```
PC       Machine Code        I  Line    File:
                             A     1    ;                      ***  VERSION 4  ***
                             A     2    ;                     ZILOG Z8 FORTH SYSTEM
                             A     3
                             A     4    ;                        April 23, 2009
                             A     5    ;         Revised for Z8 assembly syntax - April 13, 2003
                             A     6    ;         To assemble: Z8ASM newsys. -pagewidth=132
                             A     7    ;      To link: Z8LINK -FORMAT=INTEL newsys.ihx=newsys.obj
                             A     8
                             A     9    ;  This program is free software: you can redistribute it and/or modify
                             A    10    ;    it under the terms of the GNU General Public License as published by
                             A    11    ;    the Free Software Foundation, either version 3 of the License, or
                             A    12    ;    (at your option) any later version.
                             A    13
                             A    14    ;    This program is distributed in the hope that it will be useful,
                             A    15    ;    but WITHOUT ANY WARRANTY; without even the implied warranty of
                             A    16    ;    MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
                             A    17    ;    GNU General Public License for more details.
                             A    18
                             A    19    ;    You should have received a copy of the GNU General Public License
                             A    20    ;    along with this program.  If not, see <http://www.gnu.org/licenses/>.
                             A    21
                             A    22
         00000000            A    23    CRYSTAL73728  EQU 0    ;  Set one of these to 1 for desired crystal frequency
         00000000            A    24    CRYSTAL110592 EQU 0    ;
         00000001            A    25    CRYSTAL122880 EQU 1    ;
                             A    26    IF CRYSTAL73728+CRYSTAL110592+CRYSTAL122880==0
                             A    27     EXIT "No crystal frequency specified"
                             A    28    ENDIF
                             A    29    IF CRYSTAL73728+CRYSTAL110592+CRYSTAL122880>1
                             A    30     EXIT "Crystal frequency improperly specified"
                             A    31    ENDIF
                             A    32    IF CRYSTAL73728
                             A    33     WARNING "7.3728 crystal assumed"
                             A    34    ENDIF
                             A    35    IF CRYSTAL110592
                             A    36     WARNING "11.0592 crystal assumed"
                             A    37    ENDIF
                             A    38    IF CRYSTAL122880
                             A    39     WARNING "12.2880 crystal assumed"
-----WARNING (475) 12.2880 crystal assumed
                             A    40    ENDIF
                             A    41
         00000000            A    42    OFFSET: EQU $0000
                             A    43
         000004BE            A    44    LASTDEF  EQU EDITHEAD
         00001C99            A    45    VOCINIT  EQU GALHEAD
         00000080            A    46    STACKOFFSET EQU 80h
                             A    47
                             A    48     IF OFFSET != 0
                             A    49    SYSAREA  EQU 040h      ;  Block of 32 (20h) bytes for forth variables (Test ver.)
                             A    50     ELSE
         00000010            A    51    SYSAREA  EQU 010h      ;  Block of 32 (20h) bytes for forth variables
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PC       Machine Code        I  Line    File: newsys.v4e
                             A    52     ENDIF
                             A    53
         00000010            A    54    EEPBA    EQU SYSAREA   ;  Address bits to or into the eeprom address (byte)
         00000011            A    55    WIDTHLOC EQU SYSAREA+1 ;  Width of name in dictionary head (byte)
         00000012            A    56    VLLOC    EQU SYSAREA+2 ;  Voc-link pointer (head of last defined word)
         00000014            A    57    BASELOC  EQU SYSAREA+4 ;  Number base
         00000016            A    58    NV       EQU SYSAREA+6 ;  Vector to next processor
         00000018            A    59    COLON    EQU SYSAREA+8 ;  Vector to colon processor
         0000001A            A    60    PRDPLOC  EQU SYSAREA+10;  Places to right of decimal point (byte)
         0000001B            A    61    STATELOC EQU SYSAREA+11;  Compiling/interpreting state indicator (byte)
         0000001C            A    62    DPNTRLOC EQU SYSAREA+12;  Dictionary pointer
         0000001E            A    63    TOINLOC  EQU SYSAREA+14;  >In pointer to character in blk block
         00000020            A    64    BLKLOC   EQU SYSAREA+16;  Blk pointer
         00000022            A    65    TIBLOC   EQU SYSAREA+18;  Pointer to text input block
         00000022            A    66    S0LOC    EQU SYSAREA+18;  Stack initial state pointer (same as TIBLOC)
         00000024            A    67    HLDLOC   EQU SYSAREA+20;  Pointer to hold decimal point
                             A    68                           ;  SYSAREA+22 is an unused word
         00000028            A    69    DPLOC    EQU SYSAREA+24;  Decimal point location
         0000002A            A    70    SBLOC    EQU SYSAREA+26;  Colon stack balancing pointer
         0000002A            A    71    TYPEOVR  EQU SYSAREA+26;  Typover/insert flag for screen edit
         0000002C            A    72    SZ       EQU SYSAREA+28;  Line number/postion index in screen
         0000002E            A    73    SCRN     EQU SYSAREA+30;  Screen edit address
                             A    74
                             A    75
         00000030            A    76    WORKAREA EQU SYSAREA+20H;  The 16 z8 forth registers
         00000030            A    77    RSPTR EQU  WORKAREA    ;  Return stack pointer
         00000032            A    78    IP    EQU  WORKAREA+2  ;  Forth instruction pointer
         00000034            A    79    EVR   EQU  WORKAREA+4  ;  Forth execution vector
         000000E4            A    80    WW4   EQU  WORKAREA&0Fh|E0h+4
         000000E6            A    81    WW6   EQU  WORKAREA&0Fh|E0h+6
         000000E8            A    82    WW8   EQU  WORKAREA&0Fh|E0h+8
         000000EA            A    83    WW10  EQU  WORKAREA&0Fh|E0h+10
         000000EB            A    84    WW11  EQU  WORKAREA&0Fh|E0h+11
         000000EC            A    85    WW12  EQU  WORKAREA&0Fh|E0h+12
         000000EE            A    86    WW14  EQU  WORKAREA&0Fh|E0h+14
         000000EF            A    87    WW15  EQU  WORKAREA&0Fh|E0h+15
                             A    88
00000000                     A    89          ORG   0
                             A    90
                             A    91    IF OFFSET != 0
                             A    92          BLKB OFFSET
                             A    93    ENDIF
                             A    94
                             A    95         ;DWM  Vector4, vector6, vector8, vector10, vector12, vector14
                             A    96
00000000 0093                A    97          DW   VECTOR4
00000002 0095                A    98          DW   VECTOR6
00000004 0097                A    99          DW   VECTOR8
00000006 0099                A   100          DW   VECTOR10
00000008 009B                A   101          DW   VECTOR12
0000000A 009D                A   102          DW   VECTOR14
                             A   103                         ; Location 00C - this is where execution starts
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PC       Machine Code        I  Line    File: newsys.v4e
0000000C 8F                  A   104          DI              ; Disable interrupts
0000000D 3130                A   105          SRP  #WORKAREA
0000000F B000                A   106          CLR  000H       ; Set address lines a8-a15 to zero for Port 0 initialization
00000011 2C02                A   107          LD   R2,#02     ; Delay about 1 sec
00000013 AA FE               A   108     ST0: DJNZ R10,ST0    ; Initialize r10/r11 for the end-of-rom test coming up
00000015 BA FC               A   109          DJNZ R11,ST0
00000017 2A FA               A   110          DJNZ R2,ST0
00000019 EC 00               A   111          LD   R14,#HIGH ZTABLE ; Load reg f1-fb from ztable
0000001B FC 9F               A   112          LD   R15,#LOW  ZTABLE
0000001D DCF1                A   113          LD   R13,#0F1H ; Start with r13 = f1
0000001F CC0B                A   114          LD   R12,#00BH ; Do 11 bytes (i.e., don't do sio, flags, reg pntr, stack ptr)
00000021 C3DE                A   115     ST1: LDCI @R13,@RR14
00000023 CA FC               A   116          DJNZ R12,ST1
00000025 DC10                A   117          LD   R13,#SYSAREA ; Constants to initialize the system area follow ztable
00000027 CC0A                A   118          LD   R12,#00AH ; Do 10 (decimal) bytes
00000029 C3DE                A   119     ST2: LDCI @R13,@RR14
0000002B CA FC               A   120          DJNZ R12, ST2
                             A   121                         ; Look for end of rom in 1k increments
0000002D 06EA04              A   122     ST3: ADD  R10,#004H ; Add 400 (hex) to w10 (first byte of page)
00000030 C27A                A   123          LDC  R7,@RR10  ; Load byte pointed to by w10 into r7
00000032 68E7                A   124          LD   R6,R7     ; Copy the byte into r6
00000034 60E6                A   125          COM  R6        ; Complement the copy in r6
00000036 D26A                A   126          LDC  @RR10,R6  ; Attempt to store the copy to memory
00000038 C26A                A   127          LDC  R6,@RR10  ; Load it back to r6
0000003A D27A                A   128          LDC  @RR10,R7  ; Restore memory from r7 (in case it was ram)
0000003C A267                A   129          CP   R6,R7     ; Compare r6 against r7
0000003E 6B ED               A   130          JR   Z,ST3     ; If equal we are still in rom
00000040 28EA                A   131          LD   R2,R10    ; Store beginning of ram in ip
00000042 38EB                A   132          LD   R3,R11
00000044 291C                A   133          LD   DPNTRLOC,R2 ; Store beginning of ram in dictionary pntr
00000046 391D                A   134          LD   DPNTRLOC+1,R3
00000048 06EA04              A   135     ST4: ADD  R10,#004H ; Look for end of ram in 1k increments
0000004B C27A                A   136          LDC  R7,@RR10  ; Load byte pointed to by w10 into r7
0000004D 68E7                A   137          LD   R6,R7     ; Copy the byte into r6
0000004F 60E6                A   138          COM  R6        ; Complement the copy in r6
00000051 D26A                A   139          LDC  @RR10,R6  ; Attempt to store the copy to memory
00000053 C26A                A   140          LDC  R6,@RR10  ; Load it back to r6
00000055 D27A                A   141          LDC  @RR10,R7  ; Restore memory from r7 (in case it was ram)
00000057 A267                A   142          CP   R6,R7     ; Compare r6 against r7
00000059 EB ED               A   143          JR   NZ,ST4    ; If not equal we are still in ram
0000005B 08EA                A   144          LD   R0,R10    ; Rstack at end-of-ram + 1
0000005D 18EB                A   145          LD   R1,R11
0000005F 26EB80              A   146          SUB  R11,#LOW STACKOFFSET  ; Subtract stack offset from end-of-ram
00000062 00EA                A   147          DEC  R10
00000064 A922                A   148          LD   S0LOC,R10 ; Start stack at stackoffset less than rstack
00000066 B923                A   149          LD   S0LOC+1,R11
00000068 A922                A   150          LD   TIBLOC,R10; Set tib (1a-1b) to bottom of rstack
0000006A B923                A   151          LD   TIBLOC+1,R11
0000006C 80E2                A   152          DECW RR2       ; Load starting addr (last word in rom)
0000006E C272                A   153          LDC  R7,@RR2   ;   Into r6-r7
00000070 80E2                A   154          DECW RR2       ; If start addr is ffff then use start addr
00000072 C262                A   155          LDC  R6,@RR2   ;   At last word of z8 rom (@ffe)
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PC       Machine Code        I  Line    File: newsys.v4e
00000074 A0E6                A   156          INCW RR6       ; Test if addr equals hffffh
00000076 EB 06               A   157          JR   NZ,ST4A
00000078 2C 0D               A   158          LD   R2,#HIGH BOOT1; Load execution vector with pointer to address
0000007A 3C CA               A   159          LD   R3,#LOW  BOOT1; In nucleus (quit) where execution is to begin
0000007C 8B 06               A   160          JR   ST5
0000007E 80E6                A   161     ST4A:DECW RR6
00000080 28E6                A   162          LD   R2,R6     ; Use address at end of rom as
00000082 38E7                A   163          LD   R3,R7     ;   Initial value inst pntr
00000084 E6F103              A   164      ST5:LD   0F1H,#003h; Start baud rate generator
00000087 E422FE              A   165          LD   0FEH,S0LOC; Initialize starting value of stack
0000008A E423FF              A   166          LD   0FFH,S0LOC+1
0000008D 9F                  A   167          EI             ; Enable interrupts
0000008E E6F00D              A   168          LD   0F0H,#00DH; Output a carriage return
00000091 3016                A   169          JP   @NV       ; Go to next code
                             A   170
         00000093            A   171    VECTOR4: EQU $
00000093 3004                A   172          JP   @04H
         00000095            A   173    VECTOR6: EQU $
00000095 3006                A   174          JP   @06H
         00000097            A   175    VECTOR8: EQU $
00000097 3008                A   176          JP   @08H
         00000099            A   177    VECTOR10: EQU $
00000099 300A                A   178          JP   @0AH
         0000009B            A   179    VECTOR12: EQU $
0000009B 300C                A   180          JP   @0CH
         0000009D            A   181    VECTOR14: EQU $
0000009D 300E                A   182          JP   @0EH
                             A   183
         0000009F            A   184    ZTABLE: EQU $        ; Ps0=27h; c/t0=1 (9600  baud/11.059 mhz crystal)
                             A   185                         ;   Ie: ps0=0010 0111 (9 plus two control bits)
                             A   186                         ; Ps0=17h; c/t0=1 (19.2 kbaud/12.288 mhz crystal)
                             A   187                         ;   Ie: ps0=0001 0111 (5 plus two control bits)
                             A   188                         ; Ps0=0fh; c/t0=1 (19.2 kbaud/7.3728 mhz crystal)
                             A   189                         ;   Ie: ps0=0000 1111 (3 plus two control bits)
                             A   190
                             A   191    ;         Sior  tmr   c/t1  ps1   c/t0  ps0   p2mr  p3mr
                             A   192    IF CRYSTAL73728
                             A   193          DB        000H, 0F0H, 003H, 001H, 00FH, 0FFH, 041H
                             A   194          DB  092H, 02BH, 000H, 000H
                             A   195    ENDIF
                             A   196
                             A   197    IF CRYSTAL110592
                             A   198          DB        000H, 0F0H, 003H, 001H, 027H, 0FFH, 041H
                             A   199          DB  092H, 02BH, 000H, 000H
                             A   200    ENDIF
                             A   201
                             A   202    IF CRYSTAL122880
0000009F 00F00301 17FF41     A   203          DB        000H, 0F0H, 003H, 001H, 017H, 0FFH, 041H
000000A6 922B0000            A   204          DB  092H, 02BH, 000H, 000H
                             A   205    ENDIF
                             A   206    ;         P0/1m ipr   intr  intm
                             A   207
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PC       Machine Code        I  Line    File: newsys.v4e
         000000AA            A   208    FTABLE: EQU $        ; Ftable has to follow ztable
                             A   209
                             A   210    ;         Ea/wid  voclnk   #base  next  colon,
000000AA A003 1C99 0010 00BF A   211          DW  A003H,  VOCINIT, 0010H, EXNV, EXCOLON
000000B2 00E2
                             A   212
                             A   213
         000000B4            A   214    SEROUT: EQU $        ; Serial output (write) routine
000000B4 76FA10              A   215          TM   0FAH,#010H; Is serial output port ready?
000000B7 6B FB               A   216          JR   Z,SEROUT  ; Zero means not ready
000000B9 56FAEF              A   217          AND  0FAH,#0EFH; And out port ready bit
000000BC 99F0                A   218          LD   0F0H,R9   ; Place the character in i/o port
000000BE AF                  A   219          RET            ; Return from call
                             A   220
                             A   221                         ; Execute next token
         000000BF            A   222    EXNV: EQU  $
000000BF C2F2                A   223          LDC  R15,@RR2   ; Load current token
000000C1 A0E2                A   224          INCW RR2        ; Point IP to next token
000000C3 B0EE                A   225    EXNVA:CLR  R14        ; Clear out high byte of jump address
000000C5 02FF                A   226          ADD  R15,R15    ; Double token value
000000C7 10EE                A   227          RLC  R14        ;  Put the carry in low bit of high byte
000000C9 EE                  A   228          INC  R14        ; Point R14 to base of jump table: 100h + 2*token
                             A   229
                             A   230    IF OFFSET != 0
                             A   231          OR   R14,#HIGH OFFSET   ; Point to the test area in RAM
                             A   232    ENDIF
                             A   233
000000CA C24E                A   234          LDC  R4,@RR14   ; Load high byte to EVR (vector addr high)
000000CC FE                  A   235          INC  R15        ; Point to low byte
000000CD C25E                A   236          LDC  R5,@RR14   ; Load low byte to EVR+1 (vector addr low)
000000CF 30E4                A   237          JP   @RR4       ; Jump to routine via R4/R5
                             A   238
000000D1 50E4                A   239    EXWOS:POP  R4         ; Pop address of jump into R6/R7
000000D3 50E5                A   240          POP  R5
000000D5 30E4                A   241          JP   @RR4
                             A   242
         000000D7            A   243    LONGCALLSUB: EQU $       ; Execute long form
000000D7 F8FD                A   244          LD   R15,RP        ; Load R15 with current group number
000000D9 06EF04              A   245          ADD  R15,#EVR&0Fh  ; Point R15 to the branch location (EVR)
000000DC C3F2                A   246          LDCI @R15,@RR2     ; Load branch location from the word at IP
000000DE C3F2                A   247          LDCI @R15,@RR2     ; EVR will point to address after call on exit
000000E0 30E4                A   248          JP   @RR4          ; EVR left pointing to the address of the CALL
                             A   249                             ; IP left pointing to the address of the next token
         000000E2            A   250    EXCOLON: EQU $
000000E2 80E0                A   251          DECW RR0               ; Push current IP to rstack
000000E4 D230                A   252          LDC  @RR0,R3           ;  and leave RStack pointing to low byte
000000E6 80E0                A   253          DECW RR0
000000E8 D220                A   254          LDC  @RR0,R2
000000EA 28E4                A   255          LD   R2,EVR&0Fh|E0h    ; Load IP (R2/R3) from EVR (R4/R5)
000000EC 38E5                A   256          LD   R3,EVR&0Fh|E0h+1
000000EE A0E2                A   257          INCW RR2               ; Point R2/R3 to the address after the JP instruction
000000F0 A0E2                A   258          INCW RR2
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PC       Machine Code        I  Line    File: newsys.v4e
000000F2 3016                A   259          JP   @NV
                             A   260
                             A   261    ; ----------------------------------------------------
00000100                     A   262          ORG  OFFSET+$100
                             A   263
         00000100            A   264    JTB:     EQU $
         00000000            A   265    BR:      EQU ($-JTB)/2
00000100 0529                A   266          DW   BRSUB
         00000001            A   267    NR:      EQU ($-JTB)/2
00000102 0531                A   268          DW   NRSUB
         00000002            A   269    JR:      EQU ($-JTB)/2
00000104 0546                A   270          DW   JRSUB
         00000003            A   271    JRS:     EQU ($-JTB)/2
00000106 0540                A   272          DW   JRSSUB
         00000004            A   273    JRZ:     EQU ($-JTB)/2
00000108 0560                A   274          DW   JRZSUB
         00000005            A   275    JRZS:    EQU ($-JTB)/2
0000010A 0554                A   276          DW   JRZSSUB
         00000006            A   277    LONGCALL:EQU ($-JTB)/2
0000010C 00D7                A   278          DW   LONGCALLSUB
         00000007            A   279    SEMICOLON:EQU ($-JTB)/2
0000010E 04C5                A   280          DW   SEMICOLONSUB
         00000008            A   281    EXECUTE: EQU ($-JTB)/2
00000110 00D1                A   282          DW   EXWOS
         00000009            A   283    KEY:     EQU ($-JTB)/2
00000112 0510                A   284          DW   KEYSUB
         0000000A            A   285    EMIT:    EQU ($-JTB)/2
00000114 0521                A   286          DW   EMITSUB
         0000000B            A   287    STORE:   EQU ($-JTB)/2
00000116 056E                A   288          DW   STORESUB
         0000000C            A   289    CSTORE:  EQU ($-JTB)/2
00000118 0587                A   290          DW   CSTORESUB
         0000000D            A   291    AT:      EQU ($-JTB)/2
0000011A 0590                A   292          DW   ATSUB
         0000000E            A   293    CAT:     EQU ($-JTB)/2
0000011C 05AB                A   294          DW   CATSUB
         0000000F            A   295    ONTOR:   EQU ($-JTB)/2
0000011E 05B7                A   296          DW   ONTORSUB
         00000010            A   297    RONTO:   EQU ($-JTB)/2
00000120 05C5                A   298          DW   RONTOSUB
         00000011            A   299    SWAP:    EQU ($-JTB)/2
00000122 05D4                A   300          DW   SWAPSUB
         00000012            A   301    DUP:     EQU ($-JTB)/2
00000124 05DF                A   302          DW   DUPSUB
         00000013            A   303    DROP:    EQU ($-JTB)/2
00000126 05ED                A   304          DW   DROPSUB
         00000014            A   305    AND:     EQU ($-JTB)/2
00000128 05F3                A   306          DW   ANDSUB
         00000015            A   307    OR:      EQU ($-JTB)/2
0000012A 05FC                A   308          DW   ORSUB
         00000016            A   309    PLUS:    EQU ($-JTB)/2
0000012C 0605                A   310          DW   PLUSSUB
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PC       Machine Code        I  Line    File: newsys.v4e
         00000017            A   311    NEGATE:  EQU ($-JTB)/2
0000012E 060E                A   312          DW   NEGATESUB
         00000018            A   313    USTAR:   EQU ($-JTB)/2
00000130 0619                A   314          DW   USTARSUB
         00000019            A   315    USLASH:  EQU ($-JTB)/2
00000132 063C                A   316          DW   USLASHSUB
         0000001A            A   317    SLN:     EQU ($-JTB)/2
00000134 0678                A   318          DW   SLNSUB
         0000001B            A   319    ZEQ:     EQU ($-JTB)/2
00000136 069F                A   320          DW   ZEQSUB
         0000001C            A   321    GTEQ:    EQU ($-JTB)/2
00000138 06B1                A   322          DW   GTEQSUB
         0000001D            A   323    I:       EQU ($-JTB)/2
0000013A 06C0                A   324          DW   ISUB
         0000001E            A   325    CMOVE:   EQU ($-JTB)/2
0000013C 06CE                A   326          DW   CMOVESUB
         0000001F            A   327    HERE:    EQU ($-JTB)/2
0000013E 06DF                A   328          DW   HERESUB
         00000020            A   329    COMMA:     EQU ($-JTB)/2
00000140 06E5                A   330          DW   COMMASUB
         00000021            A   331    CCOMMA:    EQU ($-JTB)/2
00000142 06FA                A   332          DW   CCOMMASUB
         00000022            A   333    HDOT:      EQU ($-JTB)/2
00000144 0703                A   334          DW   HDOTSUB
         00000023            A   335    COLD:      EQU ($-JTB)/2
00000146 000C                A   336          DW   00CH
         00000024            A   337    ONEPLUS:   EQU ($-JTB)/2
00000148 070E                A   338          DW   ONEPLUSSUB
         00000025            A   339    DPNTR:     EQU ($-JTB)/2
0000014A 0718                A   340          DW   DPNTRSUB
         00000026            A   341    TOIN:      EQU ($-JTB)/2
0000014C 071C                A   342          DW   TOINSUB
         00000027            A   343    BLK:       EQU ($-JTB)/2
0000014E 0720                A   344          DW   BLKSUB
         00000028            A   345    BASE:      EQU ($-JTB)/2
00000150 0724                A   346          DW   BASESUB
         00000029            A   347    VOCLNK:    EQU ($-JTB)/2
00000152 0728                A   348          DW   VOCLNKSUB
         0000002A            A   349    S0:        EQU ($-JTB)/2
00000154 072C                A   350          DW   S0SUB
         0000002B            A   351    STATE:     EQU ($-JTB)/2
00000156 0730                A   352          DW   STATESUB
         0000002C            A   353    STKPNTR:   EQU ($-JTB)/2
00000158 0734                A   354          DW   STKPNTRSUB
         0000002D            A   355    ZERO:      EQU ($-JTB)/2
0000015A 0738                A   356          DW   ZEROSUB
         0000002E            A   357    ONE:       EQU ($-JTB)/2
0000015C 073C                A   358          DW   ONESUB
         0000002F            A   359    MINUS:     EQU ($-JTB)/2
0000015E 075C                A   360          DW   MINUSSUB
         00000030            A   361    EQUALS:    EQU ($-JTB)/2
00000160 0761                A   362          DW   EQUALSUB
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PC       Machine Code        I  Line    File: newsys.v4e
         00000031            A   363    OVER:       EQU ($-JTB)/2
00000162 0746                A   364          DW    OVERSUB
         00000032            A   365    ROT:        EQU ($-JTB)/2
00000164 0766                A   366          DW    ROTSUB
         00000033            A   367    SPACE:      EQU ($-JTB)/2
00000166 076D                A   368          DW    SPACESUB
         00000034            A   369    PLUSSTORE:  EQU ($-JTB)/2
00000168 07B8                A   370          DW    PLUSSTORESUB
         00000035            A   371    null:       EQU ($-JTB)/2
0000016A 07C1                A   372          DW    NULLSUB
         00000036            A   373    CR:         EQU ($-JTB)/2
0000016C 07D4                A   374          DW    CRSUB
         00000037            A   375    WORD:       EQU ($-JTB)/2
0000016E 082E                A   376          DW    WORDSUB
         00000038            A   377    COUNT:      EQU ($-JTB)/2
00000170 084D                A   378          DW    COUNTSUB
         00000039            A   379    TYPE:       EQU ($-JTB)/2
00000172 0855                A   380          DW    TYPESUB
         0000003A            A   381    FIND:       EQU ($-JTB)/2
00000174 0935                A   382          DW    FINDSUB
         0000003B            A   383    FINDEA:     EQU ($-JTB)/2
00000176 094D                A   384          DW    FINDEASUB
         0000003C            A   385    DPLUS:      EQU ($-JTB)/2
00000178 0866                A   386          DW    DPLUSSUB
         0000003D            A   387    DNEGATE:    EQU ($-JTB)/2
0000017A 087F                A   388          DW    DNEGATESUB
         0000003E            A   389    COMPILE:    EQU ($-JTB)/2
0000017C 0968                A   390          DW    COMPILESUB
         0000003F            A   391    LITERAL:    EQU ($-JTB)/2
0000017E 0990                A   392          DW    LITERALSUB
         00000040            A   393    DLITERAL:   EQU ($-JTB)/2
00000180 09B7                A   394          DW    DLITERALSUB
         00000041            A   395    DIGIT:      EQU ($-JTB)/2
00000182 09C6                A   396          DW    DIGITSUB
         00000042            A   397    NUMBER:     EQU ($-JTB)/2
00000184 09FD                A   398          DW    NUMBERSUB
         00000043            A   399    QUIT:       EQU ($-JTB)/2
00000186 0A6A                A   400          DW    QUITSUB
         00000044            A   401    LFTBR:      EQU ($-JTB)/2
00000188 0AA6                A   402          DW    LFTBRSUB
         00000045            A   403    RTBR:       EQU ($-JTB)/2
0000018A 0AAC                A   404          DW    RTBRSUB
         00000046            A   405    TIC:        EQU ($-JTB)/2
0000018C 0AB3                A   406          DW    TICSUB
         00000047            A   407    MIN:        EQU ($-JTB)/2
0000018E 0AC2                A   408          DW    MINSUB
         00000048            A   409    ALLOT:      EQU ($-JTB)/2
00000190 0ACC                A   410          DW    ALLOTSUB
         00000049            A   411    CREATE:     EQU ($-JTB)/2
00000192 0AD1                A   412          DW    CREATESUB
         0000004A            A   413    COLONDEF:   EQU ($-JTB)/2
00000194 0B07                A   414          DW    COLONDEFSUB
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PC       Machine Code        I  Line    File: newsys.v4e
         0000004B            A   415    SMUDGE:     EQU ($-JTB)/2
00000196 0B1E                A   416          DW    SMUDGESUB
         0000004C            A   417    SEMICDEF:   EQU ($-JTB)/2
00000198 0B2A                A   418          DW    SEMICDEFSUB
         0000004D            A   419    CONSTANT:   EQU ($-JTB)/2
0000019A 0B5C                A   420          DW    CONSTANTSUB
         0000004E            A   421    BUILDS:     EQU ($-JTB)/2
0000019C 0B65                A   422          DW    BUILDSSUB
         0000004F            A   423    DOES:       EQU ($-JTB)/2
0000019E 0B8C                A   424          DW    DOESSUB
         00000050            A   425    IMMEDIATE:  EQU ($-JTB)/2
000001A0 0B9A                A   426          DW    IMMEDIATESUB
         00000051            A   427    DOTQAUX:    EQU ($-JTB)/2
000001A2 0BA6                A   428          DW    DOTQAUXSUB
         00000052            A   429    DOTQUOTE:   EQU ($-JTB)/2
000001A4 0BB5                A   430          DW    DOTQUOTESUB
         00000053            A   431    STRING:     EQU ($-JTB)/2
000001A6 0BBB                A   432          DW    STRINGSUB
         00000054            A   433    PAD:        EQU ($-JTB)/2
000001A8 0BCA                A   434          DW    PADSUB
         00000055            A   435    HOLD:       EQU ($-JTB)/2
000001AA 0BD1                A   436          DW    HOLDSUB
         00000056            A   437    INTOPOUND:  EQU ($-JTB)/2
000001AC 0BDC                A   438          DW    INTOPOUNDSUB
         00000057            A   439    POUND:      EQU ($-JTB)/2
000001AE 0BE3                A   440          DW    POUNDSUB
         00000058            A   441    POUNDS:     EQU ($-JTB)/2
000001B0 0C02                A   442          DW    POUNDSSUB
         00000059            A   443    POUNDINTO:  EQU ($-JTB)/2
000001B2 0C0D                A   444          DW    POUNDINTOSUB
         0000005A            A   445    SIGN:       EQU ($-JTB)/2
000001B4 0C18                A   446          DW    SIGNSUB
         0000005B            A   447    DO:         EQU ($-JTB)/2
000001B6 0C2F                A   448          DW    DOSUB
         0000005C            A   449    DOAUX:      EQU ($-JTB)/2
000001B8 0C25                A   450          DW    DOAUXSUB
         0000005D            A   451    PLUSLOOP:   EQU ($-JTB)/2
000001BA 0CC8                A   452          DW    PLUSLOOPSUB
         0000005E            A   453    PLUSLOOPAUX:  EQU ($-JTB)/2
000001BC 0C65                A   454          DW    PLUSLOOPAUXSUB
         0000005F            A   455    _LOOP:      EQU ($-JTB)/2
000001BE 0CC2                A   456          DW    LOOPSUB
         00000060            A   457    LOOPAUX:      EQU ($-JTB)/2
000001C0 0CB6                A   458          DW    LOOPAUXSUB
         00000061            A   459    LEAVE:      EQU ($-JTB)/2
000001C2 0CDF                A   460          DW    LEAVESUB
         00000062            A   461    UNLOOP:      EQU ($-JTB)/2
000001C4 0C35                A   462          DW    UNLOOPSUB
         00000063            A   463    _IF:        EQU ($-JTB)/2
000001C6 0CE7                A   464          DW    IFSUB
         00000064            A   465    _THEN:      EQU ($-JTB)/2
000001C8 0CEF                A   466          DW    THENSUB
```

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PC       Machine Code        I  Line    File: newsys.v4e
         00000065            A   467    _ELSE:     EQU ($-JTB)/2
000001CA 0CFD                A   468          DW   ELSESUB
         00000066            A   469    BEGIN:     EQU ($-JTB)/2
000001CC 0D07                A   470          DW   BEGINSUB
         00000067            A   471    UNTIL:     EQU ($-JTB)/2
000001CE 0D0B                A   472          DW   UNTILSUB
         00000068            A   473    WHILE:     EQU ($-JTB)/2
000001D0 0D19                A   474          DW   WHILESUB
         00000069            A   475    REPEAT:    EQU ($-JTB)/2
000001D2 0D1D                A   476          DW   REPEATSUB
         0000006A            A   477    CASE:      EQU ($-JTB)/2
000001D4 0D34                A   478          DW   CASESUB
         0000006B            A   479    OF:        EQU ($-JTB)/2
000001D6 0D64                A   480          DW   OFSUB
         0000006C            A   481    OFAUX:     EQU ($-JTB)/2
000001D8 0D3C                A   482          DW   OFAUXSUB
         0000006D            A   483    ENDCASE:   EQU ($-JTB)/2
000001DA 0D6B                A   484          DW   ENDCASESUB
         0000006E            A   485    FORGET:    EQU ($-JTB)/2
000001DC 0D79                A   486          DW   FORGETSUB
         0000006F            A   487    BCMOVE:     EQU ($-JTB)/2
000001DE 0DA0                A   488          DW   BCMOVESUB
         00000070            A   489    EXIT:      EQU ($-JTB)/2
000001E0 0DB9                A   490          DW   EXITSUB
         00000071            A   491    BOOT:      EQU ($-JTB)/2
000001E2 0DC0                A   492          DW   BOOTSUB
         00000072            A   493    DABS:      EQU ($-JTB)/2
000001E4 0DD2                A   494          DW   DABSSUB
         00000073            A   495    DDOT:     EQU ($-JTB)/2
000001E6 0DDD                A   496          DW   DDOTSUB
         00000074            A   497    SINTOD:    EQU ($-JTB)/2
000001E8 0DE8                A   498          DW   SINTODSUB
         00000075            A   499    QS:       EQU ($-JTB)/2
000001EA 0E93                A   500          DW   QSSUB
         00000076            A   501    SCR:    EQU ($-JTB)/2
000001EC 0EE0                A   502          DW   SCRSUB
         00000077            A   503    SEMICS: EQU ($-JTB)/2
000001EE 0F00                A   504          DW   SEMICSSUB
         00000078            A   505    LSCR: EQU ($-JTB)/2
000001F0 0F12                A   506          DW   LSCRSUB
         00000079            A   507    DUMP: EQU ($-JTB)/2
000001F2 0F3D                A   508          DW   DUMPSUB
         0000007A            A   509    FILL: EQU ($-JTB)/2
000001F4 0EC7                A   510          DW   FILLSUB
         0000007B            A   511    SAVE: EQU ($-JTB)/2
000001F6 1343                A   512          DW   SAVESUB
         0000007C            A   513    BSLASH: EQU ($-JTB)/2
000001F8 1359                A   514          DW   BSLASHSUB
         0000007D            A   515    LAT: EQU ($-JTB)/2
000001FA 0FAD                A   516          DW   LATSUB
         0000007E            A   517    PAT: EQU ($-JTB)/2
000001FC 1078                A   518          DW   PATSUB
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PC       Machine Code        I  Line    File: newsys.v4e
         0000007F            A   519    SAT: EQU ($-JTB)/2
000001FE 0EEA                A   520          DW   SATSUB
         00000080            A   521    GINTO: EQU ($-JTB)/2
00000200 0FCD                A   522          DW   GINTOSUB
         00000081            A   523    GSTORE: EQU ($-JTB)/2
00000202 0EF6                A   524          DW   GSTORESUB
         00000082            A   525    ES: EQU ($-JTB)/2
00000204 1326                A   526          DW   ESSUB
         00000083            A   527    ENS: EQU ($-JTB)/2
00000206 1331                A   528          DW   ENSSUB
         00000084            A   529    EPS: EQU ($-JTB)/2
00000208 133A                A   530          DW   EPSSUB
         00000085            A   531    EDIT: EQU ($-JTB)/2
0000020A 10F9                A   532          DW   EDITSUB
                             A   533
                             A   534    ; ----------------------------------------------------
                             A   535    ; Start of the head definitions
                             A   536
         0000020C            A   537    EXECUTEHEAD: EQU $
0000020C 87455845 435554 C5  A   538          DB   087H, "EXECUT", _E
00000214 00                  A   539          DB   0
00000215 08                  A   540          DB   EXECUTE
                             A   541
         00000216            A   542    KEYHEAD: EQU $
00000216 834B45 D9           A   543          DB   083H, "KE", _Y
0000021A 0E                  A   544          DB   $-EXECUTEHEAD
0000021B 09                  A   545          DB   KEY
                             A   546
         0000021C            A   547    EMITHEAD: EQU $
0000021C 84454D49 D4         A   548          DB   084H, "EMI", _T
00000221 0B                  A   549          DB   $-KEYHEAD
00000222 0A                  A   550          DB   EMIT
                             A   551
         00000223            A   552    STOREHEAD: EQU $
00000223 81 A1               A   553          DB   081H, _EX
00000225 09                  A   554          DB   $-EMITHEAD
00000226 0B                  A   555          DB   STORE
                             A   556
         00000227            A   557    CSTOREHEAD: EQU $
00000227 8243 A1             A   558          DB   082H, "C", _EX
0000022A 07                  A   559          DB   $-STOREHEAD
0000022B 0C                  A   560          DB   CSTORE
                             A   561
         0000022C            A   562    ATHEAD:  EQU $
0000022C 81 C0               A   563          DB   081H, _AT
0000022E 07                  A   564          DB   $-CSTOREHEAD
0000022F 0D                  A   565          DB   AT
                             A   566
         00000230            A   567    CATHEAD: EQU $
00000230 8243 C0             A   568          DB   082H, "C", _AT
00000233 07                  A   569          DB   $-ATHEAD
00000234 0E                  A   570          DB   CAT
```

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PC       Machine Code        I  Line    File: newsys.v4e
                             A   571
         00000235            A   572    ONTORHEAD: EQU $
00000235 823E D2             A   573          DB   082H, ">", _R
00000238 08                  A   574          DB   $-CATHEAD
00000239 0F                  A   575          DB   ONTOR
                             A   576
         0000023A            A   577    RONTOHEAD: EQU $
0000023A 8252 BE             A   578          DB   082H, "R", _GT
0000023D 08                  A   579          DB   $-ONTORHEAD
0000023E 10                  A   580          DB   RONTO
                             A   581
         0000023F            A   582    SWAPHEAD: EQU $
0000023F 84535741 D0         A   583          DB   084H, "SWA", _P
00000244 0A                  A   584          DB   $-RONTOHEAD
00000245 11                  A   585          DB   SWAP
                             A   586
         00000246            A   587    DUPHEAD:EQU $
00000246 834455 D0           A   588          DB   083H, "DU", _P
0000024A 0B                  A   589          DB   $-SWAPHEAD
0000024B 12                  A   590          DB   DUP
                             A   591
         0000024C            A   592    DROPHEAD:EQU $
0000024C 8444524F D0         A   593          DB   084H, "DRO", _P
00000251 0B                  A   594          DB   $-DUPHEAD
00000252 13                  A   595          DB   DROP
                             A   596
         00000253            A   597    ANDHEAD:EQU $
00000253 83414E C4           A   598          DB   083H, "AN", _D
00000257 0B                  A   599          DB   $-DROPHEAD
00000258 14                  A   600          DB   AND
                             A   601
         00000259            A   602    ORHEAD: EQU $
00000259 824F D2             A   603          DB   082H, "O", _R
0000025C 09                  A   604          DB   $-ANDHEAD
0000025D 15                  A   605          DB   OR
                             A   606
         0000025E            A   607    PLUSHEAD: EQU $
0000025E 81 AB               A   608          DB   081H, _PLUS
00000260 07                  A   609          DB   $-ORHEAD
00000261 16                  A   610          DB   PLUS
                             A   611
         00000262            A   612    NEGATEHEAD:EQU $
00000262 864E4547 4154 C5    A   613          DB   086H, "NEGAT", _E
00000269 0B                  A   614          DB   $-PLUSHEAD
0000026A 17                  A   615          DB   NEGATE
                             A   616
         0000026B            A   617    USTARHEAD: EQU $
0000026B 8255 AA             A   618          DB   082H, "U", _AST
0000026E 0C                  A   619          DB   $-NEGATEHEAD
0000026F 18                  A   620          DB   USTAR
                             A   621
         00000270            A   622    USLASHHEAD: EQU $
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PC       Machine Code        I  Line    File: newsys.v4e
00000270 8255 AF             A   623          DB   082H, "U", _VIR
00000273 08                  A   624          DB   $-USTARHEAD
00000274 19                  A   625          DB   USLASH
                             A   626
         00000275            A   627    SLNHEAD: EQU $
00000275 83534C CE           A   628          DB   083H, "SL", _N
00000279 09                  A   629          DB   $-USLASHHEAD
0000027A 1A                  A   630          DB   SLN
                             A   631
         0000027B            A   632    ZEQHEAD: EQU $
0000027B 8230 BD             A   633          DB   082H, "0", _EQ
0000027E 09                  A   634          DB   $-SLNHEAD
0000027F 1B                  A   635          DB   ZEQ
                             A   636
         00000280            A   637    GTEQHEAD: EQU $
00000280 823E BD             A   638          DB   082H, ">", _EQ
00000283 08                  A   639          DB   $-ZEQHEAD
00000284 1C                  A   640          DB   GTEQ
                             A   641
         00000285            A   642    IHEAD: EQU $
00000285 81 C9               A   643          DB   081H, _I
00000287 07                  A   644          DB   $-GTEQHEAD
00000288 1D                  A   645          DB   I
                             A   646
         00000289            A   647    CMOVEHEAD: EQU $
00000289 85434D4F 56 C5      A   648          DB   085H, "CMOV", _E
0000028F 0A                  A   649          DB   $-IHEAD
00000290 1E                  A   650          DB   CMOVE
                             A   651
         00000291            A   652    HEREHEAD: EQU $
00000291 84484552 C5         A   653          DB   084H, "HER", _E
00000296 0D                  A   654          DB   $-CMOVEHEAD
00000297 1F                  A   655          DB   HERE
                             A   656
         00000298            A   657    COMMAHEAD: EQU $
00000298 81 AC               A   658          DB   081H, _CMA
0000029A 09                  A   659          DB   $-HEREHEAD
0000029B 20                  A   660          DB   COMMA
                             A   661
         0000029C            A   662    CCOMMAHEAD: EQU $
0000029C 8243 AC             A   663          DB   082H, "C", _CMA
0000029F 07                  A   664          DB   $-COMMAHEAD
000002A0 21                  A   665          DB   CCOMMA
                             A   666
         000002A1            A   667    HDOTHEAD: EQU $
000002A1 8248 AE             A   668          DB   082H, "H", _DOT
000002A4 08                  A   669          DB   $-CCOMMAHEAD
000002A5 22                  A   670          DB   HDOT
                             A   671
         000002A6            A   672    COLDHEAD: EQU $
000002A6 84434F4C C4         A   673          DB   084H, "COL", _D
000002AB 0A                  A   674          DB   $-HDOTHEAD
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PC       Machine Code        I  Line    File: newsys.v4e
000002AC 23                  A   675          DB   COLD
                             A   676
         000002AD            A   677    ONEPLUSHEAD: EQU $
000002AD 8231 AB             A   678          DB   082H, "1", _PLUS
000002B0 0A                  A   679          DB   $-COLDHEAD
000002B1 24                  A   680          DB   ONEPLUS
                             A   681
         000002B2            A   682    ZEROHEAD: EQU $
000002B2 81 B0               A   683          DB   081H, _N0
000002B4 07                  A   684          DB   $-ONEPLUSHEAD
000002B5 2D                  A   685          DB   ZERO
                             A   686
         000002B6            A   687    ONEHEAD: EQU $
000002B6 81 B1               A   688          DB   081H, _N1
000002B8 06                  A   689          DB   $-ZEROHEAD
000002B9 2E                  A   690          DB   ONE
                             A   691
         000002BA            A   692    MINUSHEAD: EQU $
000002BA 81 AD               A   693          DB   081H, _MI
000002BC 06                  A   694          DB   $-ONEHEAD
000002BD 2F                  A   695          DB   MINUS
                             A   696
         000002BE            A   697    EQUALSHEAD: EQU $
000002BE 81 BD               A   698          DB   081H, _EQ
000002C0 06                  A   699          DB   $-MINUSHEAD
000002C1 30                  A   700          DB   EQUALS
                             A   701
         000002C2            A   702    OVERHEAD: EQU $
000002C2 844F5645 D2         A   703          DB   084H, "OVE", _R
000002C7 09                  A   704          DB   $-EQUALSHEAD
000002C8 31                  A   705          DB   OVER
                             A   706
         000002C9            A   707    ROTHEAD: EQU $
000002C9 83524F D4           A   708          DB   083H, "RO", _T
000002CD 0B                  A   709          DB   $-OVERHEAD
000002CE 32                  A   710          DB   ROT
                             A   711
         000002CF            A   712    SPACEHEAD: EQU $
000002CF 85535041 43 C5      A   713          DB   085H, "SPAC", _E
000002D5 0C                  A   714          DB   $-ROTHEAD
000002D6 33                  A   715          DB   SPACE
                             A   716
         000002D7            A   717    PLUSSTOREHEAD: EQU $
000002D7 822B A1             A   718          DB   082H, "+", _EX
000002DA 0B                  A   719          DB   $-SPACEHEAD
000002DB 34                  A   720          DB   PLUSSTORE
                             A   721
         000002DC            A   722    NULLHEAD: EQU $
000002DC C180                A   723          DB   0C1H, 080H
000002DE 07                  A   724          DB   $-PLUSSTOREHEAD
000002DF 35                  A   725          DB   null
                             A   726
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PC       Machine Code        I  Line    File: newsys.v4e
         000002E0            A   727    CRHEAD: EQU $
000002E0 8243 D2             A   728          DB   082H, "C", _R
000002E3 07                  A   729          DB   $-NULLHEAD
000002E4 36                  A   730          DB   CR
                             A   731
         000002E5            A   732    WORDHEAD: EQU $
000002E5 84574F52 C4         A   733          DB   084H, "WOR", _D
000002EA 0A                  A   734          DB   $-CRHEAD
000002EB 37                  A   735          DB   WORD
                             A   736
         000002EC            A   737    COUNTHEAD: EQU $
000002EC 85434F55 4E D4      A   738          DB   085H, "COUN", _T
000002F2 0D                  A   739          DB   $-WORDHEAD
000002F3 38                  A   740          DB   COUNT
                             A   741
         000002F4            A   742    TYPEHEAD: EQU $
000002F4 84545950 C5         A   743          DB   084H, "TYP", _E
000002F9 0D                  A   744          DB   $-COUNTHEAD
000002FA 39                  A   745          DB   TYPE
                             A   746
         000002FB            A   747    FINDHEAD: EQU $
000002FB 8446494E C4         A   748          DB   084H, "FIN", _D
00000300 0C                  A   749          DB   $-TYPEHEAD
00000301 3A                  A   750          DB   FIND
                             A   751
         00000302            A   752    FINDEAHEAD: EQU $
00000302 8646494E 4445 C1    A   753          DB   086H, "FINDE", _A
00000309 0E                  A   754          DB   $-FINDHEAD
0000030A 3B                  A   755          DB   FINDEA
                             A   756
         0000030B            A   757    DPLUSHEAD: EQU $
0000030B 8244 AB             A   758          DB   082H, "D", _PLUS
0000030E 0C                  A   759          DB   $-FINDEAHEAD
0000030F 3C                  A   760          DB   DPLUS
                             A   761
         00000310            A   762    DNEGATEHEAD: EQU $
00000310 87444E45 474154 C5  A   763          DB   087H, "DNEGAT", _E
00000318 0D                  A   764          DB   $-DPLUSHEAD
00000319 3D                  A   765          DB   DNEGATE
                             A   766
         0000031A            A   767    COMPILEHEAD: EQU $
0000031A C7434F4D 50494C C5  A   768          DB   0C7H, "COMPIL", _E
00000322 12                  A   769          DB   $-DNEGATEHEAD
00000323 3E                  A   770          DB   COMPILE
                             A   771
         00000324            A   772    LITERALHEAD: EQU $
00000324 C74C4954 455241 CC  A   773          DB   0C7H, "LITERA", _L
0000032C 12                  A   774          DB   $-COMPILEHEAD
0000032D 3F                  A   775          DB   LITERAL
                             A   776
         0000032E            A   777    DLITERALHEAD: EQU $
0000032E C8444C49 54455241   A   778          DB   0C8H, "DLITERA", _L
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PC       Machine Code        I  Line    File: newsys.v4e
00000336 CC
00000337 13                  A   779          DB   $-LITERALHEAD
00000338 40                  A   780          DB   DLITERAL
                             A   781
         00000339            A   782    DIGITHEAD: EQU $
00000339 85444947 49 D4      A   783          DB   085H, "DIGI", _T
0000033F 11                  A   784          DB   $-DLITERALHEAD
00000340 41                  A   785          DB   DIGIT
                             A   786
         00000341            A   787    NUMBERHEAD: EQU $
00000341 864E554D 4245 D2    A   788          DB   086H, "NUMBE", _R
00000348 0F                  A   789          DB   $-DIGITHEAD
00000349 42                  A   790          DB   NUMBER
                             A   791
         0000034A            A   792    QUITHEAD: EQU $
0000034A 84515549 D4         A   793          DB   084H, "QUI", _T
0000034F 0E                  A   794          DB   $-NUMBERHEAD
00000350 43                  A   795          DB   QUIT
                             A   796
         00000351            A   797    LFTBRHEAD: EQU $
00000351 C1 DB               A   798          DB   0C1H, _LB
00000353 09                  A   799          DB   $-QUITHEAD
00000354 44                  A   800          DB   LFTBR
                             A   801
         00000355            A   802    RTBRHEAD: EQU $
00000355 C1 DD               A   803          DB   0C1H, _RB
00000357 06                  A   804          DB   $-LFTBRHEAD
00000358 45                  A   805          DB   RTBR
                             A   806
         00000359            A   807    TICHEAD: EQU $
00000359 C1 A7               A   808          DB   0C1H, _SQ
0000035B 06                  A   809          DB   $-RTBRHEAD
0000035C 46                  A   810          DB   TIC
                             A   811
         0000035D            A   812    MINHEAD:  EQU $
0000035D 834D49 CE           A   813          DB   083H, "MI", _N
00000361 08                  A   814          DB   $-TICHEAD
00000362 47                  A   815          DB   MIN
                             A   816
         00000363            A   817    ALLOTHEAD: EQU $
00000363 85414C4C 4F D4      A   818          DB   085H, "ALLO", _T
00000369 0C                  A   819          DB   $-MINHEAD
0000036A 48                  A   820          DB   ALLOT
                             A   821
         0000036B            A   822    CREATEHEAD: EQU $
0000036B 86435245 4154 C5    A   823          DB   086H, "CREAT", _E
00000372 0F                  A   824          DB   $-ALLOTHEAD
00000373 49                  A   825          DB   CREATE
                             A   826
         00000374            A   827    COLONDEFHEAD: EQU $
00000374 C1 BA               A   828          DB   0C1H, _CN
00000376 0B                  A   829          DB   $-CREATEHEAD
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000377 4A                  A   830          DB   COLONDEF
                             A   831
         00000378            A   832    SMUDGEHEAD: EQU $
00000378 86534D55 4447 C5    A   833          DB   086H, "SMUDG", _E
0000037F 0B                  A   834          DB   $-COLONDEFHEAD
00000380 4B                  A   835          DB   SMUDGE
                             A   836
         00000381            A   837    SEMICDEFHEAD: EQU $
00000381 C1 BB               A   838          DB   0C1H, _SCN
00000383 0B                  A   839          DB   $-SMUDGEHEAD
00000384 4C                  A   840          DB   SEMICDEF
                             A   841
         00000385            A   842    CONSTANTHEAD: EQU $
00000385 88434F4E 5354414E   A   843          DB   088H, "CONSTAN", _T
0000038D D4
0000038E 0D                  A   844          DB   $-SEMICDEFHEAD
0000038F 4D                  A   845          DB   CONSTANT
                             A   846
         00000390            A   847    BUILDSHEAD: EQU $
00000390 873C4255 494C44 D3  A   848          DB   087H, "<BUILD", _S
00000398 13                  A   849          DB   $-CONSTANTHEAD
00000399 4E                  A   850          DB   BUILDS
                             A   851
         0000039A            A   852    DOESHEAD: EQU $
0000039A 85444F45 53 BE      A   853          DB   085H, "DOES", _GT
000003A0 10                  A   854          DB   $-BUILDSHEAD
000003A1 4F                  A   855          DB   DOES
                             A   856
         000003A2            A   857    IMMEDIATEHEAD: EQU $
000003A2 89494D4D 45444941   A   858          DB   089H, "IMMEDIAT", _E
000003AA 54 C5
000003AC 12                  A   859          DB   $-DOESHEAD
000003AD 50                  A   860          DB   IMMEDIATE
                             A   861
         000003AE            A   862    DOTQUOTEHEAD: EQU $
000003AE C22EA2              A   863          DB   0C2H, ".", 22H + 080H ; 22h is a quotation marks symbol
000003B1 0F                  A   864          DB   $-IMMEDIATEHEAD
000003B2 52                  A   865          DB   DOTQUOTE
                             A   866
         000003B3            A   867    STRINGHEAD: EQU $
000003B3 C6535452 494E C7    A   868          DB   0C6h, "STRIN", _G
000003BA 0C                  A   869          DB   $-DOTQUOTEHEAD
000003BB 53                  A   870          DB   STRING
                             A   871
         000003BC            A   872    PADHEAD: EQU $
000003BC 835041 C4           A   873          DB   083H, "PA", _D
000003C0 0D                  A   874          DB   $-STRINGHEAD
000003C1 54                  A   875          DB   PAD
                             A   876
         000003C2            A   877    HOLDHEAD: EQU $
000003C2 84484F4C C4         A   878          DB   084H, "HOL", _D
000003C7 0B                  A   879          DB   $-PADHEAD
```

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PC       Machine Code        I  Line    File: newsys.v4e
000003C8 55                  A   880          DB   HOLD
                             A   881
         000003C9            A   882    INTOPOUNDHEAD: EQU $
000003C9 823C A3             A   883          DB   082H, "<", _PND
000003CC 0A                  A   884          DB   $-HOLDHEAD
000003CD 56                  A   885          DB   INTOPOUND
                             A   886
         000003CE            A   887    POUNDHEAD: EQU $
000003CE 81 A3               A   888          DB   081H, _PND
000003D0 07                  A   889          DB   $-INTOPOUNDHEAD
000003D1 57                  A   890          DB   POUND
                             A   891
         000003D2            A   892    POUNDSHEAD: EQU $
000003D2 8223 D3             A   893          DB   082H, "#", _S
000003D5 07                  A   894          DB   $-POUNDHEAD
000003D6 58                  A   895          DB   POUNDS
                             A   896
         000003D7            A   897    POUNDINTOHEAD: EQU $
000003D7 8223 BE             A   898          DB   082H, "#", _GT
000003DA 08                  A   899          DB   $-POUNDSHEAD
000003DB 59                  A   900          DB   POUNDINTO
                             A   901
         000003DC            A   902    SIGNHEAD: EQU $
000003DC 84534947 CE         A   903          DB   084H, "SIG", _N
000003E1 0A                  A   904          DB   $-POUNDINTOHEAD
000003E2 5A                  A   905          DB   SIGN
                             A   906
         000003E3            A   907    DOHEAD: EQU $
000003E3 C244 CF             A   908          DB   0C2H, "D", _O
000003E6 0A                  A   909          DB   $-SIGNHEAD
000003E7 5B                  A   910          DB   DO
                             A   911
         000003E8            A   912    PLUSLOOPHEAD: EQU $
000003E8 C52B4C4F 4F D0      A   913          DB   0C5H, "+LOO", _P
000003EE 0B                  A   914          DB   $-DOHEAD
000003EF 5D                  A   915          DB   PLUSLOOP
                             A   916
         000003F0            A   917    LOOPHEAD: EQU $
000003F0 C44C4F4F D0         A   918          DB   0C4H, "LOO", _P
000003F5 0D                  A   919          DB   $-PLUSLOOPHEAD
000003F6 5F                  A   920          DB   _LOOP
                             A   921
         000003F7            A   922    LEAVEHEAD: EQU $
000003F7 C54C4541 56 C5      A   923          DB   0C5H, "LEAV", _E
000003FD 0D                  A   924          DB   $-LOOPHEAD
000003FE 61                  A   925          DB   LEAVE
                             A   926
         000003FF            A   927    IFHEAD: EQU $
000003FF C249 C6             A   928          DB   0C2H, "I", _F
00000402 0B                  A   929          DB   $-LEAVEHEAD
00000403 63                  A   930          DB   _IF
                             A   931
```

```
PC       Machine Code        I  Line    File: newsys.v4e
         00000404            A   932    THENHEAD: EQU $
00000404 C4544845 CE         A   933          DB   0C4H, "THE", _N
00000409 0A                  A   934          DB   $-IFHEAD
0000040A 64                  A   935          DB   _THEN
                             A   936
         0000040B            A   937    ELSEHEAD: EQU $
0000040B C4454C53 C5         A   938          DB   0C4H, "ELS", _E
00000410 0C                  A   939          DB   $-THENHEAD
00000411 65                  A   940          DB   _ELSE
                             A   941
         00000412            A   942    BEGINHEAD: EQU $
00000412 C5424547 49 CE      A   943          DB   0C5H, "BEGI", _N
00000418 0D                  A   944          DB   $-ELSEHEAD
00000419 66                  A   945          DB   BEGIN
                             A   946
         0000041A            A   947    UNTILHEAD: EQU $
0000041A C5554E54 49 CC      A   948          DB   0C5H, "UNTI", _L
00000420 0E                  A   949          DB   $-BEGINHEAD
00000421 67                  A   950          DB   UNTIL
                             A   951
         00000422            A   952    WHILEHEAD: EQU $
00000422 C5574849 4C C5      A   953          DB   0C5H, "WHIL", _E
00000428 0E                  A   954          DB   $-UNTILHEAD
00000429 68                  A   955          DB   WHILE
                             A   956
         0000042A            A   957    REPEATHEAD: EQU $
0000042A C6524550 4541 D4    A   958          DB   0C6H, "REPEA", _T
00000431 0F                  A   959          DB   $-WHILEHEAD
00000432 69                  A   960          DB   REPEAT
                             A   961
         00000433            A   962    CASEHEAD: EQU $
00000433 C4434153 C5         A   963          DB   0C4H, "CAS", _E
00000438 0E                  A   964          DB   $-REPEATHEAD
00000439 6A                  A   965          DB   CASE
                             A   966
         0000043A            A   967    OFHEAD: EQU $
0000043A C24F C6             A   968          DB   0C2H, "O", _F
0000043D 0A                  A   969          DB   $-CASEHEAD
0000043E 6B                  A   970          DB   OF
                             A   971
         0000043F            A   972    ENDCASEHEAD: EQU $
0000043F C7454E44 434153 C5  A   973          DB   0C7H, "ENDCAS", _E
00000447 0D                  A   974          DB   $-OFHEAD
00000448 6D                  A   975          DB   ENDCASE
                             A   976
         00000449            A   977    FORGETHEAD: EQU $
00000449 C6464F52 4745 D4    A   978          DB   0C6H, "FORGE", _T
00000450 11                  A   979          DB   $-ENDCASEHEAD
00000451 6E                  A   980          DB   FORGET
                             A   981
         00000452            A   982    BCMOVEHEAD: EQU $
00000452 863C434D 4F56 C5    A   983          DB   086H, "<CMOV", _E
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000459 10                  A   984          DB   $-FORGETHEAD
0000045A 6F                  A   985          DB   BCMOVE
                             A   986
         0000045B            A   987    EXITHEAD: EQU $
0000045B 85455849 54 AC      A   988          DB   085H, "EXIT",_CMA
00000461 0F                  A   989          DB   $-BCMOVEHEAD
00000462 70                  A   990          DB   EXIT
                             A   991
         00000463            A   992    BOOTHEAD: EQU $
00000463 84424F4F D4         A   993          DB   084H, "BOO", _T
00000468 0D                  A   994          DB   $-EXITHEAD
00000469 71                  A   995          DB   BOOT
                             A   996
         0000046A            A   997    DABSHEAD: EQU $
0000046A 84444142 D3         A   998          DB   084H,"DAB", _S
0000046F 0C                  A   999          DB   $-BOOTHEAD
00000470 72                  A  1000          DB   DABS
                             A  1001
         00000471            A  1002    DDOTHEAD: EQU $
00000471 8244 AE             A  1003          DB   082H,"D",_DOT
00000474 0A                  A  1004          DB   $-DABSHEAD
00000475 73                  A  1005          DB   DDOT
                             A  1006
         00000476            A  1007    SINTODHEAD: EQU $
00000476 84532D3E C4         A  1008          DB   084H,"S->", _D
0000047B 0A                  A  1009          DB   $-DDOTHEAD
0000047C 74                  A  1010          DB   SINTOD
                             A  1011
         0000047D            A  1012    SCRHEAD: EQU $
0000047D 835343 D2           A  1013          DB   083H, "SC", _R
00000481 0B                  A  1014          DB   $-SINTODHEAD
00000482 76                  A  1015          DB   SCR
                             A  1016
         00000483            A  1017    SEMICSHEAD: EQU $
00000483 E23B D3             A  1018          DB   0E2H,";", _S
00000486 09                  A  1019          DB   $-SCRHEAD
00000487 77                  A  1020          DB   SEMICS
                             A  1021
         00000488            A  1022    QUESTSHEAD: EQU $
00000488 823F D3             A  1023          DB   082H,"?", _S
0000048B 08                  A  1024          DB   $-SEMICSHEAD
0000048C 75                  A  1025          DB   QS
                             A  1026
         0000048D            A  1027    FILLHEAD:  EQU $
0000048D 8446494C CC         A  1028          DB   084H, "FIL",  _L
00000492 0A                  A  1029          DB   $-QUESTSHEAD
00000493 7A                  A  1030          DB   FILL
                             A  1031
         00000494            A  1032    LSCRHEAD: EQU $
00000494 A44C5343 D2         A  1033          DB   0A4H,"LSC", _R
00000499 0C                  A  1034          DB   $-FILLHEAD
0000049A 78                  A  1035          DB   LSCR
```

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PC       Machine Code        I  Line    File: newsys.v4e
                             A  1036
         0000049B            A  1037    DUMPHEAD: EQU $
0000049B A444554D D0         A  1038          DB   0A4H,"DUM", _P
000004A0 0C                  A  1039          DB   $-LSCRHEAD
000004A1 79                  A  1040          DB   DUMP
                             A  1041
         000004A2            A  1042    ESHEAD: EQU $
000004A2 8245 D3             A  1043          DB   082H,"E", _S
000004A5 0A                  A  1044          DB   $-DUMPHEAD
000004A6 82                  A  1045          DB   ES
                             A  1046
         000004A7            A  1047    ENSHEAD: EQU $
000004A7 83454E D3           A  1048          DB   083H,"EN", _S
000004AB 09                  A  1049          DB   $-ESHEAD
000004AC 83                  A  1050          DB   ENS
                             A  1051
         000004AD            A  1052    EPSHEAD: EQU $
000004AD 834550 D3           A  1053          DB   083H,"EP", _S
000004B1 0A                  A  1054          DB   $-ENSHEAD
000004B2 84                  A  1055          DB   EPS
                             A  1056
         000004B3            A  1057    SAVEHEAD: EQU $
000004B3 844C4953 D4         A  1058          DB   084H,"LIS",_T ; SAVE is called LIST externally
000004B8 0B                  A  1059          DB   $-EPSHEAD
000004B9 7B                  A  1060          DB   SAVE
                             A  1061
         000004BA            A  1062    BSHEAD: EQU $
000004BA C1 DC               A  1063          DB   0C1H, _BS
000004BC 09                  A  1064          DB   $-SAVEHEAD
000004BD 7C                  A  1065          DB   BSLASH
                             A  1066
         000004BE            A  1067    EDITHEAD: EQU $
000004BE A4454449 D4         A  1068          DB   0A4H,"EDI", _T
000004C3 09                  A  1069          DB   $-BSHEAD
000004C4 85                  A  1070          DB   EDIT
                             A  1071
         000004C5            A  1072    LASTBYTE EQU $       ; This address is the end of the ROM defs
                             A  1073                         ; Any address beyond this is a long call
                             A  1074
                             A  1075    ; ----------------------------------------------------
         000004C5            A  1076    StartOfCode EQU $
                             A  1077
         000004C5            A  1078    SEMICOLONSUB: EQU $          ; Code for semicolon - return from forth word
000004C5 F8FD                A  1079          LD   R15,RP            ; Load r15 with current group number
000004C7 06EF02              A  1080          ADD  R15,#IP&0Fh       ; Point r15 to current ip (r2)
000004CA C3F0                A  1081          LDCI @R15,@RR0         ; Load r2/r3 from the rstack
000004CC C3F0                A  1082          LDCI @R15,@RR0         ; RStack left pointing to low bute of prior entry
000004CE 3016                A  1083          JP   @NV               ; And go to this address
                             A  1084
         000004D0            A  1085    POP8: EQU $          ; pop stack to w8 (r8-r9)
000004D0 50EE                A  1086          POP  R14       ; Pop return address to w14
000004D2 50EF                A  1087          POP  R15
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PC       Machine Code        I  Line    File: newsys.v4e
000004D4 50E8                A  1088    POP8A:POP  R8        ; Pop stack to w8
000004D6 50E9                A  1089          POP  R9
000004D8 30EE                A  1090          JP   @WW14     ; Return via w14
                             A  1091
         000004DA            A  1092    POPA8: EQU $         ; Pop top-of-stack to w10 (r10-r13)
                             A  1093                         ;   Next-to-top-of-stack to w8 (r8-r9)
000004DA 50EE                A  1094          POP  R14       ; Pop return address to w14
000004DC 50EF                A  1095          POP  R15
000004DE 50EA                A  1096    POPAA:POP  R10       ; Pop stack to w10
000004E0 50EB                A  1097          POP  R11
000004E2 50E8                A  1098          POP  R8
000004E4 50E9                A  1099          POP  R9
000004E6 30EE                A  1100          JP   @WW14     ; Return via r14
                             A  1101
         000004E8            A  1102    POPCA8: EQU $        ; Pop top-of-stack to w12 (r12-r13)
                             A  1103                         ;   Next-to-top-of-stack to w10 (r10-r13)
                             A  1104                         ;    Third-from-top to w8 (r8-r9)
000004E8 50EE                A  1105          POP  R14       ; Pop return address to w14
000004EA 50EF                A  1106          POP  R15
000004EC 50EC                A  1107          POP  R12       ; Pop stack to w12
000004EE 50ED                A  1108          POP  R13
000004F0 8B EC               A  1109          JR   POPAA     ; Go to popa8 - pop next two words to w10 & w8
                             A  1110
         000004F2            A  1111    PUSH8: EQU $         ; Push w8 to stack
000004F2 50EE                A  1112          POP  R14       ; Pop return to w14
000004F4 50EF                A  1113          POP  R15
         000004F6            A  1114    PUSH8A: EQU $
000004F6 70E9                A  1115          PUSH R9        ; Push w8 (r9-r8) to stack
000004F8 70E8                A  1116          PUSH R8
000004FA 30EE                A  1117          JP   @WW14
                             A  1118
         000004FC            A  1119    PUSHA8: EQU $        ; Push w10 then w8 to the stack
000004FC 50EE                A  1120          POP  R14       ; Pop return to w14
000004FE 50EF                A  1121          POP  R15
         00000500            A  1122    PUSHAA: EQU $
00000500 70EB                A  1123          PUSH R11       ; Push w10 (r10-r11) to stack
00000502 70EA                A  1124          PUSH R10
00000504 8B F0               A  1125          JR   PUSH8A    ; Go to push8 to push w8 to stack
                             A  1126
         00000506            A  1127    PUSHCA8: EQU $       ; Push w12, then w10, then w8 to stack
00000506 50EE                A  1128          POP  R14       ; Pop return to w14
00000508 50EF                A  1129          POP  R15
0000050A 70ED                A  1130          PUSH R13       ; Push wc (r13-r12) to stack
0000050C 70EC                A  1131          PUSH R12
0000050E 8B F0               A  1132          JR   PUSHAA    ; Go to pusha8 to push w10, w8 to stack
                             A  1133
         00000510            A  1134    KEYSUB: EQU $        ; Code for key
                             A  1135    ;     CALL SERIN     ; Read serial port
         00000510            A  1136    SERIN: EQU $         ; Serial input (read) routine
00000510 76FA08              A  1137          TM   0FAH,#008H; Is serial input port ready?
00000513 6B FB               A  1138          JR   Z,SERIN   ; Zero means not ready
00000515 56FAF7              A  1139          AND  0FAH,#0F7H; Set port empty bit
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000518 98F0                A  1140          LD   R9,0F0H    ; Read character from i/o port
                             A  1141    ;     RET             ; Return from call
0000051A B0E8                A  1142          CLR  R8         ; Zero high byte of result
0000051C D6 04F2             A  1143          CALL PUSH8      ; Push result to stack
0000051F 3016                A  1144          JP   @NV
                             A  1145
         00000521            A  1146    EMITSUB: EQU $
00000521 D6 04D0             A  1147          CALL POP8       ; Stack to w8
00000524 D6 00B4             A  1148          CALL SEROUT     ; Write character in r9 to serial port
00000527 3016                A  1149          JP   @NV
                             A  1150
         00000529            A  1151    BRSUB: EQU $
00000529 C292                A  1152          LDC  R9,@RR2    ; Load the byte to put on the stack via ip
0000052B A0E2                A  1153          INCW RR2        ; Update the ip
0000052D B0E8                A  1154          CLR  R8         ; Zero out the high byte of the word to push
0000052F 8B 09               A  1155          JR   NRSUB1     ; Push word at r8/r9 to stack
                             A  1156
         00000531            A  1157    NRSUB: EQU $
00000531 F8FD                A  1158          LD   R15,RP     ; Get the current group number
00000533 06EF08              A  1159          ADD  R15,#WW8&0Fh ; And add 8 to point to r8/r9
00000536 C3F2                A  1160          LDCI @R15,@RR2 ; Load r8/r9 with memory at r2/r3 address
00000538 C3F2                A  1161          LDCI @R15,@RR2
         0000053A            A  1162    NRSUB1: EQU $
0000053A 70E9                A  1163          PUSH R9         ; And push r8/r9 to stack
0000053C 70E8                A  1164          PUSH R8
0000053E 3016                A  1165          JP   @NV        ; Return
                             A  1166
         00000540            A  1167    JRSSUB: EQU $
00000540 C292                A  1168          LDC  R9,@RR2
00000542 B0E8                A  1169          CLR  R8
00000544 8B 08               A  1170          JR   JRS1
                             A  1171
         00000546            A  1172    JRSUB:EQU  $          ; Jump relative subroutine
00000546 C282                A  1173          LDC  R8,@RR2
00000548 A0E2                A  1174          INCW RR2
0000054A C292                A  1175          LDC  R9,@RR2
0000054C 80E2                A  1176          DECW RR2
0000054E 0239                A  1177    JRS1: ADD  R3,R9      ; Add increment to instruction pointer
00000550 1228                A  1178          ADC  R2,R8
00000552 3016                A  1179          JP   @NV        ; Return
                             A  1180
         00000554            A  1181    JRZSSUB: EQU $        ; Routine for single byte FORWARD jumps
00000554 50E8                A  1182          POP  R8
00000556 50E9                A  1183          POP  R9
00000558 4289                A  1184          OR   R8,R9
0000055A 6B E4               A  1185          JR   Z,JRSSUB
0000055C A0E2                A  1186          INCW RR2
0000055E 3016                A  1187          JP   @NV
                             A  1188
         00000560            A  1189    JRZSUB: EQU $         ; Routine for single byte FORWARD jumps
00000560 50E8                A  1190          POP  R8         ; Takes jump is WOS is zero
00000562 50E9                A  1191          POP  R9
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PC       Machine Code        I  Line    File: newsys.v4e
00000564 4289                A  1192          OR   R8,R9      ; Test whether w8 is zero
00000566 6B DE               A  1193          JR   Z,JRSUB    ; If tos zero, use address to adjust ip
00000568 A0E2                A  1194          INCW RR2        ; Otherwise, skip over the increment
0000056A A0E2                A  1195          INCW RR2
0000056C 3016                A  1196          JP   @NV
         0000056E            A  1197    STORESUB: EQU  $      ; Code for !
0000056E D6 04DA             A  1198          CALL POPA8      ; Pop address to w10, object to w8
00000571 42AA                A  1199          OR   R10,R10    ; Is high byte of address zero?
00000573 6B 08               A  1200          JR   Z, SS2     ; If not zero store in register file location
00000575 D28A                A  1201          LDC  @RR10,R8   ; Code to store w8 in ram - high byte to ram
00000577 A0EA                A  1202          INCW RR10
00000579 D29A                A  1203      SS1:LDC  @RR10,R9   ; Low byte to ram
0000057B 3016                A  1204          JP   @NV        ; Return
0000057D F5E8EB              A  1205      SS2:LD   @WW11,R8   ; Code to store r8 in reg file - high byte first
00000580 20EB                A  1206          INC  WW11       ; Point r11 to next byte in register file
00000582 F5E9EB              A  1207      SS3:LD   @WW11,R9   ; Low byte to reg file
00000585 3016                A  1208          JP   @NV        ; Return
                             A  1209
         00000587            A  1210    CSTORESUB:EQU  $      ; Code for c!
00000587 D6 04DA             A  1211          CALL POPA8      ; Pop address to w10, object to w8
0000058A 42AA                A  1212          OR   R10,R10    ; Is high byte of address zero?
0000058C 6B F4               A  1213          JR   Z, SS3     ; Make use of reg file portion of !
0000058E 8B E9               A  1214          JR    SS1       ; Make use of ram portion of !
                             A  1215
         00000590            A  1216    ATSUB: EQU  $         ; Code for @
00000590 50E8                A  1217          POP  R8         ; Pop address to w8
00000592 50E9                A  1218          POP  R9
00000594 4288                A  1219          OR   R8,R8      ; Test for fetch from reg file or ram
00000596 6B 0C               A  1220          JR   Z,AT3      ; If zero, fetch from register file
00000598 C2A8                A  1221          LDC  R10,@RR8   ; Fetch from ram
0000059A A0E8                A  1222          INCW RR8
0000059C C2B8                A  1223      AS1:LDC  R11,@RR8
0000059E 70EB                A  1224      AS2:PUSH R11        ; Push w8 to stack
000005A0 70EA                A  1225          PUSH R10
000005A2 3016                A  1226          JP   @NV        ; Return
000005A4 E3A9                A  1227      AT3:LD   R10,@R9    ; Fetch from register file
000005A6 9E                  A  1228          INC  R9
000005A7 E3B9                A  1229      AT4:LD   R11,@R9
000005A9 8B F3               A  1230          JR   AS2        ; Use last part of ram fetch to push to stack
                             A  1231
         000005AB            A  1232    CATSUB: EQU $         ; Code for c@
000005AB 50E8                A  1233          POP  R8         ; Pop address to w8
000005AD 50E9                A  1234          POP  R9
000005AF B0EA                A  1235          CLR  R10        ; Set high byte of result to zero
000005B1 4288                A  1236          OR   R8,R8      ; Test for fetch from reg file or ram
000005B3 6B F2               A  1237          JR   Z,AT4      ; If zero fetch from reg file
000005B5 8B E5               A  1238          JR   AS1        ; Use portions of @ for one-byte fetches
                             A  1239
         000005B7            A  1240    ONTORSUB: EQU $       ; Code for >r
000005B7 50E8                A  1241          POP  R8
000005B9 50E9                A  1242          POP  R9
000005BB 80E0                A  1243          DECW RR0
```

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PC       Machine Code        I  Line    File: newsys.v4e
000005BD D290                A  1244          LDC  @RR0,R9
000005BF 80E0                A  1245          DECW RR0
000005C1 D280                A  1246          LDC  @RR0,R8
000005C3 3016                A  1247          JP   @NV       ; Return
                             A  1248
         000005C5            A  1249    RONTOSUB: EQU $      ; Code for r>
000005C5 F8FD                A  1250          LD   R15,RP
000005C7 06EF08              A  1251          ADD  R15,#WW8&0Fh
000005CA C3F0                A  1252          LDCI @R15,@RR0
000005CC C3F0                A  1253          LDCI @R15,@RR0
000005CE 70E9                A  1254          PUSH R9
000005D0 70E8                A  1255          PUSH R8
000005D2 3016                A  1256          JP   @NV       ; Return
                             A  1257
         000005D4            A  1258    SWAPSUB: EQU $       ; Code for swap
000005D4 50E8                A  1259          POP R8
000005D6 50E9                A  1260          POP R9
000005D8 50EA                A  1261          POP R10
000005DA 50EB                A  1262          POP R11
000005DC 8D 0752             A  1263          JP  OSA
                             A  1264
         000005DF            A  1265    DUPSUB: EQU $        ; Code for dup
000005DF 50E8                A  1266          POP  R8
000005E1 50E9                A  1267          POP  R9
000005E3 70E9                A  1268          PUSH R9
000005E5 70E8                A  1269          PUSH R8
000005E7 70E9                A  1270     DUPA:PUSH R9
000005E9 70E8                A  1271          PUSH R8
000005EB 3016                A  1272          JP   @NV
                             A  1273
         000005ED            A  1274    DROPSUB: EQU $       ; Code for drop
000005ED A0FE                A  1275          INCW SPH
000005EF A0FE                A  1276          INCW SPH
000005F1 3016                A  1277          JP   @NV
                             A  1278
         000005F3            A  1279    ANDSUB: EQU $        ; Code for and
000005F3 D6 04DA             A  1280          CALL POPA8     ; Pop arguments into w8, w10
000005F6 528A                A  1281          AND  R8,R10
000005F8 529B                A  1282          AND  R9,R11
000005FA 8B EB               A  1283          JR   DUPA
                             A  1284
         000005FC            A  1285    ORSUB:EQU $          ; Code for or
000005FC D6 04DA             A  1286          CALL POPA8     ; Pop arguments into w8, w10
000005FF 428A                A  1287          OR   R8,R10
00000601 429B                A  1288          OR   R9,R11
00000603 8B E2               A  1289          JR   DUPA
                             A  1290                         ;
         00000605            A  1291    PLUSSUB: EQU $       ; code for +
00000605 D6 04DA             A  1292          CALL POPA8     ; Pop arguments into w8,w10
00000608 029B                A  1293          ADD  R9,R11
0000060A 128A                A  1294          ADC  R8,R10
0000060C 8B D9               A  1295          JR   DUPA
```

```
PC       Machine Code        I  Line    File: newsys.v4e
                             A  1296
         0000060E            A  1297    NEGATESUB: EQU $     ; Code for negate
0000060E D6 04D0             A  1298          CALL POP8
00000611 60E9                A  1299          COM  R9
00000613 60E8                A  1300          COM  R8
00000615 A0E8                A  1301          INCW RR8
00000617 8B CE               A  1302          JR   DUPA
                             A  1303
         00000619            A  1304    USTARSUB: EQU $      ; Code for unsigned multiply
00000619 D6 04DA             A  1305          CALL POPA8     ; Pop arguments into w8, w10
0000061C B0EC                A  1306          CLR  R12       ; Clear product register
0000061E B0ED                A  1307          CLR  R13
00000620 7C11                A  1308          LD   R7,#011H  ; Go through bit-loop 17 times
00000622 CF                  A  1309          RCF
00000623 C0EC                A  1310      US1:RRC  R12       ; Rotate quad register c,d,a,b right
00000625 C0ED                A  1311          RRC  R13
00000627 C0EA                A  1312          RRC  R10
00000629 C0EB                A  1313          RRC  R11
0000062B FB 04               A  1314          JR   UGE, US2  ; If bit in carry is zero, add in mult
0000062D 02D9                A  1315          ADD  R13,R9
0000062F 12C8                A  1316          ADC  R12,R8
00000631 7A F0               A  1317      US2:DJNZ R7, US1   ; Test for end of bit-loop
00000633 88EC                A  1318          LD   R8,R12    ; Load w8 with high part of result (w12)
00000635 98ED                A  1319          LD   R9,R13
00000637 D6 04FC             A  1320          CALL PUSHA8    ; Push both words of result to stack
0000063A 3016                A  1321          JP   @NV
                             A  1322
         0000063C            A  1323    USLASHSUB: EQU $     ; Code for unsigned divide (note: high byte of
                             A  1324                         ;   Numerator must be less than denominator)
0000063C D6 04E8             A  1325          CALL POPCA8    ; Pop dbl word numerator into w10/w8, divisor to w12
0000063F EC20                A  1326          LD   R14,#020H ; Examine 32 bits of denominator
00000641 B0EF                A  1327          CLR  R15       ; R15 is used to propagate carry in subtracting divisor
00000643 CF                  A  1328          RCF
00000644 B0E6                A  1329          CLR  R6        ; Clear 16 bit quotient
00000646 B0E7                A  1330          CLR  R7
         00000648            A  1331    USLASH1: EQU $
00000648 10E9                A  1332          RLC  R9
0000064A 10E8                A  1333          RLC  R8
0000064C 10EB                A  1334          RLC  R11
0000064E 10EA                A  1335          RLC  R10
00000650 10E7                A  1336          RLC  R7
00000652 10E6                A  1337          RLC  R6
00000654 7B 0A               A  1338          JR   C,USLASH3
00000656 A2C6                A  1339          CP   R12, R6
00000658 BB 0F               A  1340          JR   UGT,USLASH4
0000065A 7B 04               A  1341          JR   ULT,USLASH3
0000065C A2D7                A  1342          CP   R13,R7
0000065E BB 09               A  1343          JR   UGT,USLASH4
         00000660            A  1344    USLASH3: EQU $
00000660 227D                A  1345          SUB  R7,R13
00000662 326C                A  1346          SBC  R6,R12
00000664 32BF                A  1347          SBC  R11,R15
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000666 32AF                A  1348          SBC  R10,R15
00000668 DF                  A  1349          SCF
         00000669            A  1350    USLASH4: EQU $
00000669 EA DD               A  1351          DJNZ R14, USLASH1
0000066B 10E9                A  1352          RLC  R9
0000066D 10E8                A  1353          RLC  R8
0000066F 70E7                A  1354          PUSH R7
00000671 70E6                A  1355          PUSH R6
00000673 D6 04F2             A  1356          CALL PUSH8
00000676 3016                A  1357          JP   @NV       ; Return
                             A  1358
                             A  1359                         ; ARG PLACES SLN .., RESULT
         00000678            A  1360    SLNSUB: EQU $
00000678 50E9                A  1361          POP  R9
0000067A 50E9                A  1362          POP  R9
0000067C 50EC                A  1363          POP  R12
0000067E 50ED                A  1364          POP  R13
00000680 B0EA                A  1365          CLR  R10
00000682 B0EB                A  1366          CLR  R11
00000684 4299                A  1367          OR   R9,R9
00000686 6B 11               A  1368          JR   Z,SLN3
         00000688            A  1369    SLN1: EQU $
00000688 CF                  A  1370          RCF
00000689 10ED                A  1371          RLC  R13
0000068B 10EC                A  1372          RLC  R12
0000068D 10EB                A  1373          RLC  R11
0000068F 10EA                A  1374          RLC  R10
00000691 9A F5               A  1375          DJNZ R9,SLN1
00000693 70EB                A  1376          PUSH R11
00000695 70EA                A  1377          PUSH R10
00000697 3016                A  1378    SLN2: JP   @NV
00000699 70ED                A  1379    SLN3: PUSH R13
0000069B 70EC                A  1380          PUSH R12
0000069D 3016                A  1381          JP   @NV
                             A  1382
         0000069F            A  1383    ZEQSUB:  EQU $       ; Code for 0=
0000069F D6 04D0             A  1384          CALL POP8
000006A2 4289                A  1385          OR   R8,R9     ; Test if argument is zero
000006A4 B0E8                A  1386          CLR  R8        ; Zero result register
000006A6 B0E9                A  1387          CLR  R9
000006A8 EB 02               A  1388          JR   NZ,ZEQ2   ; Skip setting result to -1 if arg was zero
000006AA 80E8                A  1389     ZEQ1:DECW RR8
000006AC D6 04F2             A  1390     ZEQ2:CALL PUSH8     ; Push result to stack
000006AF 3016                A  1391          JP   @NV
                             A  1392
         000006B1            A  1393    GTEQSUB: EQU $      ; Code for >= (TOS >= TOS-1)
000006B1 D6 04DA             A  1394          CALL POPA8     ; Pop left arg to r10, right arg to r8
000006B4 229B                A  1395          SUB  R9,R11    ; Subtract right arg from left arg
000006B6 328A                A  1396          SBC  R8,R10
000006B8 B0E8                A  1397          CLR  R8        ; Zero result register
000006BA B0E9                A  1398          CLR  R9
000006BC 9B EC               A  1399          JR   GE,ZEQ1   ; Make use of code at end of 0=
```

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PC       Machine Code        I  Line    File: newsys.v4e
000006BE 8B EC               A  1400          JR   ZEQ2
                             A  1401
         000006C0            A  1402    ISUB: EQU $          ; Code for i
000006C0 C280                A  1403          LDC  R8,@RR0
000006C2 A0E0                A  1404          INCW RR0
000006C4 C290                A  1405          LDC  R9,@RR0
000006C6 80E0                A  1406          DECW RR0
000006C8 70E9                A  1407          PUSH R9
000006CA 70E8                A  1408          PUSH R8
000006CC 3016                A  1409          JP   @NV
                             A  1410
         000006CE            A  1411    CMOVESUB: EQU $      ; Code for cmove
000006CE D6 04E8             A  1412          CALL POPCA8    ; Count to wc, target addr to wa, source to w8
000006D1 C268                A  1413     CMS1:LDC  R6,@RR8   ; Both source and destination in ram
000006D3 D26A                A  1414          LDC  @RR10,R6
000006D5 A0E8                A  1415          INCW RR8       ; Increment source address
000006D7 A0EA                A  1416          INCW RR10      ; Increment destination address
000006D9 80EC                A  1417          DECW RR12      ; Decrement count
000006DB EB F4               A  1418          JR   NZ,CMS1   ; If not zero, repeat the loop
000006DD 3016                A  1419          JP   @NV
                             A  1420
         000006DF            A  1421    HERESUB: EQU $       ; Code for here
000006DF 701D                A  1422          PUSH DPNTRLOC+1; Push here (reg file 12/13) to stack
000006E1 701C                A  1423          PUSH DPNTRLOC
000006E3 3016                A  1424          JP   @NV
                             A  1425
         000006E5            A  1426    COMMASUB: EQU $         ; Code for , (compile word on stack)
000006E5 D6 04D0             A  1427          CALL POP8         ; Pop word to compile off stack
000006E8 A81C                A  1428          LD   R10,DPNTRLOC ; Dictionary pointer to RR10
000006EA B81D                A  1429          LD   R11,DPNTRLOC+1
000006EC D28A                A  1430          LDC  @RR10,R8     ; Store w8 at end on dictionary
000006EE A0EA                A  1431          INCW RR10
000006F0 D29A                A  1432     CAS1:LDC  @RR10,R9     ; Store low byte of w8 at end of dictionary
000006F2 A0EA                A  1433          INCW RR10         ; Set dictionary pointer to next unused location
000006F4 A91C                A  1434          LD   DPNTRLOC,R10 ; Store updated dictionary pointer in regfile 12/13
000006F6 B91D                A  1435          LD   DPNTRLOC+1,R11
000006F8 3016                A  1436          JP   @NV
                             A  1437
         000006FA            A  1438    CCOMMASUB: EQU $        ; Code for c, (c, - compile byte to stack)
000006FA D6 04D0             A  1439          CALL POP8
000006FD A81C                A  1440          LD   R10,DPNTRLOC ; Dictionary pointer to wa
000006FF B81D                A  1441          LD   R11,DPNTRLOC+1
00000701 8B ED               A  1442          JR   CAS1
                             A  1443
         00000703            A  1444    HDOTSUB:  EQU $
00000703 3018                A  1445          JP   @COLON
00000705 2D                  A  1446          DB   ZERO
00000706 56                  A  1447          DB   INTOPOUND
00000707 57                  A  1448          DB   POUND
00000708 57                  A  1449          DB   POUND
00000709 57                  A  1450          DB   POUND
0000070A 57                  A  1451          DB   POUND
```

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PC       Machine Code        I  Line    File: newsys.v4e
0000070B 59                  A  1452          DB   POUNDINTO
0000070C 39                  A  1453          DB   TYPE
0000070D 07                  A  1454          DB   SEMICOLON
                             A  1455
         0000070E            A  1456    ONEPLUSSUB: EQU $    ; Code for 1+
0000070E D6 04D0             A  1457          CALL POP8
00000711 A0E8                A  1458          INCW RR8
00000713 D6 04F2             A  1459          CALL PUSH8
00000716 3016                A  1460          JP   @NV
                             A  1461
         00000718            A  1462    DPNTRSUB: EQU $
00000718 9C1C                A  1463          LD   R9,#DPNTRLOC
0000071A 8B 22               A  1464          JR   NCOMMON
         0000071C            A  1465    TOINSUB:  EQU $
0000071C 9C1E                A  1466          LD   R9,#TOINLOC
0000071E 8B 1E               A  1467          JR   NCOMMON
         00000720            A  1468    BLKSUB:   EQU $
00000720 9C20                A  1469          LD   R9,#BLKLOC
00000722 8B 1A               A  1470          JR   NCOMMON
         00000724            A  1471    BASESUB:  EQU $
00000724 9C14                A  1472          LD   R9,#BASELOC
00000726 8B 16               A  1473          JR   NCOMMON
         00000728            A  1474    VOCLNKSUB:EQU $
00000728 9C12                A  1475          LD   R9,#VLLOC
0000072A 8B 12               A  1476          JR   NCOMMON
         0000072C            A  1477    S0SUB:    EQU $
0000072C 9C22                A  1478          LD   R9,#S0LOC
0000072E 8B 0E               A  1479          JR   NCOMMON
         00000730            A  1480    STATESUB:    EQU $
00000730 9C1B                A  1481          LD   R9,#STATELOC
00000732 8B 0A               A  1482          JR   NCOMMON
         00000734            A  1483    STKPNTRSUB    EQU $
00000734 9CFE                A  1484          LD   R9,#FEh
00000736 8B 06               A  1485          JR   NCOMMON
         00000738            A  1486    ZEROSUB:  EQU $
00000738 B0E9                A  1487          CLR  R9
0000073A 8B 02               A  1488          JR   NCOMMON
         0000073C            A  1489    ONESUB:   EQU $
0000073C 9C01                A  1490          LD   R9,#1
         0000073E            A  1491    NCOMMON   EQU $
0000073E B0E8                A  1492          CLR  R8
00000740 70E9                A  1493          PUSH R9
00000742 70E8                A  1494          PUSH R8
00000744 3016                A  1495          JP   @NV
                             A  1496
         00000746            A  1497    OVERSUB: EQU $
00000746 50E8                A  1498          POP  R8
00000748 50E9                A  1499          POP  R9
0000074A 50EA                A  1500          POP  R10
0000074C 50EB                A  1501          POP  R11
0000074E 70EB                A  1502          PUSH R11
00000750 70EA                A  1503          PUSH R10
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PC       Machine Code        I  Line    File: newsys.v4e
00000752 70E9                A  1504      OSA:PUSH R9
00000754 70E8                A  1505          PUSH R8
00000756 70EB                A  1506          PUSH R11
00000758 70EA                A  1507          PUSH R10
0000075A 3016                A  1508          JP   @NV
                             A  1509
         0000075C            A  1510    MINUSSUB:   EQU $
0000075C 3018                A  1511          JP   @COLON
0000075E 17                  A  1512          DB   NEGATE
0000075F 16                  A  1513          DB   PLUS
00000760 07                  A  1514          DB   SEMICOLON
                             A  1515
         00000761            A  1516    EQUALSUB:  EQU $
00000761 3018                A  1517          JP   @COLON
00000763 2F                  A  1518          DB   MINUS
00000764 1B                  A  1519          DB   ZEQ
00000765 07                  A  1520          DB   SEMICOLON
                             A  1521
         00000766            A  1522    ROTSUB:    EQU $
00000766 3018                A  1523          JP   @COLON
00000768 0F                  A  1524          DB   ONTOR
00000769 11                  A  1525          DB   SWAP
0000076A 10                  A  1526          DB   RONTO
0000076B 11                  A  1527          DB   SWAP
0000076C 07                  A  1528          DB   SEMICOLON
                             A  1529
         0000076D            A  1530    SPACESUB:EQU $
0000076D 3018                A  1531          JP   @COLON
0000076F 00                  A  1532          DB   BR
00000770 20                  A  1533          DB   " "
00000771 0A                  A  1534          DB   EMIT
00000772 07                  A  1535          DB   SEMICOLON
                             A  1536
         00000773            A  1537    EXPECT: EQU $         ; Entered via LONGCALL
00000773 3018                A  1538          JP   @COLON     ; <Storage count> expect
00000775 31                  A  1539          DB   OVER
00000776 16                  A  1540          DB   PLUS
00000777 31                  A  1541          DB   OVER       ; <Storage storage+count storage>
00000778 5C                  A  1542          DB   DOAUX
00000779 09                  A  1543      E0: DB   KEY        ; Get next character
0000077A 12                  A  1544          DB   DUP
0000077B 00                  A  1545          DB   BR         ; Bs to stack
0000077C 08                  A  1546          DB   008H
0000077D 30                  A  1547          DB   EQUALS
0000077E 05                  A  1548          DB   JRZS
0000077F 18                  A  1549          DB   E3-$       ; Branch not a back space
00000780 31                  A  1550          DB   OVER       ; It was a BS - compare index
00000781 1D                  A  1551          DB   I          ;  with start of storage
00000782 30                  A  1552          DB   EQUALS
00000783 05                  A  1553          DB   JRZS       ; Non-zero if at beginning of storage
00000784 07                  A  1554          DB   E2-$
00000785 2E                  A  1555          DB   ONE        ; Make the back space a bell
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000786 2F                  A  1556          DB   MINUS
00000787 0A                  A  1557          DB   EMIT       ; Make the bell sound
00000788 2D                  A  1558          DB   ZERO       ; Repeat the loop - don't increment loop count
00000789 03                  A  1559          DB   JRS
0000078A 29                  A  1560          DB   E8-$       ; And exit to loop termination
0000078B 10                  A  1561      E2: DB   RONTO      ; Index to stack
0000078C 11                  A  1562          DB   SWAP       ; Index BS on stack
0000078D 12                  A  1563          DB   DUP        ; Index BS BS on stack
0000078E 0A                  A  1564          DB   EMIT       ; Output backspace
0000078F 33                  A  1565          DB   SPACE      ; Out a space to cover up previous character
00000790 0A                  A  1566          DB   EMIT       ; Backspace ahead of SPACE just emitted
00000791 00                  A  1567          DB   BR         ; Subtract 2 from buffer index
00000792 02                  A  1568          DB   #2
00000793 2F                  A  1569          DB   MINUS
00000794 0F                  A  1570          DB   ONTOR      ; Put index back on stack
00000795 03                  A  1571          DB   JRS
00000796 1C                  A  1572          DB   E7-$
00000797 12                  A  1573      E3: DB   DUP        ; Check for a carriage return
00000798 00                  A  1574          DB   BR
00000799 0D                  A  1575          DB   00DH
0000079A 30                  A  1576          DB   EQUALS
0000079B 05                  A  1577          DB   JRZS
0000079C 12                  A  1578          DB   E5-$       ; Non-zero if a carriage return
0000079D 13                  A  1579          DB   DROP       ; Found a carriage return - drop the char
0000079E 00                  A  1580          DB   BR
0000079F 20                  A  1581          DB   " "
000007A0 1D                  A  1582          DB   I          ; Store count at beginning of storage
000007A1 31                  A  1583          DB   OVER
000007A2 31                  A  1584          DB   OVER
000007A3 0C                  A  1585          DB   CSTORE
000007A4 24                  A  1586          DB   ONEPLUS    ; Store 0 (null) at end of storage
000007A5 2D                  A  1587          DB   ZERO
000007A6 31                  A  1588          DB   OVER
000007A7 0C                  A  1589          DB   CSTORE
000007A8 24                  A  1590          DB   ONEPLUS
000007A9 0C                  A  1591          DB   CSTORE
000007AA 33                  A  1592          DB   SPACE      ; Output a space for the carriage return
000007AB 62                  A  1593          DB   UNLOOP
000007AC 000A                A  1594          DW   E9-$
000007AE 12                  A  1595      E5: DB   DUP
000007AF 1D                  A  1596          DB   I          ; Store character in storage
000007B0 0C                  A  1597          DB   CSTORE
000007B1 0A                  A  1598      E6: DB   EMIT
000007B2 2E                  A  1599      E7: DB   ONE        ; Prepare to get another character
000007B3 5E                  A  1600      E8: DB   PLUSLOOPAUX
000007B4 FFC5                A  1601          DW   E0-$
000007B6 13                  A  1602      E9: DB   DROP
000007B7 07                  A  1603          DB   SEMICOLON
                             A  1604
                             A  1605                       ;  : +! Swap @ + swap !
         000007B8            A  1606    PLUSSTORESUB: EQU $
000007B8 3018                A  1607          JP   @COLON
```

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PC       Machine Code        I  Line    File: newsys.v4e
000007BA 11                  A  1608          DB   SWAP
000007BB 31                  A  1609          DB   OVER
000007BC 0D                  A  1610          DB   AT
000007BD 16                  A  1611          DB   PLUS
000007BE 11                  A  1612          DB   SWAP
000007BF 0B                  A  1613          DB   STORE
000007C0 07                  A  1614          DB   SEMICOLON
                             A  1615
                             A  1616                        ;  : | [ 80 here 5 - c! ]
                             A  1617                        ;    Blk @ if k1 blk +! >in @ k0 >in !
                             A  1618                        ;    3ff = if state @ c0 = if
                             A  1619                        ;    74c  fatalerr [ rot ] then then
                             A  1620                        ;    R> drop then ; immediate
         000007C1            A  1621    NULLSUB: EQU $
000007C1 3018                A  1622          JP   @COLON
000007C3 27                  A  1623          DB   BLK
000007C4 0D                  A  1624          DB   AT
000007C5 05                  A  1625          DB   JRZS
000007C6 06                  A  1626          DB   NUL1-$
000007C7 06                  A  1627          DB   LONGCALL
000007C8 0E09                A  1628          DW   FATALERR
000007CA 07CF                A  1629          DW   NULLTEXT
000007CC 10                  A  1630    NUL1: DB   RONTO
000007CD 13                  A  1631          DB   DROP
000007CE 07                  A  1632    NUL2: DB   SEMICOLON
                             A  1633
         000007CF            A  1634    NULLTEXT: EQU $
000007CF 046E756C 6C         A  1635          DB   4,"null"
                             A  1636
         000007D4            A  1637    CRSUB: EQU $
000007D4 3018                A  1638          JP   @COLON
000007D6 00                  A  1639          DB   BR
000007D7 0D                  A  1640          DB   00DH
000007D8 0A                  A  1641          DB   EMIT
000007D9 00                  A  1642          DB   BR
000007DA 0A                  A  1643          DB   00AH
000007DB 0A                  A  1644          DB   EMIT
000007DC 07                  A  1645          DB   SEMICOLON
                             A  1646
         000007DD            A  1647    WORDSUBAUX: EQU $    ; Subroutine for word code
000007DD 68E8                A  1648          LD   R6,R8     ; Buffer address to w6
000007DF 78E9                A  1649          LD   R7,R9
000007E1 041FE7              A  1650          ADD  R7,TOINLOC+1; Add >in to buffer address
000007E4 141EE6              A  1651          ADC  R6,TOINLOC
000007E7 C2A6                A  1652          LDC  R10,@RR6  ; Fetch character from buffer to ra
000007E9 42AA                A  1653          OR   R10,R10   ; Test whether its zero
000007EB AF                  A  1654          RET
                             A  1655
         000007EC            A  1656    WORDAUX: EQU $       ; Code for word
000007EC D6 04DA             A  1657          CALL POPA8     ; Fence to r11, buffer address to w8
000007EF D6 07DD             A  1658      WS1:CALL WORDSUBAUX; Skip to first occurrence of fence
000007F2 6B 2C               A  1659          JR   Z,WS5     ; Zero if end of buffer
```

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PC       Machine Code        I  Line    File: newsys.v4e
000007F4 A2AB                A  1660          CP   R10,R11    ; Test character against fence
000007F6 EB 04               A  1661          JR   NZ, WS2    ; Non-zero if char was not the fence
000007F8 A01E                A  1662          INCW TOINLOC    ; Increment offset
000007FA 8B F3               A  1663          JR   WS1
000007FC C8E6                A  1664      WS2:LD   R12,R6     ; Load character address to wd
000007FE D8E7                A  1665          LD   R13,R7
00000800 A01E                A  1666      WS3:INCW TOINLOC    ; Increment >in
00000802 D6 07DD             A  1667          CALL WORDSUBAUX; Get another
00000805 6B 19               A  1668          JR   Z,WS5
00000807 A2AB                A  1669          CP   R10,R11    ; Compare char with fence
00000809 EB F5               A  1670          JR   NZ, WS3
0000080B 88E6                A  1671          LD   R8,R6      ; Char address to w8
0000080D 98E7                A  1672          LD   R9,R7
0000080F 229D                A  1673          SUB  R9,R13     ; Length of word to w8
00000811 328C                A  1674          SBC  R8,R12
00000813 A81C                A  1675      WS4:LD   R10,DPNTRLOC ; Directory pointer (target) to wa
00000815 B81D                A  1676          LD   R11,DPNTRLOC+1
00000817 D29A                A  1677          LDC  @RR10,R9   ; Length byte to dictionary
00000819 A0EA                A  1678          INCW RR10       ; Point to destination for text
0000081B D6 0506             A  1679          CALL PUSHCA8    ; From addr in wc, to in wa, count in w8
0000081E 3016                A  1680          JP   @NV
00000820 B01E                A  1681      WS5:CLR  TOINLOC    ; Case when buffer starts with zero
00000822 B01F                A  1682          CLR  TOINLOC+1 ;   Clear >in
00000824 C8E6                A  1683          LD   R12,R6     ; Character address to wc
00000826 D8E7                A  1684          LD   R13,R7
00000828 B0E8                A  1685          CLR  R8         ; Set character count to 1
0000082A 9C01                A  1686          LD   R9,#001H
0000082C 8B E5               A  1687          JR    WS4
                             A  1688
         0000082E            A  1689    WORDSUB: EQU $
0000082E 3018                A  1690          JP   @COLON
00000830 1F                  A  1691          DB   HERE       ; Store a blank at HERE
00000831 00                  A  1692          DB   BR
00000832 20                  A  1693          DB   " "
00000833 31                  A  1694          DB   OVER
00000834 0C                  A  1695          DB   CSTORE
00000835 12                  A  1696          DB   DUP
00000836 24                  A  1697          DB   ONEPLUS
00000837 00                  A  1698          DB   BR         ; Propagate the blank forward 20 bytes
00000838 20                  A  1699          DB   20H
00000839 1E                  A  1700          DB   CMOVE
0000083A 27                  A  1701          DB   BLK        ; If BLK is zero, input is from TIBLOC
0000083B 0D                  A  1702          DB   AT
0000083C 05                  A  1703          DB   JRZS
0000083D 06                  A  1704          DB   WORD1-$
0000083E 06                  A  1705          DB   LONGCALL   ; Otherwise, we get the input via MSHOOK
0000083F 0E11                A  1706          DW   MSHOOK
00000841 03                  A  1707          DB   JRS
00000842 04                  A  1708          DB   WORD2-$
         00000843            A  1709    WORD1: EQU $
00000843 00                  A  1710          DB   BR
00000844 22                  A  1711          DB   TIBLOC
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000845 0D                  A  1712          DB   AT
         00000846            A  1713    WORD2: EQU $
00000846 11                  A  1714          DB   SWAP
00000847 06                  A  1715          DB   LONGCALL
00000848 07EC                A  1716          DW   WORDAUX   ; Now dig out the word and put it at the HERE
0000084A 1E                  A  1717          DB   CMOVE
0000084B 1F                  A  1718          DB   HERE      ; This is where the word can be found
0000084C 07                  A  1719          DB   SEMICOLON
                             A  1720
                             A  1721                         ;  : Count dup >r 1+ r> c@
         0000084D            A  1722    COUNTSUB: EQU $
0000084D 3018                A  1723          JP   @COLON    ; Convert of the counted string (length as first byte)
0000084F 12                  A  1724          DB   DUP       ;  to two word on the stack: address of string to type
00000850 0F                  A  1725          DB   ONTOR     ;   with the count as top of stack
00000851 24                  A  1726          DB   ONEPLUS
00000852 10                  A  1727          DB   RONTO
00000853 0E                  A  1728          DB   CAT
00000854 07                  A  1729          DB   SEMICOLON
                             A  1730
                             A  1731                         ;  : Type k1 - k0 do i over + c@ emit loop drop
         00000855            A  1732    TYPESUB:EQU $
00000855 3018                A  1733          JP   @COLON
00000857 2D                  A  1734          DB   ZERO
00000858 5C                  A  1735          DB   DOAUX
         00000859            A  1736    TYPE0: EQU $
00000859 1D                  A  1737          DB   I
0000085A 31                  A  1738          DB   OVER
0000085B 16                  A  1739          DB   PLUS
0000085C 0E                  A  1740          DB   CAT
0000085D 00                  A  1741          DB   BR
0000085E 7F                  A  1742          DB   7FH
0000085F 14                  A  1743          DB   AND
00000860 0A                  A  1744          DB   EMIT
00000861 60                  A  1745          DB   LOOPAUX
00000862 FFF7                A  1746          DW   TYPE0-$
00000864 13                  A  1747          DB   DROP
00000865 07                  A  1748          DB   SEMICOLON
                             A  1749
         00000866            A  1750    DPLUSSUB: EQU $      ; Code for d+
00000866 D6 04DA             A  1751          CALL POPA8     ; Pop one double word argument to wa,w8
00000869 50E6                A  1752          POP  R6        ; Pop the other to w6,w4
0000086B 50E7                A  1753          POP  R7
0000086D 50EC                A  1754          POP  R12
0000086F 50ED                A  1755          POP  R13
00000871 029D                A  1756          ADD  R9,R13    ; Add w6,w4 to wa,w8
00000873 128C                A  1757          ADC  R8,R12
00000875 12B7                A  1758          ADC  R11,R7
00000877 12A6                A  1759          ADC  R10,R6
00000879 D6 04FC             A  1760     DPS1:CALL PUSHA8    ; Push wa then w8 onto stack
0000087C 8D 05D4             A  1761          JP   SWAPSUB
                             A  1762
         0000087F            A  1763    DNEGATESUB: EQU $    ; Code for dnegate
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PC       Machine Code        I  Line    File: newsys.v4e
0000087F D6 04DA             A  1764          CALL POPA8     ; Pop the double word arguent to wa,w8
00000882 60E9                A  1765          COM  R9
00000884 60E8                A  1766          COM  R8
00000886 60EB                A  1767          COM  R11
00000888 60EA                A  1768          COM  R10
0000088A A0E8                A  1769          INCW RR8
0000088C EB EB               A  1770          JR   NZ,DPS1
0000088E A0EA                A  1771          INCW RR10
00000890 8B E7               A  1772          JR   DPS1
                             A  1773
         00000892            A  1774    FINDAUX: EQU $
00000892 D6 04DA             A  1775          CALL POPA8     ; Address of word to r10, dictionary in r8
00000895 E8EA                A  1776          LD   R14,R10   ; Save the word's address in r14/r15
00000897 F8EB                A  1777          LD   R15,R11
00000899 4288                A  1778          OR   R8,R8     ; Is dictionary address in reg file?
0000089B EB 07               A  1779          JR   NZ,FS1    ;  non zero is address is explicit
0000089D 78E9                A  1780          LD   R7,R9     ; Dictionary address needs to be loaded from
0000089F E387                A  1781          LD   R8,@R7    ;  reg file
000008A1 7E                  A  1782          INC  R7
000008A2 E397                A  1783          LD   R9,@R7
                             A  1784
000008A4 7C1F                A  1785      FS1:LD   R7,#01FH  ; Test equality of word counts
000008A6 C2C8                A  1786          LDC  R12,@RR8  ; Get character from directory
000008A8 C2DA                A  1787          LDC  R13,@RR10 ; Get character from word
000008AA 52C7                A  1788          AND  R12,R7    ; And out characters to test
000008AC A2CD                A  1789          CP   R12,R13
000008AE EB 33               A  1790          JR   NZ,FS6    ; If not equal go get next dictionary entry
                             A  1791
000008B0 A0E8                A  1792      FS2:INCW RR8       ; Point to next byte in dictionary
000008B2 A0EA                A  1793          INCW RR10      ; Point to next byte in word
000008B4 7C7F                A  1794          LD   R7,#07FH  ; Set up to test the ascii characters
000008B6 C2C8                A  1795          LDC  R12,@RR8  ; Get character from directory
000008B8 C2DA                A  1796          LDC  R13,@RR10 ; Get character from word
000008BA 52C7                A  1797          AND  R12,R7    ; And out characters to test
000008BC A2CD                A  1798          CP   R12,R13
000008BE EB 1C               A  1799          JR   NZ,FS5    ; If not equal go get next dictionary entry
000008C0 C2D8                A  1800          LDC  R13,@RR8  ; Get the character from word
000008C2 56ED80              A  1801          AND  R13,#80H  ; Get the stop bit
000008C5 6B E9               A  1802          JR   Z,FS2     ; If not set go check next char in dictionary
                             A  1803
000008C7 A0E8                A  1804          INCW RR8       ; Dictionary entry matches word - point to
000008C9 A6E8 01             A  1805          CP   R8,#HIGH JTB
000008CC 7B 05               A  1806          JR   ULT,FS2X  ; If R8 lower than jump table start. increment twice
000008CE A6E8 04             A  1807          CP   R8,#HIGH LASTDEF ; token or jump address
000008D1 3B 02               A  1808          JR   ULE,FS3   ; Jump around extra INCW for non-ROM entry
000008D3 A0E8                A  1809     FS2X:INCW RR8       ; Advance R8/R9 to the parameter part of dictionary entry
000008D5 A0E8                A  1810      FS3:INCW RR8
000008D7 D6 04F2             A  1811      FS4:CALL PUSH8     ; Push address of parameter entry (or zero)
000008DA 3016                A  1812          JP   @NV       ;   Onto stack and return
                             A  1813
000008DC C2D8                A  1814      FS5:LDC  R13,@RR8  ; Skipping to end of entry: Get a character from word
000008DE 56ED80              A  1815          AND  R13,#80H  ; Get the stop bit
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PC       Machine Code        I  Line    File: newsys.v4e
000008E1 EB 04               A  1816          JR   NZ, FS7   ;   End of the dictionary entry?
000008E3 A0E8                A  1817      FS6:INCW RR8       ; Not yet - look at the next char in the dictionary
000008E5 8B F5               A  1818          JR   FS5       ;  Go back - not at the end yet
                             A  1819
000008E7 A0E8                A  1820      FS7:INCW RR8       ; Dictionary entry didn't match - go to next entry
000008E9 C2C8                A  1821          LDC  R12,@RR8  ; Load the byte following the word definition
000008EB A6E8 04             A  1822          CP   R8,#HIGH LASTDEF
000008EE BB 16               A  1823          JR   UGT,FS9   ; Take jump if addr of current entry > LastDef
000008F0 A6E8 01             A  1824          CP   R8, #HIGH JTB
000008F3 7B 11               A  1825          JR   ULT,FS9
                             A  1826                         ; Section for tokenized definition
000008F5 42CC                A  1827          OR   R12,R12   ; Is this the last definition?
000008F7 6B 07               A  1828          JR   Z,FS8     ;  Take jump if this is the last entry
000008F9 229C                A  1829          SUB  R9,R12    ; Adjust the dictionary entry by the offset
000008FB 36E800              A  1830          SBC  R8,#0     ;   Propagate the borrow
000008FE 8B 12               A  1831          JR   FS10      ; Reload the pointer to the word and go again
                             A  1832
00000900 B0E8                A  1833      FS8:CLR  R8        ; Return for entry > LastDef
00000902 B0E9                A  1834          CLR  R9        ; Return a zero for not found in ROM
00000904 8B D1               A  1835          JR   FS4
                             A  1836
                             A  1837                         ; Section for non-tokenized definition
00000906 A0E8                A  1838      FS9:INCW RR8       ; Definition was out of ROM
00000908 C2D8                A  1839          LDC  R13,@RR8
0000090A 88EC                A  1840          LD   R8,R12
0000090C 98ED                A  1841          LD   R9,R13
0000090E 42CD                A  1842          OR   R12,R13   ; Is this the last definition?
00000910 6B C5               A  1843          JR   Z,FS4     ; R12/R13 zero if it was, so exit with zero result
                             A  1844
00000912 A8EE                A  1845     FS10:LD   R10,R14   ; Reload pointer to the word and go again
00000914 B8EF                A  1846          LD   R11,R15
00000916 8B 8C               A  1847          JR   FS1
                             A  1848
         00000918            A  1849    TOUC: EQU $          ; Convert to upper case
00000918 50E8                A  1850          POP  R8        ; Address of string to r8/r9
0000091A 50E9                A  1851          POP  R9
0000091C C278                A  1852          LDC  R7,@RR8   ; Count to r7
0000091E A0E8                A  1853    TOUC1:INCW RR8
00000920 C268                A  1854          LDC  R6,@RR8
00000922 A6E661              A  1855          CP   R6,#61H   ; Compare to "a"
00000925 1B 0A               A  1856          JR   LT,TOUC2
00000927 A6E67A              A  1857          CP   R6,#7AH   ; Compare to "z"
0000092A AB 05               A  1858          JR   GT,TOUC2
0000092C 56E6DF              A  1859          AND  R6,#DFH   ; And out the 20 bit
0000092F D268                A  1860          LDC  @RR8,R6
00000931 7A EB               A  1861    TOUC2 DJNZ R7,TOUC1
00000933 3016                A  1862          JP   @NV
                             A  1863
                             A  1864                         ;  : FIND SP WORD VOCLNK SWAP FINDAUX
         00000935            A  1865    FINDSUB: EQU $
00000935 3018                A  1866          JP   @COLON
00000937 29                  A  1867          DB   VOCLNK
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PC       Machine Code        I  Line    File: newsys.v4e
00000938 00                  A  1868          DB   BR
00000939 20                  A  1869          DB   " "
0000093A 37                  A  1870          DB   WORD
0000093B 06                  A  1871          DB   LONGCALL
0000093C 0892                A  1872          DW   FINDAUX   ; First try to find the word as given
0000093E 12                  A  1873          DB   DUP
0000093F 1B                  A  1874          DB   ZEQ       ; Exit if word found in dictionary
00000940 05                  A  1875          DB   JRZS
00000941 0B                  A  1876          DB   FIND5-$
00000942 13                  A  1877          DB   DROP      ; Drop the zero and try after
00000943 1F                  A  1878          DB   HERE      ;   converting word to upper case
00000944 06                  A  1879          DB   LONGCALL
00000945 0918                A  1880          DW   TOUC
00000947 29                  A  1881          DB   VOCLNK    ; Set up to search dictionary again
00000948 1F                  A  1882          DB   HERE      ; Address of string
00000949 06                  A  1883          DB   LONGCALL
0000094A 0892                A  1884          DW   FINDAUX
         0000094C            A  1885    FIND5: EQU $
0000094C 07                  A  1886          DB   SEMICOLON
                             A  1887
         0000094D            A  1888    FINDEASUB: EQU $
0000094D 3018                A  1889          JP   @COLON
0000094F 3A                  A  1890          DB   FIND
00000950 12                  A  1891          DB   DUP       ; If it's zero, it wasn't found
00000951 05                  A  1892          DB   JRZS
00000952 15                  A  1893          DB   FEA1-$
00000953 12                  A  1894          DB   DUP       ; If its below the jump table, that's the answer
00000954 2D                  A  1895          DB   ZERO
00000955 1C                  A  1896          DB   GTEQ
00000956 05                  A  1897          DB   JRZS
00000957 10                  A  1898          DB   FEA1-$
00000958 01                  A  1899          DB   NR        ; If it's above the jump table, that's the answer
00000959 0500                A  1900          DW   500h
0000095B 31                  A  1901          DB   OVER
0000095C 1C                  A  1902          DB   GTEQ
0000095D 05                  A  1903          DB   JRZS
0000095E 09                  A  1904          DB   FEA1-$
0000095F 0E                  A  1905          DB   CAT       ; Convert the token to an execution address
00000960 12                  A  1906          DB   DUP
00000961 16                  A  1907          DB   PLUS
00000962 01                  A  1908          DB   NR
00000963 0100                A  1909          DW   100h
00000965 16                  A  1910          DB   PLUS
00000966 0D                  A  1911          DB   AT
         00000967            A  1912    FEA1: EQU $
00000967 07                  A  1913          DB   SEMICOLON
                             A  1914
                             A  1915
                             A  1916                         ; : COMPILE STATE @ IF R> DUP K2 + >R @ , ELSE
                             A  1917                         ;      FATALERR THEN
         00000968            A  1918    COMPILESUB: EQU $
00000968 3018                A  1919          JP   @COLON    ; Token compile routine
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PC       Machine Code        I  Line    File: newsys.v4e
0000096A 2B                  A  1920          DB   STATE     ; If state is C0 (not compile) give an error
0000096B 0E                  A  1921          DB   CAT
0000096C 05                  A  1922          DB   JRZS
0000096D 08                  A  1923          DB   C1-$
0000096E 10                  A  1924          DB   RONTO     ; Advance return to byte after the one we're compiling
0000096F 12                  A  1925          DB   DUP
00000970 24                  A  1926          DB   ONEPLUS
00000971 0F                  A  1927          DB   ONTOR
00000972 0E                  A  1928          DB   CAT       ; Get the token
00000973 21                  A  1929          DB   CCOMMA    ;  and compile it
00000974 07                  A  1930          DB   SEMICOLON
         00000975            A  1931    C1:   EQU  $
00000975 06                  A  1932          DB   LONGCALL
00000976 0E09                A  1933          DW   FATALERR
00000978 031A                A  1934          DW   COMPILEHEAD
                             A  1935
                             A  1936                         ; In the conventional double-indirect FORTH call, the routine
                             A  1937                         ;  FIND would return the address of the PFA of the called
                             A  1938                         ;  FORTH word and this would be the value compiled.
                             A  1939                         ;  In this implementation, we will compile a token (or a long
                             A  1940                         ;  call) to the address referenced by the value returned by FIND.
         0000097A            A  1941    COMPILECALL: EQU $
0000097A 3018                A  1942          JP   @COLON    ; Compile call routine - Address of place to call on stack
                             A  1943                         ; Check the address against the last address of last byte in ROM
0000097C 01                  A  1944          DB   NR        ;  .. StartOfCode PFA
0000097D 04C5                A  1945          DW   #StartOfCode
0000097F 31                  A  1946          DB   OVER      ;  Result is zero if StartOfCode < argument PFA
00000980 1C                  A  1947          DB   GTEQ      ;
00000981 31                  A  1948          DB   OVER      ;
00000982 01                  A  1949          DB   NR
00000983 0100                A  1950          DW   #JTB      ;  ... PFA JTB
00000985 1C                  A  1951          DB   GTEQ      ;  Result is zero if argument PFA < JTB
00000986 14                  A  1952          DB   AND
00000987 05                  A  1953          DB   JRZS      ;  Take the jump if non-zero, ie not in the token area
00000988 04                  A  1954          DB   CR1-$
00000989 0E                  A  1955          DB   CAT       ;  Put token on stack
0000098A 21                  A  1956          DB   CCOMMA    ;  Compile argument token into HERE
0000098B 07                  A  1957          DB   SEMICOLON
         0000098C            A  1958    CR1:  EQU $
0000098C 3E                  A  1959          DB   COMPILE   ; Compile a long call to the address
0000098D 06                  A  1960          DB   LONGCALL
0000098E 20                  A  1961          DB   COMMA     ;  and compile the address to jump to
0000098F 07                  A  1962          DB   SEMICOLON
                             A  1963
                             A  1964
         00000990            A  1965    LITERALSUB: EQU $    ; Compile the word at TOS as a number
00000990 3018                A  1966          JP   @COLON
00000992 2B                  A  1967          DB   STATE
00000993 0E                  A  1968          DB   CAT
00000994 05                  A  1969          DB   JRZS      ; If in immediate mode (state=0), just do a nop
00000995 0F                  A  1970          DB   L2-$      ;  leaving the number on the stack
00000996 12                  A  1971          DB   DUP       ; If less than 256, we can use the byte runner
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PC       Machine Code        I  Line    File: newsys.v4e
00000997 01                  A  1972          DB   NR
00000998 FF00                A  1973          DW   FF00H
0000099A 14                  A  1974          DB   AND
0000099B 05                  A  1975          DB   JRZS
0000099C 05                  A  1976          DB   L1-$
0000099D 3E                  A  1977          DB   COMPILE   ; Use the number runner
0000099E 01                  A  1978          DB   NR
0000099F 20                  A  1979          DB   COMMA
000009A0 07                  A  1980          DB   SEMICOLON
000009A1 3E                  A  1981    L1:   DB   COMPILE   ; Use the byte runner
000009A2 00                  A  1982          DB   BR
000009A3 21                  A  1983          DB   CCOMMA
000009A4 07                  A  1984    L2:   DB   SEMICOLON
                             A  1985
         000009A5            A  1986    DLITAUX: EQU $       ; Code for execution of DLITERAL
000009A5 F8FD                A  1987          LD   R15,RP
000009A7 06EF08              A  1988          ADD  R15,#WW8&0Fh
000009AA C3F2                A  1989          LDCI @R15,@RR2 ; Load 4 bytes from IP
000009AC C3F2                A  1990          LDCI @R15,@RR2 ;  to R8 - RB
000009AE C3F2                A  1991          LDCI @R15,@RR2
000009B0 C3F2                A  1992          LDCI @R15,@RR2
000009B2 D6 04FC             A  1993          CALL PUSHA8
000009B5 3016                A  1994          JP   @NV
                             A  1995
         000009B7            A  1996    DLITERALSUB: EQU $
000009B7 3018                A  1997          JP   @COLON
000009B9 2B                  A  1998          DB   STATE     ; If in immediate mode (state=0), just do a nop
000009BA 0E                  A  1999          DB   CAT       ;  leaving the two-word number on the stack
000009BB 05                  A  2000          DB   JRZS
000009BC 09                  A  2001          DB   DL1-$
000009BD 3E                  A  2002          DB   COMPILE   ; Compile a number runner for the two words on the stack
000009BE 06                  A  2003          DB   LONGCALL
000009BF 01                  A  2004          DB   NR
000009C0 09A5                A  2005          DW   DLITAUX
000009C2 20                  A  2006          DB   COMMA     ; Compile the address of the DLITAUX routine
000009C3 20                  A  2007          DB   COMMA     ; and compile the two words after the token
000009C4 20                  A  2008          DB   COMMA
000009C5 07                  A  2009    DL1:  DB   SEMICOLON
                             A  2010
                             A  2011                         ;  : DIGIT 30 - DUP K0 >= IF DUP KA >= IF
                             A  2012                         ;      7 - DUP KA >= IF [ SWAP ] THEN
                             A  2013                         ;      DUP BASE @ >= IF [ ROT ROT ] THEN THEN
                             A  2014                         ;      DROP K0 SEMICOLON THEN K1
                             A  2015
         000009C6            A  2016    DIGITSUB: EQU $
000009C6 3018                A  2017          JP   @COLON
000009C8 00                  A  2018          DB   BR
000009C9 30                  A  2019          DB   30H
000009CA 2F                  A  2020          DB   MINUS
000009CB 12                  A  2021          DB   DUP
000009CC 2D                  A  2022          DB   ZERO
000009CD 1C                  A  2023          DB   GTEQ
```

```
PC       Machine Code        I  Line    File: newsys.v4e
000009CE 05                  A  2024          DB   JRZS
000009CF 16                  A  2025          DB   DI1-$
000009D0 12                  A  2026          DB   DUP
000009D1 00                  A  2027          DB   BR
000009D2 0A                  A  2028          DB   00AH
000009D3 1C                  A  2029          DB   GTEQ
000009D4 05                  A  2030          DB   JRZS
000009D5 0A                  A  2031          DB   DI0-$
000009D6 00                  A  2032          DB   BR
000009D7 07                  A  2033          DB   7H
000009D8 2F                  A  2034          DB   MINUS
000009D9 12                  A  2035          DB   DUP
000009DA 00                  A  2036          DB   BR
000009DB 0A                  A  2037          DB   00AH
000009DC 1C                  A  2038          DB   GTEQ
000009DD 05                  A  2039          DB   JRZS
000009DE 07                  A  2040          DB   DI1-$
000009DF 12                  A  2041    DI0:  DB   DUP
000009E0 28                  A  2042          DB   BASE
000009E1 0D                  A  2043          DB   AT
000009E2 1C                  A  2044          DB   GTEQ
000009E3 05                  A  2045          DB   JRZS
000009E4 04                  A  2046          DB   DI2-$
000009E5 13                  A  2047    DI1:  DB   DROP
000009E6 2D                  A  2048          DB   ZERO
000009E7 07                  A  2049          DB   SEMICOLON
000009E8 2E                  A  2050    DI2:  DB   ONE
000009E9 07                  A  2051          DB   SEMICOLON
                             A  2052
         000009EA            A  2053    INCPRDP EQU $        ; Increment "places right of decimal point"
000009EA 201A                A  2054          INC  PRDPLOC
000009EC 3016                A  2055          JP   @NV
                             A  2056
         000009EE            A  2057    GETPRDP EQU $
000009EE B81A                A  2058          LD   R11,PRDPLOC
000009F0 BE                  A  2059          INC  R11
000009F1 6B 02               A  2060          JR   Z,GP1
000009F3 BC01                A  2061          LD   R11,#1
000009F5 00EB                A  2062      GP1:DEC  R11
000009F7 701A                A  2063          PUSH PRDPLOC
000009F9 70EB                A  2064          PUSH R11
000009FB 3016                A  2065          JP   @NV
                             A  2066
                             A  2067                         ; : Number k0 k0 rot dup 1+ c@ 2d = dup >r negate + -1
                             A  2068                         ;   Begin
                             A  2069                         ;   10 !
                             A  2070                         ;     Begin
                             A  2071                         ;       1+ dup >r c@ digit if
                             A  2072                         ;          Swap base @ u* drop rot base @ u* d+
                             A  2073                         ;          10 @ 1+ while k1 10 +! then r>
                             A  2074                         ;     Repeat
                             A  2075                         ;     R> dup c@ sp - while
```

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PC       Machine Code        I  Line    File: newsys.v4e
                             A  2076                        ;       Dup c@ 2e - if r> 24e fatalerr then k0
                             A  2077                        ;   Repeat
                             A  2078                        ;   Drop r> if dnegate then
         000009FD            A  2079    NUMBERSUB: EQU $
000009FD 3018                A  2080          JP   @COLON
000009FF 12                  A  2081          DB   DUP
00000A00 0D                  A  2082          DB   AT
00000A01 12                  A  2083          DB   DUP
00000A02 01                  A  2084          DB   NR
00000A03 0252                A  2085          DW   0252H     ; Check for Rx (Char R followed by a digit)
00000A05 30                  A  2086          DB   EQUALS
00000A06 11                  A  2087          DB   SWAP
00000A07 01                  A  2088          DB   NR
00000A08 0257                A  2089          DW   0257H     ; Check for Wx (Char R followed by a digit)
00000A0A 30                  A  2090          DB   EQUALS
00000A0B 15                  A  2091          DB   OR
00000A0C 05                  A  2092          DB   JRZS
00000A0D 0E                  A  2093          DB   NUX1-$
00000A0E 12                  A  2094          DB   DUP       ; If one of these, translate to Ex
00000A0F 24                  A  2095          DB   ONEPLUS
00000A10 24                  A  2096          DB   ONEPLUS
00000A11 0E                  A  2097          DB   CAT
00000A12 41                  A  2098          DB   DIGIT
00000A13 05                  A  2099          DB   JRZS
00000A14 07                  A  2100          DB   NUX1-$
00000A15 13                  A  2101          DB   DROP
00000A16 00                  A  2102          DB   BR
00000A17 45                  A  2103          DB   "E"
00000A18 31                  A  2104          DB   OVER
00000A19 24                  A  2105          DB   ONEPLUS
00000A1A 0C                  A  2106          DB   CSTORE
         00000A1B            A  2107    NUX1:EQU  $
00000A1B 2D                  A  2108          DB   ZERO
00000A1C 2D                  A  2109          DB   ZERO
00000A1D 32                  A  2110          DB   ROT
00000A1E 12                  A  2111          DB   DUP
00000A1F 24                  A  2112          DB   ONEPLUS
00000A20 0E                  A  2113          DB   CAT
00000A21 00                  A  2114          DB   BR
00000A22 2D                  A  2115          DB   2DH
00000A23 30                  A  2116          DB   EQUALS
00000A24 12                  A  2117          DB   DUP
00000A25 0F                  A  2118          DB   ONTOR
00000A26 17                  A  2119          DB   NEGATE    ; This assumes that true is -1
00000A27 16                  A  2120          DB   PLUS
00000A28 2E                  A  2121          DB   ONE
00000A29 17                  A  2122          DB   NEGATE
00000A2A 00                  A  2123    NU0A: DB   BR
00000A2B 1A                  A  2124          DB   PRDPLOC
00000A2C 0C                  A  2125          DB   CSTORE
00000A2D 24                  A  2126    NU0:  DB   ONEPLUS
00000A2E 12                  A  2127          DB   DUP
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000A2F 0F                  A  2128          DB   ONTOR
00000A30 0E                  A  2129          DB   CAT
00000A31 41                  A  2130          DB   DIGIT
00000A32 05                  A  2131          DB   JRZS
00000A33 18                  A  2132          DB   NU2-$
00000A34 11                  A  2133          DB   SWAP
00000A35 28                  A  2134          DB   BASE
00000A36 0D                  A  2135          DB   AT
00000A37 18                  A  2136          DB   USTAR
00000A38 13                  A  2137          DB   DROP
00000A39 32                  A  2138          DB   ROT
00000A3A 28                  A  2139          DB   BASE
00000A3B 0D                  A  2140          DB   AT
00000A3C 18                  A  2141          DB   USTAR
00000A3D 3C                  A  2142          DB   DPLUS
                             A  2143                        ;   Db   br
                             A  2144                        ;   Db   prdploc
                             A  2145                        ;   Db   at
00000A3E 06                  A  2146          DB   LONGCALL
00000A3F 09EE                A  2147          DW   GETPRDP
00000A41 24                  A  2148          DB   ONEPLUS
00000A42 05                  A  2149          DB   JRZS
00000A43 04                  A  2150          DB   NU1-$
                             A  2151                        ;   Db   one
                             A  2152                        ;   Db   br
                             A  2153                        ;   Db   prdploc
                             A  2154                        ;   Db   plusstore
00000A44 06                  A  2155          DB   LONGCALL
00000A45 09EA                A  2156          DW   INCPRDP
00000A47 10                  A  2157    NU1:  DB   RONTO
00000A48 02                  A  2158          DB   JR
00000A49 FFE4                A  2159          DW   NU0-$
00000A4B 10                  A  2160    NU2:  DB   RONTO
00000A4C 12                  A  2161          DB   DUP
00000A4D 0E                  A  2162          DB   CAT
00000A4E 00                  A  2163          DB   BR
00000A4F 20                  A  2164          DB   " "
00000A50 2F                  A  2165          DB   MINUS
00000A51 05                  A  2166          DB   JRZS
00000A52 12                  A  2167          DB   NU4-$
00000A53 12                  A  2168          DB   DUP
00000A54 0E                  A  2169          DB   CAT
00000A55 00                  A  2170          DB   BR
00000A56 2E                  A  2171          DB   2EH
00000A57 2F                  A  2172          DB   MINUS
00000A58 05                  A  2173          DB   JRZS
00000A59 07                  A  2174          DB   NU3-$
00000A5A 10                  A  2175          DB   RONTO
00000A5B 06                  A  2176          DB   LONGCALL
00000A5C 0E09                A  2177          DW   FATALERR
00000A5E 0341                A  2178          DW   NUMBERHEAD
00000A60 2D                  A  2179    NU3:  DB   ZERO
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000A61 02                  A  2180          DB   JR
00000A62 FFC8                A  2181          DW   NU0A-$
00000A64 13                  A  2182    NU4:  DB   DROP
00000A65 10                  A  2183          DB   RONTO
00000A66 05                  A  2184          DB   JRZS
00000A67 02                  A  2185          DB   NU5-$
00000A68 3D                  A  2186          DB   DNEGATE
00000A69 07                  A  2187    NU5:  DB   SEMICOLON
                             A  2188
                             A  2189                        ; : Quit s0 @ fe ! k0 blk ! k0 state !
                             A  2190                        ;   Begin
                             A  2191                        ;     Rs0 @ 7a !
                             A  2192                        ;       Begin
                             A  2193                        ;         Cr k0 >in ! tib @ k0 over c!
                             A  2194                        ;         Dup 1+ 40 cmove tib @ 40 expect
                             A  2195                        ;         Interpreter state @ 0=
                             A  2196                        ;       Until ." ok"
                             A  2197                        ;   Again
                             A  2198
         00000A6A            A  2199    QUITSUB: EQU $
00000A6A 3018                A  2200          JP   @COLON
00000A6C 2A                  A  2201          DB   S0        ; Initialize stack pointer with S0
00000A6D 0D                  A  2202          DB   AT
00000A6E 2C                  A  2203          DB   STKPNTR
00000A6F 0B                  A  2204          DB   STORE
00000A70 2D                  A  2205          DB   ZERO      ; Set blk to zero (input from serial port)
00000A71 27                  A  2206          DB   BLK
00000A72 0B                  A  2207          DB   STORE
00000A73 2D                  A  2208          DB   ZERO      ; Set state to zero (not compiling)
00000A74 2B                  A  2209          DB   STATE
00000A75 0C                  A  2210          DB   CSTORE
00000A76 2A                  A  2211    QU1:  DB   S0        ; Initialize return stack pointer to S0+StackOffset
00000A77 0D                  A  2212          DB   AT
00000A78 00                  A  2213          DB   BR
00000A79 80                  A  2214          DB   STACKOFFSET
00000A7A 16                  A  2215          DB   PLUS
00000A7B 00                  A  2216          DB   BR        ; Get address of r0 in current group pointer
00000A7C FD                  A  2217          DB   FDh
00000A7D 0E                  A  2218          DB   CAT       ; Initialize r0 of forth area with start of return stack
00000A7E 0B                  A  2219          DB   STORE
00000A7F 36                  A  2220    QU2:  DB   CR        ; Put out a carriage return
00000A80 2D                  A  2221          DB   ZERO      ; Initialize >IN to zero
00000A81 26                  A  2222          DB   TOIN
00000A82 0B                  A  2223          DB   STORE
00000A83 00                  A  2224          DB   BR
00000A84 22                  A  2225          DB   TIBLOC    ; Initialize TIB to zero
00000A85 0D                  A  2226          DB   AT
00000A86 2D                  A  2227          DB   ZERO
00000A87 31                  A  2228          DB   OVER
00000A88 0C                  A  2229          DB   CSTORE
00000A89 12                  A  2230          DB   DUP       ; Initialize TIB to zeros
00000A8A 24                  A  2231          DB   ONEPLUS
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000A8B 00                  A  2232          DB   BR
00000A8C 40                  A  2233          DB   40h       ; Assume the TIB area is 64 bytes long
00000A8D 1E                  A  2234          DB   CMOVE
00000A8E 00                  A  2235          DB   BR
00000A8F 22                  A  2236          DB   TIBLOC    ; Get address of tib
00000A90 0D                  A  2237          DB   AT
00000A91 00                  A  2238          DB   BR
00000A92 40                  A  2239          DB   40h       ; Maximum number of characters
00000A93 06                  A  2240          DB   LONGCALL
00000A94 0773                A  2241          DW   EXPECT    ; Get a string up to the delimiter
00000A96 06                  A  2242          DB   LONGCALL
00000A97 0E22                A  2243          DW   INTERPRETER
00000A99 2B                  A  2244          DB   STATE     ; If compiling (STATE<>0) get another line
00000A9A 0E                  A  2245          DB   CAT
00000A9B 1B                  A  2246          DB   ZEQ       ; Result is not zero if STATE=0
00000A9C 04                  A  2247          DB   JRZ       ; Branch taken if STATE is not zero
00000A9D FFE2                A  2248          DW   QU2-$
00000A9F 51                  A  2249          DB   DOTQAUX
00000AA0 024F4B              A  2250          DB   02H, "OK" ; Not compiling, initialize and do it again
00000AA3 02                  A  2251          DB   JR
00000AA4 FFD2                A  2252          DW   QU1-$
                             A  2253
                             A  2254                         ; : [ ZERO STATE ! ; IMMEDIATE
         00000AA6            A  2255    LFTBRSUB:EQU $
00000AA6 3018                A  2256          JP   @COLON    ; Set STATE to "not compiling"
00000AA8 2D                  A  2257          DB   ZERO
00000AA9 2B                  A  2258          DB   STATE
00000AAA 0C                  A  2259          DB   CSTORE
00000AAB 07                  A  2260          DB   SEMICOLON
                             A  2261
                             A  2262                         ; : ] KC0 STATE ! ; IMMEDIATE
         00000AAC            A  2263    RTBRSUB:EQU $
00000AAC 3018                A  2264          JP   @COLON    ; Set STATE to "compiling"
00000AAE 00                  A  2265          DB   BR
00000AAF C0                  A  2266          DB   0C0H
00000AB0 2B                  A  2267          DB   STATE
00000AB1 0C                  A  2268          DB   CSTORE
00000AB2 07                  A  2269          DB   SEMICOLON
                             A  2270
                             A  2271                         ; : ' FIND DUP IF LITERAL ELSE 557 FATALERR THEN
                             A  2272                         ;      IMMEDIATE
                             A  2273
         00000AB3            A  2274    TICSUB: EQU  $
00000AB3 3018                A  2275          JP   @COLON      ; This TIC compiles an execution address as a constant
00000AB5 3B                  A  2276          DB   FINDEA      ; Returns the address (or token) of the PFA of the
00000AB6 12                  A  2277          DB   DUP         ;   word found
00000AB7 05                  A  2278          DB   JRZS        ; If the found address is zero, it isn't there
00000AB8 05                  A  2279          DB   TIC1-$
00000AB9 3E                  A  2280          DB   COMPILE     ; Compile a constant
00000ABA 01                  A  2281          DB   NR          ;  of the address found by FINDEA
00000ABB 20                  A  2282          DB   COMMA
00000ABC 07                  A  2283          DB   SEMICOLON
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000ABD 06                  A  2284    TIC1: DB   LONGCALL
00000ABE 0E09                A  2285          DW   FATALERR
00000AC0 0359                A  2286          DW   TICHEAD
                             A  2287
                             A  2288                        ; : Min over over >= if swap then drop
         00000AC2            A  2289    MINSUB: EQU  $
00000AC2 3018                A  2290          JP   @COLON
00000AC4 31                  A  2291          DB   OVER
00000AC5 31                  A  2292          DB   OVER
00000AC6 1C                  A  2293          DB   GTEQ
00000AC7 05                  A  2294          DB   JRZS
00000AC8 02                  A  2295          DB   MIN1-$
00000AC9 11                  A  2296          DB   SWAP
00000ACA 13                  A  2297    MIN1: DB   DROP
00000ACB 07                  A  2298          DB   SEMICOLON
                             A  2299
                             A  2300                        ;  : Allot 12 +!
                             A  2301
         00000ACC            A  2302    ALLOTSUB: EQU $
00000ACC 3018                A  2303          JP   @COLON    ; Allot space in dictionary using argument on stack
00000ACE 25                  A  2304          DB   DPNTR
00000ACF 34                  A  2305          DB   PLUSSTORE
00000AD0 07                  A  2306          DB   SEMICOLON
                             A  2307
                             A  2308                        ; : CREATE FIND IF 55 ERRMSG THEN HERE DUP @ WIDTH @ MIN
                             A  2309                        ;    ALLOT A0 OVER C@ OR OVER C! HERE K80 OVER C@ OR SWAP
                             A  2310                        ;    C! ONE ALLOT VOCLNK @ , VOCLNK ! K0 HERE !
                             A  2311
         00000AD1            A  2312    CREATESUB: EQU $
00000AD1 3018                A  2313          JP   @COLON
00000AD3 29                  A  2314          DB   VOCLNK
00000AD4 00                  A  2315          DB   BR
00000AD5 20                  A  2316          DB   " "
00000AD6 37                  A  2317          DB   WORD      ; Find returns the parameter field address of the word found
00000AD7 06                  A  2318          DB   LONGCALL
00000AD8 0892                A  2319          DW   FINDAUX
00000ADA 05                  A  2320          DB   JRZS
00000ADB 07                  A  2321          DB   CREATE1-$
00000ADC 01                  A  2322          DB   NR        ; Error message if word is already defined
00000ADD 036B                A  2323          DW   CREATEHEAD;  But go on with the definition
00000ADF 06                  A  2324          DB   LONGCALL
00000AE0 0DF5                A  2325          DW   ERRMSG
         00000AE2            A  2326    CREATE1: EQU $
00000AE2 1F                  A  2327          DB   HERE      ; This is where the text for the word is stored -
00000AE3 12                  A  2328          DB   DUP       ;  the text length is stored at HERE
00000AE4 0E                  A  2329          DB   CAT       ; Get the length of the definition
00000AE5 00                  A  2330          DB   BR
00000AE6 11                  A  2331          DB   WIDTHLOC  ; Get the current max length for a word
00000AE7 0E                  A  2332          DB   CAT
00000AE8 00                  A  2333          DB   BR
00000AE9 1F                  A  2334          DB   1Fh       ; Make sure the current width is less than 32
00000AEA 14                  A  2335          DB   AND
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000AEB 47                  A  2336          DB   MIN       ; Get the min of max length and actual word length
00000AEC 48                  A  2337          DB   ALLOT     ; Allot this many more bytes to the definition
00000AED 00                  A  2338          DB   BR
00000AEE A0                  A  2339          DB   0A0H      ; 1010 binary  (smudge bit is set)
00000AEF 31                  A  2340          DB   OVER
00000AF0 0E                  A  2341          DB   CAT       ; Get the word count for the definition
00000AF1 15                  A  2342          DB   OR        ; Or the word count with 1010
00000AF2 31                  A  2343          DB   OVER
00000AF3 0C                  A  2344          DB   CSTORE
00000AF4 1F                  A  2345          DB   HERE      ; This now points to the last byte of the definition
00000AF5 00                  A  2346          DB   BR        ; Set the high bit of the last char of the definition
00000AF6 80                  A  2347          DB   80h
00000AF7 31                  A  2348          DB   OVER
00000AF8 0E                  A  2349          DB   CAT
00000AF9 15                  A  2350          DB   OR
00000AFA 11                  A  2351          DB   SWAP
00000AFB 0C                  A  2352          DB   CSTORE
00000AFC 2E                  A  2353          DB   ONE       ; Allot one more byte to point to link address
00000AFD 48                  A  2354          DB   ALLOT
00000AFE 29                  A  2355          DB   VOCLNK    ; Store the old voclnk in the new defs link
00000AFF 0D                  A  2356          DB   AT
00000B00 20                  A  2357          DB   COMMA
00000B01 29                  A  2358          DB   VOCLNK    ; Store the new head in voclnk
00000B02 0B                  A  2359          DB   STORE
00000B03 2D                  A  2360          DB   ZERO      ; Store a zero in the pfa
00000B04 1F                  A  2361          DB   HERE
00000B05 0B                  A  2362          DB   STORE
00000B06 07                  A  2363          DB   SEMICOLON
                             A  2364
                             A  2365                         ;  : : State @ if 444 fatalerr then stkpntr @ stkbal !
                             A  2366                         ;     Create ] [compile] compile colonsub ; immediate
                             A  2367
         00000B07            A  2368    COLONDEFSUB: EQU $
00000B07 3018                A  2369          JP   @COLON
00000B09 2B                  A  2370          DB   STATE     ; Make sure that we are not in compile mode
00000B0A 0E                  A  2371          DB   CAT
00000B0B 05                  A  2372          DB   JRZS
00000B0C 06                  A  2373          DB   COLONDEF1-$
00000B0D 06                  A  2374          DB   LONGCALL
00000B0E 0E09                A  2375          DW   FATALERR
00000B10 0374                A  2376          DW   COLONDEFHEAD
         00000B12            A  2377    COLONDEF1: EQU $
00000B12 2C                  A  2378          DB   STKPNTR   ; Initialize the stack balance
00000B13 0D                  A  2379          DB   AT
00000B14 00                  A  2380          DB   BR
00000B15 2A                  A  2381          DB   SBLOC
00000B16 0B                  A  2382          DB   STORE
00000B17 49                  A  2383          DB   CREATE
00000B18 45                  A  2384          DB   RTBR      ; Set to non-compile mode
00000B19 01                  A  2385          DB   NR        ; Compile the jump to the colon routine
00000B1A 3018                A  2386          JP   @COLON
00000B1C 20                  A  2387          DB   COMMA
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000B1D 07                  A  2388          DB   SEMICOLON
                             A  2389
                             A  2390                        ; : Smudge voclnk @ df over c@ and swap c!
                             A  2391
         00000B1E            A  2392    SMUDGESUB: EQU $
00000B1E 3018                A  2393          JP   @COLON
00000B20 29                  A  2394          DB   VOCLNK    ; Reset the smudge bit on the last forth definition
00000B21 0D                  A  2395          DB   AT
00000B22 00                  A  2396          DB   BR
00000B23 DF                  A  2397          DB   0DFH      ; 1101 1111
00000B24 31                  A  2398          DB   OVER
00000B25 0E                  A  2399          DB   CAT
00000B26 14                  A  2400          DB   AND
00000B27 11                  A  2401          DB   SWAP
00000B28 0C                  A  2402          DB   CSTORE
00000B29 07                  A  2403          DB   SEMICOLON
                             A  2404
                             A  2405                        ; : ; Stkpntr @ stkbal @ - if 353 fatalerr then
                             A  2406                        ;     [Compile] compile semicrtn smudge [ ; immediate
                             A  2407
         00000B2A            A  2408    SEMICDEFSUB: EQU $
00000B2A 3018                A  2409          JP   @COLON
00000B2C 2C                  A  2410          DB   STKPNTR   ; Check the current stack length against the starting length
00000B2D 0D                  A  2411          DB   AT
00000B2E 00                  A  2412          DB   BR
00000B2F 2A                  A  2413          DB   SBLOC
00000B30 0D                  A  2414          DB   AT
00000B31 2F                  A  2415          DB   MINUS
00000B32 05                  A  2416          DB   JRZS      ; Error if the stack length is different
00000B33 06                  A  2417          DB   SEMICDEF1-$
00000B34 06                  A  2418          DB   LONGCALL
00000B35 0E09                A  2419          DW   FATALERR
00000B37 0381                A  2420          DW   SEMICDEFHEAD
         00000B39            A  2421    SEMICDEF1: EQU $
00000B39 3E                  A  2422          DB   COMPILE
00000B3A 07                  A  2423          DB   SEMICOLON
00000B3B 4B                  A  2424          DB   SMUDGE    ; Make the definition executable
00000B3C 44                  A  2425          DB   LFTBR     ; Set the state back to immediate
00000B3D 07                  A  2426          DB   SEMICOLON
                             A  2427
         00000B3E            A  2428    BYTECONSUB: EQU $
00000B3E A0E4                A  2429          INCW RR4
00000B40 C294                A  2430          LDC  R9,@RR4   ; Load the byte just after ex vector
00000B42 B0E8                A  2431          CLR  R8
00000B44 8B 08               A  2432          JR   CS1
                             A  2433
         00000B46            A  2434    CONSUB: EQU $        ; Load a constant on stack
00000B46 A0E4                A  2435          INCW RR4
00000B48 C284                A  2436          LDC  R8,@RR4   ; Load constant at ep to w8
00000B4A A0E4                A  2437          INCW RR4
00000B4C C294                A  2438          LDC  R9,@RR4
00000B4E 70E9                A  2439    CS1:  PUSH R9
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000B50 70E8                A  2440          PUSH R8
00000B52 3016                A  2441          JP   @NV
                             A  2442
         00000B54            A  2443    HIBYTE: EQU $
00000B54 3018                A  2444          JP   @COLON
00000B56 2C                  A  2445          DB   STKPNTR
00000B57 0D                  A  2446          DB   AT
00000B58 0E                  A  2447          DB   CAT
00000B59 11                  A  2448          DB   SWAP
00000B5A 13                  A  2449          DB   DROP
00000B5B 07                  A  2450          DB   SEMICOLON
                             A  2451
                             A  2452                        ;  : Constant create consub , , smudge
                             A  2453
         00000B5C            A  2454    CONSTANTSUB: EQU $
00000B5C 3018                A  2455          JP   @COLON
00000B5E 49                  A  2456          DB   CREATE
00000B5F 00                  A  2457          DB   BR        ; For now, always create constant as a 3-byte definition
00000B60 46                  A  2458          DB   CONSUB
00000B61 21                  A  2459          DB   CCOMMA
00000B62 20                  A  2460          DB   COMMA
00000B63 4B                  A  2461    CON3: DB   SMUDGE
00000B64 07                  A  2462          DB   SEMICOLON
                             A  2463
                             A  2464                        ;  : <Builds k0 constant
                             A  2465
         00000B65            A  2466    BUILDSSUB: EQU $
00000B65 3018                A  2467          JP   @COLON
00000B67 49                  A  2468          DB   CREATE    ; <BUILDS is the NOT the same as CONSTANT in this version
00000B68 00                  A  2469          DB   BR        ; Compile a two-byte call at HERE
00000B69 D6                  A  2470          DB   #D6H      ; D6 is long CALL with a two byte address
00000B6A 21                  A  2471          DB   CCOMMA
00000B6B 01                  A  2472          DB   NR        ; This is the argument of the CALL
00000B6C 0B72                A  2473          DW   DOESAUX
00000B6E 20                  A  2474          DB   COMMA
00000B6F 2D                  A  2475          DB   ZERO      ; This zero will be replaced with the address of the routine
00000B70 20                  A  2476          DB   COMMA     ;  that does the work of the definition
00000B71 07                  A  2477          DB   SEMICOLON
                             A  2478
                             A  2479                        ; The DOES sequence starts with a long (two-byte) CALL,
                             A  2480                        ;  then the address of the routine to do the DOES then the address
                             A  2481                        ;   of the parameter field(s) (made by <BUILDS) for the DOES>
                             A  2482                        ; The long CALL branches to the location in R4/R5
                             A  2483                        ; The DOESAUX routine is always called via a two byte reference
                             A  2484
         00000B72            A  2485    DOESAUX: EQU $       ; Code for implement a DOES>
00000B72 80E0                A  2486          DECW RR0       ; Push IP onto RStack for return at
00000B74 D230                A  2487          LDC  @RR0,R3   ;  the semicolon at the end of the routine to execute
00000B76 80E0                A  2488          DECW RR0
00000B78 D220                A  2489          LDC  @RR0,R2
00000B7A 50E4                A  2490          POP  R4        ; DOESAUX is always entered via long CALL
00000B7C 50E5                A  2491          POP  R5        ;  with the address of the parameter after the CALL on the stack
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000B7E C224                A  2492          LDC  R2,@RR4   ; Load R2 with the address needed to execute the DOES
00000B80 A0E4                A  2493          INCW RR4
00000B82 C234                A  2494          LDC  R3,@RR4
00000B84 A0E4                A  2495          INCW RR4       ; Point to the parameter field address of the definition
00000B86 70E5                A  2496          PUSH R5        ; Push address of the parameter field to stack
00000B88 70E4                A  2497          PUSH R4
00000B8A 3016                A  2498          JP   @NV       ; Go to the new address loaded into IP
                             A  2499
                             A  2500                         ;  : DOES> VOCLNK @ BEGIN 1+ DUP C@ K80 AND UNTIL
                             A  2501                         ;    3 + DOESSUB OVER ! K2 + R> SWAP !
         00000B8C            A  2502    DOESSUB: EQU $
00000B8C 3018                A  2503          JP   @COLON
00000B8E 10                  A  2504          DB   RONTO     ; This is the address in the definition that will do the work
00000B8F 29                  A  2505          DB   VOCLNK    ; Find the zero compiled after the two-byte CALL
00000B90 0D                  A  2506          DB   AT
         00000B91            A  2507    DOES1: EQU $
00000B91 24                  A  2508          DB   ONEPLUS
00000B92 12                  A  2509          DB   DUP
00000B93 0D                  A  2510          DB   AT
00000B94 1B                  A  2511          DB   ZEQ
00000B95 04                  A  2512          DB   JRZ       ; Result is zero if the word found was not zero
00000B96 FFFB                A  2513          DW   DOES1-$
00000B98 0B                  A  2514          DB   STORE     ; Store this address in the defined word's two-byte CALL
00000B99 07                  A  2515          DB   SEMICOLON ; This return will be to the next word after the defining word's target
                             A  2516
         00000B9A            A  2517    IMMEDIATESUB: EQU $
00000B9A 3018                A  2518          JP   @COLON    ; Make the last defined FORTH word immediate
00000B9C 29                  A  2519          DB   VOCLNK    ; Set the immediate bit in the
00000B9D 0D                  A  2520          DB   AT        ;   first byte of the definition
00000B9E 00                  A  2521          DB   BR
00000B9F 40                  A  2522          DB   40h       ; 0100 000
00000BA0 31                  A  2523          DB   OVER
00000BA1 0E                  A  2524          DB   CAT
00000BA2 15                  A  2525          DB   OR
00000BA3 11                  A  2526          DB   SWAP
00000BA4 0C                  A  2527          DB   CSTORE
00000BA5 07                  A  2528          DB   SEMICOLON
                             A  2529
         00000BA6            A  2530    DOTQAUXSUB: EQU $       ; Code to execute a dot-quote
00000BA6 C282                A  2531          LDC  R8,@RR2   ; Load character count from text
00000BA8 A0E2                A  2532      DQ1:INCW RR2
00000BAA C292                A  2533          LDC  R9,@RR2   ; Load succeeding character from text
00000BAC D6 00B4             A  2534          CALL SEROUT    ; Write character to serial output port
00000BAF 8A F7               A  2535          DJNZ R8,DQ1
00000BB1 A0E2                A  2536          INCW RR2
00000BB3 3016                A  2537          JP   @NV
                             A  2538                         ;  : ." K1 >in +! [compile] ."sub 22 word c@ 1+
                             A  2539                         ;       Allot k1 >in +1 ; immediate
         00000BB5            A  2540    DOTQUOTESUB: EQU $
00000BB5 3018                A  2541          JP   @COLON    ; Compile "Print a quoted string"
00000BB7 3E                  A  2542          DB   COMPILE
00000BB8 51                  A  2543          DB   DOTQAUX
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000BB9 03                  A  2544          DB   JRS
00000BBA 03                  A  2545          DB   STR1-$
                             A  2546
         00000BBB            A  2547    STRINGSUB: EQU $     ; Compile a quoted string routine
00000BBB 3018                A  2548          JP   @COLON    ; Places the following quoted string at here
00000BBD 2E                  A  2549     STR1:DB   ONE       ;  and allocates space for it
00000BBE 26                  A  2550          DB   TOIN
00000BBF 34                  A  2551          DB   PLUSSTORE ; Advance to the first byte after the delimiter
00000BC0 00                  A  2552          DB   BR
00000BC1 22                  A  2553          DB   22h       ; Delimiter is a double quote
00000BC2 37                  A  2554          DB   WORD
00000BC3 0E                  A  2555          DB   CAT
00000BC4 24                  A  2556          DB   ONEPLUS
00000BC5 48                  A  2557          DB   ALLOT
00000BC6 2E                  A  2558          DB   ONE
00000BC7 26                  A  2559          DB   TOIN
00000BC8 34                  A  2560          DB   PLUSSTORE
00000BC9 07                  A  2561          DB   SEMICOLON
                             A  2562
                             A  2563                         ;  : Pad here 44 +
00000BCA 3018                A  2564    PADSUB:  JP   @COLON
00000BCC 1F                  A  2565          DB   HERE      ; Put HERE + 44h on the stack
00000BCD 00                  A  2566          DB   BR
00000BCE 44                  A  2567          DB   44H
00000BCF 16                  A  2568          DB   PLUS
00000BD0 07                  A  2569          DB   SEMICOLON
                             A  2570
                             A  2571                         ;  : HOLD HOLDW  -1 OVER +! @ C!
00000BD1 3018                A  2572    HOLDSUB: JP   @COLON
00000BD3 00                  A  2573          DB   BR
00000BD4 24                  A  2574          DB   HLDLOC
00000BD5 2E                  A  2575          DB   ONE
00000BD6 17                  A  2576          DB   NEGATE
00000BD7 31                  A  2577          DB   OVER
00000BD8 34                  A  2578          DB   PLUSSTORE
00000BD9 0D                  A  2579          DB   AT
00000BDA 0C                  A  2580          DB   CSTORE
00000BDB 07                  A  2581          DB   SEMICOLON
                             A  2582
                             A  2583                         ;  : <# PAD HOLDW  !
                             A  2584
         00000BDC            A  2585    INTOPOUNDSUB: EQU $
00000BDC 3018                A  2586          JP   @COLON
00000BDE 54                  A  2587          DB   PAD
00000BDF 00                  A  2588          DB   BR
00000BE0 24                  A  2589          DB   HLDLOC
00000BE1 0B                  A  2590          DB   STORE
00000BE2 07                  A  2591          DB   SEMICOLON
                             A  2592
                             A  2593                         ;  : # BASE @ >R K0 I U/ R> SWAP >R U/ R> ROT DUP KA
                             A  2594                         ;     >= IF 7 + THEN 30 + HOLD
         00000BE3            A  2595    POUNDSUB: EQU $
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000BE3 3018                A  2596          JP   @COLON
00000BE5 28                  A  2597          DB   BASE
00000BE6 0D                  A  2598          DB   AT
00000BE7 0F                  A  2599          DB   ONTOR     ; What follows is m/ - save base on rstack
00000BE8 2D                  A  2600          DB   ZERO      ; Divide [0 nh] by denominator
00000BE9 31                  A  2601          DB   OVER
00000BEA 05                  A  2602          DB   JRZS
00000BEB 03                  A  2603          DB   POUND0-$
00000BEC 1D                  A  2604          DB   I
00000BED 19                  A  2605          DB   USLASH
         00000BEE            A  2606    POUND0: EQU $
00000BEE 10                  A  2607          DB   RONTO     ; Get back copy of denominator
00000BEF 11                  A  2608          DB   SWAP      ; Put high word of quotient to top of stack
00000BF0 0F                  A  2609          DB   ONTOR     ; Save high byte of quotient on rstack
00000BF1 19                  A  2610          DB   USLASH    ; Divide [r hl] by denominator
00000BF2 10                  A  2611          DB   RONTO     ; Get qh back - stack is not ql r qh
00000BF3 32                  A  2612          DB   ROT       ; Results in ql qh r
00000BF4 12                  A  2613          DB   DUP
00000BF5 00                  A  2614          DB   BR
00000BF6 0A                  A  2615          DB   0Ah       ; Is remainder gteq to 10?
00000BF7 1C                  A  2616          DB   GTEQ
00000BF8 05                  A  2617          DB   JRZS
00000BF9 04                  A  2618          DB   POUND1-$
00000BFA 00                  A  2619          DB   BR        ; If so, add 7 to make it a letter
00000BFB 07                  A  2620          DB   007H
00000BFC 16                  A  2621          DB   PLUS
         00000BFD            A  2622    POUND1: EQU $
00000BFD 00                  A  2623          DB   BR
00000BFE 30                  A  2624          DB   030H      ; Make it an ascii character
00000BFF 16                  A  2625          DB   PLUS
00000C00 55                  A  2626          DB   HOLD      ; Put the character into the string
00000C01 07                  A  2627          DB   SEMICOLON
                             A  2628
                             A  2629                         ; : #S # OVER OVER OR 0= IF [ -C SWAP ! ]
         00000C02            A  2630    POUNDSSUB: EQU $
00000C02 3018                A  2631          JP   @COLON
         00000C04            A  2632    POUNDS1: EQU $
00000C04 57                  A  2633          DB   POUND
00000C05 31                  A  2634          DB   OVER
00000C06 31                  A  2635          DB   OVER
00000C07 15                  A  2636          DB   OR
00000C08 1B                  A  2637          DB   ZEQ
00000C09 04                  A  2638          DB   JRZ
00000C0A FFFA                A  2639          DW   POUNDS1-$
00000C0C 07                  A  2640          DB   SEMICOLON
                             A  2641
                             A  2642                         ;  : #> 2drop holdw  @ pad over -
         00000C0D            A  2643    POUNDINTOSUB: EQU $
00000C0D 3018                A  2644          JP   @COLON
00000C0F 13                  A  2645          DB   DROP
00000C10 13                  A  2646          DB   DROP
00000C11 00                  A  2647          DB   BR
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000C12 24                  A  2648          DB   HLDLOC
00000C13 0D                  A  2649          DB   AT
00000C14 54                  A  2650          DB   PAD
00000C15 31                  A  2651          DB   OVER
00000C16 2F                  A  2652          DB   MINUS
00000C17 07                  A  2653          DB   SEMICOLON
                             A  2654
                             A  2655                        ;  : SIGN ROT 8000 >= IF 2D HOLD ELSE ;
                             A  2656
         00000C18            A  2657    SIGNSUB: EQU $
00000C18 3018                A  2658          JP   @COLON
00000C1A 32                  A  2659          DB   ROT
00000C1B 2E                  A  2660          DB   ONE
00000C1C 17                  A  2661          DB   NEGATE
00000C1D 11                  A  2662          DB   SWAP
00000C1E 1C                  A  2663          DB   GTEQ
00000C1F 05                  A  2664          DB   JRZS
00000C20 04                  A  2665          DB   SIGN1-$
00000C21 00                  A  2666          DB   BR
00000C22 2D                  A  2667          DB   2DH
00000C23 55                  A  2668          DB   HOLD
         00000C24            A  2669    SIGN1: EQU $
00000C24 07                  A  2670          DB  SEMICOLON
                             A  2671
         00000C25            A  2672    DOAUXSUB: EQU $
00000C25 3018                A  2673          JP   @COLON    ; Routine to implement the start of a DO
00000C27 11                  A  2674          DB   SWAP      ; Put the limit on top
00000C28 10                  A  2675          DB   RONTO     ; Get the return address  Start Limit RA
00000C29 32                  A  2676          DB   ROT       ; Limit RA Start
00000C2A 32                  A  2677          DB   ROT       ; RA Start Limit
00000C2B 0F                  A  2678          DB   ONTOR     ; RStack: ... RA Start Limit
00000C2C 0F                  A  2679          DB   ONTOR
00000C2D 0F                  A  2680          DB   ONTOR
00000C2E 07                  A  2681          DB   SEMICOLON
                             A  2682
                             A  2683                        ;  : DO [COMPILE] COMPILE DOSUB HERE HERE ; IMMEDIATE
         00000C2F            A  2684    DOSUB: EQU $
00000C2F 3018                A  2685          JP   @COLON
00000C31 3E                  A  2686          DB   COMPILE
00000C32 5C                  A  2687          DB   DOAUX
00000C33 1F                  A  2688          DB   HERE
00000C34 07                  A  2689          DB   SEMICOLON
                             A  2690
         00000C35            A  2691    UNLOOPSUB: EQU $
00000C35 A0E0                A  2692          INCW RR0       ; Prune the index & limit from rstack
00000C37 A0E0                A  2693          INCW RR0
00000C39 A0E0                A  2694          INCW RR0
00000C3B A0E0                A  2695          INCW RR0
00000C3D 8D 0546             A  2696          JP   JRSUB     ; And execute a Jump Relative
                             A  2697
                             A  2698                        ; Routines to match up if/then begin/until while/repeat
                             A  2699                        ;   (a LEAVE may have been in the mix)
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000C40 3018                A  2700    S1:   JP   @COLON
00000C42 2D                  A  2701          DB   ZERO      ; This value at top-of-stack will count the number of LEAVEs
00000C43 31                  A  2702    S1A:  DB   OVER      ; Get the value at the branch location
00000C44 0D                  A  2703          DB   AT
00000C45 1B                  A  2704          DB   ZEQ       ; If it is non-zero, we are OK to proceed
00000C46 05                  A  2705          DB   JRZS
00000C47 0A                  A  2706          DB   S1B-$
00000C48 24                  A  2707          DB   ONEPLUS   ; If not, increment the current depth
00000C49 11                  A  2708          DB   SWAP
00000C4A 10                  A  2709          DB   RONTO     ; Get the branch location off of the return stack
00000C4B 11                  A  2710          DB   SWAP
00000C4C 0F                  A  2711          DB   ONTOR     ; And push these two locations onto the return stack
00000C4D 0F                  A  2712          DB   ONTOR
00000C4E 02                  A  2713          DB   JR        ; And keep looking for the branch with a non-zero address
00000C4F FFF4                A  2714          DW   S1A-$
00000C51 11                  A  2715    S1B   DB   SWAP      ; RetStack: ... (Branch address) (Addresses of the LEAVEs)
00000C52 07                  A  2716          DB   SEMICOLON ; Stack: (Address of non-LEAVE) (Count of the LEAVEs of the RetStack)
                             A  2717
00000C53 3018                A  2718    S2:   JP   @COLON
00000C55 12                  A  2719    S2A:  DB   DUP       ; Count of the LEAVEs on the RStack
00000C56 05                  A  2720          DB   JRZS
00000C57 0C                  A  2721          DB   S2B-$
00000C58 10                  A  2722          DB   RONTO     ; Return to stack
00000C59 11                  A  2723          DB   SWAP      ; Count to top
00000C5A 10                  A  2724          DB   RONTO     ; LEAVE address to stack
00000C5B 11                  A  2725          DB   SWAP      ; Count to top
00000C5C 2E                  A  2726          DB   ONE       ; Decrement the count
00000C5D 2F                  A  2727          DB   MINUS
00000C5E 32                  A  2728          DB   ROT       ; Return to top of stack
00000C5F 0F                  A  2729          DB   ONTOR     ; Return to RetStack
00000C60 02                  A  2730          DB   JR        ; Loop to look for another LEAVE address
00000C61 FFF4                A  2731          DW   S2A-$
00000C63 13                  A  2732    S2B   DB   DROP      ; Drop the count
00000C64 07                  A  2733          DB   SEMICOLON
                             A  2734
         00000C65            A  2735    PLUSLOOPAUXSUB: EQU $ ; Code for +loop (increment is on stack)
00000C65 50E8                A  2736          POP  R8         ; Pop loop adjustment into r8
00000C67 50E9                A  2737          POP  R9
                             A  2738                          ; PLS1:LD   R15,#WW10  ; INDEX INTO R10, LIMIT INTO R12
00000C69 F8FD                A  2739    PLS1: LD   R15,RP     ; Index into r10, limit into r12
00000C6B 06EF0A              A  2740          ADD  R15,#WW10&0Fh
00000C6E C3F0                A  2741          LDCI @R15,@RR0
00000C70 C3F0                A  2742          LDCI @R15,@RR0
00000C72 C3F0                A  2743          LDCI @R15,@RR0
00000C74 C2D0                A  2744          LDC  R13,@RR0  ; Leave rstack pointing to low byte of limit
00000C76 68EA                A  2745          LD   R6,R10    ; Copy of prior index to r6/r7
00000C78 78EB                A  2746          LD   R7,R11
00000C7A 02B9                A  2747          ADD  R11,R9    ; Add loop increment to index
00000C7C 12A8                A  2748          ADC  R10,R8
00000C7E 227D                A  2749          SUB  R7,R13    ; Pi-limit: pi >= limit?
00000C80 326C                A  2750          SBC  R6,R12
00000C82 9B 0A               A  2751          JR   GE,PLS2   ; Jump if pi >= limit (backwards loop)
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000C84 22DB                A  2752          SUB  R13,R11   ; Limit - new index:
00000C86 32CA                A  2753          SBC  R12,R10   ;  Is limit <= new index?
00000C88 80EC                A  2754          DECW RR12
00000C8A 1B 22               A  2755          JR   LT,PLS4   ; If so skip out of the loop
00000C8C 8B 08               A  2756          JR   PLS3
         00000C8E            A  2757    PLS2: EQU $
00000C8E 22DB                A  2758          SUB  R13,R11   ; Limit - new index
00000C90 32CA                A  2759          SBC  R12,R10   ;  Is limit > new index?
00000C92 80EC                A  2760          DECW RR12
00000C94 9B 18               A  2761          JR   GE,PLS4
         00000C96            A  2762    PLS3: EQU $
00000C96 80E0                A  2763          DECW RR0       ; Point back to high byte of limit
00000C98 80E0                A  2764          DECW RR0       ; Point back to low byte of index
00000C9A D2B0                A  2765          LDC  @RR0,R11  ; Restore index (low)
00000C9C 80E0                A  2766          DECW RR0       ; Point back to high byte of index
00000C9E D2A0                A  2767          LDC  @RR0,R10  ; Restore index (high)
00000CA0 C2A2                A  2768          LDC  R10,@RR2  ; High byte of ip adjustment to r11
00000CA2 A0E2                A  2769          INCW RR2       ; Point to low byte of ip adjustment
00000CA4 C2B2                A  2770          LDC  R11,@RR2  ; Low byte of ip adjustment to r10
00000CA6 80E2                A  2771          DECW RR2       ; Point back to high byte of ip adjustment
00000CA8 023B                A  2772          ADD  R3,R11    ; Add adjustment to ip
00000CAA 122A                A  2773          ADC  R2,R10
00000CAC 3016                A  2774          JP   @NV
00000CAE A0E2                A  2775    PLS4: INCW RR2       ; Skip over IP adjustment
00000CB0 A0E2                A  2776          INCW RR2
00000CB2 A0E0                A  2777          INCW RR0       ; Prune index and limit from rstack
00000CB4 3016                A  2778          JP   @NV
                             A  2779
         00000CB6            A  2780    LOOPAUXSUB: EQU $    ; Code for loop
00000CB6 9C01                A  2781          LD   R9,#001H  ; Set increment to 1
00000CB8 B0E8                A  2782          CLR  R8
00000CBA 8B AD               A  2783          JR   PLS1      ; Process through +loopaux
                             A  2784
                             A  2785                         ;  : Reladr here - ,
         00000CBC            A  2786    RELADR: EQU $
00000CBC 3018                A  2787          JP   @COLON
00000CBE 1F                  A  2788          DB   HERE
00000CBF 2F                  A  2789          DB   MINUS
00000CC0 20                  A  2790          DB   COMMA
00000CC1 07                  A  2791          DB   SEMICOLON
                             A  2792
                             A  2793                         ;  : LOOP [COMPILE] COMPILE LOOPAUX RELADR ; IMMEDIATE
         00000CC2            A  2794    LOOPSUB: EQU $
00000CC2 3018                A  2795          JP   @COLON
00000CC4 3E                  A  2796          DB   COMPILE
00000CC5 60                  A  2797          DB   LOOPAUX
00000CC6 03                  A  2798          DB   JRS
00000CC7 05                  A  2799          DB   PL1-$
                             A  2800                         ; : +LOOP [COMPILE] COMPILE +LOOPAUX RELADR ; IMMEDIATE
         00000CC8            A  2801    PLUSLOOPSUB: EQU $
00000CC8 3018                A  2802          JP   @COLON
00000CCA 3E                  A  2803          DB   COMPILE
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000CCB 5E                  A  2804          DB   PLUSLOOPAUX
         00000CCC            A  2805    PL1: EQU $
00000CCC 12                  A  2806          DB   DUP       ; Look for a zero at the branch address
00000CCD 0D                  A  2807          DB   AT
00000CCE 1B                  A  2808          DB   ZEQ
00000CCF 05                  A  2809          DB   JRZS      ; Non zero means it wasn't a LEAVE marker on the stack
00000CD0 0B                  A  2810          DB   PL2-$     ;   so just compile the relative address
00000CD1 1F                  A  2811          DB   HERE      ; If it's zero, compute HERE-Address+2 for a LEAVE
00000CD2 31                  A  2812          DB   OVER
00000CD3 2F                  A  2813          DB   MINUS
00000CD4 24                  A  2814          DB   ONEPLUS
00000CD5 24                  A  2815          DB   ONEPLUS
00000CD6 11                  A  2816          DB   SWAP      ; And store this at the LEAVE address
00000CD7 0B                  A  2817          DB   STORE
00000CD8 02                  A  2818          DB   JR
00000CD9 FFF3                A  2819          DW   PL1-$     ; Look again for another LEAVE
         00000CDB            A  2820    PL2: EQU $
00000CDB 06                  A  2821          DB   LONGCALL
00000CDC 0CBC                A  2822          DW   RELADR
00000CDE 07                  A  2823          DB   SEMICOLON
                             A  2824
                             A  2825
         00000CDF            A  2826    LEAVESUB: EQU $       ; External leave
00000CDF 3018                A  2827          JP   @COLON
00000CE1 3E                  A  2828          DB   COMPILE
00000CE2 62                  A  2829          DB   UNLOOP
00000CE3 1F                  A  2830          DB   HERE       ; Put a zero here for an address to be filled in by +LOOP or LOOP
00000CE4 2D                  A  2831          DB   ZERO
00000CE5 20                  A  2832          DB   COMMA
00000CE6 07                  A  2833          DB   SEMICOLON
                             A  2834
                             A  2835                         ; IF [COMPILE] COMPILE JRZSUB HERE K0 , ; IMMEDIATE
         00000CE7            A  2836    IFSUB: EQU $
00000CE7 3018                A  2837          JP   @COLON
00000CE9 3E                  A  2838          DB   COMPILE   ; Compile a JRZ, put HERE on the stack, compile ONE as placeholder
00000CEA 04                  A  2839          DB   JRZ
00000CEB 1F                  A  2840     IF1: DB   HERE
00000CEC 2E                  A  2841          DB   ONE       ; Compile ONE as placeholder at HERE
00000CED 20                  A  2842          DB   COMMA
00000CEE 07                  A  2843          DB   SEMICOLON
                             A  2844
                             A  2845                         ;  : THEN HERE OVER - SWAP ! ; IMMEDIATE
         00000CEF            A  2846    THENSUB: EQU $
00000CEF 3018                A  2847          JP   @COLON
00000CF1 06                  A  2848          DB   LONGCALL
00000CF2 0C40                A  2849          DW   S1        ; Drill down to the corresponding IF
         00000CF4            A  2850    THEN1: EQU $
00000CF4 1F                  A  2851          DB   HERE      ; Put HERE on the stack, get the address put on by the IF
00000CF5 31                  A  2852          DB   OVER
00000CF6 2F                  A  2853          DB   MINUS     ; Compute HERE minus that IF address
00000CF7 11                  A  2854          DB   SWAP      ;  and store at the HERE address
00000CF8 0B                  A  2855          DB   STORE
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000CF9 06                  A  2856          DB   LONGCALL
00000CFA 0C53                A  2857          DW   S2         ; Put back all the junk cast aside
00000CFC 07                  A  2858          DB   SEMICOLON
                             A  2859
                             A  2860                         ;  : ELSE [COMPILE] COMPILE JR HERE K0 ,
                             A  2861                         ;      SWAP [COMPILE] THEN ; IMMEDIATE
         00000CFD            A  2862    ELSESUB: EQU $
00000CFD 3018                A  2863          JP   @COLON
00000CFF 3E                  A  2864          DB   COMPILE
00000D00 02                  A  2865          DB   JR
00000D01 1F                  A  2866          DB   HERE
00000D02 2E                  A  2867          DB   ONE
00000D03 20                  A  2868          DB   COMMA
00000D04 11                  A  2869          DB   SWAP
00000D05 64                  A  2870          DB   _THEN
00000D06 07                  A  2871          DB   SEMICOLON
                             A  2872
                             A  2873                         ;  : Begin here ; immediate
         00000D07            A  2874    BEGINSUB: EQU $
00000D07 3018                A  2875          JP   @COLON
00000D09 1F                  A  2876          DB   HERE
00000D0A 07                  A  2877          DB   SEMICOLON
                             A  2878
                             A  2879                         ;  : Until [compile] compile jrz reladr ; immediate
         00000D0B            A  2880    UNTILSUB: EQU $
00000D0B 3018                A  2881          JP   @COLON
00000D0D 06                  A  2882          DB   LONGCALL
00000D0E 0C40                A  2883          DW   S1         ;  Find the address corresponding to the BEGIN
00000D10 3E                  A  2884          DB   COMPILE
00000D11 04                  A  2885          DB   JRZ
00000D12 06                  A  2886          DB   LONGCALL
00000D13 0CBC                A  2887          DW   RELADR
00000D15 06                  A  2888          DB   LONGCALL
00000D16 0C53                A  2889          DW   S2
00000D18 07                  A  2890          DB   SEMICOLON
                             A  2891
                             A  2892                         ;  : While [compile] if ; immediate
         00000D19            A  2893    WHILESUB: EQU $
00000D19 3018                A  2894          JP   @COLON
00000D1B 63                  A  2895          DB   _IF
00000D1C 07                  A  2896          DB   SEMICOLON
                             A  2897
                             A  2898                         ;  : REPEAT >R [COMPILE] AGAIN R> [COMPILE} THEN
                             A  2899                         ;      IMMEDIATE
         00000D1D            A  2900    REPEATSUB: EQU $
00000D1D 3018                A  2901          JP   @COLON
00000D1F 06                  A  2902          DB   LONGCALL
00000D20 0C40                A  2903          DW   S1
00000D22 0F                  A  2904          DB   ONTOR
00000D23 0F                  A  2905          DB   ONTOR
00000D24 06                  A  2906          DB   LONGCALL
00000D25 0C40                A  2907          DW   S1
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000D27 3E                  A  2908          DB   COMPILE
00000D28 02                  A  2909          DB   JR
00000D29 06                  A  2910          DB   LONGCALL
00000D2A 0CBC                A  2911          DW   RELADR
00000D2C 06                  A  2912          DB   LONGCALL
00000D2D 0C53                A  2913          DW   S2
00000D2F 10                  A  2914          DB   RONTO
00000D30 10                  A  2915          DB   RONTO
00000D31 02                  A  2916          DB   JR
00000D32 FFC2                A  2917          DW   THEN1-$
                             A  2918
                             A  2919                        ;  CASE STKPTR @ ; IMMEDIATE
         00000D34            A  2920    CASESUB: EQU $
00000D34 3018                A  2921          JP   @COLON
00000D36 2C                  A  2922          DB   STKPNTR
00000D37 0D                  A  2923          DB   AT
00000D38 00                  A  2924          DB   BR
00000D39 02                  A  2925          DB   #2
00000D3A 2F                  A  2926          DB   MINUS
00000D3B 07                  A  2927          DB   SEMICOLON
                             A  2928
         00000D3C            A  2929    OFAUXSUB: EQU $
00000D3C 50E8                A  2930          POP  R8
00000D3E 50E9                A  2931          POP  R9
00000D40 50EA                A  2932          POP  R10
00000D42 50EB                A  2933          POP  R11
00000D44 229B                A  2934          SUB  R9,R11
00000D46 328A                A  2935          SBC  R8,R10
00000D48 4289                A  2936          OR   R8,R9
00000D4A EB 06               A  2937          JR   NZ,OFAUX1
00000D4C A0E2                A  2938          INCW RR2
00000D4E A0E2                A  2939          INCW RR2
00000D50 3016                A  2940          JP   @NV
         00000D52            A  2941    OFAUX1: EQU $
00000D52 70EB                A  2942          PUSH R11
00000D54 70EA                A  2943          PUSH R10
00000D56 C282                A  2944          LDC  R8,@RR2
00000D58 A0E2                A  2945          INCW RR2
00000D5A C292                A  2946          LDC  R9,@RR2
00000D5C 80E2                A  2947          DECW RR2
00000D5E 0239                A  2948          ADD  R3,R9
00000D60 1228                A  2949          ADC  R2,R8
00000D62 3016                A  2950          JP   @NV
                             A  2951
                             A  2952                        ;  : Of [compile] ofaux here 1 , ; immediate
         00000D64            A  2953    OFSUB: EQU $
00000D64 3018                A  2954          JP   @COLON
00000D66 3E                  A  2955          DB   COMPILE
00000D67 6C                  A  2956          DB   OFAUX
00000D68 02                  A  2957          DB   JR
00000D69 FF82                A  2958          DW   IF1-$
                             A  2959
```

```
PC       Machine Code        I  Line    File: newsys.v4e
                             A  2960                        ;  : Endcase begin stkpntr @ over - while
                             A  2961                        ;     [Compile] then repeat drop ; immediate
         00000D6B            A  2962    ENDCASESUB: EQU $
00000D6B 3018                A  2963          JP   @COLON
         00000D6D            A  2964    ENDCASE1: EQU $
00000D6D 2C                  A  2965          DB   STKPNTR
00000D6E 0D                  A  2966          DB   AT
00000D6F 31                  A  2967          DB   OVER
00000D70 2F                  A  2968          DB   MINUS
00000D71 05                  A  2969          DB   JRZS
00000D72 05                  A  2970          DB   ENDCASE2-$
00000D73 64                  A  2971          DB   _THEN
00000D74 02                  A  2972          DB   JR
00000D75 FFF8                A  2973          DW   ENDCASE1-$
         00000D77            A  2974    ENDCASE2: EQU $
00000D77 13                  A  2975          DB   DROP
00000D78 07                  A  2976          DB   SEMICOLON
                             A  2977
                             A  2978                        ;  : Forget find dup if k2 - dup @ voclnk @ ! k1 k0
                             A  2979                        ;     Do begin k1 - dup c@ k80 and until loop 12 !
                             A  2980                        ;     Else drop 656 fatalerr ; immediate
         00000D79            A  2981    FORGETSUB: EQU $
00000D79 3018                A  2982          JP   @COLON
00000D7B 3A                  A  2983          DB   FIND
00000D7C 12                  A  2984          DB   DUP
00000D7D 05                  A  2985          DB   JRZS
00000D7E 1C                  A  2986          DB   FORGET4-$
00000D7F 00                  A  2987          DB   BR        ; Back up to the link to prior entry
00000D80 02                  A  2988          DB   #2
00000D81 2F                  A  2989          DB   MINUS
00000D82 12                  A  2990          DB   DUP
00000D83 0D                  A  2991          DB   AT
00000D84 29                  A  2992          DB   VOCLNK    ; And store this in VLLOC
00000D85 0B                  A  2993          DB   STORE
00000D86 00                  A  2994          DB   BR        ; Back up to the start of the word
00000D87 02                  A  2995          DB   #2        ;  And set that address into the dictionary pointer
00000D88 2D                  A  2996          DB   ZERO      ;   Note: this won't work for a word defined in rom
00000D89 5C                  A  2997          DB   DOAUX
         00000D8A            A  2998    FORGET3: EQU $
00000D8A 2E                  A  2999          DB   ONE       ; Back up into the word definition
00000D8B 2F                  A  3000          DB   MINUS     ; Look for a byte with bit 0 set
00000D8C 12                  A  3001          DB   DUP
00000D8D 0E                  A  3002          DB   CAT
00000D8E 00                  A  3003          DB   BR
00000D8F 80                  A  3004          DB   80h
00000D90 14                  A  3005          DB   AND
00000D91 04                  A  3006          DB   JRZ
00000D92 FFF8                A  3007          DW   FORGET3-$
00000D94 60                  A  3008          DB   LOOPAUX
00000D95 FFF5                A  3009          DW   FORGET3-$
00000D97 25                  A  3010          DB   DPNTR
00000D98 0B                  A  3011          DB   STORE
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000D99 07                  A  3012          DB   SEMICOLON
         00000D9A            A  3013    FORGET4: EQU $
00000D9A 13                  A  3014          DB   DROP
00000D9B 06                  A  3015          DB   LONGCALL
00000D9C 0E09                A  3016          DW   FATALERR
00000D9E 0449                A  3017          DW   FORGETHEAD
                             A  3018
         00000DA0            A  3019    BCMOVESUB: EQU $
00000DA0 D6 04E8             A  3020          CALL POPCA8
00000DA3 02BD                A  3021          ADD  R11,R13
00000DA5 12AC                A  3022          ADC  R10,R12
00000DA7 029D                A  3023          ADD  R9,R13
00000DA9 128C                A  3024          ADC  R8,R12
00000DAB 80E8                A  3025    BCM1: DECW RR8
00000DAD 80EA                A  3026          DECW RR10
00000DAF C268                A  3027          LDC  R6,@RR8
00000DB1 D26A                A  3028          LDC  @RR10,R6
00000DB3 80EC                A  3029          DECW RR12
00000DB5 EB F4               A  3030          JR   NZ,BCM1
                             A  3031
00000DB7 3016                A  3032          JP   @NV
                             A  3033                          ; The EXIT routine is part of the assembler functions
00000DB9 3018                A  3034    EXITSUB: JP   @COLON
00000DBB 01                  A  3035          DB   NR
00000DBC 3016                A  3036          DB   030H, NV
00000DBE 20                  A  3037          DB   COMMA
00000DBF 07                  A  3038          DB   SEMICOLON
                             A  3039
                             A  3040                          ;  : BOOT  K0 >IN ! BLK ! INTERPRETER QUIT ;
00000DC0 3018                A  3041    BOOTSUB: JP   @COLON
00000DC2 2D                  A  3042          DB   ZERO
00000DC3 26                  A  3043          DB   TOIN
00000DC4 0B                  A  3044          DB   STORE
00000DC5 27                  A  3045          DB   BLK       ; Boot assumes an argument on the stack to store in BLK
00000DC6 0B                  A  3046          DB   STORE     ;  and start interpreting in that block
00000DC7 06                  A  3047          DB   LONGCALL
00000DC8 0E22                A  3048          DW   INTERPRETER
         00000DCA            A  3049    BOOT1: EQU $         ; After we get done with the boot sequence, go into standard mode
00000DCA 51                  A  3050          DB   DOTQAUX   ; Write out the "OK" message
00000DCB 050D0A20 4F4B       A  3051          DB   05H,0DH,0AH," OK"
                             A  3052
                             A  3053    IF OFFSET != 0
                             A  3054          DB   LONGCALL
                             A  3055          DW   TEMPADJUST
                             A  3056    ENDIF
                             A  3057
00000DD1 43                  A  3058          DB   QUIT
                             A  3059
                             A  3060    IF OFFSET != 0
                             A  3061    TEMPADJUST: EQU $
                             A  3062          DEC  S0LOC     ; Temporarily move the register save area to a new page
                             A  3063          DEC  TIBLOC    ; Temporarily move the TIB to a new page
```

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PC       Machine Code        I  Line    File: newsys.v4e
                             A  3064          INC  DPNTRLOC  ; Terporarily move Dictionary pointer
                             A  3065          jp   @NV
                             A  3066    ENDIF
                             A  3067                         ; : DABS DUP 8000 AND IF DNEGATE THEN
                             A  3068
00000DD2 3018                A  3069    DABSSUB: JP   @COLON
00000DD4 12                  A  3070          DB   DUP
00000DD5 01                  A  3071          DB   NR
00000DD6 8000                A  3072          DW   8000H
00000DD8 14                  A  3073          DB   AND
00000DD9 05                  A  3074          DB   JRZS
00000DDA 02                  A  3075          DB   DABS1-$
00000DDB 3D                  A  3076          DB   DNEGATE
         00000DDC            A  3077    DABS1: EQU $
00000DDC 07                  A  3078          DB   SEMICOLON
                             A  3079
                             A  3080                         ; : D. SWAP OVER DABS <# #S SIGN #> TYPE
                             A  3081
00000DDD 3018                A  3082    DDOTSUB: JP   @COLON
00000DDF 11                  A  3083          DB   SWAP
00000DE0 31                  A  3084          DB   OVER
00000DE1 72                  A  3085          DB   DABS
00000DE2 56                  A  3086          DB   INTOPOUND
00000DE3 58                  A  3087          DB   POUNDS
00000DE4 5A                  A  3088          DB   SIGN
00000DE5 59                  A  3089          DB   POUNDINTO
00000DE6 39                  A  3090          DB   TYPE
00000DE7 07                  A  3091          DB   SEMICOLON
                             A  3092
                             A  3093                         ; : S->D DUP 0 >= IF O ELSE -1 THEN ;
         00000DE8            A  3094    SINTODSUB: EQU $
00000DE8 3018                A  3095          JP   @COLON
00000DEA 12                  A  3096          DB   DUP
00000DEB 2D                  A  3097          DB   ZERO
00000DEC 1C                  A  3098          DB   GTEQ
00000DED 05                  A  3099          DB   JRZS
00000DEE 04                  A  3100          DB   SINTO1-$
00000DEF 2D                  A  3101          DB   ZERO
00000DF0 03                  A  3102          DB   JRS
00000DF1 03                  A  3103          DB   SINTO2-$
         00000DF2            A  3104    SINTO1: EQU $
00000DF2 2E                  A  3105          DB   ONE
00000DF3 17                  A  3106          DB   NEGATE
         00000DF4            A  3107    SINTO2: EQU $
00000DF4 07                  A  3108          DB   SEMICOLON
                             A  3109
                             A  3110                         ;  : ERRMSG WARNING @ DUP IF EXECUTE ELSE DROP CR
                             A  3111                         ;      HERE COUNT 1F AND TYPE SPACE K3F EMIT EMIT CR
         00000DF5            A  3112    ERRMSG:  EQU $
00000DF5 3018                A  3113          JP   @COLON
00000DF7 36                  A  3114          DB   CR        ; Get to a new line
00000DF8 1F                  A  3115          DB   HERE      ; This is probably the string causing the problem
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000DF9 38                  A  3116          DB   COUNT
00000DFA 39                  A  3117          DB   TYPE      ; and type out the name causing the problem
00000DFB 51                  A  3118          DB   DOTQAUX
00000DFC 053F2069 6E20       A  3119          DB   5,"? in "
00000E02 38                  A  3120          DB   COUNT     ; Convert the argument to typable form
00000E03 00                  A  3121          DB   BR        ; And out the flags from the dictionary lead byte
00000E04 0F                  A  3122          DB   FH
00000E05 14                  A  3123          DB   AND
00000E06 39                  A  3124          DB   TYPE      ; and type out the name of the routine
00000E07 36                  A  3125          DB   CR
00000E08 07                  A  3126    EM2:  DB   SEMICOLON
                             A  3127
                             A  3128                         ;  : FATALERR ERRMSG 7 EMIT CR QUIT
         00000E09            A  3129    FATALERR: EQU $
00000E09 3018                A  3130          JP   @COLON
00000E0B 10                  A  3131          DB   RONTO     ; Get the address of the argument after the call
00000E0C 0D                  A  3132          DB   AT        ; The address on the stack is the argument to ERRMSG
00000E0D 06                  A  3133          DB   LONGCALL
00000E0E 0DF5                A  3134          DW   ERRMSG
00000E10 43                  A  3135          DB   QUIT
                             A  3136
                             A  3137                         ;  : MSHOOK BLK @ DUP 400 U* IF DROP EXECUTE
                             A  3138                         ;      SEMICOLON THEN SWAP DROP
         00000E11            A  3139    MSHOOK: EQU $
00000E11 3018                A  3140          JP   @COLON
00000E13 27                  A  3141          DB   BLK
00000E14 0D                  A  3142          DB   AT
00000E15 12                  A  3143          DB   DUP
00000E16 01                  A  3144          DB   NR
00000E17 0400                A  3145          DW   400H
00000E19 18                  A  3146          DB   USTAR
00000E1A 05                  A  3147          DB   JRZS
00000E1B 04                  A  3148          DB   MSH1-$
00000E1C 13                  A  3149          DB   DROP
00000E1D 08                  A  3150          DB   EXECUTE
00000E1E 07                  A  3151          DB   SEMICOLON
00000E1F 11                  A  3152    MSH1: DB   SWAP
00000E20 13                  A  3153          DB   DROP
00000E21 07                  A  3154          DB   SEMICOLON
                             A  3155
                             A  3156                         ;  : INTERPRETER BEGIN BEGIN BEGIN BEGIN FIND DUP IF
                             A  3157                         ;      [ ROT ROT ] DUP K2 - K1 - BEGIN
                             A  3158                         ;      K1 - DUP C@ K80 AND UNTIL
                             A  3159                         ;      C@ STATE @ >= IF EXECUTE [ SWAP ] AGAIN THEN ,
                             A  3160                         ;      AGAIN THEN
                             A  3161                         ;      DROP HERE NUMBER 10 @ 1+ IF [COMPILE] DLITERAL
                             A  3162                         ;      [ SWAP ] AGAIN THEN DROP [COMPILE] LITERAL AGAIN
                             A  3163
         00000E22            A  3164    INTERPRETER: EQU $
00000E22 3018                A  3165          JP   @COLON
00000E24 3A                  A  3166    QA0:  DB   FIND      ; Get next word.  look it up in the dictinary
00000E25 12                  A  3167          DB   DUP
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000E26 05                  A  3168          DB   JRZS       ; Find result of zero means not in dictionary
00000E27 43                  A  3169          DB   QA4-$      ;
00000E28 12                  A  3170          DB   DUP        ; Found word in dictionary - now find its start
00000E29 00                  A  3171          DB   BR         ; Point to last byte of name field in word found
00000E2A 02                  A  3172          DB   2H         ; Make the adjustment 2 if PFA in token area, 3 otherwise
00000E2B 31                  A  3173          DB   OVER       ; This is the address for second test
00000E2C 12                  A  3174          DB   DUP        ; This is the address for the first test
00000E2D 01                  A  3175          DB   NR         ; Is Start of code >= PFA address?
00000E2E 04C5                A  3176          DW   #StartOfCode
00000E30 1C                  A  3177          DB   GTEQ       ; Result is true if CodeStart >= PFA
00000E31 01                  A  3178          DB   NR
00000E32 0100                A  3179          DW   #JTB       ; ... PFA JTB
00000E34 32                  A  3180          DB   ROT
00000E35 1C                  A  3181          DB   GTEQ       ; Result is true if PFA >= JTB
00000E36 15                  A  3182          DB   OR         ; Result is non-zero if either is non-zero, ie outside token area
00000E37 05                  A  3183          DB   JRZS       ; Take the jump if it's in the token section
00000E38 02                  A  3184          DB   QAX-$
00000E39 24                  A  3185          DB   ONEPLUS    ; Otherwise, make the adjustment 3
00000E3A 2F                  A  3186    QAX:  DB   MINUS      ; Now TOS should point to last byte of name field
00000E3B 2E                  A  3187    QA1:  DB   ONE        ; Attempt to find the flags/count byte
00000E3C 2F                  A  3188          DB   MINUS
00000E3D 12                  A  3189          DB   DUP
00000E3E 0E                  A  3190          DB   CAT
00000E3F 00                  A  3191          DB   BR
00000E40 80                  A  3192          DB   80h        ;  High bit set will indicate flags/count byte
00000E41 14                  A  3193          DB   AND
00000E42 04                  A  3194          DB   JRZ
00000E43 FFF8                A  3195          DW   QA1-$
00000E45 0E                  A  3196          DB   CAT        ;  Get flags/count byte back
00000E46 2B                  A  3197          DB   STATE      ;  Are we compiling?
00000E47 0E                  A  3198          DB   CAT
00000E48 1C                  A  3199          DB   GTEQ       ;  If start byte less than c0 and state is c0, compile it
00000E49 05                  A  3200          DB   JRZS       ;  State < Start byte is a zero result
00000E4A 1A                  A  3201          DB   QA3-$
00000E4B 01                  A  3202          DB   NR         ;  .. StartOfCode PFA
00000E4C 04C5                A  3203          DW   #StartOfCode
00000E4E 31                  A  3204          DB   OVER       ;  Result is nonzero if CodeStart>= PFA
00000E4F 1C                  A  3205          DB   GTEQ       ;
00000E50 31                  A  3206          DB   OVER       ;
00000E51 01                  A  3207          DB   NR
00000E52 0100                A  3208          DW   #JTB       ;  ... PFA JTB
00000E54 1C                  A  3209          DB   GTEQ       ;  Result is nonzero if PFA >= JTB
00000E55 14                  A  3210          DB   AND
00000E56 05                  A  3211          DB   JRZS       ;  Take the jump if not in the token area
00000E57 09                  A  3212          DB   QA2-$
00000E58 0E                  A  3213          DB   CAT        ;  Get the token itself
00000E59 12                  A  3214          DB   DUP
00000E5A 16                  A  3215          DB   PLUS
00000E5B 01                  A  3216          DB   NR
00000E5C 0100                A  3217          DW   JTB
00000E5E 16                  A  3218          DB   PLUS
00000E5F 0D                  A  3219          DB   AT
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000E60 08                  A  3220    QA2:  DB   EXECUTE   ;  Otherwise, execute it
00000E61 02                  A  3221          DB   JR
00000E62 FFC2                A  3222          DW   QA0-$
00000E64 06                  A  3223    QA3:  DB   LONGCALL  ;  Compile word on stack as a LONGCALL
00000E65 097A                A  3224          DW   COMPILECALL
00000E67 02                  A  3225          DB   JR        ;  Go back for next word
00000E68 FFBC                A  3226          DW   QA0-$
00000E6A 13                  A  3227    QA4:  DB   DROP      ;  Word was not in dictionary
00000E6B 1F                  A  3228          DB   HERE      ;  Attempt to convert word to a number
00000E6C 42                  A  3229          DB   NUMBER
                             A  3230                         ;   Dw   br      ;  add one to decimal point indicator
                             A  3231                         ;   Db   prdploc
                             A  3232                         ;   Dw   at
00000E6D 06                  A  3233          DB   LONGCALL
00000E6E 09EE                A  3234          DW   GETPRDP
00000E70 24                  A  3235          DB   ONEPLUS
00000E71 05                  A  3236          DB   JRZS      ;  If result of number conversion is zero -
00000E72 05                  A  3237          DB   QA5-$     ;    It is a 16 bit number
00000E73 40                  A  3238          DB   DLITERAL
00000E74 02                  A  3239          DB   JR
00000E75 FFAF                A  3240          DW   QA0-$
00000E77 13                  A  3241    QA5:  DB   DROP      ;  Drop the high 16 bits1
00000E78 3F                  A  3242          DB   LITERAL   ;  Compile as a 16 bit number if in compile mode
00000E79 02                  A  3243          DB   JR
00000E7A FFAA                A  3244          DW   QA0-$
                             A  3245
00000E7C 3018                A  3246    PICK: JP   @COLON
00000E7E 24                  A  3247          DB   ONEPLUS
00000E7F 12                  A  3248          DB   DUP
00000E80 16                  A  3249          DB   PLUS
00000E81 2C                  A  3250          DB   STKPNTR
00000E82 0D                  A  3251          DB   AT
00000E83 16                  A  3252          DB   PLUS
00000E84 0D                  A  3253          DB   AT
00000E85 07                  A  3254          DB   SEMICOLON
                             A  3255
         00000E86            A  3256    TWIXT: EQU $           ; ARG LO HI -> RSLT
00000E86 3018                A  3257          JP   @COLON
00000E88 00                  A  3258          DB   BR
00000E89 02                  A  3259          DB   2
00000E8A 06                  A  3260          DB   LONGCALL
00000E8B 0E7C                A  3261          DW   PICK
00000E8D 1C                  A  3262          DB   GTEQ
00000E8E 32                  A  3263          DB   ROT
00000E8F 32                  A  3264          DB   ROT
00000E90 1C                  A  3265          DB   GTEQ
00000E91 14                  A  3266          DB   AND
00000E92 07                  A  3267          DB   SEMICOLON
                             A  3268
                             A  3269    ; : ?S STACKBASE  @ FE @ OVER OVER 4 + >= IF - 2 - 1
                             A  3270    ;    DO STACKBASE @ 1 - I - @ H. SPACE 2 +LOOP ELSE
                             A  3271    ;    ." STACK EMPTY" DROP DROP THEN CR
```

```
PC       Machine Code        I  Line    File: newsys.v4e
                             A  3272
00000E93 3018                A  3273    QSSUB:JP   @COLON
00000E95 2A                  A  3274          DB   S0
00000E96 0D                  A  3275          DB   AT
00000E97 2C                  A  3276          DB   STKPNTR
00000E98 0D                  A  3277          DB   AT
00000E99 31                  A  3278          DB   OVER
00000E9A 31                  A  3279          DB   OVER
00000E9B 00                  A  3280          DB   BR
00000E9C 04                  A  3281          DB   4H
00000E9D 16                  A  3282          DB   PLUS
00000E9E 1C                  A  3283          DB   GTEQ
00000E9F 05                  A  3284          DB   JRZS
00000EA0 16                  A  3285          DB   QUESTS2-$
00000EA1 2F                  A  3286          DB   MINUS
00000EA2 2E                  A  3287          DB   ONE
00000EA3 2F                  A  3288          DB   MINUS
00000EA4 2E                  A  3289          DB   ONE
00000EA5 5C                  A  3290          DB   DOAUX
         00000EA6            A  3291    QUEST1: EQU $
00000EA6 2A                  A  3292          DB   S0
00000EA7 0D                  A  3293          DB   AT
00000EA8 2E                  A  3294          DB   ONE
00000EA9 2F                  A  3295          DB   MINUS
00000EAA 1D                  A  3296          DB   I
00000EAB 2F                  A  3297          DB   MINUS
00000EAC 0D                  A  3298          DB   AT
00000EAD 22                  A  3299          DB   HDOT
00000EAE 33                  A  3300          DB   SPACE
00000EAF 00                  A  3301          DB   BR
00000EB0 02                  A  3302          DB   2H
00000EB1 5E                  A  3303          DB   PLUSLOOPAUX
00000EB2 FFF4                A  3304          DW   QUEST1-$
00000EB4 03                  A  3305          DB   JRS
00000EB5 10                  A  3306          DB   QUESTS3-$
         00000EB6            A  3307    QUESTS2: EQU $
00000EB6 51                  A  3308          DB   DOTQAUX
00000EB7 0B535441 434B2045   A  3309          DB   0BH, "STACK EMPTY"
00000EBF 4D505459
00000EC3 13                  A  3310          DB   DROP
00000EC4 13                  A  3311          DB   DROP
         00000EC5            A  3312    QUESTS3: EQU $
00000EC5 36                  A  3313          DB   CR
00000EC6 07                  A  3314          DB   SEMICOLON
                             A  3315
                             A  3316    ; : FILL OVER IF ROT DUP ROT SWAP C! DUP 1+ ROT 1 - DUP IF CMOVE
                             A  3317    ;   ELSE [ SWAP ] THEN DROP DROP DROP THEN
                             A  3318
                             A  3319                     ;  BASE COUNT CHAR FILL
         00000EC7            A  3320    FILLSUB: EQU $
00000EC7 3018                A  3321          JP   @COLON
00000EC9 31                  A  3322          DB   OVER
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000ECA 05                  A  3323          DB   JRZS
00000ECB 11                  A  3324          DB   FILL1-$
00000ECC 32                  A  3325          DB   ROT
00000ECD 12                  A  3326          DB   DUP
00000ECE 32                  A  3327          DB   ROT
00000ECF 11                  A  3328          DB   SWAP
00000ED0 0C                  A  3329          DB   CSTORE
00000ED1 12                  A  3330          DB   DUP
00000ED2 24                  A  3331          DB   ONEPLUS
00000ED3 32                  A  3332          DB   ROT
00000ED4 2E                  A  3333          DB   ONE
00000ED5 2F                  A  3334          DB   MINUS
00000ED6 12                  A  3335          DB   DUP
00000ED7 05                  A  3336          DB   JRZS
00000ED8 04                  A  3337          DB   FILL1-$
00000ED9 1E                  A  3338          DB   CMOVE
00000EDA 03                  A  3339          DB   JRS
00000EDB 04                  A  3340          DB   FILL2-$
         00000EDC            A  3341    FILL1: EQU $
00000EDC 13                  A  3342          DB   DROP
00000EDD 13                  A  3343          DB   DROP
00000EDE 13                  A  3344          DB   DROP
         00000EDF            A  3345    FILL2: EQU $
00000EDF 07                  A  3346          DB   SEMICOLON
                             A  3347
         00000EE0            A  3348    SCRSUB: EQU $
00000EE0 3018                A  3349          JP   @COLON    ; FETCH LOCATION OF SCREEN ADDRESS
00000EE2 00                  A  3350          DB   BR
00000EE3 2E                  A  3351          DB   SCRN
00000EE4 07                  A  3352          DB   SEMICOLON
                             A  3353
         00000EE5            A  3354    SZERO:  EQU $        ; FETCH LOCATION OF ROW/COL
00000EE5 3018                A  3355          JP   @COLON
00000EE7 00                  A  3356          DB   BR
00000EE8 2C                  A  3357          DB   SZ
00000EE9 07                  A  3358          DB   SEMICOLON
                             A  3359                           ; :SH S@ SCR @
         00000EEA            A  3360    SATSUB: EQU $           ; LOAD SCREEN ADDRESS
00000EEA 3018                A  3361          JP   @COLON
00000EEC 00                  A  3362          DB   BR
00000EED 2E                  A  3363          DB   SCRN
00000EEE 0D                  A  3364          DB   AT
00000EEF 07                  A  3365          DB   SEMICOLON
                             A  3366
         00000EF0            A  3367    SZEROAT: EQU $
00000EF0 3018                A  3368          JP   @COLON
00000EF2 00                  A  3369          DB   BR
00000EF3 2C                  A  3370          DB   SZ
00000EF4 0D                  A  3371          DB   AT
00000EF5 07                  A  3372          DB   SEMICOLON
                             A  3373
         00000EF6            A  3374    GSTORESUB: EQU $
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000EF6 3018                A  3375          JP   @COLON
00000EF8 00                  A  3376          DB   BR        ; Produce <esc> [ (arg)
00000EF9 1B                  A  3377          DB   1BH
00000EFA 0A                  A  3378          DB   EMIT
00000EFB 00                  A  3379          DB   BR
00000EFC 5B                  A  3380          DB   5BH
00000EFD 0A                  A  3381          DB   EMIT
00000EFE 0A                  A  3382          DB   EMIT
00000EFF 07                  A  3383          DB   SEMICOLON
                             A  3384
                             A  3385                       ; : ;S BLK @ IF R> DROP THEN [ IMMEDIATE ]
         00000F00            A  3386    SEMICSSUB: EQU $
00000F00 3018                A  3387          JP   @COLON
00000F02 27                  A  3388          DB   BLK
00000F03 0D                  A  3389          DB   AT
00000F04 05                  A  3390          DB   JRZS
00000F05 03                  A  3391          DB   SEMICOLONS1-$
00000F06 10                  A  3392          DB   RONTO
00000F07 13                  A  3393          DB   DROP
         00000F08            A  3394    SEMICOLONS1: EQU $
00000F08 07                  A  3395          DB   SEMICOLON
                             A  3396
         00000F09            A  3397    BDOT: EQU $
00000F09 3018                A  3398          JP   @COLON
00000F0B 2D                  A  3399          DB   ZERO
00000F0C 56                  A  3400          DB   INTOPOUND
00000F0D 57                  A  3401          DB   POUND
00000F0E 57                  A  3402          DB   POUND
00000F0F 59                  A  3403          DB   POUNDINTO
00000F10 39                  A  3404          DB   TYPE
00000F11 07                  A  3405          DB   SEMICOLON
                             A  3406
                             A  3407    ; : LSCR >IN @ S0 !  0 >IN ! S@ 40 U* BLK ! DROP INTERPRETER S0 @ >IN !  0 BLK !
                             A  3408
         00000F12            A  3409    LSCRSUB: EQU $
00000F12 3018                A  3410          JP   @COLON
00000F14 26                  A  3411          DB   TOIN      ; LOAD THE SCREEN BUFFER
00000F15 0D                  A  3412          DB   AT
00000F16 06                  A  3413          DB   LONGCALL
00000F17 0EE5                A  3414          DW   SZERO
00000F19 0B                  A  3415          DB   STORE
00000F1A 2D                  A  3416          DB   ZERO
00000F1B 26                  A  3417          DB   TOIN
00000F1C 0B                  A  3418          DB   STORE
00000F1D 7F                  A  3419          DB   SAT
00000F1E 00                  A  3420          DB   BR
00000F1F 40                  A  3421          DB   40H
00000F20 18                  A  3422          DB   USTAR
00000F21 27                  A  3423          DB   BLK
00000F22 0B                  A  3424          DB   STORE
00000F23 13                  A  3425          DB   DROP
00000F24 06                  A  3426          DB   LONGCALL
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000F25 0E22                A  3427          DW   INTERPRETER
00000F27 06                  A  3428          DB   LONGCALL
00000F28 0EE5                A  3429          DW   SZERO
00000F2A 0D                  A  3430          DB   AT
00000F2B 26                  A  3431          DB   TOIN
00000F2C 0B                  A  3432          DB   STORE
00000F2D 2D                  A  3433          DB   ZERO
00000F2E 27                  A  3434          DB   BLK
00000F2F 0B                  A  3435          DB   STORE
00000F30 07                  A  3436          DB   SEMICOLON
                             A  3437
         00000F31            A  3438    QUESTNP: EQU $
00000F31 3018                A  3439          JP   @COLON    ; ADD FLAG F WHERE F IS TRUE
00000F33 12                  A  3440          DB   DUP       ;  IF A IS NON-PRINT CHAR
00000F34 00                  A  3441          DB   BR
00000F35 20                  A  3442          DB   20H
00000F36 00                  A  3443          DB   BR
00000F37 7E                  A  3444          DB   7EH
00000F38 06                  A  3445          DB   LONGCALL
00000F39 0E86                A  3446          DW   TWIXT
00000F3B 1B                  A  3447          DB   ZEQ
00000F3C 07                  A  3448          DB   SEMICOLON
                             A  3449
                             A  3450    ; : DUMP S0 ! 48 G! 4A G! CR ."      " F 0 DO ."   " I  0 <# # #> TYPE LOOP
                             A  3451    ;   CR F0 S0@ + S0@ DO CR I H. ." < " I F + I
                             A  3452    ;    DO I C@  0 <# # # #> TYPE SPACE LOOP ." <>" I F + I DO I C@
                             A  3453    ;     7F AND ?NP IF DROP  20 THEN EMIT LOOP 3E EMIT 10 +LOOP CR
                             A  3454
         00000F3D            A  3455    DUMPSUB: EQU $
00000F3D 3018                A  3456          JP   @COLON
00000F3F 00                  A  3457          DB   BR         ; Get the argument of the DUMP
00000F40 20                  A  3458          DB   " "
00000F41 37                  A  3459          DB   WORD
00000F42 42                  A  3460          DB   NUMBER
00000F43 13                  A  3461          DB   DROP       ; Get rid of the high order part
00000F44 00                  A  3462          DB   BR         ; Initialize line number/position index
00000F45 2C                  A  3463          DB   SZ
00000F46 0B                  A  3464          DB   STORE
00000F47 00                  A  3465          DB   BR         ; Print <esc> [ H  (Go to home position)
00000F48 48                  A  3466          DB   48H
00000F49 81                  A  3467          DB   GSTORE
00000F4A 00                  A  3468          DB   BR         ; Print <esc> [ J  (erase display)
00000F4B 4A                  A  3469          DB   4AH
00000F4C 81                  A  3470          DB   GSTORE
00000F4D 36                  A  3471          DB   CR
00000F4E 51                  A  3472          DB   DOTQAUX
00000F4F 05202020 2020       A  3473          DB   5,"     "
00000F55 00                  A  3474          DB   BR        ; Print 0, 1, ,,, E, F across the top
00000F56 10                  A  3475          DB   10H
00000F57 2D                  A  3476          DB   ZERO
00000F58 5C                  A  3477          DB   DOAUX
         00000F59            A  3478    DUMP1: EQU $
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000F59 51                  A  3479          DB   DOTQAUX
00000F5A 022020              A  3480          DB   2,"  "
00000F5D 1D                  A  3481          DB   I
00000F5E 2D                  A  3482          DB   ZERO
00000F5F 56                  A  3483          DB   INTOPOUND
00000F60 57                  A  3484          DB   POUND
00000F61 59                  A  3485          DB   POUNDINTO
00000F62 39                  A  3486          DB   TYPE
00000F63 60                  A  3487          DB   LOOPAUX
00000F64 FFF5                A  3488          DW   DUMP1-$
                             A  3489
00000F66 36                  A  3490          DB   CR        ; Skip an extra line down from the top row
00000F67 01                  A  3491          DB   NR        ; Print a block of 100h values in lines of 10h
00000F68 0100                A  3492          DW   100H
00000F6A 2D                  A  3493          DB   ZERO
00000F6B 5C                  A  3494          DB   DOAUX
         00000F6C            A  3495    DUMP2: EQU $
00000F6C 36                  A  3496          DB   CR
00000F6D 06                  A  3497          DB   LONGCALL  ; Get the line index
00000F6E 0EF0                A  3498          DW   SZEROAT
00000F70 1D                  A  3499          DB   I         ; Add the index of the line to be printed
00000F71 16                  A  3500          DB   PLUS
00000F72 12                  A  3501          DB   DUP
00000F73 22                  A  3502          DB   HDOT      ; Print the address of the line to print
00000F74 51                  A  3503          DB   DOTQAUX
00000F75 023C20              A  3504          DB   2H, "< "
00000F78 00                  A  3505          DB   BR        ; Print 10h values for the line
00000F79 10                  A  3506          DB   10H
00000F7A 2D                  A  3507          DB   ZERO
00000F7B 5C                  A  3508          DB   DOAUX
         00000F7C            A  3509    DUMP3: EQU $
00000F7C 12                  A  3510          DB   DUP       ; Save the address and
00000F7D 1D                  A  3511          DB   I         ;  Add the increment into the line
00000F7E 16                  A  3512          DB   PLUS
00000F7F 0E                  A  3513          DB   CAT       ; Get the byte to print
00000F80 06                  A  3514          DB   LONGCALL
00000F81 0F09                A  3515          DW   BDOT      ; Print out the byte
00000F83 33                  A  3516          DB   SPACE
00000F84 60                  A  3517          DB   LOOPAUX   ; Go back a total of 10h times
00000F85 FFF7                A  3518          DW   DUMP3-$
                             A  3519
00000F87 51                  A  3520          DB   DOTQAUX   ; Print the separator for the char equivalents
00000F88 023C3E              A  3521          DB   2,"<>"
00000F8B 00                  A  3522          DB   BR        ; Start a loop to print out 10h char equivalents
00000F8C 10                  A  3523          DB   10H
00000F8D 2D                  A  3524          DB   ZERO
00000F8E 5C                  A  3525          DB   DOAUX
         00000F8F            A  3526    DUMP4: EQU $
00000F8F 12                  A  3527          DB   DUP       ; Make a copy of the line address
00000F90 1D                  A  3528          DB   I
00000F91 16                  A  3529          DB   PLUS
00000F92 0E                  A  3530          DB   CAT       ; Get the character to print
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000F93 00                  A  3531          DB   BR        ; use only the low 7 bits
00000F94 7F                  A  3532          DB   7FH
00000F95 14                  A  3533          DB   AND
00000F96 06                  A  3534          DB   LONGCALL  ; Make sure it's a printable character
00000F97 0F31                A  3535          DW   QUESTNP
00000F99 05                  A  3536          DB   JRZS
00000F9A 04                  A  3537          DB   DUMP5-$
00000F9B 13                  A  3538          DB   DROP      ; If not printable, make it a blank
00000F9C 00                  A  3539          DB   BR
00000F9D 20                  A  3540          DB   20H
         00000F9E            A  3541    DUMP5: EQU $
00000F9E 0A                  A  3542          DB   EMIT      ; Repeat the loop 10h times
00000F9F 60                  A  3543          DB   LOOPAUX
00000FA0 FFEF                A  3544          DW   DUMP4-$
                             A  3545
00000FA2 13                  A  3546          DB   DROP      ; Get rid of the line index
00000FA3 00                  A  3547          DB   BR        ; put out a trailing ">"
00000FA4 3E                  A  3548          DB   3EH
00000FA5 0A                  A  3549          DB   EMIT
00000FA6 00                  A  3550          DB   BR        ; Increment the outer loop by 10h
00000FA7 10                  A  3551          DB   10H
00000FA8 5E                  A  3552          DB   PLUSLOOPAUX
00000FA9 FFC3                A  3553          DW   DUMP2-$
00000FAB 36                  A  3554          DB   CR        ; A final CR to finish the display
00000FAC 07                  A  3555          DB   SEMICOLON
                             A  3556
         00000FAD            A  3557    LATSUB: EQU $           ; LOAD ROW POSITION
00000FAD 3018                A  3558          JP   @COLON
00000FAF 00                  A  3559          DB   BR
00000FB0 2C                  A  3560          DB   SZ
00000FB1 0E                  A  3561          DB   CAT
00000FB2 07                  A  3562          DB   SEMICOLON
                             A  3563
                             A  3564                        ; :GX + 0 A U/ 30 + EMIT 30 EMIT
00000FB3 3018                A  3565    GX:   JP  @COLON
00000FB5 16                  A  3566          DB  PLUS
00000FB6 2D                  A  3567          DB  ZERO
00000FB7 00                  A  3568          DB  BR
00000FB8 0A                  A  3569          DB  0AH
00000FB9 19                  A  3570          DB  USLASH
00000FBA 00                  A  3571          DB  BR
00000FBB 30                  A  3572          DB  30H
00000FBC 16                  A  3573          DB  PLUS
00000FBD 0A                  A  3574          DB  EMIT
00000FBE 00                  A  3575          DB  BR
00000FBF 30                  A  3576          DB  30H
00000FC0 16                  A  3577          DB  PLUS
00000FC1 0A                  A  3578          DB  EMIT
00000FC2 07                  A  3579          DB  SEMICOLON
                             A  3580
                             A  3581                        ; : SH C* 40 U* DROP + S@ +
         00000FC3            A  3582    CSTAR: EQU $
```

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PC       Machine Code        I  Line    File: newsys.v4e
00000FC3 3018                A  3583          JP   @COLON
00000FC5 00                  A  3584          DB   BR
00000FC6 40                  A  3585          DB   40H
00000FC7 18                  A  3586          DB   USTAR
00000FC8 13                  A  3587          DB   DROP
00000FC9 16                  A  3588          DB   PLUS
00000FCA 7F                  A  3589          DB   SAT
00000FCB 16                  A  3590          DB   PLUS
00000FCC 07                  A  3591          DB   SEMICOLON
                             A  3592
                             A  3593                       ; : SH G> 59 G! 21 + EMIT 26 + EMIT
                             A  3594                       ;   ... Row Col -> ...
         00000FCD            A  3595    GINTOSUB: EQU $
00000FCD 3018                A  3596          JP   @COLON   ; Generate a control sequence:
00000FCF 00                  A  3597          DB   BR       ;  esc [   H
00000FD0 1B                  A  3598          DB   1BH
00000FD1 0A                  A  3599          DB   EMIT
00000FD2 00                  A  3600          DB   BR
00000FD3 5B                  A  3601          DB   5BH
00000FD4 0A                  A  3602          DB   EMIT
00000FD5 00                  A  3603          DB   BR
00000FD6 02                  A  3604          DB   2
00000FD7 06                  A  3605          DB   LONGCALL ;
00000FD8 0FB3                A  3606          DW   GX
00000FDA 00                  A  3607          DB   BR       ; 3B is a semicolon
00000FDB 3B                  A  3608          DB   3BH
00000FDC 0A                  A  3609          DB   EMIT
00000FDD 00                  A  3610          DB   BR
00000FDE 07                  A  3611          DB   7
00000FDF 06                  A  3612          DB   LONGCALL
00000FE0 0FB3                A  3613          DW   GX
00000FE2 00                  A  3614          DB   BR
00000FE3 48                  A  3615          DB   48H
00000FE4 0A                  A  3616          DB   EMIT
00000FE5 07                  A  3617          DB   SEMICOLON
                             A  3618
                             A  3619    ; : LIST DO 0 I C* H. ." <|" 40 I C* 3F 0
                             A  3620    ;   DO 1 - DUP C@  20 - IF LEAVE THEN LOOP DUP FFC0 AND
                             A  3621    ;    DO I C@ 7F AND ?NP IF 7E EMIT DROP ELSE EMIT THEN LOOP
                             A  3622    ;     40 I G> ." |" CR LOOP
                             A  3623
00000FE6 3018                A  3624    IY:   JP   @COLON
00000FE8 5C                  A  3625          DB   DOAUX
         00000FE9            A  3626    IY1: EQU $
00000FE9 1D                  A  3627          DB   I
00000FEA 0E                  A  3628          DB   CAT
00000FEB 00                  A  3629          DB   BR
00000FEC 7F                  A  3630          DB   7FH
00000FED 14                  A  3631          DB   AND
00000FEE 06                  A  3632          DB   LONGCALL
00000FEF 0F31                A  3633          DW   QUESTNP
00000FF1 05                  A  3634          DB   JRZS
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00000FF2 07                  A  3635          DB   IY2-$
00000FF3 00                  A  3636          DB   BR
00000FF4 7E                  A  3637          DB   7EH
00000FF5 0A                  A  3638          DB   EMIT
00000FF6 13                  A  3639          DB   DROP
00000FF7 03                  A  3640          DB   JRS
00000FF8 02                  A  3641          DB   IY3-$
         00000FF9            A  3642    IY2: EQU $
00000FF9 0A                  A  3643          DB   EMIT
         00000FFA            A  3644    IY3: EQU $
00000FFA 60                  A  3645          DB   LOOPAUX
00000FFB FFEE                A  3646          DW   IY1-$
00000FFD 07                  A  3647          DB   SEMICOLON
                             A  3648
00000FFE 3018                A  3649    LIST: JP   @COLON
00001000 5C                  A  3650          DB   DOAUX
         00001001            A  3651    LIST1: EQU $
00001001 2D                  A  3652          DB   ZERO
00001002 1D                  A  3653          DB   I
00001003 06                  A  3654          DB   LONGCALL
00001004 0FC3                A  3655          DW   CSTAR
00001006 22                  A  3656          DB   HDOT
00001007 51                  A  3657          DB   DOTQAUX
00001008 023C7C              A  3658          DB   2H, "<|"
0000100B 00                  A  3659          DB   BR
0000100C 40                  A  3660          DB   40H
0000100D 1D                  A  3661          DB   I
0000100E 06                  A  3662          DB   LONGCALL
0000100F 0FC3                A  3663          DW   CSTAR
00001011 00                  A  3664          DB   BR
00001012 40                  A  3665          DB   40H
00001013 2D                  A  3666          DB   ZERO
00001014 5C                  A  3667          DB   DOAUX
         00001015            A  3668    LIST2: EQU $
00001015 2E                  A  3669          DB   ONE
00001016 2F                  A  3670          DB   MINUS
00001017 12                  A  3671          DB   DUP
00001018 0E                  A  3672          DB   CAT
00001019 00                  A  3673          DB   BR
0000101A 20                  A  3674          DB   20H
0000101B 2F                  A  3675          DB   MINUS
0000101C 05                  A  3676          DB   JRZS
0000101D 04                  A  3677          DB   LIST3-$
0000101E 62                  A  3678          DB   UNLOOP
0000101F 0005                A  3679          DW   LIST4-$
         00001021            A  3680    LIST3: EQU $
00001021 60                  A  3681          DB   LOOPAUX
00001022 FFF3                A  3682          DW   LIST2-$
                             A  3683
00001024 12                  A  3684    LIST4:DB   DUP
00001025 24                  A  3685          DB   ONEPLUS
00001026 11                  A  3686          DB   SWAP
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00001027 01                  A  3687          DB   NR
00001028 FFC0                A  3688          DW   0FFC0H
0000102A 14                  A  3689          DB   AND
0000102B 06                  A  3690          DB   LONGCALL
0000102C 0FE6                A  3691          DW   IY
0000102E 00                  A  3692          DB   BR
0000102F 40                  A  3693          DB   40H
00001030 1D                  A  3694          DB   I
00001031 80                  A  3695          DB   GINTO
00001032 51                  A  3696          DB   DOTQAUX
00001033 017C                A  3697          DB   1H, "|"
00001035 36                  A  3698          DB   CR
00001036 60                  A  3699          DB   LOOPAUX
00001037 FFCA                A  3700          DW   LIST1-$
00001039 07                  A  3701          DB   SEMICOLON
                             A  3702
         0000103A            A  3703    ZL: EQU $
0000103A 3018                A  3704          JP   @COLON     ; The argument is the line No. of the line added
0000103C 06                  A  3705          DB   LONGCALL   ; Initialize the new line to blanks
0000103D 0FC3                A  3706          DW   CSTAR      ; C* gives the address of the added line
0000103F 12                  A  3707          DB   DUP
00001040 00                  A  3708          DB   BR
00001041 20                  A  3709          DB   20H
00001042 32                  A  3710          DB   ROT
00001043 0C                  A  3711          DB   CSTORE     ; Store a blank in the first position of the line
00001044 12                  A  3712          DB   DUP
00001045 24                  A  3713          DB   ONEPLUS
00001046 00                  A  3714          DB   BR
00001047 3F                  A  3715          DB   3FH
00001048 1E                  A  3716          DB   CMOVE
00001049 01                  A  3717          DB   NR
0000104A FFFA                A  3718          DW   -6
0000104C 7D                  A  3719          DB   LAT
0000104D 80                  A  3720          DB   GINTO
0000104E 00                  A  3721          DB   BR
0000104F 4A                  A  3722          DB   4AH
00001050 81                  A  3723          DB   GSTORE
00001051 00                  A  3724          DB   BR
00001052 10                  A  3725          DB   10H
00001053 7D                  A  3726          DB   LAT
00001054 06                  A  3727          DB   LONGCALL
00001055 0FFE                A  3728          DW   LIST
00001057 2D                  A  3729          DB   ZERO
00001058 7D                  A  3730          DB   LAT
00001059 80                  A  3731          DB   GINTO
0000105A 2D                  A  3732          DB   ZERO
0000105B 06                  A  3733          DB   LONGCALL
0000105C 0EE5                A  3734          DW   SZERO
0000105E 24                  A  3735          DB   ONEPLUS
0000105F 0C                  A  3736          DB   CSTORE
00001060 2D                  A  3737          DB   ZERO
00001061 07                  A  3738          DB   SEMICOLON
```

```
PC       Machine Code        I  Line    File: newsys.v4e
                             A  3739
                             A  3740    ; : SH MP  0 L@ C* DUP 40 + DUP 40 F C* SWAP -
                             A  3741
         00001062            A  3742      MP: EQU $
00001062 3018                A  3743          JP   @COLON
00001064 2D                  A  3744          DB   ZERO
00001065 7D                  A  3745          DB   LAT
00001066 06                  A  3746          DB   LONGCALL
00001067 0FC3                A  3747          DW   CSTAR
00001069 12                  A  3748          DB   DUP
0000106A 00                  A  3749          DB   BR
0000106B 40                  A  3750          DB   40H
0000106C 16                  A  3751          DB   PLUS
0000106D 12                  A  3752          DB   DUP
0000106E 00                  A  3753          DB   BR
0000106F 40                  A  3754          DB   40H
00001070 00                  A  3755          DB   BR
00001071 0F                  A  3756          DB   0FH
00001072 06                  A  3757          DB   LONGCALL
00001073 0FC3                A  3758          DW   CSTAR
00001075 11                  A  3759          DB   SWAP
00001076 2F                  A  3760          DB   MINUS
00001077 07                  A  3761          DB   SEMICOLON
                             A  3762
         00001078            A  3763    PATSUB: EQU $           ; LOAD COLUMN POSITION
00001078 3018                A  3764          JP   @COLON
0000107A 00                  A  3765          DB   BR
0000107B 2D                  A  3766          DB   SZ+1
0000107C 0E                  A  3767          DB   CAT
0000107D 07                  A  3768          DB   SEMICOLON
                             A  3769
         0000107E            A  3770    BELL: EQU $         ; :SH BELL 7 EMIT 0
0000107E 3018                A  3771          JP   @COLON
00001080 00                  A  3772          DB   BR
00001081 07                  A  3773          DB   7H
00001082 0A                  A  3774          DB   EMIT
00001083 2D                  A  3775          DB   ZERO
00001084 07                  A  3776          DB   SEMICOLON
                             A  3777
         00001085            A  3778    SINIT: EQU $           ; :SINIT F 0 LIST 0 0 G>
00001085 3018                A  3779          JP   @COLON
00001087 00                  A  3780          DB   BR
00001088 10                  A  3781          DB   10h
00001089 2D                  A  3782          DB   ZERO
0000108A 06                  A  3783          DB   LONGCALL
0000108B 0FFE                A  3784          DW   LIST
0000108D 2D                  A  3785          DB   ZERO
0000108E 2D                  A  3786          DB   ZERO
0000108F 80                  A  3787          DB   GINTO
00001090 07                  A  3788          DB   SEMICOLON
                             A  3789
         00001091            A  3790    BSSUB: EQU $           ; AUXILIARY ROUTINE FOR BACK SPACE (7F & 08)
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00001091 3018                A  3791          JP   @COLON
00001093 7E                  A  3792          DB   PAT
00001094 05                  A  3793          DB   JRZS
00001095 3C                  A  3794          DB   BS1-$
00001096 7E                  A  3795          DB   PAT
00001097 00                  A  3796          DB   BR
00001098 3F                  A  3797          DB   3Fh
00001099 2F                  A  3798          DB   MINUS
0000109A 05                  A  3799          DB   JRZS
0000109B 13                  A  3800          DB   IX1-$
0000109C 7E                  A  3801          DB   PAT
0000109D 7D                  A  3802          DB   LAT
0000109E 06                  A  3803          DB   LONGCALL
0000109F 0FC3                A  3804          DW   CSTAR
000010A1 12                  A  3805          DB   DUP
000010A2 2E                  A  3806          DB   ONE
000010A3 2F                  A  3807          DB   MINUS
000010A4 31                  A  3808          DB   OVER
000010A5 00                  A  3809          DB   BR
000010A6 40                  A  3810          DB   40h
000010A7 7D                  A  3811          DB   LAT
000010A8 06                  A  3812          DB   LONGCALL
000010A9 0FC3                A  3813          DW   CSTAR
000010AB 11                  A  3814          DB   SWAP
000010AC 2F                  A  3815          DB   MINUS
000010AD 1E                  A  3816          DB   CMOVE
000010AE 00                  A  3817    IX1:  DB   BR
000010AF 20                  A  3818          DB   " "
000010B0 00                  A  3819          DB   BR
000010B1 3F                  A  3820          DB   3Fh
000010B2 7D                  A  3821          DB   LAT
000010B3 06                  A  3822          DB   LONGCALL
000010B4 0FC3                A  3823          DW   CSTAR
000010B6 0C                  A  3824          DB   CSTORE
000010B7 00                  A  3825          DB   BR
000010B8 08                  A  3826          DB   08H
000010B9 0A                  A  3827          DB   EMIT
000010BA 00                  A  3828          DB   BR
000010BB 50                  A  3829          DB   50H
000010BC 81                  A  3830          DB   GSTORE
000010BD 00                  A  3831          DB   BR
000010BE 08                  A  3832          DB   08H
000010BF 0A                  A  3833          DB   EMIT
000010C0 7E                  A  3834          DB   PAT
000010C1 2E                  A  3835          DB   ONE
000010C2 2F                  A  3836          DB   MINUS
000010C3 00                  A  3837          DB   BR
000010C4 2D                  A  3838          DB   SZ+1
000010C5 0C                  A  3839          DB   CSTORE
000010C6 00                  A  3840          DB   BR
000010C7 3F                  A  3841          DB   3FH
000010C8 7D                  A  3842          DB   LAT
```

```
PC       Machine Code        I  Line    File: newsys.v4e
000010C9 80                  A  3843          DB   GINTO
000010CA 51                  A  3844          DB   DOTQAUX
000010CB 02207C              A  3845          DB   2H," |"
000010CE 7E                  A  3846          DB   PAT
000010CF 7D                  A  3847          DB   LAT
000010D0 80                  A  3848          DB   GINTO
         000010D1            A  3849    BS1: EQU $
000010D1 2D                  A  3850          DB   ZERO
000010D2 07                  A  3851          DB   SEMICOLON
                             A  3852
         000010D3            A  3853    UFSET: EQU $
000010D3 E6FC01              A  3854          LD   FLAGS,#1
000010D6 3016                A  3855          JP   @NV
                             A  3856
         000010D8            A  3857    UFTOGGLE: EQU $
000010D8 76FC01              A  3858          TM   FLAGS,#1
000010DB 6D 10E4             A  3859          JP   Z,UFT1
000010DE E6FC00              A  3860          LD   FLAGS,#0
000010E1 8D 10E7             A  3861          JP   UFT2
000010E4 E6FC01              A  3862     UFT1:LD   FLAGS,#1
000010E7 3016                A  3863     UFT2:JP   @NV
                             A  3864
         000010E9            A  3865    UFTEST: EQU $
000010E9 B0EA                A  3866          CLR  R10
000010EB 76FC01              A  3867          TM   FLAGS,#1
000010EE 6D 10F3             A  3868          JP   Z,UFTX
000010F1 00EA                A  3869          DEC  R10
000010F3 70EA                A  3870     UFTX:PUSH R10
000010F5 70EA                A  3871          PUSH R10
000010F7 3016                A  3872          JP   @NV
                             A  3873
                             A  3874         ;: ?NP DUP 20 7E TWIXT 0= ;
                             A  3875         ;: SCRN 2E ; : SZ 28 ; : S@ SCRN @ ; : SZ2+ 2A ;
                             A  3876         ;: P@ SZ 1+ C@ ; : L@ SZ C@ ; : C* 40 U* DROP + S@ + ;
                             A  3877         ;: G! 1B EMIT 5B EMIT EMIT ; : BELL 7 EMIT 0 ;
                             A  3878         ;: GX + 0 A U/ 30 + EMIT 30 + EMIT ;
                             A  3879         ;: G> 1B EMIT 5B EMIT 2 GX 3B EMIT 7 GX 48 EMIT ;
                             A  3880         ;: IX P@ 3F - IF P@ L@ C* DUP 1 - OVER 40 L@ C* SWAP -
                             A  3881         ;   CMOVE THEN 20 3F L@ C* C! 08 EMIT 50 G! ;
                             A  3882         ;: IY DO I C@ 7F AND ?NP IF 7E EMIT DROP ELSE EMIT THEN LOOP ;
                             A  3883         ;: LISTX DO 0 I C* H. ." <|" 40 I C* 40 0 DO
                             A  3884         ;    1 - DUP C@  20 - IF LEAVE THEN LOOP DUP 1+ SWAP FFC0 AND IY
                             A  3885         ;    40 I G> ." |" CR LOOP ; : SINIT 10 0 LISTX 0 0 G> ;
                             A  3886         ;: ZL C* DUP  20 ROT C! DUP 1+ 3F CMOVE -6 L@ G>
                             A  3887         ;   4A G! F L@ LISTX 0 L@ G>  0 SZ 1+ !  0 ;
                             A  3888         ;: MP  0 L@ C* DUP 40 + DUP 40 F C* SWAP - ;
                             A  3889         ;                                                    ;S
                             A  3890         ;: BS P@ 40 = IF BELL ELSE IX 8 EMIT P@ 1 - SZ 1+ C!
                             A  3891         ;   3F L@ G> ."  |" P@ L@ G> 0 THEN ;
                             A  3892         ;: EDITX 1 SZ2+ ! 0 SZ ! -6 -1 G> 4A G!
                             A  3893         ; ." ^X Exit, ^N New Line, ^Y Del Line  ^O Ins Screen #"
                             A  3894         ; S@ 0 400 U/ 0 <# # # #> TYPE IF ." +" THEN ."  Insert" CR SINIT
```

```
PC       Machine Code        I  Line    File: newsys.v4e
                             A  3895         ; BEGIN KEY DUP 1B = IF DROP KEY DROP KEY 80 OR ELSE
                             A  3896         ;  DUP 9B = IF DROP KEY 80 OR THEN THEN
                             A  3897         ;  DUP 18 - WHILE ?NP IF CASE
                             A  3898         ;  C4 OF P@ 0= IF BELL ELSE 8 EMIT -1 THEN ELSE
                             A  3899         ;  C3 OF P@ 3F = IF BELL ELSE 43 G! 1 THEN ELSE
                             A  3900         ;  C2 OF L@ 0F = IF BELL ELSE 42 G! 100 SZ +! 0 THEN ELSE
                             A  3901         ;  C1 OF L@ 0= IF BELL ELSE 41 G! -100 SZ +! 0 THEN ELSE
                             A  3902         ;  02 OF 20 S@ C! S@ S@ 1+ 3FF CMOVE 3B53 S@ 3FD + ! 0 SZ !
                             A  3903         ;   -6 0 G> 4A G! SINIT 0 ELSE
                             A  3904         ;  0D OF L@ F = IF BELL ELSE
                             A  3905         ;   SZ @ 3F00 AND 100 + SZ ! 0 L@ G> 0 THEN ELSE
                             A  3906         ;
                             A  3907         ;  0F OF SZ2+ @ NEGATE 1+ DUP SZ2+ ! DUP 0= IF
                             A  3908         ;   40 L@ G> 7C EMIT THEN 2F -1 G> IF
                             A  3909         ;   ." Insert" ELSE ." Typovr" THEN P@ L@ G> 0 ELSE
                             A  3910         ;  7F OF BS ELSE 08 OF BS ELSE
                             A  3911         ;  19 OF L@ F = IF BELL ELSE MP ROT SWAP CMOVE 0 F ZL THEN ELSE
                             A  3912         ;  0E OF L@ F = IF BELL ELSE MP <CMOVE 0 L@ ZL THEN ELSE
                             A  3913         ; ELSE DROP BELL ENDCASE ELSE
                             A  3914         ;  P@ L@ C* 3E P@ >= SZ2+ @ AND IF
                             A  3915         ;   DUP DUP 1+ DUP 40 L@ C* SWAP - <CMOVE
                             A  3916         ;    40 G! OVER EMIT 40 L@ G> ." | "
                             A  3917         ;    3F P@ = 0= IF P@ 1+ L@ G> THEN
                             A  3918         ;   ELSE OVER EMIT 3F P@ = IF 08 EMIT THEN THEN C! 3F P@ = 1+
                             A  3919         ; THEN SZ +! REPEAT DROP -6 10 G> ;
                             A  3920
         000010F9            A  3921    EDITSUB: EQU $
000010F9 3018                A  3922          JP   @COLON
000010FB 06                  A  3923          DB   LONGCALL
000010FC 10D3                A  3924          DW   UFSET
000010FE 2D                  A  3925          DB   ZERO
000010FF 06                  A  3926          DB   LONGCALL
00001100 0EE5                A  3927          DW   SZERO
00001102 0B                  A  3928          DB   STORE
00001103 01                  A  3929          DB   NR
00001104 FFFA                A  3930          DW   -6H
00001106 01                  A  3931          DB   NR
00001107 FFFF                A  3932          DW   -1
00001109 80                  A  3933          DB   GINTO
0000110A 00                  A  3934          DB   BR
0000110B 4A                  A  3935          DB   4AH
0000110C 81                  A  3936          DB   GSTORE
0000110D 51                  A  3937          DB   DOTQAUX
0000110E 335E5820 45786974   A  3938          DB   33H,"^X Exit, ^N New Line, ^Y Del Line, ^O Ins: Screen #"
00001116 2C205E4E 204E6577
0000111E 204C696E 652C205E
00001126 59204465 6C204C69
0000112E 6E652C20 5E4F2049
00001136 6E733A20 53637265
0000113E 656E2023
00001142 7F                  A  3939          DB   SAT
00001143 2D                  A  3940          DB   ZERO
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00001144 01                  A  3941          DB   NR
00001145 0400                A  3942          DW   400H
00001147 19                  A  3943          DB   USLASH
00001148 06                  A  3944          DB   LONGCALL
00001149 0F09                A  3945          DW   BDOT
0000114B 05                  A  3946          DB   JRZS
0000114C 04                  A  3947          DB   EDIT1-$
0000114D 51                  A  3948          DB   DOTQAUX   ; ADD A "+" IF NOT AT A FULL PAGE BOUNDARY
0000114E 012B                A  3949          DB   1, "+"
         00001150            A  3950    EDIT1: EQU $
00001150 51                  A  3951          DB   DOTQAUX
00001151 0720496E 73657274   A  3952          DB   7H," Insert"
00001159 36                  A  3953          DB   CR
0000115A 06                  A  3954          DB   LONGCALL
0000115B 1085                A  3955          DW   SINIT
                             A  3956
         0000115D            A  3957    EDIT2: EQU $
0000115D 09                  A  3958          DB   KEY
0000115E 12                  A  3959          DB   DUP
0000115F 00                  A  3960          DB   BR
00001160 1B                  A  3961          DB   1BH       ; IS IT AN <esc>
00001161 30                  A  3962          DB   EQUALS
00001162 05                  A  3963          DB   JRZS      ; Skip to Edit3 if not an excape
00001163 0A                  A  3964          DB   EDIT3-$
00001164 13                  A  3965          DB   DROP      ; Drop the <esc>
00001165 09                  A  3966          DB   KEY       ; Load in the "["
00001166 13                  A  3967          DB   DROP
00001167 09                  A  3968          DB   KEY       ; Get the argument letter
00001168 00                  A  3969          DB   BR
00001169 80                  A  3970          DB   80h
0000116A 15                  A  3971          DB   OR
0000116B 03                  A  3972          DB   JRS
0000116C 0C                  A  3973          DB   EDIT4-$   ; And process in Edit4
         0000116D            A  3974    EDIT3: EQU $
0000116D 12                  A  3975          DB   DUP
0000116E 00                  A  3976          DB   BR        ; Is is an <esc> +80h?
0000116F 9B                  A  3977          DB   9BH
00001170 30                  A  3978          DB   EQUALS
00001171 05                  A  3979          DB   JRZS
00001172 06                  A  3980          DB   EDIT4-$   ; If not <esc>+ 80h, go to Edit 4
00001173 13                  A  3981          DB   DROP
00001174 09                  A  3982          DB   KEY
00001175 00                  A  3983          DB   BR
00001176 80                  A  3984          DB   80h
00001177 15                  A  3985          DB   OR
         00001178            A  3986    EDIT4: EQU $
00001178 12                  A  3987          DB   DUP
00001179 00                  A  3988          DB   BR        ; Was it an "cancel"
0000117A 18                  A  3989          DB   18H
0000117B 2F                  A  3990          DB   MINUS
0000117C 04                  A  3991          DB   JRZ
0000117D 01A1                A  3992          DW   EDITF1-$
```

```
PC       Machine Code        I  Line    File: newsys.v4e
0000117F 06                  A  3993          DB   LONGCALL
00001180 0F31                A  3994          DW   QUESTNP
00001182 04                  A  3995          DB   JRZ
00001183 014D                A  3996          DW   EDITPC-$
                             A  3997                        ; NOW TEST THE CHARACTER THAT TELLS WHAT DIRECTION
         00001185            A  3998    EDITD: EQU $        ; TEST FOR <ESC> D
00001185 00                  A  3999          DB   BR       ; (MOVES CURSOR LEFT ONE SPACE)
00001186 C4                  A  4000          DB   0C4H
00001187 6C                  A  4001          DB   OFAUX
00001188 0015                A  4002          DW   EDITC-$
0000118A 7E                  A  4003          DB   PAT
0000118B 1B                  A  4004          DB   ZEQ
0000118C 05                  A  4005          DB   JRZS
0000118D 07                  A  4006          DB   EDITD1-$
0000118E 06                  A  4007          DB   LONGCALL
0000118F 107E                A  4008          DW   BELL
00001191 02                  A  4009          DB   JR
00001192 0185                A  4010          DW   EDITF-$
         00001194            A  4011    EDITD1: EQU $
00001194 00                  A  4012          DB   BR
00001195 08                  A  4013          DB   8H
00001196 0A                  A  4014          DB   EMIT
00001197 01                  A  4015          DB   NR
00001198 FFFF                A  4016          DW   -1
0000119A 02                  A  4017          DB   JR
0000119B 017C                A  4018          DW   EDITF-$
                             A  4019
         0000119D            A  4020    EDITC: EQU $         ; TEST FOR FORWARD ARROW (<ESC> C)
0000119D 00                  A  4021          DB   BR
0000119E C3                  A  4022          DB   C3H
0000119F 6C                  A  4023          DB   OFAUX
000011A0 0015                A  4024          DW   EDITB-$
000011A2 7E                  A  4025          DB   PAT
000011A3 00                  A  4026          DB   BR
000011A4 3F                  A  4027          DB   3Fh
000011A5 30                  A  4028          DB   EQUALS
000011A6 05                  A  4029          DB   JRZS
000011A7 07                  A  4030          DB   EDITC1-$
000011A8 06                  A  4031          DB   LONGCALL
000011A9 107E                A  4032          DW   BELL
000011AB 02                  A  4033          DB   JR
000011AC 016B                A  4034          DW   EDITF-$
         000011AE            A  4035    EDITC1: EQU $
000011AE 00                  A  4036          DB   BR
000011AF 43                  A  4037          DB   43H
000011B0 81                  A  4038          DB   GSTORE
000011B1 2E                  A  4039          DB   ONE
000011B2 02                  A  4040          DB   JR
000011B3 0164                A  4041          DW   EDITF-$
                             A  4042
         000011B5            A  4043    EDITB: EQU $         ; TEST FOR DOWN ARROW (<ESC> B)
000011B5 00                  A  4044          DB   BR
```

```
PC       Machine Code        I  Line    File: newsys.v4e
000011B6 C2                  A  4045          DB   C2H
000011B7 6C                  A  4046          DB   OFAUX
000011B8 001C                A  4047          DW   EDITA-$
000011BA 7D                  A  4048          DB   LAT
000011BB 00                  A  4049          DB   BR
000011BC 0F                  A  4050          DB   0Fh
000011BD 30                  A  4051          DB   EQUALS
000011BE 05                  A  4052          DB   JRZS
000011BF 07                  A  4053          DB   EDITB1-$
000011C0 06                  A  4054          DB   LONGCALL
000011C1 107E                A  4055          DW   BELL
000011C3 02                  A  4056          DB   JR
000011C4 0153                A  4057          DW   EDITF-$
         000011C6            A  4058    EDITB1: EQU $
000011C6 00                  A  4059          DB   BR
000011C7 42                  A  4060          DB   42H
000011C8 81                  A  4061          DB   GSTORE
000011C9 01                  A  4062          DB   NR
000011CA 0100                A  4063          DW   100H
000011CC 06                  A  4064          DB   LONGCALL
000011CD 0EE5                A  4065          DW   SZERO
000011CF 34                  A  4066          DB   PLUSSTORE
000011D0 2D                  A  4067          DB   ZERO
000011D1 02                  A  4068          DB   JR
000011D2 0145                A  4069          DW   EDITF-$
                             A  4070
         000011D4            A  4071    EDITA: EQU $          ; TEST FOR UP ARROW (<ESC> A)
000011D4 00                  A  4072          DB   BR
000011D5 C1                  A  4073          DB   C1H
000011D6 6C                  A  4074          DB   OFAUX
000011D7 001A                A  4075          DW   EDITCR-$
000011D9 7D                  A  4076          DB   LAT
000011DA 1B                  A  4077          DB   ZEQ
000011DB 05                  A  4078          DB   JRZS
000011DC 07                  A  4079          DB   EDITA1-$
000011DD 06                  A  4080          DB   LONGCALL
000011DE 107E                A  4081          DW   BELL
000011E0 02                  A  4082          DB   JR
000011E1 0136                A  4083          DW   EDITF-$
         000011E3            A  4084    EDITA1: EQU $
000011E3 00                  A  4085          DB   BR
000011E4 41                  A  4086          DB   41H
000011E5 81                  A  4087          DB   GSTORE
000011E6 01                  A  4088          DB   NR
000011E7 FF00                A  4089          DW   -100H
000011E9 06                  A  4090          DB   LONGCALL
000011EA 0EE5                A  4091          DW   SZERO
000011EC 34                  A  4092          DB   PLUSSTORE
000011ED 2D                  A  4093          DB   ZERO
         000011EE            A  4094    EDITA2: EQU $
000011EE 02                  A  4095          DB   JR
000011EF 0128                A  4096          DW   EDITF-$
```

```
PC       Machine Code        I  Line    File: newsys.v4e
                             A  4097
         000011F1            A  4098    EDITCR: EQU $      ; TEST FOR 0D (CARRIAGE RETURN)
000011F1 00                  A  4099          DB   BR
000011F2 0D                  A  4100          DB   0DH
000011F3 6C                  A  4101          DB   OFAUX
000011F4 0024                A  4102          DW   EDITTI-$
000011F6 7D                  A  4103          DB   LAT
000011F7 00                  A  4104          DB   BR
000011F8 0F                  A  4105          DB   0Fh
000011F9 30                  A  4106          DB   EQUALS
000011FA 05                  A  4107          DB   JRZS
000011FB 07                  A  4108          DB   EDITCR1-$
000011FC 06                  A  4109          DB   LONGCALL
000011FD 107E                A  4110          DW   BELL
000011FF 02                  A  4111          DB   JR
00001200 0117                A  4112          DW   EDITF-$
         00001202            A  4113    EDITCR1: EQU $
00001202 06                  A  4114          DB   LONGCALL
00001203 0EF0                A  4115          DW   SZEROAT
00001205 01                  A  4116          DB   NR
00001206 3F00                A  4117          DW   3F00H
00001208 14                  A  4118          DB   AND
00001209 01                  A  4119          DB   NR
0000120A 0100                A  4120          DW   100H
0000120C 16                  A  4121          DB   PLUS
0000120D 06                  A  4122          DB   LONGCALL
0000120E 0EE5                A  4123          DW   SZERO
00001210 0B                  A  4124          DB   STORE
00001211 2D                  A  4125          DB   ZERO
00001212 7D                  A  4126          DB   LAT
00001213 80                  A  4127          DB   GINTO
00001214 2D                  A  4128          DB   ZERO
00001215 02                  A  4129          DB   JR
00001216 0101                A  4130          DW   EDITF-$
                             A  4131
         00001218            A  4132    EDITTI: EQU $       ; TEST FOR TYPEOVER/INSERT TOGGLE
00001218 00                  A  4133          DB   BR
00001219 0F                  A  4134          DB   0FH
0000121A 6C                  A  4135          DB   OFAUX
0000121B 0034                A  4136          DW   EDITBS-$
0000121D 06                  A  4137          DB   LONGCALL
0000121E 10D8                A  4138          DW   UFTOGGLE
00001220 06                  A  4139          DB   LONGCALL
00001221 10E9                A  4140          DW   UFTEST
00001223 12                  A  4141          DB   DUP
00001224 1B                  A  4142          DB   ZEQ
00001225 05                  A  4143          DB   JRZS
00001226 08                  A  4144          DB   EDITTI1-$
00001227 00                  A  4145          DB   BR
00001228 40                  A  4146          DB   40h
00001229 7D                  A  4147          DB   LAT
0000122A 80                  A  4148          DB   GINTO
```

```
PC       Machine Code        I  Line    File: newsys.v4e
0000122B 00                  A  4149          DB   BR
0000122C 7C                  A  4150          DB   07CH
0000122D 0A                  A  4151          DB   EMIT
         0000122E            A  4152    EDITTI1: EQU $
0000122E 00                  A  4153          DB   BR
0000122F 30                  A  4154          DB   30H
00001230 01                  A  4155          DB   NR
00001231 FFFF                A  4156          DW   -1
00001233 80                  A  4157          DB   GINTO
00001234 05                  A  4158          DB   JRZS
00001235 0B                  A  4159          DB   EDITTI2-$
00001236 51                  A  4160          DB   DOTQAUX
00001237 06496E73 657274     A  4161          DB   6H, "Insert"
0000123E 03                  A  4162          DB   JRS
0000123F 09                  A  4163          DB   EDITTI3-$
         00001240            A  4164    EDITTI2: EQU $
00001240 51                  A  4165          DB   DOTQAUX
00001241 06547970 6F7672     A  4166          DB   6H, "Typovr"
         00001248            A  4167    EDITTI3: EQU $
00001248 7E                  A  4168          DB   PAT
00001249 7D                  A  4169          DB   LAT
0000124A 80                  A  4170          DB   GINTO
0000124B 2D                  A  4171          DB   ZERO
0000124C 02                  A  4172          DB   JR
0000124D 00CA                A  4173          DW   EDITF-$
                             A  4174
         0000124F            A  4175    EDITBS: EQU $
0000124F 00                  A  4176          DB   BR        ; BACK SPACE (^H AND PS ARE THE SAME)
00001250 7F                  A  4177          DB   7FH
00001251 6C                  A  4178          DB   OFAUX
00001252 0008                A  4179          DW   EDITBS1-$
00001254 06                  A  4180          DB   LONGCALL
00001255 1091                A  4181          DW   BSSUB
00001257 02                  A  4182          DB   JR
00001258 00BF                A  4183          DW   EDITF-$
         0000125A            A  4184    EDITBS1: EQU $
0000125A 00                  A  4185          DB   BR
0000125B 08                  A  4186          DB   08H
0000125C 6C                  A  4187          DB   OFAUX
0000125D 0008                A  4188          DW   EDITCS-$
0000125F 06                  A  4189          DB   LONGCALL
00001260 1091                A  4190          DW   BSSUB
00001262 02                  A  4191          DB   JR
00001263 00B4                A  4192          DW   EDITF-$
                             A  4193
         00001265            A  4194    EDITCS: EQU $
00001265 00                  A  4195          DB   BR        ; ^B CLEAR THE BUFFER
00001266 02                  A  4196          DB   02H
00001267 6C                  A  4197          DB   OFAUX
00001268 0029                A  4198          DW   EDITDL-$
0000126A 00                  A  4199          DB   BR
0000126B 20                  A  4200          DB   " "
```

```
PC       Machine Code        I  Line    File: newsys.v4e
0000126C 7F                  A  4201          DB   SAT
0000126D 0C                  A  4202          DB   CSTORE
0000126E 7F                  A  4203          DB   SAT
0000126F 12                  A  4204          DB   DUP
00001270 24                  A  4205          DB   ONEPLUS
00001271 01                  A  4206          DB   NR
00001272 03FF                A  4207          DW   3FFH
00001274 1E                  A  4208          DB   CMOVE
00001275 01                  A  4209          DB   NR
00001276 3B53                A  4210          DW   3B53H
00001278 7F                  A  4211          DB   SAT
00001279 01                  A  4212          DB   NR
0000127A 03FD                A  4213          DW   3FDH
0000127C 16                  A  4214          DB   PLUS
0000127D 0B                  A  4215          DB   STORE
0000127E 2D                  A  4216          DB   ZERO
0000127F 06                  A  4217          DB   LONGCALL
00001280 0EE5                A  4218          DW   SZERO
00001282 0B                  A  4219          DB   STORE
00001283 01                  A  4220          DB   NR
00001284 FFFA                A  4221          DW   -6
00001286 2D                  A  4222          DB   ZERO
00001287 80                  A  4223          DB   GINTO
00001288 00                  A  4224          DB   BR
00001289 4A                  A  4225          DB   4AH
0000128A 81                  A  4226          DB   GSTORE
0000128B 06                  A  4227          DB   LONGCALL
0000128C 1085                A  4228          DW   SINIT
0000128E 2D                  A  4229          DB   ZERO
0000128F 03                  A  4230          DB   JRS
00001290 87                  A  4231          DB   EDITF-$
                             A  4232
         00001291            A  4233    EDITDL: EQU $
00001291 00                  A  4234          DB   BR        ; ^Y (DELETE A LINE FROM PAGE)
00001292 19                  A  4235          DB   19H
00001293 6C                  A  4236          DB   OFAUX
00001294 001B                A  4237          DW   EDITIL-$
00001296 7D                  A  4238          DB   LAT
00001297 00                  A  4239          DB   BR
00001298 0F                  A  4240          DB   0Fh
00001299 30                  A  4241          DB   EQUALS
0000129A 05                  A  4242          DB   JRZS
0000129B 06                  A  4243          DB   EDITDL1-$
0000129C 06                  A  4244          DB   LONGCALL
0000129D 107E                A  4245          DW   BELL
0000129F 03                  A  4246          DB   JRS
000012A0 77                  A  4247          DB   EDITF-$
         000012A1            A  4248    EDITDL1: EQU $
000012A1 06                  A  4249          DB   LONGCALL
000012A2 1062                A  4250          DW   MP        ; Move the lines up over the deleted line
000012A4 32                  A  4251          DB   ROT
000012A5 11                  A  4252          DB   SWAP
```

```
PC       Machine Code        I  Line    File: newsys.v4e
000012A6 1E                  A  4253          DB   CMOVE
000012A7 2D                  A  4254          DB   ZERO      ;
000012A8 00                  A  4255          DB   BR
000012A9 0F                  A  4256          DB   0Fh
000012AA 06                  A  4257          DB   LONGCALL
000012AB 103A                A  4258          DW   ZL
000012AD 03                  A  4259          DB   JRS
000012AE 69                  A  4260          DB   EDITF-$
                             A  4261
         000012AF            A  4262    EDITIL: EQU $
000012AF 00                  A  4263          DB   BR        ; ^N (INSERT A LINE INTO PAGE)
000012B0 0E                  A  4264          DB   0EH
000012B1 6C                  A  4265          DB   OFAUX
000012B2 0018                A  4266          DW   EDITX-$
000012B4 7D                  A  4267          DB   LAT
000012B5 00                  A  4268          DB   BR
000012B6 0F                  A  4269          DB   0Fh
000012B7 30                  A  4270          DB   EQUALS
000012B8 05                  A  4271          DB   JRZS
000012B9 06                  A  4272          DB   EDITIL1-$
000012BA 06                  A  4273          DB   LONGCALL
000012BB 107E                A  4274          DW   BELL
000012BD 03                  A  4275          DB   JRS
000012BE 59                  A  4276          DB   EDITF-$
         000012BF            A  4277    EDITIL1: EQU $
000012BF 06                  A  4278          DB   LONGCALL  ; Do a Backward move to move lines
000012C0 1062                A  4279          DW   MP        ;  down from the line inserted
000012C2 6F                  A  4280          DB   BCMOVE
000012C3 2D                  A  4281          DB   ZERO      ; Blank out this line line and
000012C4 7D                  A  4282          DB   LAT
000012C5 06                  A  4283          DB   LONGCALL  ; regenerate the display
000012C6 103A                A  4284          DW   ZL
000012C8 03                  A  4285          DB   JRS
000012C9 4E                  A  4286          DB   EDITF-$
                             A  4287
         000012CA            A  4288    EDITX: EQU $
000012CA 13                  A  4289          DB   DROP     ; CODE FOR UNKNOWN CONTROL CHAR
000012CB 06                  A  4290          DB   LONGCALL
000012CC 107E                A  4291          DW   BELL
000012CE 03                  A  4292          DB   JRS
000012CF 48                  A  4293          DB   EDITF-$
                             A  4294
         000012D0            A  4295    EDITPC: EQU $
000012D0 7E                  A  4296          DB   PAT
000012D1 7D                  A  4297          DB   LAT
000012D2 06                  A  4298          DB   LONGCALL
000012D3 0FC3                A  4299          DW   CSTAR
000012D5 00                  A  4300          DB   BR
000012D6 3E                  A  4301          DB   3EH
000012D7 7E                  A  4302          DB   PAT
000012D8 1C                  A  4303          DB   GTEQ
000012D9 06                  A  4304          DB   LONGCALL
```

```
PC       Machine Code        I  Line    File: newsys.v4e
000012DA 10E9                A  4305          DW   UFTEST
000012DC 14                  A  4306          DB   AND
000012DD 05                  A  4307          DB   JRZS
000012DE 28                  A  4308          DB   EDITPC2-$
000012DF 12                  A  4309          DB   DUP
000012E0 12                  A  4310          DB   DUP
000012E1 24                  A  4311          DB   ONEPLUS
000012E2 12                  A  4312          DB   DUP
000012E3 00                  A  4313          DB   BR
000012E4 40                  A  4314          DB   40h
000012E5 7D                  A  4315          DB   LAT
000012E6 06                  A  4316          DB   LONGCALL
000012E7 0FC3                A  4317          DW   CSTAR
000012E9 11                  A  4318          DB   SWAP
000012EA 2F                  A  4319          DB   MINUS
000012EB 6F                  A  4320          DB   BCMOVE
000012EC 00                  A  4321          DB   BR
000012ED 40                  A  4322          DB   40h
000012EE 81                  A  4323          DB   GSTORE
000012EF 31                  A  4324          DB   OVER
000012F0 0A                  A  4325          DB   EMIT
000012F1 00                  A  4326          DB   BR
000012F2 40                  A  4327          DB   40h
000012F3 7D                  A  4328          DB   LAT
000012F4 80                  A  4329          DB   GINTO
000012F5 51                  A  4330          DB   DOTQAUX
000012F6 027C20              A  4331          DB   2,"| "
000012F9 00                  A  4332          DB   BR
000012FA 3F                  A  4333          DB   3Fh
000012FB 7E                  A  4334          DB   PAT
000012FC 30                  A  4335          DB   EQUALS
000012FD 1B                  A  4336          DB   ZEQ
000012FE 05                  A  4337          DB   JRZS
000012FF 12                  A  4338          DB   EDITPC3-$
00001300 7E                  A  4339          DB   PAT
00001301 24                  A  4340          DB   ONEPLUS
00001302 7D                  A  4341          DB   LAT
00001303 80                  A  4342          DB   GINTO
00001304 03                  A  4343          DB   JRS
00001305 0C                  A  4344          DB   EDITPC3-$
         00001306            A  4345    EDITPC2: EQU $
00001306 31                  A  4346          DB   OVER
00001307 0A                  A  4347          DB   EMIT
00001308 00                  A  4348          DB   BR
00001309 3F                  A  4349          DB   3Fh
0000130A 7E                  A  4350          DB   PAT
0000130B 30                  A  4351          DB   EQUALS
0000130C 05                  A  4352          DB   JRZS
0000130D 04                  A  4353          DB   EDITPC3-$
0000130E 00                  A  4354          DB   BR
0000130F 08                  A  4355          DB   08
00001310 0A                  A  4356          DB   EMIT
```

```
PC       Machine Code        I  Line    File: newsys.v4e
         00001311            A  4357    EDITPC3: EQU $
00001311 0C                  A  4358          DB   CSTORE
00001312 00                  A  4359          DB   BR
00001313 3F                  A  4360          DB   3Fh
00001314 7E                  A  4361          DB   PAT
00001315 30                  A  4362          DB   EQUALS    ; ASSUME TRUE IS -1, FALSE IS 0
00001316 24                  A  4363          DB   ONEPLUS   ; IF FALSE, TURNS TO 1, ELSE 0
         00001317            A  4364    EDITF EQU $
00001317 06                  A  4365          DB   LONGCALL
00001318 0EE5                A  4366          DW   SZERO
0000131A 34                  A  4367          DB   PLUSSTORE
0000131B 02                  A  4368          DB   JR
0000131C FE41                A  4369          DW   EDIT2-$
                             A  4370
         0000131E            A  4371    EDITF1 EQU $
0000131E 13                  A  4372          DB   DROP
0000131F 01                  A  4373          DB   NR
00001320 FFFA                A  4374          DW   -6
00001322 00                  A  4375          DB   BR
00001323 10                  A  4376          DB   10h
00001324 80                  A  4377          DB   GINTO
00001325 07                  A  4378          DB   SEMICOLON
                             A  4379
                             A  4380    ; : ES 20 WORD NUMBER DROP SCR ! EDIT
                             A  4381
00001326 3018                A  4382    ESSUB:JP   @COLON
00001328 00                  A  4383          DB   BR
00001329 20                  A  4384          DB   " "
0000132A 37                  A  4385          DB   WORD
0000132B 42                  A  4386          DB   NUMBER
0000132C 13                  A  4387          DB   DROP
0000132D 76                  A  4388          DB   SCR
0000132E 0B                  A  4389          DB   STORE
0000132F 85                  A  4390          DB   EDIT
00001330 07                  A  4391          DB   SEMICOLON
                             A  4392
                             A  4393    ; : ENS 400 SCR +! EDIT
                             A  4394
                             A  4395
         00001331            A  4396    ENSSUB:  EQU $
00001331 3018                A  4397          JP   @COLON
00001333 01                  A  4398          DB   NR
00001334 0400                A  4399          DW   400H
00001336 76                  A  4400          DB   SCR
00001337 34                  A  4401          DB   PLUSSTORE
00001338 85                  A  4402          DB   EDIT
00001339 07                  A  4403          DB   SEMICOLON
                             A  4404
                             A  4405    ; : EPS -400 SCR +! EDIT
                             A  4406
0000133A 3018                A  4407    EPSSUB:JP   @COLON
0000133C 01                  A  4408          DB   NR
```

```
PC       Machine Code        I  Line    File: newsys.v4e
0000133D FC00                A  4409          DW   -400H
0000133F 76                  A  4410          DB   SCR
00001340 34                  A  4411          DB   PLUSSTORE
00001341 85                  A  4412          DB   EDIT
00001342 07                  A  4413          DB   SEMICOLON
                             A  4414
                             A  4415    ; : SAVE OVER + 1 - SWAP DO I C@ EMIT 10 1 DO LOOP LOOP
                             A  4416
         00001343            A  4417    SAVESUB: equ $
00001343 3018                A  4418          JP   @COLON
00001345 31                  A  4419          DB   OVER
00001346 16                  A  4420          DB   PLUS
00001347 11                  A  4421          DB   SWAP
00001348 5C                  A  4422          DB   DOAUX
         00001349            A  4423    SAVE1: EQU $
00001349 00                  A  4424          DB   BR           ; PUT OUT A CR AT LINE BEGINNING
0000134A 3F                  A  4425          DB   3FH
0000134B 1D                  A  4426          DB   I
0000134C 14                  A  4427          DB   AND
0000134D 1B                  A  4428          DB   ZEQ
0000134E 05                  A  4429          DB   JRZS
0000134F 02                  A  4430          DB   SAVE2-$
00001350 36                  A  4431          DB   CR
         00001351            A  4432    SAVE2: EQU $
00001351 1D                  A  4433          DB   I
00001352 0E                  A  4434          DB   CAT
00001353 0A                  A  4435          DB   EMIT
00001354 60                  A  4436          DB   LOOPAUX      ; GO BACK FOR MORE CHARS
00001355 FFF4                A  4437          DW   SAVE1-$
00001357 36                  A  4438          DB   CR
00001358 07                  A  4439          DB   SEMICOLON
                             A  4440
                             A  4441    ; : \ >IN @ FFC0 AND 40 + >IN !
                             A  4442
         00001359            A  4443    BSLASHSUB: EQU $
00001359 3018                A  4444          JP   @COLON
0000135B 26                  A  4445          DB   TOIN
0000135C 0D                  A  4446          DB   AT
0000135D 01                  A  4447          DB   NR
0000135E FFC0                A  4448          DW   0FFC0H
00001360 14                  A  4449          DB   AND
00001361 00                  A  4450          DB   BR
00001362 40                  A  4451          DB   40h
00001363 16                  A  4452          DB   PLUS
00001364 26                  A  4453          DB   TOIN
00001365 0B                  A  4454          DB   STORE
00001366 07                  A  4455          DB   SEMICOLON
                             A  4456
                             A  4457    ; -------------------------------------------------------
                             A  4458
         00001367            A  4459    COLONAHEAD: EQU $
00001367 A23A C1             A  4460          DB   0A2H, ":",  _A
```

```
PC       Machine Code        I  Line    File: newsys.v4e
0000136A 04BE                A  4461          DW   EDITHEAD
                             A  4462
         0000136C            A  4463    COLONA: EQU $
0000136C 3018                A  4464          JP   @COLON      ; :A is the same as CREATE SMUDGE
0000136E 49                  A  4465          DB   CREATE      ;   in this version
0000136F 4B                  A  4466          DB   SMUDGE
00001370 07                  A  4467          DB   SEMICOLON
                             A  4468
         00001371            A  4469    NOTTWIXT: EQU $
00001371 3018                A  4470          JP   @COLON
00001373 06                  A  4471          DB   LONGCALL
00001374 0E86                A  4472          DW   TWIXT
00001376 05                  A  4473          DB   JRZS
00001377 02                  A  4474          DB   NT1-$
00001378 07                  A  4475          DB   SEMICOLON
         00001379            A  4476    NT1: EQU $
00001379 51                  A  4477          DB   DOTQAUX
0000137A 0A416464 72206D6F   A  4478          DB   10,"Addr mode?"
00001382 64653F
00001385 43                  A  4479          DB   QUIT
                             A  4480
         00001386            A  4481    IN: EQU $               ; LOW NIBBLE -> HIGH NIBBLE THEN
00001386 3018                A  4482          JP   @COLON      ;  OR IN LOW NIBBLE OF NEXT TO TOP-OF-STACK
00001388 00                  A  4483          DB   BR          ;  and compile the byte
00001389 0F                  A  4484          DB   #0Fh
0000138A 14                  A  4485          DB   AND
0000138B 11                  A  4486          DB   SWAP
0000138C 00                  A  4487          DB   BR
0000138D 10                  A  4488          DB   10h
0000138E 18                  A  4489          DB   USTAR
0000138F 13                  A  4490          DB   DROP
00001390 15                  A  4491          DB   OR
00001391 07                  A  4492          DB   SEMICOLON
                             A  4493
         00001392            A  4494    RHEAD: EQU $
00001392 81 D2               A  4495          DB   081H, _R
00001394 1367                A  4496          DW   COLONAHEAD
00001396 9C00                A  4497    R:    LD   R9,#0H
00001398 8B 56               A  4498          JR   NExit1
                             A  4499
         0000139A            A  4500    IRHEAD: EQU $
0000139A 8249 D2             A  4501          DB   082H, "I", _R
0000139D 1392                A  4502          DW   RHEAD
0000139F 9C01                A  4503    IR:   LD   R9,#1
000013A1 8B 4D               A  4504          JR   NExit1
                             A  4505
         000013A3            A  4506    SRRHEAD: EQU $
000013A3 8272 F2             A  4507          DB   082H, "r", _r
000013A6 139A                A  4508          DW   IRHEAD
000013A8 9C02                A  4509    SRR   LD   R9,#2
000013AA 8B 44               A  4510          JR   NExit1
                             A  4511
```

```
PC       Machine Code        I  Line    File: newsys.v4e
         000013AC            A  4512    SRIRHEAD: EQU $
000013AC 837249 F2           A  4513          DB   083H, "rI", _r
000013B0 13A3                A  4514          DW   SRRHEAD
000013B2 9C03                A  4515          LD   R9,#3
000013B4 8B 3A               A  4516          JR   NExit1
                             A  4517
         000013B6            A  4518    ISRRHEAD: EQU $
000013B6 834972 F2           A  4519          DB   083H, "Ir", _r
000013BA 13AC                A  4520          DW   SRIRHEAD
000013BC 9C03                A  4521          LD   R9,#3
000013BE 8B 30               A  4522          JR   NExit1
                             A  4523
         000013C0            A  4524    LRRHEAD: EQU $
000013C0 8252 D2             A  4525          DB   082H, "R", _R
000013C3 13B6                A  4526          DW   ISRRHEAD
000013C5 9C04                A  4527          LD   R9,#4
000013C7 8B 27               A  4528          JR   NExit1
                             A  4529
         000013C9            A  4530    IRRHEAD: EQU $
000013C9 834952 D2           A  4531          DB   083H, "IR", _R
000013CD 13C0                A  4532          DW   LRRHEAD
000013CF 9C05                A  4533          LD   R9,#5
000013D1 8B 1D               A  4534          JR   NExit1
                             A  4535
         000013D3            A  4536    LRIRHEAD: EQU $
000013D3 835249 D2           A  4537          DB   083H, "RI", _R
000013D7 13C9                A  4538          DW   IRRHEAD
000013D9 9C05                A  4539          LD   R9,#5
000013DB 8B 13               A  4540          JR   NExit1
                             A  4541
         000013DD            A  4542    RIMHEAD: EQU $
000013DD 835249 CD           A  4543          DB   083H, "RI", _M
000013E1 13D3                A  4544          DW   LRIRHEAD
000013E3 9C06                A  4545          LD   R9,#6
000013E5 8B 09               A  4546          JR   NExit1
                             A  4547
         000013E7            A  4548    IRIMHEAD: EQU $
000013E7 84495249 CD         A  4549          DB   084H, "IRI", _M
000013EC 13DD                A  4550          DW   RIMHEAD
000013EE 9C07                A  4551          LD   R9,#7
                             A  4552
         000013F0            A  4553    NExit1: EQU $
000013F0 8B 49               A  4554          JR   NExit2
                             A  4555
                             A  4556
         000013F2            A  4557    carryHEAD: EQU $
000013F2 85636172 72 F9      A  4558          DB   085H,"carr", _y
000013F8 13E7                A  4559          DW   IRIMHEAD
000013FA 9C0F                A  4560          LD   R9,#FH
000013FC 8B 3D               A  4561          JR   NExit2
                             A  4562
         000013FE            A  4563    ncHEAD: EQU $
```

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PC       Machine Code        I  Line    File: newsys.v4e
000013FE 826E E3             A  4564          DB   082H,"n", _c
00001401 13F2                A  4565          DW   carryHEAD
00001403 9C07                A  4566          LD   R9,#7H
00001405 8B 34               A  4567          JR   NExit2
                             A  4568
         00001407            A  4569    zHEAD: EQU $
00001407 81 FA               A  4570          DB   081H, _z
00001409 13FE                A  4571          DW   ncHEAD
0000140B 9C0E                A  4572          LD   R9,#EH
0000140D 8B 2C               A  4573          JR   NExit2
                             A  4574
         0000140F            A  4575    nzHEAD: EQU $
0000140F 826E FA             A  4576          DB   082H,"n", _z
00001412 1407                A  4577          DW   zHEAD
00001414 9C06                A  4578          LD   R9,#6H
00001416 8B 23               A  4579          JR   NExit2
                             A  4580
         00001418            A  4581    plHEAD: EQU $
00001418 8270 EC             A  4582          DB   082H,"p", _l
0000141B 140F                A  4583          DW   nzHEAD
0000141D 9C05                A  4584          LD   R9,#5H
0000141F 8B 1A               A  4585          JR   NExit2
                             A  4586
         00001421            A  4587    miHEAD: EQU $
00001421 826D E9             A  4588          DB   082H,"m", _i
00001424 1418                A  4589          DW   plHEAD
00001426 9C0D                A  4590          LD   R9,#DH
00001428 8B 11               A  4591          JR   NExit2
                             A  4592
         0000142A            A  4593    ovHEAD: EQU $
0000142A 826F F6             A  4594          DB   082H,"o", _v
0000142D 1421                A  4595          DW   miHEAD
0000142F 9C0C                A  4596          LD   R9,#CH
00001431 8B 08               A  4597          JR   NExit2
                             A  4598
         00001433            A  4599    novHEAD: EQU $
00001433 836E6F F6           A  4600          DB   083H,"no", _v
00001437 142A                A  4601          DW   ovHEAD
00001439 9C04                A  4602          LD   R9,#4H
                             A  4603
         0000143B            A  4604    NExit2: EQU $
0000143B B0E8                A  4605          CLR  R8
0000143D D6 04F2             A  4606          CALL PUSH8
00001440 3016                A  4607          JP   @NV
                             A  4608
         00001442            A  4609    eqHEAD: EQU $
00001442 8265 F1             A  4610          DB   082H,"e", _q
00001445 1433                A  4611          DW   novHEAD
00001447 9C0E                A  4612          LD   R9,#EH
00001449 8B F0               A  4613          JR   NExit2
                             A  4614
         0000144B            A  4615    geHEAD: EQU $
```

```
PC       Machine Code        I  Line    File: newsys.v4e
0000144B 8267 E5             A  4616          DB   082H,"g", _e
0000144E 1442                A  4617          DW   eqHEAD
00001450 9C01                A  4618          LD   R9,#1H
00001452 8B E7               A  4619          JR   NExit2
                             A  4620
         00001454            A  4621    ltHEAD: EQU $
00001454 826C F4             A  4622          DB   082H,"l", _t
00001457 144B                A  4623          DW   geHEAD
00001459 9C09                A  4624          LD   R9,#9H
0000145B 8B DE               A  4625          JR   NExit2
                             A  4626
         0000145D            A  4627    gtHEAD: EQU $
0000145D 8267 F4             A  4628          DB   082H,"g", _t
00001460 1454                A  4629          DW   ltHEAD
00001462 9C02                A  4630          LD   R9,#2H
00001464 8B D5               A  4631          JR   NExit2
                             A  4632
         00001466            A  4633    leHEAD: EQU $
00001466 826C E5             A  4634          DB   082H,"l", _e
00001469 145D                A  4635          DW   gtHEAD
0000146B 9C0A                A  4636          LD   R9,#AH
0000146D 8B CC               A  4637          JR   NExit2
                             A  4638
         0000146F            A  4639    ugeHEAD: EQU $
0000146F 837567 E5           A  4640          DB   083H,"ug", _e
00001473 1466                A  4641          DW   leHEAD
00001475 9C07                A  4642          LD   R9,#7H
00001477 8B C2               A  4643          JR   NExit2
                             A  4644
         00001479            A  4645    ultHEAD: EQU $
00001479 83756C F4           A  4646          DB   083H,"ul", _t
0000147D 146F                A  4647          DW   ugeHEAD
0000147F 9C0F                A  4648          LD   R9,#FH
00001481 8B B8               A  4649          JR   NExit2
                             A  4650
         00001483            A  4651    ugtHEAD: EQU $
00001483 837567 F4           A  4652          DB   083H,"ug", _t
00001487 1479                A  4653          DW   ultHEAD
00001489 9C03                A  4654          LD   R9,#3H
0000148B 8B AE               A  4655          JR   NExit2
                             A  4656
         0000148D            A  4657    uleHEAD: EQU $
0000148D 83756C E5           A  4658          DB   083H,"ul", _e
00001491 1483                A  4659          DW   ugtHEAD
00001493 9C0B                A  4660          LD   R9,#BH
00001495 8B A4               A  4661          JR   NExit2
                             A  4662
         00001497            A  4663    neHEAD: EQU $
00001497 826E E5             A  4664          DB   082H,"n", _e
0000149A 148D                A  4665          DW   uleHEAD
0000149C 9C06                A  4666          LD   R9,#6H
0000149E 8B 9B               A  4667          JR   NExit2
```

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PC       Machine Code        I  Line    File: newsys.v4e
                             A  4668
         000014A0            A  4669    neverHEAD: EQU $
000014A0 856E6576 65 F2      A  4670          DB   085H,"neve", _r
000014A6 1497                A  4671          DW   neHEAD
000014A8 9C08                A  4672          LD   R9,#8H
000014AA 8B 8F               A  4673          JR   NExit2
                             A  4674
         000014AC            A  4675    alwaysHEAD: EQU $
000014AC 86616C77 6179 F3    A  4676          DB   086H,"alway", _s
000014B3 14A0                A  4677          DW   neverHEAD
000014B5 9C00                A  4678          LD   R9,#0H
000014B7 8B 82               A  4679          JR   NExit2
                             A  4680
         000014B9            A  4681    FIXEVR: EQU $
000014B9 50E4                A  4682          POP  R4        ; Set R4/R5 to the address following the call
000014BB 50E5                A  4683          POP  R5
000014BD 30E4                A  4684          JP   @RR4
                             A  4685
                             A  4686    ;--------------------------------------
         000014BF            A  4687    DICOMMAHEAD: EQU $
000014BF 834449 AC           A  4688          DB   083H, "DI", _CMA
000014C3 14AC                A  4689          DW   alwaysHEAD
                             A  4690
         000014C5            A  4691    DICOMMA: EQU $
000014C5 9C8F                A  4692          LD   R9,#8Fh
000014C7 8B 4B               A  4693          JR   M0X
                             A  4694
         000014C9            A  4695    EICOMMAHEAD: EQU $
000014C9 834549 AC           A  4696          DB   083H, "EI", _CMA
000014CD 14BF                A  4697          DW   DICOMMAHEAD
                             A  4698
         000014CF            A  4699    EICOMMA: EQU $
000014CF 9C9F                A  4700          LD   R9,#09FH
000014D1 8B 41               A  4701          JR   M0X
                             A  4702
         000014D3            A  4703    RETCOMMAHEAD: EQU $
000014D3 84524554 AC         A  4704          DB   084H, "RET", _CMA
000014D8 14C9                A  4705          DW   EICOMMAHEAD
                             A  4706
         000014DA            A  4707    RETCOMMA: EQU $
000014DA 9CAF                A  4708          LD   R9,#0AFH
000014DC 8B 36               A  4709          JR   M0X
                             A  4710
         000014DE            A  4711    IRETCOMMAHEAD: EQU $
000014DE 85495245 54 AC      A  4712          DB   085H, "IRET", _CMA
000014E4 14D3                A  4713          DW   RETCOMMAHEAD
                             A  4714
         000014E6            A  4715    IRETCOMMA: EQU $
000014E6 9CBF                A  4716          LD   R9,#0BFH
000014E8 8B 2A               A  4717          JR   M0X
                             A  4718
         000014EA            A  4719    RCFCOMMAHEAD: EQU $
```

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PC       Machine Code        I  Line    File: newsys.v4e
000014EA 84524346 AC         A  4720          DB   084H, "RCF", _CMA
000014EF 14DE                A  4721          DW   IRETCOMMAHEAD
                             A  4722
         000014F1            A  4723    RCFCOMMA: EQU $
000014F1 9CCF                A  4724          LD   R9,#0CFH
000014F3 8B 1F               A  4725          JR   M0X
                             A  4726
         000014F5            A  4727    SCFCOMMAHEAD: EQU $
000014F5 84534346 AC         A  4728          DB   084H, "SCF", _CMA
000014FA 14EA                A  4729          DW   RCFCOMMAHEAD
                             A  4730
         000014FC            A  4731    SCFCOMMA: EQU $
000014FC 9CDF                A  4732          LD   R9,#0DFH
000014FE 8B 14               A  4733          JR   M0X
                             A  4734
         00001500            A  4735    CCFCOMMAHEAD: EQU $
00001500 84434346 AC         A  4736          DB   084H, "CCF", _CMA
00001505 14F5                A  4737          DW   SCFCOMMAHEAD
                             A  4738
         00001507            A  4739    CCFCOMMA: EQU $
00001507 9CEF                A  4740          LD   R9,#0EFH
00001509 8B 09               A  4741          JR   M0X
                             A  4742
         0000150B            A  4743    NOPCOMMAHEAD: EQU $
0000150B 844E4F50 AC         A  4744          DB   084H, "NOP", _CMA
00001510 1500                A  4745          DW   CCFCOMMAHEAD
                             A  4746
         00001512            A  4747    NOPCOMMA: EQU $
00001512 9CFF                A  4748          LD   R9,#0FFH
                             A  4749
00001514 D6 04F2             A  4750    M0X:  CALL PUSH8
00001517 D6 14B9             A  4751          CALL FIXEVR       ; Patch up the EVR so COLON will work right
0000151A 3018                A  4752    M0XA: JP   @COLON
0000151C 21                  A  4753          DB   CCOMMA
0000151D 07                  A  4754          DB   SEMICOLON
                             A  4755
                             A  4756    ; -------------------------------
         0000151E            A  4757    JPCOMMAHEAD: EQU $
0000151E 834A50 AC           A  4758          DB   083H, "JP", _CMA
00001522 150B                A  4759          DW   NOPCOMMAHEAD
                             A  4760
         00001524            A  4761    JPCOMMA: EQU $
00001524 9C30                A  4762          LD   R9,#030H
00001526 8B 09               A  4763          JR   P1X
                             A  4764
         00001528            A  4765    SRPCOMMAHEAD: EQU $
00001528 84535250 AC         A  4766          DB   084H, "SRP", _CMA
0000152D 151E                A  4767          DW   JPCOMMAHEAD
                             A  4768
         0000152F            A  4769    SRPCOMMA: EQU $
0000152F 9C31                A  4770          LD   R9,#031H
                             A  4771
```

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PC       Machine Code        I  Line    File: newsys.v4e
00001531 D6 04F2             A  4772    P1X:  CALL PUSH8
00001534 D6 14B9             A  4773          CALL FIXEVR       ; Patch up the EVR so COLON will work right
00001537 3018                A  4774          JP   @COLON
00001539 21                  A  4775          DB   CCOMMA
0000153A 21                  A  4776          DB   CCOMMA
0000153B 07                  A  4777          DB   SEMICOLON
                             A  4778
                             A  4779
                             A  4780    ; -------------------------------
         0000153C            A  4781    ADDCOMMAHEAD: EQU $
0000153C 84414444 AC         A  4782          DB   084H, "ADD", _CMA
00001541 1528                A  4783          DW   SRPCOMMAHEAD
                             A  4784
         00001543            A  4785    ADDCOMMA: EQU $
00001543 9C00                A  4786          LD   R9,#000H
00001545 8B 5E               A  4787          JR   M1X
                             A  4788
         00001547            A  4789    ADCCOMMAHEAD: EQU $
00001547 84414443 AC         A  4790          DB   084H, "ADC", _CMA
0000154C 153C                A  4791          DW   ADDCOMMAHEAD
                             A  4792
         0000154E            A  4793    ADCCOMMA: EQU $
0000154E 9C10                A  4794          LD   R9,#010H
00001550 8B 53               A  4795          JR   M1X
                             A  4796
         00001552            A  4797    SUBCOMMAHEAD: EQU $
00001552 84535542 AC         A  4798          DB   084H, "SUB", _CMA
00001557 1547                A  4799          DW   ADCCOMMAHEAD
                             A  4800
         00001559            A  4801    SUBCOMMA: EQU $
00001559 9C20                A  4802          LD   R9,#020H
0000155B 8B 48               A  4803          JR   M1X
                             A  4804
         0000155D            A  4805    SBCCOMMAHEAD: EQU $
0000155D 84534243 AC         A  4806          DB   084H, "SBC", _CMA
00001562 1552                A  4807          DW   SUBCOMMAHEAD
                             A  4808
         00001564            A  4809    SBCCOMMA: EQU $
00001564 9C30                A  4810          LD   R9,#030H
00001566 8B 3D               A  4811          JR   M1X
                             A  4812
         00001568            A  4813    ORDEFCOMMAHEAD: EQU $
00001568 834F52 AC           A  4814          DB   083H, "OR", _CMA
0000156C 155D                A  4815          DW   SBCCOMMAHEAD
                             A  4816
         0000156E            A  4817    ORDEFCOMMA: EQU $
0000156E 9C40                A  4818          LD   R9,#040H
00001570 8B 33               A  4819          JR   M1X
                             A  4820
         00001572            A  4821    ANDDEFCOMMAHEAD: EQU $
00001572 84414E44 AC         A  4822          DB   084H, "AND", _CMA
00001577 1568                A  4823          DW   ORDEFCOMMAHEAD
```

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PC       Machine Code        I  Line    File: newsys.v4e
                             A  4824
         00001579            A  4825    ANDDEFCOMMA: EQU $
00001579 9C50                A  4826          LD   R9,#050H
0000157B 8B 28               A  4827          JR   M1X
                             A  4828
         0000157D            A  4829    TCMCOMMAHEAD: EQU $
0000157D 8454434D AC         A  4830          DB   084H, "TCM", _CMA
00001582 1572                A  4831          DW   ANDDEFCOMMAHEAD
                             A  4832
         00001584            A  4833    TCMCOMMA: EQU $
00001584 9C60                A  4834          LD   R9,#060H
00001586 8B 1D               A  4835          JR   M1X
                             A  4836
         00001588            A  4837    TMCOMMAHEAD: EQU $
00001588 83544D AC           A  4838          DB   083H, "TM", _CMA
0000158C 157D                A  4839          DW   TCMCOMMAHEAD
                             A  4840
         0000158E            A  4841    TMCOMMA: EQU $
0000158E 9C70                A  4842          LD   R9,#070H
00001590 8B 13               A  4843          JR   M1X
                             A  4844
         00001592            A  4845    CPCOMMAHEAD: EQU $
00001592 834350 AC           A  4846          DB   083H, "CP", _CMA
00001596 1588                A  4847          DW   TMCOMMAHEAD
                             A  4848
         00001598            A  4849    CPCOMMA: EQU $
00001598 9CA0                A  4850          LD   R9,#0A0H
0000159A 8B 09               A  4851          JR   M1X
                             A  4852
         0000159C            A  4853    XORCOMMAHEAD: EQU $
0000159C 84584F52 AC         A  4854          DB   084H, "XOR", _CMA
000015A1 1592                A  4855          DW   CPCOMMAHEAD
                             A  4856
         000015A3            A  4857    XORCOMMA: EQU $
000015A3 9CB0                A  4858          LD   R9,#0B0H
                             A  4859
000015A5 D6 04F2             A  4860    M1X:  CALL PUSH8
000015A8 D6 14B9             A  4861          CALL FIXEVR       ; Patch up the EVR so COLON will work right
000015AB 3018                A  4862          JP   @COLON
000015AD 31                  A  4863          DB   OVER         ; PARAMETER ADDR IS TOP-OF-STACK
000015AE 12                  A  4864          DB   DUP          ; CHECK THAT ADDR MODE IS BETWEEN 2 AND 7
000015AF 00                  A  4865          DB   BR
000015B0 02                  A  4866          DB   #2
000015B1 00                  A  4867          DB   BR
000015B2 07                  A  4868          DB   07H
000015B3 06                  A  4869          DB   LONGCALL
000015B4 1371                A  4870          DW   NOTTWIXT
000015B6 15                  A  4871          DB   OR           ; OR THE OPCODE WITH ADDR MODE
000015B7 21                  A  4872          DB   CCOMMA       ; COMPILE OPCODE
000015B8 12                  A  4873          DB   DUP
000015B9 00                  A  4874          DB   BR
000015BA 06                  A  4875          DB   6H
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PC       Machine Code        I  Line    File: newsys.v4e
000015BB 1C                  A  4876          DB   GTEQ         ; BRANCH TO X1 IF ADDR MODE IS 5 OR LESS
000015BC 05                  A  4877          DB   JRZS
000015BD 05                  A  4878          DB   M1X1-$
000015BE 13                  A  4879          DB   DROP         ; DROP THE ADDR MODE
000015BF 11                  A  4880          DB   SWAP
000015C0 03                  A  4881          DB   JRS          ; COMPILE THE DEST, THEN THE SOURCE
000015C1 06                  A  4882          DB   M1X1A-$
         000015C2            A  4883    M1X1:EQU  $
000015C2 00                  A  4884          DB   BR           ; GO TO rr OR rIR CODE IF ADDR MODE IS 2 OR 3
000015C3 04                  A  4885          DB   4H
000015C4 1C                  A  4886          DB   GTEQ
000015C5 05                  A  4887          DB   JRZS
000015C6 04                  A  4888          DB   M1X2-$
         000015C7            A  4889    M1X1A: EQU $
000015C7 21                  A  4890          DB   CCOMMA       ; ADDR MODE 4 OR 5: COMPILE SOURCE THEN DEST
000015C8 21                  A  4891          DB   CCOMMA
000015C9 07                  A  4892          DB   SEMICOLON
         000015CA            A  4893    M1X2:EQU  $
000015CA 06                  A  4894          DB   LONGCALL
000015CB 1386                A  4895          DW   IN           ; ADDR MODE 3 OR LESS - RT SHIFT NIBBLE AT TOP-OF-STACK
000015CD 21                  A  4896          DB   CCOMMA       ;  AND OR WITH NEXT TO TOP-OF-STACK
         000015CE            A  4897    M1X3:EQU  $
000015CE 07                  A  4898          DB   SEMICOLON
                             A  4899
                             A  4900    ; -------------------------------
         000015CF            A  4901    DECCOMMAHEAD: EQU $
000015CF 84444543 AC         A  4902          DB   084H, "DEC", _CMA
000015D4 159C                A  4903          DW   XORCOMMAHEAD
                             A  4904
         000015D6            A  4905    DECCOMMA: EQU $
000015D6 9C00                A  4906          LD   R9,#000H
000015D8 8D 1687             A  4907          JR   N1X
                             A  4908
         000015DB            A  4909    RLCCOMMAHEAD: EQU $
000015DB 84524C43 AC         A  4910          DB   084H, "RLC", _CMA
000015E0 15CF                A  4911          DW   DECCOMMAHEAD
                             A  4912
         000015E2            A  4913    RLCCOMMA: EQU $
000015E2 9C10                A  4914          LD   R9,#010H
000015E4 8D 1687             A  4915          JR   N1X
                             A  4916
         000015E7            A  4917    INCCOMMAHEAD: EQU $
000015E7 84494E43 AC         A  4918          DB   084H, "INC", _CMA
000015EC 15DB                A  4919          DW   RLCCOMMAHEAD
                             A  4920
         000015EE            A  4921    INCCOMMA: EQU $
000015EE 9C20                A  4922          LD   R9,#020H
000015F0 8D 1687             A  4923          JR   N1X
                             A  4924
         000015F3            A  4925    DACOMMAHEAD: EQU $
000015F3 834441 AC           A  4926          DB   083H, "DA", _CMA
000015F7 15E7                A  4927          DW   INCCOMMAHEAD
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PC       Machine Code        I  Line    File: newsys.v4e
                             A  4928
         000015F9            A  4929    DACOMMA: EQU $
000015F9 9C40                A  4930          LD   R9,#040H
000015FB 8D 1687             A  4931          JR   N1X
                             A  4932
         000015FE            A  4933    POPCOMMAHEAD: EQU $
000015FE 84504F50 AC         A  4934          DB   084H, "POP", _CMA
00001603 15F3                A  4935          DW   DACOMMAHEAD
                             A  4936
         00001605            A  4937    POPCOMMA: EQU $
00001605 9C50                A  4938          LD   R9,#050H
00001607 8B 7E               A  4939          JR   N1X
                             A  4940
         00001609            A  4941    COMCOMMAHEAD: EQU $
00001609 84434F4D AC         A  4942          DB   084H, "COM", _CMA
0000160E 15FE                A  4943          DW   POPCOMMAHEAD
                             A  4944
         00001610            A  4945    COMCOMMA: EQU $
00001610 9C60                A  4946          LD   R9,#060H
00001612 8B 73               A  4947          JR   N1X
                             A  4948
         00001614            A  4949    PUSHCOMMAHEAD: EQU $
00001614 85505553 48 AC      A  4950          DB   085H, "PUSH", _CMA
0000161A 1609                A  4951          DW   COMCOMMAHEAD
                             A  4952
         0000161C            A  4953    PUSHCOMMA: EQU $
0000161C 9C70                A  4954          LD   R9,#070H
0000161E 8B 67               A  4955          JR   N1X
                             A  4956
         00001620            A  4957    DECWCOMMAHEAD: EQU $
00001620 85444543 57 AC      A  4958          DB   085H, "DECW", _CMA
00001626 1614                A  4959          DW   PUSHCOMMAHEAD
                             A  4960
         00001628            A  4961    DECWCOMMA: EQU $
00001628 9C80                A  4962          LD   R9,#080H
0000162A 8B 4D               A  4963          JR   N1XA
                             A  4964
         0000162C            A  4965    RLCOMMAHEAD: EQU $
0000162C 83524C AC           A  4966          DB   083H, "RL", _CMA
00001630 1620                A  4967          DW   DECWCOMMAHEAD
                             A  4968
         00001632            A  4969    RLCOMMA: EQU $
00001632 9C90                A  4970          LD   R9,#090H
00001634 8B 51               A  4971          JR   N1X
                             A  4972
         00001636            A  4973    INCWCOMMAHEAD: EQU $
00001636 85494E43 57 AC      A  4974          DB   085H, "INCW", _CMA
0000163C 162C                A  4975          DW   RLCOMMAHEAD
                             A  4976
         0000163E            A  4977    INCWCOMMA: EQU $
0000163E 9CA0                A  4978          LD   R9,#0A0H
00001640 8B 37               A  4979          JR   N1XA
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PC       Machine Code        I  Line    File: newsys.v4e
                             A  4980
         00001642            A  4981    CLRCOMMAHEAD: EQU $
00001642 84434C52 AC         A  4982          DB   084H, "CLR", _CMA
00001647 1636                A  4983          DW   INCWCOMMAHEAD
                             A  4984
         00001649            A  4985    CLRCOMMA: EQU $
00001649 9CB0                A  4986          LD   R9,#0B0H
0000164B 8B 3A               A  4987          JR   N1X
                             A  4988
         0000164D            A  4989    RRCCOMMAHEAD: EQU $
0000164D 84525243 AC         A  4990          DB   084H, "RRC", _CMA
00001652 1642                A  4991          DW   CLRCOMMAHEAD
                             A  4992
         00001654            A  4993    RRCCOMMA: EQU $
00001654 9CC0                A  4994          LD   R9,#0C0H
00001656 8B 2F               A  4995          JR   N1X
                             A  4996
         00001658            A  4997    SRACOMMAHEAD: EQU $
00001658 84535241 AC         A  4998          DB   084H, "SRA", _CMA
0000165D 164D                A  4999          DW   RRCCOMMAHEAD
                             A  5000
         0000165F            A  5001    SRACOMMA: EQU $
0000165F 9CD0                A  5002          LD   R9,#0D0H
00001661 8B 24               A  5003          JR   N1X
                             A  5004
         00001663            A  5005    RRCOMMAHEAD: EQU $
00001663 835252 AC           A  5006          DB   083H,"RR", _CMA
00001667 1658                A  5007          DW   SRACOMMAHEAD
                             A  5008
         00001669            A  5009    RRCOMMA: EQU $
00001669 9CE0                A  5010          LD   R9,#0E0H
0000166B 8B 1A               A  5011          JR   N1X
                             A  5012
         0000166D            A  5013    SWAPCOMMAHEAD: EQU $
0000166D 85535741 50 AC      A  5014          DB   085H, "SWAP", _CMA
00001673 1663                A  5015          DW   RRCOMMAHEAD
                             A  5016
         00001675            A  5017    SWAPCOMMA: EQU $
00001675 9CF0                A  5018          LD   R9,#0F0H
00001677 8B 0E               A  5019          JR   N1X
                             A  5020
                             A  5021
         00001679            A  5022    N1XA:EQU  $            ; CHANGE RR(4) AND IRR(5) TO 0,1
00001679 D6 04F2             A  5023          CALL PUSH8
0000167C D6 14B9             A  5024          CALL FIXEVR       ; Patch up the EVR so COLON will work right
0000167F 3018                A  5025          JP   @COLON
00001681 11                  A  5026          DB   SWAP
00001682 2E                  A  5027          DB   ONE
00001683 14                  A  5028          DB   AND
00001684 11                  A  5029          DB   SWAP
00001685 03                  A  5030          DB   JRS
00001686 09                  A  5031          DB   N2X-$
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PC       Machine Code        I  Line    File: newsys.v4e
         00001687            A  5032    N1X: EQU  $
00001687 D6 04F2             A  5033          CALL PUSH8
0000168A D6 14B9             A  5034          CALL FIXEVR       ; Patch up the EVR so COLON will work right
0000168D 3018                A  5035          JP   @COLON
0000168F 31                  A  5036    N2X:  DB   OVER         ; ADDR MODE MUST BE 0 OR 1
00001690 2D                  A  5037          DB   ZERO         ;  ie, R
00001691 2E                  A  5038          DB   ONE          ;  (or RR or IRR for INCW and DECW)
00001692 06                  A  5039          DB   LONGCALL
00001693 1371                A  5040          DW   NOTTWIXT
00001695 15                  A  5041          DB   OR
00001696 21                  A  5042          DB   CCOMMA
00001697 21                  A  5043          DB   CCOMMA
00001698 07                  A  5044          DB   SEMICOLON
                             A  5045
                             A  5046
                             A  5047    ; --------------------------------
                             A  5048                          ; LOAD/STORE CONSTANT
         00001699            A  5049    LDCCOMMAHEAD: EQU $
00001699 844C4443 AC         A  5050          DB   084H, "LDC", _CMA
0000169E 166D                A  5051          DW   SWAPCOMMAHEAD
                             A  5052
         000016A0            A  5053    LDCCOMMA: EQU $
000016A0 9CC2                A  5054          LD   R9,#0C2H
000016A2 8B 51               A  5055          JR   B01X
                             A  5056
         000016A4            A  5057    STCCOMMAHEAD: EQU $
000016A4 84535443 AC         A  5058          DB   084H, "STC", _CMA
000016A9 1699                A  5059          DW   LDCCOMMAHEAD
                             A  5060
         000016AB            A  5061    STCCOMMA: EQU $
000016AB 9CD2                A  5062          LD   R9,#0D2H
000016AD 8B 52               A  5063          JR   L01X
                             A  5064                          ; LOAD/STORE CONSTANT & AUTOINCREMENT
         000016AF            A  5065    LDCICOMMAHEAD: EQU $
000016AF 854C4443 49 AC      A  5066          DB   085H, "LDCI", _CMA
000016B5 16A4                A  5067          DW   STCCOMMAHEAD
                             A  5068
         000016B7            A  5069    LDCICOMMA: EQU $
000016B7 9CC3                A  5070          LD   R9,#0C3H
000016B9 8B 3A               A  5071          JR   B01X
                             A  5072
         000016BB            A  5073    STCICOMMAHEAD: EQU $
000016BB 85535443 49 AC      A  5074          DB   085H, "STCI", _CMA
000016C1 16AF                A  5075          DW   LDCICOMMAHEAD
                             A  5076
         000016C3            A  5077    STCICOMMA: EQU $
000016C3 9CD3                A  5078          LD   R9,#0D3H
000016C5 8B 3A               A  5079          JR   L01X
                             A  5080                          ; LOAD/STORE EXTERNAL
         000016C7            A  5081    LDECOMMAHEAD: EQU $
000016C7 844C4445 AC         A  5082          DB   084H, "LDE", _CMA
000016CC 16BB                A  5083          DW   STCICOMMAHEAD
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PC       Machine Code        I  Line    File: newsys.v4e
                             A  5084
         000016CE            A  5085    LDECOMMA: EQU $
000016CE 9C82                A  5086          LD   R9,#082H
000016D0 8B 23               A  5087          JR   B01X
                             A  5088
         000016D2            A  5089    STECOMMAHEAD: EQU $
000016D2 84535445 AC         A  5090          DB   084H, "STE", _CMA
000016D7 16C7                A  5091          DW   LDECOMMAHEAD
                             A  5092
         000016D9            A  5093    STECOMMA: EQU $
000016D9 9C92                A  5094          LD   R9,#092H
000016DB 8B 24               A  5095          JR   L01X
                             A  5096                          ; LOAD/STORE EXTERNAL & AUTOINCREMENT
         000016DD            A  5097    LDEICOMMAHEAD: EQU $
000016DD 854C4445 49 AC      A  5098          DB   085H, "LDEI", _CMA
000016E3 16D2                A  5099          DW   STECOMMAHEAD
                             A  5100
         000016E5            A  5101    LDEICOMMA: EQU $
000016E5 9C83                A  5102          LD   R9,#083H
000016E7 8B 0C               A  5103          JR   B01X
                             A  5104
         000016E9            A  5105    STEICOMMAHEAD: EQU $
000016E9 85535445 49 AC      A  5106          DB   085H, "STEI", _CMA
000016EF 16DD                A  5107          DW   LDEICOMMAHEAD
                             A  5108
         000016F1            A  5109    STEICOMMA: EQU $
000016F1 9C93                A  5110          LD   R9,#093H
000016F3 8B 0C               A  5111          JR   L01X
                             A  5112
                             A  5113
         000016F5            A  5114    B01X:EQU $
000016F5 D6 04F2             A  5115          CALL PUSH8
000016F8 D6 14B9             A  5116          CALL FIXEVR       ; Patch up the EVR so COLON will work right
000016FB 3018                A  5117          JP   @COLON
000016FD 0E                  A  5118          DB   CAT
000016FE 21                  A  5119          DB   CCOMMA
000016FF 03                  A  5120          DB   JRS
00001700 0C                  A  5121          DB   L01XA-$
                             A  5122
         00001701            A  5123    L01X:EQU $
00001701 D6 04F2             A  5124          CALL PUSH8
00001704 D6 14B9             A  5125          CALL FIXEVR       ; Patch up the EVR so COLON will work right
00001707 3018                A  5126          JP   @COLON
00001709 0E                  A  5127          DB   CAT
0000170A 21                  A  5128          DB   CCOMMA
0000170B 11                  A  5129          DB   SWAP
0000170C 06                  A  5130    L01XA:DB   LONGCALL
0000170D 1386                A  5131          DW   IN
0000170F 21                  A  5132          DB   CCOMMA
00001710 07                  A  5133          DB   SEMICOLON
                             A  5134
                             A  5135
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PC       Machine Code        I  Line    File: newsys.v4e
         00001711            A  5136    LDCOMMAHEAD: EQU $
00001711 A34C44 AC           A  5137          DB   0A3H, "LD", _CMA
00001715 16E9                A  5138          DW   STEICOMMAHEAD
         00001717            A  5139    LDCOMMA: EQU $
00001717 3018                A  5140          JP   @COLON
00001719 12                  A  5141          DB   DUP          ; ADDR MODE MUST BE BETWEEN 3 AND 7
0000171A 00                  A  5142          DB   BR
0000171B 03                  A  5143          DB   03H
0000171C 00                  A  5144          DB   BR
0000171D 07                  A  5145          DB   #07H
0000171E 06                  A  5146          DB   LONGCALL
0000171F 1371                A  5147          DW   NOTTWIXT
00001721 12                  A  5148          DB   DUP
00001722 00                  A  5149          DB   BR
00001723 E0                  A  5150          DB   0E0H
00001724 15                  A  5151          DB   OR
00001725 21                  A  5152          DB   CCOMMA
00001726 12                  A  5153          DB   DUP
00001727 00                  A  5154          DB   BR
00001728 06                  A  5155          DB   #6H
00001729 1C                  A  5156          DB   GTEQ
0000172A 05                  A  5157          DB   JRZS
0000172B 06                  A  5158          DB   LDCOMMA1-$
0000172C 13                  A  5159          DB   DROP
0000172D 11                  A  5160          DB   SWAP
0000172E 21                  A  5161          DB   CCOMMA
0000172F 21                  A  5162          DB   CCOMMA
00001730 07                  A  5163          DB   SEMICOLON
         00001731            A  5164    LDCOMMA1: EQU $
00001731 00                  A  5165          DB   BR
00001732 04                  A  5166          DB   4H
00001733 1C                  A  5167          DB   GTEQ
00001734 05                  A  5168          DB   JRZS
00001735 04                  A  5169          DB   LDCOMMA2-$
00001736 21                  A  5170          DB   CCOMMA
00001737 21                  A  5171          DB   CCOMMA
00001738 07                  A  5172          DB   SEMICOLON
         00001739            A  5173    LDCOMMA2: EQU $
00001739 06                  A  5174          DB   LONGCALL
0000173A 1386                A  5175          DW   IN
0000173C 21                  A  5176          DB   CCOMMA
         0000173D            A  5177    LDCOMMA3: EQU $
0000173D 07                  A  5178          DB   SEMICOLON
                             A  5179
         0000173E            A  5180    LDGRCOMMAHEAD: EQU $
0000173E A54C4447 52 AC      A  5181          DB   0A5H,"LDGR", _CMA
00001744 1711                A  5182          DW   LDCOMMAHEAD
                             A  5183
         00001746            A  5184    LDGRCOMMA: EQU $
00001746 3018                A  5185          JP   @COLON
00001748 11                  A  5186          DB   SWAP
00001749 00                  A  5187          DB   BR
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PC       Machine Code        I  Line    File: newsys.v4e
0000174A 08                  A  5188          DB   08H
0000174B 03                  A  5189          DB   JRS
0000174C 6D                  A  5190          DB   STX1-$
                             A  5191
         0000174D            A  5192    STGRCOMMAHEAD: EQU $
0000174D A5535447 52 AC      A  5193          DB   0A5H,"STGR", _CMA
00001753 173E                A  5194          DW   LDGRCOMMAHEAD
                             A  5195
         00001755            A  5196    STGRCOMMA: EQU $
00001755 3018                A  5197          JP   @COLON
00001757 00                  A  5198          DB   BR
00001758 09                  A  5199          DB   09h
00001759 03                  A  5200          DB   JRS
0000175A 5F                  A  5201          DB   STX1-$
                             A  5202
         0000175B            A  5203    LDGRIMCOMMAHEAD: EQU $
0000175B A74C4447 52494D AC  A  5204          DB   0A7H,"LDGRIM", _CMA
00001763 174D                A  5205          DW   STGRCOMMAHEAD
                             A  5206
         00001765            A  5207    LDGRIMCOMMA: EQU $      ; Load group register immediate
00001765 3018                A  5208          JP   @COLON
00001767 11                  A  5209          DB   SWAP
00001768 00                  A  5210          DB   BR
00001769 0C                  A  5211          DB   0CH
0000176A 03                  A  5212          DB   JRS
0000176B 4E                  A  5213          DB   STX1-$
                             A  5214
         0000176C            A  5215    SINCGRCOMMAHEAD: EQU $
0000176C A6494E43 4752 AC    A  5216          DB   0A6H,"INCGR", _CMA
00001773 175B                A  5217          DW   LDGRIMCOMMAHEAD
                             A  5218
         00001775            A  5219    SINCGRCOMMA: EQU $      ; Increment group register
00001775 3018                A  5220          JP   @COLON
00001777 00                  A  5221          DB   BR
00001778 0E                  A  5222          DB   0EH
00001779 06                  A  5223          DB   LONGCALL
0000177A 1386                A  5224          DW   IN
0000177C 21                  A  5225          DB   CCOMMA
0000177D 07                  A  5226          DB   SEMICOLON
                             A  5227
         0000177E            A  5228    CALLCOMMAHEAD: EQU $
0000177E A543414C 4C AC      A  5229          DB   0A5H,"CALL", _CMA
00001784 176C                A  5230          DW   SINCGRCOMMAHEAD
                             A  5231
         00001786            A  5232    CALLCOMMA: EQU $
00001786 3018                A  5233          JP   @COLON
00001788 00                  A  5234          DB   BR
00001789 D6                  A  5235          DB   0D6H
0000178A 21                  A  5236          DB   CCOMMA
0000178B 20                  A  5237          DB   COMMA
0000178C 07                  A  5238          DB   SEMICOLON
                             A  5239
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PC       Machine Code        I  Line    File: newsys.v4e
         0000178D            A  5240    CALLATCOMMAHEAD: EQU $
0000178D A643414C 4C40 AC    A  5241          DB   0A6H,"CALL@", _CMA
00001794 177E                A  5242          DW   CALLCOMMAHEAD
                             A  5243
         00001796            A  5244    CALLATCOMMA: EQU $
00001796 3018                A  5245          JP   @COLON
00001798 00                  A  5246          DB   BR
00001799 D4                  A  5247          DB   0D4H
0000179A 21                  A  5248          DB   CCOMMA
0000179B 21                  A  5249          DB   CCOMMA
0000179C 07                  A  5250          DB   SEMICOLON
                             A  5251
         0000179D            A  5252    LDXCOMMAHEAD: EQU $
0000179D A44C4458 AC         A  5253          DB   0A4H,"LDX", _CMA
000017A2 178D                A  5254          DW   CALLATCOMMAHEAD
                             A  5255
         000017A4            A  5256    LDXCOMMA: EQU $        ; Load Indexed
000017A4 3018                A  5257          JP   @COLON
000017A6 00                  A  5258          DB   BR
000017A7 C7                  A  5259          DB   0C7H
000017A8 21                  A  5260          DB   CCOMMA
000017A9 32                  A  5261          DB   ROT
000017AA 03                  A  5262          DB   JRS
000017AB 0E                  A  5263          DB   STX1-$
                             A  5264
         000017AC            A  5265    STXCOMMAHEAD: EQU $
000017AC A4535458 AC         A  5266          DB   0A4H,"STX", _CMA
000017B1 179D                A  5267          DW   LDXCOMMAHEAD
                             A  5268
         000017B3            A  5269    STXCOMMA: EQU $       ; Store Indexed
000017B3 3018                A  5270          JP   @COLON
000017B5 00                  A  5271          DB   BR
000017B6 D7                  A  5272          DB   0D7H
000017B7 21                  A  5273          DB   CCOMMA
000017B8 11                  A  5274          DB   SWAP
000017B9 06                  A  5275    STX1: DB   LONGCALL
000017BA 1386                A  5276          DW   IN
000017BC 21                  A  5277          DB   CCOMMA
000017BD 21                  A  5278          DB   CCOMMA
000017BE 07                  A  5279          DB   SEMICOLON
                             A  5280
         000017BF            A  5281    CH0: EQU  $
000017BF 3018                A  5282          JP   @COLON
000017C1 21                  A  5283          DB   CCOMMA
000017C2 1F                  A  5284          DB   HERE
000017C3 2D                  A  5285          DB   ZERO
000017C4 07                  A  5286          DB   SEMICOLON
                             A  5287
         000017C5            A  5288    SIFCOMMAHEAD: EQU $
000017C5 A36966 AC           A  5289          DB   0A3H, "if", _CMA
000017C9 17AC                A  5290          DW   STXCOMMAHEAD
                             A  5291
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PC       Machine Code        I  Line    File: newsys.v4e
         000017CB            A  5292    SIFCOMMA: EQU $
000017CB 3018                A  5293          JP   @COLON
000017CD 00                  A  5294          DB   BR
000017CE 0B                  A  5295          DB   0BH
000017CF 06                  A  5296          DB   LONGCALL
000017D0 1386                A  5297          DW   IN
000017D2 06                  A  5298          DB   LONGCALL
000017D3 17BF                A  5299          DW   CH0
000017D5 21                  A  5300          DB   CCOMMA
000017D6 07                  A  5301          DB   SEMICOLON
                             A  5302
         000017D7            A  5303    LIFCOMMAHEAD: EQU $
000017D7 A34946 AC           A  5304          DB   0A3H, "IF", _CMA
000017DB 17C5                A  5305          DW   SIFCOMMAHEAD
                             A  5306
         000017DD            A  5307    LIFCOMMA: EQU $
000017DD 3018                A  5308          JP   @COLON
000017DF 00                  A  5309          DB   BR
000017E0 0D                  A  5310          DB   0DH
000017E1 06                  A  5311          DB   LONGCALL
000017E2 1386                A  5312          DW   IN
000017E4 06                  A  5313          DB   LONGCALL
000017E5 17BF                A  5314          DW   CH0
000017E7 20                  A  5315          DB   COMMA
000017E8 07                  A  5316          DB   SEMICOLON
                             A  5317
         000017E9            A  5318    STHENCOMMAHEAD: EQU $
000017E9 A5746865 6E AC      A  5319          DB   0A5H,"then", _CMA
000017EF 17D7                A  5320          DW   LIFCOMMAHEAD
                             A  5321
         000017F1            A  5322    STHENCOMMA: EQU $
000017F1 3018                A  5323          JP   @COLON
000017F3 1F                  A  5324          DB   HERE
000017F4 31                  A  5325          DB   OVER
000017F5 24                  A  5326          DB   ONEPLUS
000017F6 2F                  A  5327          DB   MINUS
000017F7 11                  A  5328          DB   SWAP
000017F8 0C                  A  5329          DB   CSTORE
000017F9 07                  A  5330          DB   SEMICOLON
                             A  5331
         000017FA            A  5332    LTHENCOMMAHEAD: EQU $
000017FA A5544845 4E AC      A  5333          DB   0A5H,"THEN", _CMA
00001800 17E9                A  5334          DW   STHENCOMMAHEAD
                             A  5335
         00001802            A  5336    LTHENCOMMA: EQU $
00001802 3018                A  5337          JP   @COLON
00001804 1F                  A  5338          DB   HERE
00001805 11                  A  5339          DB   SWAP
00001806 0B                  A  5340          DB   STORE
00001807 07                  A  5341          DB   SEMICOLON
                             A  5342
         00001808            A  5343    SELSECOMMAHEAD: EQU $
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PC       Machine Code        I  Line    File: newsys.v4e
00001808 A5656C73 65 AC      A  5344          DB   0A5H,"else", _CMA
0000180E 17FA                A  5345          DW   LTHENCOMMAHEAD
                             A  5346
         00001810            A  5347    SELSECOMMA: EQU $
00001810 3018                A  5348          JP   @COLON
00001812 00                  A  5349          DB   BR
00001813 8B                  A  5350          DB   8BH
00001814 06                  A  5351          DB   LONGCALL
00001815 17BF                A  5352          DW   CH0
00001817 21                  A  5353          DB   CCOMMA
00001818 11                  A  5354          DB   SWAP
00001819 06                  A  5355          DB   LONGCALL
0000181A 17F1                A  5356          DW   STHENCOMMA
0000181C 07                  A  5357          DB   SEMICOLON
                             A  5358
         0000181D            A  5359    LELSECOMMAHEAD: EQU $
0000181D A5454C53 45 AC      A  5360          DB   0A5H,"ELSE", _CMA
00001823 1808                A  5361          DW   SELSECOMMAHEAD
                             A  5362
         00001825            A  5363    LELSECOMMA: EQU $
00001825 3018                A  5364          JP   @COLON
00001827 00                  A  5365          DB   BR
00001828 8D                  A  5366          DB   8DH
00001829 06                  A  5367          DB   LONGCALL
0000182A 17BF                A  5368          DW   CH0
0000182C 20                  A  5369          DB   COMMA
0000182D 11                  A  5370          DB   SWAP
0000182E 06                  A  5371          DB   LONGCALL
0000182F 1802                A  5372          DW   LTHENCOMMA
00001831 07                  A  5373          DB   SEMICOLON
                             A  5374
                             A  5375                       ;  : BEGIN, HERE ;
         00001832            A  5376    BEGINCOMMAHEAD: EQU $
00001832 A6424547 494E AC    A  5377          DB   0A6H,"BEGIN", _CMA
00001839 181D                A  5378          DW   LELSECOMMAHEAD
         0000183B            A  5379    BEGINCOMMA: EQU $
0000183B 3018                A  5380          JP   @COLON
0000183D 1F                  A  5381          DB   HERE
0000183E 07                  A  5382          DB   SEMICOLON
                             A  5383
                             A  5384                       ;  : UNTIL, 0D IN C,
         0000183F            A  5385    LUNTILCOMMAHEAD: EQU $
0000183F A6554E54 494C AC    A  5386          DB   0A6H,"UNTIL", _CMA
00001846 1832                A  5387          DW   BEGINCOMMAHEAD
         00001848            A  5388    LUNTILCOMMA: EQU $
00001848 3018                A  5389          JP   @COLON
0000184A 00                  A  5390          DB   BR
0000184B 0D                  A  5391          DB   0DH
0000184C 06                  A  5392          DB   LONGCALL
0000184D 1386                A  5393          DW   IN
0000184F 21                  A  5394          DB   CCOMMA
00001850 20                  A  5395          DB   COMMA
```

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PC       Machine Code        I  Line    File: newsys.v4e
                             A  5396
00001851 07                  A  5397          DB   SEMICOLON
                             A  5398                       ;  : DJNZ, 0A IN CH1
         00001852            A  5399    DJNZCOMMAHEAD: EQU $
00001852 A5444A4E 5A AC      A  5400          DB   0A5H,"DJNZ", _CMA
00001858 183F                A  5401          DW   LUNTILCOMMAHEAD
         0000185A            A  5402    DJNZCOMMA: EQU $
0000185A 3018                A  5403          JP   @COLON
0000185C 00                  A  5404          DB   BR
0000185D 0A                  A  5405          DB   0AH
0000185E 03                  A  5406          DB   JRS
0000185F 0E                  A  5407          DB   SU1-$
                             A  5408
                             A  5409                       ;  : until,  0B IN C, HERE 1+ - C,
         00001860            A  5410    SUNTILCOMMAHEAD: EQU $
00001860 A6756E74 696C AC    A  5411          DB   0A6H,"until", _CMA
00001867 1852                A  5412          DW   DJNZCOMMAHEAD
         00001869            A  5413    SUNTILCOMMA: EQU $
00001869 3018                A  5414          JP   @COLON
0000186B 00                  A  5415          DB   BR
0000186C 0B                  A  5416          DB   0BH
         0000186D            A  5417    SU1: EQU $
0000186D 06                  A  5418          DB   LONGCALL
0000186E 1386                A  5419          DW   IN
00001870 21                  A  5420          DB   CCOMMA
00001871 1F                  A  5421          DB   HERE
00001872 24                  A  5422          DB   ONEPLUS
00001873 2F                  A  5423          DB   MINUS
00001874 21                  A  5424          DB   CCOMMA
00001875 07                  A  5425          DB   SEMICOLON
                             A  5426
         00000003            A  5427       p3:EQU  3
                             A  5428    ;
                             A  5429    ;  EEPROM Utility calling sequence:
                             A  5430    ;   RAM-address  EEPROM-address Byte-count StopFlag-I/ODirection
                             A  5431    ;   The StopFlag (high byte of TOS argument) is 2 to continue after
                             A  5432    ;    sending a dummy write (the read-random address procedure)
                             A  5433    ;   I/ODirection is 0 for writing, 1 for reading
                             A  5434    ;   The EEPROM base address in assumed in the System Area: EEPBA
                             A  5435
         00001876            A  5436    EIO:  EQU  $
00001876 50EA                A  5437          POP  R10       ; Stop flag to R10
00001878 A9FC                A  5438          LD   FLAGS,R10 ;   then to UF2
0000187A 50EA                A  5439          POP  R10       ; Pop Input/output byte to R10
0000187C 4410EA              A  5440          OR   R10,EEPBA ;  and OR in the base address bits
0000187F 50EE                A  5441          POP  R14       ; Pop I/O count to R14/R15
00001881 50EF                A  5442          POP  R15
00001883 50EC                A  5443          POP  R12       ; Pop EEP addr to R12/R13
00001885 50ED                A  5444          POP  R13
00001887 50E6                A  5445          POP  R6        ; Pop Ram addr to R6/R7
00001889 50E7                A  5446          POP  R7
0000188B 5603EF              A  5447          AND  p3,#EFH   ; Set SDA high
```

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PC       Machine Code        I  Line    File: newsys.v4e
0000188E 460320              A  5448          OR   p3,#20H   ; Set CLK high
00001891 460310              A  5449          OR   p3,#10H   ; Set SDA low
00001894 5603CF              A  5450          AND  p3,#CFH   ; Set CLK low and SDA high
                             A  5451
00001897 BC01                A  5452          LD   R11,#1    ; Initialize function control
00001899 46FC01              A  5453     EIO1:OR   FLAGS,#1  ; Assume we are putting a byte out
0000189C 98EA                A  5454          LD   R9,R10    ; Set page byte in output reg
                             A  5455
0000189E 76EB02              A  5456          TM   R11,#2H   ; Test for function cntrl = 2 or 3
000018A1 6B 10               A  5457          JR   Z,EIO3
000018A3 98ED                A  5458          LD   R9,R13    ; Assume we are putting out the low byte
000018A5 76EB01              A  5459          TM   R11,#1H   ; If it's a two,
000018A8 EB 02               A  5460          JR   NZ,EIO2   ;   put out the
000018AA 98EC                A  5461          LD   R9,R12    ;    high byte
000018AC 76EA01              A  5462     EIO2:TM   R10,#1H   ; Are we reading?
000018AF 6B 02               A  5463          JR   Z,EIO3
000018B1 BC04                A  5464          LD   R11,#4H   ; If reading skip the EEP address output
                             A  5465
000018B3 76EB04              A  5466     EIO3:TM   R11,#4H   ; Process the type 4 state
000018B6 6B 12               A  5467          JR   Z,EIO5
000018B8 76EA01              A  5468          TM   R10,#1    ; Reading or writing?
000018BB EB 08               A  5469          JR   NZ,EIO4
000018BD C296                A  5470          LDC  R9,@RR6   ; Writing - get the byte to put out
000018BF A0E6                A  5471          INCW RR6       ; Increment the RAM address
000018C1 80EE                A  5472          DECW RR14      ; Decrement the count
000018C3 8B 05               A  5473          JR   EIO5
000018C5 9C00                A  5474     EIO4:LD   R9,#0     ; Reading - Initialize the input reg to 0
000018C7 56FCFE              A  5475          AND  FLAGS,#FEH;  and set UF1 to zero (indicates reading)
                             A  5476
000018CA 8C08                A  5477     EIO5:LD   R8,#8H
000018CC 76FC01              A  5478          TM   FLAGS,#1  ; Writing or reading?
000018CF 6B 30               A  5479          JR   Z,EIO13
000018D1 10E9                A  5480     EIO6:RLC  R9        ; Writing - rotate the bit to put out into carry
000018D3 7B 03               A  5481          JR   C,EIO8
000018D5 460310              A  5482          OR   p3,#10H   ;  if it's a zero - set SDA low
000018D8 460320              A  5483     EIO8:OR   p3,#20H   ; Clock this result - set CLK high
000018DB 5603CF              A  5484          AND  p3,#CFH   ; Set CLK low and SDA high
000018DE 8A F1               A  5485          DJNZ R8,EIO6   ; Do 8 bits
                             A  5486
000018E0 460320              A  5487     EIO9:OR   p3,#20H   ; Set clock high
000018E3 DF                  A  5488          SCF            ; Assume SDA is high
000018E4 760308              A  5489          TM   p3,#8     ; If it's zero,
000018E7 EB 01               A  5490          JR   NZ,EIO10
000018E9 CF                  A  5491          RCF            ;   reset the carry
000018EA 5603DF              A  5492    EIO10:AND  p3,#DFH   ; Set CLK low
000018ED 98FC                A  5493          LD   R9,FLAGS  ; Save cary in R9
000018EF FB 04               A  5494          JR   NC,EIO11  ; Carry means NACK received
000018F1 ECFF                A  5495          LD   R14,#FFH  ;  so set count to -1
000018F3 FCFF                A  5496          LD   R15,#FFH  ;   so we can just exit
                             A  5497
000018F5 A0EE                A  5498    EIO11:INCW RR14      ; See if count is -1
000018F7 EB 04               A  5499          JR   NZ,EIO12  ;  is so, set the state to 4
```

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PC       Machine Code        I  Line    File: newsys.v4e
000018F9 BC04                A  5500          LD   R11,#4
000018FB 8B 2D               A  5501          JR   EIO17      ;   and go to loop end
000018FD 80EE                A  5502    EIO12:DECW RR14      ; Otherwise, restore the count
000018FF 8B 29               A  5503          JR   EIO17
                             A  5504                          ; -- Reading section --
00001901 460320              A  5505    EIO13:OR   p3,#20H   ; Set CLK high
00001904 DF                  A  5506          SCF
00001905 760308              A  5507          TM   p3,#8H     ; Test SDA (p3.4)
00001908 EB 01               A  5508          JR   NZ,EIO14   ; If zero, reset the carry
0000190A CF                  A  5509          RCF
0000190B 5603DF              A  5510    EIO14:AND  p3,#DFH   ; Set CLK low
0000190E 10E9                A  5511          RLC  R9         ; Put the next bit in carry
00001910 8A EF               A  5512          DJNZ R8,EIO13
                             A  5513
00001912 D296                A  5514          LDC   @RR6,R9   ; Store the byte in RAM
00001914 A0E6                A  5515          INCW RR6
00001916 80EE                A  5516          DECW RR14
00001918 6B 05               A  5517          JR   Z,EIO15    ; Assert NACK or ACK?
0000191A 460310              A  5518          OR   p3,#10H    ; Assert NACK
0000191D 8B 03               A  5519          JR   EIO16
0000191F 5603EF              A  5520    EIO15:AND  p3,#EFH   ; Assert ACK
00001922 460320              A  5521    EIO16:OR   p3,#20H   ; Clock this state
00001925 5603CF              A  5522          AND  p3,#CFH    ; Set CLK low and SDA high
00001928 9C00                A  5523          LD   R9,#0      ; Force true return
                             A  5524
0000192A BE                  A  5525    EIO17:INC  R11        ; Advance the control
0000192B 76EB04              A  5526          TM   R11,#4     ; Test for state => 4
0000192E 6B 0A               A  5527          JR   Z,EIO18
00001930 BC04                A  5528          LD   R11,#4
00001932 CF                  A  5529          RCF
00001933 A0EE                A  5530          INCW RR14       ; Test if count is zero
00001935 80EE                A  5531          DECW RR14
00001937 EB 01               A  5532          JR   NZ,EIO18
00001939 DF                  A  5533          SCF             ; If so, set carry
0000193A FD 1899             A  5534    EIO18:JP   NC,EIO1
                             A  5535
0000193D 76FC02              A  5536          TM   FLAGS,#2   ; Put out a stop sequence?
00001940 EB 06               A  5537          JR   NZ,EIO19
00001942 460310              A  5538          OR   p3,#10H    ; Set SDA low
00001945 460320              A  5539          OR   p3,#20H    ; Set CLK high
                             A  5540
00001948 5603EF              A  5541    EIO19:AND  p3,#EFH   ; Set SDA high
0000194B 460320              A  5542          OR   p3,#20H    ; Set CLK high
0000194E 90E9                A  5543          RL   R9         ; Carry flag to low bit
00001950 56E901              A  5544          AND  R9, #1     ; R9 is 1 if false
00001953 B0E8                A  5545          CLR  R8
00001955 80E8                A  5546          DECW RR8
00001957 70E9                A  5547          PUSH R9
00001959 70E8                A  5548          PUSH R8
0000195B 3016                A  5549          JP   @NV
                             A  5550
         0000195D            A  5551    DUP3: EQU $
```

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PC       Machine Code        I  Line    File: newsys.v4e
0000195D E8FE                A  5552          LD   R14,FEH   ; Load R14/R15 wth current stack addr
0000195F F8FF                A  5553          LD   R15,FFH
00001961 06EF06              A  5554          ADD  R15,#6    ; Add 6 to stack addr
00001964 16EE00              A  5555          ADC  R14,#0
00001967 AC06                A  5556          LD   R10,#6
00001969 80EE                A  5557     DU31:DECW RR14
0000196B C2BE                A  5558          LDC  R11,@RR14
0000196D 70EB                A  5559          PUSH R11
0000196F AA F8               A  5560          DJNZ R10,DU31
00001971 3016                A  5561          JP   @NV
                             A  5562
         00001973            A  5563    DROP3:EQU $
00001973 BC06                A  5564          LD   R11,#6
00001975 50EA                A  5565     DR31:POP  R10
00001977 BA FC               A  5566          DJNZ R11,DR31
00001979 3016                A  5567          JP   @NV
                             A  5568
                             A  5569    ;     Transfer N Bytes From RAM
                             A  5570    ; : TNBFR -1 HERE ! FF 0 DO 0 0 -1 A0 EIO IF 0 HERE ! BEGIN OVER
                             A  5571    ; + OVER FF80 AND OVER FF80 AND = 0= DUP >R OVER >R IF DROP DUP
                             A  5572    ; 7F OR 1+ THEN DUP >R OVER - DUP 3 PICK + >R 10 0 DO 3DUP A0
                             A  5573    ; EIO IF LEAVE THEN LOOP 3DROP R> R> R> OVER - DUP R> AND 0=
                             A  5574    ; UNTIL 3DROP LEAVE THEN LOOP -1 HERE @ IF DROP 3DROP 0 THEN ;
                             A  5575
                             A  5576    ; WRITE N BYTES IN BLOCK(S) OF UP TO 128 BYTES
                             A  5577    ;  CALLING SEQUENCE:
                             A  5578    ;   RAMAddr EEPAddr #Bytes TNBFR
                             A  5579    ;    Result is true if bytes are written
                             A  5580
         0000197B            A  5581    TNBFRHEAD:EQU $
0000197B 85544E42 46 D2      A  5582          DB   085H, "TNBF",_R
00001981 1860                A  5583          DW   SUNTILCOMMAHEAD
                             A  5584
00001983 3018                A  5585    TNBFR:JP   @COLON
00001985 2E                  A  5586          DB   ONE
00001986 17                  A  5587          DB   NEGATE
00001987 1F                  A  5588          DB   HERE
00001988 0B                  A  5589          DB   STORE
00001989 00                  A  5590          DB   BR
0000198A FE                  A  5591          DB   FEh
0000198B 2D                  A  5592          DB   ZERO
0000198C 5C                  A  5593          DB   DOAUX
         0000198D            A  5594     TFR1:EQU $
0000198D 06                  A  5595          DB   LONGCALL
0000198E 1A60                A  5596          DW   POLL
00001990 05                  A  5597          DB   JRZS
00001991 52                  A  5598          DB   TFR7-$
00001992 2D                  A  5599          DB   ZERO
00001993 1F                  A  5600          DB   HERE
00001994 0B                  A  5601          DB   STORE
                             A  5602
         00001995            A  5603     TFR2:EQU $
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PC       Machine Code        I  Line    File: newsys.v4e
00001995 31                  A  5604          DB   OVER
00001996 16                  A  5605          DB   PLUS
00001997 31                  A  5606          DB   OVER
00001998 01                  A  5607          DB   NR
00001999 FF80                A  5608          DW   FF80H
0000199B 14                  A  5609          DB   AND
0000199C 31                  A  5610          DB   OVER
0000199D 01                  A  5611          DB   NR
0000199E FF80                A  5612          DW   FF80H
000019A0 14                  A  5613          DB   AND
000019A1 30                  A  5614          DB   EQUALS
000019A2 1B                  A  5615          DB   ZEQ
000019A3 12                  A  5616          DB   DUP
000019A4 0F                  A  5617          DB   ONTOR
000019A5 31                  A  5618          DB   OVER
000019A6 0F                  A  5619          DB   ONTOR
000019A7 05                  A  5620          DB   JRZS
000019A8 07                  A  5621          DB   TFR3-$
000019A9 13                  A  5622          DB   DROP
000019AA 12                  A  5623          DB   DUP
000019AB 00                  A  5624          DB   BR
000019AC 7F                  A  5625          DB   7FH
000019AD 15                  A  5626          DB   OR
000019AE 24                  A  5627          DB   ONEPLUS
                             A  5628
         000019AF            A  5629     TFR3:EQU $
000019AF 12                  A  5630          DB   DUP
000019B0 0F                  A  5631          DB   ONTOR
000019B1 31                  A  5632          DB   OVER
000019B2 2F                  A  5633          DB   MINUS
000019B3 12                  A  5634          DB   DUP
000019B4 00                  A  5635          DB   BR
000019B5 03                  A  5636          DB   3H
000019B6 06                  A  5637          DB   LONGCALL
000019B7 0E7C                A  5638          DW   PICK
000019B9 16                  A  5639          DB   PLUS
000019BA 0F                  A  5640          DB   ONTOR
000019BB 00                  A  5641          DB   BR
000019BC 10                  A  5642          DB   10h
000019BD 2D                  A  5643          DB   ZERO
000019BE 5C                  A  5644          DB   DOAUX
                             A  5645
         000019BF            A  5646     TFR4:EQU $
000019BF 06                  A  5647          DB   LONGCALL
000019C0 195D                A  5648          DW   DUP3
000019C2 2D                  A  5649          DB   ZERO
000019C3 06                  A  5650          DB   LONGCALL
000019C4 1876                A  5651          DW   EIO
000019C6 05                  A  5652          DB   JRZS
000019C7 04                  A  5653          DB   TFR5-$
000019C8 62                  A  5654          DB   UNLOOP
000019C9 0005                A  5655          DW   TFR6-$
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PC       Machine Code        I  Line    File: newsys.v4e
         000019CB            A  5656     TFR5:EQU $
000019CB 60                  A  5657          DB   LOOPAUX
000019CC FFF3                A  5658          DW   TFR4-$
         000019CE            A  5659     TFR6:EQU $
000019CE 06                  A  5660          DB   LONGCALL
000019CF 1973                A  5661          DW   DROP3
000019D1 10                  A  5662          DB   RONTO
000019D2 10                  A  5663          DB   RONTO
000019D3 10                  A  5664          DB   RONTO
000019D4 31                  A  5665          DB   OVER
000019D5 2F                  A  5666          DB   MINUS
000019D6 12                  A  5667          DB   DUP
000019D7 10                  A  5668          DB   RONTO
000019D8 14                  A  5669          DB   AND
000019D9 1B                  A  5670          DB   ZEQ
000019DA 04                  A  5671          DB   JRZ
000019DB FFBA                A  5672          DW   TFR2-$
000019DD 06                  A  5673          DB   LONGCALL
000019DE 1973                A  5674          DW   DROP3
000019E0 62                  A  5675          DB   UNLOOP
000019E1 0005                A  5676          DW   TFR8-$
         000019E3            A  5677     TFR7:EQU $
000019E3 60                  A  5678          DB   LOOPAUX
000019E4 FFA9                A  5679          DW   TFR1-$
                             A  5680
         000019E6            A  5681     TFR8:EQU $
000019E6 2E                  A  5682          DB   ONE
000019E7 17                  A  5683          DB   NEGATE
000019E8 1F                  A  5684          DB   HERE
000019E9 0D                  A  5685          DB   AT
000019EA 05                  A  5686          DB   JRZS
000019EB 06                  A  5687          DB   TFR9-$
000019EC 13                  A  5688          DB   DROP
000019ED 06                  A  5689          DB   LONGCALL
000019EE 1973                A  5690          DW   DROP3
000019F0 2D                  A  5691          DB   ZERO
         000019F1            A  5692     TFR9:EQU $
000019F1 07                  A  5693          DB   SEMICOLON
                             A  5694
                             A  5695     ;    Transfer N Bytes To RAM
                             A  5696     ; : TNBTR 0 HERE ! 10 0 DO 3DUP DROP 0 02A0 EIO IF 3DUP A1
                             A  5697     ;  EIO IF -1 HERE ! LEAVE THEN THEN LOOP 3DROP HERE @ ;
                             A  5698     ;
                             A  5699     ;   CALLING SEQUENCE:
                             A  5700     ;    RAMAddr EEPAddr #Bytes TNBTR
                             A  5701     ;     Result is true if bytes were read
                             A  5702
         000019F2            A  5703     TNBTRHEAD:EQU $
000019F2 85544E42 54 D2      A  5704          DB   085H, "TNBT",_R
000019F8 197B                A  5705          DW   TNBFRHEAD
                             A  5706
000019FA 3018                A  5707     TNBTR:JP   @COLON
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PC       Machine Code        I  Line    File: newsys.v4e
000019FC 2D                  A  5708          DB   ZERO
000019FD 1F                  A  5709          DB   HERE
000019FE 0B                  A  5710          DB   STORE
000019FF 00                  A  5711          DB   BR
00001A00 10                  A  5712          DB   10h
00001A01 2D                  A  5713          DB   ZERO
00001A02 5C                  A  5714          DB   DOAUX
         00001A03            A  5715     TTR1:EQU $
00001A03 06                  A  5716          DB   LONGCALL
00001A04 195D                A  5717          DW   DUP3
00001A06 13                  A  5718          DB   DROP
00001A07 2D                  A  5719          DB   ZERO
00001A08 01                  A  5720          DB   NR
00001A09 0200                A  5721          DW   0200H
00001A0B 06                  A  5722          DB   LONGCALL
00001A0C 1876                A  5723          DW   EIO
00001A0E 05                  A  5724          DB   JRZS
00001A0F 11                  A  5725          DB   TTR2-$
00001A10 06                  A  5726          DB   LONGCALL
00001A11 195D                A  5727          DW   DUP3
                             A  5728    ;      DB   BR
                             A  5729    ;      DB   A1H
00001A13 2E                  A  5730          DB   ONE
00001A14 06                  A  5731          DB   LONGCALL
00001A15 1876                A  5732          DW   EIO
00001A17 05                  A  5733          DB   JRZS
00001A18 08                  A  5734          DB   TTR2-$
00001A19 2E                  A  5735          DB   ONE
00001A1A 17                  A  5736          DB   NEGATE
00001A1B 1F                  A  5737          DB   HERE
00001A1C 0B                  A  5738          DB   STORE
00001A1D 62                  A  5739          DB   UNLOOP
00001A1E 0005                A  5740          DW   TTR3-$
         00001A20            A  5741     TTR2:EQU $
00001A20 60                  A  5742          DB   LOOPAUX
00001A21 FFE2                A  5743          DW   TTR1-$
                             A  5744
         00001A23            A  5745     TTR3:EQU $
00001A23 06                  A  5746          DB   LONGCALL
00001A24 1973                A  5747          DW   DROP3
00001A26 1F                  A  5748          DB   HERE
00001A27 0D                  A  5749          DB   AT
00001A28 07                  A  5750          DB   SEMICOLON
                             A  5751
                             A  5752    ;    Place N Words On Stack
                             A  5753    ; : PNWOS DUP >R SWAP >R 0 DO I LOOP FE @ R> R> DUP >R
                             A  5754    ;  DUP + TNBTR DUP 0= IF DROP R> 0 DO DROP LOOP ELSE R> DROP THEN ;
                             A  5755
                             A  5756    ;   CALLING SEQUENCE:
                             A  5757    ;    EEPAddr #Bytes PNWOS
                             A  5758    ;     Result is N bytes on stack with true at TOS or false
                             A  5759    ;     Word underneath top is lowest word read
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PC       Machine Code        I  Line    File: newsys.v4e
                             A  5760
         00001A29            A  5761    PNWOSHEAD:EQU $
00001A29 85504E57 4F D3      A  5762          DB   085H, "PNWO",_S
00001A2F 19F2                A  5763          DW   TNBTRHEAD
                             A  5764
00001A31 3018                A  5765    PNWOS:JP   @COLON
00001A33 12                  A  5766          DB   DUP
00001A34 0F                  A  5767          DB   ONTOR
00001A35 11                  A  5768          DB   SWAP
00001A36 0F                  A  5769          DB   ONTOR
00001A37 2D                  A  5770          DB   ZERO
00001A38 5C                  A  5771          DB   DOAUX
         00001A39            A  5772    PNWOS1: EQU $
00001A39 1D                  A  5773          DB   I
00001A3A 60                  A  5774          DB   LOOPAUX
00001A3B FFFE                A  5775          DW   PNWOS1-$
00001A3D 00                  A  5776          DB   BR
00001A3E FE                  A  5777          DB   FEh
00001A3F 0D                  A  5778          DB   AT
00001A40 10                  A  5779          DB   RONTO
00001A41 10                  A  5780          DB   RONTO
00001A42 12                  A  5781          DB   DUP
00001A43 0F                  A  5782          DB   ONTOR
00001A44 12                  A  5783          DB   DUP
00001A45 16                  A  5784          DB   PLUS
00001A46 06                  A  5785          DB   LONGCALL
00001A47 19FA                A  5786          DW   TNBTR
00001A49 12                  A  5787          DB   DUP
00001A4A 1B                  A  5788          DB   ZEQ
00001A4B 05                  A  5789          DB   JRZS
00001A4C 0A                  A  5790          DB   PNWOS3-$
00001A4D 13                  A  5791          DB   DROP
00001A4E 10                  A  5792          DB   RONTO
00001A4F 2D                  A  5793          DB   ZERO
00001A50 5C                  A  5794          DB   DOAUX
         00001A51            A  5795    PNWOS2: EQU $
00001A51 13                  A  5796          DB   DROP
00001A52 60                  A  5797          DB   LOOPAUX
00001A53 FFE6                A  5798          DW   PNWOS1-$
00001A55 07                  A  5799          DB   SEMICOLON
                             A  5800
         00001A56            A  5801    PNWOS3: EQU $
00001A56 10                  A  5802          DB   RONTO
00001A57 13                  A  5803          DB   DROP
                             A  5804
         00001A58            A  5805    PNWOS4: EQU $
00001A58 07                  A  5806          DB   SEMICOLON
                             A  5807
         00001A59            A  5808    POLLHEAD:EQU $
00001A59 84504F4C CC         A  5809          DB   084H, "POL",_L
00001A5E 1A29                A  5810          DW   PNWOSHEAD
                             A  5811
```

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PC       Machine Code        I  Line    File: newsys.v4e
00001A60 3018                A  5812    POLL: JP   @COLON
00001A62 2D                  A  5813          DB   ZERO      ; Calling sequence 0 0 -1 EIO
00001A63 2D                  A  5814          DB   ZERO
00001A64 2E                  A  5815          DB   ONE
00001A65 17                  A  5816          DB   NEGATE
00001A66 2D                  A  5817          DB   ZERO
00001A67 06                  A  5818          DB   LONGCALL
00001A68 1876                A  5819          DW   EIO
00001A6A 07                  A  5820          DB   SEMICOLON
                             A  5821
                             A  5822    ; Parallel interface control routine
                             A  5823    ;   Argument:
                             A  5824    ;    Low byte: N/C RS LCD(R\W) LCD(E) B3 B2 B1 B0
                             A  5825    ;    High byte: 00 poll only, FE read PIO, FF write PIO
                             A  5826    ;   Result word on stack:
                             A  5827    ;    High byte: FF ACK received from PIO, 00 no ACK received
                             A  5828    ;    Low byte: If reading, result byte; if writing, same as high byte
                             A  5829    ;    If polling, T/F result
                             A  5830
         00001A6B            A  5831    PIOHEAD:EQU $
00001A6B 835049 CF           A  5832          DB   083H, "PI",_O
00001A6F 1A59                A  5833          DW   POLLHEAD
         00001A71            A  5834    PIO:  EQU $
00001A71 50ED                A  5835          POP  R13       ; Pop control argument to R13
00001A73 50EA                A  5836          POP  R10
00001A75 98ED                A  5837          LD   R9,R13    ; Control argument to R9
00001A77 56E901              A  5838          AND  R9,#1     ; Get the low bit
00001A7A BC03                A  5839          LD   R11,#3
00001A7C 22B9                A  5840          SUB  R11,R9    ; 3 for write, 2 for read
00001A7E 4410E9              A  5841          OR   R9,EEPBA ;  OR in the base address bits
                             A  5842
00001A81 5603EF              A  5843          AND  p3,#EFh   ;  Set SDA high
00001A84 460320              A  5844          OR   p3,#20h   ;  Set CLK high
00001A87 460310              A  5845          OR   p3,#10h   ;  Set SDA low
00001A8A 5603CF              A  5846          AND  p3,#CFh   ;  Set CLK low and SDA high
                             A  5847
00001A8D CC02                A  5848          LD   R12,#2    ; Initialize loop control
00001A8F 8C08                A  5849     PIO1:LD   R8,#8H    ; Initialize bit count
00001A91 76EB02              A  5850     PIO2:TM   R11,#2    ; Are we outputing a control byte?
00001A94 EB 2A               A  5851          JR   NZ,PIO6
00001A96 78E9                A  5852          LD   R7,R9     ; Save the ACK/NACK result in R7
00001A98 4299                A  5853          OR   R9,R9
00001A9A 6B 20               A  5854          JR   Z,PIO5    ; If just a poll, skip the reading
00001A9C 9C00                A  5855          LD   R9,#0     ; Clear out result register
                             A  5856                         ; -- Reading section --
00001A9E 460320              A  5857     PIO3:OR   p3,#20H   ; Set CLK high
00001AA1 DF                  A  5858          SCF
00001AA2 760308              A  5859          TM   p3,#8H    ; Test SDA (p3.4)
00001AA5 EB 01               A  5860          JR   NZ,PIO4   ; If zero, reset the carry
00001AA7 CF                  A  5861          RCF
00001AA8 5603DF              A  5862     PIO4:AND  p3,#DFH   ; Set CLK low
00001AAB 10E9                A  5863          RLC  R9        ; Put the next bit in carry
```

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PC       Machine Code        I  Line    File: newsys.v4e
00001AAD 8A EF               A  5864          DJNZ R8,PIO3
00001AAF 5603EF              A  5865          AND  p3,#EFh   ; Generate a NACK- Set SDA high
00001AB2 460320              A  5866          OR   p3,#20h    ; Set CLK high
00001AB5 5603CF              A  5867          AND  p3,#CFh   ; Set CLK low and SDA high
00001AB8 50E7                A  5868          POP  R7        ; Get the ACK/NACK off the stack
00001ABA 70E9                A  5869          PUSH R9        ; Push the result to the stack
00001ABC 70E7                A  5870     PIO5:PUSH R7        ; Push the ACK/NACK as the high byte
00001ABE 8B 2F               A  5871          JR   PIO15
                             A  5872
                             A  5873                         ; -- Writing section --
00001AC0 76EC02              A  5874     PIO6:TM   R12,#2    ; If 2, put out the PIO address byte
00001AC3 EB 06               A  5875          JR   NZ,PIO7
00001AC5 42DD                A  5876          OR   R13,R13   ; Control is zero for a poll
00001AC7 6B 02               A  5877          JR   Z,PIO7
00001AC9 98EA                A  5878          LD   R9,R10    ; Put the low argument byte in R9
00001ACB 6B 20               A  5879     PIO7:JR   Z,PIO11   ; Skip the output if NACK was received
00001ACD 10E9                A  5880     PIO8:RLC  R9        ; Rotate the bit to put out into carry
00001ACF 7B 03               A  5881          JR   C,PIO9
00001AD1 460310              A  5882          OR   p3,#10h   ;  if it's a zero - set SDA low
00001AD4 460320              A  5883     PIO9:OR   p3,#20h   ; Clock this result - set CLK high
00001AD7 5603CF              A  5884          AND  p3,#CFh   ; Set CLK low and SDA high
00001ADA 8A F1               A  5885          DJNZ R8,PIO8   ; Do 8 bits
00001ADC 460320              A  5886          OR   p3,#20h   ; Set clock high
00001ADF 9803                A  5887          LD   R9,p3     ; Put SDA ACK/NACK result in R9
00001AE1 5603CF              A  5888          AND  p3,#CFh   ; Set CLK low and SDA high
00001AE4 56E908              A  5889          AND  R9,#8     ;  and get the SDA reading
00001AE7 6B 02               A  5890          JR   Z,PIO10   ; NZ means NACK received
00001AE9 9C01                A  5891          LD   R9,#1     ;  so turn the 8 into a one
00001AEB 00E9                A  5892    PIO10:DEC  R9        ; 1 to zero, zero to -1
00001AED 70E9                A  5893    PIO11:PUSH R9        ; Push ACK/NACK result to stack
00001AEF 00EB                A  5894    PIO15:DEC  R11
00001AF1 CA 9C               A  5895          DJNZ R12,PIO1  ; Test if we are just doing a poll
00001AF3 460310              A  5896          OR   p3,#10H   ; Set SDA low
00001AF6 460320              A  5897          OR   p3,#20H   ; Set CLK high
00001AF9 5603EF              A  5898          AND  p3,#EFH   ; Set SDA high
00001AFC 460320              A  5899          OR   p3,#20H   ; Set CLK high
00001AFF 3016                A  5900    PIO18:JP   @NV
                             A  5901
00001B01 50EE                A  5902     TBL: POP  R14
00001B03 50EF                A  5903          POP  R15
00001B05 C2DE                A  5904          LDC  R13,@RR14
00001B07 A0EE                A  5905          INCW RR14
00001B09 88EE                A  5906          LD   R8,R14
00001B0B 98EF                A  5907          LD   R9,R15
00001B0D 029B                A  5908          ADD  R9,R11
00001B0F 128A                A  5909          ADC  R8,R10
00001B11 C2B8                A  5910          LDC  R11,@RR8
00001B13 02FD                A  5911          ADD  R15,R13
00001B15 12EA                A  5912          ADC  R14,R10
00001B17 30EE                A  5913          JP   @WW14
                             A  5914
         00001B19            A  5915      TXK:EQU  $         ; Routine to convert Enter, Tab, Backspace,
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PC       Machine Code        I  Line    File: newsys.v4e
00001B19 50EA                A  5916          POP  R10       ;  and printable characters to ASCII
00001B1B 50EB                A  5917          POP  R11       ; Shift is translated to 82h
00001B1D A6EBF0              A  5918          CP   R11,#F0h  ; All other key-strokes are changed to 0
00001B20 6B 6F               A  5919          JR   EQ,TXK3   ; F0 (shift) code is passed through unchanged
00001B22 A6EB66              A  5920          CP   R11,#66h  ; E0 code is changed to 0
00001B25 EB 04               A  5921          JR   NE,TXK1   ; Backspace (66h) is handled as a special case
00001B27 BC08                A  5922          LD   R11,#08h
00001B29 8B 66               A  5923          JR   TXK3
00001B2B A6EB5F              A  5924     TXK1:CP   R11,#5Fh  ; Check that argument is from 0Dh-5Eh (inclusive)
00001B2E 9B 5F               A  5925          JR   GE,TXK2   ; Otherwise, produce a zero
00001B30 A6EB0D              A  5926          CP   R11,#0Dh
00001B33 1B 5A               A  5927          JR   LT,TXK2
00001B35 26EB0D              A  5928          SUB  R11,#0Dh
00001B38 D6 1B01             A  5929          CALL TBL
00001B3B 51                  A  5930          DB   51h       ; Constant used to adjust return from TBL call
00001B3C 096000              A  5931          DB   09h,60h,0h
00001B3F 00008000 00713100   A  5932          DW   0000h,8000h,0071h,3100h
00001B47 00007A73 61773200   A  5933          DW   0000h,7A73h,6177h,3200h
00001B4F 00637864 65343300   A  5934          DW   0063h,7864h,6534h,3300h
00001B57 00207666 74723500   A  5935          DW   0020h,7666h,7472h,3500h
00001B5F 006E6268 67793600   A  5936          DW   006Eh,6268h,6779h,3600h
00001B67 00006D6A 75373800   A  5937          DW   0000h,6D6Ah,7537h,3800h
00001B6F 002C6B69 6F303900   A  5938          DW   002Ch,6B69h,6F30h,3900h
00001B77 002E2F6C 3B702D00   A  5939          DW   002Eh,2F6Ch,3B70h,2D00h
00001B7F 00002700 5B3D0000   A  5940          DW   0000h,2700h,5B3Dh,0000h
00001B87 00800D5D 005C       A  5941          DW   0080h,0D5Dh,005Ch
00001B8D 8B 02               A  5942          JR   TXK3
00001B8F B0EB                A  5943     TXK2:CLR  R11
00001B91 70EB                A  5944     TXK3:PUSH R11
00001B93 70EA                A  5945          PUSH R10
00001B95 3016                A  5946          JP   @NV
                             A  5947
         00001B97            A  5948     ULCT:EQU  $         ; Upper/lower case translate for non-alphas
00001B97 50EA                A  5949          POP  R10
00001B99 50EB                A  5950          POP  R11
00001B9B A6EB0D              A  5951          CP   R11,#0Dh  ; Don't translate a CR
00001B9E 6B 36               A  5952          JR   EQ,ULCT4
00001BA0 A6EB60              A  5953          CP   R11,#60h  ; Handle single quote as special case
00001BA3 EB 04               A  5954          JR   NE,ULCT1
00001BA5 BC7E                A  5955          LD   R11,#7Eh  ; Change single quote to tilde
00001BA7 8B 2D               A  5956          JR   ULCT4
00001BA9 A6EB5B              A  5957    ULCT1:CP   R11,#5Bh  ; Translate in range up through \ by table
00001BAC 1B 0F               A  5958          JR   LT,ULCT3
00001BAE A6EB60              A  5959          CP   R11,#60h  ; Translate [ to _ by adding 20
00001BB1 2B 05               A  5960          JR   LE,ULCT2
00001BB3 56EBDF              A  5961          AND  R11,#DFh  ; Otherwise translate by subtracting 20
00001BB6 8B 1E               A  5962          JR   ULCT4
00001BB8 46EB20              A  5963    ULCT2:OR   R11,#20h
00001BBB 8B 19               A  5964          JR   ULCT4
00001BBD 26EB2C              A  5965    ULCT3:SUB  R11,#2Ch
00001BC0 D6 1B01             A  5966          CALL TBL
00001BC3 12                  A  5967          DB   12h       ; Define an 18 byte table to translate top row
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PC       Machine Code        I  Line    File: newsys.v4e
00001BC4 3C5F3E3F 29214023   A  5968          DW   3C5Fh,3E3Fh,2921h,4023h
00001BCC 24255E26 2A28003A   A  5969          DW   2425h,5E26h,2A28h,003Ah
00001BD4 002B                A  5970          DW   002Bh
00001BD6 70EB                A  5971    ULCT4:PUSH R11
00001BD8 70EA                A  5972          PUSH R10
00001BDA 3016                A  5973          JP   @NV
                             A  5974
                             A  5975                         ; Keyboard interrupt service routine
00001BDC E4034E              A  5976    ISRK: LD   4Eh,p3    ; First save Port 3, the incoming bit, in R14
00001BDF 3140                A  5977          SRP  #40h      ; Set the group to the keyboard
00001BE1 FE                  A  5978          INC  R15       ; Increment the bit counter
00001BE2 EB 06               A  5979          JR   NZ,ISRK1  ; If first bit is the start bit
00001BE4 CC00                A  5980          LD   R12,#0    ;  Load RR12 with zero and return
00001BE6 DC00                A  5981          LD   R13,#0    ; R13 is the check bit
00001BE8 8B 2F               A  5982          JR   ISRK6
00001BEA A6EF09              A  5983    ISRK1:CP   R15,#09h  ; If R15 is 9 we  have a character in R12
00001BED 9B 0D               A  5984          JR   GE,ISRK3
00001BEF CF                  A  5985          RCF            ; The bit comes in as 0000 00x0 on port 3
00001BF0 764E02              A  5986          TM   4Eh,#2    ; P3,1 is the data bit
00001BF3 6B 01               A  5987          JR   Z,ISRK2
00001BF5 DF                  A  5988          SCF
00001BF6 C0EC                A  5989    ISRK2:RRC  R12       ; Rotate the carry into R12
00001BF8 B2DC                A  5990          XOR  R13,R12   ; This operates on the high bit of R13
00001BFA 8B 1D               A  5991          JR   ISRK6
00001BFC EB 0C               A  5992    ISRK3:JR   NE,ISRK5  ; If R15 = 9 accept the char
00001BFE 764E02              A  5993          TM   4Eh,#2    ; Otherwise, update the check bit
00001C01 6B 02               A  5994          JR   Z,ISRK4
00001C03 60ED                A  5995          COM  R13
00001C05 56ED80              A  5996    ISRK4:AND  R13,#80h
00001C08 8B 0F               A  5997          JR   ISRK6
00001C0A 2B 0D               A  5998    ISRK5:JR   LE,ISRK6  ; R15=9 to get to here
00001C0C FCFF                A  5999          LD   R15,#FFh  ; Initialize the bit counter for the next char
00001C0E D7CA40              A  6000          LD   40h(R10),R12 ; Load the char in the circular buffer
00001C11 AE                  A  6001          INC  R10       ; Update the head-of-list index
00001C12 A6EA0A              A  6002          CP   R10,#0Ah  ; Set it back to zero if we're at 4A
00001C15 1B 02               A  6003          JR   LT,ISRK6  ; Note: We don't presently make use of the check bit in R13
00001C17 AC00                A  6004          LD   R10,#0
00001C19 3130                A  6005    ISRK6:SRP  #30h      ; And return to standard group
00001C1B BF                  A  6006          IRET
                             A  6007
                             A  6008                         ; Initialize keyboard interrupt service routine
         00001C1C            A  6009    INITKB:EQU  $
00001C1C 8F                  A  6010          DI             ; Setup the interrupt registers
00001C1D E6F908              A  6011          LD   F9h,#08h
00001C20 46FB01              A  6012          OR   FBh,#1    ; Int0 - controlled by P3,2
00001C23 56FAFE              A  6013          AND  FAh,#FEh
00001C26 3140                A  6014          SRP  #40h
00001C28 AC00                A  6015          LD   R10,#0    ; Initialize the first and last of the circular register
00001C2A BC00                A  6016          LD   R11,#0    ; R10 is the least recent, R11 is the hole for the next
00001C2C FCFF                A  6017          LD   R15,#FFh  ; Set the empty flag to empty
00001C2E E604 1B             A  6018          LD   4,#HIGH ISRK  ; Set the branch to the service reoutine in RR04
00001C31 E605 DC             A  6019          LD   5,#LOW  ISRK
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PC       Machine Code        I  Line    File: newsys.v4e
00001C34 3130                A  6020          SRP  #30h
00001C36 9F                  A  6021          EI
00001C37 3016                A  6022          JP   @NV
                             A  6023
         00001C39            A  6024      CHK:EQU $
00001C39 A44B4A              A  6025          CP   4Ah,4BH   ; Wait until the circular buffer is loaded with a char
00001C3C 6B FB               A  6026          JR   Z,CHK     ;  i.e., until the head and tail of the circular list don't match
00001C3E B84B                A  6027          LD   R11,4Bh   ; Load the character at the head of the list to R11
00001C40 C7AB40              A  6028          LD   R10,40h(R11)
00001C43 70EA                A  6029          PUSH R10       ; Push the character to the stack
00001C45 B0EA                A  6030          CLR  R10
00001C47 70EA                A  6031          PUSH R10
00001C49 204B                A  6032          INC  4Bh       ; Increment the pointer to the head of the list
00001C4B A64B0A              A  6033          CP   4Bh,#0Ah  ; if needed, reset the head of the list to the beginning
00001C4E EB 02               A  6034          JR   NZ,CHK1
00001C50 B04B                A  6035          CLR  4Bh
00001C52 3016                A  6036     CHK1:JP   @NV
                             A  6037
00001C54 3018                A  6038     XMIT:JP   @COLON    ; Routine to print out a character on display device
00001C56 00                  A  6039          DB   BR
00001C57 04                  A  6040          DB   04h
00001C58 06                  A  6041          DB   LONGCALL  ; Execute the call to display device
00001C59 0E7C                A  6042          DW   PICK
00001C5B 08                  A  6043          DB   EXECUTE
00001C5C 07                  A  6044          DB   SEMICOLON
                             A  6045
         00001C5D            A  6046    GFAUX: EQU $
00001C5D 80E0                A  6047          DECW RR0          ; Save the EVR
00001C5F D230                A  6048          LDC  @RR0,R3
00001C61 80E0                A  6049          DECW RR0
00001C63 D220                A  6050          LDC  @RR0,R2
00001C65 50E2                A  6051          POP  R2           ; Pop the address of the parameter to R2/R3
00001C67 50E3                A  6052          POP  R3
00001C69 C242                A  6053          LDC  R4,@RR2      ; Load the address at the parameter location
00001C6B A0E2                A  6054          INCW RR2
00001C6D C252                A  6055          LDC  R5,@RR2
00001C6F A0E2                A  6056          INCW RR2          ; And leave EVR pointing to the return location
00001C71 30E4                A  6057          JP   @RR4
                             A  6058
         00001C73            A  6059    GFHEAD:EQU $
00001C73 8247 C6             A  6060          DB   082H, "G",_F
00001C76 1A6B                A  6061          DW   PIOHEAD
         00001C78            A  6062    GFSUB: EQU $
00001C78 3018                A  6063          JP   @COLON
00001C7A 00                  A  6064          DB   BR          ; Compile a subroutine call to GFAUX
00001C7B D6                  A  6065          DB   D6h
00001C7C 21                  A  6066          DB   CCOMMA
00001C7D 01                  A  6067          DB   NR
00001C7E 1C5D                A  6068          DW   GFAUX
00001C80 20                  A  6069          DB   COMMA
00001C81 3B                  A  6070          DB   FINDEA      ; Parameter for the call is the
00001C82 20                  A  6071          DB   COMMA       ;  address of the called FORTH routine
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PC       Machine Code        I  Line    File: newsys.v4e
00001C83 00                  A  6072          DB   BR
00001C84 06                  A  6073          DB   LONGCALL    ; On return, do a LONGCALL to the
00001C85 21                  A  6074          DB   CCOMMA      ;  location after the LONGCALL
00001C86 1F                  A  6075          DB   HERE
00001C87 24                  A  6076          DB   ONEPLUS
00001C88 24                  A  6077          DB   ONEPLUS
00001C89 20                  A  6078          DB   COMMA
00001C8A 01                  A  6079          DB   NR          ; Restore the EVR
00001C8B C220                A  6080          DW   C220h       ; LD R2,@RR0
00001C8D 20                  A  6081          DB   COMMA
00001C8E 01                  A  6082          DB   NR
00001C8F A0E0                A  6083          DW   A0E0h       ; INCW RR0
00001C91 12                  A  6084          DB   DUP
00001C92 20                  A  6085          DB   COMMA
00001C93 01                  A  6086          DB   NR          ; LD R3,@RR0
00001C94 C230                A  6087          DW   C230h
00001C96 20                  A  6088          DB   COMMA
00001C97 20                  A  6089          DB   COMMA       ; INCW RR0
00001C98 07                  A  6090          DB   SEMICOLON
                             A  6091
                             A  6092
                             A  6093
                             A  6094                        ; Routine to read a line of text via aux keyboard
                             A  6095                        ;  Only Enter, Tab, Backspace, printable characters
                             A  6096                        ;  are recognized. All other key-strokes are ignored
                             A  6097                        ;  Enter key-stroke will terminate the capture
                             A  6098                        ;  Result is stored at HERE as a counted string
                             A  6099                        ;  Argument on stack is the address of an echo routine
                             A  6100                        ;   (such as the PFA address of EMIT)
                             A  6101                        ;  The routine assumes operating with SRP=30
                             A  6102                        ;   and that 40-4F are available for scratch
         00001C99            A  6103    GALHEAD:EQU $
00001C99 834741 CC           A  6104          DB   083H, "GA",_L
00001C9D 1C73                A  6105          DW   GFHEAD
         00001C9F            A  6106      GAL:EQU  $
00001C9F 3018                A  6107          JP   @COLON
00001CA1 06                  A  6108          DB   LONGCALL
00001CA2 1C1C                A  6109          DW   INITKB
00001CA4 1F                  A  6110          DB   HERE
00001CA5 2D                  A  6111          DB   ZERO
00001CA6 21                  A  6112          DB   CCOMMA
00001CA7 2D                  A  6113          DB   ZERO        ; Initialize the shift flag
00001CA8 2D                  A  6114          DB   ZERO        ; Initialize the release code flag
00001CA9 06                  A  6115     GAL0:DB   LONGCALL
00001CAA 1C39                A  6116          DW   CHK         ; Wait for a character to come in
00001CAC 06                  A  6117          DB   LONGCALL
00001CAD 1B19                A  6118          DW   TXK         ; Translate keyboard code to ASCII
00001CAF 11                  A  6119          DB   SWAP
00001CB0 31                  A  6120          DB   OVER        ; Check for a F0 (release) code
00001CB1 00                  A  6121          DB   BR
00001CB2 F0                  A  6122          DB   F0h
00001CB3 30                  A  6123          DB   EQUALS
```

```
PC       Machine Code        I  Line    File: newsys.v4e
00001CB4 05                  A  6124          DB   JRZS
00001CB5 04                  A  6125          DB   GAL5-$
00001CB6 24                  A  6126          DB   ONEPLUS    ; Set the key-release flag
00001CB7 03                  A  6127          DB   JRS
00001CB8 3F                  A  6128          DB   GAL11-$
00001CB9 05                  A  6129     GAL5:DB   JRZS       ; Was prior character a key release?
00001CBA 09                  A  6130          DB   GAL6-$
00001CBB 12                  A  6131          DB   DUP
00001CBC 00                  A  6132          DB   BR
00001CBD 80                  A  6133          DB   80h        ; Yes it was - is the release a shift release?
00001CBE 30                  A  6134          DB   EQUALS
00001CBF 05                  A  6135          DB   JRZS       ; Ignore if not a shift release
00001CC0 36                  A  6136          DB   GAL10-$
00001CC1 03                  A  6137          DB   JRS        ; Yes it was, so set the shift flag back to zero
00001CC2 08                  A  6138          DB   GALX-$
00001CC3 12                  A  6139     GAL6:DB   DUP        ; The release flag was not set
00001CC4 00                  A  6140          DB   BR
00001CC5 80                  A  6141          DB   80h        ; Check if it was a shift press
00001CC6 30                  A  6142          DB   EQUALS
00001CC7 05                  A  6143          DB   JRZS
00001CC8 06                  A  6144          DB   GAL7-$
00001CC9 11                  A  6145          DB   SWAP       ; It was a shift press, so set the
00001CCA 1C                  A  6146     GALX:DB   GTEQ       ;  shift flag to -1
00001CCB 2D                  A  6147          DB   ZERO
00001CCC 03                  A  6148          DB   JRS
00001CCD 29                  A  6149          DB   GAL10-$
00001CCE 12                  A  6150     GAL7:DB   DUP        ; Is it a backspace?
00001CCF 00                  A  6151          DB   BR
00001CD0 08                  A  6152          DB   08h
00001CD1 30                  A  6153          DB   EQUALS
00001CD2 05                  A  6154          DB   JRZS
00001CD3 14                  A  6155          DB   GAL8-$
00001CD4 2E                  A  6156          DB   ONE        ; Load up a -1:
00001CD5 17                  A  6157          DB   NEGATE     ; Yep, backspace. Back up the dictionary
00001CD6 25                  A  6158          DB   DPNTR
00001CD7 34                  A  6159          DB   PLUSSTORE
00001CD8 12                  A  6160          DB   DUP        ; Print a BS, then a space, then another BS
00001CD9 06                  A  6161          DB   LONGCALL
00001CDA 1C54                A  6162          DW   XMIT
00001CDC 00                  A  6163          DB   BR
00001CDD 20                  A  6164          DB   " "
00001CDE 06                  A  6165          DB   LONGCALL
00001CDF 1C54                A  6166          DW   XMIT
00001CE1 12                  A  6167          DB   DUP
00001CE2 06                  A  6168          DB   LONGCALL
00001CE3 1C54                A  6169          DW   XMIT
00001CE5 03                  A  6170          DB   JRS
00001CE6 10                  A  6171          DB   GAL10-$
00001CE7 12                  A  6172     GAL8:DB   DUP        ; Character is non-zero if printable
00001CE8 05                  A  6173          DB   JRZS
00001CE9 0D                  A  6174          DB   GAL10-$
00001CEA 31                  A  6175          DB   OVER       ; Get the shift flag
```

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PC       Machine Code        I  Line    File: newsys.v4e
00001CEB 05                  A  6176          DB   JRZS
00001CEC 04                  A  6177          DB   GAL9-$
00001CED 06                  A  6178          DB   LONGCALL
00001CEE 1B97                A  6179          DW   ULCT       ;  and change case if necessary
00001CF0 12                  A  6180     GAL9:DB   DUP        ; Print the character using the given routine
00001CF1 06                  A  6181          DB   LONGCALL
00001CF2 1C54                A  6182          DW   XMIT
00001CF4 12                  A  6183          DB   DUP
00001CF5 21                  A  6184          DB   CCOMMA     ; Put the character in the string
00001CF6 2D                  A  6185    GAL10:DB   ZERO       ; Reset the release flag to zero
00001CF7 11                  A  6186    GAL11:DB   SWAP
00001CF8 00                  A  6187          DB   BR
00001CF9 0D                  A  6188          DB   0Dh        ; Return for another character if not CR
00001CFA 30                  A  6189          DB   EQUALS
00001CFB 04                  A  6190          DB   JRZ
00001CFC FFAD                A  6191          DW   GAL0-$
00001CFE 13                  A  6192          DB   DROP       ; Drop the release flag and shift flag
00001CFF 13                  A  6193          DB   DROP
00001D00 12                  A  6194          DB   DUP        ; This is the original value of HERE
00001D01 1F                  A  6195          DB   HERE       ;  used now to generate character count
00001D02 31                  A  6196          DB   OVER
00001D03 2F                  A  6197          DB   MINUS
00001D04 11                  A  6198          DB   SWAP
00001D05 0C                  A  6199          DB   CSTORE     ;  which is stored at original value of HERE
00001D06 25                  A  6200          DB   DPNTR      ; And set DPNTR back to original HERE
00001D07 0B                  A  6201          DB   STORE
00001D08 13                  A  6202          DB   DROP       ; Drop the display execution address
00001D09 07                  A  6203          DB   SEMICOLON
                             A  6204
                             A  6205
         000000A1            A  6206    _EX:  EQU  0A1H
         000000A3            A  6207    _PND: EQU  0A3H
         000000A7            A  6208    _SQ:  EQU  0A7H
         000000A8            A  6209    _LP:  EQU  0A8H
         000000AA            A  6210    _AST: EQU  0AAH
         000000AB            A  6211    _PLUS:EQU  0ABH
         000000AC            A  6212    _CMA: EQU  0ACH
         000000AD            A  6213    _MI:  EQU  0ADH
         000000AE            A  6214    _DOT: EQU  0AEH
         000000AF            A  6215    _VIR: EQU  0AFH
         000000B0            A  6216    _N0:  EQU  0B0H
         000000B1            A  6217    _N1:  EQU  0B1H
         000000BA            A  6218    _CN:  EQU  0BAH
         000000BB            A  6219    _SCN: EQU  0BBH
         000000BC            A  6220    _LT:  EQU  0BCH
         000000BD            A  6221    _EQ:  EQU  0BDH
         000000BE            A  6222    _GT:  EQU  0BEH
         000000BF            A  6223    _QM:  EQU  0BFH
         000000C0            A  6224    _AT:  EQU  0C0H
         000000C1            A  6225    _A:   EQU  0C1H
         000000C2            A  6226    _B:   EQU  0C2H
         000000C3            A  6227    _C:   EQU  0C3H
```

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PC        Machine Code        I  Line    File: newsys.v4e
          000000C4            A  6228    _D:   EQU  0C4H
          000000C5            A  6229    _E:   EQU  0C5H
          000000C6            A  6230    _F:   EQU  0C6H
          000000C7            A  6231    _G:   EQU  0C7H
          000000C8            A  6232    _H:   EQU  0C8H
          000000C9            A  6233    _I:   EQU  0C9H
          000000CA            A  6234    _J:   EQU  0CAH
          000000CB            A  6235    _K:   EQU  0CBH
          000000CC            A  6236    _L:   EQU  0CCH
          000000CD            A  6237    _M:   EQU  0CDH
          000000CE            A  6238    _N:   EQU  0CEH
          000000CF            A  6239    _O:   EQU  0CFH
          000000D0            A  6240    _P:   EQU  0D0H
          000000D1            A  6241    _Q:   EQU  0D1H
          000000D2            A  6242    _R:   EQU  0D2H
          000000D3            A  6243    _S:   EQU  0D3H
          000000D4            A  6244    _T:   EQU  0D4H
          000000D5            A  6245    _U:   EQU  0D5H
          000000D6            A  6246    _V:   EQU  0D6H
          000000D7            A  6247    _W:   EQU  0D7H
          000000D8            A  6248    _X:   EQU  0D8H
          000000D9            A  6249    _Y:   EQU  0D9H
          000000DA            A  6250    _Z:   EQU  0DAH
          000000DC            A  6251    _BS:  EQU  0DCH
          000000DB            A  6252    _LB:  EQU  0DBH
          000000DD            A  6253    _RB:  EQU  0DDH
                              A  6254
          000000E1            A  6255    _a:   EQU  0E1H
          000000E2            A  6256    _b:   EQU  0E2H
          000000E3            A  6257    _c:   EQU  0E3H
          000000E4            A  6258    _d:   EQU  0E4H
          000000E5            A  6259    _e:   EQU  0E5H
          000000E6            A  6260    _f:   EQU  0E6H
          000000E7            A  6261    _g:   EQU  0E7H
          000000E8            A  6262    _h:   EQU  0E8H
          000000E9            A  6263    _i:   EQU  0E9H
          000000EA            A  6264    _j:   EQU  0EAH
          000000EB            A  6265    _k:   EQU  0EBH
          000000EC            A  6266    _l:   EQU  0ECH
          000000ED            A  6267    _m:   EQU  0EDH
          000000EE            A  6268    _n:   EQU  0EEH
          000000EF            A  6269    _o:   EQU  0EFH
          000000F0            A  6270    _p:   EQU  0F0H
          000000F1            A  6271    _q:   EQU  0F1H
          000000F2            A  6272    _r:   EQU  0F2H
          000000F3            A  6273    _s:   EQU  0F3H
          000000F4            A  6274    _t:   EQU  0F4H
          000000F5            A  6275    _u:   EQU  0F5H
          000000F6            A  6276    _v:   EQU  0F6H
          000000F7            A  6277    _w:   EQU  0F7H
          000000F8            A  6278    _x:   EQU  0F8H
          000000F9            A  6279    _y:   EQU  0F9H
```

```
PC       Machine Code        I  Line    File: newsys.v4e
         000000FA            A  6280    _z:   EQU  0FAH
                             A  6281
                             A  6282         END
                             A  6283
```

Errors: 0
Warnings: 1
Lines Assembled: 6283