

DS4800 SERIES CORDED DIGITAL IMAGER PRODUCT REFERENCE GUIDE



DS4800 SERIES CORDED DIGITAL IMAGER PRODUCT REFERENCE GUIDE

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Revision History

Changes to the original guide are listed below:

Change	Date	Description
-01 Rev A	4/2014	Initial release
-02 Rev A	6/2014	Added Toshiba TEC QR Pre-Scan Parsing parameters, changed Decode Illumination Indicator parameter to Direct Decode Indicator, updated default for Mobile Phone/Display Mode, added Customizable Scan Tone instructions

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ABOUT THIS GUIDE

Introduction

The *DS4800 Series Corded Digital Imager Product Reference Guide* provides general instructions for setting up, operating, maintaining, and troubleshooting the DS4800 Series Corded Digital Imager.

Configurations

This guide includes the following configurations:

- DS4801-SR0000WZZWW: Area Imager, Standard Range, Corded, Alpine White
- DS4801-SR00004ZZWW: Area Imager, Standard Range, Corded, Midnight Black
- DS4801-DL0000WZZWW: Area Imager, DL Parsing, Corded, Alpine White
- DS4801-DL00004ZZWW: Area Imager, DL Parsing, Corded, Midnight Black

Chapter Descriptions

Topics covered in this guide are as follows:

- [Chapter 1, Getting Started](#) provides a product overview, unpacking instructions, and cable connection information.
- [Chapter 2, Data Capture](#) describes parts of the digital imager, beep and LED definitions, and how to use the imager in hand-held and hands-free (presentation) modes.
- [Chapter 3, USB Interface](#) describes how to set up the digital imager with a USB host.
- [Chapter 4, User Preferences & Miscellaneous Options](#) describes features frequently used to customize how data transmits to the host device and programming bar codes for selecting user preference features for the digital imager.
- [Chapter 5, Imaging Preferences](#) describes imaging preference features and provides programming bar codes for selecting these features.

- [Chapter 6, Symbologies](#) describes all symbology features and provides programming bar codes for selecting these features for the digital imager.
- [Chapter 7, Intelligent Document Capture](#) describes Intelligent Document Capture (IDC) functionality, provides parameter bar codes to control its features, and includes a quick start procedure to get you started with IDC.
- [Chapter 8, OCR Programming](#) describes how to set up the imager for OCR programming.
- [Chapter 9, Driver's License Set Up \(DS4801-DL\)](#) describes how to program the DS4801-DL digital imager to read and use the data contained in the 2D bar codes on US driver's licenses and AAMVA compliant ID cards.
- [Chapter 10, 123Scan2](#) provides information on the PC-based digital imager configuration tool 123Scan².
- [Chapter 11, Advanced Data Formatting](#) briefly describes ADF, a means of customizing data before transmission to the host device, and includes a reference to the *ADF Programmer Guide*.
- [Chapter 12, Maintenance & Technical Specifications](#) provides information on how to care for the digital imager, troubleshooting, and technical specifications.
- [Appendix A, Standard Default Parameters](#) provides a table of all host devices and miscellaneous imager defaults.
- [Appendix B, Country Codes](#) provides bar codes for programming the country keyboard type for the USB keyboard (HID) device.
- [Appendix C, Country Code Pages](#) provides bar codes for selecting code pages for the country keyboard type.
- [Appendix D, CJK Decode Control](#) describes control parameters for Unicode/CJK (Chinese, Japanese, Korean) bar code decode through USB HID Keyboard Emulation mode.
- [Appendix E, Programming Reference](#) provides a table of AIM code identifiers, ASCII character conversions, and keyboard maps.
- [Appendix F, Sample Bar Codes](#) includes sample bar codes of various code types.
- [Appendix G, Numeric Bar Codes](#) includes the numeric bar codes to scan for parameters requiring specific numeric values.
- [Appendix H, ASCII Character Sets](#) provides ASCII character value tables.
- [Appendix I, Signature Capture Code](#) describes CapCode, a special pattern that encloses a signature area on a document and allows the imager to capture a signature.
- [Appendix J, Customization Options](#) provides information on using a customized scan tone, and customizing the DS4800 bezel for your enterprise.

Notational Conventions

The following conventions are used in this document:

- *Italics* are used to highlight the following:
 - Chapters and sections in this and related documents
 - Dialog box, window and screen names
 - Drop-down list and list box names
 - Check box and radio button names

- **Bold** text is used to highlight the following:
 - Key names on a keypad
 - Button names on a screen.
- bullets (•) indicate:
 - Action items
 - Lists of alternatives
 - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.
- Throughout the programming bar code menus, asterisks (*) are used to denote default parameter settings.



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

Related Documents

- *DS4800 Series Quick Start Guide*, p/n MN000100A0x - provides general information for getting started with the DS4801 digital imager, and includes basic set up and operation instructions.
- *Advanced Data Formatting Programmer Guide*, p/n 72E-69680-xx - provides information on ADF, a means of customizing data before transmission to a host.

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

Service Information

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

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

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

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

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

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

CHAPTER 1 GETTING STARTED

Introduction

The DS4800 Series Corded Digital Imager offers an innovative form factor, capacitive touch trigger with haptic feedback, and excellent performance on both traditional and mobile 1D and 2D bar codes. The sleek design and customizable bezel and feedback tones enable today's discriminating retailer to extend their image to the point-of-sale experience.

Unpacking

Remove the imager from its packing and inspect it for damage. If the imager was damaged in transit, contact Motorola Solutions support. See [page xvii](#) for contact information. **KEEP THE PACKING.** It is the approved shipping container; use this to return the equipment for servicing.

Imager Parts

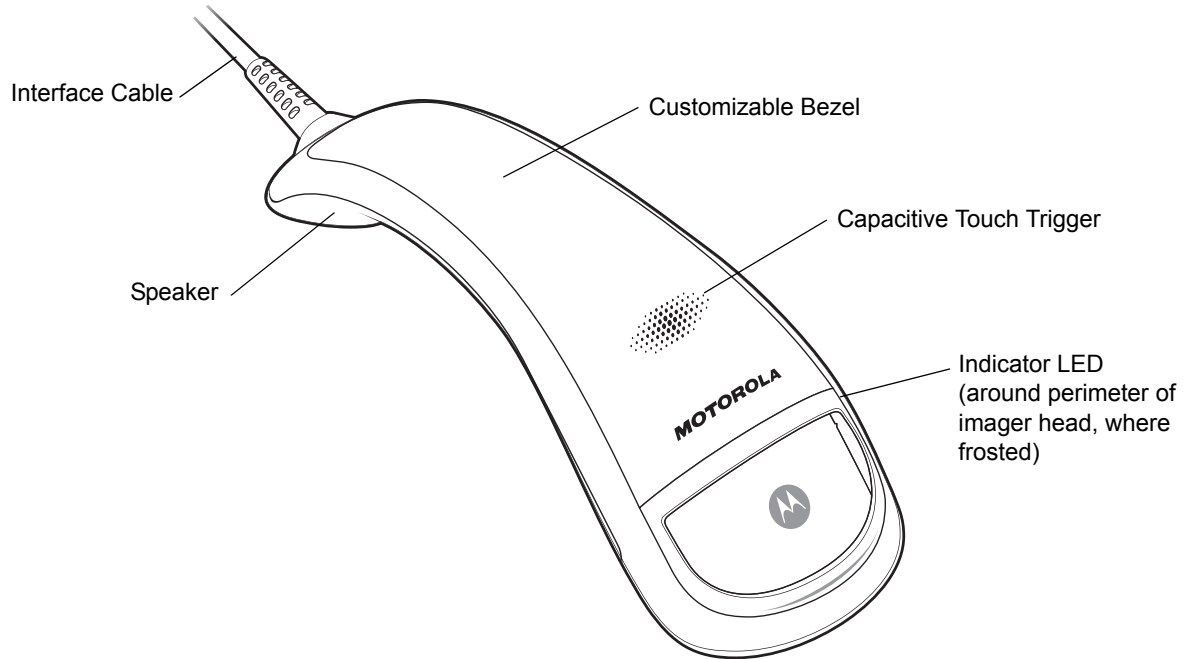


Figure 1-1 DS4800 Series Corded Digital Imager Parts

Host Connection

The DS4800 imager supports USB connection to a host. To connect the imager:

1. Plug the USB connector at the end of the cable into a USB port on the host.

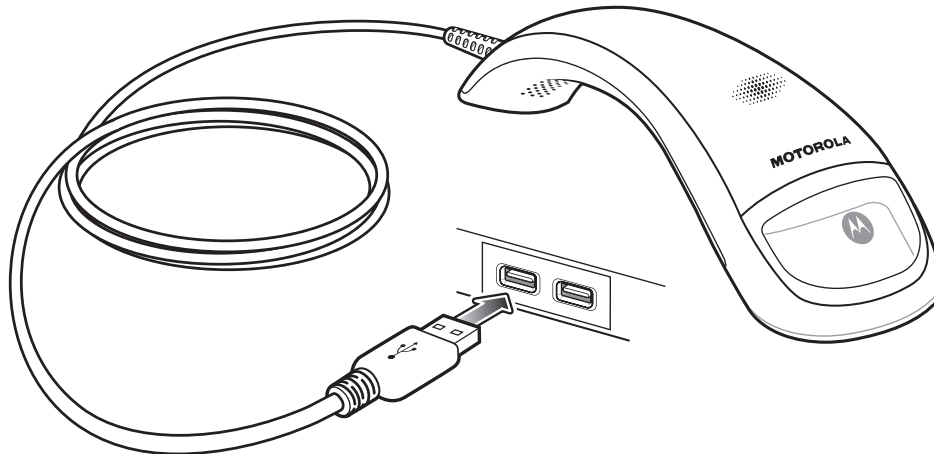


Figure 1-2 USB Host Connection

2. The imager defaults to the HID keyboard interface type. To select another USB interface type, scan a [USB Device Type on page 3-4](#).
3. On first installation when using Windows, the software prompts to select or install the Human Interface Device driver. To install this driver, provided by Windows, click **Next** through all the choices and click **Finished** on the last choice. The imager powers up during this installation.

If problems occur with the system, see [Troubleshooting on page 12-3](#).

Supported USB Protocols

The imager supports the following protocols over USB:

- HID Keyboard (default mode) for the following operating systems:
 - Windows XP 32/64 bit
 - Windows 7 32/64 bit
 - Windows 8 32/64 bit
 - Apple OS: Mac OS versions 10.6.x, 10.7.x, and 10.8.x (HID keyboard only)
- SNAPI
- COM Port Emulation
- IBM SurePOS (Yellowstone) (IBM Handheld, IBM Tabletop, OPOS)
- USB-CDC
- Toshiba TEC

The HID keyboard interface supports the international keyboards listed in [Appendix B, Country Codes](#).

DS4800 Series Presentation Stand

An optional intellistand is available for using the imager in presentation mode. Placing the imager in the stand automatically enables presentation mode, and a motion detection system rapidly wakes the imager from timeout.



Figure 1-3 *Presentation Intellistand*

Assembling the Stand

To assemble the stand:

1. Insert the stand pedestal into the base as shown in [Figure 1-4](#).

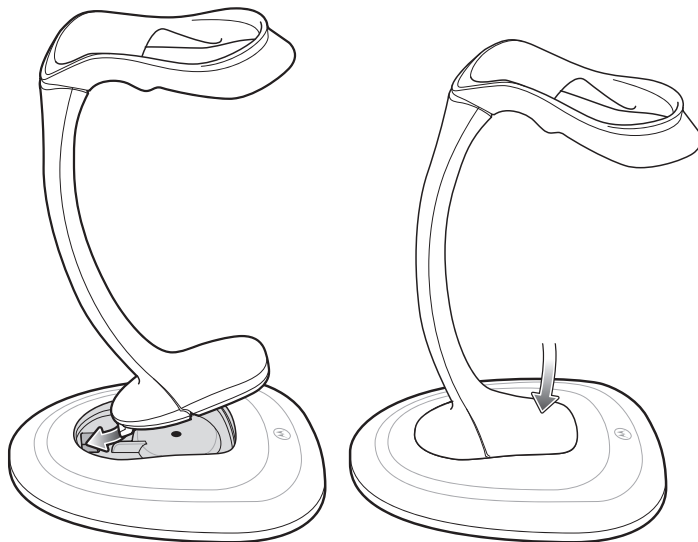


Figure 1-4 *Inserting Stand Pedestal in Base*

2. Screw the nut provided into the bottom of the base to secure.

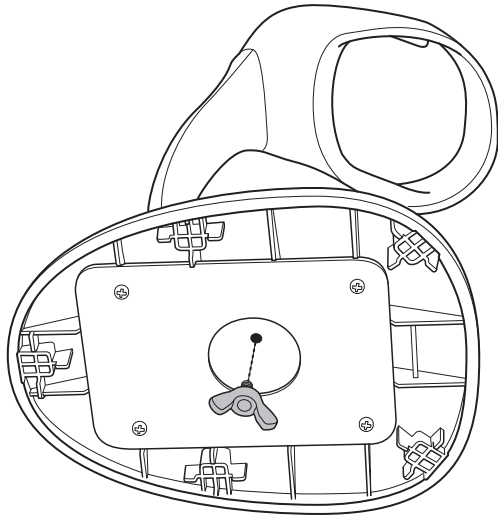


Figure 1-5 *Inserting Nut in Base*

3. Remove the adhesive from the rubber feet provided and secure them to the five recessed areas on the bottom of the base.

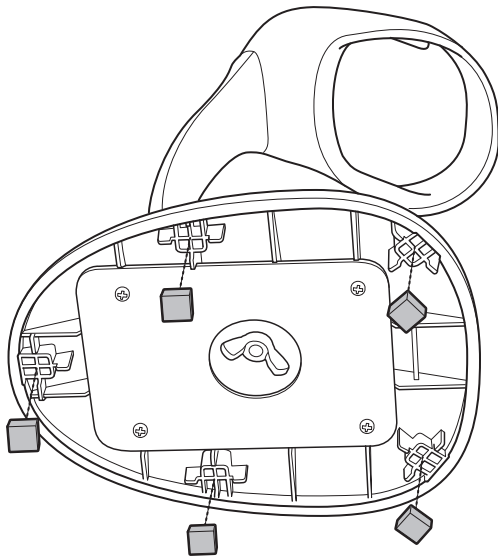


Figure 1-6 *Inserting Rubber Feet*

Configuring the Imager

To configure the imager use the bar codes included in this manual, or use the 123Scan² configuration program. See [Chapter 10, 123Scan2](#) for information on using this configuration program.

CHAPTER 2 DATA CAPTURE

Introduction

This chapter provides speaker and LED definitions, general scanning instructions and tips, and decode range information.

User Feedback Definitions

The imager uses a 2-color indicator LED, a white trigger LED, various beep sequences, and a vibrator motor to indicate status. [Table 2-1](#) defines the default beep sequences, LED displays, and vibration patterns that occur during both normal scanning and while programming the imager.

Table 2-1 *Default User Feedback Definitions*

Indication	Speaker Sequence	Indicator LED	Haptic/ Vibration
Standard Use			
Power up.	Power up tone	Green, then fades out	Double-vibrate
Ready to scan (hand-held mode).	None	None	None
Ready to scan (hands-free/presentation mode).	None	Pulsing green	None
The trigger was touched.	None	None	Vibrate for 100 ms
A bar code was decoded.	Wood block / scan tone 1	Green for 100 ms	None
Transmission error.	4 long low tones	Red	None
Conversion or format error.	5 low tones	Red	None

Table 2-1 Default User Feedback Definitions (Continued)

Indication	Speaker Sequence	Indicator LED	Haptic/ Vibration
Image Capture			
Snapshot mode started.	Low tone	Green blinking	None
Snapshot mode completed.	Low tone	Green (default based on hand-held (picklist) / hands-free)	None
Snapshot mode timed-out.	High, low tone	Green (default based on hand-held (picklist) / hands-free)	None
Parameter Programming			
Input error: incorrect bar code, programming sequence, or Cancel bar code scanned.	Low, high tone	Red for 2 seconds	None
Number expected. Enter value using numeric bar codes.	High, low tone	Green	None
Successful program exit with change in parameter setting.	High, low, high, low tone	Green for 1 second	None
ADF Programming			
Enter another digit. Add leading zeros to the front if necessary.	High, low tone	Green	None
Enter another alphabetic character or scan the End of Message bar code.	Low, low tone	Green	None
ADF criteria or action is expected. Enter another criterion or action, or scan the Save Rule bar code.	High, high tone	Green Blinking	None
Rule saved. Rule entry mode exited.	High, low, high, low tone	Green (turns off blinking)	None
All criteria or actions cleared for current rule, continue entering rule.	High, low, low tone	Green	None
Delete last saved rule. The current rule is left intact.	Low tone	Green	None
All rules are deleted.	Low, high, high tone	Green	None
Out of rule memory. Erase some existing rules, then try to save rule again	Low, high, low, high tone	Red	None
Cancel rule entry. Rule entry mode exited because of an error or the user asked to exit rule entry.	Low, high, low tone	Green (turns off blinking)	None

Table 2-1 *Default User Feedback Definitions (Continued)*

Indication	Speaker Sequence	Indicator LED	Haptic/ Vibration
Entry error, wrong bar code scanned, or criteria/action list is too long for a rule. Re-enter criterion or action.	Low, high tone	Red	None
Macro PDF			
File ID error. A bar code not in the current MPDF sequence was scanned.	2 low toned	None	None
File ID error. A bar code not in the current MPDF sequence was scanned.	2 long low tones	None	None
Out of memory. There is not enough buffer space to store the current MPDF symbol.	3 long low tones	None	None
Bad symbology. Scanned a 1D or 2D bar code in a MPDF sequence, a duplicate MPDF label, a label in an incorrect order, or trying to transmit an empty or illegal MPDF field.	4 long low tones	None	None
Flushing MPDF buffer.	5 long low tones	None	None
Aborting MPDF sequence.	Fast warble tone	None	None
Flushing an already empty MPDF buffer.	Low, high tone	None	None

Scanning

The DS4800 can be used in either hand-held triggered mode, hand-held presentation mode, or hands-free mode via an intellistand. To select the mode, see [Hand-Held Triggered Mode on page 4-17](#).

Hand-Held Triggered Scanning

When held, the DS4800 operates in standard triggered mode. Initially, the trigger LED pulses in idle state. To decode a bar code:

1. Aim the imager at a bar code and touch the trigger to decode. Upon trigger touch:
 - The trigger LED turns off.
 - The imager vibrates for 100 ms (by default).
 - If enabled, a brief audio click sounds.
 - The imager projects illumination and a red LED aiming dot to facilitate positioning the bar code within its field of view (see [Table 12-2 on page 12-5](#) for the proper distance to achieve between the imager and a bar code).

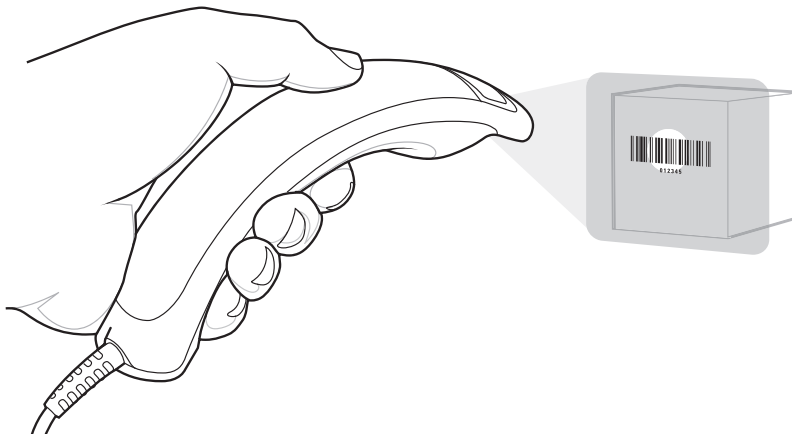


Figure 2-1 Scanning in Hand-Held Mode

2. To scan the symbol, center the aiming dot on the symbol, in any orientation.



Figure 2-2 Scanning Orientation with Imager Aiming Dot

When a bar code is decoded:

- A tone sounds (by default). To change the tone, see [Scan Tone on page 4-10](#). To disable the tone, see [Beep After Good Decode on page 4-7](#).
 - The green indicator LED turns on (by default). To disable this, see [LED on Good Decode on page 4-12](#).
 - If enabled, the imager provides haptic feedback. See [Haptic Feedback \(Vibrate\) on Good Decode on page 4-13](#).
3. Release the trigger. The trigger LED remains on while in an active state (10 seconds after the last trigger press), then returns to idle state and pulses.

Hands-Free Presentation Scanning

When placed in the presentation intellistand, the imager automatically enters hands-free presentation mode. Initially in this mode:

- Illumination is off.
- The white trigger LED is off.
- The green indicator LED continuously pulses.

Present a bar code to the imager or swipe the bar code past the exit window:

- Illumination turns on.
- Optionally, the aiming dot turns on if enabled via [Hands-Free Decode Aiming Pattern on page 4-19](#).
- The green indicator LED turns off.

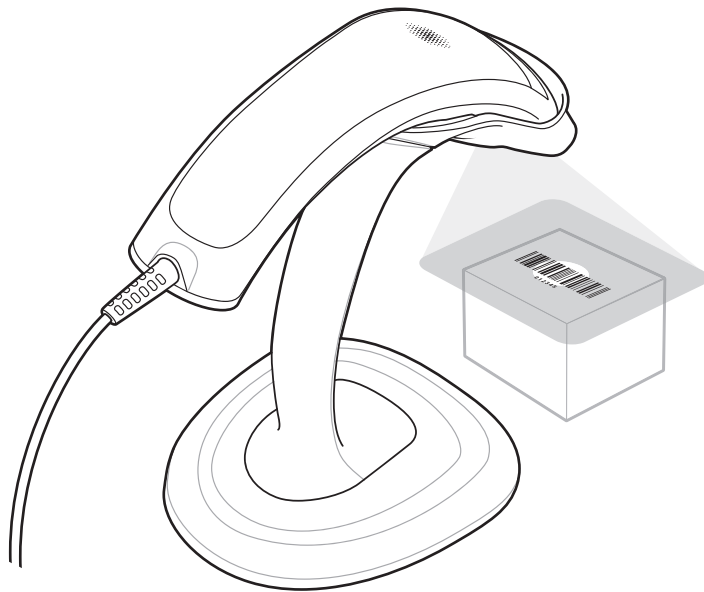


Figure 2-3 Hands-Free Presentation Scanning

When a bar code is decoded:

- A tone sounds (by default). To change the tone, see [Scan Tone on page 4-10](#). To disable the tone, see [Beep After Good Decode on page 4-7](#).
- The green indicator LED turns on momentarily (by default), then returns to idle state and pulses. To disable this, see [LED on Good Decode on page 4-12](#).
- Haptic feedback does not occur, even if enabled in hand-held mode.

Hand-Held Presentation Scanning

This mode is disabled by default. Initially in this mode:

- The aiming dot and illumination are off.
- The white trigger LED is off.
- The green indicator LED continuously pulses.

When lifted off the counter or removed from the presentation intellistand:

- The DS4800 detects motion and turns illumination on.
- Optionally, the aiming dot turns on if enabled via [Hands-Free Decode Aiming Pattern on page 4-19](#).
- The green indicator LED turns off.

Aim the imager at a bar code to activate decode processing.

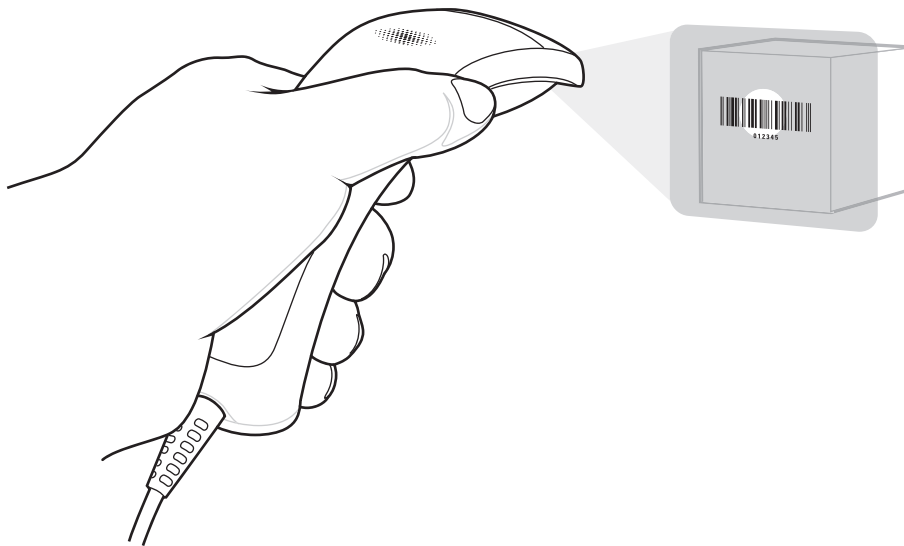


Figure 2-4 Hand-Held Presentation Scanning

When a bar code is decoded:

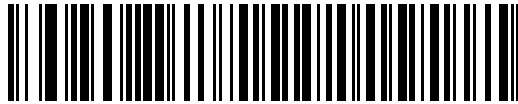
- A tone sounds (by default). To change the tone, see [Scan Tone on page 4-10](#). To disable the tone, see [Beep After Good Decode on page 4-7](#).
- The green indicator LED turns on momentarily (by default), then returns to idle state and pulses. To disable this, see [LED on Good Decode on page 4-12](#).
- If enabled, the imager provides haptic feedback. See [Haptic Feedback \(Vibrate\) on Good Decode on page 4-13](#).

CHAPTER 3 USB INTERFACE

Introduction

This chapter describes how to set up the imager with a USB host. The imager connects directly to a USB host, or a powered USB hub, which powers it. No additional power supply is required.

Throughout the programming bar code menus, asterisks (*) indicate default values.



*Indicates Default — ***Enable Keypad Emulation** — Feature/Option



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

USB Parameter Defaults

[Table 3-1](#) lists the defaults for USB host parameters. To change any option, scan the appropriate bar code(s) provided in this chapter.

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

Table 3-1 USB Interface Parameter Defaults

Parameter	Default	Page Number
USB Host Parameters		
USB Device Type	USB Keyboard HID	3-4
Symbol Native API (SNAPI) Status Handshaking	Enable	3-6
USB Keystroke Delay	No Delay	3-6
USB CAPS Lock Override	Disable	3-7
USB Ignore Unknown Characters	Enable	3-7
USB Convert Unknown to Code 39	Disable	3-8
Emulate Keypad	Enable	3-8
Emulate Keypad with Leading Zero	Enable	3-9
Quick Keypad Emulation	Enable	3-9
USB FN1 Substitution	Disable	3-10
Function Key Mapping	Disable	3-10
Simulated Caps Lock	Disable	3-11
Convert Case	None	3-11
USB Polling Interval	3 msec	3-12
USB Fast HID	Enable	3-13
USB Static CDC	Enable	3-14
Ignore Beep	Enable	3-15
Ignore Bar Code Configuration	Enable	3-15
IBM Specification Version	Original Specification	3-16
USB Toshiba TEC Host Parameters		
Code Type Table Usage	Use Table 0 Identifier	3-17
Include Symbol Types	Add Symbol Types	3-18
Include Character Counts	Add Character Counts	3-18

Table 3-1 *USB Interface Parameter Defaults (Continued)*

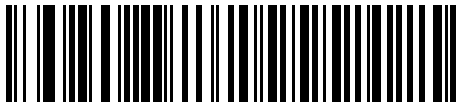
Parameter	Default	Page Number
Include Header	Add Header Character	3-18
Include Terminator	Add Terminator Character (s)	3-19
Header Character	n/a	3-19
Terminator Character	Add ETX	3-20
Light LED on Good Decode	Light LED on Good Decode	3-20
Good Decode Beep Timer	Indicate Before Transmission	3-21
Toshiba TEC QR Pre-Scan Parsing	Enable	3-22
Toshiba TEC QR Pre-Scan Parsing Transmit Interval	0 msec (No Delay)	3-22

USB Host Parameters

USB Device Type

Select the desired USB device type. To select a country keyboard type for the **USB Keyboard HID** host, see [Appendix B, Country Codes](#).

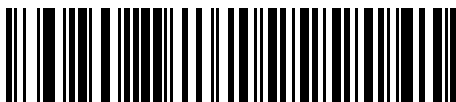
- ✓ **NOTE** When changing USB Device Types, the imager automatically resets and issues the standard startup beep sequences.
- ✓ **NOTE** Select **IBM Hand-Held USB** to disable data transmission when an IBM register issues a Scan Disable command. Aim, illumination, and decoding is still permitted. Select **IBM OPOS (IBM Hand-Held USB with Full Scan Disable)** to completely shut off the imager when an IBM register issues a Scan Disable command, including aim, illumination, decoding and data transmission.



*USB Keyboard HID



IBM Table-Top USB



IBM Hand-Held USB



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

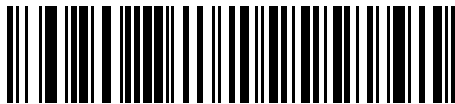


Simple COM Port Emulation

USB Device Type (continued)



USB CDC Host
(Note 1)



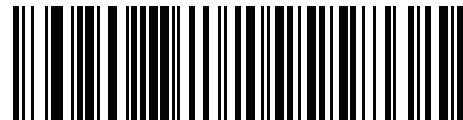
SSI over USB CDC



Symbol Native API (SNAPI) with Imaging Interface



Symbol Native API (SNAPI) without Imaging Interface



Toshiba TEC Host
(Note 2)

- ✓ **NOTE 1** Before selecting USB CDC Host, install the CDC INF file on the host to ensure the imager does not stall during power up (due to a failure to enumerate USB). If the imager stalls, to recover it:
1. Install the CDC INF file
 - or
 2. After power-up, hold the trigger for 10 seconds, which allows the imager to power up using an alternate USB configuration. Upon power-up, scan another **USB Device Type**.
- ✓ **NOTE 2** Before selecting the Toshiba TEC Host, install the driver and connect to a Toshiba TEC register. Selecting this host without installing the driver causes the scanner to become unresponsive.

Symbol Native API (SNAPI) Status Handshaking

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



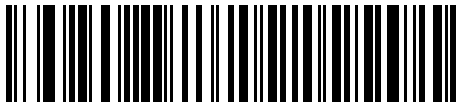
***Enable SNAPI Status Handshaking**



Disable SNAPI Status Handshaking

USB Keystroke Delay

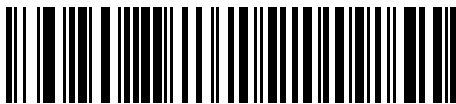
This parameter sets the delay, in milliseconds, between emulated keystrokes. Scan a bar code below to increase the delay when hosts require a slower transmission of data.



***No Delay**



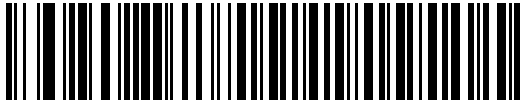
Medium Delay (20 msec)



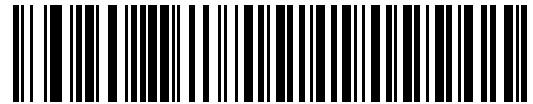
Long Delay (40 msec)

USB CAPS Lock Override

This option applies only to the USB Keyboard HID device. Enable this to preserve the case of the data regardless of the state of the **Caps Lock** key. This setting is always enabled for the Japanese, Windows (ASCII) keyboard type and can not be disabled.



Override Caps Lock Key
(Enable)



*Do Not Override Caps Lock Key
(Disable)

USB Ignore Unknown Characters

This option applies only to the USB Keyboard HID device and IBM device. Unknown characters are characters the host does not recognize. Select **Send Bar Codes With Unknown Characters** to send all bar code data except for unknown characters. The imager issues no error beeps.

Select **Do Not Send Bar Codes With Unknown Characters**, for IBM devices, to prevent sending bar codes containing at least one unknown character are to the host, or for USB Keyboard HID devices, this sends the bar code characters up to the unknown character. The imager issues an error beep.



*Send Bar Codes with Unknown Characters
(Transmit)



Do Not Send Bar Codes with Unknown Characters
(Disable)

USB Convert Unknown to Code 39

This option applies only to the IBM hand-held, IBM table-top, and OPOS devices. Scan a bar code below to enable or disable converting unknown bar code type data to Code 39.



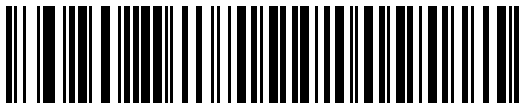
***Disable Convert Unknown to Code 39**



Enable Convert Unknown to Code 39

Emulate Keypad

Enable this to send all characters as ASCII sequences over the numeric keypad. For example ASCII A transmits as "ALT make" 0 6 5 "ALT Break".



***Enable Keypad Emulation**



Disable 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”.



*Enable Keypad Emulation with Leading Zero



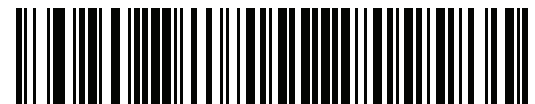
Disable Keypad Emulation with Leading Zero

Quick Keypad Emulation

This option applies only to the USB Keyboard HID device when [Emulate Keypad on page 3-8](#) is enabled. This parameter enables a quicker method of emulation using the numeric keypad where ASCII sequences are only sent for ASCII characters not found on the keyboard. The default value is **Enable**.



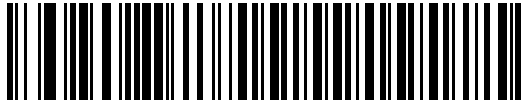
*Enable Quick Keypad Emulation



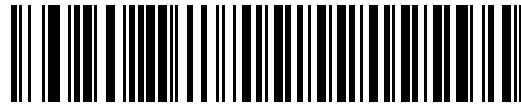
Disable Quick Keypad Emulation

USB Keyboard FN 1 Substitution

This option applies only to the USB Keyboard HID device. Enable this to replace any FN 1 characters in a GS1 128 bar code with a user-selected Key Category and value (see [FN1 Substitution Values on page 4-34](#) to set the Key Category and Key Value).



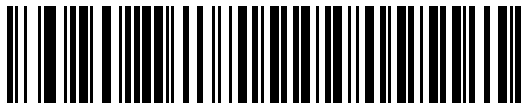
Enable USB Keyboard FN 1 Substitution



*Disable USB Keyboard FN 1 Substitution

Function Key Mapping

ASCII values under 32 are normally sent as a control-key sequences (see [Table 3-3 on page 3-24](#)). Enable this parameter to send the keys in bold in place of the standard key mapping. Table entries that do not have a bold entry remain the same whether or not you enable this parameter.



*Disable Function Key Mapping

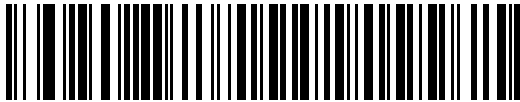


Enable Function Key Mapping

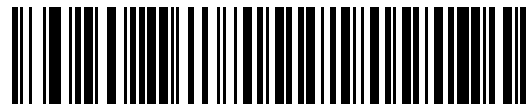
Simulated Caps Lock

Enable this to invert upper and lower case characters on the bar code as if the Caps Lock state is enabled on the keyboard. This inversion occurs regardless of the keyboard's **Caps Lock** state.

✓ **NOTE** Simulated Caps Lock applies to ASCII characters only.



*Disable Simulated Caps Lock

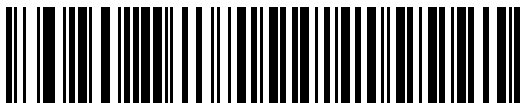


Enable Simulated Caps Lock

Convert Case

Enable this to convert all bar code data to the selected case.

✓ **NOTE** Convert Case applies to ASCII characters only.



*No Case Conversion



Convert All to Upper Case



Convert All to Lower Case

USB Polling Interval

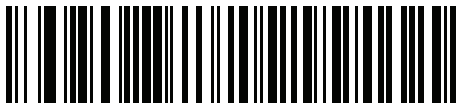
Scan a bar code below to set the polling interval. The polling interval is the rate at which data transmits between the scanner and host computer. A lower number indicates a faster data rate.



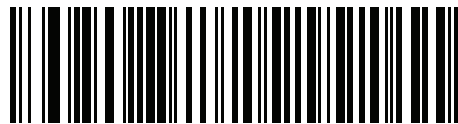
NOTE When changing the USB polling interval, the imager restarts and issues a power-up beep sequence.



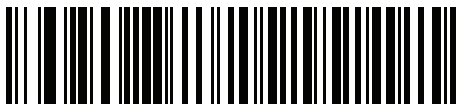
IMPORTANT Ensure the host supports the selected data rate.



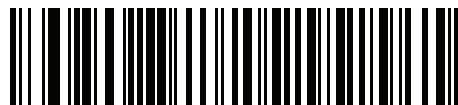
1 msec



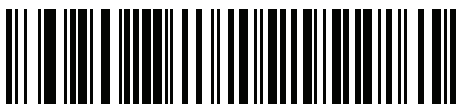
2 msec



* 3 msec



4 msec



5 msec

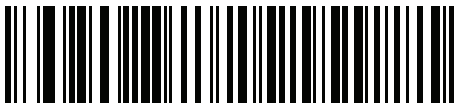
USB Polling Interval (continued)



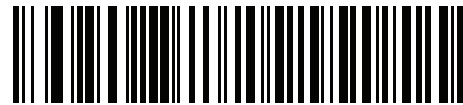
6 msec



7 msec



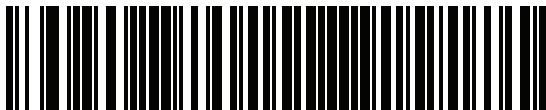
8 msec



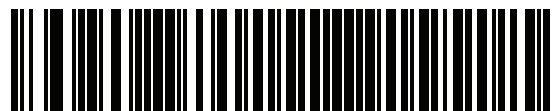
9 msec

USB Fast HID

This option transmits USB HID data at a faster rate.



*Enable



Disable

USB Static CDC

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

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



***Enable USB Static CDC**



Disable USB Static CDC

Optional USB Parameters

If the configured settings are changed or not saved after restarting the system, scan the following bar codes to override USB interface defaults.

Ignore Beep

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



Disable



***Enable**

Ignore Bar Code Configuration

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



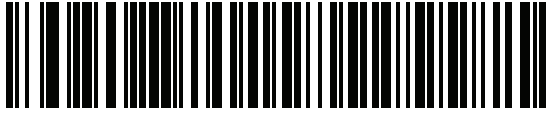
Disable



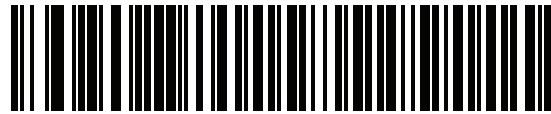
***Enable**

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

Toshiba TEC Host Parameters

This section only applies when the USB device type is set as *Toshiba TEC Host (Note 2) on page 3-5*, and the imager is connected to a Toshiba TEC register.

Toshiba TEC Code Type Table Usage

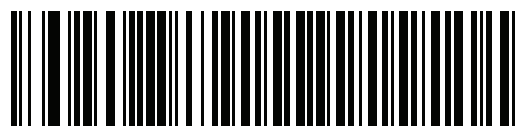
This single bit option sets the Toshiba TEC specific symbol table to use to identify bar code types.

Table 3-2 *Toshiba TEC Symbol Type Table*

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



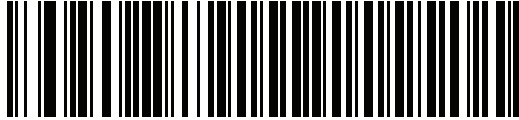
* Use Table 0 Identifier



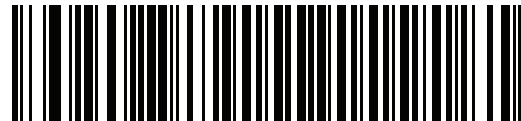
Use Table 1 Identifier

Toshiba TEC Include Symbol Type

This single bit option determines whether to use the Toshiba TEC Symbol Table to identify bar code types.



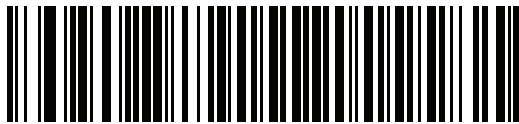
* Add Symbol Types



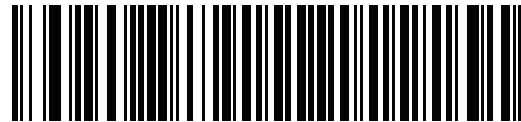
Do Not Add Symbol Types

Toshiba TEC Include Character Counts

This single bit option determines whether to prefix the count of characters in the bar code to the decoded data before transmission. This applies to all the code types except the UPC and EAN families.



* Add Character Counts



Do Not Add Character Counts

Toshiba TEC Include Header

This single bit option determines whether to prefix the header character to the decoded data before transmission. The default header character is the STX (0x02) character. To change this, see [Toshiba TEC Header Character on page 3-19](#).



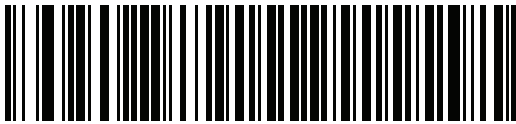
* Add Header Character



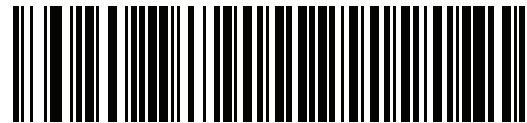
Do Not Add Header Character

Toshiba TEC Include Terminator

This single bit option determines whether to append the terminator character(s) to the decoded data before transmission. The default terminator character is the ETX (0x03) character. To change this, see [Toshiba TEC Terminator Character on page 3-20](#). You can also specify one or two terminator characters. The default is no second terminator.



* Add Terminator Character (s)



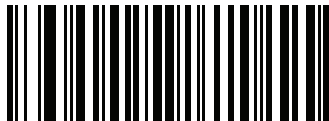
Do Not Add Terminator Character(s)

Toshiba TEC Header Character

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

Values:0 = Add STX (0x02),

All others specify the hex value to be prefixed.



Toshiba TEC Header Character

Toshiba TEC Terminator Character

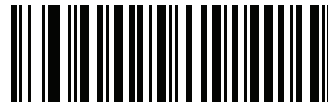
This two byte option specifies the terminator character(s) appended onto the decoded data before transmission. The default terminator character is the ETX (0x03) character. Note that it is NOT POSSIBLE to use the NULL character (0x00) as either of the terminators as this is the default value and indicates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

Values: 0 = Add ETX (0x03),

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



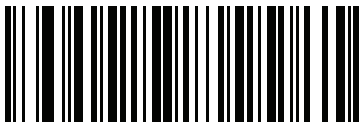
Terminator Character 1



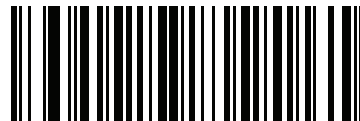
Terminator Character 2

Toshiba TEC Light LED on Good Decode

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



*** Light LED on Good Decode**



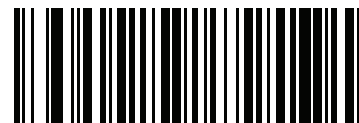
Do Not Light LED on Good Decode

Toshiba TEC Good Decode Beep Timing

This option determines whether a good decode indication occurs before or after the bar code transmits to the host.



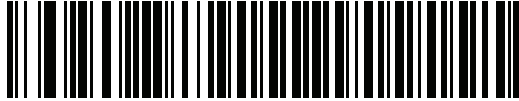
* Indicate Before Transmission



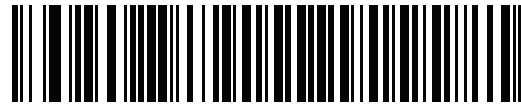
Indicate After Transmission

Toshiba TEC QR Pre-Scan Parsing

This single bit option enables or disables parsing specified QR pre-scan bar codes.



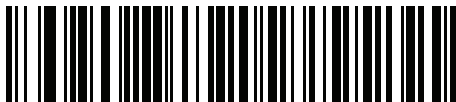
***Enable Parsing**



Disable Parsing

Toshiba TEC QR Pre-Scan Parsing Transmit Interval

This option specifies the delay between each transmission of the parsed QR scanned bar codes. The default is no delay.



***0 msec (No Delay)**



10 msec

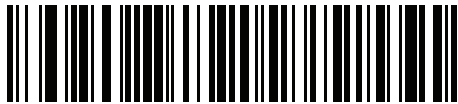
Toshiba TEC QR Pre-Scan Parsing Transmit Interval (continued)



20 msec



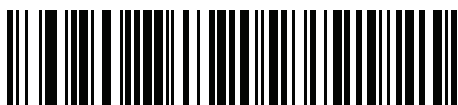
50 msec



100 msec



200 msec



500 msec



1000 msec

ASCII Character Set for USB

Table 3-3 USB Prefix/Suffix Values

Prefix/ Suffix Value	Full ASCII Code 39 Encode Character	Keystroke
1000	%U	CTRL 2
1001	\$A	CTRL A
1002	\$B	CTRL B
1003	\$C	CTRL C
1004	\$D	CTRL D
1005	\$E	CTRL E
1006	\$F	CTRL F
1007	\$G	CTRL G
1008	\$H	CTRL H/ BACKSPACE ¹
1009	\$I	CTRL I/ HORIZONTAL TAB ¹
1010	\$J	CTRL J
1011	\$K	CTRL K
1012	\$L	CTRL L
1013	\$M	CTRL M/ ENTER ¹
1014	\$N	CTRL N
1015	\$O	CTRL O
1016	\$P	CTRL P
1017	\$Q	CTRL Q
1018	\$R	CTRL R
1019	\$S	CTRL S
1020	\$T	CTRL T
1021	\$U	CTRL U
1022	\$V	CTRL V
1023	\$W	CTRL W
1024	\$X	CTRL X
1025	\$Y	CTRL Y

¹The keystroke in bold transmits only if you enable *Function Key Mapping* on page 3-10. Otherwise, the unbolded keystroke transmits.

Table 3-3 USB Prefix/Suffix Values (Continued)

Prefix/ Suffix Value	Full ASCII Code 39 Encode Character	Keystroke
1026	\$Z	CTRL Z
1027	%A	CTRL [ESC ¹
1028	%B	CTRL \
1029	%C	CTRL]
1030	%D	CTRL 6
1031	%E	CTRL -
1032	Space	Space
1033	/A	!
1034	/B	"
1035	/C	#
1036	/D	\$
1037	/E	%
1038	/F	&
1039	/G	'
1040	/H	(
1041	/I)
1042	/J	*
1043	/K	+
1044	/L	,
1045	-	-
1046	.	.
1047	/O	/
1048	0	0
1049	1	1
1050	2	2
1051	3	3
1052	4	4
1053	5	5
1054	6	6

¹The keystroke in bold transmits only if you enable *Function Key Mapping* on page 3-10. Otherwise, the unbolded keystroke transmits.

Table 3-3 USB Prefix/Suffix Values (Continued)

Prefix/ Suffix Value	Full ASCII Code 39 Encode Character	Keystroke
1055	7	7
1056	8	8
1057	9	9
1058	/Z	:
1059	%F	;
1060	%G	<
1061	%H	=
1062	%I	>
1063	%J	?
1064	%V	@
1065	A	A
1066	B	B
1067	C	C
1068	D	D
1069	E	E
1070	F	F
1071	G	G
1072	H	H
1073	I	I
1074	J	J
1075	K	K
1076	L	L
1077	M	M
1078	N	N
1079	O	O
1080	P	P
1081	Q	Q
1082	R	R
1083	S	S

¹The keystroke in bold transmits only if you enable *Function Key Mapping* on page 3-10. Otherwise, the unbolded keystroke transmits.

Table 3-3 USB Prefix/Suffix Values (Continued)

Prefix/ Suffix Value	Full ASCII Code 39 Encode Character	Keystroke
1084	T	T
1085	U	U
1086	V	V
1087	W	W
1088	X	X
1089	Y	Y
1090	Z	Z
1091	%K	[
1092	%L	\
1093	%M]
1094	%N	^
1095	%O	_
1096	%W	`
1097	+A	a
1098	+B	b
1099	+C	c
1100	+D	d
1101	+E	e
1102	+F	f
1103	+G	g
1104	+H	h
1105	+I	i
1106	+J	j
1107	+K	k
1108	+L	l
1109	+M	m
1110	+N	n
1111	+O	o
1112	+P	p

¹The keystroke in bold transmits only if you enable *Function Key Mapping* on page 3-10. Otherwise, the unbolded keystroke transmits.

Table 3-3 USB Prefix/Suffix Values (Continued)

Prefix/ Suffix Value	Full ASCII Code 39 Encode Character	Keystroke
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	~

¹The keystroke in bold transmits only if you enable *Function Key Mapping* on page 3-10. Otherwise, the unbolded keystroke transmits.

Table 3-4 *USB ALT Key Character Set*

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

Table 3-5 *USB GUI Key Character Set*

GUI Key	Keystroke
3000	Right Control Key
3048	GUI 0
3049	GUI 1
3050	GUI 2
3051	GUI 3
3052	GUI 4
3053	GUI 5
3054	GUI 6
3055	GUI 7
3056	GUI 8
3057	GUI 9
3065	GUI A
3066	GUI B
3067	GUI C
3068	GUI D
3069	GUI E
3070	GUI F
3071	GUI G
3072	GUI H
3073	GUI I
3074	GUI J
3075	GUI K
3076	GUI L
3077	GUI M
3078	GUI N
3079	GUI O
3080	GUI P
3081	GUI Q

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

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

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

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

Table 3-6 *USB F Key Character Set*

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

Table 3-7 *USB Numeric Keypad Character Set*

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

Table 3-8 *USB Extended Keypad Character Set*

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

CHAPTER 4 USER PREFERENCES & MISCELLANEOUS OPTIONS

Introduction

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

The imager ships with the settings shown in [Table 4-2 on page 4-3](#) (also see [Appendix A, Standard Default Parameters](#) for all imager defaults). If the default values suit requirements, programming is not necessary.

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

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

To return all features to default values, see [Default Parameters on page 4-5](#). Throughout the programming bar code menus, asterisks indicate (*) default values.



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

User Experience

DS4800 Series imagers offer user-friendly features that enhance the decoding experience. [Table 4-1](#) provides a quick reference for selecting these triggering and decoding features.

Table 4-1 *User Experience Options*

Feature	Parameter Number	Options	Page Number
Trigger Definitions			
Tone / Audio Click	1252	On / Off*	4-16
Haptic	1251	On* / Off	4-16
Good Decode Feedback Definitions			
Tone / Beep	56	On* / Off	4-7
Scan Tone Selection	145	Tones 1* - 6, Low, Medium, High	4-10
Haptic	613	On / Off*	4-13
Indicator LED	744	On* / Off	4-12
* indicates the default value.			

Scanning Sequence Examples

In most cases, scanning one bar code sets the parameter value. For example, to set the speaker volume to low, scan the **Low Volume** bar code listed under [Speaker Volume on page 4-9](#). The imager issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

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

Errors While Scanning

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

User Preferences/Miscellaneous Options Parameter Defaults

[Table 4-2](#) lists defaults for user preferences parameters. To change the default values:

- Scan the appropriate bar codes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, see [Default Parameters on page 4-5](#).
- Configure the imager using the 123Scan² configuration program (see [123Scan2 on page 10-1](#)).

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

Table 4-2 *User Preferences Parameter Defaults*

Parameter	Parameter Number	Default	Page Number
User Preferences			
Set Default Parameter		Restore Defaults	4-5
Report Version		N/A	4-6
Parameter Bar Code Scanning	236	Enable	4-6
Beep After Good Decode	56	Enable	4-7
Direct Decode Indicator	859	Disable	4-8
Speaker Volume	140	High	4-9
Scan Tone	145	Wood Block / Scan Tone 1	4-10
Suppress Power Up Beeps	721	Do Not Suppress	4-12
LED on Good Decode	744	Enable	4-12
Haptic Feedback (Vibrate) on Good Decode	613	Disable	4-13
Haptic Feedback (Vibrate) on Good Decode Duration	626	100 msec	4-14
Haptic Feedback (Vibrate) on Trigger Touch	1251	Enable	4-16
Tone on Trigger Touch	1252	Disable	4-16
Hand-Held Triggered Mode	138	Auto Aim	4-17
Hand-Held Decode Aiming Pattern	306	Enable	4-18
Hands-Free (Presentation) Decode Aiming Pattern	590	Enable Hands-Free (Presentation) Decode Aiming Pattern on PDF	4-19
Picklist Mode	402	Disabled Always	4-20
Continuous Bar Code Read	649	Disable	4-21
Unique Bar Code Reporting	723	Enable	4-21
Decode Session Timeout	136	9.9 Sec	4-22
Timeout Between Decodes, Same Symbol	137	0.5 Sec	4-22
Timeout Between Decodes, Different Symbols	144	0.1 sec	4-23
Fuzzy 1D Processing	514	Enable	4-23
Decode Mirror Images (Data Matrix Only)	537	Auto	4-24
Mobile Phone/Display Mode	716	Normal	4-25
PDF Prioritization	719	Disable	4-26
PDF Prioritization Timeout	720	200 ms	4-26

Table 4-2 *User Preferences Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
Presentation Mode Field of View	609	Full	4-27
Decoding Illumination	298	Enable	4-28
Low Light Scene Detection	810	Aiming Dot Low Light Assist Scene Detection	4-29
Motion Tolerance (Hand-Held Triggered Mode Only)	858	Less Motion Tolerance	4-30
Miscellaneous Options			
Transmit Code ID Character	45	None	4-31
Prefix Value	99, 105	7013 <CR><LF>	4-32
Suffix 1 Value Suffix 2 Value	98, 104 100, 106	7013 <CR><LF>	4-32
Scan Data Transmission Format	235	Data as is	4-33
FN1 Substitution Values	103, 109	7013 <CR><LF>	4-34
Transmit "No Read" Message	94	Disable	4-35
Unsolicited Heartbeat Interval	1118	Disable	4-36

User Preferences

Default Parameters

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

- **Restore Defaults** - Resets all default parameters as follows:
 - If custom default values were configured (see **Write to Custom Defaults**), the custom default values are set for all parameters each time the **Restore Defaults** bar code below is scanned.
 - If no custom default values were configured, the factory default values are set for all parameters each time the **Restore Defaults** bar code below is scanned. (For factory default values, see [Appendix A, Standard Default Parameters.](#))
- **Set Factory Defaults** - Scan the **Set Factory Defaults** bar code below to eliminate all custom default values and set the imager 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** bar code below to configure custom defaults.



*Restore Defaults



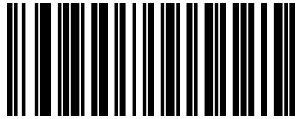
Set Factory Defaults



Write to Custom Defaults

Report Version

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



Report Software Version

Parameter Bar Code Scanning

Parameter # 236

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



***Enable Parameter Bar Code Scanning
(1)**



**Disable Parameter Bar Code Scanning
(0)**

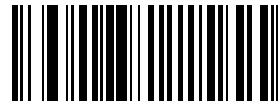
Beep After Good Decode

Parameter # 56

Scan a bar code below to select whether or not the imager beeps after a good decode. If selecting **Do Not Beep After Good Decode**, the speaker 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

This feature is only supported in Auto Aim and Standard (Level) trigger modes. Scan a bar code below to select optional blinking of the illumination upon a successful decode if you continue to hold the trigger. If you release the trigger upon decode, the blinking does not occur. This allows you to choose additional feedback for a successful decode by holding the trigger, or to continue to scan as normal.

Options are:

- **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)**

Speaker Volume

Parameter # 140

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



Low Volume
(2)



Medium Volume
(1)

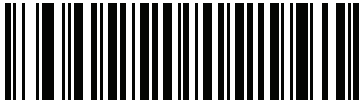


***High Volume**
(0)

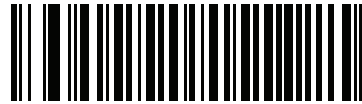
Scan Tone

Parameter # 145

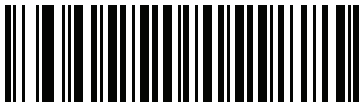
To select a scan tone, scan one of the following bar codes. Select from the special tones below, or from the standard low, medium, and high tones.



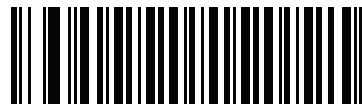
***Wood Block / Tone 1
(6)**



**Pulse / Tone 2
(7)**



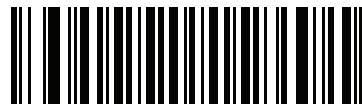
**Chime / Tone 3
(8)**



**Zap / Tone 4
(9)**



**Triple Beep / Tone 5
(10)**



**User Programmable / Tone 6
(11)**

Note: See [Custom Scan Tone on page J-1](#) to download a custom tone.

Standard Tones



Low Tone
(2)



Medium Tone
(1)



High Tone
(0)

Suppress Power Up Beeps

Parameter # 721

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



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

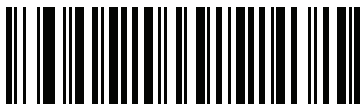


**Suppress Power Up Beeps
(1)**

LED on Good Decode

Parameter # 744

Scan a bar code below to select whether or not the imager LED blinks on a good decode.



***Enable LED on Good Decode
(3)**



**Disable LED on Good Decode
(4)**

Haptic Feedback (Vibrate) on Good Decode

Parameter # 613

The imager provides haptic feedback which, when enabled, vibrates the imager for a period of time when a successful decode occurs.

Scan a bar code below to enable or disable Haptic Feedback (Vibrate) on Good Decode. If enabled, scan the appropriate bar code for the [Haptic Feedback \(Vibrate\) on Good Decode Duration](#) to set the period of time in which to vibrate the imager.

- ✓ **NOTE** If you enable this parameter, in order to best distinguish between haptic feedback indications, either disable [Haptic Feedback \(Vibrate\) on Trigger Touch on page 4-16](#) or set a longer [Haptic Feedback \(Vibrate\) on Good Decode Duration](#).



*Disable Haptic Feedback (Vibrate) on Good Decode
(0)



Enable Haptic Feedback (Vibrate) on Good Decode
(1)

Haptic Feedback (Vibrate) on Good Decode Duration

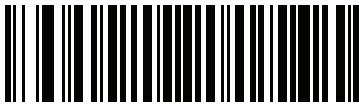
Parameter # 626



*100 msec
(10)



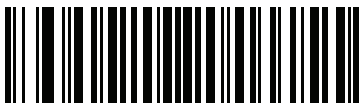
150 msec
(15)



200 msec
(20)



250 msec
(25)



300 msec
(30)

Haptic Feedback (Vibrate) on Good Decode Duration (continued)



400 msec
(40)



500 msec
(50)



600 msec
(60)



750 msec
(75)

Haptic Feedback (Vibrate) on Trigger Touch

Parameter # 1251

The imager provides haptic feedback which, when enabled, vibrates the imager upon a trigger touch. Scan a bar code below to enable or disable this feature.



***Enable Haptic Feedback (Vibrate) on Trigger Touch
(1)**



**Disable Haptic Feedback (Vibrate) on Trigger Touch
(0)**

Tone on Trigger Touch

Parameter # 1252

Scan a bar code below to enable or disable a tone upon a trigger touch.



***Disable Tone on Trigger Touch
(0)**



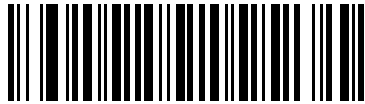
**Enable Tone on Trigger Touch
(1)**

Hand-Held Triggered Mode

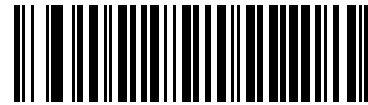
Parameter # 138

Select one of the following triggered modes for the imager.

- **Standard (Level)** - A trigger touch activates decode processing. Decode processing continues until the bar code decodes, you release the trigger, or the [Decode Session Timeout on page 4-22](#) occurs.
- **Presentation (Blink)** - The imager activates decode processing when it detects a bar code in its field of view. After a period of non-use, the imager enters a low power mode, in which the LEDs turn off until the imager senses motion.
- **Auto Aim** - This triggered mode projects the aiming dot when you lift the imager. A trigger touch activates decode processing. After 2 seconds of inactivity the aiming dot shuts off.



Level (Standard)
(0)



Presentation (Blink)
(7)



*** Auto Aim**
(9)

Hand-Held Decode Aiming Pattern

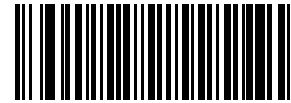
Parameter # 306

Select **Enable Hand-Held Decode Aiming Pattern** to project the aiming dot during bar code capture, **Disable Hand-Held Decode Aiming Pattern** to turn the aiming dot off, or **Enable Hand-Held Decode Aiming Pattern on PDF** to project the aiming dot when the imager detects a 2D bar code.

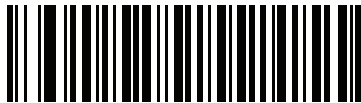
✓ **NOTE** With *Picklist Mode on page 4-20* enabled, the decode aiming dot flashes even when the **Hand-Held Decode Aiming Pattern** is disabled.



*Enable Hand-Held Decode Aiming Pattern
(2)



Disable Hand-Held Decode Aiming Pattern
(0)



Enable Hand-Held Decode Aiming Pattern on PDF
(3)

Hands-Free Decode Aiming Pattern

Parameter # 590

Select **Enable Hands-Free Decode Aiming Pattern** to project the aiming dot during bar code 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 imager detects a 2D bar code.

✓ **NOTE** With [Picklist Mode on page 4-20](#) 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

Picklist mode enables the imager to decode only bar codes that are aligned under the LED aiming dot. Select one of the following picklist modes for the imager:

- **Disabled Always** - Picklist mode is always disabled.
- **Enabled in Hand-Held Mode** - Picklist mode is enabled in hand-held mode.



***Disabled Always
(0)**



**Enabled in Hand-Held Mode
(1)**



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

Continuous Bar Code Read

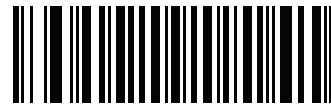
Parameter # 649

Enable this to report every bar code while the trigger is touched.

- ✓ **NOTE** Motorola strongly recommends enabling [Picklist Mode on page 4-20](#) with this feature. Disabling Picklist Mode can cause accidental decodes when more than one bar code is in the imager's field of view.



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



**Enable Continuous Bar Code Read
(1)**

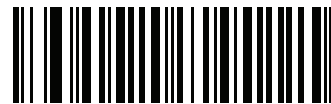
Unique Bar Code Reporting

Parameter # 723

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



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



***Enable Continuous Bar Code Read Uniqueness
(1)**

Decode Session Timeout

Parameter # 136

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

To set a Decode Session Timeout, scan the bar code below. Next, scan two numeric bar codes from [Appendix G, Numeric Bar Codes](#) that correspond to the desired on time. Enter a leading zero for single digit numbers. For example, to set a Decode Session Timeout of 0.5 seconds, scan the bar code below, then scan the **0** and **5** bar codes. To correct an error or change the selection, scan [Cancel on page G-2](#).



Decode Session Timeout

Timeout Between Decodes, Same Symbol

Parameter # 137

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

To select the timeout between decodes for the same symbol, scan the bar code below, then scan two numeric bar codes from [Appendix G, 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

Use this option in presentation mode or Continuous Bar Code Read to control the time the imager 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 bar code below, then scan two numeric bar codes from [Appendix G, 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

Fuzzy 1D Processing

Parameter # 514

This option is enabled by default to optimize decode performance on 1D bar codes, including damaged and poor quality symbols. Disable this only if you experience time delays when decoding 2D bar codes, or in detecting a no decode.



*Enable Fuzzy 1D Processing
(1)



Disable Fuzzy 1D Processing
(0)

Decode Mirror Images (Data Matrix Only)

Parameter # 537

Select an option for decoding mirror image Data Matrix bar codes:

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



Never
(0)



Always
(1)



*** Auto**
(2)

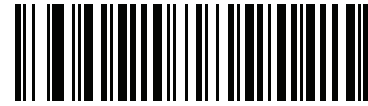
Mobile Phone/Display Mode

Parameter # 716

This mode improves bar code reading performance off mobile phones and electronic displays. Select Enhanced in hand-held, hands-free, or both modes, or select Normal Mobile Phone/Display Mode.



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



**Enhanced in Hand-Held Mode
(1)**



**Enhanced in Hands-Free Mode
(2)**



**Enhanced in Both Modes
(3)**

PDF Prioritization

Parameter # 719

Enable this feature to delay decoding a 1D bar code (Code 128) by the value specified in [PDF Prioritization Timeout](#). During that time the imager 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 imager to report it. This parameter does not affect decoding other symbologies..



NOTE

The 1D Code 128 bar code lengths include the following:

- 7 to 10 characters
- 14 to 17 characters
- 27 to 28 characters

In addition, a Code 39 bar code 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

When [PDF Prioritization](#) is enabled, this timeout specifies how long the imager attempts to decode a PDF417 symbol before reporting the 1D bar code in the field of view.

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



PDF Prioritization Timeout

Presentation Mode Field of View

Parameter # 609

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

To search for a bar code 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)

- ✓ **NOTE** With [Picklist Mode on page 4-20](#) enabled, the decode aiming dot flashes even when the **Decode Aiming Pattern** is disabled.
- ✓ **NOTE** Picklist Mode temporarily over-rides the Disable Decode Aiming Pattern parameter. You can not disable the decode aiming pattern when if Picklist Mode is enabled.

Decoding Illumination

Parameter # 298

Selecting **Enable Decoding Illumination** causes the imager to flash illumination to aid decoding. Select **Disable Decoding Illumination** to prevent the imager 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)**

Low Light Scene Detection

Parameter # 810

This parameter allows the imager to be able to detect motion in dim to dark illumination environments when in presentation mode.

- **No Low Light Scene Detection:** The imager attempts to detect motion as best it can with the aiming dot and illumination turned off when the imager is idle.
- **Aiming Dot Low Light Assist Scene Detection (default):** Illumination is turned off, but the aiming dot is turned on when the imager is idle to assist in scene detection.
- **Dim Illumination Low Light Assist Scene Detection:** The aiming dot is turned off, but illumination is turned on at a dim level to assist in scene detection.

✓ **NOTE** If both Low Light Scene Detection and Illumination On Always are enabled, Illumination On Always takes precedence.



No Low Light Assist Scene Detection
(0)



* Aiming Dot Low Light Assist Scene Detection
(1)



Dim Illumination Low Light Assist Scene Detection
(2)

Motion Tolerance (Hand-Held Triggered Modes Only)

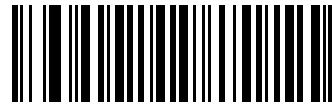
Parameter # 858

Less Motion Tolerance provides optimal decoding performance on 1D bar codes.

To increase motion tolerance and speed decoding when scanning a series of 1D bar codes in rapid progression, scan **More Motion Tolerance**.



***Less Motion Tolerance
(0)**



**More Motion Tolerance
(1)**

Miscellaneous Imager Parameters

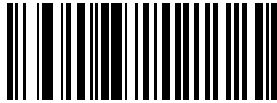
Transmit Code ID Character

Parameter # 45

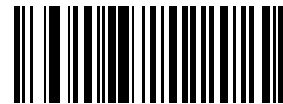
A Code ID character identifies the code type of a scanned bar code. This is useful when decoding more than one code type. In addition to any single character prefix already selected, the Code ID character is inserted between the prefix and the decoded symbol.

Select no Code ID character, a Symbol Code ID character, or an AIM Code ID character. For Code ID Characters, see [Symbol Code Identifiers on page E-1](#) and [AIM Code Identifiers on page E-3](#).

✓ **NOTE** If you enable Symbol Code ID Character or AIM Code ID Character, and enable [Transmit "No Read" Message on page 4-35](#), the imager 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

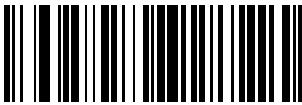
Decimal Value Parameter # P = 105, S1 = 104, S2 = 106

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 bar codes from [Appendix G, Numeric Bar Codes](#)) that corresponds to that value. See [Appendix H, ASCII Character Sets](#) for the four-digit codes.

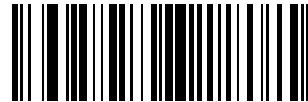
When using host commands to set the prefix or suffix, set the key category parameter to 1, then set the 3-digit decimal value. See [Appendix H, ASCII Character Sets](#) for the four-digit codes.

To correct an error or change a selection, scan [Cancel on page G-2](#).

✓ **NOTE** To use Prefix/Suffix values, first set the [Scan Data Transmission Format on page 4-33](#).



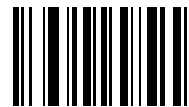
**Scan Prefix
(7)**



**Scan Suffix 1
(6)**



**Scan Suffix 2
(8)**



Data Format Cancel

Scan Data Transmission Format

Parameter # 235

To change the scan data format, scan one of the following eight bar codes 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 [Prefix/Suffix Values on page 4-32](#).



***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)

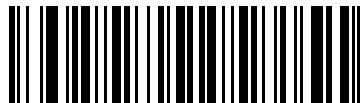
FN1 Substitution Values**Key Category Parameter # 103****Decimal Value Parameter # 109**

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

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

To select a FN1 substitution value via bar code menus:

1. Scan the bar code below.



Set FN1 Substitution Value

2. Locate the keystroke desired for FN1 Substitution in the ASCII Character Set table for the current host interface. Enter the 4-digit ASCII Value by scanning each digit in [Appendix G, Numeric Bar Codes](#).

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

To enable FN1 substitution for USB HID keyboard, scan the **Enable FN1 Substitution** bar code on page [4-34](#).

Transmit "No Read" Message

Parameter # 94

Scan a bar code below to select whether or not to transmit a No Read message. Enable this to transmit the characters NR when a successful decode does not occur before trigger release or the **Decode Session Timeout** expires. See [Decode Session Timeout on page 4-22](#). 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 4-31](#), the imager appends the code ID for Code 39 to the NR message.



Enable No Read
(1)



***Disable No Read**
(0)

Unsolicited Heartbeat Interval

Parameter # 1118

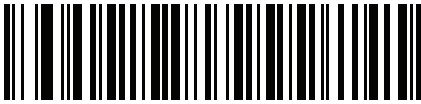
The imager supports sending *Unsolicited Heartbeat Messages* to assist in diagnostics. To enable this feature and set the desired unsolicited heartbeat interval, scan one of the time interval bar codes below, or scan **Set Another Interval** followed by four numeric bar codes from [Appendix G, Numeric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

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

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

MOTEVTHB:nnn

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



10 seconds
(10)



1 minute
(60)



Set Another Interval



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

CHAPTER 5 IMAGING PREFERENCES

Introduction

You can program the digital imager to perform various functions, or activate different features. This chapter describes imaging preference features and provides programming bar codes for selecting these features.

✓ **NOTE** Only the Symbol Native API (SNAPI) with Imaging interface supports image capture. See [USB Device Type on page 3-4](#) to enable this host.

The digital imager ships with the settings in [Imaging Preferences Parameter Defaults on page 5-2](#) (also see [Appendix A, Standard Default Parameters](#) for all host device and miscellaneous defaults). If the default values suit requirements, programming is not necessary.

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

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

To return all features to default values, scan the [Set Factory Defaults on page 4-5](#). Throughout the programming bar code menus, asterisks (*) indicate default values.



Scanning Sequence Examples

In most cases scanning one bar code sets the parameter value. For example, to disable image capture illumination, scan the **Disable Image Capture Illumination** bar code under [Image Capture Illumination on page 5-5](#). The digital imager issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

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

Errors While Scanning

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

Imaging Preferences Parameter Defaults

[Table 5-1](#) lists the defaults for imaging preferences parameters. To change the default values, scan the appropriate bar codes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, scan [*Restore Defaults on page 4-5](#).

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

Table 5-1 *Imaging Preferences Parameter Defaults*

Parameter	Parameter Number	Default	Page Number
Imaging Preferences			
Operational Modes	N/A	N/A	5-4
Image Capture Illumination	361	Enable	5-5
Snapshot Mode Timeout	323	0 (30 seconds)	5-6
Snapshot Aiming Pattern	300	Enable	5-6
Image Cropping	301	Disable	5-7
Crop to Pixel Addresses	315 316 317 318	0 top 0 left 799 bottom 1279 right	5-8
Image Size (Number of Pixels)	302	Full	5-9
Image Brightness (Target White)	390	180	5-10
JPEG Image Options	299	Quality	5-10
JPEG Target File Size	561	160 kB	5-11
JPEG Quality Value	305	65	5-11

Table 5-1 *Imaging Preferences Parameter Defaults*

Parameter	Parameter Number	Default	Page Number
Image Enhancement	564	Low (1)	5-12
Image File Format Selection	304	JPEG	5-13
Image Rotation	665	0	5-14
Bits per Pixel (BPP)	303	8 BPP	5-15
Signature Capture	93	Disable	5-16
Signature Capture Image File Format Selection	313	JPEG	5-17
Signature Capture Bits per Pixel (BPP)	314	8 BPP	5-18
Signature Capture Width	366	400	5-19
Signature Capture Height	367	100	5-19
Signature Capture JPEG Quality	421	65	5-19

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 imager has two modes of operation:

- Decode Mode
- Snapshot Mode.

Decode Mode

By default, when you pull the trigger the digital imager attempts to locate and decode enabled bar codes within its field of view. The digital imager remains in this mode until it decodes a bar code 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** bar code. While in this mode the digital imager blinks the green LED at 1-second intervals to indicate it is not in standard operating (decode) mode.

In Snapshot Mode, the digital imager turns on its aiming pattern to highlight the area to capture in the image. The next trigger pull instructs the digital imager 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 imager adjusts to the lighting conditions. Hold the digital imager 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 imager returns to Decode Mode. Use [Snapshot Mode Timeout on page 5-6](#) 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 5-6](#).



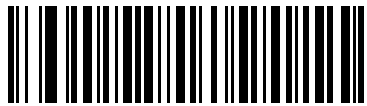
Snapshot Mode

Image Capture Illumination

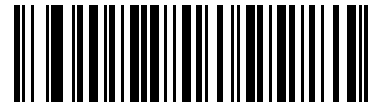
Parameter # 361

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

Snapshot Mode Timeout

Parameter # 323

This parameter sets the amount of time the digital imager remains in Snapshot Mode. The digital imager exits Snapshot Mode when you pull the trigger, or when the Snapshot Mode Timeout elapses. To set this timeout value, scan the bar code below followed by a bar code from [Appendix G, 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.



Snapshot Mode Timeout

Snapshot Aiming Pattern

Parameter # 300

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)

Image Cropping

Parameter # 301

This parameter crops a captured image. Select **Disable Image Cropping** to present the full 1280 x 800 pixels. Select **Enable Image Cropping** to crop the image to the pixel addresses set in [Crop to Pixel Addresses on page 5-8](#).



Enable Image Cropping
(1)



*Disable Image Cropping
(Use Full 1280 x 800 Pixels)
(0)

Crop to Pixel Addresses

Parameter # 315 (Top)

Parameter # 316 (Left)

Parameter # 317 (Bottom)

Parameter # 318 (Right)

If you selected **Enable Image Cropping**, set the pixel addresses from (0,0) to (799,1279) to crop to.

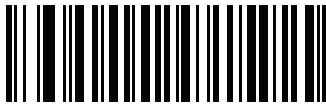
Columns are numbered from 0 to 1279, rows from 0 to 799. Specify four values for Top, Left, Bottom, and Right, where Top and Bottom correspond to row pixel addresses, and Left and Right correspond to column pixel addresses. For example, for a 4 row x 8 column image in the extreme bottom-right section of the image set the following values:

Top = 796, Bottom = 799, Left = 1272, Right = 1279

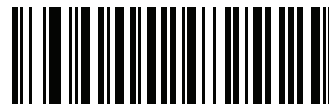
To set the crop to pixel address, scan each pixel address bar code below followed by four numeric bar codes representing the value. Leading zeros are required. For example, to crop the top pixel address to 3, scan 0, 0, 0, 3. See [Appendix G, Numeric Bar Codes](#) for numeric bar codes. The defaults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

Top = 0, Bottom = 799, Left = 0, Right = 1279

- ✓ **NOTE** The digital imager 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 5-9](#)) transfers the entire image.



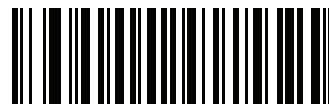
Top Pixel Address
(0 - 799 Decimal)



Left Pixel Address
(0 - 1279 Decimal)



Bottom Pixel Address
(0 - 799 Decimal)



Right Pixel Address
(0 - 1279 Decimal)

Image Size (Number of Pixels)

Parameter # 302

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:

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



*Full Resolution
(0)



1/2 Resolution
(1)



1/4 Resolution
(3)

Image Brightness (Target White)

Parameter # 390

Type: Byte

Range: 1 - 240

This parameter sets the Target White value used in Snapshot and Video Viewfinder 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 bar codes representing the value. Leading zeros are required. For example, to set an Image Brightness value of 99, scan 0, 9, 9. See [Appendix G, Numeric Bar Codes](#) for numeric bar codes.



*180



Image Brightness
(3 digits)

JPEG Image Options

Parameter # 299

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



*JPEG Quality Selector
(1)



JPEG Size Selector
(0)

JPEG Target File Size

Parameter # 561

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 5-10](#) 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 bar codes representing the value. Leading zeros are required. For example, to set an image file size value of 99, scan 0, 9, 9 in [Appendix G, Numeric Bar Codes](#).



JPEG Target File Size
(3 digits)

JPEG Quality Value

Parameter # 305

If you selected **JPEG Quality Selector**, scan the **JPEG Quality Value** bar code followed by 3 bar codes from [Appendix G, 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

This parameter configures the digital imager'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

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



BMP File Format
(3)



*** JPEG File Format**
(1)



TIFF File Format
(04h)

Image Rotation

Parameter # 665

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

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 imager ignores these settings for JPEG file formats, which only support **8 BPP**.

The digital imager 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)

Signature Capture

Parameter # 93

A signature capture bar code is a special-purpose symbology which delineates a signature capture area in a document with a machine-readable format. The recognition pattern is variable so it can optionally provide an index to various signatures. The region inside the bar code pattern is considered the signature capture area. See [Appendix I, Signature Capture Code](#) for more information.

Output File Format

Decoding a signature capture bar code de-skews the signature image and converts the image to a BMP, JPEG, or TIFF file format. The output data includes the file descriptor followed by the formatted signature image.

File Descriptor			Signature Image
Output Format (1 byte)	Signature Type (1 byte)	Signature Image Size (4 bytes) (BIG Endian)	
JPEG - 1 BMP - 3 TIFF - 4	1-8	0x00000400	0x00010203....

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



**Enable Signature Capture
(1)**



***Disable Signature Capture
(0)**

Signature Capture File Format Selector

Parameter # 313

Select a signature file format appropriate for the system (BMP, TIFF, or JPEG). The digital imager stores captured signatures in the selected format.



BMP Signature Format
(3)



***JPEG Signature Format**
(1)



TIFF Signature Format
(4)

Signature Capture Bits Per Pixel

Parameter # 314

Select the number of significant bits per pixel (BPP) to use when capturing a signature. 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 imager ignores these settings for JPEG file formats, which only support **8 BPP**.



1 BPP
(0)



4 BPP
(1)



***8 BPP**
(2)

Signature Capture Width

Parameter # 366

The aspect ratio of the Signature Capture Width and Signature Capture Height parameters must match that of the signature capture area. For example, a 4 x 1 inch signature capture area would require a 4 to 1 aspect ratio of width to height.

To set the width of the signature capture box, scan the **Signature Capture Width** bar code, followed by 4 bar codes from [Appendix G, Numeric Bar Codes](#) corresponding to a value in the range of 0001 to 1280 decimal.



Signature Capture Width
(Default: 400)
(0001 - 1280 Decimal)

Signature Capture Height

Parameter # 367

To set the height of the signature capture box, scan the **Signature Capture Height** bar code, followed by 3 bar codes from [Appendix G, Numeric Bar Codes](#) corresponding to a value in the range of 001 to 800 decimal.



Signature Capture Height (Default: 100)
(001 - 800 Decimal)

Signature Capture JPEG Quality

Parameter # 421

Scan the **JPEG Quality Value** bar code followed by 3 bar codes from [Appendix G, Numeric Bar Codes](#) corresponding to a value from 005 to 100, where 100 represents the highest quality image.



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

CHAPTER 6 SYMBOLOGIES

Introduction

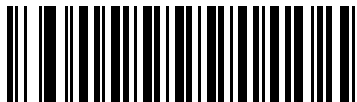
This chapter describes symbology features and provides programming bar codes for selecting these features. Before programming, follow the instructions in [Chapter 1, Getting Started](#).

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

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

Select a host type (see each host chapter for specific host information) after the power-up beeps sound. This is only necessary upon the first power-up when connected to a new host.

To return all features to default values, see [Default Parameters on page 4-5](#). Throughout the programming bar code menus, asterisks (*) indicate default values.



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

Scanning Sequence Examples

In most cases, scanning one bar code sets the parameter value. For example, to transmit bar code data without the UPC-A check digit, simply scan the **Do Not Transmit UPC-A Check Digit** bar code under [Transmit UPC-A Check Digit on page 6-16](#). The imager issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

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

Errors While Scanning

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

Symbology Parameter Defaults

[Table 6-1](#) lists the defaults for all symbology parameters. To change the default values, scan the appropriate bar codes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, see [Default Parameters on page 4-5](#).

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

Table 6-1 Symbology Parameter Defaults

Parameter	Parameter Number	Default	Page Number
Enable/Disable All Code Types			6-7
1D Symbologies			
UPC/EAN			
UPC-A	1	Enable	6-8
UPC-E	2	Enable	6-8
UPC-E1	12	Disable	6-9
EAN-8/JAN 8	4	Enable	6-9
EAN-13/JAN 13	3	Enable	6-10
Bookland EAN	83	Disable	6-10
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	16	Ignore	6-12
User-Programmable Supplementals		000	6-14
Supplemental 1:	579		
Supplemental 2:	580		
UPC/EAN/JAN Supplemental Redundancy	80	10	6-14
Decode UPC/EAN/JAN Supplemental AIM ID	672	Combined	6-15
Transmit UPC-A Check Digit	40	Enable	6-16
Transmit UPC-E Check Digit	41	Enable	6-16
Transmit UPC-E1 Check Digit	42	Enable	6-17
UPC-A Preamble	34	System Character	6-18
UPC-E Preamble	35	System Character	6-18
UPC-E1 Preamble	36	System Character	6-20

Table 6-1 Symbology Parameter Defaults (Continued)

Parameter	Parameter Number	Default	Page Number
Convert UPC-E to A	37	Disable	6-21
Convert UPC-E1 to A	38	Disable	6-21
EAN-8/JAN-8 Extend	39	Disable	6-22
Bookland ISBN Format	576	ISBN-10	6-22
UCC Coupon Extended Code	85	Disable	6-23
Coupon Report	730	New Coupon Format	6-23
ISSN EAN	617	Disable	6-24
Code 128			
Code 128	8	Enable	6-25
Set Length(s) for Code 128	209, 210	1 to 55	6-25
GS1-128 (formerly UCC/EAN-128)	14	Enable	6-27
ISBT 128	84	Enable	6-27
ISBT Concatenation	577	Autodiscriminate	6-28
Check ISBT Table	578	Enable	6-29
ISBT Concatenation Redundancy	223	10	6-29
Code 128 Security Level	751	Security Level 1	6-30
Code 39			
Code 39	0	Enable	6-31
Trioptic Code 39	13	Disable	6-31
Convert Code 39 to Code 32 (Italian Pharmacy Code)	86	Disable	6-32
Code 32 Prefix	231	Disable	6-32
Set Length(s) for Code 39	18, 19	1 to 55	6-33
Code 39 Check Digit Verification	48	Disable	6-34
Transmit Code 39 Check Digit	43	Disable	6-34
Code 39 Full ASCII Conversion	17	Disable	6-35
Code 39 Security Level	750	Security Level 1	6-36
Code 93			
Code 93	9	Enable	6-37
Set Length(s) for Code 93	26, 27	1 to 55	6-37

Table 6-1 Symbology Parameter Defaults (Continued)

Parameter	Parameter Number	Default	Page Number
Code 11			
Code 11	10	Disable	6-39
Set Lengths for Code 11	28, 29	4 to 55	6-39
Code 11 Check Digit Verification	52	Disable	6-41
Transmit Code 11 Check Digit(s)	47	Disable	6-42
Interleaved 2 of 5 (ITF)			
Interleaved 2 of 5 (ITF)	6	Enable	6-43
Set Lengths for I 2 of 5	22, 23	6 to 55	6-43
I 2 of 5 Check Digit Verification	49	Disable	6-45
Transmit I 2 of 5 Check Digit	44	Disable	6-46
Convert I 2 of 5 to EAN 13	82	Disable	6-46
I 2 of 5 Security Level	1121	Security Level 1	6-47
Discrete 2 of 5 (DTF)			
Discrete 2 of 5	5	Disable	6-48
Set Length(s) for D 2 of 5	20, 21	1 to 55	6-48
Codabar (NW - 7)			
Codabar	7	Enable	6-50
Set Lengths for Codabar	24, 25	4 to 55	6-50
CLSI Editing	54	Disable	6-52
NOTIS Editing	55	Disable	6-52
Codabar Upper or Lower Case Start/Stop Characters Detection	855	Upper Case	
MSI			
MSI	11	Disable	6-54
Set Length(s) for MSI	30, 31	4 to 55	6-54
MSI Check Digits	50	One	6-56
Transmit MSI Check Digit	46	Disable	6-56
MSI Check Digit Algorithm	51	Mod 10/Mod 10	6-57
Chinese 2 of 5			
Chinese 2 of 5	408	Disable	6-58

Table 6-1 Symbology Parameter Defaults (Continued)

Parameter	Parameter Number	Default	Page Number
Matrix 2 of 5			
Matrix 2 of 5	618	Disable	6-59
Matrix 2 of 5 Lengths	619, 620	4 to 55	6-59
Matrix 2 of 5 Check Digit	622	Disable	6-61
Transmit Matrix 2 of 5 Check Digit	623	Disable	6-61
Korean 3 of 5			
Korean 3 of 5	581	Disable	6-62
Inverse 1D	586	Regular	6-62
GS1 DataBar			
GS1 DataBar-14	338	Enable	6-64
GS1 DataBar Limited	339	Enable	6-64
GS1 DataBar Expanded	340	Enable	6-65
Convert GS1 DataBar to UPC/EAN	397	Disable	6-65
GS1 DataBar Limited Security Level	728	Level 3	6-66
Composite			
Composite CC-C	341	Disable	6-67
Composite CC-A/B	342	Disable	6-67
Composite TLC-39	371	Disable	6-68
UPC Composite Mode	344	Never Linked	6-68
Composite Beep Mode	398	Beep As Each Code Type is Decoded	6-69
GS1-128 Emulation Mode for UCC/EAN Composite Codes	427	Disable	6-69
Postal Codes			
US Postnet	89	Disable	6-70
US Planet	90	Disable	6-70
Transmit US Postal Check Digit	95	Enable	6-71
UK Postal	91	Disable	6-71
Transmit UK Postal Check Digit	96	Enable	6-72
Japan Postal	290	Disable	6-72
Australia Post	291	Disable	6-73
Australia Post Format	718	Autodiscriminate	6-74

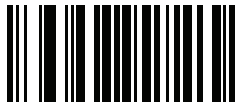
Table 6-1 Symbology Parameter Defaults (Continued)

Parameter	Parameter Number	Default	Page Number
Netherlands KIX Code	326	Disable	6-75
USPS 4CB/One Code/Intelligent Mail	592	Disable	6-75
UPU FICS Postal	611	Disable	6-76
2D Symbologies			
PDF417	15	Enable	6-77
MicroPDF417	227	Disable	6-77
Code 128 Emulation	123	Disable	6-78
Data Matrix	292	Enable	6-79
Data Matrix Inverse	588	Inverse Autodetect	6-79
Maxicode	294	Disable	6-80
QR Code	293	Enable	6-80
QR Inverse	587	Regular	6-81
MicroQR	573	Enable	6-81
Aztec	574	Enable	6-82
Aztec Inverse	589	Inverse Autodetect	6-82
Han Xin	1167	Disable	6-83
Han Xin Inverse	1168	Regular	6-83
Symbology-Specific Security Levels			
Redundancy Level	78	1	6-84
Security Level	77	1	6-86
Intercharacter Gap Size	381	Normal	6-87
Report Version			6-87
Macro PDF			
Flush Macro PDF Buffer	N/A	N/A	6-88
Abort Macro PDF Entry	N/A	N/A	6-88

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



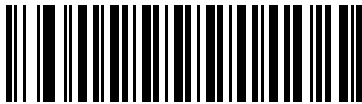
Enable All Code Types

UPC/EAN

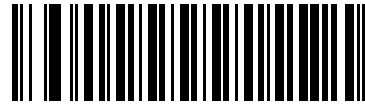
Enable/Disable UPC-A

Parameter # 1

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



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

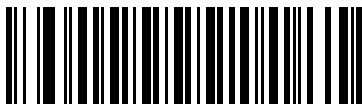


**Disable UPC-A
(0)**

Enable/Disable UPC-E

Parameter # 2

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



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



**Disable UPC-E
(0)**

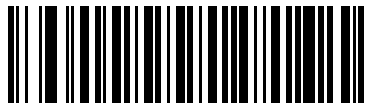
Enable/Disable UPC-E1

Parameter # 12

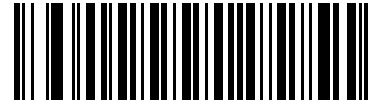
UPC-E1 is disabled by default.

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

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



**Enable UPC-E1
(1)**

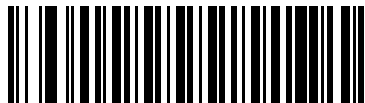


***Disable UPC-E1
(0)**

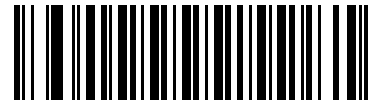
Enable/Disable EAN-8/JAN-8

Parameter # 4

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



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

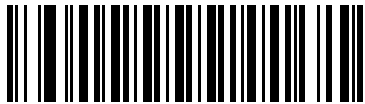


**Disable EAN-8/JAN-8
(0)**

Enable/Disable EAN-13/JAN-13

Parameter # 3

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



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

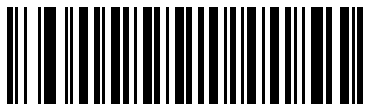


**Disable EAN-13/JAN-13
(0)**

Enable/Disable Bookland EAN

Parameter # 83

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



**Enable Bookland EAN
(1)**



***Disable Bookland EAN
(0)**



NOTE If you enable Bookland EAN, select a [Bookland ISBN Format on page 6-22](#). 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 6-11](#).

Decode UPC/EAN/JAN Supplementals

Parameter # 16

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

- If you select **Ignore UPC/EAN with Supplementals**, and the imager is presented with a UPC/EAN plus supplemental symbol, the imager decodes UPC/EAN and ignores the supplemental characters.
- If you select **Decode UPC/EAN with Supplementals**, the imager only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.
- If you select **Autodiscriminate UPC/EAN Supplementals**, the imager decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the imager must decode the bar code the number of times set via [UPC/EAN/JAN Supplemental Redundancy on page 6-14](#) before transmitting its data to confirm that there is no supplemental.
- If you select one of the following **Supplemental Mode** options, the imager immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the imager must decode the bar code the number of times set via [UPC/EAN/JAN Supplemental Redundancy on page 6-14](#) before transmitting its data to confirm that there is no supplemental. The imager transmits UPC/EAN bar codes that do not have that prefix immediately.
 - **Enable 378/379 Supplemental Mode**
 - **Enable 978/979 Supplemental Mode**

✓ **NOTE** If you select 978/979 Supplemental Mode and are scanning Bookland EAN bar codes, see [Enable/Disable Bookland EAN on page 6-10](#) to enable Bookland EAN, and select a format using [Bookland ISBN Format on page 6-22](#).

- **Enable 977 Supplemental Mode**
- **Enable 414/419/434/439 Supplemental Mode**
- **Enable 491 Supplemental Mode**
- **Enable Smart Supplemental Mode** - applies to EAN-13 bar codes starting with any prefix listed previously.
- **Supplemental User-Programmable Type 1** - applies to EAN-13 bar codes starting with a 3-digit user-defined prefix. Set this 3-digit prefix using [User-Programmable Supplementals on page 6-14](#).
- **Supplemental User-Programmable Type 1 and 2** - applies to EAN-13 bar codes starting with either of two 3-digit user-defined prefixes. Set the 3-digit prefixes using [User-Programmable Supplementals on page 6-14](#).
- **Smart Supplemental Plus User-Programmable 1** - applies to EAN-13 bar codes starting with any prefix listed previously or the user-defined prefix set using [User-Programmable Supplementals on page 6-14](#).
- **Smart Supplemental Plus User-Programmable 1 and 2** - applies to EAN-13 bar codes starting with any prefix listed previously or one of the two user-defined prefixes set using [User-Programmable Supplementals on page 6-14](#).

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

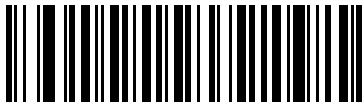
Decode UPC/EAN/JAN Supplementals (continued)



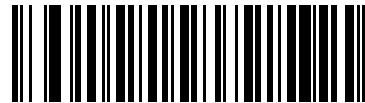
Decode UPC/EAN/JAN Only With Supplementals
(1)



*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

Supplemental 2: Parameter # 580

If you selected a Supplemental User-Programmable option from [Decode UPC/EAN/JAN Supplementals on page 6-11](#), select **User-Programmable Supplemental 1** to set the 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on [page G-1](#). Select **User-Programmable Supplemental 2** to set a second 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on [page G-1](#). The default is 000 (zeroes).



User-Programmable Supplemental 1



User-Programmable Supplemental 2

UPC/EAN/JAN Supplemental Redundancy

Parameter # 80

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

Scan the bar code below to set a decode redundancy value. Next, scan two numeric bar codes in [Appendix G, Numeric Bar Codes](#). Enter a leading zero for single digit numbers. To correct an error or change a selection, scan [Cancel on page G-2](#).



UPC/EAN/JAN Supplemental Redundancy

UPC/EAN/JAN Supplemental AIM ID Format

Parameter # 672

Select an output format when reporting UPC/EAN/JAN bar codes with Supplementals with *Transmit Code ID Character* on page 4-31 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)

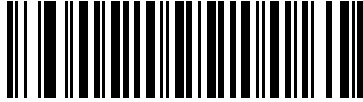


Separate Transmissions
(2)

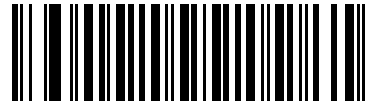
Transmit UPC-A Check Digit

Parameter # 40

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



***Transmit UPC-A Check Digit
(1)**



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

Transmit UPC-E Check Digit

Parameter # 41

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



***Transmit UPC-E Check Digit
(1)**

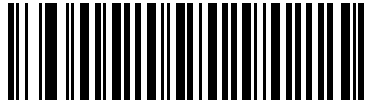


**Do Not Transmit UPC-E Check Digit
(0)**

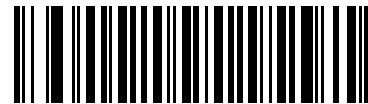
Transmit UPC-E1 Check Digit

Parameter # 42

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



***Transmit UPC-E1 Check Digit
(1)**

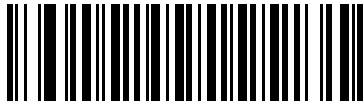


**Do Not Transmit UPC-E1 Check Digit
(0)**

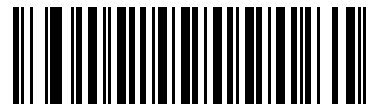
UPC-A Preamble

Parameter # 34

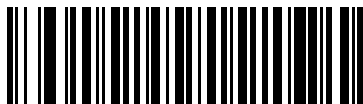
Preamble characters are part of the UPC symbol, and include Country Code and System Character. There are three options for transmitting a UPC-A preamble to the host device: transmit System Character only, transmit System Character and Country Code ("0" for USA), and transmit no preamble. Select the appropriate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



No Preamble (<DATA>)
(0)



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

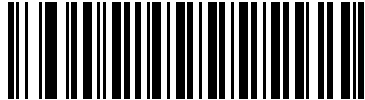


System Character & Country Code (< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(2)

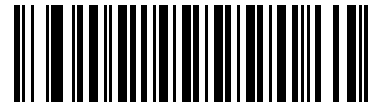
UPC-E Preamble

Parameter # 35

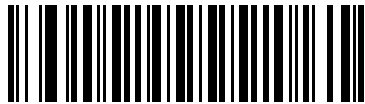
Preamble characters are part of the UPC symbol, and include Country Code and System Character. There are three options for transmitting a UPC-E preamble to the host device: transmit System Character only, transmit System Character and Country Code ("0" for USA), and transmit no preamble. Select the appropriate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



No Preamble (<DATA>)
(0)



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

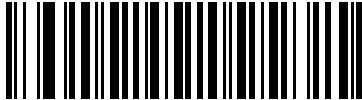


**System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER>
<DATA>)**
(2)

UPC-E1 Preamble

Parameter # 36

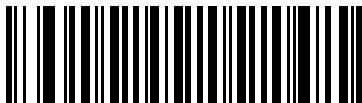
Preamble characters are part of the UPC symbol, and include Country Code and System Character. There are three options for transmitting a UPC-E1 preamble to the host device: transmit System Character only, transmit System Character and Country Code ("0" for USA), and transmit no preamble. Select the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



No Preamble (<DATA>)
(0)



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



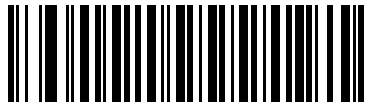
System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(2)

Convert UPC-E to UPC-A

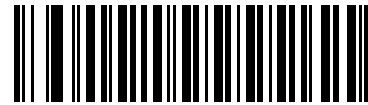
Parameter # 37

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)



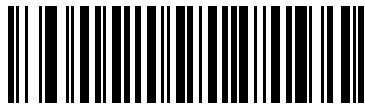
*Do Not Convert UPC-E to UPC-A (Disable)
(0)

Convert UPC-E1 to UPC-A

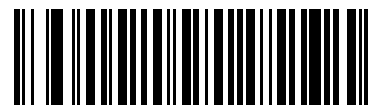
Parameter # 38

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)

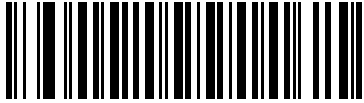


*Do Not Convert UPC-E1 to UPC-A (Disable)
(0)

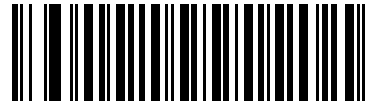
EAN-8/JAN-8 Extend

Parameter # 39

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

If you enabled Bookland EAN using [Enable/Disable Bookland EAN on page 6-10](#), select one of the following formats for Bookland data:

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



*Bookland ISBN-10
(0)



Bookland ISBN-13
(1)



NOTE For Bookland EAN to function properly, first enable Bookland EAN using [Enable/Disable Bookland EAN on page 6-10](#), then select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in [Decode UPC/EAN/JAN Supplementals on page 6-11](#).

UCC Coupon Extended Code

Parameter # 85

Enable this parameter to decode UPC-A bar codes starting with digit '5', EAN-13 bar codes starting with digit '99', and UPC-A/GS1-128 Coupon Codes. UPCA, EAN-13, and GS1-128 must be enabled to scan all types of Coupon Codes.



Enable UCC Coupon Extended Code
(1)



*Disable UCC Coupon Extended Code
(0)



NOTE See [UPC/EAN/JAN Supplemental Redundancy on page 6-14](#) to control autodiscrimination of the GS1-128 (right half) of a coupon code.

Coupon Report

Parameter # 730

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 imager supports both **Old Coupon Format** and **New Coupon Format**.



Old Coupon Format
(0)



*New Coupon Format
(1)



Autodiscriminate Coupon Format
(2)

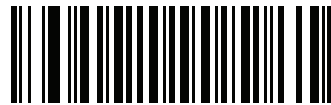
ISSN EAN

Parameter # 617

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



**Enable ISSN EAN
(1)**



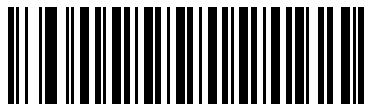
***Disable ISSN EAN
(0)**

Code 128

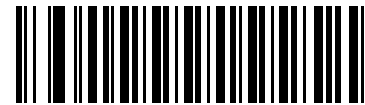
Enable/Disable Code 128

Parameter # 8

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



*Enable Code 128
(1)



Disable Code 128
(0)

Set Lengths for Code 128

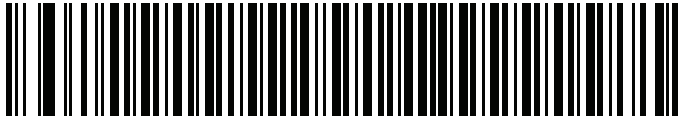
Parameter # 209, 210

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.

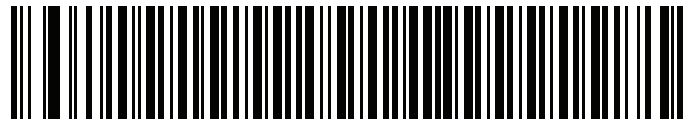
✓ **NOTE** When setting lengths for different bar code types, enter a leading zero for single digit numbers.

- **One Discrete Length** - Select this option to decode only Code 128 symbols containing a selected length. Select the length using the numeric bar codes in [Appendix G, 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 G-2](#).
- **Two Discrete Lengths** - Select this option to decode only Code 128 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in [Appendix G, 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 G-2](#).
- **Length Within Range** - Select this option to decode a Code 128 symbol with a specific length range. Select lengths using numeric bar codes in [Appendix G, 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 G-2](#).
- **Any Length** - Select this option to decode Code 128 symbols containing any number of characters within the imager's capability.

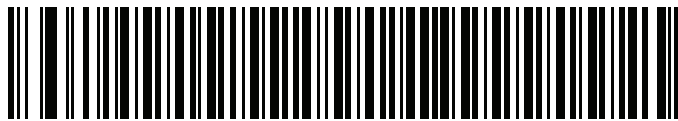
Set Lengths for Code 128 (continued)



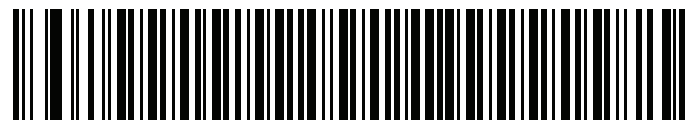
Code 128 - One Discrete Length



Code 128 - Two Discrete Lengths



Code 128 - Length Within Range

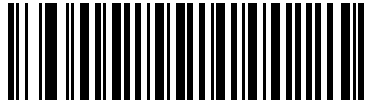


Code 128 - Any Length

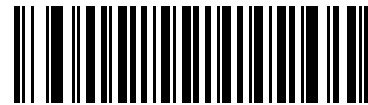
Enable/Disable GS1-128 (formerly UCC/EAN-128)

Parameter # 14

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



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



**Disable GS1-128
(0)**

Enable/Disable ISBT 128

Parameter # 84

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



***Enable ISBT 128
(1)**



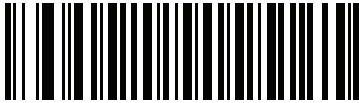
**Disable ISBT 128
(0)**

ISBT Concatenation

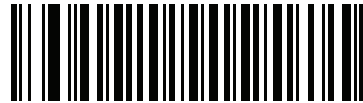
Parameter # 577

Select an option for concatenating pairs of ISBT code types:

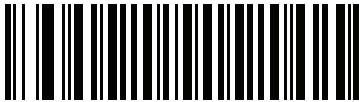
- If you select **Disable ISBT Concatenation**, the imager does not concatenate pairs of ISBT codes it encounters.
- If you select **Enable ISBT Concatenation**, there must be two ISBT codes in order for the imager to decode and perform concatenation. The imager does not decode single ISBT symbols.
- If you select **Autodiscriminate ISBT Concatenation**, the imager decodes and concatenates pairs of ISBT codes immediately. If only a single ISBT symbol is present, the imager must decode the symbol the number of times set via [ISBT Concatenation Redundancy on page 6-29](#) 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)

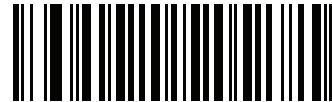
Check ISBT Table

Parameter # 578

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



*Enable Check ISBT Table
(1)



Disable Check ISBT Table
(0)

ISBT Concatenation Redundancy

Parameter # 223

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

Scan the bar code below, then scan two numeric bar codes in [Appendix G, 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 G-2](#). The default is 10.



ISBT Concatenation Redundancy

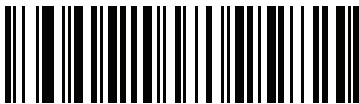
Code 128 Security Level

Parameter # 751

Code 128 bar codes are vulnerable to misdecodes, particularly when Code 128 Lengths is set to **Any Length**. The imager offers four levels of decode security for Code 128 bar codes. There is an inverse relationship between security and imager 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 imager to operate in its most aggressive state, while providing sufficient security in decoding most in-spec bar codes.
- **Code 128 Security Level 1:** A bar code must be successfully read twice, and satisfy certain safety requirements before being decoded. This default setting eliminates most misdecodes.
- **Code 128 Security Level 2:** Select this option with greater bar code 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 bar code must be successfully read three times before being decoded.

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



Code 128 Security Level 0
(0)



*Code 128 Security Level 1
(1)



Code 128 Security Level 2
(2)



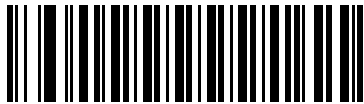
Code 128 Security Level 3
(3)

Code 39

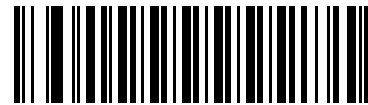
Enable/Disable Code 39

Parameter # 0

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



***Enable Code 39**
(1)

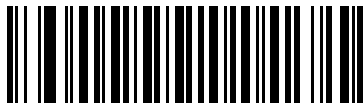


Disable Code 39
(0)

Enable/Disable Trioptic Code 39

Parameter # 13

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



Enable Trioptic Code 39
(1)



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



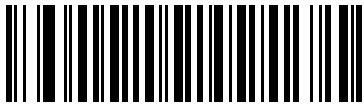
NOTE You cannot enable Trioptic Code 39 and Code 39 Full ASCII simultaneously.

Convert Code 39 to Code 32

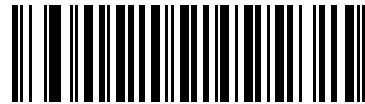
Parameter # 86

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

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



Enable Convert Code 39 to Code 32
(1)



*Disable Convert Code 39 to Code 32
(0)

Code 32 Prefix

Parameter # 231

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

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



Enable Code 32 Prefix
(1)



*Disable Code 32 Prefix
(0)

Set Lengths for Code 39

Parameter # 18, 19

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 bar code types, enter a leading zero for single digit numbers.

- **One Discrete Length** - Select this option to decode only Code 39 symbols containing a selected length. Select the length using the numeric bar codes in [Appendix G, 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 G-2](#).
- **Two Discrete Lengths** - Select this option to decode only Code 39 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in [Appendix G, 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 G-2](#).
- **Length Within Range** - Select this option to decode a Code 39 symbol with a specific length range. Select lengths using numeric bar codes in [Appendix G, 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 G-2](#).
- **Any Length** - Select this option to decode Code 39 symbols containing any number of characters within the imager's capability.



Code 39 - One Discrete Length



Code 39 - Two Discrete Lengths



Code 39 - Length Within Range

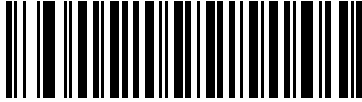


Code 39 - Any Length

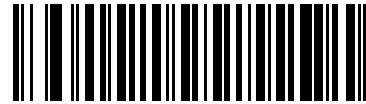
Code 39 Check Digit Verification

Parameter # 48

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)**

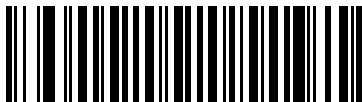


***Disable Code 39 Check Digit
(0)**

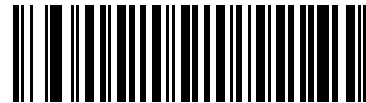
Transmit Code 39 Check Digit

Parameter # 43

Scan a bar code 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.

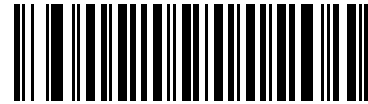
Code 39 Full ASCII Conversion

Parameter # 17

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



**Enable Code 39 Full ASCII
(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 the [ASCII Character Set for USB on page 3-24](#).

Code 39 Security Level

Parameter # 750

The imager offers four levels of decode security for Code 39 bar codes. There is an inverse relationship between security and imager 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 imager to operate in its most aggressive state, while providing sufficient security in decoding most in-spec bar codes.
- **Code 39 Security Level 1:** This default setting eliminates most misdecodes.
- **Code 39 Security Level 2:** Select this option with greater bar code security requirements if **Security Level 1** fails to eliminate misdecodes.
- **Code 39 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 bar codes. Selecting this level of security significantly impairs the decoding ability of the imager. If this level of security is required, try to improve the quality of the bar codes.



Code 39 Security Level 0
(0)



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



Code 39 Security Level 2
(2)



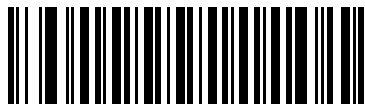
Code 39 Security Level 3
(3)

Code 93

Enable/Disable Code 93

Parameter # 9

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



***Enable Code 93**
(1)



Disable Code 93
(0)

Set Lengths for Code 93

Parameter # 26, 27

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

Set Lengths for Code 93 (continued)



Code 93 - One Discrete Length



Code 93 - Two Discrete Lengths



Code 93 - Length Within Range



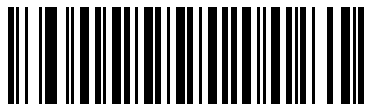
Code 93 - Any Length

Code 11

Code 11

Parameter # 10

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



Enable Code 11
(1)



*Disable Code 11
(0)

Set Lengths for Code 11

Parameter # 28, 29

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

Set Lengths for Code 11 (continued)



Code 11 - One Discrete Length



Code 11 - Two Discrete Lengths



Code 11 - Length Within Range



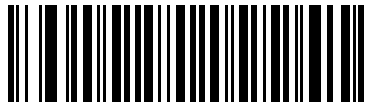
Code 11 - Any Length

Code 11 Check Digit Verification

Parameter # 52

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

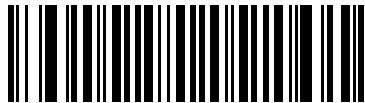
To enable this feature, scan the bar code below corresponding to the number of check digits encoded in the Code 11 symbols.



***Disable**
(0)



One Check Digit
(1)



Two Check Digits
(2)

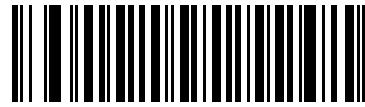
Transmit Code 11 Check Digits

Parameter # 47

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

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



*Enable Interleaved 2 of 5
(1)



Disable Interleaved 2 of 5
(0)

Set Lengths for Interleaved 2 of 5

Parameter # 22, 23

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 bar codes in [Appendix G, 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 G-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 bar codes in [Appendix G, 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 G-2](#).
- **Length Within Range** - Select this option to decode an I 2 of 5 symbol with a specific length range. Select lengths using numeric bar codes in [Appendix G, 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 G-2](#).
- **Any Length** - Scan this option to decode I 2 of 5 symbols containing any number of characters within the imager's capability.

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

Set Lengths for Interleaved 2 of 5 (continued)



I 2 of 5 - One Discrete Length



I 2 of 5 - Two Discrete Lengths



I 2 of 5 - Length Within Range



I 2 of 5 - Any Length

I 2 of 5 Check Digit Verification

Parameter # 49

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)

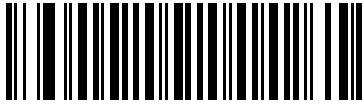


OPCC Check Digit
(2)

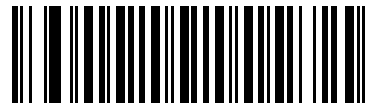
Transmit I 2 of 5 Check Digit

Parameter # 44

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



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

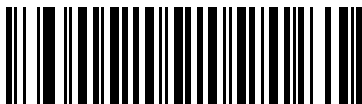


*Do Not Transmit I 2 of 5 Check Digit (Disable)
(0)

Convert I 2 of 5 to EAN-13

Parameter # 82

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)

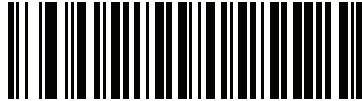
I 2 of 5 Security Level

Parameter # 1121

Interleaved 2 of 5 bar codes are vulnerable to misdecodes, particularly when I 2 of 5 Lengths is set to **Any Length**. The imager offers four levels of decode security for Interleaved 2 of 5 bar codes. There is an inverse relationship between security and imager 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 imager to operate in its most aggressive state, while providing sufficient security in decoding most in-spec bar codes.
- **I 2 of 5 Security Level 1:** A bar code must be successfully read twice, and satisfy certain safety requirements before being decoded. This default setting eliminates most misdecodes.
- **I 2 of 5 Security Level 2:** Select this option with greater bar code 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 bar code must be successfully read three times before being decoded.

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



I 2 of 5 Security Level 0
(00h)



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



I 2 of 5 Security Level 2
(02h)



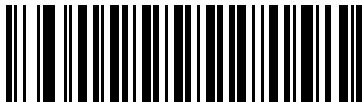
I 2 of 5 Security Level 3
(03h)

Discrete 2 of 5 (DTF)

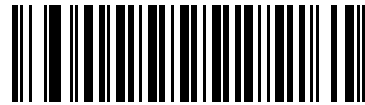
Enable/Disable Discrete 2 of 5

Parameter # 5

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



Enable Discrete 2 of 5
(1)



*Disable Discrete 2 of 5
(0)

Set Lengths for Discrete 2 of 5

Parameter # 20, 21

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 bar codes in [Appendix G, 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 G-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 bar codes in [Appendix G, 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 G-2](#).
- **Length Within Range** - Select this option to decode a D 2 of 5 symbol with a specific length range. Select lengths using numeric bar codes in [Appendix G, 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 G-2](#).
- **Any Length** - Scan this option to decode D 2 of 5 symbols containing any number of characters within the imager's capability.

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

Set Lengths for Discrete 2 of 5 (continued)



D 2 of 5 - One Discrete Length



D 2 of 5 - Two Discrete Lengths



D 2 of 5 - Length Within Range



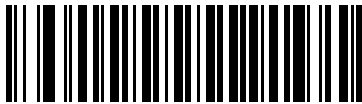
D 2 of 5 - Any Length

Codabar (NW - 7)

Enable/Disable Codabar

Parameter # 7

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



***Enable Codabar
(1)**



**Disable Codabar
(0)**

Set Lengths for Codabar

Parameter # 24, 25

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

Set Lengths for Codabar (continued)



Codabar - One Discrete Length



Codabar - Two Discrete Lengths



Codabar - Length Within Range



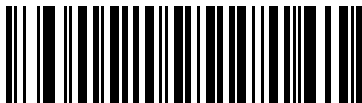
Codabar - Any Length

CLSI Editing

Parameter # 54

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)

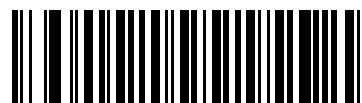
NOTIS Editing

Parameter # 55

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)

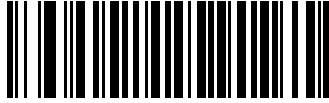


*Disable NOTIS Editing
(0)

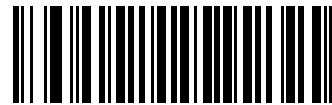
Codabar Upper or Lower Case Start/Stop Characters Detection

Parameter # 855

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



Lower Case
(1)



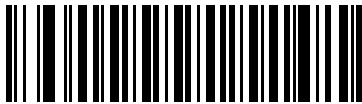
*Upper Case
(0)

MSI

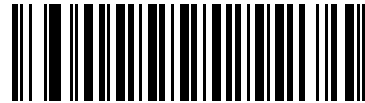
Enable/Disable MSI

Parameter # 11

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



Enable MSI
(1)



***Disable MSI**
(0)

Set Lengths for MSI

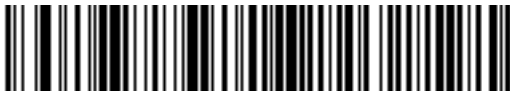
Parameter # 30, 31

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.

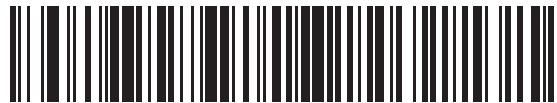
- **One Discrete Length** - Select this option to decode only MSI symbols containing a selected length. Select the length using the numeric bar codes in [Appendix G, Numeric Bar Codes](#). For example, to decode only MSI symbols with 14 characters, scan **MSI - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan [Cancel on page G-2](#).
- **Two Discrete Lengths** - Select this option to decode only MSI symbols containing either of two selected lengths. Select lengths using the numeric bar codes in [Appendix G, 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 G-2](#).
- **Length Within Range** - Select this option to decode a MSI symbol with a specific length range. Select lengths using numeric bar codes in [Appendix G, 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 G-2](#).
- **Any Length** - Scan this option to decode MSI symbols containing any number of characters within the imager's capability.

Set Lengths for MSI (continued)

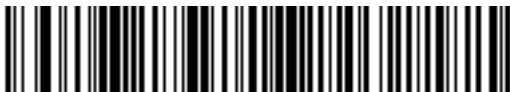
- ✓ **NOTE** Due to the construction of the MSI symbology, it is possible for a scan line covering only a portion of the code to transmit as a complete scan, yielding less data than is encoded in the bar code. To prevent this, select specific lengths (**MSI - One Discrete Length, Two Discrete Lengths**)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



MSI - One Discrete Length



MSI - Two Discrete Lengths



MSI - Length Within Range



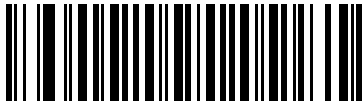
MSI - Any Length

MSI Check Digits

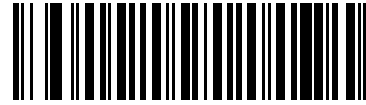
Parameter # 50

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

See [MSI Check Digit Algorithm on page 6-57](#) for the selection of second digit algorithms.



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

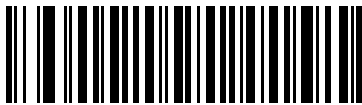


**Two MSI Check Digits
(1)**

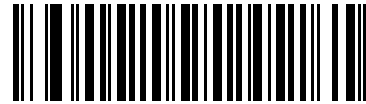
Transmit MSI Check Digit(s)

Parameter # 46

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



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

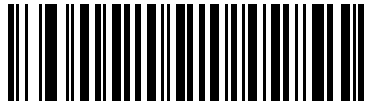


***Do Not Transmit MSI Check Digit(s) (Disable)
(0)**

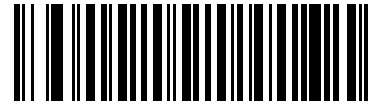
MSI Check Digit Algorithm

Parameter # 51

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



MOD 10/MOD 11
(0)



*MOD 10/MOD 10
(1)

Chinese 2 of 5

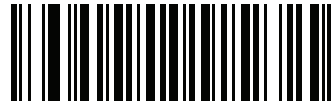
Enable/Disable Chinese 2 of 5

Parameter # 408

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

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



Enable Matrix 2 of 5
(1)



*Disable Matrix 2 of 5
(0)

Set Lengths for Matrix 2 of 5

Parameter # 619, 620

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 bar codes in [Appendix G, 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 G-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 bar codes in [Appendix G, 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 G-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 bar codes in [Appendix G, 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 G-2](#).
- **Any Length** - Scan this option to decode Matrix 2 of 5 symbols containing any number of characters within the imager's capability.

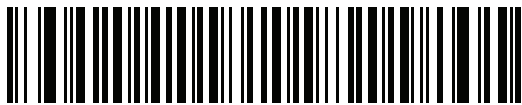
Set Lengths for Matrix 2 of 5 (continued)



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



Matrix 2 of 5 - Two Discrete Lengths



Matrix 2 of 5 - Length Within Range



Matrix 2 of 5 - Any Length

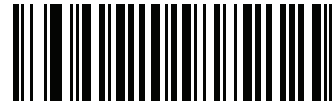
Matrix 2 of 5 Check Digit

Parameter # 622

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



Enable Matrix 2 of 5 Check Digit
(1)



*Disable Matrix 2 of 5 Check Digit
(0)

Transmit Matrix 2 of 5 Check Digit

Parameter # 623

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



Transmit Matrix 2 of 5 Check Digit
(1)



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

Korean 3 of 5

Enable/Disable Korean 3 of 5

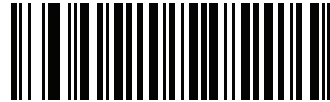
Parameter # 581

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

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



Enable Korean 3 of 5
(1)



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

Inverse 1D

Parameter # 586

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

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



***Regular**
(0)



Inverse Only
(1)



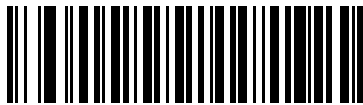
Inverse Autodetect
(2)

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 bar codes to enable or disable each variant of GS1 DataBar.

GS1 DataBar-14

Parameter # 338



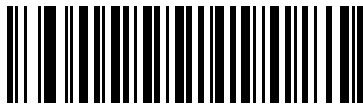
***Enable GS1 DataBar-14
(1)**



**Disable GS1 DataBar-14
(0)**

GS1 DataBar Limited

Parameter # 339



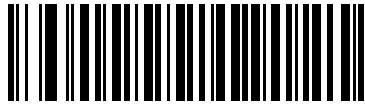
***Enable GS1 DataBar Limited
(1)**



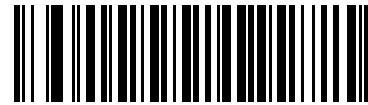
**Disable GS1 DataBar Limited
(0)**

GS1 DataBar Expanded

Parameter # 340



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



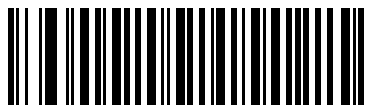
**Disable GS1 DataBar Expanded
(0)**

Convert GS1 DataBar to UPC/EAN

Parameter # 397

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

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



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



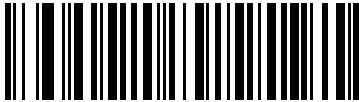
***Disable Convert GS1 DataBar to UPC/EAN
(0)**

GS1 DataBar Limited Security Level

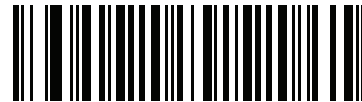
Parameter # 728

The imager offers four levels of decode security for GS1 DataBar Limited bar codes. There is an inverse relationship between security and imager 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 bar code 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 bar codes when scanning some UPC symbols. The imager 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)



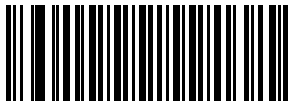
GS1 DataBar Limited Security Level 4
(4)

Composite

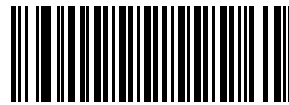
Composite CC-C

Parameter # 341

Scan a bar code below to enable or disable Composite bar codes of type CC-C.



Enable CC-C
(1)



*Disable CC-C
(0)

Composite CC-A/B

Parameter # 342

Scan a bar code below to enable or disable Composite bar codes of type CC-A/B.



Enable CC-A/B
(1)

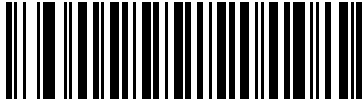


*Disable CC-A/B
(0)

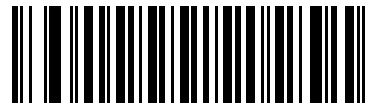
Composite TLC-39

Parameter # 371

Scan a bar code below to enable or disable Composite bar codes of type TLC-39.



Enable TLC39
(1)



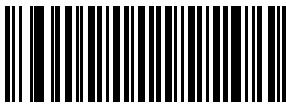
*Disable TLC39
(0)

UPC Composite Mode

Parameter # 344

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 bar codes regardless of whether a 2D symbol is detected.
- Select **UPC Always Linked** to transmit UPC bar codes and the 2D portion. If 2D is not present, the UPC bar code does not transmit.
- If you select **Autodiscriminate UPC Composites**, the imager 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)

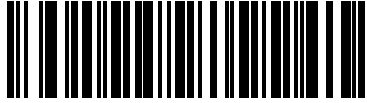


Autodiscriminate UPC Composites
(2)

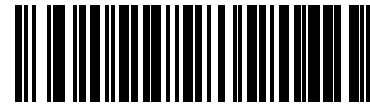
Composite Beep Mode

Parameter # 398

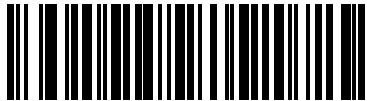
To select the number of decode beeps when a composite bar code is decoded, scan the appropriate bar code.



Single Beep after both are decoded
(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

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)

Postal Codes

US Postnet

Parameter # 89

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



Enable US Postnet
(1)



*Disable US Postnet
(0)

US Planet

Parameter # 90

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



Enable US Planet
(1)

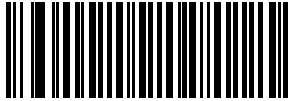


*Disable US Planet
(0)

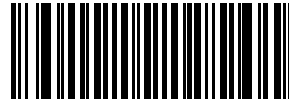
Transmit US Postal Check Digit

Parameter # 95

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

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



**Enable UK Postal
(1)**



***Disable UK Postal
(0)**

Transmit UK Postal Check Digit

Parameter # 96

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

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



**Enable Japan Postal
(1)**



***Disable Japan Postal
(0)**

Australia Post

Parameter # 291

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



**Enable Australia Post
(1)**



***Disable Australia Post
(0)**

Australia Post Format

Parameter # 718

To select one of the following formats for Australia Post, scan the appropriate bar code 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

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



Enable Netherlands KIX Code
(1)



*Disable Netherlands KIX Code
(0)

USPS 4CB/One Code/Intelligent Mail

Parameter # 592

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



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



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

UPU FICS Postal

Parameter # 611

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



Enable UPU FICS Postal
(1)



*Disable UPU FICS Postal
(0)

2D Symbologies

Enable/Disable PDF417

Parameter # 15

To enable or disable PDF417, scan the appropriate bar code below.



***Enable PDF417
(1)**



**Disable PDF417
(0)**

Enable/Disable MicroPDF417

Parameter # 227

To enable or disable MicroPDF417, scan the appropriate bar code below.



**Enable MicroPDF417
(1)**



***Disable MicroPDF417
(0)**

Code 128 Emulation

Parameter # 123

Enable this parameter to transmit data from certain MicroPDF417 symbols as Code 128. [AIM Code ID Character \(1\) on page 4-31](#) 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 bar code below to enable or disable Code 128 Emulation.



NOTE Linked MicroPDF 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

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



***Enable Data Matrix
(1)**



**Disable Data Matrix
(0)**

Data Matrix Inverse

Parameter # 588

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

- **Regular Only** - the imager decodes regular Data Matrix bar codes only.
- **Inverse Only** - the imager decodes inverse Data Matrix bar codes only.
- **Inverse Autodetect** - the imager decodes both regular and inverse Data Matrix bar codes.



**Regular
(0)**



**Inverse Only
(1)**



***Inverse Autodetect
(2)**

Maxicode

Parameter # 294

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



Enable Maxicode
(1)



*Disable Maxicode
(0)

QR Code

Parameter # 293

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



*Enable QR Code
(1)



Disable QR Code
(0)

QR Inverse

Parameter # 587

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

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



*Regular
(0)



Inverse Only
(1)



Inverse Autodetect
(2)

MicroQR

Parameter # 573

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



*Enable MicroQR
(1)



Disable MicroQR
(0)

Aztec

Parameter # 574

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



*Enable Aztec
(1)



Disable Aztec
(0)

Aztec Inverse

Parameter # 589

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

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



Regular
(0)



Inverse Only
(1)



*Inverse Autodetect
(2)

Han Xin

Parameter # 1167

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



Enable Han Xin
(1)



*Disable Han Xin
(0)

Han Xin Inverse

Parameter # 1168

Select a Han Xin inverse decoder setting:

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



*Regular
(0)



Inverse Only
(1)



Inverse Autodetect
(2)

Redundancy Level

Parameter # 78

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

Select the redundancy level appropriate for the bar code quality.

Redundancy Level 1

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

Table 6-2 *Redundancy Level 1 Codes*

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

Redundancy Level 2

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

Table 6-3 *Redundancy Level 2 Codes*

Code Type	Code Length
All	All

Redundancy Level 3

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

Table 6-4 *Redundancy Level 3 Codes*

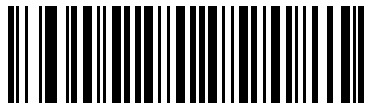
Code Type	Code Length
MSI	4 characters or less
D 2 of 5	8 characters or less
I 2 of 5	8 characters or less
Codabar	8 characters or less

Redundancy Level 4

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

Table 6-5 *Redundancy Level 4 Codes*

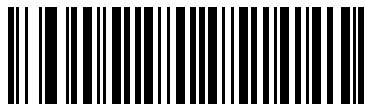
Code Type	Code Length
All	All



*Redundancy Level 1
(1)



Redundancy Level 2
(2)



Redundancy Level 3
(3)



Redundancy Level 4
(4)

Security Level

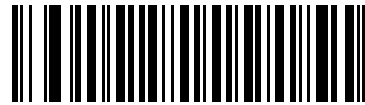
Parameter # 77

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

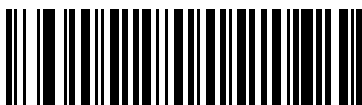
- **Security Level 0:** This setting allows the imager to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- **Security Level 1:** This default setting eliminates most misdecodes.
- **Security Level 2:** Select this option if Security level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



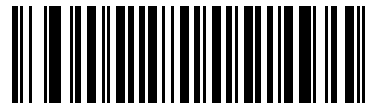
Security Level 0
(0)



*Security Level 1
(1)



Security Level 2
(2)



Security Level 3
(3)

Intercharacter Gap Size

Parameter # 381

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



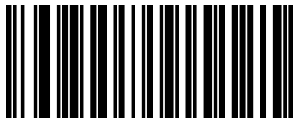
*Normal Intercharacter Gaps
(06h)



Large Intercharacter Gaps
(0Ah)

Report Version

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



Report Software Version

Macro PDF Features

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



CAUTION When printing, keep each Macro PDF sequence separate, as each sequence has unique identifiers. Do not mix bar codes 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 imager 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

CHAPTER 7 INTELLIGENT DOCUMENT CAPTURE

Introduction

Intelligent Document Capture (IDC) is Motorola Solutions advanced image processing firmware for select imager based decoders. This chapter describes the IDC functionality, provides parameter bar codes to control its features, and includes a quick start procedure to get you started with IDC.

The IDC Process

Intelligent Document Capture:

1. Verifies a bar code is appropriate to use as an IDC anchor or link. See [Bar Code Acceptance Test](#).
2. Determines the rectangular region to capture as an image. See [Capture Region Determination on page 7-2](#).
3. Processes the captured image. See [Image Post Processing on page 7-3](#).
4. Transmits the data. See [Data Transmission on page 7-3](#).

Bar Code Acceptance Test

Upon decoding a bar code, the decoder checks to ensure that the bar code fits the description of a bar code that anchors or links to an IDC form. To be accepted as an IDC bar code:

- The symbology must be enabled in the IDC symbology parameter and enabled for decode in the decoder. The IDC firmware allows enabling between zero and eight symbologies simultaneously: Code 128, Code 39, Interleaved 2 of 5, Discrete 2 of 5, Codabar, PDF417, Data Matrix, and EAN-128.
- The decoded data must satisfy the values set in the *IDC Minimum Text Length* and *IDC Maximum Text Length* parameters. To disable either of these checks, set the value to zero.

If the bar code does not satisfy both requirements, it is sent as a normal (non-IDC) decode.

An IDC bar code is required when *IDC Operating Mode on page 7-5* is set to **Anchored** or **Linked**.

Free-Form operating mode does not require a bar code, but transmits decoded data if one is found and satisfies the requirements. If no bar code is decoded, the document capture process starts but can be subject to the following condition: specify a non-zero value for the *IDC Delay Time on page 7-15*. The decoder must wait for at least this amount of time after trigger pull before capturing a document, unless a bar code is decoded before the time expires.

If *Picklist Mode on page 4-20* is enabled, the bar code must be directly under the aiming pattern, within the decoder's decode range, and the region to capture completely within the engine's field-of-view.

Capture Region Determination

After accepting an IDC bar code, the firmware establishes the region to capture as an image. The method used depends on the setting of the *IDC Operating Mode* as follows.

The IDC firmware emits a single low beep after successfully capturing a region. The engine is then no longer capturing images and can be moved without disturbing the IDC output. Be sure to hold the trigger button until the decode beep, otherwise the IDC process may be aborted.

IDC Operating Mode = Anchored

A coordinate system is built based on the bar code in its rectified (de-skewed) form. The origin is the center of the bar code, and the x-axis is set toward the right, from the bar code's point of view. The unit module width of the bar code is the unit for x. Similarly, the y-axis is set toward the up direction. The unit for the y-axis is specified via the parameter *IDC Aspect on page 7-9*. This is the aspect ratio of a thin bar or space - the bar code's height is divided by this value to get the unit in the y-axis. The aspect ratio is calculated automatically if *IDC Aspect* is set to zero. The bar code can be of different sizes for the same form, as long as the center of the bar code is the same when the bar code's length changes.

From this coordinate system, the IDC area is determined using four parameters: offsets in x and y (*IDC X Coordinate*, *IDC Y Coordinate*) to the region's top-left corner, and width and height (*IDC Width*, *IDC Height*).

If the capture area is relatively large as compared to the bar code area, the calculation to obtain the capture area is prone to significant errors. A recommended solution is to enclose the form with a single black-lined rectangular border (a box), which is not in contact with any other line on the outside of the form (although it can be connected to lines on the inside of the form). When the *IDC Find Box Outline* is set, the firmware searches for the box, and does not decode if any edges are broken (such as by a protruding thumb).

The *IDC Zoom Limit* parameter controls the quality of the captured form. The IDC firmware rejects capturing a form unless the width is at least the *IDC Zoom Limit* percentage of the *IDC Width* parameter. For example, if *IDC Zoom Limit* is set to 100 and *IDC Width* is set to 150, the form must be at least 300 pixels wide before it is captured (each unit module is scaled to two pixels).

The *IDC Maximum Rotation* parameter controls the maximum rotation any edge of the form can have in relation to the imager's horizontal or vertical axis.

IDC Operating Mode = Free-Form or Linked

The document capture region is a rectangular piece of paper, or a portion of it enclosed by a rectangular border. In either case, all four sides of the capture region must be completely within the engine's field-of-view, and there must be sufficient contrast at the border of the capture region. For example, if a piece of white paper contains the document to capture, it must be put in front of a dark background.

By default, the engine captures the largest rectangular region within the field-of-view. To specify a particular border type, use the *IDC Border Type* parameter.

The region must contain at least 10% of the field-of-view in two dimensions.

If an IDC bar code is decoded, its location is used to start the search for the capture region. Otherwise, the capture region is searched from the center of the field-of-view. IDC also uses the orientation of a decoded IDC bar code to orient the output image.

Image Post Processing

After determining the document capture region, the firmware de-skews and re-samples the region as described below. Enabling *IDC Captured Image Brighten* calls normalization, where the brightness of the image is made uniform, and contrast is enhanced as a large percent of background pixels is made completely white (a smaller percent of pixels is made completely black if the firmware determines there is no danger of enhancing the contrast of a very bland area). Enabling *IDC Captured Image Sharpen* enhances the sharpness of the image.

The image is re-sampled about one output pixel per input pixel for **Free-Form** or **Linked** modes and two pixels-per-module in **Anchored** mode.

The image is compressed and transmitted in one of the standard image formats selected by the *IDC File Format Selector*, *IDC Bits Per Pixel*, and *IDC JPEG Quality* parameters.

Note that it may take several seconds for post processing to complete, depending on the size of the captured region, the options enabled, and the decoder model.

Data Transmission

After processing the captured image, it is assembled with the decoded bar code data (if applicable) into an ISO/IEC 15434 style packet and transmitted to the host. The decoder issues the standard decode beep and the trigger can be released. Be sure the *USB Device Type on page 3-4* is set to **Symbol Native API (SNAPI) with Imaging Interface**.

PC Application and Programming Support

For a sample application running on the Microsoft Windows operating system, contact your Motorola Solutions representative. This application displays bar code data and/or captured images from Intelligent Document Capture enabled decoders and allows setting and reading IDC parameters. Complete source code and documentation are also provided for developing custom applications. The application includes documentation for the ISO/IEC 15434 format as used by the IDC firmware and C# code to process it.

Parameters

This section describes the parameters controlling the IDC firmware and provides programming bar codes for setting them.

To set parameters requiring a range of values, scan the parameter bar code followed by two, three, or four bar codes from [Appendix G, Numeric Bar Codes](#) corresponding to the desired value. Scan two numeric bar codes for parameters with a maximum value of less than 100, for example, [IDC Minimum Text Length](#). [IDC Delay Time](#) requires scanning three digits since the maximum value is 200. Leading zeros are required.

Alternatively, use the sample application to set parameters using the parameter name. The application provides prompts and error checking to assist in setting the parameters correctly and easily. You must use an application to set a parameter to a negative value, as the [IDC X Coordinate](#) can require.

Table 7-1 Intelligent Document Capture (IDC) Parameter Defaults

Parameter	Parameter Name	Parameter Number	Default	Page Number
Intelligent Document Capture (IDC)				
IDC Operating Mode	DocCap_MODE	594	Off	7-5
IDC Symbology	DocCap_SYMBOLOGY	655	001	7-6
IDC X Coordinate	DocCap_X	596	-151	7-7
IDC Y Coordinate	DocCap_Y	597	-050	7-7
IDC Width	DocCap_WIDTH	598	0300	7-8
IDC Height	DocCap_HEIGHT	599	0050	7-8
IDC Aspect	DocCap_ASPECT	595	000	7-9
IDC File Format Selector	DocCap_FMT	601	JPEG	7-9
IDC Bits Per Pixel	DocCap_BPP	602	8 BPP	7-10
IDC JPEG Quality	DocCap_JPEG_Qual	603	065	7-10
IDC Find Box Outline	Sig_FINDBOX	727	Disable	7-11
IDC Minimum Text Length	DocCap_MIN_TEXT	656	00	7-11
IDC Maximum Text Length	DocCap_MAX_TEXT	657	00	7-12
IDC Captured Image Brighten	Sig_BRIGHTEN	654	Enable	7-12
IDC Captured Image Sharpen	Sig_SHARPEN	658	Enable	7-13
IDC Border Type	DocCap_BORDER	829	None	7-14
IDC Delay Time	DocCap_DELAY	830	000	7-15
IDC Zoom Limit	Sig_MIN_PERCENT	651	000	7-15
IDC Maximum Rotation	Sig_MAX_ROT	652	00	7-16

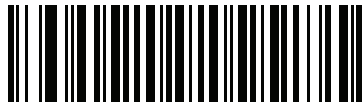
IDC Operating Mode

Parameter Name: DocCap_MODE

Parameter # 594

Select the operating mode of the Intelligent Document Capture firmware:

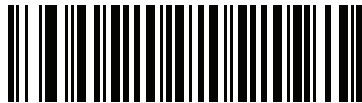
- **Off** - Disables the IDC feature.
- **Anchored** - Requires a bar code decode. The image capture region is based off this bar code.
- **Free-Form** - A printed border or page edge defines the image capture region. A bar code is optional.
- **Linked** - A printed border or page edge defines the image capture region. A bar code is required.



*Off
(0)



Anchored
(1)



Free-Form
(2)



Linked
(3)

IDC Symbology

Parameter Name: DocCap_SYMBOLOGY

Parameter # 655

Select the bar code type(s) to use when Document Capture mode is not set to **Off**. To enable more than one symbology at a time, simply add the values together. For example, to enable PDF417, Data Matrix, and Code 39 write a value of 98 (32 + 64 + 2).

Scan the bar code below, followed by three bar codes from [Appendix G, Numeric Bar Codes](#) in the range of 000 to 255 decimal. The default is 001.

Table 7-2 *IDC Symbologies*

Symbology	Value (Decimal)
Code 128	1
Code 39	2
I 2 of 5	4
D 2 of 5	8
Codabar	16
PD 417	32
Data Matrix	64
EAN 128	128



IDC Symbology

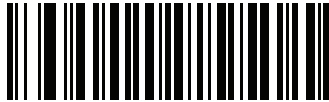
IDC X Coordinate

Parameter Name: DocCap_X

Parameter # 596

Specify the horizontal offset to the top left corner of the region to capture relative to the center of the bar code. Negative values move toward the left. This parameter only applies when *IDC Operating Mode* is set to **Anchored**.

Scan the bar code below, followed by four bar codes from [Appendix G, Numeric Bar Codes](#) in the range of +/- 1279. The default is -151. Note that you must use an application to set a negative value.



IDC X Coordinate

IDC Y Coordinate

Parameter Name: DocCap_Y

Parameter # 597

Specify the vertical offset to the top left corner of the region to capture relative to the center of the bar code. Negative values move toward the top. This parameter only applies when *IDC Operating Mode* is set to **Anchored**.

Scan the bar code below, followed by four bar codes from [Appendix G, Numeric Bar Codes](#) in the range of +/- 1023. The default is -050. Note that you must use an application to set a negative value.



IDC Y Coordinate

IDC Width

Parameter Name: DocCap_WIDTH

Parameter # 598

Specify the width of the region to capture. This parameter only applies when *IDC Operating Mode* is set to **Anchored**.

Scan the bar code below, followed by four bar codes from *Appendix G, Numeric Bar Codes* in the range of 0000 to 1279. The default is 0300.



IDC Width

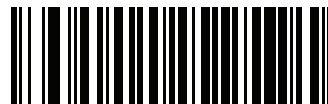
IDC Height

Parameter Name: DocCap_HEIGHT

Parameter # 599

Specify the height of the region to capture. This parameter only applies when *IDC Operating Mode* is set to **Anchored**.

Scan the bar code below, followed by four bar codes from *Appendix G, Numeric Bar Codes* in the range of 0000 to 1279. The default is 0050.



IDC Height

IDC Aspect

Parameter Name: DocCap_ASPECT

Parameter # 595

Specify the bar code's aspect ratio of a thin bar or space. The bar code's height is divided by this value to get the unit in the y-axis. The aspect value is calculated automatically if this parameter is set to zero.

This parameter only applies when *IDC Operating Mode* is set to **Anchored**.

Scan the bar code below, followed by three bar codes from *Appendix G, Numeric Bar Codes* in the range of 000 to 255. The default is 000.



IDC Aspect

IDC File Format Selector

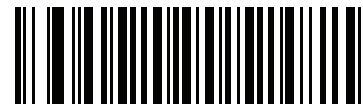
Parameter Name: DocCap_FMT

Parameter # 601

Select a document capture file format appropriate for your system (BMP, TIFF, or JPEG). The decoder stores captured areas in the selected format.



*JPEG
(1)



BMP
(3)



TIFF
(4)

IDC Bits Per Pixel

Parameter Name: DocCap_BPP

Parameter # 602

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 grey levels to each pixel, or 8 BPP to assign 1 of 256 levels of grey to each pixel.

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



1 BPP
(0)



4 BPP
(1)



*8 BPP
(2)

IDC JPEG Quality

Parameter Name: DocCap_JPEG_Qual

Parameter # 603

Set the amount of JPEG compression to perform on the captured image. Higher numbers produce a better quality image but larger files.

Scan the bar code below, followed by three bar codes from [Appendix G, Numeric Bar Codes](#) in the range of 005 to 100 decimal. The default is 065.



IDC JPEG Quality

IDC Find Box Outline

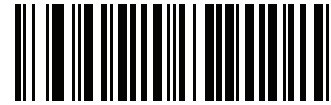
Parameter Name: Sig_FINDBOX

Parameter # 727

Select **Enable Find Box Outline** to instruct the firmware to search for a rectangular border during document capture. This parameter only applies when *IDC Operating Mode* is set to **Anchored**.



*Disable Find Box Outline
(0)



Enable Find Box Outline
(1)

IDC Minimum Text Length

Parameter Name: DocCap_MIN_TEXT

Parameter # 656

Specify the minimum number of characters encoded in a bar code for the IDC firmware to use it as an anchored or linked bar code. Set this to zero (the default) to disable all checking and use all bar codes.

Scan the bar code below, followed by two bar codes from [Appendix G, Numeric Bar Codes](#) in the range of 00 to 55 decimal. The default is 00.



IDC Minimum Text Length

IDC Maximum Text Length

Parameter Name: DocCap_MAX_TEXT

Parameter # 657

Specify the maximum number of characters encoded in a bar code for the IDC firmware to use it as an anchored or linked bar code. Set this to zero (the default) to disable all checking and use all bar codes.

Scan the bar code below, followed by two bar codes from [Appendix G, Numeric Bar Codes](#) in the range of 00 to 55 decimal. The default is 00.



IDC Maximum Text Length

IDC Captured Image Brighten

Parameter Name: Sig_BRIGHTEN

Parameter # 654

Enable **Captured Image Brighten** to make image brightness uniform and enhance contrast such that a large percent of the background pixels is made completely white (a smaller percentage of pixels is made completely black if the program determines there is no danger of enhancing the contrast of a very bland area).

✓ **NOTE** This parameter is also used for Signature Capture.



Disable Captured Image Brighten
(0)



*Enable Captured Image Brighten
(1)

IDC Captured Image Sharpen

Parameter Name: Sig_SHARPEN

Parameter # 658

Enable this to enhance the sharpness of the image.

✓ **NOTE** This parameter is also used for Signature Capture.



Disable Captured Image Sharpen
(0)



***Enable Captured Image Sharpen**
(1)

IDC Border Type

Parameter Name: DocCap_BORDER

Parameter # 829

Select the style of border used to determine the outline of the capture region in **Free-Form** and **Linked** modes:

- Select **None** to capture the largest rectangular region within the field-of-view.
- Select **Black** to indicate that the border must be black (such as a printed rectangular border).
- Select **White** to indicate that the border must be white (e.g., paper edge on a dark background).
- Select **Advanced Edge Detection (AED)** to capture a region defined by edges of any color and potentially broken.

This parameter is only used in **Free-Form** and **Linked** modes.



*None
(0)



Black
(1)



White
(2)



Advanced Edge Detection (AED)
(3)

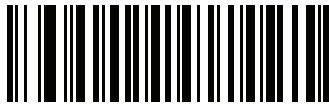
IDC Delay Time

Parameter Name: DocCap_DELAY

Parameter # 830

Set the delay for capturing a document after a trigger pull. Decoding a bar code aborts this delay. This parameter only applies in **Free-Form** mode.

Scan the bar code below, followed by three bar codes from [Appendix G, Numeric Bar Codes](#) in the range of 000 to 200 decimal in units of 10 msec. The default is 000.



IDC Delay Time

IDC Zoom Limit

Parameter Name: Sig_MIN_PERCENT

Parameter # 651

Set the minimal "zoom" percentage value of a form for it to be considered for capture. This controls the quality of the captured form. The IDC firmware rejects capturing a form unless the width is at least the *IDC Zoom Limit* percentage of the *IDC Width* parameter. For example, if you set this parameter to 100 and *IDC Width* to 150, the form must be at least 300 pixels wide before it is captured (each unit module is scaled to two pixels).

Set this to zero (the default) to disable all checking. This parameter only applies in **Anchored** mode.

Scan the bar code below, followed by three bar codes from [Appendix G, Numeric Bar Codes](#) in the range of 000 to 100 percent. The default is 000.



IDC Zoom Limit

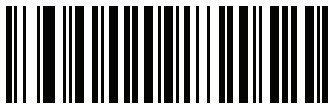
IDC Maximum Rotation

Parameter Name: Sig_MAX_ROT

Parameter # 652

Set the maximum rotation any edge of the form can have in relation to the decoder's horizontal or vertical axis for it to be considered for capture. Set this to zero (the default) to disable all checking. This parameter only applies in **Anchored** mode.

Scan the bar code below, followed by two bar codes from [Appendix G, Numeric Bar Codes](#) in the range of 00 to 45 decimal. The default is 00.



IDC Maximum Rotation

Quick Start

This section familiarizes you with some of the Intelligent Document Capture features. [IDC Demonstrations on page 7-18](#) includes instructions to demonstrate the Anchored, Free-Form, and Linked modes using a sample form to help provide an understanding of how to use IDC. These examples do not illustrate all capabilities of the advanced IDC firmware. Build upon these using different parameter settings and forms.

Sample IDC Setup

To set up IDC with the decoder:

1. Connect a decoder equipped with the Intelligent Document Capture feature to the host computer's USB port.
2. To set the decoder to the default settings and proper USB host type, scan **Set Defaults** followed by the **Symbol Native API (SNAPI) with Imaging Interface** bar code. Allow time for the decoder to reset and the USB connection to remunerate after each scan before continuing.



Set Defaults



Symbol Native API (SNAPI) with Imaging Interface

3. Start the sample application and select the decoder in the **SNAPI Scanners** drop-down menu.
4. Set the parameters as specified in [IDC Demonstrations on page 7-18](#) using the sample application or by scanning parameter bar codes in this guide. The bar code in the sample form is Code 128, which is enabled by default for decoding and as a Document Capture symbology. You can change these settings for your IDC application.
5. Perform the list of suggestions in each demo. When scanning, aim the engine at the bar code in the center of the rectangle. Pull the engine back so the rectangle is fully contained in the aiming pattern. When you pull the trigger, the decoder emits a low tone to indicate that the IDC firmware identified and captured an image, then a decode beep to indicate that the data is processed and transmitted. There may be several seconds between the two beeps, depending on the size of the captured image and options selected (de-skew, brighten, etc). You can move the decoder after the first beep, but continue to hold the trigger or the decoder may end the session before sending the data.

IDC Demonstrations

Anchored Mode Demo

Set parameters to these values:

Table 7-3 Anchored Mode Sample Parameter Values

Parameter	Value
IDC Operating Mode	Anchored
IDC Height	100
IDC Width	90
IDC X Coordinate	-175
IDC Y Coordinate	-50

- Pull the trigger. The decoder decodes the bar code and captures an image of the text scroll.
- Rotate the form clockwise so the word **Capture** is along the bottom edge, and pull the trigger. The decoder decodes the bar code and captures the same image, including orientation. (This example also works with the form rotated counter-clockwise or upside down).
- Modify the values for height, width, x, and y. Pull the trigger. The captured area changes in size and location.
- Cover the bar code with a small piece of paper (or your finger) and pull the trigger. The decoder does not decode the bar code or capture an image.

What this demonstrates:

The Intelligent Document Capture Anchored mode captures an image of fixed size and location relative to a bar code on the page. Parameters control the height, width, and location. The IDC firmware requires that a bar code is present in order to capture an image, decodes it, and uses it to adjust the image to the upright orientation.

Free-Form Mode Demo

Set IDC Operating Mode to **Free-Form**.

- Pull the trigger. The decoder decodes the bar code and captures an image of the entire rectangle, including the contents.
- Modify the values for height, width, x, and y. Pull the trigger. Note that the captured image is not affected.
- Rotate the form clockwise so the word **Capture** is along the bottom edge, and pull the trigger. The decoder decodes the bar code and captures the same image, including orientation. (This example also works with the form rotated counter-clockwise or upside down).
- Cover the bar code with a small piece of paper and pull the trigger. The decoder does not decode the bar code and does not re-orient the captured image to the normal position, i.e., with the Motorola logo in upper-left corner.

What this demonstrates:

The Intelligent Document Capture Free-Form mode captures an image whose size and position are determined by a rectangular border on the page. It adjusts the image to the upright orientation if a bar code is found and decoded in the image.

Linked Mode Demo

Set IDC Operating Mode to **Linked**.

The examples from Free-Form mode also work in Linked mode except that the last one (with the bar code covered) does not decode the bar code or capture an image.

What this demonstrates:

The Intelligent Document Capture Linked mode captures an image whose size and position are determined by a rectangular border on the page. The IDC firmware requires that a bar code is present in order to capture an image, decodes it, and uses it to adjust the image to the upright orientation

Other Suggestions

Hold the decoder at an angle (up/down or side to side) to the page instead of perpendicular to it. The IDC firmware de-skews and adjusts the brightness (enabled by default) to produce a quality image when the decoder is held at less than ideal conditions.

Quick Start Form

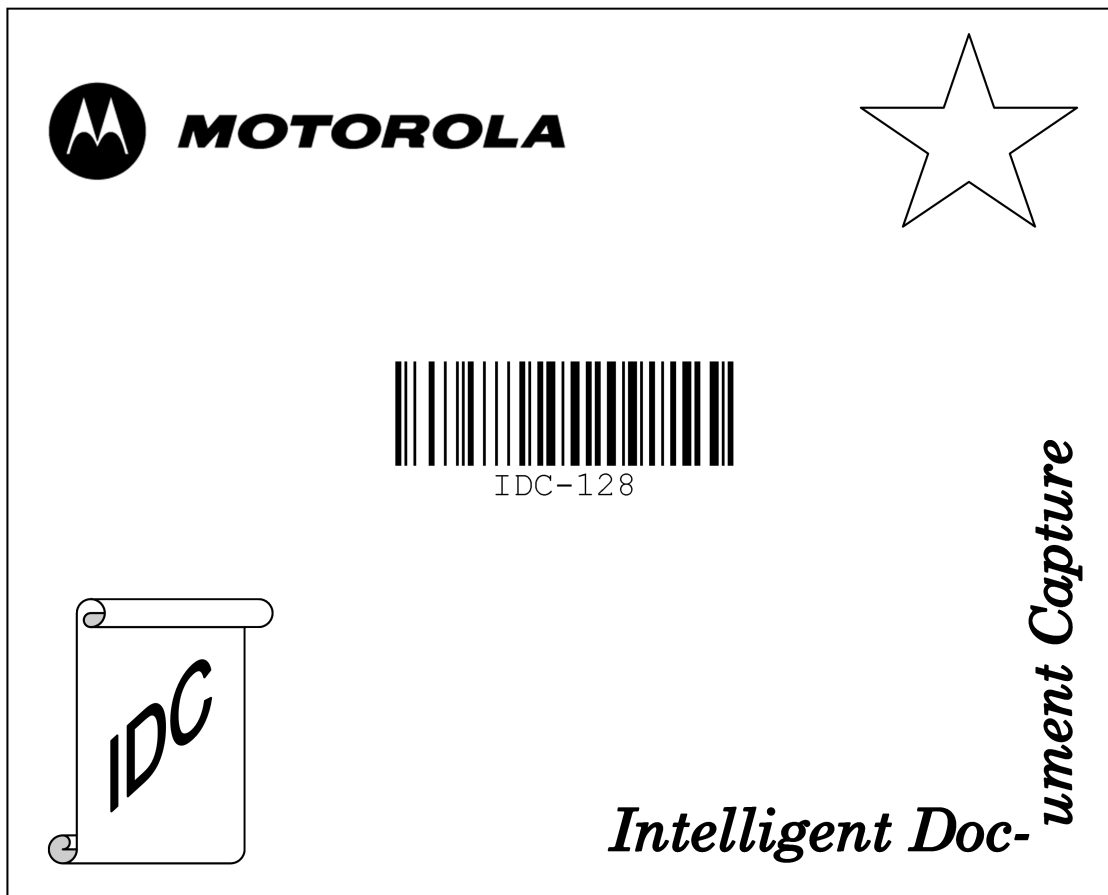


Figure 7-1 Quick Start Form

CHAPTER 8 OCR PROGRAMMING

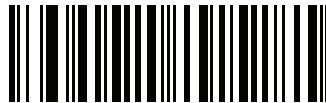
Introduction

This chapter describes how to set up the imager for OCR programming. The imager can read 6 to 60 point OCR typeface. It supports font types OCR-A, OCR-B, MICR-E13B, and US Currency Serial Number.

OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit.

All OCR fonts are disabled by default. Enabling OCR can slow bar code decoding. Enabling more than one OCR font could also slow OCR decoding and impact OCR decoding accuracy.

Throughout the programming bar code menus, asterisks (*) indicate default values.



* Indicates Default — ***Disable OCR-A** — Feature/Option



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

OCR Parameter Defaults

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

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

Table 8-1 OCR Programming Default Table

Parameter	Parameter Number	Default	Page Number
OCR Programming Parameters			
OCR-A	680	Disable	8-3
OCR-A Variant	684	Full ASCII	8-3
OCR-B	681	Disable	8-5
OCR-B Variant	685	Full ASCII	8-6
MICR E13B	682	Disable	8-9
US Currency	683	Disable	8-10
OCR Orientation	687	0°	8-10
OCR Lines	691	1	8-12
OCR Minimum Characters	689	3	8-12
OCR Maximum Characters	690	100	8-13
OCR Subset	686	Selected font variant	8-13
OCR Quiet Zone	695	50	8-14
OCR Template	547	54R	8-15
OCR Check Digit Modulus	688	1	8-24
OCR Check Digit Multiplier	700	1212121212	8-25
OCR Check Digit Validation	694	None	8-26
Inverse OCR	856	Regular	8-31

OCR Programming Parameters

Enable/Disable OCR-A

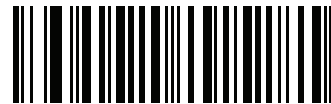
Parameter # 680

To enable or disable OCR-A, scan one of the following bar codes.

- ✓ **NOTE** OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See [OCR Subset on page 8-13](#) and [OCR Template on page 8-15](#).
- ✓ **NOTE** All OCR fonts are disabled by default. Enabling OCR can slow bar code decoding. Enabling more than one OCR font could also slow OCR decoding and impact OCR decoding accuracy.



Enable OCR-A
(1)



*Disable OCR-A
(0)

OCR-A Variant

Parameter # 684

Font variant sets a processing algorithm and default character subset for the given font. To choose a variant, scan one of the following bar codes. Selecting the most appropriate font variant optimizes performance and accuracy.

OCR-A supports the following variants:

- OCR-A Full ASCII
!"#\$()*+,-./0123456789<>ABCDEFGHIJKLMNOPQRSTUVWXYZ^
- OCR-A Reserved 1
\$*+,-./0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ
- OCR-A Reserved 2
\$*+,-./0123456789<>ABCDEFGHIJKLMNOPQRSTUVWXYZ
- OCR-A Banking
-0123456789<> 4 5 6 7 8 9

OCR-A Variant (continued)

Special banking characters output as the following representative characters:

ƒ outputs as f

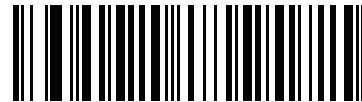
¢ outputs as c

h outputs as h

✓ **NOTE** Enable OCR-A before setting this parameter. If disabling OCR-A, set the variant to its default (OCR-A Full ASCII).



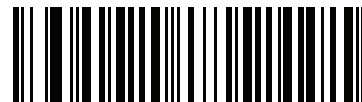
***OCR-A Full ASCII
(0)**



**OCR-A Reserved 1
(1)**



**OCR-A Reserved 2
(2)**



**OCR-A Banking
(3)**

Enable/Disable OCR-B

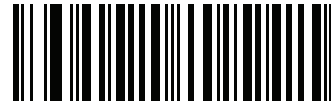
Parameter # 681

To enable or disable OCR-B, scan one of the following bar codes.

- ✓ **NOTE** OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See [OCR Subset on page 8-13](#) and [OCR Template on page 8-15](#).
- ✓ **NOTE** All OCR fonts are disabled by default. Enabling OCR can slow bar code decoding. Enabling more than one OCR font could also slow OCR decoding and impact OCR decoding accuracy.



Enable OCR-B
(1)



*Disable OCR-B
(0)

OCR-B Variant

Parameter # 685

OCR-B has the following variants. Selecting the most appropriate font variant affects performance and accuracy.

- OCR-B Full ASCII
!#\$%()*+,-./0123456789<>ABCDEFGHIJKLMNOPQRSTUVWXYZ^|ñ
- OCR-B Banking
#+-0123456789<>JNP|
- OCR-B Limited
+,-./0123456789<>ACENPSTVX
- OCR-B ISBN 10-Digit Book Numbers
-0123456789>BCEINPSXz
- OCR-B ISBN 10 or 13-Digit Book Numbers
-0123456789>BCEINPSXz
- OCR-B Travel Document Version 1 (TD1) 3-Line ID Cards
-0123456789<ABCDEFGHIJKLMNOPQRSTUVWXYZ
- OCR-B Travel Document Version 2 (TD2) 2-Line ID Cards
-0123456789<ABCDEFGHIJKLMNOPQRSTUVWXYZ
- OCR-B Travel Document 2 or 3-Line ID Cards Auto-Detect
!#\$%()*+,-./0123456789<>ABCDEFGHIJKLMNOPQRSTUVWXYZ^|ñ
- OCR-B Passport
-0123456789<ABCDEFGHIJKLMNOPQRSTUVWXYZñ
- OCR-B Visa Type A
-0123456789<ABCDEFGHIJKLMNOPQRSTUVWXYZ
- OCR-B Visa Type B
-0123456789<ABCDEFGHIJKLMNOPQRSTUVWXYZñ
- OCR-B ICAO Travel Documents
This allows reading either TD1, TD2, Passport, Visa Type A, or Visa Type B without switching between these options. It automatically recognizes the travel document read.

To choose a variant, scan one of the following bar codes. Selecting the following OCR-B variants automatically sets the appropriate [OCR Lines on page 8-12](#). These five variants invoke extensive special algorithms and checking for that particular document type:

Variant	OCR Lines Setting
Passport	2
TD1 ID Cards	3
TD2 ID Cards	2
Visa Type A	2
Visa Type B	2

Selecting one of the ISBN Book Numbers automatically applies the appropriate ISBN checksum, so you do not need to set this.

OCR-B Variant (continued)

For the best performance in passport reading, fix the target passport and the decoder in place (6.5 - 7.5”).

✓ **NOTE** Enable OCR-B before setting this parameter. If disabling OCR-B, set the variant to its default (OCR-B Full ASCII).



***OCR-B Full ASCII
(0)**



**OCR-B Banking
(1)**



**OCR-B Limited
(2)**



**OCR-B ISBN 10-Digit Book Numbers
(6)**



**OCR-B ISBN 10 or 13-Digit Book Numbers
(7)**



**OCR-B Travel Document Version 1 (TD1)
3 Line ID Cards
(3)**

OCR-B Variant (continued)



**OCR-B Travel Document Version 2 (TD2)
2-Line ID Cards
(8)**



**Travel Document 2 or 3-Line ID Cards Auto-Detect
(20)**



**OCR-B Passport
(4)**



**OCR-B Visa Type A
(9)**



**OCR-B Visa Type B
(10)**



**OCR-B ICAO Travel Documents
(11)**

Enable/Disable MICR E13B

Parameter # 682

To enable or disable MICR E13B, scan one of the following bar codes.

MICR E 13B uses the following characters:

0 1 2 3 4 5 6 7 8 9 : ; ' " #

TOAD characters (Transit, On Us, Amount, and Dash) output as the following representative characters:

␣ outputs as t

␣ outputs as a

␣ outputs as o

␣ outputs as d

- ✓ **NOTE** OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See [OCR Subset on page 8-13](#) and [OCR Template on page 8-15](#).
- ✓ **NOTE** All OCR fonts are disabled by default. Enabling OCR can slow bar code decoding. Enabling more than one OCR font could also slow OCR decoding and impact OCR decoding accuracy.



Enable MICR E13B
(1)



*Disable MICR E13B
(0)

Enable/Disable US Currency Serial Number

Parameter # 683

To enable or disable US Currency Serial Number, scan one of the following bar codes.

- ✓ **NOTE** OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See [OCR Subset on page 8-13](#) and [OCR Template on page 8-15](#).
- ✓ **NOTE** All OCR fonts are disabled by default. Enabling OCR can slow bar code decoding. Enabling more than one OCR font could also slow OCR decoding and impact OCR decoding accuracy.



Enable US Currency



***Disable US Currency**

OCR Orientation

Parameter # F1 AFh

Select one of five options to specify the orientation of an OCR string to be read:

- 0° to the imaging engine (default)
- 270° clockwise (or 90° counterclockwise) to the imaging engine
- 180° (upside down) to the imaging engine
- 90° clockwise to the imaging engine
- Omnidirectional

Setting an incorrect orientation can cause misdecodes.

OCR Orientation (continued)

***OCR Orientation 0°
(0)**



**OCR Orientation 270° Clockwise
(1)**



**OCR Orientation 180° Clockwise
(2)**



**OCR Orientation 90° Clockwise
(3)**



**OCR Orientation Omnidirectional
(4)**

OCR Lines

Parameter # 691

To select the number of OCR lines to decode, scan one of the following bar codes. Selecting Visas, TD1, or TD2 ID cards automatically sets the appropriate **OCR Lines**. Also see [OCR-B Variant on page 8-6](#).



***OCR 1 Line
(1)**



**OCR 2 Lines
(2)**



**OCR 3 Lines
(3)**

OCR Minimum Characters

Parameter # 689

To select the minimum number of OCR characters (not including spaces) per line to decode, scan the following bar code, then scan a three-digit number between 003 and 100 using the bar codes in [Appendix G, Numeric Bar Codes](#) representing the number of OCR characters to decode. Strings of OCR characters less than the minimum are ignored. The default is 003.



OCR Minimum Characters

OCR Maximum Characters

Parameter # 690

To select the maximum number of OCR characters (including spaces) per line to decode, scan the following bar code, then scan a three-digit number between 003 and 100 using the bar codes in [Appendix G, Numeric Bar Codes](#) representing the number of OCR characters to decode. Strings of OCR characters greater than the maximum are ignored. The default is 100.



OCR Maximum Characters

OCR Subset

Parameter # 686

Set an OCR subset to define a custom group of characters in place of a preset font variant. For example, if scanning only numbers and the letters A, B, and C, create a subset of just these characters to speed decoding. This applies a designated OCR Subset across all enabled OCR fonts.

To set or modify the OCR font subset, first enable the appropriate OCR font(s). Next, scan the following bar code, then scan numbers and letters to form the OCR Subset from the alphanumeric keyboard in the *Advanced Data Formatting Guide*. Then scan **End of Message** in the *Advanced Data Formatting Guide*.



OCR Subset

To cancel an OCR subset, for OCR-A or OCR-B, scan OCR-A variant **Full ASCII**, or OCR-B variant **Full ASCII**.

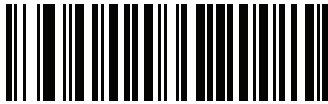
For MICR E13B or US Currency Serial Number, create a subset which includes all allowed characters in that character set, or scan an option from the [Default Parameters on page 4-5](#) and re-program the imager.

OCR Quiet Zone

Parameter # 695

This option sets the OCR quiet zone. The imager stops scanning a field when it detects a sufficiently wide blank space. The width of this space is defined by the End of Field option. Used with parsers that tolerate slanted characters, the End of Field count is roughly a count of 8 for a character width. For example if set to 15, then two character widths are an end of line indicator for the parser. Larger end of field numbers require bigger quiet zones at each end of text line.

To set a quiet zone, scan the following bar code, then scan a two-digit number using the numeric keypad in the *Advanced Data Formatting Guide*. The range of the quiet zone is 20 - 99 and the default is 50, indicating a six character width quiet zone.



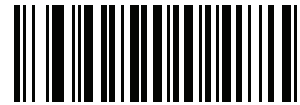
OCR Quiet Zone

OCR Template

Parameter # 547

This option creates a template for precisely matching scanned OCR characters to a desired input format. Carefully constructing an OCR template eliminates scanning errors.

To set or modify the OCR decode template, scan the [OCR Template](#) bar code, then bar codes corresponding to numbers and letters on the following pages to form the template expression. Then scan **End of Message** in the *Advanced Data Formatting Guide*. The default is **54R** which accepts any character OCR strings.



OCR Template



End of Message

Required Digit (9)



9

Only a numeric character is allowed in this position.

Template	Valid data	Valid data	Invalid data
99999	12987	30517	123AB

Required Alpha (A)



A

Only an alpha character is allowed in this position.

Template	Valid data	Valid data	Invalid data
AAA	ABC	WXY	12F

Require and Suppress (0)

It is required that any character in this position, including space or reject, is suppressed from the output.

Template	Incoming data	Output
990AA	12QAB	12AB

Optional Alphanumeric (1)**1**

When this option appears in the template string, the data validator accepts an alphanumeric character if present. Optional characters are not allowed as the first character(s) in a field of like characters.

Template	Valid data	Valid data	Invalid data
99991	1234A	12345	1234<

Optional Alpha (2)**2**

When this option appears in the template string, the data validator accepts an alpha character if present. Optional characters are not allowed as the first character(s) in a field of like characters.

Template	Valid data	Valid data	Invalid data
AAAA2	ABCDE	WXYZ	ABCD6

Alpha or Digit (3)**3**

The data validator requires an alphanumeric character in this position to validate the incoming data.

Template	Valid data	Valid data	Invalid data
33333	12ABC	WXYZ4	12AB<

Any Including Space & Reject (4)

4

The template accepts any character in this position, including space and reject. Rejects are represented as an underscore (_) in the output. This is a good selection for troubleshooting.

Template	Valid data	Valid data
99499	12\$34	34_98

Any except Space & Reject (5)

5

The template accepts any character in this position except a space or reject.

Template	Valid data	Valid data	Invalid data
55999	A.123	*Z456	A BCD

Optional Digit (7)

7

When this option appears in the template string, the template accepts a numeric character if present. Optional characters are not allowed as the first character(s) in a field of like characters.

Template	Valid data	Valid data	Invalid data
99977	12345	789	789AB

Digit or Fill (8)**8**

The data validator accepts any numeric or fill character in this position.

Template	Valid data	Valid data	Valid data
88899	12345	>>789	<<789

Alpha or Fill (F)**F**

The data validator accepts any alpha or fill character in this position.

Template	Valid data	Valid data	Valid data
AAAFF	ABCXY	LMN>>	ABC<5

Optional Space ()**Space**

When this option appears in the template string, the template accepts a space if present. Optional characters are not allowed as the first character(s) in a field of like characters.

Template	Valid data	Valid data	Invalid data
99 99	12 34	1234	67891

Optional Small Special (.)



.

When this option appears in the template string, the data validator accepts a special character if present. Optional characters are not allowed as the first character(s) in a field of like characters. Small special characters are - , and .

Template	Valid data	Valid data	Invalid data
AA.99	MN.35	XY98	XYZ12

Other Template Operators

These template operators assist in capturing, delimiting, and formatting scanned OCR data.

Literal String (" and +)



"



+

Use either of these delimiting characters surrounding characters from the alphanumeric keyboard in the *Advanced Data Formatting Guide* to define a literal string within a template that must be present in scanned OCR data. There are two characters used to delimit required literal strings; if one of the delimiter characters is present in the desired literal string, use the other delimiter.

Template	Valid data	Invalid data
"35+BC"	35+BC	AB+22

New Line (E)**E**

To create a template of multiple lines, add **E** between the template of each single line.

Template	Valid data	Valid data	Invalid data
999EAAAA	321	987	XYZW
	BCAD	ZXYW	12

String Extract (C)**C**

This operator combined with others defines a string of characters to extract from the scanned data. The string extract is structured as follows:

CbPe

Where:

- **C** is the string extract operator
- **b** is the string begin delimiter
- **P** is the category (one or more numeric or alpha characters) describing the string representation
- **e** is the string end delimiter

Values for **b** and **e** can be any scannable character. They are included in the output stream.

Template	Incoming data	Output
C>A>	XQ3>ABCDE>	>ABCDE>
	->ATHRUZ>123	>ATHRUZ>
	1ABCZXYZ	No Output

Ignore to End of Field (D)**D**

This operator causes all characters after a template to be ignored. Use this as the last character in a template expression. Examples for the template 999D:

Template	Incoming data	Output
999D	123-PED	123
	357298	357
	193	193

Skip Until (P1)**P****1**

This operator allows skipping over characters until a specific character type or a literal string is detected. It can be used in two ways:

P1ct

Where:

- P1 is the Skip Until operator
- c is the type of character that triggers the start of output
- t is one or more template characters

P1"s"t

Where:

- P1 is the Skip Until operator
- "s" is one or more literal string characters (see [Literal String \(" and +\) on page 8-19](#)) that trigger the start of output
- t is one or more template characters

The trigger character or literal string is included in output from a Skip Until operator, and the first character in the template should accommodate this trigger.

Template	Incoming data	Output
P1 "PN"AA9999	123PN9876	PN9876
	PN1234	PN1234
	X-PN3592	PN3592

Skip Until Not (P0)



P



0

This operator allows skipping over characters until a specific character type or a literal string is not matched in the output stream. It can be used in two ways:

P0ct

Where:

- P0 is the Skip Until Not operator
- c is the type of character that triggers the start of output
- t is one or more template characters

P0"s"t

Where:

- P0 is the Skip Until Not operator
- "s" is one or more literal string characters (see [Literal String \(" and +\) on page 8-19](#)) that trigger the start of output
- t is one or more template characters

The trigger character or literal string is not included in output from a Skip Until Not operator.

Template	Incoming data	Output
P0A9999	BPN3456	3456
	PN1234	1234
	5341	No output

Template	Incoming data	Output
P0 "PN" 9999	PN3456	3456
	5341	No output
	PNPN7654	7654

Repeat Previous (R)



R

This operator allows a template character to repeat one or more times, allowing the capture of variable-length scanned data. The following examples capture two required alpha characters followed by one or more required digits:

Template	Incoming data	Output
AA9R	AB3	AB3
	PN12345	PN12345
	32RM52700	No output

Scroll Until Match (S)



S

This operator steps through scanned data one character at a time until the data matches the template.

Template	Incoming data	Output
S99999	AB3	No Output
	PN12345	12345
	32RM52700	52700

Multiple Templates

This feature sets up multiple templates for OCR decoding. To do this, follow the procedure described in [OCR Template on page 8-15](#) (scan the [OCR Template](#) bar code, then bar codes corresponding to numbers and letters to form the template expression, then **End of Message**) for each template in the multiple template string, using a capital letter **X** as a separator between the templates.

For example, set the [OCR Template](#) as **99999XAAAAA** to decode OCR strings of either **12345** or **ABCDE**.

Template Examples

Following are sample templates with descriptions of valid data for each definition.

Field Definition	Description
"M"99977	M followed by three digits and two optional digits.
"X"997777"X"	X followed by two digits, four optional digits, and an X .
9959775599	Two digits followed by any character, a digit, two optional digits, any two characters, and two digits.
A55"-"999"-"99	A letter followed by two characters, a dash, three digits, a dash, and two digits.
33A"."99	Two alphanumeric characters followed by a letter, a period, and two digits.
999992991	Five digits followed by an optional alpha, two digits, and an optional alphanumeric.
"PN98"	Literal field - PN98

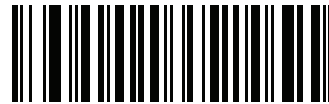
OCR Check Digit Modulus

Parameter # 688

This option sets OCR module check digit calculation. The check digit is the last digit (in the right most position) in an OCR string and improves the accuracy of the collected data. The check digit is the end product of a calculation made on the incoming data. For check digit calculation, for example Modulus 10, alpha and numeric characters are assigned numeric weights (see [OCR Check Digit Multiplier on page 8-25](#)). The calculation is applied to the character weights and the resulting check digit is added to the end of the data. If the incoming data does not match the check digit, the data is considered corrupt.

The selected check digit option does not take effect until you set **OCR Check Digit Validation**.

To choose the check digit modulus, such as 10 for modulo 10, scan the following bar code, then scan a three-digit number from 001 to 099 representing the check digit using the numeric keypad in the *Advanced Data Formatting Guide*. The default is 1.



OCR Check Digit

OCR Check Digit Multiplier

Parameter # 700

This option sets OCR check digit multipliers for the character positions. For check digit validation, each character in scanned data has an equivalent weight used in the check digit calculation. DS4800 OCR ships with the following weight equivalents:

0 = 0	A = 10	K = 20	U = 30
1 = 1	B = 11	L = 21	V = 31
2 = 2	C = 12	M = 22	W = 32
3 = 3	D = 13	N = 23	X = 33
4 = 4	E = 14	O = 24	Y = 34
5 = 5	F = 15	P = 25	Z = 35
6 = 6	G = 16	Q = 26	Space = 0
7 = 7	H = 17	R = 27	
8 = 8	I = 18	S = 28	
9 = 9	J = 19	T = 29	

All other characters are equivalent to one (1).

You can define the multiplier string if it is different from the default.

121212121212 (default)

123456789A (for ISBN, Product Add Right to Left. See [OCR Check Digit Validation on page 8-26](#))

For example:

ISBN	0	2	0	1	1	8	3	9	9	4	
Multiplier	10	9	8	7	6	5	4	3	2	1	
Product	0	18	0	7	6	40	12	27	18	4	
Product add	0+	18+	0+	7+	6+	40+	12+	27+	18+	4=	132

ISBN uses modulo 11 for its check digit. In this case, 132 is divisible by 11, so it passes the check digit.

To set the check digit multiplier, scan the following bar code, then scan numbers and letters to form the multiplier string from the alphanumeric keyboard in the *Advanced Data Formatting Guide*. Then scan **End of Message** in the *Advanced Data Formatting Guide*.



OCR Check Digit Multiplier

OCR Check Digit Validation

Parameter # 694

Use **OCR Check Digit Validation** to protect against scanning errors by applying a check digit validation scheme. The following is a list of options.

None

No check digit validation, indicating no check digit is applied. This is the default.



***No Check Digit
(0)**

Product Add Left to Right

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 8-25](#)). Each digit representing a character in the scanned data is multiplied by its corresponding digit in the multiplier, and the sum of these products is computed. The check digit passes if this sum modulo check digit modulus is zero.

Example:

Scanned data numeric value is 132456 (check digit is 6)

Check digit multiplier string is 123456

Digit	1	3	2	4	5	6
Multiplier	1	2	3	4	5	6
Product	1	6	6	16	25	36
Product add	1+	6+	6+	16+	25+	36= 90

The check digit modulus is 10. It passes because 90 is divisible by 10 (the remainder is zero).



**Product Add Left to Right
(3)**

Product Add Right to Left

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 8-25](#)). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of these products is computed. The check digit passes if this sum modulo check digit modulus is zero.

Example:

Scanned data numeric value is 132459 (check digit is 9)

Check digit multiplier string is 123456

Digit	1	3	2	4	5	9
Multiplier	6	5	4	3	2	1
Product	6	15	8	12	10	9
Product add	6+	15+	8+	12+	10+	9= 60

The check digit modulus is 10. It passes because 60 is divisible by 10 (the remainder is 0).



**Product Add Right to Left
(1)**

Digit Add Left to Right

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 8-25](#)). Each value representing a character in the scanned data is multiplied by its corresponding digit in the multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products is then calculated. The check digit passes if this sum modulo check digit modulus is zero.

Example:

Scanned data numeric value is 132456 (check digit is 6)

Check digit multiplier string is 123456

Digit	1	3	2	4	5	6
Multiplier	1	2	3	4	5	6
Product	1	6	6	16	25	36
Digit add	1+	6+	6+	1+6+	2+5+	3+6= 36

The check digit modulus is 12. It passes because 36 is divisible by 12 (the remainder is 0).



**Digit Add Left to Right
(4)**

Digit Add Right to Left

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 8-25](#)). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products is then calculated. The check digit passes if this sum modulo check digit modulus is zero.

Example:

Scanned data numeric value is 132456 (check digit is 6)

Check digit multiplier string is 123456

Digit	1	3	2	4	5	6	
Multiplier	6	5	4	3	2	1	
Product	6	15	8	12	10	6	
Digit add	6+	1+5+	8+	1+2+	1+0+	6=	30

The check digit modulus is 10. It passes because 30 is divisible by 10 (the remainder is 0).



**Digit Add Right to Left
(2)**

Product Add Right to Left Simple Remainder

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 8-25](#)). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of these products **except for the check digit's product** is computed. The check digit passes if this sum modulo check digit modulus is equal to the check digit's product.

Example:

Scanned data numeric value is 122456 (check digit is 6)

Check digit multiplier string is 123456

Digit	1	2	2	4	5	6	
Multiplier	6	5	4	3	2	1	
Product	6	10	8	12	10	6	
Product add	6+	10+	8+	12+	10=	46	6

The check digit modulus is 10. It passes because 46 divided by 10 leaves a remainder of 6.



**Product Add Right to Left Simple Remainder
(5)**

Digit Add Right To Left Simple Remainder

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 8-25](#)). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products **except for the check digit's product** is then calculated. The check digit passes if this sum modulo check digit modulus is equal to the check digit's product.

Example:

Scanned data numeric value is 122459 (check digit is 6)

Check digit multiplier string is 123456

Digit	1	2	2	4	5	9
Multiplier	6	5	4	3	2	1
Product	6	10	8	12	10	9
Digit add	6+	1+0+	8+	1+2+	1+0=	19 9

The check digit modulus is 10. It passes because 19 divided by 10 leaves a remainder of 9.



Digit Add Right to Left Simple Remainder
(6)

Health Industry - HIBCC43

This is the health industry module 43 check digit standard. The check digit is the modulus 43 sum of all the character values in a given message, and is printed as the last character in a given message.

Example:

Supplier Labelling Data Structure: + A 1 2 3 B J C 5 D 6 E 7 1

Sum of values: $41+10+1+2+3+11+19+12+5+13+6+14+7+1 = 145$

Divide 145 by 43. The quotient is 3 with a remainder of 16. The check digit is the character corresponding to the value of the remainder (see [Table 8-2](#)), which in this example is 16, or **G**. The complete Supplier Labelling Data Structure, including the check digit, therefore is:

A 1 2 3 B J C 5 D 6 E 7 1 G

Table 8-2 Table of Numeric Value Assignments for Computing HIBC LIC Data Format Check Digit

0 = 0	9 = 9	I = 18	R = 27	- = 36
1 = 1	A = 10	J = 19	S = 28	. = 37
2 = 2	B = 11	K = 20	T = 29	Space = 38
3 = 3	C = 12	L = 21	U = 30	\$ = 39
4 = 4	D = 13	M = 22	V = 31	/ = 40
5 = 5	E = 14	N = 23	W = 32	+ = 41
6 = 6	F = 15	O = 24	X = 33	% = 42
7 = 7	G = 16	P = 25	Y = 34	
8 = 8	H = 17	Q = 26	Z = 35	



Health Industry - HIBCC43

(9)

Inverse OCR

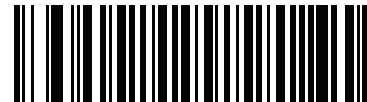
Parameter # 856

Inverse OCR is white or light words on a black or dark background. Select an option for decoding inverse OCR:

- **Regular Only** - decode regular OCR (black on white) strings only.
- **Inverse Only** - decode inverse OCR (white on black) strings only.
- **Autodiscriminate** - decodes both regular and inverse OCR strings.



***Regular Only**
(0)



Inverse Only
(1)



Autodiscriminate
(2)

CHAPTER 9 DRIVER'S LICENSE SET UP (DS4801-DL)

Introduction

The DS4801-DL digital imager is capable of parsing out information from standard US driver's licenses and certain other American Association of Motor Vehicle Administrators (AAMVA) compliant ID cards. This is achieved using internally embedded algorithms, where scanning bar codes activates algorithms internally embedded in the digital imager to produce formatted data. Use the formatted data for age verification, credit card application information, and more.

This chapter describes how to program the DS4801-DL digital imager to read and use the data contained in the 2D bar codes on US driver's licenses and AAMVA compliant ID cards.

Table 9-1 *DL Parsing Parameter Table*

Parameter	Default	Page Number
DL Parsing Parameters		
Driver's License Parsing	No Driver's License Parsing	9-2
Parsing Driver's License Data Fields	N/A	9-3
Driver's License Parse Field Bar Codes	N/A	9-4
AAMVA Parse Field Bar Codes	N/A	9-7
Set Default Parameter	N/A	9-17
Output Gender as M or F	N/A	9-17
Date Format	CCYYMMDD	9-18
No Separator	N/A	9-19
Send Keystroke	N/A	9-20
Control Characters		9-20
Keyboard Characters		9-24
Parsing Rule Example	N/A	9-39
Embedded Driver's License Parsing ADF Example	N/A	9-44

Driver's License Parsing

To enable driver's license parsing on the digital imager, scan the **Embedded Driver's License Parsing** bar code. This does not require Motorola software (.DLL).

Scan the bar codes on the following pages in the order indicating the sequence of data fields that the digital imager outputs. See [Parsing Driver's License Data Fields \(Embedded Driver's License Parsing\) on page 9-3](#) for more information.

As jurisdictional updates become available, Motorola updates a series of bar codes on the Motorola Web site: <http://www.motorola.com/enterprisemobility/support>.

These bar codes contain embedded software. Scanning these in conjunction with the bar codes on [page 9-4](#) download jurisdictional software updates to the digital imager. The updates reside in the digital imager's flash memory and apply when the digital imager is next used.



*No Driver's License Parsing



Embedded Driver's License Parsing

Parsing Driver's License Data Fields (Embedded Driver's License Parsing)

To begin programming a parsing rule:

1. Scan [Begin New Driver's License Parse Rule on page 9-4](#).
2. Scan any of the field bar codes on the following pages, or [Send Keystroke \(Control Characters and Keyboard Characters\) on page 9-20](#) to complete the parsing rule.
3. After entering the entire rule, scan [Save Driver's License Parse Rule on page 9-4](#) to save the rule.

✓ **NOTE** Only ONE driver's license parsing rule may be stored in memory at any time. Saving a new rule replaces the prior rule.

To abort the programming sequence at any time during programming, scan [Quit Entering Driver's License Rule on page 9-4](#). Any previously saved rule is retained.

To erase a programmed saved rule, scan [Erase Driver's License Parse Rules on page 9-4](#).

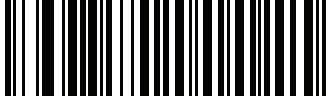
Embedded Driver's License Parsing Criteria - Code Type

After specifying the fields and their order for the parsed driver's license, you can also apply standard ADF rules to the parsed data using the **Parsed Driver's License** criterion bar code in the *Advanced Data Formatting Programmer Guide*.

✓ **NOTE** Only create standard ADF rules on parsed driver's license data when configured for Embedded Driver's License Parsing.

See [Embedded Driver's License Parsing ADF Example on page 9-44](#) for a sample ADF rule using this code type criterion.

Driver's License Parse Field Bar Codes



Begin New Driver's License Parse Rule



Save Driver's License Parse Rule



Quit Entering Driver's License Rule



Erase Driver's License Parse Rules

Driver's License Parse Field Bar Codes (continued)

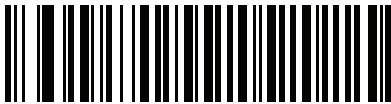
The parse fields currently supported begin below. Not all IDs present data in the same format. For example, some IDs may have separate fields for first name, last name, and middle initial, and others may have a single field with the entire name. In addition, some IDs may expire on the subject's birth date and the actual expiration date field may only indicate the year. In order to present data in a consistent format, the following nine bar codes return data that may be calculated from the actual data contained within the ID bar code.



First Name



Middle Name/Initial



Last Name



Name Suffix



Name Prefix

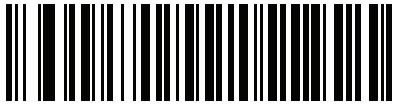


Expiration Date



Birth Date

Driver's License Parse Field Bar Codes (continued)

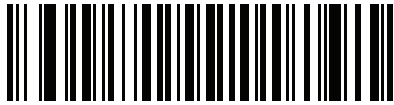


Issue Date

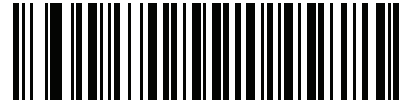


ID Number (Formatted)

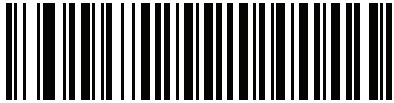
AAMVA Parse Field Bar Codes



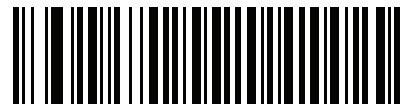
AAMVA Issuer ID



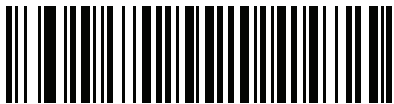
Full Name



Last Name



First Name



Middle Name / Initial



Name Suffix

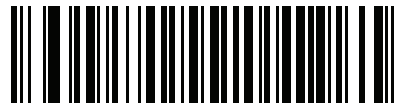


Name Prefix

AAMVA Parse Field Bar Codes (continued)



Mailing Address Line 1



Mailing Address Line 2



Mailing Address City



Mailing Address State



Mailing Address Postal Code

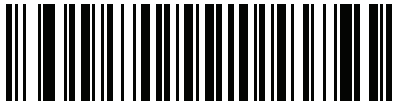


Home Address Line 1

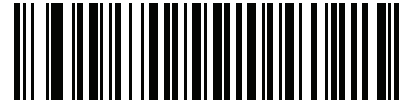


Home Address Line 2

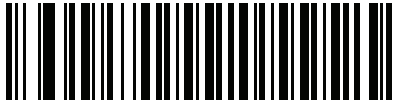
AAMVA Parse Field Bar Codes (continued)



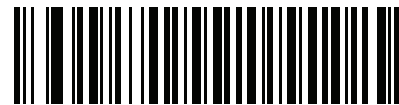
Home Address City



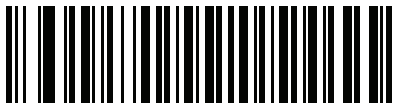
Home Address State



Home Address Postal Code



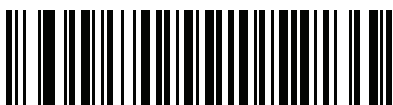
License ID Number



License Class



License Restrictions

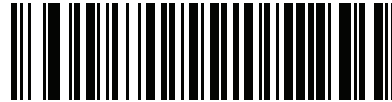


License Endorsements

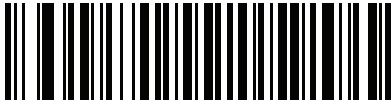
AAMVA Parse Field Bar Codes (continued)



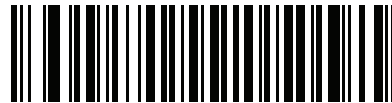
Height (Feet and/or Inches)



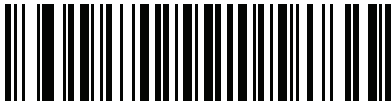
Height (Centimeters)



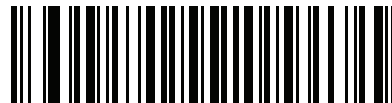
Weight (Pounds)



Weight (Kilograms)



Eye Color

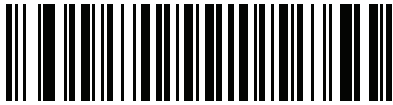


Hair Color

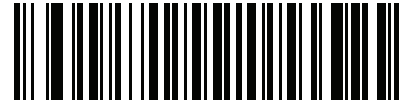


License Expiration Date

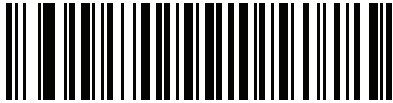
AAMVA Parse Field Bar Codes (continued)



Birth Date



Gender



License Issue Date



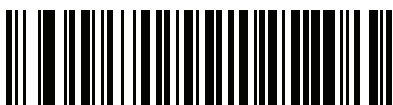
License Issue State



Social Security Number



Permit Class

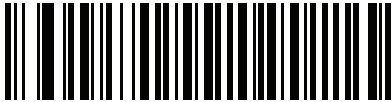


Permit Expiration Date

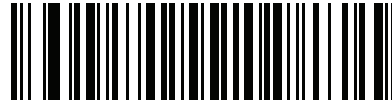
AAMVA Parse Field Bar Codes (continued)



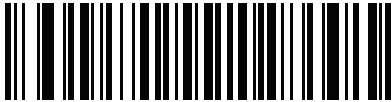
Permit ID Number



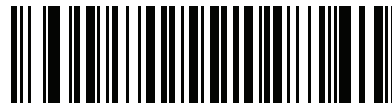
Permit Issue Date



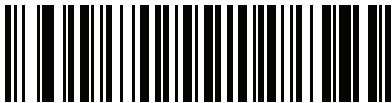
Permit Restrictions



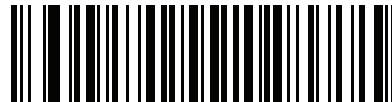
Permit Endorsements



AKA Social Security Name



AKA Full Name

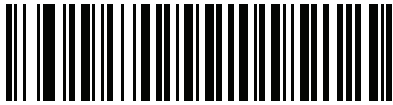


AKA Last Name



AKA First Name

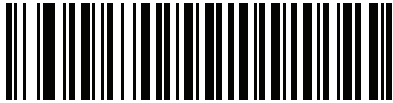
AAMVA Parse Field Bar Codes (continued)



AKA Middle Name / Initial



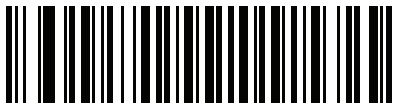
AKA Name Suffix



AKA Name Prefix



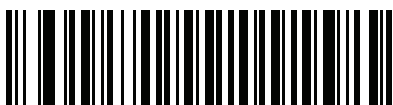
AKA Birth Date



Issue Timestamp



Number of Duplicates

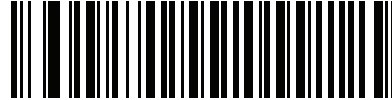


Medical Codes

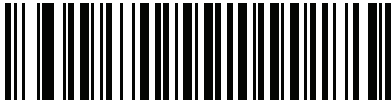
AAMVA Parse Field Bar Codes (continued)



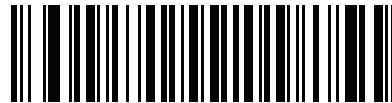
Organ Donor



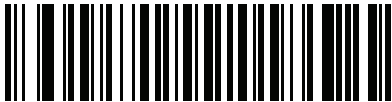
Nonresident



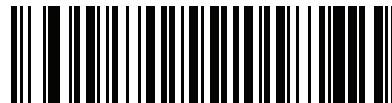
Customer ID



Weight Range



Document Discriminator

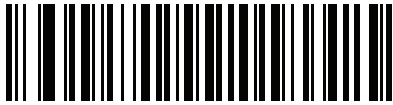


Country

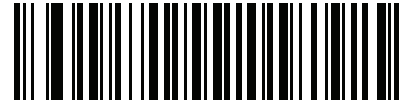


Federal Commission Codes

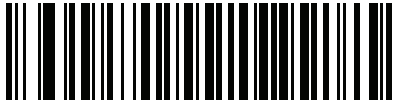
AAMVA Parse Field Bar Codes (continued)



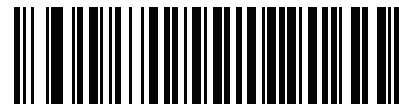
Place of Birth



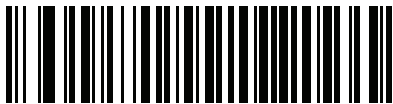
Audit Information



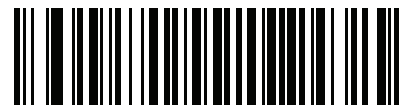
Inventory Control



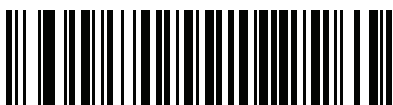
Race / Ethnicity



Std Vehicle Class



Std Endorsements

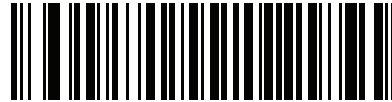


Std Restrictions

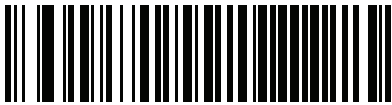
AAMVA Parse Field Bar Codes (continued)



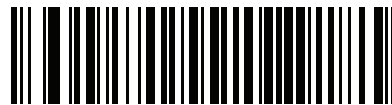
Class Description



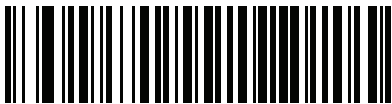
Endorsement Description



Restrictions Description



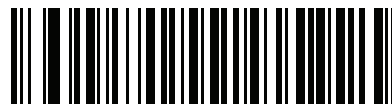
Height in Inches



Height in Centimeters

Parser Version ID Bar Codes

Include this field to emit embedded parser software version identification



Parser Version ID

User Preferences

Set Default Parameter

Scan this bar code to return all parameters to the default values listed in [Table A on page A-1](#).



*Set All Defaults

Output Gender as M or F

Scan this bar code to report the gender as **M** or **F** instead of a numeric value.



Output gender as M or F

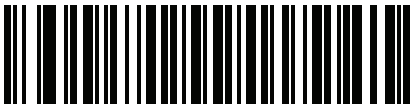
Date Format

Use these bar codes to select the date format that is displayed. Date fields include the following:

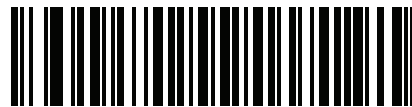
- **CCYY** = 4-digit year (**CC**=2-digit century [00-99], **YY**=2-digit year in the century [00-99])
- **MM** = 2-digit month [01-12]
- **DD** = 2-digit day of the month [00-31]

The default is Date Format **CCYYMMDD**.

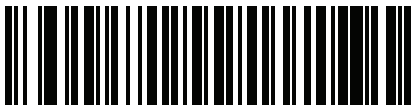
- ✓ **NOTE** To specify a date separator, i.e., a character separating each field of the date, scan the **Send <character>** bar code that corresponds to the alphanumeric character to use as the date separator immediately following the date format bar code. To select no date separator, scan the **No Separator** DL parsing rule immediately following the date format bar code.



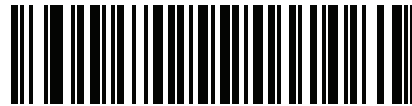
*CCYYMMDD



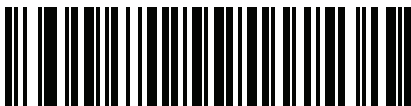
CCYYDDMM



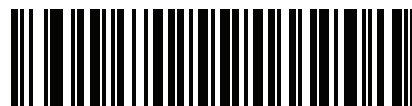
MMDDCCYY



MMCCYYDD

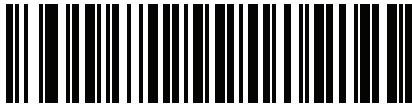


DDMMCCYY

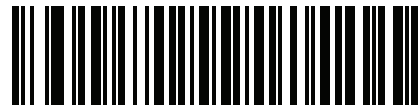


DDCCYYMM

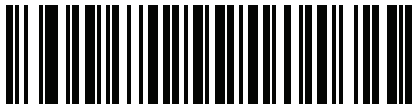
Date Format (continued)



YYMMDD



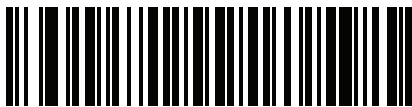
YYDDMM



MMDDYY



MMYYDD



DDMMYY



DDYYMM

No Separator

Scan this bar code immediately following a date format bar code to use no separator character between the date fields.



No Separator

Send Keystroke (Control Characters and Keyboard Characters)

Control Characters

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



Send Control A



Send Control B



Send Control C



Send Control D



Send Control E



Send Control F



Send Control G



Send Control H

Control Characters (continued)



Send Control I



Send Control J



Send Control K



Send Control L



Send Control M



Send Control N



Send Control O



Send Control P

Control Characters (continued)



Send Control Q



Send Control R



Send Control S



Send Control T



Send Control U



Send Control V



Send Control W

Control Characters (continued)



Send Control X



Send Control Y



Send Control Z



Send Control [



**Send Control **



Send Control]

Control Characters (continued)



Send Control 6



Send Control -

Keyboard Characters

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



Send Space



Send !



Keyboard Characters (continued)



Send \$



Send %



Send &



Send '



Send (



Send)



Send *

Keyboard Characters (continued)



Send +



Send ,



Send -



Send .



Send /



Send 0



Send 1

Keyboard Characters (continued)



Send 2



Send 3



Send 4



Send 5



Send 6



Send 7



Send 8

Keyboard Characters (continued)



Send 9



Send :



Send ;



Send <



Send =



Send >



Send ?

Keyboard Characters (continued)



Send @



Send A



Send B



Send C



Send D



Send E



Send F

Keyboard Characters (continued)



Send G



Send H



Send I



Send J



Send K



Send L



Send M

Keyboard Characters (continued)



Send N



Send O



Send P



Send Q



Send R



Send S



Send T

Keyboard Characters (continued)



Send U



Send V



Send W



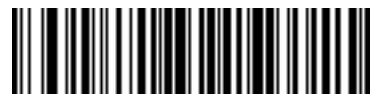
Send X



Send Y



Send Z



Send [

Keyboard Characters (continued)



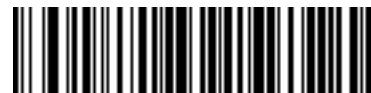
Send \



Send]



Send ^



Send _



Send `



Send a



Send b

Keyboard Characters (continued)



Send c



Send d



Send e



Send f



Send g



Send h



Send i

Keyboard Characters (continued)



Send j



Send k



Send l



Send m



Send n



Send o



Send p

Keyboard Characters (continued)



Send q



Send r



Send s



Send t



Send u



Send v



Send w

Keyboard Characters (continued)



Send x



Send y



Send z



Send {



Send |



Send }



Send ~

Keyboard Characters (continued)



Send Tab Key



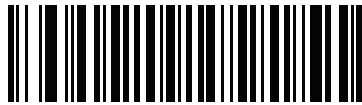
Send Enter Key

Parsing Rule Example

Scan the following bar codes in sequence to program the digital imager to extract and transmit first, middle, and last names; mailing address line 1; mailing address line 2; mailing address city; mailing address state; mailing address postal code; and, date of birth. Then, scan a driver's license bar code.

✓ **NOTE** This example applies to RS-232. To use this example with a USB interface, enable [Function Key Mapping on page 3-10](#) in place of the **Send Control M (Carriage Return)** bar codes.

1



Embedded Driver's License Parsing

2



Begin New Driver's License Parse Rule

3



First Name

4



Send Space

5



Middle Name / Initial

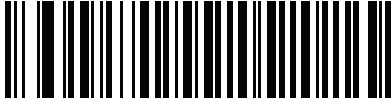
6



Send Space

Parsing Rule Example (continued)

7



Last Name

8



Send Enter Key

9



Mailing Address Line 1

10



Send Space

11



Mailing Address Line 2

12



Send Enter Key

Parsing Rule Example (continued)

13



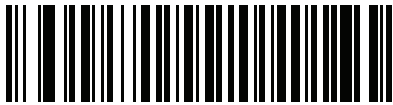
Mailing Address City

14



Send Space

15



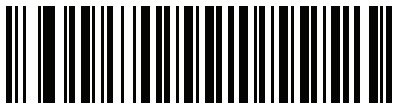
Mailing Address State

16



Send Space

17



Mailing Address Postal Code

Parsing Rule Example (continued)

18



Send Enter Key

19



Birth Date

20



Send Enter Key

21



Save Driver's Licence Parse Rule

Embedded Driver's License Parsing ADF Example

This example creates a parsing rule for parsed data configured to result in the format:

Last Name, First Name

1



Begin New Driver's License Parse Rule

2



Last Name

3



Send ,

4



Send Space

5



First Name

6



Save Driver's Licence Parse Rule

Then, in order to limit the full name to 15 characters, create the following ADF rule:

1



Begin New Rule

2



Criterion: Parsed Driver's License

3



Action: Send Next 15 Characters

4



Save Rule

For a license belonging to Michael Williams, the parsed data is Williams, Michael and Williams, Micha after applying the previous ADF rule.

CHAPTER 10 123SCAN2

Introduction

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

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

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

Communication with 123Scan²

To communicate with the 123Scan² program which runs on a host computer running a Windows XP SP2 or Windows 7 operating system, use a USB cable to connect the scanner to the host computer.

123Scan² Requirements

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

For more information on 123Scan², go to:

<http://www.motorolasolutions.com/123Scan>

For a 1 minute tour of 123Scan², go to:

<http://www.motorolasolutions.com/scannerhowtovideos>

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

<http://support.symbol.com/support/product/123Scan2.html>

Scanner SDK, Other Software Tools, and Videos

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

- 123Scan2 configuration utility (described in this chapter)
- Scanner SDK for Windows
- How-to videos
- Virtual COM port driver
- OPOS driver
- JPOS driver
- Scanner user documentation.

CHAPTER 11 ADVANCED DATA FORMATTING

Introduction

Advanced Data Formatting (ADF) is a means of customizing data before transmission to the host device. Use ADF to edit scan data to suit requirements. Implement ADF by scanning a related series of bar codes which program the imager with ADF rules.

For information and programming bar codes for ADF, refer to the *Advanced Data Formatting Programmer Guide*, p/n 72E-69680-xx.

CHAPTER 12 MAINTENANCE & TECHNICAL SPECIFICATIONS

Introduction

This chapter provides suggested imager maintenance, troubleshooting, and technical specifications.

Maintenance

Known Harmful Ingredients

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

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

Approved Cleaning Agents

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

- Pre-moistened wipes
- Isopropyl alcohol 70%

Cleaning the Imager

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

To clean the imager:

1. Dampen a soft cloth with one of the approved cleaning agents listed above or use pre-moistened wipes.
2. Gently wipe all surfaces, including the front, back, sides, top and bottom. Never apply liquid directly to the imager. Be careful not to let liquid pool around the imager window, trigger, cable connector or any other area on the device.
3. Do not spray water or other cleaning liquids directly into the exit window.
4. Wipe the imager exit window with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.
5. Immediately dry the imager after cleaning with a soft non-abrasive cloth to prevent streaking.
6. Allow the unit to air dry before use.

Troubleshooting

Table 12-1 *Troubleshooting*

Problem	Possible Causes	Possible Solutions
The aiming dot does not appear when touching the trigger.	No power to the imager.	Connect the imager to a powered USB host.
	Imager is disabled.	For USB IBM hand-held, IBM table top, and OPOS modes, enable the imager via the host interface.
	Aiming dot is disabled.	Enable the aiming dot. See Hand-Held Decode Aiming Pattern on page 4-18 .
Imager emits short low/short medium/short high beep sequence (power-up beep sequence) more than once.	The USB bus may put the imager in a state where power to the imager is cycled on and off more than once.	Normal during host reset.
Imager emits aiming dot, but does not decode the bar code.	Imager is not programmed for the correct bar code type.	Program the imager to read that type of bar code. See Chapter 6, Symbologies .
	Bar code symbol is unreadable.	Scan test symbols of the same bar code type to determine if the bar code is defaced.
	The symbol is out of the aiming dot area.	Move the aiming dot over the symbol.
Imager emits 4 short high beeps during decode attempt.	Imager has not completed USB initialization.	Wait several seconds and scan again.
Imager decodes bar code, but does not transmit the data to the host.	If the imager emits 4 long low beeps, a transmission error occurred.	Set the imager's communication parameters to match the host's setting.
	If the imager emits 5 low beeps, a conversion or format error occurred.	Configure the imager's conversion parameters properly.
	If the imager emits low/high/low beeps, it detected an invalid ADF rule.	Program the correct ADF rules. Refer to the <i>Advanced Data Formatting Programmer Guide</i> .
Host displays scanned data incorrectly.	Imager is not programmed to work with the host.	Program the proper editing options (e.g., UPC-E to UPC-A Conversion).

Table 12-1 *Troubleshooting (Continued)*

Problem	Possible Causes	Possible Solutions
Imager emits low/high beeps during programming.	Input error or Cancel bar code was scanned.	Scan the correct numeric bar codes within range for the parameter programmed.
Imager emits low/high/low/high beeps during programming.	Out of ADF parameter storage space.	Erase all rules and re-program with shorter rules.
Imager emits a power-up beep after changing USB host type.	The USB bus re-established power to the imager.	Normal when changing USB host type.



NOTE If after performing these checks the imager still experiences problems, contact the distributor or call Motorola Solutions support. See [page xvii](#) for the telephone numbers.

Technical Specifications

Table 12-2 *Technical Specifications*

Item	Description
Physical Characteristics	
Dimensions	7.47 in L x 2.61 in W x 1.90 in H (19.0 cm L x 6.6 cm W x 4.8 H)
Weight	6 oz (168 g) including cable, cable weight = 2 oz (53g)
Voltage and Current	5VDC +- 10% @ 360 mA (RMS Typical)
Power Source	USB VBUS
Color	Alpine White & Midnight Black
Supported host interfaces	USB
Keyboard Support	Supports over 90 international keyboards
Performance Characteristics	
Skew Tolerance	86° (measured using 100% UPC-A; +/-3 degree accuracy)
Pitch Tolerance	82° (measured using 100% UPC-A; +/-3 degree accuracy)
Roll Tolerance	360°
Motion Tolerance	Up to 20 in/sec
Light Source	Aiming: 606 nm LED Illumination: 640 nm LED
Imager Field of View	40° (H) X 26° (V) nominal
Minimum Print Contrast	20%
User Environment	
Ambient Light Immunity	Max 108,000 lux
Operating Temperature	0° to 40° C (32° to 104° F)
Storage Temperature	-40° to 70° C (-40° to 158° F)
Humidity	5% to 95% RH, non condensing
Drop Specification	Withstands multiple 5 foot (1.5 m) drops to concrete
Tumble Testing	250 cycles (500 drops) in 1/2 meter tumbler
Environmental Sealing	IP40

Table 12-2 Technical Specifications (Continued)

Item	Description
Bar Code Symbologies	<p>1D UPC/EAN, UPC/EAN with supplementals, Bookland EAN, ISSN, UCC Coupon Extended Code, Code 128, GS1-128, ISBT 128, Code 39, Code 39 Full ASCII, Trioptic Code 39, Code 32, Code 93, Code 11, Matrix 2 of 5, Interleaved 2 of 5, Discrete 2 of 5, Codabar, MSI, Chinese 2 of 5, GS1 DataBar variants, Korean 3 of 5, ISBT Concatenated</p> <p>2D PDF417, MicroPDF417, Composite Codes, TLC-39, Data Matrix, Maxicode, QR Code, MicroQR, Aztec, Han Xin</p> <p>Postal Australia Post, US PLANET, Royal Mail 4 State Customer, US POSTNET, KIX Code (Dutch), UK Postal, Japan Post, UPU 4 State Postal FICS (Post US4), USPS 4 State Postal (Post US3)</p>
Decode Ranges (Typical)*	
3 mil (Code 39)	0.8 - 4.7 in (2.03 - 11.94 cm)
4 mil (Code 39)	0 - 8.5 in (0 - 21.59 cm)
5 mil (Code 39)	0 - 10.0 in (0 - 25.40 cm)
7.5 mil (Code 39)	0 - 15.5 in (0 - 39.37 cm)
13 mil (100% UPC-A)	0 - 22.4 in (0 - 56.90 cm)
20 mil (Code 39)	0 - 36.0 in (0 - 91.44 cm)
26 mil (200% UPC-A)	0 - 47.6 in (0 - 120.94 cm)
100 mil reflective	0 - 175.0 in (0 - 444.50 cm)
5 mil (PDF 417)	0.8 - 6.2 in (2.03 - 15.75 cm)
10 mil (Data Matrix)	0.3 - 8.5 in (0.76 - 21.59 cm)
* Field of view limited	
Utilities and Management	123Scan ² , Scanner Management Services (SMS), Motorola Scanner SDK
Accessories	Hands-free Intellistand

APPENDIX A STANDARD DEFAULT PARAMETERS

Table A-1 *Standard Default Parameters Table*

Parameter	Parameter Number	Default	Page Number
USB Host Parameters			
USB Device Type	N/A	HID Keyboard Emulation	3-4
Symbol Native API (SNAPI) Status Handshaking	N/A	Enable	3-6
USB Keystroke Delay	N/A	No Delay	3-6
USB CAPS Lock Override	N/A	Disable	3-7
USB Ignore Unknown Characters	N/A	Enable	3-7
USB Convert Unknown to Code 39	N/A	Disable	3-8
Emulate Keypad	N/A	Enable	3-8
Emulate Keypad with Leading Zero	N/A	Enable	3-9
Quick Keypad Emulation	N/A	Enable	3-9
USB FN1 Substitution	N/A	Disable	3-10
Function Key Mapping	N/A	Disable	3-10
Simulated Caps Lock	N/A	Disable	3-11
Convert Case	N/A	None	3-11
USB Polling Interval	N/A	3 msec	3-12
USB Fast HID	N/A	Enable	3-13
USB Static CDC	N/A	Enable	3-14

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
Ignore Beep	N/A	Enable	3-15
Ignore Bar Code Configuration	N/A	Enable	3-15
IBM Specification Version	N/A	Original Specification	3-16
USB Toshiba TEC Host Parameters			
Code Type Table Usage	N/A	Use Table 0 Identifier	3-17
Include Symbol Types	N/A	Add Symbol Types	3-18
Include Character Counts	N/A	Add Character Counts	3-18
Include Header	N/A	Add Header Character	3-18
Include Terminator	N/A	Add Terminator Character (s)	3-19
Header Character	N/A	n/a	3-19
Terminator Character	N/A	Add ETX	3-20
Light LED on Good Decode	N/A	Light LED on Good Decode	3-20
Good Decode Beep Timer	N/A	Indicate Before Transmission	3-21
Toshiba TEC QR Pre-Scan Parsing	N/A	Enable	3-22
Toshiba TEC QR Pre-Scan Parsing Transmit Interval	N/A	0 msec (No Delay)	3-22
User Preferences			
Set Default Parameter	N/A	Set Defaults	4-5
Report Version	N/A	N/A	4-6
Parameter Bar Code Scanning	236	Enable	4-6
Beep After Good Decode	56	Enable	4-7
Direct Decode Indicator	859	Disable	4-8
Speaker Volume	140	High	4-9
Scan Tone	145	Wood Block / Scan Tone 1	4-10
Suppress Power Up Beeps	721	Do Not Suppress	4-12
LED on Good Decode	744	Enable	4-12
Haptic Feedback (Vibrate) on Good Decode	613	Disable	4-13
Haptic Feedback (Vibrate) on Good Decode Duration	626	100 msec	4-14
Haptic Feedback (Vibrate) on Trigger Touch	1251	Enable	4-16

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
Tone on Trigger Touch	1252	Disable	4-16
Hand-Held Trigger Mode	138	Auto Aim	4-17
Hand-Held Decode Aiming Pattern	306	Enable	4-18
Hands-Free (Presentation) Decode Aiming Pattern	590	Enable Hands-Free (Presentation) Decode Aiming Pattern on PDF	4-19
Picklist Mode	402	Disabled Always	4-20
Continuous Bar Code Read	649	Disable	4-21
Unique Bar Code Reporting	723	Enable	4-21
Decode Session Timeout	136	9.9 Sec	4-22
Timeout Between Decodes, Same Symbol	137	0.5 Sec	4-22
Timeout Between Decodes, Different Symbols	144	0.1 sec	4-23
Fuzzy 1D Processing	514	Enable	4-23
Decode Mirror Images (Data Matrix Only)	537	Auto	4-24
Mobile Phone/Display Mode	716	Normal	4-25
PDF Prioritization	719	Disable	4-26
PDF Prioritization Timeout	720	200 ms	4-26
Presentation Mode Field of View	609	Full	4-27
Decoding Illumination	298	Enable	4-28
Low Light Scene Detection	810	Aiming Dot Low Light Assist Scene Detection	4-29
Motion Tolerance (Hand-Held Trigger Mode Only)	858	Less Motion Tolerance	4-30
Miscellaneous Options			
Transmit Code ID Character	45	None	4-31
Prefix Value	99, 105	7013 <CR><LF>	4-32
Suffix 1 Value Suffix 2 Value	98, 104 100, 106	7013 <CR><LF>	4-32
Scan Data Transmission Format	235	Data as is	4-33
FN1 Substitution Values	103, 109	7013 <CR><LF>	4-34
Transmit "No Read" Message	94	Disable	4-35
Unsolicited Heartbeat Interval	1118	Disable	4-36

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
Imaging Preferences			
Operational Modes	N/A	N/A	5-4
Image Capture Illumination	361	Enable	5-5
Snapshot Mode Timeout	323	0 (30 seconds)	5-6
Snapshot Aiming Pattern	300	Enable	5-6
Image Cropping	301	Disable	5-7
Crop to Pixel Addresses	315 316 317 318	0 top 0 left 799 bottom 1279 right	5-8
Image Size (Number of Pixels)	302	Full	5-9
Image Brightness (Target White)	390	180	5-10
JPEG Image Options	299	Quality	5-10
JPEG Target File Size	561	160 kB	5-11
JPEG Quality Value	305	65	5-11
Image Enhancement	564	Low (1)	5-12
Image File Format Selection	304	JPEG	5-13
Image Rotation	665	0	5-14
Bits per Pixel (BPP)	303	8 BPP	5-15
Signature Capture	93	Disable	5-16
Signature Capture Image File Format Selection	313	JPEG	5-17
Signature Capture Bits per Pixel (BPP)	314	8 BPP	5-18
Signature Capture Width	366	400	5-19
Signature Capture Height	367	100	5-19
Signature Capture JPEG Quality	421	65	5-19

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
Symbologies			
Enable/Disable All Code Types			6-7
1D Symbologies			
UPC/EAN			
UPC-A	1	Enable	6-8
UPC-E	2	Enable	6-8
UPC-E1	12	Disable	6-9
EAN-8/JAN-8	4	Enable	6-9
EAN-13/JAN-13	3	Enable	6-10
Bookland EAN	83	Disable	6-10
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	16	Ignore	6-11
User-Programmable Supplementals		000	6-14
Supplemental 1:	579		
Supplemental 2:	580		
UPC/EAN/JAN Supplemental Redundancy	80	10	6-14
Decode UPC/EAN/JAN Supplemental AIM ID	672	Combined	6-15
Transmit UPC-A Check Digit	40	Enable	6-16
Transmit UPC-E Check Digit	41	Enable	6-16
Transmit UPC-E1 Check Digit	42	Enable	6-17
UPC-A Preamble	34	System Character	6-18
UPC-E Preamble	35	System Character	6-19
UPC-E1 Preamble	36	System Character	6-20
Convert UPC-E to A	37	Disable	6-21
Convert UPC-E1 to A	38	Disable	6-21
EAN-8/JAN-8 Extend	39	Disable	6-22
Bookland ISBN Format	576	ISBN-10	6-22
UCC Coupon Extended Code	85	Disable	6-23
Coupon Report	730	New Coupon Format	6-23
ISSN EAN	617	Disable	6-24

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
Code 128			
Code 128	8	Enable	6-25
Set Length(s) for Code 128	209, 210	1 to 55	6-25
GS1-128 (formerly UCC/EAN-128)	14	Enable	6-27
ISBT 128	84	Enable	6-27
ISBT Concatenation	577	Autodiscriminate	6-28
Check ISBT Table	578	Enable	6-29
ISBT Concatenation Redundancy	223	10	6-29
Code 128 Security Level	751	Security Level 1	6-30
Code 39			
Code 39	0	Enable	6-31
Trioptic Code 39	13	Disable	6-31
Convert Code 39 to Code 32 (Italian Pharmacy Code)	86	Disable	6-32
Code 32 Prefix	231	Disable	6-32
Set Length(s) for Code 39	18, 19	1 to 55	6-33
Code 39 Check Digit Verification	48	Disable	6-34
Transmit Code 39 Check Digit	43	Disable	6-34
Code 39 Full ASCII Conversion	17	Disable	6-35
Code 39 Security Level	750	Security Level 1	6-36
Code 93			
Code 93	9	Enable	6-37
Set Length(s) for Code 93	26, 27	1 to 55	6-37
Code 11			
Code 11	10	Disable	6-39
Set Lengths for Code 11	28, 29	4 to 55	6-39
Code 11 Check Digit Verification	52	Disable	6-41
Transmit Code 11 Check Digit(s)	47	Disable	6-42

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
Interleaved 2 of 5 (ITF)			
Interleaved 2 of 5 (ITF)	6	Enable	6-43
Set Lengths for I 2 of 5	22, 23	6 to 55	6-43
I 2 of 5 Check Digit Verification	49	Disable	6-45
Transmit I 2 of 5 Check Digit	44	Disable	6-46
Convert I 2 of 5 to EAN 13	82	Disable	6-46
I 2 of 5 Security Level	1121	Security Level 1	6-47
Discrete 2 of 5 (DTF)			
Discrete 2 of 5	5	Disable	6-48
Set Length(s) for D 2 of 5	20, 21	1 to 55	6-48
Codabar (NW - 7)			
Codabar	7	Enable	6-50
Set Lengths for Codabar	24, 25	4 to 55	6-50
CLSI Editing	54	Disable	6-52
NOTIS Editing	55	Disable	6-52
Codabar Upper or Lower Case Start/Stop Characters Detection	855	Upper Case	6-53
MSI			
MSI	11	Disable	6-54
Set Length(s) for MSI	30, 31	4 to 55	6-54
MSI Check Digits	50	One	6-56
Transmit MSI Check Digit	46	Disable	6-56
MSI Check Digit Algorithm	51	Mod 10/Mod 10	6-57
Chinese 2 of 5			
Chinese 2 of 5	408	Disable	6-58
Matrix 2 of 5			
Matrix 2 of 5	618	Disable	6-59
Matrix 2 of 5 Lengths	619, 620	4 to 55	6-59
Matrix 2 of 5 Check Digit	622	Disable	6-61
Transmit Matrix 2 of 5 Check Digit	623	Disable	6-61

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
Korean 3 of 5			
Korean 3 of 5	581	Disable	6-62
Inverse 1D	586	Regular	6-63
GS1 DataBar			
GS1 DataBar-14	338	Enable	6-64
GS1 DataBar Limited	339	Enable	6-64
GS1 DataBar Expanded	340	Enable	6-65
Convert GS1 DataBar to UPC/EAN	397	Disable	6-65
GS1 DataBar Limited Security Level	728	Level 3	6-66
Composite			
Composite CC-C	341	Disable	6-67
Composite CC-A/B	342	Disable	6-67
Composite TLC-39	371	Disable	6-68
UPC Composite Mode	344	Never Linked	6-68
Composite Beep Mode	398	Beep As Each Code Type is Decoded	6-69
GS1-128 Emulation Mode for UCC/EAN Composite Codes	427	Disable	6-69
Postal Codes			
US Postnet	89	Disable	6-70
US Planet	90	Disable	6-70
Transmit US Postal Check Digit	95	Enable	6-71
UK Postal	91	Disable	6-71
Transmit UK Postal Check Digit	96	Enable	6-72
Japan Postal	290	Disable	6-72
Australia Post	291	Disable	6-73
Australia Post Format	718	Autodiscriminate	6-74
Netherlands KIX Code	326	Disable	6-75
USPS 4CB/One Code/Intelligent Mail	592	Disable	6-75
UPU FICS Postal	611	Disable	6-76

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
2D Symbologies			
PDF417	15	Enable	6-77
MicroPDF417	227	Disable	6-77
Code 128 Emulation	123	Disable	6-78
Data Matrix	292	Enable	6-79
Data Matrix Inverse	588	Inverse Autodetect	6-79
Maxicode	294	Disable	6-80
QR Code	293	Enable	6-80
QR Inverse	587	Regular	6-81
MicroQR	573	Enable	6-81
Aztec	574	Enable	6-82
Aztec Inverse	589	Inverse Autodetect	6-82
Han Xin	1167	Disable	6-83
Han Xin Inverse	1168	Regular	6-83
Symbology-Specific Security Levels			
Redundancy Level	78	1	6-84
Security Level	77	1	6-86
Intercharacter Gap Size	381	Normal	6-87
Report Version			6-87
Macro PDF			
Flush Macro PDF Buffer	N/A		6-88
Abort Macro PDF Entry	N/A		6-88
Intelligent Document Capture (IDC)			
IDC Operating Mode	594	Off	7-5
IDC Symbology	655	001	7-6
IDC X Coordinate	596	-151	7-7
IDC Y Coordinate	597	-050	7-7
IDC Width	598	0300	7-8
IDC Height	599	0050	7-8
IDC Aspect	595	000	7-9

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
IDC File Format Selector	601	JPEG	7-9
IDC Bits Per Pixel	602	8 BPP	7-10
IDC JPEG Quality	603	065	7-10
IDC Find Box Outline	727	Disable	7-11
IDC Minimum Text Length	656	00	7-11
IDC Maximum Text Length	657	00	7-12
IDC Captured Image Brighten	654	Enable	7-12
IDC Captured Image Sharpen	658	Enable	7-13
IDC Border Type	829	None	7-14
IDC Delay Time	830	000	7-15
IDC Zoom Limit	651	000	7-15
IDC Maximum Rotation	652	00	7-16
OCR Programming Parameters			
OCR-A	680	Disable	8-3
OCR-A Variant	684	Full ASCII	8-3
OCR-B	681	Disable	8-5
OCR-B Variant	685	Full ASCII	8-6
MICR E13B	682	Disable	8-9
US Currency	683	Disable	8-10
OCR Orientation	687	0°	8-10
OCR Lines	691	1	8-12
OCR Minimum Characters	689	3	8-12
OCR Maximum Characters	690	100	8-13
OCR Subset	686	Selected font variant	8-13
OCR Quiet Zone	695	50	8-14
OCR Template	547	54R	8-15
OCR Check Digit Modulus	688	1	8-24
OCR Check Digit Multiplier	700	1212121212	8-25
OCR Check Digit Validation	694	None	8-26

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

Table A-1 Standard Default Parameters Table (Continued)

Parameter	Parameter Number	Default	Page Number
Inverse OCR	856	Regular	8-31
DL Parsing Parameters			
Driver's License Parsing	N/A	No Driver's License Parsing	8-10
Parsing Driver's License Data Fields	N/A	N/A	8-10
Driver's License Parse Field Bar Codes	N/A	N/A	8-10
AAMVA Parse Field Bar Codes	N/A	N/A	9-7
Set Default Parameter	N/A	N/A	9-17
Output Gender as M or F	N/A	N/A	9-17
Date Format	N/A	CCYYMMDD	9-18
No Separator	N/A	N/A	9-19
Send Keystroke	N/A	N/A	9-20
Control Characters			9-20
Keyboard Characters			9-24
Parsing Rule Example	N/A	N/A	9-39
Embedded Driver's License Parsing ADF Example	N/A	N/A	9-44

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

APPENDIX B COUNTRY CODES

Introduction

This chapter provides bar codes for programming the country keyboard type, and applies only to the USB keyboard (HID) device. For host setup information, see [Host Connection on page 1-3](#) and [Chapter 3, USB Interface](#).

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

USB Country Keyboard Types (Country Codes)

Scan the bar code corresponding to the keyboard type. This setting applies only to the USB Keyboard (HID) device. If the keyboard type is not listed, see [Emulate Keypad on page 3-8](#) for the USB HID host.



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

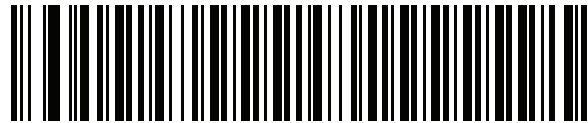


NOTE For best results when using international keyboards, enable [Quick Keypad Emulation on page 3-9](#).

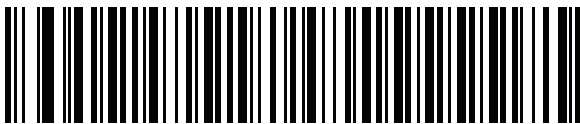


IMPORTANT 1. Some country keyboard bar code types are specific to certain Windows Operating Systems (i.e., XP, and Win 7 or higher). Bar codes requiring a specific Windows OS are noted in their bar code captions.

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



***US English (North American)**



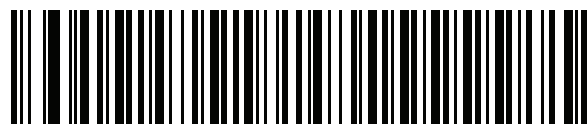
US English (Mac)



Albanian

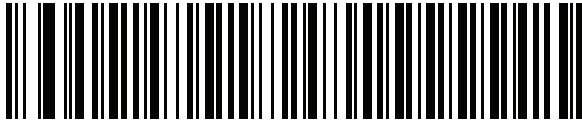


Arabic (101)

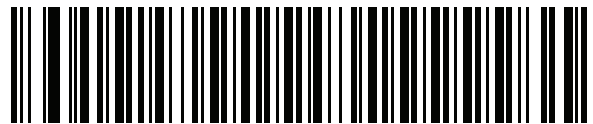


Arabic (102)

Country Codes (Continued)



Arabic (102) AZERTY



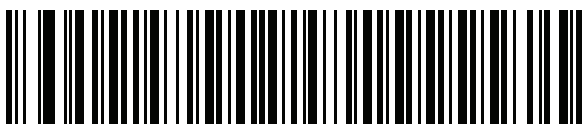
Azeri (Latin)



Azeri (Cyrillic)



Belarusian



Bosnian (Latin)

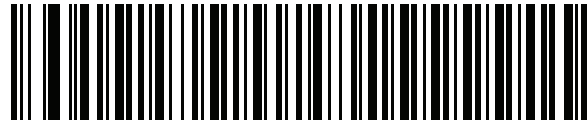


Bosnian (Cyrillic)

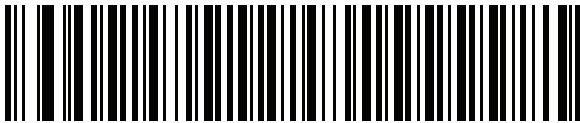


Bulgarian (Latin)

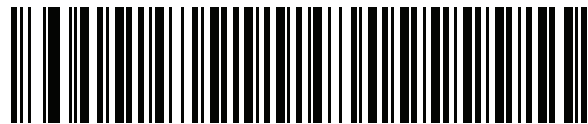
Country Codes (Continued)



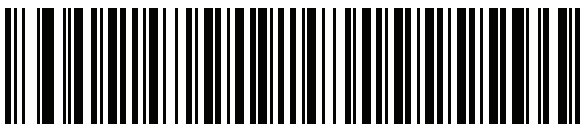
**Bulgarian Cyrillic (Typewriter)
(Bulgarian -Windows XP
Typewriter - Win 7 or higher)**



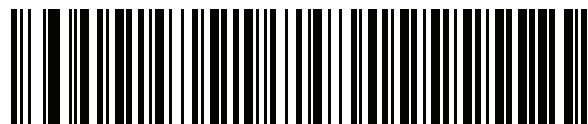
Canadian French Win7



Canadian French (Legacy)



Canadian Multilingual Standard

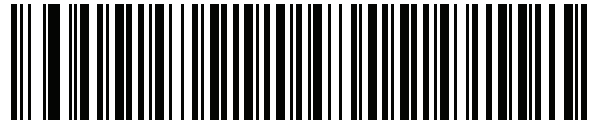


Chinese (ASCII)

Country Codes (Continued)

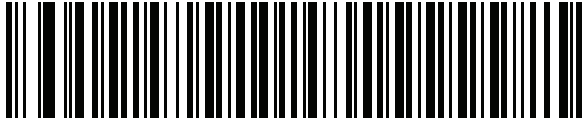


Chinese (Simplified)*



Chinese (Traditional)*

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



Croatian



Czech



Czech (Programmer)

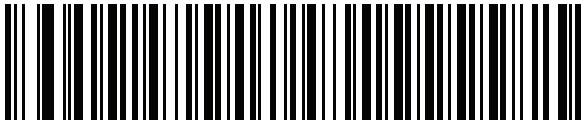


Czech (QWERTY)

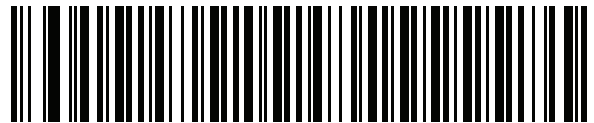


Danish

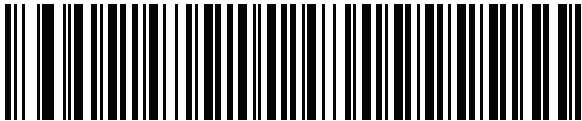
Country Codes (Continued)



Dutch (Netherlands)



Estonian



Faeroese



Finnish



French (France)



French International
(Belgian French)



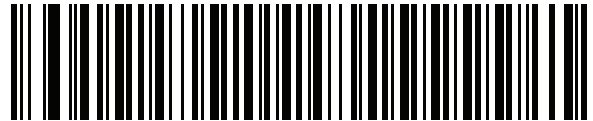
French (Canada) 95/98

Country Codes (Continued)



French (Canada) 2000/XP*

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



Galician



German



Greek Latin



Greek (220) Latin

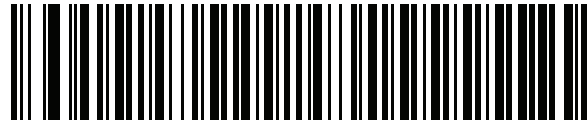


Greek (319) Latin

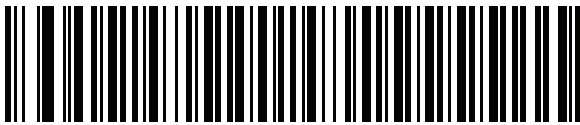


Greek

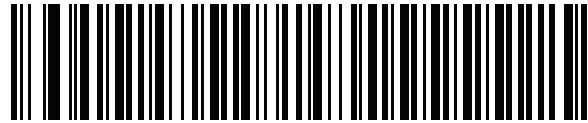
Country Codes (Continued)



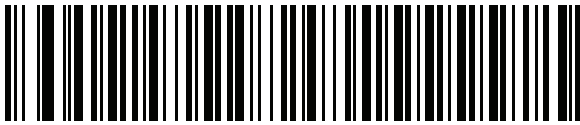
Greek (220)



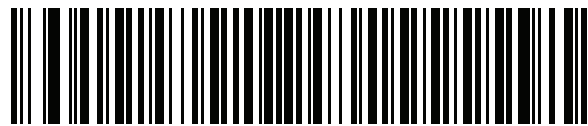
Greek (319)



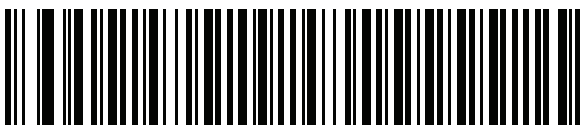
Greek Polytonic



Hebrew Israel



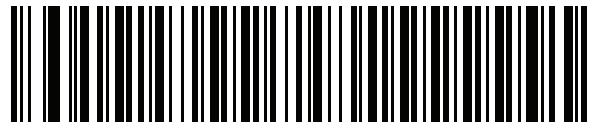
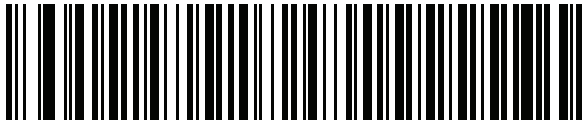
Hungarian



Hungarian_101KEY



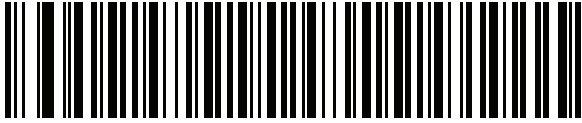
Icelandic

Country Codes (Continued)**Irish****Italian****Italian (142)****Japanese (ASCII)****Japanese (SHIFT-JIS)***

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

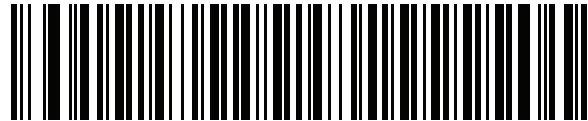
**Kazakh****Korean (ASCII)**

Country Codes (Continued)

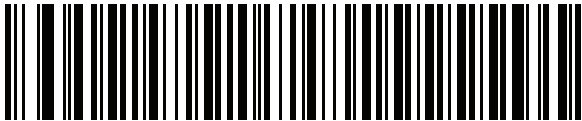


Korean (Hangul)*

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



Kyrgyz



Latin American



Latvian



Latvian (QWERTY)

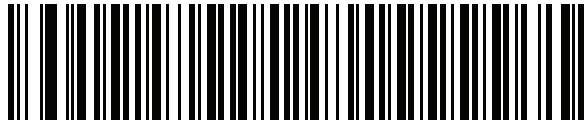


Lithuanian



Lithuanian (IBM)

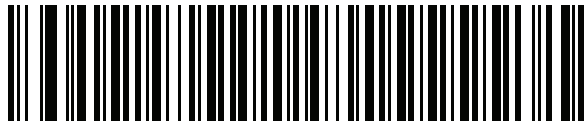
Country Codes (Continued)



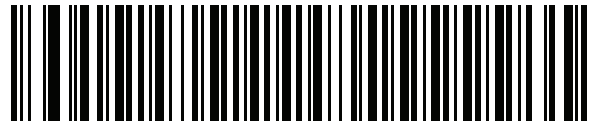
Macedonian (FYROM)



Maltese_47KEY



Mongolian



Norwegian



Polish (214)

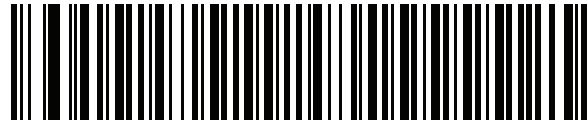


Polish (Programmer)

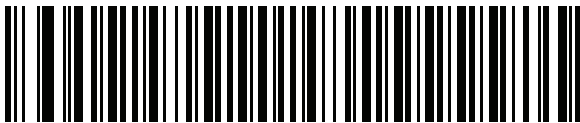


Portuguese (Brazil)
(Windows XP)

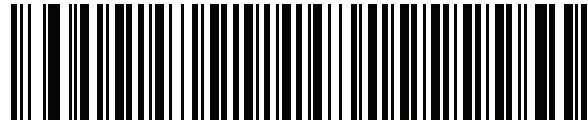
Country Codes (Continued)



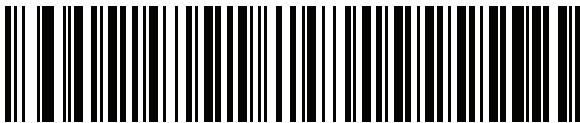
Portuguese (Brazilian ABNT)



Portuguese (Brazilian ABNT2)



Portuguese (Portugal)



Romanian
(Windows XP)

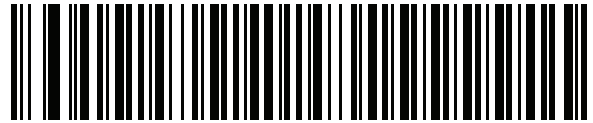


Romanian (Legacy)
(Win 7 or higher)

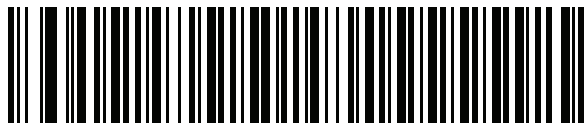


Romanian (Standard)
(Win 7 or higher)

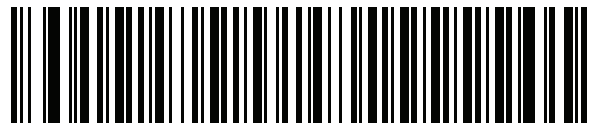
Country Codes (Continued)



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



Russian



Russian (Typewriter)



Serbian (Latin)

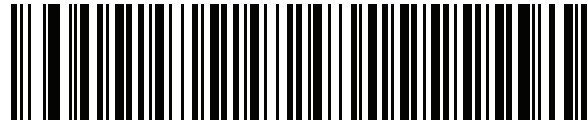


Serbian (Cyrillic)



Slovak

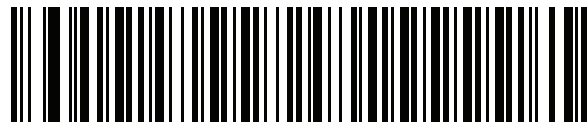
Country Codes (Continued)



Slovak (QWERTY)



Slovenian



Spanish



Spanish (Variation)



Swedish

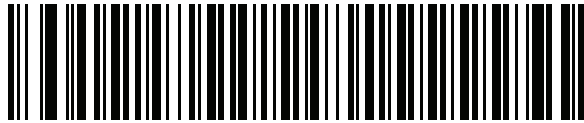


Swiss French

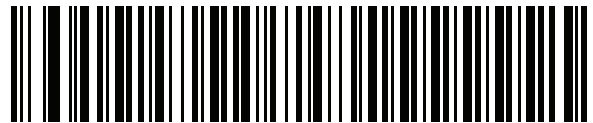


Swiss German

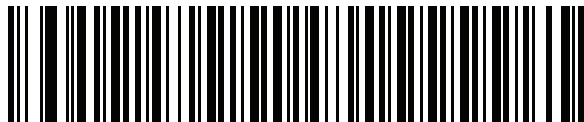
Country Codes (Continued)



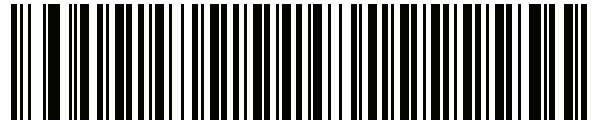
Tatar



Thai (Kedmanee)



Turkish F



Turkish Q



UK English

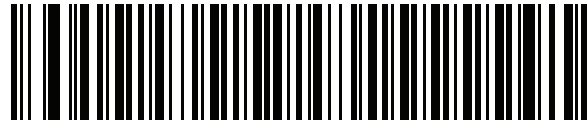


Ukrainian

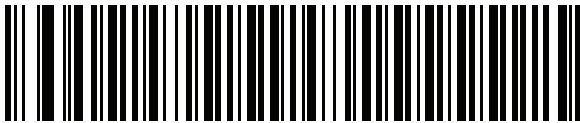


US Dvorak

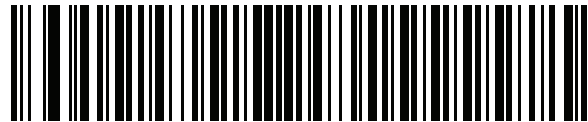
Country Codes (Continued)



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 B, Country Codes](#). If the default code page in [Table C-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 C-1](#) lists the code page default for each country keyboard.

Table C-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

Table C-1 Country Code Page Defaults

Country Keyboard	Code Page Default
Bosnian Cyrillic	Windows 1251
Bulgarian Latin	Windows 1250
Bulgarian Cyrillic	Windows 1251
Canadian French Win7	Windows 1252
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

Table C-1 Country Code Page Defaults

Country Keyboard	Code Page Default
Hebrew Israel	Windows 1255
Hungarian	Windows 1250
Hungarian_101KEY	Windows 1250
Icelandic	Windows 1252
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

Table C-1 Country Code Page Defaults

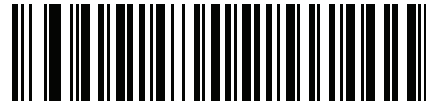
Country Keyboard	Code Page Default
Romanian Programmer	Windows 1250
Russian	Windows 1251
Russian Typewriter	Windows 1251
Serbian Latin	Windows 1250
Serbian Cyrillic	Windows 1251
Slovak	Windows 1250
Slovak QWERTY	Windows 1250
Slovenian	Windows 1250
Spanish	Windows 1252
Spanish Variation	Windows 1252
Swedish	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

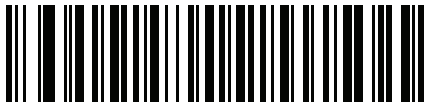
Scan the bar code corresponding to the country keyboard code page.



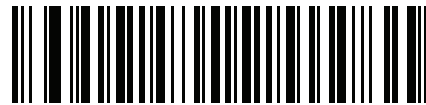
Windows 1250
Latin 2, Central European



Windows 1251
Cyrillic, Slavic



Windows 1252
Latin 1, Western European

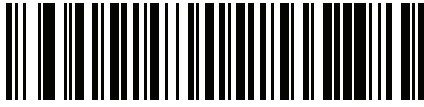


Windows 1253
Greek

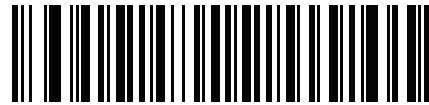


Windows 1254
Latin 5, Turkish

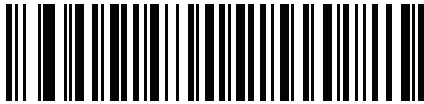
Country Code Pages (Continued)



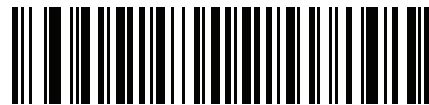
Windows 1255
Hebrew



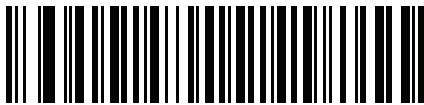
Windows 1256
Arabic



Windows 1257
Baltic



Windows 1258
Vietnamese

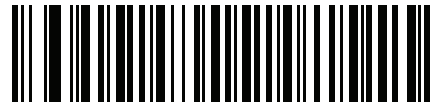


Windows 874
Thai

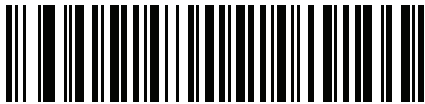
Country Code Pages (Continued)



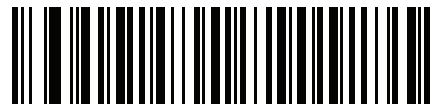
**Windows 20866
Cyrillic KOI8-R**



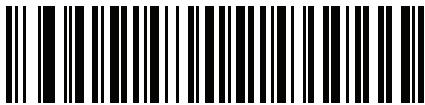
**Windows 932
Japanese Shift-JIS**



**Windows 936
Simplified Chinese GBK**



**Windows 54936
Simplified Chinese GB18030**



**Windows 949
Korean Hangul**



**Windows 950
Traditional Chinese Big5**

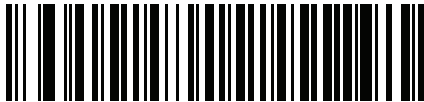
Country Code Pages (Continued)



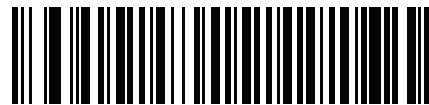
MS-DOS 437
Latin US



MS-DOS 737
Greek



MS-DOS 775
Baltic



MS-DOS 850
Latin 1

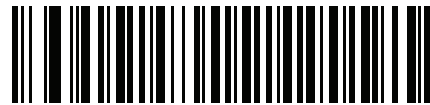


MS-DOS 852
Latin 2

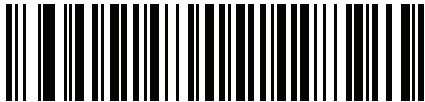
Country Code Pages (Continued)



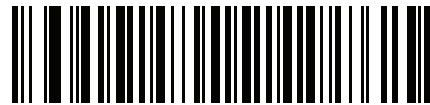
MS-DOS 855
Cyrillic



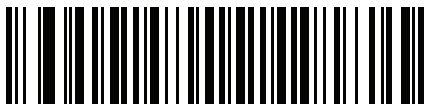
MS-DOS 857
Turkish



MS-DOS 860
Portuguese



MS-DOS 861
Icelandic

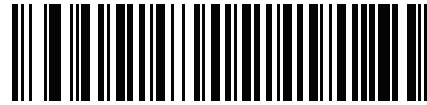


MS-DOS 862
Hebrew

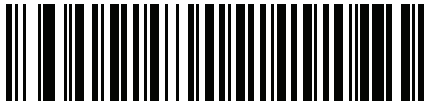
Country Code Pages (Continued)



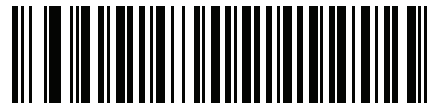
MS-DOS 863
French Canada



MS-DOS 865
Nordic



MS-DOS 866
Cyrillic

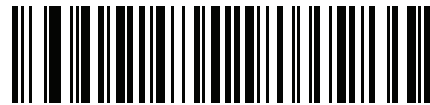


MS-DOS 869
Greek 2

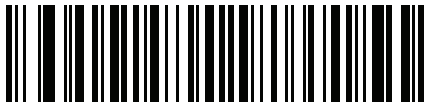
Country Code Pages (Continued)



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

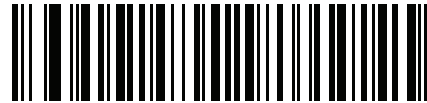


ISO 8859-5
Cyrillic

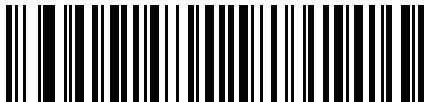
Country Code Pages (Continued)



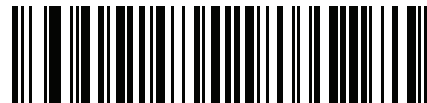
**ISO 8859-6
Arabic**



**ISO 8859-7
Greek**



**ISO 8859-8
Hebrew**



**ISO 8859-9
Latin 5, Turkish**

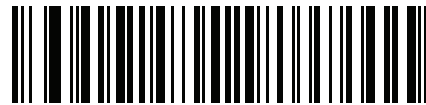


**ISO 8859-10
Latin 6, Nordic**

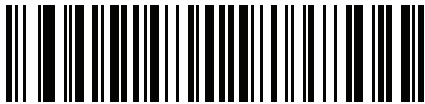
Country Code Pages (Continued)



ISO 8859-11
Thai



ISO 8859-13
Latin 7, Baltic



ISO 8859-14
Latin 8, Celtic



ISO 8859-15
Latin 9

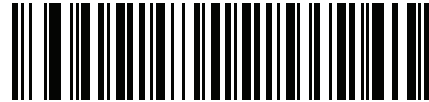


ISO 8859-16
Latin 10, South-Eastern European

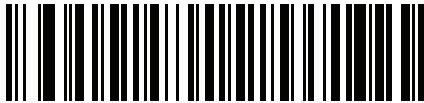
Country Code Pages (Continued)



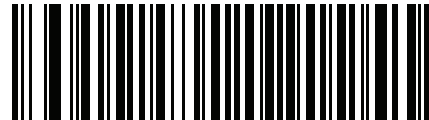
UTF-8



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 D-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)**



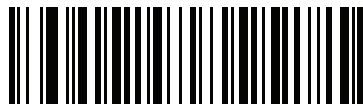
**Unicode Application Only
(1)**

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 D-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 D-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)**



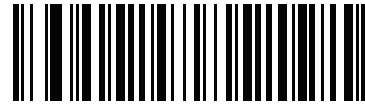
**Japanese Unicode Output
(34)**

(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)**

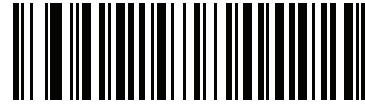


**Chinese (Simplified) Unicode Output
(2)**

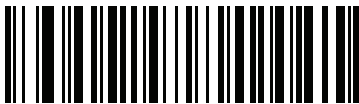


**Korean Unicode Output
(50)**

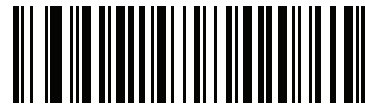
(for Korean Unicode Output, select Simplified Chinese Unicode IME on the Windows host)



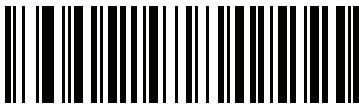
**Chinese (Traditional) Big5 Output (Windows XP)
(17)**



**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 D-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 D-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:

ƒ	F
x	Ɔ
κ	Ɔ
h	Ɔ
ø	Ɔ
ə	Ɔ
Ÿ	Ɔ
н	Ɔ
ж	Ɔ
ƒ	
н	Ɔ
Ÿ	Ɔ
κ	Ɔ
ч	Ɔ
к	Ɔ

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

Default code page: CP1250

Missing characters:

ş	Ş
ţ	Ț

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: ə, Ə

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

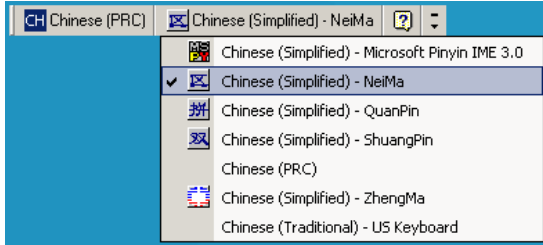
To add the desired CJK input language:

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:

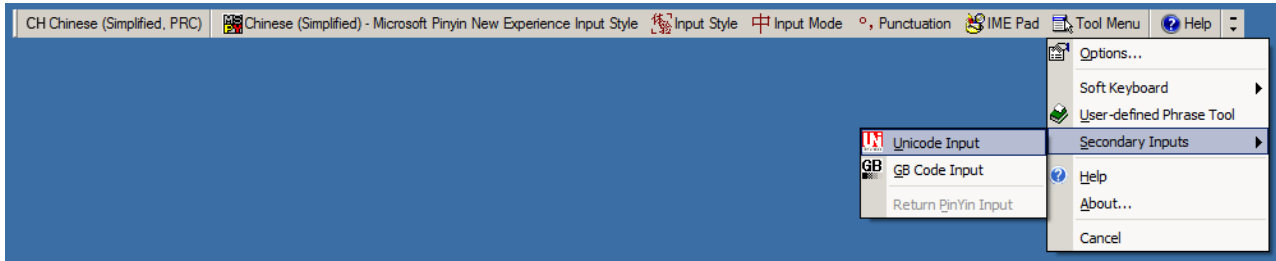
- Select Unicode/GBK input on Windows XP: **Chinese (Simplified) - NeiMa**, then click the input bar to select **Unicode** or **GBK NeiMa** input.



Or



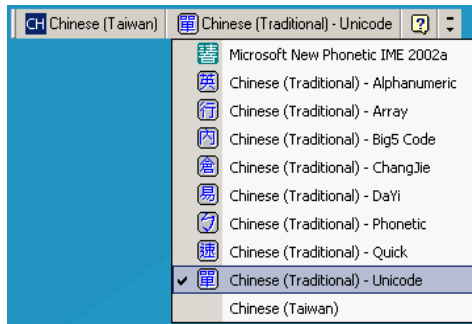
- Select Unicode/GBK input on Windows7: **Chinese (Simplified) - Microsoft Pinyin New Experience Input Style**, then select **Tool Menu > Secondary Inputs > Unicode Input** or **GB Code Input**.



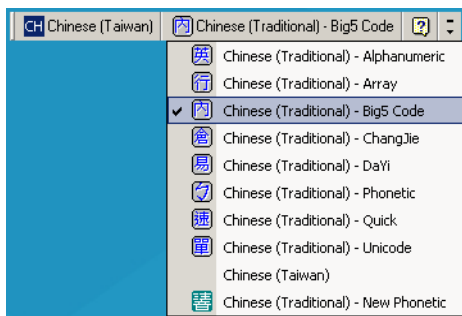
Selecting the Traditional Chinese Input Method on the Host

To select the Traditional Chinese input method:

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



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



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



APPENDIX E PROGRAMMING REFERENCE

Symbol Code Identifiers

Table E-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

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

Code Character	Code Type
V	Korean 3 of 5
X	ISSN EAN, PDF417, Macro PDF417, Micro PDF417
z	Aztec, Aztec Rune
P00	Data Matrix
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
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 E-2](#))
- m = Modifier Character (see [Table E-3](#))

Table E-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
E	UPC/EAN, Coupon (UPC portion)
e	GS1 DataBar Family
F	Codabar
G	Code 93
H	Code 11
I	Interleaved 2 of 5
L	PDF417, Macro PDF417, Micro PDF417
L2	TLC 39
M	MSI
Q	QR Code, MicroQR
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

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

Table E-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 A7 AIMID where 7 = (3+4).	
Trioptic Code 39	0	No option specified at this time. Always transmit 0.
	Example: A Trioptic bar code 412356 is transmitted as J X0 412356	
Code 128	0	Standard data packet, no Function code 1 in first symbol position.
	1	Function code 1 in first symbol character position.
	2	Function code 1 in second symbol character position.
	Example: A Code (EAN) 128 bar code with Function 1 character ^{FNC1} in the first position, AIMID is transmitted as J C1 AIMID	
I 2 of 5	0	No check digit processing.
	1	Reader has validated check digit.
	3	Reader has validated and stripped check digit.
	Example: An I 2 of 5 bar code without check digit, 4123, is transmitted as J I0 4123	
Codabar	0	No check digit processing.
	1	Reader has checked check digit.
	3	Reader has stripped check digit before transmission.
	Example: A Codabar bar code without check digit, 4123, is transmitted as J F0 4123	
Code 93	0	No options specified at this time. Always transmit 0.
	Example: A Code 93 bar code 012345678905 is transmitted as J G00 12345678905	
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 M1 4123	

Table E-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 JS04123	
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 JE00012345678905	
Bookland EAN	0	No options specified at this time. Always transmit 0.
	Example: A Bookland EAN bar code 123456789X is transmitted as JX0123456789X	
ISSN EAN	0	No options specified at this time. Always transmit 0.
	Example: An ISSN EAN bar code 123456789X is transmitted as JX0123456789X	
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 Je00110012345678902 .	
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 E-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.
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 E-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.
Aztec	0	Aztec symbol.
	C	Aztec Rune symbol.

APPENDIX F SAMPLE BAR CODES

Code 39



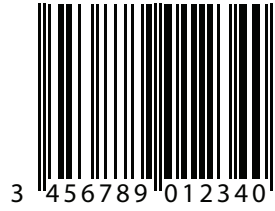
123ABC

UPC/EAN

UPC-A, 100%



EAN-13, 100%



Code 128



Interleaved 2 of 5



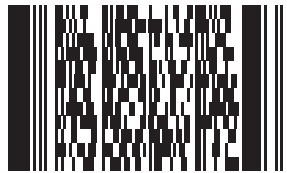
GS1 DataBar-14

✓ **NOTE** DataBar-14 must be enabled to read the bar code below (see [GS1 DataBar-14 on page 6-64](#)).



7612341562341

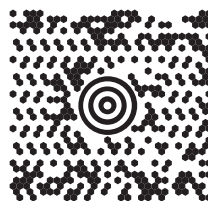
PDF417



Data Matrix



Maxicode



QR Code



US Postnet



UK Postal



APPENDIX G NUMERIC BAR CODES

Numeric Bar Codes

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



Numeric Bar Codes (continued)



Cancel

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



APPENDIX H ASCII CHARACTER SETS

Table H-1 *ASCII Value Table*

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

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

Table H-1 ASCII Value Table (Continued)

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1016	\$P	CTRL P
1017	\$Q	CTRL Q
1018	\$R	CTRL R
1019	\$S	CTRL S
1020	\$T	CTRL T
1021	\$U	CTRL U
1022	\$V	CTRL V
1023	\$W	CTRL W
1024	\$X	CTRL X
1025	\$Y	CTRL Y
1026	\$Z	CTRL Z
1027	%A	CTRL [
1028	%B	CTRL \
1029	%C	CTRL]
1030	%D	CTRL 6
1031	%E	CTRL -
1032	Space	Space
1033	/A	!
1034	/B	"
1035	/C	#
1036	/D	\$
1037	/E	%
1038	/F	&
1039	/G	'
1040	/H	(
1041	/I)
1042	/J	*
1043	/K	+
1044	/L	,

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

Table H-1 ASCII Value Table (Continued)

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1045	-	-
1046	.	.
1047	/o	/
1048	0	0
1049	1	1
1050	2	2
1051	3	3
1052	4	4
1053	5	5
1054	6	6
1055	7	7
1056	8	8
1057	9	9
1058	/Z	:
1059	%F	;
1060	%G	<
1061	%H	=
1062	%I	>
1063	%J	?
1064	%V	@
1065	A	A
1066	B	B
1067	C	C
1068	D	D
1069	E	E
1070	F	F
1071	G	G
1072	H	H
1073	I	I

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

Table H-1 ASCII Value Table (Continued)

ASCII Value	Full ASCII Code 39 Encode Char	Keystroke
1074	J	J
1075	K	K
1076	L	L
1077	M	M
1078	N	N
1079	O	O
1080	P	P
1081	Q	Q
1082	R	R
1083	S	S
1084	T	T
1085	U	U
1086	V	V
1087	W	W
1088	X	X
1089	Y	Y
1090	Z	Z
1091	%K	[
1092	%L	\
1093	%M]
1094	%N	^
1095	%O	_
1096	%W	'
1097	+A	a
1098	+B	b
1099	+C	c
1100	+D	d
1101	+E	e
1102	+F	f

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

Table H-1 ASCII Value Table (Continued)

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

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

Table H-2 ALT Key Standard Default Tables

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

Table H-3 *USB GUI Key Character Set*

GUI Key	Keystroke
3000	Right Control Key
3048	GUI 0
3049	GUI 1
3050	GUI 2
3051	GUI 3
3052	GUI 4
3053	GUI 5
3054	GUI 6
3055	GUI 7
3056	GUI 8
3057	GUI 9
3065	GUI A
3066	GUI B
3067	GUI C
3068	GUI D
3069	GUI E
3070	GUI F
3071	GUI G
3072	GUI H
3073	GUI I
3074	GUI J
3075	GUI K
3076	GUI L
3077	GUI M
3078	GUI N
3079	GUI O
3080	GUI P
3081	GUI Q

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

Table H-3 *USB GUI Key Character Set (Continued)*

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

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

Table H-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 H-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 H-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 H-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 I SIGNATURE CAPTURE CODE

Introduction

CapCode, a signature capture code, is a special pattern that encloses a signature area on a document and allows a scanner to capture a signature.

There are several accepted patterns that allow automatic identification of different signatures on the same form. For example, on the federal tax return 1040 form there are three signature areas, one each for two joint filers, and one for a professional preparer. By using different patterns, a program can correctly identify all three, so they can be captured in any sequence and still be identified correctly.

Code Structure

Signature Capture Area

A CapCode is printed as two identical patterns on either side of a signature capture box, as shown in [Figure I-1](#). Each pattern extends the full height of the signature capture box.

The box is optional, so you can omit it, replace it with a single baseline, or print a baseline with an "X" on top of it towards the left, as is customarily done in the US to indicate a request for signature. However, if an "X" or other markings are added in the signature box area, these are captured with the signature.



Figure I-1 CapCode

CapCode Pattern Structure

A CapCode pattern structure consists of a start pattern followed by a separator space, a signature capture box, a second separator space, and then a stop pattern. Assuming that X is the dimension of the thinnest element, the start and stop patterns each contains 9X total width in 4 bars and 3 spaces. A 7X quiet zone is required to the left and to the right of the CapCode pattern.

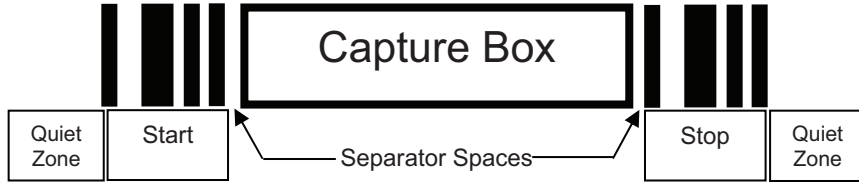


Figure I-2 CapCode Structure

The separator spaces on either side of the signature capture box can be between 1X and 3X wide.

Start / Stop Patterns

Table I-1 lists the accepted start / stop patterns. The bar and space widths are expressed as multiples of X. You must use the same pattern on either side of a signature capture box. The type value is reported with the captured signature to indicate the purpose of the signature captured.

Table I-1 Start / Stop Pattern Definitions

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

[Table I-2](#) lists selectable parameters used to generate the image of the captured signature.

Table I-2 *User Defined CapCode Parameters*

Parameter	Defined
Width	Number of pixels
Height	Number of pixels
Format	JPEG, BMP, TIFF
JPEG quality	1 (most compression) to 100 (best quality)
Bits Per Pixel (not applicable to JPEG format)	1 (2 levels)
	4 (16 levels)
	8 (256 levels)

BMP format does not use compression, JPEG and TIFF formats do.

Dimensions

The size of the signature capture box is determined by the height and separation of the start and stop patterns. The line width of the signature capture box is insignificant.

The thinnest element width, referred to here as X, is nominally 10 mils (1 mil = 0.0254 mm). Select this as an exact multiple of the pixel pitch of the printer used. For example, when using a 203 DPI (dots-per-inch) printer and printing 2 dots per module, the resulting X dimension is 9.85 mils.

Data Format

The decoder output is formatted according to [Table I-3](#). Motorola decoders allow different user options to output or inhibit bar code type. Selecting "Symbol ID" as the bar code type for output identifies the CapCode with letter "I".

Table I-3 *Data Format*

File Format (1 byte)	Type (1 byte)	Image Size (4 bytes, BIG Endian)	Image Data
JPEG - 1 BMP - 3 TIFF - 4	See Table I-1 , last column		(Same bytes as in a data file)

Additional Capabilities

Regardless of how the signature is captured, the output signature image is de-skewed and right-side up.

A scanner that captures signatures automatically determines whether it is scanning a signature or a bar code. You can disable the signature capturing capability in a decoder.

Signature Boxes

Figure I-3 illustrates the five acceptable signature boxes:

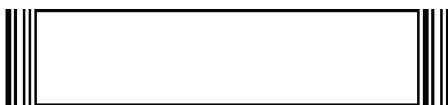
Type 2:



Type 5:



Type 7:



Type 8:



Type 9:



Figure I-3 *Acceptable Signature Boxes*

APPENDIX J CUSTOMIZATION OPTIONS

Custom Scan Tone

The imager supports downloading a custom decode tone to sound when a good decode occurs. Create the audio tone according to the following specifications:

- Use a WAV audio file format
- Encode the audio file at 16 samples per second, i.e., 16 kHz sampling rate, and at 16 bits per sample
- Ensure the file does not exceed 128 kbytes

Downloading the Custom Tone Audio File

Download the custom audio file to the imager using the **Motorola Scanner SDK C++ Sample Application**. The user-defined tone is represented by a unique attribute number.

1. Place the imager in SNAPI USB communication mode by scanning [Symbol Native API \(SNAPI\) with Imaging Interface on page 3-5](#).
2. Ensure the imager is disconnected from the host PC.

3. To launch the **Motorola Scanner SDK C++ Sample Application**, on the host PC select **Start > Motorola Scanner > Scanner SDK > C++ Sample Application**.

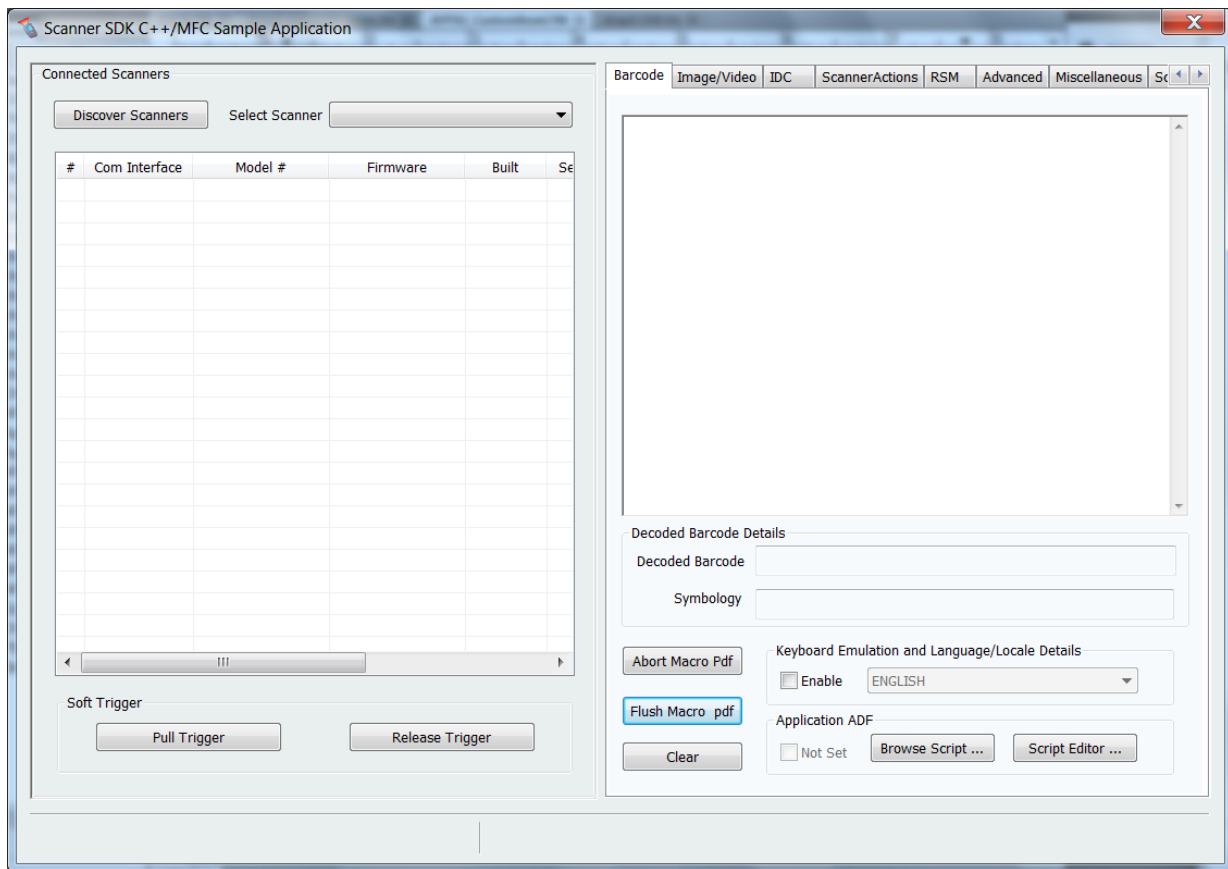


Figure J-1 *Scanner SDK C++ Sample Application*

4. Connect the imager to a USB port on the PC and wait for the power-up tone.
5. Verify imager is operational by touching the trigger to turn on illumination.
6. Select **Discover Scanners** in the SDK application. The imager appears in the **Connected Scanners** list.
7. Select the **Advanced** tab.
8. In the **Custom Good Decode Tone** section of the window, select **Browse**.
9. Select the WAV file to download. Ensure the file does not exceed 128 KB.
10. Select **Upload**. After a few seconds the status bar on the bottom of the window displays **UPDATE_AUDIO_FILE - Command Success**.
11. Scan the **Scan Tone 6** bar code below to select the downloaded tone. This bar code is also available via the parameter [Scan Tone on page 4-10](#).



Figure J-2 *Scan Tone 6*

12. Scan a bar code (e.g., the sample below) to verify that the imager sounds the downloaded decode tone.



Figure J-3 *Sample Bar Code*



NOTE The imager sounds a system-defined tone on a good decode if you select Scan Tone 6 but did not download a custom tone.

Custom Bezel Design

The DS4800 bezel can be customized for your enterprise. When designing a custom bezel, observe the following guidelines.

- The DS4800 back-lit LED trigger requires a contrasting color in order to be seen easily. Avoid white background colors when designing the bezel.
- Instead of a white logo, consider using a light metal finish.
- The light-up trigger graphic is designed for optimal usability. If modification of this graphic is necessary, ensure it fits within the **safe tolerance** area below.



Figure J-4 Custom Bezel Guidelines

- There are two recommended logo positions, horizontal position A and vertical position B.
- Due to the graphic forming process, some distortion and curvature can occur in the logo. Minimize the size of the logo and use position B to reduce this distortion.

- Provide a VECTOR format (.eps, .ai, .cdr) for screen printed artwork, or it will have to be manually recreated. Formats such as .jpg, .bmp, or .png are not acceptable.

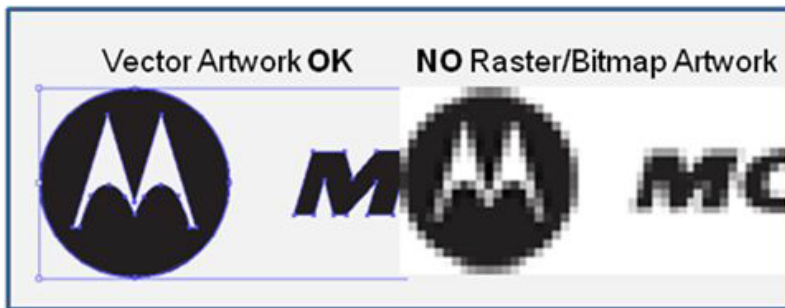


Figure J-5 *Vector vs. Bitmap Artwork*

- Screen printing uses solid ink colors for each part of the graphic. A half-tone process is necessary for printing smooth transitions of colors.
- Identify specific colors using their Pantone equivalent, or provide a custom color chip.



Figure J-6 *Specify Pantone Colors*

GLOSSARY

A

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

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

Application Programming Interface. See **API**.

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

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

B

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

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

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

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

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

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

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

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

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

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

bps. See **Bits Per Second**.

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

C

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

D

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

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

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

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

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

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

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

DRAM. Dynamic random access memory.

E

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

Element. Generic term for a bar or space.

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

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

ESD. Electro-Static Discharge

F

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

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

FTP. See **File Transfer Protocol**.

H

Hard Reset. See **Cold Boot**.

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

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

I

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

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

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

IEEE Address. See **MAC Address**.

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

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

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

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

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

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

IOCTL. Input/Output Control.

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

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

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

K

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

L

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

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

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

LCD. See **Liquid Crystal Display**.

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

Light Emitting Diode. See **LED**.

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

M

MIL. 1 mil = 1 thousandth of an inch.

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

N

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

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

NVM. Non-Volatile Memory.

O

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

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

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

P

PAN . Personal area network. Using Bluetooth wireless technology, PANs enable devices to communicate wirelessly. Generally, a wireless PAN consists of a dynamic group of less than 255 devices that communicate within about a 33-foot range. Only devices within this limited area typically participate in the network.

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

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

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

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

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

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

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

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

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

Q

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

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

R

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

Reflectance. Amount of light returned from an illuminated surface.

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

RF. Radio Frequency.

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

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

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

S

Scan Area. Area intended to contain a symbol.

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

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

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

SDK. Software Development Kit

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

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

SHIP. Symbol Host Interface Program.

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

Soft Reset. See **Warm Boot**.

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

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

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

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

STEP. Symbol Terminal Enabler Program.

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

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

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

SVTP. Symbol Virtual Terminal Program.

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

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

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

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

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

T

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

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

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

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

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

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

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

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

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

U

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

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

V

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

W

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

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