOD      0572 PSTOR      12A8 PTAT       12BC PTSTO      0992 QCOMP
09D4 QCSP       0978 QERR       0986 QERR1      0988 QERR2      09AA QEXEC
09F1 QLOAD      09C1 QPAIR      0F2B QSTAC      0303 QTERM      0C23 QUERY
1926 QUES       102B QUIT       1035 QUIT1      104C QUIT2      0A2F RBRAC
0024 RDSEC      17D7 REPEA      0027 RITSEC     07D5 RNUM       08B1 ROT
0421 RPAT       0128 RPP        042F RPSTO      049C RR         1588 RSLW
15A2 RSLW1      15B4 RSLW2      15B6 RSLW3      00A0 RTS        0710 RZERO
0777 SCR        0965 SCSP       12DC SEC        1556 SECRD      1572 SECWT
0625 SEMI       0AA2 SEMI1      0A98 SEMIC      0447 SEMIS      0021 SETDMA
14BA SETDRV     0018 SETDSK     1487 SETIO      001E SETSEC     001B SETTRK
187F SIGN       188F SIGN1      11D4 SLASH      11C4 SLMOD      0A44 SMUDG
08C1 SPACE      183A SPACS      03FB SPAT       1850 SPAX1      184A SPAX2
130B SPBLK      07D2 SPDRV1     0FA4 SPDRV2     040A SPSTO      001A SPT1
0034 SPT2       1205 SSLA       11F4 SSMOD      083C SSUB       11B5 STAR
07A8 STATE      10F3 STOD       1100 STOD1      05CE STORE      0847 SUBB
0549 SWAP       0707 SZERO      1A84 TASK       05B4 TAT        0564 TDUP
1754 THEN       06A7 THREE      071A TIB        16BF TICK       012C TNEXT
013D TNEXT1     0589 TOGGL      0472 TOR        12E8 TRACK      08E7 TRAV
08EB TRAV1      1A3A TRIA1      1A48 TRIA2      1A1A TRIAD      004D TRKS1
004D TRKS2      14FD TSCAL1     1503 TSCAL2     1533 TSCAL3     1539 TSCAL4
14D5 TSCALC     1515 TSCALS     05EA TSTOR      069F TWO        07F4 TWOP
0AFA TYPE       0B18 TYPE1      0B0A TYPE2      0B1A TYPE3      1933 UDOT
0899 ULES1      089D ULES2      0883 ULESS      179E UNTIL      0126 UP
136A UPDAT      0040 US         0679 USER       12F2 USE        038C USLA1
038E USLA2      0397 USLA3      03A6 USLA4      03B1 USLA5      03B2 USLA6
03B7 USLA7      036F USLAS      0000 USRVER     033A USTAR      0667 VAR
1953 VLIS1      1967 VLIS2      1943 VLIST      0FC2 VOCAB      0753 VOCL
1089 WARM       0732 WARN       1829 WHILE      0725 WIDTH      0CE5 WORD
0CF9 WORD1      0CFD WORD2      107A WRM        1080 WRM1       01EF XDO
01AD XLOO1      01C7 XLOO2      01CC XLOO3      01A8 XLOOP      03E8 XORR
01E2 XPLOO      0192 ZBRAN      04A3 ZEQU       04AF ZEQU1      068F ZERO
04C2 ZLES1      04B7 ZLESS
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