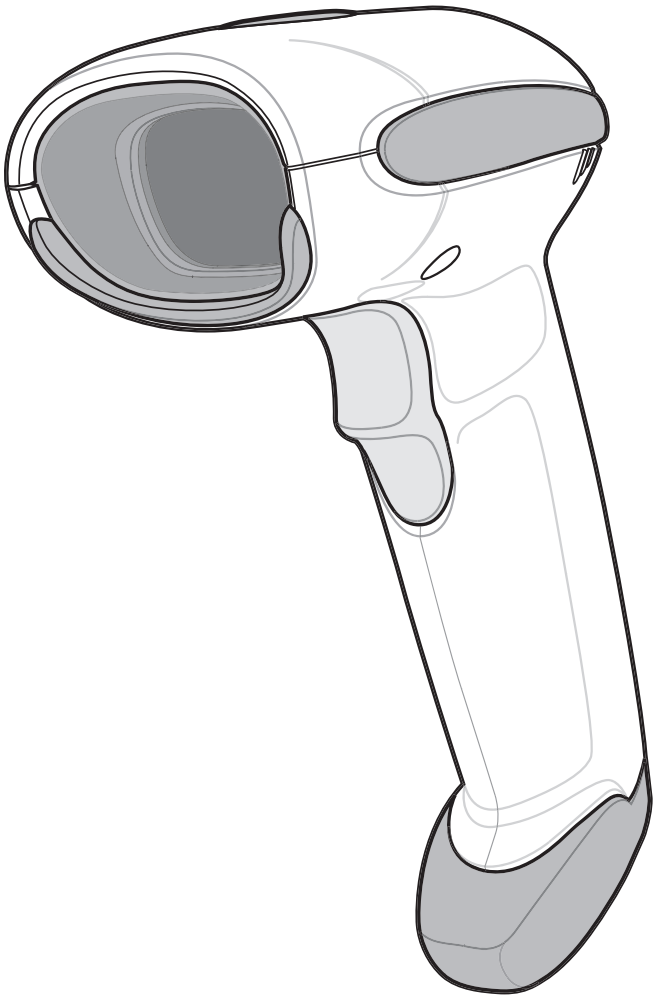
# LS3008

## Product Reference Guide



# *LS3008*
# *Product Reference Guide*

*72E-86092-04*
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*February 2015*

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For the complete Zebra hardware product warranty statement, go to:
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# Revision History

Changes to the original manual are listed below:

| Change | Date | Description |
|---|---|---|
| -01 Rev A | 6/2006 | Initial release. |
| -02 Rev A | 9/2007 | Motorola rebranding, add new UPC/EAN Supplemental options and Bookland ISBN format, change RSS references to GS1 DataBar. |
| -03 Rev A | 10/2012 | Updated ambient light tolerance. |
| -04 Rev A | 2/2015 | Zebra Re-Branding |

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**Tell Us What You Think...**

# About This Guide

## Introduction

The *LS3008 Product Reference Guide* provides general instructions for setting up, operating, maintaining, and troubleshooting the LS3008 scanner.

## Chapter Descriptions

- *Chapter , Introduction* provides a product overview, unpacking instructions, and cable connection information.
- *Chapter 2, Wireless IPS Scanning* describes parts of the scanner, beeper and LED definitions, and how to use the scanner in hand-held and hands-free modes.
- *Chapter 3, Maintenance, Troubleshooting & Specifications* provides information on how to care for the scanner, troubleshooting, and technical specifications.
- *Chapter 4, User Preferences* provides programming bar codes for selecting user preference features for the scanner.
- *Chapter 5, Keyboard Wedge Interface* provides information for setting up the scanner for Keyboard Wedge operation.
- *Chapter 6, RS-232 Interface* provides information for setting up the scanner for RS-232 operation.
- *Chapter 7, USB Interface* provides information for setting up the scanner for USB operation.
- *Chapter 8, IBM Interface* provides all information for setting up the scanner with IBM 468X/469X POS systems.
- *Chapter 9, Wand Emulation Interface* provides all information for setting up the scanner for Wand Emulation operation.
- *Chapter 10, Scanner Emulation Interface* provides information for setting up the scanner for Scanner Emulation operation.
- *Chapter 11, 123Scan* (PC based scanner configuration tool) provides the bar code that must be scanned to communicate with the 123Scan program.

- *Chapter 12, Intrusion Protection System Symbologies* describes all symbology features and provides the programming bar codes necessary for selecting these features for the scanner.
- *Chapter 13, Miscellaneous Scanner Options* includes commonly used bar codes to customize how the data is transmitted to the host device.
- *Appendix A, Standard Defaults* provides a table of all host devices and miscellaneous scanner defaults.
- *Appendix B, Programming Reference* provides a table of AIM code identifiers, ASCII character conversions, and keyboard maps.
- *Appendix C, Sample Bar Codes* includes sample bar codes.
- *Appendix D, Numeric Bar Codes* includes the numeric bar codes to scan for parameters requiring specific numeric values.
- *Appendix E, ASCII Character Sets* provides ASCII character value tables.

## Notational Conventions

The following conventions are used in this document:

- *Italics* are used to highlight the following:
  - Chapters and sections in this and related documents
- bullets (•) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.
- Throughout the programming bar code menus, asterisks (*) are used to denote default parameter settings.

***NOTE*** This symbol indicates something of special interest or importance to the reader. Failure to read the note will not result in physical harm to the reader, equipment or data.

***CAUTION*** This symbol indicates that if this information is ignored, the possiblity of data or material damage may occur.

***WARNING!*** **This symbol indicates that if this information is ignored the possibility that serious personal injury may occur.**

## Related Documents

- *LS3008 Quick Reference Guide*, p/n 72-86091-xx - provides general information to help the user get started with the scanner, including basic operation instructions and start up bar codes.

For the latest version of this guide and all guides, go to: http://www.zebra.com/support.

## Service Information

If you have a problem with your equipment, contact Zebra Support for your region. Go to http://www.zebra.com/support. If you purchased your Zebra product from a Zebra Business Partner, contact that Business Partner for service.

Before contacting, have the model number and serial number at hand. If your problem cannot be solved by the Zebra, you may need to return your equipment for servicing and you will be given specific directions.

Zebra is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.If you have a problem using the equipment, contact your facility's technical or systems support. If there is a problem with the equipment, they will contact the Zebra Customer Support Center at: http://www.zebra.com/support.

When contacting Zebra support, please have the following information available:

- Serial number of the unit
- Model number or product name
- Software type and version number

Zebra responds to calls by e-mail, telephone or fax within the time limits set forth in service agreements.

If your problem cannot be solved by Zebra support, you may need to return your equipment for servicing and will be given specific directions. Zebra is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your business product from a Zebra business partner, please contact that business partner for support.

# Chapter 1 Getting Started

## Introduction

The scanner combines excellent scanning performance and advanced ergonomics to provide the best value in a lightweight laser scanner. Whether used as a hand-held scanner or in hands-free mode in a stand, the scanner ensures comfort and ease of use for extended periods of time.

In addition to single-line laser scanning, the scanner supports multi-line rastering. Multi-line rastering allows the scanner to capture stacked GS1 DataBar codes and increases angular tolerances, minimizing product orientation and hand movements. Multi-line rastering also allows the scanner to read poor quality bar codes. For more information about scanning modes and stacked GS1 DataBar codes, see *Scan Pattern on page 4-6* and *GS1 DataBar on page C-3*.

***NOTE*** The scanner does not currently support PDF417 bar codes and its variants.

**Figure 1-1** *LS3008 Scanner*

This scanner supports the following interfaces:

- Keyboard Wedge connection to a host. The host interprets scanned data as keystrokes. This interface supports the following international keyboards (for Windows® environment): North America, German, French, French Canadian, Spanish, Italian, Swedish, UK English, Portuguese-Brazilian, and Japanese.
- Standard RS-232 connection to a host. Scan bar code menus to set up proper communication of the scanner with the host.
- USB connection to a host. The scanner autodetects a USB host and defaults to the HID keyboard interface type. Select other USB interface types by scanning programming bar code menus.This interface supports the following international keyboards (for Windows® environment): North America, German, French, French Canadian, Spanish, Italian, Swedish, UK English, Portuguese-Brazilian, and Japanese.
- Connection to IBM® 468X/469X hosts. Scan bar code menus to set up communication of the scanner with the IBM terminal.
- Wand Emulation connection to a host. The scanner is connected to a portable data terminal, a controller, or host which collects the data as wand data and decodes it.
- Scanner Emulation connection to a host. The scanner is connected to a portable data terminal, a controller which collects the data and interprets it for the host.
- Synapse capability which allows connection to a wide variety of host systems using a Synapse and Synapse adapter cable. The scanner autodetects the host.
- Configuration via 123Scan.

## Unpacking

Remove the scanner from its packing and inspect it for damage. If the scanner was damaged in transit, call the Zebra Center. See *page xiii* for contact information. **KEEP THE PACKING**. It is the approved shipping container and should be used if the equipment ever needs to be return for servicing.

# Setting Up the Scanner

## Installing the Interface Cable

To connect the interface cable:

1. Insert the interface cable's modular connector clip into the cable interface port on the bottom of the scanner handle. (See *Figure 1-2*.).
2. Gently tug the cable to ensure the connector is properly secured.
3. Connect the other end of the interface cable to the host. (See the specific host chapter for information on host connections.)

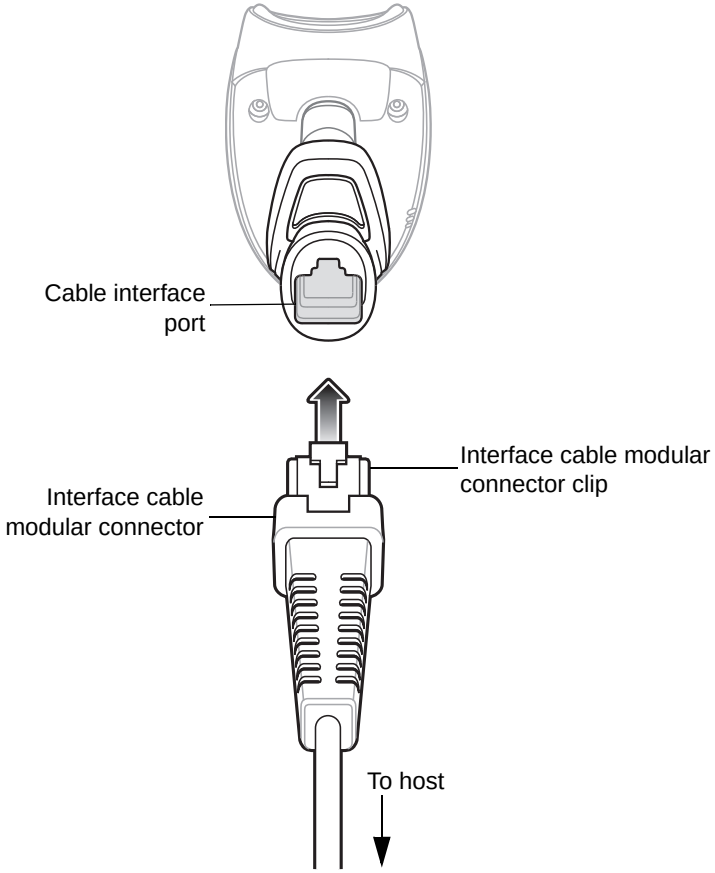



**Figure 1-2** *Installing the Cable*

***NOTE*** Different cables are required for different hosts. The connectors illustrated in each host chapter are examples only. Actual connectors may be different than those illustrated, but the steps to connect the scanner remain the same.

## Removing the Interface Cable

To remove the interface cable:

1. Unplug the installed cable's modular connector by depressing the connector clip with the tip of a screwdriver.
2. Carefully slide out the cable.
3. Follow the steps for *Installing the Interface Cable on page 1-3* to connect a new cable.

## Connecting a Synapse Cable Interface

***NOTE*** Refer to the Synapse Interface Guide provided with the Synapse cable for detailed setup instructions.

Zebra's Synapse Smart Cables enable interfacing to a variety of hosts. The appropriate Synapse cable has the built-in intelligence to detect the host to which it is connected.

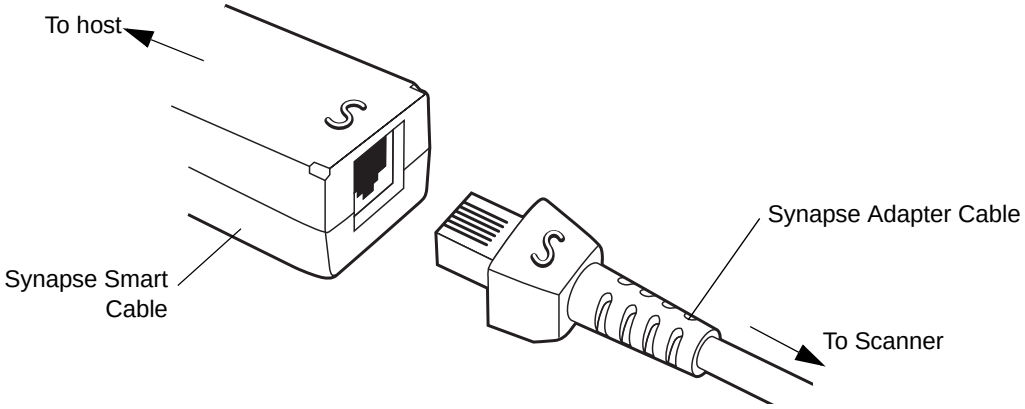



**Figure 1-3** *Synapse Cable Connection*

1. Plug the Synapse adapter cable (p/n 25-32463-xx) into the bottom of the scanner, as described in *Installing the Interface Cable on page 1-3*.
2. Align the 'S' on the Synapse adapter cable with the 'S' on the Synapse Smart Cable and plug the cable in.
3. Connect the other end of the Synapse Smart Cable to the host.

## Connecting Power (if required)

If the host does not provide power to the scanner, an external power connection to the scanner is required. To connect power:

1. Connect the interface cable to the bottom of the scanner, as described in *Installing the Interface Cable on page 1-3*.
2. Connect the other end of the interface cable to the host (refer to the host manual to locate the correct port).
3. Plug the power supply into the power jack on the interface cable. Plug the other end of the power supply into an AC outlet.

## Configuring the Scanner

To configure the scanner, use the bar codes included in this manual, or the 123Scan configuration program.

See *Chapter 4, User Preferences*, *Chapter 12, Intrusion Protection System Symbologies* and *Chapter 13, Miscellaneous Scanner Options* for information about programming the scanner using bar code menus. Also see each host-specific chapter to set up a connection to a specific host type.

See *Chapter 11, 123Scan* to configure the scanner using this configuration program. A help file is available in the program.

# Chapter 2 Wireless IPS Scanning

## Introduction

This chapter provides beeper and LED definitions, techniques involved in scanning bar codes, general instructions and tips about scanning, and decode zone diagrams.

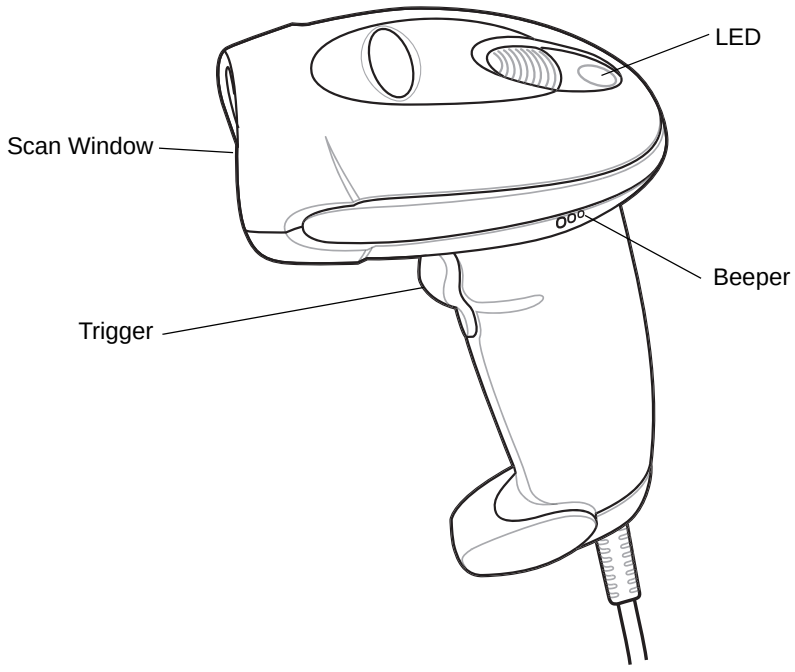



**Figure 2-1** *Parts*

# Beeper Definitions

The scanner issues different beep sequences and patterns to indicate status. *Table 2-1* defines beep sequences that occur during both normal scanning and while programming the scanner.

**Table 2-1** *Beeper Definitions*

| Beeper Sequence | Indication |
|---|---|
| **Standard Use** | |
| Low/medium/high beeps | Power up. |
| Short high beeps | A bar code symbol was decoded (if decode beeper is enabled). |
| 4 long low beeps | A transmission error was detected in a scanned symbol. The data is ignored. This occurs if a unit is not properly configured. Check option setting. |
| 5 low beeps | Conversion or format error. |
| Low/high/low beeps | Advanced Data Formatting (ADF) transmit error. (For information about ADF programming, refer to the Advanced Data Formatting Programmer Guide, p/n 72-69680-xx.) |
| High/high/high/low beeps | RS-232 receive error. |
| **Parameter Menu Scanning** | |
| Short high beeps | Correct entry scanned or correct menu sequence performed. |
| Low/high beeps | Input error, incorrect bar code or “Cancel” scanned, wrong entry, incorrect bar code programming sequence; remain in program mode. |
| High/low beeps | Keyboard parameter selected. Enter value using bar code keypad. |
| High/low/high/low beeps | Successful program exit with change in the parameter setting. |
| Low/high/low/high beeps | Out of host parameter storage space. Scan *Default Parameters on page 4-3*. |
| **Code 39 Buffering** | |
| High/low beeps | New Code 39 data was entered into the buffer. |
| 3 Beeps - long high beeps | Code 39 buffer is full. |
| Low/high/low beeps | The Code 39 buffer was erased or there was an attempt to clear or transmit an empty buffer. |
| Low/high beeps | A successful transmission of buffered data. |
| **Host Specific** | |
| **USB only** | |
| 4 short high beeps | Scanner has not completed initialization. Wait several seconds and scan again. |

**Table 2-1** *Beeper Definitions (Continued)*

| Beeper Sequence | Indication |
|---|---|
| Scanner gives a power-up beep after scanning a USB Device Type. | Communication with the bus must be established before the scanner can operate at the highest power level. |
| This power-up beep occurs more than once. | The USB bus may put the scanner in a state where power to the scanner is cycled on and off more than once. This is normal and usually happens when the host cold boots. |
| **RS-232 only** | |
| 1 short high beep | A <BEL> character is received and Beep on <BEL> is enabled. |

# LED Definitions

In addition to beeper sequences, the scanner communicates with the user using a two-color LED display. *Table 2-2* defines LED colors that display during scanning.

**Table 2-2** *Standard LED Definitions*

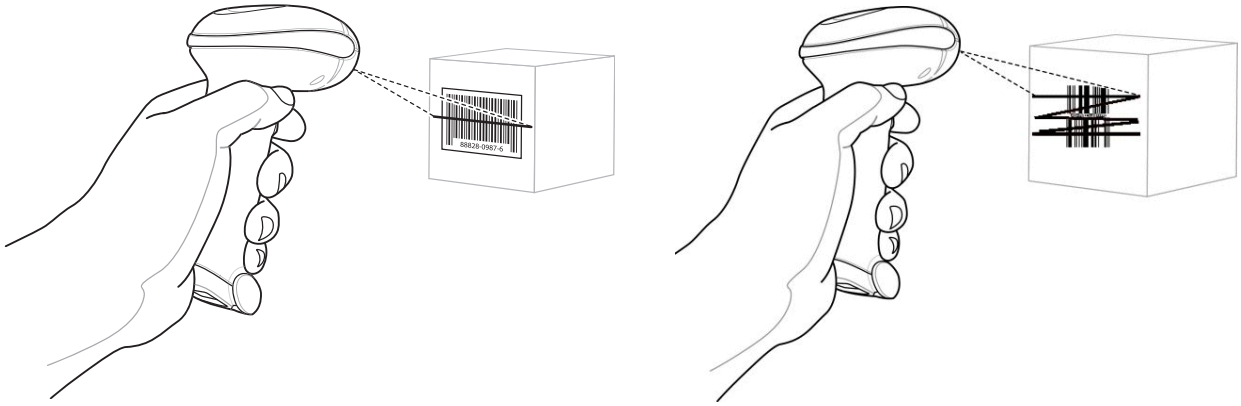
| LED | Indication |
|---|---|
| Off | No power is applied to the scanner, or the scanner is on and ready to scan. |
| Green | A bar code was successfully decoded. |
| Red | A data transmission error or scanner malfunction occurred. |

# Scanning in Hand-Held Mode

Install and program the scanner (see *Setting Up the Scanner on page 1-3*). For assistance, contact the local supplier or Zebra Support.

To scan in hand-held mode:

1. Ensure all connections are secure. (See the host chapter for the scanner.)
2. Aim the scanner at the bar code.
3. Press the trigger.



Single-Line Mode Multi-Line Raster Mode

**Figure 2-2** *Scanning in Hand-Held Mode*

4. Upon successful decode, the scanner beeps and the LED turns green. (For more information about beeper and LED definitions, see *Table 2-1* and *Table 2-2*.)

***NOTE*** Scan line lengths vary depending on the scan line width selected (see *Scan Line Width on page 4-7*). A full scan line width is the default. Medium and short scan line widths are useful for scanning menus or pick-lists.

## Aiming

On a typical UPC 100% hold the scanner between contact and 19 inches from the symbol (see *Decode Zone on page 2-9*). When scanning using a single-line scan mode, ensure the scan line crosses every bar and space of the symbol.

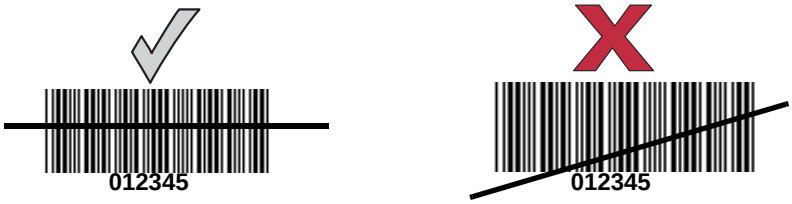



**Figure 2-3** *Acceptable and Incorrect Single-Line Aiming*

When scanning using a multi-line scan mode, at least one scan line must cross every bar and space of the symbol.

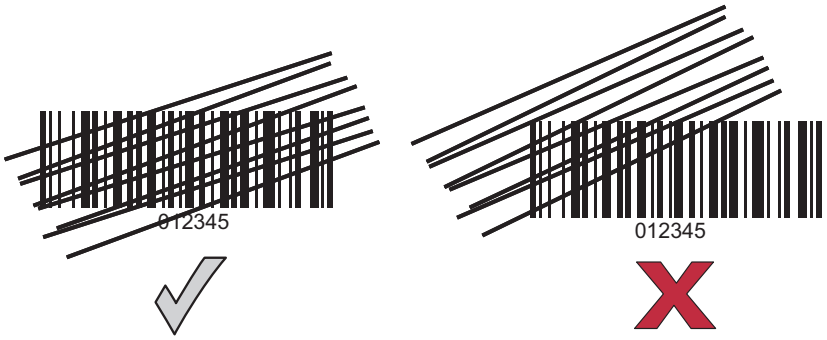



**Figure 2-4** *Acceptable and Incorrect Multi-Line Aiming*

Regardless of the scan mode, the scan line is smaller when the scanner is closer to the symbol and larger when it is farther from the symbol. Scan symbols with smaller bars or elements (mil size) closer to the scanner, and those with larger bars or elements (mil size) farther from the scanner.

Do not hold the scanner directly over the bar code. Laser light reflecting *directly* back into the scanner from the bar code is known as specular reflection. This specular reflection can make decoding difficult.

***NOTE*** Scan line lengths vary depending on the scan line width selected. A full scan line width is the default. Medium and short scan line widths are useful for scanning menus or pick-lists.

For more information about scan line widths and scanning modes, see *Scan Line Width on page 4-7* and *Scan Pattern on page 4-6*, respectively.

The scanner can be tilted up to 65° forward or back and achieve a successful decode (*Figure 2-5*). Simple practice quickly shows what tolerances to work within.

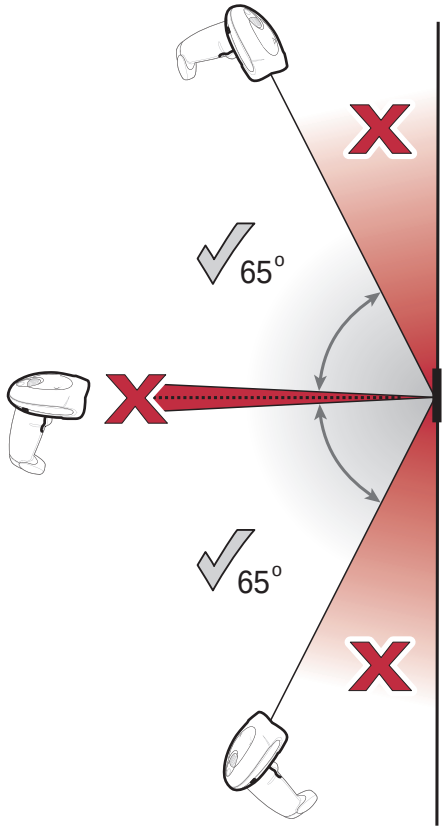



**Figure 2-5** *Maximum Tilt Angles and Dead Zone*

# Scanning in Hands-Free Mode

The optional Intellistand adds greater flexibility to scanning operation. When the scanner is seated in the stand's "cup," the scanner's built-in sensor places the scanner in hands-free mode. When the scanner is removed from the stand, it automatically switches modes to operate in its normal hand-held triggered mode.

## Assemble the Stand

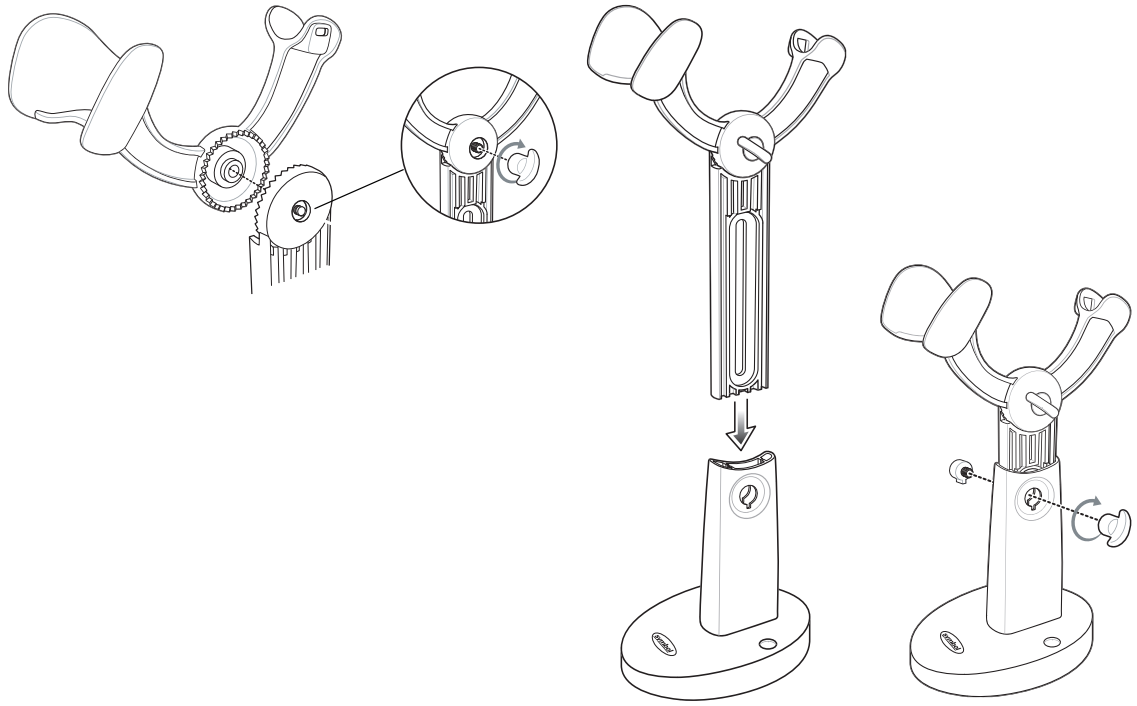


**Figure 2-6** *Assembling Intellistand*

## Scanning with Intellistand

When the scanner is placed in the Intellistand, the scan pattern selected in hand-held triggered mode continues (see *Scan Pattern on page 4-6*).

To operate the scanner in Intellistand:

1. Ensure the scanner is properly connected to the host (see the appropriate host chapter for information on host connections).
2. Insert the scanner in Intellistand by placing the front of the scanner into the stand's "cup."

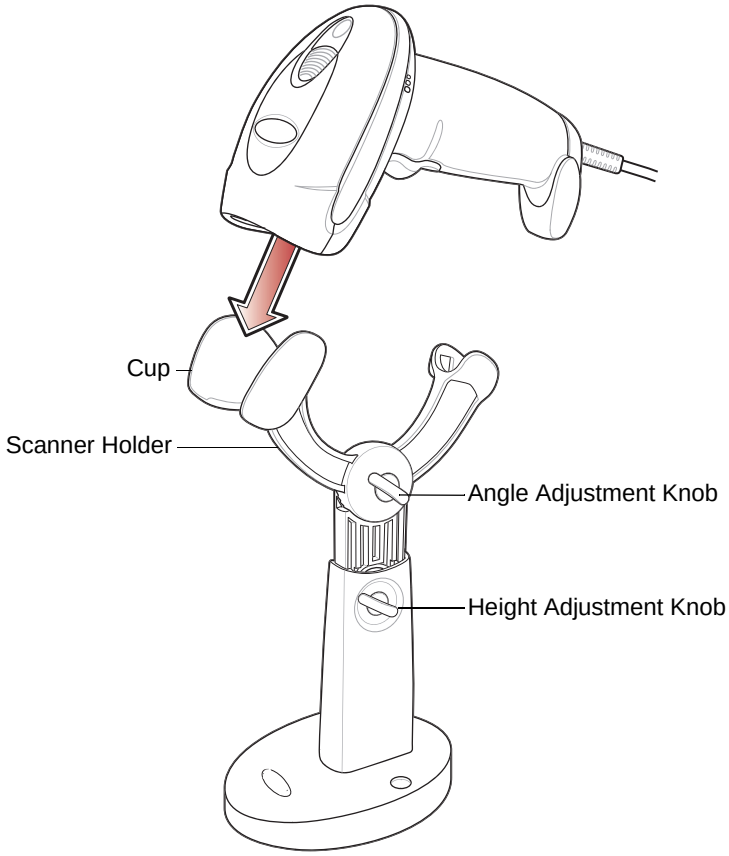


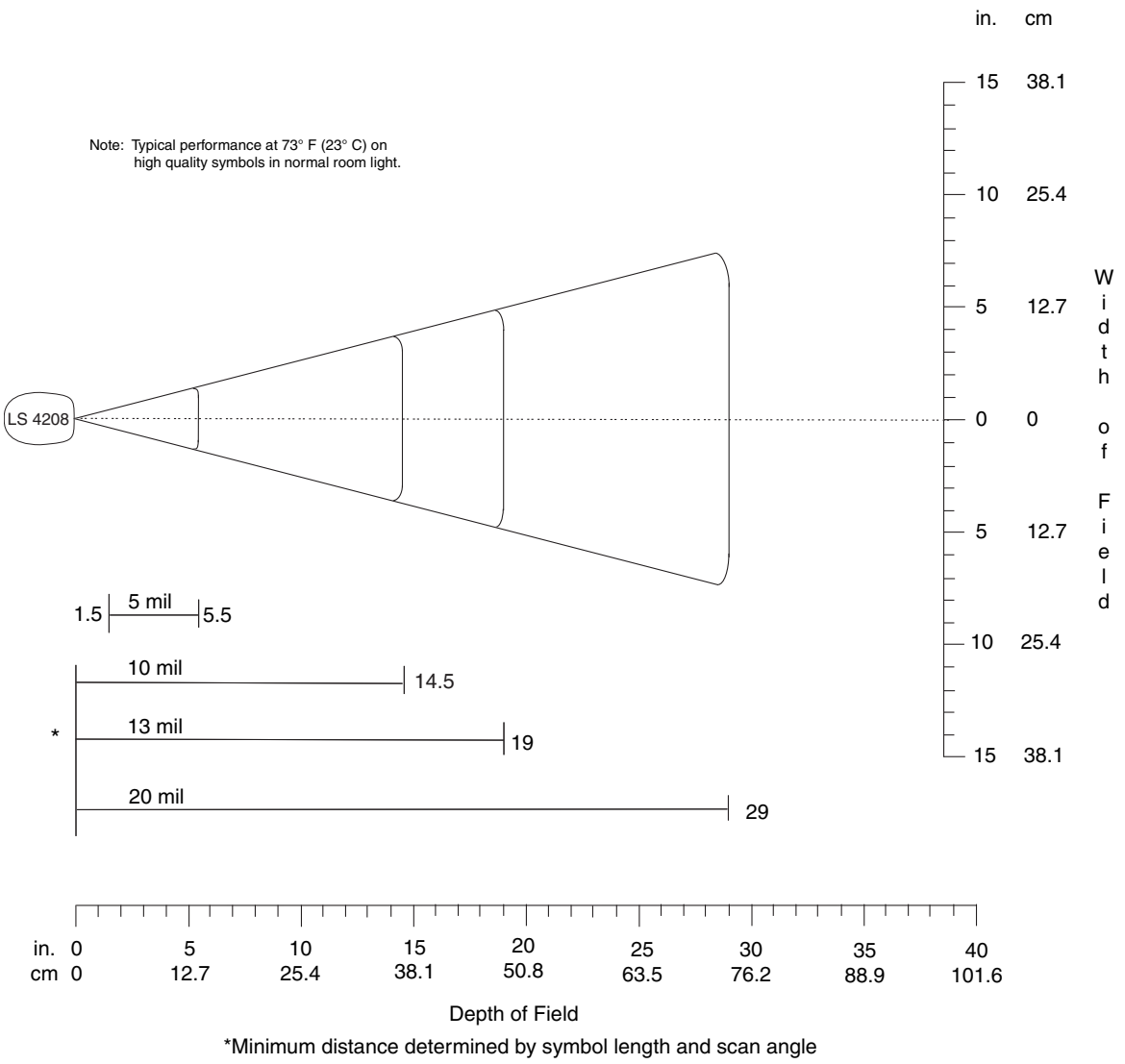

**Figure 2-7** *Inserting the Scanner in the Intellistand*

3. Use the Intellistand's adjustment knobs to adjust the height and angle of the scanner.
4. Present the bar code.

> ***NOTE*** When the bar code is in view, the scanner emits a full scan line. After 3 minutes, the scanner automatically switches to a reduced scan line. After 1 hour, the scanner automatically switches to blink mode.

5. Upon successful decode, the scanner beeps and the LED turns green. For more information about beeper and LED definitions, see *Table 2-1* and *Table 2-2*.

# Decode Zone




*Minimum distance determined by symbol length and scan angle

**Figure 2-8** *LS3008 Decode Zone*

# Chapter 3 Maintenance, Troubleshooting & Specifications

## Introduction

This chapter provides suggested scanner maintenance, troubleshooting, technical specifications, and signal descriptions (pinouts).

## Maintenance

Cleaning the exit window is the only maintenance required. A dirty window may affect scanning accuracy.

- Do not allow any abrasive material to touch the window
- Remove any dirt particles with a damp cloth
- Wipe the window using a tissue moistened with ammonia/water
- Do not spray water or other cleaning liquids directly into the window.

# Troubleshooting

**Table 3-1** *Troubleshooting*

| Problem | Possible Causes | Possible Solutions |
|---|---|---|
| **Beeper Indications** | | |
| The scanner emits frequent beeps. | No power to the scanner. | Check the system power. If the configuration requires a power supply, re-connect the power supply. |
| | Incorrect host interface cable is used. | Verify that the correct host interface cable is used. If not, connect the correct host interface cable. |
| | Interface/power cables are loose. | Check for loose cable connections and re-connect cables. |
| Scanner emits low/high/low beeps. | ADF transmit error. | Refer to the Advanced Data Formatting Programmer's Guide, p/n 72-69680-xx, for information about ADF programming. |
| | Invalid ADF rule is detected. | Refer to the Advanced Data Formatting Programmer's Guide, p/n 72-69680-xx, for information about ADF programming. |
| Scanner emits low/high beeps. | Input error, incorrect bar code or **Cancel** bar code was scanned. | Scan the correct numeric bar codes within range for the parameter programmed. |
| Scanner emits low/high/low beeps. | The Code 39 buffer was erased or there was an attempt to clear or transmit an empty buffer. | Normal when scanning the Code 39 Buffering **Clear Buffer** bar code or upon attempt to transmit an empty Code 39 buffer. |
| Scanner emits low/high/low/high beeps. | Out of host parameter storage space. | Scan *Default Parameters on page 4-3*. |
| | Out of memory for ADF rules. | Reduce the number of ADF rules or the number of steps in the ADF rules. |
| Scanner emits high/low beeps. | The scanner is buffering Code 39 data. | Normal. |
| Scanner emits high/high/high/low beeps. | RS-232 receive error. | Normal during host reset. Otherwise, set the scanner's RS-232 parity to match the host setting. |
| Scanner emits four long low beeps. | A transmission error was detected in a scanned symbol. The data is ignored. | This occurs if a unit is not properly configured. Check option setting. |
| Scanner emits four short high beeps (USB only). | Scanner has not completed initialization. | Wait several seconds and scan again. |

**Table 3-1** *Troubleshooting (Continued)*

| Problem | Possible Causes | Possible Solutions |
|---|---|---|
| Scanner emits a short low/high/low/high beep sequence while it is being programmed. | Out of ADF parameter storage space. | Erase all rules and re-program with shorter rules. |
| **Decoding Bar Codes** | | |
| Scanner emits the laser, but does not decode the bar code. | Scanner is not programmed for the correct bar code type. | Program the scanner to read that type of bar code. See *Chapter 12, Intrusion Protection System Symbologies*. |
| | Bar code symbol is unreadable. | Scan test symbols of the same bar code type to determine if the bar code is defaced. |
| | Distance between scanner and bar code is incorrect. | Move the scanner closer to or further from the bar code. See *Decode Zone on page 2-9*. |
| | The scan line is not crossing every bar and space of the symbol. | Move the symbol until the scan line is within the acceptable aiming pattern. See *Figure 2-3 on page 2-5*. |
| Scanner decodes bar code, but does not transmit the data to the host. | Scanner is not programmed for the correct host type. | Scan the appropriate host type programming bar code. See the chapter corresponding to the host type. |
| | Interface cable is loose. | Check for loose cable connection and re-connect cable. |
| Scanner emits five long low beep after a bar code is decoded. | Conversion or format error was detected.<br>The scanner's conversion parameters are not properly configured. | Ensure the scanner's conversion parameters are properly configured. |
| | Conversion or format error was detected.<br>An ADF rule was set up with characters that can't be sent for the host selected. | Change the ADF rule, or change to a host that can support the ADF rule. |
| | Conversion or format error was detected.<br>A bar code was scanned with characters that can't be sent for that host. | Change the bar code, or change to a host that can support the bar code. |

**Table 3-1** *Troubleshooting (Continued)*

| Problem | Possible Causes | Possible Solutions |
|---|---|---|
| **Host Displays** | | |
| Host displays scanned data incorrectly. | Scanner is not programmed to work with the host. | Ensure the proper host is selected.<br>Scan the appropriate host type programming bar code. |
| | | For RS-232, set the scanner's communication parameters to match the host's settings. |
| | | For a USB HID keyboard or Keyboard Wedge configuration, program the system for the correct keyboard type and language, and turn off the CAPS LOCK key. |
| | | Program the proper editing options (e.g., ADF, UPC-E to UPC-A Conversion). |
| | | Check the scanner's host type parameters or editing options. |
| **Trigger** | | |
| Nothing happens when the trigger is pulled. | No power to the scanner. | Check the system power. If the configuration requires a power supply, re-connect the power supply. |
| | Interface/power cables are loose. | Check for loose cable connections and re-connect cables. |
| The laser does not appear when the trigger is pulled. | No power to the scanner. | Check the system power. If the configuration requires a power supply, re-connect the power supply. |
| | Incorrect host interface cable is used. | Verify that the correct host interface cable is used. If not, connect the correct host interface cable. |
| | Interface/power cables are loose. | Check for loose cable connections and re-connect cables. |

***NOTE*** If after performing these checks the symbol still does not scan, contact the distributor or contact Zebra Support. See *page xiii* for contact information.

# Technical Specifications

**Table 3-2** *Technical Specifications*

| Item | Description |
|---|---|
| **Physical Characteristics** | |
| Dimensions | 6.7 in. H x 3.7 in. L x 2.7 in. W<br>(17 cm H x 9.3 cm L x 6.8 cm W) |
| Weight (without cable) | Approximately 6.4 oz. (181 g) |
| Voltage & Current | 5 +/-10%VDC @ 140 mA (Stand by: <35 mA) |
| Color | Yellow |
| **Performance Characteristics** | |
| Light Source (Laser) | 650nm laser diode |
| Motor Frequency | 50Hz |
| Decode Rate | 200 decodes per second |
| Roll Tolerance | ± 35° |
| Pitch Tolerance | ± 60° |
| Yaw Tolerance | ± 60° |
| Nominal Working Distance | 13 mil (100% UPC/EAN): 0 to 19 in. (48.25 cm)<br>5 mil (Code 39): 1.5 to 5.5 in. (3.8 cm to 13.97 cm)<br>(See *Decode Zone on page 2-9*) |
| Print Contrast Minimum | 25% minimum reflectance |
| Multi-Line Aiming Coverage | At 5 in. reading distance: ~ 0.5 in. (1.3 cm)<br>At 10 in. reading distance: ~ 1 in. (2.5 cm) |
| Motion Tolerances | Horizontal Velocity: 200 in. (508 cm) / sec<br>Vertical Velocity: 200 in. (508 cm) / sec<br>Angular Velocity: 200 in. (508 cm) / sec |
| Decode Capability | UPC/EAN and with supplementals, Code 39, Code 39 Full ASCII, Trioptic Code 39, GS1 DataBar Variants, UCC/EAN 128, Code 128, Code 128 Full ASCII, Code 93, Codabar (NW1), Interleaved 2 of 5, Discrete 2 of 5 MSI, Codell, IATA, Bookland EAN, Code 32 |
| Interfaces Supported | RS-232C (Standard, Nixdorf, ICL, & Fujitsu); IBM 468x/469x; Keyboard Wedge; USB (Standard, IBM SurePOS, Macintosh); Laser/Wand Emulation.<br>Synapse Adaptive Connectivity allows for connectivity to interfaces above and many non-standard interfaces. |

**Table 3-2** *Technical Specifications (Continued)*

| Item | Description |
|---|---|
| **User Environment** | |
| Operating Temperature | 32° to 122° F (0° to 50° C) |
| Storage Temperature | -40° to 158° F (-40° to 70° C) |
| Humidity | 5% to 95%, non-condensing |
| Drop Specifications | 6.5 ft (1.98 m) drops to concrete at room temperature<br>6 ft (1.83 m) drops at $32^{o}$, $73^{o}$, and $122^{o}$ F ($0^{o}$, $23^{o}$, and $50^{o}$ C) |
| Ambient Light Tolerance | Tolerant to typical artificial indoor and natural outdoor (direct sunlight) lighting conditions. Fluorescent, Incandescent, Mercury Vapor, Sodium Vapor, LED: 450 Ft Candles (4,844 Lux) Sunlight: 8000 Ft Candles (86,111 Lux)<br>Note: LED lighting with high AC ripple content can impact scanning performance. |
| Beeper Volume | User-selectable: three levels |
| Beeper Tone | User-selectable: three tones |
| ESD | 15 kV air discharge<br>8 kV indirect discharge |
| **Regulatory** | |
| Electrical Safety | UL1950, CSA C22.2 No. 950, EN60950/IEC950 |
| Laser Safety | CDRH Class II, IEC Class 2 |
| EMI/RFI | FCC Part 15 Class B, ICES-003 Class B, European Union EMC Directive, Australian SMA |

## Scanner Signal Descriptions

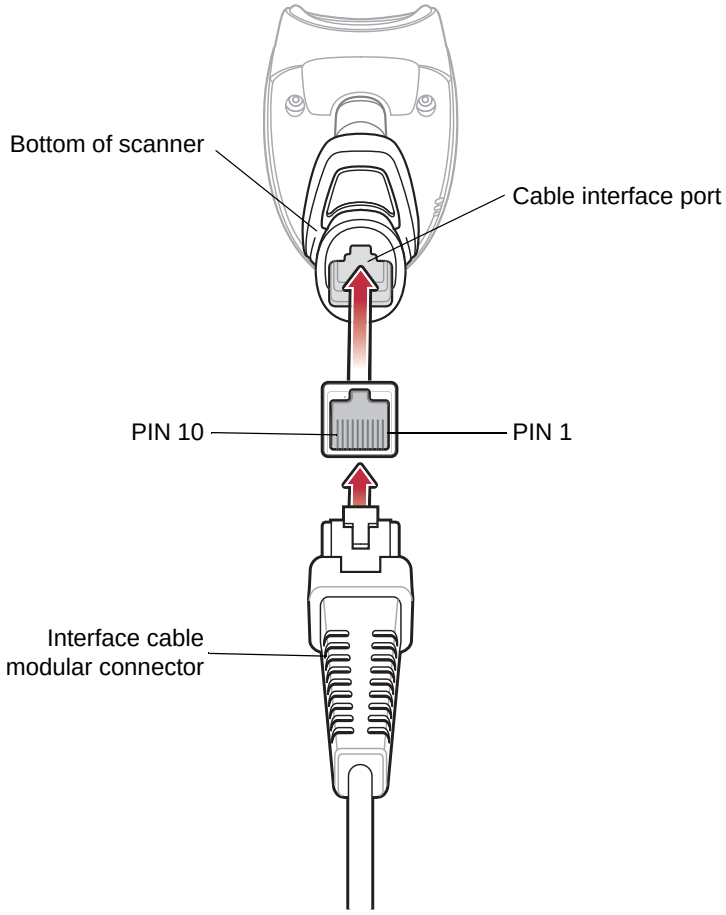



**Figure 3-1** *Scanner Cable Pin-outs*

The signal descriptions in *Table 3-3* apply to the connector on the scanner and are for reference only.

**Table 3-3** *Scanner Signal Pin-outs*

| Pin | IBM | Synapse | RS-232 | Keyboard Wedge | Wand | USB |
|---|---|---|---|---|---|---|
| 1 | Reserved | SynClock | Reserved | Reserved | Reserved | Jump to Pin 6 |
| 2 | Power | Power | Power | Power | Power | Power |
| 3 | Ground | Ground | Ground | Ground | Ground | Ground |
| 4 | IBM_A(+) | Reserved | TxD | KeyClock | DBP | Reserved |
| 5 | Reserved | Reserved | RxD | TermData | CTS | D + |
| 6 | IBM_B(-) | SynData | RTS | KeyData | RTS | Jump to Pin 1 |
| 7 | Reserved | Reserved | CTS | TermClock | Reserved | D - |
| 8 | Reserved | Reserved | Reserved | Reserved | Reserved | Reserved |
| 9 | EAS | EAS | EAS | EAS | EAS | EAS |
| 10 | EAS | EAS | EAS | EAS | EAS | EAS |

# Chapter 4 User Preferences

## Introduction

If desired, program the scanner to perform various functions, or activate different features. This chapter describes each user preference feature and provides the programming bar codes necessary for selecting these features.

The scanner ships with the settings shown in the *User Preferences Default Table on page 4-2* (also see *Appendix A, Standard Defaults* for all host device and miscellaneous defaults). If the default values suit requirements, programming may not be necessary.

To set feature values, scan a single bar code or a short bar code sequence. The settings are stored in non-volatile memory and are preserved even when the scanner is powered down.

If not using a Synapse or USB cable, select a host type (see each host chapter for specific host information) after the power-up beeps sound. This is only necessary upon the first power-up when connected to a new host.

To return all features to their default values, see *Default Parameters on page 4-3*. Throughout the programming bar code menus, default values are indicated with asterisks (*).

## Scanning Sequence Examples

In most cases, scanning one bar code sets the parameter value. For example, to set the beeper tone to high, scan the **High Frequency** (beeper tone) bar code listed under *Beeper Tone on page 4-4*. The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters, such as **Serial Response Time-Out** or **Data Transmission Formats**, require scanning several bar codes. See these parameter descriptions for this procedure.

## Errors While Scanning

Unless otherwise specified, when an error is made during a scanning sequence, just re-scan the correct parameter.

## User Preferences Parameter Defaults

*Table 4-1* lists the defaults for user preferences parameters. To change any option, scan the appropriate bar code(s) provided in the User Preferences section beginning on *page 4-3*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

**Table 4-1** *User Preferences Default Table*

| Parameter | Default | Page Number |
|---|---|---|
| **User Preferences** | | |
| Set Default Parameter | Restore Defaults | *4-3* |
| Beeper Tone | Medium | *4-4* |
| Beeper Volume | High | *4-4* |
| Power Mode | Continuous On | *4-5* |
| Scan Pattern | Multi-line Always Raster | *4-6* |
| Scan Line Width | Full Width | *4-7* |
| Laser On Time | 3.0 Sec | *4-7* |
| Beep After Good Decode | Enable | *4-8* |

# User Preferences

## Default Parameters

The scanner can be reset to two types of defaults: factory defaults or custom defaults. Scan the appropriate bar code below to reset the scanner to its default settings and/or set the scanner's current settings as the custom default.

- **Restore Defaults** - Resets all default parameters as follows:
  - If custom default values were configured (see **Write to Custom Defaults**), the custom default values are set for all parameters each time the **Restore Defaults** bar code below is scanned.
  - If no custom default values were configured, the factory default values are set for all parameters each time the **Restore Defaults** bar code below is scanned. (For factory default values, see *Table A-1* beginning on *page A-1*.)
- **Set Factory Defaults** - Scan the **Set Factory Defaults** bar code below to eliminate all custom default values and set the scanner to factory default values. (For factory default values, see *Table A-1* beginning on *page A-1*.)
- **Write to Custom Defaults** - Custom default parameters can be configured to set unique default values for all parameters. After changing all parameters to the desired default values, scan the **Write to Custom Defaults** bar code below to configure custom defaults.

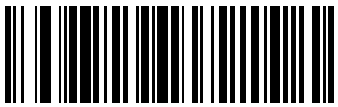
***Restore Defaults**

**Set Factory Defaults**

**Write to Custom Defaults**

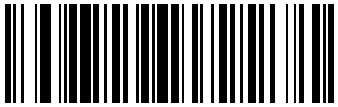
## Beeper Tone

To select a decode beep frequency (tone), scan the **Low Frequency, Medium Frequency**, or **High Frequency** bar code.



**Low Frequency**

***Medium Frequency (Optimum Settings)**



**High Frequency**

## Beeper Volume

To select a beeper volume, scan the **Low Volume, Medium Volume**, or **High Volume** bar code.

**Low Volume**

**Medium Volume**

***High Volume**

## Power Mode

This parameter determines whether or not power remains on after a decode attempt. When in reduced power mode, the scanner enters into a low power consumption mode to preserve battery life after each decode attempt. When in continuous power mode, power remains on after each decode attempt.

***Continuous On**

**Reduced Power Mode**

## Scan Pattern

This parameter determines the pattern (mode) of scanning. Scan the appropriate bar code below to set the scanning mode.

- **Single-line Only** - Scan **Single-line Only** for a single-line scan mode. The laser has no up and down scan line movement (no raster). (For an example of a single-line scan, see *Figure 2-3 on page 2-5*.)
- **Multi-line Smart Raster** - Scan **Multi-line Smart Raster** for a scan line begins as a single line and moves up and down (rasters) when a partial scan of a bar code is detected, or no bar code is decoded 500 ms after the trigger is pulled. Upon seeing a stacked GS1 DataBar code, the scanner immediately rasters. (For an example of a multi-line scan, see *Figure 2-4 on page 2-5*.)
- **Multi-line Always Raster** (default) - Scan **Multi-line Always Raster** for rastering (up and down scan line movement) to begin immediately.

**Single-line Only**
**(No Raster)**

**Multi-line Smart Raster**

***Multi-line Always Raster**

## Scan Line Width

Scan a bar code below to set the scan line width.

***Full Width**

**Medium Width**

**Small Width**

## Laser On Time

This parameter sets the maximum time that decode processing continues during a scan attempt. It is programmable in 0.1 second increments from 0.5 to 9.9 seconds. The default Laser On Time is 3.0 seconds.

To set a Laser On Time, scan the bar code below. Next, scan two numeric bar codes beginning on *page D-1* in *Appendix D, Numeric Bar Codes* that correspond to the desired on time. Single digit numbers must have a leading zero. For example, to set an On Time of 0.5 seconds, scan the bar code below, then scan the “0” and “5” bar codes. If an error is made, or the selection needs to be changed, scan **Cancel** on *page D-3*.

**Laser On Time**

## Beep After Good Decode

Scan a bar code below to select whether or not the scanner beeps after a good decode. If **Do Not Beep After Good Decode** is selected, the beeper still operates during parameter menu scanning and indicates error conditions.

***Beep After Good Decode (Enable)**

**Do Not Beep After Good Decode (Disable)**

# Chapter 5 Keyboard Wedge Interface

## Introduction

This chapter describes how to set up a Keyboard Wedge interface with the scanner. With this interface, the scanner is connected between the keyboard and host computer, and translates bar code data into keystrokes. The host computer accepts the keystrokes as if they originated from the keyboard. This mode adds bar code reading functionality to a system designed for manual keyboard input. Keyboard keystrokes are simply passed through.

Throughout the programming bar code menus, default values are indicated with asterisks (*).

* Indicates Default — ***North American** — Feature/Option

# Connecting a Keyboard Wedge Interface

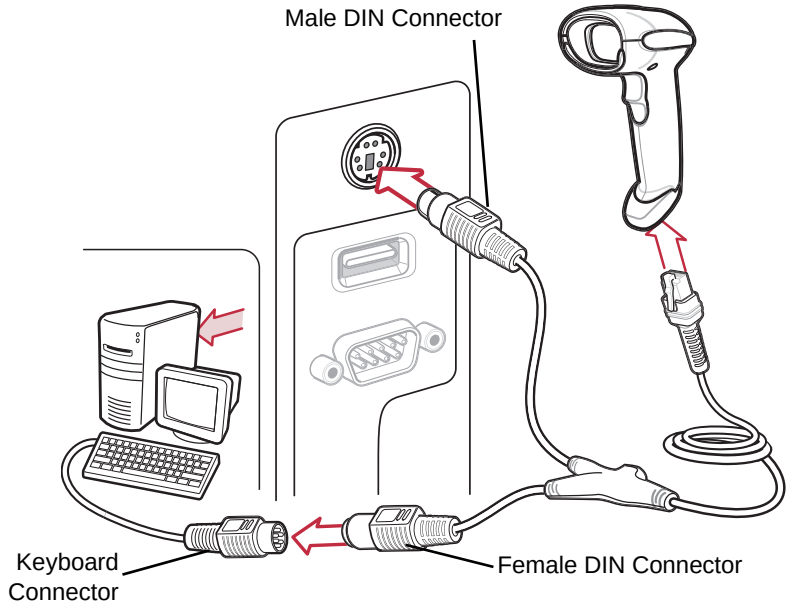



**Figure 5-1** *Keyboard Wedge Connection with Y-cable*

To connect the Keyboard Wedge interface Y-cable:

***NOTE*** Interface cables vary depending on configuration. The connectors illustrated in *Figure 5-1* are examples only. The connectors may be different than those illustrated, but the steps to connect the scanner remain the same.

1. Turn off the host and unplug the keyboard connector.
2. Attach the modular connector of the Y-cable to the cable interface port on the scanner. (See *Installing the Interface Cable on page 1-3*.)
3. Connect the round male DIN host connector of the Y-cable to the keyboard port on the host device.
4. Connect the round female DIN keyboard connector of the Y-cable to the keyboard connector.
5. If needed, attach the optional power supply to the connector in the middle of the Y-cable.
6. Ensure that all connections are secure.
7. Turn on the host system.
8. Select the Keyboard Wedge host type by scanning the appropriate bar code from *Keyboard Wedge Host Parameters on page 5-4*.
9. To modify any other parameter options, scan the appropriate bar codes in this chapter.

# Keyboard Wedge Parameter Defaults

*Table 5-1* lists the defaults for Keyboard Wedge host parameters. To change any option, scan the appropriate bar code(s) in the Keyboard Wedge Host Parameters section beginning on *page 5-4*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

**Table 5-1** *Keyboard Wedge Host Default Table*

| Parameter | Default | Page Number |
|---|---|---|
| **Keyboard Wedge Host Parameters** | | |
| Keyboard Wedge Host Type | IBM PC/AT& IBM PC Compatibles[1] | *5-4* |
| Country Types (Country Codes) | North American | *5-5* |
| Ignore Unknown Characters | Send | *5-6* |
| Keystroke Delay | No Delay | *5-7* |
| Intra-Keystroke Delay | Disable | *5-7* |
| Alternate Numeric Keypad Emulation | Disable | *5-8* |
| Caps Lock On | Disable | *5-8* |
| Caps Lock Override | Disable | *5-9* |
| Convert Wedge Data | No Convert | *5-9* |
| Function Key Mapping | Disable | *5-10* |
| FN1 Substitution | Disable | *5-10* |
| Send and Make Break | Send | *5-11* |

**[1]User selection is required to configure this interface and this is the most common selection.**

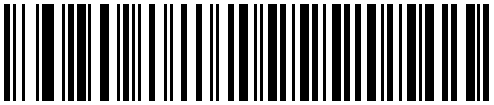
# Keyboard Wedge Host Parameters

## Keyboard Wedge Host Types

Select the Keyboard Wedge host by scanning one of the bar codes below.

**IBM PC/AT & IBM PC Compatibles**[1]

**IBM AT Notebook**

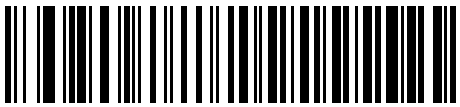


**NCR 7052**

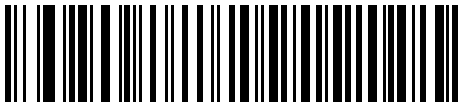
***NOTE*** [1]User selection is required to configure this interface and this is the most common selection.

## Keyboard Wedge Country Types (Country Codes)

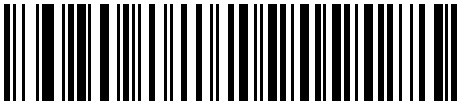
Scan the bar code corresponding to the keyboard type. If the keyboard type is not listed, see *Alternate Numeric Keypad Emulation on page 5-8*.



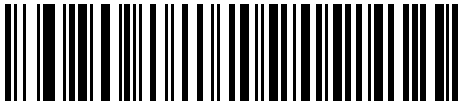
***North American**



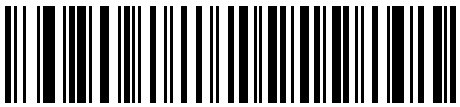
**German Windows**



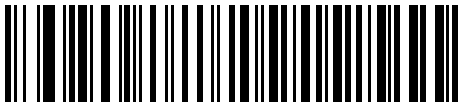
**French Windows**



**French Canadian Windows 95/98**



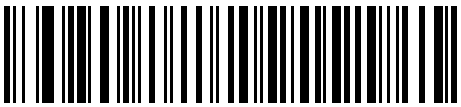
**French Canadian Windows XP/2000**



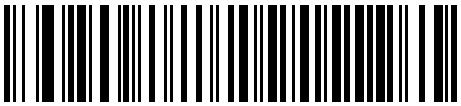
**Spanish Windows**

**Italian Windows**

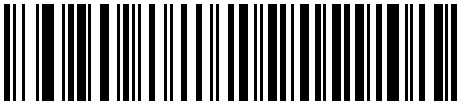
## Keyboard Wedge Country Types (continued)



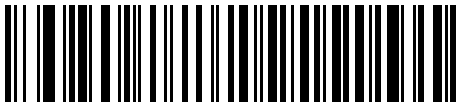
**Swedish Windows**



**UK English Windows**



**Japanese Windows**



**Portuguese-Brazilian Windows**

## Ignore Unknown Characters

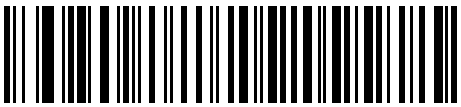
Unknown characters are characters the host does not recognize. When **Send Bar Codes With Unknown Characters** is selected, all bar code data is sent except for unknown characters, and no error beeps sound on the scanner. When **Do Not Send Bar Codes With Unknown Characters** is selected, bar code data is sent up to the first unknown character, then the scanner issues an error beep.

***Send Bar Codes with Unknown Characters**

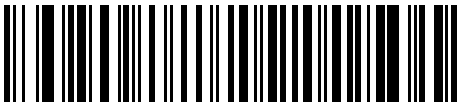
**Do Not Send Bar Codes with Unknown Characters**

## Keystroke Delay

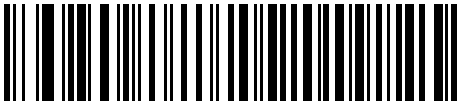
This is the delay in milliseconds between emulated keystrokes. Scan a bar code below to increase the delay when hosts require a slower transmission of data.



***No Delay**



**Medium Delay (20 msec)**



**Long Delay (40 msec)**

## Intra-Keystroke Delay

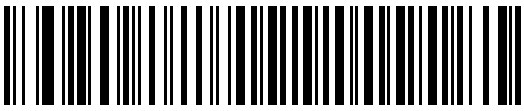
When enabled, an additional delay is inserted between each emulated key depression and release. This sets the Keystroke Delay parameter to a minimum of 5 msec as well.

**Enable Intra-Keystroke Delay**

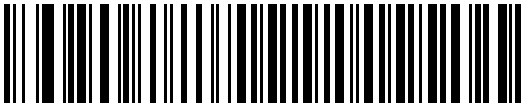
***Disable Intra-Keystroke Delay**

## Alternate Numeric Keypad Emulation

This allows emulation of most other country keyboard types not listed in *Keyboard Wedge Country Types (Country Codes) on page 5-5* in a Microsoft® operating system environment.



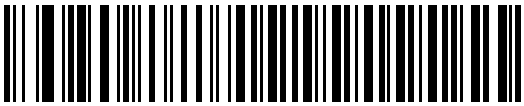
**Enable Alternate Numeric Keypad**



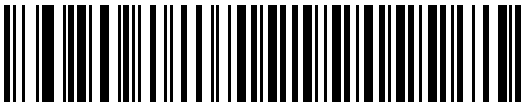
***Disable Alternate Numeric Keypad**

## Caps Lock On

When enabled, the scanner emulates keystrokes as if the Caps Lock key is always pressed. Note that if both **Caps Lock On** and **Caps Lock Override** are enabled, **Caps Lock Override** takes precedence



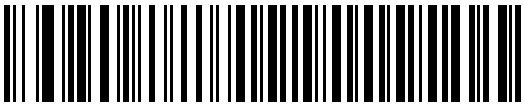
**Enable Caps Lock On**



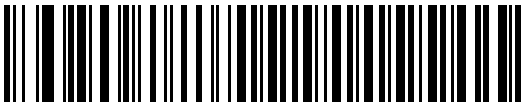
***Disable Caps Lock On**

## Caps Lock Override

When enabled, on AT or AT Notebook hosts, the keyboard ignores the state of the Caps Lock key. Therefore, an ‘A’ in the bar code is sent as an ‘A’ no matter what the state of the keyboard’s Caps Lock key. Note that if both **Caps Lock On** and **Caps Lock Override** are enabled, **Caps Lock Override** takes precedence.



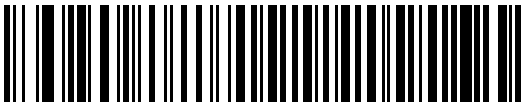
**Enable Caps Lock Override**



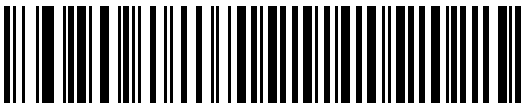
***Disable Caps Lock Override**

## Convert Wedge Data

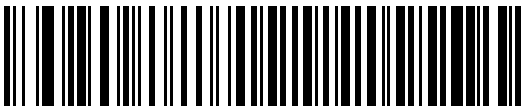
When enabled, the scanner will convert all bar code data to the selected case.



**Convert to Upper Case**



**Convert to Lower Case**



***No Convert**

## Function Key Mapping

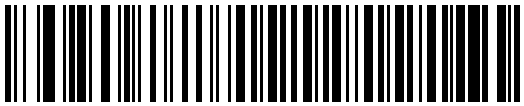
ASCII values under 32 are normally sent as control key sequences (see *Table 5-2 on page 5-13*). When this parameter is enabled, the keys in bold are sent in place of the standard key mapping. Table entries that do not have a bold entry remain the same whether or not this parameter is enabled.

**Enable Function Key Mapping**

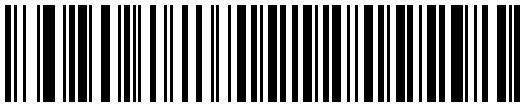
***Disable Function Key Mapping**

## FN1 Substitution

When enabled, the scanner replaces FN1 characters in an EAN128 bar code with a keystroke chosen by the user (see *FN1 Substitution Values on page 13-6*).



**Enable FN1 Substitution**



***Disable FN1 Substitution**

## Send Make and Break

When enabled, the scan codes for releasing a key are not sent.

***Send Make and Break Scan Codes**

**Send Make Scan Code Only**

# Keyboard Maps

The following keyboard maps are provided for prefix/suffix keystroke parameters. To program the prefix/suffix values, see the bar codes on *page 13-3*.

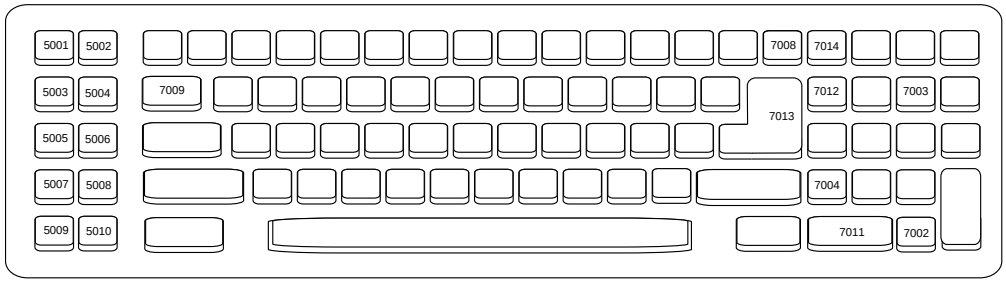



**Figure 5-2** *IBM PC/AT*

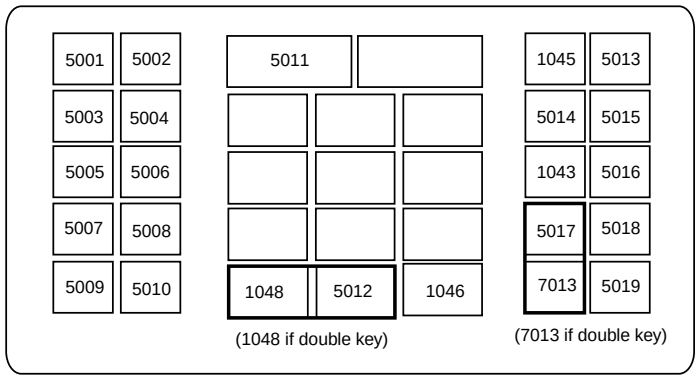



**Figure 5-3** *NCR 7052 32-KEY*

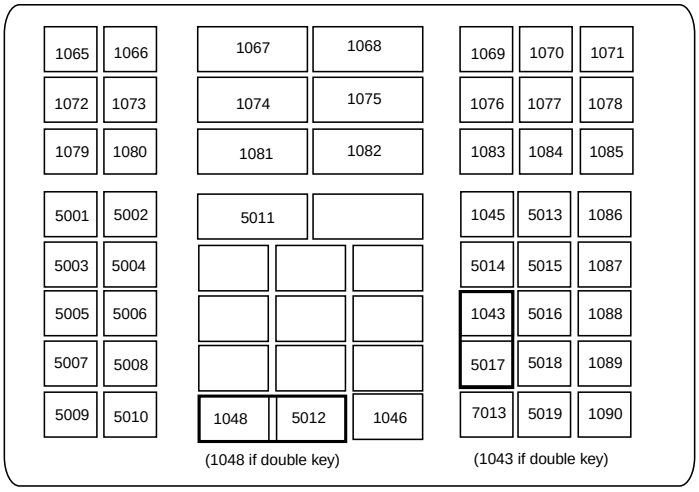



**Figure 5-4** *NCR 7052 58-KEY*

# ASCII Character Set for Keyboard Wedge

***NOTE*** Code 39 Full ASCII interprets the bar code special character ($ + % /) preceding a Code 39 character and assigns an ASCII character value to the pair. For example, when Code 39 Full ASCII is enabled and a +B is scanned, it is interpreted as b, %J as ?, and %V as @. Scanning ABC%I outputs the keystroke equivalent of ABC >.

**Table 5-2** *Keyboard Wedge ASCII Character Set*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1001 | $A | CTRL A |
| 1002 | $B | CTRL B |
| 1003 | $C | CTRL C |
| 1004 | $D | CTRL D |
| 1005 | $E | CTRL E |
| 1006 | $F | CTRL F |
| 1007 | $G | CTRL G |
| 1008 | $H | CTRL H/**BACKSPACE**[1] |
| 1009 | $I | CTRL I/**HORIZONTAL TAB**[1] |
| 1010 | $J | CTRL J |
| 1011 | $K | CTRL K |
| 1012 | $L | CTRL L |
| 1013 | $M | CTRL M/**ENTER**[1] |
| 1014 | $N | CTRL N |
| 1015 | $O | CTRL O |
| 1016 | $P | CTRL P |
| 1017 | $Q | CTRL Q |
| 1018 | $R | CTRL R |
| 1019 | $S | CTRL S |
| 1020 | $T | CTRL T |
| 1021 | $U | CTRL U |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 5-2** *Keyboard Wedge ASCII Character Set (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1022 | $V | CTRL V |
| 1023 | $W | CTRL W |
| 1024 | $X | CTRL X |
| 1025 | $Y | CTRL Y |
| 1026 | $Z | CTRL Z |
| 1027 | %A | CTRL [ /**ESC**[1] |
| 1028 | %B | CTRL \ |
| 1029 | %C | CTRL ] |
| 1030 | %D | CTRL 6 |
| 1031 | %E | CTRL - |
| 1032 | Space | Space |
| 1033 | /A | ! |
| 1034 | /B | “ |
| 1035 | /C | # |
| 1036 | /D | $ |
| 1037 | /E | % |
| 1038 | /F | & |
| 1039 | /G | ‘ |
| 1040 | /H | ( |
| 1041 | /I | ) |
| 1042 | /J | * |
| 1043 | /K | + |
| 1044 | /L | , |
| 1045 | - | - |
| 1046 | . | . |
| 1047 | /O | / |
| 1048 | 0 | 0 |
| 1049 | 1 | 1 |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 5-2** *Keyboard Wedge ASCII Character Set (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1050 | 2 | 2 |
| 1051 | 3 | 3 |
| 1052 | 4 | 4 |
| 1053 | 5 | 5 |
| 1054 | 6 | 6 |
| 1055 | 7 | 7 |
| 1056 | 8 | 8 |
| 1057 | 9 | 9 |
| 1058 | /Z | : |
| 1059 | %F | ; |
| 1060 | %G | < |
| 1061 | %H | = |
| 1062 | %I | > |
| 1063 | %J | ? |
| 1064 | %V | @ |
| 1065 | A | A |
| 1066 | B | B |
| 1067 | C | C |
| 1068 | D | D |
| 1069 | E | E |
| 1070 | F | F |
| 1071 | G | G |
| 1072 | H | H |
| 1073 | I | I |
| 1074 | J | J |
| 1075 | K | K |
| 1076 | L | L |
| 1077 | M | M |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 5-2** *Keyboard Wedge ASCII Character Set (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1078 | N | N |
| 1079 | O | O |
| 1080 | P | P |
| 1081 | Q | Q |
| 1082 | R | R |
| 1083 | S | S |
| 1084 | T | T |
| 1085 | U | U |
| 1086 | V | V |
| 1087 | W | W |
| 1088 | X | X |
| 1089 | Y | Y |
| 1090 | Z | Z |
| 1091 | %K | [ |
| 1092 | %L | \ |
| 1093 | %M | ] |
| 1094 | %N | ^ |
| 1095 | %O | _ |
| 1096 | %W | ‘ |
| 1097 | +A | a |
| 1098 | +B | b |
| 1099 | +C | c |
| 1100 | +D | d |
| 1101 | +E | e |
| 1102 | +F | f |
| 1103 | +G | g |
| 1104 | +H | h |
| 1105 | +I | i |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 5-2** *Keyboard Wedge ASCII Character Set (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1106 | +J | j |
| 1107 | +K | k |
| 1108 | +L | l |
| 1109 | +M | m |
| 1110 | +N | n |
| 1111 | +O | o |
| 1112 | +P | p |
| 1113 | +Q | q |
| 1114 | +R | r |
| 1115 | +S | s |
| 1116 | +T | t |
| 1117 | +U | u |
| 1118 | +V | v |
| 1119 | +W | w |
| 1120 | +X | x |
| 1121 | +Y | y |
| 1122 | +Z | z |
| 1123 | %P | { |
| 1124 | %Q | \| |
| 1125 | %R | } |
| 1126 | %S | ~ |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 5-3** *Keyboard Wedge ALT Key Character Set*

| ALT Keys | Keystroke |
|---|---|
| 2065 | ALT A |
| 2066 | ALT B |
| 2067 | ALT C |
| 2068 | ALT D |
| 2069 | ALT E |

**Table 5-3** *Keyboard Wedge ALT Key Character Set (Continued)*

| ALT Keys | Keystroke |
|---|---|
| 2070 | ALT F |
| 2071 | ALT G |
| 2072 | ALT H |
| 2073 | ALT I |
| 2074 | ALT J |
| 2075 | ALT K |
| 2076 | ALT L |
| 2077 | ALT M |
| 2078 | ALT N |
| 2079 | ALT O |
| 2080 | ALT P |
| 2081 | ALT Q |
| 2082 | ALT R |
| 2083 | ALT S |
| 2084 | ALT T |
| 2085 | ALT U |
| 2086 | ALT V |
| 2087 | ALT W |
| 2088 | ALT X |
| 2089 | ALT Y |
| 2090 | ALT Z |

**Table 5-4** *Keyboard Wedge GIU Key Character Set*

| GUI Keys | Keystrokes |
|---|---|
| 3000 | Right Control Key |
| 3048 | GUI 0 |
| 3049 | GUI 1 |
| 3050 | GUI 2 |
| 3051 | GUI 3 |
| 3052 | GUI 4 |
| 3053 | GUI 5 |

**Table 5-4** *Keyboard Wedge GIU Key Character Set (Continued)*

| GUI Keys | Keystrokes |
|---|---|
| 3054 | GUI 6 |
| 3055 | GUI 7 |
| 3056 | GUI 8 |
| 3057 | GUI 9 |
| 3065 | GUI A |
| 3066 | GUI B |
| 3067 | GUI C |
| 3068 | GUI D |
| 3069 | GUI E |
| 3070 | GUI F |
| 3071 | GUI G |
| 3072 | GUI H |
| 3073 | GUI I |
| 3074 | GUI J |
| 3075 | GUI K |
| 3076 | GUI L |
| 3077 | GUI M |
| 3078 | GUI N |
| 3079 | GUI O |
| 3080 | GUI P |
| 3081 | GUI Q |
| 3082 | GUI R |
| 3083 | GUI S |
| 3084 | GUI T |
| 3085 | GUI U |
| 3086 | GUI V |
| 3087 | GUI W |
| 3088 | GUI X |
| 3089 | GUI Y |
| 3090 | GUI Z |

**Table 5-5** *Keyboard Wedge F Key Character Set*

| F Keys | Keystroke |
|---|---|
| 5001 | F1 |
| 5002 | F2 |
| 5003 | F3 |
| 5004 | F4 |
| 5005 | F5 |
| 5006 | F6 |
| 5007 | F7 |
| 5008 | F8 |
| 5009 | F9 |
| 5010 | F10 |
| 5011 | F11 |
| 5012 | F12 |
| 5013 | F13 |
| 5014 | F14 |
| 5015 | F15 |
| 5016 | F16 |
| 5017 | F17 |
| 5018 | F18 |
| 5019 | F19 |
| 5020 | F20 |
| 5021 | F21 |
| 5022 | F22 |
| 5023 | F23 |
| 5024 | F24 |

**Table 5-6** *Keyboard Wedge Numeric Keypad Character Set*

| Numeric Keypad | Keystroke |
|---|---|
| 6042 | * |
| 6043 | + |
| 6044 | undefined |
| 6045 | - |
| 6046 | . |
| 6047 | / |
| 6048 | 0 |
| 6049 | 1 |
| 6050 | 2 |
| 6051 | 3 |
| 6052 | 4 |
| 6053 | 5 |
| 6054 | 6 |
| 6055 | 7 |
| 6056 | 8 |
| 6057 | 9 |
| 6058 | Enter |
| 6059 | Num Lock |

**Table 5-7** *Keyboard Wedge Extended Keypad Character Set*

| Extended Keypad | Keystroke |
|---|---|
| 7001 | Break |
| 7002 | Delete |
| 7003 | Pg Up |
| 7004 | End |
| 7005 | Pg Dn |
| 7006 | Pause |
| 7007 | Scroll Lock |
| 7008 | Backspace |

**Table 5-7** *Keyboard Wedge Extended Keypad Character Set (Continued)*

| Extended Keypad | Keystroke |
|---|---|
| 7009 | Tab |
| 7010 | Print Screen |
| 7011 | Insert |
| 7012 | Home |
| 7013 | Enter |
| 7014 | Escape |
| 7015 | Up Arrow |
| 7016 | Dn Arrow |
| 7017 | Left Arrow |
| 7018 | Right Arrow |

# Chapter 6 RS-232 Interface

## Introduction

This chapter describes how to set up the scanner with an RS-232 host. The RS-232 interface is used to connect the scanner to point-of-sale devices, host computers, or other devices with an available RS-232 port (e.g., com port).

If the host is not listed in *Table 6-2*, refer to the documentation for the host device to set communication parameters to match the host.

***NOTE*** The scanner uses TTL RS-232 signal levels, which interface with most system architectures. For system architectures requiring RS-232C signal levels, Zebra offers different cables providing TTL-to-RS-232C conversion. Contact Zebra Support for more information.

Throughout the programming bar code menus, default values are indicated with asterisks (*****).

* Indicates Default — ***Baud Rate 57,600** — Feature/Option

# Connecting an RS-232 Interface

This connection is made directly from the scanner to the host computer.

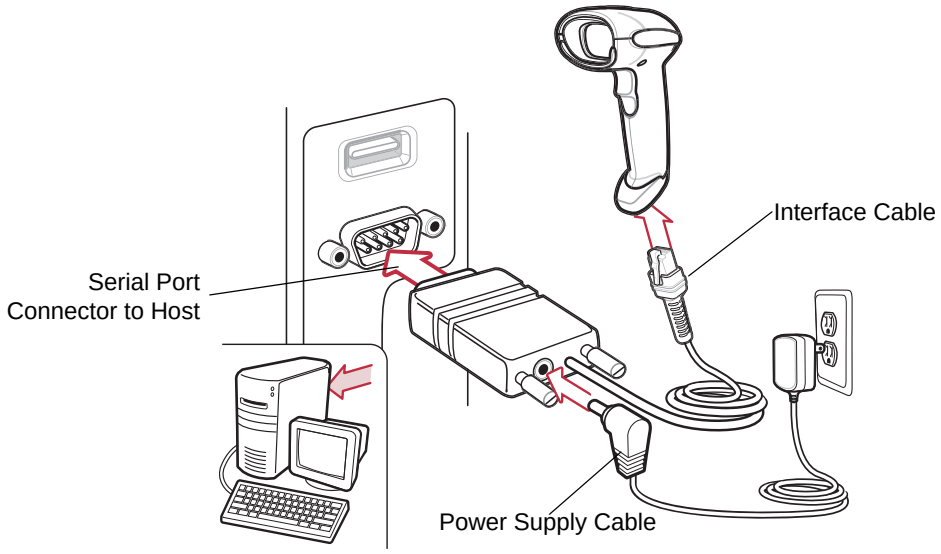



**Figure 6-1** *RS-232 Direct Connection*

**NOTE** Interface cables vary depending on configuration. The connectors illustrated in *Figure 6-1* are examples only. The connectors may be different than those illustrated, but the steps to connect the scanner remain the same.

1. Attach the modular connector of the RS-232 interface cable to the cable interface port on the scanner (see *Installing the Interface Cable on page 1-3*).
2. Connect the other end of the RS-232 interface cable to the serial port on the host.
3. Connect the power supply to the serial connector end of the RS-232 interface cable. Plug the power supply into an appropriate outlet.
4. Select the RS-232 host type by scanning the appropriate bar code from *RS-232 Host Types on page 6-6*.
5. To modify any other parameter options, scan the appropriate bar codes in this chapter.

# RS-232 Parameter Defaults

*Table 6-1* lists the defaults for RS-232 host parameters. If any option needs to be changed, scan the appropriate bar code(s) provided in the Parameter Descriptions section beginning on *page 6-4*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

**Table 6-1** *RS-232 Host Default Table*

| Parameter | Default | Page Number |
|---|---|---|
| **RS-232 Host Parameters** | | |
| RS-232 Host Types | Standard | *6-6* |
| Baud Rate | 9600 | *6-7* |
| Parity Type | None | *6-8* |
| Stop Bit Select | 1 Stop Bit | *6-9* |
| Data Bits (ASCII Format) | 8-Bit | *6-9* |
| Check Receive Errors | Enable | *6-10* |
| Hardware Handshaking | None | *6-10* |
| Software Handshaking | None | *6-12* |
| Host Serial Response Time-out | 2 Sec | *6-14* |
| RTS Line State | Low RTS | *6-15* |
| Beep on <BEL> | Disable | *6-15* |
| Intercharacter Delay | 0 msec | *6-16* |
| Nixdorf Beep/LED Options | Normal Operation | *6-17* |
| Ignore Unknown Characters | Send Bar Code | *6-17* |

## RS-232 Host Parameters

Various RS-232 hosts are set up with their own parameter default settings (*Table 6-2*). Selecting the ICL, Fujitsu, Wincor-Nixdorf Mode A, Wincor-Nixdorf Mode B, Olivetti, Omron, or terminal sets the defaults listed below.

**Table 6-2** *Terminal Specific RS-232*

| Parameter | Standard (Default) | ICL | Fujitsu | Wincor-Nixdorf Mode A | Wincor-Nixdorf Mode B/ OPOS | Olivetti | Omron |
|---|---|---|---|---|---|---|---|
| Transmit Code ID | No | Yes | Yes | Yes | Yes | Yes | Yes |
| Data Trans-mission Format | Data as is | Data/Suffix | Data/Suffix | Data/Suffix | Data/Suffix | Prefix/Data/ Suffix | Data/Suffix |
| Suffix | CR/LF (7013) | CR (1013) | CR (1013) | CR (1013) | CR (1013) | ETX (1002) | CR (1013) |
| Baud Rate | 9600 | 9600 | 9600 | 9600 | 9600 | 9600 | 9600 |
| Parity | None | Even | None | Odd | Odd | Even | None |
| Hardware Handshaking | None | RTS/CTS Option 3 | None | RTS/CTS Option 3 | RTS/CTS Option 3 | None | None |
| Software Handshaking | None | None | None | None | None | Ack/Nak | None |
| Serial Response Time-out | 2 Sec. | 9.9 Sec. | 2 Sec. | 9.9 Sec. | 9.9 Sec. | 9.9 Sec. | 9.9 Sec. |
| Stop Bit Select | One | One | One | One | One | One | One |
| ASCII Format | 8-Bit | 8-Bit | 8-Bit | 8-Bit | 8-Bit | 7-Bit | 8-Bit |
| Beep On <BEL> | Disable | Disable | Disable | Disable | Disable | Disable | Disable |
| RTS Line State | Low | High | Low | Low | Low = No data to send | Low | High |
| Prefix | None | None | None | None | None | STX (1003) | None |

***In the Nixdorf Mode B, if CTS is Low, scanning is disabled. When CTS is High, the user can scan bar codes.**
****If Nixdorf Mode B is scanned without the scanner connected to the proper host, it may appear unable to scan. If this happens, scan a different RS-232 host type within 5 seconds of cycling power to the scanner.**

# RS-232 Host Parameters (continued)

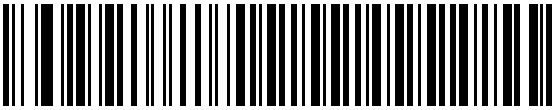
Selecting the ICL, Fujitsu, Wincor-Nixdorf Mode A, Wincor-Nixdorf Mode B, OPOS terminal enables the transmission of code ID characters listed in *Table 6-3* below. These code ID characters are not programmable and are separate from the Transmit Code ID feature. The Transmit Code ID feature should not be enabled for these terminals.

**Table 6-3** *Terminal Specific Code ID Characters*

| Code Type | ICL | Fujitsu | Wincor-Nixdorf Mode A | Wincor-Nixdorf Mode B/OPOS | Olivetti | Omron |
|---|---|---|---|---|---|---|
| UPC-A | A | A | A | A | A | A |
| UPC-E | E | E | C | C | C | E |
| EAN-8/JAN-8 | FF | FF | B | B | B | FF |
| EAN-13/JAN-13 | F | F | A | A | A | F |
| Code 39 | C <len> | None | M | M | M <len> | C <len> |
| Codabar | N <len> | None | N | N | N <len> | N <len> |
| Code 128 | L <len> | None | K | K | K <len> | L <len> |
| I 2 of 5 | I <len> | None | I | I | I <len> | I <len> |
| Code 93 | None | None | L | L | L <len> | None |
| D 2 of 5 | H <len> | None | H | H | H <len> | H <len> |
| UCC/EAN 128 | L <len> | None | P | P | P <len> | L <len> |
| MSI | None | None | O | O | O <len> | None |
| Bookland EAN | F | F | A | A | A | F |
| Trioptic | None | None | None | None | None | None |
| Code 11 | None | None | None | None | None | None |
| IATA | H<len> | None | H | H | None | None |
| Code 32 | None | None | None | None | None | None |

## RS-232 Host Types

To select an RS-232 host interface, scan one of the following bar codes.



***Standard RS-232**

**ICL RS-232**

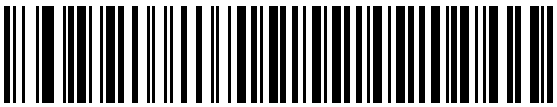
**Wincor-Nixdorf RS-232 Mode A**

**Wincor-Nixdorf RS-232 Mode B**

**Olivetti ORS4500**

**Omron**

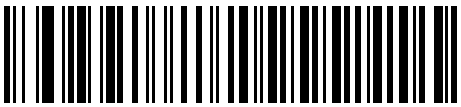
**OPOS/JPOS**



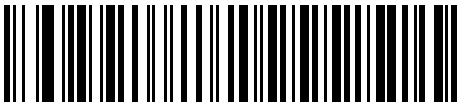
**Fujitsu RS-232**

## Baud Rate

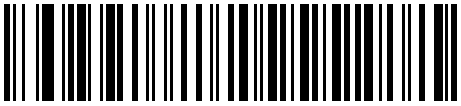
Baud rate is the number of bits of data transmitted per second. Set the scanner's baud rate to match the baud rate setting of the host device. Otherwise, data may not reach the host device or may reach it in distorted form.



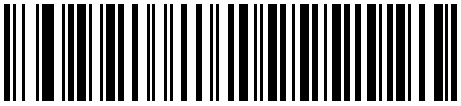
**Baud Rate 600**



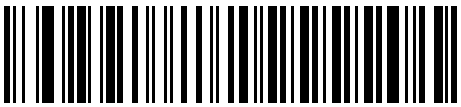
**Baud Rate 1200**



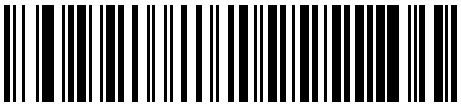
**Baud Rate 2400**



**Baud Rate 4800**



***Baud Rate 9600**



**Baud Rate 19,200**

**Baud Rate 38,400**

## Parity

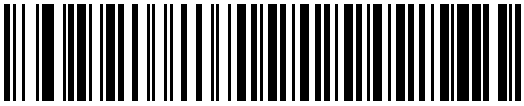
A parity check bit is the most significant bit of each ASCII coded character. Select the parity type according to host device requirements.

- Select **Odd** parity and the parity bit value is set to 0 or 1, based on data, to ensure that an odd number of 1 bits are contained in the coded character.
- Select **Even** parity and the parity bit value is set to 0 or 1, based on data, to ensure that an even number of 1 bits are contained in the coded character.
- Select **Mark** parity and the parity bit is always 1.
- Select **Space** parity and the parity bit is always 0.
- Select **None** when no parity bit is required.

**Odd**

**Even**

**Mark**



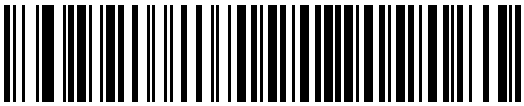
**Space**

***None**

## Stop Bit Select

The stop bit(s) at the end of each transmitted character marks the end of transmission of one character and prepares the receiving device for the next character in the serial data stream. The number of stop bits selected (one or two) depends on the number the receiving terminal is programmed to accommodate. Set the number of stop bits to match host device requirements.

***1 Stop Bit**

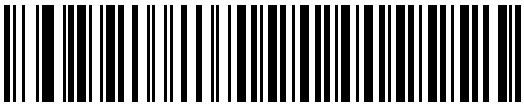


**2 Stop Bits**

## Data Bits (ASCII Format)

This parameter allows the scanner to interface with devices requiring a 7-bit or 8-bit ASCII protocol.

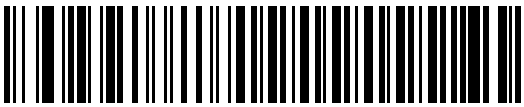
**7-Bit**



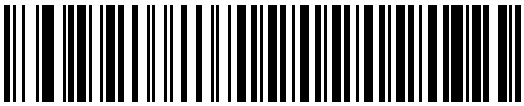
***8-Bit**

## Check Receive Errors

Select whether or not the parity, framing, and overrun of received characters are checked. The parity value of received characters is verified against the parity parameter selected above.



***Check For Received Errors (Enable)**



**Do Not Check For Received Errors (Disable)**

## Hardware Handshaking

The data interface consists of an RS-232 port designed to operate either with or without the hardware handshaking lines, *Request to Send* (RTS), and *Clear to Send* (CTS).

If Standard RTS/CTS handshaking is not selected, scan data is transmitted as it becomes available. If Standard RTS/CTS handshaking is selected, scan data is transmitted according to the following sequence:

- The scanner reads the CTS line for activity. If CTS is asserted, the scanner waits up to Host Serial Response Time-out for the host to de-assert the CTS line. If, after Host Serial Response Time-out, the CTS line is still asserted, the scanner sounds a transmit error, and any scanned data is lost.
- When the CTS line is de-asserted, the scanner asserts the RTS line and waits up to Host Serial Response Time-out for the host to assert CTS. When the host asserts CTS, data is transmitted. If, after Host Serial Response Time-out, the CTS line is not asserted, the scanner sounds a transmit error, and discards the data.
- When data transmission is complete, the scanner de-asserts RTS 10 msec after sending the last character.
- The host should respond by negating CTS. The scanner checks for a de-asserted CTS upon the next transmission of data.

During the transmission of data, the CTS line should be asserted. If CTS is de-asserted for more than 50 ms between characters, the transmission is aborted, the scanner sounds a transmission error, and the data is discarded.

If the above communication sequence fails, the scanner issues an error indication. In this case, the data is lost and must be rescanned.

If Hardware Handshaking and Software Handshaking are both enabled, Hardware Handshaking takes precedence.

***NOTE*** The DTR signal is jumpered to the active state.

- **None**: Scan the bar code below if no Hardware Handshaking is desired.
- **Standard RTS/CTS**: Scan the bar code below to select Standard RTS/CTS Hardware Handshaking.
- **RTS/CTS Option 1**: When RTS/CTS Option 1 is selected, the scanner asserts RTS before transmitting and ignores the state of CTS. The scanner de-asserts RTS when the transmission is complete.
- **RTS/CTS Option 2**: When Option 2 is selected, RTS is always high or low (user-programmed logic level). However, the scanner waits for CTS to be asserted before transmitting data. If CTS is not asserted within Host Serial Response Time-out, the scanner issues an error indication and discards the data.
- **RTS/CTS Option 3**: When Option 3 is selected, the scanner asserts RTS prior to any data transmission, regardless of the state of CTS. The scanner waits up to Host Serial Response Time-out for CTS to be asserted. If CTS is not asserted during this time, the scanner issues an error indication and discards the data. The scanner de-asserts RTS when transmission is complete.

***None**

**Standard RTS/CTS**

**RTS/CTS Option 1**

**RTS/CTS Option 2**

**RTS/CTS Option 3**

## Software Handshaking

This parameter offers control of the data transmission process in addition to, or instead of, that offered by hardware handshaking. There are five options.

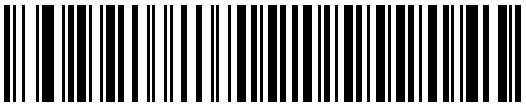
If Software Handshaking and Hardware Handshaking are both enabled, Hardware Handshaking takes precedence.

- **None**: When this option is selected, data is transmitted immediately. No response is expected from host.
- **ACK/NAK**: When this option is selected, after transmitting data, the scanner expects either an ACK or NAK response from the host. When a NAK is received, the scanner transmits the same data again and waits for either an ACK or NAK. After three unsuccessful attempts to send data when NAKs are received, the scanner issues an error indication and discards the data.

  The scanner waits up to the programmable Host Serial Response Time-out to receive an ACK or NAK. If the scanner does not get a response in this time, it issues an error indication and discards the data. There are no retries when a time-out occurs.
- **ENQ**: When this option is selected, the scanner waits for an ENQ character from the host before transmitting data. If an ENQ is not received within the Host Serial Response Time-out, the scanner issues an error indication and discards the data. The host must transmit an ENQ character at least every Host Serial Response Time-out to prevent transmission errors.
- **ACK/NAK with ENQ**: This combines the two previous options. For re-transmissions of data, due to a NAK from the host, an additional ENQ is not required.
- **XON/XOFF**: An XOFF character turns the scanner transmission off until the scanner receives an XON character. There are two situations for XON/XOFF:
  - XOFF is received before the scanner has data to send. When the scanner has data to send, it waits up to Host Serial Response Time-out for an XON character before transmission. If the XON is not received within this time, the scanner issues an error indication and discards the data.
  - XOFF is received during a transmission. Data transmission then stops after sending the current byte. When the scanner receives an XON character, it sends the rest of the data message. The scanner waits up to 30 seconds for the XON.

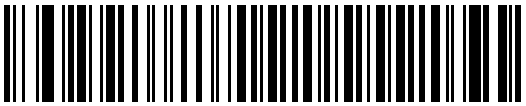
## Software Handshaking (continued)

*None



ACK/NAK

ENQ

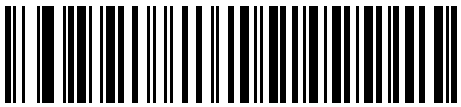


ACK/NAK with ENQ

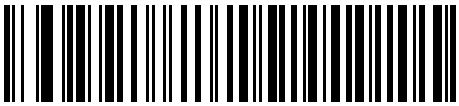
XON/XOFF

## Host Serial Response Time-out

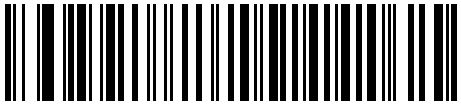
This parameter specifies how long the scanner waits for an ACK, NAK, ENQ, XON, or CTS before determining that a transmission error occurred.



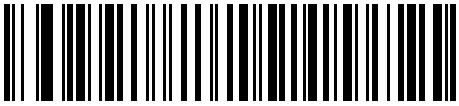
***Minimum: 2 Sec**



**Low: 2.5 Sec**



**Medium: 5 Sec**

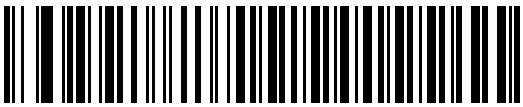


**High: 7.5 Sec**

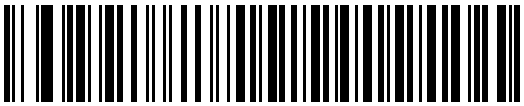
**Maximum: 9.9 Sec**

## RTS Line State

This parameter sets the idle state of the Serial Host RTS line. Scan a bar code below to select **Low RTS** or **High RTS** line state.



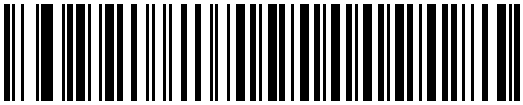
***Host: Low RTS**



**Host: High RTS**

## Beep on <BEL>

When this parameter is enabled, the scanner issues a beep when a <BEL> character is detected on the RS-232 serial line. <BEL> is issued to gain a user's attention to an illegal entry or other important event.

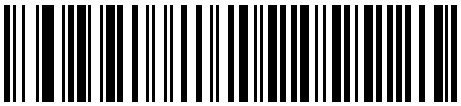


**Beep On <BEL> Character (Enable)**

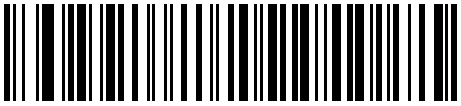
***Do Not Beep On <BEL> Character (Disable)**

## Intercharacter Delay

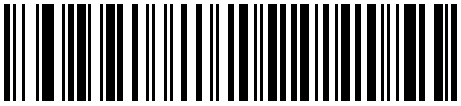
This parameter specifies the intercharacter delay inserted between character transmissions.



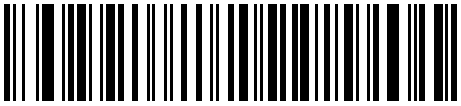
***Minimum: 0 msec**



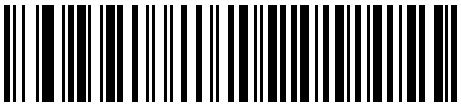
**Low: 25 msec**



**Medium: 50 msec**



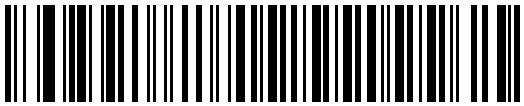
**High: 75 msec**



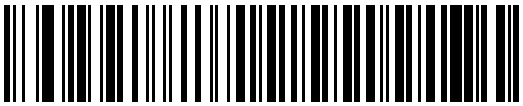
**Maximum: 99 msec**

## Nixdorf Beep/LED Options

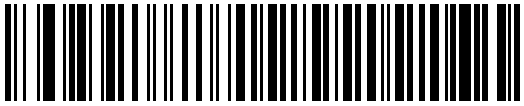
When Nixdorf Mode B is selected, this indicates when the scanner should beep and turn on its LED after a decode.



***Normal Operation**
**(Beep/LED immediately after decode)**



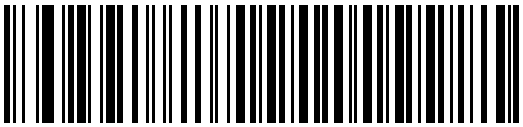
**Beep/LED After Transmission**



**Beep/LED After CTS Pulse**

## Ignore Unknown Characters

Unknown characters are characters the host does not recognize. When **Send Bar Codes with Unknown Characters** is selected, all bar code data is sent except for unknown characters, and no error beeps sound on the scanner. When **Do Not Send Bar Codes With Unknown Characters** is selected, bar code data is sent up to the first unknown character and then an error beep sounds on the scanner.



***Send Bar Code with Unknown Characters**

**Do Not Send Bar Codes with Unknown Characters**

# ASCII Character Set for RS-232

The values in *Table 6-4* can be assigned as prefixes or suffixes for ASCII character data transmission.

**Table 6-4** *ASCII Character Set for RS-232*

| ASCII Value | Full ASCII Code 39 Encode Character | ASCII Character |
|---|---|---|
| 1000 | %U | NUL |
| 1001 | $A | SOH |
| 1002 | $B | STX |
| 1003 | $C | ETX |
| 1004 | $D | EOT |
| 1005 | $E | ENQ |
| 1006 | $F | ACK |
| 1007 | $G | BELL |
| 1008 | $H | BCKSPC |
| 1009 | $I | HORIZ TAB |
| 1010 | $J | LF/NW LN |
| 1011 | $K | VT |
| 1012 | $L | FF |
| 1013 | $M | CR/ENTER |
| 1014 | $N | SO |
| 1015 | $O | SI |
| 1016 | $P | DLE |
| 1017 | $Q | DC1/XON |
| 1018 | $R | DC2 |
| 1019 | $S | DC3/XOFF |
| 1020 | $T | DC4 |
| 1021 | $U | NAK |
| 1022 | $V | SYN |
| 1023 | $W | ETB |
| 1024 | $X | CAN |
| 1025 | $Y | EM |
| 1026 | $Z | SUB |

**Table 6-4** *ASCII Character Set for RS-232 (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | ASCII Character |
|---|---|---|
| 1027 | %A | ESC |
| 1028 | %B | FS |
| 1029 | %C | GS |
| 1030 | %D | RS |
| 1031 | %E | US |
| 1032 | Space | Space |
| 1033 | /A | ! |
| 1034 | /B | " |
| 1035 | /C | # |
| 1036 | /D | $ |
| 1037 | /E | % |
| 1038 | /F | & |
| 1039 | /G | ‘ |
| 1040 | /H | ( |
| 1041 | /I | ) |
| 1042 | /J | * |
| 1043 | /K | + |
| 1044 | /L | , |
| 1045 | - | - |
| 1046 | . | . |
| 1047 | /O | / |
| 1048 | 0 | 0 |
| 1049 | 1 | 1 |
| 1050 | 2 | 2 |
| 1051 | 3 | 3 |
| 1052 | 4 | 4 |
| 1053 | 5 | 5 |
| 1054 | 6 | 6 |
| 1057 | 7 | 7 |
| 1056 | 8 | 8 |

**Table 6-4** *ASCII Character Set for RS-232 (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | ASCII Character |
|---|---|---|
| 1057 | 9 | 9 |
| 1058 | /Z | : |
| 1059 | %F | ; |
| 1060 | %G | < |
| 1061 | %H | = |
| 1062 | %I | > |
| 1063 | %J | ? |
| 1064 | %V | @ |
| 1065 | A | A |
| 1066 | B | B |
| 1067 | C | C |
| 1068 | D | D |
| 1069 | E | E |
| 1070 | F | F |
| 1071 | G | G |
| 1072 | H | H |
| 1073 | I | I |
| 1074 | J | J |
| 1075 | K | K |
| 1076 | L | L |
| 1077 | M | M |
| 1078 | N | N |
| 1079 | O | O |
| 1080 | P | P |
| 1081 | Q | Q |
| 1082 | R | R |
| 1083 | S | S |
| 1084 | T | T |
| 1085 | U | U |
| 1086 | V | V |

**Table 6-4** *ASCII Character Set for RS-232 (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | ASCII Character |
|---|---|---|
| 1087 | W | W |
| 1088 | X | X |
| 1089 | Y | Y |
| 1090 | Z | Z |
| 1091 | %K | [ |
| 1092 | %L | \ |
| 1093 | %M | ] |
| 1094 | %N | ^ |
| 1095 | %O | _ |
| 1096 | %W | ` |
| 1097 | +A | a |
| 1098 | +B | b |
| 1099 | +C | c |
| 1100 | +D | d |
| 1101 | +E | e |
| 1102 | +F | f |
| 1103 | +G | g |
| 1104 | +H | h |
| 1105 | +I | i |
| 1106 | +J | j |
| 1107 | +K | k |
| 1108 | +L | l |
| 1109 | +M | m |
| 1110 | +N | n |
| 1111 | +O | o |
| 1112 | +P | p |
| 1113 | +Q | q |
| 1114 | +R | r |
| 1115 | +S | s |
| 1116 | +T | t |

**Table 6-4** *ASCII Character Set for RS-232 (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | ASCII Character |
|---|---|---|
| 1117 | +U | u |
| 1118 | +V | v |
| 1119 | +W | w |
| 1120 | +X | x |
| 1121 | +Y | y |
| 1122 | +Z | z |
| 1123 | %P | { |
| 1124 | %Q | \| |
| 1125 | %R | } |
| 1126 | %S | ~ |
| 1127 | | Undefined |
| 7013 | | ENTER |

# Chapter 7 USB Interface

## Introduction

This chapter covers the connection and setup of the scanner to a USB host. The scanner attaches directly to a USB host, or a powered USB hub, and is powered by it. No additional power supply is required.

Throughout the programming bar code menus, default values are indicated with asterisks (*).

## Connecting a USB Interface

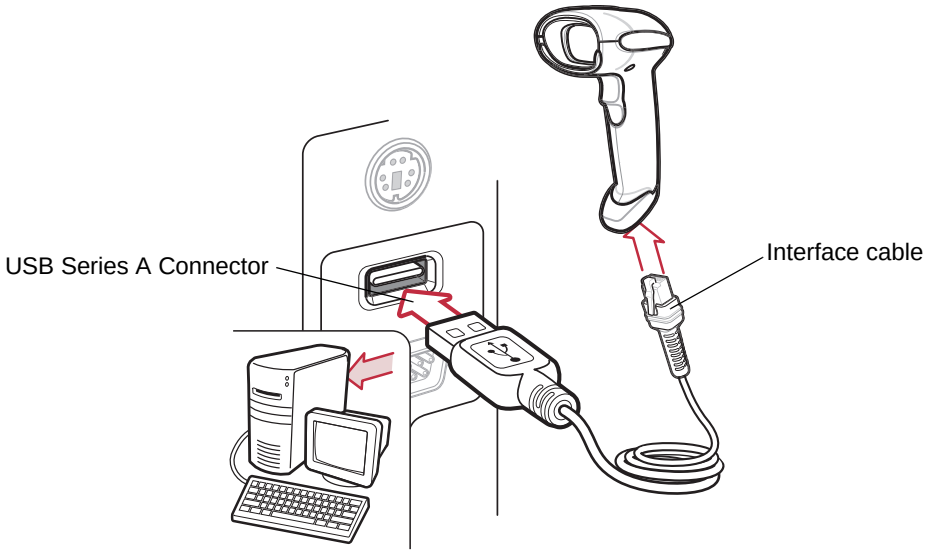



**Figure 7-1** *USB Connection*

The scanner connects with USB capable hosts including:

- Desktop PCs and Notebooks
- Apple™ iMac, G4, iBooks (North America only)
- IBM SurePOS terminals
- Sun, IBM, and other network computers that support more than one keyboard.

The following operating systems support the scanner through USB:

- Windows 98, 2000, ME, XP
- MacOS 8.5 and above
- IBM 4690 OS.

The scanner will also interface with other USB hosts which support USB Human Interface Devices (HID).

To set up the scanner:

***NOTE*** Interface cables vary depending on configuration. The connectors illustrated in *Figure 7-1*are examples only. The connectors may be different than those illustrated, but the steps to connect the scanner remain the same.

1. Attach the modular connector of the USB interface cable to the cable interface port on the scanner (see *Installing the Interface Cable on page 1-3*).
2. Plug the series A connector in the USB host or hub, or plug the Plus Power connector in an available port of the IBM SurePOS terminal.
3. Select the USB device type by scanning the appropriate bar code from *USB Device Type on page 7-4*.
4. On first installation when using Windows, the software prompts to select or install the Human Interface Device driver. To install this driver, provided by Windows, click *Next* through all the choices and click *Finished* on the last choice. The scanner powers up during this installation.
5. To modify any other parameter options, scan the appropriate bar codes in this chapter.

If problems occur with the system, see *Troubleshooting on page 3-2*.

# USB Parameter Defaults

*Table 7-1* lists the defaults for USB host parameters. If any option needs to be changed, scan the appropriate bar code(s) provided in the Parameter Descriptions section beginning on *page 7-4*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

**Table 7-1** *USB Host Default Table*

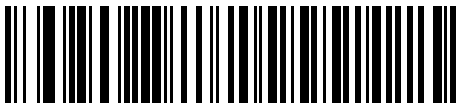
| Parameter | Default | Page Number |
|---|---|---|
| **USB Host Parameters** | | |
| USB Device Type | HID Keyboard Emulation | *7-4* |
| USB Country Keyboard Types (Country Codes) | North American | *7-5* |
| USB Keystroke Delay | No Delay | *7-7* |
| USB CAPS Lock Override | Disable | *7-7* |
| USB Ignore Unknown Characters | Send | *7-8* |
| Emulate Keypad | Disable | *7-8* |
| USB FN1 Substitution | Disable | *7-9* |
| Function Key Mapping | Disable | *7-9* |
| Simulated Caps Lock | Disable | *7-10* |
| Convert Case | No Case Conversion | *7-10* |

# USB Host Parameters

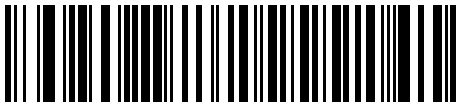
## USB Device Type

Select the desired USB device type.

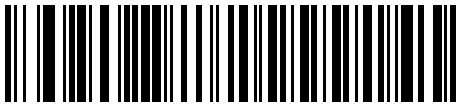
***NOTE*** When changing USB Device Types, the scanner automatically restarts. The scanner issues the standard startup beep sequences.



***HID Keyboard Emulation**



**IBM Table Top USB**



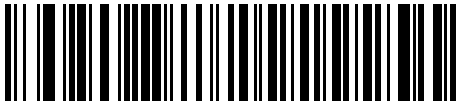
**IBM Hand-Held USB**

**USB OPOS Handheld**

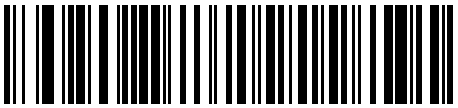
## USB Country Keyboard Types (Country Codes)

Scan the bar code corresponding to the keyboard type. This setting applies only to the USB HID Keyboard Emulation device.

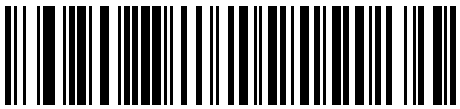
✓ ***NOTE*** When changing USB country keyboard types the scanner automatically resets. The scanner issues the standard startup beep sequences.



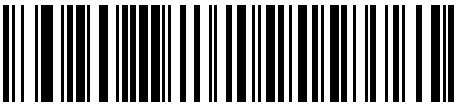
***North American Standard USB Keyboard**



**German Windows**

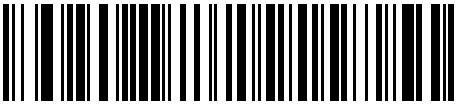


**French Windows**



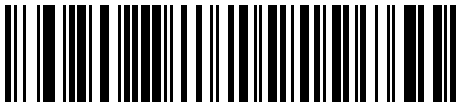
**French Canadian Windows 95/98**

**French Canadian Windows 2000/XP**

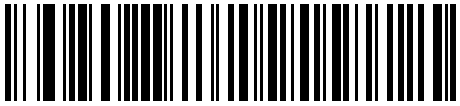


**Spanish Windows**

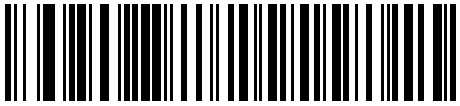
## USB Country Keyboard Types (Country Codes) (continued)



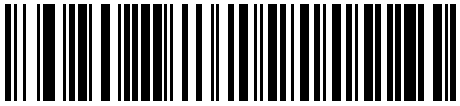
**Italian Windows**



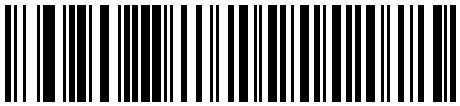
**Swedish Windows**



**UK English Windows**



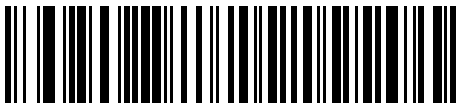
**Japanese Windows (ASCII)**



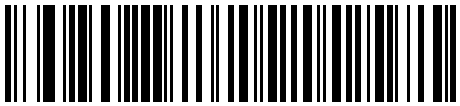
**Portuguese-Brazilian Windows**

## USB Keystroke Delay

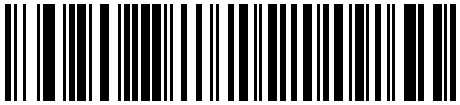
This parameter sets the delay, in milliseconds, between emulated keystrokes. Scan a bar code below to increase the delay when hosts require a slower transmission of data.



***No Delay**



**Medium Delay (20 msec)**



**Long Delay (40 msec)**

## USB CAPS Lock Override

This option applies only to the HID Keyboard Emulation device. When enabled, the case of the data is preserved regardless of the state of the caps lock key. This setting is always enabled for the “Japanese, Windows (ASCII)” keyboard type and can not be disabled.

**Override Caps Lock Key (Enable)**

***Do Not Override Caps Lock Key (Disable)**

## USB Ignore Unknown Characters

This option applies only to the HID Keyboard Emulation device and IBM device. Unknown characters are characters the host does not recognize. When **Send Bar Codes With Unknown Characters** is selected, all bar code data is sent except for unknown characters, and no error beeps sound. When **Do Not Send Bar Codes With Unknown Characters** is selected, bar code data is sent up to the first unknown character, then the scanner issues an error beep.

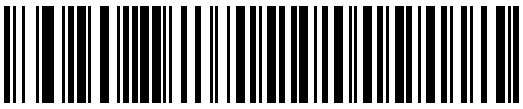
***Send Bar Codes with Unknown Characters**

**Do Not Send Bar Codes with Unknown Characters**

## Emulate Keypad

When enabled, all characters are sent as ASCII sequences over the numeric keypad. For example ASCII A would be sent as “ALT make” 0 6 5 “ALT Break.”

***Disable Keypad Emulation**



**Enable Keypad Emulation**

## USB Keyboard FN 1 Substitution

This option applies only to the USB HID Keyboard Emulation device. When enabled, this allows replacement of any FN 1 characters in an EAN 128 bar code with a Key Category and value chosen by the user (see *FN1 Substitution Values on page 13-6* to set the Key Category and Key Value).

**Enable FN1 Substitution**

***Disable FN1 Substitution**

## Function Key Mapping

ASCII values under 32 are normally sent as a control-key sequences (see *Table 7-2 on page 7-11*). When this parameter is enabled, the keys in bold are sent in place of the standard key mapping. Table entries that do not have a bold entry remain the same whether or not this parameter is enabled.

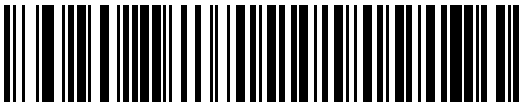
***Disable Function Key Mapping**

**Enable Function Key Mapping**

## Simulated Caps Lock

When enabled, the scanner will invert upper and lower case characters on the scanner bar code as if the Caps Lock state is enabled on the keyboard. This inversion is done regardless of the current state of the keyboard's Caps Lock state.

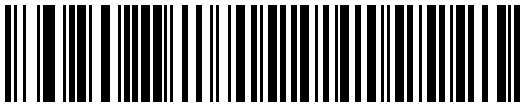
***Disable Simulated Caps Lock**



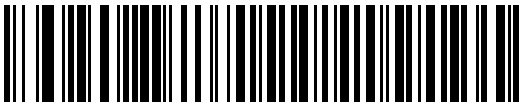
**Enable Simulated Caps Lock**

## Convert Case

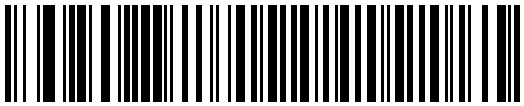
When enabled, the scanner will convert all bar code data to the selected case.



***No Case Conversion**



**Convert All to Upper Case**



**Convert All to Lower Case**

# ASCII Character Set for USB

**Table 7-2** *ASCII Character Set for USB*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1000 | %U | CTRL 2 |
| 1001 | $A | CTRL A |
| 1002 | $B | CTRL B |
| 1003 | $C | CTRL C |
| 1004 | $D | CTRL D |
| 1005 | $E | CTRL E |
| 1006 | $F | CTRL F |
| 1007 | $G | CTRL G |
| 1008 | $H | CTRL H/**BACKSPACE**[1] |
| 1009 | $I | CTRL I/**HORIZONTAL TAB**[1] |
| 1010 | $J | CTRL J |
| 1011 | $K | CTRL K |
| 1012 | $L | CTRL L |
| 1013 | $M | CTRL M/**ENTER**[1] |
| 1014 | $N | CTRL N |
| 1015 | $O | CTRL O |
| 1016 | $P | CTRL P |
| 1017 | $Q | CTRL Q |
| 1018 | $R | CTRL R |
| 1019 | $S | CTRL S |
| 1020 | $T | CTRL T |
| 1021 | $U | CTRL U |
| 1022 | $V | CTRL V |
| 1023 | $W | CTRL W |
| 1024 | $X | CTRL X |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 7-2** *ASCII Character Set for USB (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1025 | $Y | CTRL Y |
| 1026 | $Z | CTRL Z |
| 1027 | %A | CTRL [/**ESC**[1] |
| 1028 | %B | CTRL \ |
| 1029 | %C | CTRL ] |
| 1030 | %D | CTRL 6 |
| 1031 | %E | CTRL - |
| 1032 | Space | Space |
| 1033 | /A | ! |
| 1034 | /B | “ |
| 1035 | /C | # |
| 1036 | /D | $ |
| 1037 | /E | % |
| 1038 | /F | & |
| 1039 | /G | ‘ |
| 1040 | /H | ( |
| 1041 | /I | ) |
| 1042 | /J | * |
| 1043 | /K | + |
| 1044 | /L | , |
| 1045 | - | - |
| 1046 | . | . |
| 1047 | /O | / |
| 1048 | 0 | 0 |
| 1049 | 1 | 1 |
| 1050 | 2 | 2 |
| 1051 | 3 | 3 |
| 1052 | 4 | 4 |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 7-2** *ASCII Character Set for USB (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1053 | 5 | 5 |
| 1054 | 6 | 6 |
| 1055 | 7 | 7 |
| 1056 | 8 | 8 |
| 1057 | 9 | 9 |
| 1058 | /Z | : |
| 1059 | %F | ; |
| 1060 | %G | < |
| 1061 | %H | = |
| 1062 | %I | > |
| 1063 | %J | ? |
| 1064 | %V | @ |
| 1065 | A | A |
| 1066 | B | B |
| 1067 | C | C |
| 1068 | D | D |
| 1069 | E | E |
| 1070 | F | F |
| 1071 | G | G |
| 1072 | H | H |
| 1073 | I | I |
| 1074 | J | J |
| 1075 | K | K |
| 1076 | L | L |
| 1077 | M | M |
| 1078 | N | N |
| 1079 | O | O |
| 1080 | P | P |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 7-2** *ASCII Character Set for USB (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1081 | Q | Q |
| 1082 | R | R |
| 1083 | S | S |
| 1084 | T | T |
| 1085 | U | U |
| 1086 | V | V |
| 1087 | W | W |
| 1088 | X | X |
| 1089 | Y | Y |
| 1090 | Z | Z |
| 1091 | %K | [ |
| 1092 | %L | \ |
| 1093 | %M | ] |
| 1094 | %N | ^ |
| 1095 | %O | _ |
| 1096 | %W | ` |
| 1097 | +A | a |
| 1098 | +B | b |
| 1099 | +C | c |
| 1100 | +D | d |
| 1101 | +E | e |
| 1102 | +F | f |
| 1103 | +G | g |
| 1104 | +H | h |
| 1105 | +I | i |
| 1106 | +J | j |
| 1107 | +K | k |
| 1108 | +L | l |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 7-2** *ASCII Character Set for USB (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1109 | +M | m |
| 1110 | +N | n |
| 1111 | +O | o |
| 1112 | +P | p |
| 1113 | +Q | q |
| 1114 | +R | r |
| 1115 | +S | s |
| 1116 | +T | t |
| 1117 | +U | u |
| 1118 | +V | v |
| 1119 | +W | w |
| 1120 | +X | x |
| 1121 | +Y | y |
| 1122 | +Z | z |
| 1123 | %P | { |
| 1124 | %Q | \| |
| 1125 | %R | } |
| 1126 | %S | ~ |

**[1]The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table 7-3** *USB ALT Key Character Set*

| ALT Keys | Keystroke |
|---|---|
| 2064 | ALT 2 |
| 2065 | ALT A |
| 2066 | ALT B |
| 2067 | ALT C |
| 2068 | ALT D |
| 2069 | ALT E |
| 2070 | ALT F |
| 2071 | ALT G |
| 2072 | ALT H |
| 2073 | ALT I |
| 2074 | ALT J |
| 2075 | ALT K |
| 2076 | ALT L |
| 2077 | ALT M |
| 2078 | ALT N |
| 2079 | ALT O |
| 2080 | ALT P |
| 2081 | ALT Q |
| 2082 | ALT R |
| 2083 | ALT S |
| 2084 | ALT T |
| 2085 | ALT U |
| 2086 | ALT V |
| 2087 | ALT W |
| 2088 | ALT X |
| 2089 | ALT Y |
| 2090 | ALT Z |

**Table 7-4** *USB GUI Key Character Set*

| GUI Key | Keystroke |
|---|---|
| 3000 | Right Control Key |
| 3048 | GUI 0 |
| 3049 | GUI 1 |
| 3050 | GUI 2 |
| 3051 | GUI 3 |
| 3052 | GUI 4 |
| 3053 | GUI 5 |
| 3054 | GUI 6 |
| 3055 | GUI 7 |
| 3056 | GUI 8 |
| 3057 | GUI 9 |
| 3065 | GUI A |
| 3066 | GUI B |
| 3067 | GUI C |
| 3068 | GUI D |
| 3069 | GUI E |
| 3070 | GUI F |
| 3071 | GUI G |
| 3072 | GUI H |
| 3073 | GUI I |
| 3074 | GUI J |
| 3075 | GUI K |
| 3076 | GUI L |
| 3077 | GUI M |
| 3078 | GUI N |
| 3079 | GUI O |
| 3080 | GUI P |

**Note: GUI Shift Keys - The Apple™ iMac keyboard has an apple key on either side of the space bar. Windows-based systems have a GUI key to the left of the left ALT key, and to the right of the right ALT key.**

**Table 7-4** *USB GUI Key Character Set (Continued)*

| GUI Key | Keystroke |
|---|---|
| 3081 | GUI Q |
| 3082 | GUI R |
| 3083 | GUI S |
| 3084 | GUI T |
| 3085 | GUI U |
| 3086 | GUI V |
| 3087 | GUI W |
| 3088 | GUI X |
| 3089 | GUI Y |
| 3090 | GUI Z |

**Note: GUI Shift Keys - The Apple™ iMac keyboard has an apple key on either side of the space bar. Windows-based systems have a GUI key to the left of the left ALT key, and to the right of the right ALT key.**

**Table 7-5** *USB F Key Character Set*

| F Keys | Keystroke |
|---|---|
| 5001 | F1 |
| 5002 | F2 |
| 5003 | F3 |
| 5004 | F4 |
| 5005 | F5 |
| 5006 | F6 |
| 5007 | F7 |
| 5008 | F8 |
| 5009 | F9 |
| 5010 | F10 |
| 5011 | F11 |
| 5012 | F12 |
| 5013 | F13 |
| 5014 | F14 |
| 5015 | F15 |

**Table 7-5** *USB F Key Character Set (Continued)*

| F Keys | Keystroke |
|---|---|
| 5016 | F16 |
| 5017 | F17 |
| 5018 | F18 |
| 5019 | F19 |
| 5020 | F20 |
| 5021 | F21 |
| 5022 | F22 |
| 5023 | F23 |
| 5024 | F24 |

**Table 7-6** *USB Numeric Keypad Character Set*

| Numeric Keypad | Keystroke |
|---|---|
| 6042 | * |
| 6043 | + |
| 6044 | undefined |
| 6045 | - |
| 6046 | . |
| 6047 | / |
| 6048 | 0 |
| 6049 | 1 |
| 6050 | 2 |
| 6051 | 3 |
| 6052 | 4 |
| 6053 | 5 |
| 6054 | 6 |
| 6055 | 7 |
| 6056 | 8 |
| 6057 | 9 |
| 6058 | Enter |
| 6059 | Num Lock |

**Table 7-7** *USB Extended Keypad Character Set*

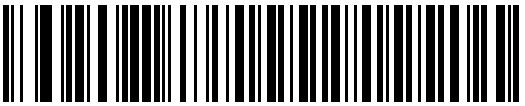
| Extended Keypad | Keystroke |
|---|---|
| 7001 | Break |
| 7002 | Delete |
| 7003 | PgUp |
| 7004 | End |
| 7005 | Pg Dn |
| 7006 | Pause |
| 7007 | Scroll Lock |
| 7008 | Backspace |
| 7009 | Tab |
| 7010 | Print Screen |
| 7011 | Insert |
| 7012 | Home |
| 7013 | Enter |
| 7014 | Escape |
| 7015 | Up Arrow |
| 7016 | Down Arrow |
| 7017 | Left Arrow |
| 7018 | Right Arrow |

# Chapter 8 IBM Interface

## Introduction

This chapter describes how to set up the scanner with an IBM 468X/469X host.

Throughout the programming bar code menus, default values are indicated with asterisks (*).




## Connecting to an IBM 468X/469X Host

This connection is made directly from the scanner to the host interface.

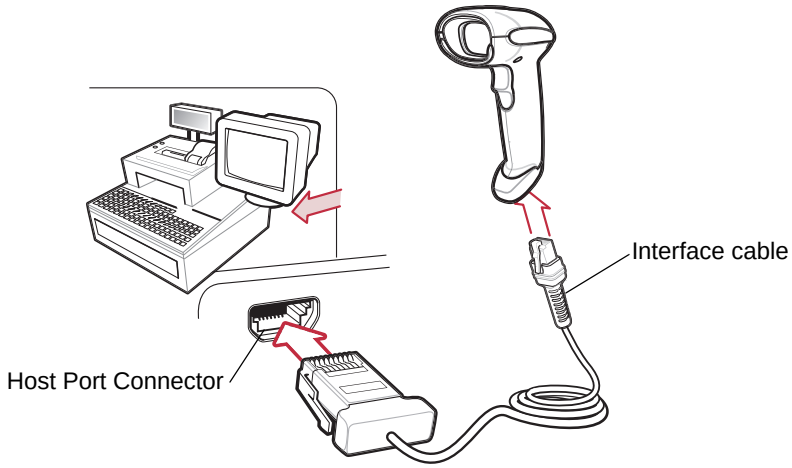



**Figure 8-1** *IBM Direct Connection*

**NOTE** Interface cables vary depending on configuration. The connectors illustrated in *Figure 8-1* are examples only. The connectors may be different than those illustrated, but the steps to connect the scanner remain the same.

1. Attach the modular connector of the IBM 46XX interface cable to the cable interface port on the scanner (see *Installing the Interface Cable on page 1-3*).
2. Connect the other end of the IBM 46XX interface cable to the appropriate port on the host (typically Port 9).
3. Select the port address by scanning the appropriate bar code from *Port Address on page 8-3*.
4. To modify any other parameter options, scan the appropriate bar codes in this chapter.

**NOTE** The only required configuration is the port number. Other scanner parameters are typically controlled by the IBM system.

# IBM Parameter Defaults

*Table 8-1* lists the defaults for IBM host parameters. To change any option, scan the appropriate bar code(s) provided in the Parameter Descriptions section beginning on *page 8-3*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

**Table 8-1** *IBM Host Default Table*

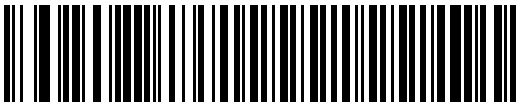
| Parameter | Default | Page Number |
|---|---|---|
| **IBM 468X/469X Host Parameters** | | |
| Port Address | None Selected | *8-3* |
| Convert Unknown to Code 39 | Disable | *8-4* |

# IBM 468X/469X Host Parameters

## Port Address

This parameter sets the IBM 468X/469X port used.

***NOTE*** Scanning one of these bar codes enables the RS-485 interface on the scanner.



*** None Selected**

**Hand-held Scanner Emulation (Port 9B)[1]**

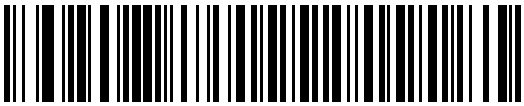
**Non-IBM Scanner Emulation (Port 5B)**

**Table-top Scanner Emulation (Port 17)**

***NOTE*** [1]User selection is required to configure this interface and this is the most common selection.

## Convert Unknown to Code 39

Scan a bar code below to enable or disable the conversion of unknown bar code type data to Code 39.



**Enable Convert Unknown to Code 39**

***Disable Convert Unknown to Code 39**

# Chapter 9 Wand Emulation Interface

## Introduction

This chapter describes how to set up the scanner with a wand emulation host when Wand Emulation communication is needed. The scanner connects to an external wand decoder or to a decoder integrated in a mobile computer or Point-of-Sale (POS) terminal.

In this mode the scanner emulates the signal of a wand to make it "readable" by a wand decoder.

Throughout the programming bar code menus, default values are indicated with asterisks (*).

## Connecting Using Wand Emulation

To perform Wand Emulation, connect the scanner to a portable data terminal, or a controller which collects the wand data and interprets it for the host.

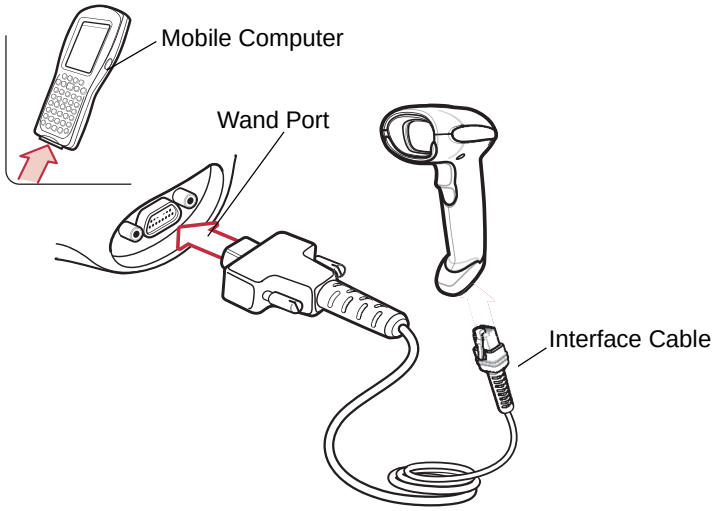



**Figure 9-1** *Wand Emulation Connection*

***NOTE*** Interface cables vary depending on configuration. The connectors illustrated in *Figure 9-1* are examples only. The connectors may be different than those illustrated, but the steps to connect the scanner remain the same.

1. the modular connector of the Wand Emulation interface cable to cable interface port on the scanner (see *Installing the Interface Cable on page 1-3*).
2. Connect the other end of the Wand Emulation interface cable to the wand port on the mobile computer or controller.
3. Select the Wand Emulation host type by scanning the appropriate bar code from *Wand Emulation Host Types on page 9-4*.
4. To modify any other parameter options, scan the appropriate bar codes in this chapter.

***CAUTION*** Connect the scanner to 5 volt decoders only. Connecting the scanner to a 12 volt decoder can damage the scanner and invalidate the warranty.

# Wand Emulation Parameter Defaults

*Table 9-1* lists the defaults for Wand Emulation host types. To change any option, scan the appropriate bar code(s) provided in Wand Emulation Host Parameters beginning on *page 9-4*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

**Table 9-1** *Wand Emulation Default Table*

| Parameter | Default | Page Number |
|---|---|---|
| **Wand Emulation Host Parameters** | | |
| Wand Emulation Host Types | Symbol OmniLink Interface Controller[1] | *9-4* |
| Leading Margin | 80 msec | *9-5* |
| Polarity | Bar High/Margin Low | *9-6* |
| Ignore Unknown Characters | Send | *9-6* |
| Convert All Bar Codes to Code 39 | Disable | *9-7* |
| Convert Code 39 to Full ASCII | Disable | *9-8* |

**[1]User selection is required to configure this interface and this is the most common selection.**

# Wand Emulation Host Parameters

## Wand Emulation Host Types

Select a Wand Emulation host by scanning one of the bar codes below.

**Symbol OmniLink Interface Controller**[1]

**Symbol PDT Terminal (MSI)**

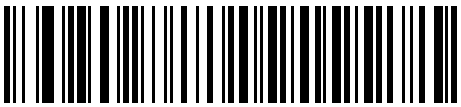
**Symbol PTC Terminal (Telxon)**

***NOTE*** [1]User selection is required to configure this interface and this is the most common selection.

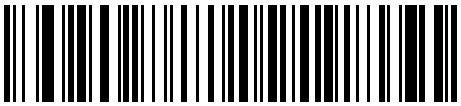
## Leading Margin (Quiet Zone)

Scan a bar code below to select a leading margin duration. A leading margin is the time that precedes the first bar of the scan, (in milliseconds). The minimum allowed value is 80 msec and the maximum is 250 msec. This parameter accommodates older wand decoders which cannot handle short leading margins.

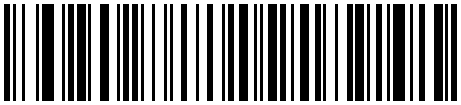
***NOTE*** [1]250 msec is the maximum value that this parameter can attain, however, 200 msec is sufficient.



***80 msec**



**140 msec**



**200 msec**

## Polarity

Scan a bar code below to select the polarity required by the decoder. Polarity determines how the scanner's Wand Emulation interface creates the Digitized Barcode Pattern (DBP). DBP is a digital signal that represents the scanned bar code. Different decoders expect the DBP to be in a certain format. The DBP either has the "highs" represent bars and the "lows" represent spaces (margins), or the "highs" represent spaces (margins) and the "lows" represent bars.

***Bar High/Margin Low**

**Bar Low/Margin High**

## Ignore Unknown Characters

Unknown characters are characters the host does not recognize. When **Send Bar Codes With Unknown Characters** is selected, all bar code data is sent except for unknown characters, and no error beeps sound on the scanner. When **Do Not Send Bar Codes With Unknown Characters** is selected, bar codes containing at least one unknown character are not sent to the host, and the scanner emits an error beep.

***Send Bar Codes With Unknown Characters**

**Do Not Send Bar Codes With Unknown Characters**

## Convert All Bar Codes to Code 39

By default, the Wand Emulation interface sends data to the attached host in the same symbology that was decoded. This can be a problem for customers with older systems that do not recognize newer symbologies (for example, GS1 DataBar).

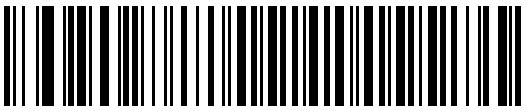
Enabling this parameter ignores the original symbology decoded, and outputs the data as if it were a Code 39 bar code. Any lowercase characters in the original data stream are transmitted as uppercase characters. This also allows ADF rules.

If **Ignore Unknown Characters** is enabled, any characters that do not have a corresponding character in the Code 39 symbology set are replaced by a space.

If **Ignore Unknown Characters** is disabled, if any characters that do not have a corresponding character are encountered, the scanner emits an error beep and no data is transmitted.

***NOTE*** [1]ADF Note: By default, the Wand Emulation interface does not allow scanned data to be processed by ADF rules. Enabling this parameter has the side effect of allowing the scanned data to be processed by the ADF rules (refer to the Advanced Data Formatting Programming Guide p/n 72-69680-xx).

**Enable Convert to Code 39 for Wand Host**



***Disable Convert to Code 39 for Wand Host**

## Convert Code 39 to Full ASCII

By default, any characters that do not have a corresponding character in the Code 39 symbology set are replaced by a space. If this parameter is enabled, the data sent to the wand interface is encoded in Code 39 Full ASCII. This setting requires that the host be able to interpret Code 39 Full ASCII data.

This setting applies only if **Convert to Code 39** is also enabled.

***Disable Code 39 Full ASCII Conversion**

**Enable Code 39 Full ASCII Conversion**

# Chapter 10 Scanner Emulation Interface

## Introduction

This chapter describes how to set up the scanner with a Scanner Emulation host. Use this mode when Scanner Emulation communication is needed. In this mode, the scanner connects to an external decoder or to a decoder integrated in a mobile computer or Point-of-Sale (POS) terminal.

Throughout the programming bar code menus, default values are indicated with asterisks (*).

## Connecting Using Scanner Emulation

To perform Scanner Emulation, connect the scanner to a mobile computer, or a controller which collects the data and interprets it for the host.

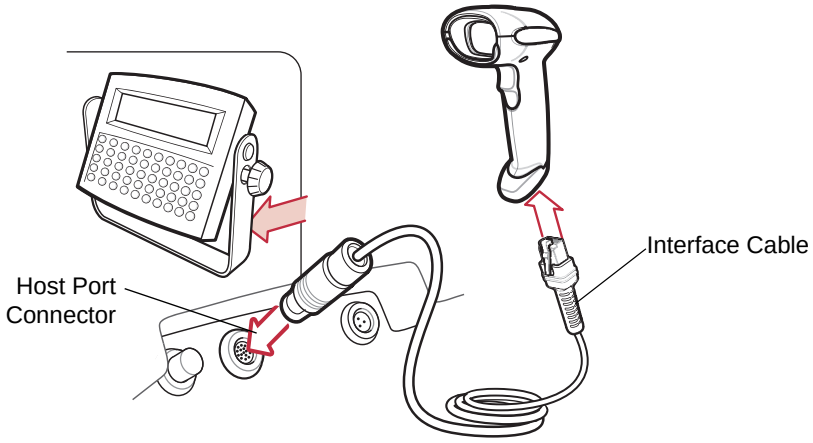



**Figure 10-1** *Scanner Emulation Connection*

***NOTE*** Interface cables vary depending on configuration. The connectors illustrated in *Figure 10-1* are examples only. The connectors may be different than those illustrated, but the steps to connect the scanner remain the same.

1. Attach the modular connector of the Scanner Emulation interface cable to the cable interface port on the scanner (see *Installing the Interface Cable on page 1-3*).
2. Connect the other end of the Scanner Emulation interface cable to the scanner port on the mobile computer or controller.
3. Scan the Scanner Emulation host bar code from *Scanner Emulation Host on page 10-4* to enable the Scanner Emulation host interface.
4. To modify any other parameter options, scan the appropriate bar codes in this chapter.

***CAUTION*** Connect the scanner to 5 volt decoders only. Connecting the scanner to a 12 volt decoder can damage the scanner and invalidate the warranty.

# Scanner Emulation Parameter Defaults

*Table 10-1* lists the defaults for the Scanner Emulation host. To change any option, scan the appropriate bar code(s) provided in the Scanner Emulation Host Parameters section beginning on *page 10-4*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

**Table 10-1** *Scanner Emulation Default Table*

| Parameter | Default | Page Number |
|---|---|---|
| Beep Style | Beep on Successful Transmit | *10-4* |
| Parameter Pass-Through | Parameter Process and Pass Through | *10-5* |
| Convert Newer Code Types | Convert Newer Code Types | *10-6* |
| Module Width | 20 µs | *10-6* |
| Convert All Bar Codes to Code 39 | Do Not Convert Bar Codes to Code 39 | *10-7* |
| Code 39 Full ASCII Conversion | Disable | *10-7* |
| Transmission Timeout | 3 Sec | *10-8* |
| Ignore Unknown Characters | Ignore Unknown Characters | *10-9* |
| Leading Margin | 2 ms | *10-9* |
| Check for Decode LED | Check for Decode LED | *10-10* |

**[1]User selection is required to configure this interface and this is the most common selection.**

# Scanner Emulation Host

Scan the bar code below to enable the Scanner Emulation host.

**Undecoded Scanner Emulation Host**

# Scanner Emulation Host Parameters

## Beep Style

The Scanner Emulation host supports three beep styles.

- **Beep On Successful Transmit**: The scanner beeps when the attached decoder issues the decode signal to the scanner, so the scanner and the attached decoder beep at the same time.
- **Beep At Decode Time**: The scanner beeps upon decode. This results in a double beep sequence from most decoders, since the scanner beeps, and the decoder beeps (at a different frequency) when it successfully decodes the output.
- **Do Not Beep**: Only the attached decoder issues the decode beep.

***Beep On Successful Transmit**

**Beep At Decode Time**

**Do Not Beep**

## Parameter Pass-Through

The Scanner Emulation host can process parameter bar code messages and send them to the attached decoder. In this way, customers using Zebra compliant decoders can control the behavior of the entire system by scanning the necessary parameters only once.

For example, to enable D 2 of 5, scan the **D 2 of 5 Enable** parameter bar code. The scanner and the attached decoder both process the parameter.

***Parameter Process and Pass-Through**

**Parameter Process Only**

## Convert Newer Code Types

The scanner supports a variety of code types that are not decodable by attached decoder systems. To allow compatibility in these environments, the scanner converts these code types to more commonly decodable symbologies, as per the following chart. Symbologies not listed on this chart are transmitted normally.

| Scan this code type: | Transmitted as: |
|---|---|
| Code 11 | Code 39 |
| Chinese 2 of 5 | Code 39 |
| GS1 DataBar (14, Limited, and Expanded) | Code 128 |
| Coupon Code | Code 128 |

When decoding these code types with this parameter disabled, the scanner issues Convert Error beeps and transmits no data.

***Convert Newer Code Types**

**Reject Newer Code Types**

## Module Width

The standard module width is 20 µs. For an extremely slow decoder system, select **50 µs Module Width**.

***20 µs Module Width**

**50 µs Module Width**

## Convert All Bar Codes to Code 39

Scan the bar code below to enable or disable the conversion of all bar code data to Code 39.

***Do Not Convert Bar Codes To Code 39**

**Convert All To Code 39**

## Code 39 Full ASCII Conversion

By default, any characters that do not have a corresponding character in the Code 39 symbology set are replaced by a space. If this parameter is enabled, the data sent to the Scanner Emulation host is encoded in Code 39 Full ASCII. The host must be able to interpret Code 39 Full ASCII data. This setting applies only if **Convert to Code 39** is also enabled.

***Disable Convert Code 39 To Full ASCII**

**Enable Convert Code 39 To Full ASCII**

## Transmission Timeout

The Scanner Emulation host transmits bar code data to the attached decoder and waits for the decoder to assert the Decode signal, indicating successful transmission. If, after a specified amount of time, the Decode signal is not asserted (indicating that the attached decoder has not successfully received the bar code data), the scanner issues transmit error beeps.

Scan a bar code below to select the desired transmission timeout.

***3 Second Transmission Timeout**

**4 Second Transmission Timeout**

**5 Second Transmission Timeout**

**10 Second Transmission Timeout**

**30 Second Transmission Timeout**

## Ignore Unknown Characters

Unknown characters are characters the decoder does not recognize. When **Ignore Unknown Characters** is selected, all bar code data is sent except for unknown characters, and no error beeps sound. When **Convert Error on Unknown Characters** is selected, bar codes containing at least one unknown character are not sent to the decoder, and a convert error beep sounds.

***Ignore Unknown Characters**

**Convert Error On Unknown Characters**

## Leading Margin

Scan a bar code below to select a leading margin duration.

**1 ms Leading Margin**

***2 ms Leading Margin**

**3 ms Leading Margin**

## Leading Margin (continued)

**5 ms Leading Margin**

**10 ms Leading Margin**

## Check For Decode LED

The attached decoder normally asserts the Decode line to signal to the Scanner Emulation host that it successfully decoded the transmitted bar code. Some decoders, however, do not assert the Decode signal. In this case, the scanner emits transmit error beeps to indicate that the bar code was not successfully transmitted. Scan the **Ignore Decode LED** bar code to disable the Transmit Error beeps.

***Check For Decode LED**

**Ignore Decode LED**

# Chapter 11 123Scan

## Introduction

123Scan is a Windows®-based utility that programs the scanner with all parameters including ADF rules. An ADF rule modifies bar code data before it is sent to the host to ensure compatibility between bar coded data and the host application. Scanners can be programmed via PC download or by scanning a sheet of bar codes generated by the utility. Scanner programming is saved in a file for electronic distribution. The 123Scan program includes a help file.

## Communication with 123Scan

To communicate with the 123Scan program which runs on a host computer running a Windows operating system, use an RS-232 cable to connect the scanner to the host computer (see*Connecting an RS-232 Interface on page 6-2*).

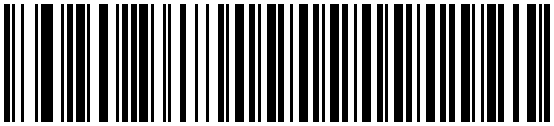
123Scan requirements:

- Host computer with Windows 98, Windows NT, Windows 2000, or Windows XP
- Scanner
- RS-232 cable.

## 123Scan Parameter

To communicate with the 123Scan program, load 123Scan, included in the documentation CD-ROM, onto the host computer, and scan the bar code below. Refer to 123Scan instructions for programming the scanner.

Scan the bar code below to enable the 123Scan interface on the scanner.



**123Scan Configuration**

# Chapter 12 Intrusion Protection System Symbologies

## Introduction

This chapter describes symbology features and provides the programming bar codes for selecting these features LS3008 Product Reference Guide. Before programming, follow the instructions in *Chapter , Introduction*.

The scanner is shipped with the settings shown in the *Symbology Parameter Defaults on page 12-2* (also see *Appendix A, Standard Defaults* for all host device and miscellaneous defaults). If the default values suit requirements, programming is not necessary.

To set feature values, scan a single bar code or a short bar code sequence. The settings are stored in non-volatile memory and are preserved even when the scanner is powered down.

If not using a Synapse or USB cable, select a host type (see each host chapter for specific host information) after the power-up beeps sound. This is only necessary upon the first power-up when connected to a new host.

To return all features to default values, scan the appropriate default bar code on *page 4-3*. Throughout the programming bar code menus, default values are indicated with asterisks (*).

## Scanning Sequence Examples

In most cases, scanning one bar code sets the parameter value. For example, to transmit bar code data without the UPC-A check digit, simply scan the **Do Not Transmit UPC-A Check Digit** bar code under *Transmit UPC-A Check Digit on page 12-13*. The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters, such as **Set Length(s) for D 2 of 5**, require scanning several bar codes. See the individual parameter, such as **Set Length(s) for D 2 of 5**, for this procedure.

## Errors While Scanning

Unless otherwise specified, to correct an error during a scanning sequence, just re-scan the correct parameter.

## Symbology Parameter Defaults

*Table 12-1* lists the defaults for all symbologies parameters. To change any option, scan the appropriate bar code(s) provided in the Symbologies Parameters section beginning on *page 12-5*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies and miscellaneous default parameters.

**Table 12-1** *Symbology Parameter Defaults*

| Parameter | Default | Page Number |
|---|---|---|
| **UPC/EAN** | | |
| UPC-A | Enable | *12-5* |
| UPC-E | Enable | *12-5* |
| UPC-E1 | Disable | *12-6* |
| EAN-8/JAN 8 | Enable | *12-7* |
| EAN-13/JAN 13 | Enable | *12-7* |
| Bookland EAN | Disable | *12-8* |
| Decode UPC/EAN/JAN Supplementals (2 and 5 digits) | Ignore | *12-9* |
| User-Programmable Supplementals<br>Supplemental 1:<br>Supplemental 2: | | *12-12* |
| Decode UPC/EAN/JAN Supplemental Redundancy | 7 | *12-13* |
| Transmit UPC-A Check Digit | Enable | *12-13* |
| Transmit UPC-E Check Digit | Enable | *12-14* |
| Transmit UPC-E1 Check Digit | Enable | *12-14* |
| UPC-A Preamble | System Character | *12-15* |
| UPC-E Preamble | System Character | *12-16* |
| UPC-E1 Preamble | System Character | *12-17* |
| Convert UPC-E to A | Disable | *12-18* |
| Convert UPC-E1 to A | Disable | *12-18* |
| EAN-8/JAN-8 Extend | Disable | *12-19* |

**Table 12-1** *Symbology Parameter Defaults (Continued)*

| Parameter | Default | Page Number |
|---|---|---|
| Bookland ISBN Format | ISBN-10 | *12-20* |
| UCC Coupon Extended Code | Disable | *12-21* |
| **Code 128** | | |
| Code 128 | Enable | *12-22* |
| UCC/EAN-128 | Enable | *12-22* |
| ISBT 128 (non-concatenated) | Enable | *12-23* |
| **Code 39** | | |
| Code 39 | Enable | *12-23* |
| Trioptic Code 39 | Disable | *12-24* |
| Convert Code 39 to Code 32 (Italian Pharmacy Code) | Disable | *12-24* |
| Code 32 Prefix | Disable | *12-25* |
| Set Length(s) for Code 39 | 2 to 55 | *12-25* |
| Code 39 Check Digit Verification | Disable | *12-26* |
| Transmit Code 39 Check Digit | Disable | *12-27* |
| Code 39 Full ASCII Conversion | Disable | *12-27* |
| Buffer Code 39 | Disable | *12-28* |
| **Code 93** | | |
| Code 93 | Disable | *12-30* |
| Set Length(s) for Code 93 | 4 to 55 | *12-30* |
| **Code 11** | | |
| Code 11 | Disable | *12-31* |
| Set Lengths for Code 11 | 4 to 55 | *12-32* |
| Code 11 Check Digit Verification | Disable | *12-33* |
| Transmit Code 11 Check Digit(s) | Disable | *12-33* |
| **Interleaved 2 of 5 (ITF)** | | |
| Interleaved 2 of 5 (ITF) | Enable | *12-34* |
| Set Lengths for I 2 of 5 | 14 | *12-34* |
| I 2 of 5 Check Digit Verification | Disable | *12-36* |
| Transmit I 2 of 5 Check Digit | Disable | *12-36* |
| Convert I 2 of 5 to EAN 13 | Disable | *12-37* |

**Table 12-1** *Symbology Parameter Defaults (Continued)*

| Parameter | Default | Page Number |
|---|---|---|
| **Discrete 2 of 5 (DTF)** | | |
| Discrete 2 of 5 | Disable | *12-37* |
| Set Length(s) for D 2 of 5 | 12 | *12-38* |
| **Chinese 2 of 5** | | |
| Enable/Disable Chinese 2 of 5 | Disable | *12-39* |
| **Codabar (NW - 7)** | | |
| Codabar | Disable | *12-40* |
| Set Lengths for Codabar | 5 to 55 | *12-40* |
| CLSI Editing | Disable | *12-41* |
| NOTIS Editing | Disable | *12-42* |
| **MSI** | | |
| MSI | Disable | *12-42* |
| Set Length(s) for MSI | 2 to 55 | *12-43* |
| MSI Check Digits | One | *12-44* |
| Transmit MSI Check Digit | Disable | *12-45* |
| MSI Check Digit Algorithm | Mod 10/Mod 10 | *12-45* |
| **GS1 DataBar (formerly GS1 RSS, Reduced Space Symbology)** | | |
| GS1 DataBar-14 | Disable | *12-46* |
| GS1 DataBar Limited | Disable | *12-46* |
| GS1 DataBar Expanded | Disable | *12-46* |
| Convert GS1 DataBar to UPC/EAN | Disable | *12-47* |
| **Symbology - Specific Security Levels** | | |
| Redundancy Level | 1 | *12-48* |
| Security Levels | 0 | *12-50* |
| Bi-directional Redundancy | Disable | *12-51* |
| **Report Version** | | *12-52* |

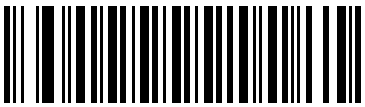
# UPC/EAN

## Enable/Disable UPC-A/UPC-E

To enable or disable UPC-A or UPC-E, scan the appropriate bar code below.

***Enable UPC-A**

**Disable UPC-A**



***Enable UPC-E**

**Disable UPC-E**

## Enable/Disable UPC-E1

UPC-E1 is disabled by default.

To enable or disable UPC-E1, scan the appropriate bar code below.

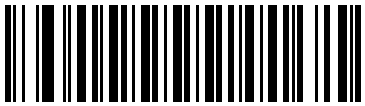
***NOTE*** UPC-E1 is not a UCC (Uniform Code Council) approved symbology.

**Enable UPC-E1**

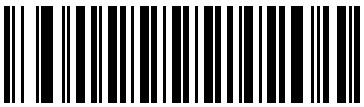
***Disable UPC-E1**

## Enable/Disable EAN-13/EAN-8

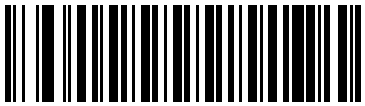
To enable or disable EAN-13 or EAN-8, scan the appropriate bar code below.



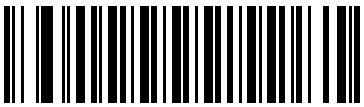
***Enable EAN-13**



**Disable EAN-13**



***Enable EAN-8**



**Disable EAN-8**

## Enable/Disable Bookland EAN

To enable or disable Bookland EAN, scan the appropriate bar code below.

**Enable Bookland EAN**

***Disable Bookland EAN**

***NOTE*** If you enable Bookland EAN, select a *Bookland ISBN Format on page 12-20*. Also select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in *Decode UPC/EAN/JAN Supplementals*.

## Decode UPC/EAN/JAN Supplementals

Supplementals are bar codes appended according to specific format conventions (e.g., UPC A+2, UPC E+2, EAN 13+2). The following options are available.

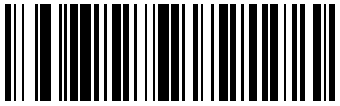
- If you select **Ignore UPC/EAN with Supplementals**, and the scanner is presented with a UPC/EAN plus supplemental symbol, the scanner decodes UPC/EAN and ignores the supplemental characters.
- If you select **Decode UPC/EAN with Supplementals**, the scanner only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.
- If you select **Autodiscriminate UPC/EAN Supplementals**, the scanner decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the scanner must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 12-13* before transmitting its data to confirm that there is no supplemental.
- If you select one of the following **Supplemental Mode** options, the scanner immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the scanner must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 12-13* before transmitting its data to confirm that there is no supplemental. The scanner transmits UPC/EAN bar codes that do not have that prefix immediately.
  - **Enable 378/379 Supplemental Mode**
  - **Enable 978/979 Supplemental Mode**

***NOTE*** If you select 978/979 Supplemental Mode and are scanning Bookland EAN bar codes, see *Enable/Disable Bookland EAN on page 12-8* to enable Bookland EAN, and select a format using *Bookland ISBN Format on page 12-20*.

  - **Enable 977 Supplemental Mode**
  - **Enable 414/419/434/439 Supplemental Mode**
  - **Enable 491 Supplemental Mode**
  - **Enable Smart Supplemental Mode** - applies to EAN-13 bar codes starting with any prefix listed previously.
  - **Supplemental User-Programmable Type 1** - applies to EAN-13 bar codes starting with a 3-digit user-defined prefix. Set this 3-digit prefix using *User-Programmable Supplementals on page 12-12*.
  - **Supplemental User-Programmable Type 1 and 2 -** applies to EAN-13 bar codes starting with either of two 3-digit user-defined prefixes. Set the 3-digit prefixes using *User-Programmable Supplementals on page 12-12***.**
  - **Smart Supplemental Plus User-Programmable 1** - applies to EAN-13 bar codes starting with any prefix listed previously or the user-defined prefix set using *User-Programmable Supplementals on page 12-12*.
  - **Smart Supplemental Plus User-Programmable 1 and 2 -** applies to EAN-13 bar codes starting with any prefix listed previously or one of the two user-defined prefixes set using *User-Programmable Supplementals on page 12-12*.

***NOTE*** To minimize the risk of invalid data transmission, select either to decode or ignore supplemental characters.

## Decode UPC/EAN/JAN Supplementals (continued)



**Decode UPC/EAN/JAN Only With Supplementals**

***Ignore Supplementals**

**Autodiscriminate UPC/EAN/JAN Supplementals**

**Enable 378/379 Supplemental Mode**

**Enable 978/979 Supplemental Mode**

**Enable 977 Supplemental Mode**

## Decode UPC/EAN/JAN Supplementals (continued)

**Enable 414/419/434/439 Supplemental Mode**

**Enable 491 Supplemental Mode**

**Enable Smart Supplemental Mode**

**Supplemental User-Programmable Type 1**

**Supplemental User-Programmable Type 1 and 2**

**Smart Supplemental Plus User-Programmable 1**

**Smart Supplemental Plus User-Programmable 1 and 2**

## User-Programmable Supplementals

If you selected a Supplemental User-Programmable option from *Decode UPC/EAN/JAN Supplementals on page 12-9*, select **User-Programmable Supplemental 1** to set the 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on *page D-1*. Select **User-Programmable Supplemental 2** to set a second 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on *page D-1*.

**User-Programmable Supplemental 1**

**User-Programmable Supplemental 2**

## UPC/EAN/JAN Supplemental Redundancy

With **Autodiscriminate UPC/EAN/JAN Supplementals** selected, this option adjusts the number of times a symbol without supplementals is decoded before transmission. The range is from two to thirty times. Five or above is recommended when decoding a mix of UPC/EAN symbols with and without supplementals, and the autodiscriminate option is selected. The default is set at 7.

Scan the bar code below to set a decode redundancy value. Next, scan two numeric bar codes in *Appendix D, Numeric Bar Codes*. Single digit numbers must have a leading zero. To correct an error or change a selection, scan **Cancel** on *page D-3*.

**UPC/EAN/JAN Supplemental Redundancy**

## Transmit UPC-A Check Digit

The check digit is the last character of the symbol used to verify the integrity of the data. Scan the appropriate bar code below to transmit the bar code data with or without the UPC-A check digit. It is always verified to guarantee the integrity of the data.

***Transmit UPC-A Check Digit**

**Do Not Transmit UPC-A Check Digit**

## Transmit UPC-E Check Digit

The check digit is the last character of the symbol used to verify the integrity of the data. Scan the appropriate bar code below to transmit the bar code data with or without the UPC-E check digit. It is always verified to guarantee the integrity of the data.

***Transmit UPC-E Check Digit**

**Do Not Transmit UPC-E Check Digit**

## Transmit UPC-E1 Check Digit

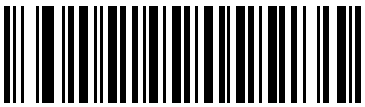
The check digit is the last character of the symbol used to verify the integrity of the data. Scan the appropriate bar code below to transmit the bar code data with or without the UPC-E1 check digit. It is always verified to guarantee the integrity of the data.

***Transmit UPC-E1 Check Digit**

**Do Not Transmit UPC-E1 Check Digit**

## UPC-A Preamble

Preamble characters are part of the UPC symbol consisting of Country Code and System Character. Three options are given for transmitting UPC-A preamble to the host device: transmit System Character only, transmit System Character and Country Code (“0” for USA), and no preamble transmitted. Scan a bar code below to match the host system.



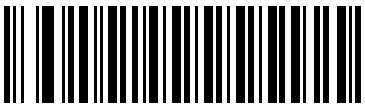
**No Preamble**
**(<DATA>)**

***System Character**
**(<SYSTEM CHARACTER> <DATA>)**

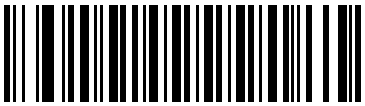
**System Character & Country Code**
**(< COUNTRY CODE> <SYSTEM CHARACTER>**
**<DATA>)**

## UPC-E Preamble

Preamble characters are part of the UPC symbol consisting of Country Code and System Character. Three options are given for transmitting UPC-E preamble to the host device: transmit System Character only, transmit System Character and Country Code (“0” for USA), and no preamble transmitted. Scan a bar code below to match the host system.



**No Preamble**
**(<DATA>)**

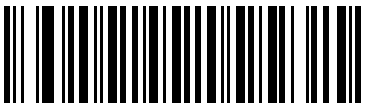


***System Character**
**(<SYSTEM CHARACTER> <DATA>)**

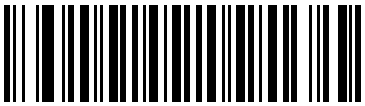
**System Character & Country Code**
**(< COUNTRY CODE> <SYSTEM CHARACTER>**
**<DATA>)**

## UPC-E1 Preamble

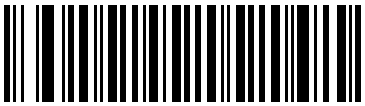
Preamble characters are part of the UPC symbol consisting of Country Code and System Character. Three options are given for transmitting UPC-E1 preamble to the host device: transmit System Character only, transmit System Character and Country Code (“0” for USA), and no preamble transmitted. Scan a bar code below to match the host system.



**No Preamble**
**(<DATA>)**



***System Character**
**(<SYSTEM CHARACTER> <DATA>)**

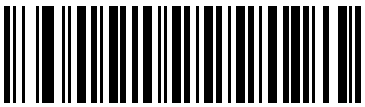


**System Character & Country Code**
**(< COUNTRY CODE><SYSTEM CHARACTER><DATA>)**

## Convert UPC-E to UPC-A

Enable this to convert UPC-E (zero suppressed) decoded data to UPC-A format before transmission. After conversion, the data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit).

When disabled, UPC-E decoded data is transmitted as UPC-E data, without conversion.



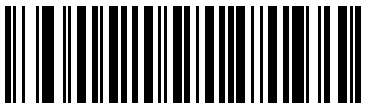
**Convert UPC-E to UPC-A (Enable)**

***Do Not Convert UPC-E to UPC-A (Disable)**

## Convert UPC-E1 to UPC-A

Enable this to convert UPC-E1 decoded data to UPC-A format before transmission. After conversion, the data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit).

When disabled, UPC-E1 decoded data is transmitted as UPC-E1 data, without conversion.



**Convert UPC-E1 to UPC-A (Enable)**

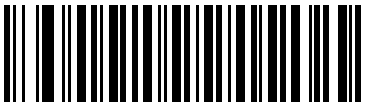
***Do Not Convert UPC-E1 to UPC-A (Disable)**

## EAN-8/JAN-8 Extend

When enabled, this parameter adds five leading zeros to decoded EAN-8 symbols to make them compatible in format to EAN-13 symbols.

When disabled, EAN-8 symbols are transmitted as is.

**Enable EAN/JAN Zero Extend**



***Disable EAN/JAN Zero Extend**

## Bookland ISBN Format

If you enabled Bookland EAN using *Enable/Disable Bookland EAN on page 12-8*, select one of the following formats for Bookland data:

- **Bookland ISBN-10** - The scanner reports Bookland data starting with 978 in traditional 10-digit format with the special Bookland check digit for backward-compatibility. Data starting with 979 is not considered Bookland in this mode.
- **Bookland ISBN-13** - The scanner reports Bookland data (starting with either 978 or 979) as EAN-13 in 13-digit format to meet the 2007 ISBN-13 protocol.

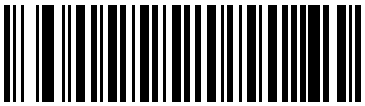
***Bookland ISBN-10**

**Bookland ISBN-13**

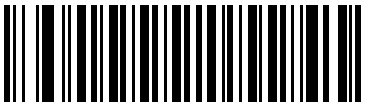
***NOTE*** For Bookland EAN to function properly, first enable Bookland EAN using *Enable/Disable Bookland EAN on page 12-8*, then select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in *Decode UPC/EAN/JAN Supplementals on page 12-9*.

## UCC Coupon Extended Code

When enabled, this parameter decodes UPCA bar codes starting with digit ‘5’, EAN-13 bar codes starting with digit ‘99’, and UPCA/EAN-128 Coupon Codes. UPCA, EAN-13 and EAN-128 must be enabled to scan all types of Coupon Codes.



**Enable UCC Coupon Extended Code**



***Disable UCC Coupon Extended Code**

***NOTE*** Use the Decode UPC/EAN Supplemental Redundancy parameter to control autodiscrimination of the EAN128 (right half) of a coupon code.

# Code 128

## Enable/Disable Code 128

To enable or disable Code 128, scan the appropriate bar code below.

***Enable Code 128**

**Disable Code 128**

## Enable/Disable UCC/EAN-128

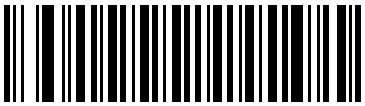
To enable or disable UCC/EAN-128, scan the appropriate bar code below.

***Enable UCC/EAN-128**

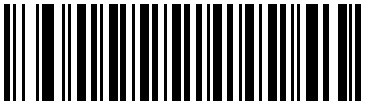
**Disable UCC/EAN-128**

### Enable/Disable ISBT 128

ISBT 128 is a variant of Code 128 used in the blood bank industry. Scan the appropriate bar code below to enable or disable ISBT 128. If necessary, the host must perform concatenation of the ISBT data.



***Enable ISBT 128**

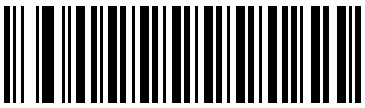


**Disable ISBT 128**

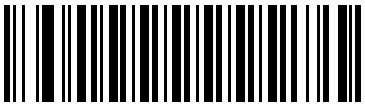
## Code 39

### Enable/Disable Code 39

To enable or disable Code 39, scan the appropriate bar code below.



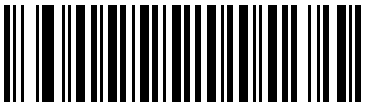
***Enable Code 39**



**Disable Code 39**

## Enable/Disable Trioptic Code 39

Trioptic Code 39 is a variant of Code 39 used in the marking of computer tape cartridges. Trioptic Code 39 symbols always contain six characters. To enable or disable Trioptic Code 39, scan the appropriate bar code below.



**Enable Trioptic Code 39**

***Disable Trioptic Code 39**

***NOTE*** Trioptic Code 39 and Code 39 Full ASCII cannot be enabled simultaneously.

## Convert Code 39 to Code 32

Code 32 is a variant of Code 39 used by the Italian pharmaceutical industry. Scan the appropriate bar code below to enable or disable converting Code 39 to Code 32.

***NOTE*** Code 39 must be enabled for this parameter to function.

**Enable Convert Code 39 to Code 32**

***Disable Convert Code 39 to Code 32**

## Code 32 Prefix

Scan the appropriate bar code below to enable or disable adding the prefix character “A” to all Code 32 bar codes.

***NOTE*** Convert Code 39 to Code 32 must be enabled for this parameter to function.

**Enable Code 32 Prefix**

***Disable Code 32 Prefix**

## Set Lengths for Code 39

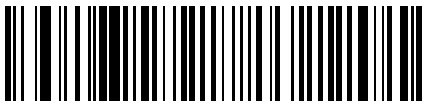
he length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 39 to any length, one or two discrete lengths, or lengths within a specific range. If Code 39 Full ASCII is enabled, **Length Within a Range** or **Any Length** are the preferred options.

***NOTE*** When setting lengths for different bar code types by scanning single digit numbers, single digit numbers must always be preceded by a leading zero.

- **One Discrete Length** - Select this option to decode only Code 39 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only Code 39 symbols with 14 characters, scan **Code 39 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Two Discrete Lengths** - Select this option to decode only Code 39 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only those Code 39 symbols containing either 2 or 14 characters, select **Code 39 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Length Within Range** - Select this option to decode a Code 39 symbol with a specific length range. Select lengths using numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode Code 39 symbols containing between 4 and 12 characters, first scan **Code 39 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Any Length** - Select this option to decode Code 39 symbols containing any number of characters within the scanner capability.

## Set Lengths for Code 39 (continued)

**Code 39 - One Discrete Length**



**Code 39 - Two Discrete Lengths**

**Code 39 - Length Within Range**

**Code 39 - Any Length**

## Code 39 Check Digit Verification

When this feature is enabled, the scanner checks the integrity of all Code 39 symbols to verify that the data complies with specified check digit algorithm. Only Code 39 symbols which include a modulo 43 check digit are decoded. Enable this feature if the Code 39 symbols contain a Modulo 43 check digit.

**Enable Code 39 Check Digit**

***Disable Code 39 Check Digit**

## Transmit Code 39 Check Digit

Scan the appropriate bar code below to transmit Code 39 data with or without the check digit.

**Transmit Code 39 Check Digit (Enable)**

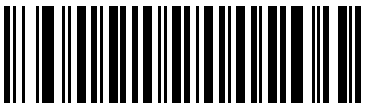
***Do Not Transmit Code 39 Check Digit (Disable)**

***NOTE*** Code 39 Check Digit Verification must be enabled for this parameter to function.

## Code 39 Full ASCII Conversion

Code 39 Full ASCII is a variant of Code 39 which pairs characters to encode the full ASCII character set. To enable or disable Code 39 Full ASCII, scan the appropriate bar code below.

**Enable Code 39 Full ASCII**



***Disable Code 39 Full ASCII**

***NOTE*** Trioptic Code 39 and Code 39 Full ASCII cannot be enabled simultaneously.

Code 39 Full ASCII to Full ASCII Correlation is host-dependent and is described in the ASCII Character Set table for the appropriate interface. See *ASCII Character Set for Keyboard Wedge on page 5-13*, *ASCII Character Set for RS-232 on page 6-18*, and *ASCII Character Set for USB on page 7-11* for the appropriate interface.

## Code 39 Buffering (Scan & Store)

This feature allows the scanner to accumulate data from multiple Code 39 symbols.

Selecting the Scan and Store option (Buffer Code 39) temporarily buffers all Code 39 symbols having a leading space as a first character for later transmission. The leading space is not buffered.

Decode of a valid Code 39 symbol with no leading space causes transmission in sequence of all buffered data in a first-in first-out format, plus transmission of the “triggering” symbol. See the following pages for further details.

When the **Do Not Buffer Code 39** option is selected, all decoded Code 39 symbols are transmitted immediately without being stored in the buffer.

This feature affects Code 39 only. If selecting **Buffer Code 39**, we recommend configuring the scanner to decode Code 39 symbology only.

**Buffer Code 39**
**(Enable)**

***Do Not Buffer Code 39**
**(Disable)**

While there is data in the transmission buffer, selecting **Do Not Buffer Code 39** is not allowed. The buffer holds 200 bytes of information.

To disable Code 39 buffering when there is data in the transmission buffer, first force the buffer transmission (see *Transmit Buffer on page 12-29*) or clear the buffer.

### Buffer Data

To buffer data, Code 39 buffering must be enabled and a Code 39 symbol must be read with a space immediately following the start pattern.

- Unless the data overflows the transmission buffer, the scanner issues a low/high beep to indicate successful decode and buffering. (For overflow conditions, see *Overfilling Transmission Buffer*.)
- The scanner adds the decoded data excluding the leading space to the transmission buffer.
- No transmission occurs.

### Clear Transmission Buffer

To clear the transmission buffer, scan the **Clear Buffer** bar code below, which contains only a start character, a dash (minus), and a stop character.

- The scanner issues a short high/low/high beep.
- The scanner erases the transmission buffer.

- No transmission occurs.

**Clear Buffer**

***NOTE*** Because the Clear Buffer contains only the dash (minus) character, set the Code 39 length to include length 1 before scanning this bar code.

### Transmit Buffer

There are two methods to transmit the Code 39 buffer.

1. Scan the **Transmit Buffer** bar code below which contains only a start character, a plus (+), and a stop character.
   - The scanner transmits and clears the buffer.
   - The scanner issues a low/high beep.

**Transmit Buffer**

2. Scan a Code 39 bar code with a leading character other than a space.
   - The scanner appends new decode data to buffered data.
   - The scanner transmits and clears the buffer.
   - The scanner signals that the buffer was transmitted with a low/high beep.
   - Scanner transmits and clears the buffer.

***NOTE*** Because the Transmit Buffer contains only a plus (+) character, set the Code 39 length to include length 1 before scanning this bar code.

### Overfilling Transmission Buffer

The Code 39 buffer holds 200 characters. If the symbol just read results in an overflow of the transmission buffer:

- The scanner indicates that the symbol was rejected by issuing three long, high beeps.
- No transmission occurs. The data in the buffer is not affected.

### Attempt to Transmit an Empty Buffer

If the symbol just read was the **Transmit Buffer** symbol and the Code 39 buffer is empty:

- A short low/high/low beep signals that the buffer is empty.
- No transmission occurs.
- The buffer remains empty.

# Code 93

## Enable/Disable Code 93

To enable or disable Code 93, scan the appropriate bar code below.

**Enable Code 93**

***Disable Code 93**

## Set Lengths for Code 93

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 93 to any length, one or two discrete lengths, or lengths within a specific range.

- **One Discrete Length** - Select this option to decode only Code 93 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only Code 93 symbols with 14 characters, scan **Code 93 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Two Discrete Lengths** - Select this option to decode only Code 93 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only those Code 93 symbols containing either 2 or 14 characters, select **Code 93 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Length Within Range** - Select this option to decode a Code 93 symbol with a specific length range. Select lengths using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode Code 93 symbols containing between 4 and 12 characters, first scan **Code 93 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Any Length** - Scan this option to decode Code 93 symbols containing any number of characters within the scanner's capability.

### Set Lengths for Code 93 (continued)

**Code 93 - One Discrete Length**

**Code 93 - Two Discrete Lengths**

**Code 93 - Length Within Range**

**Code 93 - Any Length**

## Code 11

### Code 11

To enable or disable Code 11, scan the appropriate bar code below.

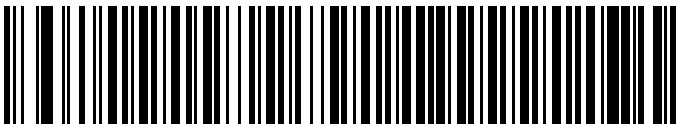
**Enable Code 11**

***Disable Code 11**

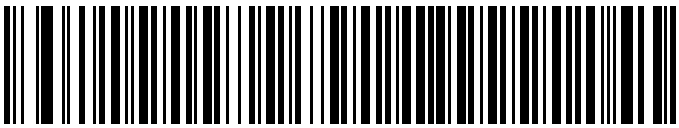
## Set Lengths for Code 11

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 11 to any length, one or two discrete lengths, or lengths within a specific range.

- **One Discrete Length** - Select this option to decode only Code 11 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only Code 11 symbols with 14 characters, scan **Code 11 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Two Discrete Lengths** - Select this option to decode only Code 11 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only those Code 11 symbols containing either 2 or 14 characters, select **Code 11 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Length Within Range** - Select this option to decode a Code 11 symbol with a specific length range. Select lengths using numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode Code 11 symbols containing between 4 and 12 characters, first scan **Code 11 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Any Length** - Scan this option to decode Code 11 symbols containing any number of characters within the scanner capability.

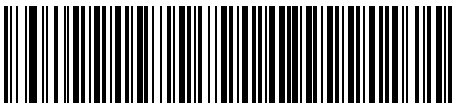


**Code 11 - One Discrete Length**



**Code 11 - Two Discrete Lengths**

**Code 11 - Length Within Range**

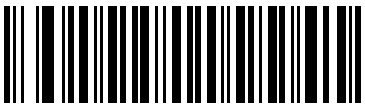


**Code 11 - Any Length**

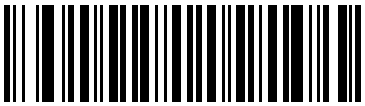
## Code 11 Check Digit Verification

This feature allows the scanner to check the integrity of all Code 11 symbols to verify that the data complies with the specified check digit algorithm. This selects the check digit mechanism for the decoded Code 11 bar code. The options are to check for one check digit, check for two check digits, or disable the feature.

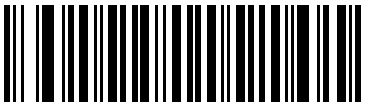
To enable this feature, scan the bar code below corresponding to the number of check digits encoded in your Code 11 symbols.



***Disable**



**One Check Digit**



**Two Check Digits**

## Transmit Code 11 Check Digits

This feature selects whether or not to transmit the Code 11 check digit(s).

**Transmit Code 11 Check Digit(s) (Enable)**

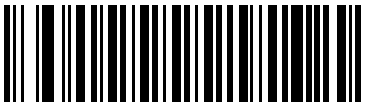
***Do Not Transmit Code 11 Check Digit(s) (Disable)**

***NOTE*** Code 11 Check Digit Verification must be enabled for this parameter to function.

# Interleaved 2 of 5 (ITF)

## Enable/Disable Interleaved 2 of 5

To enable or disable Interleaved 2 of 5, scan the appropriate bar code below, and select an Interleaved 2 of 5 length from the following pages.



***Enable Interleaved 2 of 5**

**Disable Interleaved 2 of 5**

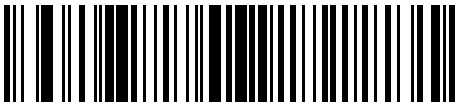
## Set Lengths for Interleaved 2 of 5

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for I 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range.

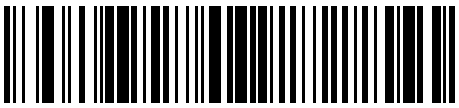
- **One Discrete Length** - Select this option to decode only I 2 of 5 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only I 2 of 5 symbols with 14 characters, scan **I 2 of 5 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Two Discrete Lengths** - Select this option to decode only I 2 of 5 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only those I 2 of 5 symbols containing either 2 or 14 characters, select **I 2 of 5 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Length Within Range** - Select this option to decode an I 2 of 5 symbol with a specific length range. Select lengths using numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode I 2 of 5 symbols containing between 4 and 12 characters, first scan **I 2 of 5 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Any Length** - Scan this option to decode I 2 of 5 symbols containing any number of characters within the scanner capability.

✓ ***NOTE*** Due to the construction of the I 2 of 5 symbology, it is possible for a scan line covering only a portion of the code to be interpreted as a complete scan, yielding less data than is encoded in the bar code. To prevent this, select specific lengths (**I 2 of 5 - One Discrete Length - Two Discrete Lengths**) for I 2 of 5 applications.

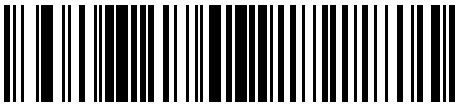
## Set Lengths for Interleaved 2 of 5 (continued)



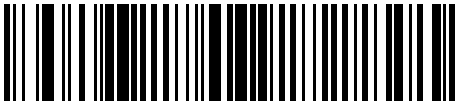
I 2 of 5 - One Discrete Length



I 2 of 5 - Two Discrete Lengths



I 2 of 5 - Length Within Range



I 2 of 5 - Any Length

## I 2 of 5 Check Digit Verification

When this feature is enabled, the scanner checks the integrity of all I 2 of 5 symbols to verify the data complies with either the specified Uniform Symbology Specification (USS), or the Optical Product Code Council (OPCC) check digit algorithm.

***Disable**

**USS Check Digit**

**OPCC Check Digit**

## Transmit I 2 of 5 Check Digit

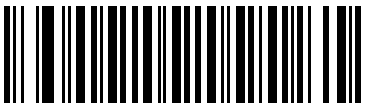
Scan the appropriate bar code below to transmit I 2 of 5 data with or without the check digit.

**Transmit I 2 of 5 Check Digit (Enable)**

***Do Not Transmit I 2 of 5 Check Digit (Disable)**

### Convert I 2 of 5 to EAN-13

Enable this parameter to convert 14-character I 2 of 5 codes to EAN-13, and transmit to the host as EAN-13. To accomplish this, the I 2 of 5 code must be enabled, and the code must have a leading zero and a valid EAN-13 check digit.



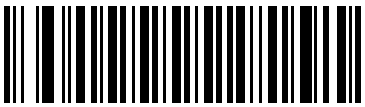
**Convert I 2 of 5 to EAN-13 (Enable)**

***Do Not Convert I 2 of 5 to EAN-13 (Disable)**

## Discrete 2 of 5 (DTF)

### Enable/Disable Discrete 2 of 5

To enable or disable Discrete 2 of 5, scan the appropriate bar code below.



**Enable Discrete 2 of 5**

***Disable Discrete 2 of 5**

## Set Lengths for Discrete 2 of 5

he length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for D 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range.

- **One Discrete Length** - Select this option to decode only D 2 of 5 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only D 2 of 5 symbols with 14 characters, scan **D 2 of 5 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Two Discrete Lengths** - Select this option to decode only D 2 of 5 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only those D 2 of 5 symbols containing either 2 or 14 characters, select **D 2 of 5 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Length Within Range** - Select this option to decode a D 2 of 5 symbol with a specific length range. Select lengths using numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode D 2 of 5 symbols containing between 4 and 12 characters, first scan **D 2 of 5 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Any Length** - Scan this option to decode D 2 of 5 symbols containing any number of characters within the scanner capability.

***NOTE*** Due to the construction of the D 2 of 5 symbology, it is possible for a scan line covering only a portion of the code to be interpreted as a complete scan, yielding less data than is encoded in the bar code. To prevent this, select specific lengths (D 2 of 5 - One Discrete Length - Two Discrete Lengths) for D 2 of 5 applications.

### Set Lengths for Discrete 2 of 5 (continued)

**D 2 of 5 - One Discrete Length**

**D 2 of 5 - Two Discrete Lengths**

**D 2 of 5 - Length Within Range**

**D 2 of 5 - Any Length**

## Chinese 2 of 5

### Enable/Disable Chinese 2 of 5

To enable or disable Chinese 2 of 5, scan the appropriate bar code below.

**Enable Chinese 2 of 5**

***Disable Chinese 2 of 5**

# Codabar (NW - 7)

## Enable/Disable Codabar

To enable or disable Codabar, scan the appropriate bar code below.

**Enable Codabar**

***Disable Codabar**

## Set Lengths for Codabar

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Codabar to any length, one or two discrete lengths, or lengths within a specific range.

- **One Discrete Length** - Select this option to decode only Codabar symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only Codabar symbols with 14 characters, scan **Codabar - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Two Discrete Lengths** - Select this option to decode only Codabar symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only Codabar symbols containing either 2 or 14 characters, select **Codabar - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Length Within Range** - Select this option to decode a Codabar symbol with a specific length range. Select lengths using numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode Codabar symbols containing between 4 and 12 characters, first scan **Codabar - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Any Length** - Scan this option to decode Codabar symbols containing any number of characters within the scanner capability.

## Set Lengths for Codabar (continued).

**Codabar - One Discrete Length**

**Codabar - Two Discrete Lengths**

**Codabar - Length Within Range**

**Codabar - Any Length**

## CLSI Editing

When enabled, this parameter strips the start and stop characters and inserts a space after the first, fifth, and tenth characters of a 14-character Codabar symbol. Enable this feature if your host system requires this data format.

✓ ***NOTE*** Symbol length does not include start and stop characters.

**Enable CLSI Editing**

***Disable CLSI Editing**

### NOTIS Editing

When enabled, this parameter strips the start and stop characters from a decoded Codabar symbol. Enable this feature if your host system requires this data format.

**Enable NOTIS Editing**

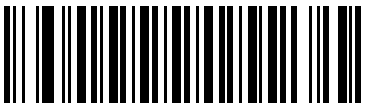
***Disable NOTIS Editing**

## MSI

### Enable/Disable MSI

To enable or disable MSI, scan the appropriate bar code below.

**Enable MSI**



***Disable MSI**

## Set Lengths for MSI

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for MSI to any length, one or two discrete lengths, or lengths within a specific range.

- **One Discrete Length** - Select this option to decode only MSI symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only MSI symbols with 14 characters, scan **MSI - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Two Discrete Lengths** - Select this option to decode only MSI symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only MSI symbols containing either 2 or 14 characters, select **MSI - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan **Cancel** on *page D-3*.
- **Length Within Range** - Select this option to decode a MSI symbol with a specific length range. Select lengths using numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode MSI symbols containing between 4 and 12 characters, first scan **MSI - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). To correct an error or change the selection, scan **Cancel** on *page D-3*.
- **Any Length** - Scan this option to decode MSI symbols containing any number of characters within the scanner capability.

***NOTE*** Due to the construction of the MSI symbology, it is possible for a scan line covering only a portion of the code to be interpreted as a complete scan, yielding less data than is encoded in the bar code. To prevent this, select specific lengths (MSI - One Discrete Length - Two Discrete Lengths) for MSI applications.

## Set Lengths for MSI (continued)

**MSI - One Discrete Length**

**MSI - Two Discrete Lengths**

**MSI - Length Within Range**

**MSI - Any Length**

## MSI Check Digits

With MSI symbols, one check digit is mandatory and always verified by the reader. The second check digit is optional. If the MSI codes include two check digits, scan the **Two MSI Check Digits** bar code to enable verification of the second check digit.

See *MSI Check Digit Algorithm on page 12-45* for the selection of second digit algorithms.

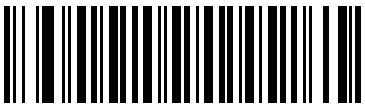
***One MSI Check Digit**

**Two MSI Check Digits**

## Transmit MSI Check Digit(s)

Scan the appropriate bar code below to transmit MSI data with or without the check digit.

**Transmit MSI Check Digit(s) (Enable)**



***Do Not Transmit MSI Check Digit(s) (Disable)**

## MSI Check Digit Algorithm

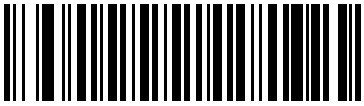
Two algorithms are possible for the verification of the second MSI check digit. Select the bar code below corresponding to the algorithm used to encode your check digit.

**MOD 10/MOD 11**

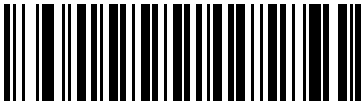
***MOD 10/MOD 10**

## GS1 DataBar (formerly RSS, Reduced Space Symbology)

The variants of GS1 DataBar are GS1 DataBar-14, GS1 DataBar Expanded and GS1 DataBar Limited. GS1 DataBar-14 and GS1 DataBar Expanded include stacked versions. Scan the appropriate bar code below to enable or disable each variant of GS1 DataBar.



**Enable GS1 DataBar-14**



***Disable GS1 DataBar-14**

**Enable GS1 DataBar Limited**

***Disable GS1 DataBar Limited**

**Enable GS1 DataBar Expanded**

***Disable GS1 DataBar Expanded**

## Convert GS1 DataBar to UPC/EAN

This parameter only applies to GS1 DataBar-14 and GS1 DataBar Limited symbols not decoded as part of a Composite symbol. Enable this to strip the leading '010' from GS1 DataBar-14 and GS1 DataBar Limited symbols encoding a single zero as the first digit, and report the bar code as EAN-13.

For bar codes beginning with two or more zeros but not six zeros, this parameter strips the leading '0100' and reports the bar code as UPC-A. The UPC-A Preamble parameter that transmits the system character and country code applies to converted bar codes. Note that neither the system character nor the check digit can be stripped.

**Enable Convert GS1 DataBar to UPC/EAN**

***Disable Convert GS1 DataBar to UPC/EAN**

# Symbology - Specific Security Levels

## Redundancy Level

The scanner offers four levels of decode redundancy. Select higher redundancy levels for decreasing levels of bar code quality. As redundancy levels increase, the scanner's aggressiveness decreases.

Select the redundancy level appropriate for the bar code quality.

### Redundancy Level 1

The following code types must be successfully read twice before being decoded:

| Code Type | Code Length |
|---|---|
| Codabar | 8 characters or less |
| MSI | 4 characters or less |
| D 2 of 5 | 8 characters or less |
| I 2 of 5 | 8 characters or less |

### Redundancy Level 2

The following code types must be successfully read twice before being decoded:

| Code Type | Code Length |
|---|---|
| All | All |

### Redundancy Level 3

Code types other than the following must be successfully read twice before being decoded. The following codes must be read three times:

| Code Type | Code Length |
|---|---|
| MSI | 4 characters or less |
| D 2 of 5 | 8 characters or less |
| I 2 of 5 | 8 characters or less |
| Codabar | 8 characters or less |

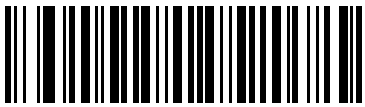
### Redundancy Level 4

The following code types must be successfully read three times before being decoded:

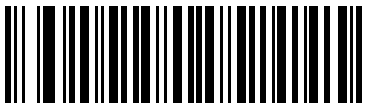
| Code Type | Code Length |
|---|---|
| All | All |

## Redundancy Level (continued)

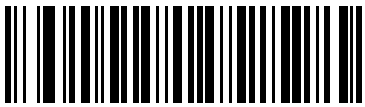
***Redundancy Level 1**



**Redundancy Level 2**



**Redundancy Level 3**

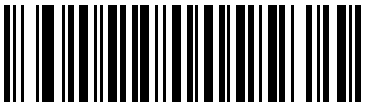


**Redundancy Level 4**

## Security Level

The scanner offers four levels of decode security for delta bar codes, which include the Code 128 family, UPC/EAN, and Code 93. Select increasing levels of security for decreasing levels of bar code quality. There is an inverse relationship between security and scanner aggressiveness, so choose only that level of security necessary for any given application.

- **Security Level 0:** This default setting allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- **Security Level 1:** Select this option if misdecodes occur. This security level should eliminate most misdecodes.
- **Security Level 2:** Select this option if Security level 1 fails to eliminate misdecodes.
- **Security Level 3**: If Security Level 2 was selected and misdecodes still occur, select this security level. Be advised, selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. Selecting this level of security significantly impairs the decoding ability of the scanner. If this level of security is necessary, try to improve the quality of the bar codes.



***Security Level 0**

**Security Level 1**

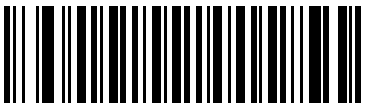
**Security Level 2**

**Security Level 3**

### Bi-directional Redundancy

Enable Bi-directional Redundancy to add security to linear code type security levels. When enabled, a bar code must be successfully scanned in both directions (forward and reverse) before reporting a good decode.

**Enable Bi-directional Redundancy**



***Disable Bi-directional Redundancy**

## Symbology - Intercharacter Gap

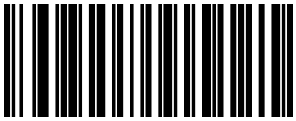
The Code 39 and Codabar symbologies have an intercharacter gap that is customarily quite small. Due to various bar code printing technologies, this gap may grow larger than the maximum size allowed, causing the scanner to be unable to decode the symbol. If this problem is encountered, scan **Large Intercharacter Gaps** to tolerate out-of-specification bar codes.

***Normal Intercharacter Gaps**

**Large Intercharacter Gaps**

## Report Version

Scan the bar code below to report the version of software currently installed in the digital scanner.



**Report Software Version**

# Chapter 13 Miscellaneous Scanner Options

## Introduction

This chapter includes commonly used bar codes to customize how data is transmitted to the host device. Refer to the *Advanced Data Formatting Programming Guide* p/n 72-69680-xx for further customization options.

The scanner ships with the settings shown in the *Miscellaneous Scanner Options Default Table on page 13-2* (also see *Appendix A, Standard Defaults* for all host device and miscellaneous scanner defaults). If the default values suit requirements, programming is not necessary.

To set feature values, scan a single bar code or a short bar code sequence. The settings are stored in non-volatile memory and are preserved even when the scanner is powered down.

If not using a Synapse or USB cable, select a host type (see each host chapter for specific host information) after the power-up beeps sound. This is only necessary upon the first power-up when connected to a new host.

To return all features to default values, scan a default bar code in *Default Parameters on page 4-3*. Throughout the programming bar code menus, default values are indicated with asterisks (*).

* Indicates Default — ***Disable No Read** — Feature/Option

## Scanning Sequence Examples

In most cases, scan one bar code to set a specific parameter value. Other parameters, such as **Prefix Value**, require scanning several bar codes. See each parameter for descriptions of this procedure.

## Errors While Scanning

Unless otherwise specified, to correct an error during a scanning sequence, just re-scan the correct parameter.

# Miscellaneous Parameter Defaults

*Table 13-1* lists the defaults for miscellaneous scanner options parameters. If you wish to change any option, scan the appropriate bar code(s) provided in the Miscellaneous Scanner Parameters section beginning on *page 13-3*.

**NOTE** See *Appendix A, Standard Defaults* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

**Table 13-1** *Miscellaneous Scanner Options Default Table*

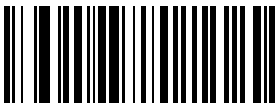
| Parameter | Default | Page Number |
|---|---|---|
| Transmit Code ID Character | None | *13-3* |
| Prefix Value | 7013 <CR><LF> | *13-3* |
| Suffix Value | 7013 <CR><LF> | *13-4* |
| Scan Data Transmission Format | Data as is | *13-4* |
| FN1 Substitution Values | Set | *13-6* |
| Transmit “No Read” Message | Disable | *13-6* |
| Synapse Interface | Standard | *13-7* |

# Miscellaneous Scanner Parameters

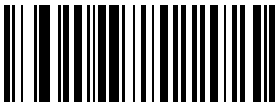
## Transmit Code ID Character

A Code ID character identifies the code type of a scanned bar code. This may be useful when the scanner is decoding more than one code type. In addition to any single character prefix already selected, the Code ID character is inserted between the prefix and the decoded symbol.

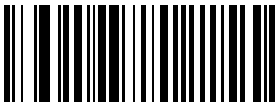
Select no Code ID character, a Symbol Code ID character, or an AIM Code ID character. For Code ID Characters, see *Symbol Code Identifiers on page B-1* and *AIM Code Identifiers on page B-2*.



**Symbol Code ID Character**



**AIM Code ID Character**



***None**

## Prefix/Suffix Values

A prefix and/or one or two suffixes can be appended to scan data for use in data editing. To set a value for a prefix or suffix, scan a four-digit number (i.e., four bar codes from *Appendix D, Numeric Bar Codes*) that corresponds to that value. See *Table E-1 on page E-1* for the four-digit codes.

When using host commands to set the prefix or suffix, set the key category parameter to 1, then set the 3-digit decimal value. See *Table E-1 on page E-1* for the four-digit codes.

To correct an error or change a selection, scan **Cancel** on <Blue><Italic>page D-3.

***NOTE*** To use Prefix/Suffix values, first set the *Scan Data Transmission Format on page 13-4*.

## Prefix/Suffix Values (continued)

**Scan Prefix**

**Scan Suffix**

## Scan Data Transmission Format

To change the scan data format, scan **Scan Options** and one of the following four bar codes corresponding to the desired format:

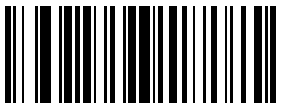
- **Data As Is**
- **<DATA> <SUFFIX>**
- **<PREFIX> <DATA>**
- **<PREFIX> <DATA> <SUFFIX>**.

Scan **Enter** on *page 13-5* to complete the change. To set values for the prefix and/or suffix, see *Prefix/Suffix Values on page 13-3*. Scan **Data Format Cancel** on *page 13-5* to cancel the change.

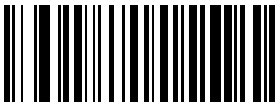
If a carriage return/enter is required after each scanned bar code, scan the following bar codes in order:

1. **Scan Options**
2. <DATA> <SUFFIX>
3. **Enter** (on *page 13-5*).

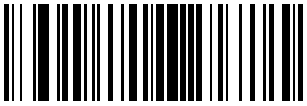
## Scan Data Transmission Format (continued)



**Scan Options**



***Data As Is**



**<DATA> <SUFFIX>**

**<PREFIX> <DATA>**

**<PREFIX> <DATA> <SUFFIX>**

**Enter**

**Data Format Cancel**

## FN1 Substitution Values

The Wedge and USB HID Keyboard hosts support an FN1 substitution feature. When enabled any FN1 character (0x1b) in an EAN128 bar code is substituted with a value. This value defaults to 7013 (Enter Key).

To select an FN1 substitution value via bar code menus:

1. Scan the bar code below.

***Set FN1 Substitution Value**

2. Look up the keystroke desired for FN1 Substitution in the *Table E-1 on page E-1* for the currently installed host interface.
3. Enter the 4-digit substitution value by scanning each digit in *Appendix D, Numeric Bar Codes*.

To correct an error or change the selection, scan **Cancel**.

To enable FN1 substitution for keyboard wedge, scan the **Enable FN1 Substitution** bar code on *page 5-10*.

To enable FN1 Substitution for USB HID keyboard, scan the **Enable FN1 Substitution** bar code on *page 7-9*.

## Transmit “No Read” Message

Scan a bar code below to select whether or not to transmit a No Read message. When enabled, the characters NR are transmitted when a bar code is not decoded. When disabled, if a symbol does not decode, nothing is sent to the host.

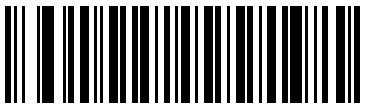
**Enable No Read**

***Disable No Read**

## Synapse Interface

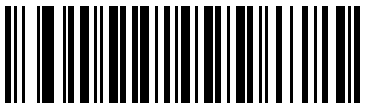
The auto-detection of a Synapse cable varies in duration depending on the type of Synapse connection. If a scanner is connected to another scanner using a Synapse cable, use the Auxiliary Synapse Port connection. In all other cases, where the cable is used, the default setting is recommended.

To disconnect and reconnect the scanner from a Synapse cable that is connected to a live host via a Synapse, use the "Plug and Play" setting. Do not change this setting from the default if an on-board wedge host is enabled.



***Standard Synapse Connection**

**Auxiliary Synapse Port Connection**



**“Plug and Play” Synapse Connection**

# Appendix A Standard Defaults

**Table A-1** *Standard Default Parameters Table*

| Parameter | Default | Page Number |
|---|---|---|
| **User Preferences** | | |
| Set Default Parameter | Restore Defaults | *4-3* |
| Beeper Tone | Medium | *4-4* |
| Beeper Volume | High | *4-4* |
| Power Mode | Continuous On | *4-5* |
| Scan Pattern | Multi-line Always Raster | *4-6* |
| Scan Line Width | Full Width | *4-7* |
| Laser On Time | 3.0 Sec | *4-7* |
| Beep After Good Decode | Enable | *4-8* |
| **Keyboard Wedge Host Parameters** | | |
| Keyboard Wedge Host Type | IBM PC/AT& IBM PC Compatibles[1] | *5-4* |
| Country Types (Country Codes) | North American | *5-5* |
| Ignore Unknown Characters | Send | *5-6* |
| Keystroke Delay | No Delay | *5-7* |
| Intra-Keystroke Delay | Disable | *5-7* |
| Alternate Numeric Keypad Emulation | Disable | *5-8* |
| Caps Lock On | Disable | *5-8* |
| Caps Lock Override | Disable | *5-9* |

**[1]User selection is required to configure this interface and this is the most common selection.**

**Table A-1** *Standard Default Parameters Table (Continued)*

| Parameter | Default | Page Number |
|---|---|---|
| Convert Wedge Data | No Convert | 5-9 |
| Function Key Mapping | Disable | 5-10 |
| FN1 Substitution | Disable | 5-10 |
| Send and Make Break | Send | 5-11 |
| **RS-232 Host Parameters** | | |
| RS-232 Host Types | Standard | 6-6 |
| Baud Rate | 9600 | 6-7 |
| Parity Type | None | 6-8 |
| Stop Bit Select | 1 Stop Bit | 6-9 |
| Data Bits (ASCII Format) | 8-Bit | 6-9 |
| Check Receive Errors | Enable | 6-10 |
| Hardware Handshaking | None | 6-10 |
| Software Handshaking | None | 6-12 |
| Host Serial Response Time-out | 2 Sec | 6-14 |
| RTS Line State | Low RTS | 6-15 |
| Beep on <BEL> | Disable | 6-15 |
| Intercharacter Delay | 0 msec | 6-16 |
| Nixdorf Beep/LED Options | Normal Operation | 6-17 |
| Ignore Unknown Characters | Send Bar Code | 6-17 |
| **USB Host Parameters** | | |
| USB Device Type | HID Keyboard Emulation | 7-4 |
| USB Country Keyboard Types (Country Codes) | North American | 7-5 |
| USB Keystroke Delay | No Delay | 7-7 |
| USB CAPS Lock Override | Disable | 7-7 |
| USB Ignore Unknown Characters | Send | 7-8 |
| Emulate Keypad | Disable | 7-8 |
| USB FN1 Substitution | Disable | 7-9 |
| Function Key Mapping | Disable | 7-9 |

**[1]User selection is required to configure this interface and this is the most common selection.**

**Table A-1** *Standard Default Parameters Table (Continued)*

| Parameter | Default | Page Number |
|---|---|---|
| Simulated Caps Lock | Disable | *7-10* |
| Convert Case | No Case Conversion | *7-10* |
| **IBM 468X/469X Host Parameters** | | |
| Port Address | None Selected | *8-3* |
| Convert Unknown to Code 39 | Disable | *8-4* |
| **Wand Emulation Host Parameters** | | |
| Wand Emulation Host Types | Symbol OmniLink Interface Controller[1] | *9-4* |
| Leading Margin | 80 msec | *9-5* |
| Polarity | Bar High/Margin Low | *9-6* |
| Ignore Unknown Characters | Send | *9-6* |
| Convert All Bar Codes to Code 39 | Disable | *9-7* |
| Convert Code 39 to Full ASCII | Disable | *9-8* |
| **Scanner Emulation** | | |
| Beep Style | Beep on Successful Transmit | *10-4* |
| Parameter Pass-Through | Parameter Process and Pass Through | *10-5* |
| Convert Newer Code Types | Convert Newer Code Types | *10-6* |
| Module Width | 20 µs | *10-6* |
| Convert All Bar Codes to Code 39 | Do Not Convert Bar Codes to Code 39 | *10-7* |
| Code 39 Full ASCII Conversion | Disable | *10-7* |
| Transmission Timeout | 3 Sec | *10-8* |
| Ignore Unknown Characters | Ignore Unknown Characters | *10-9* |
| Leading Margin | 2 ms | *10-9* |
| Check for Decode LED | Check for Decode LED | *10-10* |
| **123Scan Configuration Tool** | | |
| 123Scan Configuration | None[1] | *11-1* |
| **UPC/EAN** | | |
| UPC-A | Enable | *12-5* |
| UPC-E | Enable | *12-5* |

**[1]User selection is required to configure this interface and this is the most common selection.**

**Table A-1** *Standard Default Parameters Table (Continued)*

| Parameter | Default | Page Number |
|---|---|---|
| UPC-E1 | Disable | 12-6 |
| EAN-8/JAN 8 | Enable | 12-7 |
| EAN-13/JAN 13 | Enable | 12-7 |
| Bookland EAN | Disable | 12-8 |
| Decode UPC/EAN/JAN Supplementals (2 and 5 digits) | Ignore | 12-9 |
| User-Programmable Supplementals<br>Supplemental 1:<br>Supplemental 2: | | 12-12 |
| Decode UPC/EAN/JAN Supplemental Redundancy | 7 | 12-13 |
| Transmit UPC-A Check Digit | Enable | 12-13 |
| Transmit UPC-E Check Digit | Enable | 12-14 |
| Transmit UPC-E1 Check Digit | Enable | 12-14 |
| UPC-A Preamble | System Character | 12-15 |
| UPC-E Preamble | System Character | 12-16 |
| UPC-E1 Preamble | System Character | 12-17 |
| Convert UPC-E to A | Disable | 12-18 |
| Convert UPC-E1 to A | Disable | 12-18 |
| EAN-8/JAN-8 Extend | Disable | 12-19 |
| Bookland ISBN Format | ISBN-10 | 12-20 |
| UCC Coupon Extended Code | Disable | 12-21 |
| **Code 128** | | |
| Code 128 | Enable | 12-22 |
| UCC/EAN-128 | Enable | 12-22 |
| ISBT 128 (non-concatenated) | Enable | 12-23 |
| **Code 39** | | |
| Code 39 | Enable | 12-23 |
| Trioptic Code 39 | Disable | 12-24 |
| Convert Code 39 to Code 32 (Italian Pharmacy Code) | Disable | 12-24 |

**[1]User selection is required to configure this interface and this is the most common selection.**

**Table A-1** *Standard Default Parameters Table (Continued)*

| Parameter | Default | Page Number |
|---|---|---|
| Code 32 Prefix | Disable | 12-25 |
| Set Length(s) for Code 39 | 2 to 55 | 12-25 |
| Code 39 Check Digit Verification | Disable | 12-26 |
| Transmit Code 39 Check Digit | Disable | 12-27 |
| Code 39 Full ASCII Conversion | Disable | 12-27 |
| Buffer Code 39 | Disable | 12-28 |
| **Code 93** | | |
| Code 93 | Disable | 12-30 |
| Set Length(s) for Code 93 | 4 to 55 | 12-30 |
| **Code 11** | | |
| Code 11 | Disable | 12-31 |
| Set Lengths for Code 11 | 4 to 55 | 12-32 |
| Code 11 Check Digit Verification | Disable | 12-33 |
| Transmit Code 11 Check Digit(s) | Disable | 12-33 |
| **Interleaved 2 of 5 (ITF)** | | |
| Interleaved 2 of 5 (ITF) | Enable | 12-34 |
| Set Lengths for I 2 of 5 | 14 | 12-34 |
| I 2 of 5 Check Digit Verification | Disable | 12-36 |
| Transmit I 2 of 5 Check Digit | Disable | 12-36 |
| Convert I 2 of 5 to EAN 13 | Disable | 12-37 |
| **Discrete 2 of 5 (DTF)** | | |
| Discrete 2 of 5 | Disable | 12-37 |
| Set Length(s) for D 2 of 5 | 12 | 12-38 |
| **Chinese 2 of 5** | | |
| Enable/Disable Chinese 2 of 5 | Disable | 12-39 |
| **Codabar (NW - 7)** | | |
| Codabar | Disable | 12-40 |
| Set Lengths for Codabar | 5 to 55 | 12-40 |

**[1]User selection is required to configure this interface and this is the most common selection.**

**Table A-1** *Standard Default Parameters Table (Continued)*

| Parameter | Default | Page Number |
|---|---|---|
| CLSI Editing | Disable | 12-41 |
| NOTIS Editing | Disable | 12-42 |
| **MSI** | | |
| MSI | Disable | 12-42 |
| Set Length(s) for MSI | 2 to 55 | 12-43 |
| MSI Check Digits | One | 12-44 |
| Transmit MSI Check Digit | Disable | 12-45 |
| MSI Check Digit Algorithm | Mod 10/Mod 10 | 12-45 |
| **GS1 DataBar** | | |
| GS1 DataBar-14 | Disable | 12-46 |
| GS1 DataBar Limited | Disable | 12-46 |
| GS1 DataBar Expanded | Disable | 12-46 |
| Convert GS1 DataBar to UPC/EAN | Disable | 12-47 |
| **Symbology - Specific Security Levels** | | |
| Redundancy Level | 1 | 12-48 |
| Security Levels | 0 | 12-50 |
| Bi-directional Redundancy | Disable | 12-51 |
| **Report Version** | | 12-52 |
| **Miscellaneous Scanner Options** | | |
| Transmit Code ID Character | None | 13-3 |
| Prefix Value | 7013 <CR><LF> | 13-3 |
| Suffix Value | 7013 <CR><LF> | 13-3 |
| Scan Data Transmission Format | Data As Is | 13-4 |
| FN1 Substitution Values | Set | 13-6 |
| Transmit “No Read” Message | Disable | 13-6 |
| Synapse Interface | Standard | 13-7 |

**[1]User selection is required to configure this interface and this is the most common selection.**

# Appendix B Programming Reference

## I Symbol Code Identifiers

**Table B-1** *Code Characters*

| Code Character | Code Type |
|---|---|
| A | UPC/EAN |
| B | Code 39, Code 39 Full ASCII, Code 32 |
| C | Codabar |
| D | Code 128, ISBT 128 |
| E | Code 93 |
| F | Interleaved 2 of 5 |
| G | Discrete 2 of 5, or Discrete 2 of 5 IATA |
| H | Code 11 |
| J | MSI |
| K | UCC/EAN-128 |
| L | Bookland EAN |
| M | Trioptic Code 39 |
| N | Coupon Code |
| R | GS1 DataBar Family |

# AIM Code Identifiers

Each AIM Code Identifier contains the three-character string **]cm** where:

] = Flag Character (ASCII 93)
c = Code Character (see *Table B-2*)
m = Modifier Character (see *Table B-3*)

**Table B-2** *Aim Code Characters*

| Code Character | Code Type |
|---|---|
| A | Code 39, Code 39 Full ASCII, Code 32 |
| C | Code 128 (all variants), Coupon (Code 128 portion) |
| E | UPC/EAN, Coupon (UPC portion) |
| e | GS1 DataBar Family |
| F | Codabar |
| G | Code 93 |
| H | Code 11 |
| I | Interleaved 2 of 5 |
| M | MSI |
| S | D2 of 5, IATA 2 of 5 |
| X | Bookland EAN, Code 39 Trioptic |

The modifier character is the sum of the applicable option values based on *Table B-3*.

**Table B-3** *Modifier Characters*

| Code Type | Option Value | Option |
|---|---|---|
| Code 39 | 0 | No check character or Full ASCII processing. |
| | 1 | Reader has checked one check character. |
| | 3 | Reader has checked and stripped check character. |
| | 4 | Reader has performed Full ASCII character conversion. |
| | 5 | Reader has performed Full ASCII character conversion and checked one check character. |
| | 7 | Reader has performed Full ASCII character conversion and checked and stripped check character. |
| | Example: A Full ASCII bar code with check character W, **A+I+MI+DW**, is transmitted as **]A7**AIMID where 7 = (3+4). | |
| Trioptic Code 39 | 0 | No option specified at this time. Always transmit 0. |
| | Example: A Trioptic bar code 412356 is transmitted as **]X0**412356 | |
| Code 128 | 0 | Standard data packet, no Function code 1 in first symbol position. |
| | 1 | Function code 1 in first symbol character position. |
| | 2 | Function code 1 in second symbol character position. |
| | Example: A Code (EAN) 128 bar code with Function 1 character FNC1 in the first position, AIMID is transmitted as **]C1**AIMID | |
| I 2 of 5 | 0 | No check digit processing. |
| | 1 | Reader has validated check digit. |
| | 3 | Reader has validated and stripped check digit. |
| | Example: An I 2 of 5 bar code without check digit, 4123, is transmitted as **]I0**4123 | |
| Codabar | 0 | No check digit processing. |
| | 1 | Reader has checked check digit. |
| | 3 | Reader has stripped check digit before transmission. |
| | Example: A Codabar bar code without check digit, 4123, is transmitted as **]F0**4123 | |
| Code 93 | 0 | No options specified at this time. Always transmit 0. |
| | Example: A Code 93 bar code 012345678905 is transmitted as **]G0**012345678905 | |

**Table B-3** *Modifier Characters (Continued)*

| Code Type | Option Value | Option |
|---|---|---|
| MSI | 0 | Check digits are sent. |
| | 1 | No check digit is sent. |
| | Example: An MSI bar code 4123, with a single check digit checked, is transmitted as **]M1**4123 | |
| D 2 of 5 | 0 | No options specified at this time. Always transmit 0. |
| | Example: A D 2 of 5 bar code 4123, is transmitted as **]S0**4123 | |
| UPC/EAN | 0 | Standard packet in full EAN country code format, which is 13 digits for UPC-A and UPC-E (not including supplemental data). |
| | 1 | Two-digit supplement data only. |
| | 2 | Five-digit supplement data only. |
| | 4 | EAN-8 data packet. |
| | Example: A UPC-A bar code 012345678905 is transmitted as **]E0**0012345678905 | |
| Bookland EAN | 0 | No options specified at this time. Always transmit 0. |
| | Example: A Bookland EAN bar code 123456789X is transmitted as **]X0**123456789X | |
| Code 11 | 0 | Single check digit |
| | 1 | Two check digits |
| | 3 | Check characters validated but not transmitted. |
| GS1 DataBar Family | | No option specified at this time. Always transmit 0. GS1 DataBar-14 and GS1 DataBar Limited transmit with an Application Identifier “01”.Note: In UCC/EAN-128 emulation mode, GS1 DataBar is transmitted using Code 128 rules (i.e., ]C1). |
| | Example: A GS1 DataBar-14 bar code 100123456788902 is transmitted as **]e**0**0**1**0**0123456788902. | |

# Appendix C  Sample Bar Codes

## Code 39

# UPC/EAN

## UPC-A, 100%

## EAN-13, 100%

# Code 128

## Interleaved 2 of 5

12345678901231

## GS1 DataBar

***NOTE*** GS1 DataBar variants must be enabled to read the bar codes below (see *GS1 DataBar (formerly RSS, Reduced Space Symbology) on page 12-46*).

### GS1 DataBar

**10293847560192837465019283746029478450366523**
**(GS1 DataBar Expanded Stacked)**

**1234890hjio9900mnb**
**(GS1 DataBar Expanded)**

**08672345650916**
**(GS1 DataBar Limited)**

## GS1 DataBar-14

**55432198673467**
**(GS1 DataBar-14 Truncated)**

**90876523412674**
**(GS1 DataBar-14 Stacked)**

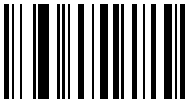
**78123465709811**
**(GS1 DataBar-14 Stacked Omni-Directional)**

# Appendix D Numeric Bar Codes

## Numeric Bar Codes

For parameters requiring specific numeric values, scan the appropriately numbered bar code(s).

**0**



**1**

**2**

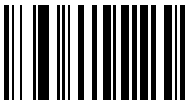
**3**

## Numeric Bar Codes

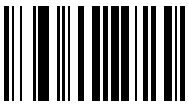
For parameters requiring specific numeric values, scan the appropriately numbered bar code(s).

**4**

**5**

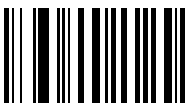


**6**



**7**

**8**



**9**

## Cancel

To correct an error or change a selection, scan the bar code below.

**Cancel**

# Appendix E ASCII Character Sets

**Table E-1** *ASCII Value Standard Default Parameters Table*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1000 | %U | CTRL 2 |
| 1001 | $A | CTRL A |
| 1002 | $B | CTRL B |
| 1003 | $C | CTRL C |
| 1004 | $D | CTRL D |
| 1005 | $E | CTRL E |
| 1006 | $F | CTRL F |
| 1007 | $G | CTRL G |
| 1008 | $H | CTRL H/**BACKSPACE**[1] |
| 1009 | $I | CTRL I/**HORIZONTAL TAB**[1] |
| 1010 | $J | CTRL J |
| 1011 | $K | CTRL K |
| 1012 | $L | CTRL L |
| 1013 | $M | CTRL M/**ENTER**[1] |
| 1014 | $N | CTRL N |
| 1015 | $O | CTRL O |

**The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table E-1** *ASCII Value Standard Default Parameters Table (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1016 | $P | CTRL P |
| 1017 | $Q | CTRL Q |
| 1018 | $R | CTRL R |
| 1019 | $S | CTRL S |
| 1020 | $T | CTRL T |
| 1021 | $U | CTRL U |
| 1022 | $V | CTRL V |
| 1023 | $W | CTRL W |
| 1024 | $X | CTRL X |
| 1025 | $Y | CTRL Y |
| 1026 | $Z | CTRL Z |
| 1027 | %A | CTRL [ |
| 1028 | %B | CTRL \ |
| 1029 | %C | CTRL ] |
| 1030 | %D | CTRL 6 |
| 1031 | %E | CTRL - |
| 1032 | Space | Space |
| 1033 | /A | ! |
| 1034 | /B | “ |
| 1035 | /C | # |
| 1036 | /D | ? |
| 1037 | /E | % |
| 1038 | /F | & |
| 1039 | /G | ‘ |
| 1040 | /H | ( |
| 1041 | /I | ) |
| 1042 | /J | * |
| 1043 | /K | + |

**The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table E-1** *ASCII Value Standard Default Parameters Table (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1044 | /L | , |
| 1045 | - | - |
| 1046 | . | . |
| 1047 | /o | / |
| 1048 | 0 | 0 |
| 1049 | 1 | 1 |
| 1050 | 2 | 2 |
| 1051 | 3 | 3 |
| 1052 | 4 | 4 |
| 1053 | 5 | 5 |
| 1054 | 6 | 6 |
| 1055 | 7 | 7 |
| 1056 | 8 | 8 |
| 1057 | 9 | 9 |
| 1058 | /Z | : |
| 1059 | %F | ; |
| 1060 | %G | < |
| 1061 | %H | = |
| 1062 | %I | > |
| 1063 | %J | ? |
| 1064 | %V | @ |
| 1065 | A | A |
| 1066 | B | B |
| 1067 | C | C |
| 1068 | D | D |
| 1069 | E | E |
| 1070 | F | F |
| 1071 | G | G |

**The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table E-1** *ASCII Value Standard Default Parameters Table (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1072 | H | H |
| 1073 | I | I |
| 1074 | J | J |
| 1075 | K | K |
| 1076 | L | L |
| 1077 | M | M |
| 1078 | N | N |
| 1079 | O | O |
| 1080 | P | P |
| 1081 | Q | Q |
| 1082 | R | R |
| 1083 | S | S |
| 1084 | T | T |
| 1085 | U | U |
| 1086 | V | V |
| 1087 | W | W |
| 1088 | X | X |
| 1089 | Y | Y |
| 1090 | Z | Z |
| 1091 | %K | [ |
| 1092 | %L | \ |
| 1093 | %M | ] |
| 1094 | %N | ^ |
| 1095 | %O | _ |
| 1096 | %W | ‘ |
| 1097 | +A | a |
| 1098 | +B | b |
| 1099 | +C | c |

**The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table E-1** *ASCII Value Standard Default Parameters Table (Continued)*

| ASCII Value | Full ASCII Code 39 Encode Character | Keystroke |
|---|---|---|
| 1100 | +D | d |
| 1101 | +E | e |
| 1102 | +F | f |
| 1103 | +G | g |
| 1104 | +H | h |
| 1105 | +I | i |
| 1106 | +J | j |
| 1107 | +K | k |
| 1108 | +L | l |
| 1109 | +M | m |
| 1110 | +N | n |
| 1111 | +O | o |
| 1112 | +P | p |
| 1113 | +Q | q |
| 1114 | +R | r |
| 1115 | +S | s |
| 1116 | +T | t |
| 1117 | +U | u |
| 1118 | +V | v |
| 1119 | +W | w |
| 1120 | +X | x |
| 1121 | +Y | y |
| 1122 | +Z | z |
| 1123 | %P | { |
| 1124 | %Q | I |
| 1125 | %R | } |
| 1126 | %S | ~ |

**The keystroke in bold is sent only if Function Key Mapping is enabled. Otherwise, the unbolded keystroke is sent.**

**Table E-2** *ALT Key Standard Default Tables*

| ALT Keys | Keystroke |
|---|---|
| 2064 | ALT 2 |
| 2065 | ALT A |
| 2066 | ALT B |
| 2067 | ALT C |
| 2068 | ALT D |
| 2069 | ALT E |
| 2070 | ALT F |
| 2071 | ALT G |
| 2072 | ALT H |
| 2073 | ALT I |
| 2074 | ALT J |
| 2075 | ALT K |
| 2076 | ALT L |
| 2077 | ALT M |
| 2078 | ALT N |
| 2079 | ALT O |
| 2080 | ALT P |
| 2081 | ALT Q |
| 2082 | ALT R |
| 2083 | ALT S |
| 2084 | ALT T |
| 2085 | ALT U |
| 2086 | ALT V |
| 2087 | ALT W |
| 2088 | ALT X |
| 2089 | ALT Y |
| 2090 | ALT Z |

**Table E-3** *Misc. Key Standard Default Table*

| Misc. Key | Keystroke |
|---|---|
| 3001 | PA 1 |
| 3002 | PA 2 |
| 3003 | CMD 1 |
| 3004 | CMD 2 |
| 3005 | CMD 3 |
| 3006 | CMD 4 |
| 3007 | CMD 5 |
| 3008 | CMD 6 |
| 3009 | CMD 7 |
| 3010 | CMD 8 |
| 3011 | CMD 9 |
| 3012 | CMD 10 |
| 3013 | CMD 11 |
| 3014 | CMD 12 |
| 3015 | CMD 13 |
| 3016 | CMD 14 |

**Table E-4** *GUI Shift Keys*

| Other Value | Keystroke |
|---|---|
| GUI Shift Keys<br>The Apple™ iMac keyboard has an apple key on either side of the space bar. Windows-based systems have a GUI key to the left of the left ALT key, and to the right of the right ALT key. | |
| 3048 | GUI 0 |
| 3049 | GUI 1 |
| 3050 | GUI 2 |
| 3051 | GUI 3 |
| 3052 | GUI 4 |
| 3053 | GUI 5 |
| 3054 | GUI 6 |
| 3055 | GUI 7 |

**Table E-4** *GUI Shift Keys (Continued)*

| Other Value | Keystroke |
|---|---|
| 3056 | GUI 8 |
| 3057 | GUI 9 |
| 3065 | GUI A |
| 3066 | GUI B |
| 3067 | GUI C |
| 3068 | GUI D |
| 3069 | GUI E |
| 3070 | GUI F |
| 3071 | GUI G |
| 3072 | GUI H |
| 3073 | GUI I |
| 3074 | GUI J |
| 3075 | GUI K |
| 3076 | GUI L |
| 3077 | GUI M |
| 3078 | GUI N |
| 3079 | GUI O |
| 3080 | GUI P |
| 3081 | GUI Q |
| 3082 | GUI R |
| 3083 | GUI S |
| 3084 | GUI T |
| 3085 | GUI U |
| 3086 | GUI V |
| 3087 | GUI W |
| 3088 | GUI X |
| 3089 | GUI Y |
| 3090 | GUI Z |

**Table E-5** *PF Key Standard Default Table*

| PF Keys | Keystroke |
|---|---|
| 4001 | PF 1 |
| 4002 | PF 2 |
| 4003 | PF 3 |
| 4004 | PF 4 |
| 4005 | PF 5 |
| 4006 | PF 6 |
| 4007 | PF 7 |
| 4008 | PF 8 |
| 4009 | PF 9 |
| 4010 | PF 10 |
| 4011 | PF 11 |
| 4012 | PF 12 |
| 4013 | PF 13 |
| 4014 | PF 14 |
| 4015 | PF 15 |
| 4016 | PF 16 |

**Table E-6** *F key Standard Default Table*

| F Keys | Keystroke |
|---|---|
| 5001 | F 1 |
| 5002 | F 2 |
| 5003 | F 3 |
| 5004 | F 4 |
| 5005 | F 5 |
| 5006 | F 6 |
| 5007 | F 7 |
| 5008 | F 8 |
| 5009 | F 9 |

**Table E-6** *F key Standard Default Table (Continued)*

| F Keys | Keystroke |
|---|---|
| 5010 | F 10 |
| 5011 | F 11 |
| 5012 | F 12 |
| 5013 | F 13 |
| 5014 | F 14 |
| 5015 | F 15 |
| 5016 | F 16 |
| 5017 | F 17 |
| 5018 | F 18 |
| 5019 | F 19 |
| 5020 | F 20 |
| 5021 | F 21 |
| 5022 | F 22 |
| 5023 | F 23 |
| 5024 | F 24 |

**Table E-7** *Numeric Key Standard Default Table*

| Numeric Keypad | Keystroke |
|---|---|
| 6042 | * |
| 6043 | + |
| 6044 | Undefined |
| 6045 | - |
| 6046 | . |
| 6047 | / |
| 6048 | 0 |
| 6049 | 1 |
| 6050 | 2 |
| 6051 | 3 |
| 6052 | 4 |

**Table E-7** *Numeric Key Standard Default Table (Continued)*

| Numeric Keypad | Keystroke |
|---|---|
| 6053 | 5 |
| 6054 | 6 |
| 6055 | 7 |
| 6056 | 8 |
| 6057 | 9 |
| 6058 | Enter |
| 6059 | Num Lock |

**Table E-8** *Extended Keypad Standard Default Table*

| Extended Keypad | Keystroke |
|---|---|
| 7001 | Break |
| 7002 | Delete |
| 7003 | Pg Up |
| 7004 | End |
| 7005 | Pg Dn |
| 7006 | Pause |
| 7007 | Scroll Lock |
| 7008 | Backspace |
| 7009 | Tab |
| 7010 | Print Screen |
| 7011 | Insert |
| 7012 | Home |
| 7013 | Enter |
| 7014 | Escape |
| 7015 | Up Arrow |
| 7016 | Dn Arrow |
| 7017 | Left Arrow |
| 7018 | Right Arrow |

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