

MS4717

Fixed Mount Imager



**Integration Guide
Draft V1.0**



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Revision History

Changes to the original guide are listed below:

Change	Date	Description
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About This Guide

Introduction

The MS4717 Fixed Mount Imager Integration Guide provides general instructions for mounting, setting up, and programming.



NOTE: Screens and windows pictured in this guide are samples and may differ from actual screens.

Chapter Descriptions

Topics covered in this guide are as follows:

- [Getting Started](#) provides general information about the MS4717, including its features and theory of operation.
- [123Scan](#) describes the Zebra software tools available for customizing imager operation.
- [Installation](#) provides information on mounting and installing the fixed mount engine.
- [Scanning](#) provides information on aiming, illumination, data capture, beeper and decode LED feedback, supported symbologies, and operating modes.
- [Specifications](#) provides specification details and decode ranges.
- [Maintenance and Troubleshooting](#) provides information on maintenance and troubleshooting.
- [User Preferences](#) describes each user preference feature and provides the programming barcodes necessary for selecting these features.
- [Imager Preferences](#) describes scanner preference features and provides the programming barcodes for selecting these features.
- [USB Interface](#) provides instructions for programming the imager to interface with a USB host.
- [Symbologies](#) describes symbology features and provides the programming barcodes for selecting these features.

Notational Conventions

The following conventions are used in this document:

- “Imager” refers to the MS4717 fixed mount imager.
- 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.

Related Documents

The following documents provide more information about the imager.

- MS4717 Fixed Mount Imager Quick Reference Guide (p/n MN-003368-xx).

For the latest version of these guides and software, visit: www.zebra.com/support.

Service Information

If you have a problem using the equipment, contact your facility's technical or systems support. If there is a problem with the equipment, they will contact the Zebra Global Customer Support Center at: www.zebra.com/support.

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

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

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

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

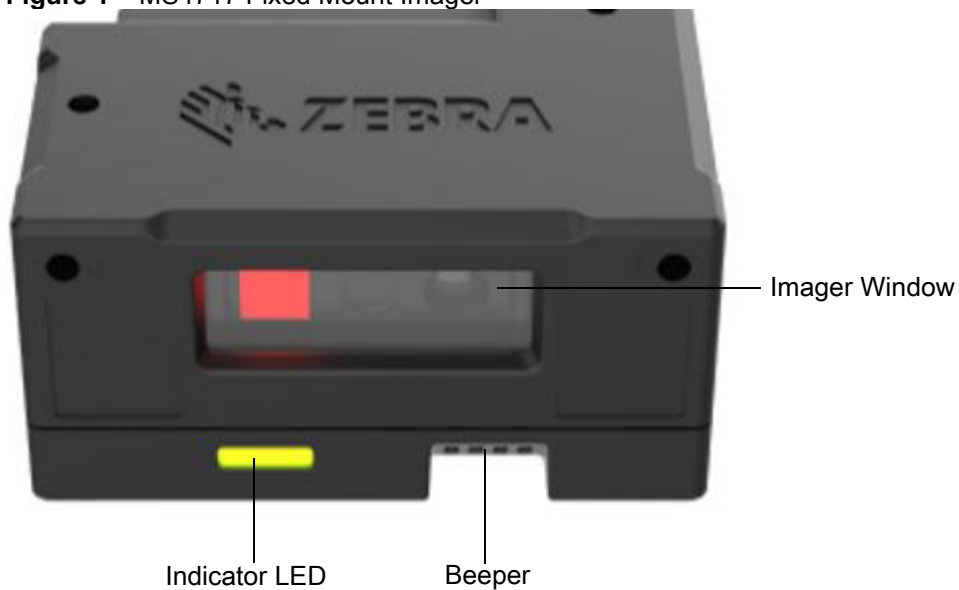
Getting Started

Introduction

The MS4717 fixed mount imager is specifically designed to be mounted into various enclosures such as the food ordering kiosk in the quick-serve restaurant, to the ticketing kiosk at the airport or amusement park. The imager provides an easy and flexible integration into most USB host devices and offers high performance scanning on both 1D and 2D barcodes.

This integration guide includes programming parameters and describes the theory of operation, installation, specifications, and configuration.

Figure 1 MS4717 Fixed Mount Imager



MS4717 Features

- Quick and easy integration for OEM devices
- Excellent imaging performance on all 1D and 2D barcodes
- USB interface
- LEDs indicating power status and successful decodes
- Easy programming and configuration
- Flexible mounting options

Theory of Operation

During image capture:

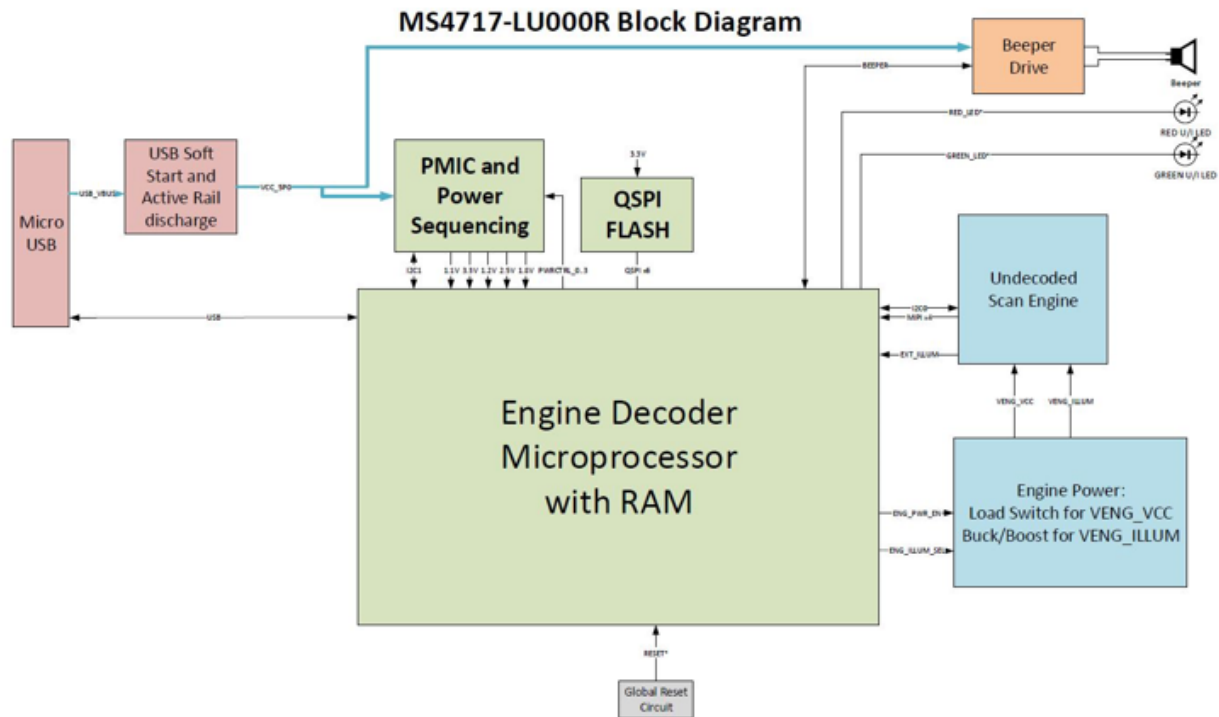
1. The image sensor array in the embedded imaging engine captures an image of the barcode through the engine's optical lens. If necessary, the engine automatically adjusts illumination, exposure, and other parameters to obtain the best quality image.
2. The imaging engine sends the image to the MS4717 CPU.
3. The MS4717 CPU processes the image to identify the target barcode(s), decodes them, and transmits the decoded data to the host.

Set various parameters provided in this guide to adjust the performance of the MS4717 to match the application or desired usage profile.

Block Diagram

The MS4717 scanner block diagram illustrates the functional relationship of the MS4717 components. This section also provides a description of each component in the block diagrams.

Figure 2 MS4717 Block Diagram



MS4717 Block Diagram Descriptions

Scan Engine - The imaging engine captures 8-bit gray scale WVGA images at up to 30 fps, which are sent uncompressed to a companion board for processing. The engine uses a red LED for intuitive aiming and features LED illumination.

Decoder Interface - The decoder board is a companion decoder module for the imaging engine, which controls the engine, receives images, decodes 1D and 2D symbologies, and performs various image processing tasks. The board controls red and green LEDs for visual feedback, and supports SNAPI (Symbol Native API) as well as USB HID Keyboard through a micro USB connector. The micro USB connector provides an outlet for the various interface signals used between the MS4717 and the host.

MS4717 Decoder/Interface Board

Power Management

- **USB Host Interface** - The MS4717 automatically manages its power usage, including USB suspend mode. Additionally, when drawing power from the USB bus, the MS4717 does not exceed the USB limit of 500 mA.

123Scan

Introduction

This chapter briefly describes the Zebra software tools available for customizing scanner operation.

123Scan

123Scan is a software tool that simplifies scanner setup and more.

Intuitive enough for first time users, the 123Scan wizard guides users through a streamlined setup process. Settings are saved in a configuration file that can be printed as a single programming barcode for scanning, emailed to a smart phone for scanning from its screen, or downloaded to the scanner using a USB cable.

Through 123Scan a user can:

- Configure a scanner using a wizard.
 - Program the following scanner settings.
 - Beeper tone / volume settings.
 - Enable / disable symbologies.
 - Communication settings.
 - Modify data before transmission to a host using Advanced Data Formatting (ADF).
- Load parameter settings to a scanner via the following.
 - Barcode scanning.
 - Scan a paper barcode.
 - Scan a barcode from a PC screen.
 - Scan a barcode from a smart phone screen.
 - Download over a USB cable.
 - Load settings to one scanner.
 - Stage up to 10 scanners simultaneously (Powered USB Hub recommended with 0.5 amp / port).
- Validate scanner setup.
 - View scanned data within the utility's **Data** view screen.
 - Capture an image and save to a PC within the utility's **Data** view screen.
 - Review settings using the Parameter Report.
 - Clone settings from an already deployed scanner from the **Start** screen.
- Upgrade scanner firmware.
 - Load settings to one scanner.
 - Stage up to 10 scanners simultaneously (Powered USB Hub recommended with 0.5 amp / port).

- View statistics such as:
 - Asset tracking information.
 - Time and usage information.
 - Barcodes scanned by symbology.
 - Battery diagnostics (select scanners).
- Generate the following reports.
 - Barcode Report - Programming barcode, included parameter settings, and supported scanner models.
 - Parameter Report - Parameters programmed within a configuration file.
 - Inventory Report - Scanner asset tracking information.
 - Validation Report - Scanned data from the **Data** view.
 - Statistics Report - All statistics retrieved from the scanner.

For more information go to: <http://www.zebra.com/123Scan>.

Communication with 123Scan

Use a USB cable to connect the scanner to a Windows host computer running 123Scan.

123Scan Requirements

- Host computer running Windows XP, 7, 8, and 10
- Scanner
- USB cable.

123Scan Information

For more information on 123Scan, go to: <http://www.zebra.com/123Scan>

For a 1 minute tour of 123Scan, go to: <http://www.zebra.com/ScannerHowToVideos>

To see a list of all of our software tools, go to: <http://www.zebra.com/scannersoftware>

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 following free tools, go to: <http://www.zebra.com/scannersoftware>.

- 123Scan configuration utility
- SDKs
 - Scanner SDK for Windows
 - Scanner SDK for Linux
 - Scanner SDK for Android
 - Scanner SDK for iOS
- Drivers
 - OPOS driver
 - JPOS driver
 - USB CDC driver
 - TWAIN driver
- Scanner Management Service (SMS) for Remote Management
 - Windows
 - Linux
- Mobile Apps
 - Scanner Control App
 - Android
 - iOS
 - Zebra AppGallery
 - Scan-To-Connect Utility
 - Android
 - Windows
- How-To-Videos

Advanced Data Formatting (ADF)

Advanced Data Formatting (ADF) allows customizing data before transmission to the host device. Use ADF to edit scanned data to suit the host application's requirements. With ADF you scan one barcode per trigger pull. ADF is programmed using 123Scan.

For a video on Creating an Advanced Data Formatting (ADF) Rule using 123Scan, go to: <http://www.zebra.com/ScannerHowToVideos>.

For additional information, refer to the Advanced Data Formatting Programmer Guide.

Installation

Introduction

This chapter provides information on mounting and installing the imager.

Mounting

The following figures provide the mounting dimensions.



NOTE: Do not use screws that penetrate more than 5 mm into the bottom mousing of the MS4717 since this is the maximum depth of the useful thread.

MS4717 Mounting Dimensions

Figure 3 Mounting Dimensions (Left Side View)

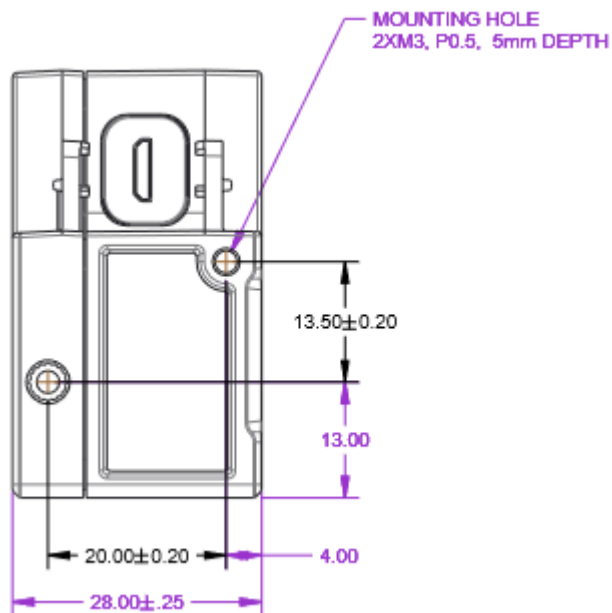


Figure 4 MS4717 Mounting Dimensions (Overhead View)

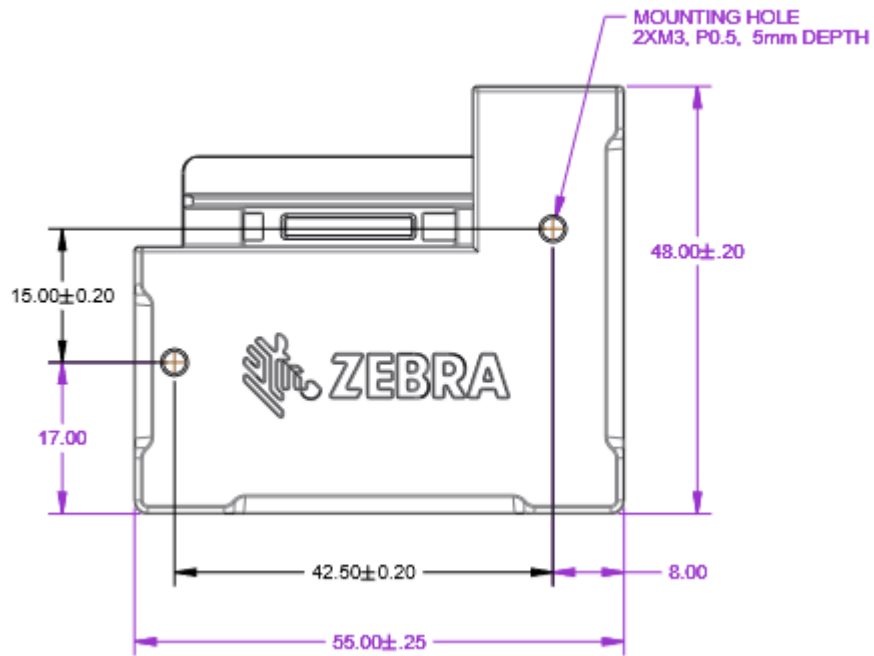


Figure 5 MS4717 Mounting Dimensions (Right Side View)

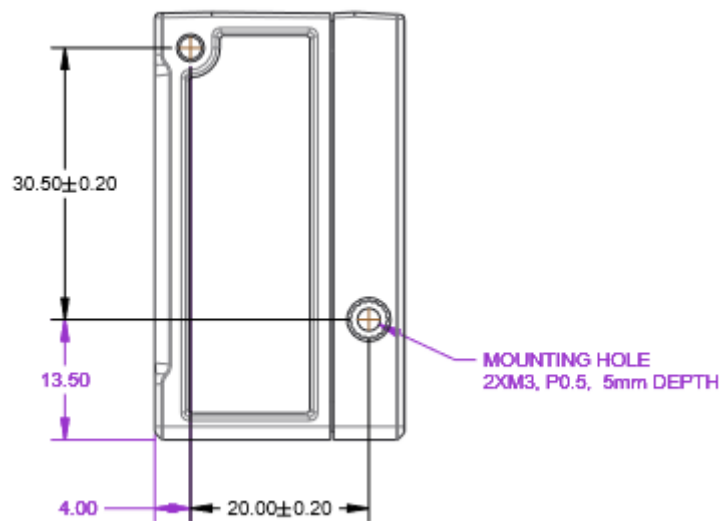
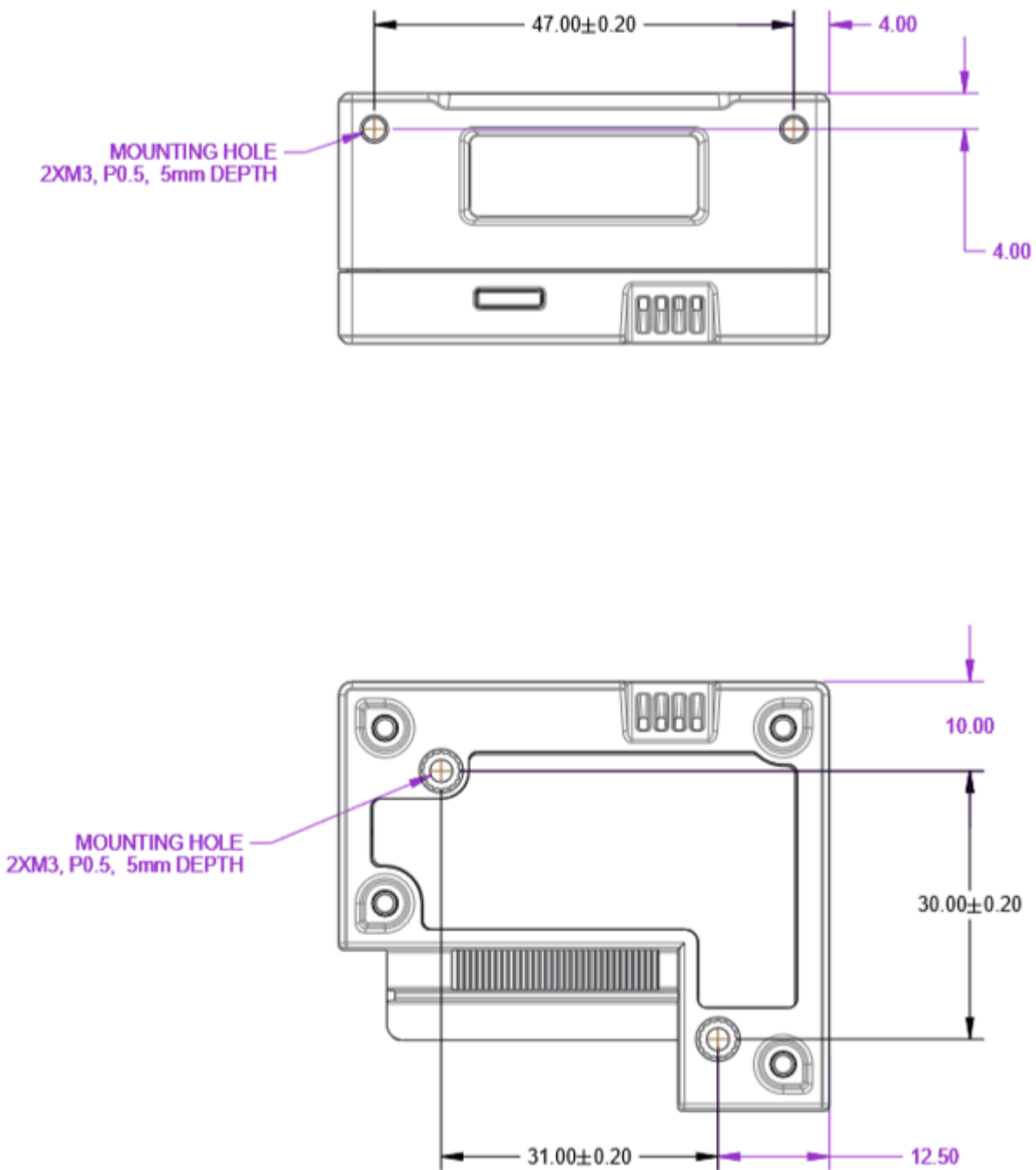


Figure 6 MS4717 Mounting Dimensions

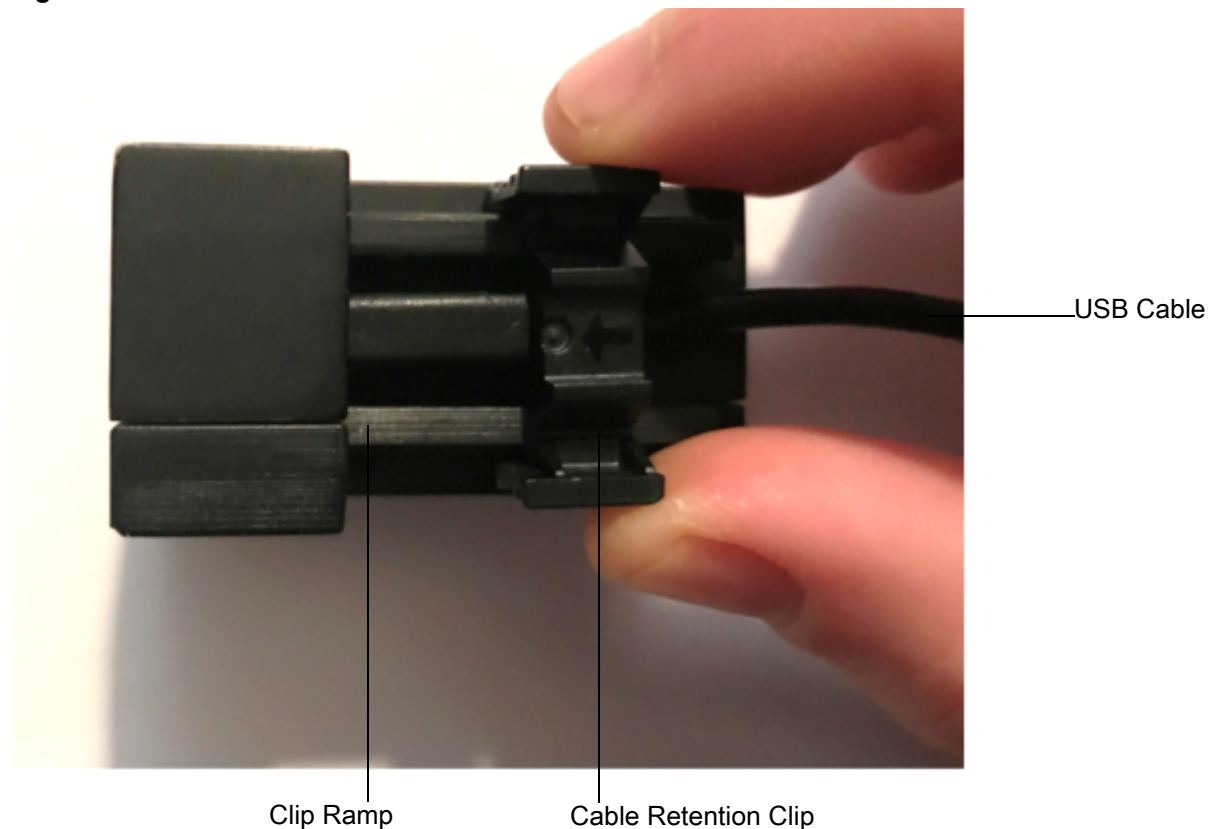


Connecting the MS4717

USB Host Connection

1. Unpack the imager.
2. Remove cable retention clip by lightly pinching the sides of the cable retention clip and sliding away from the device.
3. Plug USB cable into the device.
4. Place cable retention clip over the USB cable and attach to the MS4717 by pinching the sides of the clip slightly, using the arrows on the clip (pointing towards device) as a guide until secure.
5. Plug the USB series A into the appropriate port on the host.
6. Check all connections to ensure they are secure.
7. The green power LED illuminates upon connecting and powering on host.

Figure 7 USB Connection



NOTE: It is recommended that a Zebra USB cable is used for installation (p/n = 25-124330-01R). If other USB cables used must be compatible with current USB.org requirements.



Please refer to USB.org connectors and compliance documentation for more information found here:

<https://www.usb.org/document-library/usb-type-c-connectors-and-cable-assemblies-compliance-document-v12>

Accessories

Zebra offers additional accessories for the MS4717 through Solution Builder (ordering guide), it is recommended that this tool is used to order any accessories.



NOTE: To ensure that the USB cable will fit properly with the cable retention clip, it is recommended that the connector shell size does not exceed 11.5 mm (w) and 8.7 mm (thickness). The width cannot exceed 12.5 w and 10.5 thickness. The cable connector shell length cannot exceed 17 mm.

Location and Positioning

The location and positioning guidelines do not consider unique application characteristics. Zebra recommends that an opto-mechanical engineer perform an opto-mechanical analysis prior to integration.



NOTE: Integrate the imager in an environment that is not more extreme than the product's specification, where the imager will not exceed its temperature range. For instance, do not mount the scanner onto or next to a large heat source. When placing the imager with another device, ensure there is proper convection or venting for heat. Follow these suggestions to ensure product longevity, warranty, and overall satisfaction with the scanner.

Embedded Applications Requiring a Window

Use the following guidelines for applications that require a window in front of the MS4717.



NOTE: Zebra does not recommend placing an exit window in front of the MS4717; however, the following information is provided for applications that require such a window.

Window Material

Many window materials that look clear can contain stresses and distortions that reduce performance. For this reason, use only cell-cast plastics or optical glass (with or without an anti reflection coating, depending on the application). Following are descriptions of three popular window materials: PMMA, ADC (CR-39™), and chemically tempered glass. [Table 3-1](#) outlines the suggested window properties.

Table 3-1 *Suggested Window Properties*

Property	Description
Thickness	Typically 0.03 - 0.06 in. (0.7 - 1.5 mm)
Wavefront Distortion (transmission)	0.2 wavelengths peak-to-valley maximum and 0.04 λ maximum rms over any 0.08 in. diameter within the clear aperture
Clear Aperture	To extend to within 0.04 in. of the edges all around
Surface Quality	60-20 scratch/dig

When using plastic materials pay extra attention to the wave front distortion recommendation specified above. Plastic materials are not recommended for tilted windows since surface scratches cause image artifacts. Colored windows are not recommended if motion detection mode is required since it reduces engine sensitivity to the moving target.

Cell Cast Acrylic (ASTM: PMMA)

Cell Cast Acrylic, or Poly-methyl Methacrylic (PMMA) is fabricated by casting acrylic between two precision sheets of glass. This material has very good optical quality, reasonably good impact resistance and low initial cost, but is relatively soft and susceptible to attack by chemicals, mechanical stresses, and UV light. Therefore polysiloxane coating is strongly recommended. Acrylic can be laser cut into odd shapes and ultrasonically welded.

Cell Cast ADC (ASTM: ADC)

Also known as CR-39™, Allyl Diglycol Carbonate (ADC) is a thermal-setting plastic produced by cell-casting. Most plastic eyeglasses sold today are uncoated, cell-cast CR-39. This material has excellent chemical and environmental resistance, and reasonably good impact resistance. It also has quite good surface hardness, and therefore does not have to be hard-coated, but may be coated for severe environments. This material cannot be ultrasonically welded.

Chemically Tempered Glass

Glass is a hard material that provides excellent scratch and abrasion resistance. However, unannealed glass is brittle. Increasing flexibility strength with minimal optical distortion requires chemical tempering. Glass cannot be ultrasonically welded and is difficult to cut into odd shapes.

Commercially Available Coatings

Anti-Reflection Coatings

Anti-reflection coatings can be used for stray light control or to achieve maximum working range, and can be applied to the inside and/or outside of the window to reduce the amount of light reflected off the window back into the engine. However, they are expensive and have very poor abrasion and scratch resistance.

Polysiloxane Coating

Polysiloxane type coatings are applied to plastic surfaces to improve the surface resistance to both scratch and abrasion. To apply, dip and air dry in an oven with filtered hot air.

To gauge a window's durability, use ASTM standard D1044, Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion (the Taber Test), which quantifies abrasion resistance as a percent increase in haze after a specified number of cycles and load. Lower values of the increase in haze correspond to better abrasion and scratch resistance. See [Table 3-2](#).

Table 3-2 *Taber Test Results on Common Exit Window Materials*

Sample	Haze 100 cycles	Haze 500 cycles	Abrasion Resistance
Chemically Tempered Glass	1.20%	1.50%	Best
PMMA with Polysiloxane Hardcoat	3%	10%	
ADC	5%	30%	
PMMA	30%		Worst
* All measurements use a 100 gram load and CS-10F Abraser.			

A Word About Coatings

If using an anti-reflective (AR) coating, the specifications in [Table 3-3](#) apply. Polysiloxane coating is not required. Recess the exit window to minimize scratches and digs.

Table 3-3 *AR Coatings Specifications*

Specification	Description
Material	Both tempered glass and plastic (e.g., CR-39 or hard coated acrylic) exit windows can be AR coated. AR coated glass is easier and more durable because of a better adhesion property on the glass structure. In addition, it can be more cost effective to put an AR coating on the glass substrate rather than on the plastic.
AR Coating Specification	- Single side AR-coating: 92% minimum transmittance within spectrum range from 420 nm to 730 nm. - Double side AR-coating: 97% minimum transmittance within spectrum range from 420 nm to 730 nm. - For parallel windows, see Figure 9 on page 18.

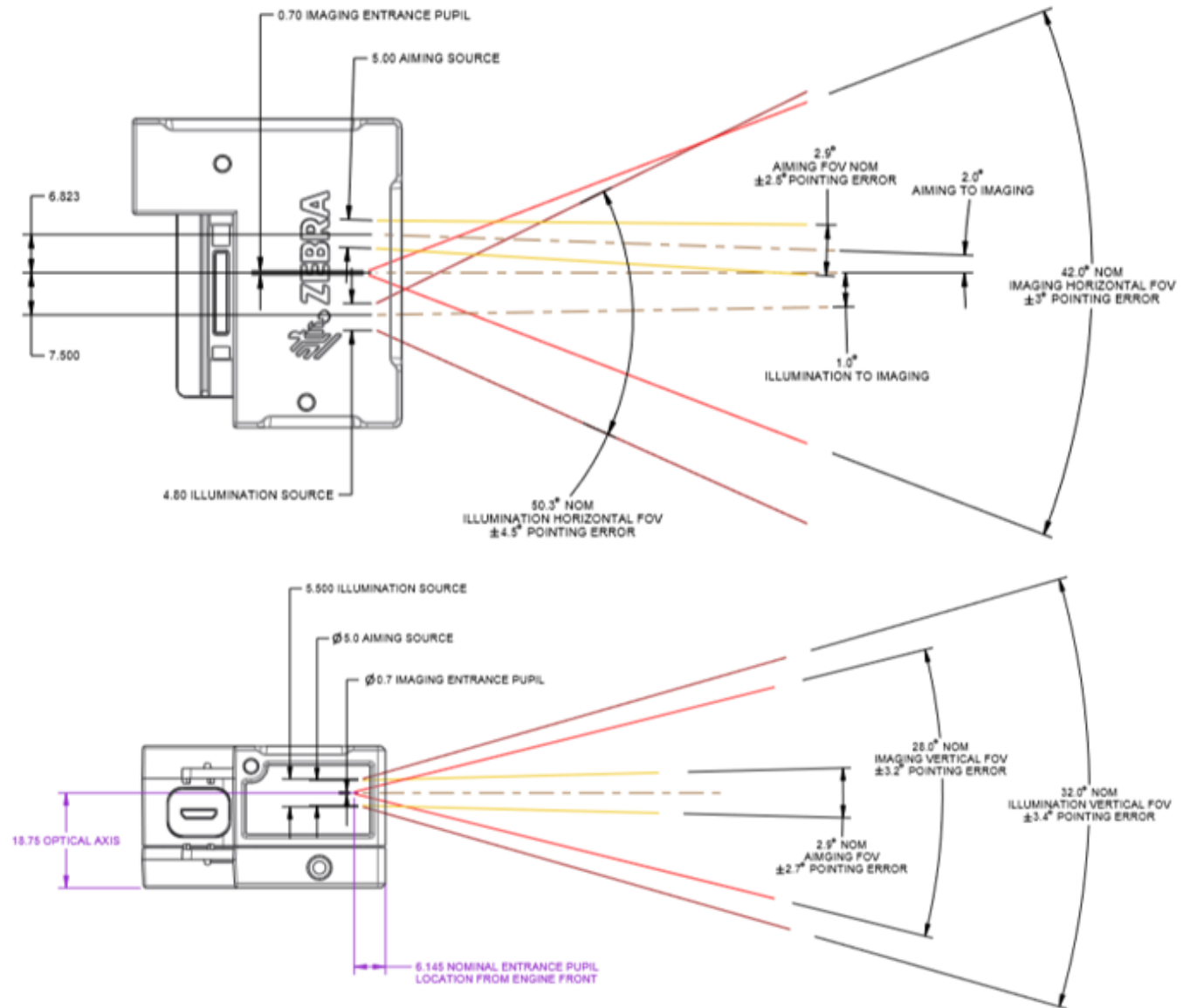
Embedded Window Angle and Position

If you are placing a window between the MS4717 and the target, observe the following guidelines:

- **Window Clear Opening** - Make the clear opening of the window large enough so that the entire imager clear aperture passes through the window. Cutting off any part of the clear aperture can degrade decode range performance. Ensure that window placement relative to the MS4717 accounts for tolerances on all parts involved in that assembly.
- **Window Angle** - Minimum window tilt is indicated in [Table 4](#). Further tilting the window is acceptable and decreases the possibility of a secondary reflection from that window degrading the scanner's performance.
- **Minimum Window Distance** - (TBD)
- **Optical Working Range** - Adding a window can reduce the working range of the scanner since there is a signal loss when passing through window material. To minimize this reduction, use a special coating described in [A Word About Coatings on page 15](#). To understand the difference, test the scanner in the desired orientation and see if the difference affects scanner performance.

Optical Path

Figure 8 MS4717 Optical Path and Exit Window



Notes:

1. Imaging axis pointing tolerance vs. datums ABC:
± 3° horizontal; ± 3.2° vertical
2. Clipping the scanner clear aperture is not permitted.
3. Dimensions are in mm.

Recommended Exit Window Information

Figure 9 Exit Window Distance Information

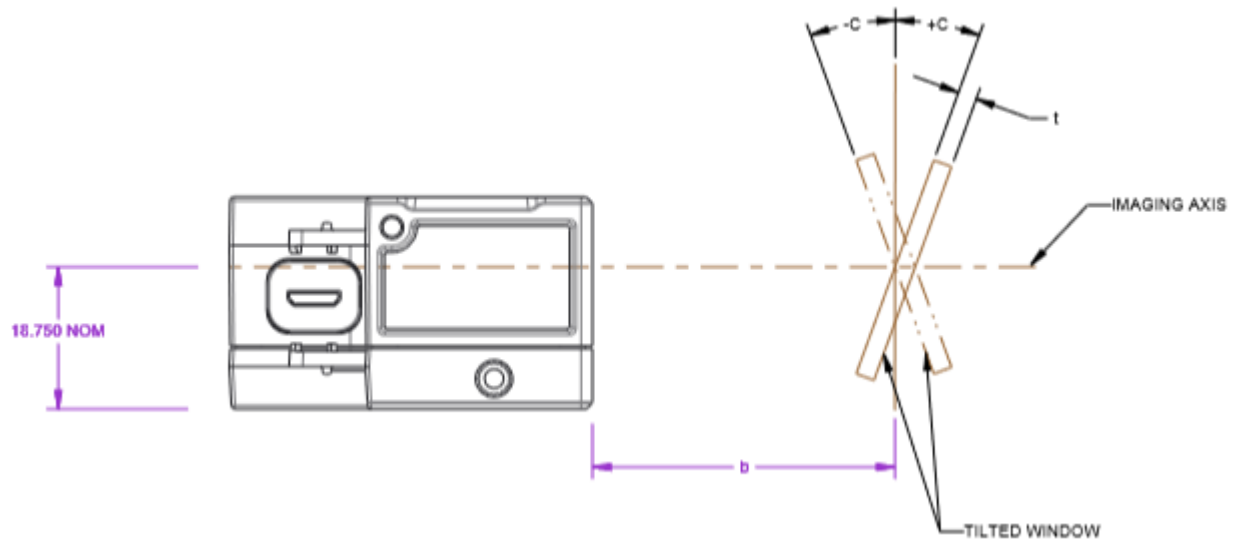


Table 4 Recommended Exit Window Information - Tilted Window

External Window Specification	Minimum Window Angle
Non-coated, minimum window positive tilt (+c)	TBD
Non-coated, minimum window negative tilt (-c)	TBD
AR coated, one side, minimum window positive tilt (+c)	TBD
AR coated, one side, minimum window negative tilt (-c)	TBD
AR coated, two sides, minimum window positive tilt (+c)	TBD
AR coated, two sides, minimum window negative tilt (-c)	TBD

Exit Window Notes

- Integration tolerances are not included.
- Ensure the window size is large enough to cover the engine clear aperture plus mounting tolerances of the window relative to the engine.

Zebra SNAPI Software Developer's Kit

The Symbol Native Application Programming Interface Software Development Kit (SNAPI SDK) facilitates communicate with SNAPI-based Zebra scanners over USB, providing the following features:

- Barcode capture and decode
- Image and video capture
- Electronic scanner configuration and software update
- Reference sample application in Microsoft Visual C#[®] .NET.

To download the SDK, go to: www.zebra.com/support.

Scanning

Introduction

This chapter provides information on aiming, illumination, data capture, beeper and decode LED feedback, supported symbologies, and operating modes.

Imaging System

Aiming System

A 610 nm LED is used to generate a circular aiming pattern which indicates the center of the imager's field of view.

Aiming with MS4717

When scanning, the device projects an orange LED dot, which allows positioning the barcode within its field of view. If necessary, the imager turns on its red LEDs to illuminate the target barcode.

To scan a barcode, center the symbol and ensure the entire symbol is within the rectangular area formed by the illumination LEDs. The imager can also read a barcode presented within the aiming dot not centered. The figure below illustrates proper LED placement to produce a successful decode.

Figure 10 MS4717 Aiming Pattern



Aiming Error

The aiming pattern is rotated by 2° relative to the imaging axis in the horizontal plane to minimize parallax between the aiming axis and the imaging axis at 190.45 mm (7.5 in.) from the front of the MS4717.

Aiming Control

The MS4717 can capture images with both the aiming subsystem turned on during exposure (the image of the aiming pattern is visible in the digital image) or off. If the aiming system is turned off during exposure, brightness of the aiming pattern decreases as exposure increases.

The aiming subsystem can also be turned off completely. Zebra recommends shutting aiming off three frames prior to capturing documents to prevent the aiming pattern from appearing faintly in captured images. Note that this is not necessary for barcode decoding.

Illumination System

The illumination system consists of one red LED and a sophisticated drive system that allows image capture and decoding throughout a full range of lighting conditions (total darkness to full sunlight).

Illumination Control

The MS4717 can capture images with the illumination subsystem turned on or off. LED illumination can be turned off when taking images of documents printed on semi-glossy or glossy paper or on a substrate with security marks. In this case, ensure ambient illumination provides a minimum of 30 fcd on the document surface.

Frame Rate Control

The MS4717 outputs images at 30 frames per second by default. The MS4717 can also output images at 60 fps, but at reduced frame size (640 x 400).

Supported Symbolologies

The following barcode types are supported and can be individually enabled or disabled:

1D Symbolologies

UPC/EAN
Bookland EAN
UCC Coupon Code
ISSN EAN
Code 128
GS1-128
ISBT 128
Code 39
Trioptic Code 39
Code 32
Code 93
Code 11
Interleaved 2 of 5
Discrete 2 of 5
Codabar
MSI
Chinese 2 of 5
Matrix 2 of 5
Korean 3 of 5
Inverse 1D
GS1 DataBar
Composite Codes

2D Symbolologies

PDF417
MicroPDF417
Data Matrix, Data Matrix Inverse
GS1 Data Matrix
Maxicode
QR Code
GS1 QR
MicroQR
Aztec, Aztec Inverse
Han Xin, Han Xin Inverse
Grid Matrix, Grid Matrix Inverse, Grid Matrix Mirrored

Postal Codes

US Postnet
US Planet
UK Postal
Japan Postal
Australia Post
Netherlands KIX Code
USPS 4CB/One Code/Intelligent Mail
UPU FICS Postal
Mailmark

Operating Modes

The MS4717 supports the following operating modes.

- Decode (default mode) - for decoding a barcode.
- Snapshot - for capturing an image.
- Snapshot with Viewfinder Mode - provides a video of the subject until a snapshot of the image is captured.
- Video - provides a video of the subject.

Specifications

MS4717 Technical Specifications

Table 4-1 MS4717 Technical Specifications

Item	Description
Performance Characteristics	
Sensor Resolution	1280 x 800 pixels
Field of View	42° horizontal, 28° vertical
Pitch/Skew/Roll Tolerance	± 60° / ± 60° / 360°
Focal Distance from Front of Imager Housing	189.45 (7.46 in)
Aiming Element (LED)	610 nm ± 10 nm
Illumination Element	660 nm ± 5 nm (LED)
Minimum Print Contrast	20% absolute dark/light reflectance
User Environment	
Power Requirements	
Supply Voltage	5.00 V ± 0.5 V
Low Power / Suspend Current Draw	2.5 mA (max)
Idle Current	125 mA RMS (typical)
Operating Current (scan/decode session)	265 mA RMS (typical)
Peak Current	480 mA
Ambient Light Immunity	Total darkness to 9,000 ft. candles (96,900 lux)
Humidity	
Operating	95% RH, non-condensing at 50° C
Storage	85% RH, non-condensing at 70° C
Drop Rating	Unit functions normally after multiple 5 ft (152 cm) drops to concrete at room temperature.
Temperature	
Operating	-4° to 122° F (-20° to 50° C)
Storage	-40° to 158° F (-40° to 70° C)

Table 4-1 *MS4717 Technical Specifications (Continued)*

Item	Description
Dimensions	1.10 in. (2.8 cm) H x 1.89 in. (4.8 cm) L x 2.17 in. (5.5 cm) W
Weight	4.13 oz. (117 g)
Interface	USB-USB (full speed)

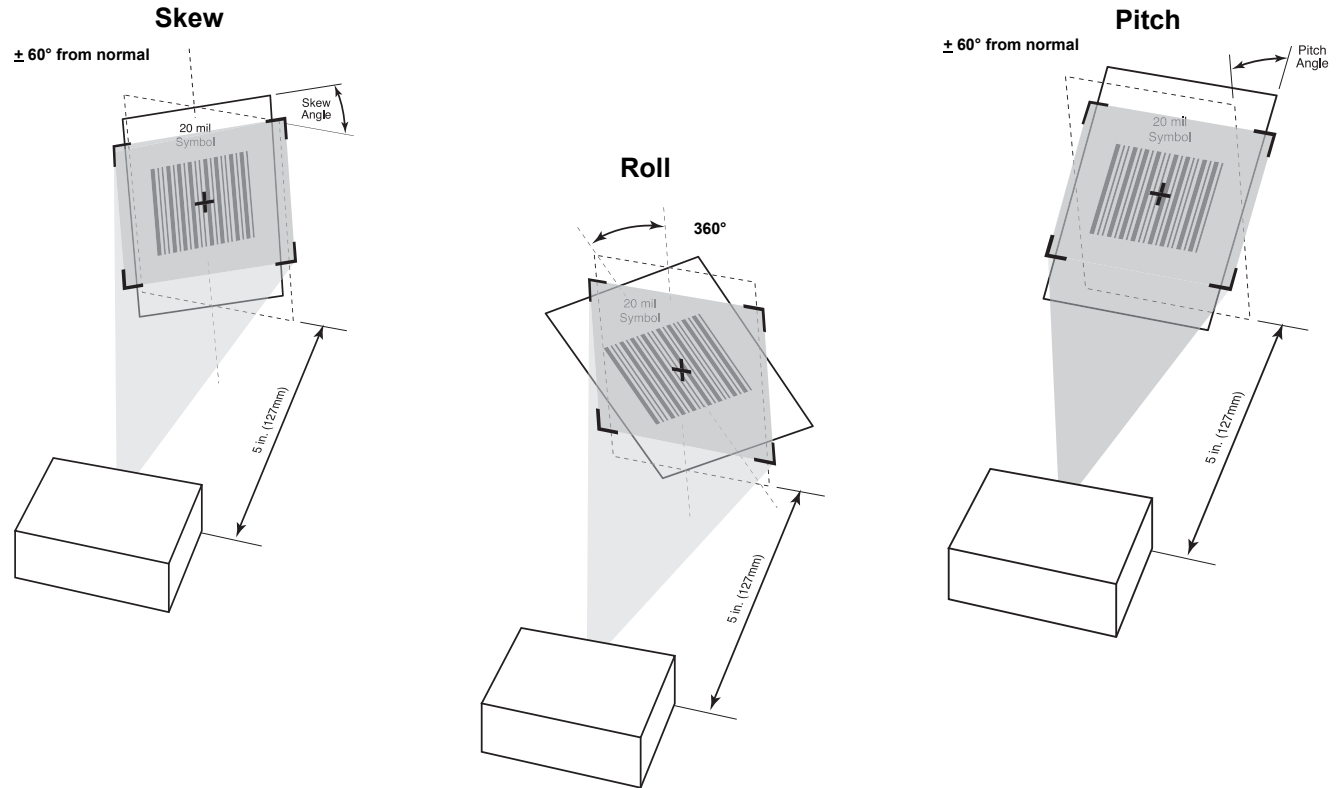


NOTE: Environmental and/or tolerance parameters are not cumulative. Zebra recommends a thermal analysis if the application is subject to an extreme temperature environment.

Skew, Pitch and Roll

Measured on a 20 mil Code 39 symbol at a distance of 10 inches. Tolerance is reduced at extreme ends of the working range.

Figure 11 Skew, Pitch and Roll



Decode Zones

Table 5 MS4717 Decode Ranges

Symbol Density/ Barcode Type	Typical Working Ranges	
	Near	Far
4 mil Code 39	3.3 in / 8.4 cm	8.8 in / 22.4 cm
5 mil Code 39	2.8 in / 7.1 cm	8.2 in / 20.8 cm
5 mil 100% UPC	2.0 in / 5.08 cm	13.5 in / 34.3 cm
5 mil Data Matrix	3.1 in / 7.9 cm	8.4 in / 21.3 cm
10 mil Data Matrix	2.9 in / 7.4 cm	10.1 in / 25.7 cm
100% UPCA Data Matrix	1.8 in / 4.6 cm*	26.0 in / 66.0 cm
20 mil Code 39	2.0 in / 5.08 cm*	30.0 in / 76.2 cm
Notes:		
1. Near distances are field-of-view (FOV) limited.		

Maintenance and Troubleshooting

Overview

The chapter provides information on maintenance and troubleshooting.

Maintenance

Clean the scanner housing and exit window with a damp cloth and, if necessary, a non-ammonia based detergent. Do not allow any abrasive material to touch the exit window.

Troubleshooting

Table 6 Troubleshooting

Problem	Possible Cause	Possible Solutions
No green LED or nothing happens during a capture attempt.	No power to the scanner.	Check the system power. Confirm that the correct host interface cable is used.
		Re-connect loose cables.
Scanner cannot read the barcode.	Scanner is not programmed for the correct barcode type.	Program the scanner to read the type of barcode to be decoded.
	Barcode symbol is unreadable.	Ensure the symbol is not defaced. Try capturing similar symbols of the same code type.
Aiming pattern does not appear.	Hot environment.	Remove the scanner from the hot environment, and allow it to cool down.
LED activates, followed by a beep sequence.	Beeper is configured.	See Supported Symbolologies on page 21 for beeper indication descriptions.

Beeper and LED Indication

Table 7 LED Indications

Indication	Beeper	LED
Reader is on.	N/A	Green
A barcode was successfully decoded.	1 beep	Green flash.
A programming parameter was entered successfully.	Fast warble	Green flash.

User Preferences

Introduction

This chapter describes each user preference feature and provides the programming barcodes necessary for selecting these features.

You can program the digital scanner to perform various functions, or activate different features. This chapter describes each user preference feature and provides programming barcodes for selecting these features.

The digital scanner ships with the settings shown in [Table 6-1](#) (also see [Appendix A, Standard Default Parameters](#) for all defaults). If the default values suit requirements, programming is not necessary.

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



NOTE: Most computer monitors allow scanning the barcodes directly on the screen. When scanning from the screen, be sure to set the document magnification to a level where you can see the barcode 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 connected to a new host.

To return all features to default values, see [Default Parameters on page 32](#). Throughout the programming barcode menus, asterisks indicate (*) default values.



* Indicates Default * **High Volume** Feature/Option
(0) Option Value

Scanning Sequence Examples

In most cases, scanning one barcode sets the parameter value. The digital scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. 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 Parameter Defaults

Table 6-1 lists defaults for user preferences parameters. To change the default values:

- Scan the appropriate barcodes in this guide. These new values replace the standard default values in memory.
- Configure the digital scanner using the 123Scan² configuration program.



NOTE: See [Appendix A, Standard Default Parameters](#) for all user preferences, hosts, symbologies, and default parameters.

Table 6-1 User Preferences Parameter Defaults

Parameter	Parameter Number ¹	SSI Number ²	Default	Page Number
User Preferences				
Set Default Parameter			Restore Defaults	6-32
Parameter Barcode Scanning	236	ECh	Enable	6-33
Beep After Good Decode	56	38h	Enable	6-33
Direct Decode Indicator	859	F2h 5Bh	Disable	6-34
Beeper Volume	140	8Ch	High	6-35
Beeper Tone	145	91h	Medium	6-36
Beeper Duration	628	F1h 74h	Medium	6-37
Suppress Power Up Beeps	721	F1h D1h	Do Not Suppress	6-37
Low Power Mode	128	80h	Enable	6-38
Time Delay to Low Power Mode	146	92h	100 msec	6-38
Hands-free (Presentation) Decode Aiming Pattern	590	F1h 4Eh	Enable Hands-free (Presentation) Decode Aiming Pattern on PDF	6-41

**1. Parameter number decimal values are used for programming via RSM commands.
2. SSI number hex values are used for programming via SSI commands.**

Table 6-1 *User Preferences Parameter Defaults (Continued)*

Parameter	Parameter Number ¹	SSI Number ²	Default	Page Number
Picklist Mode	402	F0h 92h	Disabled Always	6-42
Continuous Barcode Read	649	F1h 89h	Disable	6-43
Unique Barcode Reporting	723	F1h D3h	Enable	6-43
Decode Session Timeout	136	88h	9.9 Seconds	6-44
Hands-free Decode Session Timeout	400	F0 90	15	6-44
Timeout Between Decodes, Same Symbol	137	89h	0.5 Seconds	6-45
Timeout Between Decodes, Different Symbols	144	90h	0.1 Seconds	6-45
Decode Mirror Images (Data Matrix Only)	537	F1h 19h	Auto	6-46
Mobile Phone/Display Mode	716	F1h CCh	Normal	6-47
PDF Prioritization	719	F1h CFh	Disable	6-48
PDF Prioritization Timeout	720	F1h D0h	200 msec	6-49
Presentation Mode Field of View	609	F1h 61h	Full	6-49
Decoding Illumination	298	F0h 2Ah	Enable	6-50
Add an Enter Key	N/A	N/A	N/A	6-50
Transmit Code ID Character	45	2Dh	None	6-51
Prefix Value	99, 105	63h, 69h	7013 <CR><LF>	6-52
Suffix 1 Value Suffix 2 Value	98, 104 100, 106	62h, 68h 64h, 6Ah	7013 <CR><LF>	6-52
Scan Data Transmission Format	235	EBh	Data as is	6-53
FN1 Substitution Values	103, 109	67h, 6Dh	7013 <CR><LF>	6-54
Transmit "No Read" Message	94	5E	Disable	6-55
Unsolicited Heartbeat Interval	1118	F8h 04h 5Eh	Disable	6-56
Dump Scanner Parameters	N/A	N/A	N/A	6-57

**1. Parameter number decimal values are used for programming via RSM commands.
2. SSI number hex values are used for programming via SSI commands.**

User Preferences

Default Parameters

The digital scanner can be reset to two types of defaults: factory defaults or custom defaults. Scan the appropriate barcode below to reset the digital scanner to its default settings and/or set the digital 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** barcode below is scanned.
 - If no custom default values were configured, the factory default values are set for all parameters each time the **Restore Defaults** barcode below is scanned. (For factory default values, see [Appendix A, Standard Default Parameters](#).)
- **Set Factory Defaults** - Scan the **Set Factory Defaults** barcode below to eliminate all custom default values and set the digital scanner to factory default values (For factory default values, see [Appendix A, Standard Default Parameters](#).)
- **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** barcode below to configure custom defaults.



* **Restore Defaults**



Set Factory Defaults



Write to Custom Defaults

Parameter Barcode Scanning

Parameter # 236 (SSI # ECh)

To disable the decoding of parameter barcodes, including the **Set Defaults** parameter barcodes, scan the **Disable Parameter Scanning** barcode below. To enable decoding of parameter barcodes, scan **Enable Parameter Scanning**.



* **Enable Parameter Barcode Scanning**
(1)



Disable Parameter Barcode Scanning
(0)

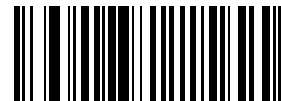
Beep After Good Decode

Parameter # 56 (SSI # 38h)

Scan a barcode below to select whether or not the digital scanner 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)**
(1)



Do Not Beep After Good Decode (Disable)
(0)

Direct Decode Indicator

Parameter # 859 (SSI # F2h 5Bh)

This feature is only supported in Auto Aim and Standard (Level) trigger modes. Scan a barcode below to select optional blinking of the illumination on a successful decode:

- **Disable Direct Decode Indicator** - illumination does not blink on a successful decode.
- **1 Blink** - illumination blinks once upon a successful decode.
- **2 Blinks** - illumination blinks twice upon a successful decode.



*** Disable Direct Decode Indicator
(0)**



**1 Blink
(1)**



**2 Blinks
(2)**

Beeper Volume

Parameter # 140 (SSI # 8Ch)

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



Low Volume
(2)



Medium Volume
(1)

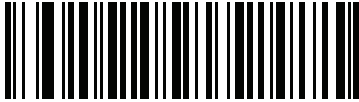


*** High Volume**
(0)

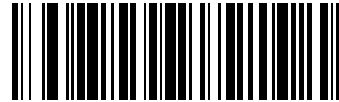
Beeper Tone

Parameter # 145 (SSI # 91h)

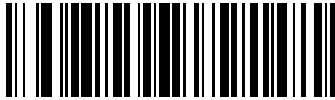
To select a beeper tone, scan one of the following barcodes.



Off
(3)



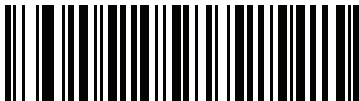
Low Tone
(2)



*** Medium Tone**
(1)



High Tone
(0)

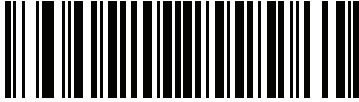


Medium to High Tone (2-tone)
(4)

Beeper Duration

Parameter # 628 (SSI # F1h 74h)

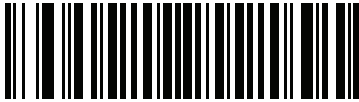
To select the duration for the beeper, scan one of the following barcodes.



Short
(0)



*** Medium**
(1)



Long
(2)

Suppress Power Up Beeps

Parameter # 721 (SSI # F1h D1h)

Scan a barcode below to select whether or not to suppress the digital scanner's power-up beeps.



*** Do Not Suppress Power Up Beeps**
(0)



Suppress Power Up Beeps
(1)

Low Power Mode

Parameter # 128 (SSI # 80h)

This parameter determines whether or not the digital scanner enters low power mode after a decode attempt. If disabled, power remains on after each decode attempt.



Disable Low Power Mode
(0)



* Enable Low Power Mode
(1)

Time Delay to Low Power Mode

Parameter # 146 (SSI # 92h)



NOTE: This parameter only applies when [Low Power Mode](#) is enabled.

This parameter sets the time it takes the scanner to enter Low Power Mode after any scanning activity. Scan the appropriate barcode below to set the time.



* 100 msec
(65)



500 msec
(69)

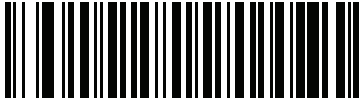


1 Second
(17)

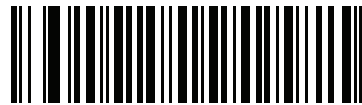
Time Delay to Low Power Mode (continued)



2 sec
(18)



3 sec
(19)



4 Seconds
(20)



5 Seconds
(21)

Hands-free Decode Aiming Pattern

Parameter # 590 (SSI # F1h 4Eh)

Select **Enable Hands-free Decode Aiming Pattern** to project the aiming dot during barcode capture, **Disable Hands-free Decode Aiming Pattern** to turn the aiming dot off, or **Enable Hands-free Decode Aiming Pattern on PDF** to project the aiming dot when the digital scanner detects a 2D barcode.



NOTE: With [Picklist Mode on page 42](#) enabled, the decode aiming dot flashes even when the **Decode Aiming Pattern** is disabled.



**Enable Hands-free Decode Aiming Pattern
(1)**



**Disable Hands-free Decode Aiming Pattern
(0)**



*** Enable Hands-free Decode Aiming Pattern on PDF
(2)**

Picklist Mode

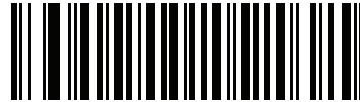
Parameter # 402 (SSI # F0h 92h)

Picklist mode enables the digital scanner to decode only barcodes that are aligned under the LED aiming dot. Select one of the following picklist modes for the digital scanner:

- **Disabled Always** - Picklist mode is always disabled.
- **Enable Always** - Picklist mode is always enabled.



*** Disabled Always**
(0)



Enabled Always
(1)



NOTE: Picklist Mode temporarily overrides the Disable Decode Aiming Pattern parameter. You can not disable the decode aiming pattern when Picklist Mode is enabled.

Continuous Barcode Read

Parameter # 649 (SSI # F1h 89h)

Enable this to report every barcode while the trigger is pulled.



NOTE: Zebra strongly recommends enabling [Picklist Mode on page 42](#) with this feature. Disabling *Picklist Mode* can cause accidental decodes when more than one barcode is in the digital scanner's field of view.



* Disable Continuous Barcode Read
(0)



Enable Continuous Barcode Read
(1)

Unique Barcode Reporting

Parameter # 723 (SSI # F1h D3h)

Enable this to report only unique barcodes while the trigger is pulled. This option only applies when **Continuous Barcode Read** is enabled.



Disable Continuous Barcode Read Uniqueness
(0)



* Enable Continuous Barcode Read Uniqueness
(1)

Decode Session Timeout

Parameter # 136 (SSI # 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 barcode below. Next, scan two numeric barcodes from [Appendix H, 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 barcode below, then scan the **0** and **5** barcodes. To correct an error or change the selection, scan [Cancel on page 2](#).



Decode Session Timeout

Hands-free Decode Session Timeout

Parameter # 400 (SSI # F0 90)

This parameter is the Hands-free compliment to the **Decode Session Timeout**. It configures the minimum and maximum decode processing time during a Hands-free scan attempt. It only applies to the Hands-free trigger mode.

The minimum decode processing time is defined as the time in which the scanner stops decoding when an object is removed or left stationary in the imaging field of view.

The maximum decode processing time is defined as the time in which the scanner stops decoding when an object is left in or is moving in the field of view.

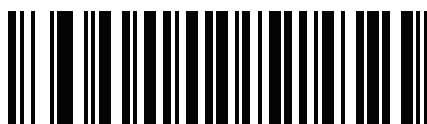
Both the maximum and minimum times are configured using a single setting. The relationship of this setting is as follows:

Setting Value	Minimum Time	Maximum Time
X < 25	250 msec	2.5 Seconds
X >= 25	X * 10 msec	X * 100 msec

For example, a setting value of 100 results in the scanner turning off approximately 1 second after an object is removed from the field of view or 10 seconds while an object is in the field of view moving.

The default value of the setting is 15 which results in a Minimum time of 250 msec and Maximum time of 1.5 seconds.

Adjust this setting based on your requirements. For example, when doing prioritization, this parameter should be set to a value where the maximum time is above the PDF prioritization timeout.



Hands-free Decode Session Timeout

Timeout Between Decodes, Same Symbol

Parameter # 137 (SSI # 89h)

Use this option in Continuous Barcode Read mode to prevent the beeper from continuously beeping when a symbol is left in the digital scanner's field of view. The barcode must be out of the field of view for the timeout period before the digital 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 barcode below, then scan two numeric barcodes from [Appendix H, 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 # 144 (SSI # 90h)

Use this option in presentation mode or Continuous Barcode Read to control the time the digital 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 seconds.

To select the timeout between decodes for different symbols, scan the barcode below, then scan two numeric barcodes from [Appendix H, 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

Decode Mirror Images (Data Matrix Only)

Parameter # 537 (SSI # F1h 19h)

Select an option for decoding mirror image Data Matrix barcodes:

- Always - decode only Data Matrix barcodes that are mirror images
- Never - do not decode Data Matrix barcodes that are mirror images
- Auto - decode both mirrored and unmirrored Data Matrix barcodes.



Never
(0)



Always
(1)



*** Auto**
(2)

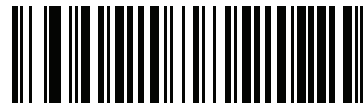
Mobile Phone/Display Mode

Parameter # 716 (SSI # F1h CCh)

This mode improves barcode reading performance off mobile phones and electronic displays. Select Enhanced Hands-free, or both modes, or select Normal Mobile Phone/Display Mode.



*** Normal Mobile Phone/Display Mode
(0)**



**Enhanced in Hands-free Mode
(1)**



**Enhanced in Both Modes
(2)**

PDF Prioritization

Parameter # 719 (SSI # F1h CFh)

Enable this feature to delay decoding a 1D barcode (Code 128) by the value specified in [PDF Prioritization Timeout](#). During that time the digital scanner attempts to decode a PDF417 symbol (e.g., on a US driver's license), and if successful, reports this only. If it does not decode (can not find) a PDF417 symbol, it reports the 1D symbol after the timeout. The 1D symbol must be in the device's field of view for the digital scanner to report it. This parameter does not affect decoding other symbologies.



NOTE

The 1D Code 128 barcode lengths include the following:

- 7 to 10 characters
- 14 to 22 characters
- 27 to 28 characters

In addition, a Code 39 barcode with the following lengths are considered to potentially be part of a US driver's license:

- 8 characters
- 12 characters



*** Disable PDF Prioritization
(0)**



**Enable PDF Prioritization
(1)**

PDF Prioritization Timeout

Parameter # 720 (SSI # F1h D0h)



NOTE: The [Hands-free Decode Session Timeout on page 44](#) should be set to a longer duration than **PDF Prioritization Timeout** when configured.s.

When [PDF Prioritization on page 48](#) is enabled, this timeout specifies how long the digital scanner attempts to decode a PDF417 symbol before reporting the 1D barcode in the field of view.

Scan the following barcode, then scan four digits from [Appendix , Numeric Bar Codes](#) that specify the timeout in milliseconds. For example, to enter 400 msec, scan the following barcode, then scan 0400. The range is 0 to 5000 msec, and the default is 200 msec.



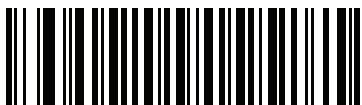
PDF Prioritization Timeout

Presentation Mode Field of View

Parameter # 609 (SSI # F1h 61h)

In presentation mode, by default the digital scanner searches the larger area of the aiming pattern (**Full Field of View**).

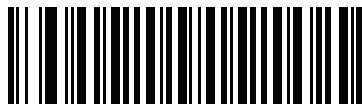
To search for a barcode in a smaller region around the aiming dot's center in order to speed search time, select **Small Field of View** or **Medium Field of View**.



**Small Field of View
(0)**



**Medium Field of View
(1)**



*** Full Field of View
(2)**

Decoding Illumination

Parameter # 298 (SSI # F0h 2Ah)

Selecting **Enable Decoding Illumination** causes the digital scanner to flash illumination to aid decoding. Select **Disable Decoding Illumination** to prevent the digital scanner from using decoding illumination.

Enabling illumination usually results in superior images. The effectiveness of the illumination decreases as the distance to the target increases.



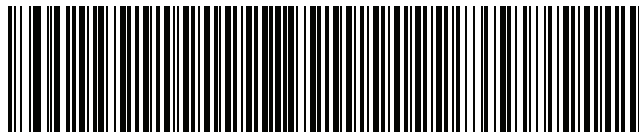
*** Enable Decoding Illumination
(1)**



**Disable Decoding Illumination
(0)**

Add an Enter Key

To add an Enter key (carriage return/line feed) after scanned data, scan the following barcode.
To program other prefixes and/or suffixes, see [Prefix/Suffix Values on page 52](#).



Add Enter Key (Carriage Return/Line Feed)

Transmit Code ID Character

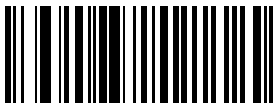
Parameter # 45 (SSI # 2Dh)

A Code ID character identifies the code type of a scanned barcode. 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.

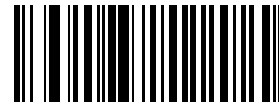
Select no Code ID character, a Symbol Code ID character, or an AIM Code ID character. For Code ID characters, see [Programming Reference on page E-Right](#).



NOTE: If you enable Symbol Code ID Character or AIM Code ID Character, and enable [Transmit "No Read" Message on page 55](#), the digital scanner appends the code ID for Code 39 to the NR message.



Symbol Code ID Character
(2)



AIM Code ID Character
(1)



* None
(0)

Prefix/Suffix Values

Key Category Parameter # P = 99, S1 = 98, S2 = 100 (SSI # P = 63h, S1 = 62h, S2 = 64h)

Decimal Value Parameter # P = 105, S1 = 104, S2 = 106 (SSI # P = 69h, S1 = 68h, S2 = 6Ah)

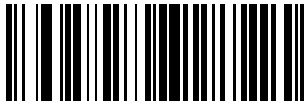
You can append a prefix and/or one or two suffixes to scan data for use in data editing. To set a value for a prefix or suffix, scan a four-digit number (i.e., four barcodes from [Appendix H, Numeric Bar Codes](#)) that corresponds to that value. See [Appendix I, ASCII Character Sets](#) for the four-digit 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 [Appendix I, ASCII Character Sets](#) for the four-digit codes.

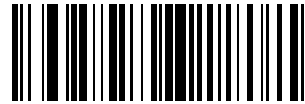
The default prefix and suffix value is 7013 <CR><LF> (the Enter key). To correct an error or change a selection, scan [Cancel on page 2](#).



NOTE: To use Prefix/Suffix values, first set the [Scan Data Transmission Format on page 53](#).



**Scan Prefix
(7)**



**Scan Suffix 1
(6)**



**Scan Suffix 2
(8)**



Data Format Cancel

Scan Data Transmission Format

Parameter # 235 (SSI # EBh)

To change the scan data format, scan one of the following eight barcodes corresponding to the desired format.



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

To set values for the prefix and/or suffix, see [Appendix I, ASCII Character Sets](#).



*** Data As Is**
(0)



<DATA> <SUFFIX 1>
(1)



<DATA> <SUFFIX 2>
(2)



<DATA> <SUFFIX 1> <SUFFIX 2>
(3)



<PREFIX> <DATA>
(4)

Scan Data Transmission Format (continued)



<PREFIX> <DATA> <SUFFIX 1>
(5)



<PREFIX> <DATA> <SUFFIX 2>
(6)



<PREFIX> <DATA> <SUFFIX 1> <SUFFIX 2>
(7)

FN1 Substitution Values

Key Category Parameter # 103 (SSI # 67h)

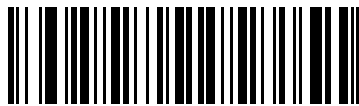
Decimal Value Parameter # 109 (SSI # 6Dh)

The wedge and USB HID keyboard hosts support a FN1 Substitution feature. Enabling this substitutes any FN1 character (0x1b) in an EAN128 barcode 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 barcode menus:

1. Scan the barcode 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 H, 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** barcode on page [6-54](#).

Transmit “No Read” Message

Parameter # 94 (SSI # 5Eh)

Scan a barcode 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 44](#). 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 51](#), the digital scanner appends the code ID for Code 39 to the NR message.



Enable No Read
(1)



*** Disable No Read**
(0)

Unsolicited Heartbeat Interval

Parameter # 1118 (SSI # F8h 04h 5Eh)

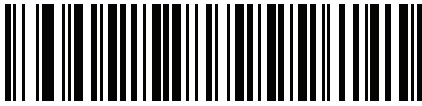
The imager supports sending *Unsolicited Heartbeat Messages* to assist in diagnostics. To enable this feature and set the desired unsolicited heartbeat interval, scan one of the time interval barcodes below, or scan **Set Another Interval** followed by four numeric barcodes from [Appendix H, Numeric Bar Codes](#) (scan sequential numbers that correspond to the desired number of seconds). The range is 0 - 9999.

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

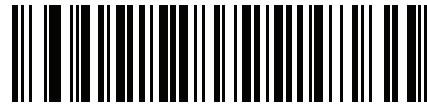
The heartbeat event is sent as decode data (with no decode beep) in the form of:

MOTEVTHB:nnn

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



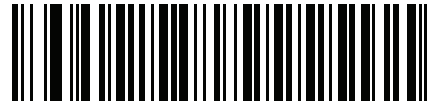
10 Seconds
(10)



1 Minute
(60)



Set Another Interval



*** Disable Unsolicited Heartbeat Interval**
(0)

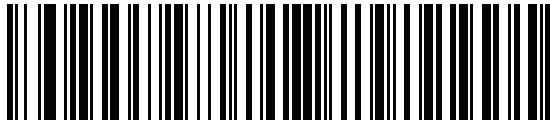
Dump Scanner Parameters

To debug a scanner issue, scan the following barcode with the scanner connected in USB HID keyboard mode to Microsoft® Windows Notepad or Wordpad. This outputs all the scanner's asset tracking information and parameter settings to a text document in human-readable format.

Refer to the parameter numbers in this guide, or the Attribute Data Dictionary (index of parameters), to interpret the parameter/attribute numbers in the output. The Attribute Data Dictionary (72E-149786-xx) is available at: <http://www.zebra.com/support>.



NOTE: For proper formatting, it may be necessary to first scan `<DATA> <SUFFIX 1> (1)` on page 53.



STISCANPARAMS

Imager Preferences

Introduction

Users can program the device to perform various functions, or activate different features. This chapter describes imaging preference features and provides programming barcodes for selecting these features.



NOTE: Only the Symbol Native API (SNAPI) with Imaging interface supports image capture. See [USB Device Type on page 4](#) to enable this host.

The digital scanner ships with the settings in [Imaging Preferences Parameter Defaults on page 59](#) (also see [Appendix A, Standard Default Parameters](#) for all host device and defaults). If the default values suit requirements, programming is not necessary.

To set feature values, scan a single barcode or a short barcode sequence. The settings are stored in non-volatile memory and are preserved even when you power down the digital scanner.



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

To return all features to default values, scan the [Default Parameters on page 5](#). Throughout the programming barcode menus, asterisks (*) indicate default values.



* Indicates Default * Enable Image Capture Illumination Feature/Option
(2) Option Value

Scanning Sequence Examples

In most cases scanning one barcode sets the parameter value. For example, to disable image capture illumination, scan the **Disable Image Capture Illumination** barcode under [Image Capture Illumination on page 62](#). The digital scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. 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.

Imaging Preferences Parameter Defaults

[Table 7-2](#) lists the defaults for imaging preferences parameters. To change the default values, scan the appropriate barcodes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, scan * [Restore Defaults on page 5](#).



NOTE: See [Appendix A, Standard Default Parameters](#) for all user preferences, hosts, symbologies, and default parameters.

Table 7-2 *Imaging Preferences Parameter Defaults*

Parameter	Parameter Number	SSI Number	Default	Page Number
Imaging Preferences				
Operational Modes	N/A	N/A	N/A	7-61
Image Capture Illumination	361	F0h 69h	Enable	7-62
Image Capture Autoexposure	360	F0h 68h	Enable	7-62
Fixed Exposure	567	F4h F1h 37h	100	7-63
Fixed Gain	568	F1h 38h	50	7-63
Gain / Exposure Priority for Snapshot Mode	562	F1h 32h	Autodetect	7-64
Snapshot Mode Timeout	323	F0h 43h	0 (30 Seconds)	7-64
Snapshot Aiming Pattern	300	F0h 2Ch	Enable	7-66
Silence Operational Mode Changes	1293	F8h 05h 0Dh	Disable (do not silence)	7-66
Image Cropping	301	F0h 2Dh	Disable	7-67
Crop to Pixel Addresses	315 316 317 318	F4h F0h 3Bh F4h F0h 3Ch F4h F0h 3Dh F4h F0h 3Eh	0 top 0 left 959 bottom 1279 right	7-68
Image Size (Number of Pixels)	302	F0h 2Eh	Full	7-69

Table 7-2 *Imaging Preferences Parameter Defaults (Continued)*

Parameter	Parameter Number	SSI Number	Default	Page Number
Image Brightness (Target White)	390	F0h 86h	180	7-70
JPEG Image Options	299	F0h 2Bh	Quality	7-70
JPEG Target File Size	561	F1h 31h	160 kB	7-71
JPEG Quality and Size Value	305	F0h 31h	65	7-71
Image Enhancement	564	F1h 34h	Low (1)	7-72
Image File Format Selection	304	F0h 30h	JPEG	7-73
Image Rotation	665	F1h 99h	0°	7-74
Bits per Pixel (BPP)	303	F0h 2Fh	8 BPP	7-75

Imaging Preferences

The parameters in this chapter control image capture characteristics. Image capture occurs in all modes of operation, including decode, and snapshot.

Operational Modes

The digital scanner has two modes of operation:

- Decode Mode
- Snapshot Mode

Decode Mode

By default, when you pull the trigger the digital scanner attempts to locate and decode enabled barcodes within its field of view. The digital scanner remains in this mode until it decodes a barcode or you release the trigger.

Snapshot Mode

Use Snapshot Mode to capture a high-quality image and transmit it to the host. To temporarily enter this mode scan the **Snapshot Mode** barcode. While in this mode the digital scanner blinks the green LED at 1 second intervals to indicate it is not in standard operating (decode) mode.

In Snapshot Mode, the digital scanner turns on its aiming pattern to highlight the area to capture in the image. The next trigger pull instructs the digital scanner to capture a high quality image and transmit it to the host. A short time may pass (less than 2 seconds) between when the trigger is pulled and the image is captured as the digital scanner adjusts to the lighting conditions. Hold the digital scanner steady until the image is captured, denoted by a single beep.

If you do not press the trigger within the Snapshot Mode Timeout period, the digital scanner returns to Decode Mode. Use [Snapshot Mode Timeout on page 65](#) to adjust this timeout period. The default timeout period is 30 seconds.

To disable the aiming pattern during Snapshot Mode, see [Snapshot Aiming Pattern on page 66](#).



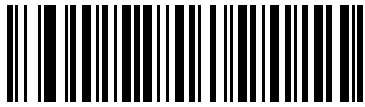
Snapshot Mode

Image Capture Illumination

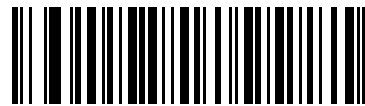
Parameter # 361 (SSI # F0h 69h)

Selecting **Enable Image Capture Illumination** causes illumination to turn on during every image capture. Disable illumination to prevent the digital scanner from using illumination.

Enabling illumination usually results in superior images. The effectiveness of illumination decreases as the distance to the target increases.



* **Enable Image Capture Illumination**
(1)



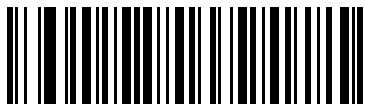
Disable Image Capture Illumination
(0)

Image Capture Autoexposure

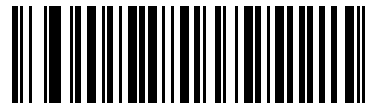
Parameter # 360 (SSI # F0h 68h)

Select **Enable Image Capture Autoexposure** to allow the digital scanner to control gain settings and exposure (integration) time to best capture an image for the selected operation mode.

Select **Disable Image Capture Autoexposure** to manually adjust the gain and exposure time (see the following pages). This option is only recommended for advanced users with difficult image capture situations.



* **Enable Image Capture Autoexposure**
(1)



Disable Image Capture Autoexposure
(0)

Fixed Exposure

Parameter # 567 (SSI # F4h F1h 37h)

Type: Word

Range: 1 - 1000

This parameter configures the exposure used in manual mode for Snapshot.

Each integer value represents 100 μ s worth of exposure. The default value is 100 which results in an exposure setting of 10 msec.

To set the Fixed Exposure parameter, scan **Fixed Exposure** followed by four numeric barcodes representing the value. Leading zeros are required. For example, to set a Fixed Exposure value of 99, scan 0, 0, 9, 9. See [Appendix H, Numeric Bar Codes](#) for numeric barcodes.



Fixed Exposure
(4 digits)

Fixed Gain

Parameter # 568 (SSI # F1h 38h)

Type: Byte

Range 1 - 100

This parameter configures the gain setting used in manual mode for Snapshot.

A value of 1 indicates that gain is not used for image capture. A value of 100 indicates that maximum gain is used for image capture. The default value of this parameter is 50.

To set the Fixed Gain parameter, scan **Fixed Gain** below followed by three numeric barcodes representing the value. Leading zeros are required. For example, to set a Fixed Gain value of 99, scan 0, 9, 9. See [Appendix H, Numeric Bar Codes](#) for numeric barcodes.



Fixed Gain

Gain/Exposure Priority for Snapshot Mode

Parameter # 562 (SSI # F1h 32h)

This parameter alters the digital scanner's gain exposure priority when it acquires an image in Snapshot Mode in auto exposure mode.

- Scan **Low Exposure Priority** to set a mode in which the digital scanner favors higher gain over exposure to capture an image. This results in an image that is less susceptible to motion blur at the expense of noise artifacts. However, for most applications, the amount of noise is acceptable.
- Scan **Low Gain Priority** to set a mode in which the digital scanner favors longer exposure time rather than higher gain to capture an image. This ensures that the image is less noisy and produces fewer artifacts during post processing activities like image enhancement (sharpening). The mode is recommended for fixed mount / fixed object image capture since the image acquired is susceptible to motion blur.
- Scan **Autodetect** (default) to set a mode in which the digital scanner automatically selects Gain Priority or Low Exposure Priority mode for Snapshot Mode. If the digital scanner is in a magnetic reed switch enabled stand (or it is configured in Blink Mode), it uses Low Gain Priority mode. Otherwise, it uses the Low Exposure Priority mode.



Low Gain Priority
(0)



Low Exposure Priority
(1)



*** Autodetect**
(2)

Snapshot Mode Timeout

Parameter # 323 (SSI # F0h 43h)

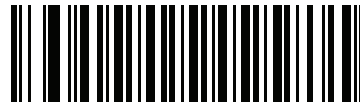
This parameter sets the amount of time the digital scanner remains in Snapshot Mode. The digital scanner exits Snapshot Mode when you pull the trigger, or when the Snapshot Mode Timeout elapses. To set this timeout value, scan the **Set Snapshot Mode Timeout** barcode below followed by a barcode from [Appendix H, Numeric Bar Codes](#). The default value is 0 which represents 30 seconds; values increment by 30. For example, 1 = 60 seconds, 2 = 90 seconds, etc.

To quickly re-set the default timeout to 30 seconds, scan the **30 Seconds** barcode below.

If you select **No Timeout**, the digital scanner remains in Snapshot Mode until you pull the trigger.



Set Snapshot Mode Timeout



*** 30 Seconds**



No Timeout

Snapshot Aiming Pattern

Parameter # 300 (SSI # F0h 2Ch)

Select **Enable Snapshot Aiming Pattern** to project the aiming pattern when in Snapshot Mode, or **Disable Snapshot Aiming Pattern** to turn the aiming pattern off.



* Enable Snapshot Aiming Pattern
(1)



Disable Snapshot Aiming Pattern
(0)

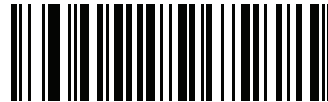
Silence Operational Mode Changes

Parameter # 1293 (SSI # F8h 05h 0Dh)

Enable this feature to silence the beeper when switching between operational modes (e.g., from Decode Mode to Snapshot Mode).



Silence Operational Mode Changes (Enable)
(1)



* Do Not Silence Operational Mode Changes (Disable)
(0)

Image Cropping

Parameter # 301 (SSI # F0h 2Dh)

This parameter crops a captured image. Select **Disable Image Cropping** to present the full 1200 x 800 pixels. Select **Enable Image Cropping** to crop the image to the pixel addresses set in [Crop to Pixel Addresses on page 68](#).



Enable Image Cropping
(1)



*** Disable Image Cropping**
(Use Full 1200 x 800 Pixels)
(0)

Crop to Pixel Addresses

Parameter # 315 (SSI # F4h F0h 3Bh) (Top)

Parameter # 316 (SSI # F4h F0h 3Ch) (Left)

Parameter # 317 (SSI # F4h F0h 3Dh) (Bottom)

Parameter # 318 (SSI # F4h F0h 3Eh) (Right)

If you selected **Enable Image Cropping**, set the pixel addresses from (0,0) to (1279 x 959) to crop to.

Columns are numbered from 0 to 1279, rows from 0 to 959. Specify four values for Top, Left, Bottom, and Right, where Top and Bottom correspond to row pixel addresses, and Left and Right correspond to column pixel addresses. For example, for a 4 row x 8 column image in the extreme bottom-right section of the image set the following values:

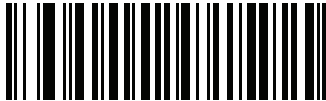
Top = 959, Bottom = 959, Left = 1272, Right = 1279

To set the crop to pixel address, scan each pixel address barcode below followed by four numeric barcodes representing the value. Leading zeros are required. For example, to crop the top pixel address to 3, scan 0, 0, 0, 3. See [Appendix H, Numeric Bar Codes](#) for numeric barcodes. The defaults are:

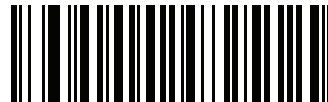
Top = 0, Bottom = 959, Left = 0, Right = 1279



NOTE: The digital scanner has a cropping resolution of 4 pixels. Setting the cropping area to less than 4 pixels (after resolution adjustment, see [Image Size \(Number of Pixels\) on page 69](#)) transfers the entire image.



Top Pixel Address
(0 - 959 Decimal)



Left Pixel Address
(0 - 1279 Decimal)



Bottom Pixel Address
(0 - 959 Decimal)



Right Pixel Address
(0 - 1279 Decimal)

Image Size (Number of Pixels)

Parameter # 302 (SSI # F0h 2Eh)

This option alters image resolution before compression. Multiple pixels are combined to one pixel, resulting in a smaller image containing the original content with reduced resolution.

Select one of the following values:

Table 7-3 Image Size

Resolution Value	Uncropped Image Size
Full	1280 x 800
1/2	640 x 400
1/4	320 x 200



Image Brightness (Target White)

Parameter # 390 (SSI # F0h 86h)

Type: Byte

Range: 1 - 240

This parameter sets the Target White value used in Snapshot mode when using auto exposure. White and black are defined as 240 decimal and 1, respectively. Setting the value to the factory default of 180 sets the white level of the image to ~180.

To set the Image Brightness parameter, scan **Image Brightness** below followed by three numeric barcodes representing the value. Leading zeros are required. For example, to set an Image Brightness value of 99, scan 0, 9, 9. See [Appendix H, Numeric Bar Codes](#) for numeric barcodes.



* 180



Image Brightness
(3 digits)

JPEG Image Options

Parameter # 299 (SSI # F0h 2Bh)

Select an option to optimize JPEG images for either size or for quality. Scan the **JPEG Quality Selector** barcode to use a quality value; the digital scanner then selects the corresponding image size. Scan the **JPEG Size Selector** barcode to use a size value; the digital scanner then selects the best image quality.



* JPEG Quality Selector
(1)



JPEG Size Selector
(0)

JPEG Target File Size

Parameter # 561 (SSI # F1h 31h)

Type: Word

Range: 5-350

This parameter defines the target JPEG file size in terms 1 Kilobytes (1024 bytes). The default value is 160 kB which represents 160 Kilobytes.



CAUTION JPEG compress may take 10 to 15 seconds based on the amount of information in the target image. Scanning **JPEG Quality Selector** (default setting) on [page 70](#) produces a compressed image that is consistent in quality and compression time.

To set the JPEG Target File Size parameter, scan **JPEG Target File Size** below followed by three numeric barcodes representing the value. Leading zeros are required. For example, to set an image file size value of 99, scan 0, 9, 9 in [Appendix H, Numeric Bar Codes](#).



JPEG Target File Size
(3 digits)

JPEG Quality and Size Value

JPEG Quality = Parameter # 305 (SSI # F0h 31h)

If you selected **JPEG Quality Selector**, scan the **JPEG Quality Value** barcode followed by 3 barcodes from [Appendix H, Numeric Bar Codes](#) corresponding to a value from 5 to 100, where 100 represents the highest quality image.



JPEG Quality Value
(Default: 065)
(5 - 100 Decimal)

Image Enhancement

Parameter # 564 (SSI # F1h 34h)

This parameter configures the digital scanner's Image Enhance feature. This feature uses a combination of edge sharpening and contrast enhancement to produce an image that is visually pleasing.

The levels of image enhancement are:

- Off (0)
- Low (1) - Default
- Med (2)
- High (3)



**Off
(0)**



*** Low
(1)**



**Medium
(2)**



**High
(3)**

Image File Format Selector

Parameter # 304 (SSI # F0h 30h)

Select an image format appropriate for the system (BMP, TIFF, or JPEG). The digital scanner stores captured images in the selected format.



BMP File Format
(3)



*** JPEG File Format**
(1)



TIFF File Format
(4)

Image Rotation

Parameter # 665 (SSI # F1h 99h)

This parameter controls the rotation of the image by 0, 90, 180, or 270 degrees.



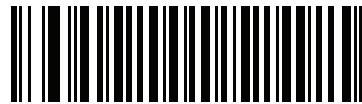
*** Rotate 0°
(0)**



**Rotate 90°
(1)**



**Rotate 180°
(2)**



**Rotate 270°
(3)**

Bits Per Pixel

Parameter # 303 (SSI # F0h 2Fh)

Select the number of significant bits per pixel (BPP) to use when capturing an image. Select **1 BPP** for a black and white image, **4 BPP** to assign 1 of 16 levels of grey to each pixel, or **8 BPP** to assign 1 of 256 levels of grey to each pixel.

NOTE The digital scanner ignores these settings for JPEG file formats, which only support **8 BPP**.

The digital scanner ignores 1 BPP for TIFF file formats, which only support **4 BPP** and **8 BPP**. 1 BPP is coerced to 4 BPP for TIFF file formats.



1 BPP
(0)



4 BPP
(1)



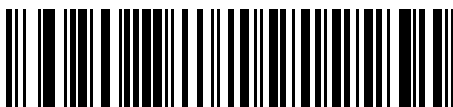
*** 8 BPP**
(2)

USB Interface

Introduction

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

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



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

Connecting a USB Interface

The digital imager scanner connects with USB capable hosts including:

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

The following operating systems support the digital imager scanner through USB:

- Windows 98, 2000, ME, XP, 7, 8, 8.1, 10
- MacOS 8.5 and above
- IBM 4690 OS

To connect the cradle to a USB host:

1. Attach the modular connector of the USB interface cable to the cable interface port on the cradle.
2. Plug the series A connector in the USB host or hub, or plug the Plus Power connector in an available port of the IBM SurePOS terminal.
3. Connect an external power supply if desired.
4. Ensure all connections are secure.

5. Pair the digital scanner to the cradle by scanning the barcode on the cradle.
6. Select the USB device type by scanning the appropriate barcode from [USB Device Type on page 79](#).
7. On first installation when using Windows, the software displays a prompt to select or install the *Human Interface Device* driver. To install the Human Interface Device driver provided by Windows, click **Next** through all the choices and click **Finished** on the last choice. The digital scanner powers up during this installation.
8. To modify any other parameter options, scan the appropriate barcodes in this chapter.



NOTE: Disconnect the host cables before the power supply, or the digital scanner may not recognize the new host.

If problems occur, see [Troubleshooting on page 27](#).

USB Parameter Defaults

Table 8-4 lists the defaults for USB host parameters. If any option needs to be changed, scan the appropriate barcode(s) provided in the Parameter Descriptions section beginning on [page 79](#).



NOTE: See [Appendix A, Standard Default Parameters](#) for all user preferences, hosts, symbologies, and default parameters.



NOTE: See [Appendix B, Country Codes](#) for USB Country Keyboard Types (Country Codes).

Table 8-4 USB Host Default Table

Parameter	Default	Page Number
USB Host Parameters		
USB Device Type	HID Keyboard Emulation	8-79
Symbol Native API (SNAPI) Status Handshaking	Enable	8-81
USB Keystroke Delay	No Delay	8-82
USB CAPS Lock Override	Disable	8-82
USB Ignore Unknown Characters	Send	8-83
USB Convert Unknown to Code 39	Disable	8-83
Emulate Keypad	Enable	8-84
Emulate Keypad with Leading Zero	Enable	8-84
Quick Keypad Emulation	Enable	8-85
USB FN1 Substitution	Disable	8-85
Function Key Mapping	Disable	8-86
Simulated Caps Lock	Disable	8-86
Convert Case	No Case Conversion	8-87
USB Static CDC	Enable	8-87
Ignore Beep	Enable	8-88
Ignore Barcode Configuration	Enable	8-88
USB Polling Interval	3 msec	8-89
USB Fast HID	Enable	8-91
IBM Specification Version	Version 2.2	8-91

USB Host Parameter

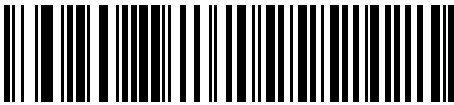
USB Device Type

Select the desired USB device type.



NOTES

1. When changing USB device types, the scanner automatically restarts. The scanner issues a power-up beep sequence.
2. Before selecting [USB CDC Host \(Note 1\) on page 80](#), install the CDC INF file on the host to ensure the scanner does not stall during power up (due to a failure to enumerate USB).
To recover a stalled scanner:
 - a) Install the CDC INF file
 - or
 - b) Unplug USB cable and add power. Connect the scanner via Bluetooth and scan **HID Keyboard** or another host.
3. Select **IBM OPOS (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.



* **HID Keyboard Emulation**



IBM Table-top USB

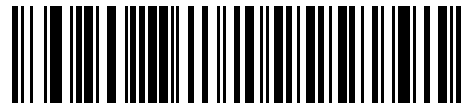


USB OPOS Hand-held

USB Device Type (continued)



Simple COM Port Emulation



SSI over USB CDC



**USB CDC Host
(Note 1)**



Symbol Native API (SNAPI) without Imaging Interface



Symbol Native API (SNAPI) with Imaging Interface

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**



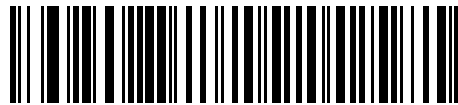
Disable SNAPI Status Handshaking

USB Keystroke Delay

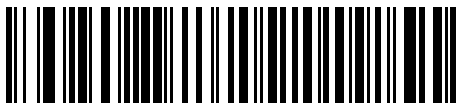
This parameter sets the delay, in milliseconds, between emulated keystrokes. Scan a barcode below to increase the delay when hosts require a slower transmission of data.



*** No Delay**



Medium Delay (20 msec)



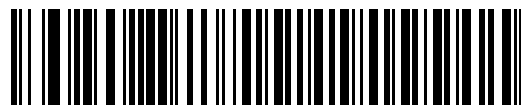
Long Delay (40 msec)

USB CAPS Lock Override

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



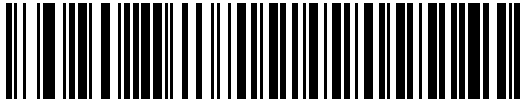
**Override Caps Lock Key
(Enable)**



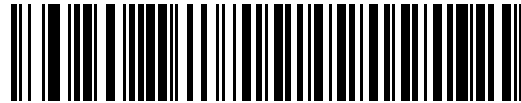
*** Do Not Override Caps Lock Key
(Disable)**

USB Ignore Unknown Characters

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



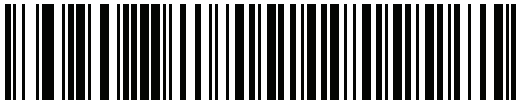
* **Send Barcodes with Unknown Characters**



Do Not Send Barcodes with Unknown Characters

USB Convert Unknown to Code 39

This option applies only to IBM Table-top, and OPOS devices. Scan a barcode below to enable or disable converting unknown barcode type data to Code 39.



* **Disable Convert Unknown to Code 39**



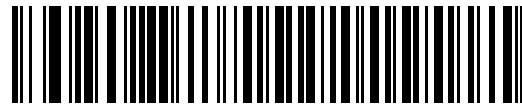
Enable Convert Unknown to Code 39

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.”



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”.



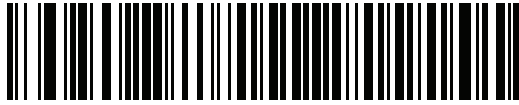
Disable Keypad Emulation with Leading Zero



*** Enable Keypad Emulation with Leading Zero**

Quick Keypad Emulation

This option applies only to the HID Keyboard Emulation Device and if Emulate Keypad is enabled. This parameter enables a quicker method of keypad emulation where ASCII sequences are only sent for ASCII characters not found on the keyboard. The default value is **Enable**.



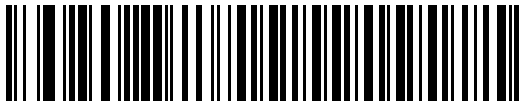
* **Enable**



Disable

USB Keyboard FN 1 Substitution

This option applies only to the USB HID Keyboard Emulation device. When enabled, this allows replacement of any FN 1 characters in an EAN 128 barcode with a Key Category and value chosen by the user (see [FN1 Substitution Values on page 35](#) 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 1 on page 1](#)). 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 digital imager scanner inverts upper and lower case characters on the digital imager scanner barcode 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.



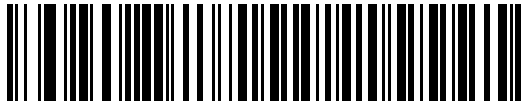
*** Disable Simulated Caps Lock**



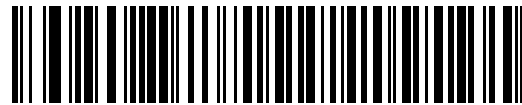
Enable Simulated Caps Lock

Convert Case

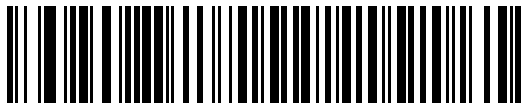
When enabled, the digital imager scanner converts all barcode data to the selected case.



*** No Case Conversion**



Convert All to Upper Case



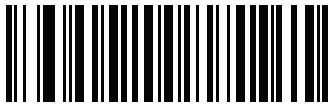
Convert All to Lower Case

USB Static CDC

Parameter # 670

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
(1)**



**Disable USB Static CDC
(0)**

Optional USB Parameters

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

Scan a barcode below after setting defaults and before configuring the digital imager scanner.

Ignore Beep

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



Disable



*** Enable**

Ignore Barcode Configuration

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



Disable



*** Enable**

USB Polling Interval

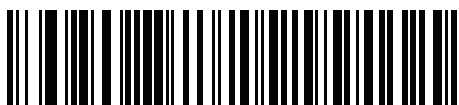
Scan a barcode below to set the polling interval. The polling interval determines the rate at which data can be sent between the scanner and host computer. A lower number indicates a faster data rate.



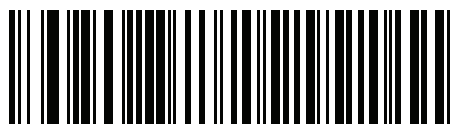
IMPORTANT Ensure your host machine can handle the selected data rate.



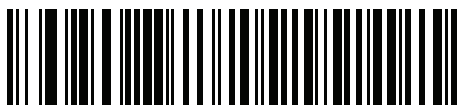
NOTE: When changing USB Device Types, the digital imager automatically restarts and issues a disconnect-reconnect beep sequence.



1 msec



2 msec



*** 3 msec**



4 msec

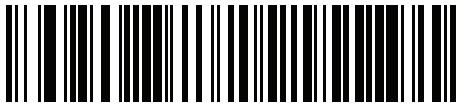
USB Polling Interval (continued)



5 msec



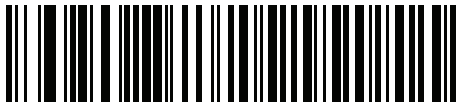
6 msec



7 msec



8 msec



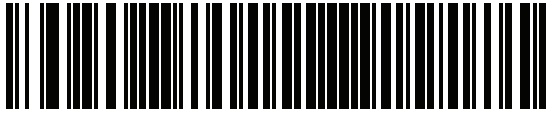
9 msec



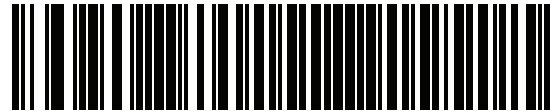
10 msec

USB Fast HID

This option transmits USB HID data at a faster rate.



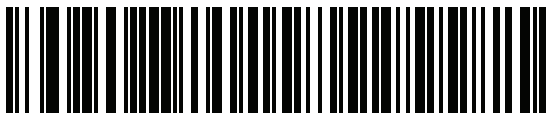
* Enable



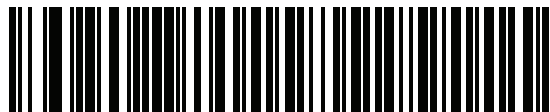
Disable

IBM Specification Version

The IBM USB interface specification version selected defines how code types are reported over the IBM USB interface.



Original Specification



* Version 2.2

ASCII Character Set for USB

See [Appendix H, Numeric Bar Codes](#) for the following:

- ASCII Character Set ([Table 3 on page 7](#))
- ALT Key Character Set ([Table 2 on page 5](#))
- GUI Key Character Set ([Table 3 on page 7](#))
- F Key Character Set ([Table 5 on page 10](#)).

Symbologies

Introduction

This chapter describes symbology features and provides programming barcodes for selecting these features.

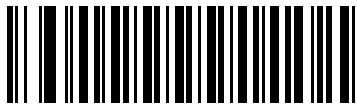
To set feature values, scan a single barcode or a short barcode sequence. The settings are stored in non-volatile memory and are preserved even when the digital scanner powers down.



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

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, see [Default Parameters on page 5](#). Throughout the programming barcode menus, asterisks (*) indicate default values.



* Indicates Default * Enable UPC-A Feature/Option
 (1) Option Value

Scanning Sequence Examples

In most cases, scanning one barcode sets the parameter value. For example, to transmit barcode data without the UPC-A check digit, simply scan the **Do Not Transmit UPC-A Check Digit** barcode under [Transmit UPC-A Check Digit on page 107](#). The digital scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters, such as **Set Length(s) for D 2 of 5** require scanning several barcodes. 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 9-5](#) lists the defaults for all symbology parameters. To change the default values, scan the appropriate barcodes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, see [Default Parameters on page 5](#).



NOTE: See [Appendix A, Standard Default Parameters](#) for all user preferences, hosts, and default parameters.

Table 9-5 Symbology Parameter Defaults

Parameter	Parameter Number	SSI Number	Default	Page Number
Enable/Disable All Code Types				9-98
1D Symbologies				
UPC/EAN				
UPC-A	1	01h	Enable	9-99
UPC-E	2	02h	Enable	9-99
UPC-E1	12	0Ch	Disable	9-100
EAN-8/JAN 8	4	04h	Enable	9-100
EAN-13/JAN 13	3	03h	Enable	9-101
Bookland EAN	83	53h	Disable	9-101
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	16	10h	Ignore	9-103
User-Programmable Supplementals			000	9-105
Supplemental 1:	579	F1h 43h		
Supplemental 2:	580	F1h 44h		
UPC/EAN/JAN Supplemental Redundancy	80	50h	10	9-105
Decode UPC/EAN/JAN Supplemental AIM ID	672	F1h A0h	Combined	9-106
UPC Reduced Quiet Zone	1289	F8h 05h 09h	Disable	9-107
Transmit UPC-A Check Digit	40	28h	Enable	9-107
Transmit UPC-E Check Digit	41	29h	Enable	9-108
Transmit UPC-E1 Check Digit	42	2Ah	Enable	9-108
UPC-A Preamble	34	22h	System Character	9-109
UPC-E Preamble	35	23h	System Character	9-110
UPC-E1 Preamble	36	24h	System Character	9-111
Convert UPC-E to A	37	25h	Disable	9-112
Convert UPC-E1 to A	38	26h	Disable	9-112

Table 9-5 Symbology Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
EAN-8/JAN-8 Extend	39	27h	Disable	9-113
Bookland ISBN Format	576	F1h 40h	ISBN-10	9-113
UCC Coupon Extended Code	85	55h	Disable	9-114
Coupon Report	730	F1h DAh	New Coupon Format	9-115
ISSN EAN	617	F1h 69h	Disable	9-115
Code 128				
Code 128	8	08h	Enable	9-116
Set Length(s) for Code 128	209, 210	D1h, D2h	1 to 55	9-117
GS1-128 (formerly UCC/EAN-128)	14	0Eh	Enable	9-118
ISBT 128	84	54h	Disable	9-118
ISBT Concatenation	577	F1h 41h	Autodiscriminate	9-119
Check ISBT Table	578	F1h 42h	Enable	9-120
ISBT Concatenation Redundancy	223	DFh	10	9-120
Code 128 Security Level	751	F1h EFh	Security Level 1	9-121
Code 128 Reduced Quiet Zone	1208	F8h 04h B8h	Disable	9-122
Ignore Code 128 <FNC4>	1254	F8h 04h E6h	Disable	9-122
Code 39				
Code 39	0	00h	Enable	9-123
Trioptic Code 39	13	0Dh	Disable	9-123
Convert Code 39 to Code 32 (Italian Pharmacy Code)	86	56h	Disable	9-124
Code 32 Prefix	231	E7h	Disable	9-124
Set Length(s) for Code 39	18, 19	12h, 13h	1 to 55	9-125
Code 39 Check Digit Verification	48	30h	Disable	9-127
Transmit Code 39 Check Digit	43	2Bh	Disable	9-127
Code 39 Full ASCII Conversion	17	11h	Disable	9-128
Code 39 Security Level	750	F1h EEh	Security Level 1	9-129
Code 39 Reduced Quiet Zone	1209	F8h 04h B9h	Disable	9-130
Code 93				
Code 93	9	09h	Enable	9-130

Table 9-5 Symbology Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
Set Length(s) for Code 93	26, 27	1Ah, 1Bh	1 to 55	9-131
Code 11				
Code 11	10	0Ah	Disable	9-132
Set Lengths for Code 11	28, 29	1Ch, 1Dh	4 to 55	9-133
Code 11 Check Digit Verification	52	34h	Disable	9-134
Transmit Code 11 Check Digit(s)	47	2Fh	Disable	9-135
Interleaved 2 of 5 (ITF)				
Interleaved 2 of 5 (ITF)	6	06h	Disable	9-135
Set Lengths for I 2 of 5	22, 23	16h, 17h	6 to 55	9-136
I 2 of 5 Check Digit Verification	49	31h	Disable	9-137
Transmit I 2 of 5 Check Digit	44	2Ch	Disable	9-138
Convert I 2 of 5 to EAN 13	82	52h	Disable	9-138
I 2 of 5 Security Level	1121	F8h 04h 61h	Security Level 1	9-139
I 2 of 5 Reduced Quiet Zone	1210	F8h 04h BAh	Disable	9-140
Discrete 2 of 5 (DTF)				
Discrete 2 of 5	5	05h	Disable	9-140
Set Length(s) for D 2 of 5	20, 21	14h 15h	1 to 55	9-141
Codabar (NW - 7)				
Codabar	7	07h	Enable	9-142
Set Lengths for Codabar	24, 25	18h, 19h	4 to 55	9-143
CLSI Editing	54	36h	Disable	9-144
NOTIS Editing	55	37h	Disable	9-144
Codabar Upper or Lower Case Start/ Stop Characters Detection	855	F2h 57h	Upper Case	9-145
MSI				
MSI	11	0Bh	Disable	9-145
Set Length(s) for MSI	30, 31	1Eh, 1Fh	4 to 55	9-146
MSI Check Digits	50	32h	One	9-147
Transmit MSI Check Digit	46	2Eh	Disable	9-147
MSI Check Digit Algorithm	51	33h	Mod 10/Mod 10	9-148

Table 9-5 Symbology Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
Chinese 2 of 5				
Chinese 2 of 5	408	F0h 98h	Disable	9-148
Matrix 2 of 5				
Matrix 2 of 5	618	F1h 6Ah	Disable	9-149
Matrix 2 of 5 Lengths	619 620	F1h 6Bh F1h 6Ch	4 to 55	9-150
Matrix 2 of 5 Check Digit	622	F1h 6Eh	Disable	9-151
Transmit Matrix 2 of 5 Check Digit	623	F1h 6Fh	Disable	9-151
Korean 3 of 5				
Korean 3 of 5	581	F1h 45h	Disable	9-152
Inverse 1D	586	F1h 4Ah	Regular	9-153
GS1 DataBar				
GS1 DataBar-14	338	F0h 52h	Enable	9-154
GS1 DataBar Limited	339	F0h 53h	Enable	9-154
GS1 DataBar Expanded	340	F0h 54h	Enable	9-155
Convert GS1 DataBar to UPC/EAN	397	F0h 8Dh	Disable	9-155
GS1 DataBar Limited Security Level	728	F1h D8h	Level 3	9-156
Composite				
Composite CC-C	341	F0h 55h	Disable	9-157
Composite CC-A/B	342	F0h 56h	Disable	9-157
Composite TLC-39	371	F0h 73h	Disable	9-158
UPC Composite Mode	344	F0h 58h	UPC Never Linked	9-158
Composite Beep Mode	398	F0h 8Eh	Beep As Each Code Type is Decoded	9-159
GS1-128 Emulation Mode for UCC/EAN Composite Codes	427	F0h ABh	Disable	9-159
2D Symbologies				
PDF417	15	0Fh	Enable	9-160
MicroPDF417	227	E3h	Disable	9-160
Code 128 Emulation	123	7Bh	Disable	9-161
Data Matrix	292	F0h 24h	Enable	9-162
GS1 Data Matrix	1336	F8h 05h 38h	Disable	9-162

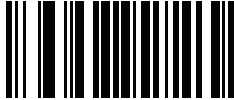
Table 9-5 Symbology Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
Data Matrix Inverse	588	F1h 4Ch	Inverse Autodetect	9-163
Maxicode	294	F0h 26h	Disable	9-163
QR Code	293	F0h 25h	Enable	9-164
GS1 QR	1343	F8h 05h 3Fh	Disable	9-164
MicroQR	573	F1h 3Dh	Enable	9-165
Aztec	574	F1h 3Eh	Enable	9-165
Aztec Inverse	589	F1h 4Dh	Inverse Autodetect	9-166
Han Xin	1167	F8h 04h 8Fh	Disable	9-167
Han Xin Inverse	1168	F8h 04h 90h	Regular	9-167
Postal Codes				
US Postnet	89	59h	Disable	9-168
US Planet	90	5Ah	Disable	9-168
Transmit US Postal Check Digit	95	5Fh	Enable	9-169
UK Postal	91	5Bh	Disable	9-169
Transmit UK Postal Check Digit	96	60h	Enable	9-170
Japan Postal	290	F0h 22h	Disable	9-170
Australia Post	291	F0h 23h	Disable	9-171
Australia Post Format	718	F1h CEh	Autodiscriminate	9-172
Netherlands KIX Code	326	F0h 46h	Disable	9-173
USPS 4CB/One Code/Intelligent Mail	592	F1h 50h	Disable	9-173
UPU FICS Postal	611	F1h 63h	Disable	9-174
Mailmark	1337	F8h 05h 39h	Disable	9-174
Symbology-Specific Security Levels				
Redundancy Level	78	4Eh	1	9-175
Security Level	77	4Dh	1	9-177
1D Quiet Zone Level	1288	F8h 05h 08h	1	9-178
Intercharacter Gap Size	381	F0h 7Dh	Normal	9-179
Report Version				9-179
Macro PDF				
Flush Macro PDF Buffer	N/A	N/A	N/A	9-180
Abort Macro PDF Entry	N/A	N/A	N/A	9-180

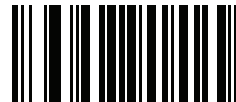
Enable/Disable All Code Types

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 code types.



Disable All Code Types



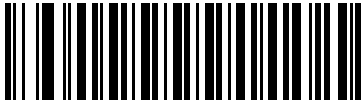
Enable All Code Types

UPC/EAN

Enable/Disable UPC-A

Parameter # 1 (SSI # 01h)

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



*** Enable UPC-A
(1)**

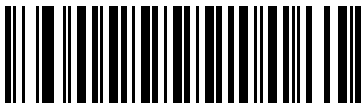


**Disable UPC-A
(0)**

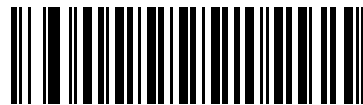
Enable/Disable UPC-E

Parameter # 2 (SSI # 02h)

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



*** Enable UPC-E
(1)**



**Disable UPC-E
(0)**

Enable/Disable UPC-E1

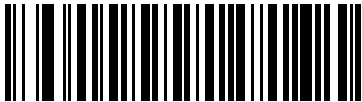
Parameter # 12 (SSI # 0Ch)

UPC-E1 is disabled by default.

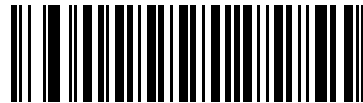
To enable or disable UPC-E1, scan the appropriate barcode below.



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



**Enable UPC-E1
(1)**



*** Disable UPC-E1
(0)**

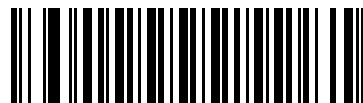
Enable/Disable EAN-8/JAN-8

Parameter # 4 (SSI # 04h)

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



*** Enable EAN-8/JAN-8
(1)**

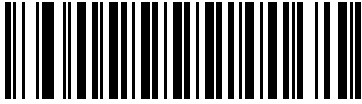


**Disable EAN-8/JAN-8
(0)**

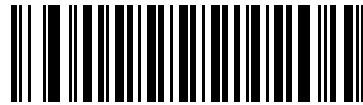
Enable/Disable EAN-13/JAN-13

Parameter # 3 (SSI # 03h)

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



*** Enable EAN-13/JAN-13**
(1)



Disable EAN-13/JAN-13
(0)

Enable/Disable Bookland EAN

Parameter # 83 (SSI # 53h)

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



Enable Bookland EAN
(1)



*** Disable Bookland EAN**
(0)



NOTE: If you enable Bookland EAN, select a [Bookland ISBN Format on page 113](#). 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 102](#).

Decode UPC/EAN/JAN Supplementals

Parameter # 16 (SSI # 10h)

Supplementals are barcodes 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 digital scanner is presented with a UPC/EAN plus supplemental symbol, the digital scanner decodes UPC/EAN and ignores the supplemental characters.
- If you select **Decode UPC/EAN with Supplementals**, the digital scanner only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.
- If you select **Autodiscriminate UPC/EAN Supplementals**, the digital scanner decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the digital scanner must decode the barcode the number of times set via [UPC/EAN/JAN Supplemental Redundancy on page 105](#) before transmitting its data to confirm that there is no supplemental.
- If you select one of the following **Supplemental Mode** options, the digital scanner immediately transmits EAN-13 barcodes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the digital scanner must decode the barcode the number of times set via [UPC/EAN/JAN Supplemental Redundancy on page 105](#) before transmitting its data to confirm that there is no supplemental. The digital scanner transmits UPC/EAN barcodes that do not have that prefix immediately.
 - **Enable 378/379 Supplemental Mode**
 - **Enable 978/979 Supplemental Mode**



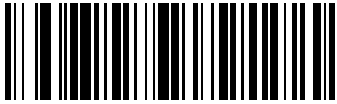
NOTE: If you select 978/979 Supplemental Mode and are scanning Bookland EAN barcodes, see [Enable/Disable Bookland EAN on page 101](#) to enable Bookland EAN, and select a format using [Bookland ISBN Format on page 113](#).

- **Enable 977 Supplemental Mode**
- **Enable 414/419/434/439 Supplemental Mode**
- **Enable 491 Supplemental Mode**
- **Enable Smart Supplemental Mode** - applies to EAN-13 barcodes starting with any prefix listed previously.
- **Supplemental User-Programmable Type 1** - applies to EAN-13 barcodes starting with a 3-digit user-defined prefix. Set this 3-digit prefix using [User-Programmable Supplementals on page 105](#).
- **Supplemental User-Programmable Type 1 and 2** - applies to EAN-13 barcodes starting with either of two 3-digit user-defined prefixes. Set the 3-digit prefixes using [User-Programmable Supplementals on page 105](#).
- **Smart Supplemental Plus User-Programmable 1** - applies to EAN-13 barcodes starting with any prefix listed previously or the user-defined prefix set using [User-Programmable Supplementals on page 105](#).
- **Smart Supplemental Plus User-Programmable 1 and 2** - applies to EAN-13 barcodes starting with any prefix listed previously or one of the two user-defined prefixes set using [User-Programmable Supplementals on page 105](#).



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

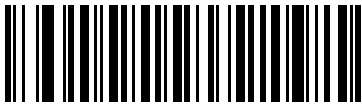
Decode UPC/EAN/JAN Supplementals (continued)



**Decode UPC/EAN/JAN Only With Supplementals
(1)**



*** Ignore Supplementals
(0)**



**Autodiscriminate UPC/EAN/JAN Supplementals
(2)**



**Enable 378/379 Supplemental Mode
(4)**



**Enable 978/979 Supplemental Mode
(5)**



**Enable 977 Supplemental Mode
(7)**

Decode UPC/EAN/JAN Supplementals (continued)



**Enable 414/419/434/439 Supplemental Mode
(6)**



**Enable 491 Supplemental Mode
(8)**



**Enable Smart Supplemental Mode
(3)**



**Supplemental User-Programmable Type 1
(9)**



**Supplemental User-Programmable Type 1 and 2
(10)**



**Smart Supplemental Plus User-Programmable 1
(11)**



**Smart Supplemental Plus User-Programmable 1 and 2
(12)**

User-Programmable Supplementals

Supplemental 1: Parameter # 579 (SSI # F1h 43h)

Supplemental 2: Parameter # 580 (SSI # F1h 44h)

If you selected a Supplemental User-Programmable option from [Decode UPC/EAN/JAN Supplementals on page 102](#), select **User-Programmable Supplemental 1** to set the 3-digit prefix. Then select the 3 digits using the numeric barcodes beginning on [Numeric Bar Codes on page H-1](#). Select **User-Programmable Supplemental 2** to set a second 3-digit prefix. Then select the 3 digits using the numeric barcodes beginning on [Numeric Bar Codes on page H-1](#). The default is 000 (zeroes).



User-Programmable Supplemental 1



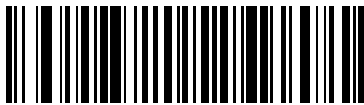
User-Programmable Supplemental 2

UPC/EAN/JAN Supplemental Redundancy

Parameter # 80 (SSI # 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 barcode below to set a decode redundancy value. Next, scan two numeric barcodes in [Appendix , Numeric Bar Codes](#). Enter a leading zero for single digit numbers. To correct an error or change a selection, scan [Cancel on page H-2](#).



UPC/EAN/JAN Supplemental Redundancy

UPC/EAN/JAN Supplemental AIM ID Format

Parameter # 672 (SSI # F1h A0h)

Select an output format when reporting UPC/EAN/JAN barcodes with Supplementals with [Transmit Code ID Character](#) on [page 32](#) 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
(0)**



*** Combined
(1)**

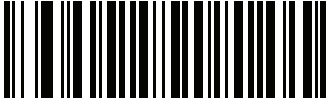


**Separate Transmissions
(2)**

UPC Reduced Quiet Zone

Parameter # 1289 (SSI # F8h 05h 09h)

Scan one of the following barcodes to enable or disable decoding UPC barcodes with reduced quiet zones. If you select **Enable**, select a [1D Quiet Zone Level on page 178](#).



Enable UPC Reduced Quiet Zone

(1)



*** Disable UPC Reduced Quiet Zone**

(0)

Transmit UPC-A Check Digit

Parameter # 40 (SSI # 28h)

The check digit is the last character of the symbol used to verify the integrity of the data. Scan the appropriate barcode below to transmit the barcode 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**

(1)



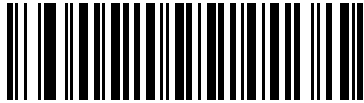
Do Not Transmit UPC-A Check Digit

(0)

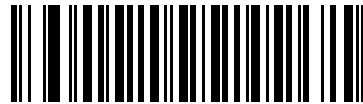
Transmit UPC-E Check Digit

Parameter # 41 (SSI # 29h)

The check digit is the last character of the symbol used to verify the integrity of the data. Scan the appropriate barcode below to transmit the barcode 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
(1)**

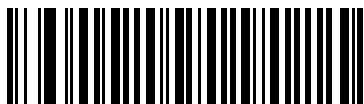


**Do Not Transmit UPC-E Check Digit
(0)**

Transmit UPC-E1 Check Digit

Parameter # 42 (SSI # 2Ah)

The check digit is the last character of the symbol used to verify the integrity of the data. Scan the appropriate barcode below to transmit the barcode 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
(1)**



**Do Not Transmit UPC-E1 Check Digit
(0)**

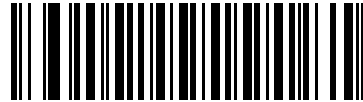
UPC-A Preamble

Parameter # 34 (SSI # 22h)

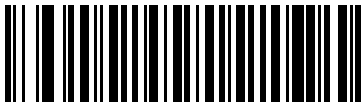
Preamble characters are part of the UPC symbol, and include Country Code and System Character. There are three options for transmitting a UPC-A preamble to the host device: transmit System Character only, transmit System Character and Country Code ("0" for USA), and transmit no preamble. Select the appropriate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



No Preamble (<DATA>)
(0)



*** System Character (<SYSTEM CHARACTER> <DATA>)**
(1)

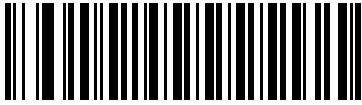


System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER>
<DATA>)
(2)

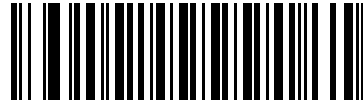
UPC-E Preamble

Parameter # 35 (SSI # 23h)

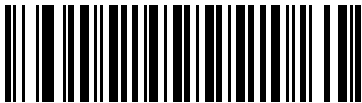
Preamble characters are part of the UPC symbol, and include Country Code and System Character. There are three options for transmitting a UPC-E preamble to the host device: transmit System Character only, transmit System Character and Country Code ("0" for USA), and transmit no preamble. Select the appropriate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



No Preamble (<DATA>)
(0)



*** System Character (<SYSTEM CHARACTER> <DATA>)**
(1)



System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER>
<DATA>)
(2)

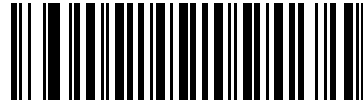
UPC-E1 Preamble

Parameter # 36 (SSI # 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>)
(0)



*** System Character (<SYSTEM CHARACTER> <DATA>)**
(1)



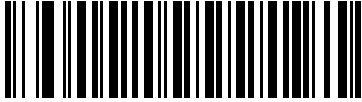
System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(2)

Convert UPC-E to UPC-A

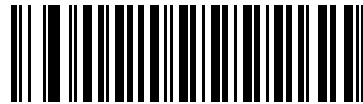
Parameter # 37 (SSI # 25h)

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)
(1)



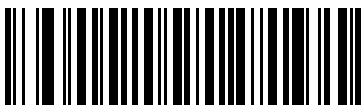
*** Do Not Convert UPC-E to UPC-A (Disable)**
(0)

Convert UPC-E1 to UPC-A

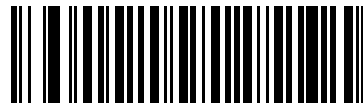
Parameter # 38 (SSI # 26h)

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)
(1)



*** Do Not Convert UPC-E1 to UPC-A (Disable)**
(0)

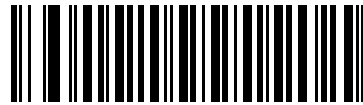
EAN-8/JAN-8 Extend

Parameter # 39 (SSI # 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
(1)**



*** Disable EAN/JAN Zero Extend
(0)**

Bookland ISBN Format

Parameter # 576 (SSI # F1h 40h)

If you enabled Bookland EAN using [Enable/Disable Bookland EAN on page 101](#), select one of the following formats for Bookland data:

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



*** Bookland ISBN-10
(0)**



**Bookland ISBN-13
(1)**



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

UCC Coupon Extended Code

Parameter # 85 (SSI # 55h)

Enable this parameter to decode UPC-A barcodes starting with digit '5', EAN-13 barcodes 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 Code.



**Enable UCC Coupon Extended Code
(1)**



*** Disable UCC Coupon Extended Code
(0)**



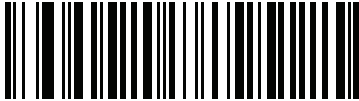
NOTE: See [UPC/EAN/JAN Supplemental Redundancy on page 105](#) to control autodiscrimination of the GS1-128 (right half) of a coupon code.

Coupon Report

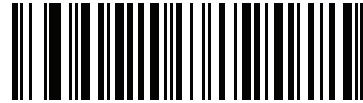
Parameter # 730 (SSI # F1h DAh)

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 digital scanner supports both **Old Coupon Format** and **New Coupon Format**.



Old Coupon Format
(0)



*** New Coupon Format**
(1)



Autodiscriminate Coupon Format
(2)

ISSN EAN

Parameter # 617 (SSI # F1h 69h)

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



Enable ISSN EAN
(1)



*** Disable ISSN EAN**
(0)

Code 128

Enable/Disable Code 128

Parameter # 8 (SSI # 08h)

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



*** Enable Code 128
(1)**



**Disable Code 128
(0)**

Set Lengths for Code 128

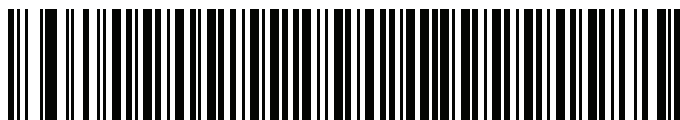
Parameter # L1 = 209 (SSI # D1h), L2 = 210 (SSI # D2h)

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 128 to any length, one or two discrete lengths, or lengths within a specific range. The default is 1 to 55.



NOTE: When setting lengths for different barcode 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 barcodes in [Appendix H, 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 H-2](#).
- **Two Discrete Lengths** - Select this option to decode only Code 128 symbols containing either of two selected lengths. Select lengths using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode a Code 128 symbol with a specific length range. Select lengths using numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Select this option to decode Code 128 symbols containing any number of characters within the digital scanner's capability.



Code 128 - One Discrete Length



Code 128 - Two Discrete Lengths



Code 128 - Length Within Range



Code 128 - Any Length

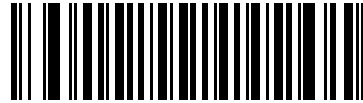
Enable/Disable GS1-128 (formerly UCC/EAN-128)

Parameter # 14 (SSI # 0Eh)

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



*** Enable GS1-128
(1)**



**Disable GS1-128
(0)**

Enable/Disable ISBT 128

Parameter # 84 (SSI # 54h)

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



**Enable ISBT 128
(1)**



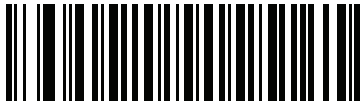
*** Disable ISBT 128
(0)**

ISBT Concatenation

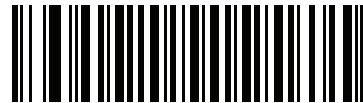
Parameter # 577 (SSI # F1h 41h)

Select an option for concatenating pairs of ISBT code types:

- If you select **Disable ISBT Concatenation**, the digital scanner 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 digital scanner to decode and perform concatenation. The digital scanner does not decode single ISBT symbols.
- If you select **Autodiscriminate ISBT Concatenation**, the digital scanner decodes and concatenates pairs of ISBT codes immediately. If only a single ISBT symbol is present, the digital scanner must decode the symbol the number of times set via [ISBT Concatenation Redundancy on page 120](#) before transmitting its data to confirm that there is no additional ISBT symbol.



Disable ISBT Concatenation
(0)



Enable ISBT Concatenation
(1)

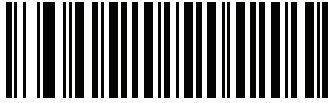


*** Autodiscriminate ISBT Concatenation**
(2)

Check ISBT Table

Parameter # 578 (SSI # F1h 42h)

The ISBT specification includes a table that lists several types of ISBT barcodes 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
(1)



Disable Check ISBT Table
(0)

ISBT Concatenation Redundancy

Parameter # 223 (SSI # DFh)

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

Scan the barcode below, then scan two numeric barcodes in [Appendix H, 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 H-2](#). The default is 10.



ISBT Concatenation Redundancy

Code 128 Security Level

Parameter # 751 (SSI # F1h EFh)

Code 128 barcodes are vulnerable to misdecodes, particularly when Code 128 Lengths is set to **Any Length**. The digital scanner offers four levels of decode security for Code 128 barcodes. There is an inverse relationship between security and digital scanner aggressiveness. Increasing the level of security can reduce scanning aggressiveness, so select only the level of security necessary.

- **Code 128 Security Level 0:** This setting allows the digital scanner to operate in its most aggressive state, while providing sufficient security in decoding most in-spec barcodes.
- **Code 128 Security Level 1:** A barcode 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 greater barcode security requirements if **Security Level 1** fails to eliminate misdecodes.
- **Code 128 Security Level 3:** If you selected **Security Level 2**, and misdecodes still occur, select this security level to apply the highest safety requirements. A barcode must be successfully read three times before being decoded.



NOTE: Selecting this option is an extreme measure against mis-decoding severely out-of-spec barcodes. Selecting this level of security significantly impairs the decoding ability of the digital scanner. If this level of security is required, try to improve the quality of the barcodes.



Code 128 Security Level 0
(0)



* Code 128 Security Level 1
(1)



Code 128 Security Level 2
(2)



Code 128 Security Level 3
(3)

Code 128 Reduced Quiet Zone

Parameter # 1208 (SSI # F8h 04h B8h)

Scan one of the following barcodes to enable or disable decoding Code 128 barcodes with reduced quiet zones. If you select **Enable**, select a [1D Quiet Zone Level on page 178](#).



Enable Code 128 Reduced Quiet Zone
(1)



*** Disable Code 128 Reduced Quiet Zone**
(0)

Ignore Code 128 <FNC4>

Parameter # 1254 (SSI # F8h 04h E6h)

This feature applies to Code 128 barcodes with an embedded <FNC4> character. Enable this to strip the <FNC4> character from the decode data. The remaining characters are sent to the host unchanged. When disabled, the <FNC4> character is processed normally as per Code 128 standard.



Enable Ignore Code 128 <FNC4>
(1)



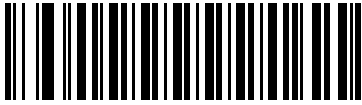
*** Disable Ignore Code 128 <FNC4>**
(0)

Code 39

Enable/Disable Code 39

Parameter # 0 (SSI # 00h)

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



*** Enable Code 39
(1)**

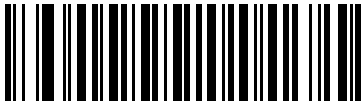


**Disable Code 39
(0)**

Enable/Disable Trioptic Code 39

Parameter # 13 (SSI # 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 barcode below.



**Enable Trioptic Code 39
(1)**



*** Disable Trioptic Code 39
(0)**



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

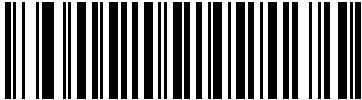
Convert Code 39 to Code 32

Parameter # 86 (SSI # 56h)

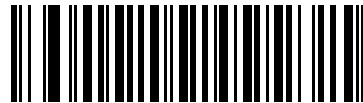
Code 32 is a variant of Code 39 used by the Italian pharmaceutical industry. Scan the appropriate barcode below to enable or disable converting Code 39 to Code 32.



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



Enable Convert Code 39 to Code 32
(1)



*** Disable Convert Code 39 to Code 32**
(0)

Code 32 Prefix

Parameter # 231 (SSI # E7h)

Scan the appropriate barcode below to enable or disable adding the prefix character “A” to all Code 32 barcodes.



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



Enable Code 32 Prefix
(1)



*** Disable Code 32 Prefix**
(0)

Set Lengths for Code 39

Parameter # L1 = 18 (SSI # 12h), L2 = 19 (SSI # 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 is 1 to 55.



NOTE: When setting lengths for different barcode 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 barcodes in [Appendix H, 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 H-2](#).
- **Two Discrete Lengths** - Select this option to decode only Code 39 symbols containing either of two selected lengths. Select lengths using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode a Code 39 symbol with a specific length range. Select lengths using numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Select this option to decode Code 39 symbols containing any number of characters within the digital scanner's capability.



Code 39 - One Discrete Length



Code 39 - Two Discrete Lengths



Code 39 - Length Within Range

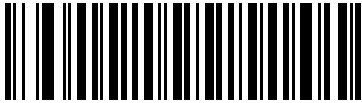


Code 39 - Any Length

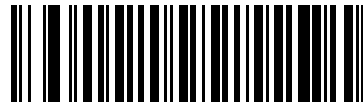
Code 39 Check Digit Verification

Parameter # 48 (SSI # 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
(1)



*** Disable Code 39 Check Digit**
(0)



Transmit Code 39 Check Digit

Parameter # 43 (SSI # 2Bh)

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



Transmit Code 39 Check Digit (Enable)
(1)



*** Do Not Transmit Code 39 Check Digit (Disable)**
(0)



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

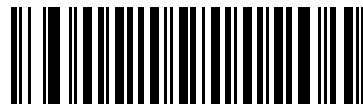
Code 39 Full ASCII Conversion

Parameter # 17 (SSI # 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 barcode below.



Enable Code 39 Full ASCII
(1)



*** Disable Code 39 Full ASCII**
(0)

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 [ASCII](#).

Code 39 Security Level

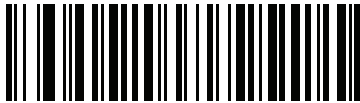
Parameter # 750 (SSI # F1h EEh)

The digital scanner offers four levels of decode security for Code 39 barcodes. There is an inverse relationship between security and digital scanner aggressiveness. Increasing the level of security can reduce scanning aggressiveness, so select only the level of security necessary.

- **Code 39 Security Level 0:** This setting allows the digital scanner to operate in its most aggressive state, while providing sufficient security in decoding most in-spec barcodes.
- **Code 39 Security Level 1:** This default setting eliminates most misdecodes.
- **Code 39 Security Level 2:** Select this option with greater barcode security requirements 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 to apply the highest safety requirements.



NOTE: Selecting this option is an extreme measure against mis-decoding severely out-of-spec barcodes. Selecting this level of security significantly impairs the decoding ability of the digital scanner. If this level of security is required, try to improve the quality of the barcodes.



Code 39 Security Level 0
(0)



* Code 39 Security Level 1
(1)



Code 39 Security Level 2
(2)



Code 39 Security Level 3
(3)

Code 39 Reduced Quiet Zone

Parameter # 1209 (SSI # F8h 04h B9h)

Scan one of the following barcodes to enable or disable decoding Code 39 barcodes with reduced quiet zones. If you select **Enable**, select a [1D Quiet Zone Level on page 178](#).



Enable Code 39 Reduced Quiet Zone
(1)



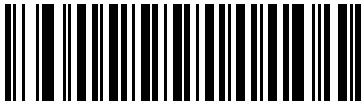
*** Disable Code 39 Reduced Quiet Zone**
(0)

Code 93

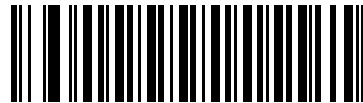
Enable/Disable Code 93

Parameter # 9 (SSI # 09h)

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



*** Enable Code 93**
(1)



Disable Code 93
(0)

Set Lengths for Code 93

Parameter # L1 = 26 (SSI # 1Ah), L2 = 27 (SSI # 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 is 1 to 55.

- **One Discrete Length** - Select this option to decode only Code 93 symbols containing a selected length. Select the length using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Two Discrete Lengths** - Select this option to decode only Code 93 symbols containing either of two selected lengths. Select lengths using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode a Code 93 symbol with a specific length range. Select lengths using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Scan this option to decode Code 93 symbols containing any number of characters within the digital scanner's capability.



Code 93 - One Discrete Length



Code 93 - Two Discrete Lengths



Code 93 - Length Within Range



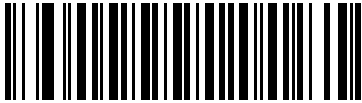
Code 93 - Any Length

Code 11

Code 11

Parameter # 10 (SSI # 0Ah)

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



Enable Code 11
(1)



*** Disable Code 11**
(0)

Set Lengths for Code 11

Parameter # L1 = 28 (SSI # 1Ch), L2 = 29 (SSI # 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 is 4 to 55.

- **One Discrete Length** - Select this option to decode only Code 11 symbols containing a selected length. Select the length using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Two Discrete Lengths** - Select this option to decode only Code 11 symbols containing either of two selected lengths. Select lengths using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode a Code 11 symbol with a specific length range. Select lengths using numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Scan this option to decode Code 11 symbols containing any number of characters within the digital scanner's capability.



Code 11 - One Discrete Length



Code 11 - Two Discrete Lengths



Code 11 - Length Within Range



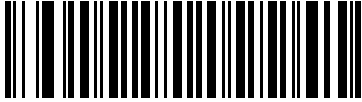
Code 11 - Any Length

Code 11 Check Digit Verification

Parameter # 52 (SSI # 34h)

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

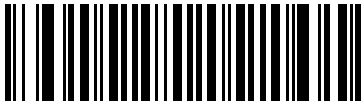
To enable this feature, scan the barcode below corresponding to the number of check digits encoded in the Code 11 symbols.



*** Disable
(0)**



**One Check Digit
(1)**



**Two Check Digits
(2)**

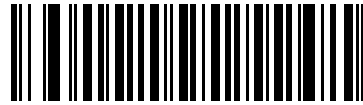
Transmit Code 11 Check Digits

Parameter # 47 (SSI # 2Fh)

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



Transmit Code 11 Check Digit(s) (Enable)
(1)



*** Do Not Transmit Code 11 Check Digit(s) (Disable)**
(0)



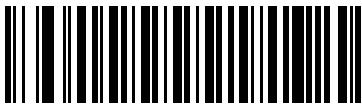
NOTE: Code 11 Check Digit Verification must be enabled for this parameter to function.

Interleaved 2 of 5 (ITF)

Enable/Disable Interleaved 2 of 5

Parameter # 6 (SSI # 06h)

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



Enable Interleaved 2 of 5
(1)



*** Disable Interleaved 2 of 5**
(0)

Set Lengths for Interleaved 2 of 5

Parameter # L1 = 22 (SSI # 16h), L2 = 23 (SSI # 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 range for Interleaved 2 of 5 lengths is 0 - 55. The default is 6 to 55.

- **One Discrete Length** - Select this option to decode only I 2 of 5 symbols containing a selected length. Select the length using the numeric barcodes in [Appendix H, 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 H-2](#).
- **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 barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode an I 2 of 5 symbol with a specific length range. Select lengths using numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Scan this option to decode I 2 of 5 symbols containing any number of characters within the digital scanner's capability.



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



I 2 of 5 - One Discrete Length



I 2 of 5 - Two Discrete Lengths



I 2 of 5 - Length Within Range



I 2 of 5 - Any Length

I 2 of 5 Check Digit Verification

Parameter # 49 (SSI # 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**
(0)



USS Check Digit
(1)



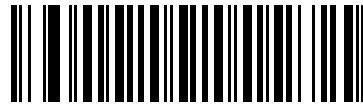
OPCC Check Digit
(2)

Transmit I 2 of 5 Check Digit**Parameter # 44 (SSI # 2Ch)**

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



Transmit I 2 of 5 Check Digit (Enable)
(1)



*** Do Not Transmit I 2 of 5 Check Digit (Disable)**
(0)

Convert I 2 of 5 to EAN-13**Parameter # 82 (SSI # 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)
(1)



*** Do Not Convert I 2 of 5 to EAN-13 (Disable)**
(0)

I 2 of 5 Security Level

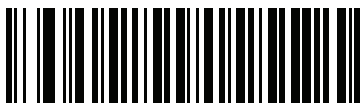
Parameter # 1121 (SSI # F8h 04h 61h)

Interleaved 2 of 5 barcodes are vulnerable to misdecodes, particularly when I 2 of 5 Lengths is set to **Any Length**. The digital scanner offers four levels of decode security for Interleaved 2 of 5 barcodes. There is an inverse relationship between security and digital scanner aggressiveness. Increasing the level of security can reduce scanning aggressiveness, so select only the level of security necessary.

- **I 2 of 5 Security Level 0:** This setting allows the digital scanner to operate in its most aggressive state, while providing sufficient security in decoding most in-spec barcodes.
- **I 2 of 5 Security Level 1:** A barcode 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 greater barcode security requirements 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 barcode must be successfully read three times before being decoded.



NOTE: Selecting this option is an extreme measure against mis-decoding severely out-of-spec barcodes. Selecting this level of security significantly impairs the decoding ability of the digital scanner. If this level of security is required, try to improve the quality of the barcodes.



I 2 of 5 Security Level 0
(0)



* I 2 of 5 Security Level 1
(1)



I 2 of 5 Security Level 2
(2)



I 2 of 5 Security Level 3
(3)

I 2 of 5 Reduced Quiet Zone

Parameter # 1210 (SSI # F8h 04h BAh)

Scan one of the following barcodes to enable or disable decoding I 2 of 5 barcodes with reduced quiet zones. If you select **Enable**, select a [1D Quiet Zone Level on page 178](#).



Enable I 2 of 5 Reduced Quiet Zone
(1)



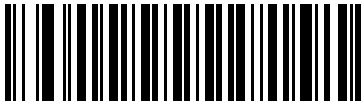
*** Disable I 2 of 5 Reduced Quiet Zone**
(0)

Discrete 2 of 5 (DTF)

Enable/Disable Discrete 2 of 5

Parameter # 5 (SSI # 05h)

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



Enable Discrete 2 of 5
(1)



*** Disable Discrete 2 of 5**
(0)

Set Lengths for Discrete 2 of 5

Parameter # L1 = 20 (SSI # 14h), L2 = 21 (SSI # 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 range for Discrete 2 of 5 lengths is 1 - 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 barcodes in [Appendix H, 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 H-2](#).
- **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 barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode a D 2 of 5 symbol with a specific length range. Select lengths using numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Scan this option to decode D 2 of 5 symbols containing any number of characters within the digital scanner's capability.



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



D 2 of 5 - One Discrete Length



D 2 of 5 - Two Discrete Lengths



D 2 of 5 - Length Within Range



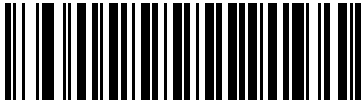
D 2 of 5 - Any Length

Codabar (NW - 7)

Enable/Disable Codabar

Parameter # 7 (SSI # 07h)

To enable or disable Codabar, scan the appropriate barcode below.



*** Enable Codabar
(1)**



**Disable Codabar
(0)**

Set Lengths for Codabar

Parameter # L1 = 24 (SSI # 18h), L2 = 25 (SSI # 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 is 4 to 55.

- **One Discrete Length** - Select this option to decode only Codabar symbols containing a selected length. Select the length using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Two Discrete Lengths** - Select this option to decode only Codabar symbols containing either of two selected lengths. Select lengths using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode a Codabar symbol with a specific length range. Select lengths using numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Scan this option to decode Codabar symbols containing any number of characters within the digital scanner's capability.



Codabar - One Discrete Length



Codabar - Two Discrete Lengths



Codabar - Length Within Range



Codabar - Any Length

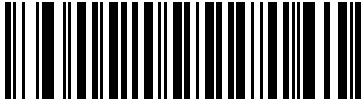
CLSI Editing

Parameter # 54 (SSI # 36h)

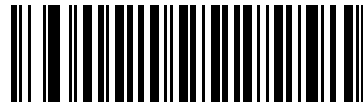
Enable this parameter to strip the start and stop characters and insert a space after the first, fifth, and tenth characters of a 14-character Codabar symbol. Enable this feature if the host system requires this data format.



NOTE: Symbol length does not include start and stop characters.



**Enable CLSI Editing
(1)**



*** Disable CLSI Editing
(0)**

NOTIS Editing

Parameter # 55 (SSI # 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.



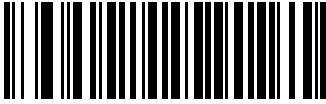
**Enable NOTIS Editing
(1)**



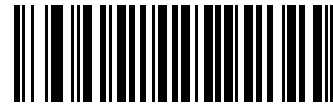
*** Disable NOTIS Editing
(0)**

Codabar Upper or Lower Case Start/Stop Characters Detection**Parameter # 855 (SSI # F2h 57h)**

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



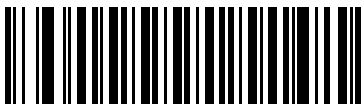
**Lower Case
(1)**



*** Upper Case
(0)**

MSI**Enable/Disable MSI****Parameter # 11 (SSI # 0Bh)**

To enable or disable MSI, scan the appropriate barcode below.



**Enable MSI
(1)**



*** Disable MSI
(0)**

Set Lengths for MSI

Parameter # L1 = 30 (SSI # 1Eh), L2 = 31 (SSI # 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 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 barcodes in [Appendix H, 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 H-2](#).
- **Two Discrete Lengths** - Select this option to decode only MSI symbols containing either of two selected lengths. Select lengths using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode a MSI symbol with a specific length range. Select lengths using numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Scan this option to decode MSI symbols containing any number of characters within the digital scanner's capability.



NOTE: Due to the construction of the MSI symbology, it is possible for a scan covering only a portion of the code to transmit as a complete scan, yielding less data than is encoded in the barcode. 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



MSI - Any Length

MSI Check Digits

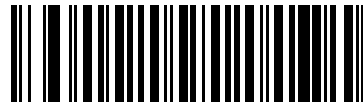
Parameter # 50 (SSI # 32h)

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** barcode to enable verification of the second check digit.

See [MSI Check Digit Algorithm on page 148](#) for the selection of second digit algorithms.



*** One MSI Check Digit
(0)**



**Two MSI Check Digits
(1)**

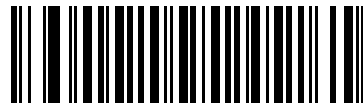
Transmit MSI Check Digit(s)

Parameter # 46 (SSI # 2Eh)

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



**Transmit MSI Check Digit(s) (Enable)
(1)**



*** Do Not Transmit MSI Check Digit(s) (Disable)
(0)**

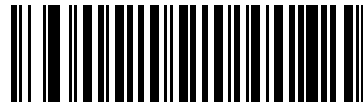
MSI Check Digit Algorithm

Parameter # 51 (SSI # 33h)

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



**MOD 10/MOD 11
(0)**



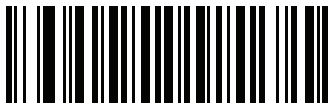
*** MOD 10/MOD 10
(1)**

Chinese 2 of 5

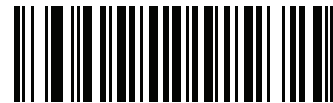
Enable/Disable Chinese 2 of 5

Parameter # 408 (SSI # F0h 98h)

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



**Enable Chinese 2 of 5
(1)**



*** Disable Chinese 2 of 5
(0)**

Matrix 2 of 5

Enable/Disable Matrix 2 of 5

Parameter # 618 (SSI # F1h 6Ah)

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



**Enable Matrix 2 of 5
(1)**



*** Disable Matrix 2 of 5
(0)**

Set Lengths for Matrix 2 of 5

Parameter # L1 = 619 (SSI # F1h 6Bh), L2 = 620 (SSI # 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 is 4 to 55.

- **One Discrete Length** - Select this option to decode only Matrix 2 of 5 symbols containing a selected length. Select the length using the numeric barcodes in [Appendix H, 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 H-2](#).
- **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 barcodes in [Appendix H, 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 H-2](#).
- **Length Within Range** - Select this option to decode a Matrix 2 of 5 symbol with a specific length range. Select lengths using the numeric barcodes in [Appendix H, 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 H-2](#).
- **Any Length** - Scan this option to decode Matrix 2 of 5 symbols containing any number of characters within the digital scanner's capability.



* Matrix 2 of 5 - One Discrete Length



Matrix 2 of 5 - Two Discrete Lengths



Matrix 2 of 5 - Length Within Range



Matrix 2 of 5 - Any Length

Matrix 2 of 5 Check Digit

Parameter # 622 (SSI # F1h 6Eh)

The check digit is the last character of the symbol used to verify the integrity of the data. Scan the appropriate barcode below to transmit the barcode data with or without the Matrix 2 of 5 check digit.



Enable Matrix 2 of 5 Check Digit
(1)

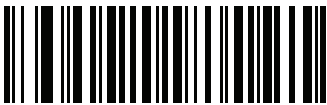


*** Disable Matrix 2 of 5 Check Digit**
(0)

Transmit Matrix 2 of 5 Check Digit

Parameter # 623 (SSI # F1h 6Fh)

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



Transmit Matrix 2 of 5 Check Digit
(1)



*** Do Not Transmit Matrix 2 of 5 Check Digit**
(0)

Korean 3 of 5

Enable/Disable Korean 3 of 5

Parameter # 581 (SSI # F1h 45h)

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



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



**Enable Korean 3 of 5
(1)**



*** Disable Korean 3 of 5
(0)**

Inverse 1D

Parameter # 586 (SSI # F1h 4Ah)

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

- **Regular Only** - the digital scanner decodes regular 1D barcodes only.
- **Inverse Only** - the digital scanner decodes inverse 1D barcodes only.
- **Inverse Autodetect** - the digital scanner decodes both regular and inverse 1D barcodes.



*** Regular
(0)**



**Inverse Only
(1)**



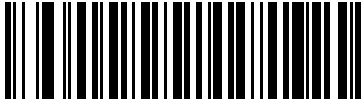
**Inverse Autodetect
(2)**

GS1 DataBar

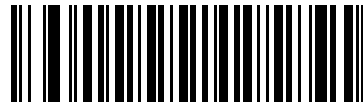
The variants of GS1 DataBar are DataBar-14, DataBar Expanded, and DataBar Limited. The limited and expanded versions have stacked variants. Scan the appropriate barcodes to enable or disable each variant of GS1 DataBar.

GS1 DataBar-14

Parameter # 338 (SSI # F0h 52h)



* Enable GS1 DataBar-14
(1)



Disable GS1 DataBar-14
(0)

GS1 DataBar Limited

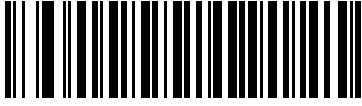
Parameter # 339 (SSI # F0h 53h)



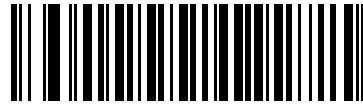
* Enable GS1 DataBar Limited
(1)



Disable GS1 DataBar Limited
(0)

GS1 DataBar Expanded**Parameter # 340 (SSI # F0h 54h)**

*** Enable GS1 DataBar Expanded
(1)**

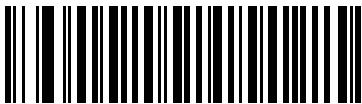


**Disable GS1 DataBar Expanded
(0)**

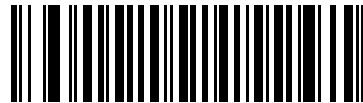
Convert GS1 DataBar to UPC/EAN**Parameter # 397 (SSI # F0h, 8Dh)**

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 barcode as EAN-13.

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



**Enable Convert GS1 DataBar to UPC/EAN
(1)**



*** Disable Convert GS1 DataBar to UPC/EAN
(0)**

GS1 DataBar Limited Security Level

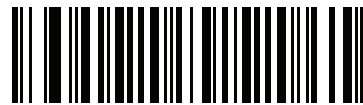
Parameter # 728 (SSI # F1h D8h)

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

- Level 1 – No clear margin required. This complies with the original GS1 standard, yet might result in erroneous decoding of the DataBar Limited barcode when scanning some UPC symbols that start with digits “9” and “7”
- Level 2 – Automatic risk detection. This level of security may result in erroneous decoding of DataBar Limited barcodes when scanning some UPC symbols. The digital scanner defaults to Level 3, otherwise to Level 1.
- Level 3 – Security level reflects newly proposed GS1 standard that requires a 5 times trailing clear margin.
- 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 1
(1)



GS1 DataBar Limited Security Level 2
(2)



*** GS1 DataBar Limited Security Level 3**
(3)



GS1 DataBar Limited Security Level 4
(4)

Composite

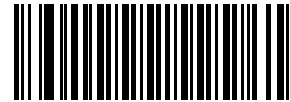
Composite CC-C

Parameter # 341 (SSI # F0h 55h)

Scan a barcode below to enable or disable Composite barcodes of type CC-C.



Enable CC-C
(1)



* Disable CC-C
(0)

Composite CC-A/B

Parameter # 342 (SSI # F0h 56h)

Scan a barcode below to enable or disable Composite barcodes of type CC-A/B.



Enable CC-A/B
(1)

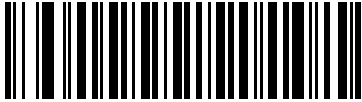


* Disable CC-A/B
(0)

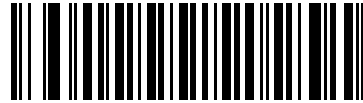
Composite TLC-39

Parameter # 371 (SSI # F0h 73h)

Scan a barcode below to enable or disable Composite barcodes of type TLC-39.



Enable TLC39
(1)



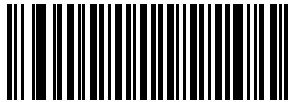
* Disable TLC39
(0)

UPC Composite Mode

Parameter # 344 (SSI # F0h 58h)

Select an option for linking UPC symbols with a 2D symbol during transmission as if they were one symbol:

- Select **UPC Never Linked** to transmit UPC barcodes regardless of whether a 2D symbol is detected.
- Select **UPC Always Linked** to transmit UPC barcodes and the 2D portion.
If 2D is not present, the UPC barcode does not transmit.
- If you select **Autodiscriminate UPC Composites**, the digital scanner determines if there is a 2D portion, then transmits the UPC, as well as the 2D portion if present.



* UPC Never Linked
(0)



UPC Always Linked
(1)

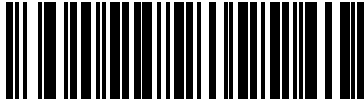


Autodiscriminate UPC Composites
(2)

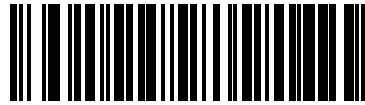
Composite Beep Mode

Parameter # 398 (SSI # F0h, 8Eh)

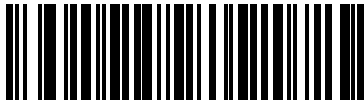
To select the number of decode beeps when a composite barcode is decoded, scan the appropriate barcode.



Single Beep after both are decoded
(0)



* Beep as each code type is decoded
(1)



Double Beep after both are decoded
(2)

GS1-128 Emulation Mode for UCC/EAN Composite Codes

Parameter # 427 (SSI # F0h, ABh)

Select whether to enable or disable this mode.



Enable GS1-128 Emulation Mode for
UCC/EAN Composite Codes
(1)



* Disable GS1-128 Emulation Mode for
UCC/EAN Composite Codes
(0)

2D Symbologies

Enable/Disable PDF417

Parameter # 15 (SSI # 0Fh)

To enable or disable PDF417, scan the appropriate barcode below.



*** Enable PDF417
(1)**



**Disable PDF417
(0)**

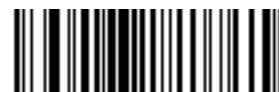
Enable/Disable MicroPDF417

Parameter # 227 (SSI # E3h)

To enable or disable MicroPDF417, scan the appropriate barcode below.



**Enable MicroPDF417
(1)**



*** Disable MicroPDF417
(0)**

Code 128 Emulation

Parameter # 123 (SSI # 7Bh)

Enable this parameter to transmit data from certain MicroPDF417 symbols as Code 128. [AIM Code ID Character on page 32](#) must be enabled for this parameter to work.

Enable Code 128 Emulation to transmit these MicroPDF417 symbols with one of the following prefixes:

-]C1 if the first codeword is 903-905
-]C2 if the first codeword is 908 or 909
-]C0 if the first codeword is 910 or 911

Disable Code 128 Emulation to transmit these MicroPDF417 symbols with one of the following prefixes:

-]L3 if the first codeword is 903-905
-]L4 if the first codeword is 908 or 909
-]L5 if the first codeword is 910 or 911

Scan a barcode below to enable or disable Code 128 Emulation.



NOTE: Linked Micro PDF codewords 906, 907, 912, 914, and 915 are not supported. Use GS1 Composites instead.



Enable Code 128 Emulation
(1)



*** Disable Code 128 Emulation**
(0)

Data Matrix

Parameter # 292 (SSI # F0h, 24h)

To enable or disable Data Matrix, scan the appropriate barcode below.



*** Enable Data Matrix
(1)**

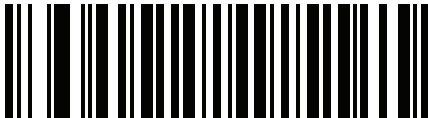


**Disable Data Matrix
(0)**

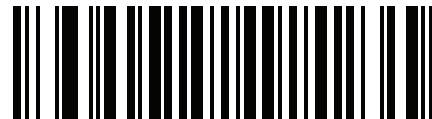
GS1 Data Matrix

Parameter # 1336 (SSI # F8h 05h 38h)

To enable or disable GS1 Data Matrix, scan the appropriate barcode below.



*** Disable GS1 Data Matrix
(0)**



**Enable GS1 Data Matrix
(1)**

Data Matrix Inverse

Parameter # 588 (SSI # F1h 4Ch)

This parameter sets the Data Matrix inverse decoder setting. Options are:

- **Regular Only** - the digital scanner decodes regular Data Matrix barcodes only.
- **Inverse Only** - the digital scanner decodes inverse Data Matrix barcodes only.
- **Inverse Autodetect** - the digital scanner decodes both regular and inverse Data Matrix barcodes.



**Regular
(0)**



**Inverse Only
(1)**



*** Inverse Autodetect
(2)**

Maxicode

Parameter # 294 (SSI # F0h, 26h)

To enable or disable Maxicode, scan the appropriate barcode below.



**Enable Maxicode
(1)**



*** Disable Maxicode
(0)**

QR Code

Parameter # 293 (SSI # F0h, 25h)



NOTE: Inverse QR barcodes decode if **QR Code** is enabled.

To enable or disable QR Code, scan the appropriate barcode below.



*** Enable QR Code
(1)**



**Disable QR Code
(0)**

GS1 QR

Parameter # 1343 (SSI # F8h 05h 3Fh)

To enable or disable, scan the appropriate barcode below.



*** Disable
(0)**



**Enable
(1)**

MicroQR

Parameter # 573 (SSI # F1h 3Dh)

To enable or disable MicroQR, scan the appropriate barcode below.



* Enable MicroQR
(1)



Disable MicroQR
(0)

Aztec

Parameter # 574 (SSI # F1h 3Eh)

To enable or disable Aztec, scan the appropriate barcode below.



* Enable Aztec
(1)



Disable Aztec
(0)

Aztec Inverse

Parameter # 589 (SSI # F1h 4Dh)

This parameter sets the Aztec inverse decoder setting. Options are:

- **Regular Only** - the digital scanner decodes regular Aztec barcodes only.
- **Inverse Only** - the digital scanner decodes inverse Aztec barcodes only.
- **Inverse Autodetect** - the digital scanner decodes both regular and inverse Aztec barcodes.



Regular
(0)



Inverse Only
(1)

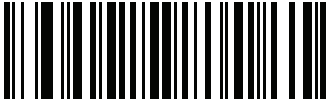


*** Inverse Autodetect**
(2)

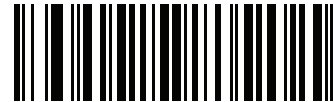
Han Xin

Parameter # 1167 (SSI # F8h 04h 8Fh)

To enable or disable Han Xin, scan the appropriate barcode below.



**Enable Han Xin
(1)**



*** Disable Han Xin
(0)**

Han Xin Inverse

Parameter # 1168 (SSI # F8h 04h 90h)

Select a Han Xin inverse decoder setting:

- **Regular Only** - the decoder decodes Han Xin barcodes with normal reflectance only.
- **Inverse Only** - the decoder decodes Han Xin barcodes with inverse reflectance only.
- **Inverse Autodetect** - the decoder decodes both regular and inverse Han Xin barcodes.



*** Regular
(0)**



**Inverse Only
(1)**



**Inverse Autodetect
(2)**

Postal Codes

US Postnet

Parameter # 89 (SSI # 59h)

To enable or disable US Postnet, scan the appropriate barcode below.



**Enable US Postnet
(1)**



*** Disable US Postnet
(0)**

US Planet

Parameter # 90 (SSI # 5Ah)

To enable or disable US Planet, scan the appropriate barcode below.



**Enable US Planet
(1)**

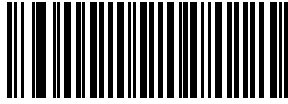


*** Disable US Planet
(0)**

Transmit US Postal Check Digit

Parameter # 95 (SSI # 5Fh)

Select whether to transmit US Postal data, which includes both US Postnet and US Planet, with or without the check digit.



*** Transmit US Postal Check Digit
(1)**



**Do Not Transmit US Postal Check Digit
(0)**

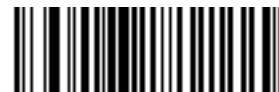
UK Postal

Parameter # 91 (SSI # 5Bh)

To enable or disable UK Postal, scan the appropriate barcode below.



**Enable UK Postal
(1)**



*** Disable UK Postal
(0)**

Transmit UK Postal Check Digit

Parameter # 96 (SSI # 60h)

Select whether to transmit UK Postal data with or without the check digit.



*** Transmit UK Postal
Check Digit
(1)**



**Do Not Transmit UK Postal Check Digit
(0)**

Japan Postal

Parameter # 290 (SSI # F0h, 22h)

To enable or disable Japan Postal, scan the appropriate barcode below.



**Enable Japan Postal
(1)**



*** Disable Japan Postal
(0)**

Australia Post

Parameter # 291 (SSI # F0h, 23h)

To enable or disable Australia Post, scan the appropriate barcode below.



Enable Australia Post
(1)



*** Disable Australia Post**
(0)

Australia Post Format

Parameter # 718 (SSI # F1h, CEh)

To select one of the following formats for Australia Post, scan the appropriate barcode below:

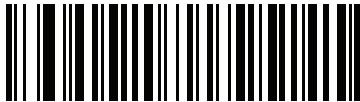
- **Autodiscriminate** (or Smart mode) - Attempt to decode the Customer Information Field using the N and C Encoding Tables.



NOTE: This option increases the risk of misdecodes because the encoded data format does not specify the Encoding Table used for encoding.

- **Raw Format** - Output raw bar patterns as a series of numbers 0 through 3.
- **Alphanumeric Encoding** - Decode the Customer Information Field using the C Encoding Table.
- **Numeric Encoding** - Decode the Customer Information Field using the N Encoding Table.

For more information on Australia Post Encoding Tables, refer to the *Australia Post Customer Barcoding Technical Specifications* available at <http://www.auspost.com.au>.



* Autodiscriminate
(0)



Raw Format
(1)



Alphanumeric Encoding
(2)



Numeric Encoding
(3)

Netherlands KIX Code

Parameter # 326 (SSI # F0h, 46h)

To enable or disable Netherlands KIX Code, scan the appropriate barcode below.



Enable Netherlands KIX Code
(1)



*** Disable Netherlands KIX Code**
(0)

USPS 4CB/One Code/Intelligent Mail

Parameter # 592 (SSI # F1h 50h)

To enable or disable USPS 4CB/One Code/Intelligent Mail, scan the appropriate barcode below.



Enable USPS 4CB/One Code/Intelligent Mail
(1)



*** Disable USPS 4CB/One Code/Intelligent Mail**
(0)

UPU FICS Postal

Parameter # 611 (SSI # F1h 63h)

To enable or disable UPU FICS Postal, scan the appropriate barcode below.



**Enable UPU FICS Postal
(1)**

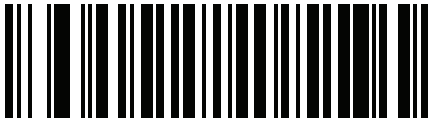


*** Disable UPU FICS Postal
(0)**

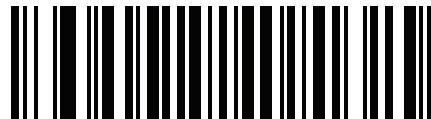
Mailmark

Parameter # 1337 (SSI # F8h 05h 39h)

To enable or disable Mailmark, scan the appropriate barcode below.



*** Disable Mailmark
(0)**



**Enable Mailmark
(1)**

Symbology-Specific Security Levels

Redundancy Level

Parameter # 78 (SSI # 4Eh)

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

Select the redundancy level appropriate for the barcode quality.

Redundancy Level 1

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

Table 9-6 *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
I 2 of 5	8 characters or less

Redundancy Level 2

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

Table 9-7 *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 9-8 *Redundancy Level 3 Codes*

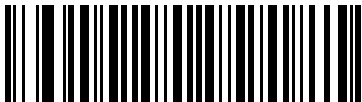
Code Type	Code Length
MSI	4 characters or less
D 2 of 5	8 characters or less
I 2 of 5	8 characters or less
Codabar	8 characters or less

Redundancy Level 4

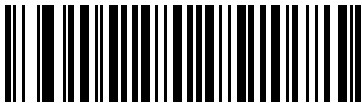
The following code types must be successfully read three times before being decoded:

Table 9-9 *Redundancy Level 4 Codes*

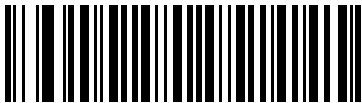
Code Type	Code Length
All	All



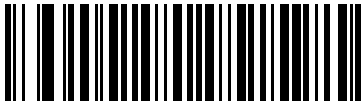
* Redundancy Level 1
(1)



Redundancy Level 2
(2)



Redundancy Level 3
(3)



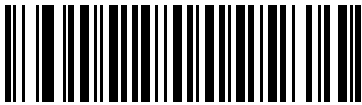
Redundancy Level 4
(4)

Security Level

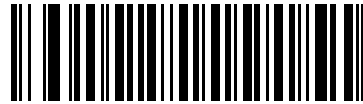
Parameter # 77 (SSI # 4Dh)

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

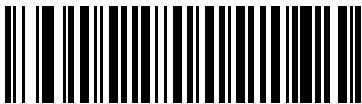
- **Security Level 0:** This setting allows the digital scanner to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” barcodes.
- **Security Level 1:** This default setting eliminates most misdecodes.
- **Security Level 2:** Select this option if Security level 1 fails to eliminate misdecodes.
- **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 barcodes. Selecting this level of security significantly impairs the decoding ability of the digital scanner. If you need this level of security, try to improve the quality of the barcodes.



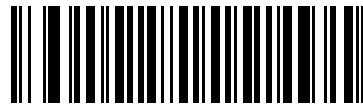
Security Level 0
(0)



* Security Level 1
(1)



Security Level 2
(2)



Security Level 3
(3)

1D Quiet Zone Level

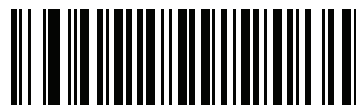
Parameter # 1288 (SSI # F8h 05h 08h)

This feature sets the level of aggressiveness in decoding barcodes with a reduced quiet zone (the area in front of and at the end of a barcode), and applies to symbologies enabled by a Reduced Quiet Zone parameter. Because higher levels increase the decoding time and risk of misdecodes, Symbol Technologies strongly recommends enabling only the symbologies which require higher quiet zone levels, and leaving Reduced Quiet Zone disabled for all other symbologies. Options are:

- 0 - The digital scanner performs normally in terms of quiet zone.
- 1 - The digital scanner performs more aggressively in terms of quiet zone.
- 2 - The digital scanner only requires one side EB (end of barcode) for decoding.
- 3 - The digital scanner decodes anything in terms of quiet zone or end of barcode.



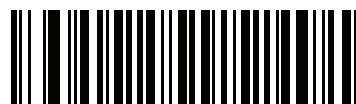
1D Quiet Zone Level 0
(0)



* 1D Quiet Zone Level 1
(1)



1D Quiet Zone Level 2
(2)



1D Quiet Zone Level 3
(3)

Intercharacter Gap Size

Parameter # 381 (SSI # F0h, 7Dh)

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



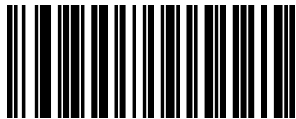
* Normal Intercharacter Gaps
(6)



Large Intercharacter Gaps
(10)

Report Version

Scan the barcode below to report the version of software installed in the digital scanner.



Report Software Version

Macro PDF Features

Macro PDF is a special feature for concatenating multiple PDF symbols into one file. The digital scanner can decode symbols that are encoded with this feature, and can store more than 64 Kb of decoded data stored in up to 50 Macro PDF symbols.



CAUTION When printing, keep each Macro PDF sequence separate, as each sequence has unique identifiers. Do not mix barcodes from several Macro PDF sequences, even if they encode the same data. When scanning Macro PDF sequences, scan the entire Macro PDF sequence without interruption. If, when scanning a mixed sequence, the digital scanner emits two long low beeps (Low/Low) this indicates an inconsistent file ID or inconsistent symbology error.

Flush Macro Buffer

This flushes the buffer of all decoded Macro PDF data stored to that point, transmits it to the host device, and aborts from Macro PDF mode.



Flush Macro PDF Buffer

Abort Macro PDF Entry

This clears all currently-stored Macro PDF data in the buffer without transmission and aborts from Macro PDF mode.



Abort Macro PDF Entry

APPENDIX A STANDARD DEFAULT PARAMETERS

Table 1 Parameter Defaults

Parameter	Parameter Number	SSI Number	Default	Page Number
User Preferences				
Set Default Parameter	N/A	N/A	Restore Defaults	6-32
Parameter Bar Code Scanning	236	ECh	Enable	6-33
Beep After Good Decode	56	38h	Enable	6-33
Direct Decode Indicator	859	F2h 5Bh	Disable	6-34
Beeper Volume	140	8Ch	High	6-35
Beeper Tone	145	91h	Medium	6-36
Beeper Duration	628	F1h 74h	Medium	6-37
Suppress Power Up Beeps	721	F1h D1h	Do Not Suppress	6-37
Low Power Mode	128	80h	Enable	6-38
Time Delay to Low Power Mode	146	92h	100 msec	6-38
Hands-free (Presentation) Decode Aiming Pattern	590	F1h 4Eh	Enable Hands-free (Presentation) Decode Aiming Pattern on PDF	6-41
Picklist Mode	402	F0h 92h	Disabled Always	6-42
Continuous Barcode Read	649	F1h 89h	Disable	6-43
Unique Barcode Reporting	723	F1h D3h	Enable	6-43
Decode Session Timeout	136	88h	9.9 Seconds	6-44
Hands-free Decode Session Timeout	400	F0 90	15	6-44
Timeout Between Decodes, Same Symbol	137	89h	0.5 Seconds	6-45

Standard Default Parameters

Table 1 Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
Timeout Between Decodes, Different Symbols	144	90h	0.1 Seconds	6-45
Decode Mirror Images (Data Matrix Only)	537	F1h 19h	Auto	6-46
Mobile Phone/Display Mode	716	F1h CCh	Normal	6-47
Prioritization	719	F1h CFh	Disable	6-48
Prioritization Timeout	720	F1h D0h	200 msec	6-49
Presentation Mode Field of View	609	F1h 61h	Full	6-49
Decoding Illumination	298	F0h 2Ah	Enable	6-50
Add an Enter Key	N/A	N/A	N/A	6-50
Transmit Code ID Character	45	2Dh	None	6-51
Prefix Value	99, 105	63h, 69h	7013 <CR><LF>	6-52
Suffix 1 Value Suffix 2 Value	98, 104 100, 106	62h, 68h 64h, 6Ah	7013 <CR><LF>	6-52
Scan Data Transmission Format	235	EBh	Data as is	6-53
FN1 Substitution Values	103, 109	67h, 6Dh	7013 <CR><LF>	6-54
Transmit "No Read" Message	94	5E	Disable	6-55
Unsolicited Heartbeat Interval	1118	F8h 04h 5Eh	Disable	6-56
Dump Scanner Parameters	N/A	N/A	N/A	6-57
Imaging Preferences				
Operational Modes	N/A	N/A	N/A	7-61
Image Capture Illumination	361	F0h 69h	Enable	7-62
Image Capture Autoexposure	360	F0h 68h	Enable	7-62
Fixed Exposure	567	F4h F1h 37h	100	7-63
Fixed Gain	568	F1h 38h	50	7-63
Gain / Exposure Priority for Snapshot Mode	562	F1h 32h	Autodetect	7-64
Snapshot Mode Timeout	323	F0h 43h	0 (30 Seconds)	7-65
Snapshot Aiming Pattern	300	F0h 2Ch	Enable	7-66
Silence Operational Mode Changes	1293	F8h 05h 0Dh	Disable (Do Not Silence)	7-66

Table 1 Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
Image Cropping	301	F0h 2Dh	Disable	7-67
Crop to Pixel Addresses	315 316 317 318	F4h F0h 3Bh F4h F0h 3Ch F4h F0h 3Dh F4h F0h 3Eh	0 top 0 left 959 bottom 1279 right	7-68
Image Size (Number of Pixels)	302	F0h 2Eh	Full	7-69
Image Brightness (Target White)	390	F0h 86h	180	7-70
JPEG Image Options	299	F0h 2Bh	Quality	7-70
JPEG Target File Size	561	F1h 31h	160 kB	7-71
JPEG Quality and Size Value	305	F0h 31h	65	7-71
Image Enhancement	564	F1h 34h	Low (1)	7-72
Image File Format Selection	304	F0h 30h	JPEG	7-73
Image Rotation	665	F1h 99h	0°	7-74
Bits per Pixel (BPP)	303	F0h 2Fh	8 BPP	7-75
USB Host Parameters				
USB Device Type	N/A	N/A	USB Keyboard HID	8-79
Symbol Native API (SNAPI) Status Handshaking	N/A	N/A	Enable	8-81
USB Keystroke Delay	N/A	N/A	No Delay	8-82
USB CAPS Lock Override	N/A	N/A	Disable	8-82
USB Ignore Unknown Characters	N/A	N/A	Send Bar Codes with Unknown Characters	8-83
USB Convert Unknown to Code 39	N/A	N/A	Disable	8-83
Emulate Keypad	N/A	N/A	Enable	8-84
Emulate Keypad with Leading Zero	N/A	N/A	Enable	8-84
Quick Keypad Emulation	N/A	N/A	Enable	8-85
USB FN1 Substitution	N/A	N/A	Disable	8-85
Function Key Mapping	N/A	N/A	Disable	8-86
Simulated Caps Lock	N/A	N/A	Disable	8-86

Table 1 Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
Convert Case	N/A	N/A	None	8-87
USB Static CDC	N/A	N/A	Enable	8-87
Ignore Beep Directive	N/A	N/A	Enable (Ignore)	8-88
Ignore Barcode Configuration	N/A	N/A	Enable (Ignore)	8-88
USB Polling Interval	N/A	N/A	3 msec	8-89
USB Fast HID	N/A	N/A	Enable	8-91
IBM Specification Version	N/A	N/A	Version 2.2	8-91
Enable/Disable All Code Types				9-98
1D Symbolologies				
UPC/EAN				
UPC-A	1	01h	Enable	9-99
UPC-E	2	02h	Enable	9-99
UPC-E1	12	0Ch	Disable	9-100
EAN-8/JAN 8	4	04h	Enable	9-100
EAN-13/JAN 13	3	03h	Enable	9-101
Bookland EAN	83	53h	Disable	9-101
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	16	10h	Ignore	9-102
User-Programmable Supplementals	579	F1h 43h	000	9-105
Supplemental 1:	580	F1h 44h		
Supplemental 2:				
UPC/EAN/JAN Supplemental Redundancy	80	50h	10	9-105
Decode UPC/EAN/JAN Supplemental AIM ID	672	F1h A0h	Combined	9-106
UPC Reduced Quiet Zone	1289	F8h 05h 09h	Disable	9-107
Transmit UPC-A Check Digit	40	28h	Enable	9-107
Transmit UPC-E Check Digit	41	29h	Enable	9-108
Transmit UPC-E1 Check Digit	42	2Ah	Enable	9-108
UPC-A Preamble	34	22h	System Character	9-109
UPC-E Preamble	35	23h	System Character	9-110

Standard Default Parameters

Table 1 Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
UPC-E1 Preamble	36	24h	System Character	9-111
Convert UPC-E to A	37	25h	Disable	9-112
Convert UPC-E1 to A	38	26h	Disable	9-112
EAN-8/JAN-8 Extend	39	27h	Disable	9-113
Bookland ISBN Format	576	F1h 40h	ISBN-10	9-113
UCC Coupon Extended Code	85	55h	Disable	9-114
Coupon Report	730	F1h DAh	New Coupon Format	9-115
ISSN EAN	617	F1h 69h	Disable	9-115
Code 128				
Code 128	8	08h	Enable	9-116
Set Length(s) for Code 128	209, 210	D1h, D2h	1 to 55	9-117
GS1-128 (formerly UCC/EAN-128)	14	0Eh	Enable	9-118
ISBT 128	84	54h	Disable	9-118
ISBT Concatenation	577	F1h 41h	Autodiscriminate	9-119
Check ISBT Table	578	F1h 42h	Enable	9-120
ISBT Concatenation Redundancy	223	DFh	10	9-120
Code 128 Security Level	751	F1h EFh	Security Level 1	9-121
Code 128 Reduced Quiet Zone	1208	F8h 04h B8h	Disable	9-122
Ignore Code 128 <FNC4>	1254	F8h 04h E6h	Disable	9-122
Code 39				
Code 39	0	00h	Enable	9-123
Trioptic Code 39	13	0Dh	Disable	9-123
Convert Code 39 to Code 32 (Italian Pharmacy Code)	86	56h	Disable	9-124
Code 32 Prefix	231	E7h	Disable	9-124
Set Length(s) for Code 39	18, 19	12h, 13h	1 to 55	9-125
Code 39 Check Digit Verification	48	30h	Disable	9-127
Transmit Code 39 Check Digit	43	2Bh	Disable	9-127
Code 39 Full ASCII Conversion	17	11h	Disable	9-128

Table 1 Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
Code 39 Security Level	750	F1h EEh	Security Level 1	9-129
Code 39 Reduced Quiet Zone	1209	F8h 04h B9h	Disable	9-130
Code 93				
Code 93	9	09h	Enable	9-130
Set Length(s) for Code 93	26, 27	1Ah, 1Bh	1 to 55	9-131
Code 11				
Code 11	10	0Ah	Disable	9-132
Set Lengths for Code 11	28, 29	1Ch, 1Dh	4 to 55	9-133
Code 11 Check Digit Verification	52	34h	Disable	9-134
Transmit Code 11 Check Digit(s)	47	2Fh	Disable	9-135
Interleaved 2 of 5 (ITF)				
Interleaved 2 of 5 (ITF)	6	06h	Disable	9-135
Set Lengths for I 2 of 5	22, 23	16h, 17h	6 to 55	9-136
I 2 of 5 Check Digit Verification	49	31h	Disable	9-137
Transmit I 2 of 5 Check Digit	44	2Ch	Disable	9-138
Convert I 2 of 5 to EAN 13	82	52h	Disable	9-138
I 2 of 5 Security Level	1121	F8h 04h 61h	Security Level 1	9-139
I 2 of 5 Reduced Quiet Zone	1210	F8h 04h BAh	Disable	9-140
Discrete 2 of 5 (DTF)				
Discrete 2 of 5	5	05h	Disable	9-140
Set Length(s) for D 2 of 5	20, 21	14h 15h	1 to 55	9-141
Codabar (NW - 7)				
Codabar	7	07h	Enable	9-142
Set Lengths for Codabar	24, 25	18h, 19h	4 to 55	9-143
CLSI Editing	54	36h	Disable	9-144
NOTIS Editing	55	37h	Disable	9-144
Codabar Upper or Lower Case Start/Stop Characters Detection	855	F2h 57h	Upper Case	9-145

Standard Default Parameters

Table 1 Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
MSI				
MSI	11	0Bh	Disable	9-145
Set Length(s) for MSI	30, 31	1Eh, 1Fh	4 to 55	9-146
MSI Check Digits	50	32h	One	9-147
Transmit MSI Check Digit	46	2Eh	Disable	9-147
MSI Check Digit Algorithm	51	33h	Mod 10/Mod 10	9-148
Chinese 2 of 5				
Chinese 2 of 5	408	F0h 98h	Disable	9-148
Matrix 2 of 5				
Matrix 2 of 5	618	F1h 6Ah	Disable	9-149
Matrix 2 of 5 Lengths	619 620	F1h 6Bh F1h 6Ch	4 to 55	9-150
Matrix 2 of 5 Check Digit	622	F1h 6Eh	Disable	9-151
Transmit Matrix 2 of 5 Check Digit	623	F1h 6Fh	Disable	9-151
Korean 3 of 5				
Korean 3 of 5	581	F1h 45h	Disable	9-152
Inverse 1D	586	F1h 4Ah	Regular	9-153
GS1 DataBar				
GS1 DataBar-14	338	F0h 52h	Enable	9-154
GS1 DataBar Limited	339	F0h 53h	Enable	9-154
GS1 DataBar Expanded	340	F0h 54h	Enable	9-155
Convert GS1 DataBar to UPC/EAN	397	F0h 8Dh	Disable	9-155
GS1 DataBar Limited Security Level	728	F1h D8h	Level 3	9-156
Composite				
Composite CC-C	341	F0h 55h	Disable	9-157
Composite CC-A/B	342	F0h 56h	Disable	9-157
Composite TLC-39	371	F0h 73h	Disable	9-158
UPC Composite Mode	344	F0h 58h	UPC Never Linked	9-158
Composite Beep Mode	398	F0h 8Eh	Beep As Each Code Type is Decoded	9-159

Table 1 Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
GS1-128 Emulation Mode for UCC/EAN Composite Codes	427	F0h ABh	Disable	9-159
2D Symbolologies				
PDF417	15	0Fh	Enable	9-160
MicroPDF417	227	E3h	Disable	9-160
Code 128 Emulation	123	7Bh	Disable	9-161
Data Matrix	292	F0h 24h	Enable	9-162
GS1 Data Matrix	1336	F8h 05h 38h	Disable	9-162
Data Matrix Inverse	588	F1h 4Ch	Inverse Autodetect	9-163
Maxicode	294	F0h 26h	Disable	9-163
QR Code	293	F0h 25h	Enable	9-164
GS1 QR	1343	F8h 05h 3Fh	Disable	9-164
MicroQR	573	F1h 3Dh	Enable	9-165
Aztec	574	F1h 3Eh	Enable	9-165
Aztec Inverse	589	F1h 4Dh	Inverse Autodetect	9-166
Han Xin	1167	F8h 04h 8Fh	Disable	9-167
Han Xin Inverse	1168	F8h 04h 90h	Regular	9-167
Postal Codes				
US Postnet	89	59h	Disable	9-168
US Planet	90	5Ah	Disable	9-168
Transmit US Postal Check Digit	95	5Fh	Enable	9-169
UK Postal	91	5Bh	Disable	9-169
Transmit UK Postal Check Digit	96	60h	Enable	9-170
Japan Postal	290	F0h 22h	Disable	9-170
Australia Post	291	F0h 23h	Disable	9-171
Australia Post Format	718	F1h CEh	Autodiscriminate	9-172
Netherlands KIX Code	326	F0h 46h	Disable	9-173
USPS 4CB/One Code/Intelligent Mail	592	F1h 50h	Disable	9-173
UPU FICS Postal	611	F1h 63h	Disable	9-174
Mailmark	1337	F8h 05h 08h	Disable	9-174

Table 1 Parameter Defaults (Continued)

Parameter	Parameter Number	SSI Number	Default	Page Number
Symbology-Specific Security Levels				
Redundancy Level	78	4Eh	1	9-175
Security Level	77	4Dh	1	9-177
1D Quiet Zone Level	1288	F8h 05h 08h	1	9-178
Intercharacter Gap Size	381	F0h 7Dh	Normal	9-179
Report Version				9-179
Macro PDF				
Flush Macro PDF Buffer	N/A	N/A	N/A	9-180
Abort Macro PDF Entry	N/A	N/A	N/A	9-180

APPENDIX B COUNTRY CODES

Introduction

This chapter provides instructions for programming the keyboard to interface with a USB or keyboard wedge host. The host powers the scanner. For host setup information, see [USB Interface](#).

To select a code page for the country keyboard type, see [Appendix C, Country Code Pages](#).

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



*Indicates Default — * **US English (North American)** — 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 [Quick Keypad Emulation on page 85](#) for the USB HID host.



NOTE: When changing USB country keyboard types the digital scanner automatically resets and issues the standard startup beep sequences.

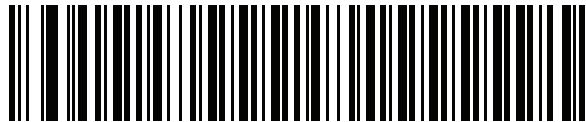


NOTE: For best results when using international keyboards, enable [Quick Keypad Emulation on page 85](#).



IMPORTANT: 1. 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.

2. Use the **French International** bar code for Belgian French keyboards.



* US English (North American)



US English (Mac)



Albanian

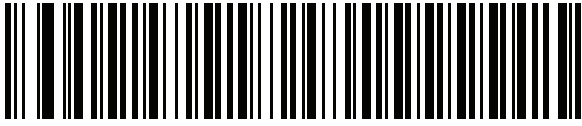


Arabic (101)

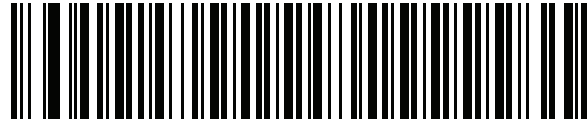


Arabic (102)

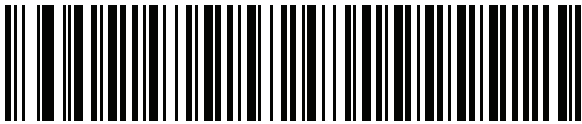
Country Codes (Continued)



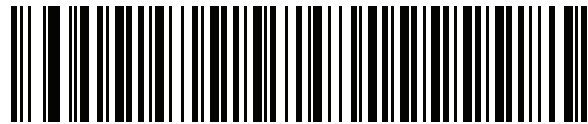
Arabic (102) AZERTY



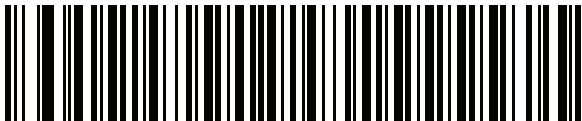
Azeri (Latin)



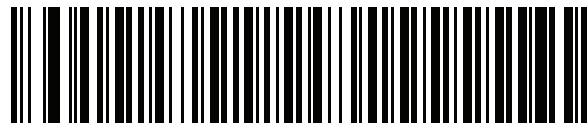
Azeri (Cyrillic)



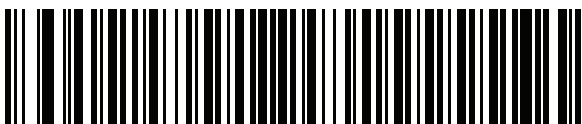
Belarusian



Bosnian (Latin)



Bosnian (Cyrillic)



Bulgarian (Latin)



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



Canadian French Win7



Canadian French (Legacy)



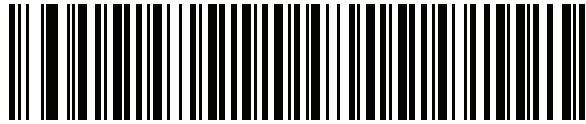
Canadian Multilingual Standard



Chinese (ASCII)

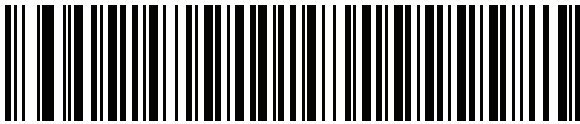


Chinese (Simplified) *



Chinese (Traditional) *

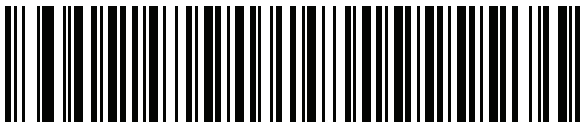
* For CJK keyboard types, see [Appendix D, CJK Decode Control](#).



Croatian



Czech



Czech (Programmer)



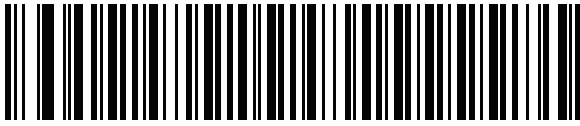
Czech (QWERTY)



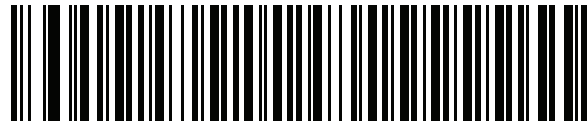
Danish



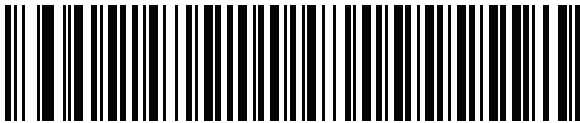
Dutch (Netherlands)



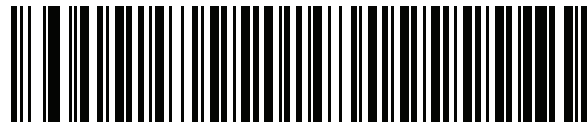
Estonian



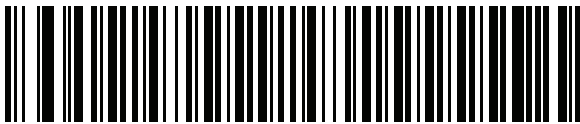
Faeroese



Finnish



French (France)



**French International
(Belgian French)**



French (Canada) 95/98



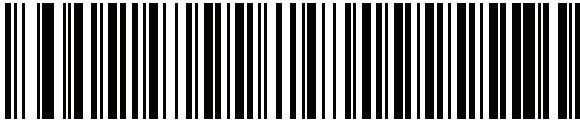
French (Canada) 2000/XP *

Country Codes

* Note that there is also a country code bar code for [Canadian Multilingual Standard on page 4](#). Be sure to select the appropriate bar code for your host system.



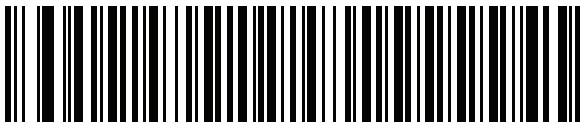
Galician



German



Greek Latin



Greek (220) Latin



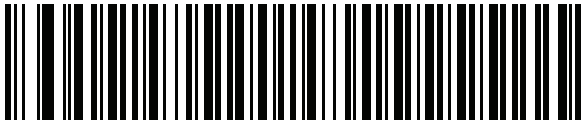
Greek (319) Latin



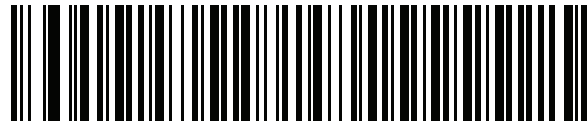
Greek



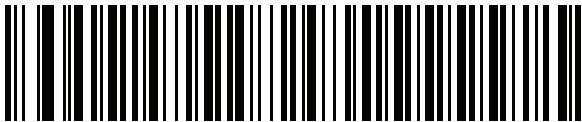
Greek (220)



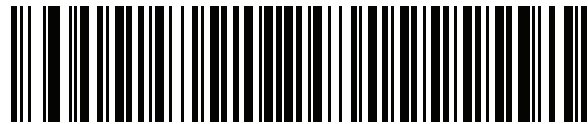
Greek (319)



Greek Polytonic



Hebrew Israel



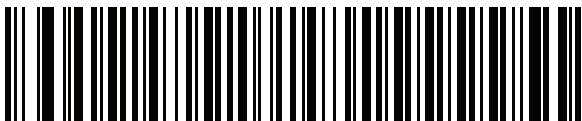
Hungarian



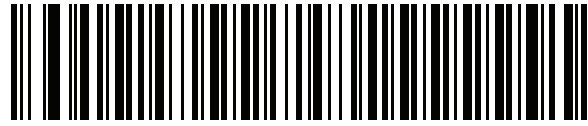
Hungarian_101KEY



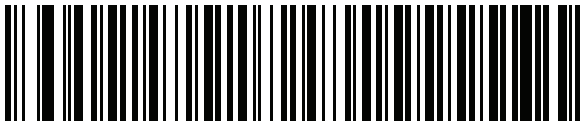
Icelandic



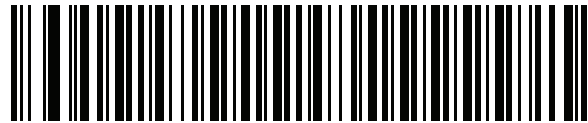
Irish



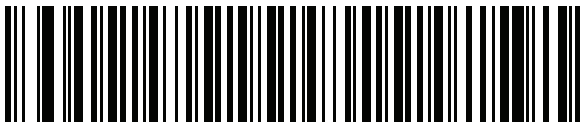
Italian



Italian (142)

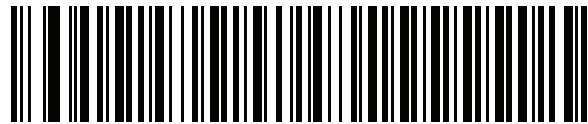


Japanese (ASCII)

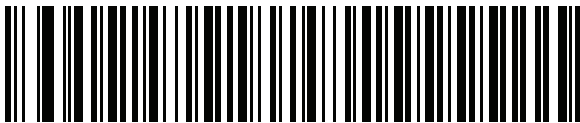


Japanese (SHIFT-JIS) *

* For CJK keyboard types, see [Appendix D, CJK Decode Control](#).



Kazakh



Korean (ASCII)

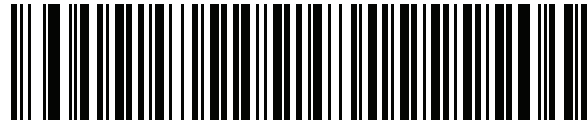
Country Codes (Continued)



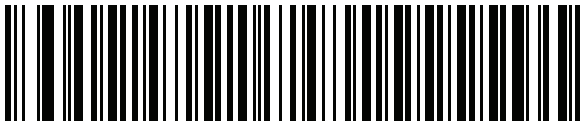
Korean (Hangul) *

Country Codes

* For CJK keyboard types, see [Appendix D, CJK Decode Control](#).



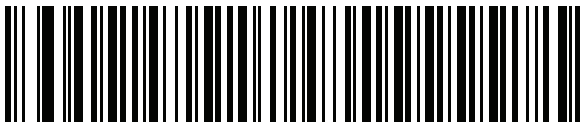
Kyrgyz



Latin American



Latvian



Latvian (QWERTY)



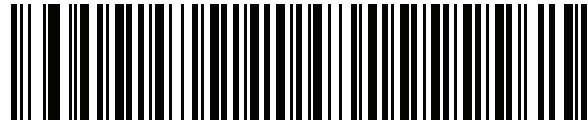
Lithuanian



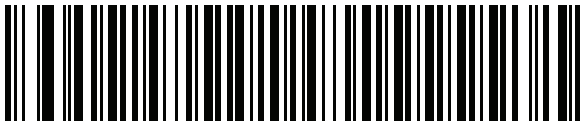
Lithuanian (IBM)



Macedonian (FYROM)



Maltese_47KEY



Mongolian



Norwegian



Polish (214)



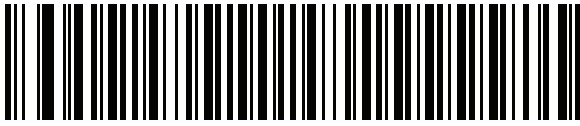
Polish (Programmer)



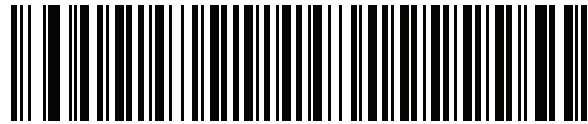
**Portuguese (Brazil)
(Windows XP)**



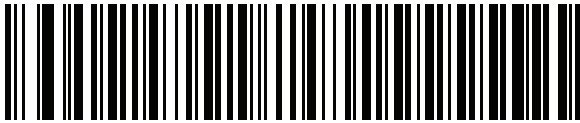
Portuguese (Brazilian ABNT)



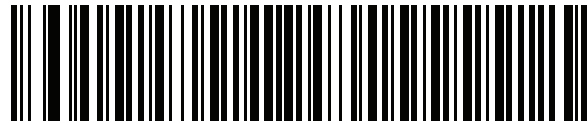
Portuguese (Brazilian ABNT2)



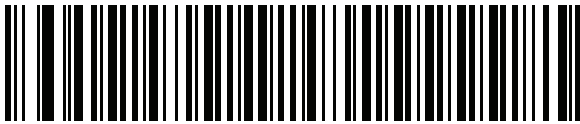
Portuguese (Portugal)



**Romanian
(Windows XP)**



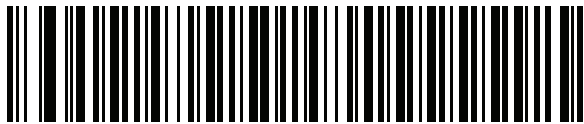
**Romanian (Legacy)
(Win 7 or higher)**



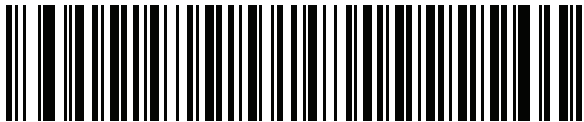
**Romanian (Standard)
(Win 7 or higher)**



**Romanian (Programmer)
(Win 7 or higher)**



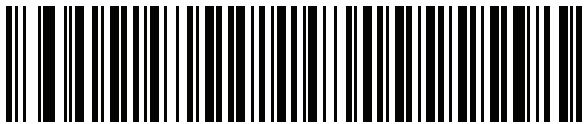
Russian



Russian (Typewriter)



Serbian (Latin)

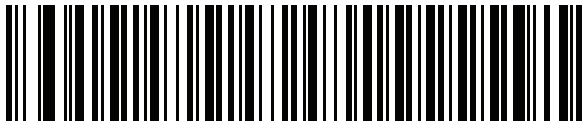


Serbian (Cyrillic)

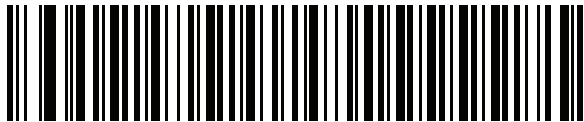


Slovak

Country Codes (Continued)

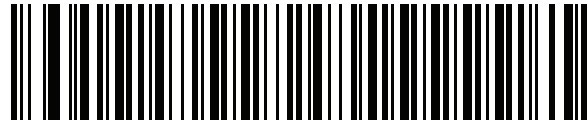


Slovak (QWERTY)

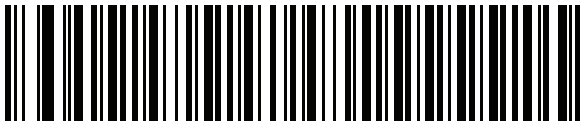


Slovenian

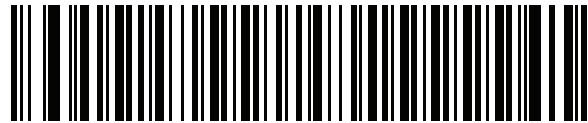
Country Codes



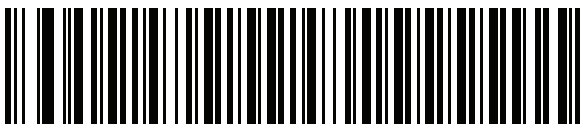
Spanish



Spanish (Variation)



Swedish



Swiss French



Swiss German

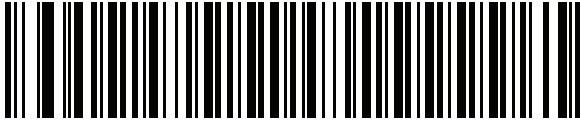
Country Codes (Continued)



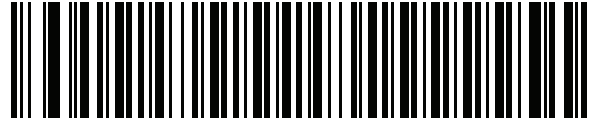
Tatar



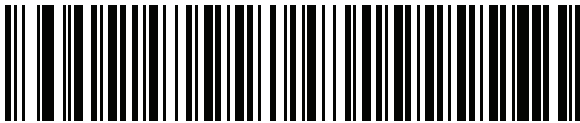
Thai (Kedmanee)



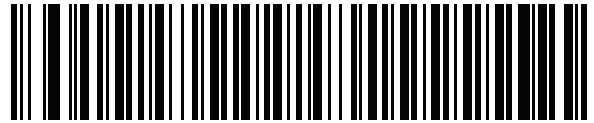
Turkish F



Turkish Q



UK English



Ukrainian



US Dvorak



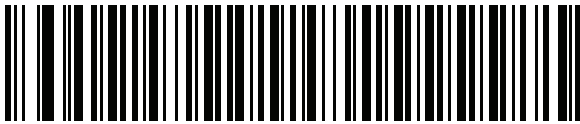
US Dvorak Left



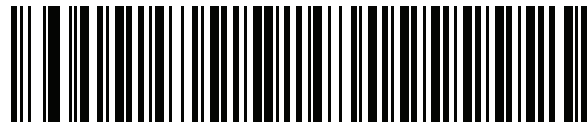
US Dvorak Right



US International



Uzbek



Vietnamese

APPENDIX C COUNTRY CODE PAGES

Introduction

This chapter provides bar codes for selecting code pages for the country keyboard type selected in [Appendix C, Country Code Pages](#). If the default code page in [Table 1](#) is appropriate for your selected country keyboard type, you do not need to scan a country code page bar code.



NOTE: ADF rules can also specify a code page based on the symbology and other ADF criteria. Refer to the *Advanced Data Formatting Programmer Guide*.

Country Code Page Defaults

[Table 1](#) lists the code page default for each country keyboard.

Table 1 Country Code Page Defaults

Country Keyboard	Code Page Default
US English (North American)	Windows 1252
US English (Mac)	Mac CP10000
Albanian	Windows 1250
Arabic 101	Windows 1256
Arabic 102	Windows 1256
Arabic 102 AZERTY	Windows 1256
Azeri Latin	Windows 1254
Azeri Cyrillic	Windows 1251
Belarusian	Windows 1251
Bosnian Latin	Windows 1250
Bosnian Cyrillic	Windows 1251
Bulgarian Latin	Windows 1250
Bulgarian Cyrillic	Windows 1251
Canadian French Win7	Windows 1252

Table 1 Country Code Page Defaults (Continued)

Country Keyboard	Code Page Default
Canadian French (Legacy)	Windows 1252
Canadian Multilingual	Windows 1252
Croatian	Windows 1250
Chinese ASCII	Windows 1252
Chinese (Simplified)	Windows 936, GBK
Chinese (Traditional)	Windows 950, Big5
Czech	Windows 1250
Czech Programmers	Windows 1250
Czech QWERTY	Windows 1250
Danish	Windows 1252
Dutch Netherland	Windows 1252
Estonian	Windows 1257
Faeroese	Windows 1252
Finnish	Windows 1252
French (France)	Windows 1252
French (Canada) 95/98	Windows 1252
French (Canada) 2000/XP	Windows 1252
French International (Belgian French)	Windows 1252
Galician	Windows 1252
German	Windows 1252
Greek Latin	Windows 1252
Greek220 Latin	Windows 1253
Greek319 Latin	Windows 1252
Greek	Windows 1253
Greek220	Windows 1253
Greek319	Windows 1253
Greek Polytonic	Windows 1253
Hebrew Israel	Windows 1255
Hungarian	Windows 1250
Hungarian_101KEY	Windows 1250
Icelandic	Windows 1252

Table 1 Country Code Page Defaults (Continued)

Country Keyboard	Code Page Default
Irish	Windows 1252
Italian	Windows 1252
Italian_142	Windows 1252
Japanese ASCII	Windows 1252
Japanese (Shift-JIS)	Windows 932, Shift-JIS
Kazakh	Windows 1251
Korean ASCII	Windows 1252
Korean (Hangul)	Windows 949, Hangul
Kyrgyz Cyrillic	Windows 1251
Latin America	Windows 1252
Latvian	Windows 1257
Latvian QWERTY	Windows 1257
Lithuanian	Windows 1257
Lithuanian IBM	Windows 1257
Macedonian -FYROM	Windows 1251
Maltese_47KEY	Windows 1252
Mongolian-Cyrillic	Windows 1251
Norwegian	Windows 1252
Polish_214	Windows 1250
Polish Programmer	Windows 1250
Portuguese Brazil	Windows 1252
Portuguese Brazilian ABNT	Windows 1252
Portuguese Brazilian ABNT2	Windows 1252
Portuguese Portugal	Windows 1252
Romanian	Windows 1250
Romanian Legacy	Windows 1250
Romanian Standard	Windows 1250
Romanian Programmer	Windows 1250
Russian	Windows 1251
Russian Typewriter	Windows 1251
Serbian Latin	Windows 1250

Table 1 Country Code Page Defaults (Continued)

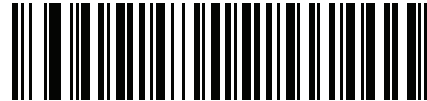
Country Keyboard	Code Page Default
Serbian Cyrillic	Windows 1251
Slovak	Windows 1250
Slovak QWERTY	Windows 1250
Slovenian	Windows 1250
Spanish	Windows 1252
Spanish Variation	Windows 1252
Swedish	Windows 1252
Swiss French	Windows 1252
Swiss German	Windows 1252
Tatar	Windows 1251
Thai-Kedmanee	Windows 874
Turkish F	Windows 1254
Turkish Q	Windows 1254
Ukrainian	Windows 1251
United Kingdom	Windows 1252
United States	Windows 1252
US Dvorak	Windows 1252
US Dvorak Left Hand	Windows 1252
US Dvorak Right Hand	Windows 1252
US International	Windows 1252
Uzbek Cyrillic	Windows 1251
Vietnamese	Windows 1258

Country Code Page Bar Codes

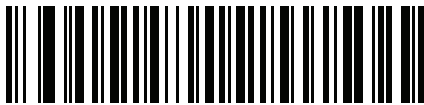
Scan the bar code corresponding to the country keyboard code page.



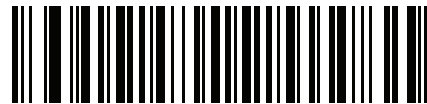
Windows 1250
Latin 2, Central European



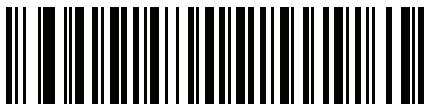
Windows 1251
Cyrillic, Slavic



Windows 1252
Latin 1, Western European



Windows 1253
Greek

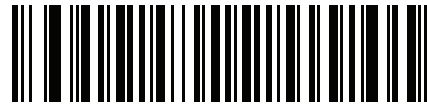


Windows 1254
Latin 5, Turkish

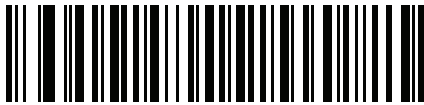
Country Code Pages (Continued)



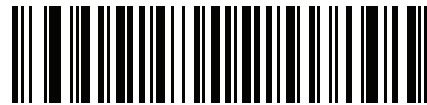
**Windows 1255
Hebrew**



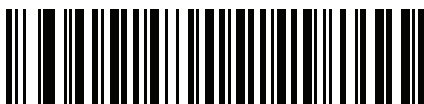
**Windows 1256
Arabic**



**Windows 1257
Baltic**



**Windows 1258
Vietnamese**

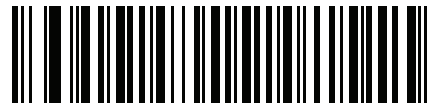


**Windows 874
Thai**

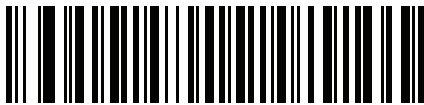
Country Code Pages (Continued)



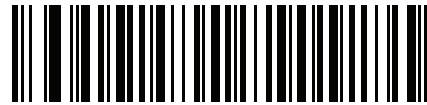
**Windows 20866
Cyrillic KOI8-R**



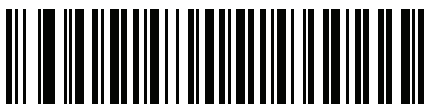
**Windows 932
Japanese Shift-JIS**



**Windows 936
Simplified Chinese GBK**



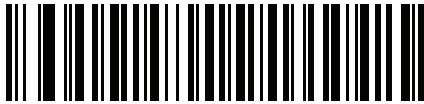
**Windows 54936
Simplified Chinese GB18030**



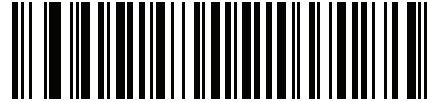
**Windows 949
Korean Hangul**



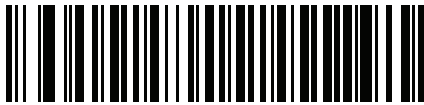
**Windows 950
Traditional Chinese Big5**



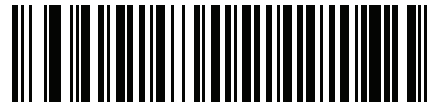
MS-DOS 437
Latin US



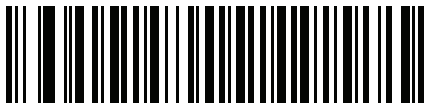
MS-DOS 737
Greek



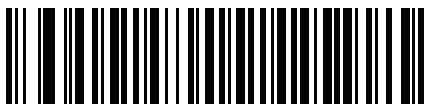
MS-DOS 775
Baltic



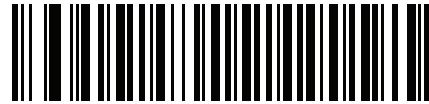
MS-DOS 850
Latin 1



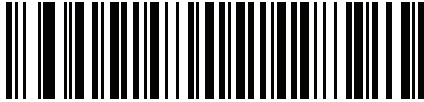
MS-DOS 852
Latin 2



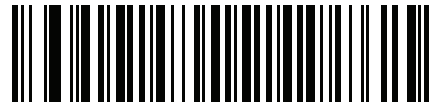
MS-DOS 855
Cyrillic



MS-DOS 857
Turkish



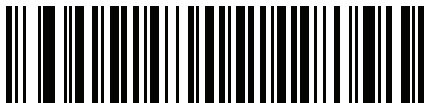
MS-DOS 860
Portuguese



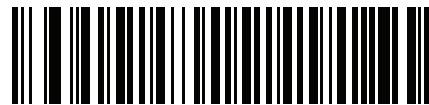
MS-DOS 861
Icelandic



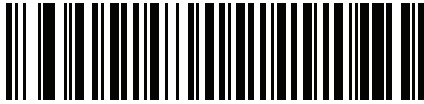
MS-DOS 862
Hebrew



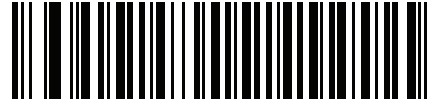
MS-DOS 863
French Canada



MS-DOS 865
Nordic



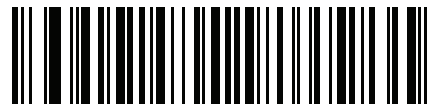
MS-DOS 866
Cyrillic



MS-DOS 869
Greek 2



ISO 8859-1
Latin 1, Western European



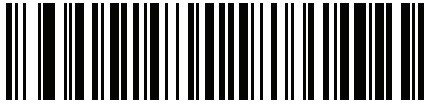
ISO 8859-2
Latin 2, Central European



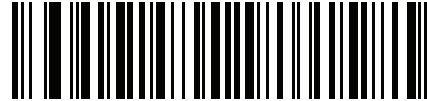
ISO 8859-3
Latin 3, South European



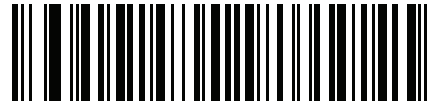
ISO 8859-4
Latin 4, North European



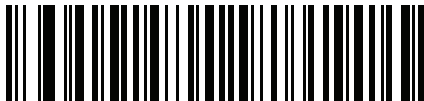
ISO 8859-5
Cyrillic



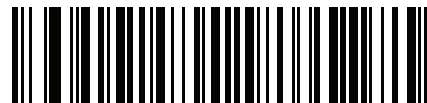
ISO 8859-6
Arabic



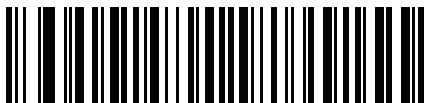
ISO 8859-7
Greek



ISO 8859-8
Hebrew



ISO 8859-9
Latin 5, Turkish



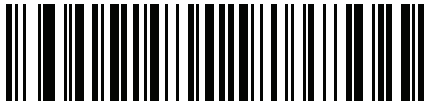
ISO 8859-10
Latin 6, Nordic



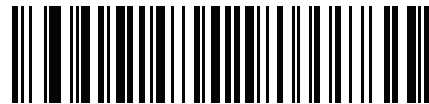
ISO 8859-11
Thai



ISO 8859-13
Latin 7, Baltic



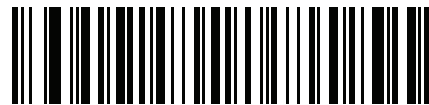
ISO 8859-14
Latin 8, Celtic



ISO 8859-15
Latin 9



ISO 8859-16
Latin 10, South-Eastern European



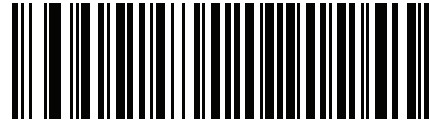
UTF-8



UTF-16LE
UTF-16 Little Endian



UTF-16BE
UTF-16 Big Endian



Mac CP10000
Roman

APPENDIX D CJK DECODE CONTROL

Introduction

This appendix describes control parameters for CJK (Chinese, Japanese, Korean) bar code decode through USB HID Keyboard Emulation mode.



NOTE: Because ADF does not support CJK character processing, there is no format manipulation for CJK output.

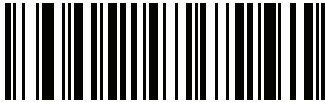
CJK Control Parameters

Unicode Output Control

Parameter # 973

For a Unicode encoded CJK bar code, select one of the following options for unicode output:

- **Universal Output to Unicode and MBCS Application** - This default method applies to Unicode and MBCS expected applications, such as MS Word and Notepad on a Windows host.
- ✓ **NOTE:** To support Unicode universal output, set up the registry table for the Windows host. See [Unicode/CJK Decode Setup with Windows Host on page 7](#).
- **Output to Unicode Application Only** - This method applies only to Unicode expected applications, such as MS Word and WordPad, but not Notepad.



* Universal Output
(0)



Unicode Application Only
(1)

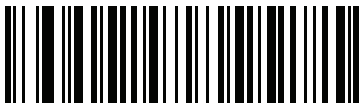
CJK Output Method to Windows Host

Parameter # 972

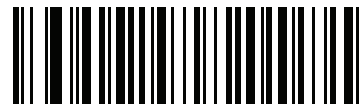
For a national standard encoded CJK bar code, select one of the following options for CJK output to a Windows host:

- **Universal CJK Output** - This is the default universal CJK output method for US English IME or Chinese/Japanese/Korean ASCII IME on a Windows host. This method converts CJK characters to Unicode and emulates the characters when transmitting to the host. Use the [Unicode Output Control](#) parameter to control Unicode output.
- ✓ **NOTE:** To support universal CJK output, set up the registry table for the Windows host. See [Unicode/CJK Decode Setup with Windows Host on page 7](#).
- **Other options for CJK output** - With the following methods, the scanner sends the CJK character hexadecimal internal code (Nei Ma) value to host, or converts the CJK character to Unicode and sends the hexadecimal Unicode value to host. When using these methods, the Windows host must select the corresponding IME to accept the CJK character. See [Unicode/CJK Decode Setup with Windows Host on page 7](#).
 - **Japanese Unicode Output**
 - **Simplified Chinese GBK Code Output**
 - **Simplified Chinese Unicode Output**
 - **Korean Unicode Code Output**
 - **Traditional Chinese Big5 Code Output** (Windows XP)
 - **Traditional Chinese Big5 Code Output** (Windows 7)
 - **Traditional Chinese Unicode Code Output** (Windows XP)
 - **Traditional Chinese Unicode Code Output** (Windows 7)

✓ **NOTE:** The Unicode emulate output method depends on the host system (Windows XP or Windows 7).



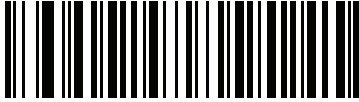
* Universal CJK Output
(0)



Japanese Unicode Output
(34)

(for Japanese Unicode Output, select Simplified Chinese Unicode IME on the Windows host)

CJK Output Method to Windows Host (continued)



**Chinese (Simplified) GBK Output
(1)**

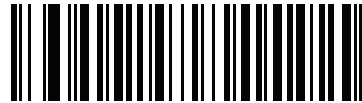


**Chinese (Simplified) Unicode Output
(2)**



**Korean Unicode Output
(50)**

(for Korean Unicode Output, select Simplified Chinese Unicode IME on the Windows host)



**Chinese (Traditional) Big5 Output (Windows XP)
(17)**



**Chinese (Traditional) Big5 Output (Windows 7)
(19)**



**Chinese (Traditional) Unicode Output (Windows XP)
(18)**



**Chinese (Traditional) Unicode Output (Windows 7)
(20)**

Non-CJK UTF Bar Code Output

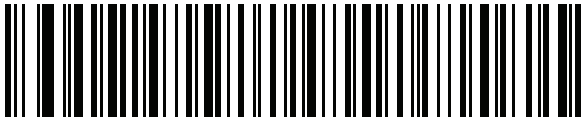
Parameter # 960

Some country keyboard type layouts contain characters that do not exist in the default code page (see [Country Keyboard Type Missing Characters on page 6](#)). Although the default code page can not encode these characters in a bar code, they can be encoded in the UTF-8 bar code. Scan this parameter bar code to output the Unicode values by emulation mode.



NOTE: Use this special country keyboard type to decode the non-CJK UTF-8 bar code. After decoding, re-configure the scanner to use the original country keyboard type.

Use US English IME on Windows. See [Unicode Output Control on page 2](#).



Non-CJK UTF-8 Emulation Output

Country Keyboard Type Missing CharactersCountry keyboard type: **Tatar, Uzbek, Mongolian, Kyrgyz, Kazakh and Azeri**

Default code page: CP1251

Missing characters:

?	?
?	?
?	?
?	?
?	?
?	?
?	?
?	?
?	?
?	
?	?
?	?
?	?
?	?
?	?

Country keyboard type: **Romanian (Standard)**

Default code page: CP1250

Missing characters:

?	?
?	?

Country keyboard type: **Portuguese-Brazilian (ABNT), Portuguese-Brazilian (ABNT2)**

Default code page: CP1252

Missing character: **€**Country keyboard type: **Azeri-Latin**

Default code page: CP1254

Missing characters: ?, ?

Unicode/CJK Decode Setup with Windows Host

This section describes how to set up CJK decode with a Windows host.

Setting Up the Windows Registry Table for Unicode Universal Output

To support the Unicode universal output method, set up the Windows host registry table as follows:

1. Select **Start > Run > regedt32** to start the registry editor.
2. Under **HKEY_Current_User\Control Panel\Input Method**, set **EnableHexNumpad** to **1** as follows:

```
[HKEY_CURRENT_USER\Control Panel\Input Method]
```

```
"EnableHexNumpad"="1"
```

If this key does not exist, add it as type **REG_SZ** (string value).

3. Reboot the computer to implement the registry change.

Adding CJK IME on Windows

To add the desired CJK input language:

1. Click **Start > Control Panel**.
2. If the Control Panel opens in category view, select **Switch to Classic View** in the top left corner.
3. Select **Regional and Language Options**.
4. Click the **Language** tab.
5. Under **Supplemental Language Support**, select the **Install Files for East Asian Languages** check box if not already selected, and click **Apply**. This may require a Windows installation CD to install the required files. This step ensures that the East Asian Languages (CJK) are available.
6. Under **Text Services and Input Language**, click **Details**.
7. Under **Installed Services**, click **Add**.
8. In the **Add Input Language** dialog box, choose the CJK input language and keyboard layout or Input Method Editor (IME) to add.
9. Click **OK** twice. The language indicator appears in the system tray (at bottom right corner of the desktop by default). To switch between input languages (keyboard languages) select the language indicator in the system tray.
10. Select the language indicator in the system tray to select the desired country keyboard type.
11. Verify that the characters displayed on each country's keyboard appear.

Selecting the Simplified Chinese Input Method on the Host

To select the Simplified Chinese input method:

- Select Unicode/GBK input on Windows XP: **Chinese (Simplified) - NeiMa**, then click the input bar to select **Unicode** or **GBK NeiMa** input.

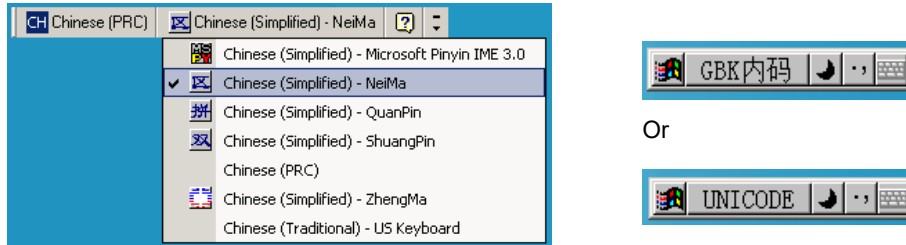


Figure 1 Unicode/GBK Input on Windows XP

- Select Unicode/GBK input on Windows 7: **Chinese (Simplified) - Microsoft Pinyin New Experience Input Style**, then select **Tool Menu > Secondary Inputs > Unicode Input** or **GB Code Input**.

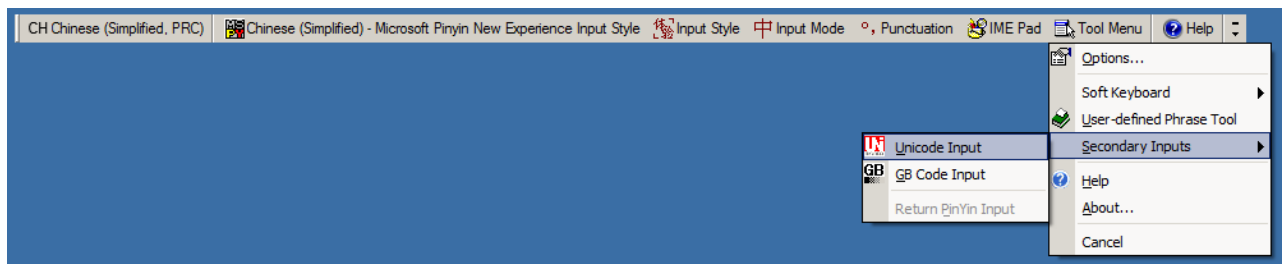


Figure 2 Unicode/GBK Input on Windows 7

Selecting the Traditional Chinese Input Method on the Host

To select the Traditional Chinese input method:

Figure 3 Select Unicode input on Windows XP: **Chinese (Traditional) - Unicode**

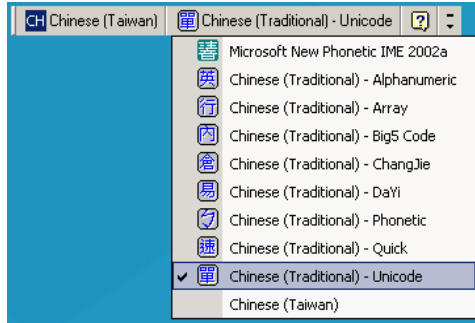


Figure 4 Unicode Input on Windows XP

- Select Big5 input on Windows XP: **Chinese (Traditional) - Big5 Code**

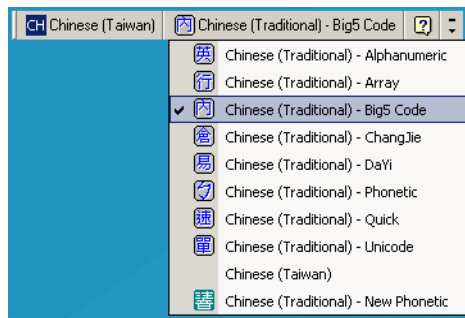


Figure 5 Big5 input on Windows XP

- Select Unicode/Big5 input on Windows 7: **Chinese (Traditional) - New Quick**. This option support both Unicode and Big5 input.



Figure 6 Unicode/Big5 input on Windows 7

APPENDIX E PROGRAMMING REFERENCE

Symbol Code Identifiers

Table 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
T	UCC Composite, TLC 39
U	Chinese 2 of 5
V	Korean 3 of 5
X	ISSN EAN, PDF417, Macro PDF417, Micro PDF417
z	Aztec, Aztec Rune
P00	Data Matrix

Table 1 Symbol Code Characters (Continued)

Code Character	Code Type
P01	QR Code, MicroQR
P02	Maxicode
P03	US Postnet
P04	US Planet
P05	Japan Postal
P06	UK Postal
P08	Netherlands KIX Code
P09	Australia Post
P0A	USPS 4CB/One Code/Intelligent Mail
P0B	UPU FICS Postal
P0C	Mailmark
P0H	Han Xin
P0G	GS1 Data Matrix
P0Q	GS1 QR
P0X	Signature Capture

AIM Code Identifiers

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

- j = Flag Character (ASCII 93)
- c = Code Character (see [Table 2](#))
- m = Modifier Character (see [Table 3](#))

Table 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)
d	Data Matrix, GS1-DM
E	UPC/EAN, Coupon (UPC portion)
e	GS1 DataBar Family
F	Codabar
G	Code 93
H	Code 11
h	Han Xin
I	Interleaved 2 of 5
L	PDF417, Macro PDF417, Micro PDF417
L2	TLC 39
M	MSI
Q	QR Code, MicroQR, GS1-QR
S	Discrete 2 of 5, IATA 2 of 5
U	Maxicode
z	Aztec, Aztec Rune
X	Bookland EAN, ISSN EAN, Trioptic Code 39, Chinese 2 of 5, Matrix 2 of 5, Korean 3 of 5, US Postnet, US Planet, UK Postal, Japan Postal, Australia Post, Netherlands KIX Code, USPS 4CB/One Code/Intelligent Mail, UPU FICS Postal, Signature Capture, Mailmark

The modifier character is the sum of the applicable option values based on [Table 3](#).

Table 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 J A7AIMID 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 JX0412356	
Mailmark	0	No option specified at this time. Always transmit 0.
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 J C1AIMID	
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 J I04123	
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 J F04123	
Code 93	0	No options specified at this time. Always transmit 0.
	Example: A Code 93 bar code 012345678905 is transmitted as J G0012345678905	
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 J M14123	

Table 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 JS04 123
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 JE000 12345678905
Bookland EAN	0	No options specified at this time. Always transmit 0.
		Example: A Bookland EAN bar code 123456789X is transmitted as JX0 123456789X
ISSN EAN	0	No options specified at this time. Always transmit 0.
		Example: An ISSN EAN bar code 123456789X is transmitted as JX0 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., JC1).
		Example: A GS1 DataBar-14 bar code 0110012345678902 is transmitted as Je00 110012345678902.
EAN.UCC Composites (GS1 DataBar, GS1-128, 2D portion of UPC composite)		Native mode transmission. Note: UPC portion of composite is transmitted using UPC rules.
	0	Standard data packet.
	1	Data packet containing the data following an encoded symbol separator character.
	2	Data packet containing the data following an escape mechanism character. The data packet does not support the ECI protocol.
	3	Data packet containing the data following an escape mechanism character. The data packet supports the ECI protocol.
		GS1-128 emulation Note: UPC portion of composite is transmitted using UPC rules.
	1	Data packet is a GS1-128 symbol (i.e., data is preceded with JC1).

Table 3 Modifier Characters (Continued)

Code Type	Option Value	Option
PDF417, Micro PDF417	0	Reader set to conform to protocol defined in 1994 PDF417 symbology specifications. Note: When this option is transmitted, the receiver cannot reliably determine whether ECIs have been invoked or whether data byte 92 _{DEC} has been doubled in transmission.
	1	Reader set to follow the ECI protocol (Extended Channel Interpretation). All data characters 92 _{DEC} are doubled.
	2	Reader set for Basic Channel operation (no escape character transmission protocol). Data characters 92 _{DEC} are not doubled. Note: When decoders are set to this mode, unbuffered Macro symbols and symbols requiring the decoder to convey ECI escape sequences cannot be transmitted.
	3	The bar code contains a GS1-128 symbol, and the first codeword is 903-907, 912, 914, 915.
	4	The bar code contains a GS1-128 symbol, and the first codeword is in the range 908-909.
	5	The bar code contains a GS1-128 symbol, and the first codeword is in the range 910-911.
	Example: A PDF417 bar code ABCD, with no transmission protocol enabled, is transmitted as]L2ABCD.	
Data Matrix	0	ECC 000-140, not supported.
	1	ECC 200.
	2	ECC 200, FNC1 in first or fifth position.
	3	ECC 200, FNC1 in second or sixth position.
	4	ECC 200, ECI protocol implemented.
	5	ECC 200, FNC1 in first or fifth position, ECI protocol implemented.
	6	ECC 200, FNC1 in second or sixth position, ECI protocol implemented.
GS1 Data Matrix	2	ECC 200, FNC1 in first or fifth position.
MaxiCode	0	Symbol in Mode 4 or 5.
	1	Symbol in Mode 2 or 3.
	2	Symbol in Mode 4 or 5, ECI protocol implemented.
	3	Symbol in Mode 2 or 3, ECI protocol implemented in secondary message.

Table 3 Modifier Characters (Continued)

Code Type	Option Value	Option
QR Code	0	Model 1 symbol.
	1	Model 2 / MicroQR symbol, ECI protocol not implemented.
	2	Model 2 symbol, ECI protocol implemented.
	3	Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.
	4	Model 2 symbol, ECI protocol implemented, FNC1 implied in first position.
	5	Model 2 symbol, ECI protocol not implemented, FNC1 implied in second position.
	6	Model 2 symbol, ECI protocol implemented, FNC1 implied in second position.
GS1 QR	3	Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.
Aztec	0	Aztec symbol.
	C	Aztec Rune symbol.
Han Xin	0	Generic data, no special features are set. The transmitted data does not follow the AIM ECI protocol.
	1	ECI protocol enabled. There is at least one ECI mode encoded. Transmitted data must follow the AIM ECI protocol.

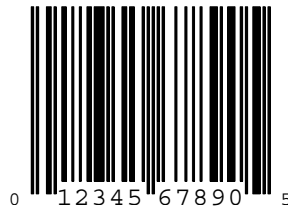
APPENDIX F SAMPLE BAR CODES

Code 39



UPC/EAN

UPC-A, 100%



EAN-13, 100%



Code 128



Interleaved 2 of 5



GS1 DataBar-14

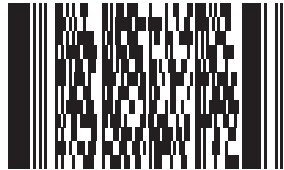


NOTE: DataBar-14 must be enabled to read the bar code below (see [GS1 DataBar on page 154](#)).



7612341562341

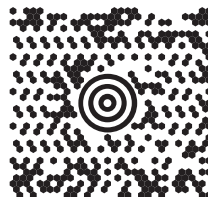
PDF417



Data Matrix



Maxicode



QR Code



US Postnet



UK Postal



APPENDIX G ALPHANUMERIC BAR CODES

Alphanumeric Bar Codes



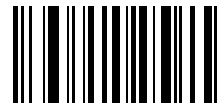
Space



#



\$



%

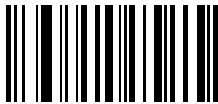
Alphanumeric Keyboard (continued)



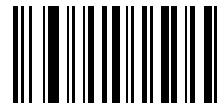
*



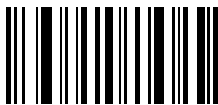
+



-



.



/

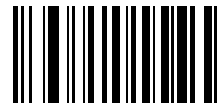


!

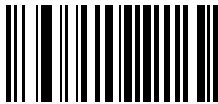
Alphanumeric Keyboard (continued)



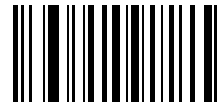
“



&



’



(



)

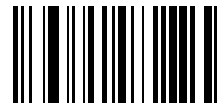


:

Alphanumeric Keyboard (continued)



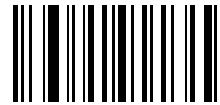
;



<



=



>



?



@

Alphanumeric Keyboard (continued)



[



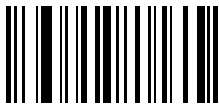
\



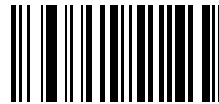
]



^



_



,

Alphanumeric Keyboard (continued)



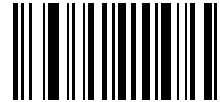
NOTE: Do not confuse the bar codes that follow with those on the numeric keypad.



0



1



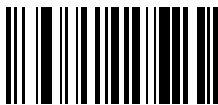
2



3



4

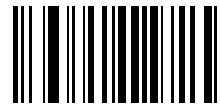


5

Alphanumeric Keyboard (continued)



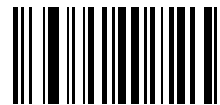
6



7



8



9



End of Message

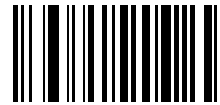


Cancel

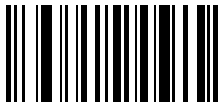
Alphanumeric Keyboard (continued)



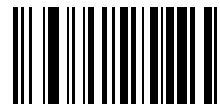
A



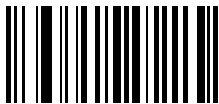
B



C



D



E

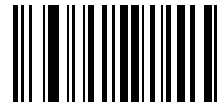


F

Alphanumeric Keyboard (continued)



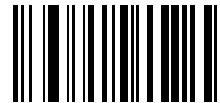
G



H



I



J



K

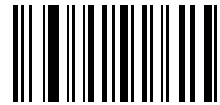


L

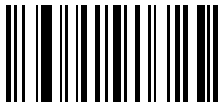
Alphanumeric Keyboard (continued)



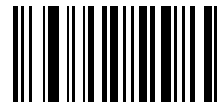
M



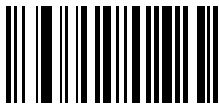
N



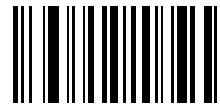
O



P



Q

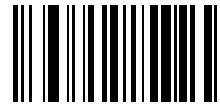


R

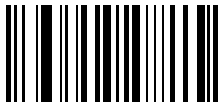
Alphanumeric Keyboard (continued)



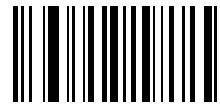
S



T



U



V



W

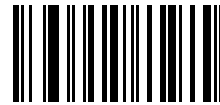


X

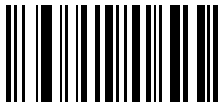
Alphanumeric Keyboard (continued)



Y



Z



a



b

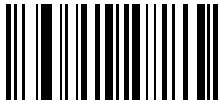


c

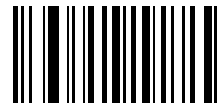


d

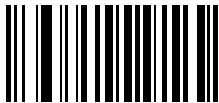
Alphanumeric Keyboard (continued)



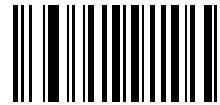
e



f



g



h



i

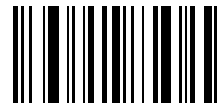


j

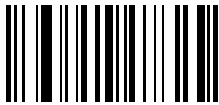
Alphanumeric Keyboard (continued)



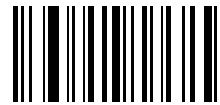
k



l



m



n

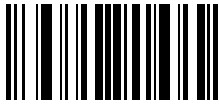


o

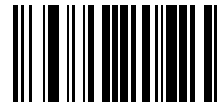


p

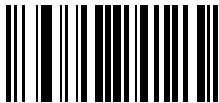
Alphanumeric Keyboard (continued)



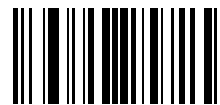
q



r



s



t

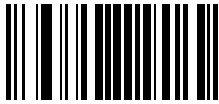


u

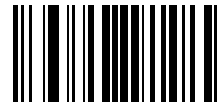


v

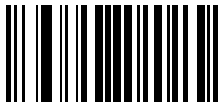
Alphanumeric Keyboard (continued)



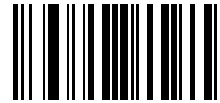
w



x



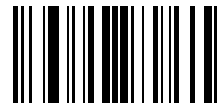
y



z

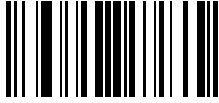


{

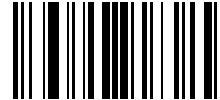


|

Alphanumeric Keyboard (continued)



}



~

APPENDIX H NUMERIC BAR CODES

Numeric Bar Codes

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



Numeric Barcodes

Numeric Bar Codes (continued)



Cancel

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



APPENDIX I ASCII CHARACTER SETS

Table 1 ASCII Character Set

ASCII Value	Full ASCII Code 39 Encode Char	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

The keystroke in bold transmits only if you enabled Function Key Mapping. Otherwise, the unbold keystroke transmits.

Table 1 ASCII Character Set (Continued)

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
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	,
1045	-	-
1046	.	.
1047	/o	/
1048	0	0

The keystroke in bold transmits only if you enabled Function Key Mapping. Otherwise, the unbold keystroke transmits.

Table 1 ASCII Character Set (Continued)

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
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
1074	J	J
1075	K	K
1076	L	L
1077	M	M

The keystroke in bold transmits only if you enabled Function Key Mapping. Otherwise, the unbold keystroke transmits.

Table 1 ASCII Character Set (Continued)

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1078	N	N
1079	O	O
1080	P	P
1081	Q	Q
1082	R	R
1083	S	S
1084	T	T
1085	U	U
1086	V	V
1087	W	W
1088	X	X
1089	Y	Y
1090	Z	Z
1091	%K	[
1092	%L	\
1093	%M	]
1094	%N	^
1095	%O	_
1096	%W	'
1097	+A	a
1098	+B	b
1099	+C	c
1100	+D	d
1101	+E	e
1102	+F	f
1103	+G	g
1104	+H	h
1105	+I	i
1106	+J	j

The keystroke in bold transmits only if you enabled Function Key Mapping. Otherwise, the unbold keystroke transmits.

Table 1 ASCII Character Set (Continued)

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1107	+K	k
1108	+L	l
1109	+M	m
1110	+N	n
1111	+O	o
1112	+P	p
1113	+Q	q
1114	+R	r
1115	+S	s
1116	+T	t
1117	+U	u
1118	+V	v
1119	+W	w
1120	+X	x
1121	+Y	y
1122	+Z	z
1123	%P	{
1124	%Q	
1125	%R	}
1126	%S	~
1127		Undefined

The keystroke in bold transmits only if you enabled Function Key Mapping. Otherwise, the unbold keystroke transmits.

Table 2 ALT Key Standard Default Tables

ALT Keys	Keystroke
2050	ALT 2
2054	ALT 6
2064	ALT @
2065	ALT A
2066	ALT B
2067	ALT C

Table 2 ALT Key Standard Default Tables (Continued)

ALT Keys	Keystroke
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
2091	ALT [
2092	ALT \
2093	ALT]

Table 3 USB GUI Key Character Set

GUI Key	Keystroke
3000	Right Control Key
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
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

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 USB GUI Key Character Set (Continued)

GUI Key	Keystroke
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

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 4 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 5 F key Standard Default Table

F Keys	Keystroke
5001	F 1
5002	F 2
5003	F 3
5004	F 4
5005	F 5
5006	F 6
5007	F 7
5008	F 8
5009	F 9
5010	F 10
5011	F 11
5012	F 12
5013	F 13
5014	F 14
5015	F 15
5016	F 16
5017	F 17
5018	F 18
5019	F 19
5020	F 20
5021	F 21
5022	F 22
5023	F 23
5024	F 24

Table 6 Numeric Key Standard Default Table

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

Table 7 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

APPENDIX J COMMUNICATION PROTOCOL FUNCTIONALITY

Functionality Supported via Communication (Cable) Interface

Table 1 lists supported scanner functionality by communication protocol.

Table 1 Communication Interface Functionality

Communication Interfaces	Functionality		
	Data Transmission	Remote Management	Image and Video Transmission
USB			
HID Keyboard Emulation	Supported	Not Available	Not Available
Simple COM Port Emulation	Supported	Not Available	Not Available
CDC COM Port Emulation	Supported	Not Available	Not Available
SSI over CDC COM Port Emulation	Supported	Supported	Supported
IBM Table-top USB	Supported	Supported	Not Available
Symbol Native API (SNAPI) without Imaging Interface	Supported	Supported	Not Available
Symbol Native API (SNAPI) with Imaging Interface	Supported	Supported	Supported
Toshiba TEC	Not Available	Not Available	Not Available
OPOS/JPOS	Supported	Not Available	Not Available
SSI	Supported	Supported	Supported
IBM 4690			
Table-top Scanner Emulation (Port 17)	Supported	Supported	Not Available
Non-IBM Scanner Emulation (Port 5B)	Supported	Supported	Not Available

APPENDIX K NON-PARAMETER ATTRIBUTES

Introduction

This appendix defines non-parameter attributes.

Attributes

Model Number

Attribute #533

Model number of the scanner. This electronic output matches the printout on the physical device label, for example **LI2208-SR00006ZZWW**.

Type	S
Size (Bytes)	18
User Mode Access	R
Values	Variable

Serial Number

Attribute #534

Unique serial number assigned in the manufacturing facility. This electronic output matches the printout on the physical device label, for example **M1J26F45V**.

Type	S
Size (Bytes)	16
User Mode Access	R
Values	Variable

Date of Manufacture

Attribute #535

Date of device manufacture assigned in the manufacturing facility. This electronic output matches the printout on the physical device label, for example **30APR14** (which reads the 30th of April 2014).

Type	S
Size (Bytes)	7
User Mode Access	R

Values

Variable

Date of First Programming

Attribute #614

Date of first electronic programming represents the first time settings were electronically loaded to the scanner either by 123Scan or via SMS, for example **18MAY14** (which reads the 18th of May 2014).

Type S

Size (Bytes) 7

User Mode Access R

Values Variable

Configuration Filename

Attribute #616

The name assigned to the configuration settings loaded electronically to the device either by 123Scan or via SMS.



NOTE: Scanning the **Set Defaults** bar code automatically changes the configuration filename to *factory defaults*.

To indicate the configuration settings loaded to the device were changed, the configuration filename changes to *Modified* upon scanning any parameter bar code.

Type S

Size (Bytes) 17

User Mode Access RW

Values Variable

Beeper/LED**Attribute #6000**

Activates the beeper and/or LED.

Type X
Size (Bytes) N/A
User Mode Access W

Values:

Beep / LED Action	Value
1 high short beep	0
2 high short beeps	1
3 high short beeps	2
4 high short beeps	3
5 high short beeps	4
1 low short beep	5
2 low short beeps	6
3 low short beeps	7
4 low short beeps	8
5 low short beeps	9
1 high long beep	10
2 high long beeps	11
3 high long beeps	12
4 high long beeps	13
5 high long beeps	14
1 low long beep	15
2 low long beeps	16
3 low long beeps	17
4 low long beeps	18
5 low long beeps	19
Fast warble beep	20
Slow warble beep	21
High-low beep	22
Low-high beep	23
High-low-high beep	24
Low-high-low beep	25
High-high-low-low beep	26
Green LED off	42
Green LED on	43
Red LED on	47
Red LED off	48

Parameter Defaults

Attribute #6001

This attribute restores all parameters to their factory defaults.

Type	X
Size (Bytes)	N/A
User Mode Access	W
Values	0 = Restore Defaults 1 = Restore Factory Defaults 2 = Write Custom Defaults

Beep on Next Bootup

Attribute #6003

This attribute configures (enables or disables) beep on next boot up of scanner.

Type	X
Size (Bytes)	N/A
User Mode Access	W
Values	0 = Disable beep on next bootup 1 = Enable beep on next bootup

Reboot

Attribute #6004

This attribute initiates a device reboot.

Type	X
Size (Bytes)	N/A
User Mode Access	W
Values	N/A

Host Trigger Session

Attribute #6005

This attribute triggers a decode session similar to manually depressing the scanner trigger button.

Type	X
Size (Bytes)	N/A
User Mode Access	W
Values	1 = Start Host Trigger Session 0 = Stop Host Trigger Session

Firmware Version

Attribute #20004

The scanner's operating system version. For example, **NBRFMAAC** or **PAAAABS00-007-R03D0**.

Type	S
Size (Bytes)	Variable
User Mode Access	R
Values	Variable

Scankit Version

Attribute #20008

Identifies the 1D decode algorithms resident on the device, for example **SKIT4.33T02**.

Type	S
Size (Bytes)	Variable
User Mode Access	R
Values	Variable

ImageKit Version

Attribute #20013

Identifies the 2D decode algorithms resident on the device, for example **IMGKIT_7.01T08.31**

Type	S
Size (Bytes)	Variable
User Mode Access	R
Values	Variable

Bar/Space Patterns							Type
B	S	B	S	B	S	B	
1	1	2	2	1	1	1	2
1	2	2	1	1	1	1	5
2	1	1	2	1	1	1	7
2	2	1	1	1	1	1	8
3	1	1	1	1	1	1	9

