LI2208
PRODUCT REFERENCE GUIDE

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72E-170534-01

Revision A

June 2013

Warranty

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

Revision History

Changes to the original guide are listed below:

Change	Date	Description
Rev. A	6/2013	Initial Release

TABLE OF CONTENTS

ABOUT THIS GUIDE

Introduction

The *LI2208 Product Reference Guide* provides general instructions for setting up, operating, maintaining, and troubleshooting the LI2208 linear imager.

Scanner Configurations

- LI2208-SR00006ZZWW - Nova White
- LI2208-SR00007ZZWW - Twilight Black
- LI2208-HC0000BZZWW - Healthcare White

NOTE Check Solution Builder for the latest available model configurations.

Related Product Line Configurations

Table 1 below lists the configurations of product lines related to the LI2208 linear imager.

NOTE Check Solution Builder for:
- additional information regarding all available accessories.
- the complete selection of optional accessories.
- the latest available configurations.

- Only the cables listed in *Table 1* are supported.

Table 1. *Stand, Power Supply, Miscellaneous Configurations*

Product Line	Part #	Description
Accessories		
Cup	21-61022-0BR	Healthcare White
Gooseneck Stand	20-61022-07R	Twilight Black
Universal Cables		
Shielded USB		
	CBA-U21-S07ZAR	Cable - Shielded USB: 7ft. (2.8m), Straight
	CBA-U23-S07ZAR	Cable - Shielded USB: Power Plus Connector, 7ft. (2.8m), Straight
	CBA-U29-C15ZAR	Cable - Shielded USB: Series A Connector, 15ft. (4.6m), Coiled
	CBA-U32-C09ZAR	Cable - Shielded USB: Series A Connector, 9ft. (2.8m), Coiled
	CBA-U28-C15ZAR	Cable - Shielded USB: Power Plus Connector, 15ft. (4.6m), Coiled
	CBA-U30-S15ZAR	Cable - Shielded USB: 15ft. (4.6m), Straight
	CBA-U34-C09ZAR	Cable - Shielded USB: Power Plus Connector, 9ft. (2.8m), Coiled
	CBA-U35-S15ZAR	Cable - Shielded USB: Power Plus Connector, 15ft. (4.6m), Straight
Keyboard Wedge		
	CBA-K61-S07PAR	Cable - Auto-Host Detect - Keyboard Wedge: 7 ft. (2m) Straight, PS/2 Power Port
	CBA-K62-C09PAR	Cable - Auto-Host Detect - Keyboard Wedge: 9 ft. (2.8m) Coiled, PS/2 Power Port

Table 1. *Stand, Power Supply, Miscellaneous Configurations (Continued)*

Product Line	Part #	Description
IBM		
	CBA-M61-S07ZAR	Cable - Auto-Host Detect - IBM: 468x/9x, 7ft (2m) Straight, Port 9B
	CBA-M64-S07ZAR	Cable - Auto-Host Detect - IBM: 468x/9x, 7ft (2m) Straight, Port 5B
RS-232		
	CBA-R01-S07PAR	Cable - RS-232: DB9 Female Connector, 7 ft. (2m) Straight, TxD on 2
	CBA-R02-C09PAR	Cable - RS-232: DB9 Female Connector, 9 ft. (2.8m) Coiled, TxD on 2
	CBA-R03-C12PAR	Cable - RS-232: DB9 Female Connector, 12 ft. (3.6m) Coiled, TxD on 2
	CBA-R06-C20PAR	Cable - RS-232: DB9 Female Connector, 20 ft. (6m) Coiled, TxD on 2
	CBA-R08-S07ZAR	Cable - RS-232: 7 ft. (2m) Straight, Nixdorf Beetle - 5V Direct Power
	CBA-R09-C09ZAR	Cable - RS-232: 9 ft. (2.8m) Coiled, Nixdorf Beetle - 5V Direct Power
	CBA-R10-S07ZAR	Cable - RS-232: 7 ft. (2m) Straight, Nixdorf Beetle - Direct Power
	CBA-R11-C09ZAR	Cable - RS-232: 9 ft. (2.8m) Coiled, Nixdorf Beetle - Direct Power
	CBA-R12-C12ZAR	Cable - RS-232: 12ft. (3.7m) Coiled, Nixdorf Beetle- Direct Power
	CBA-R17-C09ZAR	Cable - RS-232: DB15 Connector, 9ft. (2.8m) Coiled, IBM Sure One, TxD on 2
	CBA-R22-C09ZAR	Cable - RS-232: 9 ft. (2.8m) Coiled, Fujitsu T POS 500 ICL
	CBA-R23-S07ZAR	Cable - RS-232: 7 ft. (2m) Straight, Fujitsu T POS 500 ICL
	CBA-R24-C20ZAR	Cable - RS-232: 20 ft. (6m) Coiled, Fujitsu T POS 500 ICL
	CBA-R28-C09ZAR	Cable - RS-232: 9 ft. (2.8m) Coiled, Verifone Ruby
	CBA-R31-C09ZAR	Cable - RS-232: 9 ft. (2.8m) Coiled, NCR 7448
	CBA-R32-S07PAR	Cable - RS-232: DB9 Female Connector, 7 ft. (2m) Straight, TxD on 2, True Converter
	CBA-R33-C09PAR	Cable - RS-232: DB9 Female Connector, 9ft. (2.8m) Coiled, True Converter, TxD on 2
	CBA-R36-C09ZAR	Cable - RS-232: DB9 Female Connector, 9 ft. (2.8m) Coiled, Power Pin 9
	CBA-R38-C09ZAR	Cable - RS-232: DB25 Female Connector, 9ft (2.8m)Coiled, Power Pin 12
	CBA-R39-C20ZAR	Cable - RS-232: DB25 Female Connector, 20ft (6m) Coiled, Power Pin 12
	CBA-R40-C09SAR	Cable - RS-232: Split DB9 Female Connector & Power Line, 9ft (2.8m) Coiled
	CBA-R41-S12ZAR	Cable - RS-232: 12ft. (3.7m) Straight, Nixdorf Beetle- Direct Power
Power Supplies		
	PWRS-14000-253R	Power Supply: 5VDC, 850MA, US-CA-MX-JP-TW
	PWRS-14000-256R	Power Supply: 5VDC, 850MA, EU-UK-EMEA-RU-ZA
	PWRS-14000-257R	Power Supply: 5VDC, 850MA, CHINA
	PWRS-14000-258R	Power Supply:5VDC, 850MA, AU-HK-NZ
	PWRS-14000-259R	Power Supply, 5VDC, 850MA, ARGENTINA-UY

Chapter Descriptions

Topics covered in this guide are as follows:

- *Chapter 1, GETTING STARTED* provides a product overview, unpacking instructions, and cable connection information.
- *Chapter 2, SCANNING* describes parts of the linear imager, beeper and LED definitions, and how to use the linear imager.
- *Chapter 12, MAINTENANCE, TROUBLESHOOTING & TECHNICAL SPECIFICATIONS* provides information on how to care for the linear imager, troubleshooting, and technical specifications.
- *Chapter 7, USER PREFERENCES & MISCELLANEOUS SCANNER OPTIONS* provides programming bar codes for selecting user preference features for the linear imager and commonly used bar codes to customize how the data is transmitted to the host device.
- *Chapter 3, USB INTERFACE* provides information for setting up the linear imager for USB operation.
- *Chapter 4, RS-232 INTERFACE* provides information for setting up the linear imager for RS-232 operation.
- *Chapter 5, IBM INTERFACE* provides all information for setting up the linear imager with IBM 468X/469X POS systems.
- *Chapter 6, KEYBOARD WEDGE INTERFACE* provides information for setting up the linear imager for Keyboard Wedge operation.
- *Chapter 9, SYMBOLOGIES* describes all symbology features and provides the programming bar codes necessary for selecting these features for the linear imager.
- *Chapter 10, 123SCAN2* (PC based scanner configuration tool) enables rapid and easy customized setup of scanners.
- *Chapter 11, ADVANCED DATA FORMATTING* (ADF) describes how to customize scanned data before transmitting to the host. This chapter also contains the bar codes for advanced data formatting.
- *Appendix A, STANDARD DEFAULT PARAMETERS* provides a table of all host devices and miscellaneous linear imager defaults.
- *Appendix B, COUNTRY CODES* provides instructions for programming the keyboard to interface with a USB or Keyboard Wedge host.
- *Appendix C, PROGRAMMING REFERENCE* provides a table of AIM code identifiers, ASCII character conversions, and keyboard maps.
- *Appendix D, SAMPLE BAR CODES* includes sample bar codes.
- *Appendix E, NUMERIC BAR CODES* includes the numeric bar codes to scan for parameters requiring specific numeric values.
- *Appendix F, ALPHANUMERIC BAR CODES* includes the bar codes representing the alphanumeric keyboard, used when setting ADF rules.
- *Appendix G, ASCII CHARACTER SETS* provides ASCII character value tables.

Notational Conventions

The following conventions are used in this document:

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

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

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

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

Related Documents

- The *LI2208 Quick Start Guide* (p/n 72-170536-xx) provides general information to help the user get started with the linear imager. It includes basic operation instructions and start up bar codes.

The latest version of this guide and all guides, are available at: www.motorolasolutions.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 Motorola Solutions Global Customer Support Center at: http://www.motorolasolutions.com/support.

When contacting Motorola Solutions support, please have the following information available:

- Serial number of the unit

- Model number or product name
- Software type and version number

Motorola 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 Motorola Solutions support, you may need to return your equipment for servicing and will be given specific directions. Motorola 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 Motorola business partner, please contact that business partner for support.

CHAPTER 1 GETTING STARTED

Introduction

The LI2208 represents the next generation in 1D scanning and builds on our most popular scanner ever, the LS2208. You get the same reliability and ergonomics of the LS2208, combined with enhanced features such as extended range and support for mobile bar codes. With our best-in-class linear imager, you can count on unparalleled scanning performance on every bar code, every time.

Unpacking

Remove the scanner from their respective packing and inspect for damage. If the scanner was damaged in transit, contact Motorola Solutions Global Customer Support Center. See *page xvii* for contact information. **KEEP THE PACKING**. It is the approved shipping container and should be used if the equipment ever needs to be returned for servicing.

Scanner Parts

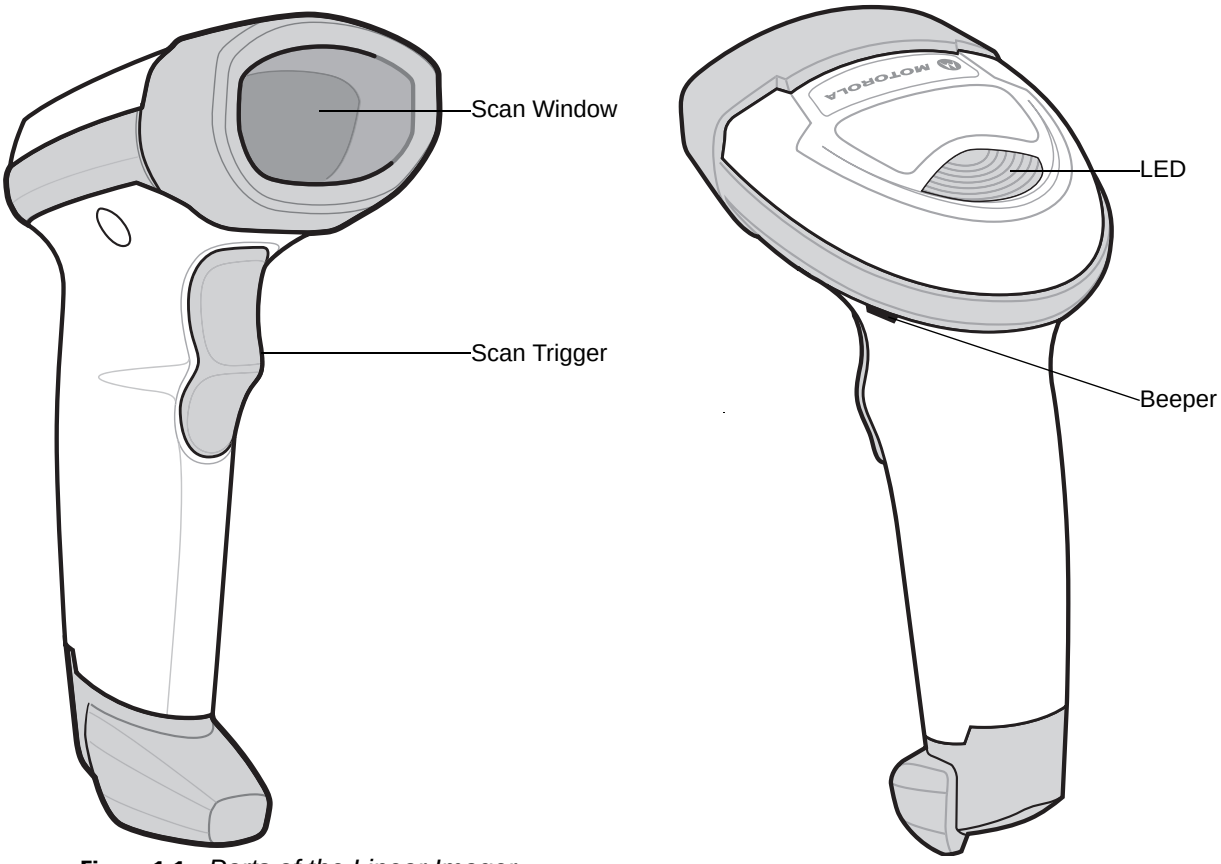


Figure 1-1 *Parts of the Linear Imager*

Configuring the Linear Imager

Use the bar codes in this manual or the 123Scan^2 configuration program to configure the linear imager. See *Chapter 7, USER PREFERENCES & MISCELLANEOUS SCANNER OPTIONS* for information about programming the linear imager using bar code menus. Also see each host-specific chapter to set up connection to a specific host type. See *Chapter 10, 123SCAN2* to configure the linear imager using this configuration program.

CHAPTER 2 SCANNING

Introduction

This chapter provides beeper and LED definitions, scanning techniques, general instructions and tips about scanning, and decode ranges.

Beeper and LED Definitions

The linear imager issues different beep sequences/patterns and an LED display to indicate status. *Table 2-1* defines beep sequences/patterns and LED displays which occur during both normal scanning and while programming the linear imager.

Table 2-1 *Scanner Beeper and LED Definitions*

Beeper Sequence	LED Indication	Indication
Standard Use		
Low/medium/high beeps	None	Power up.
Scanning		
None	Green Solid	Presentation Mode on.
None	No LED; green LED is turned off	Presentation Mode off.
Medium beep (or as configured)	Green Flash	A bar code was successfully decoded. (See *Chapter 7-1, User Preferences Parameter Defaults* for programming beeper sounds.)
Low/low/low/extra low beeps	Red	Parity error.
Four long low beeps	Red	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.
Five long low beeps	Red	Conversion or format error.

Table 2-1 *Scanner Beeper and LED Definitions (Continued)*

Beeper Sequence	LED Indication	Indication
Parameter Programming		
Long low/long high beeps	Red	Input error, incorrect bar code or **Cancel** scanned, wrong entry, incorrect bar code programming sequence; remain in program mode.
High/low beeps	Green	Keyboard parameter selected. Enter value using bar code keypad.
High/low/high/low beeps	Green	Successful program exit with change in the parameter setting.
ADF Programming		
Low/high/low beeps	None	ADF transmit error.
High/low beeps	Green	Number expected. Enter another digit. Add leading zeros to the front if necessary.
Low/low beeps	Green	Alpha expected. Enter another alphabetic character or scan the **End of Message** bar code.
High/high beeps	Green Blinking	ADF criteria or action is expected. Enter another criteria or action or scan the **Save Rule** bar code.
High/low/low beeps	Green	All criteria or actions cleared for current rule, continue entering rule.
High/low/high/low beeps	Green (turns off blinking)	Rule saved. Rule entry mode exited.
Long low/long high beeps	Red	Rule error. Entry error, wrong bar code scanned, or criteria/action list is too long for a rule. Re-enter criteria or action.
Low beep	Green	Deleted last saved rule. The current rule is left intact.
Low/high/high beeps	Green	All rules deleted.
Long low/long high/long low/long high beeps	Red	Out of rule memory. Erase some existing rules, then try to save rule again.
Long low/long high/long low beeps	Green (turns off blinking)	Cancel rule entry. Rule entry mode exited because of an error or the user asked to exit rule entry.
Code 39 Buffering		
High/low beeps	None	New Code 39 data was entered into the buffer.
Three long high beeps	None	Code 39 buffer is full.
High/low/high beeps	None	The Code 39 buffer was erased/cleared.
Low/high/low beeps	None	The Code 39 buffer was erased or there was an attempt to clear or transmit an empty buffer.
Low/high beeps	None	A successful transmission of buffered data.

Table 2-1 *Scanner Beeper and LED Definitions (Continued)*

Beeper Sequence	LED Indication	Indication
Host Specific		
USB only		
Four high beeps	None	Linear imager scanner has not completed initialization. Wait several seconds and scan again.
RS-232 only		
High/high/high/low beeps	Red	RS-232 receive error.
High beep	None	A <BEL> character is received when Beep on <BEL> is enabled (Point-to-Point mode only).

Scanning

To program the linear imager, see the appropriate host chapter, and *Chapter 9, SYMBOLOGIES*. (In addition to the parameters included in the chapters mentioned, user preference and miscellaneous linear imager option parameters are also available in this guide.)Aiming

When scanning, the linear imager projects a red illumination line which allows positioning the bar code within its field of view. See *Decode Ranges on page 2-6* for the proper distance to achieve between the linear imager and a bar code. (See *Aiming Illumination on page 7-13* to set the type of pattern when aiming.)

Hand-Held Scanning

NOTE Best practice is to place the scanner above the bar code before pressing the trigger. Sweeping over the bar code after trigger press may produce inconsistent results.

To scan:

1. Ensure all connections are secure (see appropriate host chapter).
2. Aim the linear imager at the bar code.

NOTE In the default aiming configuration, the red line emitted by the scanner is referred to as the illumination line. To scan a bar code, aim the illumination line such that it covers the desired bar code with some overlap on the right, and left sides (as shown in *Figure 2-1*). Pressing the trigger causes the read, or decode, to occur and be transmitted back to the host. See *Decode Ranges on page 2-6* for proper distances between the scanner and the intended bar code.

3. Press the trigger.

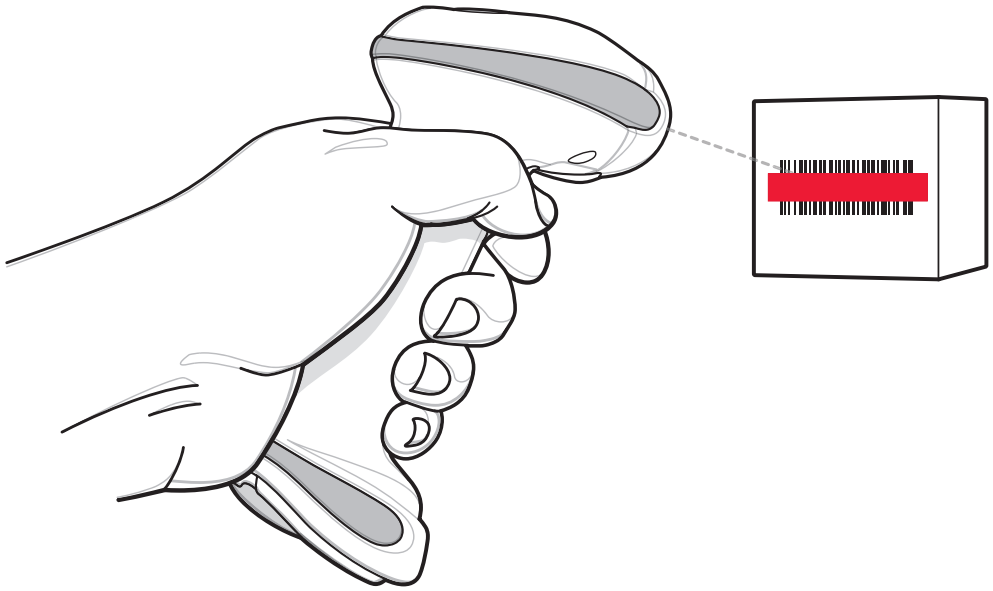


Figure 2-1 *Scanning*

4. Upon successful decode, the linear imager beeps and the LED displays a single green flash. (For more information about beeper and LED definitions, see *Table 2-1*.)

Hands-Free Scanning

Unless hands-free mode is disabled by scanning *Hands-Free (Presentation) Trigger Mode on page 7-11*, the linear imager is in hands-free (presentation) mode when it sits in the gooseneck stand. In this mode the linear imager operates in continuous (constant-on) mode, where it automatically decodes a bar code presented in the field of view. The scanner LED is on, solid green.

To scan:

1. Ensure all connections are secure (see appropriate host chapter).
2. Present the bar code in the linear imager field of view.

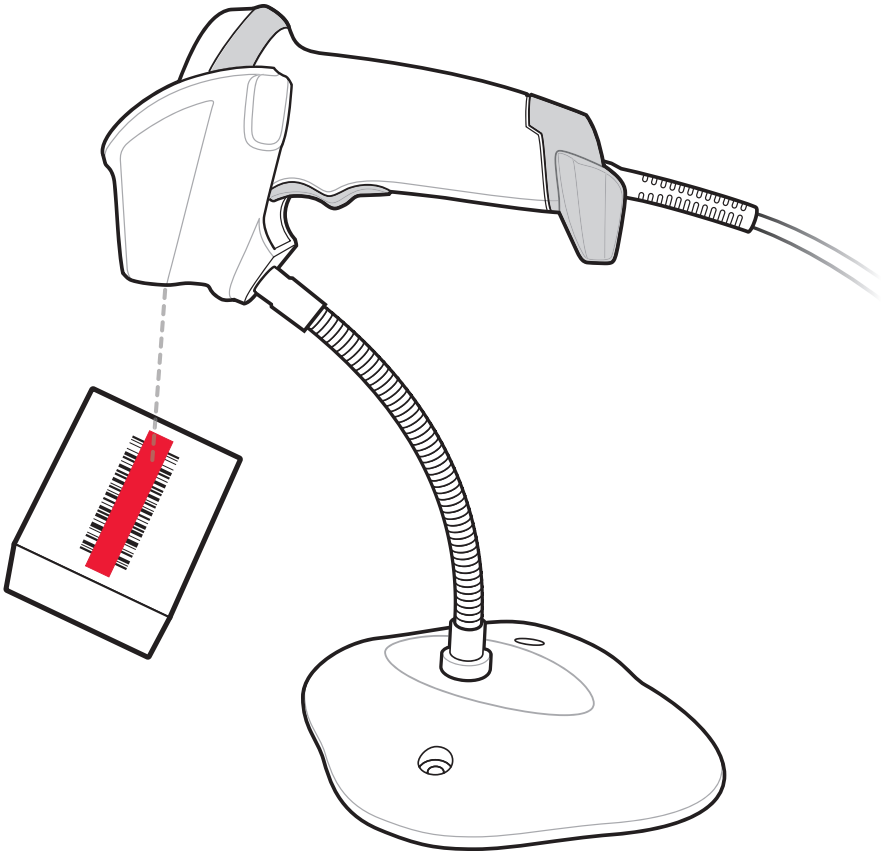


Figure 2-2 *Presentation Scanning*

3. Upon successful decode, the linear imager beeps and the green LED momentarily turns off. (For more information about beeper and LED definitions, see *Table 2-1*.)

Decode Ranges

Ranges are calculated on Code 39 except where noted.

Table 2-2 *LI2208 Decode Ranges*

Symbol Density	Bar Code Type	Typical Working Ranges	
		Near	Far
3 mil (minimum resolution)			
4 mil	Code 39	4 in. (10.2 cm)	10.0 in. (25.4 cm)
5 mil	Code 39	3.0 in. (7.6 cm)	13.0 in. (33.0 cm)
7.5 mil	Code 39	1.5 in. (3.8 cm)	19.0 in. (48.3 cm)
13 mil	100% UPC-A	1.0 in. (2.5 cm)	31.0 in. (78.7 cm)
20 mil	Code 39	1.0 in. (2.5 cm)	42.0 in. (106.7 cm)
26 mil	200% UPC-A	3.0 in. (7.6 cm)	55.0 in. (140.0 cm)
100 mil (reflective)			> 20 ft. (> 6 m)

NOTE When reading high density bar codes, users should attempt to read them slightly farther away from the scanner. Typically a 3 mil Code39 bar code begins reading at 5 in. (12.8cm).

CHAPTER 3 USB INTERFACE

Introduction

This chapter provides instructions for programming the linear imager to interface with a USB host. The linear imager connects directly to a USB host, or a powered USB hub. The USB host can power the linear imager.

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

*Indicates Default —— ***No Delay**——Feature/Option

Connecting a USB Interface

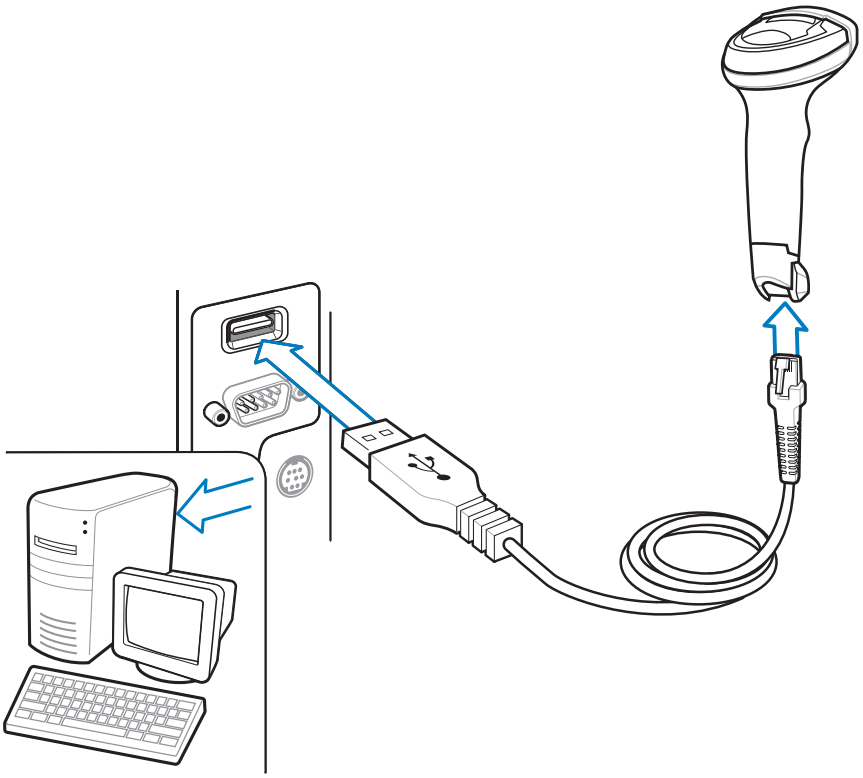


Figure 3-1 *USB Connection*

The linear imager connects with USB capable hosts including:

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

The following operating systems support the linear imager through USB:

- Windows 98, 2000, ME, XP , Vista, Windows 7 - 32-bit/64-bit, Windows 8
- MacOS 8.5 and above
- IBM 4690 OS.

The linear imager also interfaces with other USB hosts which support USB Human Interface Devices (HID).

To connect the USB interface:

1. Attach the modular connector of the USB interface cable to the host port on the bottom of the linear imager.
2. Plug the series A connector in the USB host or hub, or plug the Power Plus 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 3-6*.

> ***NOTE*** The interface cable automatically detects the host interface type and uses the default setting. If the default (*) does not meet your requirements, scan another host bar code.

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 12-4*.

USB Parameter Defaults

Table 3-1 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 3-6*.

NOTE See*Chapter B, COUNTRY CODES* for USB Country Keyboard Types (Country Codes).

See *Appendix A, STANDARD DEFAULT PARAMETERS* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 3-1 *USB Host Default Table*

Parameter	Default	Page Number
USB Host Parameters		
USB Device Type	USB Keyboard (HID)	*3-6*
Symbol Native API (SNAPI) Status Handshaking	Enable	*3-8*
USB Keystroke Delay	No Delay	*3-9*
USB CAPS Lock Override	Disable	*3-9*
USB Ignore Unknown Characters	Send	*3-10*
USB Convert Unknown to Code 39	Disable	*3-10*
Emulate Keypad	Enable	*3-11*
Emulate Keypad with Leading Zero	Disable	*3-11*
Quick Keypad Emulation	Enable	*3-12*
USB FN1 Substitution	Disable	*3-12*
Function Key Mapping	Disable	*3-13*
Simulated Caps Lock	Disable	*3-13*
Convert Case	No Case Conversion	*3-14*
USB Static CDC	Enable	*3-14*
Ignore Beep	Disable	*3-15*
Ignore Bar Code Configuration	Disable	*3-15*
USB Polling Interval	3 msec	*3-16*
Fast HID Keyboard	Disable	*3-18*
USB Toshiba TEC Host Parameters		
Code Type Table Usage	Use Table 0 Identifier	*3-19*
Include Symbol Types	Add Symbol Types	*3-20*
Include Character Counts	Add Character Counts	*3-20*

Table 3-1 *USB Host Default Table (Continued)*

Parameter	Default	Page Number
Include Header	Add Header Character	*3-21*
Include Terminator	Add Terminator Character (s)	*3-21*
Header Character	n/a	*3-22*
Terminator Character	Add ETX	*3-23*
Light LED on Good Decode	Light LED on Good Decode	*3-23*
Good Decode Beeper Timer	Indicate Before Transmission	*3-24*

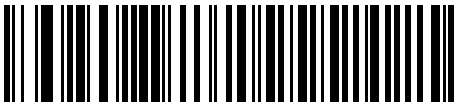
USB Host Parameters

USB Device Type

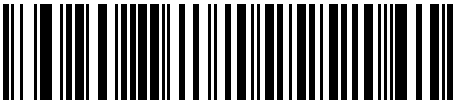
Select the desired USB device type.

NOTE When changing USB device types, the scanner automatically restarts. The linear imager issues a power-up beep sequence.

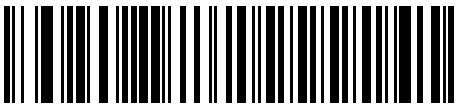
NOTE Select **IBM Hand-Held USB** to disable data transmission when an IBM register issues a Scan Disable command. Aim, illumination, and decoding is still permitted. Select **IBM OPOS (IBM Hand-held USB with Full Scan Disable)** to completely shut off the scanner when an IBM register issues a Scan Disable command, including aim, illumination, decoding, and data transmission.



***USB Keyboard (HID)**



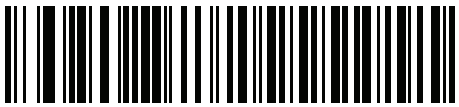
IBM Table Top USB



IBM Hand-Held USB

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

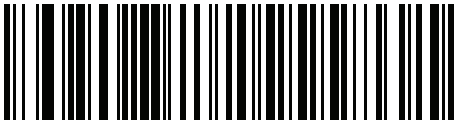
USB Device Type (continued)



Simple COM Port Emulation

USB CDC Host

Symbol Native API (SNAPI) without Imaging Interface



Toshiba TEC Host

Symbol Native API (SNAPI) Status Handshaking

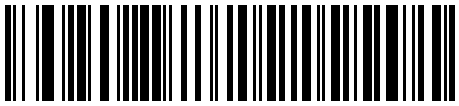
After selecting a SNAPI interface as the USB device type, select whether to enable or disable status handshaking.

***Enable SNAPI Status Handshaking**

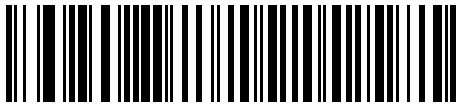
Disable SNAPI Status Handshaking

USB Keystroke Delay

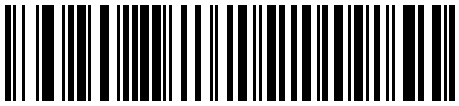
This parameter sets the delay, in milliseconds, between emulated keystrokes. Scan a bar code below to increase the delay when hosts require a slower transmission of data.



***No Delay**



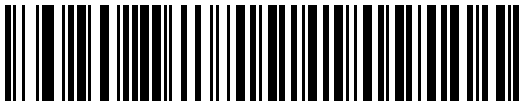
Medium Delay (20 msec)



Long Delay (40 msec)

USB CAPS Lock Override

This option applies only to the USB Keyboard (HID) 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 USB Keyboard (HID) 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 linear imager issues an error beep.

***Send Bar Codes with Unknown Characters**

Do Not Send Bar Codes with Unknown Characters

USB Convert Unknown to Code 39

This option applies only to the IBM Handheld, IBM Tabletop, and OPOS devices. Scan a bar code below to enable or disable converting unknown bar code type data to Code 39.

***Disable Convert Unknown to Code 39**

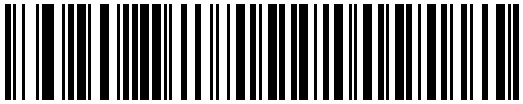
Enable Convert Unknown to Code 39

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.”

✓ ***NOTE*** If your keyboard type is not listed in the country code list (see *Appendix B, COUNTRY CODES*), disable *Quick Keypad Emulation on page 3-12* and ensure **Emulate Keypad** is enabled.

Disable Keypad Emulation



*** Enable Keypad Emulation**

Emulate Keypad with Leading Zero

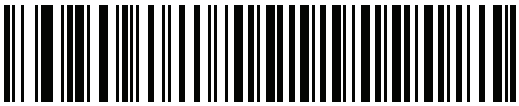
Enable this to send character sequences sent over the numeric keypad as ISO characters which have a leading zero. For example ASCII A transmits as “ALT MAKE” 0 0 6 5 “ALT BREAK”.

***Disable Keypad Emulation with Leading Zero**

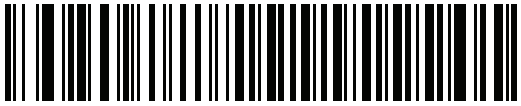
Enable Keypad Emulation with Leading Zero

Quick Keypad Emulation

This options applies only if **Alternate Numeric Keypad Emulation** is enabled. This parameter enables a quicker method of keypad emulation where character value sequences are only sent for characters not found on the keyboard. The default value is Enable.



*** Enable**

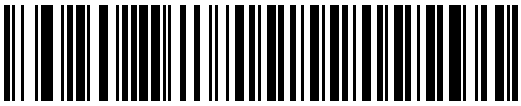


Disable

USB Keyboard FN1 Substitution

This option applies only to the USB USB Keyboard (HID) device. When enabled, this allows replacement of any FN1 characters in an EAN 128 bar code with a Key Category and value chosen by the user (see *FN1 Substitution Values on page 7-26* to set the Key Category and Key Value).

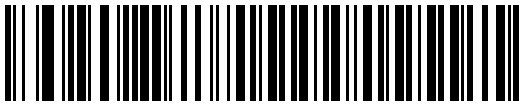
Enable FN1 Substitution



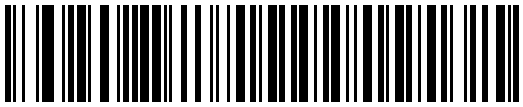
***Disable FN1 Substitution**

Function Key Mapping

ASCII values under 32 are normally sent as a control-key sequences (see *Table 3-3 on page 3-25*). 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

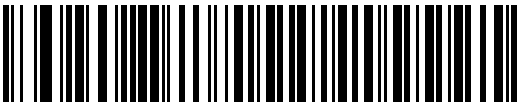
When enabled, the linear imager inverts upper and lower case characters on the linear imager bar code as if the Caps Lock state is enabled on the keyboard. This inversion is done regardless of the current state of the keyboard's Caps Lock state.

***Disable Simulated Caps Lock**

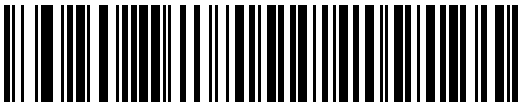
Enable Simulated Caps Lock

Convert Case

When enabled, the linear imager converts all bar code data to the selected case.



***No Case Conversion**



Convert All to Upper Case

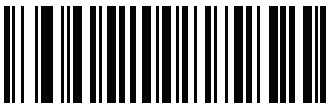
Convert All to Lower Case

USB Static CDC

When disabled, each device connected consumes another COM port (first device = COM1, second device = COM2, third device = COM3, etc.)

When enabled, each device connects to the same COM port.

***Enable USB Static CDC**



Disable USB Static CDC

Optional USB Parameters

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

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

Ignore Beep

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

***Disable**

Enable

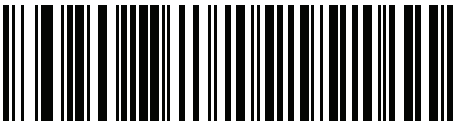
USB Polling Interval

Scan a bar code below to set the polling interval. The polling interval determines the rate at which data can be sent between the scanner and host computer. A lower number indicates a faster data rate.

NOTE When changing the USB polling interval, the linear imager automatically restarts and issues a power-up beep sequence.

IMPORTANT Ensure your host machine can handle the selected data rate.

1 msec

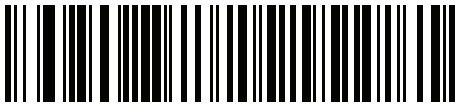


2 msec

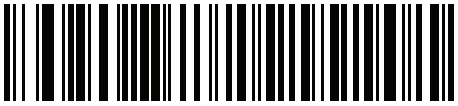
*** 3 msec**

4 msec

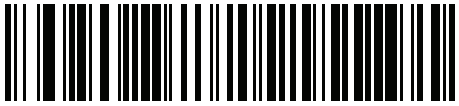
USB Polling Interval (continued)



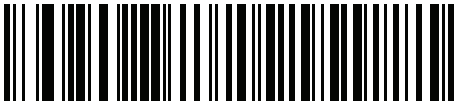
5 msec



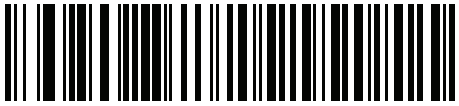
6 msec



7 msec



8 msec

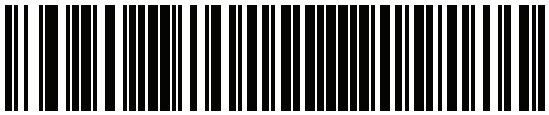


9 msec

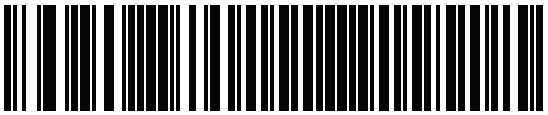
Fast HID Keyboard

This option transmits USB HID keyboard data at a faster rate.

NOTE **Quick Keypad Emulation** (on page 3-12) overrides **Fast HID Keyboard**.



Enable



*** Disable**

Toshiba TEC Host Parameters

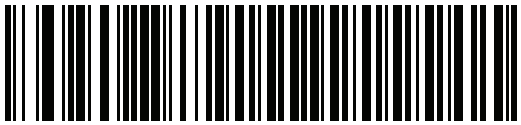
This section only applies when the USB device type is set as *Toshiba TEC Host on page 3-7*, and the scanner is connected to a Toshiba TEC register.

Toshiba TEC Code Type Table Usage

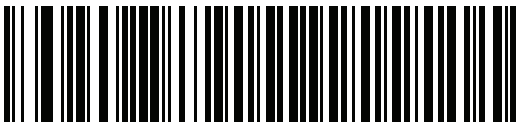
This single bit option chooses which Toshiba TEC specific Symbol Table is used for identifying bar code types.

Table 3-2 *Toshiba TEC Symbol Type Table*

Code Type	Table 0 Identifier	Table 1 Identifier
UPC-A	A	A
UPC-E	E	C
EAN-8	FF	B
EAN-13	F	A
Codabar (NW-7)	N	N
Code 39	M	M
I25	I	I
D25 (Standard 2 of 5)	H	H
Code 93	L	L
Code 128	K	K
RSS	R	R
All Others	X	X



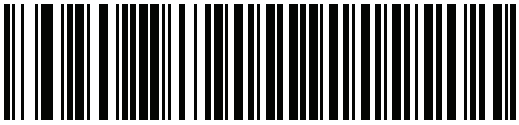
*** Use Table 0 Identifier**



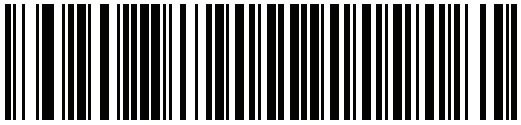
Use Table 1 Identifier

Toshiba TEC Include Symbol Type

This single bit option chooses whether or not the Toshiba TEC Symbol Table is used for identifying bar code types.



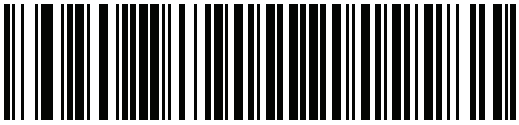
*** Add Symbol Types**



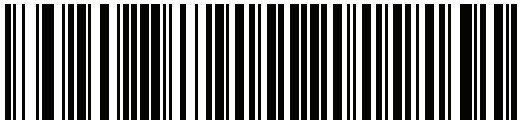
Do Not Add Symbol Types

Toshiba TEC Include Character Counts

This single bit option chooses whether or not the count of characters in the bar code is prefixed onto the decoded data before transmission. This applies to all the code types except the UPC and EAN families.



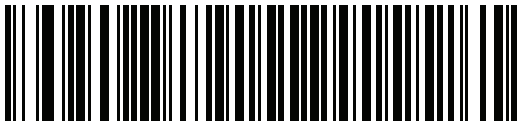
*** Add Character Counts**



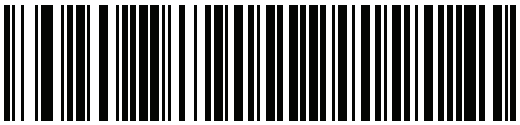
Do Not Add Character Counts

Toshiba TEC Include Header

This single bit option chooses whether or not the header character is prefixed onto the decoded data before transmission. The default header character is the STX (0x02) character. That can be changed with the Toshiba TEC Header Character parameters listed below.



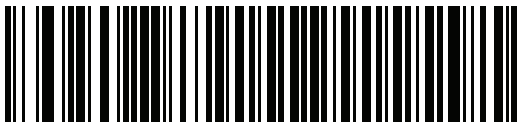
*** Add Header Character**



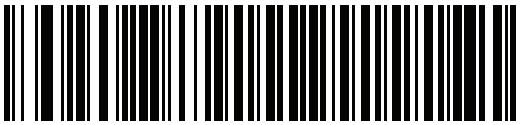
Do Not Add Header Character

Toshiba TEC Include Terminator

This single bit option chooses whether or not the terminator character(s) are appended onto the decoded data before transmission. The default terminator character is the ETX (0x03) character. That can be changed with the Toshiba TEC Terminator Character parameters listed below. Additionally, there is an ability to specify one or two terminator characters. The default is no second terminator.



*** Add Terminator Character (s)**



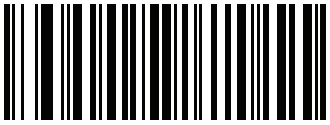
Do Not Add Terminator Character (s)

Toshiba TEC Header Character

This single byte option specifies the header character prefixed onto the decoded data before transmission. The default header character is the STX (0x02) character. Note that it is NOT POSSIBLE to use the NULL character (0x00) as the prefix as this is the default value and indicates that an STX must be used. To program a header character, scan the bar code below followed by two numeric bar codes in *Appendix E, NUMERIC BAR CODES*.

Values:0 = Add STX (0x02),

All others specify the hex value to be prefixed.



Toshiba TEC Header Character

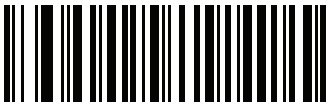
Toshiba TEC Terminator Character

This two byte option specifies the terminator character(s) appended onto the decoded data before transmission. The default terminator character is the ETX (0x03) character. Note that it is NOT POSSIBLE to use the NULL character (0x00) as either of the terminators as this is the default value and indicates that an ETX must be used. If the first character is a NULL, then only the ETX is appended even if there is a second character defined. If the desired terminator is ETX followed by another character, then BOTH characters must be specified. To program a terminator character, scan the bar code below followed by two numeric bar codes in *Appendix E, NUMERIC BAR CODES*.

Values: 0 = Add ETX (0x03),

All others specify the value to be appended in decimal format.

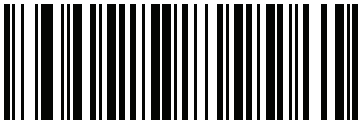
Terminator Character 1



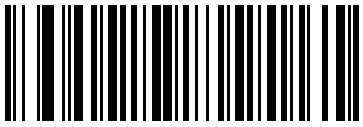
Terminator Character 2

Toshiba TEC Light LED on Good Decode

This option specifies whether or not to light the *Good Decode LED* on a good decode.



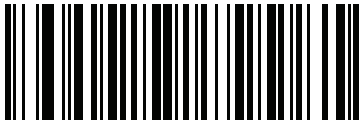
*** Light LED on Good Decode**



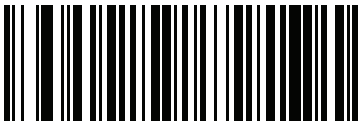
Do Not Light LED on Good Decode

Toshiba TEC Good Decode Beeper Timing

This option specifies when a good decode indication takes place. The options are to indicate the good decode either before or after the bar code was transmitted to the host.



*** Indicate Before Transmission**



Indicate After Transmission

ASCII Character Set for USB

Table 3-3 *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 non-bold keystroke is sent.

Table 3-3 *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 non-bold keystroke is sent.

Table 3-3 *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
1081	Q	Q

[1]The keystroke in bold is sent only if the "Function Key Mapping" is enabled. Otherwise, the non-bold keystroke is sent.

Table 3-3 *ASCII Character Set for USB (Continued)*

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
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
1109	+M	m
1110	+N	n

[1]The keystroke in bold is sent only if the "Function Key Mapping" is enabled. Otherwise, the non-bold keystroke is sent.

Table 3-3 *ASCII Character Set for USB (Continued)*

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
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 non-bold keystroke is sent.

Table 3-4 *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 3-5 *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
3081	GUI Q

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 3-5 *USB GUI Key Character Set (Continued)*

GUI Key	Keystroke
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 3-6 *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
5016	F16
5017	F17

Table 3-6 *USB F Key Character Set (Continued)*

F Keys	Keystroke
5018	F18
5019	F19
5020	F20
5021	F21
5022	F22
5023	F23
5024	F24

Table 3-7 *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 3-8 *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 4 RS-232 INTERFACE

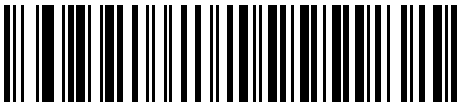
Introduction

This chapter provides instructions for programming the linear imager to interface with an RS-232 host interface. The RS-232 interface is used to attach the scanner to point-of-sale devices, host computers, or other devices with an available RS-232 port (i.e., COM port).

If the particular host is not listed in *Table 4-2*, set the communication parameters to match the host device. Refer to the documentation for the host device.

NOTE This linear imager uses TTL RS-232 signal levels, which interface with most system architectures. For system architectures requiring RS-232C signal levels, Motorola offers different cables providing the TTL to RS-232C conversion. Contact Motorola Solutions Support for more information.

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



*Indicates Default — ***Baud Rate 9600** — Feature/Option

Connecting an RS-232 Interface

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

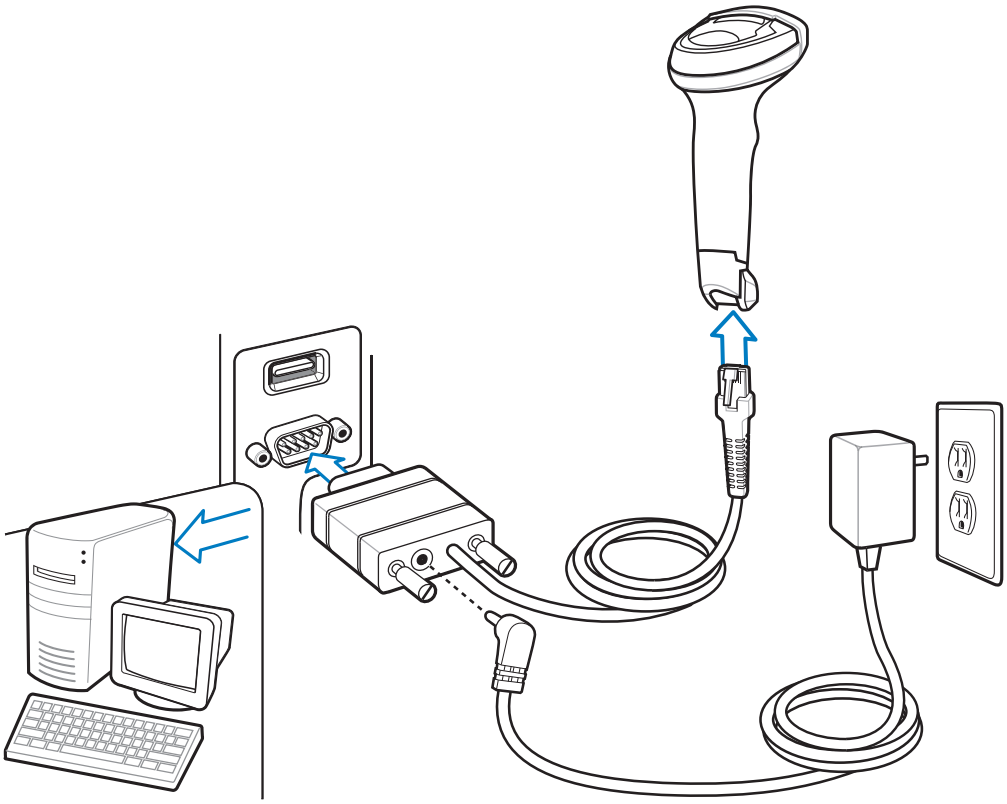


Figure 4-1 *RS-232 Direct Connection*

To connect the RS-232 interface:

1. Attach the modular connector of the RS-232 interface cable to the host port on the bottom of the scanner.
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 4-6*.

NOTE The interface cable automatically detects the host interface type and uses the default setting. If the default (*) does not meet your requirements, scan another host bar code.

5. To modify any other parameter options, scan the appropriate bar codes in this chapter.

RS-232 Parameter Defaults

Table 4-1 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 4-4*.

NOTE See *Appendix A, STANDARD DEFAULT PARAMETERS* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 4-1 *RS-232 Host Default Table*

Parameter	Default	Page Number
RS-232 Host Parameters		
RS-232 Host Types	Standard	*4-6*
Baud Rate	9600	*4-8*
Stop Bit Select	1 Stop Bit	*4-9*
Check Receive Errors	Enable	*4-9*
Parity Type	None	*4-10*
Data Bits (ASCII Format)	8-bit	*4-10*
Hardware Handshaking	None	*4-12*
Software Handshaking	None	*4-14*
Host Serial Response Time-out	2 sec	*4-15*
RTS Line State	Low RTS	*4-16*
Beep on <BEL>	Disable	*4-16*
Intercharacter Delay	0 msec	*4-17*
Nixdorf Beep/LED Options	Normal Operation	*4-18*
Ignore Unknown Characters	Send Bar Code	*4-18*

RS-232 Host Parameters

Various RS-232 hosts are set up with their own parameter default settings (*Table 4-2*). Selecting the ICL, Fujitsu, Wincor-Nixdorf Mode A, Wincor-Nixdorf Mode B, Olivetti, Omron, or terminal sets the defaults listed below.

Table 4-2 *Terminal Specific RS-232*

Parameter	ICL	Fujitsu	Wincor-Nixdorf Mode A	Wincor-Nixdorf Mode B/OPOS/JPOS	Olivetti	Omron	CUTE
Transmit Code ID	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data Transmission Format	Data/Suffix	Data/Suffix	Data/Suffix	Data/Suffix	Prefix/Data/Suffix	Data/Suffix	Prefix/Data/Suffix
Suffix	CR (1013)	CR (1013)	CR (1013)	CR (1013)	ETX (1002)	CR (1013)	CR (1013) ETX (1003)
Baud Rate	9600	9600	9600	9600	9600	9600	9600
Parity	Even	None	Odd	Odd	Even	None	Even
Hardware Handshaking	RTS/CTS Option 3	None	RTS/CTS Option 3	RTS/CTS Option 3	None	None	None
Software Handshaking	None	None	None	None	ACK/NAK	None	None
Serial Response Time-out	9.9 Sec.	2 Sec.	9.9 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	7-bit	8-bit	7-bit
Beep On <BEL>	Disable	Disable	Disable	Disable	Disable	Disable	Disable
RTS Line State	High	Low	Low	Low = No data to send	Low	High	High
Prefix	None	None	None	None	STX (1003)	None	STX (1002)

Notes:
In the Nixdorf Mode B, if CTS is low, scanning is disabled. When CTS is high, scanning is enabled.

If you scan Nixdorf Mode B without connecting the linear imager 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 linear imager.

The CUTE host disables all parameter scanning, including Set Defaults. If you inadvertently select CUTE, scan **Enable Parameter Bar Code Scanning (01h) on page 7-5*, then change the host selection.

In ASCII format, when 7-bit is selected, Parity must be set to Odd or Even. If Parity is set to None, the scanner automatically operates in 8-bit mode, even if 7-bit is scanned.

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 4-3* 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.

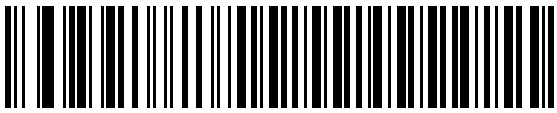
NOTE The code types in *Table 4-3* may not be automatically enabled. Check the defaults for each code type in *Table 9-1*, *Chapter 9, SYMBOLOGIES*.

Table 4-3 *Terminal Specific Code ID Characters*

Code Type	ICL	Fujitsu	Wincor-Nixdorf Mode A	Wincor-Nixdorf Mode B/ OPOS/JPOS	Olivetti	Omron	CUTE
UPC-A	A	A	A	A	A	A	A
UPC-E	E	E	C	C	C	E	None
EAN-8/JAN-8	FF	FF	B	B	B	FF	None
EAN-13/JAN-13	F	F	A	A	A	F	A
Code 39	C <len>	None	M	M	M <len>	C <len>	3
Code 39 Full ASCII	None	None	M	M	None	None	3
Codabar	N <len>	None	N	N	N <len>	N <len>	None
Code 128	L <len>	None	K	K	K <len>	L <len>	5
I 2 of 5	I <len>	None	I	I	I <len>	I <len>	1
Code 93	None	None	L	L	L <len>	None	None
D 2 of 5	H <len>	None	H	H	H <len>	H <len>	2
GS1-128	L <len>	None	P	P	P <len>	L <len>	5
MSI	None	None	O	O	O <len>	None	None
Bookland EAN	F	F	A	A	A	F	None
Trioptic	None	None	None	None	None	None	None
Code 11	None	None	None	None	None	None	None
IATA	H<len>	None	H	H	H <len>	H <len>	2
Code 32	None	None	None	None	None	None	None
GS1 DataBar Variants	None	None	E	E	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

RS-232 Host Types (continued)

Omron

OPOS/JPOS

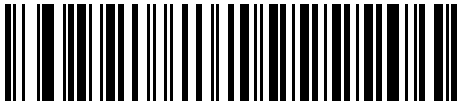
Fujitsu RS-232

CUTE

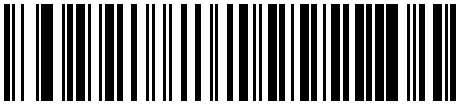
✓ ***NOTE*** The CUTE host disables all parameter scanning, including set defaults. If the CUTE parameter is inadvertently selected, scan *Enable Parameter Bar Code Scanning (01h) on page 7-5, then change the host selection.

Baud Rate

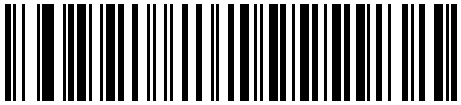
Baud rate is the number of bits of data transmitted per second. Set the linear imager's baud rate to match the baud rate setting of the host device. Otherwise, data may not reach the host device or may reach it in distorted form.



***Baud Rate 9600**



Baud Rate 19,200



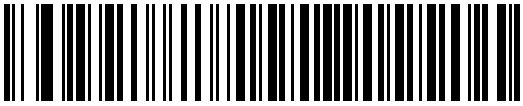
Baud Rate 38,400

Baud Rate 57,600

Baud Rate 115,200

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

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.

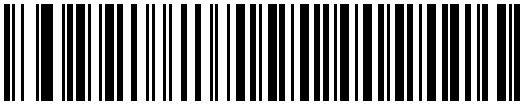
***Check For Received Errors (Enable)**

Do Not Check For Received Errors (Disable)

Data Bits (ASCII Format)

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

NOTE When 7-bit is selected, *Parity* must be set to **Odd** or **Even**. If *Parity* is set to **None**, the scanner automatically operates in 8-bit mode, even if 7-bit is scanned.



7-bit

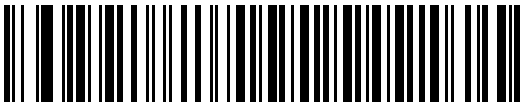
***8-bit**

Parity

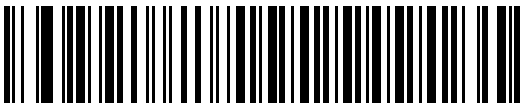
NOTE *Parity* of **None** is not valid when Data Bits is set to **7-bit**.

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

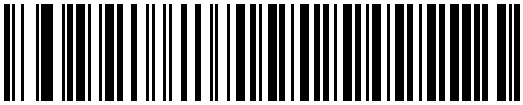
- Select **Odd** parity and the parity bit value is set to 0 or 1, based on data, to ensure that an odd number of 1 bits are contained in the coded character.
- Select **Even** parity and the parity bit value is set to 0 or 1, based on data, to ensure that an even number of 1 bits are contained in the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



Odd



Even



***None**

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 linear imager reads the CTS line for activity. If CTS is asserted, the linear imager 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 linear imager sounds a transmit error, and any scanned data is lost.
- When the CTS line is de-asserted, the linear imager 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 linear imager sounds a transmit error, and discards the data.
- When data transmission is complete, the linear imager de-asserts RTS 10 msec after sending the last character.
- The host should respond by negating CTS. The linear imager 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 linear imager sounds a transmission error, and the data is discarded.

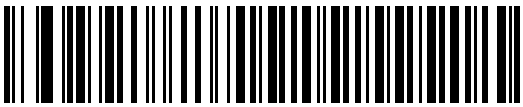
If the above communication sequence fails, the linear imager issues an error indication. In this case, the data is lost and must be rescanned.

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

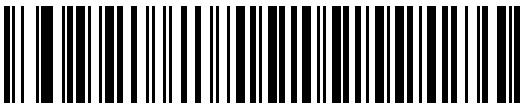
NOTE The DTR signal is jumpered to the active state.

Hardware Handshaking (continued)

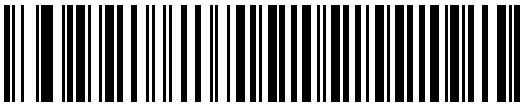
- **None**: Scan the bar code below if no Hardware Handshaking is desired.
- **Standard RTS/CTS**: Scan the bar code below to select Standard RTS/CTS Hardware Handshaking.
- **RTS/CTS Option 1**: When RTS/CTS Option 1 is selected, the linear imager asserts RTS before transmitting and ignores the state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



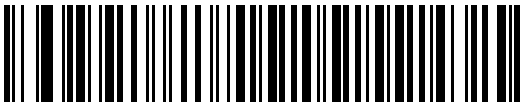
***None**



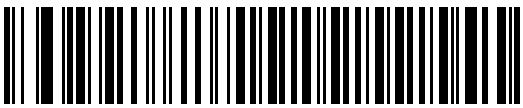
Standard RTS/CTS



RTS/CTS Option 1



RTS/CTS Option 2



RTS/CTS Option 3

Software Handshaking

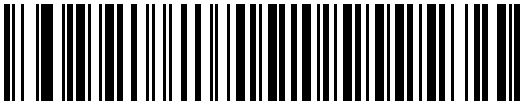
This parameter offers control of the data transmission process in addition to, or instead of, that offered by hardware handshaking. There are five options.

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

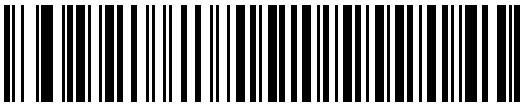
- **None**: When this option is selected, data is transmitted immediately. No response is expected from host.
- **ACK/NAK**: When this option is selected, after transmitting data, the linear imager expects either an ACK or NAK response from the host. When a NAK is received, the linear imager transmits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

  The linear imager waits up to the programmable Host Serial Response Time-out to receive an ACK or NAK. If the linear imager 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 linear imager 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 linear imager 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 linear imager transmission off until the linear imager receives an XON character. There are two situations for XON/XOFF:
  - XOFF is received before the linear imager has data to send. When the linear imager 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 linear imager 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 linear imager receives an XON character, it sends the rest of the data message. The linear imager waits up to 30 seconds for the XON.

Software Handshaking (continued)

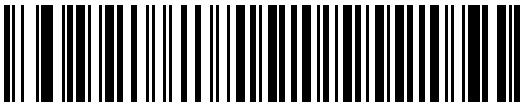


*None

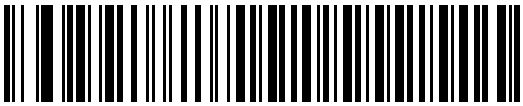


ACK/NAK

ENQ



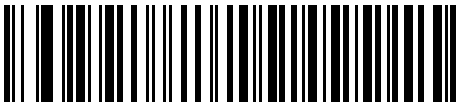
ACK/NAK with ENQ



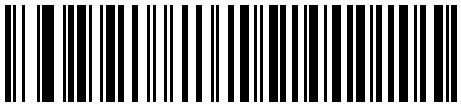
XON/XOFF

Host Serial Response Time-out

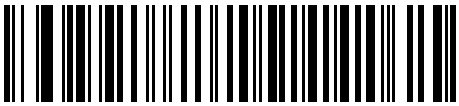
This parameter specifies how long the linear imager waits for an ACK, NAK, ENQ, XON, or CTS before determining that a transmission error occurred.



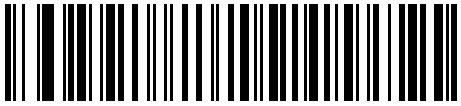
***Minimum: 2 sec**



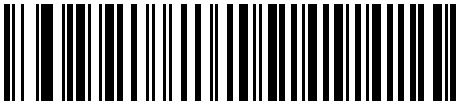
Low: 2.5 sec



Medium: 5 sec



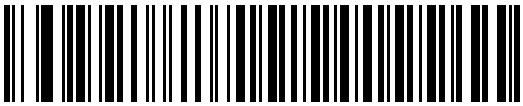
High: 7.5 sec



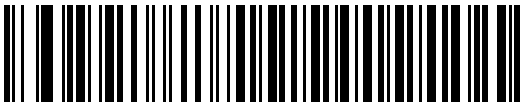
Maximum: 9.9 sec

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**



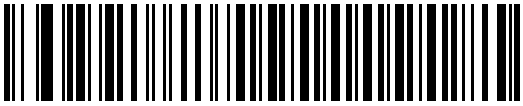
Host: High RTS

Beep on <BEL>

Point-to-Point Mode Only

When this parameter is enabled, the linear imager 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.

NOTE This parameter is not supported in Multipoint-to-Point mode.

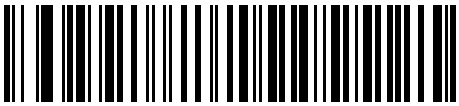


Beep On <BEL> Character (Enable)

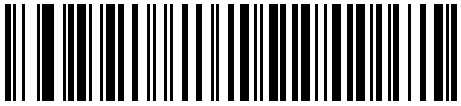
***Do Not Beep On <BEL> Character (Disable)**

Intercharacter Delay

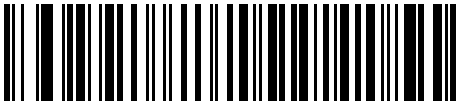
This parameter specifies the intercharacter delay inserted between character transmissions.



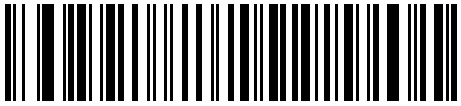
***Minimum: 0 msec**



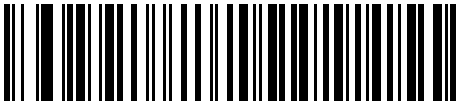
Low: 25 msec



Medium: 50 msec



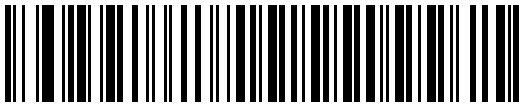
High: 75 msec



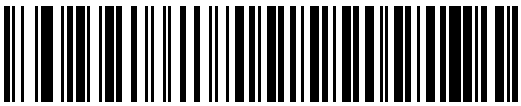
Maximum: 99 msec

Nixdorf Beep/LED Options

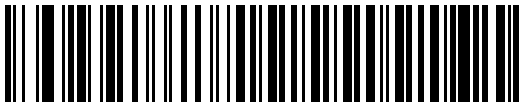
When Nixdorf Mode B is selected, this indicates when the linear imager should beep and turn on its LED after a decode.



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



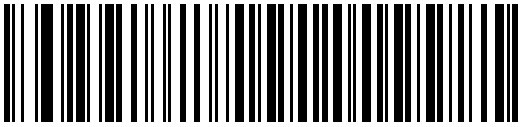
Beep/LED After Transmission



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 linear imager. 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 linear imager.



***Send Bar Code with Unknown Characters**

Do Not Send Bar Codes with Unknown Characters

ASCII Character Set for RS-232

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

Table 4-4 *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
1027	%A	ESC

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

ASCII Value	Full ASCII Code 39 Encode Character	ASCII Character
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
1057	9	9
1058	/Z	:

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

ASCII Value	Full ASCII Code 39 Encode Character	ASCII Character
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
1087	W	W
1088	X	X
1089	Y	Y

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

ASCII Value	Full ASCII Code 39 Encode Character	ASCII Character
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
1117	+U	u
1118	+V	v
1119	+W	w
1120	+X	x

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

ASCII Value	Full ASCII Code 39 Encode Character	ASCII Character
1121	+Y	y
1122	+Z	z
1123	%P	{
1124	%Q	|
1125	%R	}
1126	%S	~
1127		Undefined
7013		ENTER

CHAPTER 5 IBM INTERFACE

Introduction

This chapter provides instructions for programming the linear imager to interface with an IBM 468X/469X host computer.

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 linear imager to the host interface.

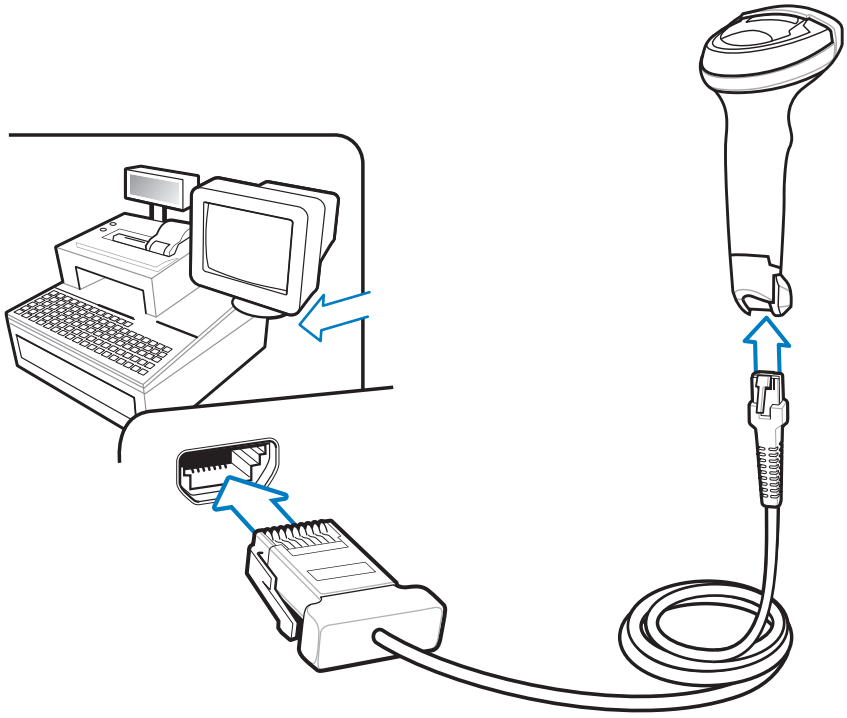


Figure 5-1 *IBM Direct Connection*

To connect the IBM 46XX interface:

1. Attach the modular connector of the IBM 46XX interface cable to the host port on the bottom of the linear imager.
2. Connect the other end of the IBM 46XX interface cable to the appropriate port on the host.
3. Select the port address by scanning the appropriate bar code from *Port Address on page 5-4*.

   IMPORTANT The Auto-Host Detect Cable feature automatically detects the host interface type, but there is no default setting. Scan one of the bar codes below to select the appropriate port.

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 linear imager parameters are typically controlled by the IBM system.

IBM Parameter Defaults

Table 5-1 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 5-4*.

NOTE See *Appendix A, STANDARD DEFAULT PARAMETERS* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 5-1 *IBM Host Default Table*

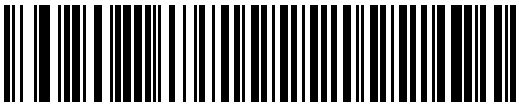
Parameter	Default	Page Number
IBM 468X/469X Host Parameters		
Port Address	None Selected	*5-4*
Convert Unknown to Code 39	Disable	*5-5*
Ignore Beep	Disable	*5-5*
Ignore Bar Code Configuration	Disable	*5-6*

IBM 468X/469X Host Parameters

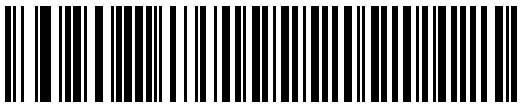
Port Address

This parameter sets the IBM 468X/469X port used. User selection is required to configure this interface The Auto-Host Detect Cable feature automatically detects the host interface type, but there is no default setting. Scan one of the bar codes below to select the appropriate port.

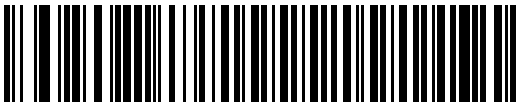
✓ ***NOTE*** Scanning one of these bar codes enables the RS-485 interface on the linear imager.



***None Selected**



Hand-held Scanner Emulation (Port 9B)



Non-IBM Scanner Emulation (Port 5B)

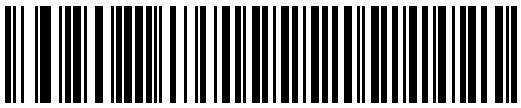
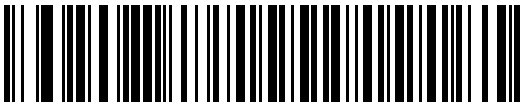


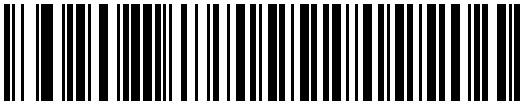
Table-top Scanner Emulation (Port 17)

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 linear imager 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 linear imager.

Ignore Beep

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

***Disable**

Enable

CHAPTER 6 KEYBOARD WEDGE INTERFACE

Introduction

This chapter provides instructions for programming the linear imager for keyboard wedge host interface, used to connect the scanner between the keyboard and host computer. The linear imager translates the bar code data into keystrokes, and transmits the information to the host computer. The host computer accepts the keystrokes as if they originated from the keyboard.

This interface adds bar code reading functionality to a system designed for manual keyboard input. In this mode the keyboard keystrokes are simply passed through.

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

*Indicates Default — *Send Bar Codes with Unknown Characters — Feature/Option

Connecting a Keyboard Wedge Interface

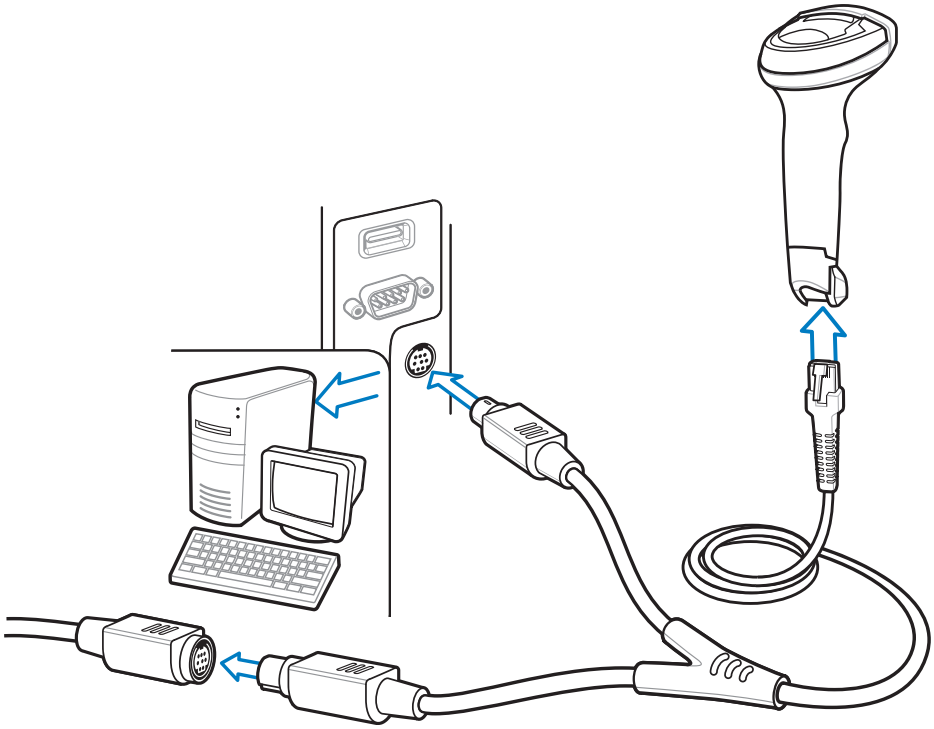


Figure 6-1 *Keyboard Wedge Connection with Y-cable*

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

To connect the Keyboard Wedge interface Y-cable:

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 linear imager.
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 6-4*.

   NOTE The Auto-Host Detect Cable feature automatically detects the host interface type and uses the default setting. If the default (*) does not meet your requirements, scan *IBM PC/AT & IBM PC Compatibles on page 6-4*.

9. To modify any other parameter options, scan the appropriate bar codes in this chapter.

Keyboard Wedge Parameter Defaults

Table 6-1 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 6-4*.

NOTE See *Chapter B, COUNTRY CODES* for Keyboard Wedge Country Keyboard Types (Country Codes).

See *Appendix A, STANDARD DEFAULT PARAMETERS* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

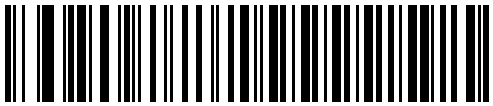
Table 6-1 *Keyboard Wedge Host Default Table*

Parameter	Default	Page Number
Keyboard Wedge Host Parameters		
Keyboard Wedge Host Type	IBM AT Notebook	*6-4*
Ignore Unknown Characters	Send	*6-5*
Keystroke Delay	No Delay	*6-5*
Intra-Keystroke Delay	Disable	*6-6*
Alternate Numeric Keypad Emulation	Enable	*6-6*
Quick Keyboard Emulation	Enable	*6-7*
Caps Lock On	Disable	*6-7*
Caps Lock Override	Disable	*6-8*
Convert Wedge Data	No Convert	*6-8*
Function Key Mapping	Disable	*6-9*
FN1 Substitution	Disable	*6-9*
Send and Make Break	Send	*6-10*

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

***IBM AT Notebook**

Ignore Unknown Characters

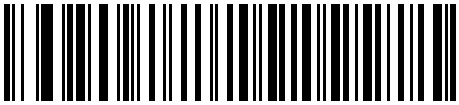
Unknown characters are characters the host does not recognize. When **Send Bar Codes With Unknown Characters** is selected, all bar code data is sent except for unknown characters, and no error beeps sound on the linear imager. When **Do Not Send Bar Codes With Unknown Characters** is selected, bar code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

***Send Bar Codes with Unknown Characters**

Do Not Send Bar Codes with Unknown Characters

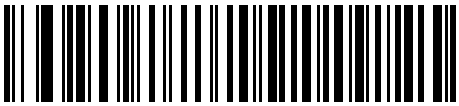
Keystroke Delay

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.

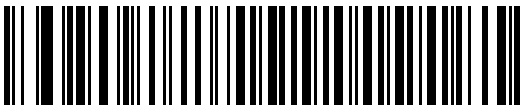
Enable Intra-Keystroke Delay

***Disable Intra-Keystroke Delay**

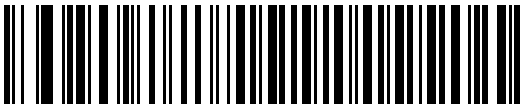
Alternate Numeric Keypad Emulation

In a Microsoft® operating system environment, this allows emulation of most other country keyboard types not listed in *Appendix B, COUNTRY CODES*.

✓ ***NOTE*** If your keyboard type is not listed in the country code list (see *Appendix B, COUNTRY CODES*), disable *Quick Keypad Emulation on page 6-7* and ensure *Alternate Numeric Keypad Emulation on page 6-6* is enabled.



***Enable Alternate Numeric Keypad**

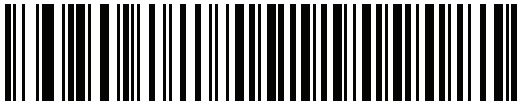


Disable Alternate Numeric Keypad

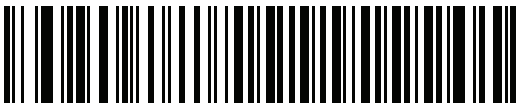
Quick Keypad Emulation

This parameter enables a method of quicker keypad emulation where character value sequences are only sent for characters not found on the keyboard.

NOTE This option applies only when **Alternate Numeric Keypad Emulation** is enabled.



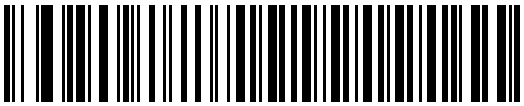
***Enable Quick Keypad Emulation**



Disable Quick Keypad Emulation

Caps Lock On

When enabled, the linear imager 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



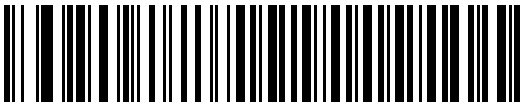
Enable Caps Lock On

***Disable Caps Lock On**

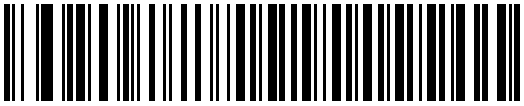
Caps Lock Override

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.



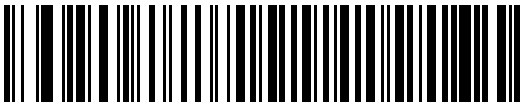
Enable Caps Lock Override



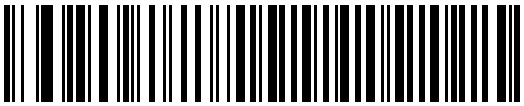
***Disable Caps Lock Override**

Convert Wedge Data

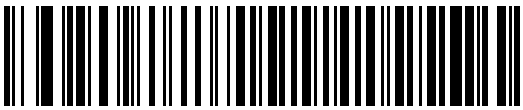
When enabled, the linear imager converts all bar code data to the selected case.



Convert to Upper Case



Convert to Lower Case



***No Convert**

Function Key Mapping

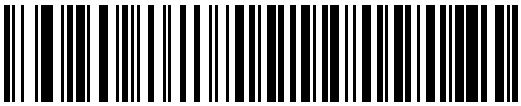
ASCII values under 32 are normally sent as control key sequences (see *Table 6-2 on page 6-12*). When this parameter is enabled, the keys in bold are sent in place of the standard key mapping. Table entries that do not have a bold entry remain the same whether or not this parameter is enabled.

Enable Function Key Mapping

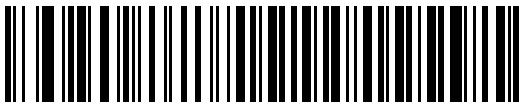
***Disable Function Key Mapping**

FN1 Substitution

When enabled, the linear imager replaces FN1 characters in an EAN128 bar code with a keystroke chosen by the user (see *FN1 Substitution Values on page 7-26*).



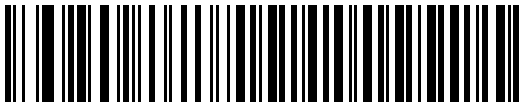
Enable FN1 Substitution



***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 Map

Refer to the following keyboard map for prefix/suffix keystroke parameters. To program the prefix/suffix values, see the bar codes on *page 7-23*.

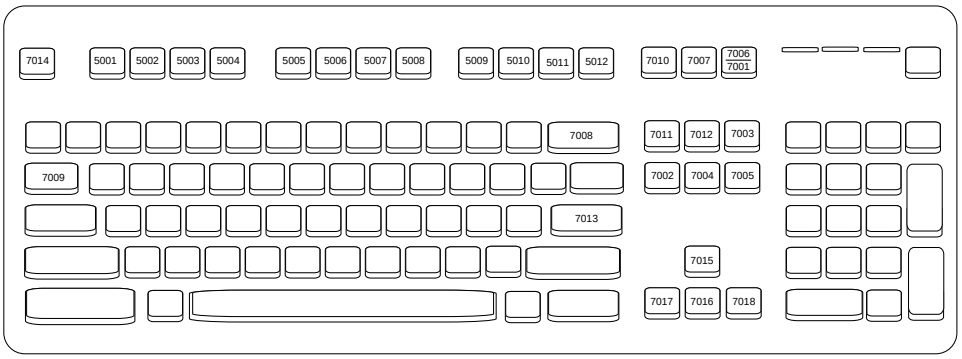


Figure 6-2 *IBM PS2 Type Keyboard*

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 6-2 *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
1022	$V	CTRL V

[1]The keystroke in bold is sent only if the "Function Key Mapping" is enabled. Otherwise, the non-bold keystroke is sent.

Table 6-2 *Keyboard Wedge ASCII Character Set (Continued)*

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
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
1050	2	2
1051	3	3

[1]The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the non-bold keystroke is sent.

Table 6-2 *Keyboard Wedge ASCII Character Set (Continued)*

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
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
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 non-bold keystroke is sent.

Table 6-2 *Keyboard Wedge ASCII Character Set (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
1109	+M	m

[1]The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the non-bold keystroke is sent.

Table 6-2 *Keyboard Wedge ASCII Character Set (Continued)*

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
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 non-bold keystroke is sent.

Table 6-3 *Keyboard Wedge ALT Key Character Set*

ALT Keys	Keystroke
2065	ALT A
2066	ALT B
2067	ALT C
2068	ALT D
2069	ALT E
2070	ALT F
2071	ALT G
2072	ALT H
2073	ALT I
2074	ALT J

Table 6-3 *Keyboard Wedge ALT Key Character Set (Continued)*

ALT Keys	Keystroke
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 6-4 *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
3054	GUI 6
3055	GUI 7
3056	GUI 8
3057	GUI 9
3065	GUI A
3066	GUI B

Table 6-4 *Keyboard Wedge GIU Key Character Set (Continued)*

GUI Keys	Keystrokes
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 6-5 *Keyboard Wedge F Key Character Set*

F Keys	Keystroke
5001	F1
5002	F2
5003	F3
5004	F4

Table 6-5 *Keyboard Wedge F Key Character Set (Continued)*

F Keys	Keystroke
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 6-6 *Keyboard Wedge Numeric Keypad Character Set*

Numeric Keypad	Keystroke
6042	*
6043	+
6044	undefined
6045	-
6046	.
6047	/
6048	0
6049	1

Table 6-6 *Keyboard Wedge Numeric Keypad Character Set (Continued)*

Numeric Keypad	Keystroke
6050	2
6051	3
6052	4
6053	5
6054	6
6055	7
6056	8
6057	9
6058	Enter
6059	Num Lock

Table 6-7 *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 7 USER PREFERENCES & MISCELLANEOUS SCANNER OPTIONS

Introduction

If desired, configure the linear imager to perform various functions, or activate different features. This chapter describes imaging preference features and provides programming bar codes for selecting these features.

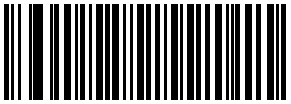
The linear imager ships with the settings in *User Preferences Parameter Defaults on page 7-2* (also see *Appendix A, STANDARD DEFAULT PARAMETERS* for all host device and miscellaneous defaults). If the default values suit requirements, programming is not necessary.

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 you power down the linear imager.

✓ ***NOTE*** Most computer monitors allow scanning the bar codes directly on the screen. When scanning from the screen, be sure to set the document magnification to a level where you can see the bar code clearly, and bars and/or spaces are not merging.

If not using a 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 connecting to a new host.

To return all features to default values, scan the *Default Parameters on page 7-4*. Throughout the programming bar code menus, asterisks (*) indicate default values.



*Indicates Default — ***Do Not Suppress Power Up Beeps** — Feature/Option

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 7-7*. The linear imager issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several bar codes. See these parameter descriptions for this procedure.

Errors While Scanning

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

User Preferences/Miscellaneous Option Parameter Defaults

Table 7-1 lists the defaults for preferences parameters. To change the default values:

- Scan the appropriate bar codes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, scan the *Default Parameters on page 7-4*.
- Configure the linear imager using the 123Scan^2 configuration program (see *123SCAN2 on page 10-1*).

NOTE See *Appendix A, STANDARD DEFAULT PARAMETERS* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 7-1 *User Preferences Parameter Defaults*

Parameter	Parameter Number	Default	Page Number
User Preferences			
Set Default Parameter		Set Factory Defaults	*7-4*
Report Version	N/A	N/A	*7-5*
Parameter Bar Code Scanning	ECh	Enable	*7-5*
Beep After Good Decode	38h	Enable	*7-6*
Decode Illumination Indicator	F2h 5Bh	Disable	*7-6*
Suppress Power Up Beeps	F1h D1h	Do Not Suppress (Disable)	*7-8*
Beeper Tone	91h	Medium	*7-7*
Beeper Volume	8Ch	High	*7-8*
Beeper Duration	F1h 74h	Medium	*7-9*
Hand-Held Trigger Mode	8Ah	Level	*7-10*
Hands-Free Mode	F1h 76h	Enable	*7-11*
Linear Imager Picklist Mode	04h BBh	Auto-discriminate	*7-12*
Aiming Illumination	04h A3h	Pulsing Pattern	*7-13*

Parameter	Parameter Number	Default	Page Number
Low Power Mode	80h	Enable	*7-14*
Time Delay to Low Power Mode	92h	1 Hour	*7-16*
Time Delay to Presentation Sleep Mode	F1h 96h	5 Min	*7-17*
Continuous Bar Code Read	F1 89h	Disable	*7-19*
Unique Bar Code Reporting	F1h D3h	Enable	*7-19*
Decode Session Timeout	88h	9.9 sec	*7-20*
Timeout Between Decodes, Same Symbol	89h	0.5 sec	*7-20*
Timeout Between Decodes, Different Symbols	90h	0.1 sec	*7-20*
Decoding Illumination	F0h, 2Ah	Enable	*7-21*
Miscellaneous Options			
Transmit Code ID Character	2Dh	None	*7-22*
Prefix Value	63h, 69h	7013 <CR><LF>	*7-23*
Suffix 1 Value Suffix 2 Value	62h 68h 64h 6Ah	7013 <CR><LF>	*7-23*
Scan Data Transmission Format	EBh	Data as is	*7-25*
FN1 Substitution Values	67h 6Dh	7013 <CR><LF>	*7-26*
Transmit “No Read” Message	5Eh	Disable	*7-27*
Unsolicited Heartbeat Interval	F8h 04h 5Eh	Disable	*7-28*
Enter Key (Carriage Return/Line Feed)			*7-29*
Tab Key			*7-29*

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 *Appendix A, STANDARD DEFAULT PARAMETERS* beginning on *page A-1*.)
- **Set Factory Defaults** - Scan the **Set Factory Defaults** bar code below to eliminate all custom default values and set the scanner to factory default values. (For factory default values, see *Appendix A, STANDARD DEFAULT PARAMETERS* beginning on *page A-1*.)
- **Write to Custom Defaults** - Custom default parameters can be configured to set unique default values for all parameters. After changing all parameters to the desired default values, scan the **Write to Custom Defaults** bar code below to configure custom defaults.

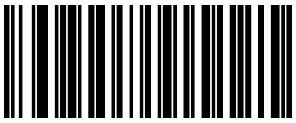
Restore Defaults

***Set Factory Defaults**

Write to Custom Defaults

Report Version

Scan the bar code below to report the version of software installed in the linear imager.



Report Software Version

Parameter Bar Code Scanning

Parameter # ECh

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)**

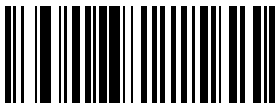
Disable Parameter Bar Code Scanning (00h)

Beep After Good Decode

Parameter # 38h

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

***Beep After Good Decode**
(Enable)
(01h)

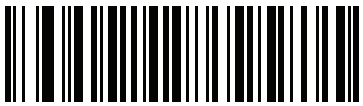


Do Not Beep After Good Decode
(Disable)
(00h)

Decode Illumination Indicator

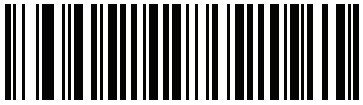
Parameter # F2h 5Bh

Scan a bar code below to select optional blinking of the illumination on a successful decode.



***Disable Decode Illumination Indicator**
(00h)

1 Blink
(01h)

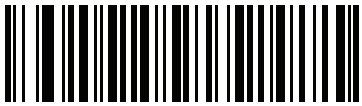


2 Blinks
(02h)

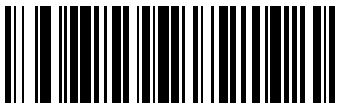
Beeper Tone

Parameter # 91h

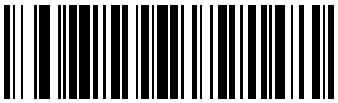
To select a decode beep frequency (tone), scan one of the following bar codes.



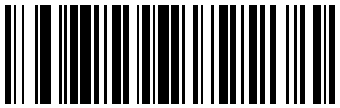
Off
(03h)



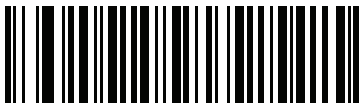
Low Tone
(02h)



***Medium Tone**
(01h)



High Tone
(00h)



Medium to High Tone (2-tone)
(04h)

Suppress Power Up Beeps

Parameter # F1h D1h

Scan a bar code below to select whether or not to suppress linear imager beeps upon power up.

***Do Not Suppress Power Up Beeps (00h)**

Suppress Power Up Beeps (01h)

Beeper Volume

Parameter # 8Ch

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

Low Volume (02h)

Medium Volume (01h)

***High Volume (00h)**

Beeper Duration

Parameter # F1h 74h

To select the duration for the beeper, scan one of the following bar codes.

Short
(00h)

***Medium**
(01h)

Long
(02h)

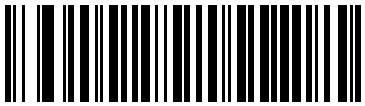
Hand-Held Trigger Mode

Parameter # 8Ah

Select one of the following trigger modes for the linear imager:

- **Standard (Level)** - A trigger pull activates decode processing. Decode processing continues until the bar code decodes, you release the trigger, or the Decode Session Timeout occurs.
- **Presentation (Blink)** - The digital scanner activates decode processing when it detects a bar code in its field of view. After a period of non-use, the digital scanner enters a low power mode, in which the LEDs turn off until the digital scanner senses motion.
- **Auto Aim** - This trigger mode projects the red illumination when you lift the linear imager. A trigger pull activates decode processing. After 2 seconds of inactivity the aiming pattern shuts off. (See *Aiming Illumination on page 7-13* to set the type of pattern when aiming.)

***Standard (Level)**
(00h)



Presentation (Blink)
(07h)

Auto Aim
(09h)

Hands-Free (Presentation) Trigger Mode

Parameter # F1h 76h

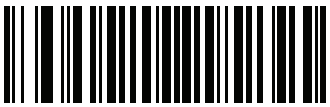
When the linear imager is seated in the gooseneck Intellistand, hands-free (presentation) trigger mode is automatically enabled. When removed from the Intellistand, the linear imager reverts to the hand-held trigger mode configurations previously set (see *Hand-Held Trigger Mode on page 7-10*).

In hands-free (presentation) mode, the linear imager automatically triggers when presented with a bar code.

NOTE The linear imager can be configured to be hand-held presentation mode, without Intellistand.

If you select **Disable Hands-Free Mode**, the linear imager behaves according to the setting of the *Hand-Held Trigger Mode* regardless of whether it is hand-held or on a counter top.

***Enable Hands-Free Mode (01h)**



Disable Hands-Free Mode (00h)

Linear Imager Picklist Mode

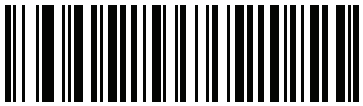
Parameter # 04h BBh

This mode allows a user to decode one of multiple bar codes printed close together, when the scan illumination intersects more than one bar code. The out-of-box default for this mode is **Auto-discriminate**.

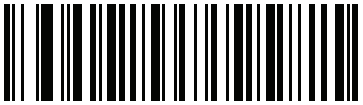
NOTE *Picklist Mode* cannot decode bar codes printed on top of one another. If the scan illumination crosses through two bar codes printed on top of one another, a decode may or may not occur. If a decode occurs, the bar code scanned is not identified.

There are three settings for this mode:

- **Always Enabled** - When multiple bar codes are close together in a row, the bar code decoded is always the one in the center of aiming beam.
- **Always Disabled** - When multiple bar codes are close together in a row, the bar code decoded is the first bar code that comes into scanner field of view.
- **Auto-discriminate** (default) - When there is only one bar code in the scanner field of view, decode is always attempted; when multiple bar codes are close together in a row, the bar code decoded is always the one in the center of the aiming beam.



***Auto-discriminate**
(02h)



Disable Picklist Mode
(00h)

Enable Picklist Mode
(01h)

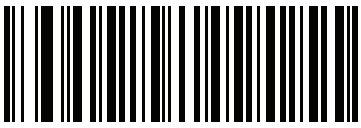
Aiming Illumination

Parameter # 04h A3h

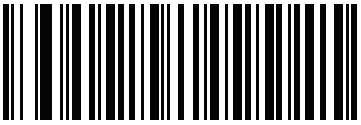
Scan a bar code below to select a preferred aiming pattern. When solid aiming pattern is selected, the scanner LED is on steadily when aiming. When pulsing pattern is selected, a pulsing LED pattern displays when aiming.

✓ ***NOTE*** **Pulsing Pattern** or **Solid Pattern** is only applicable in hands-free mode.

.



***Pulsing Pattern**
(01h)



Solid Pattern
(00h)

Low Power Mode

Parameter # 80h

If enabled, the linear imager enters a low power consumption mode after Time Delay to Low Power Mode has expired, in which the LEDs turn off in order to conserve energy and prolong the life of the scanner. The linear imager wakes when it senses a trigger pull or when the host attempts to communicate.

If disabled, power remains on after each decode attempt.

✓ ***NOTE*** If hands-free trigger mode is enabled, see *Hands-Free (Presentation) Trigger Mode on page 7-11*, the linear imager does not go into lower power mode when it is seated in the stand.

Disable Low Power Mode
(00h)

*** Enable Low Power Mode**
(01h)

Time Delay to Low Power Mode

Parameter # 92h

This parameter sets the time it takes the linear imager to enter low power mode after any scanning activity. Scan the appropriate bar code below to set the time.

1 Second
(11h)

10 Seconds
(1Ah)

1 Minute
(21h)

5 Minutes
(25h)

15 Minutes
(2Bh)

Time Delay to Low Power Mode (continued)

30 Minutes
(2Dh)

45 Minutes
(2Eh)

*** 1 Hour**
(31h)

3 Hours
(33h)

6 Hours
(36h)

9 Hours
(39h)

Time Delay to Presentation Sleep Mode

Parameter # F1h 96h

In Presentation Mode, this parameter sets the time the linear imager remains active before entering sleep mode with no illumination. The linear imager wakes when it senses motion, upon presentation of a bar code, or a trigger pull.

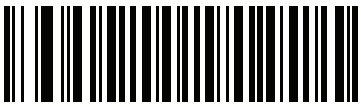
NOTE Linear imager scanner performance is not guaranteed in dim conditions.

Disable
(00h)

1 Second
(01h)

10 Seconds
(0Ah)

1 Minute
(11h)



***5 Minutes**
(15h)

Time Delay to Presentation Sleep Mode (continued)

15 Minutes
(1Bh)

30 Minutes
(1Dh)

45 Minutes
(1Eh)

1 Hour
(21h)

3 Hours
(23h)

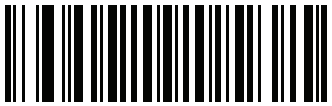
6 Hours
(26h)

9 Hours
(29h)

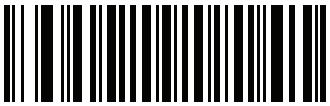
Continuous Bar Code Read

Parameter # F1 89h

Enable **Continuous Bar Code Read** to report every bar code while the trigger is pressed.



***Disable Continuous Bar Code Read**
(0h)



Enable Continuous Bar Code Read
(1h)

Unique Bar Code Reporting

Parameter # F1h D3h

Enable **Continuous Bar Code Read Uniqueness** to report only unique bar codes while the trigger is pressed. This option only applies when **Continuous Bar Code Read** is enabled.

Disable Continuous Bar Code Read Uniqueness
(00h)

***Enable Continuous Bar Code Read Uniqueness**
(01h)

Decode Session Timeout

Parameter # 88h

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

To set a Decode Session Timeout, scan the bar code below. Next, scan two numeric bar codes from *Appendix E, NUMERIC BAR CODES* that correspond to the desired on time. Enter a leading zero for single digit numbers. For example, to set a Decode Session Timeout of 0.5 seconds, scan the bar code below, then scan the **0** and **5** bar codes. To correct an error or change the selection, scan **Cancel** on *page E-3*.

Decode Session Timeout

Timeout Between Decodes, Same Symbol

Parameter # 89h

Use this option in presentation mode and Continuous Bar Code Read mode to prevent the beeper from continuously beeping when a symbol is left in the linear imager's field of view. The bar code must be out of the field of view for the timeout period before the scanner reads the same consecutive symbol. It is programmable in 0.1 second increments from 0.0 to 9.9 seconds. The default interval is 0.5 seconds.

To select the timeout between decodes for the same symbol, scan the bar code below, then scan two numeric bar codes from *Appendix E, NUMERIC BAR CODES* that correspond to the desired interval, in 0.1 second increments.

Timeout Between Decodes, Same Symbol

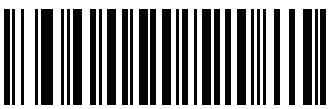
Timeout Between Decodes, Different Symbols

Parameter # 90h

Use this option in presentation mode or Continuous Bar Code Read to control the time the scanner is inactive between decoding different symbols. It is programmable in 0.1 second increments from 0.1 to 9.9 seconds. The default is 0.1 second.

To select the timeout between decodes for different symbols, scan the bar code below, then scan two numeric bar codes from *Appendix E, NUMERIC BAR CODES* that correspond to the desired interval, in 0.1 second increments.

NOTE Timeout Between Decodes, Different Symbols cannot be greater than or equal to the Decode Session Timeout.



Timeout Between Decodes, Different Symbols

Decoding Illumination

Parameter # F0h, 2Ah

Scanning **Enable Decoding Illumination** enables LED Illumination and usually results in superior images and reading ranges. Scanning **Disable Decoding Illumination** disables LED illumination.

NOTE If the decode illumination LED is disabled, decoding bar codes can become difficult.

***Enable Decoding Illumination**
(01h)

Disable Decoding Illumination
(00h)

Miscellaneous Scanner Parameters

Transmit Code ID Character

Parameter # 2Dh

A Code ID character identifies the code type of a scanned bar code. This is useful when 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 Characters on page C-1* and *Aim Code Characters on page C-3*.

NOTE If you enable Symbol Code ID Character or AIM Code ID Character, and enable *Transmit "No Read" Message on page 7-27*, the linear imager appends the code ID for Code 39 to the NR message.

Symbol Code ID Character
(02h)

AIM Code ID Character
(01h)

***None**
(00h)

Prefix/Suffix Values

Key Category Parameter # P = 63h, S1 = 62h, S2 = 64h

Decimal Value Parameter # P = 69h, S1 = 68h, S2 = 6Ah

You can append a prefix and/or one or two suffixes to scan data for use in data editing.

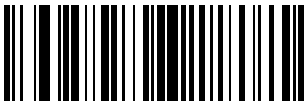
NOTE To use prefix/suffix values, first set the *Scan Data Transmission Format on page 7-24*.

To set a value for a prefix or suffix, scan a four-digit number (i.e., four bar codes from *Appendix E, NUMERIC BAR CODES*) that corresponds to that value. See *Table G-1 on page G-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 G-1 on page G-1* for the four-digit codes.

To correct an error or change a selection, scan *Cancel on page E-3*.

Scan Prefix
(07h)



Scan Suffix 1
(06h)

Scan Suffix 2
(08h)

Data Format Cancel

Scan Data Transmission Format

Parameter # EBh

To change the scan data format, scan one of the eight bar codes corresponding to the desired format (bar codes begin on page 7-25). To set the values for a prefix or suffix follow the instructions in *Prefix/Suffix Values on page 7-23*.

NOTE If using this parameter do not use ADF rules to set the prefix/suffix.

Table 7-2 *Scan Data Format Descriptions*

Scan Data Format	Description
Data As Is	Sends data to the host as is (with no format changes).
<DATA> <SUFFIX 1>	Sends scanned data to the host with one suffix value appended to the end of the scanned data. The suffix 1 value is set in *Prefix/Suffix Values on page 7-23*.
<DATA> <SUFFIX 2>	Sends scanned data to the host with one suffix value appended to the end of the scanned data. The suffix 2 value is set in *Prefix/Suffix Values on page 7-23*. **Note**: Suffix 1 (above) and Suffix 2, used individually as single appendages to the end of the scanned data, are virtually performing the same function - appending one suffix to the end of scanned data transmitted to the host.
<DATA> <SUFFIX 1> <SUFFIX 2>	Sends scanned data to the host with two suffix values appended to the end of the scanned data. The values for each suffix are set in *Prefix/Suffix Values on page 7-23*.
<PREFIX> <DATA >	Sends scanned data to the host with one prefix value appended to the front of the scanned data. The prefix value is set in *Prefix/Suffix Values on page 7-23*.
<PREFIX> <DATA> <SUFFIX 1>	Sends scanned data to the host with one prefix value appended to the front of the scanned data, and one suffix value appended to the end of the scanned data. Both prefix and suffix values are set in *Prefix/Suffix Values on page 7-23*.
<PREFIX> <DATA> <SUFFIX 2>	Sends scanned data to the host with one prefix value appended to the front of the scanned data, and one suffix value appended to the end of the scanned data. Both prefix and suffix values are set in *Prefix/Suffix Values on page 7-23*. **Note**: Suffix 1 and Suffix 2, used individually as single appendages to the end of the scanned data, are virtually performing the same function - appending one suffix to the end of scanned data transmitted to the host.
<PREFIX> <DATA> <SUFFIX 1> <SUFFIX 2>	Sends scanned data to the host with one prefix value appended to the front of the scanned data, and two suffix values appended to the end of the scanned data, in the order shown: suffix 1 followed by suffix 2. Both prefix and suffix values are set in *Prefix/Suffix Values on page 7-23*.

Scan Data Transmission Format (continued)

To set values for the prefix and/or suffix, see *Prefix/Suffix Values on page 7-23*.

***Data As Is**
(00h)

<DATA> <SUFFIX 1>
(01h)

<DATA> <SUFFIX 2>
(02h)

<DATA> <SUFFIX 1> <SUFFIX 2>
(03h)

<PREFIX> <DATA >
(04h)

<PREFIX> <DATA> <SUFFIX 1>
(05h)

Scan Data Transmission Format (continued)

<PREFIX> <DATA> <SUFFIX 2>
(06h)

<PREFIX> <DATA> <SUFFIX 1> <SUFFIX 2>
(07h)

FN1 Substitution Values

Key Category Parameter # 67h

Decimal Value Parameter # 6Dh

The Wedge and USB HID Keyboard hosts support a FN1 Substitution feature. Enabling this substitutes any FN1 character (0x1b) in an EAN128 bar code with a value. This value defaults to 7013 (Enter key).

When using host commands to set the FN1 substitution value, set the key category parameter to 1, then set the 3-digit keystroke value. See the ASCII Character Set table for the current host interface for the desired value.

To select a FN1 substitution value via bar code menus:

1. Scan the bar code below.

Set FN1 Substitution Value

2. Locate the keystroke desired for FN1 Substitution in the ASCII Character Set table for the current host interface. Enter the 4-digit ASCII Value by scanning each digit in *Appendix E, NUMERIC BAR CODES*.

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

To enable FN1 substitution for USB HID keyboard, scan the **Enable FN1 Substitution** bar code on page *3-12*.

Transmit “No Read” Message

Parameter # 5Eh

Scan a bar code below to select whether or not to transmit a No Read message. Enable this to transmit the characters NR when a successful decode does not occur before trigger release or the **Decode Session Timeout** expires. See *Decode Session Timeout on page 7-20*. Disable this to send nothing to the host if a symbol does not decode.

NOTE If you enable **Transmit No Read**, and also enable Symbol Code ID Character or AIM Code ID Character for *Transmit Code ID Character on page 7-22*, the linear imager appends the code ID for Code 39 to the NR message.

Enable No Read
(01h)

***Disable No Read**
(00h)

Unsolicited Heartbeat Interval

Parameter # F8h 04h 5Eh

The linear imager supports sending *Unsolicited Heartbeat Messages* to assist in diagnostics. To enable this feature and set the desired unsolicited heartbeat interval, scan one of the time interval bar codes below, or scan **Set Another Interval** followed by four numeric bar codes from *Appendix E, NUMERIC BAR CODES* (scan sequential numbers that correspond to the desired number of seconds).

Scan **Disable Unsolicited Heartbeat Interval** to turn off the feature.

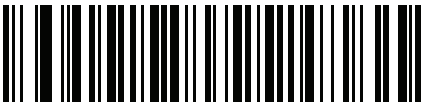
The heartbeat event is sent as decode data (with no decode beep) in the form of:

MOTEVTHB:nnn

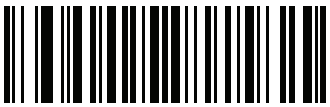
where nnn is a three digit sequence number starting at 001 and wrapping after 100.

NOTE For correct operation, you must disable Low Power Mode (see *Low Power Mode on page 7-13*).

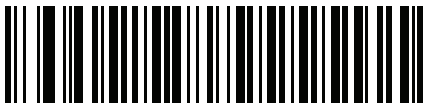
10 seconds



1 minute



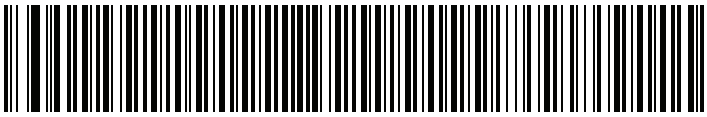
Set Another Interval



***Disable Unsolicited Heartbeat Interval**

Enter Key (Carriage Return/Line Feed)

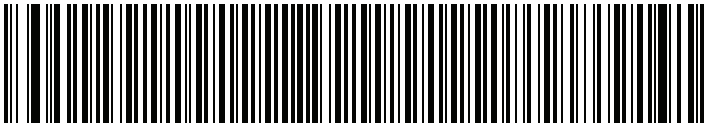
Scan the bar code below to add an Enter key after scanned data.



Enter Key
(Carriage Return/Line Feed)

Tab Key

Scan the bar code below to add a Tab key after scanned data.



Tab Key

CHAPTER 9 SYMBOLOGIES

Introduction

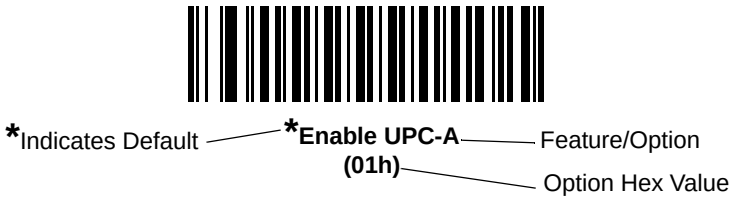
This chapter describes symbology features and provides programming bar codes for selecting these features. Before programming, follow the instructions in *Chapter 1, GETTING STARTED*.

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 linear imager powers down.

NOTE Most computer monitors allow scanning the bar codes directly on the screen. When scanning from the screen, be sure to set the document magnification to a level where you can see the bar code clearly, and bars and/or spaces do not merge.

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 *Default Parameters on page 7-4*. Throughout the programming bar code menus, asterisks (*) indicate default values.



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 9-15*. The linear imager 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 9-1 lists the defaults for all symbologies parameters. To change the default values, scan the appropriate bar codes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, scan the *Default Parameters on page 7-4*.

NOTE See *Appendix A, STANDARD DEFAULT PARAMETERS* for all user preferences, hosts, and miscellaneous default parameters.

Table 9-1 *Parameter Defaults*

Parameter	Parameter Number	Default	Page Number
Disable All Code Types	n/a	n/a	*9-6*
Enable All Code Types	n/a	n/a	*9-6*
UPC/EAN			
UPC-A	01h	Enable	*9-7*
UPC-E	02h	Enable	*9-7*
UPC-E1	0Ch	Disable	*9-8*
EAN-8/JAN 8	04h	Enable	*9-8*
EAN-13/JAN 13	03h	Enable	*9-9*
Bookland EAN	53h	Disable	*9-9*
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	10h	Ignore	*9-11*
User-Programmable Supplementals Supplemental 1: Supplemental 2:	 F1h 43h F1h 44h	000	*9-13*
UPC/EAN/JAN Supplemental Redundancy	50h	10	*9-13*
UPC/EAN/JAN Supplemental AIM ID Format	F1h A0h	Combined	*9-14*
Transmit UPC-A Check Digit	28h	Enable	*9-15*
Transmit UPC-E Check Digit	29h	Enable	*9-15*
Transmit UPC-E1 Check Digit	2Ah	Enable	*9-16*
UPC-A Preamble	22h	System Character	*9-17*
UPC-E Preamble	23h	System Character	*9-18*
UPC-E1 Preamble	24h	System Character	*9-19*

Table 9-1 *Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
Convert UPC-E to A	25h	Disable	*9-20*
Convert UPC-E1 to A	26h	Disable	*9-20*
EAN-8/JAN-8 Extend	27h	Disable	*9-21*
Bookland ISBN Format	F1h 40h	ISBN-10	*9-21*
UCC Coupon Extended Code	55h	Disable	*9-22*
Coupon Report	F1h DAh	New Coupon Format	*9-22*
ISSN EAN	F1h 69h	Disable	*9-23*
Code 128			
Code 128	08h	Enable	*9-24*
Set Length(s) for Code 128	D1h, D2h	Any Length - 1 to 80	*9-25*
GS1-128 (formerly UCC/EAN-128)	0Eh	Enable	*9-26*
ISBT 128	54h	Enable	*9-26*
ISBT Concatenation	F1h 41h	Autodiscriminate	*9-27*
Check ISBT Table	F1h 42h	Enable	*9-28*
ISBT Concatenation Redundancy	DFh	10	*9-28*
Code 128 Security Level	F1h EFh	Security Level 1	*9-29*
Code 39			
Code 39	00h	Enable	*9-30*
Trioptic Code 39	0Dh	Disable	*9-30*
Convert Code 39 to Code 32 (Italian Pharmacy Code)	56h	Disable	*9-31*
Code 32 Prefix	E7h	Disable	*9-31*
Set Length(s) for Code 39	12h, 13h	Any Length - 1 to 80	*9-32*
Code 39 Check Digit Verification	30h	Disable	*9-33*
Transmit Code 39 Check Digit	2Bh	Disable	*9-33*
Code 39 Full ASCII Conversion	11h	Disable	*9-34*
Buffer Code 39	71h	Disable	*9-35*
Code 39 Security Level	F1h EEh	Security Level 1	*9-37*
Code 93			
Code 93	09h	Enable	*9-38*
Set Length(s) for Code 93	1Ah, 1Bh	Any Length - 1 to 80	*9-38*
UPC/EAN/Code 93 Security Level	4Dh	1	*9-71*

Table 9-1 *Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
Code 11			
Code 11	0Ah	Disable	*9-40*
Set Length(s) for Code 11	1Ch, 1Dh	4 to 80	*9-40*
Code 11 Check Digit Verification	34h	Disable	*9-42*
Transmit Code 11 Check Digit(s)	2Fh	Disable	*9-43*
Interleaved 2 of 5 (ITF)			
Interleaved 2 of 5 (ITF)	06h	Enable (I 2 of 5 Security Level must be set to 1)	*9-44*
Set Length(s) for I 2 of 5	16h, 17h	Length Within Range - 6 to 80	*9-44*
I 2 of 5 Check Digit Verification	31h	Disable	*9-46*
Transmit I 2 of 5 Check Digit	2Ch	Disable	*9-46*
Convert I 2 of 5 to EAN 13	52h	Disable	*9-47*
I 2 of 5 Security Level	04h 61h	1	*9-48*
Discrete 2 of 5 (DTF)			
Discrete 2 of 5	05h	Disable	*9-49*
Set Length(s) for D 2 of 5	14h, 15h	Any Length - 1 to 55	*9-49*
Codabar (NW - 7)			
Codabar	07h	Enable	*9-51*
Set Length(s) for Codabar	18h, 19h	4 to 60	*9-51*
CLSI Editing	36h	Disable	*9-53*
NOTIS Editing	37h	Disable	*9-53*
Codabar Upper or Lower Case Start/Stop Characters Detection	F2h 57h	Upper Case	*9-54*
MSI			
MSI	0Bh	Disable	*9-55*
Set Length(s) for MSI	1Eh, 1Fh	4 to 55	*9-55*
MSI Check Digits	32h	1	*9-57*
Transmit MSI Check Digit	2Eh	Disable	*9-57*
MSI Check Digit Algorithm	33h	Mod 10/Mod 10	*9-58*

Table 9-1 *Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
Chinese 2 of 5			
Chinese 2 of 5	F0h 98h	Disable	*9-59*
Matrix 2 of 5			
Matrix 2 of 5	F1h 6Ah	Disable	*9-60*
Matrix 2 of 5 Lengths	F1h 6Bh F1h 6Ch	Length Within Range - 4 to 80	*9-61*
Matrix 2 of 5 Check Digit	F1h 6Eh	Disable	*9-62*
Transmit Matrix 2 of 5 Check Digit	F1h 6Fh	Disable	*9-62*
Korean 3 of 5			
Korean 3 of 5	F1h 45h	Disable	*9-63*
Inverse 1D			
Inverse 1D	F1h 4Ah	Regular	*9-64*
GS1 DataBar			
GS1 DataBar-14	F0h 52h	Enable	*9-65*
GS1 DataBar Limited	F0h 53h	Enable	*9-65*
GS1 DataBar Expanded	F0h 54h	Enable	*9-66*
GS1 DataBar Limited Security Level	F1h D8h	Level 3	*9-67*
Convert GS1 DataBar to UPC/EAN	F0h 8Dh	Disable	*9-68*
Symbology-Specific Security Levels			
Redundancy Level	4Eh	1	*9-70*
UPC/EAN/Code 93 Security Level	4Dh	1	*9-71*
Intercharacter Gap Size	F0h 7Dh	Normal	*9-72*

Disable All Code Types

To disable all symbologies, scan **Disable All Code Types** below. This is useful when enabling only a few code types.

Scan **Enable All Code Types** turn on (enable) all code types. This is useful when you want to read all codes, or when you want to disable only a few select codes.

Disable All Code Types

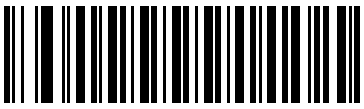
Enable All Code Types

UPC/EAN

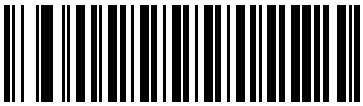
Enable/Disable UPC-A

Parameter # 01h

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



***Enable UPC-A**
(01h)

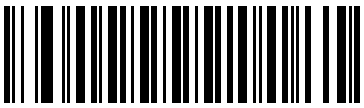


Disable UPC-A
(00h)

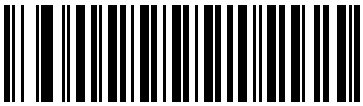
Enable/Disable UPC-E

Parameter # 02h

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



***Enable UPC-E**
(01h)



Disable UPC-E
(00h)

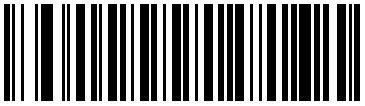
Enable/Disable UPC-E1

Parameter # 0Ch

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
(01h)

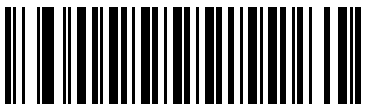
***Disable UPC-E1**
(00h)

Enable/Disable EAN-8/JAN-8

Parameter # 04h

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

***Enable EAN-8/JAN-8**
(01h)

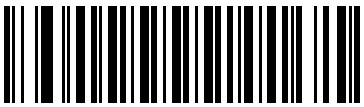


Disable EAN-8/JAN-8
(00h)

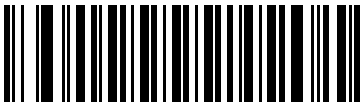
Enable/Disable EAN-13/JAN-13

Parameter # 03h

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



***Enable EAN-13/JAN-13**
(01h)



Disable EAN-13/JAN-13
(00h)

Enable/Disable Bookland EAN

Parameter # 53h

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

Enable Bookland EAN
(01h)

***Disable Bookland EAN**
(00h)

✓ ***NOTE*** If you enable Bookland EAN, select a *Bookland ISBN Format on page 9-21*. Also select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in *Decode UPC/EAN/JAN Supplementals on page 9-10*.

Decode UPC/EAN/JAN Supplementals

Parameter # 10h

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

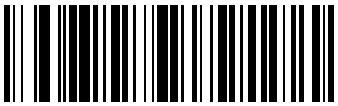
- If you select **Ignore UPC/EAN with Supplementals**, and the linear imager is presented with a UPC/EAN plus supplemental symbol, the linear imager decodes UPC/EAN and ignores the supplemental characters.
- If you select **Decode UPC/EAN with Supplementals**, the linear imager only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.
- If you select **Autodiscriminate UPC/EAN Supplementals**, the linear imager decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the linear imager must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 9-13* before transmitting its data to confirm that there is no supplemental.
- If you select one of the following **Supplemental Mode** options, the linear imager immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the linear imager must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 9-13* before transmitting its data to confirm that there is no supplemental. The linear imager transmits UPC/EAN bar codes that do not have that prefix immediately.
  - **Enable 378/379 Supplemental Mode**
  - **Enable 978/979 Supplemental Mode**

> ***NOTE*** If you select 978/979 Supplemental Mode and are scanning Bookland EAN bar codes, see *Enable/Disable Bookland EAN on page 9-9* to enable Bookland EAN, and select a format using *Bookland ISBN Format on page 9-21*.

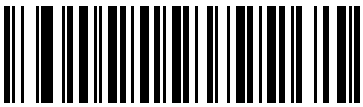
  - **Enable 977 Supplemental Mode**
  - **Enable 414/419/434/439 Supplemental Mode**
  - **Enable 491 Supplemental Mode**
  - **Enable Smart Supplemental Mode** - applies to EAN-13 bar codes starting with any prefix listed previously.
  - **Supplemental User-Programmable Type 1** - applies to EAN-13 bar codes starting with a 3-digit user-defined prefix. Set this 3-digit prefix using *User-Programmable Supplementals on page 9-13*.
  - **Supplemental User-Programmable Type 1 and 2 -** applies to EAN-13 bar codes starting with either of two 3-digit user-defined prefixes. Set the 3-digit prefixes using *User-Programmable Supplementals on page 9-13***.**
  - **Smart Supplemental Plus User-Programmable 1** - applies to EAN-13 bar codes starting with any prefix listed previously or the user-defined prefix set using *User-Programmable Supplementals on page 9-13*.
  - **Smart Supplemental Plus User-Programmable 1 and 2 -** applies to EAN-13 bar codes starting with any prefix listed previously or one of the two user-defined prefixes set using *User-Programmable Supplementals on page 9-13*.

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

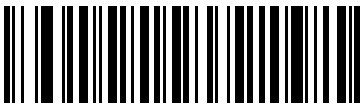
Decode UPC/EAN/JAN Supplementals (continued)



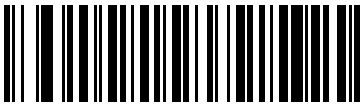
Decode UPC/EAN/JAN Only With Supplementals (01h)



***Ignore Supplementals (00h)**



Autodiscriminate UPC/EAN/JAN Supplementals (02h)



Enable 378/379 Supplemental Mode (04h)

Enable 978/979 Supplemental Mode (05h)

Enable 977 Supplemental Mode (07h)

Decode UPC/EAN/JAN Supplementals (continued)

Enable 414/419/434/439 Supplemental Mode (06h)

Enable 491 Supplemental Mode (08h)

Enable Smart Supplemental Mode (03h)

Supplemental User-Programmable Type 1 (09h)

Supplemental User-Programmable Type 1 and 2 (0Ah)

Smart Supplemental Plus User-Programmable 1 (0Bh)

Smart Supplemental Plus User-Programmable 1 and 2 (0Ch)

User-Programmable Supplementals

Supplemental 1: Parameter # F1h 43h

Supplemental 2: Parameter # F1h 44h

If you selected a Supplemental User-Programmable option from *Decode UPC/EAN/JAN Supplementals on page 9-10*, select **User-Programmable Supplemental 1** to set the 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on *page E-1*. Select **User-Programmable Supplemental 2** to set a second 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on *page E-1*. The default is 000 (zeroes).

User-Programmable Supplemental 1

User-Programmable Supplemental 2

UPC/EAN/JAN Supplemental Redundancy

Parameter # 50h

If you selected **Autodiscriminate UPC/EAN/JAN Supplementals**, this option adjusts the number of times to decode a symbol without supplementals before transmission. The range is from two to thirty times. Five or above is recommended when decoding a mix of UPC/EAN/JAN symbols with and without supplementals. The default is 10.

Scan the bar code below to set a decode redundancy value. Next, scan two numeric bar codes in *Appendix E, NUMERIC BAR CODES*. Enter a leading zero for single digit numbers. To correct an error or change a selection, scan *Cancel on page E-3*.

UPC/EAN/JAN Supplemental Redundancy

UPC/EAN/JAN Supplemental AIM ID Format

Parameter # F1h A0h

Select an output format when reporting UPC/EAN/JAN bar codes with Supplementals with *Transmit Code ID Character on page 7-22* set to **AIM Code ID Character**:

- **Separate** - transmit UPC/EAN with supplementals with separate AIM IDs but one transmission, i.e.:

  ]E<0 or 4><data>]E<1 or 2>[supplemental data]

- **Combined** – transmit UPC/EAN with supplementals with one AIM ID and one transmission, i.e.:

  ]E3<data+supplemental data>

- **Separate Transmissions** - transmit UPC/EAN with supplementals with separate AIM IDs and separate transmissions, i.e.:

  ]E<0 or 4><data>
  ]E<1 or 2>[supplemental data]

Separate
(00h)

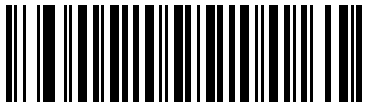
***Combined**
(01h)

Separate Transmissions
(02h)

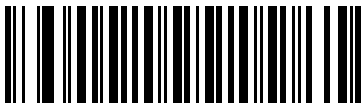
Transmit UPC-A Check Digit

Parameter # 28h

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**
(01h)

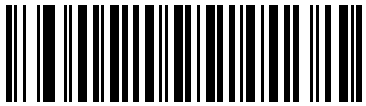


Do Not Transmit UPC-A Check Digit
(00h)

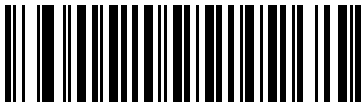
Transmit UPC-E Check Digit

Parameter # 29h

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**
(01h)



Do Not Transmit UPC-E Check Digit
(00h)

Transmit UPC-E1 Check Digit

Parameter # 2Ah

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 (01h)**

Do Not Transmit UPC-E1 Check Digit (00h)

UPC-A Preamble

Parameter # 22h

Preamble characters are part of the UPC symbol, and include Country Code and System Character. There are three options for transmitting a UPC-A preamble to the host device: transmit System Character only, transmit System Character and Country Code (“0” for USA), and transmit no preamble. Select the appropriate option to match the host system.

No Preamble (<DATA>)
(00h)

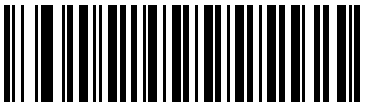
***System Character (<SYSTEM CHARACTER> <DATA>)**
(01h)

System Character & Country Code (< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(02h)

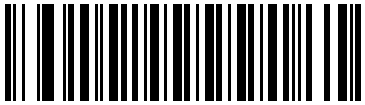
UPC-E Preamble

Parameter # 23h

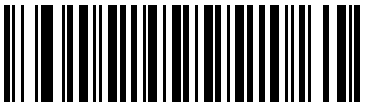
Preamble characters are part of the UPC symbol, and include Country Code and System Character. There are three options for transmitting a UPC-E preamble to the host device: transmit System Character only, transmit System Character and Country Code (“0” for USA), and transmit no preamble. Select the appropriate option to match the host system.



No Preamble (<DATA>)
(00h)



***System Character (<SYSTEM CHARACTER> <DATA>)**
(01h)



System Character & Country Code (< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(02h)

UPC-E1 Preamble

Parameter # 24h

Preamble characters are part of the UPC symbol, and include Country Code and System Character. There are three options for transmitting a UPC-E1 preamble to the host device: transmit System Character only, transmit System Character and Country Code (“0” for USA), and transmit no preamble. Select the appropriate option to match the host system.

No Preamble (<DATA>)
(00h)

***System Character (<SYSTEM CHARACTER> <DATA>)**
(01h)

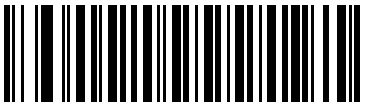
System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(02h)

Convert UPC-E to UPC-A

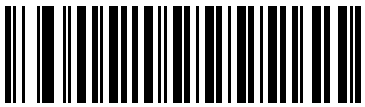
Parameter # 25h

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).

Disable this to transmit UPC-E decoded data as UPC-E data, without conversion.



Convert UPC-E to UPC-A (Enable)
(01h)



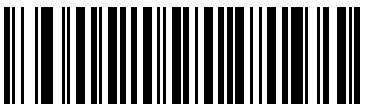
***Do Not Convert UPC-E to UPC-A (Disable)**
(00h)

Convert UPC-E1 to UPC-A

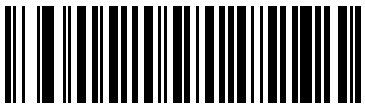
Parameter # 26h

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).

Disable this to transmit UPC-E1 decoded data as UPC-E1 data, without conversion.



Convert UPC-E1 to UPC-A (Enable)
(01h)



***Do Not Convert UPC-E1 to UPC-A (Disable)**
(00h)

EAN-8/JAN-8 Extend

Parameter # 27h

Enable this parameter to add five leading zeros to decoded EAN-8 symbols to make them compatible in format to EAN-13 symbols.

Disable this to transmit EAN-8 symbols as is.

Enable EAN/JAN Zero Extend
(01h)

***Disable EAN/JAN Zero Extend**
(00h)

Bookland ISBN Format

Parameter # F1h 40h

If you enabled Bookland EAN using *Enable/Disable Bookland EAN on page 9-9*, select one of the following formats for Bookland data:

- **Bookland ISBN-10** - The linear imager 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 linear imager 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**
(00h)

Bookland ISBN-13
(01h)

✓ ***NOTE*** For Bookland EAN to function properly, first enable Bookland EAN using *Enable/Disable Bookland EAN on page 9-9*, 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 9-10*.

UCC Coupon Extended Code

Parameter # 55h

Enable this parameter to decode UPC-A bar codes starting with digit ‘5’, EAN-13 bar codes starting with digit ‘99’, and UPC-A/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 (01h)

***Disable UCC Coupon Extended Code (00h)**

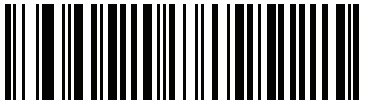
✓ ***NOTE*** See *UPC/EAN/JAN Supplemental Redundancy on page 9-13* to control autodiscrimination of the GS1-128 (right half) of a coupon code.

Coupon Report

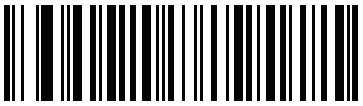
Parameter # F1h DAh

Select an option to determine which type of coupon format to support.

- Select **Old Coupon Format** to support UPC-A/GS1-128 and EAN-13/GS1-128.
- Select **New Coupon Format** as an interim format to support UPC-A/GS1-DataBar and EAN-13/GS1-DataBar.
- If you select **Autodiscriminate Format**, the linear imager supports both **Old Coupon Format** and **New Coupon Format.**



Old Coupon Format (00h)



***New Coupon Format (01h)**

Autodiscriminate Coupon Format (02h)

ISSN EAN

Parameter # F1h 69h

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

Enable ISSN EAN
(01h)

***Disable ISSN EAN**
(00h)

Code 128

Enable/Disable Code 128

Parameter # 08h

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

***Enable Code 128**
(01h)

Disable Code 128
(00h)

Set Length(s) for Code 128

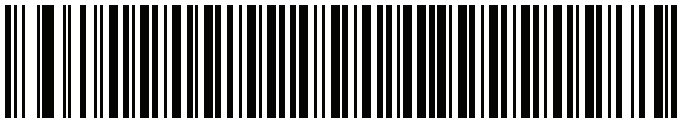
Parameter # L1 = D1h, L2 = D2h

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set length(s) for Code 128 to any length, one or two discrete lengths, or lengths within a specific range. The default option is **Any Length.** The range is 1 to 80.

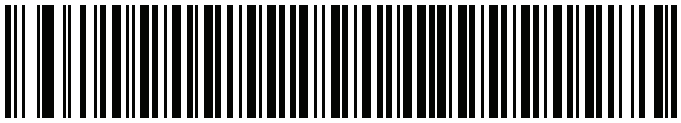
NOTE When setting lengths for different bar code types, enter a leading zero for single digit numbers.

- **One Discrete Length** - Select this option to decode only Code 128 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix E, NUMERIC BAR CODES*. For example, to decode only Code 128 symbols with 14 characters, scan **Code 128 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or change the selection, scan *Cancel on page E-3*.
- **Two Discrete Lengths** - Select this option to decode only Code 128 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix E, NUMERIC BAR CODES*. For example, to decode only Code 128 symbols containing either 2 or 14 characters, select **Code 128 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or change the selection, scan *Cancel on page E-3*.
- **Length Within Range** - Select this option to decode a Code 128 symbol with a specific length range. Select lengths using numeric bar codes in *Appendix E, NUMERIC BAR CODES*. For example, to decode Code 128 symbols containing between 4 and 12 characters, first scan **Code 128 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*.
- **Any Length** - Select this option to decode Code 128 symbols containing any number of characters within the linear imager's capability. This is the default option.

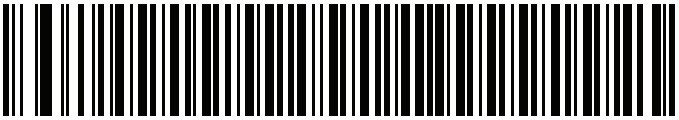
Set Length(s) for Code 128 (continued)



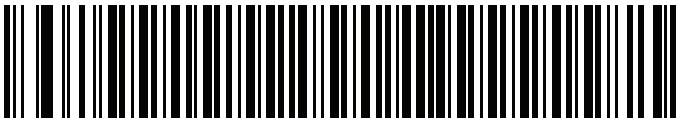
Code 128 - One Discrete Length



Code 128 - Two Discrete Lengths



Code 128 - Length Within Range

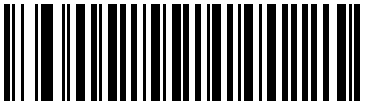


***Code 128 - Any Length**
(1 to 80)

Enable/Disable GS1-128 (formerly UCC/EAN-128)

Parameter # 0Eh

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



***Enable GS1-128**
(01h)

Disable GS1-128
(00h)

Enable/Disable ISBT 128

Parameter # 54h

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

***Enable ISBT 128**
(01h)

Disable ISBT 128
(00h)

ISBT Concatenation

Parameter # F1h 41h

Select an option for concatenating pairs of ISBT code types:

- If you select **Disable ISBT Concatenation**, the linear imager does not concatenate pairs of ISBT codes it encounters.
- If you select **Enable ISBT Concatenation**, there must be two ISBT codes in order for the linear imager to decode and perform concatenation. The linear imager does not decode single ISBT symbols.
- If you select **Auto-discriminate ISBT Concatenation**, the linear imager decodes and concatenates pairs of ISBT codes immediately. If only a single ISBT symbol is present, the linear imager must decode the symbol the number of times set via *ISBT Concatenation Redundancy on page 9-28* before transmitting its data to confirm that there is no additional ISBT symbol.

Disable ISBT Concatenation (00h)

Enable ISBT Concatenation (01h)

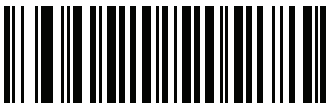
*** Auto-discriminate ISBT Concatenation (02h)**

Check ISBT Table

Parameter # F1h 42h

The ISBT specification includes a table that lists several types of ISBT bar codes that are commonly used in pairs. If you set **ISBT Concatenation** to **Enable**, enable **Check ISBT Table** to concatenate only those pairs found in this table. Other types of ISBT codes are not concatenated.

***Enable Check ISBT Table (01h)**



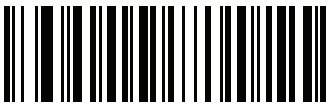
Disable Check ISBT Table (00h)

ISBT Concatenation Redundancy

Parameter # DFh

If you set **ISBT Concatenation** to **Autodiscriminate,** use this parameter to set the number of times the linear imager must decode an ISBT symbol before determining that there is no additional symbol.

Scan the bar code below, then scan two numeric bar codes in *Appendix E, NUMERIC BAR CODES* to set a value between 2 and 20. Enter a leading zero for single digit numbers. To correct an error or change a selection, scan *Cancel on page E-3*. The default is 10.



ISBT Concatenation Redundancy

Code 128 Security Level

Parameter # F1h EFh

Code 128 bar codes are vulnerable to misdecodes by the nature of the symbol, especially when **Any Length** is set for Code 128 bar codes. The linear imager offers four levels of decode security for Code 128 bar codes. There is an inverse relationship between security and linear imager aggressiveness. Increasing the level of security may result in reduced aggressiveness in scanning, so select only the level of security necessary.

- **Code 128 Security Level 0:** This setting allows the linear imager to operate in its most aggressive state, while providing sufficient security in decoding the most in-spec bar codes.
- **Code 128 Security Level 1:** A bar code must be successfully read twice, and satisfy certain safety requirements before being decoded. This default setting eliminates most misdecodes.
- **Code 128 Security Level 2:** Select this option with higher safety requirements to the bar codes if **Security Level 1** fails to eliminate misdecodes.
- **Code 128Security Level 3:** If you selected **Security Level 2**, and misdecodes still occur, select this security level. The highest safety requirements are applied. A bar code must be successfully read three times before being decoded.

> ***NOTE*** 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 linear imager. If this level of security is required, it is recommended that you try to improve the quality of the bar codes.

Code 128Security Level 0 (00h)

***Code 128 Security Level 1 (01h)**

Code 128 Security Level 2 (02h)

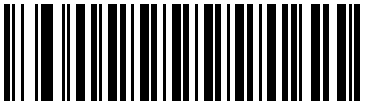
Code 128 Security Level 3 (03h)

Code 39

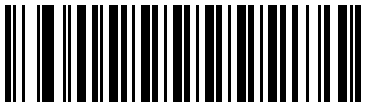
Enable/Disable Code 39

Parameter # 00h

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



***Enable Code 39**
(01h)

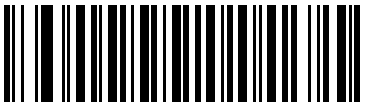


Disable Code 39
(00h)

Enable/Disable Trioptic Code 39

Parameter # 0Dh

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
(01h)

***Disable Trioptic Code 39**
(00h)

NOTE You cannot enable Trioptic Code 39 and Code 39 Full ASCII simultaneously.

Convert Code 39 to Code 32

Parameter # 56h

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 (01h)

***Disable Convert Code 39 to Code 32 (00h)**

Code 32 Prefix

Parameter # E7h

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 (01h)

***Disable Code 32 Prefix (00h)**

Set Length(s) for Code 39

Parameter # L1 = 12h, L2 = 13h

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 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. The default option is **Any Length**. The range is 1 to 80.

NOTE When setting lengths for different bar code types, enter a leading zero for single digit numbers.

- **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 E, 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 E-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 E, NUMERIC BAR CODES*. For example, to decode only 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 E-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 E, 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** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*.
- **Any Length** - Select this option to decode Code 39 symbols containing any number of characters within the linear imager's capability. This is the default option.

Code 39 - One Discrete Length

Code 39 - Two Discrete Lengths

Code 39 - Length Within Range

*** Code 39 - Any Length (1 to 80)**

Code 39 Check Digit Verification

Parameter # 30h

Enable this feature to check 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 (01h)

***Disable Code 39 Check Digit (00h)**

Transmit Code 39 Check Digit

Parameter # 2Bh

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

Transmit Code 39 Check Digit (Enable) (01h)

***Do Not Transmit Code 39 Check Digit (Disable) (00h)**

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

Code 39 Full ASCII Conversion

Parameter # 11h

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 (01h)

***Disable Code 39 Full ASCII (00h)**

NOTE You cannot enable Trioptic Code 39 and Code 39 Full ASCII simultaneously.

Code 39 Full ASCII to Full ASCII Correlation is host-dependent, and is therefore described in the ASCII Character Set Table for the appropriate interface. See the *ASCII Character Set for RS-232 on page 4-19* or the *ASCII Character Set for USB on page 3-25*.

Code 39 Buffering - Scan & Store

Parameter # 71h

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

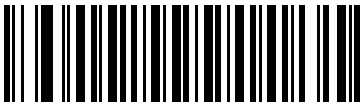
Selecting the Scan and Store option (Buffer Code 39) temporarily buffers all Code 39 symbols having a leading space as a first character for later transmission. The leading space is not buffered.

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

Select **Do Not Buffer Code 39** to transmit all decoded Code 39 symbols immediately without storing them in the buffer.

Code 39 Buffering - Scan & Store (continued)

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



Buffer Code 39 (Enable)
(01h)

***Do Not Buffer Code 39 (Disable)**
(00h)

While there is data in the transmission buffer, you cannot select **Do Not Buffer Code 39**. 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 9-36*) or clear the buffer.

Buffer Data

To buffer data, enable Code 39 buffering and scan a Code 39 symbol with a space immediately following the start pattern.

- Unless the data overflows the transmission buffer, the linear imager issues a low/high beep to indicate successful decode and buffering. (For overflow conditions, see *Overfilling Transmission Buffer on page 9-36*.)
- The linear imager 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 linear imager issues a short high/low/high beep.
- The linear imager erases the transmission buffer.
- No transmission occurs.

Clear Buffer

✓ ***NOTE*** The Clear Buffer contains only the dash (minus) character. In order to scan this command, set Code 39 lengths to include length 1.

Transmit Buffer

There are two methods to transmit the Code 39 buffer.

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

Transmit Buffer

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

NOTE The Transmit Buffer contains only a plus (+) character. In order to scan this command, set Code 39 lengths to include length 1.

Overfilling Transmission Buffer

The Code 39 buffer holds 200 characters. If the symbol just read overflows the transmission buffer:

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

Attempt to Transmit an Empty Buffer

If you scan 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 39 Security Level

Parameter # F1h EEh

The linear imager offers four levels of decode security for Code 39. Select increasing levels of security for decreasing levels of bar code quality. There is an inverse relationship between security and linear imager aggressiveness, so choose only that level of security necessary for any given application.

- **Code 39 Security Level 0:** This setting allows the linear imager to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- **Code 39 Security Level 1:** This default setting eliminates most misdecodes.
- **Code 39 Security Level 2:** Select this option if Security level 1 fails to eliminate misdecodes.
- **Code 39 Security Level 3:** If you selected Security Level 2 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 linear imager. If you need this level of security, try to improve the quality of the bar codes.

Code 39 Security Level 0
(00h)

***Code 39 Security Level 1**
(01h)

Code 39 Security Level 2
(02h)

Code 39 Security Level 3
(03h)

Code 93

Enable/Disable Code 93

Parameter # 09h

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

*** Enable Code 93 (01h)**

Disable Code 93 (00h)

Set Length(s) for Code 93

Parameter # L1 = 1Ah, L2 = 1Bh

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. The default option is **Any Length**. The range is 1 to 80.

- **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 E, 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 E-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 E, NUMERIC BAR CODES*. For example, to decode only 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 E-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 E, 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** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*.
- **Any Length** - Scan this option to decode Code 93 symbols containing any number of characters within the linear imager's capability. This is the default option (any length 1 to 80).

Set Length(s) for Code 93 (continued)

Code 93 - One Discrete Length

Code 93 - Two Discrete Lengths

Code 93 - Length Within Range

*** Code 93 - Any Length (1 to 80)**

Code 11

Code 11

Parameter # 0Ah

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

Enable Code 11
(01h)

***Disable Code 11**
(00h)

Set Length(s) for Code 11

Parameter # L1 = 1Ch, L2 = 1Dh

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. The default option is **Length Within Range**. The range is 4 to 80.

- **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 E, 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 E-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 E, NUMERIC BAR CODES*. For example, to decode only 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 E-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 E, 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** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*. This is the default option (length within range from 4 to 80).
- **Any Length** - Scan this option to decode Code 11 symbols containing any number of characters within the linear imager's capability.

Set Length(s) for Code 11 (continued)

Code 11 - One Discrete Length

Code 11 - Two Discrete Lengths

*** Code 11 - Length Within Range (4 to 80)**

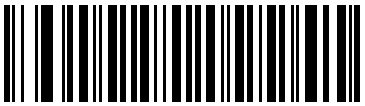
Code 11 - Any Length

Code 11 Check Digit Verification

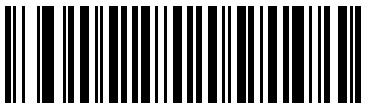
Parameter # 34h

This feature allows the linear imager 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.

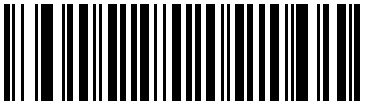
To enable this feature, scan the bar code below corresponding to the number of check digits encoded in the Code 11 symbols.



***Disable**
(00h)



One Check Digit
(01h)



Two Check Digits
(02h)

Transmit Code 11 Check Digits

Parameter # 2Fh

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

Transmit Code 11 Check Digit(s) (Enable) (01h)

***Do Not Transmit Code 11 Check Digit(s) (Disable) (00h)**

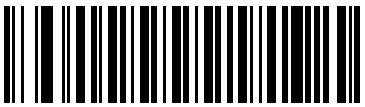
NOTE Code 11 Check Digit Verification must be enabled for this parameter to function.

Interleaved 2 of 5 (ITF)

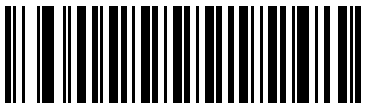
Enable/Disable Interleaved 2 of 5

Parameter # 06h

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 (01h)**



Disable Interleaved 2 of 5 (00h)

Set Length(s) for Interleaved 2 of 5

Parameter # L1 = 16h, L2 = 17h

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. The default option is **Length Within Range**.The range is 6 to 80.

- **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 E, 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 E-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 E, NUMERIC BAR CODES*. For example, to decode only 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 E-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 E, 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** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*. This is the default option (length within range from 6 to 80).
- **Any Length** - Scan this option to decode I 2 of 5 symbols containing any number of characters within the linear imager's capability.

✓ ***NOTE*** Due to the construction of the I 2 of 5 symbology, it is possible for a scan line covering only a portion of the code to transmit 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 Length(s) 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 (6 to 80)

I 2 of 5 - Any Length

I 2 of 5 Check Digit Verification

Parameter # 31h

Enable this feature to check 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**
(00h)

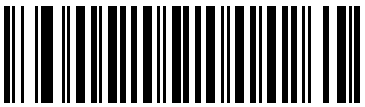
USS Check Digit
(01h)

OPCC Check Digit
(02h)

Transmit I 2 of 5 Check Digit

Parameter # 2Ch

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)
(01h)

***Do Not Transmit I 2 of 5 Check Digit (Disable)**
(00h)

Convert I 2 of 5 to EAN-13

Parameter # 52h

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) (01h)

***Do Not Convert I 2 of 5 to EAN-13 (Disable) (00h)**

I 2 of 5 Security Level

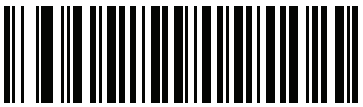
Parameter # 04h 61h

Interleaved 2 of 5 bar codes are vulnerable to misdecodes by the nature of the symbol, especially when **Any Length** is set for Interleaved 2 of 5 bar codes. The linear imager offers four levels of decode security for Interleaved 2 of 5 bar codes. There is an inverse relationship between security and linear imager aggressiveness. Increasing the level of security may result in reduced aggressiveness in scanning, so select only the level of security necessary.

- **I 2 of 5 Security Level 0:** This setting allows the linear imager to operate in its most aggressive state, while providing sufficient security in decoding the most in-spec bar codes.
- **I 2 of 5 Security Level 1:** A bar code must be successfully read twice, and satisfy certain safety requirements before being decoded. This default setting eliminates most misdecodes.
- **I 2 of 5 Security Level 2:** Select this option with higher safety requirements to the bar codes if **Security Level 1** fails to eliminate misdecodes.
- **I 2 of 5 Security Level 3:** If you selected **Security Level 2**, and misdecodes still occur, select this security level. The highest safety requirements are applied. A bar code must be successfully read three times before being decoded.

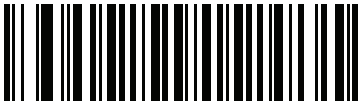
> ***NOTE*** Selecting this option is an extreme measure against mis-decoding severely out-of-spec bar codes. Selecting this level of security significantly impairs the decoding ability of the linear imager. If this level of security is required, it is recommended that you try to improve the quality of the bar codes.

I 2 of 5 Security Level 0 (00h)



***I 2 of 5 Security Level 1 (01h)**

I 2 of 5 Security Level 2 (02h)



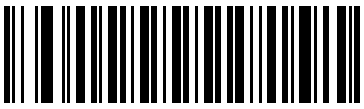
I 2 of 5 Security Level 3 (03h)

Discrete 2 of 5 (DTF)

Enable/Disable Discrete 2 of 5

Parameter # 05h

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



Enable Discrete 2 of 5 (01h)

***Disable Discrete 2 of 5 (00h)**

Set Length(s) for Discrete 2 of 5

Parameter # L1 = 14h, L2 = 15h

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 D 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The default option is **Any Length**. The range is 1 to 55.

- **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 E, 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 E-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 E, NUMERIC BAR CODES*. For example, to decode only 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 E-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 E, 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** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*. This is the default option (length within range from 1 to 55).
- **Any Length** - Scan this option to decode D 2 of 5 symbols containing any number of characters within the linear imager's 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 transmit 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 Length(s) 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 (1 to 55)

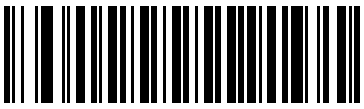
***D 2 of 5 - Any Length (1 to 55)**

Codabar (NW - 7)

Enable/Disable Codabar

Parameter # 07h

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



*** Enable Codabar (01h)**

Disable Codabar (00h)

Set Length(s) for Codabar

Parameter # L1 = 18h, L2 = 19h

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. The default option is **Length Within Range**. The range is 4 to 60.

- **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 E, 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 E-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 E, 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 E-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 E, 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** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*. This is the default option (length within range from 4 to 60).
- **Any Length** - Scan this option to decode Codabar symbols containing any number of characters within the linear imager's capability.

Set Length(s) for Codabar (continued)

Codabar - One Discrete Length

Codabar - Two Discrete Lengths

***** **Codabar - Length Within Range (4 to 60)**

Codabar - Any Length

CLSI Editing

Parameter # 36h

Enable this parameter to strip the start and stop characters and insert a space after the first, fifth, and tenth characters of a 14-character Codabar symbol. Enable this feature if the host system requires this data format.

NOTE Symbol length does not include start and stop characters.

Enable CLSI Editing
(01h)

***Disable CLSI Editing**
(00h)

NOTIS Editing

Parameter # 37h

Enable this parameter to strip the start and stop characters from a decoded Codabar symbol. Enable this feature if the host system requires this data format.

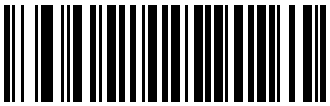
Enable NOTIS Editing
(01h)

***Disable NOTIS Editing**
(00h)

Codabar Upper or Lower Case Start/Stop Characters Detection

Parameter # F2h 57h

Select whether to detect upper case or lower case Codabar start/stop characters.



Lower Case
(01h)

***Upper Case**
(00h)

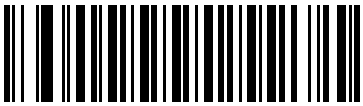
MSI

Enable/Disable MSI

Parameter # 0Bh

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

Enable MSI
(01h)



***Disable MSI**
(00h)

Set Length(s) for MSI

Parameter # L1 = 1Eh, L2 = 1Fh

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.The default option is **Length Within Range**. The range is 1 to 55.

The default is 4 to 55.

- **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 E, 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 E-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 E, 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 E-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 E, 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** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*. This is the default option (length within range 4 to 55).
- **Any Length** - Scan this option to decode MSI symbols containing any number of characters within the linear imager's capability.

Set Length(s) for MSI (continued)

NOTE Due to the construction of the MSI symbology, it is possible for a scan line covering only a portion of the code to transmit 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.

MSI - One Discrete Length

MSI - Two Discrete Lengths

*** MSI - Length Within Range (4 to 55)**

MSI - Any Length

MSI Check Digits

Parameter # 32h

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 9-58* for the selection of second digit algorithms.

***One MSI Check Digit**
(00h)

Two MSI Check Digits
(01h)

Transmit MSI Check Digit(s)

Parameter # 2Eh

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

Transmit MSI Check Digit(s) (Enable)
(01h

***Do Not Transmit MSI Check Digit(s) (Disable)**
(00h)

MSI Check Digit Algorithm

Parameter # 33h

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 the check digit.

MOD 10/MOD 11
(00h)

***MOD 10/MOD 10**
(01h)

Chinese 2 of 5

Enable/Disable Chinese 2 of 5

Parameter # F0h 98h

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

Enable Chinese 2 of 5
(01h)

***Disable Chinese 2 of 5**
(00h)

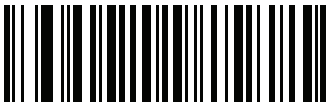
Matrix 2 of 5

Enable/Disable Matrix 2 of 5

Parameter # F1h 6Ah

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

Enable Matrix 2 of 5 (01h)



***Disable Matrix 2 of 5 (00h)**

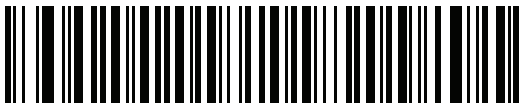
Set Length(s) for Matrix 2 of 5

Parameter # L1 = F1h 6Bh, L2 = F1h 6Ch

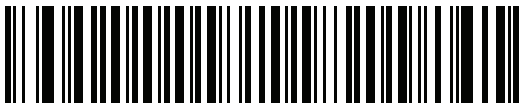
The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Matrix 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The default option is **Length Within Range**. The range is 4 to 80.

- **One Discrete Length** - Select this option to decode only Matrix 2 of 5 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix E, NUMERIC BAR CODES*. For example, to decode only Matrix 2 of 5 symbols with 14 characters, scan **Matrix 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 E-3*.
- **Two Discrete Lengths** - Select this option to decode only Matrix 2 of 5 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix E, NUMERIC BAR CODES*. For example, to decode only Matrix 2 of 5 symbols containing either 2 or 14 characters, select **Matrix 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 E-3*.
- **Length Within Range** - Select this option to decode a Matrix 2 of 5 symbol with a specific length range. Select lengths using the numeric bar codes in *Appendix E, NUMERIC BAR CODES*. For example, to decode Matrix 2 of 5 symbols containing between 4 and 12 characters, first scan **Matrix 2 of 5 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page E-3*. This is the default option (length within range from 4 to 80).
- **Any Length** - Scan this option to decode Matrix 2 of 5 symbols containing any number of characters within the linear imager's capability.

Set Length(s) for Matrix 2 of 5 (continued)



Matrix 2 of 5 - One Discrete Length



Matrix 2 of 5 - Two Discrete Lengths

*** Matrix 2 of 5 - Length Within Range (4 to 80)**

Matrix 2 of 5 - Any Length

Matrix 2 of 5 Check Digit

Parameter # F1h 6Eh

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 Matrix 2 of 5 check digit.

Enable Matrix 2 of 5 Check Digit (01h)

***Disable Matrix 2 of 5 Check Digit (00h)**

Transmit Matrix 2 of 5 Check Digit

Parameter # F1h 6Fh

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

Transmit Matrix 2 of 5 Check Digit (01h)

***Do Not Transmit Matrix 2 of 5 Check Digit (00h)**

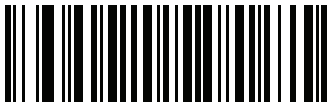
Korean 3 of 5

Enable/Disable Korean 3 of 5

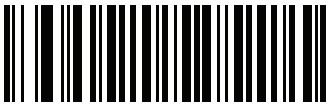
Parameter # F1h 45h

To enable or disable Korean 3 of 5, scan the appropriate bar code below.

✓ ***NOTE*** The length for Korean 3 of 5 is fixed at 6.



Enable Korean 3 of 5
(01h)



***Disable Korean 3 of 5**
(00h)

Inverse 1D

Parameter # F1h 4Ah

This parameter sets the 1D inverse decoder setting. Options are:

- **Regular Only** - the linear imager decodes regular 1D bar codes only.
- **Inverse Only** - the linear imager decodes inverse 1D bar codes only.
- **Inverse Autodetect** - the linear imager decodes both regular and inverse 1D bar codes.

***Regular**
(00h)

Inverse Only
(01h)

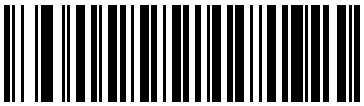
Inverse Autodetect
(02h)

GS1 DataBar

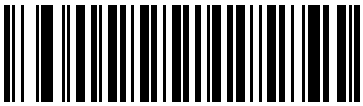
The variants of GS1 DataBar are DataBar-14, DataBar Expanded, and DataBar Limited. The limited and expanded versions have stacked variants. Scan the appropriate bar codes to enable or disable each variant of GS1 DataBar.

GS1 DataBar-14

Parameter # F0h 52h



***Enable GS1 DataBar-14**
(01h)



Disable GS1 DataBar-14
(00h)

GS1 DataBar Limited

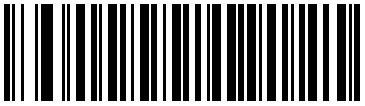
Parameter # F0h 53h

***Enable GS1 DataBar Limited**
(01h)

Disable GS1 DataBar Limited
(00h)

GS1 DataBar Expanded

Parameter # F0h 54h



***Enable GS1 DataBar Expanded (01h)**

Disable GS1 DataBar Expanded (00h)

GS1 DataBar Limited Security Level

Parameter # F1h D8h

The linear imager offers four levels of decode security for GS1 DataBar Limited bar codes. There is an inverse relationship between security and linear imager aggressiveness. Increasing the level of security may result in reduced aggressiveness in scanning, so choose only that level of security necessary.

- **GS1 DataBar Limited Security Level 1:** No clear margin required. This complies with the original GS1 standard, yet might result in erroneous decoding of the DataBar Limited bar code when scanning some UPC symbols that start with digits “9” and “7”
- **GS1 DataBar Limited Security Level 2:** Automatic risk detection. This level of security may result in erroneous decoding of DataBar Limited bar codes when scanning some UPC symbols. The scanner defaults to Level 3, otherwise to Level 1.
- **GS1 DataBar Limited Security Level 3:** Security level reflects newly proposed GS1 standard that requires a 5 times trailing clear margin.
- **GS1 DataBar Limited Security Level 4:** Security level extends beyond the standard required by GS1. This level of security requires a 5 times leading and trailing clear margin.

GS1 DataBar Limited Security Level (continued)

GS1 DataBar Limited Security Level 1
(01h)

GS1 DataBar Limited Security Level 2
(02h)

***GS1 DataBar Limited Security Level 3**

(03h)

GS1 DataBar Limited Security Level 4

(04h)

Convert GS1 DataBar to UPC/EAN

Parameter # F0h, 8Dh

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 DataBar-14 and 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 (01h)

***Disable Convert GS1 DataBar to UPC/EAN (00h)**

Symbology-Specific Security Levels

Redundancy Level

Parameter # 4Eh

The linear imager offers four levels of decode redundancy. Select higher redundancy levels for decreasing levels of bar code quality. As redundancy levels increase, the linear imager'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:

Table 9-2 *Redundancy Level 1 Codes*

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

Redundancy Level 2

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

Table 9-3 *Redundancy Level 2 Codes*

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:

Table 9-4 *Redundancy Level 3 Codes*

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

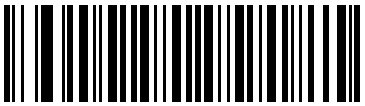
Redundancy Level 4

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

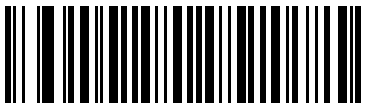
Table 9-5 *Redundancy Level 4 Codes*

Code Type	Code Length
All	All

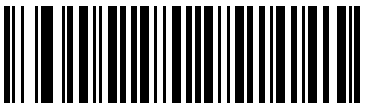
Redundancy Level (continued)



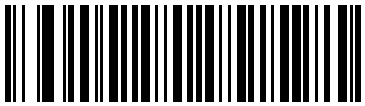
***Redundancy Level 1**
(01h)



Redundancy Level 2
(02h)



Redundancy Level 3
(03h)



Redundancy Level 4
(04h)

UPC/EAN/Code 93 Security Level

Parameter # 4Dh

The linear imager offers four levels of decode security for 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 linear imager aggressiveness, so choose only that level of security necessary for any given application.

- **UPC/EAN Security Level 0:** This setting allows the linear imager to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- **UPC/EAN Security Level 1:** This default setting eliminates most misdecodes.
- **UPC/EAN Security Level 2:** Select this option if Security level 1 fails to eliminate misdecodes.
- **UPC/EAN Security Level 3:** If you selected Security Level 2 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 linear imager. If you need this level of security, try to improve the quality of the bar codes.

UPC/EAN/Code 93 Security Level 0 (00h)

***UPC/EAN/Code 93 Security Level 1 (01h)**

UPC/EAN/Code 93 Security Level 2 (02h)

UPC/EAN/Code 93 Security Level 3 (03h)

Intercharacter Gap Size

Parameter # F0h, 7Dh

The Code 39 and Codabar symbologies have an intercharacter gap that is typically quite small. Due to various bar code-printing technologies, this gap can grow larger than the maximum size allowed, preventing the linear imager from decoding the symbol. If this problem occurs, scan the **Large Intercharacter Gaps** parameter to tolerate these out-of-specification bar codes.

***Normal Intercharacter Gaps (06h)**

Large Intercharacter Gaps (0Ah)

CHAPTER 10 123SCAN2

Introduction

123Scan² is an easy-to-use, PC-based software tool that enables rapid and easy customized setup of Motorola scanners.

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

Additionally 123Scan² can upgrade scanner firmware, check online to enable support for newly released products, generate a collection of multi-setting bar codes if the number of settings is very large, stage large number of scanners simultaneously, generate reports with asset tracking information and create custom products.

Communication with 123Scan²

To communicate with the 123Scan² program which runs on a host computer running a Windows XP SP2, or Windows 7 operating system, use a USB cable to connect the scanner to the host computer (see *Connecting a USB Interface on page 3-2*).

123Scan² Requirements

- Host computer with Windows XP SP2, or Windows 7
- Scanner
- USB cable.

For more information on123Scan², go to:
http://www.motorolasolutions.com/123Scan

For a 1 minute video tour of 123Scan, go to:
http://www.motorolasolutions.com/scannerhowtovideos

To download 123Scan² software and access the Help file integrated in the utility, go to:
http://support.symbol.com/support/product/123Scan2.html

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.MotorolaSolutions.com/ScannerSoftware.

- 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 11 ADVANCED DATA FORMATTING

Introduction

Advanced Data Formatting (ADF) is a means of customizing data before transmission to the host device. Scan data can be edited to suit particular requirements.

To implement ADF, scan a related series of bar codes, which begin on*page 11-8*, which allows programming the linear imager with Advanced Data Formatting (ADF) Rules.

Avoid using ADF formatting with bar codes containing more than 60 characters. To add a prefix or suffix value for such bar codes, use *Prefix/Suffix Values on page 7-23*. Using ADF with longer bar codes transmits the bar code in segments of length 252 or less (depending on the host selected), and applies the rule to each segment

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 scanning.

To program each data formatting rule:

- **Start the Rule**. Scan *Begin New Rule on page 11-8*.
- **Specify 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 11-11*.
- **Select 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 11-24*.
- **Save the Rule**. Scan *Save Rule on page 11-8*. This places the rule in the “top” position in the rule buffer.
- To correct any errors, see *Erase on page 11-9* to erase criteria, actions, and entire rules.

ADF Bar Code Menu Example

This section provides an example of how to enter and use 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 need to 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, see the following steps.

Rule 1: The Code 128 Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Begin New Rule	*11-8*	High High
2	Code 128	*11-11*	High High
3	Send next 5 characters	*11-25*	High High
4	Send <CTRL M>	*11-46*	High High
5	Send next 5 characters	*11-25*	High High
6	Send <CTRL P>	*11-46*	High High
7	Send next 2 characters	*11-24*	High High
8	Send <CTRL D>	*11-45*	High High
9	Save Rule	*11-8*	High Low High Low

Rule 2: The UPC Scanning Rule

Step	Bar Code	On Page	Beep Indication
1	Begin New Rule	*11-8*	High High
2	UPC/EAN	*11-13*	High High
3	Send all remaining data	*11-24*	High High
4	Send <CTRL M>	*11-46*	High High
5	Save Rule	*11-8*	High Low High Low

To correct any errors made while entering this rule, scan *Quit Entering Rules on page 11-9*. If you already saved the rule, scan *Erase Previously Saved Rule on page 11-9*.

Alternate Rule Sets

You can 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)

The bar code might look like this:

245671243701500

where:

Class = 24
Stock Number = 56712437
Price = 01500

Ordinarily, data is sent 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:

> Scan Rule Belongs to Set 1. 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:

> Scan Rule Belongs to Set 2. 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 what 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, a rule can be entered as follows:

> 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 11-10* 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 on *page 11-10*.

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 create three rules, the list is configured as follows:

> Third Rule
>
> Second Rule
>
> First Rule

When you scan data, the rules list is checked from top to bottom to determine if the criteria matches (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 appears to 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 linear imager, this applies to prefix/suffix programming in the parameter *Scan Data Transmission Format on page 7-24*.

These rules reside in the same “rule list” as ADF Rules, so the order you create them 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 applies the default rules.

ADF Bar Codes

Table 11-1 lists the bar codes available through ADF.

Table 11-1 *ADF Bar Codes*

Table 11-1 *ADF Bar Codes (Continued)*

Special Commands

Pause Duration

Use this parameter, along with *Send Pause on page 11-29*, to insert a pause in the data transmission. Set the pause by scanning a two-digit number (i.e., two bar codes) from *Appendix E, NUMERIC BAR CODES* in 0.1 second intervals. For example, scanning bar codes **0** and **1** inserts a 0.1 second pause; **0** and **5** inserts a 0.5 second delay. To correct an error or change a selection, scan *Cancel on page E-3*.

Pause Duration

Begin New Rule

Scan the bar code below to start entering a new rule

.

Begin New Rule

Save Rule

Scan the bar code below 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 the bar code below 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

Scan the bar codes for all codes to be affected by the rule. Scan the codes 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

D 2 OF 5

Code Types (continued)

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

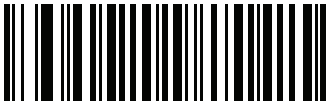
Code 32

Code Types (continued)

ISBT 128

Coupon Code

Chinese 2 of 5



Matrix 2 of 5

ISSN EAN

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

Code Lengths (continued)

7 Characters

8 Characters

9 Characters

10 Characters

11 Characters

12 Characters

13 Characters

Code Lengths (continued)

14 Characters

15 Characters

16 Characters

17 Characters

18 Characters

19 Characters

20 Characters

Code Lengths (continued)

21 Characters

22 Characters

23 Characters

24 Characters

25 Characters

26 Characters

27 Characters

Code Lengths (continued)

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 4 features:

- Specific String at Start
- Specific String, Any Location
- 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 11-88*.
3. Scan *End of Message on page 11-97*.

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 11-21*.
3. Scan the bar codes representing the desired character or characters (up to a total of 8) using the *Alphanumeric Keyboard on page 11-88*.
4. Scan *End of Message on page 11-97*.

Specific String Any Location

Specific String Search

1. Scan the following bar code.
2. Enter an alphanumeric string representing the desired character or characters (up to a total of 10) using the *Alphanumeric Keyboard on page 11-88*.
3. Scan *End of Message on page 11-97*.

Specific String Search

Any Message OK

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

Numeric Keypad

Do not confuse bar codes on this page with those on the alphanumeric keyboard.

0

1

2

3

4

5

6

Numeric Keypad (continued)

7

8

9

Cancel

Rule Belongs To Set

Select the set to which a rule belongs. There are four possible rule sets. See *Alternate Rule Sets on page 11-3* for more information about rule sets.

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 11-88*, or send the next *X* characters. Note that only bar codes for **Send Next 1** to **20** appear here, and can be scanned multiple times to send values greater then 20. For instance, to send the next 28 characters, scan **Send Next 20 Characters**, then **Send Next 8 Characters**.

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 Data (continued)

Send Next 5 Characters

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 Data (continued)

Send Next 12 Characters

Send Next 13 Characters

Send Next 14 Characters

Send Next 15 Characters

Send Next 16 Characters

Send Next 17 Characters

Send Next 18 Characters

Send Data (continued)

Send Next 19 Characters

Send Next 20 Characters

Setup Field(s)

Table 11-2 *Setup Field(s) Definitions*

Parameter	Description	Page
Move Cursor		
Move Cursor To a Character	Scan the *Move Cursor To Character on page 11-28*, then any printable ASCII character from the *Alphanumeric Keyboard on page 11-88*. This moves the cursor to the position after the matching character. If the character is not there, the rule fails and ADF tries the next rule.	*11-28*
Move Cursor to Start of Data	Scan this bar code to move the cursor to the beginning of the data.	*11-28*
Move Cursor Past a Character	This action 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 on page 11-28*, then select a character from the *Alphanumeric Keyboard on page 11-88*. If the character is not there, the cursor does not move (i.e., has no effect).	*11-28*
Move Cursor Past Specific String	This action moves the cursor past the first occurrence of a selected string.	*11-28*
Move Cursor to Specific String and Replace	This action moves the cursor to the start of the first occurrence of a selected string and replaces that string with another user-defined string.	*11-28*
Move Cursor to Last Occurrence of String and Replace All	This action replaces all occurrences of a specific string with a user-defined string and moves the cursor to the beginning of the last such occurrence.	*11-28*
Skip to End	This action moves the cursor to the end of the bar code.	*11-28*
Skip Ahead “N” Characters	Scan one of these bar codes to select the number of positions ahead to move the cursor.	*11-30*
Skip Back “N” Characters	Scan one of these bar codes to select the number of positions back to move the cursor.	*11-31*
Send Preset Value	Send Values 1 through 6 by scanning the appropriate bar code. Set these values using the prefix/suffix values in *Table 4-4 on page 4-19* or *Table 3-3 on page 3-25*. Value 1 = Scan Suffix Value 2 = Scan Prefix Values 3-6 are not applicable	*11-31*

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 11-88*.

NOTE If there is no match 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 to Specific String and Replace

Move Cursor (continued)

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. See *Pause Duration on page 11-8* to set the length of this pause.

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 7 Characters

Skip Ahead (continued)

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 (continued)

Skip Back 4 Characters

Skip Back 5 Characters

Skip Back 6 Characters

Skip Back 7 Characters

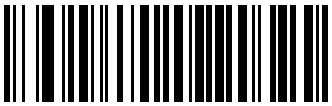
Skip Back 8 Characters

Skip Back 9 Characters

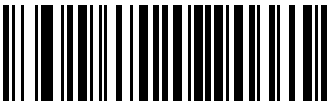
Skip Back 10 Characters

Send Preset Value

Use these bar codes to send preset values. See *Prefix/Suffix Values on page 7-23* to set these values.



Send Prefix



Send Suffix

Modify Data

Modify data as described below. The following actions work for all send commands that follow it within a rule. Programming *pad zeros to length 6, send next 3 characters, stop padding, send next 5 characters,* adds three zeros 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 the bar code below.

Remove All Spaces

Crunch All Spaces

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

Crunch All Spaces

Stop Space Removal

Scan the bar code below to disable space removal.

Stop Space Removal

Remove Leading Zeros

Scan the bar code below to remove all leading zeros.

Remove Leading Zeros

Stop Zero Removal

Scan the bar code below 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. Use **Send** commands to activate this parameter.

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 Data with Spaces (continued)

Pad Spaces To Length 8

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 Data with Spaces (continued)

Pad Spaces To Length 15

Pad Spaces To Length 16

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 Data with Spaces (continued)

Pad Spaces To Length 22

Pad Spaces To Length 23

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 Data with Spaces (continued)

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. Use **Send** commands to activate this parameter.

Pad Zeros To Length 1

Pad Zeros To Length 2

Pad Zeros To Length 3

Pad Data with Zeros (continued)

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 Zeros To Length 9

Pad Zeros To Length 10

Pad Data with Zeros (continued)

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 Zeros To Length 17

Pad Data with Zeros (continued)

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 a **Send** bar code for the keystroke to send.

Send Control 2

Send Control A

Send Control B

Control Characters (continued)

Send Control C

Send Control D

Send Control E

Send Control F

Send Control G

Send Control H

Send Control I

Control Characters (continued)

Send Control J

Send Control K

Send Control L

Send Control M

Send Control N

Send Control O

Send Control P

Control Characters (continued)

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]

Control Characters (continued)

Send Control 6

Send Control -

Keyboard Characters

Scan a **Send** bar code for the keyboard characters to send.

Send Space

Send !

Send “

Send #

Keyboard Characters (continued)

Send $

Send %

Send &

Send ‘

Send (

Send)

Send *

Keyboard Characters (continued)

Send +

Send ,

Send -

Send .

Send /

Send 0

Send 1

Keyboard Characters (continued)

Send 2

Send 3

Send 4

Send 5

Send 6

Send 7

Send 8

Keyboard Characters (continued)

Send 9

Send :

Send ;

Send <

Send =

Send >

Send ?

Keyboard Characters (continued)

Send @

Send A

Send B

Send C

Send D

Send E

Send F

Keyboard Characters (continued)

Send G

Send H

Send I

Send J

Send K

Send L

Send M

Keyboard Characters (continued)

Send N

Send O

Send P

Send Q

Send R

Send S

Send T

Keyboard Characters (continued)

Send U

Send V

Send W

Send X

Send Y

Send Z

Send [

Keyboard Characters (continued)

**Send **

Send]

Send ^

Send _

Send `

Send a

Send b

Keyboard Characters (continued)

Send c

Send d

Send e

Send f

Send g

Send h

Send i

Keyboard Characters (continued)

Send j

Send k

Send l

Send m

Send n

Send o

Send p

Keyboard Characters (continued)

Send q

Send r

Send s

Send t

Send u

Send v

Send w

Keyboard Characters (continued)

Send x

Send y

Send z

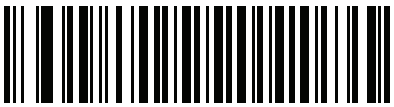
Send {

Send |

Send }

Send ~

Send ALT Characters



Send Alt 2

Send Alt 6

Send Alt A

Send Alt B

Send Alt C

Send Alt D

Send Alt E

Send ALT Characters (continued)

Send Alt F

Send Alt G

Send Alt H

Send Alt I

Send Alt J

Send Alt K

Send Alt L

Send ALT Characters (continued)

Send Alt M

Send Alt N

Send Alt O

Send Alt P

Send Alt Q

Send Alt R

Send Alt S

Send ALT Characters (continued)

Send Alt T

Send Alt U

Send Alt V

Send Alt W

Send Alt X

Send Alt Y

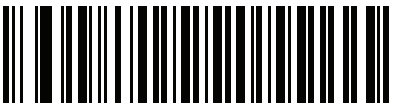
Send Alt Z

Send ALT Characters (continued)

Send Alt [

**Send Alt **

Send Alt]



Send Alt @

Send Alt -

Send Keypad Characters

Send Keypad *

Send Keypad +

Send Keypad -

Send Keypad .

Send Keypad /

Send Keypad 0

Send Keypad 1

Send Keypad Characters (continued)

Send Keypad 2

Send Keypad 3

Send Keypad 4

Send Keypad 5

Send Keypad 6

Send Keypad 7

Send Keypad 8

Send Keypad Characters (continued)

Send Keypad 9

Send Keypad Enter

Send Keypad Numlock

Send Break Key

Send Delete Key

Send Page Up Key

Send End Key

Send Keypad Characters (continued)

Send Page Down Key

Send Pause Key

Send Scroll Lock Key

Send Backspace Key

Send Tab Key

Send Print Screen Key

Send Insert Key

Send Keypad Characters (continued)

Send Home Key

Send Enter Key

Send Escape Key

Send Up Arrow Key

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 F7 Key

Send Function Key (continued)

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 Function Key (continued)

Send F22 Key

Send F23 Key

Send F24 Key

Send PF1 Key

Send PF2 Key

Send PF3 Key

Send PF4 Key

Send Function Key (continued)

Send PF5 Key

Send PF6 Key

Send PF7 Key

Send PF8 Key

Send PF9 Key

Send PF10 Key

Send PF11 Key

Send Function Key (continued)

Send PF12 Key

Send PF13 Key

Send PF14 Key

Send PF15 Key

Send PF16 Key

Send PF17 Key

Send PF18 Key

Send Function Key (continued)

Send PF19 Key

Send PF20 Key

Send PF21 Key

Send PF22 Key

Send PF23 Key

Send PF24 Key

Send PF25 Key

Send Function Key (continued)

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 will send a tap (press and release) of the Right Control Key.

Send Right Control Key

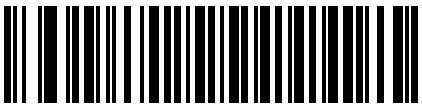
Send Graphic User Interface (GUI) Characters

The **Send Graphic User Interface Character** actions taps the specified key while holding the System Dependent Graphic User Interface (GUI) Key. The definition of the Graphic User Interface key depends on the attached system.

Send GUI 0

Send GUI 1

Send GUI 2



Send GUI 3

Send GUI 4

Send GUI 5

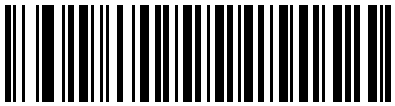
Send Graphic User Interface (GUI) Characters (continued)

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

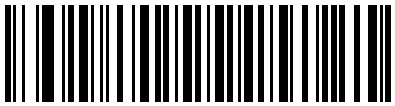
Send Graphic User Interface (GUI) Characters (continued)

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 On/Off Rule Sets (continued)

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

Turn Off Rule Set 1

Turn Off Rule Set 2

Turn Off Rule Set 3

Turn Off Rule Set 4

Alphanumeric Keyboard

Space

#

$

%

*****
(Single Quote)

+

-
(Dash)

Alphanumeric Keyboard (continued)

.

,
(Comma)

/

!

“

&

‘

(

Alphanumeric Keyboard (continued)

)

:

;

<

=

>

?

Alphanumeric Keyboard (continued)

@

[

\

]

^

_

(Underscore)

`

Alphanumeric Keyboard (continued)

✓ ***NOTE*** Do not confuse the numeric bar codes below with those on the numeric keypad.

0

1

2

3

4

5

Alphanumeric Keyboard (continued)

6

7

8

9

A

B

C

Alphanumeric Keyboard (continued)

D

E

F

G

H

I

J

Alphanumeric Keyboard (continued)

K

L

M

N

O

P

Q

Alphanumeric Keyboard (continued)

R

S

T

U

V

W

X

Alphanumeric Keyboard (continued)

Y

Z

Cancel

End of Message

a

b

c

Alphanumeric Keyboard (continued)

d

e

f

g

h

i

j

Alphanumeric Keyboard (continued)

k

l

m

n

o

p

q

Alphanumeric Keyboard (continued)

r

s

t

u

v

w

x

Alphanumeric Keyboard (continued)

y

z

{

|

}

~

CHAPTER 12 MAINTENANCE, TROUBLESHOOTING & TECHNICAL SPECIFICATIONS

Introduction

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

Maintenance

Standard Linear Imagers

NOTE See *Health Care Linear Imagers on page 12-3* for the proper cleaning techniques for the LI2208-HC0000BZZWW health care model.

Known Harmful Ingredients

The following chemicals are known to damage the plastics on Motorola scanners and should not come in contact with the device:

- Acetone
- Ammonia solutions
- Aqueous or alcoholic alkaline solutions
- Aromatic and chlorinated hydrocarbons
- Benzene
- Bleach
- Carbolic acid
- Compounds of amines or ammonia
- Ethanolamine
- Ethers
- Ketones
- TB-lysoform
- Toluene
- Trichloroethylene.

Approved Cleaning Agents

The following cleaning agents are approved for cleaning the plastics on Motorola scanners:

- Pre-moistened wipes
- Isopropyl alcohol 70%

Cleaning the Linear Imager

Routinely cleaning the exit window is required. A dirty window may affect scanning accuracy. Do not allow any abrasive material to touch the window.

To clean the scanner:

1. Dampen a soft cloth with one of the approved cleaning agents listed above or use pre-moistened wipes.
2. Gently wipe all surfaces, including the front, back, sides, top and bottom. Never apply liquid directly to the scanner. Be careful not to let liquid pool around the scanner window, trigger, cable connector or any other area on the device.
3. Be sure to clean the trigger and in between the trigger and the housing (use a cotton-tipped applicator to reach tight or inaccessible areas).
4. Do not spray water or other cleaning liquids directly into the exit window.
5. Wipe the scanner exit window with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.
6. Immediately dry the scanner window after cleaning with a soft non-abrasive cloth to prevent streaking.
7. Allow the unit to air dry before use.
8. Scanner connectors:
   a. Dip the cotton portion of a cotton-tipped applicator in isopropyl alcohol.

      Rub the cotton portion of the cotton-tipped applicator in-line with the connector pins on the Motorola scanner at least 3 times. Do not leave any cotton residue on the connector.

   b. Use the cotton-tipped applicator dipped in alcohol to remove any grease and dirt near the connector area.
   c. Use a dry cotton tipped applicator and rub the cotton portion of the cotton-tipped applicator back-and-forth across the connectors at least 3 times. Do not leave any cotton residue on the connectors.

Health Care Linear Imagers

Cleaning the Health Care Linear Imager

The LI2208-HC0000BZZWW health care design allows safe cleansing of the product plastics with a variety of cleaning products and disinfectants. If required, wipe the digital scanner with the following list of approved cleansers:

- Isopropyl alcohol
- Bleach/sodium hypochlorite
- Hydrogen peroxide
- Gentle dish soap and water

IMPORTANT Cleansers that contain active ingredients not listed above should not be utilized on the LI2208-HC0000BZZWW.

Daily Cleaning and Disinfecting

Following are the cleaning and disinfecting instructions for environments that require daily or more frequent cleaning to prevent the spread of germs, including healthcare workers who need to disinfect their scanner after each patient visit and retail and other shift workers who share devices.

1. Dampen a soft cloth with one of the approved cleaning agents listed above or use pre-moistened wipes.
2. Gently wipe all surfaces, including the front, back, sides, top and bottom. Never apply liquid directly to the scanner. Be careful not to let liquid pool around the scanner window, trigger, cable connector or any other area on the device.
3. Be sure to clean the trigger and in between the trigger and the housing (use a cotton-tipped applicator to reach tight or inaccessible areas).
4. Immediately dry the scanner window after cleaning with a soft non-abrasive cloth to prevent streaking.
5. Allow the unit to air dry before use.

Monthly 'Deep Cleaning' Maintenance

Keep your Motorola scanner in good working order with a regular comprehensive cleaning routine to remove the natural build-up of dirt that occurs with everyday use on connectors and the scanner exit window as well as the main surfaces of the device.

1. Housing: Follow the instructions for daily cleaning and disinfecting above to give the housing a general cleaning.
2. Scanner exit window: Wipe the scanner exit window with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.
3. Scanner connector:
   a. Dip the cotton portion of a cotton-tipped applicator in isopropyl alcohol.
   b. Rub the cotton portion of the cotton-tipped applicator back-and-forth across the connector on the Motorola scanner. Do not leave any cotton residue on the connector.
   c. Repeat at least 3 times.
   d. Use the cotton-tipped applicator dipped in alcohol to remove any grease and dirt near the connector area.
   e. Use a dry cotton tipped applicator and repeat steps c, d and e (do not apply alcohol as directed in any of these steps).

Troubleshooting

NOTE If having issues decoding, ensure you are above the bar code before engaging the trigger, and NOT sweeping the illumination over the bar code during a decode session.

Table 12-1 *Troubleshooting*

Problem	Possible Causes	Possible Solutions
Beeper Indications		
Linear imager scanner emits low/high/low beeps.	ADF transmit error.	See *Chapter 11, ADVANCED DATA FORMATTING* for information about ADF programming.
	Invalid ADF rule is detected.	See *Chapter 11, ADVANCED DATA FORMATTING* for information about ADF programming.
	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.
Linear imager scanner emits a low/high/low/high beep sequence while it is being programmed.	Out of ADF parameter storage space.	Erase all rules and re-program with shorter rules.
Linear imager scanner emits long low/long 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.
Linear imager scanner emits long low/long high/long low/long high beeps.	Out of host parameter storage space.	Scan *Default Parameters on page 7-4*.
	Out of memory for ADF rules.	Reduce the number of ADF rules or the number of steps in the ADF rules.
Linear imager scanner emits high/high/high/low beeps.	RS-232 receive error.	Normal during host reset. Otherwise, set the linear imager's RS-232 parity to match the host setting.
Linear imager scanner emits high/low beeps.	The linear imager is buffering Code 39 data. Or Keyboard parameter selected.	Normal. Or Enter value using bar code keypad.
Linear imager scanner emits three long high beeps.	Code 39 buffer is full.	Scan the Code 39 bar code without a leading space or scan **Do Not Buffer Code 39** on *Code 39 Buffering - Scan & Store on page 9-34* to transmit stored Code 29 data.
Linear imager 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.

Table 12-1 *Troubleshooting (Continued)*

Problem	Possible Causes	Possible Solutions
Linear imager scanner emits five low long beeps.	Conversion or format error.	Check ADF rules for the host.
Linear imager scanner emits a power-up beep after scanning a USB device type.	Communication with the bus was not established.	Communication with the bus must be established before the linear imager can operate at the highest power level.
Power-up beep occurs more than once.	The host PC performed a cold boot.	The USB bus may put the linear imager in a state where power to the linear imager is cycled on and off more than once. This is normal and usually happens when the host PC cold boots.
Decoding Bar Codes		
Linear imager scanner projects red illumination, but does not decode the bar code.	Linear imager scanner is not programmed for the correct bar code type.	Program the linear imager to read that type of bar code. See *Chapter 9, 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 linear imager and bar code is incorrect.	Move the linear imager closer to or further from the bar code. See *Decode Ranges on page 2-6*.
	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 2-1 on page 2-4*.
Linear imager scanner decodes bar code, but does not transmit the data to the host.	Linear imager 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.	Ensure all cable connections are secure.
Linear imager scanner emits five long low beep after a bar code is decoded.	Conversion or format error was detected. The linear imager's conversion parameters are not properly configured.	Ensure the linear imager'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 12-1 *Troubleshooting (Continued)*

Problem	Possible Causes	Possible Solutions
Host Displays		
Host displays scanned data incorrectly.	Linear imager 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, ensure the linear imager's communication parameters match the host's settings.
		For a USB HID keyboard or Keyboard Wedge configuration, ensure the system is programmed for the correct keyboard type and language, and turn off the CAPS LOCK key.
		Ensure editing options (e.g., ADF, UPC-E to UPC-A Conversion) are properly programmed.
		Check the linear imager's host type parameters or editing options.
Trigger		
Nothing happens when the trigger is pulled, and/or the red illumination does not appear when the trigger is pulled.	No power to the linear imager.	Ensure all power (if applicable) and cable connections are secure. Check the system power. If the configuration requires a power supply, re-connect the power supply.
	Interface/power cables are loose.	Ensure all power (if applicable) and cable connections are secure. Check for loose cable connections and re-connect cables.
	Linear imager scanner is disabled.	For IBM-468x mode, enable the linear imager via the host interface.

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

Technical Specifications

Table 12-2 *Technical Specifications - LI2208 Linear Imager*

Item	Description
Physical Characteristics	
Dimensions	6.30 in. H x 2.64 in. W x 3.90 in. L 16 cm H x 6.7 cm W x 9.9 cm L
Weight	4.95 oz./140 grams
Color	Nova White, Healthcare White, or Twilight Black
Host Interface	USB, RS-232, RS-485 (IBM), Keyboard Wedge (also see *Table 12-3*)
Voltage and Current	5VDC ± 10% <165 mA scanning <40 mA standby <2.5 mA USB suspend <4.0 mA low power mode (when enabled, RS232 and Keyboard Wedge only)
Power Source	Host power or external power supply
Keyboard Support Supports over 90 international keyboards	
Performance Characteristics	
Light Source	LED Class 1 device 617nm (amber)
Scan Speed	547 scans per second
Scan Pattern	Single bright aiming line
Scan Angle	Horizontal 35°
Roll Tolerance	± 45°
Pitch Tolerance	± 65°
Skew Tolerance	± 65°
Nominal Working Distance	(See *Decode Ranges on page 2-6*)
Decode Capability	UPC/EAN: UPC-A, UPC-E, UPC-E1, EAN-8/JAN 8, EAN-13/JAN 13, Bookland EAN, Bookland ISBN Format, UCC Coupon Extended Code, ISSN EAN Code 128 Including GS1-128, ISBT 128, ISBT Concatenation, Code 39 including Trioptic Code 39, Convert Code 39 to Code 32 (Italian Pharmacy Code), Code 39 Full ASCII Conversion Code 93 Code 11 Matrix 2 of 5 Interleaved 2 of 5 (ITF) Discrete 2 of 5 (DTF) Codabar (NW - 7) MSI Chinese 2 of 5 IATA Inverse 1D (except all GS1 DataBars) GS1 DataBar including GS1 DataBar-14, GS1 DataBar Limited, GS1 DataBar Expanded
Motion Tolerance	25 in./ 63.5 cm per second
Min. Print Contrast	15% MRD
User Environment	
Ambient Light Immunity	Max 108,000 lux
Operating Temperature	32° to 122° F (0° to 50° C)

Table 12-2 *Technical Specifications - LI2208 Linear Imager*

Item	Description
Storage Temperature	-40° to 158° F (-40° to 70° C)
Humidity	5 % to 95 % RH, non-condensing
Drop Specifications	Over 100 drops at 5 ft./1.5 m at room temperature; survives 6 ft./1.8 m drops to concrete
Environmental Sealing	IP42
Utilities and Management	123Scan^2, Scanner Management Services (SMS), Motorola Scanner SDK
Accessories	Hands-free (gooseneck) Intellistand; auto-host detect cables

Signal Descriptions

The signal descriptions in *Table 12-3* apply to the connector on the linear imager and are for reference only.

Table 12-3 *Signal Pin-outs*

Pin	IBM	RS-232	Keyboard Wedge	USB
1	Cable ID	Cable ID	Cable ID	Cable ID
2	Power	Power	Power	Power
3	Ground	Ground	Ground	Ground
4	IBM_OUT	TxD	KeyClock	Reserved
5	IBM_IN	RxD	TermData	D +
6	IBM_T/R	RTS	KeyData	Reserved
7	Reserved	CTS	TermClock	D -
8	Reserved	Reserved	Reserved	Reserved
9	N/A	N/A	N/A	N/A
10	N/A	N/A	N/A	N/A

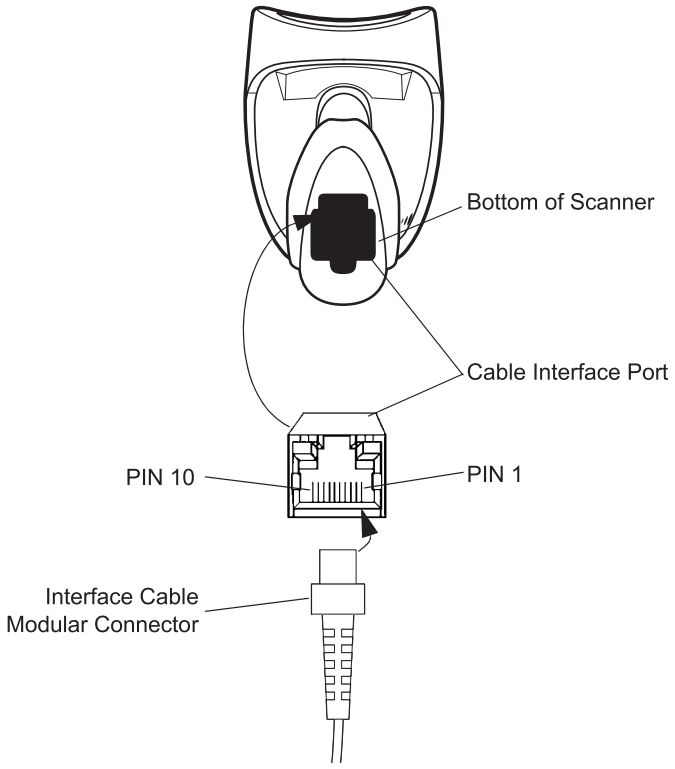


Figure 12-1 *Scanner Cable Pinouts*

APPENDIX A STANDARD DEFAULT PARAMETERS

Table A-1 *Standard Default Parameters Table*

Parameter	Default	Page Number
USB Host Parameters		
USB Device Type	USB Keyboard (HID)	*3-6*
Symbol Native API (SNAPI) Status Handshaking	Enable	*3-8*
USB Keystroke Delay	No Delay	*3-9*
USB CAPS Lock Override	Disable	*3-9*
USB Ignore Unknown Characters	Send	*3-10*
USB Convert Unknown to Code 39	Disable	*3-10*
Emulate Keypad	Enable	*3-11*
Emulate Keypad with Leading Zero	Disable	*3-12*
Quick Keypad Emulation	Enable	*3-12*
USB FN1 Substitution	Disable	*3-12*
Function Key Mapping	Disable	*3-12*
Simulated Caps Lock	Disable	*3-13*
Convert Case	No Case Conversion	*3-14*
USB Static CDC	Enable	*3-14*
Ignore Beep	Disable	*3-15*
Ignore Bar Code Configuration	Disable	*3-15*
USB Polling Interval	3 msec	*3-16*

[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
Fast HID Keyboard	Disable	3-18
RS-232 Host Parameters		
RS-232 Host Types	Standard	4-6
Baud Rate	9600	4-8
Parity Type	None	4-10
Stop Bit Select	1 Stop Bit	4-9
Data Bits (ASCII Format)	8-bit	4-10
Check Receive Errors	Enable	4-9
Hardware Handshaking	None	4-12
Software Handshaking	None	4-14
Host Serial Response Time-out	2 sec	4-15
RTS Line State	Low RTS	4-16
Beep on <BEL>	Disable	4-16
Intercharacter Delay	0 msec	4-17
Nixdorf Beep/LED Options	Normal Operation	4-18
Ignore Unknown Characters	Send Bar Code	4-18
IBM 468X/469X Host Parameters		
Port Address	None Selected	5-4
Convert Unknown to Code 39	Disable	5-5
Ignore Beep	Disable	5-5
Ignore Bar Code Configuration	Disable	5-6
Keyboard Wedge Host Parameters		
Keyboard Wedge Host Type	IBM AT Notebook	6-4
Ignore Unknown Characters	Send	6-5
Keystroke Delay	No Delay	6-5
Intra-Keystroke Delay	Disable	6-6
Alternate Numeric Keypad Emulation	Enable	6-6
Quick Keyboard Emulation	Enable	6-7
Caps Lock On	Disable	6-7
Convert Wedge Data	No Convert	6-8

[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
Caps Lock Override	Disable	*6-8*
Function Key Mapping	Disable	*6-9*
FN1 Substitution	Disable	*6-9*
Send and Make Break	Send	*6-10*
User Preferences		
Set Default Parameter	Set Factory Defaults	*7-4*
Report Software Version	N/A	*7-5*
Parameter Bar Code Scanning	Enable	*7-5*
Beep After Good Decode	Enable	*7-6*
Decode Illumination Indicator	Disable	*7-6*
Beeper Tone	Medium	*7-7*
Suppress Power Up Beeps	Do Not Suppress	*7-8*
Beeper Volume	High	*7-8*
Beeper Duration	Medium	*7-9*
Hand-Held Trigger Mode	Level	*7-10*
Hands-Free Mode	Enable	*7-11*
Linear Imager Picklist Mode	Auto-discriminate	*7-12*
Aiming Illumination	Pulsing Pattern	*7-13*
Low Power Mode	Enabled	*7-14*
Time Delay to Low Power Mode	1 Hour	*7-16*
Time Delay to Presentation Sleep Mode	5 Min	*7-17*
Continuous Bar Code Read	Disable	*7-19*
Unique Bar Code Reporting	Enable	*7-19*
Decode Session Timeout	9.9 Sec	*7-19*
Timeout Between Decodes, Same Symbol	0.5 Sec	*7-20*
Timeout Between Decodes, Different Symbols	0.1 Sec	*7-20*
Decoding Illumination	Enable	*7-21*
Miscellaneous Options		
Transmit Code ID Character	None	*7-22*
Prefix Value	7013 <CR><LF>	*7-23*

[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
Suffix 1 Value Suffix 2 Value	7013 <CR><LF>	7-23
Scan Data Transmission Format	Data as is	7-25
FN1 Substitution Values	7013 <CR><LF>	7-26
Transmit “No Read” Message	Disable	7-27
Unsolicited Heartbeat Interval	Disable	7-28
Enter Key (Carriage Return/Line Feed)		7-29
Tab Key		7-29
Symbologies		
Disable All Code Types	N/A	9-6
Enable All Code Types	N/A	9-6
UPC/EAN		
UPC-A	Enable	9-7
UPC-E	Enable	9-7
UPC-E1	Disable	9-8
EAN-8/JAN 8	Enable	9-8
EAN-13/JAN 13	Enable	9-9
Bookland EAN	Disable	9-9
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	Ignore	9-11
User-Programmable Supplementals	None	9-13
UPC/EAN/JAN Supplemental Redundancy	10	9-13
UPC/EAN/JAN Supplemental AIM ID Format	Combined	9-13
Transmit UPC-A Check Digit	Enable	9-15
Transmit UPC-E Check Digit	Enable	9-15
Transmit UPC-E1 Check Digit	Enable	9-16
UPC-A Preamble	System Character	9-17
UPC-E Preamble	System Character	9-18
UPC-E1 Preamble	System Character	9-19
Convert UPC-E to A	Disable	9-20
Convert UPC-E1 to A	Disable	9-20

[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
EAN-8/JAN-8 Extend	Disable	*9-21*
Bookland ISBN Format	ISBN-10	*9-21*
UCC Coupon Extended Code	Disable	*9-22*
Coupon Report	New Coupon Format	*9-22*
ISSN EAN	Disable	*9-23*
Code 128		
Code 128	Enable	*9-24*
Set Length(s) for Code 128	Any Length - 1 to 80	*9-25*
GS1-128 (formerly UCC/EAN-128)	Enable	*9-26*
ISBT 128	Enable	*9-26*
ISBT Concatenation	Autodiscriminate	*9-27*
Check ISBT Table	Enable	*9-28*
ISBT Concatenation Redundancy	10	*9-28*
Code 128 Security Level	Security Level 1	*9-29*
Code 39		
Code 39	Enable	*9-30*
Trioptic Code 39	Disable	*9-30*
Convert Code 39 to Code 32 (Italian Pharmacy Code)	Disable	*9-31*
Code 32 Prefix	Disable	*9-31*
Set Length(s) for Code 39	Any Length - 1 to 80	*9-32*
Code 39 Check Digit Verification	Disable	*9-33*
Transmit Code 39 Check Digit	Disable	*9-33*
Code 39 Full ASCII Conversion	Disable	*9-34*
Buffer Code 39	Disable	*9-35*
Code 39 Security Level	Security Level 1	*9-37*
Code 93		
Code 93	Enable	*9-38*
Set Length(s) for Code 93	Any Length - 1 to 80	*9-38*
UPC/EAN/Code 93 Security Level	1	*9-71*
Code 11		

[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 11	Disable	9-40
Set Length(s) for Code 11	4 to 80	9-40
Code 11 Check Digit Verification	Disable	9-42
Transmit Code 11 Check Digit(s)	Disable	9-43
Interleaved 2 of 5 (ITF)		
Interleaved 2 of 5 (ITF)	Enable (I 2 of 5 Security Level must be set to 1)	9-44
Set Length(s) for I 2 of 5	Length Within Range - 6 to 80	9-44
I 2 of 5 Check Digit Verification	Disable	9-46
Transmit I 2 of 5 Check Digit	Disable	9-46
Convert I 2 of 5 to EAN 13	Disable	9-47
I 2 of 5 Security Level	1	9-48
Discrete 2 of 5 (DTF)		
Discrete 2 of 5	Disable	9-49
Set Length(s) for D 2 of 5	Any Length - 1 to 55	9-49
Codabar (NW - 7)		
Codabar	Enable	9-51
Set Length(s) for Codabar	4 to 60	9-51
CLSI Editing	Disable	9-53
NOTIS Editing	Disable	9-53
Codabar Upper or Lower Case Start/Stop Characters Detection	Upper Case	9-54
MSI		
MSI	Disable	9-55
Set Length(s) for MSI	4 to 55	9-55
MSI Check Digits	1	9-57
Transmit MSI Check Digit	Disable	9-57
MSI Check Digit Algorithm	Mod 10/Mod 10	9-58
Chinese 2 of 5		
Enable/Disable Chinese 2 of 5	Disable	9-59

[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
Matrix 2 of 5		
Enable/Disable Matrix 2 of 5	Disable	*9-60*
Matrix 2 of 5 Lengths	Length Within Range - 4 to 80	*9-61*
Matrix 2 of 5 Check Digit	Disable	*9-62*
Transmit Matrix 2 of 5 Check Digit	Disable	*9-62*
Korean 3 of 5		
Korean 3 of 5	Disable	*9-63*
Inverse 1D		
Inverse 1D	Regular	*9-64*
GS1 DataBar		
GS1 DataBar-14	Enable	*9-65*
GS1 DataBar Limited	Enable	*9-65*
GS1 DataBar Expanded	Enable	*9-66*
GS1 DataBar Limited Security Level	Level 3	*9-67*
Convert GS1 DataBar to UPC/EAN	Disable	*9-68*
Symbology-Specific Security Levels		
Redundancy Level	1	*9-70*
UPC/EAN/Code 93 Security Level	1	*9-71*
Intercharacter Gap Size	Normal	*9-72*
USB & Keyboard Wedge Country Codes		
Country Keyboard Types (Country Codes)	North American Standard Keyboard	*B-1*

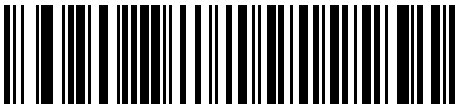
[1]User selection is required to configure this interface and this is the most common selection.

APPENDIX B COUNTRY CODES

Introduction

This chapter provides instructions for programming the keyboard to interface with a USB, or Keyboard Wedge host. The host can power the scanner. For host setup information, see *Chapter 3, USB INTERFACE* and *Chapter 6, KEYBOARD WEDGE INTERFACE*.

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



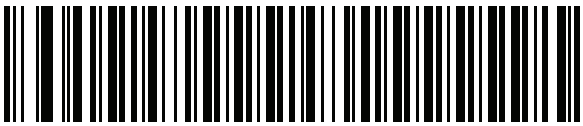
*Indicates Default — ***US English (North American) Keyboard** — Feature/Option

USB and Keyboard Wedge Country Keyboard Types (Country Codes)

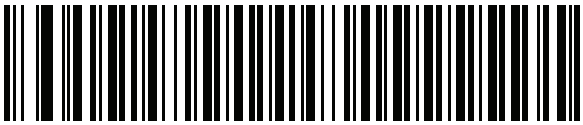
Scan the bar code corresponding to the keyboard type. For a USB host, this setting applies only to the USB Keyboard (HID) device. If the keyboard type is not listed, see *Emulate Keypad on page 3-11* for the USB HID host. For a Keyboard Wedge host, see *Alternate Numeric Keypad Emulation on page 6-6*.

NOTE When changing USB country keyboard types the linear imager automatically resets. The linear imager issues the standard startup beep sequences.

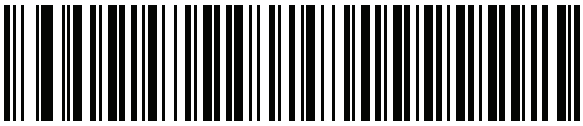
IMPORTANT Some country keyboard bar code types are specific to certain Windows Operating Systems (i.e., XP, and Win 7, or higher). Bar codes requiring a specific Windows OS are noted so in their bar code captions.



***US English (North American)**

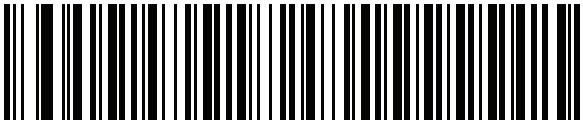


Albanian



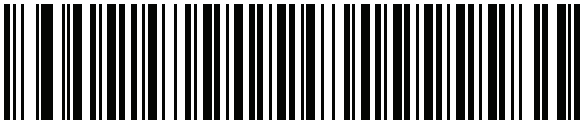
Arabic (101)

Arabic (102)

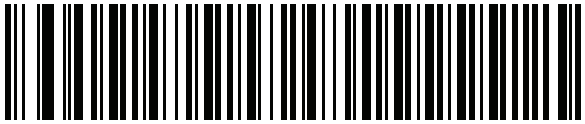


Arabic (102) AZERTY

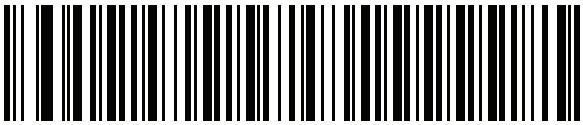
Country Codes (Continued)



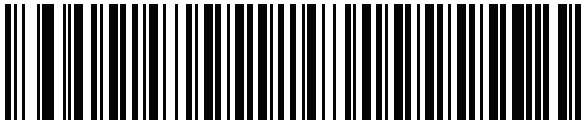
Azeri (Latin)



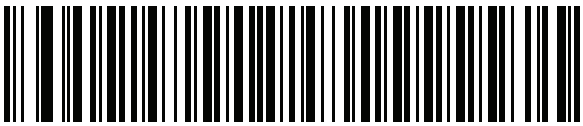
Azeri (Cyrillic)



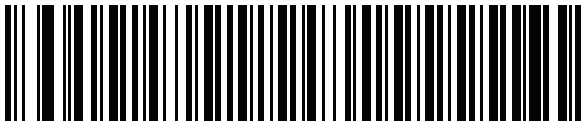
Belarusian



Belgian French

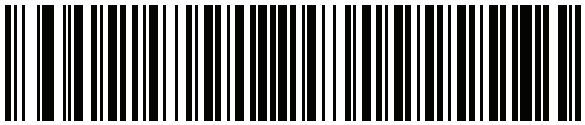


Bosnian (Latin)

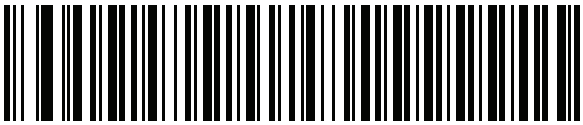


Bosnian (Cyrillic)

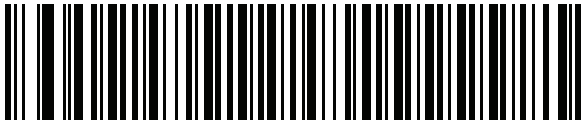
Country Codes (Continued)



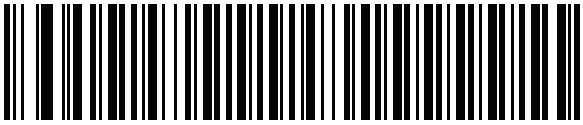
Bulgarian (Latin)



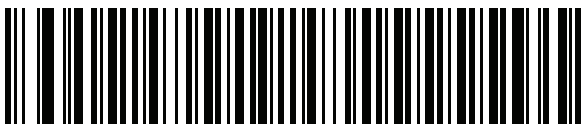
Bulgarian Cyrillic (Typewriter)
(Bulgarian -Windows XP
Typewriter - Win 7, or higher)



Canadian French Win7

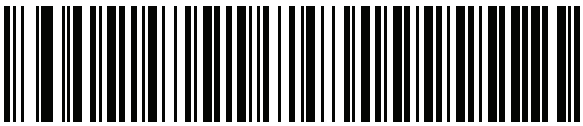


Canadian French (Legacy)

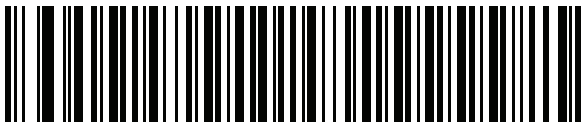


Canadian Multilingual Standard

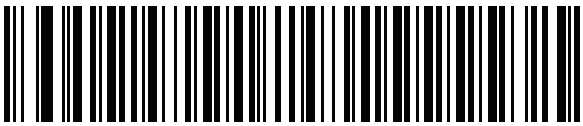
Country Codes (Continued)



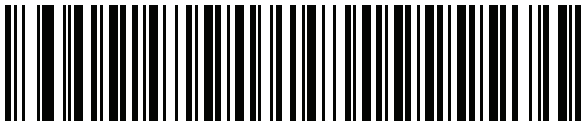
Chinese (ASCII)



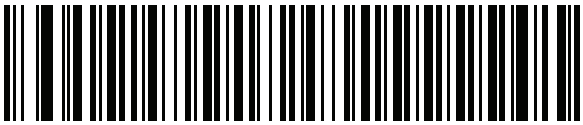
Croatian



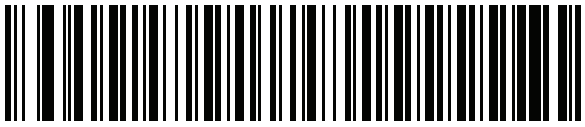
Czech



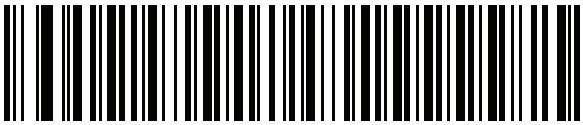
Czech (Programmer)



Czech (QWERTY)

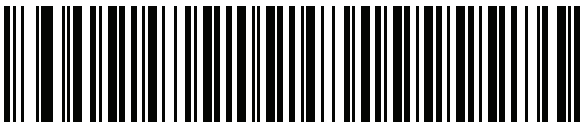


Danish

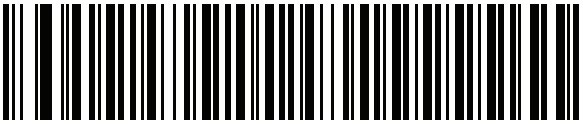


Dutch (Netherlands)

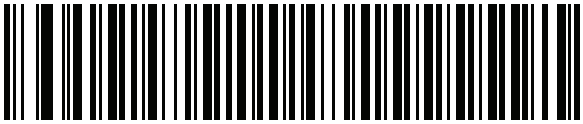
Country Codes (Continued)



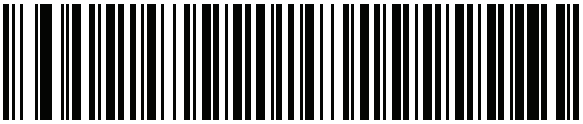
Estonian



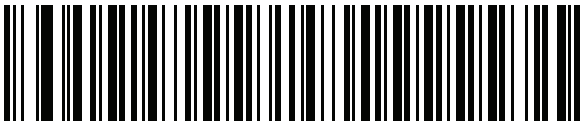
Faeroese



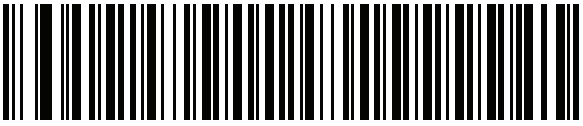
Finnish



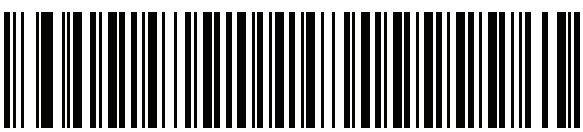
French (France)



French (Canada) 95/98



French (Canada) 2000/XP



Galician

Country Codes (Continued)

German

Greek Latin

Greek (220) Latin

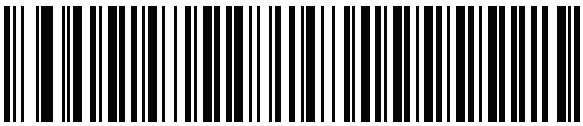
Greek (319) Latin

Greek

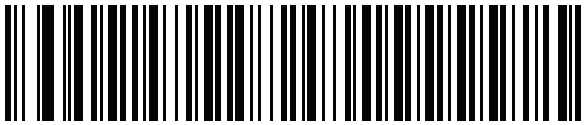
Greek (220)

Greek (319)

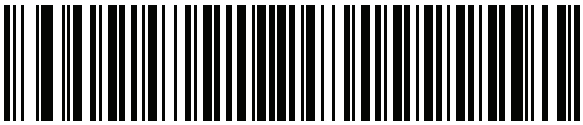
Country Codes (Continued)



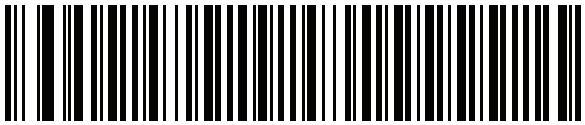
Greek Polytonic



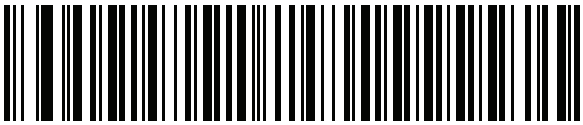
Hebrew Israel



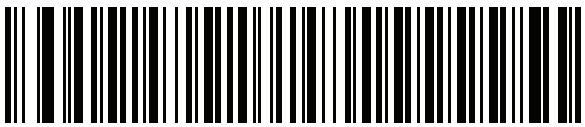
Hungarian



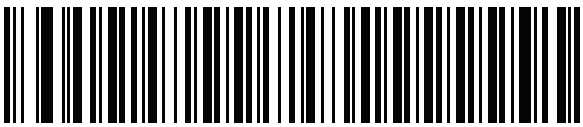
Hungarian_101KEY



Icelandic

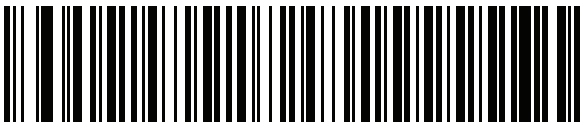


Irish

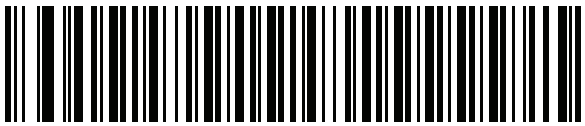


Italian

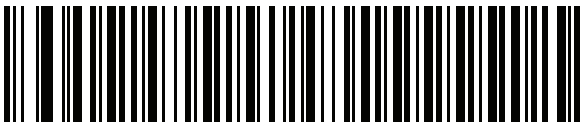
Country Codes (Continued)



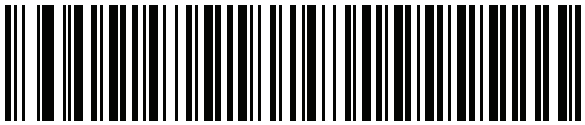
Italian (142)



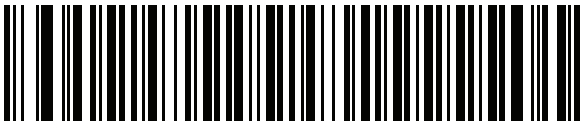
Japanese (ASCII)



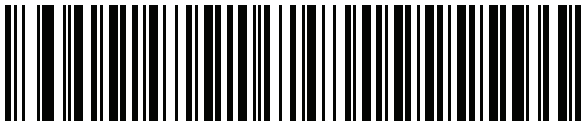
Kazakh



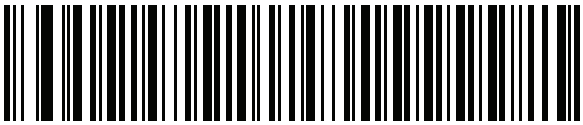
Korean (ASCII)



Kyrgyz



Latin American



Latvian

Country Codes (Continued)

Latvian (QWERTY)

Lithuanian

Lithuanian (IBM)

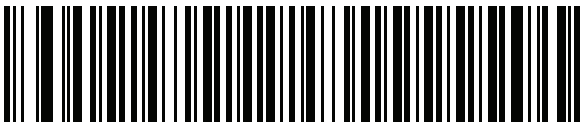
Macedonian (FYROM)

Maltese_47KEY

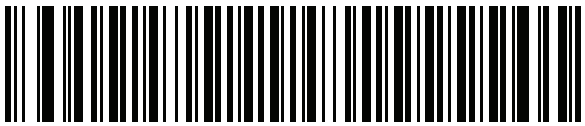
Mongolian

Norwegian

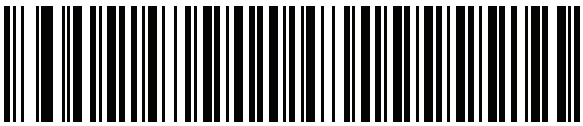
Country Codes (Continued)



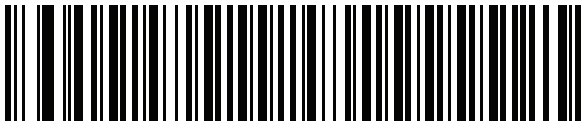
Polish (214)



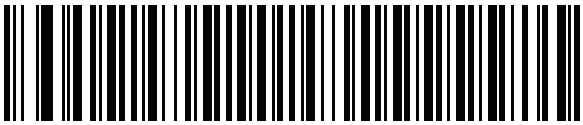
Polish (Programmer)



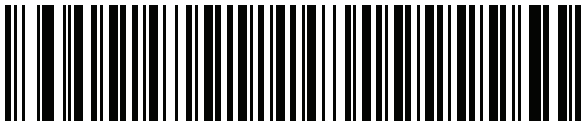
Portuguese (Brazil)



Portuguese (Brazilian ABNT)



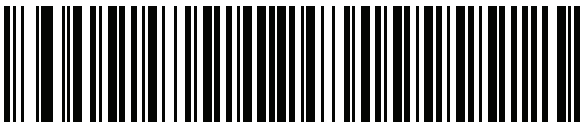
Portuguese (Brazilian ABNT2)



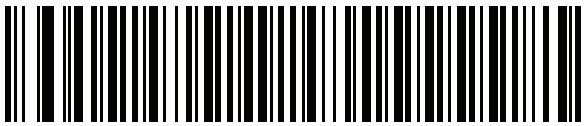
Portuguese (Portugal)

Romanian

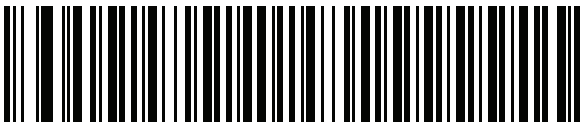
Country Codes (Continued)



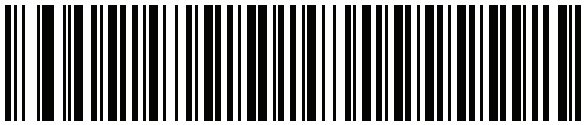
Romanian (Legacy)
(Win 7, or higher)



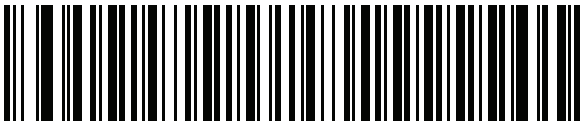
Romanian (Standard)
(Win 7, or higher)



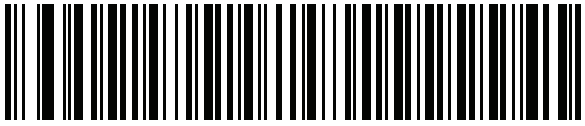
Romanian (Programmer)
(Win 7, or higher)



Russian

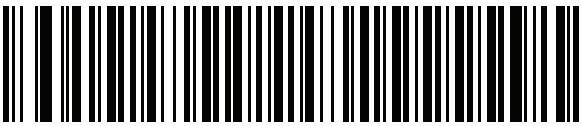


Russian (Typewriter)

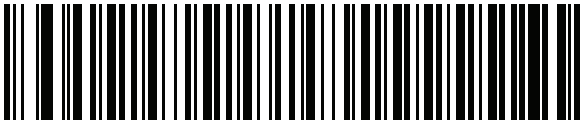


Serbian (Latin)

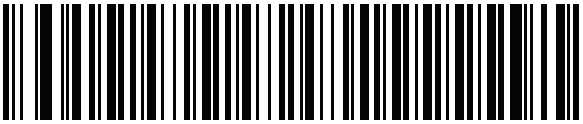
Country Codes (Continued)



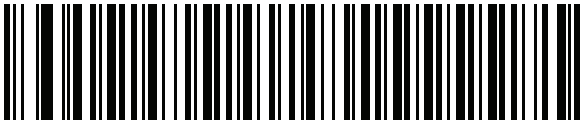
Serbian (Cyrillic)



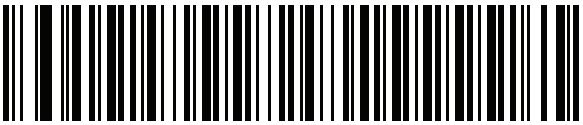
Slovak



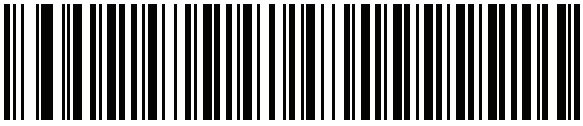
Slovak (QWERTY)



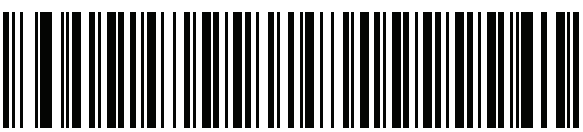
Slovenian



Spanish

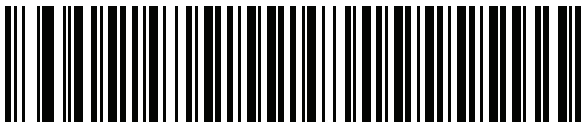


Spanish (Variation)

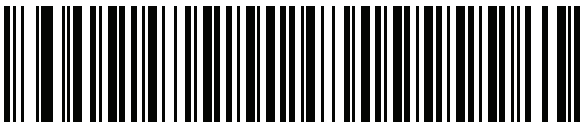


Swedish

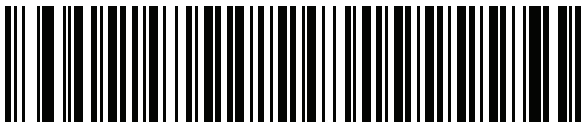
Country Codes (Continued)



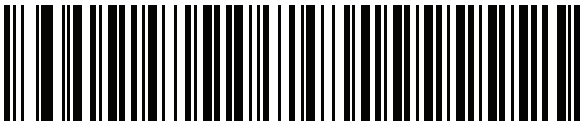
Swiss French



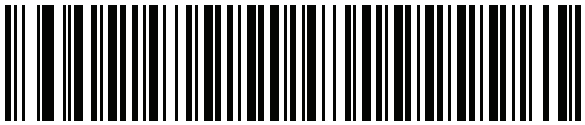
Swiss German



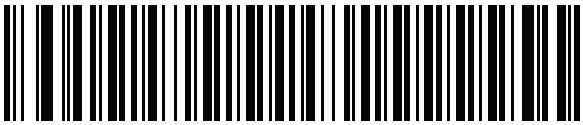
Tatar



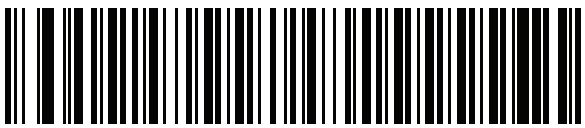
Thai (Kedmanee)



Turkish F

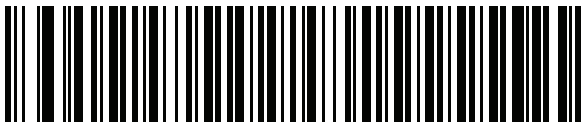


Turkish Q

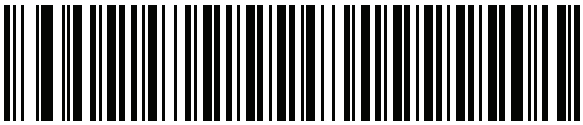


UK English

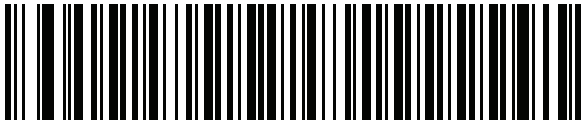
Country Codes (Continued)



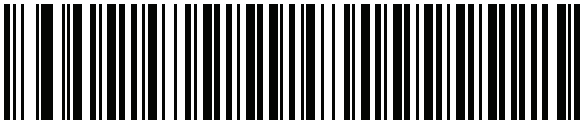
Ukrainian



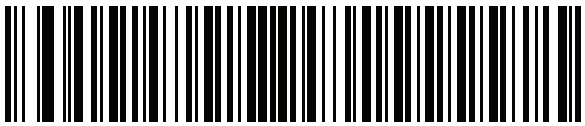
US Dvorak



US Dvorak Left

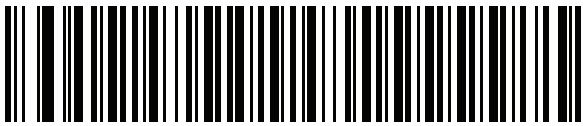


US Dvorak Right

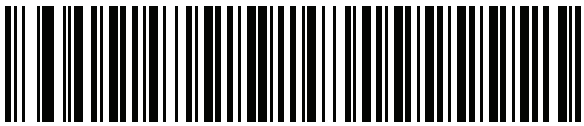


US International

Country Codes (Continued)



Uzbek



Vietnamese

APPENDIX C PROGRAMMING REFERENCE

Symbol Code Identifiers

Table C-1 *Symbol Code Characters*

Code Character	Code Type
A	UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13
B	Code 39, Code 32
C	Codabar
D	Code 128, ISBT 128, ISBT 128 Concatenated
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
S	Matrix 2 of 5

Table C-1 *Symbol Code Characters (Continued)*

Code Character	Code Type
U	Chinese 2 of 5
V	Korean 3 of 5
X	ISSN EAN

AIM Code Identifiers

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

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

Table C-2 *Aim Code Characters*

Code Character	Code Type
A	Code 39, Code 39 Full ASCII, Code 32
C	Code 128, ISBT 128, ISBT 128 Concatenated, GS1-128, 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	Discrete 2 of 5, IATA 2 of 5
X	Bookland EAN, ISSN EAN, Trioptic Code 39, Chinese 2 of 5, Matrix 2 of 5, Korean 3 of 5

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

Table C-3 *Modifier Characters*

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

Table C-3 *Modifier Characters (Continued)*

Code Type	Option Value	Option
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 data packet in full EAN format, i.e. 13 digits for UPC-A, UPC-E, and EAN-13 (not including supplemental data).
	1	Two digit supplemental data only.
	2	Five digit supplemental data only.
	3	Combined data packet comprising 13 digits from EAN-13, UPC-A or UPC-E symbol and 2 or 5 digits from supplemental symbol.
	4	EAN-8 data packet.
	Example: A UPC-A bar code 012345678905 is transmitted as **]E0**0012345678905	
Bookland EAN	0	No options specified at this time. Always transmit 0.
	Example: A Bookland EAN bar code 123456789X is transmitted as **]X0**123456789X	
ISSN EAN	0	No options specified at this time. Always transmit 0.
	Example: An ISSN 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 GS1 DataBar-14 bar code 0110012345678902 is transmitted as **]e**00110012345678902.	

APPENDIX D 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 on page 9-65*).

1029384756019283746501928374602947845036652 3
(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)

APPENDIX E NUMERIC BAR CODES

Numeric Bar Codes

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

0

1

2

3

4

5

6

7

8

9

Cancel

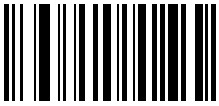
To correct an error or change a selection, scan the bar code below.

Cancel

APPENDIX F ALPHANUMERIC BAR CODES

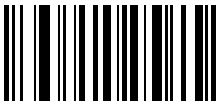
Alphanumeric Keyboard

Space



#

$

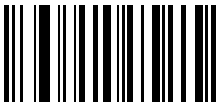


%

Alphanumeric Keyboard (continued)

*

+



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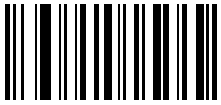
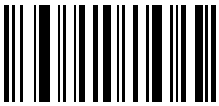
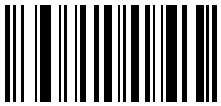


.



/



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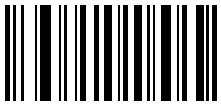
Alphanumeric Keyboard (continued)



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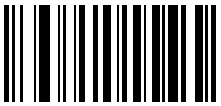
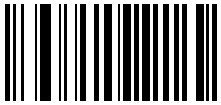


&



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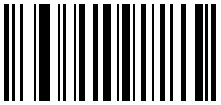

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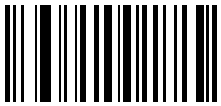

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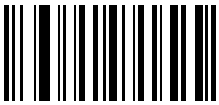
Alphanumeric Keyboard (continued)



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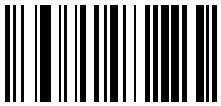

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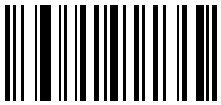

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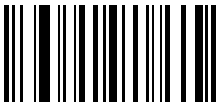

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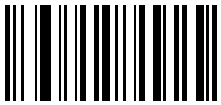
Alphanumeric Keyboard (continued)



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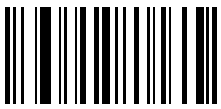

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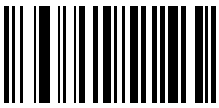


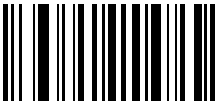
`

Alphanumeric Keyboard (continued)

NOTE The bar codes that follow should not be confused with those on the numeric keypad.

0

1



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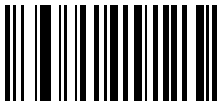
3

4

5

Alphanumeric Keyboard (continued)



6

7

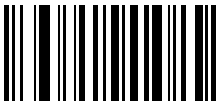
8

9

End of Message

Cancel

Alphanumeric Keyboard (continued)



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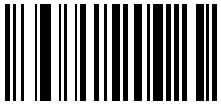

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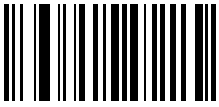
C

D



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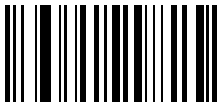
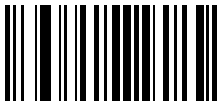


F

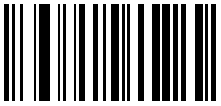
Alphanumeric Keyboard (continued)



G

H

I



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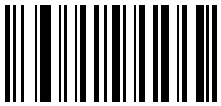
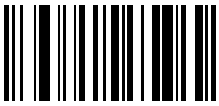


K

L

Alphanumeric Keyboard (continued)



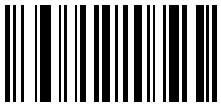
M

N

O

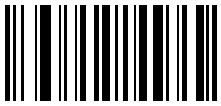
P

Q



R

Alphanumeric Keyboard (continued)



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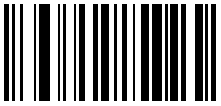
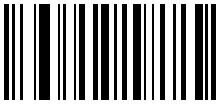


T

U



V

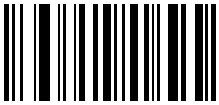
W

X

Alphanumeric Keyboard (continued)

Y

Z



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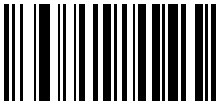
b



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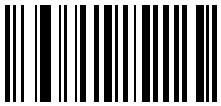
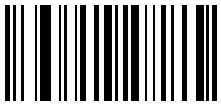
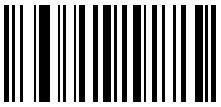


d

Alphanumeric Keyboard (continued)



e



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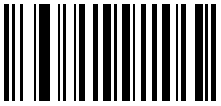
g



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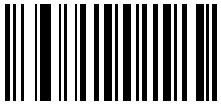

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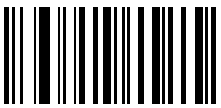
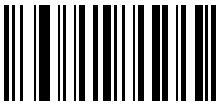


j

Alphanumeric Keyboard (continued)



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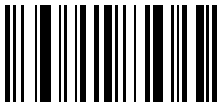

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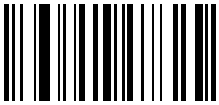

m

n

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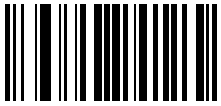
p

Alphanumeric Keyboard (continued)

q

r



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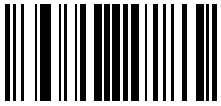
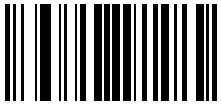


u

v

Alphanumeric Keyboard (continued)

w



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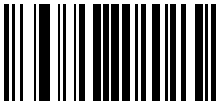

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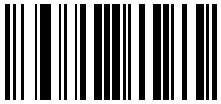

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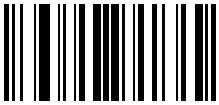

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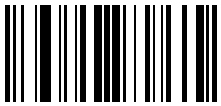
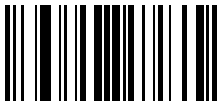


|

Alphanumeric Keyboard (continued)



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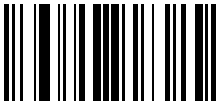

~

APPENDIX G ASCII CHARACTER SETS

Table G-1 *ASCII Value 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 non-bold keystroke is sent.

Table G-1 *ASCII Value 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	+
1044	/L	,

The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the non-bold keystroke is sent.

Table G-1 *ASCII Value Table (Continued)*

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
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
1072	H	H
1073	I	I

The keystroke in bold is sent only if the "Function Key Mapping" is enabled. Otherwise, the non-bold keystroke is sent.

Table G-1 *ASCII Value Table (Continued)*

ASCII Value	Full ASCII Code 39 Encode Character	Keystroke
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
1100	+D	d
1101	+E	e
1102	+F	f

The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the non-bold keystroke is sent.

Table G-1 *ASCII Value Table (Continued)*

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

The keystroke in bold is sent only if the “Function Key Mapping” is enabled. Otherwise, the non-bold keystroke is sent.

Table G-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 G-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 G-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
3056	GUI 8
3057	GUI 9

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 G-4 *GUI Shift Keys (Continued)*

Other Value	Keystroke
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

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 G-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 G-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

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

F Keys	Keystroke
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 G-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

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

Numeric Keypad	Keystroke
6057	9
6058	Enter
6059	Num Lock

Table G-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

INDEX

Numerics

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GLOSSARY

A

Aperture. The opening in an optical system defined by a lens or baffle that establishes the field of view.

API. An interface by means of which one software component communicates with or controls another. Usually used to refer to services provided by one software component to another, usually via software interrupts or function calls

Application Programming Interface. See **API**.

ASCII. American Standard Code for Information Interchange. A 7 bit-plus-parity code representing 128 letters, numerals, punctuation marks and control characters. It is a standard data transmission code in the U.S.

Autodiscrimination. The ability of an interface controller to determine the code type of a scanned bar code. After this determination is made, the information content is decoded.

B

Bar. The dark element in a printed bar code symbol.

Bar Code. A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a bar code symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format. See **Symbology**.

Bar Code Density. The number of characters represented per unit of measurement (e.g., characters per inch).

Bar Height. The dimension of a bar measured perpendicular to the bar width.

Bar Width. Thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

BIOS. Basic Input Output System. A collection of ROM-based code with a standard API used to interface with standard PC hardware.

Bit. Binary digit. One bit is the basic unit of binary information. Generally, eight consecutive bits compose one byte of data. The pattern of 0 and 1 values within the byte determines its meaning.

Bits per Second (bps). Bits transmitted or received.

Boot or Boot-up. The process a computer goes through when it starts. During boot-up, the computer can run self-diagnostic tests and configure hardware and software.

BOOTP. A protocol for remote booting of diskless devices. Assigns an IP address to a machine and may specify a boot file. The client sends a bootp request as a broadcast to the bootp server port (67) and the bootp server responds using the bootp client port (68). The bootp server must have a table of all devices, associated MAC addresses and IP addresses.

bps. See **Bits Per Second**.

Byte. On an addressable boundary, eight adjacent binary digits (0 and 1) combined in a pattern to represent a specific character or numeric value. Bits are numbered from the right, 0 through 7, with bit 0 the low-order bit. One byte in memory is used to store one ASCII character.

C

CDRH. Center for Devices and Radiological Health. A federal agency responsible for regulating laser product safety. This agency specifies various laser operation classes based on power output during operation.

CDRH Class 1. This is the lowest power CDRH laser classification. This class is considered intrinsically safe, even if all laser output were directed into the eye's pupil. There are no special operating procedures for this class.

CDRH Class 2. No additional software mechanisms are needed to conform to this limit. Laser operation in this class poses no danger for unintentional direct human exposure.

Character. A pattern of bars and spaces which either directly represents data or indicates a control function, such as a number, letter, punctuation mark, or communications control contained in a message.

Character Set. Those characters available for encoding in a particular bar code symbology.

Check Digit. A digit used to verify a correct symbol decode. The scanner inserts the decoded data into an arithmetic formula and checks that the resulting number matches the encoded check digit. Check digits are required for UPC but are optional for other symbologies. Using check digits decreases the chance of substitution errors when a symbol is decoded.

Codabar. A discrete self-checking code with a character set consisting of digits 0 to 9 and six additional characters: (- $: / , +).

Code 128. A high density symbology which allows the controller to encode all 128 ASCII characters without adding extra symbol elements.

Code 3 of 9 (Code 39). A versatile and widely used alphanumeric bar code symbology with a set of 43 character types, including all uppercase letters, numerals from 0 to 9 and 7 special characters (- . / + % $ and space). The code name is derived from the fact that 3 of 9 elements representing a character are wide, while the remaining 6 are narrow.

Code 93. An industrial symbology compatible with Code 39 but offering a full character ASCII set and a higher coding density than Code 39.

Code Length. Number of data characters in a bar code between the start and stop characters, not including those characters.

Cold Boot. A cold boot restarts the mobile computer and erases all user stored records and entries.

COM port. Communication port; ports are identified by number, e.g., COM1, COM2.

Continuous Code. A bar code or symbol in which all spaces within the symbol are parts of characters. There are no intercharacter gaps in a continuous code. The absence of gaps allows for greater information density.

Cradle. A cradle is used for charging the battery and for communicating with a host computer, and provides a storage place for the terminal when not in use.

D

Dead Zone. An area within a scanner's field of view, in which specular reflection may prevent a successful decode.

Decode. To recognize a bar code symbology (e.g., UPC/EAN) and then analyze the content of the specific bar code scanned.

Decode Algorithm. A decoding scheme that converts pulse widths into data representation of the letters or numbers encoded within a bar code symbol.

Decryption. Decryption is the decoding and unscrambling of received encrypted data. Also see, **Encryption** and **Key**.

Depth of Field. The range between minimum and maximum distances at which a scanner can read a symbol with a certain minimum element width.

Discrete 2 of 5. A binary bar code symbology representing each character by a group of five bars, two of which are wide. The location of wide bars in the group determines which character is encoded; spaces are insignificant. Only numeric characters (0 to 9) and START/STOP characters may be encoded.

Discrete Code. A bar code or symbol in which the spaces between characters (intercharacter gaps) are not part of the code.

DRAM. Dynamic random access memory.

E

EAN. European Article Number. This European/International version of the UPC provides its own coding format and symbology standards. Element dimensions are specified metrically. EAN is used primarily in retail.

Element. Generic term for a bar or space.

Encoded Area. Total linear dimension occupied by all characters of a code pattern, including start/stop characters and data.

ENQ (RS-232). ENQ software handshaking is also supported for the data sent to the host.

ESD. Electro-Static Discharge

F

Flash Disk. An additional megabyte of non-volatile memory for storing application and configuration files.

Flash Memory. Flash memory is responsible for storing the system firmware and is non-volatile. If the system power is interrupted the data is not be lost.

FTP. See **File Transfer Protocol**.

H

Hard Reset. See **Cold Boot**.

Host Computer. A computer that serves other terminals in a network, providing such services as computation, database access, supervisory programs and network control.

Hz. Hertz; A unit of frequency equal to one cycle per second.

I

IDE. Intelligent drive electronics. Refers to the solid-state hard drive type.

IEC. International Electrotechnical Commission. This international agency regulates laser safety by specifying various laser operation classes based on power output during operation.

IEC60825-1 Class 1. This is the lowest power IEC laser classification. Conformity is ensured through a software restriction of 120 seconds of laser operation within any 1000 second window and an automatic laser shutdown if the scanner's oscillating mirror fails.

IEEE Address. See **MAC Address**.

Input/Output Ports. I/O ports are primarily dedicated to passing information into or out of the terminal’s memory. Series 9000 mobile computers include Serial and USB ports.

Intellistand. The Intellistand holds a scanner to use in hands-free mode. When a scanner is seated correctly in the stand “cup,” the scanner’s built-in sensor places the scanner in hands-free mode to automatically decode bar codes moved into the scan area. When you remove the scanner from the stand it operates in its normal hand-held mode.

Intercharacter Gap. The space between two adjacent bar code characters in a discrete code.

Interleaved 2 of 5. A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

Interleaved Bar Code. A bar code in which characters are paired together, using bars to represent the first character and the intervening spaces to represent the second.

Interleaved 2 of 5. A binary bar code symbology representing character pairs in groups of five bars and five interleaved spaces. Interleaving provides for greater information density. The location of wide elements (bar/spaces) within

each group determines which characters are encoded. This continuous code type uses no intercharacter spaces. Only numeric (0 to 9) and START/STOP characters may be encoded.

I/O Ports. interface The connection between two devices, defined by common physical characteristics, signal characteristics, and signal meanings. Types of interfaces include RS-232 and PCMCIA.

IOCTL. Input/Output Control.

IP Address. (Internet Protocol address) The address of a computer attached to an IP network. Every client and server station must have a unique IP address. A 32-bit address used by a computer on a IP network. Client workstations have either a permanent address or one that is dynamically assigned to them each session. IP addresses are written as four sets of numbers separated by periods; for example, 204.171.64.2.

IPX/SPX. Internet Package Exchange/Sequential Packet Exchange. A communications protocol for Novell. IPX is Novell's Layer 3 protocol, similar to XNS and IP, and used in NetWare networks. SPX is Novell's version of the Xerox SPP protocol.

IS-95. Interim Standard 95. The EIA/TIA standard that governs the operation of CDMA cellular service. Versions include IS-95A and IS-95B. See CDMA.

K

Key. A key is the specific code used by the algorithm to encrypt or decrypt the data. Also see, **Encryption** and **Decrypting**.

L

LASER. Light Amplification by Stimulated Emission of Radiation.The laser is an intense light source. Light from a laser is all the same frequency, unlike the output of an incandescent bulb. Laser light is typically coherent and has a high energy density.

Laser Diode. A gallium-arsenide semiconductor type of laser connected to a power source to generate a laser beam. This laser type is a compact source of coherent light.

Laser Scanner. A type of bar code reader that uses a beam of laser light.

LCD. See **Liquid Crystal Display**.

LED Indicator. A semiconductor diode (LED - Light Emitting Diode) used as an indicator, often in digital displays. The semiconductor uses applied voltage to produce light of a certain frequency determined by the semiconductor's particular chemical composition.

Light Emitting Diode. See **LED**.

Liquid Crystal Display (LCD). A display that uses liquid crystal sealed between two glass plates. The crystals are excited by precise electrical charges, causing them to reflect light outside according to their bias. They use little electricity and react relatively quickly. They require external light to reflect their information to the user.

M

MIL. 1 1 mil = 1 thousandth of an inch.

Misread (Misdecode). A condition which occurs when the data output of a reader or interface controller does not agree with the data encoded within a bar code symbol.

N

Nominal. The exact (or ideal) intended value for a specified parameter. Tolerances are specified as positive and negative deviations from this value.

Nominal Size. Standard size for a bar code symbol. Most UPC/EAN codes are used over a range of magnifications (e.g., from 0.80 to 2.00 of nominal).

NVM. Non-Volatile Memory.

O

ODI. See **Open Data-Link Interface**.

Open Data-Link Interface (ODI). Novell's driver specification for an interface between network hardware and higher-level protocols. It supports multiple protocols on a single NIC (Network Interface Controller). It is capable of understanding and translating any network information or request sent by any other ODI-compatible protocol into something a NetWare client can understand and process.

Open System Authentication. Open System authentication is a null authentication algorithm.

P

Parameter. A variable that can have different values assigned to it.

PC Card. A plug-in expansion card for laptop computers and other devices, also called a PCMCIA card. PC Cards are 85.6mm long x 54 mm wide, and have a 68 pin connector. There are several different kinds:

- Type I; 3.3 mm high; use - RAM or Flash RAM
- Type II; 5 mm high; use - modems, LAN adaptors
- Type III; 10.5 high; use - Hard Disks

PCMCIA. Personal Computer Memory Card Interface Association. See **PC Card**.

Percent Decode. The average probability that a single scan of a bar code would result in a successful decode. In a well-designed bar code scanning system, that probability should approach near 100%.

PING. (Packet Internet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

Presentation Mode. Typically used when the digital scanner sits on a counter top or is mounted on a wall, in this mode, the digital scanner operates in continuous (constant-on) mode, where it automatically decodes a bar code presented in its field of view.

Print Contrast Signal (PCS). Measurement of the contrast (brightness difference) between the bars and spaces of a symbol. A minimum PCS value is needed for a bar code symbol to be scannable. PCS = (RL - RD) / RL, where RL is the reflectance factor of the background and RD the reflectance factor of the dark bars.

Programming Mode. The state in which a scanner is configured for parameter values. See **Scanning Mode**.

Q

Quiet Zone. A clear space, containing no dark marks, which precedes the start character of a bar code symbol and follows the stop character.

QWERTY. A standard keyboard commonly used on North American and some European PC keyboards. “QWERTY” refers to the arrangement of keys on the left side of the third row of keys.

R

RAM. Random Access Memory. Data in RAM can be accessed in random order, and quickly written and read.

Reflectance. Amount of light returned from an illuminated surface.

Resolution. The narrowest element dimension which is distinguished by a particular reading device or printed with a particular device or method.

RF. Radio Frequency.

ROM. Read-Only Memory. Data stored in ROM cannot be changed or removed.

Router. A device that connects networks and supports the required protocols for packet filtering. Routers are typically used to extend the range of cabling and to organize the topology of a network into subnets. See **Subnet**.

RS-232. An Electronic Industries Association (EIA) standard that defines the connector, connector pins, and signals used to transfer data serially from one device to another.

S

Scan Area. Area intended to contain a symbol.

Scanner. An electronic device used to scan bar code symbols and produce a digitized pattern that corresponds to the bars and spaces of the symbol. Its three main components are: 1) Light source (laser or photoelectric cell) - illuminates a bar code,; 2) Photodetector - registers the difference in reflected light (more light reflected from spaces); 3) Signal conditioning circuit - transforms optical detector output into a digitized bar pattern.

Scanning Mode. The scanner is energized, programmed and ready to read a bar code.

Scanning Sequence. A method of programming or configuring parameters for a bar code reading system by scanning bar code menus.

SDK. Software Development Kit

Self-Checking Code. A symbology that uses a checking algorithm to detect encoding errors within the characters of a bar code symbol.

Shared Key. Shared Key authentication is an algorithm where both the AP and the MU share an authentication key.

SHIP. Symbol Host Interface Program.

SID. System Identification code. An identifier issued by the FCC for each market. It is also broadcast by the cellular carriers to allow cellular devices to distinguish between the home and roaming service.

Soft Reset. See **Warm Boot**.

Space. The lighter element of a bar code formed by the background between bars.

Specular Reflection. The mirror-like direct reflection of light from a surface, which can cause difficulty decoding a bar code.

Standard Trigger Mode. The digital scanner uses this mode when lifted off the counter or removed from the wall mount. In this mode, aim the digital scanner at a bar code and pull the trigger to decode.

Start/Stop Character. A pattern of bars and spaces that provides the scanner with start and stop reading instructions and scanning direction. The start and stop characters are normally to the left and right margins of a horizontal code.

STEP. Symbol Terminal Enabler Program.

Subnet. A subset of nodes on a network that are serviced by the same router. See **Router**.

Subnet Mask. A 32-bit number used to separate the network and host sections of an IP address. A custom subnet mask subdivides an IP network into smaller subsections. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets. Default is often 255.255.255.0.

Substrate. A foundation material on which a substance or image is placed.

SVTP. Symbol Virtual Terminal Program.

Symbol. A scannable unit that encodes data within the conventions of a certain symbology, usually including start/stop characters, quiet zones, data characters and check characters.

Symbol Aspect Ratio. The ratio of symbol height to symbol width.

Symbol Height. The distance between the outside edges of the quiet zones of the first row and the last row.

Symbol Length. Length of symbol measured from the beginning of the quiet zone (margin) adjacent to the start character to the end of the quiet zone (margin) adjacent to a stop character.

Symbology. The structural rules and conventions for representing data within a particular bar code type (e.g. UPC/EAN, Code 39, PDF417, etc.).

T

TCP/IP. (Transmission Control Protocol/Internet Protocol) A communications protocol used to internetwork dissimilar systems. This standard is the protocol of the Internet and has become the global standard for communications. TCP provides transport functions, which ensures that the total amount of bytes sent is received correctly at the other end. UDP is an alternate transport that does not guarantee delivery. It is widely used for real-time voice and video transmissions where erroneous packets are not retransmitted. IP provides the routing mechanism. TCP/IP is a routable protocol, which means that all messages contain not only the address of the destination station, but the address of a destination network. This allows TCP/IP messages to be sent to multiple networks within an organization or around the world, hence its use in the worldwide Internet. Every client and server in a TCP/IP network requires an IP address, which is either permanently assigned or dynamically assigned at startup.

Telnet. A terminal emulation protocol commonly used on the Internet and TCP/IP-based networks. It allows a user at a terminal or computer to log onto a remote device and run a program.

Terminal Emulation. A “terminal emulation” emulates a character-based mainframe session on a remote non-mainframe terminal, including all display features, commands and function keys. The VC5000 Series supports Terminal Emulations in 3270, 5250 and VT220.

Terminate and Stay Resident (TSR). A program under DOS that ends its foreground execution to remain resident in memory to service hardware/software interrupts, providing background operation. It remains in memory and may provide services on behalf of other DOS programs.

TFTP. (Trivial File Transfer Protocol) A version of the TCP/IP FTP (File Transfer Protocol) protocol that has no directory or password capability. It is the protocol used for upgrading firmware, downloading software and remote booting of diskless devices.

Tolerance. Allowable deviation from the nominal bar or space width.

Transmission Control Protocol/Internet Protocol. See **TCP/IP.**

Trivial File Transfer Protocol. See **TFTP.**

TSR. See **Terminate and Stay Resident**.

U

UDP. User Datagram Protocol. A protocol within the IP protocol suite that is used in place of TCP when a reliable delivery is not required. For example, UDP is used for real-time audio and video traffic where lost packets are simply ignored, because there is no time to retransmit. If UDP is used and a reliable delivery is required, packet sequence checking and error notification must be written into the applications.

UPC. Universal Product Code. A relatively complex numeric symbology. Each character consists of two bars and two spaces, each of which is any of four widths. The standard symbology for retail food packages in the United States.

V

Visible Laser Diode (VLD). A solid state device which produces visible laser light.

W

Warm Boot. A warm boot restarts the mobile computer by closing all running programs. All data that is not saved to flash memory is lost.

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