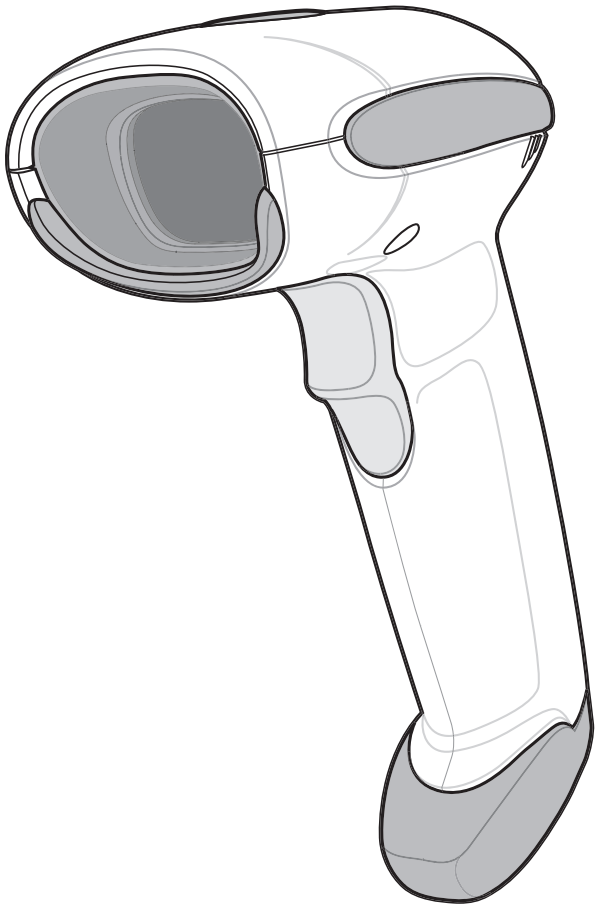
LS4208

Product Reference Guide



LS4208
Product Reference Guide

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Revision A
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Zebra Technologies Corporation
Lincolnshire, IL U.S.A.
http://www.zebra.com

Warranty

For the complete Zebra hardware product warranty statement, go to:
http://www.zebra.com/warranty.

Revision History

Changes to the original manual are listed below:

Change	Date	Description
-01 Rev A	5/2005	Initial release.
-02 Rev A	6/2005	Update RSS description.
-03 Rev A	1/2007	Update service section, add special IBM command bar codes, add parameter bar codes for Bookland ISBN format and new UPC supplemental decode options, add bar codes for report version, report MIMIC version, and report Synapse cable, add ADF section.
-04 Rev A	6/2007	Add information for LS4208PR version, which supports PDF417.
-05 Rev A	7/2007	Add note to end of Wand Emulation chapter regarding error beep emitted when scanner attempts to send composite data.
-06 Rev A	4/2009	Add Parameter Scanning option, add Simple COM Port Emulation to USB device type parameter, add new ADF options.
-07 Rev A	11/2012	Removed patents, and Regulatory specs; updated URLs, ambient light tolerance, and 123Scan^2 chapter.
-08 Rev A	3/2015	Zebra Rebranding

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About This Guide

Introduction

The *LS4208 Product Reference Guide* provides general instructions for setting up, operating, maintaining, and troubleshooting the LS4208 scanner. The scanner includes the following variations of the scanner:

- LS4208-SR: Standard version
- LS4208-PR: PDF417 version

Chapter Descriptions

- *Chapter 1, Getting Started* provides a product overview, unpacking instructions, and cable connection information.
- *Chapter 2, 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 & Technical 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, 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.
- *Chapter 14, Advanced Data Formatting* details Advanced Data Formatting (ADF), a means of customizing data before transmission to a host device.
- *Appendix A, Standard Default Parameters* provides a table of all host devices and miscellaneous scanner defaults.
- *Appendix B, Programming References* 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:

- 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.

Related Documents

The following documents provide more information for the LS4208 scanner:

- The *LS4208 Quick Reference Guide* (p/n 72-69411-xx) provides general information to help the user get started with the scanner. It includes 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 using the equipment, contact your facility's technical or systems support. If there is a problem with the equipment, they will contact the Zebra Global 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 (formerly Reduced Space Symbology/RSS) 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 Only the LS4208-PR version supports PDF417 bar codes and variants.

Figure 1-1 *LS4208 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, contact Zebra Mobility Support. See page xv 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.)

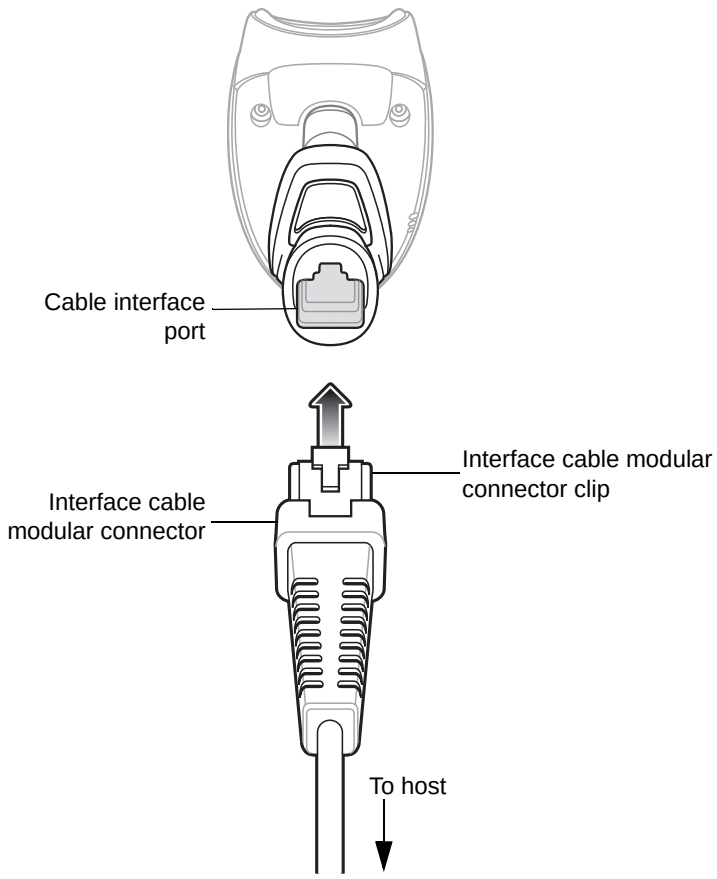


Figure 1-2 *Installing the Cable*

NOTE Different hosts require different cables. 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 are 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.

Symbol'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.

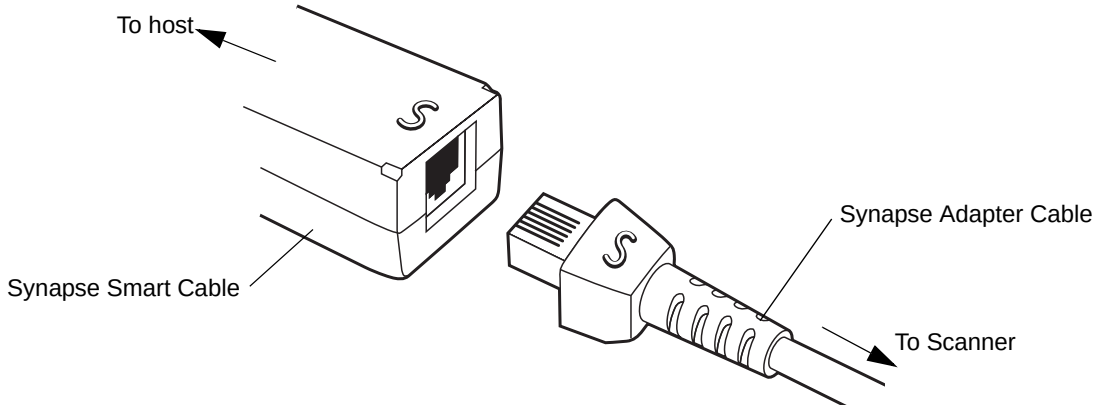


Figure 1-3 *Synapse Cable Connection*

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, 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 Scanning

Introduction

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

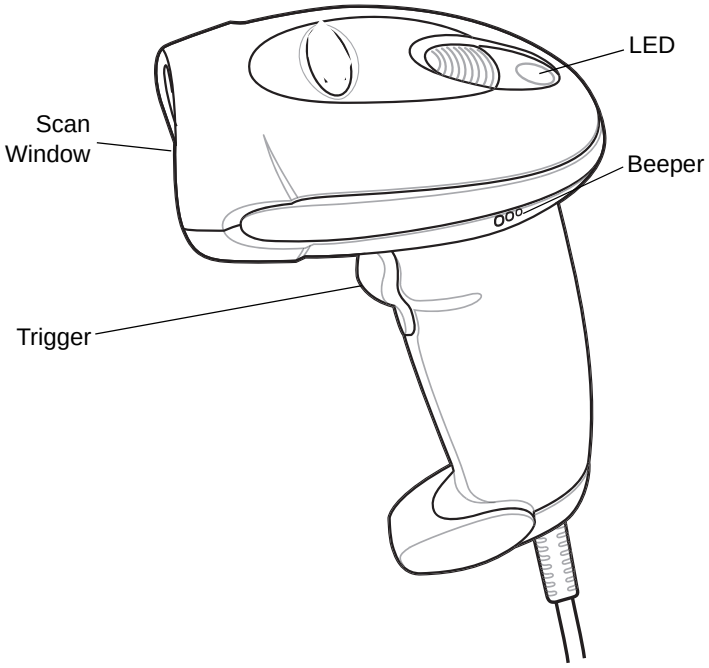


Figure 2-1 *Parts*

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).
Clicking	Occurs during PDF417 decoding to indicate proper alignment, motion, and distance.
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. See *Chapter 14, Advanced Data Formatting*.
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.

Table 2-1 *Beeper Definitions (Continued)*

Beeper Sequence	Indication
Host Specific	
USB only	
4 short high beeps	Scanner has not completed initialization. Wait several seconds and scan again.
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.

Scan Patterns

The scanner emits several scanning patterns, described as follows. To select a pattern, see *Scan Pattern on page 4-6*.

Single-Line Only

The laser has no up and down scan line movement (no raster).

Figure 2-2 *Single-Line Only Scan Pattern*

Multi-Line Smart Raster

The 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. If the scanner detects a PDF417 (LS4208-PR only), GS1 DataBar, or Composite Code, it immediately rasters, opening to a full, optimized raster pattern as soon as the scanner is properly aligned over the bar code.

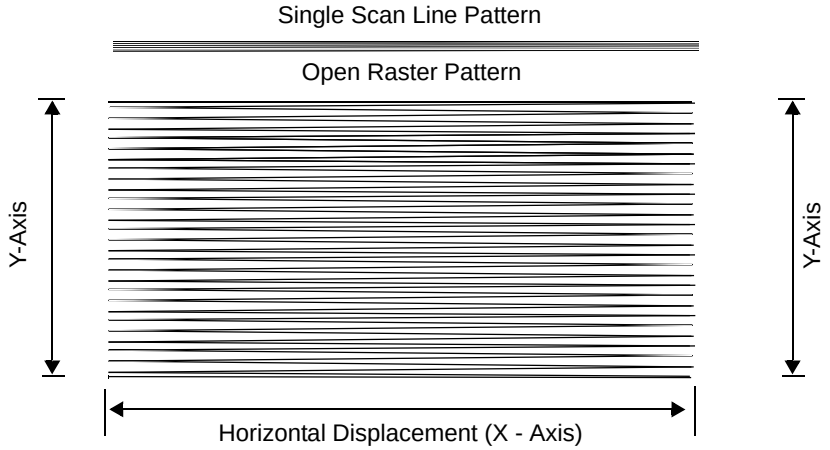


Figure 2-3 *Multi-Line Smart Raster Scan Pattern*

Multi-line Always Raster

Rastering (up and down scan line movement) begins immediately to decode 1D, PDF417 (LS4208-PR only), GS1 DataBar, and Composite Codes.

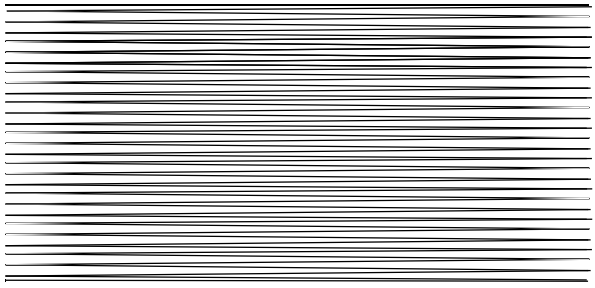


Figure 2-4 *Multi-Line Always Raster Scan Pattern*

Scanning Modes

The LS4208 accommodates both hand-held and hands-free modes. In hand-held use, you pull the trigger to activate the scan pattern and decode the bar code. In hands-free mode, the scanner sits in the Intellistand and automatically decodes a bar code presented in its field of view.

Scanning in Hand-Held Mode

Install and program the scanner (see *Setting Up the Scanner on page 1-3*). For assistance, contact Zebra Mobility Support. See page xv for contact information.

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.

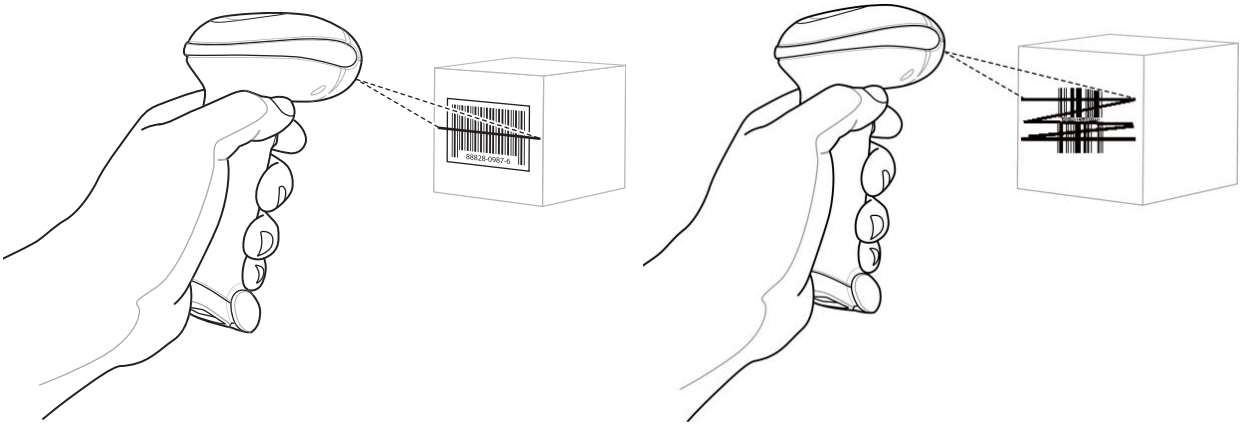


Figure 2-5 *Scanning in Hand-Held Mode*

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 *Symbol LS4208 Decode Zone on page 2-11*). When scanning using a single-line scan mode, ensure the scan line crosses every bar and space of the symbol.

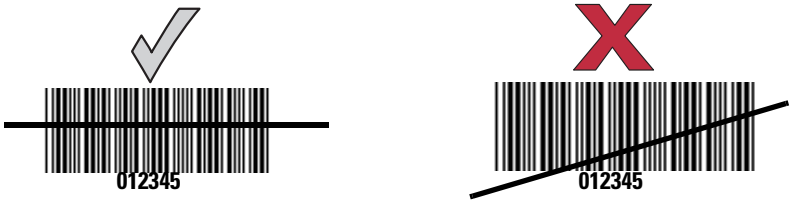


Figure 2-6 *Acceptable and Incorrect Single-Line Aiming*

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

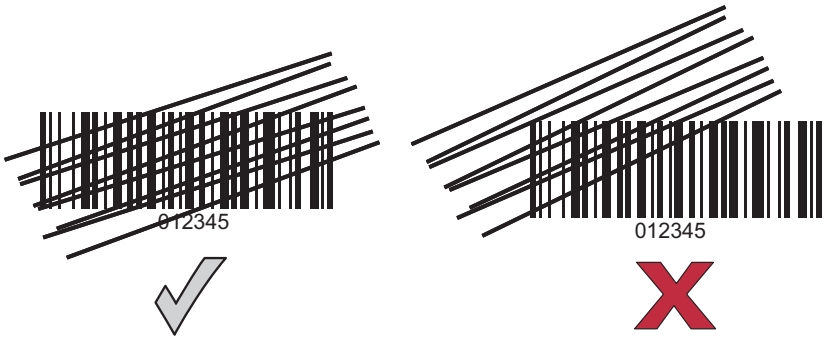


Figure 2-7 *Acceptable and Incorrect Multi-Line Aiming*

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 (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.

The scanner can be tilted up to 65° forward or back and achieve a successful decode (*Figure 2-8*). Simple practice quickly shows what tolerances to work within.

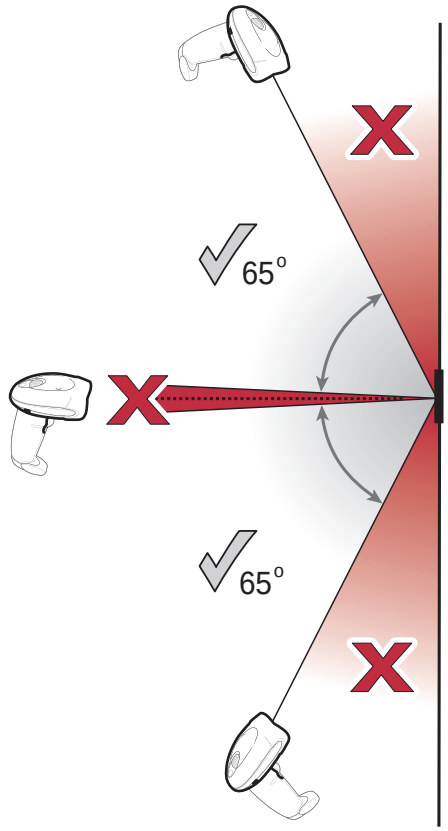


Figure 2-8 *Maximum Tilt Angles and Dead Zone*

Scanning PDF Symbols

For optimal scanning performance, use rastering mode to scan PDF417 symbols. Adjust the raster to cover the entire PDF symbol. For large PDF symbols, you may need to manually raster the scanner in order to cover the entire symbol.

If the pattern does not cover the top and bottom of a PDF symbol, pull the scanner back until it does. Make sure the scan pattern extends beyond the edges of the bar code.

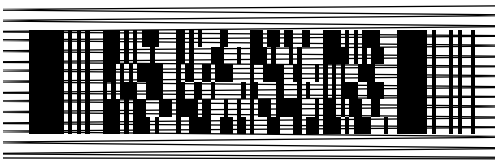


Figure 2-9 *Raster Pattern Expanded Over PDF417 Symbol*

If the vertical scan pattern is not high enough to cover a “tall” PDF417 symbol, move the scanner slowly down toward the bottom of the symbol, keeping the beam horizontal to the rows, and then slowly back upward to the top. Alternatively, move the scanner further away from the bar code until the scan pattern covers a larger portion of the bar code in the vertical direction.

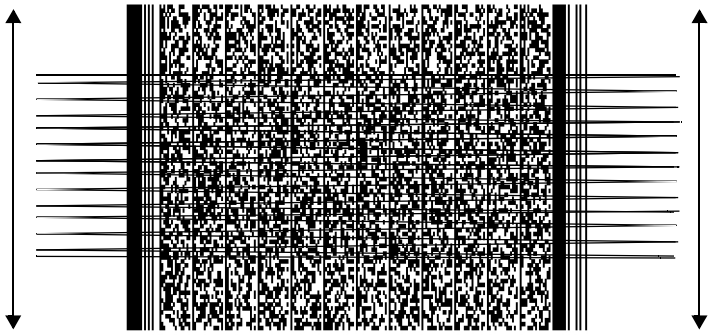


Figure 2-10 *Moving Scan Pattern Upward and Downward on “Tall” PDF Symbol*

Keep the scan pattern parallel to the symbol rows. 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 Raster height varies depending on the option selected (see *Raster Height on page 4-8*).

Scanning Composite Bar Codes

Composite Code is a combination of a 1D symbol (GS1 DataBar, UPC/EAN or GS1-128) and a 2D symbol (CC-A, CC-B or CC-C). When scanning a Composite Code:

- Keep the scan pattern parallel to the symbol’s rows.
- Hold the scanner as still as possible.
- Hold the scanner at an angle which does not cause specular reflection.
- Hold the scanner close for small symbols, and farther away for large symbols. Practice shows what works.
- Aim the scan line at the middle of the 2D portion. The scan pattern rasters and decodes both the 2D and 1D portion of the Composite Code.

Aim at the center of the 2D portion

Raster pattern expands to decode both portions

Figure 2-11 *Scanning Composite Codes*

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

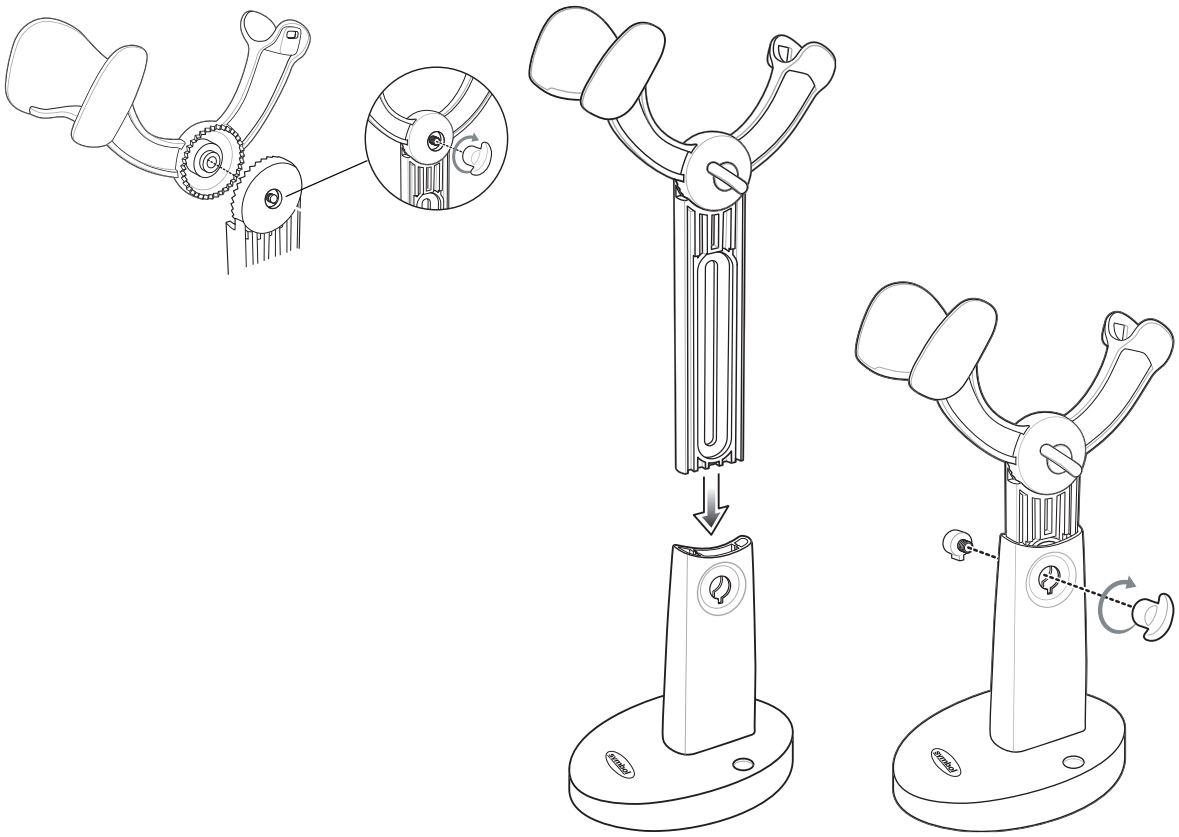


Figure 2-12 *Assembling Intellistand*

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."

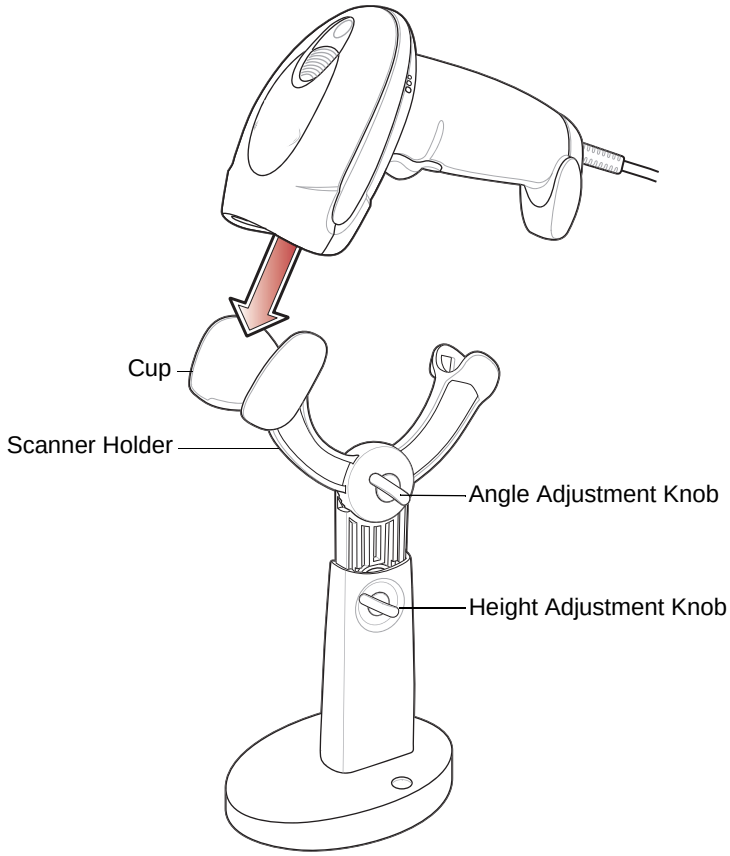


Figure 2-13 *Inserting the Scanner in the Intellistand*

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*.

LS4208 Decode Zone

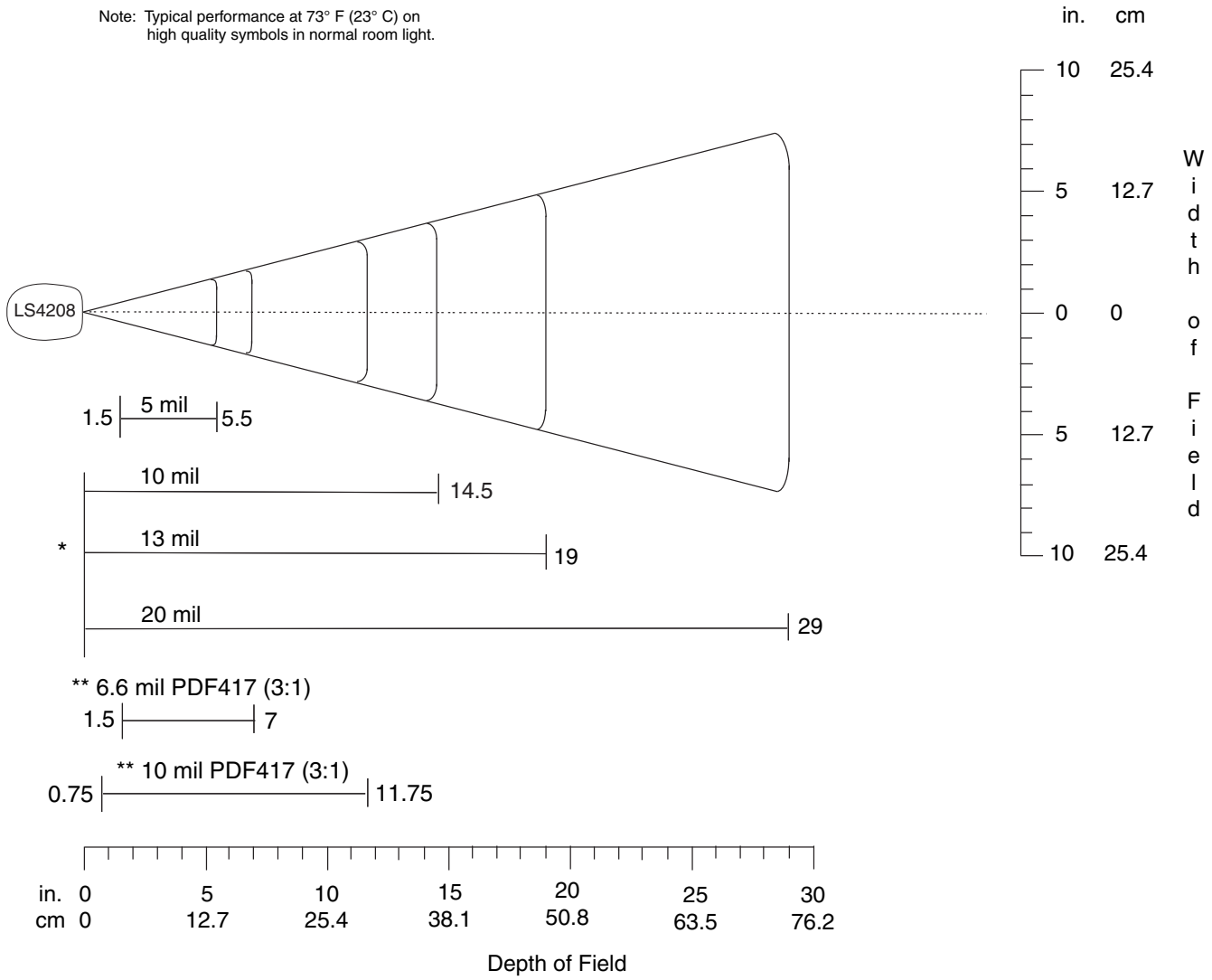


Figure 2-14 *LS4208 Decode Zone*

Chapter 3 Maintenance, Troubleshooting & Technical 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.	See *Chapter 14, Advanced Data Formatting*.
	Invalid ADF rule is detected.	See *Chapter 14, Advanced Data Formatting*.
	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 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/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.
	During programming, indicates out of ADF parameter storage space.	Erase all rules and re-program with shorter 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
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, 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 *Symbol LS4208 Decode Zone on page 2-11*.
	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 2-6 on page 2-6*.
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 beeps after a bar code is decoded.	Conversion or format error was detected. The scanner's conversion parameters are not properly configured.	Ensure the scanner's conversion parameters are properly configured.
	Conversion or format error was detected. 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. 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. 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 Zebra Mobility Support. See page xv 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 (17 cm H x 9.3 cm L x 6.8 cm W)
Weight (without cable)	Approximately 6.4 oz. (181 g)
Voltage & Current LS4208-SR LS4208-PR	 5 +/-10%VDC @ 140 mA (Stand by: <35 mA) 5 +/-10%VDC @ 155 mA (Stand by: <60 mA)
Color	Cash Register White or Twilight Black
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	See *Symbol LS4208 Decode Zone on page 2-11*
Minimum Resolution	5 mil (linear bar codes) 5 mil (uPDF & PDF, 3:1, Y:X aspect ratio)
Print Contrast Minimum	25% minimum reflectance
Multi-Line Aiming Coverage	At 5 in. reading distance: ~ 0.5 in. (1.3 cm) At 10 in. reading distance: ~ 1 in. (2.5 cm)
Motion Tolerances	Horizontal Velocity: 200 in. (508 cm) / sec Vertical Velocity: 200 in. (508 cm) / sec Angular Velocity: 200 in. (508 cm) / sec
Decode Capability	UPC/EAN and with supplementals, Bookland EAN, Code 39, Code 39 Full ASCII, Trioptic Code 39, GS1DataBar Variants, GS1-128, Code 128, Code 128 Full ASCII, Code 93, Codabar (NW1), Code 11, Interleaved 2 of 5, Discrete 2 of 5, Chinese 2 of 5, MSI, IATA, Code 32, PDF417, MicroPDF417, Composite Codes

Table 3-2 *Technical Specifications (Continued)*

Item	Description
Interfaces Supported	RS-232C (Standard, Nixdorf, ICL, & Fujitsu); IBM 468x/469x; Keyboard Wedge; USB (Standard, IBM SurePOS, Macintosh); Laser/Wand Emulation. Synapse Adaptive Connectivity allows for connectivity to interfaces above and many non-standard interfaces.
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	Withstands multiple 6 ft./1.825 m drops to concrete
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) Note: LED lighting with high AC ripple content can impact scanning performance.
EAS Support	Optional Checkpoint Electronic Article Surveillance (EAS)
Beeper Volume	User-selectable: three levels
Beeper Tone	User-selectable: three tones
ESD	15 kV air discharge 8 kV indirect discharge

Scanner Signal Descriptions

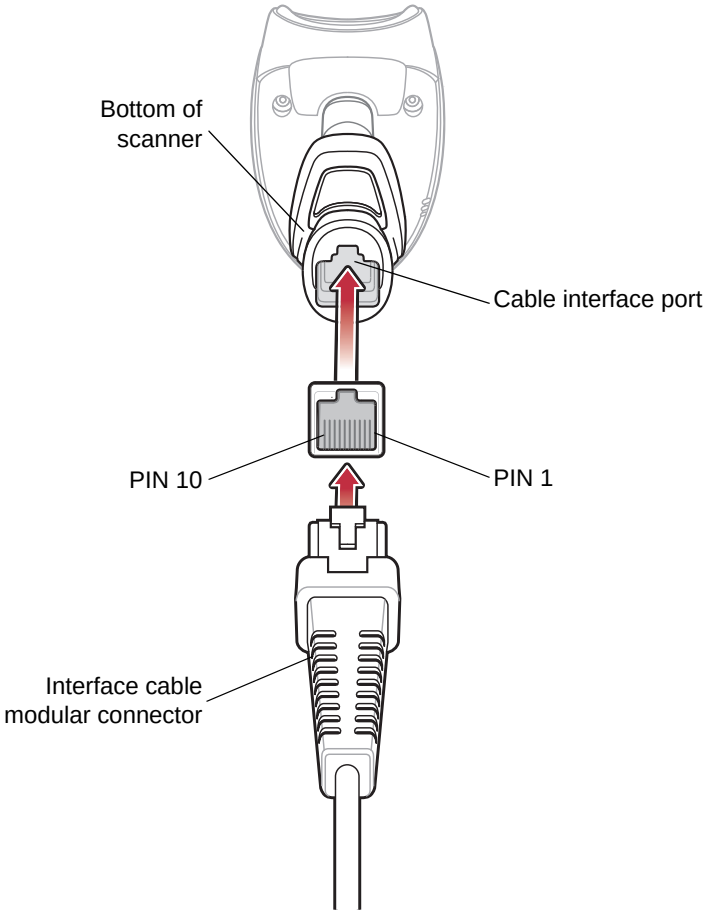


Figure 3-1 *Scanner Cable Pin-outs*

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

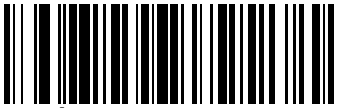
If desired, program the scanner to perform various functions, or activate different features. This chapter describes each user preference feature and provides the programming bar codes necessary for selecting these features.

The scanner ships with the settings shown in the *User Preferences Default Table on page 4-2* (also see *Appendix A, Standard Default Parameters* 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 Default Parameters* 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
Parameter Bar Code Scanning	Enable	4-4
Beeper Tone	Medium	4-4
Beeper Volume	High	4-5
Power Mode	Continuous On	4-5
Scan Pattern	Multi-line Always Raster	4-6
Scan Line Width	Full Width	4-7
Raster Height	Adjustable Raster	4-8
Laser On Time	3.0 Sec	4-9
Beep After Good Decode	Enable	4-9
PDF Decode Feedback	Disable	4-10

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 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 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

Parameter Bar Code Scanning

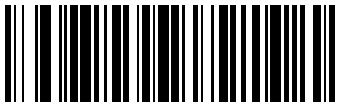
To disable the decoding of parameter bar codes, including the **Set Defaults** parameter bar codes, scan the **Disable Parameter Scanning** bar code below. To enable decoding of parameter bar codes, scan **Enable Parameter Scanning**.

***Enable Parameter Bar Code Scanning**
(01h)

Disable Parameter Bar Code Scanning
(00h)

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.

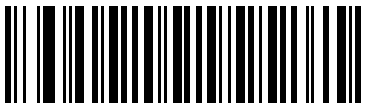
***Continuous On**

Reduced Power Mode

Scan Pattern

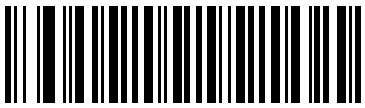
This parameter determines the pattern (mode) of scanning. Scan the appropriate bar code below to set the scanning mode.

- **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 2-6 on page 2-6*.)
- **Multi-line Smart Raster** - The scan line begins as a single line, and immediately rasters upon seeing a stacked GS1 DataBar code or a 2D variant. (For an example of a multi-line scan, see *Figure 2-7 on page 2-6*.)
- **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

Raster Height

This parameter determines the scanner's raster height when scanning PDF symbols only.

- **Short Raster** - Scan **Short Raster** to use the standard 1D raster height of approximately 4°. This option provides the best performance on MicroPDF and short PDF symbols.
- **Tall Raster** - Scan **Tall Raster** for a raster of approximately 50% taller than the short raster, opening to about 6° and slowing to capture bar code data more efficiently. This provides the best performance on tall PDF symbols.
- **Adjustable Raster** (default) - This option starts as a short raster, then opens to a tall raster and slows half a second later. Use this option when scanning a variety of symbol heights.

Short Raster

Tall Raster

***Adjustable Raster**

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.

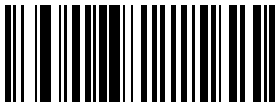
To set a Laser On Time, scan the bar code below. Next, scan two numeric bar codes beginning on page D-1 in *Appendix D, Numeric Bar Codes* that correspond to the desired on time. Single digit numbers must have a leading zero. For example, to set an On Time of 0.5 seconds, scan the bar code below, then 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)

PDF Decode Feedback

Scan a bar code below to select whether or not the scanner emits a clicking sound during PDF417 decoding. This clicking helps the user ensure proper alignment, motion, and distance during decoding. The scanner issues a standard decode beep upon successfully decoding the bar code.

Enable PDF Decode Feedback

***Disable PDF Decode Feedback**

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 (*).

Connecting a Keyboard Wedge Interface

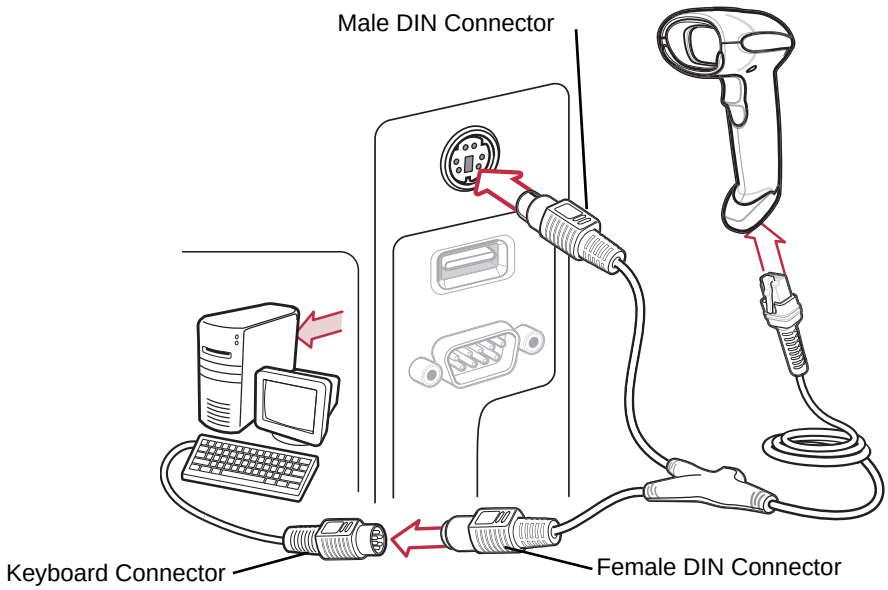


Figure 5-1 *Keyboard Wedge Connection with Y-cable*

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 are 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 Default Parameters* 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	5-10
Function Key Mapping	Disable	5-10
FN1 Substitution	Disable	5-11
Send and Make Break	Send	5-11

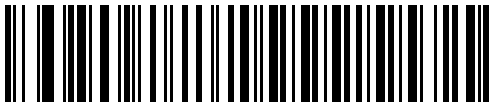
[1]User selection is required to configure this interface and this is the most common selection.

Keyboard Wedge Host Parameters

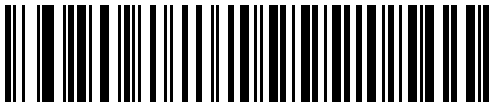
Keyboard Wedge Host Types

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

IBM PC/AT & IBM PC Compatibles[1]



IBM AT Notebook

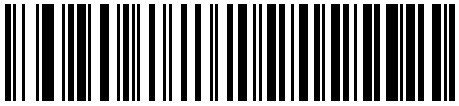


NCR 7052

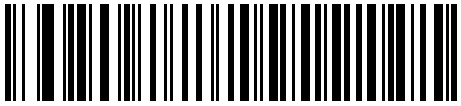
NOTE [1]User selection is required to configure this interface and this is the most common selection.

Keyboard Wedge Country Types (Country Codes)

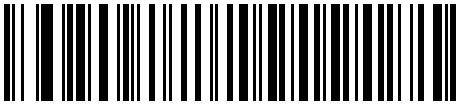
Scan the bar code corresponding to the keyboard type. If the keyboard type is not listed, see *Alternate Numeric Keypad Emulation on page 5-8*.



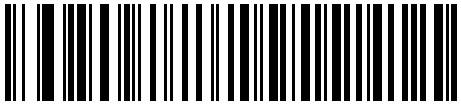
***North American**



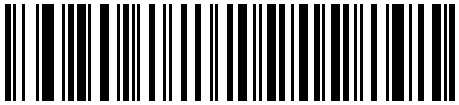
German Windows



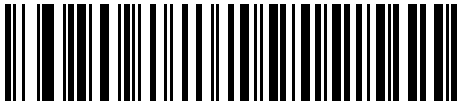
French Windows



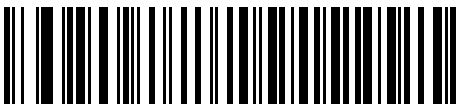
French Canadian Windows 95/98



French Canadian Windows XP/2000

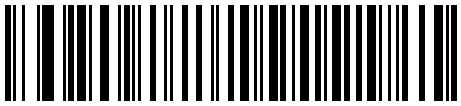


Spanish Windows

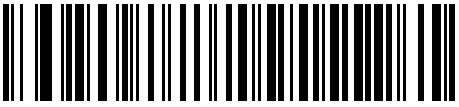


Italian Windows

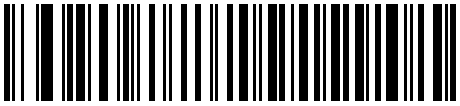
Keyboard Wedge Country Types (continued)



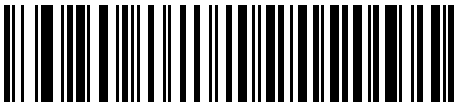
Swedish Windows



UK English Windows



Japanese Windows



Portuguese-Brazilian Windows

Ignore Unknown Characters

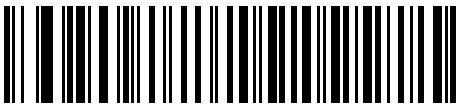
Unknown characters are characters the host does not recognize. When **Send Bar Codes With Unknown Characters** is selected, all bar code data is sent except for unknown characters, and no error beeps sound on the scanner. When **Do Not Send Bar Codes With Unknown Characters** is selected, bar code data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

***Send Bar Codes with Unknown Characters**

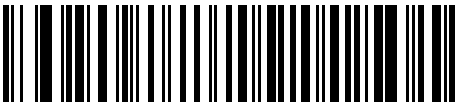
Do Not Send Bar Codes with Unknown Characters

Keystroke Delay

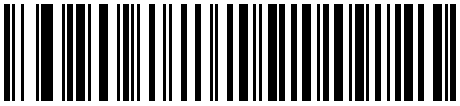
This is the delay in milliseconds between emulated keystrokes. Scan a bar code below to increase the delay when hosts require a slower transmission of data.



***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.

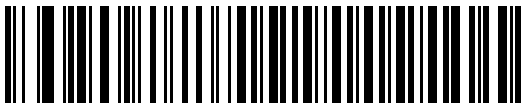
Enable Caps Lock On

***Disable Caps Lock On**

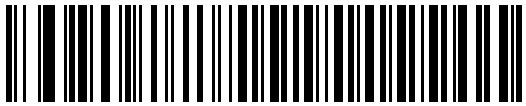
Caps Lock Override

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.



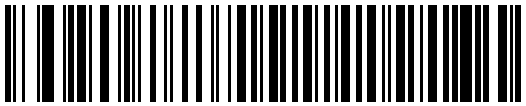
Enable Caps Lock Override



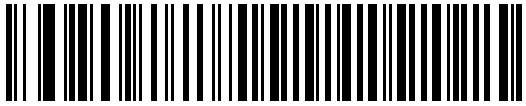
***Disable Caps Lock Override**

Convert Wedge Data

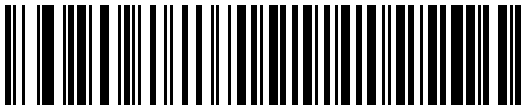
When enabled, the scanner will convert all bar code data to the selected case.



Convert to Upper Case



Convert to Lower Case



***No Convert**

Function Key Mapping

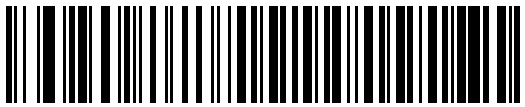
ASCII values under 32 are normally sent as control key sequences (see *Table 5-2 on page 5-13*). When this parameter is enabled, the keys in bold are sent in place of the standard key mapping. Table entries that do not have a bold entry remain the same whether or not this parameter is enabled.

Enable Function Key Mapping

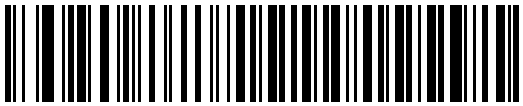
***Disable Function Key Mapping**

FN1 Substitution

When enabled, the scanner replaces FN1 characters in a GS1-128 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.

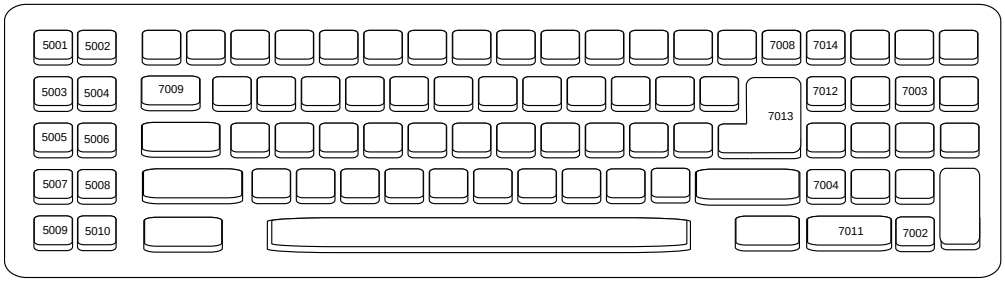


Figure 5-2 *IBM PC/AT*

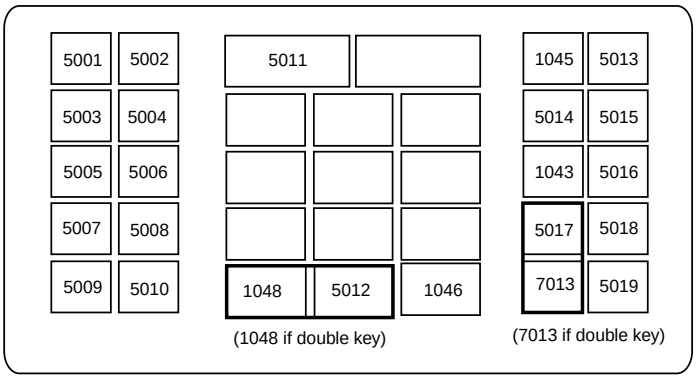


Figure 5-3 *NCR 7052 32-KEY*

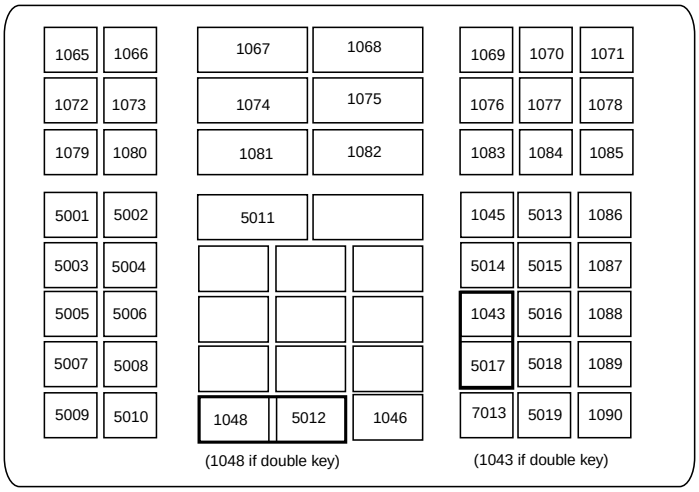


Figure 5-4 *NCR 7052 58-KEY*

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 the "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 the “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 the "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 the “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 the "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
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, Symbol offers different cables providing TTL-to-RS-232C conversion. Contact Zebra Enterprise Mobility 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.

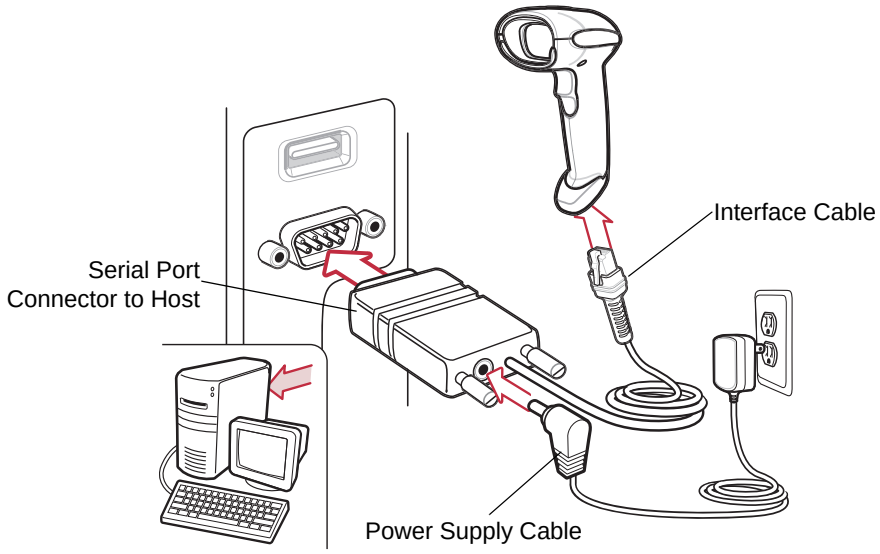


Figure 6-1 *RS-232 Direct Connection*

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 Default Parameters* 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 Transmission 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)

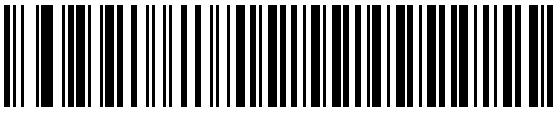
Selecting the ICL, Fujitsu, Wincor-Nixdorf Mode A, Wincor-Nixdorf Mode B, OPOS terminal enables the transmission of code ID characters listed in *Table 6-3* below. These code ID characters are not programmable and are separate from the Transmit Code ID feature. The Transmit Code ID feature should not 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>
GS1-128	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.



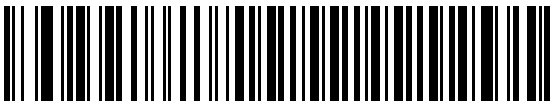
***Standard RS-232**

ICL RS-232

Wincor-Nixdorf RS-232 Mode A

Wincor-Nixdorf RS-232 Mode B

Olivetti ORS4500



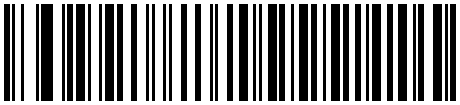
Omron

OPOS/JPOS

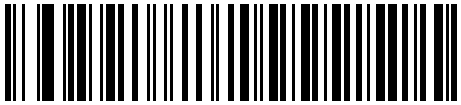
Fujitsu RS-232

Baud Rate

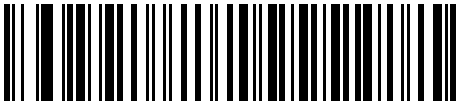
Baud rate is the number of bits of data transmitted per second. Set the scanner's baud rate to match the baud rate setting of the host device. Otherwise, data may not reach the host device or may reach it in distorted form.



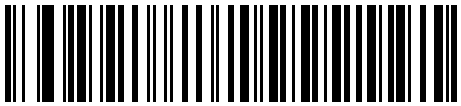
Baud Rate 600



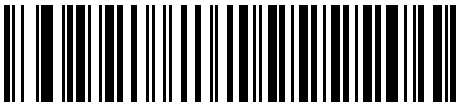
Baud Rate 1200



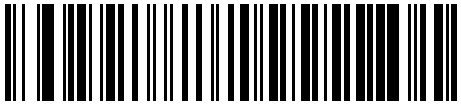
Baud Rate 2400



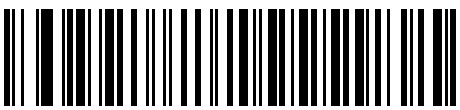
Baud Rate 4800



***Baud Rate 9600**



Baud Rate 19,200



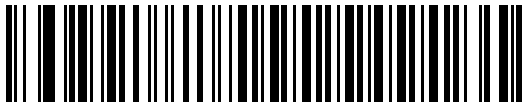
Baud Rate 38,400

Parity

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

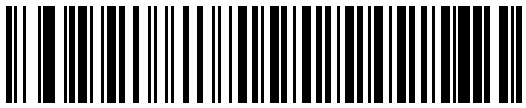
- Select **Odd** parity and the parity bit value is set to 0 or 1, based on data, to ensure that an odd number of 1 bits are contained in the coded character.
- Select **Even** parity and the parity bit value is set to 0 or 1, based on data, to ensure that an even number of 1 bits are contained in the 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

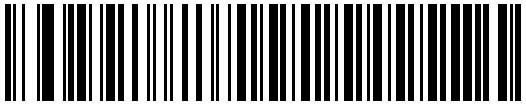


Even

Mark



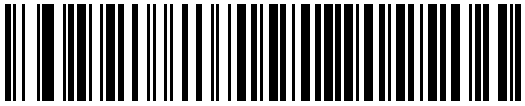
Space



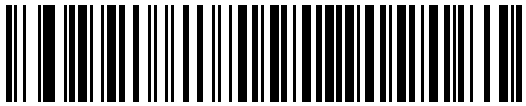
***None**

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.



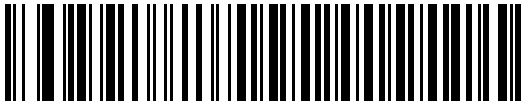
***1 Stop Bit**



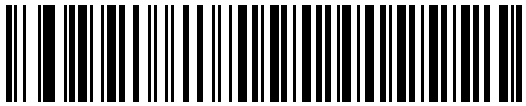
2 Stop Bits

Data Bits (ASCII Format)

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



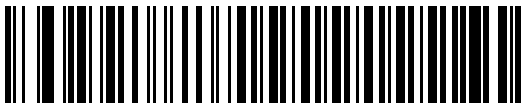
7-Bit



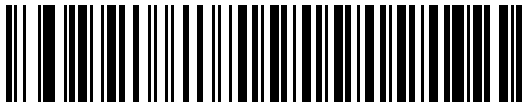
***8-Bit**

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.

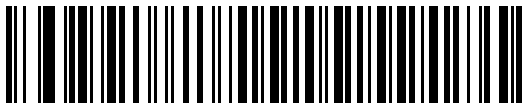
If the above communication sequence fails, the scanner issues an error indication. In this case, the data is lost and must be rescanned.

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

NOTE The DTR signal is jumpered to the active state.

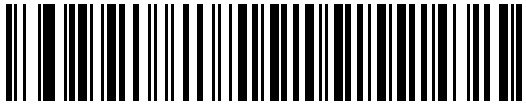
- **None**: Scan the bar code below if no Hardware Handshaking is desired.
- **Standard RTS/CTS**: Scan the bar code below to select Standard RTS/CTS Hardware Handshaking.
- **RTS/CTS Option 1**: When RTS/CTS Option 1 is selected, the scanner asserts RTS before transmitting and ignores the state of CTS. 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**

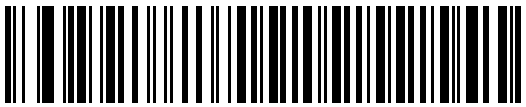


Standard RTS/CTS

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.

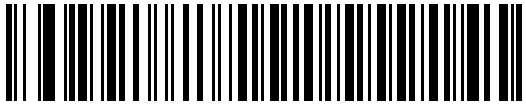
If Software Handshaking and Hardware Handshaking are both enabled, Hardware Handshaking takes precedence.

- **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.

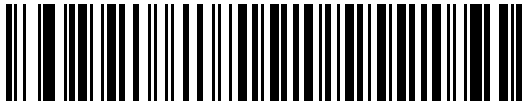
Software Handshaking (continued)

*None



ACK/NAK

ENQ

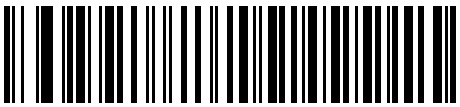


ACK/NAK with ENQ

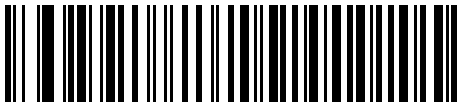
XON/XOFF

Host Serial Response Time-out

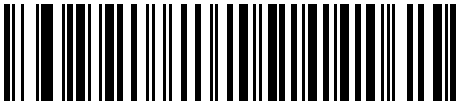
This parameter specifies how long the scanner waits for an ACK, NAK, ENQ, XON, or CTS before determining that a transmission error occurred.



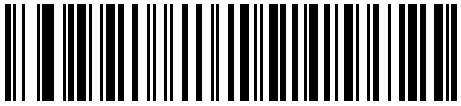
***Minimum: 2 Sec**



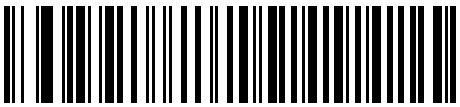
Low: 2.5 Sec



Medium: 5 Sec



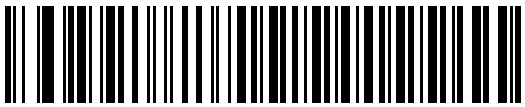
High: 7.5 Sec



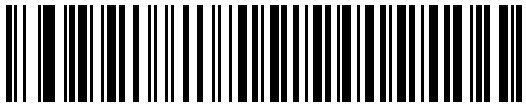
Maximum: 9.9 Sec

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.



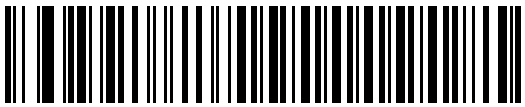
***Host: Low RTS**



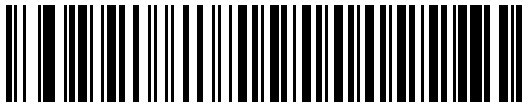
Host: High RTS

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.



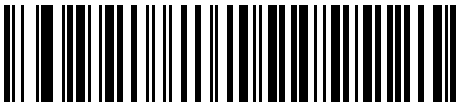
Beep On <BEL> Character (Enable)



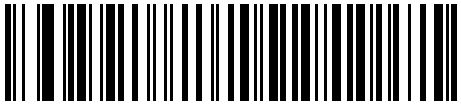
***Do Not Beep On <BEL> Character (Disable)**

Intercharacter Delay

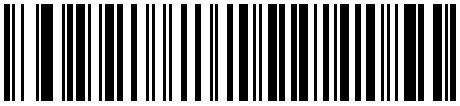
This parameter specifies the intercharacter delay inserted between character transmissions.



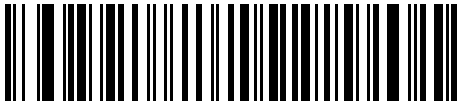
***Minimum: 0 msec**



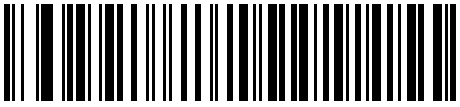
Low: 25 msec



Medium: 50 msec



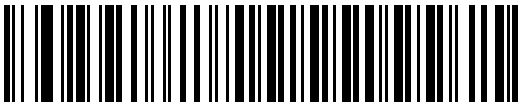
High: 75 msec



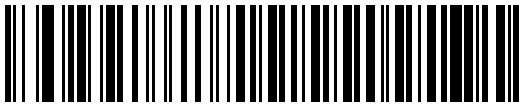
Maximum: 99 msec

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)

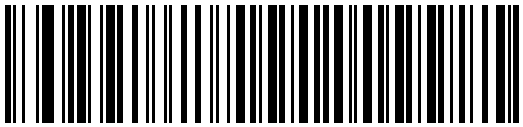


Beep/LED After Transmission

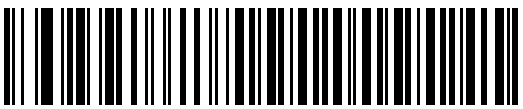
Beep/LED After CTS Pulse

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)*

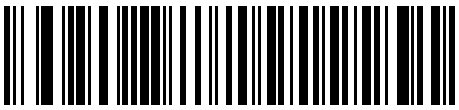
ASCII Value	Full ASCII Code 39 Encode Character	ASCII Character
1117	+U	u
1118	+V	v
1119	+W	w
1120	+X	x
1121	+Y	y
1122	+Z	z
1123	%P	{
1124	%Q	|
1125	%R	}
1126	%S	~
1127		Undefined
7013		ENTER

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 (*).



* Indicates Default — ***North American Standard USB Keyboard** — Feature/Option

Connecting a USB Interface

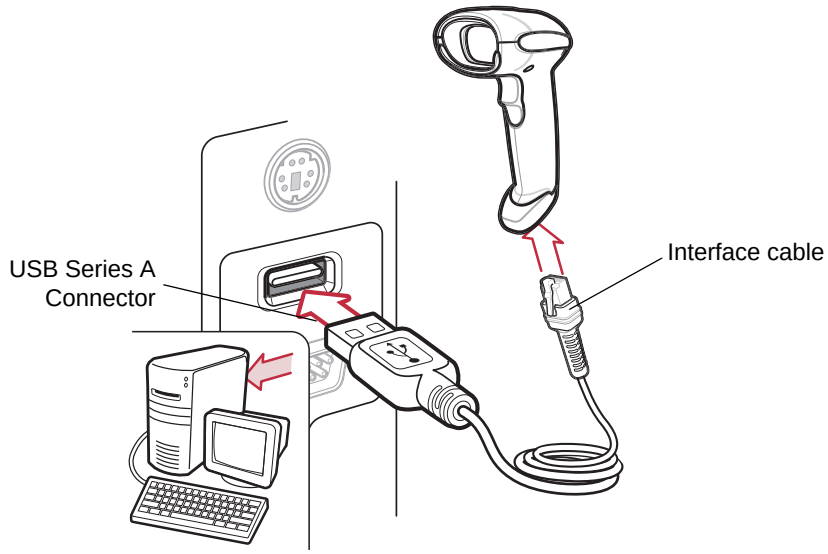


Figure 7-1 *USB Connection*

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 are 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 7-5*.
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 7-5.

NOTE See *Appendix A, Standard Default Parameters* 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	7-5
USB Country Keyboard Types (Country Codes)	North American	7-6
USB Keystroke Delay	No Delay	7-8
USB CAPS Lock Override	Disable	7-8
USB Ignore Unknown Characters	Send	7-9
Emulate Keypad	Disable	7-9
USB FN1 Substitution	Disable	7-10
Function Key Mapping	Disable	7-10
Simulated Caps Lock	Disable	7-11
Convert Case	No Case Conversion	7-11

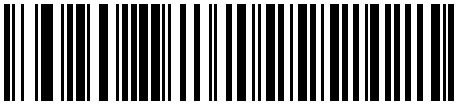
USB Host Parameters

USB Device Type

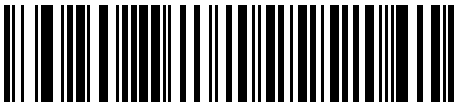
Select the desired USB device type.

NOTE 1. When changing USB Device Types, the scanner automatically restarts. The scanner issues the standard startup beep sequences.

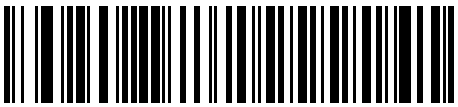
2. In IBM Hand-Held USB mode, the Scan Disable command blocks the transmission of scan data to the host and does not turn the scanner completely off. In IBM Hand-Held USB with Full Scan Disable (OPOS) mode a Scan Disable command will completely turn off the Scanner



***HID Keyboard Emulation**



IBM Table Top USB



IBM Hand-Held USB

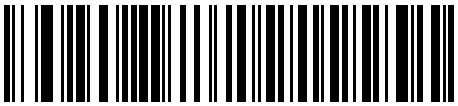
IBM Hand-Held USB with Full Scan Disable (OPOS)

Simple COM Port Emulation

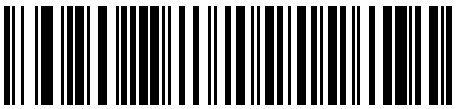
USB Country Keyboard Types (Country Codes)

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.

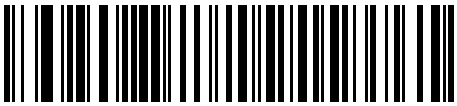


***North American Standard USB Keyboard**



German Windows

French Windows

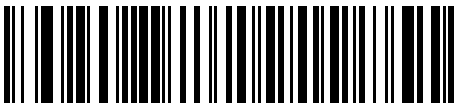


French Canadian Windows 95/98

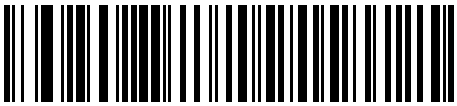
French Canadian Windows 2000/XP

Spanish Windows

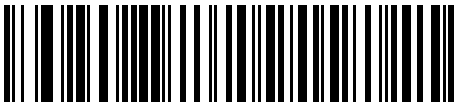
USB Country Keyboard Types (Country Codes continued)



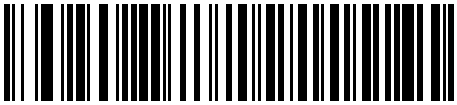
Italian Windows



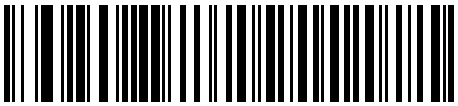
Swedish Windows



UK English Windows



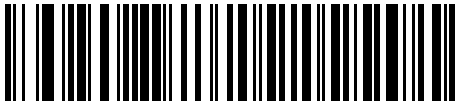
Japanese Windows (ASCII)



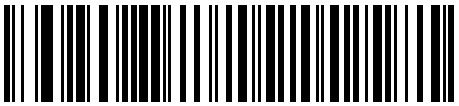
Portuguese-Brazilian Windows

USB Keystroke Delay

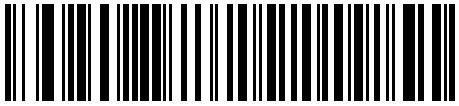
This parameter sets the delay, in milliseconds, between emulated keystrokes. Scan a bar code below to increase the delay when hosts require a slower transmission of data.



***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.”

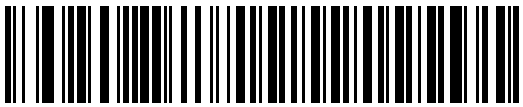
***Disable Keypad Emulation**

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 a GS1-128 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).

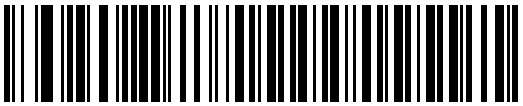
Enable FN1 Substitution



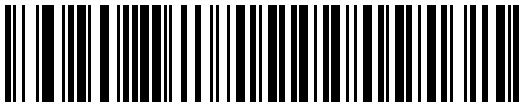
***Disable FN1 Substitution**

Function Key Mapping

ASCII values under 32 are normally sent as a control-key sequences (see *Table 7-2 on page 7-12*). 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.



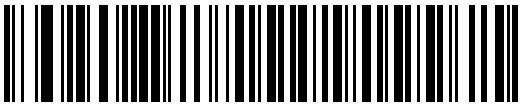
***Disable Function Key Mapping**



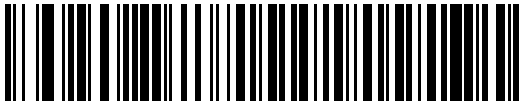
Enable Function Key Mapping

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**

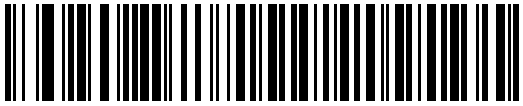


Enable Simulated Caps Lock

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 the "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 the “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 the "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 the "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 the "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.

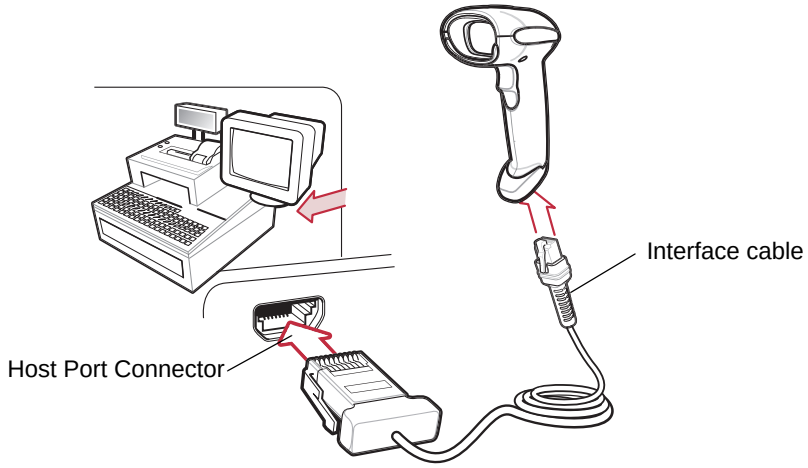


Figure 8-1 *IBM Direct Connection*

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 are 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 8-4*.
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 8-4.

NOTE See *Appendix A, Standard Default Parameters* 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	8-4
Convert Unknown to Code 39	Disable	8-5
Ignore Beep	Disable	8-6
Ignore Bar Code Configuration	Disable	8-6

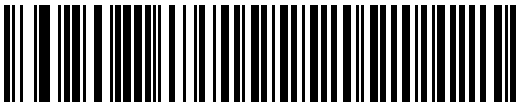
IBM 468X/469X Host Parameters

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)

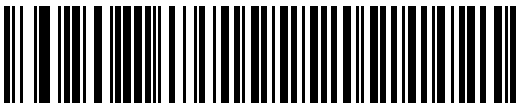
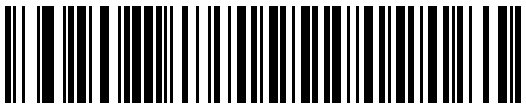


Table-top Scanner Emulation (Port 17)

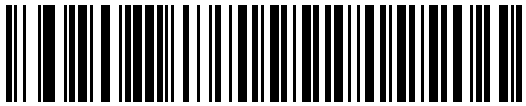
NOTE [1]User selection is required to configure this interface and this is the most common selection.

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**

Optional IBM Parameters

If you configure the scanner and find the settings were not saved, or changed, when the system is restarted scan the bar codes that follow to override IBM interface defaults.

Scan a bar code below after setting defaults and before configuring the scanner.

Ignore Beep

The host can send a beep request to the scanner. When this parameter is enabled, the request is not sent to the attached scanner. All directives are still acknowledged to the IBM RS485 host as if it were processed.

***Disable**

Enable

Ignore Bar Code Configuration

The host has the ability to enable/disable code types. When this parameter is enabled, the request is not sent to the attached scanner. All directives are still acknowledged to the IBM RS485 host as if it were processed.

***Disable**

Enable

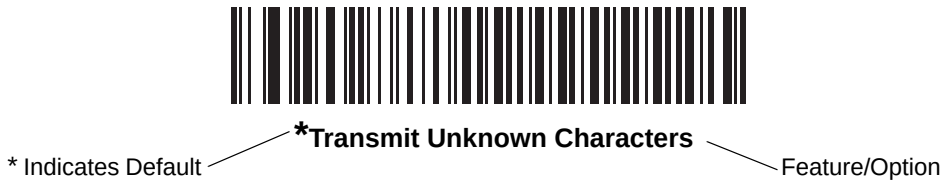
Chapter 9 Wand Emulation Interface

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.

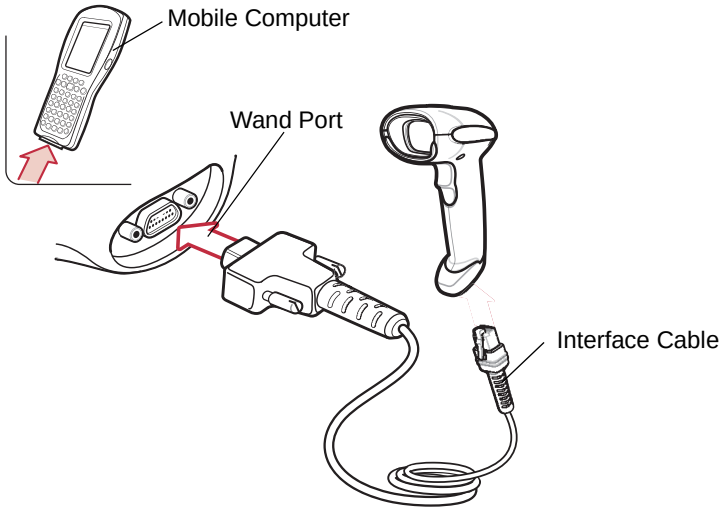


Figure 9-1 *Wand Emulation Connection*

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 are the same.

1. Connect the modular connector of the Wand 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 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 Default Parameters* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 9-1 *Wand Emulation Default Table*

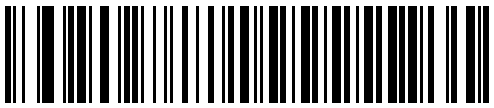
Parameter	Default	Page Number
Wand Emulation Host Parameters		
Wand Emulation Host Types	Symbol OmniLink Interface Controller[1]	9-4
Leading Margin	80 msec	9-5
Polarity	Bar High/Margin Low	9-6
Ignore Unknown Characters	Send	9-6
Convert All Bar Codes to Code 39	Disable	9-7
Convert Code 39 to Full ASCII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

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

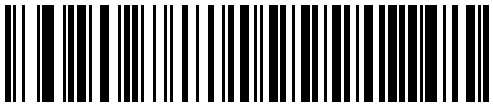
Wand Emulation Host Parameters

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)

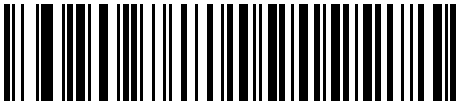
Symbol PTC Terminal (Telxon)

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

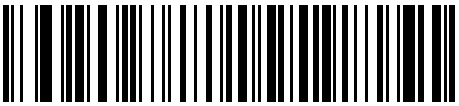
Leading Margin (Quiet Zone)

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.

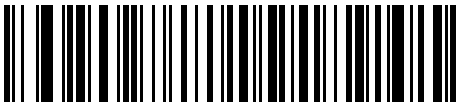
NOTE 250 msec is the maximum value that this parameter can attain, however, 200 msec is sufficient.



***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 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 (see *Chapter 14, Advanced Data Formatting*).

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

NOTE Wand emulation emits an error beep when there is an attempt to send composite data. No data is sent.

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.

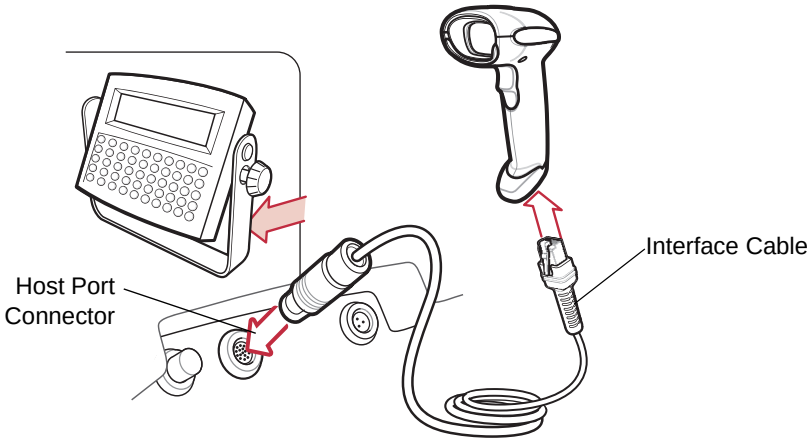


Figure 10-1 *Scanner Emulation Connection*

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 Default Parameters* 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	10-7
Convert All Bar Codes to Code 39	Do Not Convert Bar Codes to Code 39	10-7
Code 39 Full ASCII Conversion	Disable	10-8
Transmission Timeout	3 Sec	10-9
Ignore Unknown Characters	Ignore Unknown Characters	10-10
Leading Margin	2 ms	10-10
Check for Decode LED	Check for Decode LED	10-11

[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 Symbol 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

123Scan² is an easy-to-use, PC-based software tool that enables the quick and easy setup of Zebra scanners.

123Scan² uses a wizard tool to guide users through a streamlined set up process. Once parameters are set, the values are saved to a configuration file that can be distributed via e-mail, electronically downloaded via a USB or RS-232 cable, or used to generate a sheet of programming bar codes that can be scanned.

123Scan² can generate multiple reports that can be easily rebranded using Microsoft Word or Access. Report options include programmed parameters, asset tracking information and proof of scanner output.

Additionally, 123Scan² can display scanned bar code data including non-printable characters. It can display, optimize and save pictures from an imaging scanner. It can also upgrade scanner firmware, automatically check online to enable support for newly released products, generate a single 2D bar code for one scan programming and stage large numbers of scanners simultaneously via USB hub(s).

Communication with 123Scan2

To communicate with the 123Scan² program which runs on a host computer running a Windows XP SP2 and Windows 7 operating system, use a USB cable to connect the scanner cradle to the host computer (see *Connecting a USB Interface on page -1*).

123Scan2 Requirements

- Host computer with Windows XP SP2 or Windows 7
- Scanner
- Cradle (cordless scanning only)
- USB cable.

For more information on 123Scan², go to:

http://www.zebra.com/123scan2

For a one minute tour of 123Scan², go to:

http://www.zebra.com/scannersoftwarevideos

To download 123Scan² software and access the Help file integrated in the utility, go to:

http://www.zebra.com/123scan2

Scanner SDK, Other Software Tools, and Videos

Tackle all your scanner programming needs with our diversified set of software tools. Whether you need to simply stage a device, or develop a fully featured application with image and data capture as well as asset management, these tools help you every step of the way. To download any of the free tools listed below, go to: www.zebra.com/software.

- 123Scan² Configuration Utility (described in this chapter)
- Scanner SDK for Windows
- How-to-Videos
- Virtual Com Port Driver
- OPOS Driver
- JPOS Driver
- Scanner User Documentation

Archive of Older Drivers.

Chapter 12 Symbologies

Introduction

This chapter describes symbology features and provides the programming bar codes for selecting these features. Before programming, follow the instructions in *Chapter 1, Getting Started*.

The scanner is shipped with the settings shown in *Table 12-1 on page 12-2* (also see *Appendix A, Standard Default Parameters* 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 12-14*. 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 12-6.

NOTE See *Appendix A, Standard Default Parameters* 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	12-6
UPC-E	Enable	12-6
UPC-E1	Disable	12-7
EAN-8/JAN 8	Enable	12-8
EAN-13/JAN 13	Enable	12-8
Bookland EAN	Disable	12-9
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	Ignore	12-9
Decode UPC/EAN/JAN Supplemental Redundancy	7	12-14
Transmit UPC-A Check Digit	Enable	12-14
Transmit UPC-E Check Digit	Enable	12-15
Transmit UPC-E1 Check Digit	Enable	12-15
UPC-A Preamble	System Character	12-16
UPC-E Preamble	System Character	12-17
UPC-E1 Preamble	System Character	12-18
Convert UPC-E to A	Disable	12-19
Convert UPC-E1 to A	Disable	12-19
EAN-8/JAN-8 Extend	Disable	12-20
Bookland ISBN Format	ISBN-10	12-21

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

Parameter	Default	Page Number
UCC Coupon Extended Code	Disable	12-22
Code 128		
Code 128	Enable	12-23
GS1-128 (formerly UCC/EAN-128)	Enable	12-23
ISBT 128 (non-concatenated)	Enable	12-24
Code 39		
Code 39	Enable	12-25
Trioptic Code 39	Disable	12-25
Convert Code 39 to Code 32 (Italian Pharmacy Code)	Disable	12-26
Code 32 Prefix	Disable	12-26
Set Length(s) for Code 39	2 to 55	12-27
Code 39 Check Digit Verification	Disable	12-28
Transmit Code 39 Check Digit	Disable	12-29
Code 39 Full ASCII Conversion	Disable	12-30
Buffer Code 39	Disable	12-31
Code 93		
Code 93	Disable	12-34
Set Length(s) for Code 93	4 to 55	12-34
Code 11		
Code 11	Disable	12-36
Set Lengths for Code 11	4 to 55	12-36
Code 11 Check Digit Verification	Disable	12-38
Transmit Code 11 Check Digit(s)	Disable	12-39
Interleaved 2 of 5 (ITF)		
Interleaved 2 of 5 (ITF)	Enable	12-40
Set Lengths for I 2 of 5	14	12-40
I 2 of 5 Check Digit Verification	Disable	12-42
Transmit I 2 of 5 Check Digit	Disable	12-43
Convert I 2 of 5 to EAN-13	Disable	12-43

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

Parameter	Default	Page Number
Discrete 2 of 5 (DTF)		
Discrete 2 of 5	Disable	12-44
Set Length(s) for D 2 of 5	12	12-44
Chinese 2 of 5		
Enable/Disable Chinese 2 of 5	Disable	12-46
Codabar (NW - 7)		
Codabar	Disable	12-47
Set Lengths for Codabar	5 to 55	12-47
CLSI Editing	Disable	12-49
NOTIS Editing	Disable	12-49
MSI		
MSI	Disable	12-50
Set Length(s) for MSI	2 to 55	12-50
MSI Check Digits	One	12-51
Transmit MSI Check Digit	Disable	12-52
MSI Check Digit Algorithm	Mod 10/Mod 10	12-52
GS1 DataBar (formerly RSS - Reduced Space Symbology)		
GS1 DataBar-14	Disable	12-53
GS1 DataBar Limited	Disable	12-53
GS1 DataBar Expanded	Disable	12-53
Convert GS1 DataBar to UPC/EAN	Disable	12-54
PDF		
PDF417	Enable (LS4208-PR PDF417 version only)	12-55
MicroPDF		
MicroPDF417	Disable	12-55
MicroPDF Performance	Standard Performance for MicroPDF	12-56
Transmit		
Transmit Symbol in Codeword Format	Disable	12-57
Transmit Unknown Codewords	Disable	12-58

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

Parameter	Default	Page Number
Character		
Escape Character	None	12-58
Delete Character Set ECI's	Transmit	12-59
Composite		
Composite CC-C	Disable	12-60
Composite CC-A/B	Disable	12-60
UPC Composite Mode	UPC Always Linked	12-61
Composite Beep Mode	Beep as Each Code Type is Decoded	12-62
Symbology - Specific Security Levels		
Redundancy Level	1	12-63
Security Levels	0	12-65
Bi-directional Redundancy	Disable	12-66
Intercharacter Gap	Normal Intercharacter Gap	12-66

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**

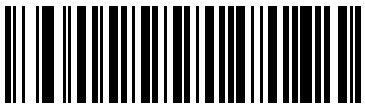
Disable UPC-E

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.

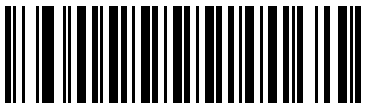


Enable UPC-E1

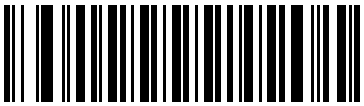
***Disable UPC-E1**

Enable/Disable EAN-13/EAN-8

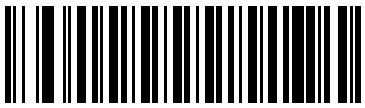
To enable or disable EAN-13 or EAN-8, scan the appropriate bar code below.



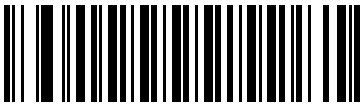
***Enable EAN-13**



Disable EAN-13



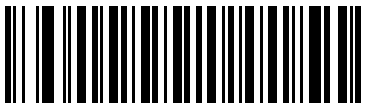
***Enable EAN-8**



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 12-21*. 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 additionally appended characters (2 or 5) according to specific code format conventions (e.g., UPC A+2, UPC E+2, EAN 8+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 12-14* 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 12-14* 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* to enable Bookland EAN, and select a format using *Bookland ISBN Format on page 12-21*.

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

- Select **Supplemental User-Programmable 1** to set a 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on page D-1.
- Select **Supplemental User-Programmable 2** to set a second 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on page D-1.

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

Decode UPC/EAN/JAN Supplementals (continued)

*Ignore UPC/EAN/JAN With Supplementals

Decode UPC/EAN/JAN Only With 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

Decode UPC/EAN/JAN Supplementals (continued)

Smart Supplemental Plus User-Programmable 1

Smart Supplemental Plus User-Programmable 1 and 2

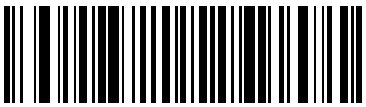
Supplemental User-Programmable 1

Supplemental User-Programmable 2

UPC/EAN/JAN Supplemental Redundancy

With **Autodiscriminate UPC/EAN/JAN Supplementals** or one of the supplemental modes selected, this option adjusts the number of times a symbol without supplementals is decoded before transmission. The range is from 2 to 22 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.

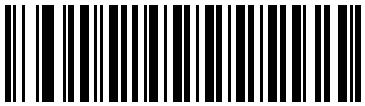
No Preamble
(<DATA>)

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

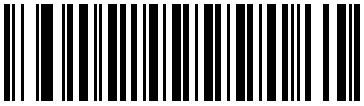
System Character & Country Code
(< COUNTRY CODE>
<SYSTEM CHARACTER> <DATA>)

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>)

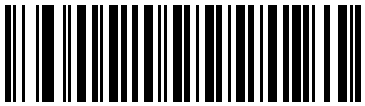
***System Character**
(<SYSTEM CHARACTER> <DATA>)

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 12-9*, 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.

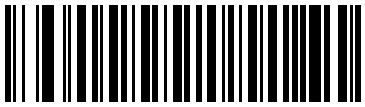
***Bookland ISBN-10**

Bookland ISBN-13

NOTE For Bookland EAN to function properly, first enable Bookland EAN using *Enable/Disable Bookland EAN on page 12-9*, 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/GS1-128 Coupon Codes. UPCA, EAN-13 and GS1-128 must be enabled to scan all types of Coupon Codes.



Enable UCC Coupon Extended Code

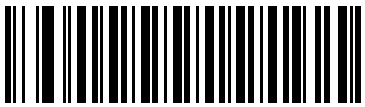
***Disable UCC Coupon Extended Code**

NOTE Use the *UPC/EAN/JAN Supplemental Redundancy* parameter to control autodiscrimination of the GS1-128 (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 GS1-128 (formerly UCC/EAN-128)

To enable or disable GS1-128, scan the appropriate bar code below.

***Enable GS1-128**

Disable GS1-128

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.

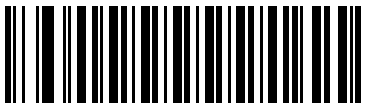
***Enable ISBT 128**

Disable ISBT 128

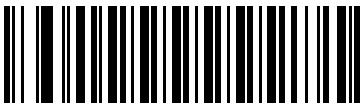
Code 39

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

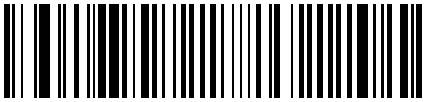
he length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 39 to any length, one or two discrete lengths, or lengths within a specific range. If Code 39 Full ASCII is enabled, **Length Within a Range** or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

Code 39 - One Discrete Length



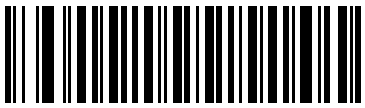
Code 39 - Two Discrete Lengths

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.

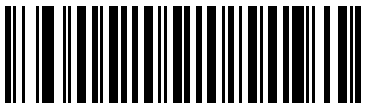


Enable Code 39 Check Digit

***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.



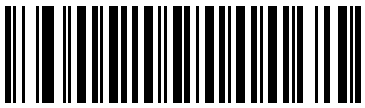
Transmit Code 39 Check Digit (Enable)

***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 7-12* for the appropriate interface.

Code 39 Buffering (Scan & Store)

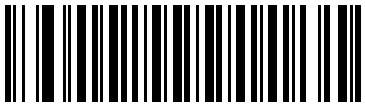
This feature allows the scanner to accumulate data from multiple Code 39 symbols.

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.

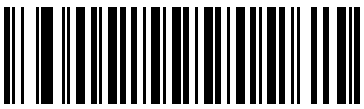
Decode of a valid Code 39 symbol with no leading space causes transmission in sequence of all buffered data in a first-in first-out format, plus transmission of the “triggering” symbol. See the following pages for further details.

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 12-32*) 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

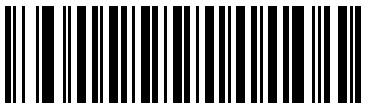
If the symbol just read was the **Transmit Buffer** symbol and the Code 39 buffer is empty:

- 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

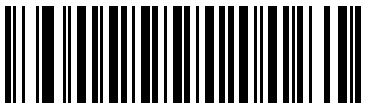
Code 93 - Length Within Range

Code 93 - Any Length

Code 11

Code 11

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



Enable Code 11

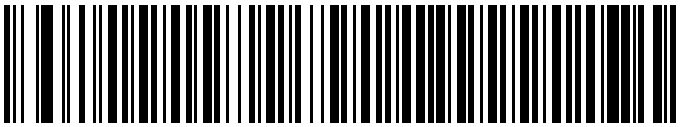
***Disable Code 11**

Set Lengths for Code 11

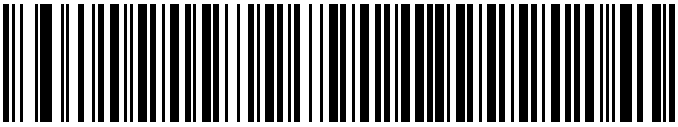
The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 11 to any length, one or two discrete lengths, or lengths within a specific range.

- **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.

Set Lengths for Code 11 (continued)



Code 11 - One Discrete Length



Code 11 - Two Discrete Lengths

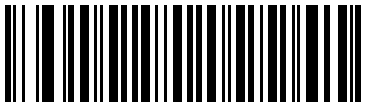
Code 11 - Length Within Range

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)**

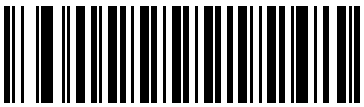
NOTE Code 11 Check Digit Verification must be enabled for this parameter to function.

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

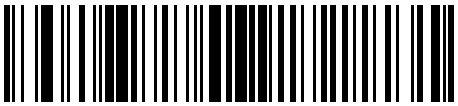
Set Lengths for Interleaved 2 of 5

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.

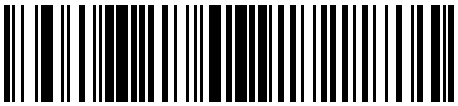
NOTE Cue to the construction of the I 2 of 5 symbology, it is possible for a scan line covering only a portion of the code to be interpreted as a complete scan, yielding less data than is encoded in the bar code. To prevent this, select specific lengths (I 2 of 5 - One Discrete Length - Two Discrete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

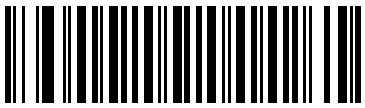
***Disable**

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.

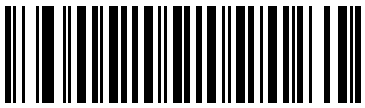


Transmit I 2 of 5 Check Digit (Enable)

***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.



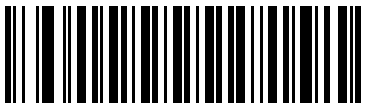
Convert I 2 of 5 to EAN-13 (Enable)

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

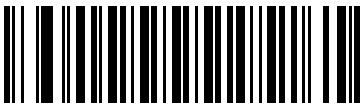
Discrete 2 of 5 (DTF)

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.

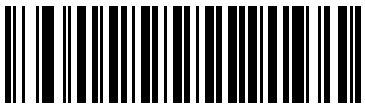
Enable Chinese 2 of 5

***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

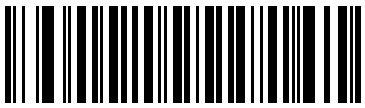
Codabar - Length Within Range

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.

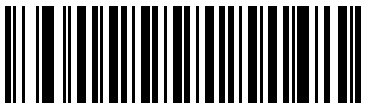
Enable NOTIS Editing

***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.

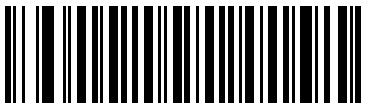
See *MSI Check Digit Algorithm on page 12-52* for the selection of second digit algorithms.

***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.

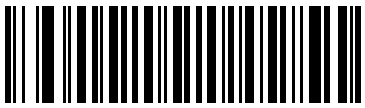


Transmit MSI Check Digit(s) (Enable)

***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.

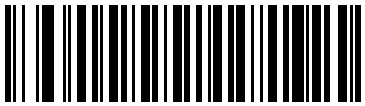


MOD 10/MOD 11

***MOD 10/MOD 10**

GS1 DataBar (formerly RSS - Reduced Space Symbology)

The variants of GS1 DataBar are 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**

PDF417/MicroPDF417

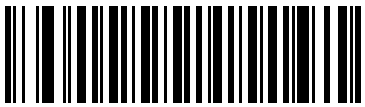
Enable/Disable PDF417

NOTE PDF417 is enabled by default for the Symbol LS4208-PR (PDF417 version) scanner only.

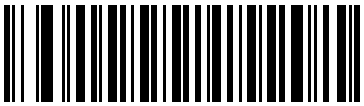
***Enable PDF417**

Disable PDF417

Enable/Disable MicroPDF417



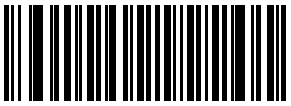
Enable MicroPDF417



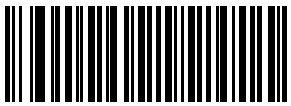
***Disable MicroPDF417**

MicroPDF Performance

If your scanner is having trouble decoding MicroPDF symbols, select Selective Performance. Note that this may decrease decoding aggressiveness on some symbols.



***Standard Performance for MicroPDF**



Selective Performance for MicroPDF

Transmit Symbols in Codeword Format

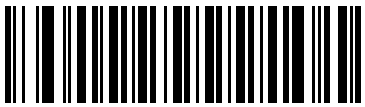
Enabling this activates transmission of each PDF symbol as directly decoded data codewords, whether that symbol is part of a macro PDF sequence or not. Note that data is output as codeword values — not as interpreted data.

“Codeword values” is an ASCII representation of a number from 000 to 928 for each codeword, preceded by an escape character. This escape character is a backslash. For example, the codeword value 005 is sent to the host in the form of \005 for GLIs, and \C005C for ECIs. This output format is based on the AIM USA Uniform Symbology Specification for PDF-417 (1994).

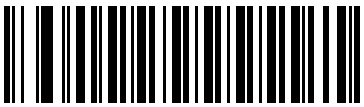
All output codewords take up exactly 4 characters for GLIs and 6 characters for ECIs. However, there may be nondecodable characters in the PDF symbol, such as a GLI sequence. This special codeword sequence activates a certain kind of interpretation to the encoded data. Non-decodable codewords like GLIs are embedded in the output stream just like any other codeword, e.g., \927\001.

Because GLIs are indistinguishable from other codewords in the output data stream, the host must intelligently recognize them as GLIs and process their interpretations.

Note that when a macro PDF sequence is transmitted, the last character in the last block of data transmitted is always \922 (if selected). This indicates the end of that macro PDF transmission.



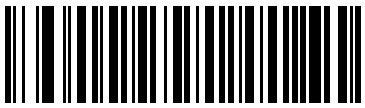
Enable Transmit In Codeword Format



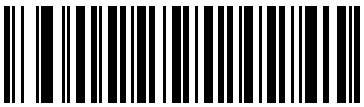
***Disable Transmit In Codeword Format**

Transmit Unknown Codewords

This enables using the output codeword format for transmitting any non-GLI or non-macro PDF codeword. If this is not enabled and an unknown codeword is found, a decode error beep sounds.



Transmit Unknown Codewords



***Do Not Transmit Unknown Codewords**

Escape Characters

This enables the backslash (\) character as an Escape character for systems that can process transmissions containing special data sequences. Scan a bar code below to either format special data (e.g., GLI escapes, MacroPDF-417 Control Block optional fields) according to the GLI (Global Label Identifier) protocol or the ECI (Extended Channel Interpretation) protocol, or to disable this parameter.

When ECI or GLI protocol is selected, backslashes encoded in the data will be doubled upon transmission. If 'None' is selected and a barcode containing an escape sequence is scanned, the scanner will emit an error beep.

ECI Protocol

GLI Protocol

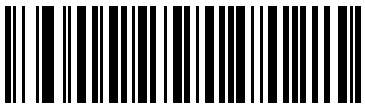
***None**

Delete Character Set ECIs

This parameter enables the scanner to delete any escape sequences representing Character Set ECIs (also known as GLIs) from its buffer before transmission. In many receiving systems, Character Set ECIs can be removed without affecting the way data is displayed or processed.

When deletion is selected, the scanner transmits data from PDF-417 and MicroPDF-417 bar codes containing Character Set ECIs, even when the ECI Protocol is disabled.

Scan a bar code to delete or transmit character set ECIs.



Delete Character Set ECIs

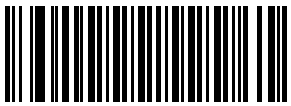
***Transmit Character Set ECIs**

Composite Codes

Composite CC-C

Scan a bar code below to enable or disable composite bar codes of type CC-C. If you select Enable, GS1-128 (the associated 1D symbology) must also be enabled.

Enable CC-C



***Disable CC-C**

Composite CC-A/B

Scan a bar code below to enable or disable composite bar codes of type CC-A/B. To specify which CC-A/B composites are decoded, you may enable or disable the associated 1D symbology. For example, to allow all CC-A/B types, enable UPC-A, UPC-E, EAN-8, EAN-13, GS1-128, GS1 DataBar-14, GS1 DataBar-14 Limited and GS1 DataBar-14 Expanded. Disabling any of these prevents that type of CC-A symbol from being decoded.

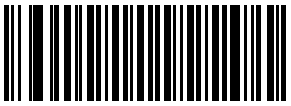
Enable CC-A/B

***Disable CC-A/B**

UPC Composite Mode

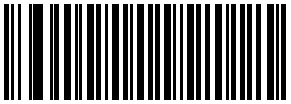
UPC symbols can be “linked” with a 2D symbol during transmission as if they were one symbol. Three options are offered for these symbols:

- If **UPC Never Linked** is selected, UPC bar codes are transmitted regardless of whether a 2D symbol is detected.
- If **UPC Always Linked** is selected, UPC bar codes are only transmitted when the 2D portion is detected.
- If **Autodiscriminate UPC Composites** is selected, the scanner determines if there is a 2D portion, then transmits the UPC portion only.



UPC Never Linked

***UPC Always Linked**

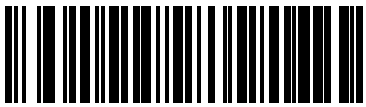


Autodiscriminate UPC Composites

Composite Beep Mode

To select the number of decode beeps when a composite bar code is decoded, scan the appropriate bar code.

Single Beep After Both are Decoded



***Beep as Each Code Type is Decoded**

Double Beep After Both are Decoded

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:

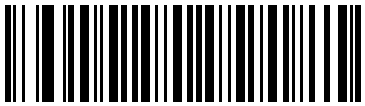
Code Type	Code Length
MSI	4 characters or less
D 2 of 5	8 characters or less
I 2 of 5	8 characters or less
Codabar	8 characters or less

Redundancy Level 4

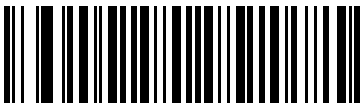
The following code types must be successfully read three times before being decoded:

Code Type	Code Length
All	All

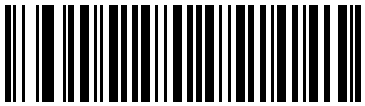
Redundancy Level (continued)



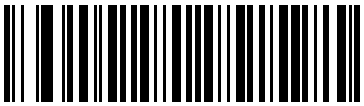
***Redundancy Level 1**



Redundancy Level 2



Redundancy Level 3

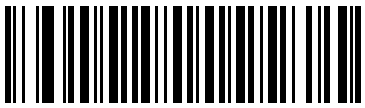


Redundancy Level 4

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.

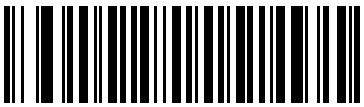
- **Security Level 0:** This default setting allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- **Security Level 1:** Select this option if misdecodes occur. This security level should eliminate most misdecodes.
- **Security 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 Redunda\ncy

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**

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 Gap**

Large Intercharacter Gap

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 Default Parameters* 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 (*).

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 Default Parameters* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 13-1 *Miscellaneous Scanner Options Default Table*

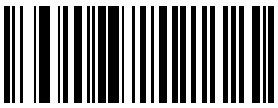
Parameter	Default	Page Number
Transmit Code ID Character	None	13-3
Prefix Value	7013 <CR><LF>	13-3
Suffix Value	7013 <CR><LF>	13-3
Scan Data Transmission Format	Data as is	13-4
FN1 Substitution Values	Set	13-6
Transmit “No Read” Message	Disable	13-6
Synapse Interface	Standard	13-7
Report Version		13-8
Report Synapse Cable		13-8

Miscellaneous Scanner Parameters

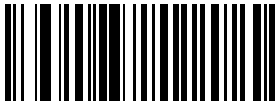
Transmit Code ID Character

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.

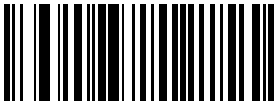
Select no Code ID character, a Symbol Code ID character, or an AIM Code ID character. For Code ID Characters, see *Symbol Code Identifiers on page B-1* and *AIM Code Identifiers on page B-2*.



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 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>**.

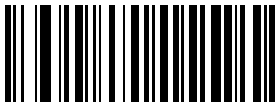
Scan **Enter** on page 13-5 to complete the change. To set values for the prefix and/or suffix, see *Prefix/Suffix Values on page 13-3*. Scan **Data Format Cancel** on page 13-5 to cancel the change.

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

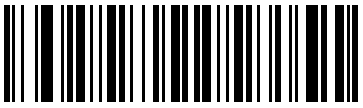
Data Format Cancel

FN1 Substitution Values

The Wedge and USB HID Keyboard hosts support an FN1 substitution feature. When enabled any FN1 character (0x1b) in a GS1-128 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 *ASCII Value Standard Default Parameters Table 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 5-11.

To enable FN1 Substitution for USB HID keyboard, scan the **Enable FN1 Substitution** bar code on page 7-10.

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.

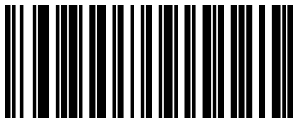
***Standard Synapse Connection**

Auxiliary Synapse Port Connection

“Plug and Play” Synapse Connection

Report Version

Scan the bar code below to report the software revision installed in the scanner's primary microprocessor.



Report Software Version

Report Synapse Cable

Scan the bar code below to report the software revision of the attached Synapse cable. If the scanner does not detect an attached Synapse cable, it reports *Synapse not attached*.

Report Synapse Cable

Chapter 14 Advanced Data Formatting

Introduction

Advanced Data Formatting (ADF) is a means of customizing data before transmission to the host device. Edit scan data to suit particular requirements.

To implement ADF, scan a related series of bar codes, which begin on page 14-8, or install the 123Scan utility (see *Chapter 11, 123Scan*) which programs the scanner with ADF rules.

NOTE If using the wand interface with the scanner, you cannot use ADF rules to format data.

Rules: Criteria Linked to Actions

ADF uses **rules** to customize data. These rules perform detailed actions when the data meets certain criteria. One rule may consist of single or multiple criteria applied to single or multiple actions.

For instance, a data formatting rule could be:

Criteria: *When scan data is Code 39, length 12, and data at the start position is the string "129"*,

Actions: *pad all sends with zeros to length 8,*
send all data up to X,
send a space.

Scanning a Code 39 bar code of 1299X1559828 transmits the following: 00001299<space>. If you scan a Code 39 bar code of 1299X15598, this rule is ignored because the bar code did not meet the length criteria.

The rule specifies the editing conditions and requirements before data transmission occurs.

Using ADF Bar Codes

When programming a rule, make sure the rule is logically correct. Plan ahead before you start scanning.

To program each data formatting rule:

- **Start the Rule**. Scan the Begin New Rule bar code on page 14-8.
- **Criteria**. Scan the bar codes for all pertinent criteria. Criteria can include code type (e.g., Code 128), code length, or data that contains a specific character string (e.g., the digits “129”). See *Criteria on page 14-11*.
- **Actions**. Scan all actions related to, or affecting, these criteria. The actions of a rule specify how to format the data for transmission. See *Actions on page 14-23*.
- **Save the Rule**. Scan the Save Rule bar code on page 14-8. This places the rule in the “top” position in the rule buffer.
- To correct errors during this process, erase criteria, actions, and entire rules by scanning the appropriate bar code under *Erase on page 14-9*.

Beeper Definitions on page 2-2 guide through the programming steps. For more information on scanning, see *Chapter 2, Scanning*.

ADF Bar Code Menu Example

This section provides an example of how to enter ADF rules for scan data.

An auto parts distribution center wants to encode manufacturer ID, part number, and destination code into their own Code 128 bar codes. The distribution center also has products that carry UPC bar codes, placed there by the manufacturer. The Code 128 bar codes have the following format:

MMMMMPPPPPDD

Where: M = Manufacturer ID
P = Part Number
D = Destination Code

The distribution center uses a PC with dedicated control characters for manufacturer ID <CTRL M>, part number <CTRL P>, and destination code <CTRL D>. At this center the UPC data is treated as manufacturer ID code.

The following rules must be entered:

When scanning data of code type Code 128, send the next 5 characters, send the manufacturer ID key <CTRL M>, send the next 5 characters, send the part number key <CTRL P>, send the next 2 characters, send the destination code key <CTRL D>.

When scanning data of code type UPC/EAN, send all data, send the manufacturer ID key <CTRL M>.

To enter these rules, use the following steps:

Rule 1: The Code 128 Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Begin New Rule	14-8	High High
2	Code 128	14-11	High High
3	Send next 5 characters	14-23	High High
4	Send <CTRL M>	14-44	High High
5	Send next 5 characters	14-23	High High
6	Send <CTRL P>	14-45	High High
7	Send next 2 characters	14-23	High High
8	Send <CTRL D>	14-43	High High
9	Save Rule	14-8	High Low High Low

Rule 2: The UPC Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Begin New Rule	14-8	High High
2	UPC/EAN	14-12	High High
3	Send all remaining data	14-23	High High
4	Send <CTRL M>	14-44	High High
5	Save Rule	14-8	High Low High Low

To correct any errors made while entering this rule, scan *Quit Entering Rules on page 14-9*. If you already saved the rule, scan *Erase Previously Saved Rule on page 14-9*.

Alternate Rule Sets

Group ADF rules into one of four alternate sets which you can turn on and off when needed. This is useful to format the same message in different ways. For example, a Code 128 bar code contains the following information:

Class (2 digits), Stock Number (8) digits, Price (5 digits)

This bar code might look like this:

245671243701500

where:

Class = 24

Stock Number = 56712437

Price = 01500

Ordinarily this data transmits as follows:

24 (class key)

56712437 (stock key)

01500 (enter key)

But, when there is a sale, send only the following:

24 (class key)

56712437 (stock key)

and the cashier keys the price manually.

To implement this, first enter an ADF rule that applies to the normal situation, such as:

When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key, send the data that remains, send the Enter key.

The “sale” rule may look like this:

When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key.

To switch between the two sets of rules, program a “switching rule” that specifies the type of bar code to scan to switch between the rule sets. For example, in the case of the “sale” rule above, the rule programmer wants the cashier to scan the bar code “M” before a sale. To do this, enter the following rule:

When scanning a bar code of length 1 that begins with “M”, select rule set number 1.

Program another rule to switch back:

When scanning a bar code of length 1 that begins with “N”, turn off rule set number 1.

Or include the switching back to normal rules in the “sale” rule:

When scanning a bar code of length 15, send the next 2 characters, send the class key, send the next 8 characters, send the stock key, turn off rule set 1.

For optimal results, scan *Disable All Rule Sets on page 14-10* after programming a rule belonging to an alternate rule set.

In addition to enabling and disabling rule sets within the rules, enable or disable them by scanning the appropriate bar codes beginning on *page 14-10*.

Rules Hierarchy (in Bar Codes)

The order of programming individual rules is important. Program the most general rule first.

All programmed rules are stored in a buffer. As they are programmed, they are stored at the “top” of a rules list. If you created three rules, the list is configured as follows:

Third Rule

Second Rule

First Rule

When scanning data, the rules list is checked from top to bottom to determine if the criteria match (and therefore, if the actions occur). Input is modified into the data format specified by the first matching set of criteria it finds. Be sure to program the most general rule first.

For example, if the THIRD rule states:

When scanning a bar code of any length, send all data, then send the ENTER key.

And the SECOND rule states:

> When scanning a Code 128 bar code of length 12, send the first four characters, then send the ENTER key, then send all remaining data.

and you scan a Code 128 bar code of length 12, the THIRD rule applies, and the SECOND rule does not function.

Note that using the standard data editing functions also creates ADF rules. Scan options are entered as ADF rules, and the hierarchy mentioned above also applies to them. For the LS4208, this applies to prefix/suffix programming in *Scan Data Transmission Format on page 13-4*.

These rules reside in the same “rule list” as ADF rules, so the order of their creation is also important.

Default Rules

Every unit has a default rule to send all scan data. Units with custom software may have one or more default rules burned in. The rules hierarchy checks user programmable rules first, then the default rules. Disable default rules by entering the following general rule in the user programmable buffer:

> When receiving scan data, send all data.

Since this rule always applies, ADF never enters the default rules.

ADF Bar Codes

Table 14-1 lists the bar codes available through ADF.

Table 14-1 *ADF Bar Codes*

Table 14-1 *ADF Bar Codes (Continued)*

Table 14-1 *ADF Bar Codes (Continued)*

Parameter	Page Number
Send F1 Key - Send F24 Key	*14-68*
Send PF1 Key - Send PF30 Key	*14-71*
Send Right Control Key	*14-75*
Send Graphic User Interface (GUI) Characters	*14-76*
Send GUI 0 - Send GUI 9	*14-76*
Send GUI A - Send GUI Z	*14-77*
Turn On/Off Rule Sets	*14-82*
Alphanumeric Keyboard	*14-83*
Space - ‘	*14-83*
0 - 9	*14-87*
A - Z	*14-88*
Cancel	*14-91*
End of Message	*14-91*
a - z	*14-92*
{ - ~	*14-95*

Special Commands

Pause Duration

This parameter, along with *Send Pause on page 14-28*, inserts a pause in the data transmission. To set the pause scan a two-digit number (i.e., two bar codes) representing a 0.1 second interval in the range of 0.1 to 9.9. For example, scanning bar codes **0** and **1** inserts a 0.1 second pause; **0** and **5** gives a 0.5 second delay. The default is 1 second. For numeric bar codes see *Appendix D, Numeric Bar Codes*. In case of an error, or to change the selection, scan *Cancel on page D-3*.

Pause Duration

Begin New Rule

Scan this bar code to start entering a new rule

Begin New Rule

Save Rule

Scan this bar code to save the rule.

Save Rule

Erase

Use these bar codes to erase criteria, actions, or rules.

Erase Criteria And Start Again

Erase Actions And Start Again

Erase Previously Saved Rule

Erase All Rules

Quit Entering Rules

Scan this bar code to quit entering rules.

Quit Entering Rules

Disable Rule Set

Use these bar codes to disable rule sets.

Disable Rule Set 1

Disable Rule Set 2

Disable Rule Set 3

Disable Rule Set 4

Disable All Rule Sets

Criteria

Code Types

Select any number of code types to be affected by the rule. Scan all selected codes in succession, prior to selecting other criteria. *To select all code types, do not scan any code type*.

Code 39

Codabar

GS1 DataBar-14

GS1 DataBar Limited

GS1 DataBar Expanded

Code 128

Code Types (continued)

D 2 OF 5

IATA 2 OF 5

I 2 OF 5

Code 93

UPC-A

UPC-E

EAN-8

EAN-13

Code Types (continued)

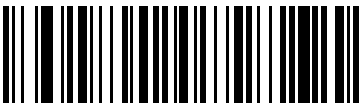
MSI

GS1-128

UPC-E1

Bookland EAN

Trioptic Code 39



Code 11

Code Types (continued)

PDF417

MicroPDF

UPC/EAN Composites

GS1 DataBar and GS1-128 Composites

Code Lengths

Scan these bar codes to define the number of characters the selected code type must contain. Select one length per rule only. *Do not select any code length to select code types of any length*.

1 Character

2 Characters

3 Characters

4 Characters

5 Characters

6 Characters

7 Characters

Code Lengths (continued)

8 Characters

9 Characters

10 Characters

11 Characters

12 Characters

13 Characters

14 Characters

Code Lengths (continued)

15 Characters

16 Characters

17 Characters

18 Characters

19 Characters

20 Characters

21 Characters

22 Characters

Code Lengths (continued)

23 Characters

24 Characters

25 Characters

26 Characters

27 Characters

28 Characters

29 Characters

30 Characters

Message Containing A Specific Data String

Use this feature to select whether the formatting affects data that begins with a specific character or data string, or contains a specific character or data string.

There are five features:

- Specific String at Start
- Specific String, Any Location
- Specific String Search
- Any Message OK
- Rule Belongs to Set

Specific String at Start

1. Scan the following bar code.
2. Scan the bar codes representing the desired character or characters (up to a total of 8) using the *Alphanumeric Keyboard on page 14-83*.
3. Scan *End of Message on page 14-91*.

Specific String At Start

Specific String, Any Location

1. Scan the following bar code.
2. Enter a location by scanning a two-digit number representing the ***position*** (use a leading “zero” if necessary) using the *Numeric Keypad on page 14-21*.
3. Scan the bar codes representing the desired character or characters (up to a total of 8) using the *Alphanumeric Keyboard on page 14-83*.
4. Scan *End of Message on page 14-91*.

Specific String Any Location

Specific String Search

1. Scan the following bar code.
2. Scan the bar codes representing the desired character or characters (up to a total of 10) using the *Alphanumeric Keyboard on page 14-83*.
3. Scan *End of Message on page 14-91*.

Specific String Search

Any Message OK

Do not scan any bar code to format all selected code types, regardless of information contained.

Numeric Keypad

Bar codes on this page should not be confused with those on the alphanumeric keyboard.

0

1

2

3

4

5

6

7

Numeric Keypad (continued)

8

9

Cancel

Rule Belongs To Set

Select the set a rule belongs to. (There are four possible rule sets.) See *Alternate Rule Sets on page 14-3* for more information about rule sets.

Scan a bar code below to select which set a rule belongs to.

Rule Belongs To Set 1

Rule Belongs To Set 2

Rule Belongs To Set 3

Rule Belongs To Set 4

Actions

Select how to format the data for transmission.

Send Data

Send all data that remains, send all data up to a specific character selected from the *Alphanumeric Keyboard on page 14-83*, or send the next N characters. N = any number from 1 to 254, selected from the *Alphanumeric Keyboard on page 14-83*. Use these bar codes to send data.

Send Data Up To Character

Send All Data That Remains

Send Next Character

Send Next 2 Characters

Send Next 3 Characters

Send Next 4 Characters

Send Next 5 Characters

Send Data (continued)

Send Next 6 Characters

Send Next 7 Characters

Send Next 8 Characters

Send Next 9 Characters

Send Next 10 Characters

Send Next 11 Characters

Send Next 12 Characters

Send Next 13 Characters

Send Data (continued)

Send Next 14 Characters

Send Next 15 Characters

Send Next 16 Characters

Send Next 17 Characters

Send Next 18 Characters

Send Next 19 Characters

Send Next 20 Characters

Setup Field(s)

Table 14-2 *Setup Field(s) Definitions*

Parameter	Description	Page
Move Cursor		
Move Cursor to a Character	Scan the *Move Cursor To Character bar code on page 14-27*, then any printable ASCII character from the *Alphanumeric Keyboard*. When this is used, the cursor moves to the position after the matching character. If the character is not there, the rule fails and ADF tries the next rule.	14-27
Move Cursor to Start of Data	Scan this bar code to move cursor to the beginning of the data.	14-27
Move Cursor Past a Character	This parameter moves the cursor past all sequential occurrences of a selected character. For example, if the selected character is 'A,' then the cursor moves past 'A,' 'AA,' 'AAA,' etc. Scan the *Move Cursor Past Character bar code on page 14-27*, then select a character from the *Alphanumeric Keyboard*. If the character is not there, the cursor does not move (i.e., has no effect).	14-27
Move Cursor Past a Specific String	This action moves the cursor past the first occurrence of a selected string. Scan *Move Cursor Past Specific String*, then select the character(s) (up to 10) using the *Alphanumeric Keyboard*. Scan the *Move Cursor Past Character bar code on page 14-27*.	*14-27*
Move Cursor to Specific String and Replace	This action moves the cursor to the first occurrence of a selected string and replaces the string with another user-defined string. Scan *Move Cursor to Specific String and Replace*, then enter an alphanumeric string representing the character(s) (up to 10) to match and delete using the *Alphanumeric Keyboard*. Scan the *End of Message*. Enter another alphanumeric string representing the character(s) (up to 10) to insert using the *Alphanumeric Keyboard*. Scan *End of Message*.	*14-28*
Move Cursor to Last Occurrence of String and Replace All	This action replaces all occurrences of a selected string with another user-defined string, and moves the cursor to the beginning of the last occurrence. Scan *Move Cursor to Last Occurrence of String and Replace All*, then enter an alphanumeric string representing the character(s) (up to 10) to match and delete using the *Alphanumeric Keyboard*. Scan the *End of Message*. Enter another alphanumeric string representing the character(s) (up to 10) to insert using the *Alphanumeric Keyboard*. Scan *End of Message*.	*14-28*
Skip to End	Scan *Skip to End* to move the cursor to the end of the data.	*14-28*

Table 14-2 *Setup Field(s) Definitions (Continued)*

Parameter	Description	Page
Skip Ahead “N” Characters	Scan one of these bar codes to select the desired number of positions to move the cursor ahead.	14-29
Skip Back “N” Characters	Scan one of these bar codes to select the desired number of positions to move the cursor back.	14-31
Send Preset Value	Send prefix and/or suffix value by scanning the appropriate bar code. These values must be set using the Scan Prefix and Scan Suffix bar codes on page 13-4.	14-32

Move Cursor

Scan a bar code below to move the cursor in relation to a specified character. Then enter a character by scanning a bar code from the *Alphanumeric Keyboard on page 14-83*.

NOTE If there is no match when the rule is interpreted and the rule fails, the next rule is checked.

Move Cursor To Character

Move Cursor To Start

Move Cursor Past Character

Move Cursor Past Specific String

Move Cursor (continued)

Move Cursor to Specific String and Replace

Move Cursor to Last Occurrence of String and Replace All

Skip to End

Send Pause

Scan the bar code below to insert a pause in the transmission of data. The length of this pause is controlled by the value of the Pause Duration parameter.

Send Pause

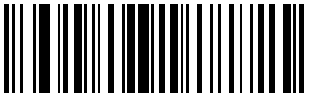
Skip Ahead

Use the following bar codes to skip ahead characters.

Skip Ahead 1 Character

Skip Ahead 2 Characters

Skip Ahead 3 Characters



Skip Ahead 4 Characters

Skip Ahead 5 Characters

Skip Ahead 6 Characters

Skip Ahead (continued)

Skip Ahead 7 Characters

Skip Ahead 8 Characters

Skip Ahead 9 Characters

Skip Ahead 10 Characters

Skip Back

Use the following bar codes to skip back characters.

Skip Back 1 Character

Skip Back 2 Characters

Skip Back 3 Characters

Skip Back 4 Characters

Skip Back 5 Characters

Skip Back 6 Characters

Skip Back 7 Characters

Skip Back (continued)

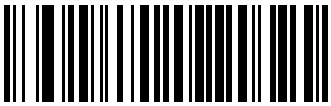
Skip Back 8 Characters

Skip Back 9 Characters

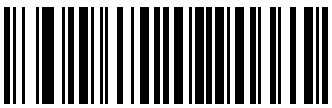
Skip Back 10 Characters

Send Preset Value

Use these bar codes to send preset values. These values must be set using the Scan Prefix and Scan Suffix bar codes on page 13-4.



Send Prefix



Send Suffix

Modify Data

Modify data in the ways listed. The following actions work for all send commands that follow it within a rule. If *pad zeros to length 6, send next 3 characters, stop padding, send next 5 characters* is programmed, three zeros are added to the first send, and the next send is unaffected by the padding. These options do not apply to the Send Keystroke or Send Preset Value options.

Remove All Spaces

To remove all spaces in the send commands that follow, scan this bar code.

Remove All Spaces

Crunch All Spaces

To leave one space between words, scan this bar code. This also removes all leading and trailing spaces.

Crunch All Spaces

Stop Space Removal

Scan this bar code to disable space removal.

Stop Space Removal

Remove Leading Zeros

Scan this bar code to remove all leading zeros.

Remove Leading Zeros

Stop Zero Removal

Scan this bar code to disable the removal of zeros.

Stop Zero Removal

Pad Data with Spaces

To pad data to the left, scan the bar code containing the desired number of spaces. This parameter is activated by Send commands.

Pad Spaces To Length 1

Pad Spaces To Length 2

Pad Spaces To Length 3

Pad Spaces To Length 4

Pad Spaces To Length 5

Pad Spaces To Length 6

Pad Spaces To Length 7

Pad Spaces To Length 8

Pad Data with Spaces (continued)

Pad Spaces To Length 9

Pad Spaces To Length 10

Pad Spaces To Length 11

Pad Spaces To Length 12

Pad Spaces To Length 13

Pad Spaces To Length 14

Pad Spaces To Length 15

Pad Spaces To Length 16

Pad Data with Spaces (continued)

Pad Spaces To Length 17

Pad Spaces To Length 18

Pad Spaces To Length 19

Pad Spaces To Length 20

Pad Spaces To Length 21

Pad Spaces To Length 22

Pad Spaces To Length 23

Pad Data with Spaces (continued)

Pad Spaces To Length 24

Pad Spaces To Length 25

Pad Spaces To Length 26

Pad Spaces To Length 27

Pad Spaces To Length 28

Pad Spaces To Length 29

Pad Spaces To Length 30

Stop Pad Spaces

Pad Data with Zeros

To pad data to the left, scan the bar code containing the desired number of zeros. This parameter is activated by Send commands.

Pad Zeros To Length 1

Pad Zeros To Length 2

Pad Zeros To Length 3

Pad Zeros To Length 4

Pad Zeros To Length 5

Pad Zeros To Length 6

Pad Zeros To Length 7

Pad Zeros To Length 8

Pad Data with Zeros (continued)

Pad Zeros To Length 9

Pad Zeros To Length 10

Pad Zeros To Length 11

Pad Zeros To Length 12

Pad Zeros To Length 13

Pad Zeros To Length 14

Pad Zeros To Length 15

Pad Zeros To Length 16

Pad Data with Zeros (continued)

Pad Zeros To Length 17

Pad Zeros To Length 18

Pad Zeros To Length 19

Pad Zeros To Length 20

Pad Zeros To Length 21

Pad Zeros To Length 22

Pad Zeros To Length 23

Pad Zeros To Length 24

Pad Data with Zeros (continued)

Pad Zeros To Length 25

Pad Zeros To Length 26

Pad Zeros To Length 27

Pad Zeros To Length 28

Pad Zeros To Length 29

Pad Zeros To Length 30

Stop Pad Zeros

Beeps

Select a beep sequence for each ADF rule.

Beep Once

Beep Twice

Beep Three Times

Send Keystroke (Control Characters and Keyboard Characters)

Control Characters

Scan the “Send __” bar code for the desired keystroke

Send Control 2

Send Control A

Send Control B

Send Control C

Send Control D

Send Control E

Send Control F

Send Control G

Control Characters (continued)

Send Control H

Send Control I

Send Control J

Send Control K

Send Control L

Send Control M

Send Control N

Send Control O

Control Characters (continued)

Send Control P

Send Control Q

Send Control R

Send Control S

Send Control T

Send Control U

Send Control V

Send Control W

Control Characters (continued)

Send Control X

Send Control Y

Send Control Z

Send Control [

**Send Control **

Send Control]

Send Control 6

Send Control -

Keyboard Characters

Scan the “Send __” bar code for the desired keyboard characters

Send Space

Send !

Send “

Send #

Send $

Send %

Send &

Send ‘

Keyboard Characters (continued)

Send (

Send)

Send *

Send +

Send ,

Send -

Send .

Send /

Keyboard Characters (continued)

Send 0

Send 1

Send 2

Send 3

Send 4

Send 5

Send 6

Send 7

Keyboard Characters (continued)

Send 8

Send 9

Send :

Send ;

Send <

Send =

Send >

Send ?

Keyboard Characters (continued)

Send @

Send A

Send B

Send C

Send D

Send E

Send F

Send G

Keyboard Characters (continued)

Send H

Send I

Send J

Send K

Send L

Send M

Send N

Send O

Keyboard Characters (continued)

Send P

Send Q

Send R

Send S

Send T

Send U

Send V

Send W

Keyboard Characters (continued)

Send X

Send Y

Send Z

Send [

**Send **

Send]

Send ^

Send _

Keyboard Characters (continued)

Send `

Send a

Send b

Send c

Send d

Send e

Send f

Send g

Keyboard Characters (continued)

Send h

Send i

Send j

Send k

Send l

Send m

Send n

Send o

Keyboard Characters (continued)

Send p

Send q

Send r

Send s

Send t

Send u

Send v

Send w

Keyboard Characters (continued)

Send x

Send y

Send z

Send {

Send |

Send }

Send ~

Send ALT Characters

Send Alt 2

Send Alt A

Send Alt B

Send Alt C

Send Alt D

Send Alt E

Send Alt F

Send Alt G

Send ALT Characters (continued)

Send Alt H

Send Alt I

Send Alt J

Send Alt K

Send Alt L

Send Alt M

Send Alt N

Send Alt O

Send ALT Characters (continued)

Send Alt P

Send Alt Q

Send Alt R

Send Alt S

Send Alt T

Send Alt U

Send Alt V

Send Alt W

Send ALT Characters (continued)

Send Alt X

Send Alt Y

Send Alt Z

Send Alt [

**Send Alt **

Send Alt]

Send Alt 6

Send Alt -

Send Keypad Characters

Send Keypad *

Send Keypad +

Send Keypad -

Send Keypad .

Send Keypad /

Send Keypad 0

Send Keypad 1

Send Keypad 2

Send Keypad Characters (continued)

Send Keypad 3

Send Keypad 4

Send Keypad 5

Send Keypad 6

Send Keypad 7

Send Keypad 8

Send Keypad 9

Send Keypad Enter

Send Keypad Characters (continued)

Send Keypad Numlock
NUM LOCK

Send Break Key

Send Delete Key

Send Page Up Key

Send End Key

Send Page Down Key

Send Pause Key

Send Scroll Lock Key

Send Keypad Characters (continued)

Send Backspace Key

Send Tab Key

Send Print Screen Key

Send Insert Key

Send Home Key

Send Enter Key

Send Escape Key

Send Up Arrow Key

Send Keypad Characters (continued)

Send Down Arrow Key

Send Left Arrow Key

Send Right Arrow Key

Send Function Key

Send F1 Key

Send F2 Key

Send F3 Key

Send F4 Key

Send F5 Key

Send F6 Key

Send Function Key (continued)

Send F7 Key

Send F8 Key

Send F9 Key

Send F10 Key

Send F11 Key

Send F12 Key

Send F13 Key

Send F14 Key

Send Function Key (continued)

Send F15 Key

Send F16 Key

Send F17 Key

Send F18 Key

Send F19 Key

Send F20 Key

Send F21 Key

Send F22 Key

Send Function Key (continued)

Send F23 Key

Send F24 Key

Send PF1 Key

Send PF2 Key

Send PF3 Key

Send PF4 Key

Send PF5 Key

Send PF6 Key

Send Function Key (continued)

Send PF7 Key

Send PF8 Key

Send PF9 Key

Send PF10 Key

Send PF11 Key

Send PF12 Key

Send PF13 Key

Send PF14 Key

Send Function Key (continued)

Send PF15 Key

Send PF16 Key

Send PF17 Key

Send PF18 Key

Send PF19 Key

Send PF20 Key

Send PF21 Key

Send PF22 Key

Send Function Key (continued)

Send PF23 Key

Send PF24 Key

Send PF25 Key

Send PF26 Key

Send PF27 Key

Send PF28 Key

Send PF29 Key

Send PF30 Key

Send Right Control Key

The “Send Right Control Key” action sends a tap (press and release) of the Right Control Key.

Send Right Control Key

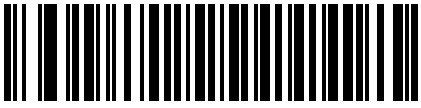
Send Graphic User Interface (GUI) Characters

The “Send Graphic User Interface Character” actions tap the specified key while holding the System Dependent Graphic User Interface (GUI) Key. The definition of the Graphic User Interface key is dependent upon the attached system:

Send GUI 0

Send GUI 1

Send GUI 2



Send GUI 3

Send GUI 4

Send GUI 5

Send Graphic User Interface (GUI) Characters (continued)

Send GUI 6

Send GUI 7

Send GUI 8

Send GUI 9

Send GUI A

Send GUI B

Send GUI C

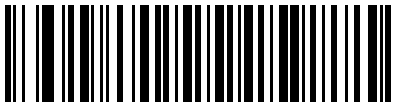
Send Graphic User Interface (GUI) Characters (continued)

Send GUI D

Send GUI E

Send GUI F

Send GUI G



Send GUI H

Send GUI I

Send GUI J

Send Graphic User Interface (GUI) Characters (continued)

Send GUI K

Send GUI L

Send GUI M

Send GUI N

Send GUI O

Send GUI P

Send GUI Q

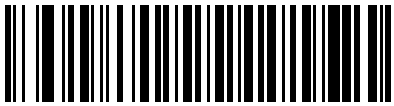
Send Graphic User Interface (GUI) Characters (continued)

Send GUI R

Send GUI S

Send GUI T

Send GUI U



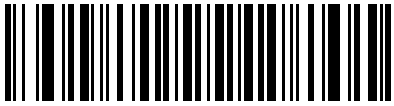
Send GUI V

Send GUI W

Send GUI X

Send Graphic User Interface (GUI) Characters (continued)

Send GUI Y



Send GUI Z

Turn On/Off Rule Sets

Use these bar codes to turn rule sets on and off.

Turn On Rule Set 1

Turn On Rule Set 2

Turn On Rule Set 3

Turn On Rule Set 4

Turn Off Rule Set 1

Turn Off Rule Set 2

Turn Off Rule Set 3

Turn Off Rule Set 4

Alphanumeric Keyboard

Space

#

$

%

*****

+

-
(Dash)

.

,
(Comma)

Alphanumeric Keyboard (continued)

/

!

“

&

‘

(

)

Alphanumeric Keyboard (continued)

:

;

<

=

>

?

@

Alphanumeric Keyboard (continued)

[

\

]

^

_ (Underscore)

` (Single Open Quote)

Alphanumeric Keyboard (continued)

NOTE Bar codes on this page should not be confused with those on the numeric keypad.

0

1

2

3

4

5

6

Alphanumeric Keyboard (continued)

7

8

9

A

B

C

D

Alphanumeric Keyboard (continued)

E

F

G

H

I

J

K

L

Alphanumeric Keyboard (continued)

M

N

O

P

Q

R

S

T

Alphanumeric Keyboard (continued)

U

V

W

X

Y

Z

Cancel

End of Message

Alphanumeric Keyboard (continued)

a

b

c

d

e

f

g

h

Alphanumeric Keyboard (continued)

i

j

k

l

m

n

o

Alphanumeric Keyboard (continued)

p

q

r

s

t

u

v

Alphanumeric Keyboard (continued)

w

x

y

z

{

|

}

~

Appendix A Standard Default Parameters

Default Parameters

Table A-1 *Standard Default Parameters Table*

Parameter	Default	Page Number
User Preferences		
Set Default Parameter	Restore Defaults	4-3
Parameter Bar Code Scanning	Enable	4-4
Beeper Tone	Medium	4-4
Beeper Volume	High	4-5
Power Mode	Continuous On	4-5
Scan Pattern	Multi-line Always Raster	4-6
Scan Line Width	Full Width	4-7
Raster Height	Adjustable Raster	4-8
Laser On Time	3.0 Sec	4-9
Beep After Good Decode	Enable	4-9
PDF Decode Feedback	Disable	4-10
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

[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
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	5-10
Function Key Mapping	Disable	5-10
FN1 Substitution	Disable	5-11
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	7-5
USB Country Keyboard Types (Country Codes)	North American	7-6
USB Keystroke Delay	No Delay	7-8

[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
USB CAPS Lock Override	Disable	7-8
USB Ignore Unknown Characters	Send	7-9
Emulate Keypad	Disable	7-9
USB FN1 Substitution	Disable	7-10
Function Key Mapping	Disable	7-10
Simulated Caps Lock	Disable	7-11
Convert Case	No Case Conversion	7-11
IBM 468X/469X Host Parameters		
Port Address	None Selected	8-4
Convert Unknown to Code 39	Disable	8-5
Ignore Beep	Disable	8-6
Ignore Bar Code Configuration	Disable	8-6
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	10-7
Convert All Bar Codes to Code 39	Do Not Convert Bar Codes to Code 39	10-7
Code 39 Full ASCII Conversion	Disable	10-8
Transmission Timeout	3 Sec	10-9
Ignore Unknown Characters	Ignore Unknown Characters	10-10

[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
Leading Margin	2 ms	10-10
Check for Decode LED	Check for Decode LED	10-11
123Scan^2 Configuration Tool		11-1
UPC/EAN		
UPC-A	Enable	12-6
UPC-E	Enable	12-6
UPC-E1	Disable	12-7
EAN-8/JAN 8	Enable	12-8
EAN-13/JAN 13	Enable	12-8
Bookland EAN	Disable	12-9
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	Ignore	12-9
Decode UPC/EAN/JAN Supplemental Redundancy	7	12-14
Transmit UPC-A Check Digit	Enable	12-14
Transmit UPC-E Check Digit	Enable	12-15
Transmit UPC-E1 Check Digit	Enable	12-15
UPC-A Preamble	System Character	12-16
UPC-E Preamble	System Character	12-17
UPC-E1 Preamble	System Character	12-18
Convert UPC-E to A	Disable	12-19
Convert UPC-E1 to A	Disable	12-19
EAN-8/JAN-8 Extend	Disable	12-20
Bookland ISBN Format	ISBN-10	12-21
UCC Coupon Extended Code	Disable	12-22
Code 128		
Code 128	Enable	12-23
GS1-128 (formerly UCC/EAN-128)	Enable	12-23
ISBT 128 (non-concatenated)	Enable	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 39		
Code 39	Enable	12-25
Trioptic Code 39	Disable	12-25
Convert Code 39 to Code 32 (Italian Pharmacy Code)	Disable	12-26
Code 32 Prefix	Disable	12-26
Set Length(s) for Code 39	2 to 55	12-27
Code 39 Check Digit Verification	Disable	12-28
Transmit Code 39 Check Digit	Disable	12-29
Code 39 Full ASCII Conversion	Disable	12-30
Buffer Code 39	Disable	12-31
Code 93		
Code 93	Disable	12-34
Set Length(s) for Code 93	4 to 55	12-34
Code 11		
Code 11	Disable	12-36
Set Lengths for Code 11	4 to 55	12-36
Code 11 Check Digit Verification	Disable	12-38
Transmit Code 11 Check Digit(s)	Disable	12-39
Interleaved 2 of 5 (ITF)		
Interleaved 2 of 5 (ITF)	Enable	12-40
Set Lengths for I 2 of 5	14	12-40
I 2 of 5 Check Digit Verification	Disable	12-42
Transmit I 2 of 5 Check Digit	Disable	12-43
Convert I 2 of 5 to EAN-13	Disable	12-43
Discrete 2 of 5 (DTF)		
Discrete 2 of 5	Disable	12-44
Set Length(s) for D 2 of 5	12	12-44

[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
Chinese 2 of 5		
Enable/Disable Chinese 2 of 5	Disable	12-46
Codabar (NW - 7)		
Codabar	Disable	12-47
Set Lengths for Codabar	5 to 55	12-47
CLSI Editing	Disable	12-49
NOTIS Editing	Disable	12-49
MSI		
MSI	Disable	12-50
Set Length(s) for MSI	2 to 55	12-50
MSI Check Digits	One	12-51
Transmit MSI Check Digit	Disable	12-52
MSI Check Digit Algorithm	Mod 10/Mod 10	12-52
GS1 DataBar		
GS1 DataBar-14	Disable	12-53
GS1 DataBar Limited	Disable	12-53
GS1 DataBar Expanded	Disable	12-53
Convert GS1 DataBar to UPC/EAN	Disable	12-54
PDF		
PDF417	Enable (LS4208-PR PDF417 version only)	12-55
MicroPDF		
MicroPDF417	Disable	12-55
MicroPDF Performance	Standard Performance for MicroPDF	12-56
Transmit		
Transmit Symbol in Codeword Format	Disable	12-57
Transmit Unknown Codewords	Disable	12-58

[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
Character		
Escape Character	None	12-58
Delete Character Set ECI's	Transmit	12-59
Composite		
Composite CC-C	Disable	12-60
Composite CC-A/B	Disable	12-60
UPC Composite Mode	UPC Always Linked	12-61
Composite Beep Mode	Beep as Each Code Type is Decoded	12-62
Symbology - Specific Security Levels		
Redundancy Level	1	12-63
Security Levels	0	12-65
Bi-directional Redundancy	Disable	12-66
Intercharacter Gap	Normal Intercharacter Gap	12-66
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
Report Version		13-8
Report Synapse Cable		13-8

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

Appendix B Programming References

Symbol Code Identifiers

Table B-1 *Symbol 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	GS1-128
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).	

Table B-3 *Modifier Characters (Continued)*

Code Type	Option Value	Option
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	
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	

Table B-3 *Modifier Characters (Continued)*

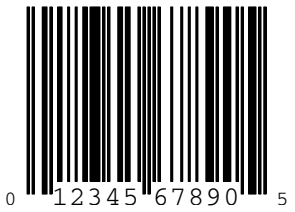
Code Type	Option Value	Option
Bookland EAN	0	No options specified at this time. Always transmit 0.
	Example: A Bookland EAN bar code 123456789X is transmitted as **]X0**123456789X	
Code 11	0	Single check digit
	1	Two check digits
	3	Check characters validated but not transmitted.
GS1 DataBar Family		No option specified at this time. Always transmit 0. GS1 DataBar-14 and GS1 DataBar Limited transmit with an Application Identifier “01”.Note: In GS1-128 emulation mode, GS1 DataBar is transmitted using Code 128 rules (i.e.,]C1).
	Example: A DataBar-14 bar code 0110012345678902 is transmitted as **]e**00110012345678902.	

Appendix C Sample Bar Codes

Code 39

UPC/EAN

UPC-A, 100%



EAN-13, 100%

Code 128

Interleaved 2 of 5

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 12-53*).

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 (continued)

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 the "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 the “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 the "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 the “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	l
1125	%R	}
1126	%S	~

The keystroke in bold is sent only if the "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
3048	GUI 0
3049	GUI 1
3050	GUI 2
3051	GUI 3
3052	GUI 4
3053	GUI 5
3054	GUI 6
3055	GUI 7

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 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

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 E-4 *GUI Shift Keys (Continued)*

Other Value	Keystroke
3088	GUI X
3089	GUI Y
3090	GUI Z
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 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
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
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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