

fig-FORTH FOR PACE  
ASSEMBLY SOURCE LISTING

RELEASE 1  
WITH COMPILER SECURITY  
AND  
VARIABLE LENGTH NAMES

MAY 1979

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bpUB. LISTING 79/05/05.TITLE: FORTH NUCLEUS FOR PACE

```
1          .TITLE  FORTH,'NUCLEUS FOR PACE'
2          ;
3          .ASM    TI
4          ;
5          PART   =    1
6          ;
7          .LIST   PART=1
8          ;
9          ;*****
10         ;*      THIS IMPLEMENTATION OF THE FORTH LANGUAGE      *
11         ;*      IS ONE OF A UNIFORM SERIES DEVELOPED BY THE   *
12         ;*
13         ;*      FORTH INTEREST GROUP                          *
14         ;*      P.O. BOX 1105                                  *
15         ;*      SAN CARLOS, CA 94070                          *
16         ;*
17         ;*      PACE IMPLEMENTATION BY DAVID KILBRIDGE        *
18         ;*****
19         ;
20         0000    .ASECT
21         0010    .=    0010
22         ;
23         ;*****
24         ;*      BOC AND FLAG ABBREVIATIONS                      *
25         ;*****
26         ;
27         0001    Z      =    1
28         0002    P      =    2
29         0003    BITO   =    3
30         0005    NZ     =    5
31         0007    CRY    =    7
32         0008    LINK   =    8
33         000A    CSET   =    10
34         000B    M      =    11
35         ;
36         ;*****
37         ;*      MEMORY ASSIGNMENTS                              *
38         ;*****
39         ;
40         3FC0    HIBLK  =    03FC0          ; HIGHEST BLOCK FWA
41         2000    LOBLK  =    02000          ; LOWEST BLOCK FWA
42         0080    BLKSIZ =    128           ; BLOCK SIZE IN BYTES
43         0008    NBUF   =    8             ; NO OF BLOCK BUFFERS
44         2000    TOPMEM =    02000          ; LWA+1 OF DISK BUFFS
45         0210    BUFMEM =    BLKSIZ/2+2*NBUF ; LTH OF BUFFER AREA
46         1DF0    BUFFS  =    TOPMEM-BUFMEM  ; FWA OF DISK BUFFERS
47         1DD0    UVARs  =    BUFFS-32      ; START OF USER AREA
48         0100    DICT   =    0100          ; FWA OF DICTIONARY
49         ;
50         ;*****
51         ;*      START-UP LITERALS                                *
52         ;*****
53         ;
54         0010 9811 A ORIG:  JMP    @.+1          ; COLD
```

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```

55 0011 088C A      .WORD  CENT      ; ENTRY
56 0012 9813 A      JMP    @.+1     ; WARM
57 0013 0892 A      .WORD  WENT     ; ENTRY
58 0014 0000 A CPU:  .WORD  0        ; RESERVED
59 0015 0000 A REV:  .WORD  0        ; RESERVED
60 0016 0C65 A FORTH0: .WORD  TASK-4   ; TOP WORD IN DICT
61 0017 005F A BACKSP: .WORD  005F    ; BACKSPACE CHARACTER
62 0018 1DD0 A UO:   .WORD  UVARS    ; START OF USER AREA
63 0019 1D8F A SO:   .WORD  UVARS-65 ; TOP OF EMPTY STACK
64 001A 1DD0 A RO:   .WORD  UVARS    ; TOP OF RETURN STACK
65 001B 1D8F A TIBO: .WORD  UVARS-65 ; SOURCE BUFFER ORIG
66 001C 001F A WIDTH0: .WORD  31     ; INITIAL NAME LENGTH
67 001D 0000 A WARN0: .WORD  0        ; ERROR WARNING MODE
68 001E 0C65 A FENCE0: .WORD  TASK-4   ; BARRIER FOR FORGET
69 001F 0C6B A DPO:   .WORD  FIN      ; FWA OF FREE STORAGE
70 0020 0843 A VOCLO: .WORD  FORTH+4  ; INITIAL VOC-LINK
71

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```

                                .PAGE
72                                ;
73                                ;*****
74                                ;*           FORTH REGISTERS          *
75                                ;*****
76                                ;
77 0021 0000 A RP:   .WORD  0        ; RETURN STACK PTR
78 0022 0000 A UP:   .WORD  0        ; USER POINTER
79          0002 X     =      2        ; INDEX
80          0003 Y     =      3        ; REGISTERS
81          0001 IP    =      1        ; INTERPRETIVE PTR
82          0002 W     =      X        ; FORTH CODE PTR
83          0003 SP    =      Y        ; FORTH STACK PTR
84                                ;
85                                ;*****
86                                ;           INSTALLATION-DEPENDENT ROUTINES
87                                ;*****
88                                ;
89          7E3B GETC  =      07E3B
90          7E44 PUTC  =      07E44
91          7ECC INTEST =      07ECC
92                                ;
93 0023 5000 A INIT:  LI      0,0
94 0024 0800 A      CRF      0
95 0025 6700 A      PULL     Y
96 0026 5109 A      LI      1,9
97 0027 6400 A      PULL     0
98 0028 79FF A      AISZ     1,-1
99 0029 1827 A      JMP      .-2
100 002A 3100 A      PFLG     1

```

```

101 002B 6300 A      PUSH      Y
102 002C 1B00 A      JMP        (Y)
103
104      0000          .BSECT
      00F6          .=.+00F6          ; POINTER AREA
105      002D          .ASECT
106 ;*****
107 ;*          AIDS FOR NAME FIELD CONSTRUCTION      *
108 ;*****
109 ;
110      .FORM      HEAD,1(1),1,1(0),5,1,7
111 ;
112      0000      ORD      =      0          ; ORDIN. WD PREC BIT
113      0001      IMM      =      1          ; IMMED. WD PREC BIT
114      0001      SHORT    =      1          ; FOR 1-CHAR NAMES
115      0000      LONG     =      0          ; FOR LONGER NAMES
116      8000      EVEN     =      08000     ; EVEN-LTH STOP BIT
117      0080      ODD      =      00080     ; ODD-LTH STOP BIT
118

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PACE ASSEMBLER REV-A 05/23/75  
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 DICTIONARY

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      .PAGE      'DICTIONARY'
119 ;
120      002D          .ASECT
121      0100          .=      DICT
122 ;
123 ;*****
124 ;*          LIT, PUSH, PUT, NEXT      *
125 ;*****
126 ;
127 0100 834C A      HEAD      ORD,3,LONG,'L'/256
128 0101 49D4 A      .WORD      'IT'+ODD,0000
      0102 0000 A
129 0103 0104 A      LIT:      .WORD      .+1
130 0104 5E40 A      RCPY      IP,X          ; PICK UP
131 0105 C200 A      LD        0,(X)        ; VALUE
132 0106 7901 A      AISZ      IP,1          ; STEP IP OVER
133 0107 7BFF A      PUSH:     AISZ      SP,-1        ; EXTEND STACK
134 0108 D300 A      PUT:      ST        0,(SP)        ; STORE VALUE
135 0109 5E40 A      NEXT:     RCPY      IP,X
136 010A 7901 A      AISZ      IP,1          ; INCREMENT IP
137 010B CA00 A      LD        W,(X)        ; ADDR OF NEXT WORD
138 010C 9A00 A      JMP        @(W)          ; JUMP THRU CODE ADDR
139 ;
140 ;*****
141 ;*          EXECUTE      *
142 ;*****
143 ;
144 010D 8745 A      HEAD      ORD,7,LONG,'E'/256
145 010E 5845 A      .WORD      'XE','CU','TE'+ODD,LIT-3
      010F 4355 A
      0110 54C5 A
      0111 0100 A

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146 0112 0113 A EXEC: .WORD .+1
147 0113 CB00 A LD W,0(SP) ; FETCH CODE ADDR
148 0114 7B01 A AISZ SP,1 ; POP STACK
149 0115 9A00 A JMP @(W) ; JUMP THRU CODE ADDR
150 ;
151 ;*****
152 ;* BRANCH, OBRANCH *
153 ;*****
154 ;
155 0116 8642 A HEAD ORD,6,LONG,'B'/256
156 0117 5241 A .WORD 'RA','NC','H'+EVEN,EXEC-5
0118 4E43 A
0119 C820 A
011A 010D A
157 011B 011C A BRAN: .WORD .+1
158 011C 5E40 A RCPY IP,X ; ADD OFFSET
159 011D E600 A ADD IP,(X) ; TO IP
160 011E 19EA A JMP NEXT
161 ;
162 011F 8730 A HEAD ORD,7,LONG,'O'/256
163 0120 4252 A .WORD 'BR','AN','CH'+ODD,BRAN-5
0121 414E A
0122 43C8 A

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0123 0116 A
164 0124 0125 A ZBRAN: .WORD .+1
165 0125 C300 A LD 0,0(SP) ; GET BOOLEAN
166 0126 7B01 A AISZ SP,1 ; POP STACK
167 0127 41F4 A BOC Z,BRAN+1 ; IF BOOLEAN = 0
168 0128 7901 A AISZ IP,1 ; STEP IP OVER OFFSET
169 0129 19DF A JMP NEXT
170 ;
171 ;*****
172 ;* LOOP CONTROL *
173 ;*****
174 ;
175 012A 8628 A HEAD ORD,6,LONG,'('/256
176 012B 4C4F A .WORD 'LO','OP','')'+EVEN,ZBRAN-5
012C 4F50 A
012D A920 A
012E 011F A
177 012F 0130 A XLOOP: .WORD .+1
178 0130 5001 A LI 0,1 ; INCREMENT = 1
179 0131 C821 A LD X,RP ; GET RETURN POINTER
180 0132 E200 A ADD 0,(X) ; UPDATE
181 0133 D200 A ST 0,(X) ; INDEX
182 0134 3780 A SFLG CRY ; SUBTRACT
183 0135 9201 A SUBB 0,1(X) ; LIMIT
184 0136 4BE5 A BOC M,BRAN+1 ; IF LIMIT > INDEX
185 0137 7901 A XLOOP1: AISZ IP,1 ; STEP IP OVER OFFSET
186 0138 7A02 A AISZ X,2 ; POP INDEX AND LIMIT
187 0139 D821 A ST X,RP ; FROM RETURN STACK
188 013A 19CE A JMP NEXT

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189 ;
190 013B 8728 A HEAD ORD,7,LONG,'('/256
191 013C 2B4C A .WORD 'L','OO','P')+ODD,XLOOP-5
    013D 4F4F A
    013E 50A9 A
    013F 012A A
192 0140 0141 A XPLOOP: .WORD .+1
193 0141 6100 A PUSH IP ; SAVE IP
194 0142 C700 A LD 1,0(SP) ; GET INCREMENT
195 0143 7B01 A AISZ SP,1 ; POP STACK
196 0144 C821 A LD X,RP ; GET RETURN POINTER
197 0145 C200 A LD 0,(X) ; GET INDEX
198 0146 6840 A RADD 1,0 ; ADD INCREMENT
199 0147 D200 A ST 0,(X) ; UPDATE INDEX
200 0148 3780 A SFLG CRY ; SUBTRACT
201 0149 9201 A SUBB 0,1(X) ; LOOP LIMIT
202 014A 4104 A BOC Z,PULL ; IF INDEX = LIMIT
203 014B 5840 A RXOR 1,0 ; COMBINE SIGN BITS
204 014C 6500 A PULL IP ; RESTORE IP
205 014D 4BCE A BOC M,BRAN+1 ; IND<LIM XOR INC<0
206 014E 19E8 A JMP XLOOP1
207 014F 6500 A PULL: PULL IP ; RESTORE IP
208 0150 19E6 A JMP XLOOP1
209 ;
210 ;*****
211 ;* (DO), POPTWO, POP, I *
```

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212 ;*****
213 ;
214 0151 8428 A HEAD ORD,4,LONG,'('/256
215 0152 444F A .WORD 'DO','')+EVEN,XPLOOP-5
    0153 A920 A
    0154 013B A
216 0155 0156 A XDO: .WORD .+1
217 0156 C301 A LD 0,1(SP) ; MOVE LIMIT
218 0157 AC21 A DSZ RP ; TO RETURN
219 0158 B021 A ST 0,@RP ; STACK
220 0159 C300 A LD 0,0(SP) ; MOVE INITIAL
221 015A AC21 A DSZ RP ; INDEX TO RETURN
222 015B B021 A ST 0,@RP ; STACK
223 015C 7B01 A POP2: AISZ SP,1 ; POP ONE ITEM
224 015D 7B01 A POP: AISZ SP,1 ; POP ONE ITEM
225 015E 19AA A JMP NEXT
226 ;
227 015F 81C9 A HEAD ORD,1,SHORT,'I'/256
228 0160 0151 A .WORD XDO-4
229 0161 028A A I: .WORD R+1 ; GET FROM RTN STACK
230 ;
```

```

231 ;*****
232 ;* DIGIT *
233 ;*****
234 ;
235 0162 8544 A HEAD ORD,5,LONG,'D'/256
236 0163 4947 A .WORD 'IG','IT'+ODD,I-2
0164 49D4 A
0165 015F A
237 0166 0167 A DIGIT: .WORD .+1
238 0167 C301 A LD 0,1(SP) ; GET ASCII
239 0168 78D0 A AISZ 0,-0030
240 0169 4B0B A BOC M,BAD ; ASCII < 30
241 016A 9DOC A SKG 0,NINE
242 016B 1903 A JMP CKBASE ; 30 <= ASCII <= 39
243 016C 78F9 A AISZ 0,-7
244 016D 9D09 A SKG 0,NINE
245 016E 1906 A JMP BAD ; 39 < ASCII < 41
246 016F 9F00 A CKBASE: SKG 0,0(SP)
247 0170 F300 A SKNE 0,0(SP)
248 0171 1903 A JMP BAD ; ASCII >= BASE
249 0172 D301 A ST 0,1(SP) ; PUT DIGIT SECOND
250 0173 5001 A LI 0,1 ; AND TRUE FLAG
251 0174 1993 A JMP PUT ; ON BOTTOM
252 0175 5000 A BAD: LI 0,0 ; LEAVE FALSE FLAG
253 0176 98F6 I JMP BIN ; ON BOTTOM
254 0177 0009 A NINE: .WORD 9
255 ;
256 ;*****
257 ;* (FIND) *
258 ;*****
259 ;
260 0178 8628 A HEAD ORD,6,LONG,'('/256
261 0179 4649 A .WORD 'FI','ND','')'+EVEN,DIGIT-4
017A 4E44 A

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017B A920 A
017C 0162 A
262 017D 017E A PFIND: .WORD .+1
263 017E 6100 A PUSH IP ; SAVE IP
264 017F 7BFF A AISZ SP,-1 ; EXTEND STACK
265 0180 CB01 A LD X,1(SP) ; GET NFA
266 0181 A302 A NEWNAM: LD 0,@2(SP) ; FIRST WD OF STRING
267 0182 C600 A LD 1,(X) ; FIRST WD OF NAME
268 0183 5840 A RXOR 1,0
269 0184 A923 A AND 0,X3FFF ; CLEAR START & PREC
270 0185 B923 A SKAZ 0,X7F7F ; CMP LTH, FIRST CHAR
271 0186 1915 A JMP MISS ; IF MISMATCH
272 0187 450C A BOC NZ,FOUND ; IF ONLY ONE CHAR
273 0188 C702 A LD 1,2(SP) ; INITIALIZE
274 0189 D700 A ST 1,0(SP) ; STRING POINTER
275 018A 7A01 A CYCLE: AISZ X,1 ; BUMP NAME AND
276 018B 8F00 A ISZ 0(SP) ; STRING POINTERS

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277 018C A300 A      LD      0,@0(SP)      ; NEXT WD OF STRING
278 018D C600 A      LD      1,(X)          ; NEXT WD OF NAME
279 018E 5840 A      RXOR    1,0
280 018F 4201 A      BOC     P,+.2         ; IF HI BYTE IS LAST,
281 0190 A919 A      AND     0,XFF00       ; CLEAR LOW BYTE
282 0191 B917 A      SKAZ   0,X7F7F      ; COMPARE CHARS
283 0192 1909 A      JMP     MISS         ; IF MISMATCH
284 0193 41F6 A      BOC     Z,CYCLE      ; IF NO STOP BIT
285 0194 7A03 A      FOUND: AISZ        X,3          ; FORM PFA
286 0195 DB02 A      ST     X,2(SP)      ; PUT THIRD ON STACK
287 0196 A301 A      LD     0,@1(SP)     ; FIRST WD OF NAME
288 0197 2C10 A      SHR    0,8,0        ; GET LENGTH BYTE
289 0198 D301 A      ST     0,1(SP)     ; PUT SECOND ON STACK
290 0199 5001 A      LI     0,1          ; BOOLEAN TRUE
291 019A 6500 A      PULL   IP           ; RESTORE IP
292 019B 98F7 I      JMP     PUT         ; BOOLEAN ON BOTTOM
293 019C B90E A      MISS: SKAZ        0,X8080    ; TEST FOR A STOP BIT
294 019D 1903 A      JMP     ENDNAM      ; IF PRESENT
295 019E 7A01 A      AISZ   X,1          ; BUMP NAME POINTER
296 019F C200 A      LD     0,(X)        ; GET NEXT WORD
297 01A0 19FB A      JMP     MISS        ; CONTINUE SCANNING
298 01A1 CA01 A      ENDNAM: LD        X,1(X)     ; FETCH LINK
299 01A2 DB01 A      ST     X,1(SP)     ; NEW NFA
300 01A3 7A00 A      AISZ   X,0          ; TEST FOR LINK = 0
301 01A4 19DC A      JMP     NEWNAM      ; IF NOT DONE
302 01A5 DB02 A      ST     X,2(SP)     ; PUT BOOLEAN FALSE
303 01A6 6500 A      PULL   IP           ; RESTORE IP
304 01A7 19B4 A      JMP     POP2
305
306 01A8 3FFF A      X3FFF: .WORD      03FFF
307 01A9 7F7F A      X7F7F: .WORD      07F7F
308 01AA FF00 A      XFF00: .WORD      0FF00
309 01AB 8080 A      X8080: .WORD      08080
310
311 ;*****
312 ;*                               ENCLOSE                               *
313 ;*****
314 ;

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315 ; SCAN SOURCE STRING, PACKED TWO CHARACTERS/WORD,
316 ; FOR DELIMITER ON TOP OF STACK, OR ASCII NULL.
317 ;
318 01AC 8745 A      HEAD   ORD,7,LONG,'E'/256
319 01AD 4E43 A      .WORD  'NC','LO','SE'+ODD,PFIND-5
    01AE 4C4F A
    01AF 53C5 A
    01B0 0178 A
320 01B1 01B2 A      ENCL: .WORD      .+1
321 01B2 6100 A      PUSH   IP           ; SAVE IP
322 01B3 7BFE A      AISZ   SP,-2        ; EXTEND STACK
323 01B4 C302 A      LD     0,2(SP)     ; GET DELIMITER
324 01B5 A932 A      AND    0,RMASK     ; USE LOWER
325 01B6 5D00 A      RCPY   0,1         ; BYTE ONLY

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326 01B7 2910 A      SHL      1,8,0      ; DOUBLE UP
327 01B8 6900 A      RADD     0,1        ; DELIMITER
328 01B9 C303 A      LD       0,3(SP)   ; GET BYTE ADDRESS
329 01BA 3800 A      PFLG    LINK       ;
330 01BB 2403 A      ROR      0,1,1     ; CONVERT ADDRESS
331 01BC D300 A      ST       0,0(SP)   ; SAVE WORD ADDRESS
332 01BD 5200 A      LI       X,0       ; CLEAR COUNT
333 01BE A300 A      NEW1:   LD       0,@0(SP) ; GET NEXT 2 BYTES
334 01BF 5840 A      RXOR    1,0       ; COMPARE WITH DELIMS
335 01C0 4803 A      BOC     LINK,RT1   ; IF START ADDR ODD
336 01C1 B925 A      SKAZ    0,LMASK   ; TEST LEFT BYTE
337 01C2 1908 A      JMP     LNDEL     ; IF NOT DELIM
338 01C3 7A01 A      AISZ    X,1       ; BUMP COUNT
339 01C4 B923 A      RT1:   SKAZ    0,RMASK ; TEST RIGHT BYTE
340 01C5 1904 A      JMP     RNDEL     ; IF NOT DELIM
341 01C6 7A01 A      AISZ    X,1       ; BUMP COUNT
342 01C7 3800 A      PFLG    LINK       ; LEFT BYTE OF
343 01C8 8F00 A      ISZ     0(SP)     ; FOLLOWING WORD
344 01C9 19F4 A      JMP     NEW1     ; IS NEXT
345 01CA 3880 A      RNDEL:  SFLG    LINK   ; REMEMBER WHICH BYTE
346 01CB DB02 A      LNDEL:  ST       X,2(SP) ; SET FC OFFSET
347 01CC 4810 A      BOC     LINK,RT2   ; RESUME AT SAME BYTE
348 01CD A300 A      NEW2:   LD       0,@0(SP) ; GET DATA
349 01CE DB01 A      ST       X,1(SP)   ; MAYBE EW OFFSET
350 01CF B917 A      SKAZ    0,LMASK   ; TEST FOR NULL
351 01D0 1905 A      JMP     NONUL    ;
352 01D1 DB00 A      NUL:   ST       X,0(SP) ; NC OFFSET
353 01D2 FB02 A      SKNE    X,2(SP)   ; IS NC = FC?
354 01D3 8F01 A      ISZ     1(SP)     ; YES, BUMP EW
355 01D4 6500 A      PULL    IP        ; RESTORE IP
356 01D5 98F8 I      JMP     NEXT     ;
357 01D6 7A01 A      NONUL:  AISZ    X,1   ; BUMP COUNT
358 01D7 5840 A      RXOR    1,0       ;
359 01D8 B90E A      SKAZ    0,LMASK   ; TEST FOR DELIM
360 01D9 1903 A      JMP     RT2      ;
361 01DA DB00 A      DELIM:  ST       X,0(SP) ; NC OFFSET
362 01DB 6500 A      PULL    IP        ; RESTORE IP
363 01DC 98F8 I      JMP     NEXT     ;
364 01DD 5840 A      RT2:   RXOR    1,0   ;
365 01DE DB01 A      ST       X,1(SP)   ; MAYBE EW
366 01DF A908 A      AND     0,RMASK   ;

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367 01E0 41F0 A      BOC     Z,NUL     ; TEST FOR NULL
368 01E1 7A01 A      AISZ    X,1       ; BUMP COUNT
369 01E2 5840 A      RXOR    1,0       ;
370 01E3 A904 A      AND     0,RMASK   ;
371 01E4 41F5 A      BOC     Z,DELIM   ; TEST FOR DELIM
372 01E5 8F00 A      ISZ     0(SP)     ; BACK FOR
373 01E6 19E6 A      JMP     NEW2     ; NEXT WORD
374 01E7 FF00 A      LMASK:  .WORD    OFF00
375 01E8 00FF A      RMASK:  .WORD    000FF
376
;

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```

377 ;*****
378 ;*                TERMINAL VECTORS                *
379 ;*****
380 ;
381 ; THESE WORDS VECTOR TO INSTALLATION-SPECIFIC CODE
382 ;
383 01E9 8445 A      HEAD      ORD,4,LONG,'E'/256
384 01EA 4D49 A      .WORD     'MI','T'+EVEN,ENCL-5
      01EB D420 A
      01EC 01AC A
385 01ED 0A49 A      EMIT:     .WORD     Pemit
386 ;
387 01EE 834B A      HEAD      ORD,3,LONG,'K'/256
388 01EF 45D9 A      .WORD     'EY'+ODD,EMIT-4
      01F0 01E9 A
389 01F1 0A4D A      KEY:      .WORD     PKEY
390 ;
391 01F2 893F A      HEAD      ORD,9,LONG,'?'/256
392 01F3 5445 A      .WORD     'TE','RM','IN','AL'+ODD,KEY-3
      01F4 524D A
      01F5 494E A
      01F6 41CC A
      01F7 01EE A
393 01F8 0A4F A      QTERM:    .WORD     PQTERM
394 ;
395 01F9 8243 A      HEAD      ORD,2,LONG,'C'/256
396 01FA D220 A      .WORD     'R'+EVEN,QTERM-6
      01FB 01F2 A
397 01FC 0A53 A      CR:      .WORD     PCR
398 ;
399 ;*****
400 ;*                MOVE                *
401 ;*****
402 ;
403 ; NOTE THAT THIS WORD MOVES DATA IN 16-BIT UNITS.
404 ;
405 01FD 844D A      HEAD      ORD,4,LONG,'M'/256
406 01FE 4F56 A      .WORD     'OV','E'+EVEN,CR-3
      01FF C520 A
      0200 01F9 A
407 0201 0202 A      MOVE:     .WORD     .+1
408 0202 C300 A      LD        0,0(SP)          ; GET COUNT
409 0203 410A A      BOC      Z,MOVE2          ; IF ZERO
410 0204 6100 A      PUSH     IP              ; SAVE IP
411 0205 5D00 A      RCPY     0,1

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412 0206 CB02 A      LD        X,2(SP)          ; SOURCE ADDRESS
413 0207 C200 A      MOVE1:   LD        0,(X)          ; GET DATA ITEM
414 0208 B301 A      ST        0,@1(SP)        ; STORE AT DEST
415 0209 7A01 A      AISZ     X,1              ; INCREMENT
416 020A 8F01 A      ISZ     1(SP)            ; ADDRESSES
417 020B 79FF A      AISZ     1,-1            ; DECREMENT COUNT
418 020C 19FA A      JMP      MOVE1           ; UNTIL DONE

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419 020D 6500 A          PULL      IP          ; RESTORE IP
420 020E 7B03 A  MOVE2:  AISZ      SP,3        ; POP ARGUMENTS
421 020F 98F8 I          JMP       NEXT
422                      ;
423                      ;*****
424                      ;*                U*, FOR 16 BITS          *
425                      ;*****
426                      ;
427 0210 8255 A          HEAD      ORD,2,LONG,'U'/256
428 0211 AA20 A          .WORD     '*'+EVEN,MOVE-4
      0212 01FD A
429 0213 0214 A  USTAR:  .WORD     .+1
430 0214 6100 A          PUSH      IP          ; SAVE IP
431 0215 C300 A          LD        0,0(SP)      ; GET MULTIPLIER
432 0216 5100 A          LI        1,0          ; CLEAR RESULT
433 0217 5210 A          LI        X,16         ; LOOP COUNT
434 0218 7000 A          CAI       0,0          ; COMPLEMENT MPLR
435 0219 6940 A  LP:    RADD      1,1          ; SHIFT LO INTO CRY
436 021A 7400 A          RADC      0,0          ; ROTATE MPLR LEFT
437 021B 4A02 A          BOC      CSET, TEST    ; TEST FOR ADD
438 021C E701 A          ADD      1,1(SP)      ; ADD IF MPLR BIT=1
439 021D 9105 A          SUBB     0, MINUS1     ; ADD CARRY TO HI
440 021E 7AFF A  TEST:  AISZ      X,-1     ; DECR LOOP COUNT
441 021F 19F9 A          JMP      LP          ; REPEAT UNTIL LIMIT
442 0220 D701 A          ST        1,1(SP)     ; PUT LO-ORDER SECOND
443 0221 6500 A          PULL     IP          ; RESTORE IP
444 0222 98F7 I          JMP      PUT         ; HI-ORDER ON BOTTOM
445 0223 FFFF A  MINUS1: .WORD     -1
446                      ;
447                      ;*****
448                      ;*                U/, FOR 32 BITS          *
449                      ;*****
450                      ;
451 0224 8255 A          HEAD      ORD,2,LONG,'U'/256
452 0225 AF20 A          .WORD     '/'+EVEN,USTAR-3
      0226 0210 A
453 0227 0228 A  USLASH: .WORD     .+1
454 0228 6100 A          PUSH      IP          ; SAVE IP
455 0229 C701 A          LD        1,1(SP)     ; HI-ORDER DIVIDEND
456 022A C302 A          LD        0,2(SP)     ; LO-ORDER DIVIDEND
457 022B CB00 A          LD        X,0(SP)     ; GET DIVISOR
458 022C 7201 A          CAI       X,1          ; SAVE -(DIVISOR) FOR
459 022D DB01 A          ST        X,1(SP)     ; CONVENIENCE
460 022E 5210 A          LI        X,16         ; LOOP COUNT
461 022F 2803 A          SHL      0,1,1        ; SHIFT LO INTO LINK
462 0230 2103 A  POOL:  ROL      1,1,1    ; ROTATE HI WITH LINK
463 0231 2003 A          ROL      0,1,1        ; ROTATE HI INTO QUOT
464 0232 E701 A          ADD      1,1(SP)     ; SUBTR DIVSR FROM HI

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465 0233 9107 A          SUBB     0,MIN1        ; ADD CARRY TO QUOT
466 0234 4301 A          BOC      BIT0, .+2     ; IF QUOT BIT = 0,
467 0235 E700 A          ADD      1,0(SP)     ; ADD DIVISOR BACK

```

```

468 0236 7AFF A      AISZ      X,-1      ; DECREMENT LOOP CNT
469 0237 19F8 A      JMP      POOL      ; REPEAT UNTIL LIMIT
470 0238 D702 A      ST       1,2(SP)   ; REMAINDER SECOND
471 0239 6500 A      PULL     IP        ; RESTORE IP
472 023A 1967 A      JMP      BIN       ; QUOTIENT ON BOTTOM
473 023B FFFF A      MIN1:    .WORD     -1
474                ;
475                ;*****
476                ;*                LOGICALS                *
477                ;*****
478                ;
479 023C 8341 A      HEAD     ORD,3,LONG,'A'/256
480 023D 4EC4 A      .WORD    'ND'+ODD,U SLASH-3
      023E 0224 A
481 023F 0240 A      AND:     .WORD     .+1
482 0240 C301 A      LD       0,1(SP)   ; GET SECOND
483 0241 AB00 A      AND     0,0(SP)   ; AND WITH BOTTOM
484 0242 195F A      JMP      BIN       ; REMOVE ARGS
485                ;
486 0243 824F A      HEAD     ORD,2,LONG,'O'/256
487 0244 D220 A      .WORD    'R'+EVEN,AND-3
      0245 023C A
488 0246 0247 A      OR:     .WORD     .+1
489 0247 C301 A      LD       0,1(SP)   ; GET SECOND
490 0248 A700 A      OR      0,0(SP)   ; OR WITH BOTTOM
491 0249 1958 A      JMP      BIN       ; REMOVE ARGS
492                ;
493 024A 8358 A      HEAD     ORD,3,LONG,'X'/256
494 024B 4FD2 A      .WORD    'OR'+ODD,OR-3
      024C 0243 A
495 024D 024E A      XOR:    .WORD     .+1
496 024E C301 A      LD       0,1(SP)   ; GET SECOND
497 024F CB00 A      LD       X,0(SP)   ; GET BOTTOM
498 0250 5880 A      RXOR    X,0       ; FORM EXCLUSIVE OR
499 0251 1950 A      JMP      BIN       ; REMOVE ARGS
500                ;
501                ;*****
502                ;*                STACK INITIALIZATION                *
503                ;*****
504                ;
505 0252 8353 A      HEAD     ORD,3,LONG,'S'/256
506 0253 50C0 A      .WORD    'P@'+ODD,XOR-3
      0254 024A A
507 0255 0256 A      SPAT:   .WORD     .+1
508 0256 5CC0 A      RCPY    SP,0      ; STACK POINTER
509 0257 98F9 I      JMP      PUSH     ; PUSH ON STACK
510                ;
511 0258 8353 A      HEAD     ORD,3,LONG,'S'/256
512 0259 50A1 A      .WORD    'P!'+ODD,SPAT-3
      025A 0252 A
513 025B 025C A      SPSTOR: .WORD     .+1
514 025C C822 A      LD       X,UP     ; GET USER POINTER

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515 025D CE03 A          LD      SP,3(X)          ; FETCH SPO
516 025E 98F8 I          JMP      NEXT
517                      ;
518 025F 8352 A          HEAD     ORD,3,LONG,'R'/256
519 0260 50A1 A          .WORD   'P!'+ODD,SPSTOR-3
      0261 0258 A
520 0262 0263 A          RPSTOR: .WORD     .+1
521 0263 C822 A          LD      X,UP              ; GET USER POINTER
522 0264 C204 A          LD      0,4(X)           ; FETCH R0
523 0265 D021 A          ST      0,RP             ; SET RETURN POINTER
524 0266 98F8 I          JMP      NEXT
525                      ;
526 0267 823B A          HEAD     ORD,2,LONG,';/256
527 0268 D320 A          .WORD   'S'+EVEN,RPSTOR-3
      0269 025F A
528 026A 026B A          SEMIS:  .WORD     .+1
529 026B A021 A          LD      0,@RP            ; RESTORE
530 026C 5D00 A          RCPY    0,IP             ; OLD IP
531 026D 8C21 A          ISZ     RP               ; POP RETURN STACK
532 026E 98F8 I          JMP      NEXT
533                      ;
534                      ;*****
535                      ;*          RETURN STACK WORDS          *
536                      ;*****
537                      ;
538 026F 854C A          HEAD     ORD,5,LONG,'L'/256
539 0270 4541 A          .WORD   'EA','VE'+ODD,SEMIS-3
      0271 56C5 A
      0272 0267 A
540 0273 0274 A          LEAVE:  .WORD     .+1
541 0274 C821 A          LD      X,RP            ; GET RETURN POINTER
542 0275 C200 A          LD      0,0(X)         ; GET LOOP INDEX
543 0276 D201 A          ST      0,1(X)        ; MAKE LIMIT EQUAL
544 0277 98F8 I          JMP      NEXT
545                      ;
546 0278 823E A          HEAD     ORD,2,LONG,'>'/256
547 0279 D220 A          .WORD   'R'+EVEN,LEAVE-4
      027A 026F A
548 027B 027C A          TOR:    .WORD     .+1
549 027C AC21 A          DSZ     RP              ; EXTEND RETURN STACK
550 027D C300 A          LD      0,(SP)         ; GET DATA ITEM
551 027E B021 A          ST      0,@RP         ; PUT ON RETURN STACK
552 027F 98FA I          JMP     POP            ; POP FROM DATA STACK
553                      ;
554 0280 8252 A          HEAD     ORD,2,LONG,'R'/256
555 0281 BE20 A          .WORD   '>'+EVEN,TOR-3
      0282 0278 A
556 0283 0284 A          FROMR: .WORD     .+1
557 0284 A021 A          LD      0,@RP         ; GET FROM RETURN STK
558 0285 8C21 A          ISZ     RP            ; POP RETURN STACK
559 0286 98F9 I          JMP     PUSH          ; PUSH ON DATA STACK
560                      ;
561 0287 81D2 A          HEAD     ORD,1,SHORT,'R'/256
562 0288 0280 A          .WORD   FROMR-3
563 0289 028A A          R:     .WORD     .+1

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564 028A A021 A          LD      0,@RP          ; GET NONDESTRUCTIVE
565 028B 98F9 I          JMP      PUSH          ; PUSH ON DATA STACK
566                      ;
567                      ;*****
568                      ;*                TESTS AND LOGICALS                *
569                      ;*****
570                      ;
571 028C 8230 A          HEAD    ORD,2,LONG,'0'/256
572 028D BD20 A          .WORD   '='+EVEN,R-2
573 028E 0287 A
573 028F 0290 A  ZEQU:   .WORD   .+1
574 0290 5000 A          LI      0,0          ; RETURN ZERO
575 0291 F300 A          SKNE   0,0(SP)       ; IF DATA NONZERO
576 0292 5001 A          LI      0,1          ; OTHERWISE RETURN 1
577 0293 98F7 I          JMP      PUT
578                      ;
579 0294 8230 A          HEAD    ORD,2,LONG,'0'/256
580 0295 BC20 A          .WORD   '<'+EVEN,ZEQU-3
581 0296 028C A
581 0297 0298 A  ZLESS:  .WORD   .+1
582 0298 5000 A          LI      0,0          ; RETURN ZERO
583 0299 9F00 A          SKG    0,0(SP)       ; IF DATA >= ZERO
584 029A 98F7 I          JMP      PUT
585 029B 5001 A          LI      0,1          ; OTHERWISE RETURN 1
586 029C 98F7 I          JMP      PUT
587                      ;
588                      ;*****
589                      ;*                MATH, BINARY                *
590                      ;*****
591                      ;
592 029D 81AB A          HEAD    ORD,1,SHORT,'+' /256
593 029E 0294 A          .WORD   ZLESS-3
594 029F 02A0 A  PLUS:   .WORD   .+1
595 02A0 C300 A          LD      0,0(SP)       ; ADD BOTTOM TWO
596 02A1 E301 A          ADD    0,1(SP)       ; STACK VALUES
597 02A2 7B01 A  BIN:   AISZ   SP,1     ; REMOVE ONE ARG
598 02A3 98F7 I          JMP      PUT          ; REPL OTHER W/RESULT
599                      ;
600 02A4 8244 A          HEAD    ORD,2,LONG,'D'/256
601 02A5 AB20 A          .WORD   '+'+EVEN,PLUS-2
602 02A6 029D A
602 02A7 02A8 A  DPLUS:  .WORD   .+1
603 02A8 C303 A          LD      0,3(SP)       ; AUGEND LOW-ORDER
604 02A9 E301 A          ADD    0,1(SP)       ; ADDEND LOW-ORDER
605 02AA D303 A          ST      0,3(SP)       ; SUM LOW-ORDER
606 02AB C302 A          LD      0,2(SP)       ; AUGEND HI-ORDER
607 02AC CB00 A          LD      X,0(SP)       ; ADDEND HI-ORDER
608 02AD 7480 A          RADC   X,0          ; ADD WITH CARRY
609 02AE D302 A          ST      0,2(SP)       ; SUM HI-ORDER
610 02AF 98FB I          JMP      POP2
611                      ;
612 02B0 854D A          HEAD    ORD,5,LONG,'M'/256
613 02B1 494E A          .WORD   'IN','US'+ODD,DPLUS-3
614 02B2 55D3 A
615 02B3 02A4 A

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614 02B4 02B5 A MINUS: .WORD .+1
615 02B5 C300 A LD 0,(SP) ; GET STACK VALUE
616 02B6 7001 A CAI 0,1 ; AND FORM 2'S COMP
617 02B7 98F7 I JMP PUT
618 ;
619 02B8 8644 A HEAD ORD,6,LONG,'D'/256
620 02B9 4D49 A .WORD 'MI','NU','S'+EVEN,MINUS-4
    02BA 4E55 A
    02BB D320 A
    02BC 02B0 A
621 02BD 02BE A DMINUS: .WORD .+1
622 02BE 3780 A SFLG CRY ; CLEAR BORROW
623 02BF 5000 A LI 0,0 ; SUBTRACT LO-ORDER
624 02C0 9301 A SUBB 0,1(SP) ; FROM 0
625 02C1 D301 A ST 0,1(SP)
626 02C2 5000 A LI 0,0 ; SUBTRACT HI-ORDER
627 02C3 9300 A SUBB 0,0(SP) ; FROM 0 WITH BORROW
628 02C4 98F7 I JMP PUT
629 ;
630 ;*****
631 ;* STACK MANIPULATION *
632 ;*****
633 ;
634 02C5 844F A HEAD ORD,4,LONG,'O'/256
635 02C6 5645 A .WORD 'VE','R'+EVEN,DMINUS-5
    02C7 D220 A
    02C8 02B8 A
636 02C9 02CA A OVER: .WORD .+1
637 02CA C301 A LD 0,1(SP) ; GET SECOND VALUE
638 02CB 98F9 I JMP PUSH ; PUSH ON STACK
639 ;
640 02CC 8444 A HEAD ORD,4,LONG,'D'/256
641 02CD 524F A .WORD 'RO','P'+EVEN,OVER-4
    02CE D020 A
    02CF 02C5 A
642 02D0 015D A DROP: .WORD POP ; VECTOR DIRECTLY
643 ;
644 02D1 8453 A HEAD ORD,4,LONG,'S'/256
645 02D2 5741 A .WORD 'WA','P'+EVEN,DROP-4
    02D3 D020 A
    02D4 02CC A
646 02D5 02D6 A SWAP: .WORD .+1
647 02D6 C301 A LD 0,1(SP) ; EXCHANGE TOP
648 02D7 CB00 A LD X,0(SP) ; TWO STACK
649 02D8 DB01 A ST X,1(SP) ; VALUES
650 02D9 98F7 I JMP PUT
651 ;
652 02DA 8344 A HEAD ORD,3,LONG,'D'/256
653 02DB 55D0 A .WORD 'UP'+ODD,SWAP-4
    02DC 02D1 A
654 02DD 02DE A DUP: .WORD .+1
655 02DE C300 A LD 0,0(SP) ; GET BOTTOM VALUE
656 02DF 98F9 I JMP PUSH ; PUSH A COPY OF IT
657 ;

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659      ;* MEMORY INCREMENT, COMPLEMENT, ADDRESS CONVERT *
660      ;*****
661      ;
662 02E0 822B A      HEAD      ORD,2,LONG,'+' /256
663 02E1 A120 A      .WORD      '!'+EVEN,DUP-3
        02E2 02DA A
664 02E3 02E4 A      PSTORE: .WORD      .+1
665 02E4 A300 A      LD          0,@(SP)          ; GET VALUE
666 02E5 E301 A      ADD          0,1(SP)          ; ADD INCREMENT
667 02E6 B300 A      ST          0,@(SP)          ; STORE AT ADDRESS
668 02E7 98FB I      JMP          POP2              ; REMOVE BOTH
669      ;
670      ; THE FOLLOWING WORD EXPECTS A BYTE PSEUDO-ADDRESS
671      ;
672 02E8 8654 A      HEAD      ORD,6,LONG,'T' /256
673 02E9 4F47 A      .WORD      'OG','GL','E'+EVEN,PSTORE-3
        02EA 474C A
        02EB C520 A
        02EC 02E0 A
674 02ED 02EE A      TOGGLE: .WORD      .+1
675 02EE CB01 A      LD          X,1(SP)          ; GET BYTE ADDRESS
676 02EF 3800 A      PFLG       LINK           ; CONVERT TO
677 02F0 2603 A      ROR        X,1,1           ; WORD ADDRESS
678 02F1 DB01 A      ST          X,1(SP)          ; SAVE FOR LATER
679 02F2 C200 A      LD          0,(X)           ; GET DATA WORD
680 02F3 CB00 A      LD          X,0(SP)          ; GET BIT PATTERN
681 02F4 4801 A      BOC        LINK,+.2        ; EVEN BYTE ADDRESS
682 02F5 2A10 A      SHL        X,8,0           ; MEANS LEFT BYTE
683 02F6 5880 A      RXOR       X,0             ; COMPL SELECTED BITS
684 02F7 B301 A      ST          0,@1(SP)        ; REPLACE DATA WORD
685 02F8 98FB I      JMP          POP2
686      ;
687      ; THE FOLLOWING WORD CONVERTS A 15-BIT WORD
688      ; ADDRESS TO A 16-BIT BYTE PSEUDO-ADDRESS.
689      ;
690 02F9 8442 A      HEAD      ORD,4,LONG,'B' /256
691 02FA 5954 A      .WORD      'YT','E'+EVEN,TOGGLE-5
        02FB C520 A
        02FC 02E8 A
692 02FD 02FE A      BYTE:     .WORD      .+1
693 02FE C300 A      LD          0,0(SP)          ; GET WORD ADDRESS
694 02FF 6800 A      RADD       0,0             ; MULTIPLY BY 2
695 0300 98F7 I      JMP          PUT
696      ;
697      ; THE FOLLOWING WORD CONVERTS A 16-BIT BYTE
698      ; PSEUDO-ADDRESS TO A 15-BIT WORD ADDRESS.
699      ;
700 0301 8443 A      HEAD      ORD,4,LONG,'C' /256
701 0302 454C A      .WORD      'EL','L'+EVEN,BYTE-4
        0303 CC20 A
        0304 02F9 A
    
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702 0305 0306 A CELL: .WORD .+1
703 0306 C300 A LD 0,0(SP) ; GET BYTE ADDRESS
704 0307 2C02 A SHR 0,1,0 ; DIVIDE BY 2
705 0308 98F7 I JMP PUT

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706 ;
707 ;*****
708 ;* MEMORY FETCH AND STORE *
709 ;*****
710 ;
711 0309 81C0 A HEAD ORD,1,SHORT,'@'/256
712 030A 0301 A .WORD CELL-4
713 030B 030C A AT: .WORD .+1
714 030C A300 A LD 0,@0(SP) ; GET VALUE
715 030D 98F7 I JMP PUT
716 ;
717 ; THE FOLLOWING WORD EXPECTS A BYTE PSEUDO-ADDRESS
718 ;
719 030E 8243 A HEAD ORD,2,LONG,'C'/256
720 030F C020 A .WORD '@'+EVEN,AT-2
721 0311 0312 A CAT: .WORD .+1
722 0312 CB00 A LD X,0(SP) ; GET BYTE ADDRESS
723 0313 3800 A PFLG LINK ; CONVERT TO
724 0314 2603 A ROR X,1,1 ; WORD ADDRESS
725 0315 C200 A LD 0,(X) ; GET DATA WORD
726 0316 4801 A BOC LINK,+.2 ; LINK = 0 MEANS
727 0317 2C10 A SHR 0,8,0 ; LEFT BYTE
728 0318 A901 A AND 0,XFF ; CLEAR UNWANTED BYTE
729 0319 98F7 I JMP PUT
730 031A 00FF A XFF: .WORD 00FF
731 ;
732 031B 81A1 A HEAD ORD,1,SHORT,'!'/256
733 031C 030E A .WORD CAT-3
734 031D 031E A STORE: .WORD .+1
735 031E C301 A LD 0,1(SP) ; GET VALUE
736 031F B300 A ST 0,@0(SP) ; STORE AT ADDRESS
737 0320 98FB I JMP POP2 ; REMOVE BOTH
738 ;
739 ; THE FOLLOWING WORD EXPECTS A BYTE PSEUDO-ADRESSS
740 ;
741 0321 8243 A HEAD ORD,2,LONG,'C'/256
742 0322 A120 A .WORD '!'+EVEN,STORE-2
743 0323 031B A
744 0324 0325 A CSTORE: .WORD .+1
745 0325 6100 A PUSH IP ; SAVE IP
746 0326 CB00 A LD X,0(SP) ; GET BYTE ADDRESS
747 0327 3800 A PFLG LINK ; CONVERT TO
748 0328 2603 A ROR X,1,1 ; WORD ADDRESS
749 0329 C10B A LD 0,X00FF
750 032A C701 A LD 1,1(SP) ; BYTE TO BE
751 032B 5500 A RAND 0,1 ; STORED
752 032C 7000 A CAI 0,0 ; SET UP MASK

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752 032D 4802 A      BOC      LINK, .+3      ; AND CLEAR
753 032E 7000 A      CAI      0,0        ; APPROPRIATE
754 032F 2910 A      SHL      1,8,0     ; HALF OF WORD
755 0330 AA00 A      AND      0,(X)    ; TO STORE INTO
756 0331 6840 A      RADD     1,0      ; ADD IN BYTE
757 0332 D200 A      ST       0,(X)   ; STORE ALTERED WORD
758 0333 6500 A      PULL     IP      ; RESTORE IP

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759 0334 98FB I      JMP      POP2      ; REMOVE ARGUMENTS
760 0335 00FF A      X00FF:  .WORD     00FF
761                      ;
762                      ;*****
763                      ;*                               : ; *
764                      ;*****
765                      ;
766 0336 C1BA A      HEAD     IMM,1,SHORT,':/256
767 0337 0321 A      .WORD     CSTORE-3
768 0338 0342 A      COLON:  .WORD     DOCOL,QEXEC,SCSP,CURR,AT,CONT
      0339 04EF A
      033A 04CC A
      033B 0401 A
      033C 030B A
      033D 03FA A
769 033E 031D A      .WORD     STORE,CREATE,RBRAC,PSCODE
      033F 0779 A
      0340 0533 A
      0341 055E A
770                      ;
771 0342 AC21 A      DOCOL:  DSZ      RP      ; EXTEND RETURN STK
772 0343 5C40 A      RCPY     IP,0     ; SAVE IP ON
773 0344 B021 A      ST       0,@RP   ; RETURN STACK
774 0345 5101 A      LI      IP,1     ; POINT IP TO WORD
775 0346 6980 A      RADD     W,IP    ; AFTER DOCOL
776 0347 98F8 I      JMP      NEXT
777                      ;
778 0348 C1BB A      HEAD     IMM,1,SHORT,':/256
779 0349 0336 A      .WORD     COLON-2
780 034A 0342 A      SEMI:   .WORD     DOCOL,QCSP,COMPIL,SEMIS
      034B 0505 A
      034C 0521 A
      034D 026A A
781 034E 053E A      .WORD     SMUDGE,LBRAC,SEMIS
      034F 052C A
      0350 026A A

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782 ;
783 ;*****
784 ;*          CONSTANT, VARIABLE, USER          *
785 ;*****
786 ;
787 0351 8843 A          HEAD      ORD,8,LONG,'C'/256
788 0352 4F4E A          .WORD    'ON','ST','AN','T'+EVEN,SEMI-2
      0353 5354 A
      0354 414E A
      0355 D420 A
      0356 0348 A
789 0357 0342 A  CON:      .WORD    DOCOL,CREATE,SMUDGE,COMMA,PSCODE
      0358 0779 A
      0359 053E A
      035A 0448 A
      035B 055E A
790 ;
791 035C C201 A  DOCON:  LD      0,1(W)          ; GET PARAMETER
792 035D 98F9 I          JMP      PUSH          ; PUSH ON STACK

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793 ;
794 035E 8856 A          HEAD      ORD,8,LONG,'V'/256
795 035F 4152 A          .WORD    'AR','IA','BL','E'+EVEN,CON-6
      0360 4941 A
      0361 424C A
      0362 C520 A
      0363 0351 A
796 0364 0342 A  VAR:      .WORD    DOCOL,CON,PSCODE
      0365 0357 A
      0366 055E A
797 ;
798 0367 5001 A  DOVAR:  LI      0,1          ; FORM ADDRESS
799 0368 6880 A          RADD     W,0          ; OF PARAMETER
800 0369 98F9 I          JMP      PUSH          ; PUSH ON STACK
801 ;
802 036A 8455 A          HEAD      ORD,4,LONG,'U'/256
803 036B 5345 A          .WORD    'SE','R'+EVEN,VAR-6
      036C D220 A
      036D 035E A
804 036E 0342 A  USER:      .WORD    DOCOL,CON,PSCODE
      036F 0357 A
      0370 055E A
805 ;
806 0371 C201 A  DOUSER: LD      0,1(W)          ; GET OFFSET
807 0372 E022 A          ADD      0,UP          ; ADD USER POINTER
808 0373 98F9 I          JMP      PUSH          ; PUSH ON STACK

```

```

809 ;
810 ;*****
811 ;*           DEFINED CONSTANTS           *
812 ;*****
813 ;
814 0374 81B0 A           HEAD      ORD,1,SHORT,'0'/256
815 0375 036A A           .WORD     USER-4
816 0376 035C A ZERO:    .WORD     DOCON,0
      0377 0000 A
817 ;
818 0378 81B1 A           HEAD      ORD,1,SHORT,'1'/256
819 0379 0374 A           .WORD     ZERO-2
820 037A 035C A ONE:     .WORD     DOCON,1
      037B 0001 A
821 ;
822 037C 81B2 A           HEAD      ORD,1,SHORT,'2'/256
823 037D 0378 A           .WORD     ONE-2
824 037E 035C A TWO:     .WORD     DOCON,2
      037F 0002 A
825 ;
826 0380 81B3 A           HEAD      ORD,1,SHORT,'3'/256
827 0381 037C A           .WORD     TWO-2
828 0382 035C A THREE:   .WORD     DOCON,3
      0383 0003 A
829 ;
830 0384 8242 A           HEAD      ORD,2,LONG,'B'/256
831 0385 CC20 A           .WORD     'L'+EVEN,THREE-2
      0386 0380 A
832 0387 035C A BL:      .WORD     DOCON,' '/256

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      0388 0020 A
833 ;
834 0389 8546 A           HEAD      ORD,5,LONG,'F'/256
835 038A 4952 A           .WORD     'IR','ST'+ODD,BL-3
      038B 53D4 A
      038C 0384 A
836 038D 035C A FIRST:   .WORD     DOCON,BUFFS
      038E 1DF0 A
837 ;
838 038F 854C A           HEAD      ORD,5,LONG,'L'/256
839 0390 494D A           .WORD     'IM','IT'+ODD,FIRST-4
      0391 49D4 A
      0392 0389 A
840 0393 035C A LIMIT:   .WORD     DOCON,TOPMEM
      0394 2000 A
841 ;
842 0395 8542 A           HEAD      ORD,5,LONG,'B'/256
843 0396 2F42 A           .WORD     '/B','UF'+ODD,LIMIT-4
      0397 55C6 A
      0398 038F A
844 0399 035C A BBUF:    .WORD     DOCON,BLKSIZ
      039A 0080 A
845 ;

```



```

846 039B 8542 A          HEAD    ORD,5,LONG,'B'/256
847 039C 2F53 A          .WORD   '/S','CR'+ODD,BBUF-4
      039D 43D2 A
      039E 0395 A
848 039F 035C A    BSCR:   .WORD   DOCON,1024/BLKSIZ
      03A0 0008 A
849                               ;
850                               ;
851                               ;
852                               ;
853 03A1 872B A          HEAD    ORD,7,LONG,'+' /256
854 03A2 4F52 A          .WORD   'OR','IG','IN'+ODD,BSCR-4
      03A3 4947 A
      03A4 49CE A
      03A5 039B A
855 03A6 0342 A    PORIG:   .WORD   DOCOL,LIT,ORIG,PLUS,SEMIS
      03A7 0103 A
      03A8 0010 A
      03A9 029F A
      03AA 026A A
856                               ;
857                               ;*****
858                               ;*                USER VARIABLES                *
859                               ;*****
860                               ;
861 03AB 8253 A          HEAD    ORD,2,LONG,'S'/256
862 03AC B020 A          .WORD   'O'+EVEN,PORIG-5
      03AD 03A1 A
863 03AE 0371 A    SZERO:   .WORD   DOUSER,03
      03AF 0003 A
864                               ;
865 03B0 8252 A          HEAD    ORD,2,LONG,'R'/256

```

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866 03B1 B020 A          .WORD   'O'+EVEN,SZERO-3
      03B2 03AB A
867 03B3 0371 A    RZERO:   .WORD   DOUSER,04
      03B4 0004 A
868                               ;
869 03B5 8354 A          HEAD    ORD,3,LONG,'T'/256
870 03B6 49C2 A          .WORD   'IB'+ODD,RZERO-3
      03B7 03B0 A
871 03B8 0371 A    TIB:    .WORD   DOUSER,05
      03B9 0005 A
872                               ;
873 03BA 8557 A          HEAD    ORD,5,LONG,'W'/256
874
875 03BB 4944 A          .WORD   'ID','TH'+ODD,TIB-3
      03BC 54C8 A
      03BD 03B5 A
876 03BE 0371 A    WIDTH:   .WORD   DOUSER,06
      03BF 0006 A
877                               ;

```

|     |      |      |   |        |       |                                  |
|-----|------|------|---|--------|-------|----------------------------------|
| 878 | 03C0 | 8757 | A |        | HEAD  | ORD,7, LONG, 'W'/256             |
| 879 | 03C1 | 4152 | A |        | .WORD | 'AR', 'NI', 'NG'+ODD, WIDTH-4    |
|     | 03C2 | 4E49 | A |        |       |                                  |
|     | 03C3 | 4EC7 | A |        |       |                                  |
|     | 03C4 | 03BA | A |        |       |                                  |
| 880 | 03C5 | 0371 | A | WARN:  | .WORD | DOUSER,07                        |
|     | 03C6 | 0007 | A |        |       |                                  |
| 881 |      |      |   |        |       |                                  |
|     |      |      |   |        |       |                                  |
| 882 | 03C7 | 8546 | A |        | HEAD  | ORD,5, LONG, 'F'/256             |
| 883 | 03C8 | 454E | A |        | .WORD | 'EN', 'CE'+ODD, WARN-5           |
|     | 03C9 | 43C5 | A |        |       |                                  |
|     | 03CA | 03C0 | A |        |       |                                  |
| 884 | 03CB | 0371 | A | FENCE: | .WORD | DOUSER,08                        |
|     | 03CC | 0008 | A |        |       |                                  |
| 885 |      |      |   |        |       |                                  |
|     |      |      |   |        |       |                                  |
| 886 | 03CD | 8244 | A |        | HEAD  | ORD,2, LONG, 'D'/256             |
| 887 | 03CE | D020 | A |        | .WORD | 'P'+EVEN, FENCE-4                |
|     | 03CF | 03C7 | A |        |       |                                  |
| 888 | 03D0 | 0371 | A | DP:    | .WORD | DOUSER,09                        |
|     | 03D1 | 0009 | A |        |       |                                  |
|     |      |      |   |        |       |                                  |
|     |      |      |   |        |       |                                  |
| 890 | 03D2 | 8856 | A |        | HEAD  | ORD,8, LONG, 'V'/256             |
| 891 | 03D3 | 4F43 | A |        | .WORD | 'OC', '-L', 'IN', 'K'+EVEN, DP-3 |
|     | 03D4 | 2D4C | A |        |       |                                  |
|     | 03D5 | 494E | A |        |       |                                  |
|     | 03D6 | CB20 | A |        |       |                                  |
|     | 03D7 | 03CD | A |        |       |                                  |
| 892 | 03D8 | 0371 | A | VOCL:  | .WORD | DOUSER,0A                        |
|     | 03D9 | 000A | A |        |       |                                  |
| 893 |      |      |   |        |       |                                  |
|     |      |      |   |        |       |                                  |
| 894 | 03DA | 8342 | A |        | HEAD  | ORD,3, LONG, 'B'/256             |
| 895 | 03DB | 4CCB | A |        | .WORD | 'LK'+ODD, VOCL-6                 |
|     | 03DC | 03D2 | A |        |       |                                  |
| 896 | 03DD | 0371 | A | BLK:   | .WORD | DOUSER,0B                        |
|     | 03DE | 000B | A |        |       |                                  |
| 897 |      |      |   |        |       |                                  |

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|     |      |      |   |      |       |                      |
|-----|------|------|---|------|-------|----------------------|
| 898 | 03DF | 8249 | A |      | HEAD  | ORD,2, LONG, 'I'/256 |
| 899 | 03E0 | CE20 | A |      | .WORD | 'N'+EVEN, BLK-3      |
|     | 03E1 | 03DA | A |      |       |                      |
| 900 | 03E2 | 0371 | A | IN:  | .WORD | DOUSER,0C            |
|     | 03E3 | 000C | A |      |       |                      |
| 901 |      |      |   |      |       |                      |
|     |      |      |   |      |       |                      |
| 902 | 03E4 | 834F | A |      | HEAD  | ORD,3, LONG, 'O'/256 |
| 903 | 03E5 | 55D4 | A |      | .WORD | 'UT'+ODD, IN-3       |
|     | 03E6 | 03DF | A |      |       |                      |
| 904 | 03E7 | 0371 | A | OUT: | .WORD | DOUSER,0D            |
|     | 03E8 | 000D | A |      |       |                      |
| 905 |      |      |   |      |       |                      |
|     |      |      |   |      |       |                      |
| 906 | 03E9 | 8353 | A |      | HEAD  | ORD,3, LONG, 'S'/256 |
| 907 | 03EA | 43D2 | A |      | .WORD | 'CR'+ODD, OUT-3      |
|     | 03EB | 03E4 | A |      |       |                      |
| 908 | 03EC | 0371 | A | SCR: | .WORD | DOUSER,0E            |
|     | 03ED | 000E | A |      |       |                      |

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909          ;
910 03EE 864F A          HEAD   ORD,6,LONG,'O'/256
911 03EF 4646 A          .WORD  'FF','SE','T'+EVEN,SCR-3
      03F0 5345 A
      03F1 D420 A
      03F2 03E9 A
912 03F3 0371 A  OFFSET: .WORD  DOUSER,0F
      03F4 000F A
913          ;
914 03F5 8743 A          HEAD   ORD,7,LONG,'C'/256
915 03F6 4F4E A          .WORD  'ON','TE','XT'+ODD,OFFSET-5
      03F7 5445 A
      03F8 58D4 A
      03F9 03EE A
916 03FA 0371 A  CONT:   .WORD  DOUSER,010
      03FB 0010 A
917          ;
918 03FC 8743 A          HEAD   ORD,7,LONG,'C'/256
919 03FD 5552 A          .WORD  'UR','RE','NT'+ODD,CONT-5
      03FE 5245 A
      03FF 4ED4 A
      0400 03F5 A
920 0401 0371 A  CURR:   .WORD  DOUSER,011
      0402 0011 A
921          ;
922 0403 8553 A          HEAD   ORD,5,LONG,'S'/256
923 0404 5441 A          .WORD  'TA','TE'+ODD,CURR-5
      0405 54C5 A
      0406 03FC A
924 0407 0371 A  STATE:  .WORD  DOUSER,012
      0408 0012 A
925          ;
926 0409 8442 A          HEAD   ORD,4,LONG,'B'/256
927 040A 4153 A          .WORD  'AS','E'+EVEN,STATE-4
      040B C520 A
      040C 0403 A
928 040D 0371 A  BASE:   .WORD  DOUSER,013
      040E 0013 A

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```

929          ;
930 040F 8344 A          HEAD   ORD,3,LONG,'D'/256
931 0410 50CC A          .WORD  'PL'+ODD,BASE-4
      0411 0409 A
932 0412 0371 A  DPL:   .WORD  DOUSER,014
      0413 0014 A
933          ;
934 0414 8346 A          HEAD   ORD,3,LONG,'F'/256
935 0415 4CC4 A          .WORD  'LD'+ODD,DPL-3
      0416 040F A
936 0417 0371 A  FLD:   .WORD  DOUSER,015
      0418 0015 A
937          ;

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938 0419 8343 A      HEAD      ORD,3,LONG,'C'/256
939 041A 53D0 A      .WORD      'SP'+ODD,FLD-3
      041B 0414 A
940 041C 0371 A      CSP:      .WORD      DOUSER,016
      041D 0016 A
941                                     ;
942 041E 8252 A      HEAD      ORD,2,LONG,'R'/256
943 041F A320 A      .WORD      ','+EVEN,CSP-3
      0420 0419 A
944 0421 0371 A      RNUM:     .WORD      DOUSER,017
      0422 0017 A
945                                     ;
946 0423 8348 A      HEAD      ORD,3,LONG,'H'/256
947 0424 4CC4 A      .WORD      'LD'+ODD,RNUM-3
      0425 041E A
948 0426 0371 A      HLD:      .WORD      DOUSER,018
      0427 0018 A
949                                     ;
950                                     ;*****
951                                     ;*
952                                     ;*****
953                                     ;
954 0428 8231 A      HEAD      ORD,2,LONG,'1'/256
955 0429 AB20 A      .WORD      '+'EVEN,HLD-3
      042A 0423 A
956 042B 042C A      ONEP:     .WORD      .+1
957 042C 8F00 A      ISZ      0(SP)          ; ADD ONE
958 042D 98F8 I      JMP      NEXT          ; TO BOTTOM
959 042E 98F8 I      JMP      NEXT          ; OF STACK
960                                     ;
961 042F 8232 A      HEAD      ORD,2,LONG,'2'/256
962 0430 AB20 A      .WORD      '+'EVEN,ONEP-3
      0431 0428 A
963 0432 0342 A      TWOP:     .WORD      DOCOL,TWO,PLUS,SEMIS
      0433 037E A
      0434 029F A
      0435 026A A
964                                     ;
965 0436 8448 A      HEAD      ORD,4,LONG,'H'/256
966 0437 4552 A      .WORD      'ER','E'+EVEN,TWOP-3
      0438 C520 A
      0439 042F A

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```

967 043A 0342 A      HERE:     .WORD      DOCOL,DP,AT,SEMIS
      043B 03D0 A
      043C 030B A
      043D 026A A
968                                     ;
969 043E 8541 A      HEAD      ORD,5,LONG,'A'/256
970 043F 4C4C A      .WORD      'LL','OT'+ODD,HERE-4
      0440 4FD4 A
      0441 0436 A

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```

971 0442 0342 A ALLOT: .WORD DOCOL,DP,PSTORE,SEMIS
    0443 03D0 A
    0444 02E3 A
    0445 026A A
972 ;
973 ; : , HERE ! 1 ALLOT ;
974 ;
975 0446 81AC A HEAD ORD,1,SHORT,' '/256
976 0447 043E A .WORD ALLOT-4
977 0448 0342 A COMMA: .WORD DOCOL,HERE,STORE,ONE,ALLOT,SEMIS
    0449 043A A
    044A 031D A
    044B 037A A
    044C 0442 A
    044D 026A A
978 ;
979 044E 81AD A HEAD ORD,1,SHORT,'-' /256
980 044F 0446 A .WORD COMMA-2
981 0450 0451 A SUB: .WORD .+1
982 0451 C301 A LD 0,1(SP) ; GET MINUEND
983 0452 3780 A SFLG CRY ; CLEAR BORROW
984 0453 9300 A SUBB 0,0(SP) ; SUBTRACT SUBTRAHEND
985 0454 98F6 I JMP BIN
986 ;
987 0455 81BD A HEAD ORD,1,SHORT,'=' /256
988 0456 044E A .WORD SUB-2
989 0457 0342 A EQUAL: .WORD DOCOL,SUB,ZEQU,SEMIS
    0458 0450 A
    0459 028F A
    045A 026A A
990 ;
991 045B 81BC A HEAD ORD,1,SHORT,'<' /256
992 045C 0455 A .WORD EQUAL-2
993 045D 0342 A LESS: .WORD DOCOL,SUB,ZLESS,SEMIS
    045E 0450 A
    045F 0297 A
    0460 026A A
994 ;
995 0461 81BE A HEAD ORD,1,SHORT,'>' /256
996 0462 045B A .WORD LESS-2
997 0463 0342 A GREAT: .WORD DOCOL,SWAP,LESS,SEMIS
    0464 02D5 A
    0465 045D A
    0466 026A A
998 ;
999 0467 8352 A HEAD ORD,3,LONG,'R' /256

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```

1000 0468 4FD4 A .WORD 'OT'+ODD,GREAT-2
    0469 0461 A
1001 046A 046B A ROT: .WORD .+1
1002 046B C302 A LD 0,2(SP) ; GET THIRD
1003 046C CB01 A LD X,1(SP) ; MOVE SECOND

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1004 046D DB02 A          ST      X,2(SP)          ; TO THIRD
1005 046E CB00 A          LD      X,0(SP)          ; MOVE BOTTOM
1006 046F DB01 A          ST      X,1(SP)          ; TO SECOND
1007 0470 98F7 I          JMP     PUT              ; PUT THIRD ON BOTTOM
1008
1009 0471 8553 A          ;
1009 0471 8553 A          HEAD     ORD,5,LONG,'S'/256
1010 0472 5041 A          .WORD   'PA','CE'+ODD,ROT-3
1010 0473 43C5 A
1010 0474 0467 A
1011 0475 0342 A          SPACE: .WORD   DOCOL,BL,EMIT,SEMIS
1011 0476 0387 A
1011 0477 01ED A
1011 0478 026A A
1012
1013 0479 842D A          ;
1013 0479 842D A          HEAD     ORD,4,LONG,'-' /256
1014 047A 4455 A          .WORD   'DU','P'+EVEN,SPACE-4
1014 047B D020 A
1014 047C 0471 A
1015 047D 047E A          DDUP:   .WORD   .+1
1016 047E C300 A          LD      0,0(SP)          ; GET BOTTOM OF STACK
1017 047F 4101 A          BOC     Z,+.2
1018 0480 98F9 I          JMP     PUSH            ; DUP IF NOT ZERO
1019 0481 98F8 I          JMP     NEXT
1020
1021
1021 ;*****
1022 ;*          VARIABLE LENGTH NAME SUPPORT          *
1023 ;*****
1024 ;
1025 0482 8854 A          HEAD     ORD,8,LONG,'T'/256
1026 0483 5241 A          .WORD   'RA','VE','RS','E'+EVEN,DDUP-4
1026 0484 5645 A
1026 0485 5253 A
1026 0486 C520 A
1026 0487 0479 A
1027 0488 0342 A          TRAV:   .WORD   DOCOL,SWAP
1027 0489 02D5 A
1028 048A 02C9 A          TRAV1:  .WORD   OVER,PLUS,LIT,007F
1028 048B 029F A
1028 048C 0103 A
1028 048D 007F A
1029 048E 02C9 A          .WORD   OVER,CAT,LESS,ZBRAN
1029 048F 0311 A
1029 0490 045D A
1029 0491 0124 A
1030 0492 FFF8 A          .WORD   TRAV1-. ,SWAP,DROP,SEMIS
1030 0493 02D5 A
1030 0494 02D0 A
1030 0495 026A A
1031
1031 ;
1032 0496 864C A          HEAD     ORD,6,LONG,'L'/256

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```

1033 0497 4154 A          .WORD  'AT','ES','T'+EVEN,TRAV-6
      0498 4553 A
      0499 D420 A
      049A 0482 A
1034 049B 0342 A  LATEST: .WORD  DOCOL,CURR,AT,AT,SEMIS
      049C 0401 A
      049D 030B A
      049E 030B A
      049F 026A A

1035          ;
1036          ; : LFA  2  -  ;
1037          ;
1038 04A0 834C A          HEAD   ORD,3,LONG,'L'/256
1039 04A1 46C1 A          .WORD  'FA'+ODD,LATEST-5
      04A2 0496 A
1040 04A3 0342 A  LFA:    .WORD  DOCOL,TWO,SUB,SEMIS
      04A4 037E A
      04A5 0450 A
      04A6 026A A

1041          ;
1042          ; : CFA  1  -  ;
1043          ;
1044 04A7 8343 A          HEAD   ORD,3,LONG,'C'/256
1045 04A8 46C1 A          .WORD  'FA'+ODD,LFA-3
      04A9 04A0 A
1046 04AA 0342 A  CFA:    .WORD  DOCOL,ONE,SUB,SEMIS
      04AB 037A A
      04AC 0450 A
      04AD 026A A

1047          ;
1048          ; : NFA  2  -  BYTE  -1  TRAVERSE
1049          ; :                               -1  TRAVERSE  CELL  ;
1050          ;
1051 04AE 834E A          HEAD   ORD,3,LONG,'N'/256
1052 04AF 46C1 A          .WORD  'FA'+ODD,CFA-3
      04B0 04A7 A
1053 04B1 0342 A  NFA:    .WORD  DOCOL,TWO,SUB,BYTE,LIT,-1
      04B2 037E A
      04B3 0450 A
      04B4 02FD A
      04B5 0103 A
      04B6 FFFF A
1054 04B7 0488 A          .WORD  TRAV,LIT,-1,TRAV,CELL,SEMIS
      04B8 0103 A
      04B9 FFFF A
      04BA 0488 A
      04BB 0305 A
      04BC 026A A

1055          ;
1056          ; : PFA  BYTE  1  TRAVERSE  CELL  3  +  ;
1057          ;
1058 04BD 8350 A          HEAD   ORD,3,LONG,'P'/256
1059 04BE 46C1 A          .WORD  'FA'+ODD,NFA-3
      04BF 04AE A
1060 04C0 0342 A  PFA:    .WORD  DOCOL,BYTE,ONE,TRAV

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```

    04C1 02FD A
    04C2 037A A
    04C3 0488 A
1061 04C4 0305 A      .WORD    CELL,THREE,PLUS,SEMIS
    04C5 0382 A
    04C6 029F A
    04C7 026A A

1062
1063
1064
1065
1066
1067 04C8 8421 A      HEAD     ORD,4,LONG,'!'/256
1068 04C9 4353 A      .WORD    'CS','P'+EVEN,PFA-3
    04CA D020 A
    04CB 04BD A
1069 04CC 0342 A      SCSP:   .WORD    DOCOL,SPAT,CSP,STORE,SEMIS
    04CD 0255 A
    04CE 041C A
    04CF 031D A
    04D0 026A A

1070
1071 04D1 863F A      HEAD     ORD,6,LONG,'?'/256
1072 04D2 4552 A      .WORD    'ER','RO','R'+EVEN,SCSP-4
    04D3 524F A
    04D4 D220 A
    04D5 04C8 A
1073 04D6 0342 A      QERROR: .WORD    DOCOL,SWAP,ZBRAN
    04D7 02D5 A
    04D8 0124 A
1074 04D9 0004 A      .WORD    QERR1-.,ERROR,BRAN
    04DA 0744 A
    04DB 011B A
1075 04DC 0002 A      .WORD    QERR2-.
1076 04DD 02D0 A      QERR1:  .WORD    DROP
1077 04DE 026A A      QERR2:  .WORD    SEMIS
1078
1079 04DF 853F A      HEAD     ORD,5,LONG,'?'/256
1080 04E0 434F A      .WORD    'CO','MP'+ODD,QERROR-5
    04E1 4DD0 A
    04E2 04D1 A
1081 04E3 0342 A      QCOMP:  .WORD    DOCOL,STATE,AT,ZEQU
    04E4 0407 A
    04E5 030B A
    04E6 028F A
1082 04E7 0103 A      .WORD    LIT,0011,QERROR,SEMIS
    04E8 0011 A
    04E9 04D6 A
    04EA 026A A

1083
1084 04EB 853F A      HEAD     ORD,5,LONG,'?'/256
1085 04EC 4558 A      .WORD    'EX','EC'+ODD,QCOMP-4
    04ED 45C3 A
    04EE 04DF A
1086 04EF 0342 A      QEXEC:  .WORD    DOCOL,STATE,AT

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```

    04F0 0407 A
    04F1 030B A
1087 04F2 0103 A      .WORD    LIT,0012,QERROR,SEMIS
    04F3 0012 A
    04F4 04D6 A
    04F5 026A A
1088
1089 04F6 863F A      ;      HEAD    ORD,6,LONG,'?'/256
1090 04F7 5041 A      .WORD    'PA','IR','S'+EVEN,QEXEC-4
    04F8 4952 A
    04F9 D320 A
    04FA 04EB A
1091 04FB 0342 A      QPAIRS: .WORD    DOCOL,SUB,LIT,0013,QERROR,SEMIS
    04FC 0450 A
    04FD 0103 A
    04FE 0013 A
    04FF 04D6 A
    0500 026A A
1092
1093 0501 843F A      ;      HEAD    ORD,4,LONG,'?'/256
1094 0502 4353 A      .WORD    'CS','P'+EVEN,QPAIRS-5
    0503 D020 A
    0504 04F6 A
1095 0505 0342 A      QCSP:   .WORD    DOCOL,SPAT,CSP,AT,SUB
    0506 0255 A
    0507 041C A
    0508 030B A
    0509 0450 A
1096 050A 0103 A      .WORD    LIT,0014,QERROR,SEMIS
    050B 0014 A
    050C 04D6 A
    050D 026A A
1097
1098 050E 883F A      ;      HEAD    ORD,8,LONG,'?'/256
1099 050F 4C4F A      .WORD    'LO','AD','IN','G'+EVEN,QCSP-4
    0510 4144 A
    0511 494E A
    0512 C720 A
    0513 0501 A
1100 0514 0342 A      QLOAD: .WORD    DOCOL,BLK,AT,ZEQU
    0515 03DD A
    0516 030B A
    0517 028F A
1101 0518 0103 A      .WORD    LIT,0016,QERROR,SEMIS
    0519 0016 A
    051A 04D6 A
    051B 026A A
1102
1103
1104
1105
1106
1107
1108
1109 051C 8743 A      ;
;*****
;*      COMPILER, SMUDGE, HEX, DECIMAL      *
;*****
;
;      : COMPILER ?COMP R> DUP 1+ >R @ , ;
;
    HEAD    ORD,7,LONG,'C'/256

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```

1110 051D 4F4D A          .WORD  'OM','PI','LE'+ODD,QLOAD-6
      051E 5049 A
      051F 4CC5 A
      0520 050E A
1111 0521 0342 A  COMPIL: .WORD  DOCOL,QCOMP,FROMR,DUP
      0522 04E3 A
      0523 0283 A
      0524 02DD A
1112 0525 042B A          .WORD  ONEP,TOR,AT,COMMA,SEMIS
      0526 027B A
      0527 030B A
      0528 0448 A
      0529 026A A
1113                                     ;
1114 052A C1DB A          HEAD    IMM,1,SHORT,[' '/256
1115 052B 051C A          .WORD  COMPIL-5
1116 052C 0342 A  LBRAC:  .WORD  DOCOL,ZERO,STATE,STORE,SEMIS
      052D 0376 A
      052E 0407 A
      052F 031D A
      0530 026A A
1117                                     ;
1118 0531 81DD A          HEAD    ORD,1,SHORT,']'/256
1119 0532 052A A          .WORD  LBRAC-2
1120 0533 0342 A  RBRAC:  .WORD  DOCOL,LIT,00C0
      0534 0103 A
      0535 00C0 A
1121 0536 0407 A          .WORD  STATE,STORE,SEMIS
      0537 031D A
      0538 026A A
1122                                     ;
1123                                     ; : SMUDGE  LATEST  BYTE  20  TOGGLE  ;
1124                                     ;
1125 0539 8653 A          HEAD    ORD,6,LONG,'S'/256
1126 053A 4D55 A          .WORD  'MU','DG','E'+EVEN,RBRAC-2
      053B 4447 A
      053C C520 A
      053D 0531 A
1127 053E 0342 A  SMUDGE: .WORD  DOCOL,LATEST,BYTE
      053F 049B A
      0540 02FD A
1128 0541 0103 A          .WORD  LIT,0020,TOGGLE,SEMIS
      0542 0020 A
      0543 02ED A
      0544 026A A
1129                                     ;
1130 0545 8348 A          HEAD    ORD,3,LONG,'H'/256
1131 0546 45D8 A          .WORD  'EX'+ODD,SMUDGE-5
      0547 0539 A
1132 0548 0342 A  HEX:    .WORD  DOCOL,LIT,0010,BASE,STORE,SEMIS
      0549 0103 A
      054A 0010 A
      054B 040D A
      054C 031D A
      054D 026A A

```

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```

1133 ;
1134 054E 8744 A HEAD ORD,7,LONG,'D'/256
1135 054F 4543 A .WORD 'EC','IM','AL'+ODD,HEX-3
      0550 494D A
      0551 41CC A
      0552 0545 A
1136 0553 0342 A DEC: .WORD DOCOL,LIT,0A,BASE,STORE,SEMIS
      0554 0103 A
      0555 000A A
      0556 040D A
      0557 031D A
      0558 026A A

1137 ;
1138 ;*****
1139 ;* ;CODE *
1140 ;*****
1141 ;
1142 0559 8728 A HEAD ORD,7,LONG,'('/256
1143 055A 3B43 A .WORD ';'C','OD','E'+ODD,DEC-5
      055B 4F44 A
      055C 45A9 A
      055D 054E A
1144 055E 0342 A PSCODE: .WORD DOCOL,FROMR,LATEST
      055F 0283 A
      0560 049B A
1145 0561 04C0 A .WORD PFA,CFA,STORE,SEMIS
      0562 04AA A
      0563 031D A
      0564 026A A

1146 ;
1147 ;
1148 0565 C53B A HEAD IMM,5,LONG,''/256
1149 0566 434F A .WORD 'CO','DE'+ODD,PSCODE-5
      0567 44C5 A
      0568 0559 A
1150 0569 0342 A SEMIC: .WORD DOCOL,QCSP,COMPIL,PSCODE
      056A 0505 A
      056B 0521 A
      056C 055E A
1151 056D 052C A .WORD LBRAC,SMUDGE,SEMIS
      056E 053E A
      056F 026A A

1152 ;
1153 ;*****
1154 ;* <BUILDS, DOES> *
1155 ;*****
1156 ;
1157 0570 873C A HEAD ORD,7,LONG,'<'/256
1158 0571 4255 A .WORD 'BU','IL','DS'+ODD,SEMIC-4
      0572 494C A
      0573 44D3 A
      0574 0565 A
1159 0575 0342 A BUILDS: .WORD DOCOL,ZERO,CON,SEMIS
      0576 0376 A
      0577 0357 A

```

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```

    0578 026A A
1160      ;
1161 0579 8544 A      HEAD      ORD,5,LONG,'D'/256
1162 057A 4F45 A      .WORD      'OE','S'+ODD,BUILDS-5
    057B 53BE A
    057C 0570 A
1163 057D 0342 A      DOES:      .WORD      DOCOL,FROMR,LATEST,PFA,STORE,PSCODE
    057E 0283 A
    057F 049B A
    0580 04C0 A
    0581 031D A
    0582 055E A

1164      ;
1165 0583 AC21 A      DODOES: DSZ      RP      ; EXTEND RETURN STACK
1166 0584 5C40 A      RCPY      IP,0
1167 0585 B021 A      ST      0,@RP      ; PUSH IP
1168 0586 C601 A      LD      1,1(W)      ; LOAD IP FROM PARAM
1169 0587 5002 A      LI      0,2      ; POINT BOTTOM
1170 0588 6880 A      RADD     W,0      ; OF STACK
1171 0589 98F9 I      JMP      PUSH      ; TO PFA+1
1172      ;
1173      ;*****
1174      ;*          TEXT OUTPUTS          *
1175      ;*****
1176      ;
1177      ; : COUNT      BYTE      DUP      1+      SWAP      C@      ;
1178      ;
1179 058A 8543 A      HEAD      ORD,5,LONG,'C'/256
1180 058B 4F55 A      .WORD      'OU','NT'+ODD,DOES-4
    058C 4ED4 A
    058D 0579 A
1181 058E 0342 A      COUNT:      .WORD      DOCOL,BYTE,DUP,ONEP,SWAP,CAT,SEMIS
    058F 02FD A
    0590 02DD A
    0591 042B A
    0592 02D5 A
    0593 0311 A
    0594 026A A

1182      ;
1183 0595 8454 A      HEAD      ORD,4,LONG,'T'/256
1184 0596 5950 A      .WORD      'YP','E'+EVEN,COUNT-4
    0597 C520 A
    0598 058A A
1185 0599 0342 A      TYPE:      .WORD      DOCOL,DDUP,ZBRAN
    059A 047D A
    059B 0124 A
1186 059C 000C A      .WORD      TYPE2-. ,OVER,PLUS,SWAP,XDO
    059D 02C9 A
    059E 029F A
    059F 02D5 A
    05A0 0155 A
1187 05A1 0161 A      TYPE1:      .WORD      I,CAT,EMIT,XLOOP
    05A2 0311 A
    05A3 01ED A
    05A4 012F A

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```

1188 05A5 FFFC A      .WORD  TYPE1-.,BRAN
      05A6 011B A
1189 05A7 0002 A      .WORD  TYPE3-.
1190 05A8 02D0 A      TYPE2: .WORD  DROP
1191 05A9 026A A      TYPE3: .WORD  SEMIS
1192                ;
1193 05AA 892D A      HEAD    ORD,9,LONG,'-' /256
1194 05AB 5452 A      .WORD    'TR','AI','LI','NG'+ODD,TYPE-4
      05AC 4149 A
      05AD 4C49 A
      05AE 4EC7 A
      05AF 0595 A
1195 05B0 0342 A      DTRAIL: .WORD  DOCOL,DUP,ZERO,XDO
      05B1 02DD A
      05B2 0376 A
      05B3 0155 A
1196 05B4 02C9 A      DTRAI:  .WORD  OVER,OVER,PLUS,ONE,SUB
      05B5 02C9 A
      05B6 029F A
      05B7 037A A
      05B8 0450 A
1197 05B9 0311 A      .WORD  CAT,BL,SUB,ZBRAN
      05BA 0387 A
      05BB 0450 A
      05BC 0124 A
1198 05BD 0004 A      .WORD  DTRA2-.,LEAVE,BRAN
      05BE 0273 A
      05BF 011B A
1199 05C0 0003 A      .WORD  DTRA3-.
1200 05C1 037A A      DTRA2: .WORD  ONE,SUB
      05C2 0450 A
1201 05C3 012F A      DTRA3: .WORD  XLOOP
1202 05C4 FFF0 A      .WORD  DTRAI-.,SEMIS
      05C5 026A A
1203                ;
1204                ; : (." ) R COUNT DUP CELL 1+
1205                ; R> + >R TYPE ;
1206                ;
1207 05C6 8428 A      HEAD    ORD,4,LONG,'(' /256
1208 05C7 2E22 A      .WORD    '."',')'+EVEN,DTRAIL-6
      05C8 A920 A
      05C9 05AA A
1209 05CA 0342 A      PDOTQ: .WORD  DOCOL,R,COUNT,DUP,CELL,ONEP
      05CB 0289 A
      05CC 058E A
      05CD 02DD A
      05CE 0305 A
      05CF 042B A
1210 05D0 0283 A      .WORD  FROMR,PLUS,TOR,TYPE,SEMPF
      05D1: 029F A
      05D2 027B A
      05D3 0599 A
      05D4 026A A
1211:                ;
1212                ; : ." 22 STATE @ IF COMPILE (." ) WORD

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```

1213          ;          HERE  BYTE  C@  CELL  1+  ALLOT  ELSE
1214          ;          WORD:  HERE  COUNT  TYPE  ENDIF  ;'
1215          ;          IMMEDIATE
1216          ;
1217 05D5 C22E A          HEAD    IMM,2,LONG,'./256
1218 05D6 A220 A          .WORD   "'+EVEN,PDOTQ-4
      05D7 05C6 A
1219 05D8 0342 A  DOTQ:   .WORD   DOCOL,LIT,'"/256,STATE,AT,ZBRAN
      05D9 0103 A
      05DA 0022 A
      05DB 0407 A
      05DC 030B A
      05DD 0124 A
1220 05DE 000C A          .WORD   DOTQ1-.,COMPIL,PDOTQ,WORD
      05DF 0521 A
      05E0 05CA A
      05E1 06A8 A
1221 05E2 043A A          .WORD   HERE,BYTE,CAT,CELL,ONEP,ALLOT,BRAN
      05E3 02FD A
      05E4 0311 A
      05E5 0305 A
      05E6 042B A
      05E7 0442 A
      05E8 011B A
1222 05E9 0005 A          .WORD   DOTQ2-.
1223 05EA 06A8 A  DOTQ1:  .WORD   WORD,HERE,COUNT,TYPE
      05EB 043A A
      05EC 058E A
      05ED 0599 A
1224 05EE 026A A  DOTQ2:  .WORD   SEMIS
1225          ;
1226          .LIST   PART=2
      05ED 0599 A
1224 05EE 026A A  DOTQ2:  .WORD   SEMIS
1225          ;
1226          024 05EE 026A A  DOTQ2:  .WORD   SEMIS
1225          ;
1226          PACE ASSEMBLER REV-A 05/23/75
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```

1227 ;
1228 ;*****
1229 ;*          TERMINAL INPUT
1230 ;*****
1231 ;
1232 ;   : EXPECT   OVER + OVER DO KEY DUP
1233 ;           07 +ORIGIN @ = IF DROP 08
1234 ;           OVER I = DUP R> 2 - + >R -
1235 ;           ELSE DUP 0D =
1236 ;           IF LEAVE DROP BL 0 ELSE DUP
1237 ;           ENDIF I C! 0 I 1+ C!
1238 ;           ENDIF EMIT LOOP DROP ;
1239 ;
1240 05EF 8645 A           HEAD   ORD,6,LONG,'E'/256
1241 05F0 5850 A           .WORD  'XP','EC','T'+EVEN,DOTQ-3
      05F1 4543 A
      05F2 D420 A
      05F3 05D5 A
1242 05F4 0342 A   EXPECT: .WORD  DOCOL,OVER,PLUS,OVER,XDO
      05F5 02C9 A
      05F6 029F A
      05F7 02C9 A
      05F8 0155 A
1243 05F9 01F1 A   EXPEC1: .WORD  KEY,DUP,LIT,07,PORIG,AT,EQUAL,ZBRAN
      05FA 02DD A
      05FB 0103 A
      05FC 0007 A
      05FD 03A6 A
      05FE 030B A
      05FF 0457 A
      0600 0124 A
1244 0601 0010 A           .WORD  EXPEC2-.,DROP,LIT,08,OVER,I,EQUAL
      0602 02D0 A
      0603 0103 A
      0604 0008 A
      0605 02C9 A
      0606 0161 A
      0607 0457 A
1245 0608 02DD A           .WORD  DUP,FROMR,TWO,SUB,PLUS,TOR,SUB,BRAN
      0609 0283 A
      060A 037E A
      060B 0450 A
      060C 029F A
      060D 027B A
      060E 0450 A

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```

    060F 011B A
1246 0610 0014 A      .WORD      EXPECT5-.
1247 0611 02DD A      EXPECT2: .WORD      DUP,LIT,OD,EQUAL,ZBRAN
    0612 0103 A
    0613 000D A
    0614 0457 A
    0615 0124 A
1248 0616 0007 A      .WORD      EXPECT3-.,LEAVE,DROP,BL,ZERO,BRAN
    0617 0273 A
    0618 02D0 A
    0619 0387 A
    061A 0376 A
    061B 011B A
1249 061C 0002 A      .WORD      EXPECT4-.
1250 061D 02DD A      EXPECT3: .WORD      DUP
1251 061E 0161 A      EXPECT4: .WORD      I,CSTORE,ZERO,I,ONEP,CSTORE
    061F 0324 A
    0620 0376 A
    0621 0161 A
    0622 042B A
    0623 0324 A
1252 0624 01ED A      EXPECT5: .WORD      EMIT,XLOOP
    0625 012F A
1253 0626 FFD3 A      .WORD      EXPECT1-.,DROP,SEMIS
    0627 02D0 A
    0628 026A A
1254                ;
1255                ; : QUERY TIB @ BYTE 50 EXPECT 0 IN ! ;
1256                ;
1257 0629 8551 A      HEAD      ORD,5,LONG,'Q'/256
1258 062A 5545 A      .WORD      'UE','RY'+ODD,EXPECT-5
    062B 52D9 A
    062C 05EF A
1259 062D 0342 A      QUERY:  .WORD      DOCOL,TIB,AT,BYTE,LIT,0050
    062E 03B8 A
    062F 030B A
    0630 02FD A
    0631 0103 A
    0632 0050 A
1260 0633 05F4 A      .WORD      EXPECT,ZERO,IN,STORE,SEMIS
    0634 0376 A
    0635 03E2 A
    0636 031D A
    0637 026A A
1261                ;
1262 0638 C180 A      HEAD      IMM,1,SHORT,00      ; NULL
1263 0639 0629 A      .WORD      QUERY-4
1264 063A 0342 A      NULL:    .WORD      DOCOL,BLK,AT,ZBRAN
    063B 03DD A
    063C 030B A
    063D 0124 A
1265 063E 0013 A      .WORD      NULL2-.
1266 063F 037A A      .WORD      ONE,BLK,PSTORE,ZERO,IN,STORE
    0640 03DD A
    0641 02E3 A

```



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```

    0642 0376 A
    0643 03E2 A
    0644 031D A
1267 0645 03DD A      .WORD   BLK,AT,BSCR,MOD,ZEQU,ZBRAN
    0646 030B A
    0647 039F A
    0648 0919 A
    0649 028F A
    064A 0124 A
1268 064B 0004 A      .WORD   NULL1-.,QEXEC,FROMR,DROP
    064C 04EF A
    064D 0283 A
    064E 02D0 A
1269 064F 011B A     NULL1:  .WORD   BRAN
1270 0650 0003 A      .WORD   NULL3-.
1271 0651 0283 A     NULL2:  .WORD   FROMR,DROP
    0652 02D0 A
1272 0653 026A A     NULL3:  .WORD   SEMIS
1273 ;
1274 ;*****
1275 ;*      FILL, ERASE, BLANKS, HOLD, PAD, CMOVE      *
1276 ;*****
1277 ;
1278 ;      NOTE THAT THE NEXT THREE WORDS FILL
1279 ;      16-BIT WORDS, NOT BYTES.
1280 ;
1281 ;      : FILL  SWAP >R OVER ! DUP 1+
1282 ;      R> 1 - MOVE ;
1283 ;
1284 0654 8446 A      HEAD    ORD,4,LONG,'F'/256
1285 0655 494C A      .WORD   'IL','L'+EVEN,NULL-2
    0656 CC20 A
    0657 0638 A
1286 0658 0342 A     FILL:   .WORD   DOCOL,SWAP,TOR,OVER,STORE,DUP
    0659 02D5 A
    065A 027B A
    065B 02C9 A
    065C 031D A
    065D 02DD A
1287 065E 042B A      .WORD   ONEP,FROMR,ONE,SUB,MOVE,SEMIS
    065F 0283 A
    0660 037A A
    0661 0450 A
    0662 0201 A
    0663 026A A
1288 ;
1289 0664 8545 A      HEAD    ORD,5,LONG,'E'/256
1290 0665 5241 A      .WORD   'RA','SE'+ODD,FILL-4
    0666 53C5 A
    0667 0654 A
1291 0668 0342 A     ERASE:  .WORD   DOCOL,ZERO,FILL,SEMIS
    0669 0376 A
    066A 0658 A
    066B 026A A
1292 ;

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1293           ;      : BLANKS      2020  FILL  ;
1294           ;
1295 066C 8642 A           HEAD      ORD,6, LONG, 'B'/256
1296 066D 4C41 A           .WORD    'LA', 'NK', 'S'+EVEN, ERASE-4
           066E 4E4B A
           066F D320 A
           0670 0664 A
1297 0671 0342 A  BLANKS: .WORD    DOCOL, LIT, 02020, FILL, SEMIS
           0672 0103 A
           0673 2020 A
           0674 0658 A
           0675 026A A
1298           ;
1299 0676 8448 A           HEAD      ORD,4, LONG, 'H'/256
1300 0677 4F4C A           .WORD    'OL', 'D'+EVEN, BLANKS-5
           0678 C420 A
           0679 066C A
1301 067A 0342 A  HOLD:   .WORD    DOCOL, LIT, -1, HLD, PSTORE
           067B 0103 A
           067C FFFF A
           067D 0426 A
           067E 02E3 A
1302 067F 0426 A           .WORD    HLD, AT, CSTORE, SEMIS
           0680 030B A
           0681 0324 A
           0682 026A A
1303           ;
1304           ;      NOTE THAT PAD IS A WORD ADDRESS.
1305           ;
1306           ;      : PAD      HERE  22  +  ;
1307           ;
1308 0683 8350 A           HEAD      ORD,3, LONG, 'P'/256
1309 0684 41C4 A           .WORD    'AD'+ODD, HOLD-4
           0685 0676 A
1310 0686 0342 A  PAD:    .WORD    DOCOL, HERE, LIT, 0022, PLUS, SEMIS
           0687 043A A
           0688 0103 A
           0689 0022 A
           068A 029F A
           068B 026A A
1311           ;
1312           ;      : CMOVE    -DUP  IF  OVER  +  SWAP  DO
1313           ;      DUP  C@  I  C!  1+  LOOP
1314           ;      ELSE  DROP  ENDIF  DROP  ;
1315           ;
1316 068C 8543 A           HEAD      ORD,5, LONG, 'C'/256
1317 068D 4D4F A           .WORD    'MO', 'VE'+ODD, PAD-3
           068E 56C5 A
           068F 0683 A
1318 0690 0342 A  CMOVE:  .WORD    DOCOL, DDUP, ZBRAN
           0691 047D A
           0692 0124 A
1319 0693 000E A           .WORD    CMOVE2-., OVER, PLUS, SWAP, XDO
           0694 02C9 A
           0695 029F A

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```

    0696 02D5 A
    0697 0155 A
1320 0698 02DD A  CMOVE1: .WORD  DUP,CAT,I,CSTORE,ONEP,XLOOP
    0699 0311 A
    069A 0161 A
    069B 0324 A
    069C 042B A
    069D 012F A
1321 069E FFFA A          .WORD  CMOVE1-.,BRAN
    069F 011B A
1322 06A0 0002 A          .WORD  CMOVE3-.
1323 06A1 02D0 A  CMOVE2: .WORD  DROP
1324 06A2 02D0 A  CMOVE3: .WORD  DROP,SEMIS
    06A3 026A A
1325 ;
1326 ;*****
1327 ;*                               WORD                               *
1328 ;*****
1329 ;
1330 ;   : WORD  BLK @ IF BLK @ BLOCK ELSE TIB @
1331 ;           ENDIF BYTE IN @ + SWAP ENCLOSE
1332 ;           HERE 11 BLANKS IN +! OVER - >R
1333 ;           R HERE BYTE C! + HERE BYTE 1+
1334 ;           R> CMOVE ;
1335 ;
1336 06A4 8457 A          HEAD  ORD,4,LONG,'W'/256
1337 06A5 4F52 A          .WORD  'OR','D'+EVEN,CMOVE-4
    06A6 C420 A
    06A7 068C A
1338 06A8 0342 A  WORD:   .WORD  DOCOL,BLK,AT,ZBRAN
    06A9 03DD A
    06AA 030B A
    06AB 0124 A
1339 06AC 0006 A          .WORD  WORD1-.,BLK,AT,BLOCK,BRAN
    06AD 03DD A
    06AE 030B A
    06AF 09B6 A
    06B0 011B A
1340 06B1 0003 A          .WORD  WORD2-.
1341 06B2 03B8 A  WORD1:  .WORD  TIB,AT
    06B3 030B A
1342 06B4 02FD A  WORD2:  .WORD  BYTE,IN,AT,PLUS,SWAP,ENCL
    06B5 03E2 A
    06B6 030B A
    06B7 029F A
    06B8 02D5 A
    06B9 01B1 A
1343 06BA 043A A          .WORD  HERE,LIT,17,BLANKS,IN,PSTORE
    06BB 0103 A
    06BC 0011 A
    06BD 0671 A
    06BE 03E2 A
    06BF 02E3 A
1344 06C0 02C9 A          .WORD  OVER,SUB,TOR,R,HERE,BYTE,CSTORE
    06C1 0450 A

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```

    06C2 027B A
    06C3 0289 A
    06C4 043A A
    06C5 02FD A
    06C6 0324 A
1345 06C7 029F A      .WORD    PLUS,HERE,BYTE,ONEP
    06C8 043A A
    06C9 02FD A
    06CA 042B A
1346 06CB 0283 A      .WORD    FROMR,CMOVE,SEMIS
    06CC 0690 A
    06CD 026A A
1347
1348
1349
1350
1351
1352 06CE 8828 A      HEAD    ORD,8,LONG,'(/256
1353 06CF 4E55 A      .WORD    'NU','MB','ER','')+EVEN,WORD-4
    06D0 4D42 A
    06D1 4552 A
    06D2 A920 A
    06D3 06A4 A
1354 06D4 0342 A      PNUMB:  .WORD    DOCOL
1355 06D5 042B A      PNUMB1: .WORD    ONEP,DUP,TOR,CAT,BASE,AT,DIGIT,ZBRAN
    06D6 02DD A
    06D7 027B A
    06D8 0311 A
    06D9 040D A
    06DA 030B A
    06DB 0166 A
    06DC 0124 A
1356 06DD 0016 A      .WORD    PNUMB3-.,SWAP,BASE,AT,USTAR
    06DE 02D5 A
    06DF 040D A
    06E0 030B A
    06E1 0213 A
1357 06E2 02D0 A      .WORD    DROP,ROT,BASE,AT,USTAR
    06E3 046A A
    06E4 040D A
    06E5 030B A
    06E6 0213 A
1358 06E7 02A7 A      .WORD    DPLUS,DPL,AT,ONEP,ZBRAN
    06E8 0412 A
    06E9 030B A
    06EA 042B A
    06EB 0124 A
1359 06EC 0004 A      .WORD    PNUMB2-.,ONE,DPL,PSTORE
    06ED 037A A
    06EE 0412 A
    06EF 02E3 A
1360 06F0 0283 A      PNUMB2: .WORD    FROMR,BRAN
    06F1 011B A
1361 06F2 FFE3 A      .WORD    PNUMB1-.
1362 06F3 0283 A      PNUMB3: .WORD    FROMR,SEMIS

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```

    06F4 026A A
1363      ;
1364      ; : NUMBER  BYTE  0  0  ROT  DUP  1+  C@
1365      ;       2D  =  DUP  >R  +  -1
1366      ;       BEGIN  DPL  !  (NUMBER)  DUP  C@  BL  -
1367      ;       WHILE  DUP  C@  2E  -  0  ?ERROR  0  REPEAT
1368      ;       DROP  R>  IF  DMINUS  ENDIF  ;
1369      ;
1370 06F5 864E A      HEAD      ORD,6,LONG,'N'/256
1371 06F6 554D A      .WORD      'UM','BE','R'+EVEN,PNUMB-6
      06F7 4245 A
      06F8 D220 A
      06F9 06CE A
1372 06FA 0342 A      NUMB:      .WORD      DOCOL,BYTE,ZERO,ZERO
      06FB 02FD A
      06FC 0376 A
      06FD 0376 A
1373 06FE 046A A      .WORD      ROT,DUP,ONEP,CAT,LIT
      06FF 02DD A
      0700 042B A
      0701 0311 A
      0702 0103 A
1374 0703 002D A      .WORD      '-'/256,EQUAL,DUP,TOR,PLUS,LIT,-1
      0704 0457 A
      0705 02DD A
      0706 027B A
      0707 029F A
      0708 0103 A
      0709 FFFF A
1375 070A 0412 A      NUMB1:      .WORD      DPL,STORE,PNUMB,DUP,CAT,BL,SUB,ZBRAN
      070B 031D A
      070C 06D4 A
      070D 02DD A
      070E 0311 A
      070F 0387 A
      0710 0450 A
      0711 0124 A
1376 0712 000B A      .WORD      NUMB2-. ,DUP,CAT,LIT,'.'/256
      0713 02DD A
      0714 0311 A
      0715 0103 A
      0716 002E A
1377 0717 0450 A      .WORD      SUB,ZERO,QERROR,ZERO,BRAN
      0718 0376 A
      0719 04D6 A
      071A 0376 A
      071B 011B A
1378 071C FFEE A      .WORD      NUMB1-.
1379 071D 02DD A      NUMB2:      .WORD      DROP,FROMR,ZBRAN
      071E 0283 A
      071F 0124 A
1380 0720 0002 A      .WORD      NUMB3-. ,DMINUS
      0721 02BD A
1381 0722 026A A      NUMB3:      .WORD      SEMIS
1382      ;

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```

1383 0723 852D A          HEAD    ORD,5,LONG,'-' /256
1384 0724 4649 A          .WORD   'FI','ND'+ODD,NUMB-5
      0725 4EC4 A
      0726 06F5 A
1385 0727 0342 A  DFIND:  .WORD   DOCOL,BL,WORD,HERE,CONT,AT
      0728 0387 A
      0729 06A8 A
      072A 043A A
      072B 03FA A
      072C 030B A
1386 072D 030B A          .WORD   AT,PFIND,DUP,ZEQU,ZBRAN
      072E 017D A
      072F 02DD A
      0730 028F A
      0731 0124 A
1387 0732 0005 A          .WORD   DFIND1-.,DROP,HERE,LATEST,PFIND
      0733 02D0 A
      0734 043A A
      0735 049B A
      0736 017D A
1388 0737 026A A  DFIND1: .WORD   SEMIS
1389                                     ;
1390                                     ;*****
1391                                     ;*          ERROR HANDLER          *
1392                                     ;*****
1393                                     ;
1394                                     .FORM   STRING,8,8
1395                                     ;
1396 0738 8728 A          HEAD    ORD,7,LONG,'(' /256
1397 0739 4142 A          .WORD   'AB','OR','T'+ODD,DFIND-4
      073A 4F52 A
      073B 54A9 A
      073C 0723 A
1398 073D 0342 A  PABORT: .WORD   DOCOL,ABORT,SEMIS
      073E 0874 A
      073F 026A A
1399                                     ;
1400 0740 8545 A          HEAD    ORD,5,LONG,'E' /256
1401 0741 5252 A          .WORD   'RR','OR'+ODD,PABORT-5
      0742 4FD2 A
      0743 0738 A
1402 0744 0342 A  ERROR:  .WORD   DOCOL,WARN,AT,ZLESS,ZBRAN
      0745 03C5 A
      0746 030B A
      0747 0297 A
      0748 0124 A
1403 0749 0002 A          .WORD   ERROR1-.,PABORT
      074A 073D A
1404 074B 043A A  ERROR1: .WORD   HERE,COUNT,TYPE,PDOTQ
      074C 058E A
      074D 0599 A
      074E 05CA A
1405 074F 0420 A          STRING  4,' ' /256
1406 0750 203F A          .ASCII  ' ? '
      0751 2020 A

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```

1407 0752 0A05 A      .WORD  MESS,SPSTOR,IN,AT
      0753 025B A
      0754 03E2 A
      0755 030B A
1408 0756 03DD A      .WORD  BLK,AT,QUIT,SEMIS
      0757 030B A
      0758 085C A
      0759 026A A

1409                      ;
1410                      ;   : ID.  PAD  010  5F5F  FILL  DUP  PFA  LFA
1411                      ;   OVER -  PAD  SWAP  MOVE  PAD  COUNT
1412                      ;   01F  AND  TYPE  SPACE  ;
1413                      ;
1414 075A 8349 A      HEAD   ORD,3,LONG,'I'/256
1415 075B 44AE A      .WORD  'D.'+ODD,ERROR-4
      075C 0740 A
1416 075D 0342 A      IDDOT: .WORD  DOCOL,PAD,LIT,0010,LIT,05F5F
      075E 0686 A
      075F 0103 A
      0760 0010 A
      0761 0103 A
      0762 5F5F A
1417 0763 0658 A      .WORD  FILL,DUP,PFA,LFA,OVER,SUB
      0764 02DD A
      0765 04C0 A
      0766 04A3 A
      0767 02C9 A
      0768 0450 A
1418 0769 0686 A      .WORD  PAD,SWAP,MOVE,PAD,COUNT
      076A 02D5 A
      076B 0201 A
      076C 0686 A
      076D 058E A
1419 076E 0103 A      .WORD  LIT,001F,AND,TYPE,SPACE,SEMIS
      076F 001F A
      0770 023F A
      0771 0599 A
      0772 0475 A
      0773 026A A

1420                      ;
1421                      ; *****
1422                      ; *                CREATE                *
1423                      ; *****
1424                      ;
1425                      ;   : CREATE  SP@  HERE  50  +  <  2  ?ERROR  -FIND
1426                      ;   IF  DROP  NFA  ID.  4  MESSAGE  SPACE
1427                      ;   ENDIF  HERE  DUP  BYTE  DUP  C@
1428                      ;   WIDTH  @  MIN  DUP  CELL  1+  ALLOT
1429                      ;   OVER  A0  TOGGLE  +  80  TOGGLE
1430                      ;   LATEST  ,  CURRENT  @  !
1431                      ;   HERE  1+  ,  ;
1432                      ;
1433 0774 8643 A      HEAD   ORD,6,LONG,'C'/256
1434 0775 5245 A      .WORD  'RE','AT','E'+EVEN,IDDOT-3
      0776 4154 A

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CTIONARY

```

0777 C520 A
0778 075A A
1435 0779 0342 A CREATE: .WORD DOCOL,SPAT,HERE,LIT,0050,PLUS
077A 0255 A
077B 043A A
077C 0103 A
077D 0050 A
077E 029F A
1436 077F 045D A .WORD LESS,TWO,QERROR,DFIND,ZBRAN
0780 037E A
0781 04D6 A
0782 0727 A
0783 0124 A
1437 0784 0008 A .WORD CREAT1-.,DROP,NFA,IDDOT
0785 02D0 A
0786 04B1 A
0787 075D A
1438 0788 0103 A .WORD LIT,4,MESS,SPACE
0789 0004 A
078A 0A05 A
078B 0475 A
1439 078C 043A A CREAT1: .WORD HERE,DUP,BYTE,DUP,CAT,WIDTH,AT
078D 02DD A
078E 02FD A
078F 02DD A
0790 0311 A
0791 03BE A
0792 030B A
1440 0793 08CF A .WORD MIN,DUP,CELL,ONEP,ALLOT,OVER
0794 02DD A
0795 0305 A
0796 042B A
0797 0442 A
0798 02C9 A
1441 0799 0103 A .WORD LIT,00A0,TOGGLE,PLUS,LIT,0080
079A 00A0 A
079B 02ED A
079C 029F A
079D 0103 A
079E 0080 A
1442 079F 02ED A .WORD TOGGLE,LATEST,COMMA,CURR,AT
07A0 049B A
07A1 0448 A
07A2 0401 A
07A3 030B A
1443 07A4 031D A .WORD STORE,HERE,ONEP,COMMA,SEMIS
07A5 043A A
07A6 042B A
07A7 0448 A
07A8 026A A

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1444 ;
1445 ;*****
1446 ;* [COMPILE], LITERAL, DLITERAL *
1447 ;*****
1448 ;

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```

1449 07A9 C95B A      HEAD      IMM,9,LONG,'['/256
1450 07AA 434F A      .WORD      'CO','MP','IL','E']+ODD,CREATE-5
      07AB 4D50 A
      07AC 494C A
      07AD 45DD A
      07AE 0774 A
1451 07AF 0342 A      BCOMP:   .WORD      DOCOL,DFIND,ZEQU,ZERO,QERROR
      07B0 0727 A
      07B1 028F A
      07B2 0376 A
      07B3 04D6 A
1452 07B4 02D0 A      .WORD      DROP,CFA,COMMA,SEMIS
      07B5 04AA A
      07B6 0448 A
      07B7 026A A
1453                                     ;
1454 07B8 C74C A      HEAD      IMM,7,LONG,'L'/256
1455 07B9 4954 A      .WORD      'IT','ER','AL'+ODD,BCOMP-6
      07BA 4552 A
      07BB 41CC A
      07BC 07A9 A
1456 07BD 0342 A      LITER:   .WORD      DOCOL,STATE,AT,ZBRAN
      07BE 0 D7 A
      07BF 030B A
      07C0 0124 A
1457 07C1 0004 A      .WORD      LITER1-.,COMPIL,LIT,COMMA
      07C2 0521 A
      07C3 0103 A
      07C4 0448 A
1458 07C5 026A A      LITER1:  .WORD      SEMIS
1459                                     ;
1460 07C6 C844 A      HEAD      IMM,8,LONG,'D'/256
1461 07C7 4C49 A      .WORD      'LI','TE','RA','L'+EVEN,LITER-5
      07C8 5445 A
      07C9 5241 A
      07CA CC20 A
      07CB 07B8 A
1462 07CC 0342 A      DLITER:  .WORD      DOCOL,STATE,AT,ZBRAN
      07CD 0407 A
      07CE 030B A
      07CF 0124 A
1463 07D0 0004 A      .WORD      DLITER1-.,SWAP,LITER,LITER
      07D1 02D5 A
      07D2 07BD A
      07D3 07BD A
1464 07D4 026A A      DLITER1: .WORD      SEMIS
1465                                     ;
1466                                     ; : ?STACK  SO @ SP@ < 1: ?ERROR
1467                                     ; SP@ HERE 42 + < 7 ?ERROR ;
1468                                     ;
1469 07D5 863F A      HEAD      ORD,6,LONG,'?'/256
1470 07D6 5354 A      .WORD      'ST','AC','K'+EVEN,DLITER-6
      07D7 4143 A
      07D8 CB20 A
      07D9 07C6 A

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```

1471 07DA 0342 A  QSTACK: .WORD  DOCOL,SZERO,AT,SPAT,LESS
      07DB 03AE A
      07DC 030B A
      07DD 0255 A
      07DE 045D A
1472 07DF 037A A          .WORD  ONE,QERROR,SPAT,HERE,LIT,0042
      07E0 04D6 A
      07E1 0255 A
      07E2 043A A
      07E3 0103 A
      07E4 0042 A
1473 07E5 029F A          .WORD  PLUS,LESS,LIT,7,QERROR,SEMIS
      07E6 045D A
      07E7 0103 A
      07E8 0007 A
      07E9 04D6 A
      07EA 026A A

1474 ;
1475 ;*****
1476 ;*                               INTERPRET                               *
1477 ;*****
1478 ;
1479 07EB 8949 A          HEAD  ORD,9,LONG,'I'/256
1480 07EC 4E54 A          .WORD  'NT','ER','PR','ET'+ODD,QSTACK-5
      07ED 4552 A
      07EE 5052 A
      07EF 45D4 A
      07F0 07D5 A
1481 07F1 0342 A  INTER:  .WORD  DOCOL
1482 07F2 0727 A  INTER1: .WORD  DFIND,ZBRAN
      07F3 0124 A
1483 07F4 000F A          .WORD  INTER4-.,STATE,AT,LESS,ZBRAN
      07F5 0407 A
      07F6 030B A
      07F7 045D A
      07F8 0124 A
1484 07F9 0005 A          .WORD  INTER2-.,CFA,COMMA,BRAN
      07FA 04AA A
      07FB 0448 A
      07FC 011B A
1485 07FD 0003 A          .WORD  INTER3-.
1486 07FE 04AA A  INTER2: .WORD  CFA,EXEC
      07FF 0112 A
1487 0800 07DA A  INTER3: .WORD  QSTACK,BRAN
      0801 011B A
1488 0802 000E A          .WORD  INTER7-.
1489 0803 043A A  INTER4: .WORD  HERE,NUMB,DPL,AT,ONEP,ZBRAN
      0804 06FA A
      0805 0412 A
      0806 030B A
      0807 042B A
      0808 0124 A
1490 0809 0004 A          .WORD  INTER5-.,DLITER,BRAN
      080A 07CC A
      080B 011B A

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1491 080C 0003 A      .WORD    INTER6-.
1492 080D 02D0 A      INTER5: .WORD    DROP,LITER
      080E 07BD A
1493 080F 07DA A      INTER6: .WORD    QSTACK
1494 0810 011B A      INTER7: .WORD    BRAN
1495 0811 FFE1 A      .WORD    INTER1-.,SEMIS
      0812 026A A
1496                      ;
1497                      ;*****
1498                      ;* IMMEDIATE, VOCABULARY, DEFINITIONS, FORTH, ( *
1499                      ;*****
1500                      ;
1501                      ; : IMMEDIATE LATEST BYTE 40 TOGGLE ;
1502                      ;
1503 0813 8949 A      HEAD    ORD,9,LONG,'I'/256
1504 0814 4D4D A      .WORD    'MM','ED','IA','TE'+ODD,INTER-6
      0815 4544 A
      0816 4941 A
      0817 54C5 A
      0818 07EB A
1505 0819 0342 A      IMMED:  .WORD    DOCOL,LATEST,BYTE
      081A 049B A
      081B 02FD A
1506 081C 0103 A      .WORD    LIT,0040,TOGGLE,SEMIS
      081D 0040 A
      081E 02ED A
      081F 026A A
1507                      ;
1508                      ; : VOCABULARY <BUILDS 81A0 , CURRENT @
1509                      ; CFA , HERE VOC-LINK @ , VOC-LINK !
1510                      ; DOES> 1+ CONTEXT ! ;
1511                      ;
1512 0820 8A56 A      HEAD    ORD,10,LONG,'V'/256
1513 0821 4F43 A      .WORD    'OC','AB','UL','AR','Y'+EVEN,IMMED-6
      0822 4142 A
      0823 554C A
      0824 4152 A
      0825 D920 A
      0826 0813 A
1514 0827 0342 A      VOCAB:  .WORD    DOCOL,BUILDS,LIT,081A0,COMMA
      0828 0575 A
      0829 0103 A
      082A 81A0 A
      082B 04 48 A
1515 082C 0401 A      .WORD    CURR,AT,CFA,COMMA,HERE,VOCL
      082D 030B A
      082E 04AA A
      082F 0448 A
      0830 043A A
      0831 03D8 A
1516 0832 030B A      .WORD    AT,COMMA,VOCL,STORE,DOES
      0833 0448 A
      0834 03D8 A
      0835 031D A
      0836 057D A

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1517 0837 042B A DOVOC: .WORD ONEP,CONT,STORE,SEMIS
      0838 03FA A
      0839 031D A
      083A 026A A
1518 ;
1519 083B C546 A HEAD IMM,5,LONG,'F'/256
1520 083C 4F52 A .WORD 'OR','TH'+ODD,VOCAB-7
      083D 54C8 A
      083E 0820 A
1521 083F 0583 A FORTH: .WORD DODOES,DOVOC,081A0,TASK-4,0
      0840 0837 A
      0841 81A0 A
      0842 0C65 A
      0843 0000 A
1522 ;
1523 0844 8B44 A HEAD ORD,11,LONG,'D'/256
1524 0845 4546 A .WORD 'EF','IN','IT','IO','NS'+ODD,FORTH-4
      0846 494E A
      0847 4954 A
      0848 494F A
      0849 4ED3 A
      084A 083B A
1525 084B 0342 A DEFIN: .WORD DOCOL,CONT,AT,CURR,STORE,SEMIS
      084C 03FA A
      084D 030B A
      084E 0401 A
      084F 031D A
      0850 026A A
1526 ;
1527 0851 C1A8 A HEAD IMM,1,SHORT,'('/256
1528 0852 0844 A .WORD DEFIN-7
1529 0853 0342 A PAREN: .WORD DOCOL,LIT,')'/256,WORD,SEMIS
      0854 0103 A
      0855 0029 A
      0856 06A8 A
      0857 026A A
1530 ;
1531 ;*****
1532 ;* QUIT, ABORT *
1533 ;*****
1534 ;
1535 0858 8451 A HEAD ORD,4,LONG,'Q'/256
1536 0859 5549 A .WORD 'UI','T'+EVEN,PAREN-2
      085A D420 A
      085B 0851 A
1537 085C 0342 A QUIT: .WORD DOCOL,ZERO,BLK,STORE,LBRAC
      085D 0376 A
      085E 03DD A
      085F 031D A
      0860 052C A
1538 0861 0262 A QUIT1: .WORD RPSTOR,CR,QUERY,INTER
      0862 01FC A
      0863 062D A
      0864 07F1 A
1539 0865 0407 A .WORD STATE,AT,ZEQU,ZBRAN

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    0866 030B A
    0867 028F A
    0868 0124 A
1540 0869 0004 A      .WORD    QUIT2-.,PDOTQ
    086A 05CA A
1541 086B 0320 A      STRING   3,' '/256
1542 086C 4F4B A      .ASCII  'OK'
1543 086D 011B A      QUIT2:  .WORD    BRAN
1544 086E FFF3 A      .WORD    QUIT1-.,SEMIS
    086F 026A A

1545 ;
1546 ; : ABORT  SP!  DECIMAL  DRO  CR
1547 ;      ." PACE FORTH  V 4.0"  [COMPILE]
1548 ;      FORTH  DEFINITIONS  QUIT  ;
1549 ;

1550 0870 8541 A      HEAD     ORD,5,LONG,'A'/256
1551 0871 424F A      .WORD    'BO','RT'+ODD,QUIT-4
    0872 52D4 A
    0873 0858 A
1552 0874 0342 A      ABORT:  .WORD    DOCOL,SPSTOR,DEC,DRONE,CR,PDOTQ
    0875 025B A
    0876 0553 A
    0877 097F A
    0878 01FC A
    0879 05CA A
1553 087A 1150 A      STRING   17,'P'/256
1554 087B 4143 A      .ASCII  'ACE FORTH  V 4.0'
    087C 4520 A
    087D 464F A
    087E 5254 A
    087F 4820 A
    0880 2056 A
    0881 2034 A
    0882 2E30 A
1555 0883 083F A      .WORD    FORTH,DEFIN,QUIT,SEMIS
    0884 084B A
    0885 085C A
    0886 026A A

1556 ;
1557 ; *****
1558 ; *                COLD START                *
1559 ; *****
1560 ;

1561 0887 8443 A      HEAD     ORD,4,LONG,'C'/256
1562 0888 4F4C A      .WORD    'OL','D'+EVEN,ABORT-4
    0889 C420 A
    088A 0870 A
1563 088B 088C A      COLD:  .WORD    .+1
1564 088C 1423 A      CENT:  JSR     INIT                ; (INSTALL. DEPEND.)
1565 088D C912 A      LD     X,ORGPTR                ; PTR TO STARTUP LITS
1566 088E C206 A      LD     0,06(X)                ; INITIALIZE
1567 088F D1B2 A      ST     0,FORTH+3                ; FORTH VOCABULARY
1568 0890 5108 A      LI     1,08                    ; INIT 8 USER VARS
1569 0891 1902 A      JMP    LDUP
1570 0892 5105 A      WENT:  LI     1,05                ; INIT 5 USER VARS

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1571 0893 C90C A      LD      X,ORGPTR      ; PTR TO STARTUP LITS
1572 0894 CE08 A LDUP: LD      Y,08(X)      ; INITIALIZE
1573 0895 DC22 A      ST      Y,UP          ; USER POINTER
1574 0896 C209 A LDUVS: LD      0,09(X)     ; MOVE FROM LITERAL
1575 0897 D303 A      ST      0,03(Y)     ; AREA TO USER AREA
1576 0898 7A01 A      AISZ     X,1
1577 0899 7B01 A      AISZ     Y,1
1578 089A 79FF A      AISZ     1,-1
1579 089B 19FA A      JMP      LDUVS
1580 089C C502 A      LD      IP,IPO      ; POINT IP TO ABORT
1581 089D 9900 A      JMP      @START    ; START AT RP!
1582 089E 0263 A START: .WORD    RPSTOR+1
1583 089F 0875 A IPO:   .WORD    ABORT+1
1584 08A0 0010 A ORGPTR: .WORD    ORIG          ; START OF LITERALS
1585 ;
1586 ;*****
1587 ;*          MATH UTILITY          *
1588 ;*****
1589 ;
1590 08A1 8453 A      HEAD     ORD,4,LONG,'S'/256
1591 08A2 2D3E A      .WORD    '->','D'+EVEN,COLD-4
      08A3 C420 A
      08A4 0887 A
1592 08A5 08A6 A STOD:  .WORD    .+1
1593 08A6 5000 A      LI      0,0
1594 08A7 9F00 A      SKG     0,0(SP)
1595 08A8 98F9 I      JMP      PUSH
1596 08A9 50FF A      LI      0,-1
1597 08AA 98F9 I      JMP      PUSH
1598 ;
1599 08AB 822B A      HEAD     ORD,2,LONG,'+' /256
1600 08AC AD20 A      .WORD    '-'+EVEN,STOD-4
      08AD 08A1 A
1601 08AE 0342 A PMI:   .WORD    DOCOL,ZLESS,ZBRAN
      08AF 0297 A
      08B0 0124 A
1602 08B1 0002 A      .WORD    PMI1-.,MINUS
      08B2 02B4 A
1603 08B3 026A A PMI1:  .WORD    SEMIS
1604 ;
1605 08B4 8344 A      HEAD     ORD,3,LONG,'D'/256
1606 08B5 2BAD A      .WORD    '+-'+ODD,PMI-3
      08B6 08AB A
1607 08B7 0342 A DPMI:  .WORD    DOCOL,ZLESS,ZBRAN
      08B8 0297 A
      08B9 0124 A
1608 08BA 0002 A      .WORD    DPMI1-.,DMINUS
      08BB 02BD A
1609 08BC 026A A DPMI1: .WORD    SEMIS
1610 ;
1611 08BD 8341 A      HEAD     ORD,3,LONG,'A'/256
1612 08BE 42D3 A      .WORD    'BS'+ODD,DPMI-3
      08BF 08B4 A
1613 08C0 0342 A ABS:   .WORD    DOCOL,DUP,PMI,SEMIS
      08C1 02DD A

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    08C2 08AE A
    08C3 026A A
1614      ;
1615 08C4 8444 A      HEAD      ORD,4,LONG,'D'/256
1616 08C5 4142 A      .WORD      'AB','S'+EVEN,ABS-3
    08C6 D320 A
    08C7 08BD A
1617 08C8 0342 A      DABS:      .WORD      DOCOL,DUP,DPMI,SEMIS
    08C9 02DD A
    08CA 08B7 A
    08CB 026A A
1618      ;
1619 08CC 834D A      HEAD      ORD,3,LONG,'M'/256
1620 08CD 49CE A      .WORD      'IN'+ODD,DABS-4
    08CE 08C4 A
1621 08CF 08D0 A      MIN:      .WORD      .+1
1622 08D0 C300 A      LD        0,0(SP)          ; GET BOTTOM
1623 08D1 9F01 A      SKG       0,1(SP)          ; COMPARE WITH SECOND
1624 08D2 98F6 I      JMP       BIN              ; IF BOTTOM <= SECOND
1625 08D3 98FA I      JMP       POP              ; IF BOTTOM > SECOND
1626      ;
1627 08D4 834D A      HEAD      ORD,3,LONG,'M'/256
1628 08D5 41D8 A      .WORD      'AX'+ODD,MIN-3
    08D6 08CC A
1629 08D7 08D8 A      MAX:      .WORD      .+1
1630 08D8 C300 A      LD        0,0(SP)          ; GET BOTTOM
1631 08D9 9F01 A      SKG       0,1(SP)          ; COMPARE WITH SECON
1632 08DA 98FA I      JMP       POP              ; IF BOTTOM <= SECOND
1633 08DB 98F6 I      JMP       BIN              ; IF BOTTOM > SECOND
1634      ;
1635      ;*****
1636      ;          SIGNED MATH
1637      ;*****
1638      ;
1639 08DC 824D A      HEAD      ORD,2,LONG,'M'/256
1640 08DD AA20 A      .WORD      '*'+EVEN,MAX-3
    08DE 08D4 A
1641 08DF 0342 A      MSTAR:    .WORD      DOCOL,OVER,OVER,XOR,TOR
    08E0 02C9 A
    08E1 02C9 A
    08E2 024D A
    08E3 027B A
1642 08E4 08C0 A      .WORD      ABS,SWAP,ABS,USTAR
    08E5 02D5 A
    08E6 08C0 A
    08E7 0213 A
1643 08E8 0283 A      .WORD      FROMR,DPMI,SEMIS
    08E9 08B7 A
    08EA 026A A
1644      ;
1645 08EB 824D A      HEAD      ORD,2,LONG,'M'/256
1646 08EC AF20 A      .WORD      '/'+EVEN,MSTAR-3
    08ED 08DC A
1647 08EE 0342 A      MSLASH:  .WORD      DOCOL,OVER,TOR,TOR
    08EF 02C9 A

```

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|      |      |      |   |        |                      |                                    |
|------|------|------|---|--------|----------------------|------------------------------------|
|      | 08F0 | 027B | A |        |                      |                                    |
|      | 08F1 | 027B | A |        |                      |                                    |
| 1648 | 08F2 | 08C8 | A | .WORD  | DABS,R,ABS,USLASH    |                                    |
|      | 08F3 | 0289 | A |        |                      |                                    |
|      | 08F4 | 08C0 | A |        |                      |                                    |
|      | 08F5 | 0227 | A |        |                      |                                    |
| 1649 | 08F6 | 0283 | A | .WORD  | FROMR,R,XOR,PMI,SWAP |                                    |
|      | 08F7 | 0289 | A |        |                      |                                    |
|      | 08F8 | 024D | A |        |                      |                                    |
|      | 08F9 | 08AE | A |        |                      |                                    |
|      | 08FA | 02D5 | A |        |                      |                                    |
| 1650 | 08FB | 0283 | A | .WORD  | FROMR,PMI,SWAP,SEMIS |                                    |
|      | 08FC | 08AE | A |        |                      |                                    |
|      | 08FD | 02D5 | A |        |                      |                                    |
|      | 08FE | 026A | A |        |                      |                                    |
| 1651 |      |      |   |        |                      |                                    |
|      |      |      |   |        |                      |                                    |
| 1652 | 08FF | 81AA | A | HEAD   | ORD,1,SHORT,'*/256   |                                    |
| 1653 | 0900 | 08EB | A | .WORD  | MSLASH-3             |                                    |
| 1654 | 0901 | 0342 | A | STAR:  | .WORD                | DOCOL,USTAR,DROP,SEMIS             |
|      | 0902 | 0213 | A |        |                      |                                    |
|      | 0903 | 02D0 | A |        |                      |                                    |
|      | 0904 | 026A | A |        |                      |                                    |
| 1655 |      |      |   |        |                      |                                    |
|      |      |      |   |        |                      |                                    |
| 1656 | 0905 | 842F | A | HEAD   | ORD,4,LONG,'//256    |                                    |
| 1657 | 0906 | 4D4F | A | .WORD  | 'MO','D'+EVEN,STAR-2 |                                    |
|      | 0907 | C420 | A |        |                      |                                    |
|      | 0908 | 08FF | A |        |                      |                                    |
| 1658 | 0909 | 0342 | A | SLMOD: | .WORD                | DOCOL,TOR,STOD,FROMR,MSLASH,SEMIS  |
|      | 090A | 027B | A |        |                      |                                    |
|      | 090B | 08A5 | A |        |                      |                                    |
|      | 090C | 0283 | A |        |                      |                                    |
|      | 090D | 08EE | A |        |                      |                                    |
|      | 090E | 026A | A |        |                      |                                    |
| 1659 |      |      |   |        |                      |                                    |
|      |      |      |   |        |                      |                                    |
| 1660 | 090F | 81AF | A | HEAD   | ORD,1,SHORT,'//256   |                                    |
| 1661 | 0910 | 0905 | A | .WORD  | SLMOD-4              |                                    |
| 1662 | 0911 | 0342 | A | SLASH: | .WORD                | DOCOL,SLMOD,SWAP,DROP,SEMIS        |
|      | 0912 | 0909 | A |        |                      |                                    |
|      | 0913 | 02D5 | A |        |                      |                                    |
|      | 0914 | 02D0 | A |        |                      |                                    |
|      | 0915 | 026A | A |        |                      |                                    |
| 1663 |      |      |   |        |                      |                                    |
|      |      |      |   |        |                      |                                    |
| 1664 | 0916 | 834D | A | HEAD   | ORD,3,LONG,'M'/256   |                                    |
| 1665 | 0917 | 4FC4 | A | .WORD  | 'OD'+ODD,SLASH-2     |                                    |
|      | 0918 | 090F | A |        |                      |                                    |
| 1666 | 0919 | 0342 | A | MOD:   | .WORD                | DOCOL,SLMOD,DROP,SEMIS             |
|      | 091A | 0909 | A |        |                      |                                    |
|      | 091B | 02D0 | A |        |                      |                                    |
|      | 091C | 026A | A |        |                      |                                    |
| 1667 |      |      |   |        |                      |                                    |
|      |      |      |   |        |                      |                                    |
| 1668 | 091D | 852A | A | HEAD   | ORD,5,LONG,'*/256    |                                    |
| 1669 | 091E | 2F4D | A | .WORD  | '/M','OD'+ODD,MOD-3  |                                    |
|      | 091F | 4FC4 | A |        |                      |                                    |
|      | 0920 | 0916 | A |        |                      |                                    |
| 1670 | 0921 | 0342 | A | SSMOD: | .WORD                | DOCOL,TOR,MSTAR,FROMR,MSLASH,SEMIS |



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    0922 027B A
    0923 08DF A
    0924 0283 A
    0925 08EE A
    0926 026A A
1671      ;
1672 0927 822A A      HEAD      ORD,2,LONG,'*' /256
1673 0928 AF20 A      .WORD      '/' +EVEN,SSMOD-4
    0929 091D A
1674 092A 0342 A      SSLASH: .WORD      DOCOL,SSMOD,SWAP,DROP,SEMIS
    092B 0921 A
    092C 02D5 A
    092D 02D0 A
    092E 026A A
1675      ;
1676 092F 854D A      HEAD      ORD,5,LONG,'M' /256
1677 0930 2F4D A      .WORD      '/M','OD'+ODD,SSLASH-3
    0931 4FC4 A
    0932 0927 A
1678 0933 0342 A      MSMOD:  .WORD      DOCOL,TOR,ZERO,R,USLASH,FROMR
    0934 027B A
    0935 0376 A
    0936 0289 A
    0937 0227 A
    0938 0283 A
1679 0939 02D5 A      .WORD      SWAP,TOR,USLASH,FROMR,SEMIS
    093A 027B A
    093B 0227 A
    093C 0283 A
    093D 026A A
1680      ;
1681      ;*****
1682      ;*          DISC UTILITY, GENERAL USE          *
1683      ;*****
1684      ;
1685 093E 8355 A      HEAD      ORD,3,LONG,'U' /256
1686 093F 53C5 A      .WORD      'SE'+ODD,MSMOD-4
    0940 092F A
1687 0941 0367 A      USE:      .WORD      DOVAR,BUFFS
    0942 1DF0 A
1688      ;
1689 0943 8450 A      HEAD      ORD,4,LONG,'P' /256
1690 0944 5245 A      .WORD      'RE','V'+EVEN,USE-3
    0945 D620 A
    0946 093E A
1691 0947 0367 A      PREV:     .WORD      DOVAR,BUFFS
    0948 1DF0 A
1692      ;
1693 0949 842B A      HEAD      ORD,4,LONG,'+' /256
1694 094A 4255 A      .WORD      'BU','F'+EVEN,PREV-4
    094B C620 A
    094C 0943 A
1695 094D 0342 A      PBUF:     .WORD      DOCOL,LIT,BLKSIZ/2+2,PLUS
    094E 0103 A
    094F 0042 A

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|      |      |      |   |               |                               |
|------|------|------|---|---------------|-------------------------------|
| 0950 | 029F | A    |   |               |                               |
| 1696 | 0951 | 02DD | A | .WORD         | DUP,LIMIT,EQUAL,ZBRAN         |
|      | 0952 | 0393 | A |               |                               |
|      | 0953 | 0457 | A |               |                               |
|      | 0954 | 0124 | A |               |                               |
| 1697 | 0955 | 0003 | A | .WORD         | PBUF1-.,DROP,FIRST            |
|      | 0956 | 02D0 | A |               |                               |
|      | 0957 | 038D | A |               |                               |
| 1698 | 0958 | 02DD | A | PBUF1: .WORD  | DUP,PREV,AT,SUB,SEMIS         |
|      | 0959 | 0947 | A |               |                               |
|      | 095A | 030B | A |               |                               |
|      | 095B | 0450 | A |               |                               |
|      | 095C | 026A | A |               |                               |
| 1699 |      |      |   |               |                               |
|      |      |      |   |               |                               |
| 1700 | 095D | 8655 | A | HEAD          | ORD,6,LONG,'U'/256            |
| 1701 | 095E | 5044 | A | .WORD         | 'PD','AT','E'+EVEN,PBUF-4     |
|      | 095F | 4154 | A |               |                               |
|      | 0960 | C520 | A |               |                               |
|      | 0961 | 0949 | A |               |                               |
| 1702 | 0962 | 0342 | A | UPDATE: .WORD | DOCOL,PREV,AT,AT,LIT,08000    |
|      | 0963 | 0947 | A |               |                               |
|      | 0964 | 030B | A |               |                               |
|      | 0965 | 030B | A |               |                               |
|      | 0966 | 0103 | A |               |                               |
|      | 0967 | 8000 | A |               |                               |
| 1703 | 0968 | 0246 | A | .WORD         | OR,PREV,AT,STORE,SEMIS        |
|      | 0969 | 0947 | A |               |                               |
|      | 096A | 030B | A |               |                               |
|      | 096B | 031D | A |               |                               |
|      | 096C | 026A | A |               |                               |
| 1704 |      |      |   |               |                               |
|      |      |      |   |               |                               |
| 1705 | 096D | 8D45 | A | HEAD          | ORD,13,LONG,'E'/256           |
| 1706 | 096E | 4D50 | A | .WORD         | 'MP','TY','-B','UF'           |
|      | 096F | 5459 | A |               |                               |
|      | 0970 | 2D42 | A |               |                               |
|      | 0971 | 5546 | A |               |                               |
| 1707 | 0972 | 4645 | A | .WORD         | 'FE','RS'+ODD,UPDATE-5        |
|      | 0973 | 52D3 | A |               |                               |
|      | 0974 | 095D | A |               |                               |
| 1708 | 0975 | 0342 | A | MTBUF: .WORD  | DOCOL,FIRST,LIMIT             |
|      | 0976 | 038D | A |               |                               |
|      | 0977 | 0393 | A |               |                               |
| 1709 | 0978 | 02C9 | A | .WORD         | OVER,SUB,ERASE,SEMIS          |
|      | 0979 | 0450 | A |               |                               |
|      | 097A | 0668 | A |               |                               |
|      | 097B | 026A | A |               |                               |
| 1710 |      |      |   |               |                               |
|      |      |      |   |               |                               |
| 1711 | 097C | 8344 | A | HEAD          | ORD,3,LONG,'D'/256            |
| 1712 | 097D | 52B1 | A | .WORD         | 'RI'+ODD,MTBUF-8              |
|      | 097E | 096D | A |               |                               |
| 1713 | 097F | 0342 | A | DRONE: .WORD  | DOCOL,ZERO,OFFSET,STORE,SEMIS |
|      | 0980 | 0376 | A |               |                               |
|      | 0981 | 03F3 | A |               |                               |
|      | 0982 | 031D | A |               |                               |
|      | 0983 | 026A | A |               |                               |

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1714          ;
1715 0984 8344 A          HEAD   ORD,3,LONG,'D'/256
1716 0985 52B2 A          .WORD  'R2'+ODD,DRONE-3
      0986 097C A
1717 0987 0342 A  DRTWO:  .WORD  DOCOL,LIT,2000
      0988 0103 A
      0989 07D0 A
1718 098A 03F3 A          .WORD  OFFSET,STORE,SEMIS
      098B 031D A
      098C 026A A

1719          ;
1720          ;*****
1721          ;*                BUFFER                *
1722          ;*****
1723          ;
1724          ; : BUFFER  USE @ DUP >R BEGIN +BUF UNTIL
1725          ;      USE ! R @ 0< IF R 1+ R @ 7FFF
1726          ;                          AND 0 R/W ENDIF
1727          ;      R ! R PREV ! R> 1+ ;
1728          ;
1729 098D 8642 A          HEAD   ORD,6,LONG,'B'/256
1730 098E 5546 A          .WORD  'UF','FE','R'+EVEN,DRTWO-3
      098F 4645 A
      0990 D220 A
      0991 0984 A
1731 0992 0342 A  BUFFER:  .WORD  DOCOL,USE,AT,DUP,TOR
      0993 0941 A
      0994 030B A
      0995 02DD A
      0996 027B A
1732 0997 094D A  BUFF1:  .WORD  PBUF,ZBRAN
      0998 0124 A
1733 0999 FFFE A          .WORD  BUFF1-.,USE,STORE
      099A 0941 A
      099B 031D A
1734 099C 0289 A          .WORD  R,AT,ZLESS,ZBRAN
      099D 030B A
      099E 0297 A
      099F 0124 A
1735 09A0 000A A          .WORD  BUFF2-.,R,ONEP,R,AT
      09A1 0289 A
      09A2 042B A
      09A3 0289 A
      09A4 030B A
1736 09A5 0103 A          .WORD  LIT,07FFF,AND,ZERO,RW
      09A6 7FFF A
      09A7 023F A
      09A8 0376 A
      09A9 0A63 A
1737 09AA 0289 A  BUFF2:  .WORD  R,STORE,R,PREV,STORE
      09AB 031D A
      09AC 0289 A
      09AD 0947 A
      09AE 031D A
1738 09AF 0283 A          .WORD  FROMR,ONEP,SEMIS

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    09B0 042B A
    09B1 026A A
1739
1740
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1743
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1745
1746
1747
1748
1749
1750
1751
1752 09B2 8542 A
1753 09B3 4C4F A
    09B4 43CB A
    09B5 098D A
1754 09B6 0342 A
    09B7 03F3 A
    09B8 030B A
    09B9 029F A
    09BA 027B A
1755 09BB 0947 A
    09BC 030B A
    09BD 02DD A
    09BE 030B A
    09BF 0289 A
1756 09C0 0450 A
    09C1 02DD A
    09C2 029F A
    09C3 0124 A
1757 09C4 001A A
1758 09C5 094D A
    09C6 028F A
    09C7 0124 A
1759 09C8 000A A
    09C9 02D0 A
    09CA 0289 A
    09CB 0992 A
1760 09CC 02DD A
    09CD 0289 A
    09CE 037A A
    09CF 0A63 A
    09D0 037A A
    09D1 0450 A
1761 09D2 02DD A
    09D3 030B A
    09D4 0289 A
    09D5 0450 A
    09D6 02DD A
1762 09D7 029F A
    09D8 028F A
    09D9 0124 A
;
;*****
;*          BLOCK          *
;*****
;
;   : BLOCK   OFFSET @ + >R
;     PREV @ DUP @ R - DUP +
;     IF BEGIN +BUF 0=
;         IF DROP R BUFFER
;             DUP R 1 R/W 1 - ENDIF
;         DUP @ R - DUP + 0= UNTIL
;     DUP PREV ! ENDIF R> DROP 1+ ;
;
HEAD   ORD,5,LONG,'B'/256
.WORD  'LO','CK'+ODD,BUFFER-5
BLOCK: .WORD  DOCOL,OFFSET,AT,PLUS,TOR
.WORD  PREV,AT,DUP,AT,R
.WORD  SUB,DUP,PLUS,ZBRAN
BLOCK1: .WORD  BLOCK3-.
        PBUF,ZEQU,ZBRAN
.WORD  BLOCK2-.,DROP,R,BUFFER
.WORD  DUP,R,ONE,RW,ONE,SUB
BLOCK2: .WORD  DUP,AT,R,SUB,DUP
.WORD  PLUS,ZEQU,ZBRAN

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1763 09DA FFEB A          .WORD  BLOCK1-.,DUP,PREV,STORE
      09DB 02DD A
      09DC 0947 A
      09DD 031D A
1764 09DE 0283 A  BLOCK3: .WORD  FROMR,DROP,ONEP,SEMIS
      09DF 02D0 A
      09E0 042B A
      09E1 026A A

1765 ;
1766 ;*****
1767 ;*          TEXT OUTPUT FORMATTING          *
1768 ;*****
1769 ;
1770 ;      : (LINE)  >R 40 B/BUF */MOD R> B/SCR *
1771 ;          + BLOCK BYTE + 40 ;
1772 ;
1773 09E2 8628 A          HEAD  ORD,6,LONG,' '/256
1774 09E3 4C49 A          .WORD  'LI','NE','')+EVEN,BLOCK-4
      09E4 4E45 A
      09E5 A920 A
      09E6 09B2 A
1775 09E7 0342 A  PLINE:  .WORD  DOCOL,TOR,LIT,64,BBUF,SSMOD
      09E8 027B A
      09E9 0103 A
      09EA 0040 A
      09EB 0399 A
      09EC 0921 A
1776 09ED 0283 A          .WORD  FROMR,BSCR,STAR,PLUS,BLOCK
      09EE 039F A
      09EF 0901 A
      09F0 029F A
      09F1 09B6 A
1777 09F2 02FD A          .WORD  BYTE,PLUS,LIT,64,SEMIS
      09F3 029F A
      09F4 0103 A
      09F5 0040 A
      09F6 026A A

1778 ;
1779 09F7 852E A          HEAD  ORD,5,LONG,' '/256
1780 09F8 4C49 A          .WORD  'LI','NE'+ODD,PLINE-5
      09F9 4EC5 A
      09FA 09E2 A
1781 09FB 0342 A  DLINE:  .WORD  DOCOL,PLINE,DTRAIL,TYPE,SEMIS
      09FC 09E7 A
      09FD 05B0 A
      09FE 0599 A
      09FF 026A A

1782 ;
1783 0A00 874D A          HEAD  ORD,7,LONG,'M'/256
1784 0A01 4553 A          .WORD  'ES','SA','GE'+ODD,DLINE-4
      0A02 5341 A
      0A03 47C5 A
      0A04 09F7 A
1785 0A05 0342 A  MESS:   .WORD  DOCOL,WARN,AT,ZBRAN
      0A06 03C5 A

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    OA07 030B A
    OA08 0124 A
  1786 OA09 000E A      .WORD    MESS2-.,DDUP,ZBRAN
    OA0A 047D A
    OA0B 0124 A
  1787 OA0C 0009 A      .WORD    MESS1-.,LIT,4,OFFSET,AT
    OA0D 0103 A
    OA0E 0004 A
    OA0F 03F3 A
    OA10 030B A
  1788 OA11 039F A      .WORD    BSCR,SLASH,SUB,DLINE
    OA12 0911 A
    OA13 0450 A
    OA14 09FB A
  1789 OA15 011B A      MESS1:   .WORD    BRAN
  1790 OA16 0007 A      .WORD    MESS3-.
  1791 OA17 05CA A      MESS2:   .WORD    PDOTQ
  1792 OA18 064D A      STRING   6,'M'/256
  1793 OA19 5347 A      .ASCII   'SG , '
    OA1A 2023 A
    OA1B 2020 A
  1794 OA1C 0BD5 A      .WORD    DOT
  1795 OA1D 026A A      MESS3:   .WORD    SEMIS
  1796
  1797
  1798
  1799
  1800
  1801 OA1E 844C A      HEAD     ORD,4,LONG,'L'/256
  1802 OA1F 4F41 A      .WORD    'OA','D'+EVEN,MESS-5
    OA20 C420 A
    OA21 0A00 A
  1803 OA22 0342 A      LOAD:    .WORD    DOCOL,BLK,AT,TOR,IN,AT,TOR
    OA23 03DD A
    OA24 030B A
    OA25 027B A
    OA26 03E2 A
    OA27 030B A
    OA28 027B A
  1804 OA29 0376 A      .WORD    ZERO,IN,STORE,BSCR,STAR,BLK,STORE
    OA2A 03E2 A
    OA2B 031D A
    OA2C 039F A
    OA2D 0901 A
    OA2E 03DD A
    OA2F 031D A
  1805 OA30 07F1 A      .WORD    INTER,FROMR,IN,STORE
    OA31 0283 A
    OA32 03E2 A
    OA33 031D A
  1806 OA34 0283 A      .WORD    FROMR,BLK,STORE,SEMIS
    OA35 03DD A
    OA36 031D A
    OA37 026A A
  1807
  ;

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1808 0A38 C32D A          HEAD    IMM,3,LONG,'-/256
1809 0A39 2DBE A          .WORD   '->'+ODD,LOAD-4
      0A3A 0A1E A
1810 0A3B 0342 A  ARROW:  .WORD   DOCOL,QLOAD,ZERO,IN,STORE
      0A3C 0514 A
      0A3D 0376 A
      0A3E 03E2 A
      0A3F 031D A
1811 0A40 039F A          .WORD   BSCR,BLK,AT,OVER,MOD
      0A41 03DD A
      0A42 030B A
      0A43 02C9 A
      0A44 0919 A
1812 0A45 0450 A          .WORD   SUB,BLK,PSTORE,SEMIS
      0A46 03DD A
      0A47 02E3 A
      0A48 026A A

1813 ;
1814 ;*****
1815 ;*          INSTALLATION-DEPENDENT TERMINAL I-O          *
1816 ;*****
1817 ;
1818 0A49 507F A  PEMIT:  LI      0,007F
1819 0A4A AB00 A          AND      0,0(SP)          ; CLEAR PARITY BIT
1820 0A4B 94FC I          JSR     PUTC
1821 0A4C 98FA I          JMP     POP
1822 ;
1823 0A4D 94FD I  PKEY:   JSR     GETC
1824 0A4E 98F9 I          JMP     PUSH
1825 ;
1826 0A4F 5000 A  PQTERM: LI      0,0
1827 0A50 94FE I          JSR     INTST
1828 0A51 5001 A          LI      0,1          ; IF INPUT
1829 0A52 98F9 I          JMP     PUSH
1830 ;
1831 0A53 500D A  PCR:    LI      0,0D
1832 0A54 94FC I          JSR     PUTC
1833 0A55 98F8 I          JMP     NEXT
1834 ;
1835 ;*****
1836 ;*          R/W FOR RAM          *
1837 ;*****
1838 ;
1839 ;   THESE THREE WORDS SIMULATE MASS STORAGE BY
1840 ;   READING FROM AND WRITING TO MAIN MEMORY.
1841 ;   HI AND LO ARE CONSTANTS CONTAINING THE STARTING
1842 ;   ADDRESSES OF THE FIRST AND LAST BLOCKS. EACH
1843 ;   BLOCK CONTAINS B/BUF BYTES PACKED TWO PER WORD.
1844 ;
1845 ;   IF MASS MEMORY IS AVAILABLE, R/W SHOULD BE
1846 ;   REPLACED BY INSTALLATION-SPECIFIC I/O DRIVERS.
1847 ;
1848 0A56 8248 A          HEAD    ORD,2,LONG,'H'/256
1849 0A57 C920 A          .WORD   'I'+EVEN,ARROW-3
      0A58 0A38 A

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1850 0A59 035C A HI: .WORD DOCON,HIBLK
      0A5A 3FC0 A
1851 ;
1852 0A5B 824C A HEAD ORD,2,LONG,'L'/256
1853 0A5C CF20 A .WORD 'O'+EVEN,HI-3
      0A5D 0A56 A
1854 0A5E 035C A LO: .WORD DOCON,LOBLK
      0A5F 2000 A
1855 ;
1856 ; : R/W >R DUP 0< 6 ?ERROR ( BLOCK, < 0 ? )
1857 ; B/BUF CELL * LO + ( FWA OF BLOCK )
1858 ; DUP HI > 6 ?ERROR ( TOO HIGH ? )
1859 ; R> IF SWAP ENDIF ( TO OR FROM ? )
1860 ; B/BUF CELL MOVE ; ( TRANSFER DATA )
1861 ;
1862 0A60 8352 A HEAD ORD,3,LONG,'R'/256
1863 0A61 2FD7 A .WORD '/W'+ODD,LO-3
      0A62 0A5B A
1864 0A63 0342 A RW: .WORD DOCOL,TOR,DUP,ZLESS
      0A64 027B A
      0A65 02DD A
      0A66 0297 A
1865 0A67 0103 A .WORD LIT,6,QERROR,BBUF,CELL
      0A68 0006 A
      0A69 04D6 A
      0A6A 0399 A
      0A6B 0305 A
1866 0A6C 0901 A .WORD STAR,LO,PLUS,DUP,HI,GREAT
      0A6D 0A5E A
      0A6E 029F A
      0A6F 02DD A
      0A70 0A59 A
      0A71 0463 A
1867 0A72 0103 A .WORD LIT,6,QERROR,FROMR,ZBRAN
      0A73 0006 A
      0A74 04D6 A
      0A75 0283 A
      0A76 0124 A
1868 0A77 0002 A .WORD RW1-.,SWAP
      0A78 02D5 A
1869 0A79 0399 A RW1: .WORD BBUF,CELL,MOVE,SEMIS
      0A7A 0305 A
      0A7B 0201 A
      0A7C 026A A
1870 ;
1871 ;*****
1872 ;* ' , FORGET *
1873 ;*****
1874 ;
1875 0A7D C1A7 A HEAD IMM,1,SHORT,'''/256
1876 0A7E 0A60 A .WORD RW-3
1877 0A7F 0342 A TICK: .WORD DOCOL,DFIND,ZEQU,ZERO
      0A80 0727 A
      0A81 028F A
      0A82 0376 A

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1878 0A83 04D6 A      .WORD  QERROR,DROP,LITER,SEMIS
      0A84 02D0 A
      0A85 07BD A
      0A86 026A A

1879 ;
1880 ;*****
1881 ; : FORGET  CURRENT @ CONTEXT @ ( IS VOCAB )
1882 ; - 18 ?ERROR ( NON-AMBIGUOUS ? )
1883 ; [COMPILE] ' NFA ( HD OF WORD TO FORGET )
1884 ; DUP FENCE @ < 15 ?ERROR ( CMP FENCE )
1885 ; >R VOC-LINK @ ( START WITH LATEST VOCAB )
1886 ; BEGIN R OVER < ( FORGET ENTIRE VOCAB? )
1887 ; WHILE [COMPILE] FORTH DEFINITIONS
1888 ; @ DUP VOC-LINK ! ( UNLINK VOCAB )
1889 ; REPEAT
1890 ; BEGIN DUP 2 - ( START AT PHANTOM NAME )
1891 ; BEGIN PFA LFA @ ( HEAD OF WORD )
1892 ; DUP R < ( FORGETTING IT ? )
1893 ; UNTIL
1894 ; OVER 1 - ! ( NEW HEAD OF VOCAB )
1895 ; @ -DUP 0= ( END OF VOCAB LIST ? )
1896 ; UNTIL
1897 ; R> DP ! ; ( NEW DICTIONARY POINTER )
1898 ;

1899 0A87 8646 A      HEAD  ORD,6,LONG,'F'/256
1900 0A88 4F52 A      .WORD  'OR','GE','T'+EVEN,TICK-2
      0A89 4745 A
      0A8A D420 A
      0A8B 0A7D A
1901 0A8C 0342 A      FORGET: .WORD  DOCOL,CURR,AT,CONT,AT
      0A8D 0401 A
      0A8E 030B A
      0A8F 03FA A
      0A90 030B A
1902 0A91 0450 A      .WORD  SUB,LIT,0018,QERROR
      0A92 0103 A
      0A93 0018 A
      0A94 04D6 A
1903 0A95 0A7F A      .WORD  TICK,NFA,DUP,FENCE,AT,LESS
      0A96 04B1 A
      0A97 02DD A
      0A98 03CB A
      0A99 030B A
      0A9A 045D A
1904 0A9B 0103 A      .WORD  LIT,0015,QERROR,TOR,VOCL,AT
      0A9C 0015 A
      0A9D 04D6 A
      0A9E 027B A
      0A9F 03D8 A
      0AA0 030B A
1905 0AA1 0289 A      FORG1: .WORD  R,OVER,LESS,ZBRAN
      0AA2 02C9 A
      0AA3 045D A
      0AA4 0124 A
1906 0AA5 0009 A      .WORD  FORG2-.,FORTH,DEFIN
    
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    0AA6 083F A
    0AA7 084B A
1907 0AA8 030B A      .WORD    AT,DUP,VOCL,STORE,BRAN
    0AA9 02DD A
    0AAA 03D8 A
    0AAB 031D A
    0AAC 011B A
1908 0AAD FFF4 A      .WORD    FORG1-.
1909 0AAE 02DD A      FORG2:  .WORD    DUP,TWO,SUB
    0AAF 037E A
    0AB0 0450 A
1910 0AB1 04C0 A      FORG3:  .WORD    PFA,LFA,AT,DUP,R,LESS,ZBRAN
    0AB2 04A3 A
    0AB3 030B A
    0AB4 02DD A
    0AB5 0289 A
    0AB6 045D A
    0AB7 0124 A
1911 0AB8 FFF9 A      .WORD    FORG3-.,OVER,ONE,SUB,STORE
    0AB9 02C9 A
    0ABA 037A A
    0ABB 0450 A
    0ABC 031D A
1912 0ABD 030B A      .WORD    AT,DDUP,ZEQU,ZBRAN
    0ABE 047D A
    0ABF 028F A
    0AC0 0124 A
1913 0AC1 FFED A      .WORD    FORG2-.,FROMR,DP,STORE,SEMIS
    0AC2 0283 A
    0AC3 03D0 A
    0AC4 031D A
    0AC5 026A A
1914
1915
1916
1917
1918
1919 0AC6 8442 A      HEAD    ORD,4,LONG,'B'/256
1920 0AC7 4143 A      .WORD    'AC','K'+EVEN,FORGET-5
    0AC8 CB20 A
    0AC9 0A87 A
1921 0ACA 0342 A      BACK:  .WORD    DOCOL,HERE,SUB,COMMA,SEMIS
    0ACB 043A A
    0ACC 0450 A
    0ACD 0448 A
    0ACE 026A A
1922
1923 0ACF C542 A      HEAD    IMM,5,LONG,'B'/256
1924 0AD0 4547 A      .WORD    'EG','IN'+ODD,BACK-4
    0AD1 49CE A
    0AD2 0AC6 A
1925 0AD3 0342 A      BEGIN: .WORD    DOCOL,QCOMP,HERE,ONE,SEMIS
    0AD4 04E3 A
    0AD5 043A A
    0AD6 037A A
;
;*****
;*      CO N D I T I O N A L   C O M P I L E R ,   P E R   S H I R A      *
;*****
;

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    OAD7 026A A
1926                                     ;
1927 OAD8 C545 A                       HEAD   IMM,5,LONG,'E'/256
1928 OAD9 4E44 A                       .WORD  'ND','IF'+ODD,BEGIN-4
    OADA 49C6 A
    OADB 0ACF A
1929 OADC 0342 A   ENDIF:  .WORD  DOCOL,QCOMP,TWO,QPAIRS,HERE
    OADD 04E3 A
    OADE 037E A
    OADF 04FB A
    OAE0 043A A
1930 OAE1 02C9 A                       .WORD  OVER,SUB,SWAP,STORE,SEMIS
    OAE2 0450 A
    OAE3 02D5 A
    OAE4 031D A
    OAE5 026A A
1931                                     ;
1932 OAE6 C454 A                       HEAD   IMM,4,LONG,'T'/256
1933 OAE7 4845 A                       .WORD  'HE','N'+EVEN,ENDIF-4
    OAE8 CE20 A
    OAE9 0AD8 A
1934 OAEA 0342 A   THEN:  .WORD  DOCOL,ENDIF,SEMIS
    OAEB 0ADC A
    OAEC 026A A
1935                                     ;
1936 OAED C244 A                       HEAD   IMM,2,LONG,'D'/256
1937 OAEE CF20 A                       .WORD  'O'+EVEN,THEN-4
    OAEF 0AE6 A
1938 OAF0 0342 A   DO:    .WORD  DOCOL,COMPIL,XDO
    OAF1 0521 A
    OAF2 0155 A
1939 OAF3 043A A                       .WORD  HERE,THREE,SEMIS
    OAF4 0382 A
    OAF5 026A A
1940                                     ;
1941 OAF6 C44C A                       HEAD   IMM,4,LONG,'L'/256
1942 OAF7 4F4F A                       .WORD  'OO','P'+EVEN,DO-3
    OAF8 D020 A
    OAF9 0AED A
1943 OAFa 0342 A   LOOP:  .WORD  DOCOL,THREE,QPAIRS,COMPIL
    OAFB 0382 A
    OAFc 04FB A
    OAFD 0521 A
1944 OAFE 012F A                       .WORD  XLOOP,BACK,SEMIS
    OAFF 0ACA A
    OB00 026A A
1945                                     ;
1946 OB01 C52B A                       HEAD   IMM,5,LONG,'+'/256
1947 OB02 4C4F A                       .WORD  'LO','OP'+ODD,LOOP-4
    OB03 4FD0 A
    OB04 0AF6 A
1948 OB05 0342 A   PLOOP: .WORD  DOCOL,THREE,QPAIRS,COMPIL
    OB06 0382 A
    OB07 04FB A
    OB08 0521 A

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|      |             |         |       |                               |
|------|-------------|---------|-------|-------------------------------|
| 1949 | OB09 0140 A |         | .WORD | XPLOOP, BACK, SEMIS           |
|      | OB0A 0ACA A |         |       |                               |
|      | OB0B 026A A |         |       |                               |
| 1950 |             | ;       |       |                               |
| 1951 | OB0C C555 A |         | HEAD  | IMM, 5, LONG, 'U' / 256       |
| 1952 | OB0D 4E54 A |         | .WORD | 'NT', 'IL'+ODD, PLOOP-4       |
|      | OB0E 49CC A |         |       |                               |
|      | OB0F 0B01 A |         |       |                               |
| 1953 | OB10 0342 A | UNTIL:  | .WORD | DOCOL, ONE, QPAIRS, COMPIL    |
|      | OB11 037A A |         |       |                               |
|      | OB12 04FB A |         |       |                               |
|      | OB13 0521 A |         |       |                               |
| 1954 | OB14 0124 A |         | .WORD | ZBRAN, BACK, SEMIS            |
|      | OB15 0ACA A |         |       |                               |
|      | OB16 026A A |         |       |                               |
| 1955 |             | ;       |       |                               |
| 1956 | OB17 C345 A |         | HEAD  | IMM, 3, LONG, 'E' / 256       |
| 1957 | OB18 4EC4 A |         | .WORD | 'ND'+ODD, UNTIL-4             |
|      | OB19 0B0C A |         |       |                               |
| 1958 | OB1A 0342 A | END:    | .WORD | DOCOL, UNTIL, SEMIS           |
|      | OB1B 0B10 A |         |       |                               |
|      | OB1C 026A A |         |       |                               |
| 1959 |             | ;       |       |                               |
| 1960 | OB1D C541 A |         | HEAD  | IMM, 5, LONG, 'A' / 256       |
| 1961 | OB1E 4741 A |         | .WORD | 'GA', 'IN'+ODD, END-3         |
|      | OB1F 49CE A |         |       |                               |
|      | OB20 0B17 A |         |       |                               |
| 1962 | OB21 0342 A | AGAIN:  | .WORD | DOCOL, ONE, QPAIRS, COMPIL    |
|      | OB22 037A A |         |       |                               |
|      | OB23 04FB A |         |       |                               |
|      | OB24 0521 A |         |       |                               |
| 1963 | OB25 011B A |         | .WORD | BRAN, BACK, SEMIS             |
|      | OB26 0ACA A |         |       |                               |
|      | OB27 026A A |         |       |                               |
| 1964 |             | ;       |       |                               |
| 1965 | OB28 C652 A |         | HEAD  | IMM, 6, LONG, 'R' / 256       |
| 1966 | OB29 4550 A |         | .WORD | 'EP', 'EA', 'T'+EVEN, AGAIN-4 |
|      | OB2A 4541 A |         |       |                               |
|      | OB2B D420 A |         |       |                               |
|      | OB2C 0B1D A |         |       |                               |
| 1967 | OB2D 0342 A | REPEAT: | .WORD | DOCOL, TOR, TOR, AGAIN, FROMR |
|      | OB2E 027B A |         |       |                               |
|      | OB2F 027B A |         |       |                               |
|      | OB30 0B21 A |         |       |                               |
|      | OB31 0283 A |         |       |                               |
| 1968 | OB32 0283 A |         | .WORD | FROMR, TWO, SUB, ENDIF, SEMIS |
|      | OB33 037E A |         |       |                               |
|      | OB34 0450 A |         |       |                               |
|      | OB35 0ADC A |         |       |                               |
|      | OB36 026A A |         |       |                               |
| 1969 |             | ;       |       |                               |
| 1970 | OB37 C249 A |         | HEAD  | IMM, 2, LONG, 'I' / 256       |
| 1971 | OB38 C620 A |         | .WORD | 'F'+EVEN, REPEAT-5            |
|      | OB39 0B28 A |         |       |                               |
| 1972 | OB3A 0342 A | IF:     | .WORD | DOCOL, COMPIL, ZBRAN, HERE    |

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    OB3B 0521 A
    OB3C 0124 A
    OB3D 043A A
1973 OB3E 0376 A      .WORD    ZERO,COMMA,TWO,SEMIS
    OB3F 0448 A
    OB40 037E A
    OB41 026A A
1974                                     ;
1975 OB42 C445 A      HEAD      IMM,4,LONG,'E'/256
1976 OB43 4C53 A      .WORD    'LS','E'+EVEN,IF-3
    OB44 C520 A
    OB45 0B37 A
1977 OB46 0342 A      ELSE:    .WORD    DOCOL,TWO,QPAIRS,COMPIL
    OB47 037E A
    OB48 04FB A
    OB49 0521 A
1978 OB4A 011B A      .WORD    BRAN,HERE,ZERO,COMMA
    OB4B 043A A
    OB4C 0376 A
    OB4D 0448 A
1979 OB4E 02D5 A      .WORD    SWAP,TWO,ENDIF,TWO,SEMIS
    OB4F 037E A
    OB50 0ADC A
    OB51 037E A
    OB52 026A A
1980                                     ;
1981 OB53 C557 A      HEAD      IMM,5,LONG,'W'/256
1982 OB54 4849 A      .WORD    'HI','LE'+ODD,ELSE-4
    OB55 4CC5 A
    OB56 0B42 A
1983 OB57 0342 A      WHILE:  .WORD    DOCOL,IF,TWOP,SEMIS
    OB58 0B3A A
    OB59 0432 A
    OB5A 026A A
1984                                     ;
1985                                     ;*****
1986                                     ;*          NUMERIC PRIMITIVES          *
1987                                     ;*****
1988                                     ;
1989 OB5B 8653 A      HEAD      ORD,6,LONG,'S'/256
1990 OB5C 5041 A      .WORD    'PA','CE','S'+EVEN,WHILE-4
    OB5D 4345 A
    OB5E D320 A
    OB5F 0B53 A
1991 OB60 0342 A      SPACES:  .WORD    DOCOL,ZERO,MAX,DDUP,ZBRAN
    OB61 0376 A
    OB62 08D7 A
    OB63 047D A
    OB64 0124 A
1992 OB65 0006 A      .WORD    SPACE2-.,ZERO,XDO
    OB66 0376 A
    OB67 0155 A
1993 OB68 0475 A      SPACE1:  .WORD    SPACE,XLOOP
    OB69 012F A
1994 OB6A FFFE A      .WORD    SPACE1-.

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1995 OB6B 026A A SPACE2: .WORD SEMIS
1996 ;
1997 ; : <, PAD BYTE HLD ! ;
1998 ;
1999 OB6C 823C A HEAD ORD,2,LONG,'<'/256
2000 OB6D A320 A .WORD ','+EVEN,SPACES-5
      OB6E OB5B A
2001 OB6F 0342 A BDIGS: .WORD DOCOL,PAD,BYTE,HLD,STORE,SEMIS
      OB70 0686 A
      OB71 02FD A
      OB72 0426 A
      OB73 031D A
      OB74 026A A

2002 ;
2003 ; : ,> DROP DROP HLD @
2004 ; PAD BYTE OVER + ;
2005 ;
2006 OB75 8223 A HEAD ORD,2,LONG,', '/256
2007 OB76 BE20 A .WORD '>'+EVEN,BDIGS-3
      OB77 OB6C A
2008 OB78 0342 A EDIGS: .WORD DOCOL,DROP,DROP,HLD,AT
      OB79 02D0 A
      OB7A 02D0 A
      OB7B 0426 A
      OB7C 030B A
2009 OB7D 0686 A .WORD PAD,BYTE,OVER,SUB,SEMIS
      OB7E 02FD A
      OB7F 02C9 A
      OB80 0450 A
      OB81 026A A

2010 ;
2011 OB82 8453 A HEAD ORD,4,LONG,'S'/256
2012 OB83 4947 A .WORD 'IG','N'+EVEN,EDIGS-3
      OB84 CE20 A
      OB85 OB75 A
2013 OB86 0342 A SIGN: .WORD DOCOL,ROT,ZLESS,ZBRAN
      OB87 046A A
      OB88 0297 A
      OB89 0124 A
2014 OB8A 0004 A .WORD SIGN1-.,LIT,'-' /256,HOLD
      OB8B 0103 A
      OB8C 002D A
      OB8D 067A A
2015 OB8E 026A A SIGN1: .WORD SEMIS
2016 ;
2017 OB8F 81A3 A HEAD ORD,1,SHORT,', '/256
2018 OB90 OB82 A .WORD SIGN-4
2019 OB91 0342 A DIG: .WORD DOCOL,BASE,AT,MSMOD,ROT
      OB92 040D A
      OB93 030B A
      OB94 0933 A
      OB95 046A A
2020 OB96 0103 A .WORD LIT,9,OVER,LESS,ZBRAN
      OB97 0009 A
      OB98 02C9 A

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    OB99 045D A
    OB9A 0124 A
2021  OB9B 0004 A      .WORD    DIG1-. ,LIT,7,PLUS
    OB9C 0103 A
    OB9D 0007 A
    OB9E 029F A
2022  OB9F 0103 A  DIG1:  .WORD    LIT,0030,PLUS,HOLD,SEMIS
    OBA0 0030 A
    OBA1 029F A
    OBA2 067A A
    OBA3 026A A
2023  ;
2024  OBA4 8223 A      HEAD     ORD,2,LONG,' '/256
2025  OBA5 D320 A      .WORD    'S'+EVEN,DIG-2
    OBA6 0B8F A
2026  OBA7 0342 A  DIGS:  .WORD    DOCOL
2027  OBA8 0B91 A  DIGS1: .WORD    DIG,OVER,OVER,OR,ZEQU,ZBRAN
    OBA9 02C9 A
    OBAA 02C9 A
    OBAB 0246 A
    OBAC 028F A
    OBAD 0124 A
2028  OBAE FFFA A      .WORD    DIGS1-. ,SEMIS
    OBAF 026A A
2029  ;
2030  ;*****
2031  ;*          OUTPUT OPERATORS
2032  ;*****
2033  ;
2034  OBB0 8344 A      HEAD     ORD,3,LONG,'D'/256
2035  OBB1 2ED2 A      .WORD    '.R'+ODD,DIGS-3
    OBB2 OBA4 A
2036  OBB3 0342 A  DDOTR: .WORD    DOCOL,TOR,SWAP,OVER,DABS
    OBB4 027B A
    OBB5 02D5 A
    OBB6 02C9 A
    OBB7 08C8 A
2037  OBB8 0B6F A      .WORD    BDIGS,DIGS,SIGN,EDIGS,FROMR
    OBB9 OBA7 A
    OBBA 0B86 A
    OBBB 0B78 A
    OBBC 0283 A
2038  OBBD 02C9 A      .WORD    OVER,SUB,SPACES,TYPE,SEMIS
    OBBE 0450 A
    OBBF 0B60 A
    OBC0 0599 A
    OBC1 026A A
2039  ;
2040  OBC2 822E A      HEAD     ORD,2,LONG,'.'/256
2041  OBC3 D220 A      .WORD    'R'+EVEN,DDOTR-3
    OBC4 OBB0 A
2042  OBC5 0342 A  DOTR:  .WORD    DOCOL,TOR,STOD,FROMR,DDOTR,SEMIS
    OBC6 027B A
    OBC7 08A5 A
    OBC8 0283 A

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    OBC9 OBB3 A
    OBCA 026A A
2043      ;
2044 OBCB 8244 A      HEAD      ORD,2,LONG,'D'/256
2045 OBCC AE20 A      .WORD      '.'+EVEN,DOTR-3
    OBCD OBC2 A
2046 OBCE 0342 A      DDOT:     .WORD      DOCOL,ZERO,DDOTR,SPACE,SEMIS
    OBCF 0376 A
    OBD0 OBB3 A
    OBD1 0475 A
    OBD2 026A A
2047      ;
2048 OBD3 81AE A      HEAD      ORD,1,SHORT,'.'/256
2049 OBD4 OBCB A      .WORD      DDOT-3
2050 OBD5 0342 A      DOT:     .WORD      DOCOL,STOD,DDOT,SEMIS
    OBD6 08A5 A
    OBD7 OBCE A
    OBD8 026A A
2051      ;
2052 OBD9 81BF A      HEAD      ORD,1,SHORT,'?'/256
2053 OBDA OBD3 A      .WORD      DOT-2
2054 OBDB 0342 A      QUES:    .WORD      DOCOL,AT,DOT,SEMIS
    OBDC 030B A
    OBDD OBD5 A
    OBDE 026A A
2055      ;
2056 OBDF 8255 A      HEAD      ORD,2,LONG,'U'/256
2057 OBE0 AE20 A      .WORD      '.'+EVEN,QUES-2
    OBE1 OBD9 A
2058 OBE2 0342 A      UDOT:    .WORD      DOCOL,ZERO,DDOT,SEMIS
    OBE3 0376 A
    OBE4 OBCE A
    OBE5 026A A
2059      ;
2060      ;*****
2061      ;*          PROGRAM DOCUMENTATION          *
2062      ;*****
2063      ;
2064 OBE6 844C A      HEAD      ORD,4,LONG,'L'/256
2065 OBE7 4953 A      .WORD      'IS','T'+EVEN,UDOT-3
    OBE8 D420 A
    OBE9 OBDF A
2066 OBEA 0342 A      LIST:    .WORD      DOCOL,CR,DUP,SCR,STORE,PDOTQ
    OBEB 01FC A
    OBEC 02DD A
    OBED 03EC A
    OBEF 05CA A
2067 OBF0 0653 A      STRING   6,'S'/256
2068 OBF1 4352 A      .ASCII   'CR',
    OBF2 2023 A
    OBF3 2020 A
2069 OBF4 OBD5 A      .WORD      DOT,LIT,16,ZERO,XDO
    OBF5 0103 A
    OBF6 0010 A

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|      |      |      |   |         |       |                             |
|------|------|------|---|---------|-------|-----------------------------|
|      | OBF7 | 0376 | A |         |       |                             |
|      | OBF8 | 0155 | A |         |       |                             |
| 2070 | OBF9 | 01FC | A | LIST1:  | .WORD | CR,I,ZERO,THREE,DDOTR,SPACE |
|      | OBFA | 0161 | A |         |       |                             |
|      | OBFB | 0376 | A |         |       |                             |
|      | OBFC | 0382 | A |         |       |                             |
|      | OBFD | 0BB3 | A |         |       |                             |
|      | OBFE | 0475 | A |         |       |                             |
| 2071 | OBFF | 0161 | A |         | .WORD | I,SCR,AT,DLINE,XLOOP        |
|      | OC00 | 03EC | A |         |       |                             |
|      | OC01 | 030B | A |         |       |                             |
|      | OC02 | 09FB | A |         |       |                             |
|      | OC03 | 012F | A |         |       |                             |
| 2072 | OC04 | FFF5 | A |         | .WORD | LIST1-.,CR,SEMIS            |
|      | OC05 | 01FC | A |         |       |                             |
|      | OC06 | 026A | A |         |       |                             |
| 2073 |      |      |   |         |       | ;                           |
| 2074 | OC07 | 8549 | A |         | HEAD  | ORD,5,LONG,'I'/256          |
| 2075 | OC08 | 4E44 | A |         | .WORD | 'ND','EX'+ODD,LIST-4        |
|      | OC09 | 45D8 | A |         |       |                             |
|      | OC0A | 0BE6 | A |         |       |                             |
| 2076 | OC0B | 0342 | A | INDEX:  | .WORD | DOCOL,LIT,000C,EMIT         |
|      | OC0C | 0103 | A |         |       |                             |
|      | OC0D | 000C | A |         |       |                             |
|      | OC0E | 01ED | A |         |       |                             |
| 2077 | OC0F | 01FC | A |         | .WORD | CR,ONEP,SWAP,XDO            |
|      | OC10 | 042B | A |         |       |                             |
|      | OC11 | 02D5 | A |         |       |                             |
|      | OC12 | 0155 | A |         |       |                             |
| 2078 | OC13 | 01FC | A | INDEX1: | .WORD | CR,I,ZERO,THREE,DDOTR,SPACE |
|      | OC14 | 0161 | A |         |       |                             |
|      | OC15 | 0376 | A |         |       |                             |
|      | OC16 | 0382 | A |         |       |                             |
|      | OC17 | 0BB3 | A |         |       |                             |
|      | OC18 | 0475 | A |         |       |                             |
| 2079 | OC19 | 0376 | A |         | .WORD | ZERO,I,DLINE,QTERM,ZBRAN    |
|      | OC1A | 0161 | A |         |       |                             |
|      | OC1B | 09FB | A |         |       |                             |
|      | OC1C | 01F8 | A |         |       |                             |
|      | OC1D | 0124 | A |         |       |                             |
| 2080 | OC1E | 0002 | A |         | .WORD | INDEX2-.,LEAVE              |
|      | OC1F | 0273 | A |         |       |                             |
| 2081 | OC20 | 012F | A | INDEX2: | .WORD | XLOOP                       |
| 2082 | OC21 | FFF2 | A |         | .WORD | INDEX1-.,SEMIS              |
|      | OC22 | 026A | A |         |       |                             |
| 2083 |      |      |   |         |       | ;                           |
| 2084 | OC23 | 8554 | A |         | HEAD  | ORD,5,LONG,'T'/256          |
| 2085 | OC24 | 5249 | A |         | .WORD | 'RI','AD'+ODD,INDEX-4       |
|      | OC25 | 41C4 | A |         |       |                             |
|      | OC26 | 0C07 | A |         |       |                             |
| 2086 | OC27 | 0342 | A | TRIAD:  | .WORD | DOCOL,LIT,000C,EMIT,THREE   |
|      | OC28 | 0103 | A |         |       |                             |
|      | OC29 | 000C | A |         |       |                             |
|      | OC2A | 01ED | A |         |       |                             |
|      | OC2B | 0382 | A |         |       |                             |

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2087 0C2C 0911 A          .WORD    SLASH,THREE,STAR,THREE
      0C2D 0382 A
      0C2E 0901 A
      0C2F 0382 A
2088 0C30 02C9 A          .WORD    OVER,PLUS,SWAP,XDO
      0C31 029F A
      0C32 02D5 A
2089 0C34 01FC A    TRIAD1: .WORD    CR,I,LIST,XLOOP
      0C35 0161 A
      0C36 0BEA A
      0C37 012F A
2090 0C38 FFFC A          .WORD    TRIAD1-. ,CR,LIT,000F
      0C39 01FC A
      0C3A 0103 A
      0C3B 000F A
2091 0C3C 0A05 A          .WORD    MESS,CR,SEMIS
      0C3D 01FC A
      0C3E 026A A

2092
2093
2094
2095
2096
2097 0C3F 8556 A          HEAD    ORD,5,LONG,'V'/256
2098 0C40 4C49 A          .WORD    'LI','ST'+ODD,TRIAD-4
      0C41 53D4 A
      0C42 0C23 A
2099 0C43 0342 A    VLIST:  .WORD    DOCOL,LIT,0080,OUT,STORE
      0C44 0103 A
      0C45 0080 A
      0C46 03E7 A
      0C47 031D A
2100 0C48 03FA A          .WORD    CONT,AT,AT
      0C49 030B A
      0C4A 030B A
2101 0C4B 03E7 A    VLIST1: .WORD    OUT,AT,LIT,0040,GREAT,ZBRAN
      0C4C 030B A
      0C4D 0103 A
      0C4E 0040 A
      0C4F 0463 A
      0C50 0124 A
2102 0C51 0005 A          .WORD    VLIST2-. ,CR,ZERO,OUT,STORE
      0C52 01FC A
      0C53 0376 A
      0C54 03E7 A
      0C55 031D A
2103 0C56 02DD A    VLIST2: .WORD    DUP,IDDOT,SPACE,SPACE
      0C57 075D A
      0C58 0475 A
      0C59 0475 A
2104 0C5A 04C0 A          .WORD    PFA,LFA,AT,DUP,ZEQU
      0C5B 04A3 A
      0C5C 030B A
      0C5D 02DD A

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OC5E 028F A  
2105 OC5F 01F8 A .WORD QTERM,OR,ZBRAN  
OC60 0246 A  
OC61 0124 A  
2106 OC62 FFE9 A .WORD VLIST1-.,DROP,SEMIS  
OC63 02D0 A  
OC64 026A A  
2107 ;  
2108 OC65 8454 A HEAD ORD,4,LONG,'T'/256  
2109 OC66 4153 A .WORD 'AS','K'+EVEN,VLIST-4  
OC67 CB20 A  
OC68 0C3F A  
2110 OC69 0342 A TASK: .WORD DOCOL,SEMIS  
OC6A 026A A  
2111

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2112 ; .PAGE  
2113 088C FIN: .END CENT

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00F6 02A2 A  
00F7 0108 A  
00F8 0109 A  
00F9 0107 A  
00FA 015D A  
00FB 015C A  
00FC 7E44 A  
00FD 7E3B A  
00FE 7ECC A

|        |      |    |        |      |   |        |      |    |
|--------|------|----|--------|------|---|--------|------|----|
| ABORT  | 0874 | A  | ABS    | 08C0 | A | AGAIN  | 0B21 | A  |
| ALLOT  | 0442 | A  | AND    | 023F | A | ARROW  | 0A3B | A  |
| AT     | 030B | A  | BACK   | 0ACA | A | BACKSP | 0017 | A* |
| BAD    | 0175 | A  | BASE   | 040D | A | BBUF   | 0399 | A  |
| BCOMP  | 07AF | A  | BDIGS  | 0B6F | A | BEGIN  | 0AD3 | A  |
| BIN    | 02A2 | A  | BIT0   | 0003 | A | BL     | 0387 | A  |
| BLANKS | 0671 | A  | BLK    | 03DD | A | BLKSIZ | 0080 | A  |
| BLOCK  | 09B6 | A  | BLOCK1 | 09C5 | A | BLOCK2 | 09D2 | A  |
| BLOCK3 | 09DE | A  | BRAN   | 011B | A | BSCR   | 039F | A  |
| BUFF1  | 0997 | A  | BUFF2  | 09AA | A | BUFFER | 0992 | A  |
| BUFFS  | 1DF0 | A  | BUFMEM | 0210 | A | BUILDS | 0575 | A  |
| BYTE   | 02FD | A  | CAT    | 0311 | A | CELL   | 0305 | A  |
| CENT   | 088C | A  | CFA    | 04AA | A | CKBASE | 016F | A  |
| CMOVE  | 0690 | A  | CMOVE1 | 0698 | A | CMOVE2 | 06A1 | A  |
| CMOVE3 | 06A2 | A  | COLD   | 088B | A | COLON  | 0338 | A  |
| COMMA  | 0448 | A  | COMPIL | 0521 | A | CON    | 0357 | A  |
| CONT   | 03FA | A  | COUNT  | 058E | A | CPU    | 0014 | A* |
| CR     | 01FC | A  | CREAT1 | 078C | A | CREATE | 0779 | A  |
| CRY    | 0007 | A  | CSET   | 000A | A | CSP    | 041C | A  |
| CSTORE | 0324 | A  | CURR   | 0401 | A | CYCLE  | 018A | A  |
| DABS   | 08C8 | A  | DDOT   | 0BCE | A | DDOTR  | 0BB3 | A  |
| DDUP   | 047D | A  | DEC    | 0553 | A | DEFIN  | 084B | A  |
| DELIM  | 01DA | A  | DFIND  | 0727 | A | DFIND1 | 0737 | A  |
| DICT   | 0100 | A  | DIG    | 0B91 | A | DIG1   | 0B9F | A  |
| DIGIT  | 0166 | A  | DIGS   | 0BA7 | A | DIGS1  | 0BA8 | A  |
| DLINE  | 09FB | A  | DLITE1 | 07D4 | A | DLITER | 07CC | A  |
| DMINUS | 02BD | A  | DO     | 0AF0 | A | DOCOL  | 0342 | A  |
| DOCON  | 035C | A  | DODOES | 0583 | A | DOES   | 057D | A  |
| DOT    | 0BD5 | A  | DOTQ   | 05D8 | A | DOTQ1  | 05EA | A  |
| DOTQ2  | 05EE | A  | DOTR   | 0BC5 | A | DOUSER | 0371 | A  |
| DOVAR  | 0367 | A  | DOVOC  | 0837 | A | DP     | 03D0 | A  |
| DPO    | 001F | A* | DPL    | 0412 | A | DPLUS  | 02A7 | A  |
| DPMI   | 08B7 | A  | DPMI1  | 08BC | A | DRONE  | 097F | A  |
| DROP   | 02D0 | A  | DRTWO  | 0987 | A | DTRAI  | 05B4 | A  |
| DTRA2  | 05C1 | A  | DTRA3  | 05C3 | A | DTRAIL | 05B0 | A  |
| DUP    | 02DD | A  | EDIGS  | 0B78 | A | ELSE   | 0B46 | A  |
| EMIT   | 01ED | A  | ENCL   | 01B1 | A | END    | 0B1A | A  |
| ENDIF  | 0ADC | A  | ENDNAM | 01A1 | A | EQUAL  | 0457 | A  |
| ERASE  | 0668 | A  | ERROR  | 0744 | A | ERROR1 | 074B | A  |

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|        |      |    |        |      |    |        |      |   |
|--------|------|----|--------|------|----|--------|------|---|
| EVEN   | 8000 | A  | EXEC   | 0112 | A  | EXPEC1 | 05F9 | A |
| EXPEC2 | 0611 | A  | EXPEC3 | 061D | A  | EXPEC4 | 061E | A |
| EXPEC5 | 0624 | A  | EXPECT | 05F4 | A  | FENCE  | 03CB | A |
| FENCE0 | 001E | A* | FILL   | 0658 | A  | FIN    | 0C6B | A |
| FIRST  | 038D | A  | FLD    | 0417 | A  | FORG1  | 0AA1 | A |
| FORG2  | 0AAE | A  | FORG3  | 0AB1 | A  | FORGET | 0A8C | A |
| FORTH  | 083F | A  | FORTH0 | 0016 | A* | FOUND  | 0194 | A |
| FROMR  | 0283 | A  | GETC   | 7E3B | A  | GREAT  | 0463 | A |
| HEAD   | FORM |    | HERE   | 043A | A  | HEX    | 0548 | A |
| HI     | 0A59 | A  | HIBLK  | 3FC0 | A  | HLD    | 0426 | A |
| HOLD   | 067A | A  | I      | 0161 | A  | IDDOT  | 075D | A |
| IF     | 0B3A | A  | IMM    | 0001 | A  | IMMED  | 0819 | A |
| IN     | 03E2 | A  | INDEX  | 0C0B | A  | INDEX1 | 0C13 | A |
| INDEX2 | 0C20 | A  | INIT   | 0023 | A  | INTER  | 07F1 | A |
| INTER1 | 07F2 | A  | INTER2 | 07FE | A  | INTER3 | 0800 | A |
| INTER4 | 0803 | A  | INTER5 | 080D | A  | INTER6 | 080F | A |
| INTER7 | 0810 | A  | INTEST | 7ECC | A  | IP     | 0001 | A |
| IPO    | 089F | A  | KEY    | 01F1 | A  | LATEST | 049B | A |
| LBRAC  | 052C | A  | LDUP   | 0894 | A  | LDUVS  | 0896 | A |
| LEAVE  | 0273 | A  | LESS   | 045D | A  | LFA    | 04A3 | A |
| LIMIT  | 0393 | A  | LINK   | 0008 | A  | LIST   | 0BEA | A |
| LIST1  | 0BF9 | A  | LIT    | 0103 | A  | LITER  | 07BD | A |
| LITER1 | 07C5 | A  | LMASK  | 01E7 | A  | LNDEL  | 01CB | A |
| LO     | 0A5E | A  | LOAD   | 0A22 | A  | LOBLK  | 2000 | A |
| LONG   | 0000 | A  | LOOP   | 0AFA | A  | LP     | 0219 | A |
| M      | 000B | A  | MAX    | 08D7 | A  | MESS   | 0A05 | A |
| MESS1  | 0A15 | A  | MESS2  | 0A17 | A  | MESS3  | 0A1D | A |
| MIN    | 08CF | A  | MIN1   | 023B | A  | MINUS  | 02B4 | A |
| MINUS1 | 0223 | A  | MISS   | 019C | A  | MOD    | 0919 | A |
| MOVE   | 0201 | A  | MOVE1  | 0207 | A  | MOVE2  | 020E | A |
| MSLASH | 08EE | A  | MSMOD  | 0933 | A  | MSTAR  | 08DF | A |
| MTBUF  | 0975 | A  | NBUF   | 0008 | A  | NEW1   | 01BE | A |
| NEW2   | 01CD | A  | NEWNAM | 0181 | A  | NEXT   | 0109 | A |
| NFA    | 04B1 | A  | NINE   | 0177 | A  | NONUL  | 01D6 | A |
| NUL    | 01D1 | A  | NULL   | 063A | A  | NULL1  | 064F | A |
| NULL2  | 0651 | A  | NULL3  | 0653 | A  | NUMB   | 06FA | A |
| NUMB1  | 070A | A  | NUMB2  | 071D | A  | NUMB3  | 0722 | A |
| NZ     | 0005 | A  | ODD    | 0080 | A  | OFFSET | 03F3 | A |
| ONE    | 037A | A  | ONEP   | 042B | A  | OR     | 0246 | A |
| ORD    | 0000 | A  | ORGPTR | 08A0 | A  | ORIG   | 0010 | A |
| OUT    | 03E7 | A  | OVER   | 02C9 | A  | P      | 0002 | A |
| PABORT | 073D | A  | PAD    | 0686 | A  | PAREN  | 0853 | A |
| PART   | 0002 | A  | PBUF   | 094D | A  | PBUF1  | 0958 | A |
| PCR    | 0A53 | A  | PDOTQ  | 05CA | A  | PEMIT  | 0A49 | A |
| PFA    | 04C0 | A  | PFIND  | 017D | A  | PKEY   | 0A4D | A |
| PLINE  | 09E7 | A  | PLOOP  | 0B05 | A  | PLUS   | 029F | A |
| PMI    | 08AE | A  | PMI1   | 08B3 | A  | PNUMB  | 06D4 | A |
| PNUMB1 | 06D5 | A  | PNUMB2 | 06F0 | A  | PNUMB3 | 06F3 | A |
| POOL   | 0230 | A  | POP    | 015D | A  | POP2   | 015C | A |
| PORIG  | 03A6 | A  | PQTERM | 0A4F | A  | PREV   | 0947 | A |
| PSCODE | 055E | A  | PSTORE | 02E3 | A  | PULL   | 014F | A |
| PUSH   | 0107 | A  | PUT    | 0108 | A  | PUTC   | 7E44 | A |
| QCOMP  | 04E3 | A  | QCSP   | 0505 | A  | QERR1  | 04DD | A |
| QERR2  | 04DE | A  | QERROR | 04D6 | A  | QEXEC  | 04EF | A |
| QLOAD  | 0514 | A  | QPAIRS | 04FB | A  | QSTACK | 07DA | A |

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|        |      |    |        |      |    |        |      |    |
|--------|------|----|--------|------|----|--------|------|----|
| QTERM  | 01F8 | A  | QUAD   | 0000 | A  | QUERY  | 062D | A  |
| QUES   | 0BDB | A  | QUIT   | 085C | A  | QUIT1  | 0861 | A  |
| QUIT2  | 086D | A  | R      | 0289 | A  | RO     | 001A | A* |
| RBRAC  | 0533 | A  | REPEAT | 0B2D | A  | REV    | 0015 | A* |
| RMASK  | 01E8 | A  | RNDEL  | 01CA | A  | RNUM   | 0421 | A  |
| ROT    | 046A | A  | RP     | 0021 | A  | RPSTOR | 0262 | A  |
| RT1    | 01C4 | A  | RT2    | 01DD | A  | RW     | 0A63 | A  |
| RW1    | 0A79 | A  | RZERO  | 03B3 | A  | SO     | 0019 | A* |
| SCR    | 03EC | A  | SCSP   | 04CC | A  | SEMI   | 034A | A  |
| SEMIC  | 0569 | A  | SEMIS  | 026A | A  | SHORT  | 0001 | A  |
| SIGN   | 0B86 | A  | SIGN1  | 0B8E | A  | SLASH  | 0911 | A  |
| SLMOD  | 0909 | A  | SMUDGE | 053E | A  | SP     | 0003 | A  |
| SPACE  | 0475 | A  | SPACE1 | 0B68 | A  | SPACE2 | 0B6B | A  |
| SPACES | 0B60 | A  | SPAT   | 0255 | A  | SPSTOR | 025B | A  |
| SSLASH | 092A | A  | SSMOD  | 0921 | A  | STAR   | 0901 | A  |
| START  | 089E | A  | STATE  | 0407 | A  | STOD   | 08A5 | A  |
| STORE  | 031D | A  | STRING | FORM |    | SUB    | 0450 | A  |
| SWAP   | 02D5 | A  | SZERO  | 03AE | A  | TASK   | 0C69 | A  |
| TEST   | 021E | A  | THEN   | 0AEA | A  | THREE  | 0382 | A  |
| TIB    | 03B8 | A  | TIBO   | 001B | A* | TICK   | 0A7F | A  |
| TOGGLE | 02ED | A  | TOPMEM | 2000 | A  | TOR    | 027B | A  |
| TRAV   | 0488 | A  | TRAV1  | 048A | A  | TRIAD  | 0C27 | A  |
| TRIAD1 | 0C34 | A  | TWO    | 037E | A  | TWOP   | 0432 | A  |
| TYPE   | 0599 | A  | TYPE1  | 05A1 | A  | TYPE2  | 05A8 | A  |
| TYPE3  | 05A9 | A  | UO     | 0018 | A* | UDOT   | 0BE2 | A  |
| UNTIL  | 0B10 | A  | UP     | 0022 | A  | UPDATE | 0962 | A  |
| USE    | 0941 | A  | USER   | 036E | A  | USLASH | 0227 | A  |
| USTAR  | 0213 | A  | UVARs  | 1DD0 | A  | VAR    | 0364 | A  |
| VLIST  | 0C43 | A  | VLIST1 | 0C4B | A  | VLIST2 | 0C56 | A  |
| VOCAB  | 0827 | A  | VOCL   | 03D8 | A  | VOCL0  | 0020 | A* |
| W      | 0002 | A  | WARN   | 03C5 | A  | WARN0  | 001D | A* |
| WENT   | 0892 | A  | WHILE  | 0B57 | A  | WIDTH  | 03BE | A  |
| WIDTH0 | 001C | A* | WORD   | 06A8 | A  | WORD1  | 06B2 | A  |
| WORD2  | 06B4 | A  | X      | 0002 | A  | X00FF  | 0335 | A  |
| X3FFF  | 01A8 | A  | X7F7F  | 01A9 | A  | X8080  | 01AB | A  |
| XDO    | 0155 | A  | XFF    | 031A | A  | XFF00  | 01AA | A  |
| XLOOP  | 012F | A  | XLOOP1 | 0137 | A  | XOR    | 024D | A  |
| XPLOOP | 0140 | A  | Y      | 0003 | A  | Z      | 0001 | A  |
| ZBRAN  | 0124 | A  | ZEQU   | 028F | A  | ZERO   | 0376 | A  |
| ZLESS  | 0297 | A  |        |      |    |        |      |    |

NO ERROR LINES

SOURCE CHECKSUM : E77A

A            ZEQU        028F    A            ZERO        0376    A

