CRT CONTROLLER

PROGRAM LISTING

JOHN BELL ENGINEERING

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ASM80 :F1:CRT.SRC TITLE('24 MARCH 1980 4:00 PM')


ISIS-II 8080/8085 MACRO ASSEMBLER, V3.0          CRT       PAGE    1
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  LOC  OBJ          LINE        SOURCE STATEMENT

                      1 $MACROFILE MOD85
                      2 ;VERSION 1.3   PWB REV. B
                      3 ;FILENAME CRT.SRC CREATED 17 NOV 1979 BY TOM ROSSI
                      4         NAME    CRT
                      5 ;THIS FILE CONTAINS THE SOURCE FOR THE 8275 CRT DEMO DESIGNED
                      6 ;BY TOM ROSSI AND BASED ON THE APPLICATION NOTE WRITTEN BY
                      7 ;JOHN KATAUSKY
                      8
  0050                9 LINSIZ  EQU     80      ;80 CHARACTERS PER LINE.
  0019               10 NUMLIN  EQU     25      ;25 CHARACTER LINES PER FRAME.
                     11
                     12 ;MEMORY MAP
                     13 ;       ROM    ---  0000-7FFF
                     14 ;       USART  ---  2000-2001
                     15 ;       PIO    ---  4000-4003
                     16 ;       RAM    ---  6000-6FFF
                     17 ;THE RAM IS FURTHER BROKEN DOWN INTO FOUR SECTIONS:
                     18 ;       STORE DATA  ---  6000-67FF
                     19 ;       8275 CS + RAM  --- 6800-6FFF
                     20 ;       8275 DACK + RAM  --- 7000-77FF
                     21 ;       8253 + RAM  --- 7800-7FFF
                     22 ;THE FIRST (LINSIZ*NUMLIN) RAM LOCATIONS ARE RESERVED FOR THE CRT DISPLAY.
                     23 ;    THE REMAINING LOCATIONS ARE USED FOR LOCAL VARIABLES, STACK,
                     24 ;    AND TO INITIALIZE THE 8253 AND 8275.
                     25 ;CHARACTERS ARE ADDED TO THE DISPLAY BY WRITING TO THE 'STORE DATA'
                     26 ;    ADDRESSES. THE SYSTEM REFRESHES THE CRT DISPLAY BY READING THE SAME
                     27 ;    LOCATIONS THROUGH THE '8275 + DACK' ADDRESSES.
                     28 ;THE 8253 IS INITIALIZED BY WRITING THE APPROPRIATE PARAMETERS DIRECTLY
                     29 ;    TO THE PERIPHERAL. BECAUSE OF THE MINIMAL ADDRESA DECODING USED,
                     30 ;    THIS WILL ALSO WRITE OVER FOUR OF THE 'STORE DATA' LOCATIONS.
                     31 ;TWO OF THESE LOCATIONS ARE ALSO USED TO INITIALIZE THE 8275.
                     32 ;    THIS IS ACCOMPLISHED BY WRITING THE INITIALIZATION PARAMETERS TO THE
                     33 ;    APPROPRIATE 'STORE DATA' LOCATIONS, AND THE PERFORMING A READ
                     34 ;    TO THE 8275 CS ADDRESS.
                     35
                     36 $EJECT
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LOC  OBJ          LINE        SOURCE STATEMENT

                    37          ASEG
6000                38          ORG     6000H   ;START OF RAM.
                    39
                    40 RAM:
6000                41 TOPDIS:  DS      LINSIZ*NUMLIN-1
67CF                42 BOTDIS:  DS      1
                    43 LAST:
                    44
67D0                45          ORG     2*( ($+1)/2 )   ;ALIGN TO EVEN ADDRESS.
67D0                46 LD75:    DS      4       ;BUFFER USED TO INIT 8275,8253.
                    47
67D4                48 CURAD:   DS      2
67D6                49 TOPAD:   DS      2
67D8                50 LOCBO:   DS      2
67DA                51 CURSY:   DS      1
67DB                52 CURSX:   DS      1
67DC                53 USCHR:   DS      1
67DD                54 KEYDWN:  DS      1
67DE                55 KBCHR:   DS      1
67DF                56 BAUD:    DS      1
67E0                57 KEYOK:   DS      1
67E1                58 ESCP:    DS      1
67E2                59 SHCON:   DS      1
67E3                60 RETLIN:  DS      1
67E4                61 SCNLIN:  DS      1
67E5                62 LINCNT:  DS      1
                    63
6800                64 STPTR    EQU     RAM+800H        ;PROGRAM STACK.
6FD0                65 CS75     EQU     LD75+800H
7000                66 DACK     EQU     TOPDIS+1000H    ;RAM + 8275 DACK
7FD0                67 BASE53   EQU     LD75+1800H      ;RAM + 8253 CS.
4000                68 BASE55   EQU     4000H           ;8255 BASE ADDRESS.
4000                69 PORTA    EQU     BASE55+0        ;
4001                70 PORTB    EQU     BASE55+1        ;
4002                71 PORTC    EQU     BASE55+2        ;
4003                72 CMD55    EQU     BASE55+3        ;
2000                73 BASE51   EQU     2000H           ;8251 BASE ADDRESS.
2000                74 SERDAT   EQU     BASE51+0
2001                75 SERCMD   EQU     BASE51+1
7FD0                76 CNT0     EQU     BASE53+0
7FD1                77 CNT1     EQU     BASE53+1
7FD2                78 CNT2     EQU     BASE53+2
7FD3                79 CNTM     EQU     BASE53+3
6FD0                80 CRTPAR   EQU     CS75+0
6FD1                81 CRTCMD   EQU     CS75+1
0018                82 CURBOT   EQU     NUMLIN-1
0008                83 VRTC     EQU     08H     ;CONNECTED TO 8255A PORT C BIT 3.
0080                84 LCL      EQU     80H     ;CONNECTED TO 8255A PORT C BIT 7.
00F0                85 EOR      EQU     0F0H    ;END-OF-ROW CMD FOR 8275.
                    86 $EJECT
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LOC  OBJ          LINE        SOURCE STATEMENT

                    87
                    88          ASEG
0000                89          ORG     0
                    90 ;INITIALIZE VARIABLES.
0000 F3             91 INIT:    DI                          ;DISABLE INTERRUPTS
0001 310068         92          LXI     SP,STPTR            ;LOAD STACK POINTER
0004 210060         93          LXI     H,TOPDIS            ;LOAD H&L WITH TOP OF DISPLAY
0007 22D667         94          SHLD    TOPAD               ;SET TOP = TOP OF DISPLAY
000A 22D467         95          SHLD    CURAD               ;STORE THE CURRENT ADDRESS
000D 21DA67         96          LXI     H,CURSY             ;CLEAR VARIABLES 'CURSY' TO 'LINCNT'.
0010 0E0B           97          MVI     C,LINCNT-CURSY
0012 3600           98 INIT1:   MVI     M,0
0014 23             99          INX     H
0015 0D            100          DCR     C
0016 C21200        101          JNZ     INIT1
0019 3619          102          MVI     M,NUMLIN            ;INIT LINCNT
                   103          ;THIS ROUTINE CLEARS THE ENTIRE SCREEN BY PUTTING
                   104          ;SPACE CODES (20H) IN EVERY LOCATION ON THE SCREEN.
                   105          ;
001B 01D067        106          LXI     B,LAST
001E 210060        107          LXI     H,TOPDIS
0021 1E20          108          MVI     E,' '
0023 73            109 LOOPF:   MOV     M,E
0024 23            110          INX     H
0025 7D            111          MOV     A,L
0026 B9            112          CMP     C
0027 C22300        113          JNZ     LOOPF
002A 7C            114          MOV     A,H
002B B8            115          CMP     B
002C C22300        116          JNZ     LOOPF
002F C3AD00        117          JMP     INIT55
                   118
                   119 $EJECT
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 LOC  OBJ          LINE        SOURCE STATEMENT

                    120 ;RST 6.5 LINE INTERRUPT ROUTINE.
                    121 ;THIS ROUTINE IS EXECUTED ONCE EVERY CHARACTER LINE.
                    122 ;THE PROCESSOR THEN SENDS THE NEXT LINE TO THE 8275 ROW BUFFER,
                    123 ;THEN CHECKS TO SEE IF IT IS THE LAST LINE IN THE FRAME.
 0034               124         ORG     34H
 0034 F5            125 POPDAT: PUSH    PSW             ;SAVE A AND FLAGS
 0035 D5            126         PUSH    D               ;SAVE D AND E
 0036 E5            127         PUSH    H               ;SAVE H AND L
 0037 210000        128         LXI     H,0000H         ;ZERO H AND L
 003A 39            129         DAD     SP              ;PUT STACK POINTER IN H AND L
 003B EB            130         XCHG                    ;PUT STACK IN D AND E
 003C 2AD467        131         LHLD    CURAD           ;GET POINTER
 003F 310010        132         LXI     SP,DACK-TOPDIS  ;ADD DACK OFFSET.
 0042 39            133         DAD     SP
 0043 F9            134         SPHL                    ;PUT CURRENT LINE INTO SP
                    135         REPT (LINSIZ/2)
-                   136         POP     H
                    137         ENDM
 0044 E1            138+        POP     H
 0045 E1            139+        POP     H
 0046 E1            140+        POP     H
 0047 E1            141+        POP     H
 0048 E1            142+        POP     H
 0049 E1            143+        POP     H
 004A E1            144+        POP     H
 004B E1            145+        POP     H
 004C E1            146+        POP     H
 004D E1            147+        POP     H
 004E E1            148+        POP     H
 004F E1            149+        POP     H
 0050 E1            150+        POP     H
 0051 E1            151+        POP     H
 0052 E1            152+        POP     H
 0053 E1            153+        POP     H
 0054 E1            154+        POP     H
 0055 E1            155+        POP     H
 0056 E1            156+        POP     H
 0057 E1            157+        POP     H
 0058 E1            158+        POP     H
 0059 E1            159+        POP     H
 005A E1            160+        POP     H
 005B E1            161+        POP     H
 005C E1            162+        POP     H
 005D E1            163+        POP     H
 005E E1            164+        POP     H
 005F E1            165+        POP     H
 0060 E1            166+        POP     H
 0061 E1            167+        POP     H
 0062 E1            168+        POP     H
 0063 E1            169+        POP     H
 0064 E1            170+        POP     H
 0065 E1            171+        POP     H
 0066 E1            172+        POP     H
 0067 E1            173+        POP     H
 0068 E1            174+        POP     H
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LOC  OBJ          LINE        SOURCE STATEMENT

0069 E1           175+        POP     H
006A E1           176+        POP     H
006B E1           177+        POP     H
006C 2100F0       178         LXI     H,TOPDIS-DACK   ;CORRECT FOR DACK OFFSET.
006F 39           179         DAD     SP              ;ADD STACK
0070 EB           180         XCHG                    ;PUT STACK IN H AND L
0071 F9           181         SPHL                    ;RESTORE STACK
                  182 ;CHECK FOR DISPLAY MEMORY WRAPAROUND.
0072 213098       183         LXI     H, - (LAST)
0075 19           184         DAD     D
0076 EB           185         XCHG
0077 D27D00       186         JNC     NOWRAP
007A 210060       187         LXI     H,TOPDIS
007D 22D467       188 NOWRAP: SHLD    CURAD           ;PUT BACK CURRENT ADDRESS
                  189
                  190 ;CHECK FOR LAST LINE IN THE FRAME.
0080 21E567       191         LXI     H,LINCNT
0083 35           192         DCR     M
0084 C2A800       193         JNZ     LINE    ;JMP IF MORE LINES.
0087 3619         194         MVI     M,NUMLIN;RE-INIT LINE COUNT.
                  195         ;
                  196         ;FRAME ROUTINE.
                  197         ;THIS ROUTINE CHECKS THE BAUD RATE SWITCHES, RESETS THE
                  198         ;SCREEN POINTERS AND READS AND LOOKS UP THE KEYBOARD.
                  199         ;
                  200         ;SET UP THE POINTERS
                  201         ;
0089 C5           202 FRAME:  PUSH    B
008A 2AD667       203         LHLD    TOPAD           ;LOAD TOP IN H AND L
008D 22D467       204         SHLD    CURAD           ;STORE TOP IN CURRENT ADDRESS
                  205         ;
                  206         ;SET UP BAUD RATE
                  207         ;
0090 3A0240       208         LDA     PORTC           ;READ BAUD RATE SWITCHES
0093 E607         209         ANI     111B
0095 21DF67       210         LXI     H,BAUD
0098 BE           211         CMP     M
0099 C48904       212         CNZ     STB1          ;IF NOT SAME, THEN CHANGE USART CLOCKS.
                  213         ;
                  214         ;READ KEYBOARD
                  215         ;
009C 3ADD67       216         LDA     KEYDWN          ;SEE IF A KEY IS DOWN
009F E640         217         ANI     40H             ;SET THE FLAGS
00A1 C2B501       218         JNZ     KYDOWN          ;IF KEY IS DOWN JUMP AROUND
00A4 CD8C01       219         CALL    RDKB            ;GO READ THE KEYBOARD
00A7 C1           220 EFRAME: POP     B
                  221
00A8 E1           222 LINE:   POP     H
00A9 D1           223         POP     D
00AA F1           224         POP     PSW
00AB FB           225         EI
00AC C9           226         RET
                  227
                  228 ;REST OF POWER-ON INITIALIZATION CONTINUES HERE.
00AD 3E8B         229 INIT55: MVI     A,8BH           ;MOVE 8255 CONTROL WORD INTO A
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LOC  OBJ          LINE        SOURCE STATEMENT

00AF 320D40        230          STA     CMD55            ;PUT CONTROL WORD INTO 8255
                   231          ;
                   232          ;8251 INITIALIZATION
                   233          ;
00B2 210120        234 INIT51:  LXI     H,SERCMD         ;POINT TO 8251A COMMAND REGISTER.
00B5 3680          235          MVI     M,80H            ;DUMMY STORE TO 8251
00B7 3600          236          MVI     M,00H            ;RESET 8251
00B9 3640          237          MVI     M,40H
00BB 00            238          NOP                      ;WAIT FOR RESET TO OCCUR.
00BC 00            239          NOP
00BD 00            240          NOP
00BE 00            241          NOP
00BF 36EA          242          MVI     M,0EAH   ;2 STOP BITS, NO PARITY,16X RATE, 8 DATA BITS
00C1 3627          243          MVI     M,27H    ;ENABLE RTS, TX, RX.
                   244          ;
                   245          ;8253 INITIALIZATION
                   246          ;
00C3 3E32          247          MVI     A,32H            ;CONTROL WORD FOR 8253
00C5 32D37F        248          STA     CNTM             ;PUT CONTROL WORD INTO 8253
00C8 3E32          249          MVI     A,32H            ;LSB 8253
00CA 32D07F        250          STA     CNT0             ;PUT IT IN 8253
00CD 3E00          251          MVI     A,00H            ;MSB 8253
00CF 32D07F        252          STA     CNT0             ;PUT IT IN 8253
00D2 CD8104        253          CALL    STBAUD           ;GO DO BAUD RATE
                   254          ;
                   255          ;8275 INITIALIZATION
                   256          ;
00D5 11D16F        257 IN75:    LXI     D,CRTCMD
00D8 21D167        258          LXI     H,LD75+1
00DB 3600          259          MVI     M,00H            ;RESET AND STOP DISPLAY
00DD 1A            260          LDAX    D
00DE 1B            261          DCX     D
00DF 2B            262          DCX     H                ;HL=1000H
00E0 364F          263          MVI     M,LINSIZ-1
00E2 1A            264          LDAX    D
00E3 3658          265          MVI     M,40H+(NUMLIN-1);2 ROWS/VRTC, (NUMLIN) CHARACTER ROWS
00E5 1A            266          LDAX    D
00E6 3689          267          MVI     M,89H    ;UNDERLINE ROW 8, 10 HRTC/CHAR.
00E8 1A            268          LDAX    D
00E9 36DD          269          MVI     M,0DDH;NON-OFFSET,TRANSPARENT,BLINK UNDERLINE,HRTC=28 CCLK
00EB 1A            270          LDAX    D
00EC CD7003        271          CALL    LDCUR            ;LOAD THE CURSOR
00EF 23            272          INX     H
00F0 13            273          INX     D
00F1 36E0          274          MVI     M,0E0H           ;PRESET COUNTERS
00F3 1A            275          LDAX    D
00F4 3623          276          MVI     M,23H            ;START DISPLAY
00F6 1A            277          LDAX    D
                   278 ;CRT INITIALIZATION IS COMPLETE AT THIS POINT, AND VRTC AND HRTC ARE
                   279 ;FREE-RUNNING. INTERRUPTS WILL NOT BE ENABLED UNTIL THE FIRST VERTICAL
                   280 ;RETRACE INTERVAL. THIS WILL SYNC THE SOFTWARE TO THE CRT DMA REQUESTS.
                   281 ;VRTC IS MONITORED VIA BIT 7 OF THE 8255A. WHEN A L-TO-H IS
                   282 ;DETECTED, THE PROGRAM WILL DROP THRU TO THE IDLE LOOP AND ENABLE
                   283 ;INTERRUPTS.
00F7 210240        284          LXI     H,PORTC
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 LOC  OBJ          LINE        SOURCE STATEMENT

 00FA 7E           285 IN75A.  MOV     A,M
 00FB E608         286         ANI     VRTC
 00FD C2FA00       287         JNZ     IN75A
 0100 7E           288 IN75B:  MOV     A,M
 0101 E608         289         ANI     VRTC
 0103 CA0001       290         JZ      IN75B
                   291         .
                   292 ;THIS IS THE CRT IDLE LOOP.  THE LINE/LOCAL SWITCH IS MONITORED,
                   293 ;AND ANY KEY DEPRESSIONS FREOM THE PREVIOUS FRAME INTERRUPT ARE
                   294 ,HANDLED CORRESPONDINGLY.
 0106 3E18         295 SETUP:  MVI     A,18H           ;SET MASK
 0108 30           296         SIM                     ;LOAD MASK
 0109 FB           297         EI                      ;ENABLE INTERRUPTS
                   298         ;
                   299         ;READ THE USART
                   300         ;
 010A 3A0240       301 RXRDY:  LDA     PORTC   ;TEST LINE/LOCAL SWITCH.
 010D E680         302         ANI     LCL
 010F C21A01       303         JNZ     KEYINP          ;LEAVE IF IN LOCAL
 0112 3A0120       304         LDA     SERCMD          ;READ 8251 FLAGS
 0115 E602         305         ANI     02H             ;LOOK AT RXRDY
 0117 C25701       306         JNZ     OK7             ;IF HAVE CHARACTER GO TO WORK
 011A 3ADD67       307 KEYINP: LDA     KEYDWN          ;GET KEYBOARD CHARACTER
 011D E680         308         ANI     80H             ;IS IT THERE
 011F C22D01       309         JNZ     KEYS            ;IF KEY IS PUSHED LEAVE
 0122 3E00         310         MVI     A,00H           ;ZERO A
 0124 32E067       311         STA     KEYOK           ;CLEAR KEYOK
 0127 C30A01       312         JMP     RXRDY           ;LOOP AGAIN
                   313
                   314 ;AUTO-REPEAT FUNCTION.
                   315 ;NOT IMPLEMENTED YET.
 012A C30A01       316 REPEAT: JMP     RXRDY
                   317
                   318 ;PROGRAM REACHES THIS POINT IF KEY DEPRESSION WAS SENSES
                   319 ;DURING LAST KEYBOARD SCAN.
 012D 3AE067       320 KEYS:   LDA     KEYOK           ;WAS KEY DOWN
 0130 4F           321         MOV     C,A             ;SAVE A IN C
 0131 3ADE67       322         LDA     KBCHR           ;GET KEYBOARD CHARACTER
 0134 B9           323         CMP     C               ;IS IT THE SAME AS KEYOK
 0135 CA2A01       324         JZ      REPEAT          ;CHECK FOR KEY REPEAT.
 0138 32E067       325         STA     KEYOK           ;IF NOT SAVE IT
 013B 32DC67       326         STA     USCHR           ;SAVE IT
 013E 3A0240       327         LDA     PORTC           ;TEST LINE/LOCAL SWITCH.
 0141 E680         328         ANI     LCL
 0143 C25F01       329         JNZ     CHREC           ;JMP IF IN LOCAL MODE.
 0146 3A0120       330 TRANS:  LDA     SERCMD          ;GET USART FLAGS
 0149 E601         331         ANI     01H             ;READY TO TRANSMIT?
 014B CA4601       332         JZ      TRANS           ;LOOP IF NOT READY
 014E 3ADC67       333         LDA     USCHR           ;GET CHARACTER
 0151 320020       334         STA     SERDAT          ;PUT IN USART
 0154 C30601       335         JMP     SETUP           ;LEAVE
 0157 3A0020       336 OK7:    LDA     SERDAT          ;READ USART
 015A E67F         337         ANI     07FH            ;STRIP MSB
 015C 32DC67       338         STA     USCHR           ;PUT IT IN MEMORY
                   339
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LOC  OBJ          LINE        SOURCE STATEMENT

                   340         ;THIS ROUTINE CHECKS FOR ESCAPE CHARACTERS, LF, CR,
                   341         ;FF, AND BACK SPACE
                   342         ;
015F 3AE167        343 CHREC:  LDA     ESCP            ;ESCAPE SET?
0162 FE80          344         CPI     80H             ;SEE IF IT IS
0164 CA4902        345         JZ      ESSQ            ;LEAVE IF IT IS
0167 3ADC67        346         LDA     USCHR           ;GET CHARACTER
016A FE0A          347         CPI     0AH             ;LINE FEED
016C CAB103        348         JZ      LNFD            ;GO TO LINE FEED
016F FE0C          349         CPI     0CH             ;FORM FEED
0171 CA8603        350         JZ      FMFD            ;GO TO FORM FEED
0174 FE0D          351         CPI     0DH             ;CR
0176 CA6503        352         JZ      CGRT            ;DO A CR
0179 FE08          353         CPI     08H             ;BACK SPACE
017B CA2603        354         JZ      LEFT            ;DO A BACK SPACE
017E FE1B          355         CPI     1BH             ;ESCAPE
0180 CA5D03        356         JZ      ESKAP           ;DO AN ESCAPE
0183 B7            357         ORA     A               ;CLEAR CARRY
0184 C6E0          358         ADI     0E0H            ;SEE IF CHARACTER IS PRINTABLE
0186 DA2E04        359         JC      CHRPUT          ;IF PRINTABLE DO IT
0189 C30601        360         JMP     SETUP           ;GO BACK AND READ USART AGAIN
                   361
                   362 ;THIS ROUTINE IS USED TO SCAN THE KEYBOARD DURIN THE VERTICAL
                   363 ;RETRACE INTERVAL.  IF A KEY DEPRESSION IS SENSED, THEN 'SCNLIN'
                   364 ;IS SET TO THE VALUE OF THE SCAN LINES IN WHICH THE KEY IS SENSED,
                   365 ;AND 'RETLIN' IS SET TO THE VALUE OF THE RETURN LINES, AND
                   366 ;'KEYDOWN' IS SET TO 40H.  THIS INFORMATION IS USED BY THE IDLE LOOP
                   367 ;TO PERFORM KEY DEBOUNCE AND VALIDATION.
018C 21E267        368 RDKB:   LXI     H,SHCON         ;INIT FOR KEYBOARD SCAN.
018F 3A0240        369         LDA     PORTC           ;SAVE CONTROL AND SHIFT KEYS.
0192 77            370         MOV     M,A
0193 3EFE          371         MVI     A,NOT 1
0195 320040        372 LOOPK:  STA     PORTA           ;SET SCAN LINES
0198 47            373         MOV     B,A
0199 3A0140        374         LDA     PORTB           ;READ RETURN LINES
019C 3C            375         INR     A               ;CHECK ANY KEYS DOWN.
019D C2AA01        376         JNZ     SAVKEY          ;JMP IF KEY DEPRESSED.
01A0 78            377         MOV     A,B             ;CALCULATE NEXT SCAN VALUE.
01A1 07            378         RLC
01A2 DA9501        379         JC      LOOPK           ;JMP IF MORE SCAN LINES.
01A5 AF            380         XRA     A               ;OTHERWISE, INDICATE NO KEYS DOWN.
01A6 32DD67        381         STA     KEYDWN
01A9 C9            382         RET
01AA 23            383 SAVKEY: INX     H               ;POINT AT 'RETLIN'.
01AB 3D            384         DCR     A               ;ADJUST RETURN LINES.
01AC 77            385         MOV     M,A             ;SAVE RETURN LINE IN MEMORY
01AD 23            386         INX     H               ;POINT H AT SCAN LINE
01AE 70            387         MOV     M,B             ;SAVE SCAN LINE IN MEMORY
01AF 3E40          388         MVI     A,40H           ;SET A
01B1 32DD67        389         STA     KEYDWN          ;SAVE KEY DOWN
01B4 C9            390         RET                     ;LEAVE
                   391
                   392 ;THIS ROUTINE IS CALLED FROM THE FRAME INTERRUPT WHEN A KEY DEPRESSION
                   393 ;WAS SENSED DURING THE LAST VERTICAL RETRACE INTERVAL.
01B5 21E467        394 KYDOWN: LXI     H,SCNLIN        ;GET SCAN LINE
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LOC  OBJ      LINE     SOURCE STATEMENT

01B8 7E         395      MOV    A,M          ;PUT SCAN LINE IN A
01B9 320040     396      STA    PORTA        ;OUTPUT SCAN LINE TO PORT A
01BC 2B         397      DCX    H            ;POINT AT RETURN LINE
01BD 3A0140     398      LDA    PORTB        ;GET RETURN LINES
01C0 B6         399      ORA    M            ;ARE THEY THE SAME?
01C1 2F         400      CMA                 ;INVERT A
01C2 B7         401      ORA    A            ;SET FLAGS
01C3 CA2102     402      JZ     KYCHNG       ;IF DIFFERENT KEY HAS CHANGED
01C6 3ADD67     403      LDA    KEYDWN       ;GET KEY DOWN
01C9 E601       404      ANI    01H          ;HAS THIS BEEN DONE BEFORE?
01CB C2A700     405      JNZ    EFRAME         ;LEAVE IF IT HAS
01CE 3A0140     406      LDA    PORTB        ;GET RETURN LINE
01D1 06FF       407      MVI    B,0FFH       ;GET READY TO ZERO B
01D3 04         408 UP:  INR    B            ;ZERO B
01D4 0F         409      RRC                 ;ROTATE A
01D5 DAD301     410      JC     UP           ;DO IT AGAIN
01D8 23         411      INX    H            ;POINT H AT SCAN LINES
01D9 7E         412      MOV    A,M          ;GET SCAN LINES
01DA 0EFF       413      MVI    C,0FFH       ;GET READY TO LOOP
01DC 0C         414 UP1: INR    C            ;START C COUNTING
01DD 0F         415      RRC                 ;ROTATE A
01DE DADC01     416      JC     UP1          ;JUMP TO LOOP
01E1 78         417      MOV    A,B          ;GET RETURN LINES
01E2 07         418      RLC                 ;MOVE OVER ONCE
01E3 07         419      RLC                 ;MOVE OVER TWICE
01E4 07         420      RLC                 ;MOVE OVER THREE TIMES
01E5 B1         421      ORA    C            ;OR SCAN AND RETURN LINES
01E6 47         422      MOV    B,A          ;SAVE A IN B
01E7 3A0240     423      LDA    PORTC        ;GET SHIFT CONTROL
01EA E640       424      ANI    40H          ;IS CONTROL SET
01EC 4F         425      MOV    C,A          ;SAVE A IN C
01ED 3AE267     426      LDA    SHCON        ;GET SHIFT CONTROL
01F0 57         427      MOV    D,A          ;SAVE A IN D
01F1 E640       428      ANI    40H          ;STRIP CONTROL
01F3 B1         429      ORA    C            ;SET BIT
01F4 CA3902     430      JZ     CNTDWN       ;IF SET LEAVE
01F7 3A0240     431      LDA    PORTC        ;READ IT AGAIN
01FA E620       432      ANI    20H          ;STRIP SHIFT
01FC 4F         433      MOV    C,A          ;SAVE A
01FD 7A         434      MOV    A,D          ;GET SHIFT CONTROL
01FE E620       435      ANI    20H          ;STRIP CONTROL
0200 B1         436      ORA    C            ;ARE THEY THE SAME?
0201 CA4202     437      JZ     SHDWN        ;IF SET LEAVE
0204 58         438 SCR: MOV    E,B          ;PUT  TARGET IN E
0205 1600       439      MVI    D,00H        ;ZERO D
0207 21D304     440      LXI    H,KYLKUP     ;GET LOOKUP TABLE
020A 19         441      DAD    D            ;GET OFFSET
020B 7E         442      MOV    A,M          ;GET CHARACTER
020C 47         443      MOV    B,A          ;PUT CHARACTER IN B
020D 3A0240     444      LDA    PORTC        ;GET PORTC
0210 E610       445      ANI    10H          ;STRIP BIT
0212 CA2902     446      JZ     CAPLOC       ;CAPS LOCK
0215 78         447      MOV    A,B          ;GET A BACK
0216 32DE67     448 STKEY: STA  KBCHR        ;SAVE CHARACTER
0219 3EC1       449      MVI    A,0C1H       ;SET A
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LOC  OBJ          LINE        SOURCE STATEMENT

021B 32DD67         450          STA     KEYDWN          ;SAVE KEY DOWN
021E C3A700         451          JMP     EFRAME            ;LEAVE
                    452
0221 3E00           453 KYCHNG:  MVI     A,00H           ;ZERO 0
0223 32DD67         454          STA     KEYDWN          ;RESET KEY DOWN
0226 C3A700         455          JMP     EFRAME            ;LEAVE
                    456          ;
                    457          ;IF THE CAP LOCK BUTTON IS PUSHED THIS ROUTINE SEES IF
                    458          ;THE CHARACTER IS BETWEEN 61H AND 7AH AND IF IT IS THIS
                    459          ;ROUTINE ASSUMES THAT THE CHARACTER IS LOWER CASE ASCII
                    460          ;AND SUBTRACTS 20H, WHICH CONVERTS THE CHARACTER TO
                    461          ;UPPER CASE ASCII
                    462          ;
0229 78             463 CAPLOC:  MOV     A,B             ;GET A BACK
022A FE60           464          CPI     60H             ;HOW BIG IS IT?
022C DA1602         465          JC      STKEY           ;LEAVE IF IT'S TOO SMALL
022F FE7B           466          CPI     7BH             ;IS IT TOO BIG
0231 D21602         467          JNC     STKEY           ;LEAVE IF TOO BIG
0234 D620           468          SUI     20H             ;ADJUST A
0236 C31602         469          JMP     STKEY           ;STORE THE KEY
                    470          ;
                    471          ;THE ROUTINES SHDWN AND CNTDWN SET BIT 6 AND 7 RESPECTIVLY
                    472          ;IN THE ACC.
                    473          ;
0239 3E80           474 CNTDWN:  MVI     A,80H           ;SET BIT 7 IN A
023B B0             475          ORA     B               ;OR WITH CHARACTER
023C E6BF           476          ANI     0BFH            ;MAKE SURE SHIFT IS NOT SET
023E 47             477          MOV     B,A             ;PUT IT BACK IN B
023F C30402         478          JMP     SCR             ;GO BACK
0242 3E40           479 SHDWN:   MVI     A,40H           ;SET BIT 6 IN A
0244 B0             480          ORA     B               ;OR WITH CHARACTER
0245 47             481          MOV     B,A             ;PUT IT BACK IN B
0246 C30402         482          JMP     SCR             ;GO BACK
                    483          ;
                    484          ;THIS ROUTINE RESETS THE ESCAPE LOCATION AND DECODES
                    485          ;THE CHARACTERS FOLLOWING AN ESCAPE.  THE COMMANDS ARE
                    486          ;COMPATABLE WITH INTELS CREDIT TEXT EDITOR
                    487          ;
0249 3E00           488 ESSQ:    MVI     A,00H           ;ZERO A
024B 32E167         489          STA     ESCP            ;RESET  ESCP
024E 3ADC67         490          LDA     USCHR           ;GET CHARACTER
0251 FE42           491          CPI     'B'             ;DOWN
0253 CA7C02         492          JZ      DOWN            ;MOVE CURSOR DOWN
0256 FE45           493          CPI     'E'             ;CLEAR SCREEN CHARACTER
0258 CA9D02         494          JZ      CLEAR           ;CLEAR THE SCREEN
025B FE4A           495          CPI     'J'             ;CLEAR REST OF SCREEN
025D CAA302         496          JZ      CLRST           ;GO CLEAR THE REST OF THE SCREEN
0260 FE4B           497          CPI     'K'             ;CLEAR LINE CHARACTER
0262 CADF02         498          JZ      CLRLIN          ;GO CLEAR A LINE
0265 FE41           499          CPI     'A'             ;CURSOR UP CHARACTER
0267 CAEB02         500          JZ      UPCUR           ;MOVE CURSOR UP
026A FE43           501          CPI     'C'             ;CURSOR RIGHT CHARACTER
026C CAFD02         502          JZ      RIGHT           ;MOVE CURSOR TO THE RIGHT
026F FE44           503          CPI     'D'             ;CURSOR LEFT CHARACTER
0271 CA2603         504          JZ      LEFT            ;MOVE CURSOR TO THE LEFT
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 LOC  OBJ          LINE        SOURCE STATEMENT

 0274 FE48          505         CPI     'H'             ;HOME CURSOR CHARACTER
 0276 CA4F03        506         JZ      HOME            ;HOME THE CURSOR
 0279 C30601        507         JMP     SETUP           ;LEAVE
                    508         ;
                    509         ;THIS ROUTINE MOVES THE CURSOR DOWN ONE CHARACTER LINE
                    510         ;
 027C 3ADA67        511 DOWN:   LDA     CURSY           ;PUT CURSOR Y IN A
 027F FE18          512         CPI     CURBOT          ;SEE IF ON BOTTOM OF SCREEN
 0281 CA0601        513         JZ      SETUP           ;LEAVE IF ON BOTTOM
 0284 3C            514         INR     A               ;INCREMENT Y CURSOR
 0285 32DA67        515         STA     CURSY           ;SAVE NEW CURSOR
 0288 CD7003        516         CALL    LDCUR           ;LOAD THE CURSOR
 028B CD5C04        517         CALL    CALCU           ;CALCULATE ADDRESS
 028E 7E            518         MOV     A,M             ;GET FIRST LOCATION OF THE LINE
 028F FEF0          519         CPI     0F0H            ;SEE IF CLEAR SCREEN CHARACTER
 0291 C20601        520         JNZ     SETUP           ;LEAVE IF IT IS NOT
 0294 22DB67        521         SHLD    LOC80           ;SAVE BEGINNING OF THE LINE
 0297 CDD003        522         CALL    CLLINE          ;CLEAR THE LINE
 029A C30601        523         JMP     SETUP           ;LEAVE
                    524         ;
                    525         ;THIS ROUTINE CLEARS THE SCREEN.
                    526         ;
 029D CDA003        527 CLEAR:  CALL    CLSCR           ;GO CLEAR THE SCREEN
 02A0 C30601        528         JMP     SETUP           ;GO BACK
                    529         ;
                    530         ;THIS ROUTINE CLEARS ALL LINES BENEATH THE LOCATION
                    531         ;OF THE CURSOR.
                    532         ;
 02A3 CD5C04        533 CLRST:  CALL    CALCU           ;CALCULATE ADDRESS
 02A6 CD7904        534         CALL    ADX             ;ADD X POSITION
 02A9 0650          535         MVI     B,(LINSIZ-1)+1  ;LOAD LARGEST X COORDINATE.
 02AB 0E20          536         MVI     C,' '
 02AD 3ADA67        537         LDA     CURSY   ;LOAD CURRENT Y COORDINATE.
 02B0 5F            538         MOV     E,A
 02B1 3ADB67        539         LDA     CURSX   ;LOAD CURRENT X COORDINATE.
 02B4 A7            540         ANA     A       ;SEE IF AT BEGINNING OF LINE.
 02B5 CAC002        541         JZ      OVR1    ;JMP IF IT IS.
 02B8 71            542 LLP:    MOV     M,C     ;CLEAR NEXT CHARACTER ON CURRENT LINE.
 02B9 23            543         INX     H
 02BA 3C            544         INR     A       ;SEE IF MORE TO THE LINE.
 02BB B8            545         CMP     B
 02BC C2B802        546         JNZ     LLP     ;JMP IF MORE.
 02BF 1C            547         INR     E       ;UPDATE LINE COUNT.
 02C0 015000        548 OVR1:   LXI     B,LINSIZ;LOAD OFFSET TO NEXT LINE.
 02C3 7B            549 OVR2:   MOV     A,E     ;SEE IF MORE LINES
 02C4 FE19          550         CPI     NUMLIN
 02C6 CA0601        551         JZ      SETUP   ;EXIT IF DONE.
 02C9 36F0          552         MVI     M,EOR   ;BLANK ROW.
 02CB 1C            553         INR     E       ;UPDATE LINE COUNTER.
 02CC 09            554         DAD     B       ;POINT TO NEXT ROW.
 02CD 7D            555         MOV     A,L     ;CHECK FOR DISPLAY WRAP-AROUND.
 02CE FED0          556         CPI     LOW(LAST)
 02D0 C2C302        557         JNZ     OVR2
 02D3 7C            558         MOV     A,H
 02D4 FE67          559         CPI     HIGH(LAST)
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LOC  OBJ          LINE        SOURCE STATEMENT

02D6 C2C302        560          JNZ     OVR2
02D9 210060        561          LXI     H,TOPDIS;CORRECT FOR WRAP-AROUND.
02DC C3C302        562          JMP     OVR2    ;CONTINUE BLANKING REST OF SCREEN.
                   563          ;
                   564          ;THIS ROUTINE CLEARS THE LINE THE CURSOR IS ON.
                   565          ;
02DF CD5C04        566 CLRLIN:  CALL    CALCU           ;CALCULATE ADDRESS
02E2 22D867        567          SHLD    LOC80           ;STORE H AND L TO CLEAR LINE
02E5 CDD003        568          CALL    CLLINE          ;CLEAR THE LINE
02E8 C30601        569          JMP     SETUP           ;GO BACK
                   570          ;
                   571          ;THIS ROUTINE MOVES THE CURSOR UP ONE LINE.
                   572          ;
02EB 3ADA67        573 UPCUR:   LDA     CURSY           ;GET Y CURSOR
02EE FE00          574          CPI     00H             ;IS IT ZERO
02F0 CA0601        575          JZ      SETUP           ;IF IT IS LEAVE
02F3 3D            576          DCR     A               ;MOVE CURSOR UP
02F4 32DA67        577          STA     CURSY           ;SAVE NEW CURSOR
02F7 CD7003        578          CALL    LDCUR           ;LOAD THE CURSOR
02FA C30601        579          JMP     SETUP           ;LEAVE
                   580          ;
                   581          ;THIS ROUTINE MOVES THE CURSOR ONE LOCATION TO THE RIGHT
                   582          ;
02FD 3AD867        583 RIGHT:   LDA     CURSX           ;GET X CURSOR
0300 FE4F          584          CPI     LINSIZ-1        ;IS IT ALL THE WAY OVER?
0302 C21C03        585          JNZ     NTOVER          ;IF NOT JUMP AROUND
0305 3ADA67        586          LDA     CURSY           ;GET Y CURSOR
0308 FE18          587          CPI     CURBOT          ;SEE IF ON BOTTOM
030A CA1103        588          JZ      GD18            ;IF WE ARE JUMP
030D 3C            589          INR     A               ;INCREMENT Y CURSOR
030E 32DA67        590          STA     CURSY           ;SAVE IT
0311 3E00          591 GD18:    MVI     A,00H           ;ZERO A
0313 32D867        592          STA     CURSX           ;ZERO X CURSOR
0316 CD7003        593          CALL    LDCUR           ;LOAD THE CURSOR
0319 C30601        594          JMP     SETUP           ;LEAVE
031C 3C            595 NTOVER:  INR     A               ;INCREMENT X CURSOR
031D 32D867        596          STA     CURSX           ;SAVE IT
0320 CD7003        597          CALL    LDCUR           ;LOAD THE CURSOR
0323 C30601        598          JMP     SETUP           ;LEAVE
                   599          ;
                   600          ;THIS ROUTINE MOVES THE CURSOR LEFT ONE CHARACTER POSITION
                   601          ;
0326 3AD867        602 LEFT:    LDA     CURSX           ;GET X CURSOR
0329 FE00          603          CPI     00H             ;IS IT ALL THE WAY OVER
032B C24503        604          JNZ     NOVER           ;IF NOT JUMP AROUND
032E 3ADA67        605          LDA     CURSY           ;GET CURSOR Y
0331 FE00          606          CPI     00H             ;IS IT ZERO?
0333 CA0601        607          JZ      SETUP           ;IF IT IS JUMP
0336 3D            608          DCR     A               ;MOVE CURSOR Y UP
0337 32DA67        609          STA     CURSY           ;SAVE IT
033A 3E4F          610          MVI     A,LINSIZ-1      ;GET LAST X LOCATION
033C 32D867        611          STA     CURSX           ;SAVE IT
033F CD7003        612          CALL    LDCUR           ;LOAD THE CURSOR
0342 C30601        613          JMP     SETUP
0345 3D            614 NOVER:   DCR     A               ;ADJUST X CURSOR
```

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LOC  OBJ       LINE       SOURCE STATEMENT

0346 32DB67     615        STA     CURSX           ;SAVE CURSOR X
0349 CD7003     616        CALL    LDCUR           ;LOAD THE CURSOR
034C C30601     617        JMP     SETUP           ;LEAVE
                618        ;
                619        ;THIS ROUTINE HOMES THE CURSOR.
                620        ;
034F 3E00       621 HOME:  MVI     A,00H           ;ZERO A
0351 32DB67     622        STA     CURSX           ;ZERO X CURSOR
0354 32DA67     623        STA     CURSY           ;ZERO Y CURSOR
0357 CD7003     624        CALL    LDCUR           ;LOAD THE CURSOR
035A C30601     625        JMP     SETUP           ;LEAVE
                626        ;
                627        ;THIS ROUTINE SETS THE ESCAPE BIT
                628        ;
035D 3E80       629 ESKAP: MVI     A,80H           ;LOAD A WITH ESCAPE BIT
035F 32E167     630        STA     ESCP            ;SET ESCAPE LOCATION
0362 C30601     631        JMP     SETUP           ;GO BACK AND READ USART
                632        ;
                633        ;THIS ROUTINE DOES A CR
                634        ;
0365 3E00       635 CGRT:  MVI     A,00H           ;ZERO A
0367 32DB67     636        STA     CURSX           ;ZERO  CURSOR X
036A CD7003     637        CALL    LDCUR           ;LOAD CURSOR INTO 8275
036D C30601     638        JMP     SETUP           ;POLL USART AGAIN
                639        ;
                640        ;THIS ROUTINE LOADS THE CURSOR
                641        ;
0370 21D167     642 LDCUR: LXI     H,LD75+1
0373 11D16F     643        LXI     D,CRTCMD
0376 3680       644 LDCUR1: MVI    M,80H    ;LOAD CURSOR COMMAND.
0378 1A         645        LDAX    D
0379 1B         646        DCX     D
037A 2B         647        DCX     H
037B 3ADB67     648        LDA     CURSX
037E 77         649        MOV     M,A
037F 1A         650        LDAX    D
0380 3ADA67     651        LDA     CURSY
0383 77         652        MOV     M,A
0384 1A         653        LDAX    D
0385 C9         654        RET
                655        ;
                656        ;THIS ROUTINE DOES A FORM FEED
                657        ;
0386 CDA003     658 FMFD:  CALL    CLSCR           ;CALL CLEAR SCREEN
0389 210060     659        LXI     H,TOPDIS              ;PUT TOP DISPLAY IN HL
038C 22D867     660        SHLD    LOC80           ;PUT IT IN LOC80
038F CDD003     661        CALL    CLLINE          ;CLEAR TOP LINE
0392 3E00       662        MVI     A,00H           ;ZERO A
0394 32DB67     663        STA     CURSX           ;ZERO CURSOR X
0397 32DA67     664        STA     CURSY           ;ZERO CURSOR Y
039A CD7003     665        CALL    LDCUR           ;LOAD THE CURSOR
039D C30601     666        JMP     SETUP           ;BACK TO USART
                667        ;
                668        ;THIS ROUTINE CLEARS THE SCREEN BY WRITING END OF ROW
                669        ;CHARACTERS INTO THE FIRST LOCATION OF ALL LINES ON
```

```
LOC  OBJ          LINE        SOURCE STATEMENT

                   670        ;THE SCREEN.
                   671        ;
03A0 3EF0          672 CLSCR: MVI     A,0F0H          ;PUT EOR CHARACTER IN A
03A2 0619          673        MVI     B,NUMLIN
03A4 210060        674        LXI     H,TOPDIS            ;LOAD H AND L WITH TOP OF RAM
03A7 115000        675        LXI     D,LINSIZ        ;LOAD LINE SIZE.
03AA 77            676 LOADX: MOV     M,A             ;MOVE EOR INTO MEMORY
03AB 19            677        DAD     D               ;CHANGE POINTER BY BOD
03AC 05            678        DCR     B               ;COUNT THE LOOPS
03AD C2AA03        679        JNZ     LOADX           ;CONTINUE IF NOT ZERO
03B0 C9            680        RET                     ;GO BACK
                   681        ;
                   682        ;THIS ROUTINE DOES A LINE FEED
                   683        ;
03B1 CDB703        684 LNFD:  CALL    LNFD1           ;CALL ROUTINE
03B4 C30601        685        JMP     SETUP           ;POLL FLAGS
                   686        ;
                   687        ;LINE FEED
                   688        ;
03B7 3ADA67        689 LNFD1: LDA     CURSY           ;GET Y LOCATION OF CURSOR
03BA FE18          690        CPI     CURBOT          ;SEE IF AT BOTTOM OF SCREEN
03BC CA0E04        691        JZ      ONBOT           ;IF WE ARE, LEAVE
03BF 3C            692        INR     A               ;INCREMENT A
03C0 32DA67        693        STA     CURSY           ;SAVE NEW CURSOR
03C3 CD5C04        694        CALL    CALCU           ;CALCULATE ADDRESS
03C6 22D867        695        SHLD    LOC80           ;SAVE TO CLEAR LINE
03C9 CDD003        696        CALL    CLLINE          ;CLEAR THE LINE
03CC CD7003        697        CALL    LDCUR           ;LOAD THE CURSOR
03CF C9            698        RET                     ;LEAVE
                   699        ;
                   700        ;THIS ROUTINE CLEARS THE LINE WHOSE FIRST ADDRESS
                   701        ;IS IN LOC80. PUSH INSTRUCTIONS ARE USED TO RAPIDLY
                   702        ;CLEAR THE LINE
                   703        ;
03D0 F3            704 CLLINE: DI                     ;NO INTERRUPTS HERE
03D1 2AD867        705        LHLD    LOC80           ;GET LOC80
03D4 115000        706        LXI     D,LINSIZ        ;GET OFFSET
03D7 19            707        DAD     D               ;ADD OFFSET
03D8 EB            708        XCHG                    ;PUT START IN DE
03D9 210000        709        LXI     H,0000H         ;ZERO HL
03DC 39            710        DAD     SP              ;GET STACK
03DD EB            711        XCHG                    ;PUT STACK IN DE
03DE F9            712        SPHL                    ;PUT START IN SP
03DF 212020        713        LXI     H,'  '          ;PUT SPACES IN HL
                   714        ;
                   715        ;NOW DO 40 PUSH INSTRUCTIONS TO CLEAR THE LINE
                   716        ;
                   717        REPT (LINSIZ/2)
                   718        PUSH    H
                   719        ENDM
03E2 E5            720+       PUSH    H
03E3 E5            721+       PUSH    H
03E4 E5            722+       PUSH    H
03E5 E5            723+       PUSH    H
03E6 E5            724+       PUSH    H
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LOC  OBJ          LINE       SOURCE STATEMENT

03E7 E5           725+       PUSH    H
03E8 E5           726+       PUSH    H
03E9 E5           727+       PUSH    H
03EA E5           728+       PUSH    H
03EB E5           729+       PUSH    H
03EC E5           730+       PUSH    H
03ED E5           731+       PUSH    H
03EE E5           732+       PUSH    H
03EF E5           733+       PUSH    H
03F0 E5           734+       PUSH    H
03F1 E5           735+       PUSH    H
03F2 E5           736+       PUSH    H
03F3 E5           737+       PUSH    H
03F4 E5           738+       PUSH    H
03F5 E5           739+       PUSH    H
03F6 E5           740+       PUSH    H
03F7 E5           741+       PUSH    H
03F8 E5           742+       PUSH    H
03F9 E5           743+       PUSH    H
03FA E5           744+       PUSH    H
03FB E5           745+       PUSH    H
03FC E5           746+       PUSH    H
03FD E5           747+       PUSH    H
03FE E5           748+       PUSH    H
03FF E5           749+       PUSH    H
0400 E5           750+       PUSH    H
0401 E5           751+       PUSH    H
0402 E5           752+       PUSH    H
0403 E5           753+       PUSH    H
0404 E5           754+       PUSH    H
0405 E5           755+       PUSH    H
0406 E5           756+       PUSH    H
0407 E5           757+       PUSH    H
0408 E5           758+       PUSH    H
0409 E5           759+       PUSH    H
040A EB           760        XCHG                    ;PUT STACK IN HL
040B F9           761        SPHL                    ;PUT IT BACK IN SP
040C FB           762        EI                      ;ENABLE INTERRUPTS
040D C9           763        RET                     ;GO BACK
                  764        ;
                  765        ;IF CURSOR IS ON THE BOTTOM OF THE SCREEN THIS ROUTINE
                  766        ;IS USED TO IMPLEMENT THE LINE FEED
                  767        ;
040E 2AD667       768 ONBOT: LHLD    TOPAD           ;GET TOP ADDRESS
0411 22D867       769        SHLD    LOC80           ;SAVE IT IN LOC80
0414 115000       770        LXI     D,LINSIZ                ;LINE LENGTH
0417 19           771        DAD     D               ;ADD HL + DE
0418 EB           772        XCHG
0419 213098       773        LXI     H, - (LAST)
041C 19           774        DAD     D
041D EB           775        XCHG
041E D22404       776        JNC     ARND
0421 210060       777        LXI     H,TOPDIS                ;LOAD HL WITH TOP OF DISPLAY
0424 22D667       778 ARND:  SHLD    TOPAD           ;SAVE NEW TOP ADDRESS
0427 CDD003       779        CALL    CLLINE          ;CLEAR LINE
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LOC  OBJ          LINE      SOURCE STATEMENT

042A CD7003        780          CALL    LDCUR           ;LOAD THE CURSOR
042D C9            781          RET
                   782          ;
                   783          ;THIS ROUTINE PUTS A CHARACTER ON THE SCREEN AND
                   784          ;INCREMENTS THE X CURSOR POSITION.
                   785          ;AUTO CR/LF MODE IS USED.
                   786          ;
042E CD5C04        787 CHRPUT:  CALL    CALCU           ;CALCULATE SCREEN POSITION
0431 7E            788          MOV     A,M             ;GET FIRST CHARACTER
0432 FEF0          789          CPI     0F0H            ;IS IT A CLEAR LINE
0434 22D867        790          SHLD    LOC80           ;SAVE LINE TO CLEAR
0437 CCD003        791          CZ      CLLINE          ;CLEAR LINE
043A 2AD067        792          LHLD    LOC80           ;GET LINE
043D CD7704        793          CALL    ADX             ;ADD CURSOR X
0440 3ADC67        794          LDA     USCHR           ;GET CHARACTER
0443 77            795          MOV     M,A             ;PUT IT ON SCREEN
0444 3ADB67        796          LDA     CURSX           ;GET CURSOR X
0447 3C            797          INR     A               ;INCREMENT CURSOR X
0448 FE50          798          CPI     LINSIZ          ;HAS IT GONE TOO FAR?
044A C25304        799          JNZ     OK1             ;IF NOT GOOD
044D CDB703        800          CALL    LNFD1           ;DO A LINE FEED
0450 C36503        801          JMP     CGRT            ;DO A CR
0453 32DB67        802 OK1:     STA     CURSX           ;SAVE CURSOR
0456 CD7003        803          CALL    LDCUR           ;LOAD THE CURSOR
0459 C30601        804          JMP     SETUP           ;LEAVE
                   805          ;
                   806          ;THIS ROUTINE TAKES THE TOP ADDRESS AND THE Y CURSOR
                   807          ;LOCATION AND CALCULATES THE ADDRESS OF THE LINE
                   808          ;THAT THE CURSOR IS ON.  THE RESULT IS RETURNED IN H
                   809          ;AND L AND ALL REGISTERS ARE USED.
                   810          ;
045C 2ADA67        811 CALCU:   LHLD    CURSY    ;CALCULATE START ADDRESS OF CURRENT LINE.
045F 2600          812          MVI     H,0
0461 29            813          DAD     H
0462 119F04        814          LXI     D,LINTAB
0465 19            815          DAD     D
0466 5E            816          MOV     E,M
0467 23            817          INX     H
0468 56            818          MOV     D,M
0469 2AD667        819          LHLD    TOPAD    ;GET CURRENT SCREEN START ADDRESS.
046C 19            820          DAD     D        ;ADD CURSOR OFFSET TO CURRENT LINE.
046D EB            821          XCHG             ;SAVE.
046E 213098        822          LXI     H,-LAST;CHECK FOR CURSOR WRAP-AROUND.
0471 19            823          DAD     D
0472 EB            824          XCHG
0473 D0            825          RNC              ;RETURN IF NO WRAP.
0474 1130F8        826          LXI     D,TOPDIS-LAST;OTHERWISE, CORRECT FOR WRAP.
0477 19            827          DAD     D
0478 C9            828          RET
                   829          ;
                   830          ;THIS ROUTINE ADDS THE X CURSOR LOCATION TO THE ADDRESS
                   831          ;THAT IS IN THE H AND L REGISTERS AND RETURNS THE RESULT
                   832          ;IN H AND L
                   833          ;
0479 3ADB67        834 ADX:     LDA     CURSX           ;GET CURSOR
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LOC  OBJ          LINE        SOURCE STATEMENT

047C 0600          835         MVI     B,00H           ;ZERO B
047E 4F            836         MOV     C,A             ;PUT CURSOR X IN C
047F 09            837         DAD     B               ;ADD CURSOR X TO H AND L
0480 C9            838         RET                     ;LEAVE
                   839
                   840         ;THIS ROUTINE READS THE BAUD RATE SWITCHES FROM PORT C
                   841         ;OF THE 8255 AND LOOKS UP THE NUMBERS NEEDED TO LOAD
                   842         ;THE 8253 TO PROVIDE THE PROPER BAUD RATE.
                   843         ;
0481 3A0240        844 STBAUD: LDA     PORTC           ;READ BAUD RATE SWITCHES
0484 E607          845         ANI     111B
0486 21DF67        846         LXI     H,BAUD
0489 77            847 STB1:   MOV     M,A
048A 07            848         RLC                     ;MOVE BITS OVER ONE PLACE
048B 219105        849         LXI     H,BDLK          ;GET BAUD RATE LOOK UP TABLE
048E 1600          850         MVI     D,00H           ;ZERO D
0490 5F            851         MOV     E,A             ;PUT A IN E
0491 19            852         DAD     D               ;GET OFFSET
0492 11D37F        853         LXI     D,CNTM          ;POINT DE TO 8253
0495 3EB6          854         MVI     A,0B6H          ;GET CONTROL WORD
0497 12            855         STAX    D               ;STORE IN 8253
0498 1B            856         DCX     D               ;POINT AT #2 COUNTER
0499 7E            857         MOV     A,M             ;GET LSB BAUD RATE
049A 12            858         STAX    D               ;PUT IT IN 8253
049B 23            859         INX     H               ;POINT AT MSB BAUD RATE
049C 7E            860         MOV     A,M             ;GET MSB BAUD RATE
049D 12            861         STAX    D               ;PUT IT IN 8253
049E C9            862         RET             ;GO BACK.
                   863
                   864         ;THIS TABLE CONTAINS THE OFFSET ADDRESSES FOR EACH
                   865         ;OF THE 25 DISPLAYED LINES.
                   866         ;
0000               867 LINTAB: LINNUM SET 0
                   868         REPT (NUMLIN+1)
--                 869         DW      (LINSIZ*LINNUM)
-                  870         LINNUM SET (LINNUM+1)
                   871         ENDM
049F 0000          872+        DW      (LINSIZ*LINNUM)
0001               873+        LINNUM SET (LINNUM+1)
04A1 5000          874+        DW      (LINSIZ*LINNUM)
0002               875+        LINNUM SET (LINNUM+1)
04A3 A000          876+        DW      (LINSIZ*LINNUM)
0003               877+        LINNUM SET (LINNUM+1)
04A5 F000          878+        DW      (LINSIZ*LINNUM)
0004               879+        LINNUM SET (LINNUM+1)
04A7 4001          880+        DW      (LINSIZ*LINNUM)
0005               881+        LINNUM SET (LINNUM+1)
04A9 9001          882+        DW      (LINSIZ*LINNUM)
0006               883+        LINNUM SET (LINNUM+1)
04AB E001          884+        DW      (LINSIZ*LINNUM)
0007               885+        LINNUM SET (LINNUM+1)
04AD 3002          886+        DW      (LINSIZ*LINNUM)
0008               887+        LINNUM SET (LINNUM+1)
04AF 8002          888+        DW      (LINSIZ*LINNUM)
0009               889+        LINNUM SET (LINNUM+1)
```

```
 LOC  OBJ          LINE       SOURCE STATEMENT

 04B1 D002          890+       DW      (LINSIZ*LINNUM)
 000A               891+       LINNUM SET (LINNUM+1)
 04B3 2003          892+       DW      (LINSIZ*LINNUM)
 000B               893+       LINNUM SET (LINNUM+1)
 04B5 7003          894+       DW      (LINSIZ*LINNUM)
 000C               895+       LINNUM SET (LINNUM+1)
 04B7 C003          896+       DW      (LINSIZ*LINNUM)
 000D               897+       LINNUM SET (LINNUM+1)
 04B9 1004          898+       DW      (LINSIZ*LINNUM)
 000E               899+       LINNUM SET (LINNUM+1)
 04BB 6004          900+       DW      (LINSIZ*LINNUM)
 000F               901+       LINNUM SET (LINNUM+1)
 04BD B004          902+       DW      (LINSIZ*LINNUM)
 0010               903+       LINNUM SET (LINNUM+1)
 04BF 0005          904+       DW      (LINSIZ*LINNUM)
 0011               905+       LINNUM SET (LINNUM+1)
 04C1 5005          906+       DW      (LINSIZ*LINNUM)
 0012               907+       LINNUM SET (LINNUM+1)
 04C3 A005          908+       DW      (LINSIZ*LINNUM)
 0013               909+       LINNUM SET (LINNUM+1)
 04C5 F005          910+       DW      (LINSIZ*LINNUM)
 0014               911+       LINNUM SET (LINNUM+1)
 04C7 4006          912+       DW      (LINSIZ*LINNUM)
 0015               913+       LINNUM SET (LINNUM+1)
 04C9 9006          914+       DW      (LINSIZ*LINNUM)
 0016               915+       LINNUM SET (LINNUM+1)
 04CB E006          916+       DW      (LINSIZ*LINNUM)
 0017               917+       LINNUM SET (LINNUM+1)
 04CD 3007          918+       DW      (LINSIZ*LINNUM)
 0018               919+       LINNUM SET (LINNUM+1)
 04CF 8007          920+       DW      (LINSIZ*LINNUM)
 0019               921+       LINNUM SET (LINNUM+1)
 04D1 D007          922+       DW      (LINSIZ*LINNUM)
 001A               923+       LINNUM SET (LINNUM+1)
                    924        ;
                    925        ;KEYBOARD LOOKUP TABLE
                    926        ;THIS TABLE CONTAINS ALL THE ASCII CHARACTERS
                    927        ;THAT ARE TRANSMITTED BY THE TERMINAL
                    928        ;THE CHARACTERS ARE ORGANIZED SO THAT BITS 0,1 AND 2
                    929        ;ARE THE SCAN LINES, BITS 3,4 AND 5 ARE THE RETURN LINES
                    930        ;BIT 6 IS SHIFT AND BIT 7 IS CONTROL
                    931        ;
 04D3 38            932 KYLKUP: DB      38H,39H         ;8 AND 9
 04D4 39
 04D5 30            933         DB      30H,2DH         ;0 AND -
 04D6 2D
 04D7 3D            934         DB      3DH,5CH         ;= AND \
 04D8 5C
 04D9 08            935         DB      08H,00H         ;BS AND BREAK
 04DA 00
 04DB 75            936         DB      75H,69H         ;LOWER CASE U AND I
 04DC 69
 04DD 6F            937         DB      6FH,70H         ;LOWER CASE O AND P
 04DE 70
 04DF 5B            938         DB      5BH,5CH         ;[ AND \
```

```
LOC  OBJ          LINE        SOURCE STATEMENT

04E0 5C
04E1 0A            939          DB       0AH,7FH          ;LF AND DELETE
04E2 7F
04E3 6A            940          DB       6AH,6BH          ;LOWER CASE J AND K
04E4 6B
04E5 6C            941          DB       6CH,3BH          ;LOWER CASE L AND ;
04E6 3B
04E7 27            942          DB       27H,00H          ;' AND NOTHING
04E8 00
04E9 0D            943          DB       0DH,37H          ;CR AND 7
04EA 37
04EB 6D            944          DB       6DH,2CH          ;LOWER CASE M AND COMMA
04EC 2C
04ED 2E            945          DB       2EH,2FH          ;PERIOD AND SLASH
04EE 2F
04EF 00            946          DB       00H,00H          ;BLANK AND NOTHING
04F0 00
04F1 00            947          DB       00H,00H          ;NOTHING AND NOTHING
04F2 00
04F3 00            948          DB       00H,61H          ;NOTHING AND LOWER CASE A
04F4 61
04F5 7A            949          DB       7AH,78H          ;LOWER CASE Z AND X
04F6 78
04F7 63            950          DB       63H,76H          ;LOWER CASE C AND V
04F8 76
04F9 62            951          DB       62H,6EH          ;LOWER CASE B AND N
04FA 6E
04FB 79            952          DB       79H,00H          ;LOWER CASE Y AND NOTHING
04FC 00
04FD 00            953          DB       00H,20H          ;NOTHING AND SPACE
04FE 20
04FF 64            954          DB       64H,66H          ;LOWER CASE D AND F
0500 66
0501 67            955          DB       67H,68H          ;LOWER CASE G AND H
0502 68
0503 00            956          DB       00H,71H          ;TAB AND LOWER CASE Q
0504 71
0505 77            957          DB       77H,73H          ;LOWER CASE W AND S
0506 73
0507 65            958          DB       65H,72H          ;LOWER CASE E AND R
0508 72
0509 74            959          DB       74H,00H          ;LOWER CASE T AND NOTHING
050A 00
050B 1B            960          DB       1BH,31H          ;ESCAPE AND 1
050C 31
050D 32            961          DB       32H,33H          ; 2 AND 3
050E 33
050F 34            962          DB       34H,35H          ; 4 AND 5
0510 35
0511 36            963          DB       36H,00H          ; 6 AND NOTHING
0512 00
0513 2A            964          DB       2AH,28H          ;* AND )
0514 28
0515 29            965          DB       29H,5FH          ;( AND -
0516 5F
```

```
LOC  OBJ          LINE        SOURCE STATEMENT

0517 2B           966         DB      2BH, 00H        ;+ AND NOTHING
0518 00
0519 08           967         DB      08H, 00H        ;BS AND BREAK
051A 00
051B 55           968         DB      55H, 49H        ;U AND I
051C 49
051D 4F           969         DB      4FH, 50H        ;O AND P
051E 50
051F 5D           970         DB      5DH, 00H        ;] AND NO CHARACTER
0520 00
0521 0A           971         DB      0AH, 7FH        ;LF AND DELETE
0522 7F
0523 4A           972         DB      4AH, 4BH        ;J AND K
0524 4B
0525 4C           973         DB      4CH, 3AH        ;L AND :
0526 3A
0527 22           974         DB      22H, 00H        ;" AND NO CHARACTER
0528 00
0529 0D           975         DB      0DH, 26H        ;CR AND &
052A 26
052B 4D           976         DB      4DH, 3CH        ;M AND <
052C 3C
052D 3E           977         DB      3EH, 3FH        ;> AND ?
052E 3F
052F 00           978         DB      00H, 00H        ;BLANK AND NOTHING
0530 00
0531 00           979         DB      00H, 00H        ;NOTHING AND NOTHING
0532 00
0533 00           980         DB      00H, 41H        ;NOTHING AND A
0534 41
0535 5A           981         DB      5AH, 58H        ;Z AND X
0536 58
0537 43           982         DB      43H, 56H        ;C AND V
0538 56
0539 42           983         DB      42H, 4EH        ;B AND N
053A 4E
053B 59           984         DB      59H, 00H        ;Y AND NOTHING
053C 00
053D 00           985         DB      00H, 20H        ;NO CHARACTER AND SPACE
053E 20
053F 44           986         DB      44H, 46H        ;D AND F
0540 46
0541 47           987         DB      47H, 48H        ;G AND H
0542 48
0543 00           988         DB      00H, 51H        ;TAB AND Q
0544 51
0545 57           989         DB      57H, 53H        ;W AND S
0546 53
0547 45           990         DB      45H, 52H        ;E AND R
0548 52
0549 54           991         DB      54H, 00H        ;T AND NO CONNECTION
054A 00
054B 1B           992         DB      1BH, 21H        ;ESCAPE AND !
054C 21
054D 40           993         DB      40H, 23H        ;@ AND #
```

```
LOC  OBJ          LINE        SOURCE STATEMENT

054E 23
054F 24            994         DB      24H,25H         ;$ AND %
0550 25
0551 5E            995         DB      5EH,00H         ;^ AND NO CONNECTION
0552 00
                   996         ;
                   997         ;THIS IS WHERE THE CONTROL CHARACTERS ARE LOOKED UP
                   998         ;
0553 00            999         DB      00H,00H         ;NOTHING
0554 00
0555 00           1000         DB      00H,00H         ;NOTHING
0556 00
0557 00           1001         DB      00H,00H         ;NOTHING
0558 00
0559 00           1002         DB      00H,00H         ;NOTHING
055A 00
055B 15           1003         DB      15H,09H         ;CONTROL U AND I
055C 09
055D 0F           1004         DB      0FH,10H         ;CONTROL O AND P
055E 10
055F 0B           1005         DB      0BH,0CH         ;CONTROL [ AND \
0560 0C
0561 0A           1006         DB      0AH,7FH         ;LF AND DELETE
0562 7F
0563 0A           1007         DB      0AH,0BH         ;CONTROL J AND K
0564 0B
0565 0C           1008         DB      0CH,00H         ;CONTROL L AND NOTHING
0566 00
0567 00           1009         DB      00H,00H         ;NOTHING
0568 00
0569 0D           1010         DB      0DH,00H         ;CR AND NOTHING
056A 00
056B 0D           1011         DB      0DH,00H         ;CONTROL M AND COMMA
056C 00
056D 00           1012         DB      00H,00H         ;NOTHING
056E 00
056F 00           1013         DB      00H,00H         ;NOTHING
0570 00
0571 00           1014         DB      00H,00H         ;NOTHING AND NOTHING
0572 00
0573 1A           1015         DB      1AH,18H         ;CONTROL Z AND X
0574 18
0575 03           1016         DB      03H,16H         ;CONTROL C AND V
0576 16
0577 02           1017         DB      02H,0EH         ;CONTROL B AND N
0578 0E
0579 19           1018         DB      19H,00H         ;CONTROL Y AND NOTHING
057A 00
057B 00           1019         DB      00H,20H         ;NOTHING AND SPACE
057C 20
057D 04           1020         DB      04H,06H         ;CONTROL D AND F
057E 06
057F 07           1021         DB      07H,08H         ;CONTROL G AND H
0580 08
0581 00           1022         DB      00H,11H         ;NOTHING AND CONTROL Q
```

```
 LOC  OBJ          LINE        SOURCE STATEMENT

 0582 11
 0583 17          1023         DB      17H,13H          ;CONTROL W AND S
 0584 13
 0585 06          1024         DB      06H,12H          ;CONTROL E AND R
 0586 12
 0587 14          1025         DB      14H,00H          ;CONTROL W AND NOTHING
 0588 00
 0589 1B          1026         DB      1BH,1DH          ;ESCAPE AND HOME(CREDIT)
 058A 1D
 058B 1E          1027         DB      1EH,1CH          ;CURSOR UP AND DOWN(CREDIT)
 058C 1C
 058D 14          1028         DB      14H,1FH          ;CURSOR RIGHT AND LEFT(CREDIT)
 058E 1F
 058F 00          1029         DB      00H,00H          ;NOTHING
 0590 00
                  1030         ;
                  1031         ;LOOK UP TABLE FOR 8253 BAUD RATE GENERATOR
                  1032         ;
 01B5             1033 BD110   SET     1B5H     ;8253 COUNT FOR 110 BAUD.
 000A             1034 BD9600  EQU     000AH    ;8253 COUNT FOR 9600 BAUD.
                  1035
                  1036 SETBD   MACRO   COUNT
                  1037         DB      LOW COUNT
                  1038         DB      HIGH COUNT
                  1039         ENDM
                  1040                                  ;  S2  S1  S0   BAUD
                  1041
                  1042 BDLK:   SETBD   BD110            ;  ON  ON  ON   110
 0591 B5          1043+        DB      LOW BD110
 0592 01          1044+        DB      HIGH BD110
                  1045         SETBD   (BD9600*64)      ;  ON  ON  OFF  150
 0593 80          1046+        DB      LOW (BD9600*64)
 0594 02          1047+        DB      HIGH (BD9600*64)
                  1048         SETBD   (BD9600*32)      ;  ON  OFF ON   300
 0595 40          1049+        DB      LOW (BD9600*32)
 0596 01          1050+        DB      HIGH (BD9600*32)
                  1051         SETBD   (BD9600*16)      ;  ON  OFF OFF  600
 0597 A0          1052+        DB      LOW (BD9600*16)
 0598 00          1053+        DB      HIGH (BD9600*16)
                  1054         SETBD   (BD9600*8)       ;  OFF ON  ON   1200
 0599 50          1055+        DB      LOW (BD9600*8)
 059A 00          1056+        DB      HIGH (BD9600*8)
                  1057         SETBD   (BD9600*4)       ;  OFF ON  OFF 2400
 059B 28          1058+        DB      LOW (BD9600*4)
 059C 00          1059+        DB      HIGH (BD9600*4)
                  1060         SETBD   (BD9600*2)       ;  OFF OFF ON  4800
 059D 14          1061+        DB      LOW (BD9600*2)
 059E 00          1062+        DB      HIGH (BD9600*2)
                  1063         SETBD   (BD9600)         ;  OFF OFF OFF 9600
 059F 0A          1064+        DB      LOW (BD9600)
 05A0 00          1065+        DB      HIGH (BD9600)
                  1066
                  1067         END
```

PUBLIC SYMBOLS

EXTERNAL SYMBOLS

USER SYMBOLS

ADX	A 0479	ARND	A 0424	BASE51	A 2000	BASE53	A 7FD0	BASE55	A 4000	BAUD	A 67DF	BD110	A 01B5
BD9600	A 000A	BDLK	A 0591	BOTDIS	A 67CF	CALCU	A 045C	CAPLOC	A 0229	CCRT	A 0365	CHREC	A 015F
CHRPUT	A 042E	CLEAR	A 029D	CLLINE	A 03D0	CLRLIN	A 02DF	CLRST	A 02A3	CLSCR	A 03A0	CMD55	A 4003
CNT0	A 7FD0	CNT1	A 7FD1	CNT2	A 7FD2	CNTDWN	A 0239	CNTM	A 7FD3	CRTCMD	A 6FD1	CRTPAR	A 6FD0
CS75	A 6FD0	CURAD	A 67D4	CURBOT	A 0018	CURSX	A 67DB	CURSY	A 67DA	DACK	A 7000	DOWN	A 027C
EFRAME	A 00A7	EOR	A 00F0	ESCP	A 67E1	ESKAP	A 035D	ESSQ	A 0249	FMFD	A 0386	FRAME	A 0089
GD18	A 0311	HOME	A 034F	IN75	A 00D5	IN75A	A 00FA	IN75B	A 0100	INIT	A 0000	INIT1	A 0012
INIT51	A 00B2	INIT55	A 00AD	KBCHR	A 67DE	KEYDWN	A 67DD	KEYINP	A 011A	KEYOK	A 67E0	KEYS	A 012D
KYCHNG	A 0221	KYDOWN	A 01B5	KYLKUP	A 04D3	LAST	A 67D0	LCL	A 0080	LD75	A 67D0	LDCUR	A 0370
LDCUR1	A 0376	LEFT	A 0326	LINCNT	A 67E5	LINE	A 00A8	LINNUM	A 001A	LINSIZ	A 0050	LINTAB	A 049F
LLP	A 02B8	LNFD	A 03B1	LNFD1	A 03B7	LOADX	A 03AA	LOC80	A 67D8	LOOPF	A 0023	LOOPK	A 0195
NOVER	A 0345	NOWRAP	A 007D	NTOVER	A 031C	NUMLIN	A 0019	OK1	A 0453	OK7	A 0157	ONBOT	A 040E
OVR1	A 02C0	OVR2	A 02C3	POPDAT	A 0034	PORTA	A 4000	PORTB	A 4001	PORTC	A 4002	RAM	A 6000
RDKB	A 018C	REPEAT	A 012A	RETLIN	A 67E3	RIGHT	A 02FD	RXRDY	A 010A	SAVKEY	A 01AA	SCNLIN	A 67E4
SCR	A 0204	SERCMD	A 2001	SERDAT	A 2000	SETBD	+ 0003	SETUP	A 0106	SHCON	A 67E2	SHDWN	A 0242
STB1	A 0489	STBAUD	A 0481	STKEY	A 0216	STPTR	A 6800	TOPAD	A 67D6	TOPDIS	A 6000	TRANS	A 0146
UP	A 01D3	UP1	A 01DC	UPCUR	A 02EB	USCHR	A 67DC	VRTC	A 0008				

ASSEMBLY COMPLETE, NO ERRORS

```
ASM80 :F1:CHRGEN.SRC TITLE('25 APRIL 1980 D2-6')


ISIS-II 8080/8085 MACRO ASSEMBLER, V3.0        MODULE   PAGE    1
25 APRIL 1980 D2-6

  LOC  OBJ          LINE        SOURCE STATEMENT

                      1 ;FILENAME CHRGEN.SRC CREATED 30 JAN 1980 BY TOM ROSSI
                      2 ;THIS FILE CONTAINS THE DOT PATTERNS FOR THE LOW-COST
                      3 ;8275 CRT DEMO BOARDS.
                      4 ;
0000 00               5 ASC00:  DB      00000000B
0001 00               6         DB      00000000B
0002 00               7         DB      00000000B
0003 00               8         DB      00000000B
0004 00               9         DB      00000000B
0005 00              10         DB      00000000B
0006 00              11         DB      00000000B
0007 00              12         DB      00000000B
0008 00              13 ASC01:  DB      00000000B
0009 00              14         DB      00000000B
000A 00              15         DB      00000000B
000B 00              16         DB      00000000B
000C 00              17         DB      00000000B
000D 00              18         DB      00000000B
000E 00              19         DB      00000000B
000F 00              20         DB      00000000B
0010 00              21 ASC02:  DB      00000000B
0011 00              22         DB      00000000B
0012 00              23         DB      00000000B
0013 00              24         DB      00000000B
0014 00              25         DB      00000000B
0015 00              26         DB      00000000B
0016 00              27         DB      00000000B
0017 00              28         DB      00000000B
0018 00              29 ASC03:  DB      00000000B
0019 00              30         DB      00000000B
001A 00              31         DB      00000000B
001B 00              32         DB      00000000B
001C 00              33         DB      00000000B
001D 00              34         DB      00000000B
001E 00              35         DB      00000000B
001F 00              36         DB      00000000B
0020 00              37 ASC04:  DB      00000000B
0021 00              38         DB      00000000B
0022 00              39         DB      00000000B
0023 00              40         DB      00000000B
0024 00              41         DB      00000000B
0025 00              42         DB      00000000B
0026 00              43         DB      00000000B
0027 00              44         DB      00000000B
0028 00              45 ASC05:  DB      00000000B
0029 00              46         DB      00000000B
002A 00              47         DB      00000000B
002B 00              48         DB      00000000B
002C 00              49         DB      00000000B
002D 00              50         DB      00000000B
002E 00              51         DB      00000000B
002F 00              52         DB      00000000B
                     53 $EJECT

  LOC  OBJ          LINE        SOURCE STATEMENT

0060 00             103 ASC0C:  DB      00000000B
0061 00             104         DB      00000000B
0062 00             105         DB      00000000B
0063 00             106         DB      00000000B
0064 00             107         DB      00000000B
0065 00             108         DB      00000000B
0066 00             109         DB      00000000B
0067 00             110         DB      00000000B
0068 00             111 ASC0D:  DB      00000000B
0069 00             112         DB      00000000B
006A 00             113         DB      00000000B
006B 00             114         DB      00000000B
006C 00             115         DB      00000000B
006D 00             116         DB      00000000B
006E 00             117         DB      00000000B
006F 00             118         DB      00000000B
0070 00             119 ASC0E:  DB      00000000B
0071 00             120         DB      00000000B
0072 00             121         DB      00000000B
0073 00             122         DB      00000000B
0074 00             123         DB      00000000B
0075 00             124         DB      00000000B
0076 00             125         DB      00000000B
0077 00             126         DB      00000000B
0078 00             127 ASC0F:  DB      00000000B
0079 00             128         DB      00000000B
007A 00             129         DB      00000000B
007B 00             130         DB      00000000B
007C 00             131         DB      00000000B
007D 00             132         DB      00000000B
007E 00             133         DB      00000000B
007F 00             134         DB      00000000B
0080 00             135 ASC10:  DB      00000000B
0081 00             136         DB      00000000B
0082 00             137         DB      00000000B
0083 00             138         DB      00000000B
0084 00             139         DB      00000000B
0085 00             140         DB      00000000B
0086 00             141         DB      00000000B
0087 00             142         DB      00000000B
0088 00             143 ASC11:  DB      00000000B
0089 00             144         DB      00000000B
008A 00             145         DB      00000000B
008B 00             146         DB      00000000B
008C 00             147         DB      00000000B
008D 00             148         DB      00000000B
008E 00             149         DB      00000000B
008F 00             150         DB      00000000B
                    151 $EJECT
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LOC  OBJ       LINE        SOURCE STATEMENT      LOC  OBJ       LINE        SOURCE STATEMENT      LOC  OBJ       LINE        SOURCE STATEMENT

0090 00         152 ASC12:  DB      00000000B     00C0 00        201 ASC18:  DB      00000000B     00F0 00        250 ASC1E.  DB      00000000B
0091 00         153         DB      00000000B     00C1 00        202         DB      00000000B     00F1 00        251         DB      00000000B
0092 00         154         DB      00000000B     00C2 00        203         DB      00000000B     00F2 00        252         DB      00000000B
0093 00         155         DB      00000000B     00C3 00        204         DB      00000000B     00F3 00        253         DB      00000000B
0094 00         156         DB      00000000B     00C4 00        205         DB      00000000B     00F4 00        254         DB      00000000B
0095 00         157         DB      00000000B     00C5 00        206         DB      00000000B     00F5 00        255         DB      00000000B
0096 00         158         DB      00000000B     00C6 00        207         DB      00000000B     00F6 00        256         DB      00000000B
0097 00         159         DB      00000000B     00C7 00        208         DB      00000000B     00F7 00        257         DB      00000000B
0098 00         160 ASC13:  DB      00000000B     00C8 00        209 ASC19:  DB      00000000B     00F8 00        258 ASC1F:  DB      00000000B
0099 00         161         DB      00000000B     00C9 00        210         DB      00000000B     00F9 00        259         DB      00000000B
009A 00         162         DB      00000000B     00CA 00        211         DB      00000000B     00FA 00        260         DB      00000000B
009B 00         163         DB      00000000B     00CB 00        212         DB      00000000B     00FB 00        261         DB      00000000B
009C 00         164         DB      00000000B     00CC 00        213         DB      00000000B     00FC 00        262         DB      00000000B
009D 00         165         DB      00000000B     00CD 00        214         DB      00000000B     00FD 00        263         DB      00000000B
009E 00         166         DB      00000000B     00CE 00        215         DB      00000000B     00FE 00        264         DB      00000000B
009F 00         167         DB      00000000B     00CF 00        216         DB      00000000B     00FF 00        265         DB      00000000B
00A0 00         168 ASC14:  DB      00000000B     00D0 00        217 ASC1A:  DB      00000000B     0100 00        266 ASC20:  DB      00000000B
00A1 00         169         DB      00000000B     00D1 00        218         DB      00000000B     0101 00        267         DB      00000000B
00A2 00         170         DB      00000000B     00D2 00        219         DB      00000000B     0102 00        268         DB      00000000B
00A3 00         171         DB      00000000B     00D3 00        220         DB      00000000B     0103 00        269         DB      00000000B
00A4 00         172         DB      00000000B     00D4 00        221         DB      00000000B     0104 00        270         DB      00000000B
00A5 00         173         DB      00000000B     00D5 00        222         DB      00000000B     0105 00        271         DB      00000000B
00A6 00         174         DB      00000000B     00D6 00        223         DB      00000000B     0106 00        272         DB      00000000B
00A7 00         175         DB      00000000B     00D7 00        224         DB      00000000B     0107 00        273         DB      00000000B
00A8 00         176 ASC15:  DB      00000000B     00D8 00        225 ASC1B:  DB      00000000B     0108 10        274 ASC21:  DB      00010000B
00A9 00         177         DB      00000000B     00D9 00        226         DB      00000000B     0109 10        275         DB      00010000B
00AA 00         178         DB      00000000B     00DA 00        227         DB      00000000B     010A 10        276         DB      00010000B
00AB 00         179         DB      00000000B     00DB 00        228         DB      00000000B     010B 10        277         DB      00010000B
00AC 00         180         DB      00000000B     00DC 00        229         DB      00000000B     010C 10        278         DB      00010000B
00AD 00         181         DB      00000000B     00DD 00        230         DB      00000000B     010D 00        279         DB      00000000B
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00AF 00         183         DB      00000000B     00DF 00        232         DB      00000000B     010F 00        281         DB      00000000B
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00B1 00         185         DB      00000000B     00E1 00        234         DB      00000000B     0111 28        283         DB      00101000B
00B2 00         186         DB      00000000B     00E2 00        235         DB      00000000B     0112 28        284         DB      00101000B
00B3 00         187         DB      00000000B     00E3 00        236         DB      00000000B     0113 00        285         DB      00000000B
00B4 00         188         DB      00000000B     00E4 00        237         DB      00000000B     0114 00        286         DB      00000000B
00B5 00         189         DB      00000000B     00E5 00        238         DB      00000000B     0115 00        287         DB      00000000B
00B6 00         190         DB      00000000B     00E6 00        239         DB      00000000B     0116 00        288         DB      00000000B
00B7 00         191         DB      00000000B     00E7 00        240         DB      00000000B     0117 00        289         DB      00000000B
00B8 00         192 ASC17:  DB      00000000B     00E8 00        241 ASC1D:  DB      00000000B     0118 28        290 ASC23:  DB      00101000B
00B9 00         193         DB      00000000B     00E9 00        242         DB      00000000B     0119 28        291         DB      00101000B
00BA 00         194         DB      00000000B     00EA 00        243         DB      00000000B     011A 7C        292         DB      01111100B
00BB 00         195         DB      00000000B     00EB 00        244         DB      00000000B     011B 28        293         DB      00101000B
00BC 00         196         DB      00000000B     00EC 00        245         DB      00000000B     011C 7C        294         DB      01111100B
00BD 00         197         DB      00000000B     00ED 00        246         DB      00000000B     011D 28        295         DB      00101000B
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0122 50          301         DB   01010000B   0152 38          350         DB   00111000B   0182 4C          399         DB   01001100B
0123 38          302         DB   00111000B   0153 10          351         DB   00010000B   0183 54          400         DB   01010100B
0124 14          303         DB   00010100B   0154 38          352         DB   00111000B   0184 64          401         DB   01100100B
0125 78          304         DB   01111000B   0155 54          353         DB   01010100B   0185 44          402         DB   01000100B
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0127 00          306         DB   00000000B   0157 00          355         DB   00000000B   0187 00          404         DB   00000000B
0128 60          307 ASC25:  DB   01100000B   0158 00          356 ASC2B:  DB   00000000B   0188 10          405 ASC31:  DB   00010000B
0129 64          308         DB   01100100B   0159 10          357         DB   00010000B   0189 30          406         DB   00110000B
012A 08          309         DB   00001000B   015A 10          358         DB   00010000B   018A 10          407         DB   00010000B
012B 10          310         DB   00010000B   015B 7C          359         DB   01111100B   018B 10          408         DB   00010000B
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012D 4C          312         DB   01001100B   015D 10          361         DB   00010000B   018D 10          410         DB   00010000B
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012F 00          314         DB   00000000B   015F 00          363         DB   00000000B   018F 00          412         DB   00000000B
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0131 50          316         DB   01010000B   0161 00          365         DB   00000000B   0191 44          414         DB   01000100B
0132 50          317         DB   01010000B   0162 00          366         DB   00000000B   0192 04          415         DB   00000100B
0133 20          318         DB   00100000B   0163 00          367         DB   00000000B   0193 38          416         DB   00111000B
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0135 48          320         DB   01001000B   0165 10          369         DB   00010000B   0195 40          418         DB   01000000B
0136 34          321         DB   00110100B   0166 10          370         DB   00010000B   0196 7C          419         DB   01111100B
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0138 10          323 ASC27:  DB   00010000B   0168 00          372 ASC2D:  DB   00000000B   0198 7C          421 ASC33:  DB   01111100B
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013A 10          325         DB   00010000B   016A 00          374         DB   00000000B   019A 08          423         DB   00001000B
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0141 20          332         DB   00100000B   0171 00          381         DB   00000000B   01A1 18          430         DB   00011000B
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0146 10          337         DB   00010000B   0176 10          386         DB   00010000B   01A6 08          435         DB   00001000B
0147 00          338         DB   00000000B   0177 00          387         DB   00000000B   01A7 00          436         DB   00000000B
0148 10          339 ASC29:  DB   00010000B   0178 00          388 ASC2F:  DB   00000000B   01A8 7C          437 ASC35:  DB   01111100B
0149 08          340         DB   00001000B   0179 04          389         DB   00000100B   01A9 40          438         DB   01000000B
014A 04          341         DB   00000100B   017A 08          390         DB   00001000B   01AA 78          439         DB   01111000B
014B 04          342         DB   00000100B   017B 10          391         DB   00010000B   01AB 04          440         DB   00000100B
014C 04          343         DB   00000100B   017C 20          392         DB   00100000B   01AC 04          441         DB   00000100B
014D 08          344         DB   00001000B   017D 40          393         DB   01000000B   01AD 44          442         DB   01000100B
014E 10          345         DB   00010000B   017E 00          394         DB   00000000B   01AE 38          443         DB   00111000B
014F 00          346         DB   00000000B   017F 00          395         DB   00000000B   01AF 00          444         DB   00000000B
                 347 $EJECT                                    396 $EJECT                                    445 $EJECT
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01B2 40         448         DB   01000000B    01E2 20         497         DB   00100000B    0212 24         546         DB   00100100B
01B3 78         449         DB   01111000B    01E3 40         498         DB   01000000B    0213 38         547         DB   00111000B
01B4 44         450         DB   01000100B    01E4 20         499         DB   00100000B    0214 24         548         DB   00100100B
01B5 44         451         DB   01000100B    01E5 10         500         DB   00010000B    0215 24         549         DB   00100100B
01B6 38         452         DB   00111000B    01E6 08         501         DB   00001000B    0216 78         550         DB   01111000B
01B7 00         453         DB   00000000B    01E7 00         502         DB   00000000B    0217 00         551         DB   00000000B
01B8 7C         454 ASC37:  DB   01111100B    01E8 00         503 ASC3D:  DB   00000000B    0218 38         552 ASC43:  DB   00111000B
01B9 04         455         DB   00000100B    01E9 00         504         DB   00000000B    0219 44         553         DB   01000100B
01BA 08         456         DB   00001000B    01EA 7C         505         DB   01111100B    021A 40         554         DB   01000000B
01BB 10         457         DB   00010000B    01EB 00         506         DB   00000000B    021B 40         555         DB   01000000B
01BC 20         458         DB   00100000B    01EC 7C         507         DB   01111100B    021C 40         556         DB   01000000B
01BD 20         459         DB   00100000B    01ED 00         508         DB   00000000B    021D 44         557         DB   01000100B
01BE 20         460         DB   00100000B    01EE 00         509         DB   00000000B    021E 38         558         DB   00111000B
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01C0 38         462 ASC38:  DB   00111000B    01F0 20         511 ASC3E:  DB   00100000B    0220 78         560 ASC44:  DB   01111000B
01C1 44         463         DB   01000100B    01F1 10         512         DB   00010000B    0221 24         561         DB   00100100B
01C2 44         464         DB   01000100B    01F2 08         513         DB   00001000B    0222 24         562         DB   00100100B
01C3 38         465         DB   00111000B    01F3 04         514         DB   00000100B    0223 24         563         DB   00100100B
01C4 44         466         DB   01000100B    01F4 08         515         DB   00001000B    0224 24         564         DB   00100100B
01C5 44         467         DB   01000100B    01F5 10         516         DB   00010000B    0225 24         565         DB   00100100B
01C6 38         468         DB   00111000B    01F6 20         517         DB   00100000B    0226 78         566         DB   01111000B
01C7 00         469         DB   00000000B    01F7 00         518         DB   00000000B    0227 00         567         DB   00000000B
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01C9 44         471         DB   01000100B    01F9 44         520         DB   01000100B    0229 40         569         DB   01000000B
01CA 44         472         DB   01000100B    01FA 04         521         DB   00000100B    022A 40         570         DB   01000000B
01CB 3C         473         DB   00111100B    01FB 08         522         DB   00001000B    022B 70         571         DB   01110000B
01CC 04         474         DB   00000100B    01FC 10         523         DB   00010000B    022C 40         572         DB   01000000B
01CD 08         475         DB   00001000B    01FD 10         524         DB   00010000B    022D 40         573         DB   01000000B
01CE 70         476         DB   01110000B    01FE 00         525         DB   00000000B    022E 7C         574         DB   01111100B
01CF 00         477         DB   00000000B    01FF 10         526         DB   00010000B    022F 00         575         DB   00000000B
01D0 00         478 ASC3A:  DB   00000000B    0200 38         527 ASC40:  DB   00111000B    0230 7C         576 ASC46:  DB   01111100B
01D1 00         479         DB   00000000B    0201 44         528         DB   01000100B    0231 40         577         DB   01000000B
01D2 10         480         DB   00010000B    0202 54         529         DB   01010100B    0232 40         578         DB   01000000B
01D3 00         481         DB   00000000B    0203 5C         530         DB   01011100B    0233 70         579         DB   01110000B
01D4 00         482         DB   00000000B    0204 58         531         DB   01011000B    0234 40         580         DB   01000000B
01D5 10         483         DB   00010000B    0205 40         532         DB   01000000B    0235 40         581         DB   01000000B
01D6 00         484         DB   00000000B    0206 3C         533         DB   00111100B    0236 40         582         DB   01000000B
01D7 00         485         DB   00000000B    0207 00         534         DB   00000000B    0237 00         583         DB   00000000B
01D8 00         486 ASC3B:  DB   00000000B    0208 10         535 ASC41:  DB   00010000B    0238 3C         584 ASC47:  DB   00111100B
01D9 00         487         DB   00000000B    0209 28         536         DB   00101000B    0239 40         585         DB   01000000B
01DA 10         488         DB   00010000B    020A 44         537         DB   01000100B    023A 40         586         DB   01000000B
01DB 00         489         DB   00000000B    020B 44         538         DB   01000100B    023B 5C         587         DB   01011100B
01DC 00         490         DB   00000000B    020C 7C         539         DB   01111100B    023C 44         588         DB   01000100B
01DD 10         491         DB   00010000B    020D 44         540         DB   01000100B    023D 44         589         DB   01000100B
01DE 10         492         DB   00010000B    020E 44         541         DB   01000100B    023E 3C         590         DB   00111100B
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                494 $EJECT                                   543 $EJECT                                   592 $EJECT
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0242 44          595         DB      01000100B    0272 54          644         DB      01010100B    02A2 10          693         DB      00010000B
0243 7C          596         DB      01111100B    0273 4C          645         DB      01001100B    02A3 10          694         DB      00010000B
0244 44          597         DB      01000100B    0274 44          646         DB      01000100B    02A4 10          695         DB      00010000B
0245 44          598         DB      01000100B    0275 44          647         DB      01000100B    02A5 10          696         DB      00010000B
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0247 00          600         DB      00000000B    0277 00          649         DB      00000000B    02A7 00          698         DB      00000000B
0248 38          601 ASC49:  DB      00111000B    0278 38          650 ASC4F:  DB      00111000B    02A8 44          699 ASC55:  DB      01000100B
0249 10          602         DB      00010000B    0279 44          651         DB      01000100B    02A9 44          700         DB      01000100B
024A 10          603         DB      00010000B    027A 44          652         DB      01000100B    02AA 44          701         DB      01000100B
024B 10          604         DB      00010000B    027B 44          653         DB      01000100B    02AB 44          702         DB      01000100B
024C 10          605         DB      00010000B    027C 44          654         DB      01000100B    02AC 44          703         DB      01000100B
024D 10          606         DB      00010000B    027D 44          655         DB      01000100B    02AD 44          704         DB      01000100B
024E 38          607         DB      00111000B    027E 38          656         DB      00111000B    02AE 38          705         DB      00111000B
024F 00          608         DB      00000000B    027F 00          657         DB      00000000B    02AF 00          706         DB      00000000B
0250 07          609 ASC4A.  DB      0000111B     0280 78          658 ASC50:  DB      01111000B    02B0 44          707 ASC56:  DB      01000100B
0251 04          610         DB      000000100    0281 44          659         DB      01000100B    02B1 44          708         DB      01000100B
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0257 00          616         DB      00000000B    0287 00          665         DB      00000000B    02B7 00          714         DB      00000000B
0258 44          617 ASC4B:  DB      01000100B    0288 38          666 ASC51:  DB      00111000B    02B8 44          715 ASC57:  DB      01000100B
0259 48          618         DB      01001000B    0289 44          667         DB      01000100B    02B9 44          716         DB      01000100B
025A 50          619         DB      01010000B    028A 44          668         DB      01000100B    02BA 44          717         DB      01000100B
025B 60          620         DB      01100000B    028B 44          669         DB      01000100B    02BB 44          718         DB      01000100B
025C 50          621         DB      01010000B    028C 54          670         DB      01010100B    02BC 54          719         DB      01010100B
025D 48          622         DB      01001000B    028D 48          671         DB      01001000B    02BD 6C          720         DB      01101100B
025E 44          623         DB      01000100B    028E 34          672         DB      00110100B    02BE 44          721         DB      01000100B
025F 00          624         DB      00000000B    028F 00          673         DB      00000000B    02BF 00          722         DB      00000000B
0260 40          625 ASC4C:  DB      01000000B    0290 78          674 ASC52:  DB      01111000B    02C0 44          723 ASC58:  DB      01000100B
0261 40          626         DB      01000000B    0291 44          675         DB      01000100B    02C1 44          724         DB      01000100B
0262 40          627         DB      01000000B    0292 44          676         DB      01000100B    02C2 28          725         DB      00101000B
0263 40          628         DB      01000000B    0293 78          677         DB      01111000B    02C3 10          726         DB      00010000B
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0266 7C          631         DB      01111100B    0296 44          680         DB      01000100B    02C6 44          729         DB      01000100B
0267 00          632         DB      00000000B    0297 00          681         DB      00000000B    02C7 00          730         DB      00000000B
0268 44          633 ASC4D:  DB      01000100B    0298 3C          682 ASC53:  DB      00111100B    02C8 44          731 ASC59:  DB      01000100B
0269 6C          634         DB      01101100B    0299 40          683         DB      01000000B    02C9 44          732         DB      01000100B
026A 54          635         DB      01010100B    029A 40          684         DB      01000000B    02CA 44          733         DB      01000100B
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026C 44          637         DB      01000100B    029C 04          686         DB      00000100B    02CC 10          735         DB      00010000B
026D 44          638         DB      01000100B    029D 04          687         DB      00000100B    02CD 10          736         DB      00010000B
026E 44          639         DB      01000100B    029E 78          688         DB      01111000B    02CE 10          737         DB      00010000B
026F 00          640         DB      00000000B    029F 00          689         DB      00000000B    02CF 00          738         DB      00000000B
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02D2 08          742         DB      00001000B    0302 88        791         DB      10001000B    0332 20        840         DB      00100000B
02D3 10          743         DB      00010000B    0303 00        792         DB      00000000B    0333 70        841         DB      01110000B
02D4 20          744         DB      00100000B    0304 00        793         DB      00000000B    0334 20        842         DB      00100000B
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02D9 20          749         DB      00100000B    0309 00        798         DB      00000000B    0339 00        847         DB      00000000B
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02DC 20          752         DB      00100000B    030C 3C        801         DB      00111100B    033C 44        850         DB      01000100B
02DD 20          753         DB      00100000B    030D 44        802         DB      01000100B    033D 3C        851         DB      00111100B
02DE 38          754         DB      00111000B    030E 3C        803         DB      00111100B    033E 04        852         DB      00000100B
02DF 00          755         DB      00000000B    030F 00        804         DB      00000000B    033F 3C        853         DB      00111100B
02E0 00          756 ASC5C:  DB      00000000B    0310 40        805 ASC62:  DB      01000000B    0340 40        854 ASC68:  DB      01000000B
02E1 40          757         DB      01000000B    0311 40        806         DB      01000000B    0341 40        855         DB      01000000B
02E2 20          758         DB      00100000B    0312 5C        807         DB      01011100B    0342 40        856         DB      01000000B
02E3 10          759         DB      00010000B    0313 64        808         DB      01100100B    0343 78        857         DB      01111000B
02E4 08          760         DB      00001000B    0314 44        809         DB      01000100B    0344 44        858         DB      01000100B
02E5 04          761         DB      00000100B    0315 44        810         DB      01000100B    0345 44        859         DB      01000100B
02E6 00          762         DB      00000000B    0316 78        811         DB      01111000B    0346 44        860         DB      01000100B
02E7 00          763         DB      00000000B    0317 00        812         DB      00000000B    0347 00        861         DB      00000000B
02E8 1C          764 ASC5D:  DB      00011100B    0318 00        813 ASC63:  DB      00000000B    0348 10        862 ASC69:  DB      00010000B
02E9 04          765         DB      00000100B    0319 00        814         DB      00000000B    0349 00        863         DB      00000000B
02EA 04          766         DB      00000100B    031A 1C        815         DB      00011100B    034A 10        864         DB      00010000B
02EB 04          767         DB      00000100B    031B 20        816         DB      00100000B    034B 10        865         DB      00010000B
02EC 04          768         DB      00000100B    031C 20        817         DB      00100000B    034C 10        866         DB      00010000B
02ED 04          769         DB      00000100B    031D 20        818         DB      00100000B    034D 10        867         DB      00010000B
02EE 1C          770         DB      00011100B    031E 1C        819         DB      00011100B    034E 08        868         DB      00001000B
02EF 00          771         DB      00000000B    031F 00        820         DB      00000000B    034F 00        869         DB      00000000B
02F0 10          772 ASC5E:  DB      00010000B    0320 00        821 ASC64:  DB      00000000B    0350 04        870 ASC6A:  DB      00000100B
02F1 38          773         DB      00111000B    0321 04        822         DB      00000100B    0351 00        871         DB      00000000B
02F2 54          774         DB      01010100B    0322 04        823         DB      00000100B    0352 04        872         DB      00000100B
02F3 10          775         DB      00010000B    0323 04        824         DB      00000100B    0353 04        873         DB      00000100B
02F4 10          776         DB      00010000B    0324 3C        825         DB      00111100B    0354 04        874         DB      00000100B
02F5 10          777         DB      00010000B    0325 44        826         DB      01000100B    0355 24        875         DB      00100100B
02F6 10          778         DB      00010000B    0326 3C        827         DB      00111100B    0356 24        876         DB      00100100B
02F7 00          779         DB      00000000B    0327 00        828         DB      00000000B    0357 18        877         DB      00011000B
02F8 00          780 ASC5F:  DB      00000000B    0328 00        829 ASC65:  DB      00000000B    0358 40        878 ASC6B:  DB      01000000B
02F9 00          781         DB      00000000B    0329 00        830         DB      00000000B    0359 40        879         DB      01000000B
02FA 00          782         DB      00000000B    032A 1C        831         DB      00011100B    035A 44        880         DB      01000100B
02FB 00          783         DB      00000000B    032B 24        832         DB      00100100B    035B 48        881         DB      01001000B
02FC 00          784         DB      00000000B    032C 3C        833         DB      00111100B    035C 50        882         DB      01010000B
02FD 00          785         DB      00000000B    032D 20        834         DB      00100000B    035D 68        883         DB      01101000B
02FE 00          786         DB      00000000B    032E 1C        835         DB      00011100B    035E 44        884         DB      01000100B
02FF 3F          787         DB      0111111B     032F 00        836         DB      00000000B    035F 00        885         DB      00000000B
                 788 $EJECT                                      837 $EJECT                                     886 $EJECT
```

```
LOC  OBJ       LINE        SOURCE STATEMENT

0390 00          936 ASC72:  DB      00000000B
0391 00          937         DB      00000000B
0392 58          938         DB      01011000B
0393 64          939         DB      01100100B
0394 40          940         DB      01000000B
0395 40          941         DB      01000000B
0396 40          942         DB      01000000B
0397 00          943         DB      00000000B
0398 00          944 ASC73:  DB      00000000B
0399 00          945         DB      00000000B
039A 1C          946         DB      00011100B
039B 20          947         DB      00100000B
039C 18          948         DB      00011000B
039D 04          949         DB      00000100B
039E 38          950         DB      00111000B
039F 00          951         DB      00000000B
03A0 10          952 ASC74:  DB      00010000B
03A1 10          953         DB      00010000B
03A2 38          954         DB      00111000B
03A3 10          955         DB      00010000B
03A4 10          956         DB      00010000B
03A5 10          957         DB      00010000B
03A6 08          958         DB      00001000B
03A7 00          959         DB      00000000B
03A8 00          960 ASC75:  DB      00000000B
03A9 00          961         DB      00000000B
03AA 44          962         DB      01000100B
03AB 44          963         DB      01000100B
03AC 44          964         DB      01000100B
03AD 4C          965         DB      01001100B
03AE 19          966         DB      0011001B
03AF 00          967         DB      000000000B
03B0 00          968 ASC76:  DB      00000000B
03B1 00          969         DB      00000000B
03B2 44          970         DB      01000100B
03B3 44          971         DB      01000100B
03B4 44          972         DB      01000100B
03B5 28          973         DB      00101000B
03B6 10          974         DB      00010000B
03B7 00          975         DB      00000000B
03B8 00          976 ASC77:  DB      00000000B
03B9 00          977         DB      00000000B
03BA 44          978         DB      01000100B
03BB 44          979         DB      01000100B
03BC 54          980         DB      01010100B
03BD 7C          981         DB      01111100B
03BE 28          982         DB      00101000B
03BF 00          983         DB      00000000B
                 984 $EJECT

LOC  OBJ       LINE        SOURCE STATEMENT

0360 10          887 ASC6C:  DB      00010000B
0361 10          888         DB      00010000B
0362 10          889         DB      00010000B
0363 10          890         DB      00010000B
0364 10          891         DB      00010000B
0365 10          892         DB      00010000B
0366 08          893         DB      00001000B
0367 00          894         DB      00000000B
0368 00          895 ASC6D:  DB      00000000B
0369 00          896         DB      00000000B
036A 6C          897         DB      01101100B
036B 54          898         DB      01010100B
036C 54          899         DB      01010100B
036D 44          900         DB      01000100B
036E 44          901         DB      01000100B
036F 00          902         DB      00000000B
0370 00          903 ASC6E:  DB      00000000B
0371 00          904         DB      00000000B
0372 58          905         DB      01011000B
0373 64          906         DB      01100100B
0374 44          907         DB      01000100B
0375 44          908         DB      01000100B
0376 44          909         DB      01000100B
0377 00          910         DB      00000000B
0378 00          911 ASC6F:  DB      00000000B
0379 00          912         DB      00000000B
037A 18          913         DB      00011000B
037B 24          914         DB      00100100B
037C 24          915         DB      00100100B
037D 24          916         DB      00100100B
037E 18          917         DB      00011000B
037F 00          918         DB      00000000B
0380 00          919 ASC70:  DB      00000000B
0381 00          920         DB      00000000B
0382 78          921         DB      01111000B
0383 44          922         DB      01000100B
0384 44          923         DB      01000100B
0385 78          924         DB      01111000B
0386 40          925         DB      01000000B
0387 40          926         DB      01000000B
0388 00          927 ASC71:  DB      00000000B
0389 00          928         DB      00000000B
038A 38          929         DB      00111000B
038B 44          930         DB      01000100B
038C 44          931         DB      01000100B
038D 3C          932         DB      00111100B
038E 04          933         DB      00000100B
038F 04          934         DB      00000100B
                 935 $EJECT
```

```
 LOC  OBJ          LINE     SOURCE STATEMENT

 03C0 00            985 ASC78:  DB      00000000B
 03C1 00            986         DB      00000000B
 03C2 44            987         DB      01000100B
 03C3 28            988         DB      00101000B
 03C4 10            989         DB      00010000B
 03C5 28            990         DB      00101000B
 03C6 44            991         DB      01000100B
 03C7 00            992         DB      00000000B
 03C8 00            993 ASC79:  DB      00000000B
 03C9 00            994         DB      00000000B
 03CA 44            995         DB      01000100B
 03CB 44            996         DB      01000100B
 03CC 44            997         DB      01000100B
 03CD 3C            998         DB      00111100B
 03CE 04            999         DB      00000100B
 03CF 1C           1000         DB      00011100B
 03D0 00           1001 ASC7A:  DB      00000000B
 03D1 00           1002         DB      00000000B
 03D2 7C           1003         DB      01111100B
 03D3 08           1004         DB      00001000B
 03D4 10           1005         DB      00010000B
 03D5 20           1006         DB      00100000B
 03D6 7C           1007         DB      01111100B
 03D7 00           1008         DB      00000000B
 03D8 18           1009 ASC7B:  DB      00011000B
 03D9 10           1010         DB      00010000B
 03DA 10           1011         DB      00010000B
 03DB 60           1012         DB      01100000B
 03DC 10           1013         DB      00010000B
 03DD 10           1014         DB      00010000B
 03DE 18           1015         DB      00011000B
 03DF 00           1016         DB      00000000B
 03E0 10           1017 ASC7C:  DB      00010000B
 03E1 10           1018         DB      00010000B
 03E2 10           1019         DB      00010000B
 03E3 10           1020         DB      00010000B
 03E4 10           1021         DB      00010000B
 03E5 10           1022         DB      00010000B
 03E6 10           1023         DB      00010000B
 03E7 10           1024         DB      00010000B
 03E8 60           1025 ASC7D:  DB      01100000B
 03E9 20           1026         DB      00100000B
 03EA 20           1027         DB      00100000B
 03EB 18           1028         DB      00011000B
 03EC 20           1029         DB      00100000B
 03ED 20           1030         DB      00100000B
 03EE 60           1031         DB      01100000B
 03EF 00           1032         DB      00000000B
 03F0 00           1033 ASC7E:  DB      00000000B
 03F1 00           1034         DB      00000000B
 03F2 60           1035         DB      01100000B
 03F3 54           1036         DB      01010100B
 03F4 0C           1037         DB      00001100B
 03F5 00           1038         DB      00000000B
 03F6 00           1039         DB      00000000B
```


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```
 LOC  OBJ          LINE     SOURCE STATEMENT

 03F7 00           1040         DB      00000000B
 03F8 00           1041 ASC7F:  DB      00000000B
 03F9 00           1042         DB      00000000B
 03FA 00           1043         DB      00000000B
 03FB 00           1044         DB      00000000B
 03FC 00           1045         DB      00000000B
 03FD 00           1046         DB      00000000B
 03FE 00           1047         DB      00000000B
 03FF 00           1048         DB      00000000B
                   1049         END
```

PUBLIC SYMBOLS

EXTERNAL SYMBOLS

USER SYMBOLS

ASC00	A 0000	ASC01	A 0008	ASC02	A 0010
ASC07	A 0038	ASC08	A 0040	ASC09	A 0048
ASC0E	A 0070	ASC0F	A 0078	ASC10	A 0080
ASC15	A 00A8	ASC16	A 00B0	ASC17	A 00B8
ASC1C	A 00E0	ASC1D	A 00E8	ASC1E	A 00F0
ASC23	A 0118	ASC24	A 0120	ASC25	A 0128
ASC2A	A 0150	ASC2B	A 0158	ASC2C	A 0160
ASC31	A 0188	ASC32	A 0190	ASC33	A 0198
ASC38	A 01C0	ASC39	A 01C8	ASC3A	A 01D0
ASC3F	A 01F8	ASC40	A 0200	ASC41	A 0208
ASC46	A 0230	ASC47	A 0238	ASC48	A 0240
ASC4D	A 0268	ASC4E	A 0270	ASC4F	A 0278
ASC54	A 02A0	ASC55	A 02A8	ASC56	A 02B0
ASC5B	A 02D8	ASC5C	A 02E0	ASC5D	A 02E8
ASC62	A 0310	ASC63	A 0318	ASC64	A 0320
ASC69	A 0348	ASC6A	A 0350	ASC6B	A 0358
ASC70	A 0380	ASC71	A 0388	ASC72	A 0390
ASC77	A 03B8	ASC78	A 03C0	ASC79	A 03C8
ASC7E	A 03F0	ASC7F	A 03F8		

ASSEMBLY COMPLETE, NO ERRORS