# CHAPTER 12 BAR-CODE READER

## 12.1 General

A bar code is a code which uses combinations of bars of varying thicknesses, designed to be read by an optical wand, and provides an effective means as a consumer product information code in inventory control, etc. (The current BASIC version of the HX-20 does not support the input/output of bar codes.)
This chapter describes the methods of inputting bar codes and printing them out using MX-80 series printers. (These functions will become available only with the external BASIC.)

## 12.2 Input/Output Ports related to the bar-code reader

Input/output ports related to the bar-code reader are shown in Table 1 below.

Table 1 Input/Output Ports Related to the Bar-Code Reader

| MCU | Port | Direction | Function |
|---|---|---|---|
| Master MCU | P20 | Input | Bar-code input signals (1: Mark (black), 0: Space (white)) |
| Slave MCU | P35 | Output | Bar-code reader power supply (0: On, 1: Off) |
| | P41 | Output | Always 0 |

Fig. 12-1 Bar Codes

When bar codes are to be scanned with a bar-code reader, each bar (black) is input as binary "1" (mark) and a blank (white) between bars is input as binary "0" (space) to the P20 of the master MCU. A code is input by measuring the time duration of the black and white elements of the code.

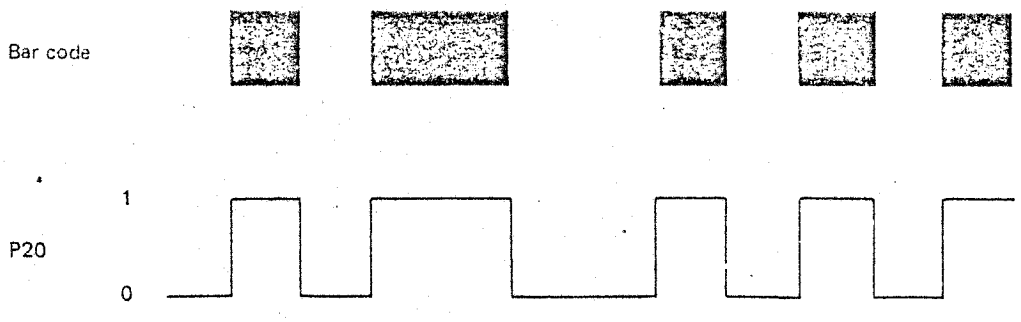



Fig. 12-2 Bar Code Scanned and Input Signal

## 12.3 Procedure for Data Input

### 12.3.1 Turning On the Power supply of the bar-code reader.

Before inputting data to the bar-code reader, its power supply must be turned on as follows:

```
SNSCOM   EQU       $FF19
         LDA   A   #$03      * Opens the special command mask of
                               the slave MCU.
         JSR       SNSCOM
         LDA   A   #$AA
         JSR       SNSCOM
         LDA   A   #$08      * Turns off the P35 of the slave MCU.
         JSR       SNSCOM
         LDA   A   #$00      * (Turns off the bit 5 at address 0006H.)
         JSR       SNSCOM
         LDA   A   #$6
         JSR       SNSCOM
         LDA   A   #$DF
         JSR       SNSCOM    * Special command of slave MCU
         LDA   A   #$04      * Closes the special command masks.
         JSR       SNSCOM
```

### 12.3.2 Data input

Data must be input only after the power supply of the bar-code reader has been turned On. Data input is accomplished by measuring the time duration of the binary 1 or binary 0 at the P20 of the master MCU as follows:

Here, it is assumed that the initial state of P20 is binary 1 (black).

(1) Time measurement of the binary 1 (black) state

(a) Set the bit 1 of TCSR to "0" (by specifying as a change of the input from "1" to "0"). ("AIM #$FD, TCSR").

(b) Wait until the bit 7 of TCSR becomes "1" (indicating that the edge detection has been completed). The period of FRC at this point is approximately 0.1 sec. In normal bar-code scanning, the thickness of any single bar in a bar code will not exceed this time interval of 0.1 sec. Time-out monitoring is performed by the OCR in the bar-code reader so that any bar exceeding 0.1 sec. in time duration may be detected as an error. Data setting in the OCR is performed as follows:

```
LDD       FRC       * Sets the timing of the OCR interrupt
                      at 0.1 sec.
STD       OCR       * 0.1 sec is judged.
LDA   B   TCSR      * Clears the bit 6 (Output compare flag)
                      of TCSR.
STA   A   OCR
```

Edge detection is performed as follows:

```
LOOP    LDA   A   TCSR      * When bit 7=1, it indicates that the
                              edge detection has been completed.
        BMI       EDGE
        BIT   A   #$40      * Monitors the time-out condition.
        BEQ       LOOP
        JMP       TIMOUT    * Executes the time-out processing.
EDGE    LDD       ICR       * (A, B) ← Time duration of binary 1.
        SUBD      LSTTIM
        LDX       ICR       * Stores the time when the edge is
        STX       LSTTIM      detected.
          .
          .
          .
LSTTIM RMB          2
```

(2) Time measurement of the binary 0 (white) state
The time duration of binary 0 is measured by the same procedure as described above, except the bit 1 of TCSR is set to "1" (by specifying as a change of the input edge from "0" to "1").

12.3.3 Turning Off the power supply of the bar-code reader
Upon completion of the data input to the bar-code reader, the power supply of the bar-code reader must be turned off as follows:

```
SNSCOM  EQU       $FF19
        LDA   A   #$03      * Opens the special command mask of the
                              slave MCU.
        JSR       SNSCOM
        LDA   A   #$AA
        JSR       SNSCOM
        LDA   A   #$07      * Turns On the P35 of slave MCU.
        JSR       SNSCOM
        LDA   A   #$00      * (Turns ON the bit 5 at address 0006H).
        JSR       SNSCOM
        LDA   A   #$06
        JSR       SNSCOM
        LDA   A   #$20
        JSR       SNSCOM
        LDA   A   #$04      * Closes the special command mask of the
        JSR       SNSCOM      slave MCU.
```

## 12.4 Printing Bar Codes with M-80 Series Printers

The method of printing bar codes is explained using the codes shown in Fig. 12-3 as an example. The codes in this figure are available in two types of bars differing in thickness or width and two types of blanks differing in width. Namely, a 0.3mm narrow bar and a 1.0mm wide bar and a 0.3mm narrow blank and 1.0mm wide blank. To print these bars at a height of 1.7cm with any MX-80 series printer, the following must be specified.

(1) Paper feed pitch: 4/216 inch (specified with ESC, "3", 4)
(2) Dot density : 960 dots/line (specified with ESC, "L, $n_1$, $n_2$)

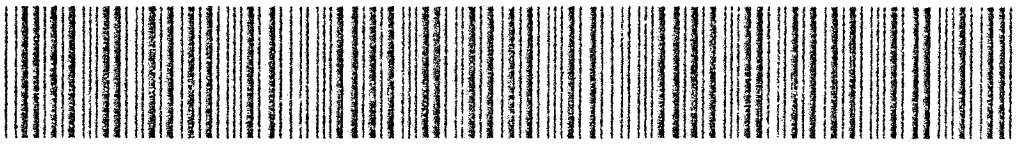



Fig. 12-3 Print Sample of Bar Codes with MX-80

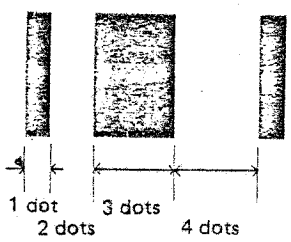



Fig. 12-4 Print Spacing with MX-80

The print spacing must be as shown in Fig. 12.4.

| | |
|---|---|
| Narrow bar | 1-dot space |
| Wide bar | 3-dot space |
| Narrow blank | 2-dot space |
| Wide blank | 4-dot space |

A sequence of 8 dots is printed 16 times to produce a 1.7cm long bar (see Fig. 12.5).

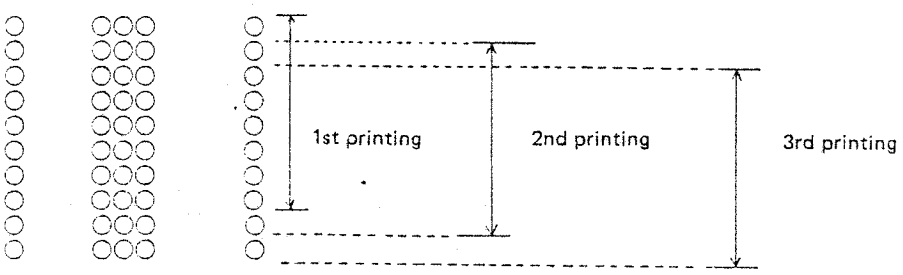
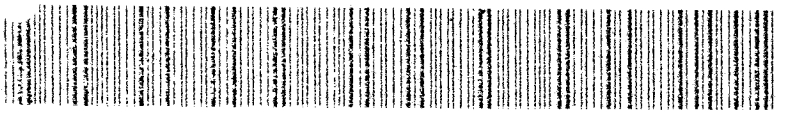



Fig. 12-5 Repetition of Graphic Printing

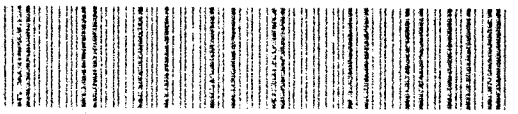
* 0 1 2 3 4 5 6 7 8 9 *

* A B C D E F G H I J K L M N O *

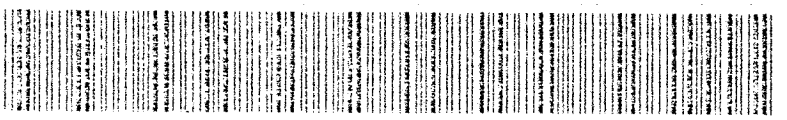
* P Q R S T U V W X Y Z [ \ ] ^ _ *



* ` a b c d e f g h i *

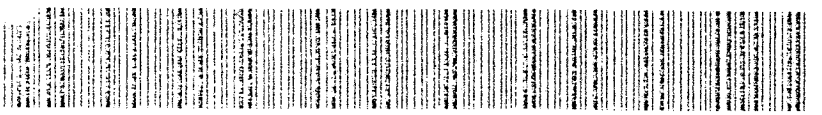


* j k l m n o *



* p q r s t u v w x y *

* z { | } ~ *



* ! " # $ % & ' ( ) * *

* , - . / 1 ; < = > ? @ *

Bar Code Listing

12-5

ERR SEQ LOC OBJECT PROGRAM BARCOD --- BARCODE READER READ SMAPLE ---

```
00001                                   NAM     BARCOD
00002                                   OPT     PAGE=55
00003                                   TTL     --- BARCODE READER READ SMAPLE ---
00004                           * FILE NAME  'EX$D'     BY KOIKE
00005                           *
00006                           *
00007                           *       BARCODE READER DECODE PROGRAM
00008                           *           CREATIVE DATE : 1982/09/30 --- VER 0.1
00009                           *
00010                           *
00011                           *
00012           0003  A         PORT2   EQU     $3          * MAIN PORT2 ADDRESS
00013           0006  A         PORT3   EQU     $6          * SLAVE PORT3 ADDRESS
00014           0007  A         PORT4   EQU     $7          * SLAVE PORT4 ADDRESS
00015           0008  A         TCSR    EQU     $8          * TIMER CONTROL STATUS REGISTER
00016           0009  A         FRC     EQU     $9          * FREE RUNNING COUNTER
00017           000B  A         OCR     EQU     $B          * OUTPUT COMPARE REGISTER
00018           000D  A         ICR     EQU     $D          * INPUT CAPTURE REGISTER
00019           007C  A         SIOSTS  EQU     $7C         * SLAVE I/O STATUS
00020           007D  A         MIOSTS  EQU     $7D         * MAIN I/O STATUS
00021           0076  A         MINVAL  EQU     118         * MINIMUM WIDTH VALUE
00022           C350  A         OVRVAL  EQU     50000       * OVER FLOW VALUE
00023                           *
00024           FF16  A         RV232C  EQU     $FF16       * SLAVE RS232C RECOVERY
00025           FF19  A         SNSCOM  EQU     $FF19       * SLAVE COMMUNICATION
00026                           *
00027           05E2  A         HKLOAD  EQU     $5E2        * HOOK LOAD ADDRESS FOR BARCODE
00028           063C  A         HKABTD  EQU     $63C        * HOOK ABORT ADDRESS FOR BARCODE
00029           0665  A         DCBTAD  EQU     $665        * DCB POINTER FOR BARCODE
00030           068C  A         ASCFLG  EQU     $68C        * LOAD ASCII JUDGE FLAG
00031           068F  A         OPTNTB  EQU     $68F        * OPTION TABLE ADDRESS
00032           8433  A         ERROR   EQU     $8433       * BASIC ERROR JUMP
00033           8C70  A         FCERR   EQU     $8C70       * BASIC FC-ERROR JUMP
00034           A6D0  A         LODCNT  EQU     $A6D0       * BASIC CONTINUE LOADING ADDRESS
00035           A9D8  A         ABTDO   EQU     $A9D8       * BASIC ABORT ADDRESS
00036                           *
00037                                   TTL     TEST MAIN
00038                           *
00039                           *
00040                           *       TEST MAIN
00041                           *
00042A 1700                             ORG     $1700
00043                           *
0044A 1700 86 01      A                 LDA A   #$01
00045A 1702 B7 173D   A                 STA A   CHKDGT      * CHECK DIGIT JUDGE FLAG
00046A 1705 86 01     A                 LDA A   #$01
00047A 1707 B7 173E   A                 STA A   FULVER      * FULL ASCII JUDGE FLAG
00048                           *
00049A 170A BD 1803   A                 JSR     PONBAR      * POWER ON BARCODE WAND
00050                           *
00051A 170D 86 02     A         MNST    LDA A   #$2         * GATE OPEN
00052A 170F C6 07     A                 LDA B   #PORT4
00053A 1711 BD 1C0D   A                 JSR     SPWRIT
00054                           *
00055A 1714 7F 17FC   A                 CLR     ASCCNT
```

ERR SEQ LOC OBJECT PROGRAM BARCOD TEST MAIN

```
00056A 1717 7F 068C  A              CLR    ASCFLG
00057                         *
00058A 171A BD 1801  A              JSR    RECBAR     * RECOGNITION BARCODE
00059                         *
00060A 171D B7 1738  A              STA A  ANSWER     * ERROR CODE BUFFER
00061A 1720 25 06 1728              BCS    MN10
00062A 1722 7F 1739  A              CLR    CARRY      * (C) BUFFER
00063A 1725 7E 1730  A              JMP    MN20
00064                         *
00065A 1728 86 FF    A      MN10    LDA A  #$FF
00066A 172A B7 1739  A              STA A  CARRY
00067A 172D 7E 1735  A              JMP    MNED
00068                         *
00069A 1730 B6 1738  A      MN20    LDA A  ANSWER
00070A 1733 27 D8 170D              BEQ    MNST
00071                         *
00072A 1735 7E 1735  A      MNED    JMP    *          ERROR END
00073                         *
00074A 1738    0001  A      ANSWER  RMB    1
00075A 1739    0001  A      CARRY   RMB    1
00076                         *
00077                               TTL    WORK AREA
00078                         *
00079                         *
00080                         *
00081                         *
00082A 173A    0001  A      BAR     RMB    1          * BAR BIT PATTERN
00083A 173B    0001  A      SPACE   RMB    1          * SPACE BIT PATTERN
00084A 173C    0001  A      DIRECF  RMB    1          * SCAN DIRECTION FLAG
00085A 173D    0001  A      CHKDGT  RMB    1          * CHECK DIGIT FLAG
00086A 173E    0001  A      FULVER  RMB    1          * FULL ASCII VERSION JUDGE FLAG
00087A 173F    0001  A      CHRJDG  RMB    1          * INPUT ROUTINE FIRST JUDGE FLAG
00088A 1740    0002  A      TIMOVC  RMB    2          * TIMER OVER FLOW COUNTER
00089A 1742    0002  A      TIMCT1  RMB    2          * TIMER FIRST COUNTER
00090A 1744    0002  A      TIMCT2  RMB    2          * TIMER END COUNTER
00091A 1746    0002  A      TIMCNT  RMB    2          * TIMER COUNTER
00092A 1748    0002  A      TIMSTC  RMB    2          *
00093A 174A    0002  A      STRTMG  RMB    2          * START MARGIN
00094A 174C    0002  A      SUMCHK  RMB    2          * CHECK DIGIT SUM
00095A 174E    0002  A      ZNKBZC  RMB    2          * LAST BAR ZERO COUNTER VALUE
00096A 1750    0002  A      ZNKBOC  RMB    2          * LAST BAR ONE COUNTER VALUE
00097A 1752    0002  A      THRSHB  RMB    2          * BAR 1 OR 0 THRESH LEVEL
00098A 1754    0002  A      ZNKSZC  RMB    2          * LAST SPACE ZERO COUNTER VALUE
00099A 1756    0002  A      ZNKSOC  RMB    2          * LAST SPACE ONE COUNTER VALUE
00100A 1758    0002  A      THRSHS  RMB    2          * SPACE 1 OR 0 THRESH LEVEL
00101A 175A    0001  A      ANSCTB  RMB    1          * BUFFER
00102A 175B    0001  A      FULHNT  RMB    1          * FULL ASCII DOUBLE CHARACTER JUDGE
00103A 175C    0001  A      ASCBF1  RMB    1          * DOUBLE CHARACTER FIRST BUFFER
00104A 175D    0001  A      ASCBF2  RMB    1          * DOUBLE CHARACTER SECOND BUFFER
00105A 175E    0001  A      BITCNT  RMB    1          * CHARACTER BIT COUNTER
00106A 175F    0001  A      ERRBF   RMB    1          * ERROR CODE BUFFER
00107A 1760    0001  A      ZNKOVF  RMB    1          * ZENKAI OVER FLOW
00108A 1761    0002  A      SPWRBF  RMB    2          * SLAVE WRITE BUFFER
00109A 1763    0002  A      ANSTBA  RMB    2          * PRE-ANSWER TABLE ADDRESS
00110A 1765    0002  A      ANSADR  RMB    2          *
```

```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     WORK AREA

00111A 1767    0002  A      ANSASA RMB    2          * ANSWER TABLE ADDRESS
00112A 1769    0002  A      FULTBA RMB    2          * FULL ASCII TABLE ADDRESS
00113                       *
00114A 1768    0048  A      ANSTBL RMB    72         * PRE-ANSWER TABLE
00115A 17B3    0001  A      ANSCNT RMB    1          * PRE-ANSWER COUNTER
00116                       *
00117A 17B4    0048  A      ANSASC RMB    72         * ANSWER TABLE
00118A 17FC    0001  A      ASCCNT RMB    1          * ANSWER COUNTER
00119                       *
00120A 17FD    00    A             FCB    0
00121A 17FE    0001  A      STDIGT RMB    1          * START CHECK DIGIT
00122A 17FF    00    A             FCB    0
00123A 1800    0001  A      EDDIGT RMB    1          * END CHECK DIGIT
00124                       *
00125                       *
00126                              TTL    RECOGNITION
00127                       *
00128                       *
00129                       *  FUNCTION :  RECOGNITION BARCODE
00130                       *  CALL     :  JSR   RECBAR
00131                       *  RETURN   :  (A)= ERROR CODE
00132                       *                   000: NORMAL
00133                       *                   100: SCAN SPEED SLOWER
00134                       *                   101: SCAN SPEED FASTER
00135                       *                 X 102: SW BAD OPERATION -- VER 0.3
00136                       *                 X 103: TIMER OVER FLOW  -- VER 0.3
00137                       *                   104: BUFFER OVER FLOW
00138                       *                   105: NOT CODE 39
00139                       *                   106: CHECK DIGIT ERROR
00140                       *                   107: FULL ASCII CONVERTION ERROR
00141                       *                (C)= BREAK STATUS.
00142                       *                     0: NORMAL
00143                       *                     1: BREAK
00144                       *
00145                       *
00146                       *
00147A 1801 96 03     A    RECBAR LDA A  PORT2      * WAND PAPER ON ?
00148A 1803 85 01     A           BIT A  #1
00149A 1805 27 13 181A            BEQ    REC50
00150                       *
00151A 1807    78     A           FCB    $78,$80,$7D * TIM  #580 MIOSTS
     A 1808    80     A
     A 1809    7D     A
00152A 180A 27 F5 1801            BEQ    RECBAR
00153A 180C 0D                    SEC
00154A 180D 20 01 1810            BRA    REC800
00155                       *
00156                       **********   RETURN PROCESS   ************
00157                       *
00158A 180F 0C              REC700 CLC                * (C) CLEAR
00159                       *
00160A 1810 86 00     A     REC800 LDA A  #0          * ANSWER COUNTER CLEAR
00161A 1812 87 17FC   A            STA A  ASCCNT
00162                       *
00163A 1815 0E                    CLI                 * INTERRUPT ENABLE
```

```
00164                                   *
00165A 1816 B6 175F  A                  LDA A  ERRBF      * ERROR CODE
00166                                   *
00167A 1819 39                          REC900 RTS                * RETURN
00168                                   *
00169                                   *************** MARGIN DETECT ***************
00170                                   *
00171A 181A    7B    A                  REC50  FCB    $7B,$80,$7D * TIM   #$80 MIOSTS
     A 181B    80    A
     A 181C    7D    A
00172A 181D 27 03 1822                  BEQ    REC60
00173A 181F 0D                          SEC
00174A 1820 20 EE 1810                  BRA    REC800
00175                                   *
00176A 1822 96 08    A                  REC60  LDA A  TCSR        * ICF CLEAR
00177A 1824 DC 0D    A                  LDD    ICR
00178                                   *
00179A 1826 DC 09    A                  LDD    FRC        * OVF CLEAR
00180A 1828 FD 1742  A                  STD    TIMCT1
00181                                   *
00182A 1828 C3 C350  A                  ADDD   #OVRVAL    * OCF CLEAR
00183A 182E DD 0B    A                  STD    OCR
00184A 1830 96 08    A                  LDA A  TCSR
00185A 1832    72    A                  FCB    $72,$00,$8 * OIM   #$0,OCR
     A 1833    00    A
     A 1834    08    A
00186                                   *
00187A 1835    72    A                  FCB    $72,$02,$08 * OIM   #2 TCSR * IEDG=1
     A 1836    02    A
     A 1837    08    A
00188                                   *
00189A 1838 BD 1AD8  A                  JSR    TIMRED     * MARGIN READ
00190                                   *
00191A 183B 25 02 183F                  BCS    REC70      * OVER FLOW ?
00192A 183D 20 1E 185D                  BRA    REC90
00193                                   *
00194A 183F 96 08    A                  REC70  LDA A  TCSR
00195A 1841 2B 02 1845                  BMI    REC80      * ICF ?
00196A 1843 20 FA 183F                  BRA    REC70
00197                                   *
00198A 1845 DC 0D    A                  REC80  LDD    ICR        * START VALUE
00199A 1847 FD 1742  A                  STD    TIMCT1
00200A 184A C3 C350  A                  ADDD   #OVRVAL    * OVER FLOW COUNTER
00201A 184D DD 0B    A                  STD    OCR
00202                                   *
00203A 184F 96 08    A                  LDA A  TCSR       * OCF CLEAR
00204A 1851    72    A                  FCB    $72,$00,$08 * OIM   #$00,OCR
     A 1852    00    A
     A 1853    08    A
00205A 1854    71    A                  FCB    $71,$FD,$08 * AIM   #$FD TCSR       * IEDG=0
     A 1855    FD    A
     A 1856    08    A
00206                                   *
00207A 1857 CC FFFF  A                  REC85  LDD    #$FFFF     * OVER FLOW COUNTER SET
00208A 185A FD 1746  A                  STD    TIMCNT
```

```
00209                          *
00210A 185D FC 1746  A         REC90   LDD     TIMCNT      * MARGIN ENTRY
00211A 1860 FD 174A  A                 STD     STRTMG
00212                          *
00213A 1863 BD 1AD8  A                 JSR     TIMRED      * START BAR READ
00214                          *
00215A 1866 24 02 186A                 BCC     REC110
00216                          *
00217A 1868 20 B0 181A         REC100  BRA     REC50
00218                          *
00219A 186A FC 1746  A         REC110  LDD     TIMCNT
00220A 186D 83 0076  A                 SUBD    #MINVAL     * 118 SPEED OVER ?
00221A 1870 25 A8 181A                 BCS     REC50
00222                          *
00223A 1872 FC 174A  A                 LDD     STRTMG      * MARGIN CHECK
00224A 1875 04                         LSRD                * (MARGIN)/16>=(START BAR WIDTH)
00225A 1876/04                         LSRD
00226A 1877 04                         LSRD
00227A 1878 04                         LSRD
00228A 1879 B3 1746  A                 SUBD    TIMCNT
00229A 187C 25 9C 181A                 BCS     REC50
00230                          *
00231                          ************    STRT CODE ( * ) READ    ************
00232                          *
00233A 187E FC 1746  A                 LDD     TIMCNT      * INITIAL VALUE ENTRY
00234A 1881 FD 174E  A                 STD     ZNKSZC      * INITIAL NARROW BAR
00235A 1884 FD 1754  A                 STD     ZNKSZC      *
00236A 1887 05                         ASLD
00237A 1888 FD 1750  A                 STD     ZNKBOC      * INITIAL WIDE VALUE ( X 2 )
00238A 188B FD 1756  A                 STD     ZNKSOC      *
00239                          *
00240A 188E F3 1746  A                 ADDD    TIMCNT      * THRESH LEVEL ENTRY ( X 1.5 )
00241A 1891 04                         LSRD
00242A 1892 FD 1752  A                 STD     THRSHB      * THRESH LEVEL
00243A 1895 FD 1758  A                 STD     THRSHS
00244A 1898 86 FF    A                 LDA A   #$FF        * PRE-ANSWER COUNTER INITIAL
00245A 189A B7 1783  A                 STA A   ANSCNT
00246                          *
00247A 189D 86 08    A                 LDA A   #8          * REST 8 BIT OF START CODE
00248A 189F BD 1808  A                 JSR     DTTOBT
00249                          *
00250A 18A2 27 02 18A6                 BEQ     REC120
00251A 18A4 20 C2 1868                 BRA     REC100
00252                          *
00253A 18A6 B6 173A  A         REC120  LDA A   BAR         * NORMAL DIRECTION CHECK
00254A 18A9 81 06    A                 CMP A   #6
00255A 18AB 26 0C 18B9                 BNE     REC130
00256A 18AD B6 173B  A                 LDA A   SPACE
00257A 18B0 81 08    A                 CMP A   #8
00258A 18B2 26 B4 1868                 BNE     REC100      * NOT START CODE
00259A 18B4 7F 173C  A                 CLR     DIRECF      * L TO R DIRECTION SET
00260A 18B7 20 0E 18C7                 BRA     REC140
00261                          *
00262A 18B9 81 0C    A         REC130  CMP A   #$C         * REVERSE DIRECTION CHECK
00263A 18BB 26 AB 1868                 BNE     REC100      * NOT START CODE
```

```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     RECOGNITION

00264A 18BD B6 173B  A              LDA A  SPACE
00265A 18C0 81 01    A              CMP A  #1
00266A 18C2 26 A4 1868              BNE    REC100
00267A 18C4 B7 173C  A              STA A  DIRECF    * R TO L DIRECTION SET
00268                         *
00269A 18C7    7B    A      REC140 FCB    $7B,$B0,$7D * TIM   #$B0 MIOSTS     * BREAK C
     A 18C8    B0    A
     A 18C9    7D    A
00270A 18CA 27 04 18D0              BEQ    REC150
00271A 18CC 0D                      SEC
00272A 18CD 7E 1810  A              JMP    REC800
00273                         *
00274                         ***************   DATA READ - IN   ***************
00275                         *
00276A 18D0 0F                REC150 SEI              * INTERRUPT MASK DISABLE
00277                         *
00278A 18D1 CC 0000  A              LDD    #0
00279A 18D4 FD 174C  A              STD    SUMCHK    * CHECK DIGIT SUM AREA CLEAR
00280A 18D7 86 FF    A              LDA A  #$FF
00281A 18D9 B7 17FE  A              STA A  STDIGT    * START DIGIT INITIA
00282A 18DC CE 1768  A              LDX    #ANSTBL   * PRE-ANSWER TABLE ADDRESS
00283A 18DF FF 1763  A              STX    ANSTBA
00284                         *
00285A 18E2 BD 1AD8  A      REC160 JSR    TIMRED    * CHARACTER GAP READ
00286                         *
00287A 18E5 24 08 18EF              BCC    REC170    * OVER FLOW ?
00288A 18E7 86 64    A              LDA A  #100      * SCAN SPEED SLOWER
00289A 18E9 B7 175F  A              STA A  ERRBF
00290A 18EC 7E 180F  A              JMP    REC700
00291                         *
00292A 18EF 86 09    A      REC170 LDA A  #9        * 1 CHARACTER DATA BIT CONVERT
00293A 18F1 BD 1B0B  A              JSR    DTTOBT
00294                         *
00295A 18F4 B7 175F  A              STA A  ERRBF
00296A 18F7 27 03 18FC              BEQ    REC175
00297A 18F9 7E 180F  A              JMP    REC700
00298                         *
00299A 18FC B6 1783  A      REC175 LDA A  ANSCNT    * BUFFER OVER CHECK
00300A 18FF 81 49    A              CMP A  #73
00301A 1901 25 08 190B              BCS    REC180
00302A 1903 86 68    A              LDA A  #104      * BUFFER OVER FLOW ERROR
00303A 1905 B7 175F  A              STA A  ERRBF
00304A 1908 7E 180F  A              JMP    REC700
00305                         *
00306                         ************  BIT TO ASCII CODE CONVERT  **********
00307                         *
00308A 190B CE 1C5E  A      REC180 LDX    #SPCTBL   * SPACE TABLE
00309A 190E F6 173B  A             LDA B  SPACE     * (X)=(X)+(SPACE)X4
00310A 1911 58                      ASL B
00311A 1912 58                      ASL B
00312A 1913 3A                      ABX
00313                         *
00314A 1914 B6 173C  A              LDA A  DIRECF    * DIRECTION  L TO R ?
00315A 1917 27 02 191B              BEQ    REC190
00316A 1919 08                      INX
```

ERR SEQ LOC OBJECT PROGRAM BARCOD RECOGNITION

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00317A 191A 08                          INX
00318                           *
00319A 1918 EC 00     A         REC190 LDD     ,X          * SPACE TABLE DATA
00320A 191D 27 08 192A                  BEQ     REC200
00321A 191F 2B 36 1957                  BMI     REC280      * SPECIAL CHARACTER
00322A 1921    18     A                FCB     $18         * XGDX          * (D) TO (X)
00323A 1922 F6 173A   A                 LDA B   BAR
00324A 1925 3A                          ABX                 * (X)=(X)+(BAR)
00325A 1926 A6 00     A                 LDA A   ,X          * BAR TABLE DATA
00326A 1928 26 08 1932                  BNE     REC210
00327                           *
00328A 192A 86 69     A         REC200 LDA A   #105        * NOT CODE 39 ERROR
00329A 192C B7 175F   A                 STA A   ERRBF
00330A 192F 7E 180F   A                 JMP     REC700
00331                           *
00332                           ********** CHECK DIGIT CALCULATE **********
00333                           *
00334A 1932 16                  REC210 TAB                  * (A) TO (B)
00335A 1933 C1 41     A                 CMP B   #$41        * ALPHA ?
00336A 1935 24 1C 1953                  BCC     REC250
00337A 1937 C1 30     A                 CMP B   #$30        * NUMERIC ?
00338A 1939 24 14 194F                  BCC     REC240
00339A 193B C1 20     A                 CMP B   #$20        * SP ?
00340A 193D 26 04 1943                  BNE     REC220
00341A 193F C6 26     A                 LDA B   #38         * SP DIGIT
00342A 1941 20 1B 195E                  BRA     REC290
00343                           *
00344A 1943 C1 2D     A         REC220 CMP B   #$2D        * - ?
00345A 1945 26 04 1948                  BNE     REC230
00346A 1947 C6 24     A                 LDA B   #36         * - DIGIT
00347A 1949 20 13 195E                  BRA     REC290
00348                           *
00349A 1948 C6 25     A         REC230 LDA B   #37         * . DIGIT
00350A 1940 20 0F 195E                  BRA     REC290
00351                           *
00352A 194F C0 30     A         REC240 SUB B   #$30        * 0-9 DIGIT
00353A 1951 20 0B 195E                  BRA     REC290
00354                           *
00355A 1953 C0 37     A         REC250 SUB B   #$37        * A-Z DIGIT
00356A 1955 20 07 195E                  BRA     REC290
00357                           *
00358A 1957 84 7F     A         REC280 AND A   #$7F        * SPECIAL CHARACTER
00359A 1959 7D 173A   A                 TST     BAR
00360A 195C 26 CC 192A                  BNE     REC200      * NOT CODE 39 ERROR
00361                           *
00362A 195E B1 2A     A         REC290 CMP A   #$2A        * END CODE (*) ?
00363A 1960 27 1E 1980                  BEQ     REC310
00364                           *
00365A 1962 FE 1763   A                 LDX     ANSTBA
00366A 1965 A7 00     A                 STA A   ,X          * ANSWER ASCII ENTRY
00367A 1967 08                          INX
00368A 1968 FF 1763   A                 STX     ANSTBA      * NEXT ADDRESS SAVE
00369A 1968 FE 174C   A                 LDX     SUMCHK      * CHECK DIGIT SUM
00370A 196E 3A                          ABX
00371A 196F FF 174C   A                 STX     SUMCHK
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ERR SEQ LOC OBJECT PROGRAM BARCOD RECOGNITION

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00372                                *
00373A 1972 B6 17FE  A               LDA A  STDIGT    * START DIGIT ?
00374A 1975 2A 03 197A               BPL    REC300
00375A 1977 F7 17FE  A               STA B  STDIGT
00376                                *
00377A 197A F7 1800  A       REC300  STA B  EDDIGT    * NEW DIGIT ENTRY
00378A 197D 7E 18E2  A               JMP    REC160
00379                                *
00380                                ********** DATA ARRANGEMENT AND CONVERTION **********
00381                                *
00382A 1980 7A 1783  A       REC310  DEC    ANSCNT    * LAST (*) BUN COUNTER DECREMENT
00383                                *
00384A 1983 0E                       CLI              * INTERRUPT ENABLE
00385                                *
00386A 1984 B6 173D  A               LDA A  CHKDGT
00387A 1987 27 32 19BB               BEQ    REC340
00388                                *
00389A 1989 7A 1783  A               DEC    ANSCNT    * CHECK DIGIT BUN COUNTER DECREMENT
00390A 198C B6 173C  A               LDA A  DIRECF    * DIRECTION CHECK
00391A 198F 26 08 199C               BNE    REC320
00392                                *
00393A 1991 FC 174C  A               LDD    SUMCHK    * L TO R DIRECTION
00394A 1994 B3 17FF  A               SUBD   EDDIGT-1  * CHECK SUM
00395A 1997 FD 174C  A               STD    SUMCHK
00396A 199A 20 0F 19AB               BRA    REC330
00397                                *
00398A 199C FC 174C  A       REC320  LDD    SUMCHK    * R TO L DIRECTION
00399A 199F B3 17FD  A               SUBD   STDIGT-1  * CHECK SUM
00400A 19A2 FD 174C  A               STD    SUMCHK
00401A 19A5 B6 17FE  A               LDA A  STDIGT    * LAST DIGIT SHITEI
00402A 19A8 B7 1800  A               STA A  EDDIGT
00403                                *
00404A 19AB BD 18C1  A       REC330  JSR    DGTCAL    * CHECK DIGIT CALCULATE
00405                                *
00406A 19AE B1 1800  A               CMP A  EDDIGT    * DIGIT OK ?
00407A 19B1 27 08 19BB               BEQ    REC340
00408                                *
00409A 19B3 B6 6A    A               LDA A  #106      * CHECK DIGIT ERROR
00410A 19B5 B7 179F  A               STA A  ERRBF
00411A 19B8 7E 180F  A               JMP    REC700
00412                                *
00413                                *************** ANSWER ASCII REARRANGEMENT **********
00414                                *
00415A 19BB CE 1768  A       REC340  LDX    #ANSTBL   * PRE-ANSWER TABLE
00416A 19BE CC 1784  A               LDD    #ANSASC   * ANSWER TABLE
00417A 19C1 FD 1767  A               STD    ANSASA
00418                                *
00419A 19C4 B6 173C  A               LDA A  DIRECF    * DIRECTION FLAG
00420A 19C7 27 08 19D4               BEQ    REC360
00421A 19C9 F6 1783  A               LDA B  ANSCNT    * R TO L DIRECTION
00422A 19CC B6 173D  A               LDA A  CHKDGT
00423A 19CF 26 02 19D3               BNE    REC350
00424A 19D1 C0 01    A               SUB B  #1        * NONE CHECK DIGIT
00425                                *
00426A 19D3 3A               REC350  ABX              * TOP DATA ADDRESS
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ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     RECOGNITION

      00427                          *
      00428A 19D4 FF 1763  A         REC360 STX     ANSTBA     * SOURCE ADDRESS
      00429A 19D7 B6 17B3  A                LDA A   ANSCNT
      00430A 19DA B7 175A  A                STA A   ANSCTB     * TRANSFER COUNTER
      00431                          *
      00432A 19DD B6 175A  A         REC370 LDA A   ANSCTB
      00433A 19E0 27 28 1A0A                BEQ     REC400
      00434                          *
      00435A 19E2 FE 1763  A                LDX     ANSTBA     * SOURCE ADDRESS
      00436A 19E5 A6 00    A                LDA A   ,X
      00437A 19E7 FE 1767  A                LDX     ANSASA     * DESTINATION ADDRESS
      00438A 19EA A7 00    A                STA A   ,X
      00439A 19EC 08                        INX
      00440A 19ED FF 1767  A                STX     ANSASA
      00441                          *
      00442A 19F0 B6 173C  A                LDA A   DIRECF
      00443A 19F3 26 09 19FE                BNE     REC380
      00444A 19F5 FE 1763  A                LDX     ANSTBA     * L TO R DIRECTION
      00445A 19F8 08                        INX                * NEXT ADDRESS
      00446A 19F9 FF 1763  A                STX     ANSTBA
      00447A 19FC 20 07 1A05                BRA     REC390
      00448                          *
      00449A 19FE FE 1763  A         REC380 LDX     ANSTBA     * R TO L DIRECTION
      00450A 1A01 09                        DEX                * NEXT ADDRESS
      00451A 1A02 FF 1763  A                STX     ANSTBA
      00452                          *
      00453A 1A05 7A 175A  A         REC390 DEC     ANSCTB
      00454A 1A08 20 D3 19DD                BRA     REC370
      00455                          *
      00456A 1A0A B6 173E  A         REC400 LDA A   FULVER
      00457A 1A0D 26 19 1A28                BNE     REC500
      00458                          *
      00459                          ***************   END PROCESS   ***************
      00460                          *
      00461A 1A0F B6 17B3  A                LDA A   ANSCNT     * PRE-ANSWER COUNTER
      00462A 1A12 B7 17FC  A                STA A   ASCCNT     * ANSWER COUNTER
      00463                          *
      00464A 1A15 BD 13A9  A         REC410 JSR     BEEPOK     * OK BEEP
      00465                          *
      00466A 1A18 24 06 1A20                BCC     REC420
      00467A 1A1A 7F 175F  A                CLR     ERRBF      * BREAK
      00468A 1A1D 7E 1810  A                JMP     REC800
      00469                          *
      00470A 1A20 7F 173F  A         REC420 CLR     CHRJDG     * NORMAL END
      00471A 1A23 4F                        CLR A              * (A) CLEAR
      00472A 1A24 0C                        CLC                * (C) CLEAR
      00473A 1A25 7E 1819  A                JMP     REC900
      00474                          *
      00475                          ***************  FULL ASCII CHECK  ***************
      00476                          *
      00477A 1A28 CE 1784  A         REC500 LDX     #ANSASC
      00478A 1A2B FF 1765  A                STX     ANSADR     * SOURCE ADDRESS
      00479A 1A2E FF 1767  A                STX     ANSASA     * DESTINATION ADDRESS
      00480A 1A31 7F 1758  A                CLR     FULHNT
      00481A 1A34 7F 17FC  A                CLR     ASCCNT     * ANSWER COUNTER CLEAR
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ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     RECOGNITION

      00482                          *
      00483A 1A37 B6 1783  A         REC510 LDA A  ANSCNT
      00484A 1A3A 81 00    A                CMP A  #0
      00485A 1A3C 2F D7 1A15                BLE    REC410     * END
      00486                          *
      00487A 1A3E 7A 1783  A                DEC    ANSCNT     * SOURCE COUNTER DECREMENT
      00488A 1A41 B6 175B  A                LDA A  FULHNT     * DOUBLE CHARACTER JUDGE
      00489A 1A44 27 08 1A4E                BEQ    REC520
      00490A 1A46 B6 175D  A                LDA A  ASCBF2     * SPECIAL CODE ( $,+,/,% )
      00491A 1A49 B7 175C  A                STA A  ASCBF1
      00492A 1A4C 20 0C 1A5A                BRA    REC530
      00493                          *
      00494A 1A4E FE 1765  A         REC520 LDX    ANSADR     * SOURCE ADDRESS
      00495A 1A51 A6 00    A                LDA A  ,X
      00496A 1A53 B7 175C  A                STA A  ASCBF1
      00497A 1A56 08                        INX
      00498A 1A57 FF 1765  A                STX    ANSADR
      00499                          *
      00500A 1A5A 81 24    A         REC530 CMP A  #$24       * $
      00501A 1A5C 26 08 1A66                BNE    REC540
      00502A 1A5E CE 1D9E  A                LDX    #FULASC
      00503A 1A61 FF 1769  A                STX    FULTBA
      00504A 1A64 20 27 1A8D                BRA    REC580
      00505                          *
      00506A 1A66 81 2F    A         REC540 CMP A  #$2F       * /
      00507A 1A68 26 08 1A72                BNE    REC550
      00508A 1A6A CE 1D88  A                LDX    #FULASC+26
      00509A 1A6D FF 1769  A                STX    FULTBA
      00510A 1A70 20 1B 1A8D                BRA    REC580
      00511                          *
      00512A 1A72 81 2B    A         REC550 CMP A  #$2B       * +
      00513A 1A74 26 08 1A7E                BNE    REC560
      00514A 1A76 CE 1DD2  A                LDX    #FULASC+52
      00515A 1A79 FF 1769  A                STX    FULTBA
      00516A 1A7C 20 0F 1A8D                BRA    REC580
      00517                          *
      00518A 1A7E 81 25    A         REC560 CMP A  #$25       * %
      00519A 1A80 27 05 1A87                BEQ    REC570
      00520A 1A82 7F 175B  A                CLR    FULHNT
      00521A 1A85 20 3F 1AC6                BRA    REC610
      00522                          *
      00523A 1A87 CE 1DEC  A         REC570 LDX    #FULASC+78 * %
      00524A 1A8A FF 1769  A                STX    FULTBA
      00525                          *
      00526A 1A8D B6 1783  A         REC580 LDA A  ANSCNT     * SOURCE DATA END CHECK
      00527A 1A90 81 00    A                CMP A  #0
      00528A 1A92 2F 32 1AC6                BLE    REC610     * END DATA ENTRY
      00529                          *
      00530A 1A94 FE 1765  A                LDX    ANSADR     * NEXT DATA PRE-READ
      00531A 1A97 A6 00    A                LDA A  ,X
      00532A 1A99 B7 175D  A                STA A  ASCBF2
      00533A 1A9C 08                        INX
      00534A 1A9D FF 1765  A                STX    ANSADR     * NEXT SOURCE ADDRESS
      00535                          *
      00536A 1AA0 81 41    A                CMP A  #$41       * ALPHA ?
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SEQ   LOC  OBJECT      PROGRAM  BARCOD     RECOGNITION

00537A 1AA2 25 1D 1AC1          BCS     REC600
00538                       *
00539A 1AA4 80 41     A         SUB A   #$41
00540A 1AA6 16                  TAB
00541A 1AA7 7F 175B   A         CLR     FULHNT
00542A 1AAA FE 1769   A         LDX     FULTBA
00543A 1AAD 3A                  ABX                 * DATA ADDRESS
00544                       *
00545A 1AAE A6 00     A         LDA A   ,X          * CONVERTION DATA
00546A 1AB0 81 FF     A         CMP A   #$FF
00547A 1AB2 26 08 1ABC          BNE     REC590
00[illegible]                       *
00[illegible] A 1AB4 86 6B     A         LDA A   #107        * FULL ASCII ERROR
00550A 1AB6 B7 175F   A         STA A   ERRBF
00551A 1AB9 7E 180F   A         JMP     REC700
00552                       *
00553A 1ABC 7A 1783   A   REC590 DEC     ANSCNT      * SOURCE COUNTER DECREMENT
00554A 1ABF 20 08 1AC9          BRA     REC620
00555                       *
00556A 1AC1 86 01     A   REC600 LDA A   #1           * SINGLE DATA FLAG SET
00557A 1AC3 B7 175B   A         STA A   FULHNT
00558                       *
00559A 1AC6 B6 175C   A   REC610 LDA A   ASCBF1      * PRE-READ DATA
00560                       *
00561A 1AC9 FE 1767   A   REC620 LDX     ANSASA      * FULL ASCII ENTRY
00562A 1ACC A7 00     A         STA A   ,X
00563A 1ACE 08                  INX                 * DESTINATION NEXT ADDRESS
00564A 1ACF FF 1767   A         STX     ANSASA
00565A 1AD2 7C 17FC   A         INC     ASCCNT      * DESTINATION COUNTER RENEW
00566A 1AD5 7E 1A37   A         JMP     REC510
00567                       *
00568                           TTL     SUBROUTIN
00569                       *
00570                       *
00571                       *   FUNCTION :  BAR OR SPACE WIDTH TIMER VALUE READ
00[illegible]                       *   CALL     :  JSR   TIMRED
00[illegible]                       *   RETURN   :  (C)= RETURN STATUS
00574                       *                           0: NORMAL
00575                       *                           1: OVER FLOW
00576                       *                    TIMCNT= TIMER VALUE
00577                       *
00578                       *
00579A 1AD8 96 08     A   TIMRED LDA A   TCSR        * TIMER CONTROLL STATUS REGISTER
00580A 1ADA 85 40     A         BIT A   #$40        * OVER FLOW CHECK
00581A 1ADC 26 24 1B02          BNE     TIM100
00582A 1ADE 85 80     A         BIT A   #$80        * ICF CHECK
00583A 1AE0 27 F6 1AD8          BEQ     TIMRED
00584                       *
00585A 1AE2 DC 0D     A         LDD     ICR         * TIMER READ
00586A 1AE4 FD 1744   A         STD     TIMCT2
00587A 1AE7 B3 1742   A         SUBD    TIMCT1
00588A 1AEA FD 1746   A         STD     TIMCNT      * TIMER VALUE ENTRY
00589                       *
00590A 1AED FC 1744   A         LDD     TIMCT2      * START VALUE RENEW
00591A 1AF0 FD 1742   A         STD     TIMCT1
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00592                                   *
00593A 1AF3 C3 C350  A                  ADDD    #OVRVAL     * OVER FLOW COUNTER SET
00594A 1AF6 DD 08    A                  STD     OCR
00595A 1AF8 96 08    A                  LDA A   TCSR
00596A 1AFA    72    A                  FCB     $72,$00,$08 * OIM   #$00,OCR
     A 1AFB    00    A
     A 1AFC    08    A
00597                                   *
00598A 1AFD    75    A                  FCB     $75,$02,$08 * EIM   #2 TCSR * EDGE CONVERT
     A 1AFE    02    A
     A 1AFF    08    A
00599A 1800 0C                          CLC                 * CARRY CLEAR
00600                                   *
00601A 1801 39                  TIM900  RTS                 * RETURN
00602                                   *
00603A 1802 CC FFFF  A          TIM100  LDD     #$FFFF      * OVER FLOW
00604A 1805 FD 1746  A                  STD     TIMCNT
00605A 1808 0D                          SEC                 * (C) SET
00606A 1809 20 F6 1801                  BRA     TIM900
00607                                   *
00608                                   *
00609                                   *  FUNCTION :  BAR DATA READ AND BIT CONVERT
00610                                   *  CALL     :  JSR   DTTOBT
00611                                   *                 (A)= BIT NUMBER
00612                                   *  RETURN   :  (A)= RETURN STATUS
00613                                   *                    0: NORMAL
00614                                   *                  100: SCAN SPEED SLOWER
00615                                   *                  101: SCAN SPEED FASTER
00616                                   *              BAR    = BAR BIT ANSWER
00617                                   *              SPACE  = SPACE BIT ANSWER
00618                                   *
00619                                   *
00620A 1808 B7 175E  A          DTTOBT  STA A   BITCNT      * BIT COUNTER
00621A 180E 7F 173A  A                  CLR     BAR
00622A 1811 7F 1739  A                  CLR     SPACE
00623                                   *
00624A 1814 B6 175E  A          DTT10   LDA A   BITCNT      * BIT END CHECK
00625A 1817 26 05 181E                  BNE     DTT20
00626                                   *
00627A 1819 7C 1783  A                  INC     ANSCNT      * END  ENTRY CHARACTER RENEW
00628A 181C 4F                          CLR A               * NORMAL RETURN
00629                                   *
00630A 181D 39                  DTT900  RTS                 * RETURN
00631                                   *
00632A 181E B6 175E  A          DTT20   LDA A   BITCNT      * BAR , SPACE CHECK
00633A 1821 85 01    A                  BIT A   #$1
00634A 1823 26 05 182A                  BNE     DTT30
00635A 1825 78 1739  A                  ASL     SPACE       * WHEN SPACE
00636A 1828 20 03 182D                  BRA     DTT40
00637                                   *
00638A 182A 78 173A  A          DTT30   ASL     BAR         * WHEN BAR
00639                                   *
00640A 182D BD 1AD8  A          DTT40   JSR     TIMRED      * WIDTH READ
00641                                   *
00642A 1830 24 04 1836                  BCC     DTT50
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00643                          *
00644A 1832 86 64     A        DTT50   LDA A   #100        * SCAN SPEED SLOWER ERROR
00645A 1834 20 E7 181D                 BRA     DTT900
00646                          *
00647A 1836 FC 1746   A                LDD     TIMCNT
00648A 1839 83 0076   A                SUBD    #MINVAL     * 118  SPEED OVER CHECK
00649A 183C 24 04 1842                 BCC     DTT60
00650                          *
00651A 183E 86 65     A                LDA A   #101        * SCAN SPEED FASTER
00652A 1840 20 DB 181D                 BRA     DTT900
00653                          *
00654A 1842 B6 175E   A        DTT60   LDA A   BITCNT
00655A 1845 85 01     A                BIT A   #$1         * BAR OR SPACE CHECK
00656A 1847 26 2E 1877                 BNE     DTT80       * BAR
00657                          *
00658                          ***************    SPACE    ******************
00659                          *
00660A 1849 FC 1746   A                LDD     TIMCNT      *
00661A 184C B3 1758   A                SUBD    THRSHS      * COMPARE WITH SPACE THRESH
00662A 184F 22 0F 1860                 BHI     DTT70
00663                          *
00664A 1851 FC 1746   A                LDD     TIMCNT      * WHEN SPACE 0
00665A 1854 FD 1754   A                STD     ZNKSZC      * LAST SPACE ZERO COUNTER ENTRY
00666A 1857 F3 1756   A                ADDD    ZNKSOC
00667A 185A 04                         LSRD                * / 2
00668A 185B FD 1758   A                STD     THRSHS      * NEW SPACE THRESH
00669A 185E 20 43 18A3                 BRA     DTT110
00670                          *
00671A 1860 FC 1746   A        DTT70   LDD     TIMCNT      * WHEN SPACE 1
00672A 1863 FD 1756   A                STD     ZNKSOC      * LAST SPACE ONE COUNTER ENTRY
00673A 1866 F3 1754   A                ADDD    ZNKSZC
00674A 1869 04                         LSRD                * / 2
00675A 186A FD 1758   A                STD     THRSHS      * NEW SPACE THRESH
00676                          *
00677A 186D B6 1738   A                LDA A   SPACE       * SPACE BIT SET
00678A 1870 8A 01     A                ORA A   #1
00679A 1872 B7 1738   A                STA A   SPACE
00680A 1875 20 2C 18A3                 BRA     DTT110
00681                          *
00682                          ***************    BAR     *****************
00683                          *
00684A 1877 FC 1746   A        DTT80   LDD     TIMCNT
00685A 187A B3 1752   A                SUBD    THRSHB      * COMPARE WITH BAR THRESH
00686A 187D 22 0F 188E                 BHI     DTT90       *
00687                          *
00688A 187F FC 1746   A                LDD     TIMCNT      * WHEN BAR 0
00689A 1882 FD 174E   A                STD     ZNKBZC      * LAST BAR ZERO COUNTER ENTRY
00690A 1885 F3 1750   A                ADDD    ZNKBOC
00691A 1888 04                         LSRD                * / 2
00692A 1889 FD 1752   A                STD     THRSHB      * NEW BAR THRESH
00693A 188C 20 15 18A3                 BRA     DTT110
00694                          *
00695A 188E FC 1746   A        DTT90   LDD     TIMCNT      * WHEN BAR 1
00696A 1891 FD 1750   A                STD     ZNKBOC      * LAST BAR ONE COUNTER ENTRY
00697A 1894 F3 174E   A                ADDD    ZNKBZC
```

ERR SEQ LOC OBJECT PROGRAM BARCOD SUBROUTIN

```
00698A 1B97 04                          LSRD                    * / 2
00699A 1B98 FD 1752  A                  STD     THRSHB          * NEW BAR THRESH
00700                           *
00701A 1B9B B6 173A  A                  LDA A   BAR             * BAR BIT SET
00702A 1B9E 8A 01    A                  ORA A   #1
00703A 1BA0 B7 173A  A                  STA A   BAR
00704                           *
00705A 1BA3 7A 175E  A          DTT110  DEC     BITCNT
00706A 1BA6 7E 1B14  A                  JMP     DTT10
00707                           *
00708                           *
00709                           *  FUNCTION :  OK BEEP ON
00710                           *  CALL     :  JSR   BEEPOK
00711                           *  RETURN   :  (C)= BREAK STATUS
00712                           *                   0: NORMAL
00713                           *                   1: BREAK
00714                           *
00715                           *
00716A 1BA9 BD 1C53  A          BEEPOK  JSR     SRWINT          * SLAVE SUPER VISOR MASK OPEN
00717                           *
00718A 1BAC 86 30    A                  LDA A   #$30            * SLAVE BEEP COMMAND
00719A 1BAE BD FF19  A                  JSR     SNSCOM
00720                           *
00721A 1BB1 86 1C    A                  LDA A   #$1C            * SOUND LEVEL
00722A 1BB3 BD FF19  A                  JSR     SNSCOM
00723                           *
00724A 1BB6 86 01    A                  LDA A   #$1             * SOUND LENGTH
00725A 1BB8 BD FF19  A                  JSR     SNSCOM
00726                           *
00727A 1BBB 25 03 1BC0                  BCS     BEP900
00728A 1BBD BD FF16  A                  JSR     RV232C          * SLAVE COMMUNICATION INITIAL
00729                           *
00730A 1BC0 39                  BEP900  RTS
00731                           *
00732                           *
00733                           *  FUNCTION :  CHECK DIGIT CALCULATE
00734                           *  CALL     :  JSR   DGTCAL
00735                           *                SUMCHK,+1=CHECK DIGIT SUM AREA
00736                           *  RETURN   :  (A)= CHECK DIGIT
00737                           *
00738                           *
00739A 1BC1 FC 174C  A          DGTCAL  LDD     SUMCHK          * SUM CHECK
00740A 1BC4 83 0023  A                  SUBD    #43
00741A 1BC7 25 05 1BCE                  BCS     DGT10
00742                           *
00743A 1BC9 FD 174C  A                  STD     SUMCHK
00744A 1BCC 20 F3 1BC1                  BRA     DGTCAL
00745                           *
00746A 1BCE C3 0028  A          DGT10   ADDD    #43
00747A 1BD1 17                          TBA                     * REST  (B) TO (A)
00748A 1BD2 39                          RTS
00749                           *
00750                                   TTL     I/O SUBROUTINE
00751                           *
00752                           *
```

ERR SEQ LOC OBJECT PROGRAM BARCOD I/O SUBROUTINE

```
00753                          *  FUNCTION :  BARCODE WAND POWER ON
00754                          *  CALL     :  JSR   PONBAR
00755                          *  RETURN   :  (C)= RETURN STATUS
00756                          *                   0: NORMAL
00757                          *                   1: BREAK
00758                          *
00759                          *
00760A 18D3 86 20     A        PONBAR LDA A  #$20       * BARCODE WAND POWER ON
00761A 18D5 C6 06     A               LDA B  #PORT3
00762A 18D7 BD 1C0D   A               JSR    SPWRIT
00763                          *
00764A 18DA 25 06 18E2                BCS    PON900    * BREAK CHECK
00765A 18DC     72    A               FCB    $72,$40,$7C * OIM   #$40 SIOSTS     * POWER ON STATUS
     A 18DD     40    A
     A 18DE     7C    A
00766                          *
00767A 18DF BD FF16   A               JSR    RV232C    * SLAVE RS232C RECOVERY
00768                          *
00769A 18E2 39                 PON900 RTS               * RETURN
00770                          *
00771                          *
00772                          *  FUNCTION :  BARCODE WAND POWER OFF
00773                          *  CALL     :  (C)= RETURN STATUS
00774                          *                   0: NORMAL
00775                          *                   1: BREAK
00776                          *
00777                          *
00778A 18E3 86 20     A        POFBAR LDA A  #$20       * BARCODE WAND POWER OFF
00779A 18E5 C6 06     A               LDA B  #PORT3
00780A 18E7 CA 80     A               ORA B  #$80
00781A 18E9 BD 1C0D   A               JSR    SPWRIT
00782                          *
00783A 18EC 25 06 18F4                BCS    POF900    * BREAK CHECK
00784A 18EE     71    A               FCB    $71,$BF,$7C * AIM   #$BF SIOSTS     * POWER ON STATUS
     A 18EF     BF    A
     A 18F0     7C    A
00785                          *
00786A 18F1 BD FF16   A               JSR    RV232C    * SLAVE RS232C RECOVERY
00787                          *
00788A 18F4 39                 POF900 RTS               * RETURN
00789                          *
00790                          *
00791                          *  FUNCTION :  SLAVE PORT READ
00792                          *  CALL     :  JSR   SPREAD
00793                          *                (B)= PORT ADDRESS
00794                          *  RETURN   :  (A)= READ DATA
00795                          *              (C)= RETURN STATUS
00796                          *                   0: NORMAL
00797                          *                   1: BREAK
00798                          *
00799                          *
00800A 18F5 BD 1C53   A        SPREAD JSR    SRWINT     * SLAVE COMMUNICATION INITIAL
00801A 18F8 25 12 1C0C                BCS    SPR900     * ERROR
00802                          *
00803A 18FA 86 05     A               LDA A  #5         * READ COMMMAND
```

ERR SEQ LOC OBJECT PROGRAM BARCOD I/O SUBROUTINE

```
00804A 1BFC BD FF19  A              JSR    SNSCOM
00805                          *
00806A 1BFF 4F                      CLR A             * PORT ADDRESS (H)
00807A 1C00 BD FF19  A              JSR    SNSCOM
00808                          *
00809A 1C03 17                      TBA               * PORT ADDRESS (L)
00810A 1C04 BD FF19  A              JSR    SNSCOM
00811A 1C07 25 03 1C0C              BCS    SPR900     * ERROR
00812                          *
00813A 1C09 BD FF16  A              JSR    RV232C     * SLAVE RS232C RECOVERY
00814                          *
00815A 1C0C 39              SPR900  RTS                * RETURN
00816                          *
00817                          *
00818                          *  FUNCTION :  SLAVE PORT DATA WRITE
00819                          *  CALL     :  JSR   SPWRIT
00820                          *                 (A)= OUTPUT DATA
00821                          *                 (B)= PORT ADDRESS
00822                          *  RETURN   :  (C)= RETURN STATUS
00823                          *                  0: NORMAL
00824                          *                  1: BREAK
00825                          *
00826                          *
00827A 1C0D FD 1761  A      SPWRIT STD    SPWRBF     * DATA SAVE
00828A 1C10 C4 7F    A             AND B  #$7F       * PORT ADDRESS
00829                          *
00830A 1C12 BD 1BF5  A              JSR    SPREAD     * PORT STATUS READ
00831A 1C15 25 38 1C52              BCS    SPW900     * ERROR
00832A 1C17 36                      PSH A             * DATA SAVE
00833                          *
00834A 1C18 B6 1762  A              LDA A  SPWRBF+1
00835A 1C1B 2B 11 1C2E              BMI    SPWR10
00836                          *
00837A 1C1D B6 1761  A              LDA A  SPWRBF     * DATA RESET
00838A 1C20 88 FF    A              EOR A  #$FF
00839A 1C22 B7 1761  A              STA A  SPWRBF     * DATA INVERT
00840                          *
00841A 1C25 32                      PUL A
00842A 1C26 B4 1761  A              AND A  SPWRBF     * OUT DATA
00843A 1C29 B7 1761  A              STA A  SPWRBF
00844A 1C2C 20 07 1C35              BRA    SPWR20
00845                          *
00846A 1C2E 32              SPWR10  PUL A             * DATA SET
00847A 1C2F BA 1761  A              ORA A  SPWRBF     * OUT DATA
00848A 1C32 B7 1761  A              STA A  SPWRBF
00849                          *
00850A 1C35 BD 1C53  A      SPWR20  JSR    SRWINT     * SLAVE COMMUNICATION INITIAL
00851A 1C38 25 18 1C52              BCS    SPW900     * ERROR
00852                          *
00853A 1C3A 86 06    A              LDA A  #6         * WRITE COMMAND
00854A 1C3C BD FF19  A              JSR    SNSCOM
00855                          *
00856A 1C3F 4F                      CLR A             * PORT ADDRESS (H)
00857A 1C40 BD FF19  A              JSR    SNSCOM
00858                          *
```

ERR SEQ LOC OBJECT PROGRAM BARCOD I/O SUBROUTINE

```
00859A 1C43 17                          TBA             * PORT ADDRESS (L)
00860A 1C44 BD FF19  A                  JSR     SNSCOM
00861                           *
00862A 1C47 B6 1761  A                  LDA A   SPWR8F  * DATA OUTPUT
00863A 1C4A BD FF19  A                  JSR     SNSCOM
00864A 1C4D 25 03 1C52                  BCS     SPW900  * ERROR
00865                           *
00866A 1C4F BD FF16  A                  JSR     RV232C  * SLAVE RS232C RECOVERY
00867                           *
00868A 1C52 39                  SPW900  RTS             * RETURN
00869                           *
00870                           *
 0871                           *   FUNCTION :  SLAVE COMMUNICATION INITIAL
 0872                           *   CALL     :  JSR   SRWINT
00873                           *   RETURN   :  (C)= RETURN STATUS
00874                           *                    0: NORMAL
00875                           *                    1: BREAK
00876                           *
00877                           *
00878A 1C53 86 03    A          SRWINT  LDA A   #3      * SLAVE SUPER VISOR MASK OPEN
00879A 1C55 BD FF19  A                  JSR     SNSCOM
00880                           *
00881A 1C58 86 AA    A                  LDA A   #$AA
00882A 1C5A BD FF19  A                  JSR     SNSCOM
00883                           *
00884A 1C5D 39                          RTS             * RETURN
00885                           *
00886                                   TTL     SPACE TABLE
00887                           *
00888                           ********************************************************
00889                           *                                                      *
00890                           *       SPACE   TABLE                                  *
00891                           *                                                      *
00892                           ********************************************************
00893                           *
00894A 1C5E     0000  A         SPCTBL  FDB     0,0     * 0000  ERROR
     A 1C60     0000  A
 0895                           *
00896A 1C62     1C9E  A                 FDB     BARTBL  * 0001  L TO R
00897A 1C64     1D7E  A                 FDB     BARTBL+$E0 * 1C00  R TO L
00898                           *
00899A 1C66     1CDE  A                 FDB     BARTBL+$40 * 0010  L TO R
00900A 1C68     1D3E  A                 FDB     BARTBL+$A0 * 0100  R TO L
00901                           *
00902A 1C6A     0000  A                 FDB     0,0     * 0011  ERROR
     A 1C6C     0000  A
00903                           *
00904A 1C6E     1D1E  A                 FDB     BARTBL+$80 * 0100  L TO R
00905A 1C70     1CFE  A                 FDB     BARTBL+$60 * 0010  R TO L
00906                           *
00907A 1C72     0000  A                 FDB     0,0     * 0101  ERROR
     A 1C74     0000  A
00908                           *
00909A 1C76     0000  A                 FDB     0,0     * 0110  ERROR
     A 1C78     0000  A
```

```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     SPACE TABLE

      00910                          *
      00911A 1C7A    A5     A                FCB    $A5        * 0111  L TO R  % CODE
      00912A 1C7B    2A     A                FCB    $2A        *                % DIGIT
      00913A 1C7C    A4     A                FCB    $A4        *         R TO L  $ CODE
      00914A 1C7D    27     A                FCB    $27        *                 $ DIGIT
      00915                          *
      00916A 1C7E    1D5E   A                FDB    BARTBL+$C0 * 1000  L TO R
      00917A 1C80    1C8E   A                FDB    BARTBL+$20 * 0001  R TO L
      00918                          *
      00919A 1C82    0000   A                FDB    0,0        * 1001  ERROR
           A 1C84    0000   A
      00920                          *
      00921A 1C86    0000   A                FDB    0,0        * 1010  ERROR
           A 1C88    0000   A
      00922                          *
      00923A 1C8A    AB     A                FCB    $AB        * 1011  L TO R  + CODE
      00924A 1C8B    29     A                FCB    $29        *                + DIGIT
      00925A 1C8C    AF     A                FCB    $AF        *         R TO L  / CODE
      00926A 1C8D    28     A                FCB    $28        *                 / DIGIT
      00927                          *
      00928A 1C8E    0000   A                FDB    0,0        * 1100  ERROR
           A 1C90    0000   A
      00929                          *
      00930A 1C92    AF     A                FCB    $AF        * 1110  L TO R  / CODE
      00931A 1C93    28     A                FCB    $28        *                / DIGIT
      00932A 1C94    AB     A                FCB    $AB        *         R TO L  + CODE
      00933A 1C95    29     A                FCB    $29        *                 + DIGIT
      00934                          *
      00935A 1C96    A4     A                FCB    $A4        * 1110  L TO R  $ CODE
      00936A 1C97    27     A                FCB    $27        *                 $ DIGIT
      00937A 1C98    A5     A                FCB    $A5        *         R TO L  % CODE
      00938A 1C99    2A     A                FCB    $2A        *                 % DIGIT
      00939                          *
      00940A 1C9A    0000   A                FDB    0,0        * 1111  ERROR
           A 1C9C    0000   A
      00941                          *
      00942                                 TTL    BAR TABLE
      00943                          *
      00944                          ***********************************************************
      00945                          *                                                         *
      00946                          *       BAR. TABLE                                        *
      00947                          *                                                         *
      00948                          ***********************************************************
      00949                          *
      00950A 1C9E    00     A        BARTBL FCB    0,0,0      * SPACE=0001  L TO R
           A 1C9F    00     A
           A 1CA0    00     A
      00951A 1CA1    51     A                FCB    $51        * Q
      00952A 1CA2    00     A                FCB    0
      00953A 1CA3    4E     A                FCB    $4E        * N
      00954A 1CA4    54     A                FCB    $54        * T
      00955A 1CA5    00     A                FCB    0,0
           A 1CA6    00     A
      00956A 1CA7    4C     A                FCB    $4C        * L
      00957A 1CA8    53     A                FCB    $53        * S
```

```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     BAR TABLE

     00958A 1CA9     00     A              FCB     0
     00959A 1CAA     50     A              FCB     $50         * P
     00960A 1CAB     00     A              FCB     0,0,0,0
          A 1CAC     00     A
          A 1CAD     00     A
          A 1CAE     00     A
     00961A 1CAF     48     A              FCB     $4B         * K
     00962A 1CB0     52     A              FCB     $52         * R
     00963A 1CB1     00     A              FCB     0
     00964A 1CB2     4F     A              FCB     $4F         * O
     00965A 1CB3     00     A              FCB     0,0,0
          A 1CB4     00     A
          A 1CB5     00     A
     00966A 1CB6     4D     A              FCB     $4D         * M
     00967A 1CB7     00     A              FCB     0,0,0,0,0,0,0
          A 1CB8     00     A
          A 1CB9     00     A
          A 1CBA     00     A
          A 1CBB     00     A
          A 1CBC     00     A
          A 1CBD     00     A
     00968                          *
     00969A 1CBE     00     A              FCB     0,0,0       * SPACE=0001  R TO L
          A 1CBF     00     A
          A 1CC0     00     A
     00970A 1CC1     4D     A              FCB     $4D         * M
     00971A 1CC2     00     A              FCB     0
     00972A 1CC3     4F     A              FCB     $4F         * O
     00973A 1CC4     50     A              FCB     $50         * P
     00974A 1CC5     00     A              FCB     0,0
          A 1CC6     00     A
     00975A 1CC7     52     A              FCB     $52         * R
     00976A 1CC8     53     A              FCB     $53         * S
     00977A 1CC9     00     A              FCB     0
     00978A 1CCA     54     A              FCB     $54         * T
     00979A 1CCB     00     A              FCB     0,0,0,0
          A 1CCC     00     A
          A 1CCD     00     A
          A 1CCE     00     A
     00980A 1CCF     4B     A              FCB     $4B         * K
     00981A 1CD0     4C     A              FCB     $4C         * L
     00982A 1CD1     00     A              FCB     0
     00983A 1CD2     4E     A              FCB     $4E         * N
     00984A 1CD3     00     A              FCB     0,0,0
          A 1CD4     00     A
          A 1CD5     00     A
     00985A 1CD6     51     A              FCB     $51         * Q
     00986A 1CD7     00     A              FCB     0,0,0,0,0,0,0
          A 1CD8     00     A
          A 1CD9     00     A
          A 1CDA     00     A
          A 1CDB     00     A
          A 1CDC     00     A
          A 1CDD     00     A
     00987                          *
```

```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     BAR TABLE

     00988A 1CDE     00     A              FCB     0,0,0       * SPACE= 0010  L TO R
          A 1CDF     00     A
          A 1CE0     00     A
     00989A 1CE1     47     A              FCB     $47         * G
     00990A 1CE2     00     A              FCB     0
     00991A 1CE3     44     A              FCB     $44         * D
     00992A 1CE4     4A     A              FCB     $4A         * J
     00993A 1CE5     00     A              FCB     0,0
          A 1CE6     00     A
     00994A 1CE7     42     A              FCB     $42         * B
     00995A 1CE8     49     A              FCB     $49         * I
     00996A 1CE9     00     A              FCB     0
     00997A 1CEA     46     A              FCB     $46         * F
     00998A 1CEB     00     A              FCB     0,0,0,0
          A 1CEC     00     A
          A 1CED     00     A
          A 1CEE     00     A
     00999A 1CEF     41     A              FCB     $41         * A
     01000A 1CF0     48     A              FCB     $48         * H
     01001A 1CF1     00     A              FCB     0
     01002A 1CF2     45     A              FCB     $45         * E
     01003A 1CF3     00     A              FCB     0,0,0
          A 1CF4     00     A
          A 1CF5     00     A
     01004A 1CF6     43     A              FCB     $43         * C
     01005A 1CF7     00     A              FCB     0,0,0,0,0,0,0
          A 1CF8     00     A
          A 1CF9     00     A
          A 1CFA     00     A
          A 1CFB     00     A
          A 1CFC     00     A
          A 1CFD     00     A
     01006                          *
     01007A 1CFE     00     A              FCB     0,0,0       * SPACE=0010  R TO L
          A 1CFF     00     A
          A 1D00     00     A
      1008A 1D01     43     A              FCB     $43         * C
     01009A 1D02     00     A              FCB     0
     01010A 1D03     45     A              FCB     $45         * E
     01011A 1D04     46     A              FCB     $46         * F
     01012A 1D05     00     A              FCB     0,0
          A 1D06     00     A
     01013A 1D07     48     A              FCB     $48         * H
     01014A 1D08     49     A              FCB     $49         * I
     01015A 1D09     00     A              FCB     0
     01016A 1D0A     4A     A              FCB     $4A         * J
     01017A 1D0B     00     A              FCB     0,0,0,0
          A 1D0C     00     A
          A 1D0D     00     A
          A 1D0E     00     A
     01018A 1D0F     41     A              FCB     $41         * A
     01019A 1D10     42     A              FCB     $42         * B
     01020A 1D11     00     A              FCB     0
     01021A 1D12     44     A              FCB     $44         * D
     01022A 1D13     00     A              FCB     0,0,0
```

```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     BAR TABLE

          A 1D14    00      A
          A 1D15    00      A
01023A    A 1D16    47      A              FCB     $47         * G
01024A    A 1D17    00      A              FCB     0,0,0,0,0,0,0
          A 1D18    00      A
          A 1D19    00      A
          A 1D1A    00      A
          A 1D1B    00      A
          A 1D1C    00      A
          A 1D1D    00      A
01025                                *
01026A    A 1D1E    00      A              FCB     0,0,0       * SPACE=0100  L TO R
          A 1D1F    00      A
          A 1D20    00      A
01027A    A 1D21    37      A              FCB     $37         * 7
01028A    A 1D22    00      A              FCB     0
01029A    A 1D23    34      A              FCB     $34         * 4
01030A    A 1D24    30      A              FCB     $30         * 0
01031A    A 1D25    00      A              FCB     0,0
          A 1D26    00      A
01032A    A 1D27    32      A              FCB     $32         * 2
01033A    A 1D28    39      A              FCB     $39         * 9
01034A    A 1D29    00      A              FCB     0
01035A    A 1D2A    36      A              FCB     $36         * 6
01036A    A 1D2B    00      A              FCB     0,0,0,0
          A 1D2C    00      A
          A 1D2D    00      A
          A 1D2E    00      A
01037A    A 1D2F    31      A              FCB     $31         * 1
01038A    A 1D30    38      A              FCB     $38         * 8
01039A    A 1D31    00      A              FCB     0
01040A    A 1D32    35      A              FCB     $35         * 5
01041A    A 1D33    00      A              FCB     0,0,0
          A 1D34    00      A
          A 1D35    00      A
01042A    A 1D36    33      A              FCB     $33         * 3
01043A    A 1D37    00      A              FCB     0,0,0,0,0,0,0
          A 1D38    00      A
          A 1D39    00      A
          A 1D3A    00      A
          A 1D3B    00      A
          A 1D3C    00      A
          A 1D3D    00      A
01044                                *
01045A    A 1D3E    00      A              FCB     0,0,0       * SPACE= 0100  R TO L
          A 1D3F    00      A
          A 1D40    00      A
01046A    A 1D41    33      A              FCB     $33         * 3
01047A    A 1D42    00      A              FCB     0
01048A    A 1D43    35      A              FCB     $35         * 5
01049A    A 1D44    36      A              FCB     $36         * 6
01050A    A 1D45    00      A              FCB     0,0
          A 1D46    00      A
01051A    A 1D47    38      A              FCB     $38         * 8
01052A    A 1D48    39      A              FCB     $39         * 9
```

```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     BAR TABLE

     01053A 1D49    00     A              FCB     0
     01054A 1D4A    30     A              FCB     $30          * 0
     01055A 1D4B    00     A              FCB     0,0,0,0
          A 1D4C    00     A
          A 1D4D    00     A
          A 1D4E    00     A
     01056A 1D4F    31     A              FCB     $31          * 1
     01057A 1D50    32     A              FCB     $32          * 2
     01058A 1D51    00     A              FCB     0
     01059A 1D52    34     A              FCB     $34          * 4
     01060A 1D53    00     A              FCB     0,0,0
          A 1D54    00     A
          A 1D55    00     A
     01061A 1D56    37     A              FCB     $37          * 7
     01062A 1D57    00     A              FCB     0,0,0,0,0,0,0
          A 1D58    00     A
          A 1D59    00     A
          A 1D5A    00     A
          A 1D5B    00     A
          A 1D5C    00     A
          A 1D5D    00     A
     01063                          *
     01064A 1D5E    00     A              FCB     0,0,0        * SPACE=1000   L TO R
          A 1D5F    00     A
          A 1D60    00     A
     01065A 1D61    2D     A              FCB     $2D          * -
     01066A 1D62    00     A              FCB     0
     01067A 1D63    58     A              FCB     $58          * X
     01068A 1D64    2A     A              FCB     $2A          * *
     01069A 1D65    00     A              FCB     0,0
          A 1D66    00     A
     01070A 1D67    56     A              FCB     $56          * V
     01071A 1D68    20     A              FCB     $20          * SP
     01072A 1D69    00     A              FCB     0
     01073A 1D6A    5A     A              FCB     $5A          * Z
     01074A 1D6B    00     A              FCB     0,0,0,0
          A 1D6C    00     A
          A 1D6D    00     A
          A 1D6E    00     A
     01075A 1D6F    55     A              FCB     $55
     01076A 1D70    2E     A              FCB     $2E          * .
     01077A 1D71    00     A              FCB     0
     01078A 1D72    59     A              FCB     $59          * Y
     01079A 1D73    00     A              FCB     0,0,0
          A 1D74    00     A
          A 1D75    00     A
     01080A 1D76    57     A              FCB     $57          * W
     01081A 1D77    00     A              FCB     0,0,0,0,0,0,0
          A 1D78    00     A
          A 1D79    00     A
          A 1D7A    00     A
          A 1D7B    00     A
          A 1D7C    00     A
          A 1D7D    00     A
     01082                          *
```

```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     BAR TABLE

     01083A 1D7E    00    A              FCB  .  0,0,0      * SPACE=1000  R TO L
          A 1D7F    00    A
          A 1D80    00    A
     01084A 1D81    57    A              FCB     $57        * W
     01085A 1D82    00    A              FCB     0
     01086A 1D83    59    A              FCB     $59        * Y
     01087A 1D84    5A    A              FCB     $5A        * Z
     01088A 1D85    00    A              FCB     0,0
          A 1D86    00    A
     01089A 1D87    2E    A              FCB     $2E        * .
     01090A 1D88    20    A              FCB     $20        * SP
     01091A 1D89    00    A              FCB     0
     01092A 1D8A    2A    A              FCB     $2A        * *
     01093A 1D8B    00    A              FCB     0,0,0,0
          A 1D8C    00    A
          A 1D8D    00    A
          A 1D8E    00    A
     01094A 1D8F    55    A              FCB     $55        * U
     01095A 1D90    56    A              FCB     $56        * V
     01096A 1D91    00    A              FCB     0
     01097A 1D92    58    A              FCB     $58        * X
     01098A 1D93    00    A              FCB     0,0,0
          A 1D94    00    A
          A 1D95    00    A
     01099A 1D96    2D    A              FCB     $2D        * -
     01100A 1D97    00    A              FCB     0,0,0,0,0,0,0
          A 1D98    00    A
          A 1D99    00    A
          A 1D9A    00    A
          A 1D9B    00    A
          A 1D9C    00    A
          A 1D9D    00    A
     01101                         *
     01102                                 TTL     FULL ASCII TABLE
     01103                         *
     01104                         ***********************************************************
     01105                         *                                                         *
     01106                         *       FULL ASCII CONVERTION TABLE                       *
     01107                         *                                                         *
     01108                         ***********************************************************
     01109                         *
     01110A 1D9E    01    A        FULASC FCB     $01        * $A= SOH
     01111A 1D9F    02    A               FCB     $02        * $B= STX
     01112A 1DA0    03    A               FCB     $03        * $C= ETX
     01113A 1DA1    04    A               FCB     $04        * $D= EOT
     01114A 1DA2    05    A               FCB     $05        * $E= ENQ
     01115A 1DA3    06    A               FCB     $06        * $F= ACK
     01116A 1DA4    07    A               FCB     $07        * $G= BEL
     01117A 1DA5    08    A               FCB     $08        * $H= BS
     01118A 1DA6    09    A               FCB     $09        * $I= HT
     01119A 1DA7    0A    A               FCB     $0A        * $J= LF
     01120A 1DA8    0B    A               FCB     $0B        * $K= VT
     01121A 1DA9    0C    A               FCB     $0C        * $L= FF
     01122A 1DAA    0D    A               FCB     $0D        * $M= CR
     01123A 1DAB    0E    A               FCB     $0E        * $N= SO
```

ERR SEQ LOC OBJECT PROGRAM BARCOD FULL ASCII TABLE

```
01124A 1DAC    0F     A          FCB    $0F       * $O= SI
01125A 1DAD    10     A          FCB    $10       * $P= DLE
01126A 1DAE    11     A          FCB    $11       * $Q= DC1
01127A 1DAF    12     A          FCB    $12       * $R= DC2
01128A 1DB0    13     A          FCB    $13       * $S= DC3
01129A 1DB1    14     A          FCB    $14       * $T= DC4
01130A 1DB2    15     A          FCB    $15       * $U= NAK
01131A 1DB3    16     A          FCB    $16       * $V= SYN
01132A 1DB4    17     A          FCB    $17       * $W= ETB
01133A 1DB5    18     A          FCB    $18       * $X= CAN
01134A 1DB6    19     A          FCB    $19       * $Y= EM
01135A 1DB7    1A     A          FCB    $1A       * $Z= SUB
01136                    *
01137A 1DB8    21     A          FCB    $21       * /A= !
01138A 1DB9    22     A          FCB    $22       * /B= "
01139A 1DBA    23     A          FCB    $23       * /C= #
01140A 1DBB    24     A          FCB    $24       * /D= $
01141A 1DBC    25     A          FCB    $25       * /E= %
01142A 1DBD    26     A          FCB    $26       * /F= &
01143A 1DBE    27     A          FCB    $27       * /G= '
01144A 1DBF    28     A          FCB    $28       * /H= (
01145A 1DC0    29     A          FCB    $29       * /I= )
01146A 1DC1    2A     A          FCB    $2A       * /J= *
01147A 1DC2    2B     A          FCB    $2B       * /K= +
01148A 1DC3    2C     A          FCB    $2C       * /L= ,
01149A 1DC4    FF     A          FCB    $FF       * /M= -    ERROR
01150A 1DC5    FF     A          FCB    $FF       * /N= .    ERROR
01151A 1DC6    2F     A          FCB    $2F       * /O=/
01152A 1DC7    30     A          FCB    $30       * /P= 0
01153A 1DC8    31     A          FCB    $31       * /Q= 1
01154A 1DC9    32     A          FCB    $32       * /R= 2
01155A 1DCA    33     A          FCB    $33       * /S= 3
01156A 1DCB    34     A          FCB    $34       * /T= 4
01157A 1DCC    35     A          FCB    $35       * /U= 5
01158A 1DCD    36     A          FCB    $36       * /V= 6
01159A 1DCE    37     A          FCB    $37       * /W= 7
01160A 1DCF    38     A          FCB    $38       * /X= 8
01161A 1DD0    39     A          FCB    $39       * /Y= 9
01162A 1DD1    3A     A          FCB    $3A       * /Z= :
01163                    *
01164A 1DD2    61     A          FCB    $61       * +A= SMALL A
01165A 1DD3    62     A          FCB    $62       * +B= SMALL B
01166A 1DD4    63     A          FCB    $63       * +C= SMALL C
01167A 1DD5    64     A          FCB    $64       * +D= SMALL D
01168A 1DD6    65     A          FCB    $65       * +E= SMALL E
01169A 1DD7    66     A          FCB    $66       * +F= SMALL F
01170A 1DD8    67     A          FCB    $67       * +G= SMALL G
01171A 1DD9    68     A          FCB    $68       * +H= SMALL H
01172A 1DDA    69     A          FCB    $69       * +I= SMALL I
01173A 1DDB    6A     A          FCB    $6A       * +J= SMALL J
01174A 1DDC    6B     A          FCB    $6B       * +K= SMALL K
01175A 1DDD    6C     A          FCB    $6C       * +L= SMALL L
01176A 1DDE    6D     A          FCB    $6D       * +M= SMALL M
01177A 1DDF    6E     A          FCB    $6E       * +N= SMALL N
01178A 1DE0    6F     A          FCB    $6F       * +O= SMALL O
```

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```
ERR   SEQ   LOC  OBJECT      PROGRAM  BARCOD     FULL ASCII TABLE

     01179A 1DE1     70     A              FCB     $70        * +P= SMALL P
     01180A 1DE2     71     A              FCB     $71        * +Q= SMALL Q
     01181A 1DE3     72     A              FCB     $72        * +R= SMALL R
     01182A 1DE4     73     A              FCB     $73        * +S= SMALL S
     01183A 1DE5     74     A              FCB     $74        * +T= SMALL T
     01184A 1DE6     75     A              FCB     $75        * +U= SMALL U
     01185A 1DE7     76     A              FCB     $76        * +V= SMALL V
     01186A 1DE8     77     A              FCB     $77        * +W= SMALL W
     01187A 1DE9     78     A              FCB     $78        * +X= SMALL X
     01188A 1DEA     79     A              FCB     $79        * +Y= SMALL Y
     01189A 1DEB     7A     A              FCB     $7A        * +Z= SMALL Z
     01190                          *
     01191A 1DEC     1B     A              FCB     $1B        * %A= ESC
     01192A 1DED     1C     A              FCB     $1C        * %B= FS
     01193A 1DEE     1D     A              FCB     $1D        * %C= GS
     01194A 1DEF     1E     A              FCB     $1E        * %D= RS
     01195A 1DF0     1F     A              FCB     $1F        * %E= US
     01196A 1DF1     3B     A              FCB     $3B        * %F= ;
     01197A 1DF2     3C     A              FCB     $3C        * %G= <
     01198A 1DF3     3D     A              FCB     $3D        * %H= =
     01199A 1DF4     3E     A              FCB     $3E        * %I= >
     01200A 1DF5     3F     A              FCB     $3F        * %J= ?
     01201A 1DF6     5B     A              FCB     $5B        * %K= LEFT SQUARE BRACKET
     01202A 1DF7     5C     A              FCB     $5C        * %L= REVERSE /
     01203A 1DF8     5D     A              FCB     $5D        * %M= RIGHT SQUARE BRACKET
     01204A 1DF9     5E     A              FCB     $5E        * %N= 0
     01205A 1DFA     5F     A              FCB     $5F        * %O= HAT
     01206A 1DFB     7B     A              FCB     $7B        * %P= LEFT KAGI KAKKO
     01207A 1DFC     7C     A              FCB     $7C        * %Q= VERTICAL DASHU
     01208A 1DFD     7D     A              FCB     $7D        * %R= RIGHT KAGI KAKKO
     01209A 1DFE     7E     A              FCB     $7E        * %S= WAVE
     01210A 1DFF     7F     A              FCB     $7F        * %T= DEL
     01211A 1E00     00     A              FCB     $00        * %U= NUL
     01212A 1E01     40     A              FCB     $40        * %V= @
     01213A 1E02     60     A              FCB     $60        * %W= APOSTROPHY
     01214A 1E03     7F     A              FCB     $7F        * %X= DEL
     01215A 1E04     7F     A              FCB     $7F        * %Y= DEL
     01216A 1E05     7F     A              FCB     $7F        * %Z= DEL
     01217                          *
     01218           0000   A              END
***** TOTAL ERRORS     0
```

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