

**V520-LGP6125  
Handheld CCD Scanner**

**USER MANUAL**

**OMRON**

**V520-LGP6125**  
**Handheld CCD Scanner**  
**User Manual**



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# Table of Contents

## **PART I CCD Scanning**

General Information .....2  
Unpacking.....2  
Factory Technical Support.....2

## **PART II Installation and Setup**

**A. Installation - RS-232C Interface** ..... 3  
Reset all Defaults ..... 3  
RS-232C Communication Parameters ..... 4  
Baud Rate..... 4  
Data Bits / Stop Bits / Parity ..... 5

**B.V520-LGP6125 Installation - Omron  
PLC or Touchscreen**..... 6  
Reset all Defaults ..... 6

## **Part III Bar Code Menu Functions**

**A. Programming the Scanner** ..... 7

**B. Symbology Selections** ..... 8  
Enabling only a single symbology ..... 8  
Enabling an additional symbology ..... 10  
Setting options for UPC-A/E ..... 13  
Setting options for EAN-13 and -8 ..... 15  
Code 39 Settings ..... 17  
Codabar Settings ..... 19  
2of5 Settings ..... 22  
MSI/Plessey Setting ..... 24  
Code 128 Setting ..... 25  
IATA Settings..... 26

**C. Universal Selections** ..... 28  
Case Conversion ..... 28  
Prefix Options ..... 29  
Suffix Options ..... 31  
Direct Input - Keyboard Keys ..... 33  
Direct Input - Characters..... 36  
Direct Input - Control Characters ..... 44  
Read Mode Settings ..... 47  
Trigger Settings ..... 48  
Beeper Options ..... 52  
Good Read Indicator (LED) ..... 54

## **Part I CCD Scanning V500**

### **General Information**

The V520-LGP6125 Series CCD Scanners utilize state-of-the-art imaging technology similar to that found in digital cameras, facsimile machines and video camcorders. The scanner images the bar code label, then converts the digital signals into data the host computer can understand. By capturing the bar code image all at once, the scanner provides fast, highly accurate reading.

Miniature surface mount electronics make up the CCD scanner's solid state construction. CCD scanners have no moving mechanical parts and provide years of trouble-free operation.

This manual contains information on setting-up the scanner as well as programming various parameters of the scanner.

The V520-LGP6125 scanner is available in several different interface configurations:

- RS-232C Serial Interface
- Omron PLC / Touchscreen (-P)

There is a specific section of this manual for installing each type of interface. Be sure you are using the section of the manual that pertains to the interface you are using.

### **Unpacking**

Remove the scanner from its packaging and inspect it for damage. If the scanner was damaged in transit, call the sales representative from whom you purchased it. If you purchased it directly from Omron, call Omron Customer Service Dept. at (847) 843-7900.

### **Factory Technical Support**

If you have any questions or need assistance with programming your scanner, call Omron Technical Support at (800) 556-6766. Please have the unit model number and several bar code labels readily at hand. The model number is located near the connector end of the cable.

If the scanner must be returned, please contact Omron to obtain an RMA (Return Merchandise Authorization) number prior to returning the product. The Customer Service Dept. may be reached at (847) 843-7900.

**Note** Returned merchandise will not be accepted without a RMA number indicated clearly on the outside of the carton.

### A. Installation – RS-232C Interface

The RS-232C scanner cable is terminated in with a DB9 female connector. An external power supply (+5V DC) is necessary, only if the port used does not supply +5 VDC on pin 9.

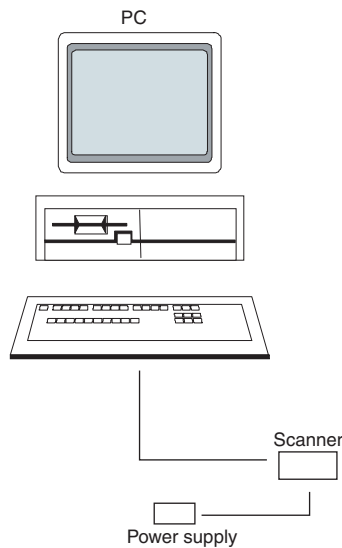
Installation is as follows:

1. Plug the scanner into an RS-232C serial port (such as COM1) of the host PC. External power is required, insert external power plug into the jack on the RS-232C connector.
2. Connect the power supply into an electrical outlet (110 V AC).
3. Turn on the power to the host computer. Make sure the communication parameters of the computer match those of the scanner. The default communications settings are: 9600 baud, 8 data bits, 1 stop bit, no parity, no handshaking.
4. Be sure the PC is in a program (such as Hyperterminal) that will accept input from the serial port.

### Reset All Defaults – RS-232C Interface

Our scanners are shipped with factory default settings that represent the settings most commonly used by our customers. In most applications, the scanner will work right out of the box without any need for additional programming. At any time, you can return the scanner to the factory default settings by scanning the “Reset all Defaults” programming bar codes below. First scan the Start Program Menu bar code below, then scan the “Reset all Defaults” programming bar code, and then the End Program Menu bar.










|    |                               |  |
|----|-------------------------------|--|
| ZZ | <b>Start<br/>Program Menu</b> |    |
| U2 | RS-232C<br>Reset all defaults |   |
| ZZ | <b>End<br/>Program Menu</b>   |  |











## RS-232C Communication Parameters

### Handshaking Protocol

|      |                             |   |
|------|-----------------------------|---|
| ZZ   | Start Program Menu          |   |
| P0   | None                        |   |
| HP04 | RTS/CTS                     |   |
| P3   | ACK/NAK                     |   |
| ZG   | Xon/Xoff                    |   |
| I0   | Flow Control Time Unlimited |   |
| I1   | Flow Control: 100ms         |   |
| I2   | Flow Control: 200ms         |   |
| I3   | Flow Control: 400ms         |  |













### Baud Rate

|    |       |  |
|----|-------|--|
| K7 | 19200 |  |
| K6 | 9600  |  |
| K5 | 4800  |  |
| K4 | 2400  |  |
| K3 | 1200  |  |
| K2 | 600   |  |



### Data Bits / Stop Bits / Parity

|    |                  |  |   |
|----|------------------|--|---|
| L0 | 7 Data Bits      |  |   |
| L1 | 8 Data Bits      |  |  |
| L5 | 1 Stop Bit       |  |  |
| L6 | 2 Stop Bits      |  |   |
| L3 | Even Parity      |  |   |
| L4 | Odd Parity       |  |   |
| L2 | Mark No Parity   |  |  |
| ZZ | End Program Menu |  |   |

## B. Installation – Omron PLC or Touchscreen

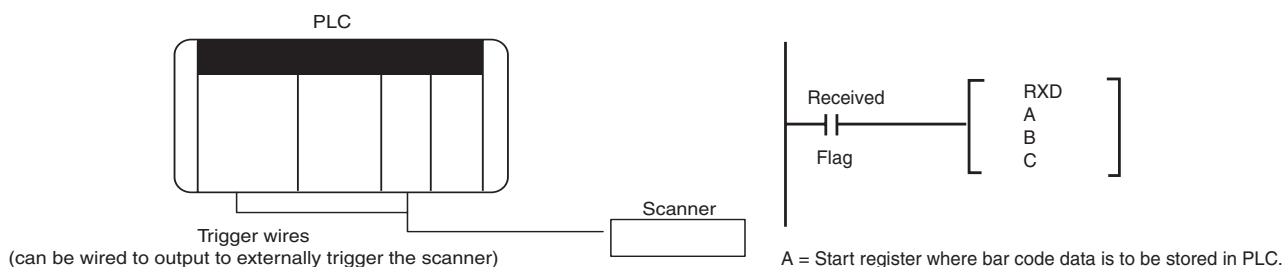
Plug the scanner into the serial connector on your PLC or touch screen. Power will be supplied by the PLC or touch screen. If connecting to a touchscreen, only port A can be used.

### Reset All Defaults - Omron Interface

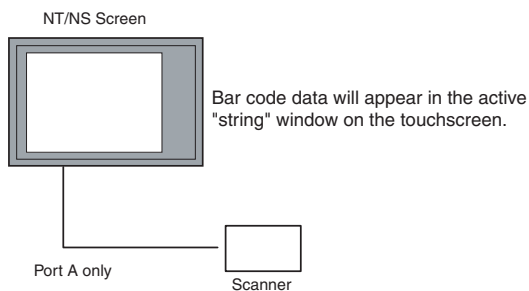
Our scanners are shipped with factory default settings that represent the settings most commonly used by our customers. In most applications, the scanner will work right out of the box without any need for additional programming. At any time, you can return the scanner to the factory default settings by scanning the “Reset all Defaults” programming bar code below. Make sure the PLC/touch screen port settings match the scanner.

|     |                           |  |
|-----|---------------------------|--|
| ZZ  | <b>Start Program Menu</b> |  |
| U2* | Omron PLC/<br>touchscreen |  |
| ZZ  | <b>End Program Menu</b>   |  |

**Note** \* Default settings 9600, 7, E, 2. If changes are needed use the codes in section A.



If using a touchscreen, make sure the scanner is configured for using (STX) for a “start” character and (ETX) for an “end” character.



## Part III - Bar Code Menu Functions

### A. Programming the Scanner

This manual contains information that allows you to easily change certain programmable parameters of the scanner. The scanner is ready to use - no additional programming is required in most situations. The scanner has been programmed at the factory with the most common settings. These factory default settings are ideal for most situations.

A specific parameter is set or changed by scanning one or more of the special programming bar codes found on the following pages. For each parameter, you can choose from a menu of options. When you scan the special bar code for a specific menu option, the scanner retains the changes you have made even if you disconnect the scanner or turn off the power.

#### Step-by-Step


Programming is easy. Simply:

1. Scan the bar code for "**Start/End Program Menu**" (ZZ). The scanner will beep continuously to indicate that it is ready to be programmed. When the scanner is in Programming Mode, it cannot read normal bar code. It can only read the special bar codes found on the following pages.
2. Select desired parameter from menu and scan the bar code. The scanner will beep once and the green light will flash, indicating the desired parameter has been scanned. The scanner will continue to beep continuously while in Programming Mode.
3. Scan "**Start/End Program Menu**" (ZZ). The scanner will stop beeping, indicating that it is back in normal scanning mode. The changes made while in Programming Mode are now saved in the scanner's memory.













When the scanner is in Programming Mode, more than one parameter at a time can be changed. Until some proficiency at programming is achieved, it is highly recommended that users change only one parameter at a time and test the change before proceeding to program any additional changes. It is also recommended that users keep a record of the changes made to the scanner.

#### What If I Make A Mistake?

Scanning the "**Reset All Defaults**" bar code for your type of interface will return the scanner to all factory default settings (including any changes made during previous programming sessions).

**Note** (  ) A pointing finger indicates scanner default settings throughout the following menus.










**B. Symbology Selection**

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |    |
| A0 | Read all codes         |    |
| A2 | Code 39 only           |    |
| A3 | Codabar only           |    |
| A4 | IATA only              |    |
| A5 | Code 93 only           |    |
| A6 | Code 128 only          |    |
| A7 | MSI/Plessey only       |    |
| A9 | Telepen only           |   |
| AB | Matrix 2of5 only       |  |
| J0 | All UPC and EAN only   |  |
| J1 | UPC only               |  |



Continued on next page.....














## Symbology Selection (cont.)

|    |                             |   |
|----|-----------------------------|---|
| ZZ | Start/End<br>Program Menu   |   |
| J2 | UPC+2<br>only               |   |
| J3 | UPC+5<br>only               |   |
| J4 | EAN<br>only                 |   |
| J5 | EAN+2<br>only               |   |
| J6 | EAN+5<br>only               |   |
| J7 | Industrial<br>2of5<br>only  |   |
| J8 | Interleaved<br>2of5<br>only |   |
| JD | Trioptics<br>only           |  |

These options do not influence the reading of the menu labels. The required bar code types can be selected by enabling a single readable code only. It is strongly recommended that only the required codes be selected.







## Symbology Additions

If the scanner will not be used to read all symbologies (default setting), shorten operation time by using this menu to add only the specific symbologies being used (add only the symbologies that are required).

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |    |
| B0 | Disable all            |    |
| B2 | Enable Code 39         |    |
| B3 | Enable Codabar         |    |
| B4 | Enable IATA            |    |
| B5 | Enable Code 93         |    |
| B6 | Enable Code 128        |    |
| B7 | Enable MSI/Plessey     |   |
| B9 | Enable Telepen         |  |
| JZ | Enable Trioptics       |  |
| R1 | Enable UPC             |  |
| R2 | Enable UPC+2           |  |
| R3 | Enable UPC+5           |  |

Continued on next page...

Symbology Additions (cont.)

|    |                         |  |
|----|-------------------------|--|
| ZZ | Start/End Program Menu  |  |
| R4 | Enable EAN              |  |
| R5 | Enable EAN+2            |  |
| R6 | Enable EAN+5            |  |
| R7 | Enable Industrial 2of5  |  |
| R8 | Enable Interleaved 2of5 |  |



## Setting the Number of Characters to be Scanned

|    |                                |  |
|----|--------------------------------|--|
| ZZ | Start/End Program Menu         |  |
| H0 | Fixed length OFF all codes     |  |
| H1 | Fixed length ON all codes      |  |
| HK | Fixed length ON selected codes |  |
| HL | Min. length selected codes     |  |
| HM | Max. length selected codes     |  |

**Setting Code Specific Options** - Options for specific codes may be configured affecting:

- Enabling and disabling code variants and translations.
- Data verification such as by mean of a check digit calculation. A check digit has a value that can be calculated from the other data characters and is usually the last data character in a bar code.
- Pre-editing of the data string such as removing the check digit and/or ST/SP characters.

The more common options are described here.

**Check CD** - Enables the check digit calculation. If the calculated check digit does not correspond to the check digit in the bar code, then the bar code is ignored. The use of a check digit greatly improves the security of a bar code.

**Do Not Check CD** - Disables the check digit calculation. This option is required when the bar codes do not contain a check digit or contain an invalid check digit.

**Transmit CD** - Enables the transmission of the check digit together with the data characters. If the check digit calculation is disabled, the reader cannot differentiate between a (valid) check digit and a data character. It will therefore transmit all data characters of the label, including what could constitute a check digit.















**Do Not Transmit CD** - Disables the transmission of the check digit. If the check digit calculation is disabled, the reader cannot differentiate between a (valid) check digit and a data character. It will therefore transmit all data characters of the label, excluding the character that could constitute the check digit for the type of bar code.

**Transmit ST/SP** - Enables the transmission of the start and stop characters of a bar code.

**Do Not Transmit ST/SP** - Disables the transmission of the start and stop characters of a bar code.

## UPC Settings

**Note** Options for UPC-A and UPC-E bar codes.  
 Abbreviations: Xmit = transmit; CD = Check digit; CC = Country code

|    |  |  |   |
|----|--|--|---|
| ZZ | <b>Start/End Program Menu</b>                |    |   |
| E2 | UPC-A as EAN13 w/ CD (13 digits)             |    |   |
| E3 | UPC-A w/ CD (12 digits)                      |    |    |
| E4 | UPC-A w/ CD (12 digits)                      |    |   |
| E5 | UPC-A w/o CD (11 digits)                     |    |   |
| E6 | UPC-E w/ CC & CD (8 digits)                  |    |   |
| E7 | UPC-E w/o CC, w/ CD (7 digits)               |  |  |
| E8 | UPC-E w/ CC, w/o CD (7 digits)               |  |   |
| E9 | UPC-E w/o CC & CD (6 digits)                 |  |   |
| 6P | Xmit UPC-E as UPC-A w/ CD (8 digits)         |  |   |
| 6Q | Do not xmit UPC-E as UPC-A w/o CD (7 digits) |  |  |

**UPC Settings (cont.)**

**Options for UPC-A** - The UPC-A symbology is a fixed length symbology encoding 11 data digits, a check digit and non printable start/stop characters. Supported characters are numeric digits 1 to 9.

An optional leading zero can be transmitted which, together with the data and the check digit, forms a 13 digit field providing compatibility with the EAN-13 format.

**String Format:**

|           |                  |             |
|-----------|------------------|-------------|
| Leading 0 | data (11 digits) | check digit |
|-----------|------------------|-------------|

**UPC-A add-on 2/add-on 5** - The UPC-A symbology as described above can be succeeded by an additional 2 or 5 digit UPC-A code.

**String Format:**

|           |                  |             |               |
|-----------|------------------|-------------|---------------|
| Leading 0 | data (11 digits) | check digit | add-on 2 or 5 |
|-----------|------------------|-------------|---------------|

**Options for UPC-A**

- Disable transmission of the leading zero.
- Disable transmission of the check digit.

**Options for UPC-E** - The UPC-E symbology is a fixed length symbology encoding 6 data digits, a check digits and non printable start/stop characters. Supported characters include numeric digits 0 to 9. An optional leading zero can be transmitted which, together with the data and the check digit, forms an 8 digit field providing a compatibility with the EAN-8 format.

**String Format:**

|           |                 |             |
|-----------|-----------------|-------------|
| Leading 0 | data (6 digits) | check digit |
|-----------|-----------------|-------------|

**UPC-E add-on 2/add-on 5** - The UPC-E symbology as described above can be succeeded by an additional 2 or 5 digit UPC-A code.
















**String Format:**

|           |                 |             |               |
|-----------|-----------------|-------------|---------------|
| Leading 0 | data (6 digits) | check digit | add-on 2 or 5 |
|-----------|-----------------|-------------|---------------|

**Options for UPC-E**

- Enable transmission of the leading zero.
- Disable transmission of the check digit.
- Transmit UPC-E as UPC-A.

### EAN-13 and EAN-8 Settings

|    |                           |  |   |
|----|---------------------------|--|---|
| ZZ | Start/End Program Menu    |    |   |
| 6K | EAN-13 transmit CD        |    |    |
| 6J | EAN-13 do not transmit CD |    |   |
| 6I | EAN-8 transmit CD         |    |    |
| 6H | EAN-8 do not transmit CD  |    |   |
| IB | Disable ISBN translation  |    |    |
| IA | Enable ISBN translation   |    |   |
| IK | Enable ISBN if possible   |    |   |
| HN | Disable ISSN translation  |  |  |
| HO | Enable ISSN translation   |  |   |
| 4V | Enable ISSN if possible   |  |   |

**EAN-13 and EAN-8 Settings (cont.)**

**EAN-13** is a fixed length symbology encoding 12 data digits, a check digit and non printable start/stop characters. Supported characters are numeric digits 0 to 9. The data may be translated into ISBN or ISSN format.

**String Format:**

|                  |             |
|------------------|-------------|
| data (12 digits) | check digit |
|------------------|-------------|

**EAN-13 add-on 2/add-on 5** - The EAN-13 symbology as described above can be succeeded by an additional 2 or 5 digit UPC-A code.

**String Format:**

|                  |             |               |
|------------------|-------------|---------------|
| data (12 digits) | check digit | add-on 2 or 5 |
|------------------|-------------|---------------|

**EAN-8** is a fixed length symbology encoding 7 data digits, a check digit and non printable start/stop characters. Supported characters are numeric digits 0 to 9.

**String Format:**

|                 |             |
|-----------------|-------------|
| data (7 digits) | check digit |
|-----------------|-------------|

**EAN-8 add-on 2/add-on 5** - The EAN-8 symbology as described above can be succeeded by an additional 2 or 5 digit UPC-A code.

**String Format:**

|                 |             |               |
|-----------------|-------------|---------------|
| data (7 digits) | check digit | add-on 2 or 5 |
|-----------------|-------------|---------------|

**Options for EAN**

- Disable transmission of the check digit.
- Enable ISBN or ISSN translation.

Enable ISBN or ISSN translation - If this option is enabled, an EAN-13 label is verified for the correct format and transmitted as a 10 digit ISBN number or 8 digit ISSN number.

### Code 39 Settings

|    |                                |  |  |
|----|--------------------------------|--|--|
| ZZ | Start/End Program Menu         |  |  |
| C0 | Check CD                       |  |  |
| C1 | Do not check CD                |  |  |
| D0 | Xmit ST/SP                     |  |  |
| D1 | Do not xmit ST/SP              |  |  |
| D4 | Full ASCII                     |  |  |
| D5 | Normal Code 39                 |  |  |
| D8 | Do not xmit CD                 |  |  |
| D9 | Xmit CD                        |  |  |
| +K | Full ASCII Code 39 if possible |  |  |
| +L | Enable concatenation           |  |  |
| +M | Disable concatenation          |  |  |
| 8D | Minimum 3 digits               |  |  |
| 8E | Minimum 1 digit                |  |  |

Continued on next page.....

**Code 39 Settings (cont.)**

**Code 39** is a variable length symbology with an optional check digit ("CD") and printable start/stop ("ST/SP") characters. The following characters are supported:

- Numeric characters 0 to 9.
- Alpha characters capital A to Z.
- Special characters - \$/ +% and SPACE.
- Start/stop character is \*.

The checksum is calculated as the sum modulo 43 of the numerical value of the data characters.

In full ASCII mode, all 128 ASCII characters are supported. This is done by combining one of the characters +, %, \$ or / with one of the alpha characters (A to Z).

**String Format:**

|             |                             |             |            |
|-------------|-----------------------------|-------------|------------|
| start char. | data (0 or more characters) | check digit | stop char. |
|-------------|-----------------------------|-------------|------------|

**Options for Code 39:**

- Enable full ASCII conversion.
- Enable Italian Pharmaceutical conversion.
- Enable check digit.
- Disable transmission of the check digit.
- Enable transmission of start/stop.
- Enable leading A for Italian Pharmaceutical.
- Selection of the minimum number of data characters.

**Normal Code 39** - In this mode the decoded data characters are transmitted without further translation.

**Full ASCII Code 39** - In this mode the decoded data characters are translated to full ASCII Code 39.

**Full ASCII Code 39 if possible** - In this mode the decoded data characters are translated to full ASCII code 39. Invalid combinations are not translated and are transmitted as is.

**Concatenation** - If a Code 39 bar code contains a leading space, the data is stored into the reader's buffer without the leading space. As soon as a Code 39 bar code is read without a leading space, the data is appended to the reader's buffer and the entire buffer is transmitted and cleared for new data.

### Codabar Settings

|    |                                  |  |
|----|----------------------------------|--|
| ZZ | Start/End Program Menu           |  |
| F0 | Do not transmit start/stop       |  |
| F1 | Transmit start stop as ABCD TN*E |  |
| F2 | Transmit start stop as abcd/tn*e |  |
| F3 | Transmit start stop as ABCD ABCD |  |
| F4 | Transmit start stop as abcd abcd |  |
| H3 | Enable Codabar, ABC and CX       |  |
| H4 | Enable only ABC code             |  |
| H5 | Enable only CX code              |  |
| H6 | Check CD                         |  |
| H7 | Do not check CD                  |  |
| H8 | Transmit CD                      |  |
| H9 | Do not transmit CD               |  |



Continued on next page.....



Codabar Settings (cont.)

|    |                                 |  |  |
|----|---------------------------------|--|--|
| ZZ | Start/End Program Menu          |  |  |
| HA | Enable Codabar normal mode only |  |  |
| HB | Min. data 3 chars.              |  |  |
| HC | Min. data 1 char.               |  |  |
| HD | Enable space insertion          |  |  |
| HE | Disable space insertion         |  |  |
| HF | Min. data 5 chars.              |  |  |
| HH | Enable interchar. gap check     |  |  |
| HI | Disable interchar. gap check    |  |  |

**Codabar Settings**

**Codabar (NW7)** is a variable length symbology with an optional check digit and printable start/stop characters. Supported characters include:

- Numeric digits 0 to 9.
- special characters - \$: /, +.
- start/stop characters are A, B, C or D.

The checksum is calculated as the sum modulo 16 of the numerical values of all data characters.

**String Format:**

|             |                         |             |            |
|-------------|-------------------------|-------------|------------|
| start char. | data (1 or more chars.) | check digit | stop char. |
|-------------|-------------------------|-------------|------------|

Continued on next page.....

**Codabar Settings (cont.)**

**ABC-Code** - The ABC code is an acronym for American Blood Commission. The code consists of two bar codes which are decoded in one read cycle. The code is concatenated (linked in series) when the stop character of the first bar code and the start character of the second bar code is a D. These two D's are not transmitted.

**String Format:**

|             |                 |             |                 |             |            |
|-------------|-----------------|-------------|-----------------|-------------|------------|
| start char. | data (1+chars.) | check digit | data (1+chars.) | check digit | stop char. |
|-------------|-----------------|-------------|-----------------|-------------|------------|

**CX-Code** - The CX-Code consists of two bar codes which are decoded in one read cycle. The code is concatenated when the stop character of the first bar code is a C, and the start character of the second bar code is a B. The B and C characters are not transmitted.

**String Format:**

|             |                  |             |                 |             |            |
|-------------|------------------|-------------|-----------------|-------------|------------|
| start char. | data (1+ chars.) | check digit | data (1+chars.) | check digit | stop char. |
|-------------|------------------|-------------|-----------------|-------------|------------|

**Options for Codabar:**

- Enable ABC code concatenation.
- Enable CD code concatenation.
- Enable check digit check.
- Disable transmission of the check digit.
- Disable transmission of start/stop.
- Selection of start/stop character translation.
- Selection of minimum number of data characters.
- Enable library space (CLSI) insertion.















**Space Insertion** - This option inserts spaces in position 2, 7 and 13 of the data string for use in library systems.

**ST/SP Translation** - This option enables the translation and transmission of the start and stop characters. Thus, if the option ST/SP: abcd/tn\*e is chosen, the start character is converted to lower case, e.g. from A, B, C or D to a, b, c or d, respectively), and the stop character is converted from A, B, C or D to t, n, \* or e, respectively.

**Minimum Data Characters** - Codabar labels are checked for a minimum of 1, 3 or 5 characters as set by the user. If the number of characters in the label is shorter than the minimum selected, the label will be rejected. If the fixed length option is used for Codabar type labels, then such labels will additionally be checked for fixed length. This option will no longer be supported in future software releases.

**Intercharacter Gap Check** - This option enables the reading of Codabar labels with a large or irregular gap between characters.

## 2of5 Settings

|    |   |  |  |
|----|---|--|--|
| ZZ | Start/End Program Menu                  |    |  |
| E0 | Transmit CD                             |    |   |
| E1 | Do not transmit CD                      |    |  |
| G0 | Do not check CD                         |    |   |
| G1 | Check CD                                |    |  |
| GE | Min. data 1 char.                       |    |  |
| GF | Min. data 3 chars.                      |    |  |
| GI | Min. data 5 chars.                      |    |   |
| GJ | Enable space check for Industrial 2of5  |   |  |
| GK | Disable space check for Industrial 2of5 |  |  |

Continued on next page.....

**2of5 Settings (cont.)**

**Code 2of5** is a variable length symbology with an optional check digit and non-printable start and stop character. Supported characters include numeric digits 0 to 9.

The checksum is calculated as the sum modulo 10 of the numerical values of all the data characters. The following 2of5 codes are supported.

**Industrial 2of5 (D 2of5)** - This symbology encodes a pair of digits in each symbol, the number of digits are therefore always an even number. Information is carried in the bars and spaces. The start and stop pattern is not unique inside the code. It is therefore essential to use the fixed length option to prevent partial reads.

**Matrix 2of5** - This symbology encodes 1 digit in each character, the number of digits can therefore be an odd or an even number. Information is carried in the bars and spaces.

**String Format** - Industrial, Interleaved or Matrix 2of5:

|              |                         |             |
|--------------|-------------------------|-------------|
| leading zero | data (1 or more digits) | check digit |
|--------------|-------------------------|-------------|

**Options for Code 2of5:**

- Disable transmission of the check digit.
- Enable check digit check.
- Selection of the minimum number of data characters.
- Disable space check for industrial 2of5.
- Transmit S Code as Interleaved 2of5.

**Minimum Data Characters** - Code 2of5 are checked for a minimum of 1, 3 or 5 characters as set by the user. If the number of characters in the label is less than the number set, the label will be rejected. If the fixed length option is used for a Code 2of5 type label, then such label will also be checked for fixed length.

**Intercharacter Gap Check** - This option enables the reading of Industrial 2of5 labels with a large or irregular spacing.

### MSI/Plessey Settings

|    |                               |  |   |
|----|-------------------------------|--|---|
| ZZ | Start/End Program Menu        |  |   |
| 4A | Do not check CD               |  |   |
| 4B | Check 1 CD = Mod 10           |  | ☞ |
| 4C | Check 2 CD's = Mod 10 /Mod 10 |  |   |
| 4D | Check 2 CD's = Mod 10 /Mod 11 |  |   |
| 4E | Transmit CD1                  |  | ☞ |
| 4F | Transmit CD1 and CD2          |  |   |
| 4G | Do not transmit CD            |  |   |
| 4R | Check 2 CD's = Mod 11 /Mod 10 |  |   |

**MSI Plessey** is a variable length symbology with one or two optional check digit calculations CD1 and CD2 and non-printable start/stop characters. Supported characters include numeric digits 0 through 9.

The checksum is calculated as the sum modulo 10 or 11 of the data characters. The checksum CD2 is calculated as the sum modulo 10 or 11 of the data characters and CD1.

**String Format:**

|                       |     |     |
|-----------------------|-----|-----|
| data (1 to 13 digits) | CD1 | CD2 |
|-----------------------|-----|-----|

**Options for MSI/Plessey:**

- Disable check digit check.
- Selection of the check digit calculation.
- Selection of the number of check digits to be transmitted.

**Check Digit** - If the check digit calculation is required, then the appropriate calculation method must be selected.

**Do Not Transmit CD** - The character positions CD1 and CD2 are not transmitted.

**Transmit CD1** - The character position CD2 is not transmitted.

**Transmit CD1 and CD2** - All characters in the label are transmitted.

### Code 128, EAN 128 Settings

|    |                            |  |  |
|----|----------------------------|--|--|
| ZZ | Start/End Program Menu     |  |  |
| JF | Enable EAN 128 only        |  |  |
| MO | Enable FNC2 concatenation  |  |  |
| MP | Disable FNC2 concatenation |  |  |
| OF | Disable EAN 128            |  |  |
| OG | Enable EAN 128 if possible |  |  |

Code 128 is a variable length symbology with a mandatory check digit and non-printable start/stop characters. Supported characters include:

- All 128 ASCII characters;
- 4 non data function characters;
- 4 code set selection characters;
- 3 start characters; and
- 1 stop character.

The check is calculated as the sum modulo 103 of the start character and the weighted values of the data and special characters.

**String Format:**

|                             |
|-----------------------------|
| data (1 or more characters) |
|-----------------------------|

**EAN 128** - In this mode, the Code 128 data is translated to the EAN 128 format. EAN 128 data starts with the FNC1 character and separates 2 data fields with the FNC1 character. The first FNC1 character is translated to ]C1, and the second FNC1 character is translated to ASCII GS (hex 1D) character.

**String Format:**

|     |                 |      |                 |
|-----|-----------------|------|-----------------|
| ]C1 | data characters | <GS> | data characters |
|-----|-----------------|------|-----------------|

**Enable EAN 128 Only** - In the mode, the decoded data characters are translated to the EAN 128 format. If the data does not comply with the EAN 128 format, then the label is rejected.

**Enable EAN 128 If Possible** - In this mode, the decoded data characters are translated to the EAN 128 format. If the data does not comply with the EAN 128 format, then the label is transmitted as Code 128.

**FNC2 Concatenation** - If a Code 128 bar code contains a leading FNC2 character, the data is stored into the reader's buffer. As soon as a Code 128 bar code is read without a leading FNC2 character, the data is appended to the reader's buffer and the entire buffer is transmitted and cleared for new data. In case a non-Code 128 bar code is read, the data in the non-Code 128 bar code is transmitted and the buffer is cleared. The buffer size is reader dependent.

## IATA Settings

|    |                            |  |   |
|----|----------------------------|--|---|
| ZZ | Start/End Program Menu     |  |   |
| 4H | Do not check CD            |  | ☞ |
| 4I | Check S/N only             |  |   |
| 4J | Check CPN, S/N             |  |   |
| 4K | Check CPN, airline and S/N |  |   |
| 4L | Transmit CD                |  | ☞ |
| 4M | Do not transmit CD         |  |   |

**IATA** is a variable length symbology with an optional check digit and non-printable start/stop characters. Supported characters include numeric digits 0 through 9.

The checksum is calculated as the modulo seven of the data string. IATA is acronym for International Air Transport Association.

**String Format** - A possible format of IATA is as follows:





|                    |        |              |           |               |             |
|--------------------|--------|--------------|-----------|---------------|-------------|
| <b>Code</b>        | CPN    | AC           | FC        | SN            | CD          |
| <b>Description</b> | Coupon | Airline Code | Form Code | Serial Number | Check Digit |
| <b>Digits</b>      | 1      | 3            | 2         | 8             | 15          |

### Options for IATA:

- Enable check digit check.
- Selection of the check digit calculation.
- Disable transmission of the check digit.

**Check Digit** - If the check digit calculation is required, then the appropriate calculation method must be selected.

### Telepen Settings

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |    |
| D2 | Numeric mode           |   |
| D3 | ASCII mode             |    |

**Telepen** is a variable length symbology with a check digit and non-printable start/stop characters. Supported characters include numeric digits 00 through 99 in numeric mode, and all 128 ASCII characters in full ASCII mode.

The check digit calculation is derived from the sum of all data characters modulo 127. The check digit cannot be transmitted.

**String Format:**

Data (1 to 32 characters)

**Options for Telepen:**

- Selection of full ASCII mode.



### C. Universal Selections

#### Case Conversion

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |  |
| YZ | No case conversion     |  |
| YW | Convert to upper case  |  |
| YX | Convert to lower case  |  |
| YY | Exchange case          |  |



**String Options** - This section describes the alterations which can be made to the format of the transmitted data string. Options available are:

- Case conversion.
- Transmission of a code identifier.
- Transmission of the code length.
- Transmission of a prefix.
- Transmission of a suffix.

The prefix and/or suffix may include a code identifier and/or the code length.

**String Format:**

|        |               |        |
|--------|---------------|--------|
| prefix | bar code data | suffix |
|--------|---------------|--------|

**Case Conversion** - The bar code may be converted to either lower or upper case or the case may be exchanged. These options may be used if the user of a wedge has a preference to leave, for instance, the CAPSLOCK ON or if the host required upper case characters only.












## Setting a Prefix or Suffix

A Prefix and Suffix consisting of a maximum 4 direct input entries each may be included in front and at the end of the string, respectively.

The following steps are used to establish a Prefix or Suffix that will be transmitted with the bar code data.













1. Scan Start/End Program Menu to enter programming mode.
2. Scan the bar code representing the desired symbology you wish to add a Prefix or Suffix to.
3. Scan the character(s) that comprise the Prefix or Suffix. Up to 4 numbers, letters or control characters may be used.
4. Scan Start/End Program Menu to exit programming mode.

## Prefix Settings
















|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |    |
| GL | Matrix 2of5            |    |
| I8 | IATA                   |    |
| L8 | Telepen                |    |
| M0 | UPC-A + add-on         |  |
| M1 | UPC-E + add-on         |  |
| M2 | EAN-13 + add-on        |  |
| M3 | EAN-8 + add-on         |  |
| M4 | Code 39                |  |
| M5 | Codabar                |  |
| M6 | Industrial 2of5        |  |

Continued on next page.....

## Prefix Settings (cont.)









|    |                           |  |
|----|---------------------------|--|
| ZZ | Start/End<br>Program Menu |    |
| M7 | Interleaved 2of5          |    |
| M8 | Code 93                   |    |
| M9 | Code 128                  |    |
| N0 | MSI/Plessey               |    |
| N1 | UPC-A                     |    |
| N2 | UPC-E                     |    |
| N3 | EAN-13                    |    |
| N4 | EAN-8                     |   |
| RY | All codes                 |  |
| MG | Clear all prefixes        |  |
| MZ | Preamble                  |  |

## Suffix Settings
















|    |                           |  |
|----|---------------------------|--|
| ZZ | Start/End<br>Program Menu |    |
| GM | Matrix 2of5               |    |
| I9 | IATA                      |    |
| L9 | Telepen                   |    |
| N5 | MSI/Plessey               |    |
| N6 | UPC-A                     |    |
| N7 | UPC-E                     |    |
| N8 | EAN-13                    |   |
| N9 | EAN-8                     |  |
| O0 | UPC-A<br>+ add-on         |  |
| O1 | UPC-E<br>+ add-on         |  |
| O2 | EAN-13<br>+ add-on        |  |
| O3 | EAN-8<br>+ add-on         |  |
| O4 | Code 39                   |  |
| O5 | Codabar                   |  |

Continued on next page.....

## Suffix Settings (cont.)
















|    |                        |   |
|----|------------------------|---|
| ZZ | Start/End Program Menu |   |
| O6 | Industrial 2of5        |   |
| O7 | Interleaved 2of5       |   |
| O8 | Code 93                |   |
| O9 | Code 128               |   |
| PR | Clear all suffixes     |   |
| PS | Postamble              |   |
| RZ | All Codes              |  |

### Direct Input Keyboard Keys

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |    |
| 8J | F1                     |    |
| 8K | F2                     |    |
| 8L | F3                     |    |
| 8M | F4                     |    |
| 8N | F5                     |    |
| 8O | F6                     |    |
| 8P | F7                     |    |
| 8Q | F8                     |  |
| 8R | F9                     |  |
| 8S | F10                    |  |
| 8T | F11                    |  |
| 8U | F12                    |  |
| 9X | Backspace              |  |
| 7H | TAB                    |  |

Continued on next page.....










Direct Input Keyboard Keys (cont.)

|    |                                  |  |
|----|----------------------------------|--|
| ZZ | Start/End Program Menu           |    |
| 7I | Carriage return                  |    |
| 7Q | Enter (numeric pad)              |    |
| 7R | Enter make (alpha pad)           |    |
| 7S | Enter make and break (alpha pad) |    |
| 7J | ESC                              |    |
| 7K | Arrow down                       |    |
| 7L | Arrow up                         |    |
| 7M | Arrow right                      |   |
| 7N | Arrow left                       |  |
| 7T | <DEL>                            |  |
| VQ | <INSERT>                         |  |
| VR | <HOME>                           |  |
| VS | <END>                            |  |
| 7O | Page up                          |  |


















Continued on next page.....

Direct Input Keyboard Keys (cont.)

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |    |
| 7P | Page down              |    |
| 7U | Left <Shift>           |    |
| 7W | Left <Ctrl>            |    |
| 7Y | Left <Alt>             |    |
| 7V | Right <Shift>          |    |
| 7X | Right <Ctrl>           |    |
| 7Z | Right <Alt>            |   |
| 9S | CAPSLOCK               |  |


















## Direct Input Characters

|    |                           |  |
|----|---------------------------|--|
| ZZ | Start/End<br>Program Menu |    |
| 5A | <SPACE>                   |    |
| 5B | !                         |    |
| 5C | "                         |    |
| 5D | #                         |    |
| 5E | \$                        |    |
| 5F | %                         |    |
| 5G | &                         |    |
| 5H | ,                         |   |
| 5I | (                         |  |
| 5J | )                         |  |
| 5K | *                         |  |
| 5L | +                         |  |
| 5M | ,                         |  |
| 5N | -                         |  |







Continued on next page.....

Direct Input Characters (cont.)

|    |                           |  |
|----|---------------------------|--|
| ZZ | Start/End<br>Program Menu |    |
| 5O | .                         |    |
| 5P | /                         |    |
| 6A | :                         |    |
| 6B | ;                         |    |
| 6C | <                         |    |
| 6D | =                         |    |
| 6E | >                         |   |
| 6F | ?                         |  |
| 6G | @                         |  |
| 7A | [                         |  |
| 7B | \                         |  |
| 7C | ]                         |  |
| 7D | ^                         |  |
| 7E | -                         |  |















Continued on next page.....

Direct Input Characters (cont.)

|    |                           |  |
|----|---------------------------|--|
| ZZ | Start/End<br>Program Menu |  |
| 7F | ,                         |  |
| 9T | {                         |  |
| 9U |                           |  |
| 9V | }                         |  |
| 9W | ~                         |  |
















Continued on next page.....

Direct Input Characters (cont.)

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |    |
| Q0 | 0                      |    |
| Q1 | 1                      |    |
| Q2 | 2                      |    |
| Q3 | 3                      |    |
| Q4 | 4                      |    |
| Q5 | 5                      |    |
| Q6 | 6                      |   |
| Q7 | 7                      |  |
| Q8 | 8                      |  |
| Q9 | 9                      |  |
| 0A | A                      |  |
| 0B | B                      |  |
| 0C | C                      |  |
















Continued on next page.....

## Direct Input Characters (cont.)

|    |                           |  |
|----|---------------------------|--|
| ZZ | Start/End<br>Program Menu |    |
| 0D | D                         |    |
| 0E | E                         |    |
| 0F | F                         |    |
| 0G | G                         |    |
| 0H | H                         |    |
| 0I | I                         |    |
| 0J | J                         |    |
| 0K | K                         |  |
| 0L | L                         |  |
| 0M | M                         |  |
| 0N | N                         |  |
| 0O | O                         |  |
| 0P | P                         |  |
| 0Q | Q                         |  |
















Continued on next page.....

Direct Input Characters (cont.)

|     |                        |  |
|-----|------------------------|--|
| ZZ  | Start/End Program Menu |    |
| 0R  | R                      |    |
| 0S  | S                      |    |
| 0T  | T                      |    |
| 0U  | U                      |    |
| 0V  | V                      |    |
| 0W  | W                      |    |
| 0X  | X                      |    |
| 0Y  | Y                      |   |
| 0Z  | Z                      |  |
| \$A | a                      |  |
| \$B | b                      |  |
| \$C | c                      |  |
| \$D | d                      |  |
| \$E | e                      |  |









Continued on next page.....

Direct Input Characters (cont.)

|     |                           |  |
|-----|---------------------------|--|
| ZZ  | Start/End<br>Program Menu |    |
| \$F | f                         |    |
| \$G | g                         |    |
| \$H | h                         |    |
| \$I | i                         |    |
| \$J | j                         |    |
| \$K | k                         |    |
| \$L | l                         |   |
| \$M | m                         |  |
| \$N | n                         |  |
| \$O | o                         |  |
| \$P | p                         |  |
| \$Q | q                         |  |
| \$R | r                         |  |
| \$S | s                         |  |
















Continued on next page.....

Direct Input Characters (cont.)

|     |                           |  |
|-----|---------------------------|--|
| ZZ  | Start/End<br>Program Menu |  |
| \$T | t                         |  |
| \$U | u                         |  |
| \$V | v                         |  |
| \$W | w                         |  |
| \$X | x                         |  |
| \$Y | y                         |  |
| \$Z | z                         |  |


















## Direct Input Control Characters

|    |                           |  |
|----|---------------------------|--|
| ZZ | Start/End<br>Program Menu |    |
| 9G | ^@(NUL)                   |    |
| 1A | ^A(SOH)                   |    |
| 1B | ^B(STX)                   |    |
| 1C | ^C(ETX)                   |    |
| 1D | ^D(EOT)                   |    |
| 1E | ^E(ENQ)                   |    |
| 1F | ^F(ACK)                   |    |
| 1G | ^G(BEL)                   |  |
| 1H | ^H(BS)                    |  |
| 1I | ^I(HT)                    |  |
| 1J | ^J(LF)                    |  |
| 1K | ^K(VT)                    |  |
| 1L | ^L(FF)                    |  |
| 1M | ^M(CR)                    |  |

Continued on next page.....

Direct Input Control Characters (cont.)




|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |    |
| 1N | ^N(SO)                 |    |
| 1O | ^O(SI)                 |    |
| 1P | ^P(DLE)                |    |
| 1Q | ^Q(DC1)                |    |
| 1R | ^R(DC2)                |    |
| 1S | ^S(DC3)                |    |
| 1T | ^T(DC4)                |   |
| 1U | ^U(NAK)                |  |
| 1V | ^V(SYN)                |  |
| 1W | ^W(ETB)                |  |
| 1X | ^X(CAN)                |  |
| 1Y | ^Y(EM)                 |  |
| 1Z | ^Z(SUB)                |  |
| 9A | ^[(ESC)                |  |

Continued on next page.....











Direct Input Control Characters (cont.)

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |  |
| 9B | ^(FS)                  |  |
| 9C | ^](GS)                 |  |
| 9D | ^(RS)                  |  |
| 9E | ^_(US)                 |  |
| 9F | DEL<br>(ASCII 127)     |  |

Direct Input Code ID/Length

|     |                        |  |
|-----|------------------------|--|
| ZZ  | Start/End Program Menu |    |
| \$2 | Code identification    |   |
| \$3 | Code length            |  |

## Read Mode Settings

|    |                            |  |   |
|----|----------------------------|--|---|
| ZZ | Start/End Program Menu     |  |   |
| S0 | Single read                |  |   |
| S1 | Multiple read              |  |  |
| S2 | Continuous read            |  |   |
| XA | Add-on wait mode disabled  |  |   |
| XB | Add-on wait mode 0.25 sec. |  |   |
| XC | Add-on wait mode 0.50 sec. |  |  |
| XD | Add-on wait mode 0.70 sec. |  |   |

**Single Read** - When a bar code has been decoded, the reader will be turned OFF. The reader must be triggered again to read another label. This option and "Disable trigger" cannot be programmed at the same time.

**Multiple Read** - When a bar code has been decoded, the reader will stay ON for a time as set by "read time settings" or indefinitely if the trigger switch has been disabled. The same label can only be decoded again after the label has not been detected for a number of scans.

**Continuous Read** - The reader will produce as much data as it can decode whether it is the same or not. This mode is mainly used for demonstration and diagnosis.

**Add-on Wait Mode** - Used if UPC/EAN with add-on is enabled. The reader searches within the selected time for a valid add-on code. If a valid add-on code is found, the reader transmits the data immediately. If nothing is found behind the code, the scanner will transmit the data without add-on. If something is found behind the code, the reader ignored the code in case it is not a valid add-on.

### Trigger Settings

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |  |
| S7 | Disable trigger        |  |
| S8 | Enable trigger         |  |

**Disable Trigger** - This is applicable to readers which have a trigger switch. When this option is selected, the reader will stay ON all the time.










### Multiple Read Reset Time

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |  |
| AH | 50 ms                  |  |
| AI | 100 ms                 |  |
| AJ | 200 ms                 |  |
| AK | 300 ms                 |  |
| AL | 400 ms                 |  |
| AM | 500 ms                 |  |
| AN | 600 ms                 |  |



**Multiple Read Reset Time** - This option can be used in conjunction with multiple read mode. It sets the time the reader should be pointed away from the label before it can decode the same label again.

## Quiet Zone Settings

|    |                               |  |
|----|-------------------------------|--|
| ZZ | Start/End<br>Program Menu     |    |
| YN | No margin<br>check            |    |
| YO | Margin<br>check 1/7<br>normal |    |
| YP | Margin<br>check 2/7<br>normal |    |
| YQ | Margin<br>check 3/7<br>normal |    |
| YR | Margin<br>check 4/7<br>normal |    |
| YS | Margin<br>check 5/7<br>normal |    |
| YT | Margin<br>check 6/7<br>normal |    |
| YU | Margin<br>check<br>normal     |  |



With these settings, the reader can decode bar codes that have smaller start and/or end margins than specified for the symbology. These settings may increase the possibility of partial and ghost reads, hence do not use smaller margin checks than necessary. Replace any bar code labels with ones that have the correct start and end margins if possible.

### Read Time Settings

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |  |
| Y0 | 0 seconds              |  |
| Y1 | 1 second               |  |
| Y2 | 2 seconds              |  |
| Y3 | 3 seconds              |  |
| Y4 | 4 seconds              |  |
| Y5 | 5 seconds              |  |
| Y6 | 6 seconds              |  |
| Y7 | 7 seconds              |  |
| Y8 | 8 seconds              |  |
| YL | Read time x 10         |  |
| YM | Indefinitely           |  |



**Read Time Settings** - the length of the period that the reader is ON after the trigger switch is pressed, or (in multiple or continuous read mode) after a label has been read. Selecting a read time of 0 means that the reader will stay ON as long as the trigger switch is being pressed. Selecting a read time for readers without a trigger switch, or when the trigger switch is disabled, has no effect.

### Redundant Decoding Settings

|    |                        |  |
|----|------------------------|--|
| ZZ | Start/End Program Menu |  |
| X0 | No redundancy          |  |
| X1 | Two times redundant    |  |
| X2 | Three times redundant  |  |
| X3 | Four times redundant   |  |



**Redundancy Settings** - This is the number of times that a label must be correctly decoded before it is transmitted. Selecting a higher redundancy count makes reading slower, but it reduces the probability of reading errors, especially when labels of poor definition are used.

### Positive and Negative Bar Codes





















|    |                                      |  |
|----|--------------------------------------|--|
| ZZ | Start/End Program Menu               |  |
| V2 | Positive bar codes                   |  |
| V4 | Both positive and negative bar codes |  |



**Positive and Negative Bar Codes** - Usually bar codes are printed black on white, but sometimes white on black. These labels are called positive and negative, respectively.







### Buzzer Settings

|    |                            |  |   |
|----|----------------------------|--|---|
| ZZ | Start/End Program Menu     |    |   |
| W8 | Enable software buzzer     |    |    |
| W0 | Disable buzzer             |    |   |
| W1 | Single tone buzzer         |    |   |
| W2 | High - low buzzer          |    |    |
| W3 | Low - high buzzer          |    |   |
| W7 | Buzzer duration 50 msec.   |    |   |
| W4 | Buzzer duration 100 msec.  |    |   |
| W5 | Buzzer duration 200 msec.  |  |   |
| W6 | Buzzer duration 400 msec.  |  |   |
| T0 | Buzzer volume maximum      |  |  |
| T1 | Buzzer volume loud         |  |   |
| T2 | Buzzer volume normal       |  |   |
| T3 | Buzzer volume minimum      |  |   |
| VY | Buzzer before transmission |  |  |

Continued on next page.....

**Buzzer Settings (cont.)**

|    |                           |  |
|----|---------------------------|--|
| ZZ | Start/End Program Menu    |  |
| VZ | Buzzer after transmission |  |
| GD | Disable startup buzzer    |  |
| GC | Enable startup buzzer     |  |

**Buzzer Settings** - These options determine the buzzer type, tone, duration and loudness. By default, the buzzer is disabled for Linker type readers.

**Buzzer Type** - The buzzer may be disabled or enabled as either a hardware or software buzzer. Not all readers support both a hardware and software buzzer.

**Buzzer Tone** - If a software buzzer is used, the buzzer tone may be selected.

**Buzzer Duration and Volume** - If a software buzzer is used, a buzzer duration of 50, 100, 200 or 400 m sec. may be selected. Volume may also be adjusted.

**Buzzer Before Transmission** - The good read buzzer will be activated after decoding the bar code, but before transmission. During transmission, the buzzer sequence will be completed.

**Buzzer After Transmission** - The good read buzzer will be activated after transmission.

**Enable Startup Buzzer** - When this option is selected, the reader will generate a single good read buzzer to indicate the reader is ready after the reader is supplied with power.

**Disable Startup Buzzer** - When this option is selected, the reader will not sound the buzzer after the reader is supplied with power.

### Good Read LED

|    |                             |  |
|----|-----------------------------|--|
| ZZ | Start/End Program Menu      |  |
| T4 | Disable indicator           |  |
| T5 | Indicator duration 0.2 sec. |  |
| T6 | Indicator duration 0.4 sec. |  |
| T7 | Indicator duration 0.8 sec. |  |



### Diagnostics

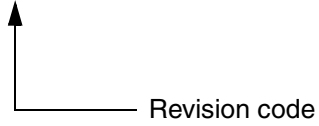
|    |                                 |  |
|----|---------------------------------|--|
| ZZ | Start/End Program Menu          |  |
| Z1 | Transmit software version       |  |
| Z3 | Transmit settings               |  |
| ZA | Transmit ASCII printable string |  |
| YV | Transmit ASCII control string   |  |
| TH | Error msg. label                |  |
| TI | Error msg. no decode            |  |



# Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.

Cat. No. Q05BAZ1



The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous version.

| Revision code | Date       | Revised content     |
|---------------|------------|---------------------|
| 1             | March 2003 | Original production |





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