Zebra Technologies

Barcode Scanner Configuration Guide

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CHAPTER 1

USER PREFERENCES & MISCELLANEOUS OPTIONS

Introduction

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

Changing Default Values

The barcode scanner ships with the settings shown in the *Table 1-1 on page 1-3*. If the default values suit requirements,   programming is not necessary.

To change a configuration parameter value:

- Scan the appropriate bar codes in this guide. These new values replace the standard default values in memory.

✓ **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 **Restore Defaults on page 1-5*. Throughout the programming bar code menus, asterisks (*****) indicate default values.

* Indicates Default ——— ***High Volume** ——— Feature/Option
                              (00h)
                                          Option Hex Value for programming
                                          via SSI command

Scanning Sequence Examples

In most cases, scanning one bar code sets the parameter value. For example, to set the beeper tone to high, scan the **High Frequency** (beeper tone) bar code listed under *Beeper Tone on page 1-10*. The barcode scanner issues   a fast warble beep and the LED turns green, signifying a successful parameter entry.

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

Errors While Scanning

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

User Preferences Parameter Defaults

Table 1-1 lists defaults for user preferences parameters. To change any parameter value, scan the appropriate bar code(s) provided in the User Preferences section beginning on *page 1-5*.

Table 1-1 *User Preferences Default Table*

Parameter	SSI Number	Parameter Number	Default	Page Number
User Preferences				
Set Default Parameter	n/a	n/a	Restore Defaults	*1-5*
Parameter Scanning	ECh	236	Enable	*1-6*
Lock Parameter Scanning	F2h 22h	802	Disable	*1-7*
Unlock Parameter Scanning	F2h 23h	803	Disable	*1-7*
User Parameter Pass Through	F1h 71h	625	Disable	*1-8*
Beep After Good Decode	38h	56	Enable	*1-9*
Beeper Tone	91h	145	Medium	*1-10*
Beeper Volume	8Ch	140	High	*1-11*
Beeper Duration	F1h 74h	628	Medium	*1-12*
Suppress Power-up Beeps	F1h D1h	721	Do not suppress	*1-12*
Decode LED Behavior	F1h E8h	744	Power down after LED shuts off	*1-13*

Visual Decode Indicator
    Decode Blinks
    Decode Blink Duration
	
	F2h 5Bh
	F2h 5Ch
		
		859
		860
			
			Disable
			Timeout Between Decodes, Different Symbols value
				1-14
				1-14
				1-15

Picklist Mode	F0h 92h	402	Disabled Always	*1-16*
Decode Session Timeout	88h	136	9.9 Sec	*1-16*
Timeout Between Decodes, Same Symbol	89h	137	0.6 Sec	*1-17*
Timeout Between Decodes, Different Symbols	90h	144	0.2 Sec	*1-17*
[1] **SSI number hex values are used for programming via SSI commands.** [2] **Parameter number decimal values are used for programming via RSM commands.**				

Table 1-1 *User Preferences Default Table*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
Continuous Bar Code Read	F1h 89h	649	Disable	*1-18*
Unique Bar Code Reporting	F1h D31h	723	Disable	*1-18*
Fuzzy 1D Processing	F1h 02h	514	Enable	*1-19*
Mirrored Image	F1h 70h	624	Disable	*1-19*
Mobile Phone/Display Mode	F1h CCh	716	Disable	*1-20*
Validate Concatenated Parameter Bar Codes	F1h B4h	692	Disable	*1-20*
PDF Prioritization	F1h CFh	719	Disable	*1-21*
PDF Prioritization Timeout	F1h D0h	720	200 ms	*1-21*
Miscellaneous Scanning Parameters				
Transmit Code ID Character	2Dh	45	None	*1-22*
Prefix Value	63h, 69h	99, 105	<CR>	*1-23*
Suffix 1 Value Suffix 2 Value	62h, 68h 64h, 6Ah	98, 104 100, 106	<CR> <CR>	*1-23*
Scan Data Transmission Format	EBh	235	Data as is	*1-24*
FN1 Substitution Values	67h, 6Dh	103, 109	Set	*1-25*
Transmit "No Read" Message	5Eh	94	Disable	*1-26*
Event Reporting				*1-27*
Decode Event				*1-27*
Boot Up Event				*1-28*
Parameter Event				*1-28*

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

User Preferences

Set Default Parameter

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

- **Restore Defaults** - Scan this bar code to reset all default parameters as follows.
  - If you previously set custom defaults by scanning **Write to Custom Defaults**, scan **Restore Defaults** to retrieve and restore the barcode scanner's custom default settings.
  - If you did not set custom defaults, scan **Restore Defaults** to restore the factory default values listed in *Table 1-1*.
- **Set Factory Defaults** - Scan this bar code to restore the factory default values listed in *Table 1-1.* This deletes any custom defaults set.
- **Write to Custom Defaults** - Scan this bar code to set the current barcode scanner settings as custom defaults.   Once set, you can recover custom default settings by scanning **Restore Defaults**.

*Restore Defaults

Set Factory Defaults

Write to Custom Defaults

Parameter Scanning

SSI #ECh

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 Scanning
(01h)**

**Disable Parameter Scanning
(00h)**

Lock/Unlock Parameter Scanning

Lock: SSI # F2h 22h
Unlock: SSI # F2h 23h

Lock: Parameter # 802
Unlock: Parameter # 803

This feature locks parameter settings with a 4-digit code to prevent the user from changing parameter values by scanning parameter bar codes. This provides an added level of security not offered via **Disable Parameter Scanning**.

After locking parameter settings, the only parameter bar code that is accepted is **Unlock** with the correct code.

> ✓ **NOTE** *Parameter Scanning* must be enabled in order to scan the **Lock** parameter bar code. Once parameter   scanning is locked, scanning the **Enable** or **Disable Parameter Scanning** bar code results in a parameter error beep.

To lock parameter scanning:

1. Scan the **Lock** bar code.

2. Scan four bar codes from *Appendix B, Numeric Bar Codes* that represent the desired code. Enter leading zeros for numbers below 1000, e.g., to program a code of 29, enter **0**, **0**, **2**, **9**. A lock beep sounds (two long high beeps) in addition to the parameter entry beep.

To unlock parameter scanning:

1. Scan the **Unlock** bar code.

2. Scan four bar codes from *Appendix B, Numeric Bar Codes* that represent the correct code. An unlock beep sounds (two long low beeps) in addition to the parameter entry beep. Entering an incorrect code results in a parameter error beep.

Lock

Unlock

> ✓ **NOTE** Parameter values can be changed via host interface commands even when parameter scanning is locked.

User Parameter Pass Through

SSI # F1h 71h
Parameter # 625

Enable this to send user-defined parameter bar codes (see *User-Defined Parameter Bar Code Format*) as normal decode data in decode data packets for SSI and SNAPI hosts (see *Decode Data Format*).

User-Defined Parameter Bar Code Format

Code 128 bar codes with:

    <FNC3><L><data>

or

    <FNC3><B><12 bytes of data>

Decode Data Format

    <0xf3><L><data>

or

    <0xf3><B><12 bytes of data>

Note that the **B** type only works with 12 bytes of data.

A normal decode beep sounds upon a successful decode of a user-defined parameter bar code.

**Enable User Parameter Pass Through
(01h)**

***Disable User Parameter Pass Through
(00h)**

Beep After Good Decode

SSI # 38h
Parameter # 56

Scan a bar code below to select whether or not the barcode scanner issues a beep signal after a good decode. If   selecting **Do Not Beep After Good Decode**, beeper signals still occur during parameter menu scanning and to indicate error conditions.
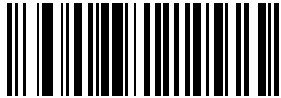
*Beep After Good Decode
(Enable)
(01h)
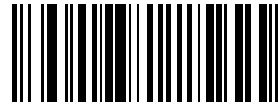
Do Not Beep After Good Decode
(Disable)
(00h)

Beeper Tone

SSI # 91h
Parameter # 145

To select a decode beep frequency (tone), scan the **Low Frequency, Medium Frequency**, or **High Frequency** bar code.
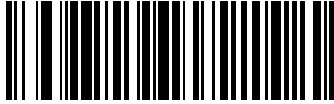
**Low Frequency
(02h)**

***Medium Frequency
(Optimum Setting)
(01h)**
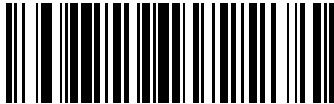
**High Frequency
(00h)**

Beeper Volume

SSI # 8Ch
Parameter # 140

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

**Low Volume
(02h)**

**Medium Volume
(01h)**

***High Volume
(00h)**

Beeper Duration

SSI # F1h 74h
Parameter # 628

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

**Short
(00h)**

*** Medium
(01h)**

**Long
(02h)**

Suppress Power-up Beeps

SSI # F1h D1h
Parameter # 721

Select whether or not to suppress the barcode scanner's power-up beeps.

*** Do Not Suppress Power-up Beeps
(00h)**

**Suppress Power-up Beeps
(01h)**

Decode LED Behavior

SSI # F1h E8h
Parameter # 744

Select one of the following options to control decode LED behavior with respect to low power mode for serial hosts:

- **Power Down After LED Shuts Off** - the decode LED remains on for approximately 1.5 seconds, then the scanner can enter **Low Power Mode**.

- **Decode LED Off on Power-Down** - the decode LED remains on until the scanner enters **Low Power Mode**. This allows the scanner to enter **Low Power Mode** quickly, but also have the decode LED light.

- **Disable Decode LED** - shuts off the decode LED completely.

***Power Down After LED Shuts Off
(02h)**

**Decode LED Off on Power-Down
(01h)**

**Disable Decode LED
(00h)**

Visual Decode Indicator

This feature specifies how many times to blink the illumination to indicate a successful decode. This feature is disabled by default (no blink).

To enable this feature, scan a **Decode Blink** bar code to specify the number of blinks. Next, scan the **Decode Blink Duration** bar code, and then scan two numeric bar codes from *Appendix B, Numeric Bar Codes* that correspond to the desired duration of decode blinks in 100 msec increments. Values can range from 00 to 99 (9.9 seconds). Changing the **Decode Blink Duration** also changes the values set for *Timeout Between Decodes, Different Symbols*.

To return the duration to the value specified by *Timeout Between Decodes, Different Symbols on page 1-17*, scan **Set Decode Blink Duration to Timeout Between Decodes, Different Symbols**.

Decode Blinks

SSI # F2h 5Bh
Parameter #859

*Disable Decode Blinks
(00h)

1 Decode Blink
(01h)

2 Decode Blinks
(02h)

3 Decode Blinks
(03h)

Decode Blink Duration

SSI # F2h 5Ch
Parameter # 860

Decode Blink Duration

*Set Decode Blink Duration to
Timeout Between Decodes, Different Symbols
(00h)

Picklist Mode

SSI # F0h 92h
Parameter # 402

Picklist mode enables the barcode scanner to decode only bar codes aligned under the center of the aiming pattern.   Select one of the following picklist modes:

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

- **Enabled Always** - Picklist mode is always enabled.

✓ *NOTE* With Picklist Mode enabled, the decode aiming pattern turns on even when the *Decode Aiming Pattern on page 2-15* is disabled.

***Disabled Always**
(00h)

Enabled Always
(02h)

Decode Session Timeout

SSI # 88h
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 B, Numeric Bar Codes* that correspond to the desired on time. Provide 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 B-2*.

Decode Session Timeout

Timeout Between Decodes, Same Symbol

SSI # 89h
Parameter # 137

Use this option in **Presentation Mode** or **Continuous Bar Code Read** to prevent multiple reads of a symbol left in the barcode scanner's field of view. The timeout begins when you remove the symbol from the field of view.

To select the timeout between decodes for the same symbol, available in 0.1 second increments from 0.0 to 9.9 seconds, scan the bar code below, then scan two numeric bar codes from *Appendix B, Numeric Bar Codes* that correspond to the desired interval. The default interval is 0.6 seconds.

✓   **NOTE**   The **Timeout Between Decodes, Same Symbol** value must be greater than the *Timeout Between Decodes, Different Symbols* value.

Timeout Between Decodes, Same Symbol

Timeout Between Decodes, Different Symbols

SSI # 90h
Parameter # 144

Use this option in **Presentation Mode** or **Continuous Bar Code Read** to control the time the barcode scanner is inactive between decoding different symbols. It is programmable in 0.1 second increments from 0.1 to 9.9   seconds. The default is 0.2 seconds.

To select the timeout between decodes for different symbols, scan the bar code below, then scan two numeric bar codes from *Appendix B, Numeric Bar Codes* that correspond to the desired interval, in 0.1 second increments.

✓   **NOTE**   The **Timeout Between Decodes, Different Symbols** value cannot be greater than or equal to the *Timeout Between Decodes, Same Symbol* or the *Decode Session Timeout on page 1-16* value.

Timeout Between Decodes, Different Symbols

Continuous Bar Code Read

SSI # F1h 89h

Parameter # 649

Select **Enable** to allow decode processing to continue until the trigger event ends. User indications occur upon decoding each bar code. Select **Disable** to end decode processing upon a valid decode as well. This mode does not apply to **Presentation Mode**.

✓ **NOTE** Zebra strongly recommends enabling *Picklist Mode on page 1-16* with this feature. Disabling Picklist Mode can cause accidental decodes when more than one bar code is in the barcode scanner's field of view.

*Disable Continuous Bar Code Read
(00h)

Enable Continuous Bar Code Read
(01h)

Unique Bar Code Reporting

SSI # F1h D3h

Parameter # 723

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

* Disable Continuous Bar Code Read Uniqueness
(00h)

Enable Continuous Bar Code Read Uniqueness
(01h)

Fuzzy 1D Processing

SSI # F1h 02h
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
(01h)

Disable Fuzzy 1D Processing
(00h)

Mirrored Image

SSI # F1h 70h
Parameter # 624

Enable this to scan images in reverse, or mirrored, as if seen through a mirror. This mode is useful in applications requiring scanning through a mirror and using symbologies that do not decode in reverse.

Enabling this mode when using snapshot, video, or video viewfinder mode transmits images as mirrored images.

*Disable Mirrored Image
(00h)

Enable Mirrored Image
(01h)

Mobile Phone/Display Mode

SSI # F1h CCh
Parameter # 716

This mode improves bar code reading performance with target bar codes displayed on mobile phones and electronic displays.

***Disable Mobile Phone/Display Mode
(00h)**

**Enable Mobile Phone/Display Mode
(03h)**

Validate Concatenated Parameter Bar Codes

SSI # F1h B4h
Parameter # 692

The barcode scanner can encounter invalid parameters when using concatenated parameter bar codes intended for   different scanner models or different versions of a scanner. This parameter determines how to process   concatenated parameter bar codes when the barcode scanner encounters an invalid parameter setting in the bar code.

Disable this to ignore invalid parameters and configure valid parameters. Enable this to ignore all parameters if one or more are invalid.

***Disable Validate Concatenated Parameter Bar Codes
(00h)**

**Enable Validate Concatenated Parameter Bar Codes
(01h)**

PDF Prioritization

SSI # F1h CFh
Parameter # 719

Enable this feature to delay decoding a 1D bar code (Code 128 of 8 to 25 characters length) by the value specified in *PDF Prioritization Timeout*. During that time the barcode scanner attempts to decode a PDF417 symbol   (e.g., on a US driver's license), and if successful reports this only. If it does not decode (can not find) a PDF417   symbol, it reports the 1D symbol after the timeout. The 1D symbol must be in the device's field of view for the   barcode scanner to report it. This parameter does not affect decoding other symbologies.

*Disable PDF Prioritization
(00h)

Enable PDF Prioritization
(01h)

PDF Prioritization Timeout

SSI # F1h D0h
Parameter # 720

When *PDF Prioritization* is enabled, this timeout specifies how long the barcode scanner 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 B, 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

Miscellaneous Scanning Parameters

Transmit Code ID Character

SSI # 2Dh
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 A-1* and *AIM Code Identifiers on page A-3*.

✓ **NOTE** If you enable Symbol Code ID Character or AIM Code ID Character, and enable *Transmit "No Read" Message on page 1-26*, the barcode scanner appends the code ID for Code 39 to the NR message.
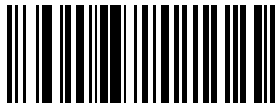
**Symbol Code ID Character
(02h)**
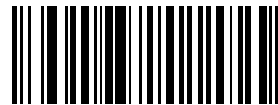
**AIM Code ID Character
(01h)**
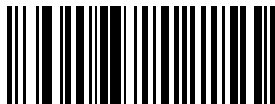
***None
(00h)**

Prefix/Suffix Values

Key Category SSI # P = 63h, S1 = 62h, S2 = 64h Decimal Value SSI # P = 69h, S1 = 68h, S2 = 6Ah

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 the prefix or suffix bar code below, then scan a four-digit number (i.e., four bar codes from *Appendix B, Numeric Bar Codes*) that corresponds to that value. The first digit defines the key category (type of character to send) and is stored in the key category parameter. The remaining three digits define the value of the character and are stored in the decimal value parameter. Be sure to use both key category and decimal value parameters to define the prefix/suffix value. See *Table C-1 on pageC-1* for the four-digit codes.

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

To correct an error or change a selection, scan *Cancel on page B-2*.

✓ **NOTE**   To use Prefix/Suffix values, set the *Scan Data Transmission Format on page 1-25*.

**Scan Prefix
(07h)**
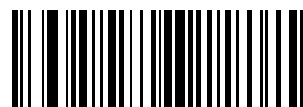
**Scan Suffix 1
(06h)**

**Scan Suffix 2
(08h)**

Scan Data Transmission Format

SSI # EBh
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 1-23*.

*Data As Is
(00h)

<DATA> <SUFFIX 1>
(01h)

<DATA> <SUFFIX 2>
(02h)

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

<PREFIX> <DATA >
(04h)

Scan Data Transmission Format (continued)

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

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

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

FN1 Substitution Values

Key Category SSI # 67h Decimal Value SSI # 6Dh

Key Category Parameter # 103 Decimal Value Parameter # 109

The USB HID keyboard host supports 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 in the appropriate host interface chapter. Enter the 4-digit ASCII value by scanning each digit in *Appendix B, Numeric Bar Codes*.

To correct an error or change the selection, scan *Cancel on page B-2*.

Transmit "No Read" Message

SSI # 5Eh
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 on page 1-16* expires. 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 1-22*, the barcode scanner appends the code ID for Code 39 to the NR message.

Enable No Read
(01h)

*Disable No Read
(00h)

Event Reporting

The host can request the barcode scanner to provide certain information (events) relative to the barcode scanner's behavior. Enable or disable the events listed in *Table 1-2* and on the following pages by scanning the appropriate bar codes.

Table 1-2 *Event Codes*

Event Class	Event	Code Reported
Decode Event	Non parameter decode	0x01
Boot Up Event	System power-up	0x03
Parameter Event	Parameter entry error	0x07
	Parameter stored	0x08
	Defaults set (and parameter event is enabled by default)	0x0A
	Number expected	0x0F

Decode Event

SSI # F0h, 00h
Parameter # 256

When enabled, the barcode scanner generates a message to the host upon a successful bar code decode. When   disabled, no notification is sent.

**Enable Decode Event
(01h)**

***Disable Decode Event
(00h)**

Boot Up Event

SSI # F0h, 02h
Parameter # 258

When enabled, the barcode scanner generates a message to the host whenever power is applied. When disabled, no notification is sent.

**Enable Boot Up Event
(01h)**

***Disable Boot Up Event
(00h)**

Parameter Event

SSI # F0h, 03h
Parameter # 259

When enabled, the barcode scanner generates a message to the host when one of the events specified in *Table 1-2 on page1-27* occurs. When disabled, no notification is sent.

**Enable Parameter Event
(01h)**

***Disable Parameter Event
(00h)**

CHAPTER 2

IMAGING PREFERENCES

Introduction

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

The barcode scanner ships with the settings in *Imager Preferences Default Table on page 2-2*. If the default values suit requirements, programming is not necessary.

There are two ways to change a parameter value:

- Scan the appropriate bar codes in this guide. These new values replace the standard default values in memory.

  ✓ *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.

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

To return all features to default values, scan the *Set Default Parameter on page 1-5*. Throughout the programming bar code menus, asterisks (*) indicate default values.

Feature/Option

* Indicates Default ——— ***Enable Decode Aiming Pattern**

(02h) ——— Option Hex Value
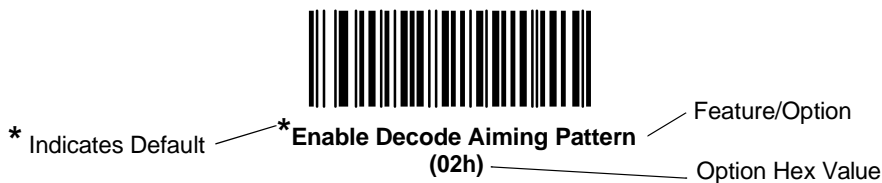
Scanning Sequence Examples

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 2-16*. The barcode scanner 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 1-1 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 the *Set Default Parameter on page 1-5*.

Table 2-1 *Imager Preferences Default Table*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
Imaging Options				
Aim Brightness (SE4750)	F1h 9Ch	668	0	*2-5*
Aim Brightness (SE4710)	F1h 9Ch	668	2 (High)	*2-6*
Illumination Brightness	F1h 9Dh	669	10	*2-7*
Decoding Illumination	F0h 2Ah	298	Enable	*2-8*
Decode Aiming Pattern	F0h 32h	306	Enable	*2-9*
Image Capture Illumination	F0h 69h	361	Enable	*2-10*
Snapshot Aiming Pattern	F0h 2Ch	300	Enable	*2-11*
Image Cropping	F0h 2Dh	301	Disable	*2-11*
Crop to Pixel Addresses	F4h F0h 3Bh; F4h F0h 3Ch; F4h F0h 3Dh; F4h F0h 3Eh	315 316 317 318	SE3300/SE4500: 0 top, 0 left, 479 bottom, 751 right SE4710: 0 top, 0 left, 799 bottom, 1279 right SE4750: 0 top, 0 left, 959 bottom, 1279 right	*2-12*
Image Resolution	F0h 2Eh	302	Full	*2-14*
Image Brightness (Target White)	F0h 86h	390	180	*2-15*
Image File Format Selection	F0h 30h	304	JPEG	*2-16*

JPEG Image Options	F0h 2Bh	299	Quality	2-16
JPEG Quality Value	F0h 31h	305	65	2-17
JPEG Size Value	F1h 31h	561	160	2-17
Image File Meta Data	F1h B5h	693	Disable	2-18
Image Enhancement	F1h 34h	564	Low	2-19
Image Edge Sharpening	F1h 98h	664	Low	2-20
Image Contrast Enhancement	F1h 9Ah	666	Enable	2-21
Image Rotation	F1h 99h	665	0	2-21
Bits per Pixel (BPP)	F0h 2Fh	303	8 BPP	2-22
Signature Capture	5Dh	93	Disable	2-23
Signature Capture Image File Format Selection	F0h 39h	313	JPEG	2-24
Signature Capture Bits per Pixel (BPP)	F0h 3Ah	314	8 BPP	2-25
Signature Capture Width	F4h F0h 6Eh	366	400	2-26
Signature Capture Height	F4h F0h 6Fh	367	100	2-26
Signature Capture JPEG Quality	F0h A5h	421	65	2-27
Video View Finder	F0h 44h	324	Disable	2-27
Target Video Frame Size	F0h 48h	328	2200 bytes	2-28
Video View Finder Image Size	F0h 49h	329	1700 bytes	2-28
Video Resolution	F0h 9Bh	411	1/4 resolution	2-29

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

Imager
Preferences

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

Operating Modes

The barcode scanner has three modes of operation:

- Decode Mode
- Snapshot Mode
    - Snapshot with Viewfinder Mode
- Video Mode.

Decode Mode

By default, upon a trigger event, the barcode scanner attempts to locate and decode bar codes within its field of view.   The barcode scanner remains in this mode as long as the trigger is active, until it decodes a bar code, or it reaches the   *Decode Session Timeout on page 1-19*.

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 barcode scanner blinks the green LED at 1-second intervals   to indicate it is not in standard operating (decode) mode

In Snapshot Mode, the barcode scanner turns on the imager engine's aiming pattern to highlight the area to capture in   the image. The next trigger event instructs the barcode scanner to capture a high quality image and transmit it to the   host. A short time may pass (less than 2 seconds) between trigger activation and image capture as the barcode scanner adjusts to the lighting conditions. Hold the barcode scanner steady until image capture, denoted by a single   beep.

If a trigger event does not occur within the Snapshot Mode Timeout period, the barcode scanner returns to Decode   Mode after 30 seconds.

To disable the aiming pattern during Snapshot Mode, see *Snapshot Aiming Pattern on page 2-11*.

Use *Video View Finder on page 2-27* to enable **Snapshot with Viewfinder Mode**. In this mode the barcode scanner   behaves as a video camera until the trigger activates, at which time a Snapshot occurs as described above.

Video Mode

In this mode the barcode scanner behaves as a video camera as long as the trigger is active. Upon trigger release, the   barcode scanner returns to Decode Mode. Scan the **Video Mode** bar code to temporarily enter Video Capture Mode.

Snapshot Mode

Video Mode

Aim Brightness (SE4750)

SSI # F1h 9Ch
Parameter # 668

This feature sets the brightness of the aim pattern. The default is 0, which indicates that the aim pattern is always on in between camera exposures. For values above 0, each increment of the brightness value increments the aim duration 0.5 ms.

To program Aim Brightness, scan this bar code followed by three numeric bar codes in *Appendix B, Numeric Bar Codes* that correspond to the value representing brightness. Settings range from 0 to 255. The maximum aim duration is limited by the frame time, so the recommended range is 0 to 30 when the frame rate is set to 60 fps.

Aim Brightness

Aim Brightness (SE4710 Only)

SSI # F1h 9Ch
Parameter # 668

This feature sets the brightness, or power of the aim pattern for the SE4710. The SE4710 has three settings: low (0), medium (1), and high (2). The default is high.

To program the Aim Brightness for the SE4710, scan one of the following bar codes.

Aim Brightness - Low
(00h)

Aim Brightness - Medium
(01h)

*Aim Brightness - High
(02h)

Illumination Brightness

SSI # F1h 9Dh
Parameter # 669

This feature sets the brightness of the illumination by altering LED power. The default is 10, which is maximum LED brightness. For values from 1 to 10, LED brightness varies from lowest to highest level of brightness.

To program Illumination Brightness, scan this bar code followed by two numeric bar codes in *Appendix B, Numeric Bar Codes* that correspond to the value of desired illumination brightness. For example, to set Illumination Brightness to 6, scan the bar code below followed by the 0 and 6 bar codes.

✓   ***NOTE***   For the SE4710:

This feature sets the brightness of the illumination by altering LED power. The allowed range is from 1 to 27; LED brightness varies from lowest to highest level of brightness. The default is 7. Using a brightness above 7 is not recommended, unless all thermal issues are considered.

Illumination Brightness

Decoding Illumination

SSI # F0h 2Ah
Parameter # 298

Selecting **Enable Decoding Illumination** causes the barcode scanner to turn on illumination every image capture to aid decoding. Select **Disable Decoding Illumination** to prevent the barcode scanner from using decoding illumination.

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

✓   *NOTE*   Changing this parameter while using **Presentation Mode**, with or without **Motion Enhancement**, is not recommended.

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

**Disable Decoding Illumination
(00h)**

Decode Aiming Pattern

SSI # F0h 32h
Parameter # 306

Select **Enable Decode Aiming Pattern** to project the aiming pattern during bar code capture, or **Disable Decode Aiming Pattern** to turn the aiming pattern off.

√ **NOTE**   With *Picklist Mode on page 1-16* enabled, the decode aiming pattern flashes even when the **Decode Aiming Pattern** is disabled.

*** Enable Decode Aiming Pattern
(02h)**

**Disable Decode Aiming Pattern
(00h)**

Image Capture Illumination

SSI # F0h 69h
Parameter # 361

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

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

***Enable Image Capture Illumination
(01h)**

**Disable Image Capture Illumination
(00h)**

Snapshot Aiming Pattern

SSI # F0h 2Ch
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
(01h)

Disable Snapshot Aiming Pattern
(00h)

Image Cropping

SSI # F0h 2Dh
Parameter # 301

This parameter crops a captured image. Select **Disable Image Cropping** to present the full 752 x 480 pixels for the SE3300 and SE4500, the full 1280 x 800 pixels for the SE4710, and the full 1280 x 960 pixels for the SE4750. Select **Enable** to crop the image to the pixel addresses set in *Crop to Pixel Addresses on page 2-12*.

✓ *NOTE* The barcode scanner has a cropping resolution of 4 pixels. Setting the cropping area to less than 3 pixels transfers   the entire image.

Enable Image Cropping
(01h)

*Disable Image Cropping
(SE3300/SE4500: use full 752 x 480 pixels;
SE4710: use full 1280x800 pixels; SE4750:
use full 1280x960 pixels)
(00h)

Crop to Pixel Addresses (SE4710)

SSI # F4h F0h 3Bh (Top)
SSI # F4h F0h 3Ch (Left)
SSI # F4h F0h 3Dh (Bottom)
SSI # F4h F0h 3Eh (Right)

Parameter # 315 (Top)

Parameter # 316 (Left)

Parameter # 317 (Bottom)

Parameter # 318 (Right)

If *Image Cropping* is enabled, set the pixel addresses from (0,0) to (1279, 799) 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 = 1271, Right = 1279

To set the pixel address to crop to, scan each Pixel Address bar code followed by four bar codes from *Appendix B, Numeric Bar Codes* which represent the value. Include leading zeros, so to enter a value of 3, for example, scan **0**, **0**, **0**, **3**.

✓ **NOTE** The barcode scanner has a minimum cropping resolution of four pixels; increment and decrement cropping addresses in multiples of four. Other values are rounded up. For example, choosing to crop from the top at addresses 0, 1, or 2 (removing 1, 2, or 3 pixels) has the same result as cropping at address 3; this removes four rows from the top.

Top Pixel Address
(0 - 799 Decimal)

Left Pixel Address
(0 - 1279 Decimal)

Bottom Pixel Address
(0 - 799 Decimal)

Right Pixel Address
(0 - 1279 Decimal)

Crop to Pixel Addresses (SE4750)

SSI # F4h F0h 3Bh (Top)
SSI # F4h F0h 3Ch (Left)
SSI # F4h F0h 3Dh (Bottom)
SSI # F4h F0h 3Eh (Right)

Parameter # 315 (Top)

Parameter # 316 (Left)

Parameter # 317 (Bottom)

Parameter # 318 (Right)

If *Image Cropping* is enabled, set the pixel addresses from (0,0) to (1279, 959) to crop to.

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

Top = 955, Bottom = 959, Left = 1271, Right = 1279

To set the pixel address to crop to, scan each Pixel Address bar code followed by four bar codes from *Appendix B, Numeric Bar Codes* which represent the value. Include leading zeros, so to enter a value of 3, for example, scan **0**, **0**, **0**, **3**.

✓ *NOTE*   The barcode scanner has a minimum cropping resolution of four pixels; increment and decrement cropping addresses in multiples of four. Other values are rounded up. For example, choosing to crop from the top at addresses 0, 1, or 2 (removing 1, 2, or 3 pixels) has the same result as cropping at address 3; this removes four rows from the top.

Top Pixel Address
(0 - 959 Decimal)

Left Pixel Address
(0 - 1279 Decimal)

Bottom Pixel Address
(0 - 959 Decimal)

Right Pixel Address
(0 - 1279 Decimal)

Image Resolution

SSI # F0h 2Eh
Parameter # 302

This option alters image resolution before compression. Rows and columns are removed from the image, resulting in a smaller image containing the original content with reduced resolution.

Select one of the following values:

Table 2-2 *Resolution and Image Sizes*

Resolution Value	Uncropped Image Size		
	SE3300, SE4500	SE4710	SE4750
Full	752 x 480	1280 x 800	1280 x 960
1/2	376 x 240	640 x 400	640 x 480
1/4	188 x 120	320 x 200	320 x 240

***Full Resolution
(00h)**

**1/2 Resolution
(01h)**

**1/4 Resolution
(03h)**

Image Brightness (Target White)

SSI # F0h 86h
Parameter # 390

This parameter sets the Target White value used in Snapshot and Video modes when using autoexposure. White and black are defined as 240 decimal and 1, respectively. Setting the value to the default of 180 results in a white level of ~180 for the image.

To set the Image Brightness parameter, scan **Image Brightness** below followed by three numeric bar codes representing the value. Include leading zeros. For example, to set an Image Brightness value of 99, scan 0, 9, 9. See *Appendix B, Numeric Bar Codes* for numeric bar codes.

*180

**Image Brightness
(3 digits)**

Image File Format Selector

SSI # F0h 30h
Parameter # 304

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

**BMP File Format
(03h)**

***JPEG File Format
(01h)**

**TIFF File Format
(04h)**

JPEG Image Options

SSI # F0h 2Bh
Parameter # 299

JPEG images can be optimized for either size or for quality. Scan the **Quality Selector** bar code to enter a quality value; the barcode scanner then selects the corresponding image size. Scan the **Size Selector** bar code to   enter a size value; the barcode scanner then selects the best image quality.

***JPEG Quality Selector
(01h)**

**JPEG Size Selector
(00h)**

JPEG Quality and Size Value

JPEG Quality = S SI # F0h 31h
Parameter # 305
JPEG Size =   SSI # F1h 31h
Parameter # 561

If you select JPEG Quality Selector, scan the **JPEG Quality Value** bar code followed by 3 bar codes from *Appendix B, Numeric Bar Codes* corresponding to a value from 5 to 100, where 100 represents the highest quality image.

If you select JPEG Size Selector, scan **JPEG Size Value** followed by 3 bar codes from *Appendix B, Numeric Bar Codes* corresponding to a value from 5 to 350 which represents the file size in multiples of 1024 bytes (1K). For example, setting this value to 8 (008) permits the file size to be as large as 8192 bytes.

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

JPEG Size Value
(Default: 160)
(5 - 350 Decimal)

Image File Meta Data

SSI # F1h B5h
Parameter # 693

Enable this option to tag images transmitted in JPEG format with the following EXIF 2.2 standard data fields:

- Time (since power up)
- Sensor used
- Device name
- Manufacturer
- Frame rate
- Host type
- Image number (since power up)
- Image Enhancement parameter setting
- Image Edge Sharpness parameter setting
- Image Contract Enhancement parameter setting.

This parameter has no effect on images transmitted in TIFF or BMP format.

**Enable Image File Meta Data
(01h)**

***Disable Image File Meta Data
(00h)**

Image Enhancement

SSI # F1h 34h
Parameter # 564

This feature uses a combination of edge sharpening and contrast enhancement to produce an image that is visually pleasing. If you select **User**, also set the *Image Edge Sharpening on page 2-20* and *Image Contrast Enhancement on page 2-21* to enhance the image.

The levels of image enhancement are:

- Off (0)
- Low (1) - Default
- Med (2)
- High (3)
- User (4).

Off
(0)

*Low
(1)

Medium
(2)

High
(3)

User
(4)

Image Edge Sharpening

SSI # F1h 98h
Parameter # 664

This feature uses an edge sharpening technique, and only applies if you set the *Image Enhancement* parameter to **User**. To set this parameter, scan the **Image Edge Sharpening** bar code, followed by three numeric bar codes in *Appendix B, Numeric Bar Codes* that represent the image edge sharpening value. Alternatively, to set a recommended value, scan one of the value bar codes below.

Recommended settings are:

- Off (0)
- Low (30) - Default
- Med (75)
- High (100).

Image Edge Sharpening

**Off
(0)**

***Low
(30)**

**Medium
(75)**

**High
(100)**

Image Contrast Enhancement

SSI # F1h 9Ah
Parameter # 666

Enable this feature to enhance the contrast of an image. This parameter only applies if you set the *Image Enhancement* parameter to **User**.

Disable
(00h)

*Enable
(01h)

Image Rotation

SSI # F1h 99h
Parameter # 665

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

*Rotate 0°
(00h)

Rotate 90°
(01h)

Rotate 180°
(02h)

Rotate 270°
(03h)

Bits per Pixel

SSI # F0h 2Fh
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. The barcode scanner ignores these settings for JPEG files, which always use 8 BPP.

1 BPP
(00h)

4 BPP
(01h)

*8 BPP
(02h)

Signature Capture SSI # 5Dh
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 D, 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
(01h)**

***Disable Signature Capture
(00h)**

Signature Capture Image File Format Selection

SSI # F0h, 39h
Parameter # 313

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

**BMP Signature Format
(03h)**

***JPEG Signature Format
(01h)**

**TIFF Signature Format
(04h)**

Signature Capture Bits Per Pixel

SSI # F0h, 3Ah
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 scanner ignores these settings for JPEG file formats, which only support **8 BPP**.

1 BPP
(00h)

4 BPP
(01h)

*8 BPP
(02h)

Signature Capture Width

SSI # F4h, F0h, 6Eh
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 for the SE3300/SE4500, scan the **Signature Capture Width for the SE3300/SE4500** bar code, followed by 3 bar codes from *Appendix B, Numeric Bar Codes* corresponding to a value in the range of 001 to 752 decimal.

To set the width of the signature capture box for the SE4710, and SE4750, scan the **Signature Capture Width for the SE4710/SE4750** bar code, followed by 4 bar codes from *Appendix B, Numeric Bar Codes* corresponding to a value in the range of 0001 to 1280.

**Signature Capture Width for the SE3300/SE4500
(Default: 400)
(001 - 752 Decimal)**

**Signature Capture Width for the SE4710/SE4750
(Default: 400)
(001 - 1280 Decimal)**

Signature Capture Height

SSI # F4h, F0h, 6Fh
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 B, Numeric Bar Codes* corresponding to a value in the range of 001 to 480 decimal for the SE3300/SE4500, 001 to 800 for the SE4710, and 001 to 960 for the SE4750.

**Signature Capture Height (Default: 100)
(SE3300/SE4500: 001 - 480 Decimal)
(SE4710: 001 - 800 Decimal)
(SE4750: 001 - 960 Decimal)**

Signature Capture JPEG Quality

SSI # F0h, A5h
Parameter # 421

Scan the **JPEG Quality Value** bar code followed by 3 bar codes from *Appendix B, 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)

Video View Finder

SSI # F0h 44h
Parameter # 324

Select **Enable Video View Finder** to project the video view finder while in Image Mode, or **Disable Video View Finder** to turn the video view finder off.

*Disable Video View Finder
(00h)

Enable Video View Finder
(01h)

Target Video Frame Size

SSI # F0h 48h
Parameter # 328

Select the number of 100-byte blocks to transmit per second. Selecting a smaller value transmits more frames per second but reduces video quality; selecting a larger value increases video quality but slows transmission.

To set the Target Video Frame Size, scan the bar code below followed by three bar codes from *Appendix B, Numeric Bar Codes* corresponding to the 100-byte value from 800 to 20,000 bytes. For example, to select 1500 bytes, enter 0, 1, 5. To select 900 bytes, enter 0, 0, 9. The default is 2200 bytes.

Target Video Frame Size

Video View Finder Image Size

SSI # F0h 49h
Parameter # 329

Select the number of 100-byte blocks. Values range from 800 to 12,000 bytes. Selecting a smaller value transmits more frames per second; selecting a larger value increases video quality.

To set the Video View Finder Image Size, scan the bar code below followed by three bar codes from *Appendix B, Numeric Bar Codes* corresponding to the 100-byte value from 800 to 12,000 bytes. For example, to select 1500 bytes, enter 0, 1, 5. To select 900 bytes, enter 0, 0, 9. The default is 1700 bytes.

Video View Finder Image Size

Video Resolution

SSI # F1h 9Bh
Parameter # 411

This parameter alters the video resolution before transmission. Rows and columns are removed from the image, resulting in a smaller video image containing the original content with reduced resolution.

Select one of the following values:

Table 2-3 *Resolution and Video Image Sizes*

Resolution Value	Video Image Size		
	SE3300, SE4500	SE4710	SE4750
Full	752 x 480	1280 x 800	1280 x 960
1/2	376 x 240	640 x 400	640 x 480
1/4	188 x 120	320 x 200	320 x 240

Full Resolution
(00h)

1/2 Resolution
(01h)

*1/4 Resolution
(03h)

CHAPTER 3

OCR PROGRAMMING

Introduction

This chapter describes how to set up the barcode scanner for OCR programming. The barcode scanner 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 3-1 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 3-3*.

Table 3-1   *OCR Programming Default Table*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
OCR Programming Parameters				
OCR-A	F1h A8h	680	Disable	*3-3*
OCR-A Variant	F1h ACh	685	Full ASCII	*3-3*
OCR-B	F1h A9h	681	Disable	*3-5*
OCR-B Variant	F1h ADh	685	Full ASCII	*3-6*
MICR E13B	F1h AAh	682	Disable	*3-9*
US Currency	F1h ABh	683	Disable	*3-10*
OCR Orientation	F1h AFh	687	0º	*3-10*
OCR Lines	F1h B3h	691	1	*3-12*
OCR Minimum Characters	F1h B1h	689	3	*3-12*
OCR Maximum Characters	F1h B2h	690	100	*3-13*
OCR Subset	F1h AEh	686	Selected font variant	*3-13*
OCR Quiet Zone	F1h B7h	695	50	*3-14*
OCR Template	F1h 23h	547	54R	*3-14*
OCR Check Digit Modulus	F1h B0h	688	1	*3-23*
OCR Check Digit Multiplier	F1h BCh	700	121212121212	*3-24*
OCR Check Digit Validation	F1h B6h	694	None	*3-25*
Inverse OCR	F2h 58h	856	Regular	*3-29*

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

OCR Programming Parameters

Enable/Disable OCR-A

SSI # F1h A8h
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 3-13* and *OCR Template on page 3-14*.

✓ **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

*Disable OCR-A

OCR-A Variant

SSI # F1 ACh
Parameter # 685

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<> ⑂⑃⑆

OCR-A Variant (continued)

Special banking characters output as the following representative characters:

Ⴤ   outputs as f

Ⴤ   outputs as c

♩   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
(00h)

OCR-A Reserved 1
(01h)

OCR-A Reserved 2
(02h)

OCR-A Banking
(03h)

Enable/Disable OCR-B

SSI # F1h A9h
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 3-13* and *OCR Template on page 3-14*.

✓ *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

*Disable OCR-B

OCR-B Variant

SSI # F1h ADh
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 3-12*. 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 barcode scanner 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).
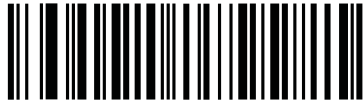
*OCR-B Full ASCII
(00h)

OCR-B Banking
(01h)

OCR-B Limited
(02h)

OCR-B ISBN 10-Digit Book Numbers
(06h)

OCR-B ISBN 10 or 13-Digit Book Numbers
(07h)

OCR-B Variant (continued)

OCR-B Travel Document Version 1 (TD1)
3 Line ID Cards
(03h)

OCR-B Travel Document Version 2 (TD2)
2-Line ID Cards
(08h)

Travel Document 2 or 3-Line ID Cards Auto-Detect
(14h)

OCR-B Visa Type A
(09h)

OCR-B Visa Type B
(0Ah)

OCR-B ICAO Travel Documents
(0Bh)

Enable/Disable MICR E13B

SSI # F1h AAh
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 3-13* and *OCR Template on page 3-14*.

> ✓ **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

*Disable MICR E13B

Enable/Disable US Currency Serial Number

SSI # F1h ABh
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 3-13* and *OCR Template on page 3-14*.

✓ **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

SSI # F1 AFh
Parameter # 687

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°
(00h)

OCR Orientation 270° Clockwise
(01h)

OCR Orientation 180° Clockwise
(02h)

OCR Orientation 90° Clockwise
(03h)

OCR Orientation Omnidirectional
(04h)

OCR Lines

SSI # F1 B3h
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 3-6*.

*OCR 1 Line
(001h)

OCR 2 Lines
(002h)

OCR 3 Lines
(003h)

OCR Minimum Characters

SSI # F1 B1h
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 B, 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

SSI # F1 B2h
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 B, 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

SSI # F1 AEh
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 *Set Default Parameter on page 1-5* and re-program the barcode scanner.

OCR Quiet Zone

SSI # F1h B7h
Parameter # 695

This option sets the OCR quiet zone. The barcode scanner 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

SSI # F1 23h
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

OCR Template (continued)

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

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<

OCR Template (continued)

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	WXY34	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

OCR Template (continued)

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

OCR Template (continued)

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

OCR Template (continued)

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

OCR Template (continued)

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 3-18*) that trigger the start of output
- t is one or more template characters

OCR Template (continued)

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 3-18*) 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

OCR Template (continued)

Repeat Previous (R)

[Barcode image]

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	AB34	AB34
	PN12345	PN12345
	32RM52700	No output

Scroll Until Match (S)

[Barcode image]

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 3-14* (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**. Up to 99 templates are permitted.

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

SSI # F1h B0h
Parameter # 688

✓ **NOTE**   This feature is currently only partially supported, and will be fully supported in future versions.

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 3-24*). 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

SSI # F1h BCh
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. PL3307 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 3-25*)

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

SSI # F1h B6h
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
(00h)**

Product Add Left to Right

Each character in the scanned data is assigned a numeric value (see *OCR Check Digit Multiplier on page 3-24*). 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
(03h)**

Product Add Right to Left

Each character in the scanned data is assigned a numeric value (see *OCR Check Digit Multiplier on page 3-24*). 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
(01h)**

Digit Add Left to Right

Each character in the scanned data is assigned a numeric value (see *OCR Check Digit Multiplier on page 3-24*). 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
(04h)**

Digit Add Right to Left

Each character in the scanned data is assigned a numeric value (see *OCR Check Digit Multiplier on page 3-24*). 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
(02h)**

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 3-24*). 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
(05h)**

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 3-24*). 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
(06h)**

Health Industry - HIBCC43

This is the health industry module 43 check digit standard.

**Health Industry - HIBCC43
(09h)**

Inverse OCR

SSI # F2h 58h
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
(00h)**

**Inverse Only
(01h)**

**Autodiscriminate
(02h)**

CHAPTER 4

SYMBOLOGIES

Introduction

This chapter describes symbology features and provides the programming bar codes for selecting these features.

The barcode scanner is shipped with the settings shown in *Table 4-1 on page 4-2*. If the default values suit requirements,   programming is not necessary.

To change a parameter value:

- Scan the appropriate bar codes in this guide. These new values replace the standard default values in memory.

✓ **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 the bar code can be seen clearly, and bars and/or spaces are not merging.

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

To return all features to default values, scan the *Set Default Parameter on page 1-5*. Throughout the programming bar code menus, asterisks (*) indicate default values.

* Indicates Default ——— *Enable UPC-A —— Feature/Option
(01h) —— Option Hex 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 4-19*. The barcode scanner issues a fast warble beep and the LED turns green, signifying   a successful parameter entry.

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

Errors While Scanning

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

Symbology Parameter Defaults

Table 4-1 lists the defaults for all symbologies parameters. To change the default values, scan the appropriate bar codes in this guide. These new values replace the standard default values in memory. To recall the default parameter values, scan the *Set Default Parameter on page 1-5*.

Table 4-1 *Parameter Defaults*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
Disable All Code Types				*4-8*
UPC/EAN				
UPC-A	01h	1	Enable	*4-9*
UPC-E	02h	2	Enable	*4-9*
UPC-E1	0Ch	12	Disable	*4-10*
EAN-8/JAN8	04h	4	Enable	*4-10*
EAN-13/JAN 13	03h	3	Enable	*4-11*
Bookland EAN	53h	83	Disable	*4-11*
Bookland ISBN Format	F1h 40h	576	ISBN-10	*4-12*
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	10h	16	Ignore	*4-13*

User-Programmable Supplementals
    Supplemental 1:
    Supplemental 2:
	
	F1h 43h
	F1h 44h
		
		579
		580
			n/a	*4-16*

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

Table 4-1   *Parameter Defaults (Continued)*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
UPC/EAN/JAN Supplemental Redundancy	50h	80	10	*4-16*
Decode UPC/EAN/JAN Supplemental AIM ID	F1h A0h	672	Combined	*4-17*
UPC Reduced Quiet Zone	F8h 05h 09h	1289	Disable	*4-18*
Transmit UPC-A Check Digit	28h	40	Enable	*4-19*
Transmit UPC-E Check Digit	29h	41	Enable	*4-19*
Transmit UPC-E1 Check Digit	2Ah	42	Enable	*4-20*
UPC-A Preamble	22h	34	System Character	*4-20*
UPC-E Preamble	23h	35	System Character	*4-20*
UPC-E1 Preamble	24h	12	System Character	*4-22*
Convert UPC-E to A	25h	37	Disable	*4-23*
Convert UPC-E1 to A	26h	38	Disable	*4-23*
EAN-8/JAN-8 Extend	27h	39	Disable	*4-24*
UCC Coupon Extended Code	55h	85	Disable	*4-24*
Coupon Report	F1h DAh	730	New Coupon Symbols	*4-25*
ISSN EAN	F1h 69h	617	Disable	*4-26*
Code 128				
Code 128	08h	8	Enable	*4-27*
Set Length(s) for Code 128	D1h, D2h	209, 210	Any Length	*4-27*
GS1-128 (formerly UCC/EAN-128)	0Eh	14	Enable	*4-28*
ISBT 128	54h	84	Enable	*4-29*
ISBT Concatenation	F1h 41h	577	Disable	*4-30*
Check ISBT Table	F1h 42h	578	Enable	*4-31*
ISBT Concatenation Redundancy	DFh	223	10	*4-31*
Code 128 Reduced Quiet Zone	F8h 04h B8h	1208	Disable	*4-32*
Ignore Code 128 <FNC4>	F8h 04h E6h	1254	Disable	*4-32*
Code 39				
Code 39	00h	0	Enable	*4-33*

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

Table 4-1 *Parameter Defaults (Continued)*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
Trioptic Code 39	0Dh	13	Disable	*4-33*
Convert Code 39 to Code 32 (Italian Pharmacy Code)	56h	86	Disable	*4-34*
Code 32 Prefix	E7h	231	Disable	*4-34*
Set Length(s) for Code 39	12h, 13h	18, 19	Length Within Range: 2 to 55	*4-35*
Code 39 Check Digit Verification	30h	48	Disable	*4-36*
Transmit Code 39 Check Digit	2Bh	43	Disable	*4-36*
Code 39 Full ASCII Conversion	11h	17	Disable	*4-37*
Buffer Code 39	71h	113	Disable	*4-38*
Code 39 Reduced Quiet Zone	F8h 04h B9h	1209	Disable	*4-40*
Code 93				
Code 93	09h	9	Disable	*4-40*
Set Length(s) for Code 93	1Ah, 1Bh	26, 27	Length Within Range: 4 to 55	*4-41*
Code 11				
Code 11	0Ah	10	Disable	*4-43*
Set Lengths for Code 11	1Ch, 1Dh	28, 29	Length Within Range: 4 to 55	*4-43*
Code 11 Check Digit Verification	34h	52	Disable	*4-45*
Transmit Code 11 Check Digit(s)	2Fh	47	Disable	*4-46*
Interleaved 2 of 5 (ITF)				
Interleaved 2 of 5 (ITF)	06h	6	Disable	*4-47*
Set Lengths for I 2 of 5	16h, 17h	22, 23	1 Length; Length = 14	*4-47*
I 2 of 5 Check Digit Verification	31h	49	Disable	*4-49*
Transmit I 2 of 5 Check Digit	2Ch	44	Disable	*4-49*
Convert I 2 of 5 to EAN 13	52h	82	Disable	*4-50*
I 2 of 5 Security Level	461h	1121	1	*4-51*
I 2 of 5 Reduced Quiet Zone	F8h 04h BAh	1210	Disable	*4-52*

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

Table 4-1   *Parameter Defaults (Continued)*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
Discrete 2 of 5 (DTF)				
Discrete 2 of 5	05h	5	Disable	*4-53*
Set Length(s) for D 2 of 5	14h, 15h	20, 21	1 Length; Length = 12	*4-53*
Codabar (NW - 7)				
Codabar	07h	7	Disable	*4-55*
Set Lengths for Codabar	18h, 19h	24, 25	Length Within Range: 5 to 55	*4-55*
CLSI Editing	36h	54	Disable	*4-57*
NOTIS Editing	37h	55	Disable	*4-57*
Codabar Upper or Lower Case Start/Stop Characters Detection	F2h 57h	855	Upper Case	*4-58*
MSI				
MSI	0Bh	11	Disable	*4-59*
Set Length(s) for MSI	1Eh, 1Fh	30, 31	Length Within Range: 4 to 55	*4-59*
MSI Check Digits	32h	50	One	*4-61*
Transmit MSI Check Digit	2Eh	46	Disable	*4-61*
MSI Check Digit Algorithm	33h	51	Mod 10/Mod 10	*4-62*
Chinese 2 of 5				
Chinese 2 of 5	F0h 98h	408	Disable	*4-62*
Matrix 2 of 5				
Matrix 2 of 5	F1h 6Ah	618	Disable	*4-63*
Matrix 2 of 5 Lengths	F1h 6Bh F1h 6Ch	619, 620	Length; Length = 14	*4-64*
Matrix 2 of 5 Check Digit	F1h 6Eh	622	Disable	*4-65*
Transmit Matrix 2 of 5 Check Digit	F1h 6Fh	623	Disable	*4-65*
Korean 3 of 5				
Korean 3 of 5	F1h 45h	581	Disable	*4-66*
Inverse 1D	F1h 4Ah	586	Regular	*4-67*

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

Table 4-1   *Parameter Defaults (Continued)*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
Postal Codes				
US Postnet	59h	89	Disable	*4-68*
US Planet	5Ah	90	Disable	*4-68*
Transmit US Postal Check Digit	5Fh	95	Enable	*4-69*
UK Postal	5Bh	91	Disable	*4-69*
Transmit UK Postal Check Digit	60h	96	Enable	*4-70*
Japan Postal	F0h 22h	290	Disable	*4-70*
Australia Post	F0h 23h	291	Disable	*4-71*
Australia Post Format	F1h CEh	718	Autodiscriminate	*4-72*
Netherlands KIX Code	F0h 46h	326	Disable	*4-73*
USPS 4CB/One Code/Intelligent Mail	F1h 50h	592	Disable	*4-73*
UPU FICS Postal	F1h 63h	611	Disable	*4-74*
GS1 DataBar				
GS1 DataBar (GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional)	F0h 52h	338	Enable	*4-75*
GS1 DataBar Limited	F0h 53h	339	Disable	*4-76*
GS1 DataBar Limited Security Level	F1h D8h	728	3	*4-77*
GS1 DataBar Expanded (GS1 DataBar Expanded, GS1 DataBar Expanded Stacked)	F0h 54h	340	Enable	*4-78*
Convert GS1 DataBar to UPC/EAN	F0h 8Dh	397	Disable	*4-78*
Composite				
Composite CC-C	F0h 55h	341	Disable	*4-79*
Composite CC-A/B	F0h 56h	342	Disable	*4-79*
Composite TLC-39	F0h 73h	371	Disable	*4-80*
UPC Composite Mode	F0h 58h	344	UPC Always Linked	*4-80*
Composite Beep Mode	F0h 8Eh	398	Beep As Each Code Type is Decoded	*4-81*
GS1-128 Emulation Mode for UCC/EAN Composite Codes	F0h ABh	427	Disable	*4-81*

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

Table 4-1   *Parameter Defaults (Continued)*

Parameter	SSI Number [1]	Parameter Number [2]	Default	Page Number
2D Symbologies				
PDF417	0Fh	15	Enable	*4-82*
MicroPDF417	E3h	227	Disable	*4-82*
Code 128 Emulation	7Bh	123	Disable	*4-83*
Data Matrix	F0h 24h	292	Enable	*4-84*
Data Matrix Inverse	F1h 4Ch	588	Regular	*4-84*
Decode Mirror Images (Data Matrix Only)	F1h 19h	537	Auto	*4-85*
Maxicode	F0h 26h	294	Disable	*4-86*
QR Code	F0h 25h	293	Enable	*4-86*
QR Inverse	F1h 4Bh	587	Regular	*4-87*
MicroQR	F1h 3Dh	573	Enable	*4-87*
Aztec	F1h 3Eh	574	Enable	*4-88*
Aztec Inverse	F1h 4Dh	589	Inverse Autodetect	*4-88*
Han Xin	F8h 04h 8Fh	1167	Disable	*4-89*
Han Xin Inverse	F8h 04h 90h	1168	Regular	*4-89*
Symbology-Specific Security Levels				
Redundancy Level	4Eh	78	1	*4-90*
Security Level (UPC/EAN and Code 93)	4Dh	77	1	*4-92*
1D Quiet Zone Level	F8h 05h 08h	1288	1	*4-93*
Intercharacter Gap Size	F0h 7Dh	381	Normal	*4-94*
Macro PDF				
Macro PDF Transmit/Decode Mode Symbols	BCh	188	Passthrough Mode	*4-96*
Transmit Macro PDF Control Header	B8h	184	Enable	*4-97*
Escape Characters	E9h	233	None	*4-97*
Flush Macro PDF Buffer	n/a	n/a	n/a	*4-98*
Abort Macro PDF Entry	n/a	n/a	n/a	*4-98*

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

Disable All Code Types

To disable all symbologies, scan the bar code below. This is useful when enabling only a few code types.

Disable All Code Types

UPC/EAN

Enable/Disable UPC-A

SSI # 01h
Parameter # 1

To enable or disable UPC-A, scan the appropriate bar code below.
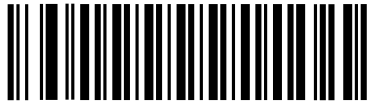
***Enable UPC-A
(01h)**

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

Enable/Disable UPC-E

SSI # 02h
Parameter # 2

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

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

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

Enable/Disable UPC-E1

SSI # 0Ch
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
(01h)**

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

Enable/Disable EAN-8/JAN-8

SSI # 04h
Parameter # 4

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

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

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

Enable/Disable EAN-13/JAN-13

SSI # 03h
Parameter # 3

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

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

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

Enable/Disable Bookland EAN

SSI # 53h
Parameter # 83

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

Enable Bookland EAN
(01h)

*Disable Bookland EAN
(00h)

> ✓ **NOTE**   If Bookland EAN is enabled, select a *Bookland ISBN Format on page 4-12*. 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 4-13*.

Bookland ISBN Format

SSI # F1h 40h
Parameter # 576

If Bookland EAN is enabled, select one of the following formats for Bookland data:

- **Bookland ISBN-10** - The barcode scanner reports Bookland data starting with 978 in traditional 10-digit format   with the special Bookland check digit for backward-compatibility. Data starting with 979 is not considered Bookland in this mode.

- **Bookland ISBN-13** - The barcode scanner reports Bookland data (starting with either 978 or 979) as EAN-13 in   13-digit format to meet the 2007 ISBN-13 protocol.

*Bookland ISBN-10
(00h)

Bookland ISBN-13
(01h)

NOTE   For Bookland EAN to function properly, ensure Bookland EAN is enabled (see *Enable/Disable Bookland   EAN on page 4-11*), 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 4-13*.

Decode UPC/EAN/JAN Supplementals

SSI # 16
Parameter # 10h

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

- If you select **Ignore UPC/EAN with Supplementals**, and the barcode scanner is presented with a UPC/EAN plus supplemental symbol, the barcode scanner decodes UPC/EAN and ignores the supplemental characters.

- If you select **Decode UPC/EAN with Supplementals**, the barcode scanner only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.

- If you select **Autodiscriminate UPC/EAN Supplementals**, the barcode scanner decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the barcode scanner must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 4-16* before transmitting its data to confirm that there is no supplemental.

- If you select one of the following **Supplemental Mode** options, the barcode scanner immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not
have a supplemental, the barcode scanner must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 4-16* before transmitting its data to confirm that there is no supplemental. The barcode scanner transmits UPC/EAN bar codes that do not have that prefix immediately.

  - **Enable 378/379 Supplemental Mode**

  - **Enable 978/979 Supplemental Mode**

  ✓ *NOTE* If you select 978/979 Supplemental Mode and are scanning Bookland EAN bar codes, see *Enable/Disable Bookland EAN on page 4-11* to enable Bookland EAN, and select a format using *Bookland ISBN Format on page 4-12*.

  - **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 4-16*.

  - **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 4-16*.

  - **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 4-16*.

  - **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 4-16*.

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

Decode UPC/EAN/JAN Supplementals (continued)

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

***Ignore Supplementals**
(00h)

Autodiscriminate UPC/EAN/JAN Supplementals
(02h)

Enable 378/379 Supplemental Mode
(04h)

Enable 978/979 Supplemental Mode
(05h)

Enable 977 Supplemental Mode
(07h)

Decode UPC/EAN/JAN Supplementals (continued)

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

Enable 491 Supplemental Mode
(08h)

Enable Smart Supplemental Mode
(03h)

Supplemental User-Programmable Type 1
(09h)

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

Smart Supplemental Plus User-Programmable 1
(0Bh)

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

User-Programmable Supplementals

SSI # F1h 43h
Supplemental 1: Parameter # 579

SSI # F1h 44h
Supplemental 2: Parameter # 580

If you selected a Supplemental User-Programmable option from *Decode UPC/EAN/JAN Supplementals on page 4-13*, select **User-Programmable Supplemental 1** to set the 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on *page B-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 B-1*.

User-Programmable Supplemental 1

User-Programmable Supplemental 2

UPC/EAN/JAN Supplemental Redundancy

SSI # 50h
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 B, Numeric Bar Codes*. Enter a leading zero for single digit numbers. To correct an error or change a selection, scan *Cancel on page B-2*.
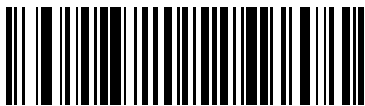
UPC/EAN/JAN Supplemental Redundancy

UPC/EAN/JAN Supplemental AIM ID Format

SSI # F1h A0h
Parameter # 672

Select an output format when reporting UPC/EAN/JAN bar codes with Supplementals with *Transmit Code ID Character on page 1-22* set to **AIM Code ID Character**:

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

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

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

    ]E3<data+supplemental data>

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

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

Separate
(00h)

***Combined**
(01h)

Separate Transmissions
(02h)

UPC Reduced Quiet Zone

SSI # F8h 05h 09h
Parameter # 1289

Scan one of the following bar codes to enable or disable decoding UPC bar codes with reduced quiet zones. If you select **Enable**, select a *1D Quiet Zone Level on page 4-93*.

Enable UPC Reduced Quiet Zone
(1)

*Disable UPC Reduced Quiet Zone
(0)

Transmit UPC-A Check Digit

SSI # 28h
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
(01h)

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

Transmit UPC-E Check Digit

SSI # 29h
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
(01h)

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

Transmit UPC-E1 Check Digit

SSI # 2Ah
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.
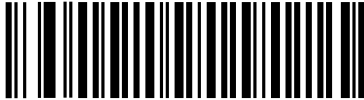
*Transmit UPC-E1 Check Digit
(01h)
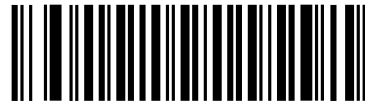
Do Not Transmit UPC-E1 Check Digit
(00h)

UPC-A Preamble

SSI # 22h
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>)
(00h)

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

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

UPC-E Preamble

SSI # 23h
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>)
(00h)

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

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

UPC-E1 Preamble

SSI # 24h
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.
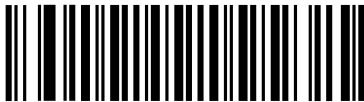
No Preamble (<DATA>)
(00h)

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

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

Convert UPC-E to UPC-A

SSI # 25h
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)
(01h)

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

Convert UPC-E1 to UPC-A

SSI # 26h
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)
(01h)

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

EAN-8/JAN-8 Extend

SSI # 27h
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
(01h)

*Disable EAN/JAN Zero Extend
(00h)

UCC Coupon Extended Code

SSI # 55h
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
(01h)

*Disable UCC Coupon Extended Code
(00h)

NOTE   See *UPC/EAN/JAN Supplemental Redundancy on page 4-16* to control autodiscrimination of the GS1-128 (right half) of a coupon code.

Coupon Report

SSI # F1h DAh
Parameter # 730

Traditional coupon symbols (old coupon symbols) are composed of two bar codes: UPC/EAN and Code128. A new coupon symbol is composed of a single Databar Expanded bar code. The new coupon format offers more options for purchase values (up to $999.99) and supports complex discount offers such as a second purchase requirement.

An interim coupon symbol also exists that contains both types of bar codes: UPC/EAN and Databar Expanded. This format accommodates both retailers that do not recognize or use the additional information included in the new coupon symbol, as well as those who can process new coupon symbols.

✓ *NOTE* The behavior described above applies when **UCC Coupon Extended Code** (parameter # 55 on *page 4-24*) is enabled. If disabled (default) then new coupons (GS1 Databar Expanded starting with 8110) decodes as a normal GS1 Expanded (RSS) bar code.

Scan a bar code below to select one of the following options for decoding coupon symbols:

- **Old Coupon Symbols** - Scanning an old coupon symbol reports both UPC and Code 128, scanning an interim coupon symbol reports UPC, and scanning a new coupon symbol reports nothing (no decode).

- **New Coupon Symbols** - Scanning an old coupon symbol reports either UPC or Code 128, and scanning an interim coupon symbol or a new coupon symbol reports Databar Expanded.

- **Both Coupon Formats** - Scanning an old coupon symbol reports both UPC and Code 128, and scanning an interim coupon symbol or a new coupon symbol reports Databar Expanded.

**Old Coupon Symbols
(00h)**

***New Coupon Symbols
(01h)**

**Both Coupon Formats
(02h)**

ISSN EAN

SSI # F1h 69h
Parameter # 617

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

Enable ISSN EAN
(01h)

*Disable ISSN EAN
(00h)

Code 128

Enable/Disable Code 128

SSI # 08h
Parameter # 8

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

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

Disable Code 128
(00h)

Set Lengths for Code 128

SSI #L1 = D1h, L2 = D2h
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.

✓ *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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Select this option to decode Code 128 symbols containing any number of characters within the barcode scanner's capability.

Set Lengths for Code 128 (continued)
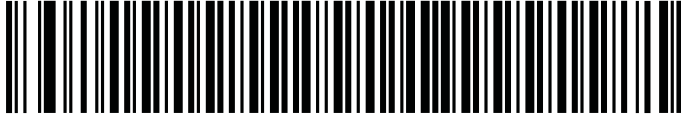
Code 128 - One Discrete Length

Code 128 - Two Discrete Lengths

Code 128 - Length Within Range
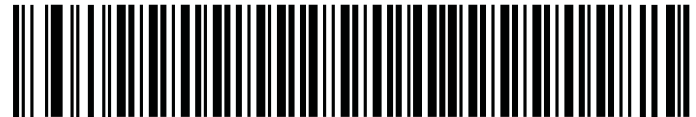
*Code 128 - Any Length

GS1-128 (formerly UCC/EAN-128)

SSI # 0Eh
Parameter # 14

To enable or disable GS1-128, scan the appropriate bar code below.
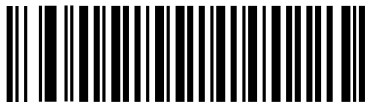
*Enable GS1-128
(01h)

Disable GS1-128
(00h)

ISBT 128

SSI # 54h
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
(01h)

Disable ISBT 128
(00h)

ISBT Concatenation

SSI # F1h 41h
Parameter # 577

Select an option for concatenating pairs of ISBT code types:

- If you select **Disable ISBT Concatenation**, the barcode scanner does not concatenate pairs of ISBT codes it encounters.

- If you select **Enable ISBT Concatenation**, there must be two ISBT codes in order for the barcode scanner to decode and perform concatenation. The barcode scanner does not decode single ISBT symbols.

- If you select **Autodiscriminate ISBT Concatenation**, the barcode scanner decodes and concatenates pairs of   ISBT codes immediately. If only a single ISBT symbol is present, the barcode scanner must decode the symbol   the number of times set via *ISBT Concatenation Redundancy on page 4-31* before transmitting its data   to confirm that there is no additional ISBT symbol.

***Disable ISBT Concatenation**
(00h)

Enable ISBT Concatenation
(01h)
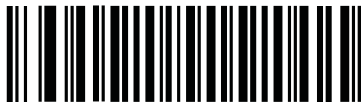
Autodiscriminate ISBT Concatenation
(02h)

Check ISBT Table

SSI # F1h 42h
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
(01h)**

**Disable Check ISBT Table
(00h)**

ISBT Concatenation Redundancy

SSI # DFh
Parameter # 223

If you set **ISBT Concatenation** to **Autodiscriminate,** use this parameter to set the number of times the barcode scanner 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 B, 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 B-2*. The default is 10.

ISBT Concatenation Redundancy

Code 128 Reduced Quiet Zone

SSI # F8h 04h B8h
Parameter # 1208

Scan one of the following bar codes to enable or disable decoding Code 128 bar codes with reduced quiet zones. If you select **Enable**, select a *1D Quiet Zone Level on page 4-93*.

Enable Code 128 Reduced Quiet Zone
(1)

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

Ignore Code 128 <FNC4>

SSI # F8h 04h E6h
Parameter # 1254

This feature applies to Code 128 bar codes with an embedded <FNC4> character. Enable this to strip the <FNC4> character from the decode data. The remaining characters do not change. When disabled, the <FNC4> character is not transmitted but the following character has 128 added to it.

Enable Ignore Code 128 <FNC4>
(1)

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

Code 39

Enable/Disable Code 39

SSI # 00h
Parameter # 0

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

*Enable Code 39
(01h)

Disable Code 39
(00h)

Enable/Disable Trioptic Code 39

SSI # 0Dh
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
(01h)

*Disable Trioptic Code 39
(00h)

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

Convert Code 39 to Code 32

SSI # 56h
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
(01h)**

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

Code 32 Prefix

SSI # E7h
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
(01h)**

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

Set Lengths for Code 39

SSI # L1 = 12h, L2 = 13h
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.

> ✓ **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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Select this option to decode Code 39 symbols containing any number of characters within the barcode scanner's capability.

Code 39 - One Discrete Length

Code 39 - Two Discrete Lengths

*Code 39 - Length Within Range

Code 39 - Any Length

Code 39 Check Digit Verification

SSI # 30h
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
(01h)

*Disable Code 39 Check Digit
(00h)

Transmit Code 39 Check Digit

SSI # 2Bh
Parameter # 43

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

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

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

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

Code 39 Full ASCII Conversion

SSI # 11h
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.
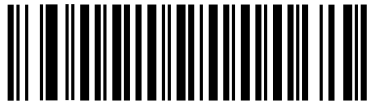
Enable Code 39 Full ASCII
(01h)

*Disable Code 39 Full ASCII
(00h)

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

Code 39 Buffering - Scan & Store

SSI # 71h
Parameter # 113

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

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

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

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

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

Buffer Code 39 (Enable)
(01h)

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

While there is data in the transmission buffer, you cannot select **Do Not Buffer Code 39**. The buffer holds 200 bytes of information.

To disable Code 39 buffering when there is data in the transmission buffer, first force the buffer transmission (see) or clear the buffer.

Buffer Data

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

- Unless the data overflows the transmission buffer, the barcode scanner issues a low/high beep to indicate   successful decode and buffering. (For overflow conditions, see .)

- The barcode scanner adds the decoded data excluding the leading space to the transmission buffer.

- No transmission occurs.

Clear Transmission Buffer

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

- The barcode scanner issues a short high/low/high beep.

- The barcode scanner erases the transmission buffer.

- No transmission occurs.

Clear Buffer

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

Transmit Buffer

There are two methods to transmit the Code 39 buffer.

1. Scan the **Transmit Buffer** bar code below, which includes only a start character, a plus (+), and a stop character.

2. The barcode scanner transmits and clears the buffer.

    • The barcode scanner issues a low/high beep.

Transmit Buffer

3. Scan a Code 39 bar code with a leading character other than a space.

    • The barcode scanner appends new decode data to buffered data.

    • The barcode scanner transmits and clears the buffer.

    • The barcode scanner signals that it transmitted the buffer with a low/high beep.

    • The barcode scanner transmits and clears the buffer.

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

Overfilling Transmission Buffer

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

    • The barcode scanner indicates that it rejected the symbol by issuing three long, high beeps.

    • No transmission occurs. The data in the buffer is not affected.

Attempt to Transmit an Empty Buffer

If you scan the **Transmit Buffer** symbol and the Code 39 buffer is empty:

    • A short low/high/low beep signals that the buffer is empty.

    • No transmission occurs.

    • The buffer remains empty.

Code 39 Reduced Quiet Zone

SSI # F8h 04h B9h
Parameter # 1209

Scan one of the following bar codes to enable or disable decoding Code 39 bar codes with reduced quiet zones. If you select **Enable**, select a .

**Enable Code 39 Reduced Quiet Zone
(1)**

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

Code 93

Enable/Disable Code 93

SSI # 09h
Parameter # 9

To enable or disable Code 93, scan the appropriate bar code below.
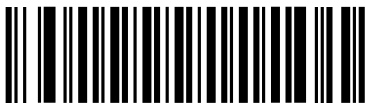
**Enable Code 93
(01h)**

***Disable Code 93
(00h)**

Set Lengths for Code 93

SSI # L1 = 1Ah, L2 = 1Bh
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.

- **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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Scan this option to decode Code 93 symbols containing any number of characters within the barcode scanner's capability.

Set Lengths for Code 93 (continued)

Code 93 - One Discrete Length

Code 93 - Two Discrete Lengths

*Code 93 - Length Within Range

Code 93 - Any Length

Code 11

Code 11

SSI # 0Ah
Parameter # 10

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

Enable Code 11
(01h)

*Disable Code 11
(00h)

Set Lengths for Code 11

SSI # L1 = 1Ch, L2 = 1Dh
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.

- **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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Scan this option to decode Code 11 symbols containing any number of characters within the barcode scanner'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

SSI # 34h
Parameter # 52

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

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

*Disable
(00h)

One Check Digit
(01h)

Two Check Digits
(02h)

Transmit Code 11 Check Digits

SSI # 2Fh
Parameter # 47

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

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

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

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

Interleaved 2 of 5 (ITF)

Enable/Disable Interleaved 2 of 5

SSI # 06h
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
(01h)

*Disable Interleaved 2 of 5
(00h)

Set Lengths for Interleaved 2 of 5

SSI # L1 = 16h, L2 = 17h
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.

- **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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Scan this option to decode I 2 of 5 symbols containing any number of characters within the barcode scanner'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)

||||| barcode |||||

*I 2 of 5 - One Discrete Length

||||| barcode |||||

I 2 of 5 - Two Discrete Lengths

||||| barcode |||||

I 2 of 5 - Length Within Range

||||| barcode |||||

I 2 of 5 - Any Length

I 2 of 5 Check Digit Verification

SSI # 31h
Parameter

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

*Disable
(00h)

USS Check Digit
(01h)

OPCC Check Digit
(02h)

Transmit I 2 of 5 Check Digit

SSI # 2Ch
Parameter

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

Transmit I 2 of 5 Check Digit (Enable)
(01h)

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

Convert I 2 of 5 to EAN-13

SSI # 52h
Parameter #

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

Convert I 2 of 5 to EAN-13 (Enable)
(01h)

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

I 2 of 5 Security Level

SSI # 461h
Parameter

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

- **I 2 of 5 Security Level 0:** This setting allows the barcode scanner to operate in its most aggressive state, while   providing sufficient security in decoding the most in-spec bar codes.

- **I 2 of 5 Security Level 1:** A bar code must be successfully read twice, and satisfy certain safety requirements before being decoded. This default setting eliminates most misdecodes.

- **I 2 of 5 Security Level 2:** Select this option with higher safety requirements to the bar codes if **Security Level 1** fails to eliminate misdecodes.

- **I 2 of 5 Security Level 3:** If you selected **Security Level 2**, and misdecodes still occur, select this security level. The highest safety requirements are applied. A bar code must be successfully read three times before being decoded.

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

**I 2 of 5 Security Level 0
(00h)**

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

**I 2 of 5 Security Level 2
(02h)**

**I 2 of 5 Security Level 3
(03h)**

I 2 of 5 Reduced Quiet Zone

SSI # F8h 04h BAh
Parameter # 1210

Scan one of the following bar codes to enable or disable decoding I 2 of 5 bar codes with reduced quiet zones. If you select **Enable**, select a *1D Quiet Zone Level on page 4-93*.

Enable I 2 of 5 Reduced Quiet Zone
(1)

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

Discrete 2 of 5 (DTF)

Enable/Disable Discrete 2 of 5

SSI # 05h
Parameter # 5

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

**Enable Discrete 2 of 5
(01h)**

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

Set Lengths for Discrete 2 of 5

SSI # L1 = 14h, L2 = 15h
Parameter # L1 = 20, L2 = 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 0 - 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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Scan this option to decode D 2 of 5 symbols containing any number of characters within the barcode scanner'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

SSI # 07h
Parameter # 7

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

**Enable Codabar
(01h)**

***Disable Codabar
(00h)**

Set Lengths for Codabar

SSI # L1 = 18h, L2 = 19h
Parameter # L1 = 24, L2 = 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.

- **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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Scan this option to decode Codabar symbols containing any number of characters within the barcode scanner's capability.

Set Lengths for Codabar (continued)

Codabar - One Discrete Length

Codabar - Two Discrete Lengths

*Codabar - Length Within Range

Codabar - Any Length

CLSI Editing

SSI # 36h
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
(01h)

*Disable CLSI Editing
(00h)

NOTIS Editing

SSI # 37h
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
(01h)

*Disable NOTIS Editing
(00h)

Codabar Upper or Lower Case Start/Stop Characters Detection

SSI # F2h 57h
Parameter # 855

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

Lower Case
(01h)

*Upper Case
(00h)

MSI

Enable/Disable MSI

SSI # 0Bh
Parameter # 11

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

Enable MSI
(01h)

*Disable MSI
(00h)

Set Lengths for MSI

SSI # L1 = 1Eh, L2 = 1Fh
Parameter # L1 = 30, L2 = 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.

- **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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Scan this option to decode MSI symbols containing any number of characters within the barcode scanner'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.
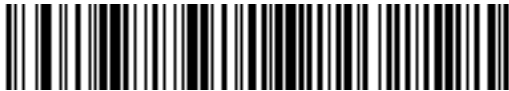
MSI - One Discrete Length

MSI - Two Discrete Lengths

*MSI - Length Within Range

MSI - Any Length

MSI Check Digits

SSI # 32h
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 4-62* for the selection of second digit algorithms.
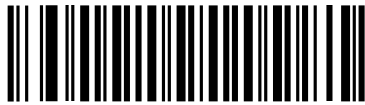
*One MSI Check Digit
(00h)

Two MSI Check Digits
(01h)

Transmit MSI Check Digit(s)

SSI # 2Eh
Parameter # 46

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

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

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

MSI Check Digit Algorithm

SSI # 33h
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.
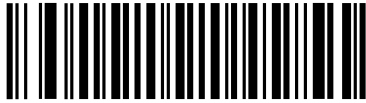
**MOD 10/MOD 11
(00h)**
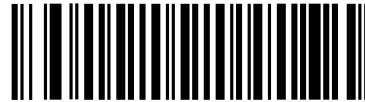
***MOD 10/MOD 10
(01h)**

Chinese 2 of 5

Enable/Disable Chinese 2 of 5

SSI # F0h 98h
Parameter # 408

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

**Enable Chinese 2 of 5
(01h)**

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

Matrix 2 of 5

Enable/Disable Matrix 2 of 5

SSI # F1h 6Ah
Parameter # 618

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

Enable Matrix 2 of 5
(01h)

*Disable Matrix 2 of 5
(00h)

Set Lengths for Matrix 2 of 5

SSI # L1 = F1h 6Bh, L2 = F1h 6Ch
Parameter # L1 = 619, L2 = 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.

- **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 B, 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 B-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 B, 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 B-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 B, 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 B-2*.

- **Any Length** - Scan this option to decode Matrix 2 of 5 symbols containing any number of characters within the barcode scanner's capability.

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

Matrix 2 of 5 - Two Discrete Lengths

Matrix 2 of 5 - Length Within Range

Matrix 2 of 5 - Any Length

Matrix 2 of 5 Check Digit

SSI # F1h 6Eh
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.
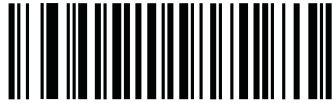
Enable Matrix 2 of 5 Check Digit
(01h)

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

Transmit Matrix 2 of 5 Check Digit

SSI # F1h 6Fh
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
(01h)

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

Korean 3 of 5

Enable/Disable Korean 3 of 5

SSI # F1h 45h
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
(01h)**

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

Inverse 1D

SSI # F1h 4Ah
Parameter # 586

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

- **Regular Only** - the barcode scanner decodes regular 1D bar codes only.

- **Inverse Only** - the barcode scanner decodes inverse 1D bar codes only.

- **Inverse Autodetect** - the barcode scanner decodes both regular and inverse 1D bar codes.

*Regular
(00h)

Inverse Only
(01h)

Inverse Autodetect
(02h)

Postal Codes

US Postnet

SSI # 59h
Parameter # 89

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

**Enable US Postnet
(01h)**

***Disable US Postnet
(00h)**

US Planet

SSI # 5Ah
Parameter # 90

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

**Enable US Planet
(01h)**

***Disable US Planet
(00h)**

Transmit US Postal Check Digit

SSI # 5Fh
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
(01h)

Do Not Transmit US Postal Check Digit
(00h)

UK Postal

SSI # 5Bh
Parameter # 91

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

Enable UK Postal
(01h)

*Disable UK Postal
(00h)

Transmit UK Postal Check Digit

SSI # 60h
Parameter # 96

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

*Transmit UK Postal
Check Digit
(01h)

Do Not Transmit UK Postal Check Digit
(00h)

Japan Postal

SSI # F0h, 22h
Parameter # 290

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

Enable Japan Postal
(01h)

*Disable Japan Postal
(00h)

Australia Post

SSI # F0h, 23h
Parameter # 291

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

**Enable Australia Post
(01h)**

***Disable Australia Post
(00h)**

Australia Post Format

SSI # F1h, CEh
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
(00h)

Raw Format
(01h)

Alphanumeric Encoding
(02h)

Numeric Encoding
(03h)

Netherlands KIX Code

SSI # F0h, 46h
Parameter # 326

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

**Enable Netherlands KIX Code
(01h)**

***Disable Netherlands KIX Code
(00h)**

USPS 4CB/One Code/Intelligent Mail

SSI # F1h 50h
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
(01h)**

***Disable USPS 4CB/One Code/Intelligent Mail
(00h)**

UPU FICS Postal

SSI # F1h 63h
Parameter # 611

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

Enable UPU FICS Postal
(01h)

*Disable UPU FICS Postal
(00h)

GS1 DataBar

GS1 DataBar types are:

- GS1 DataBar Omnidirectional
- GS1 DataBar Truncated
- GS1 DataBar Stacked
- GS1 DataBar Stacked Omnidirectional
- GS1 DataBar Limited
- GS1 DataBar Expanded
- GS1 DataBar Expanded Stacked

Scan the appropriate bar codes to enable or disable each type of GS1 DataBar.

GS1 DataBar

SSI # F0h 52h
Parameter # 338

Scan the appropriate bar code below to enable or disable the following code types:

- GS1 DataBar Omnidirectional
- GS1 DataBar Truncated
- GS1 DataBar Stacked
- GS1 DataBar Stacked Omnidirectional,

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

**Disable GS1 DataBar
(00h)**

GS1 DataBar Limited

SSI # F0h 53h
Parameter # 339

Enable GS1 DataBar Limited (01h)

*Disable GS1 DataBar Limited (00h)

GS1 DataBar Limited Security Level

SSI # F1h D8h
Parameter # 728

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

- Level 1 – No clear margin required. This complies with the original GS1 standard, yet might result in erroneous[1] decoding of the DataBar Limited bar code when scanning some UPC symbols that start with the 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. If a misdecode is detected, the barcode scanner operates   in Level 3 or Level 1.

- Level 3 – Security level reflects newly proposed GS1 standard that requires a 5X trailing clear margin.

- Level 4 – Security level extends beyond the standard required by GS1. This level of security requires a 5X leading and trailing clear margin.

Security Level 1
(01h)

Security Level 2
(02h)

***Security Level 3**
(03h)

Security Level 4
(04h)

1.May result in erroneous decoding due to Databar Limited and UPC symbologies.

GS1 DataBar Expanded

SSI # F0h 54h
Parameter # 340

Scan the appropriate bar code below to enable or disable the following code types:

- GS1 DataBar Expanded
- GS1 DataBar Expanded Stacked.

*Enable GS1 DataBar Expanded
(01h)

Disable GS1 DataBar Expanded
(00h)

Convert GS1 DataBar to UPC/EAN

SSI # F0h, 8Dh
Parameter # 397

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

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

Enable Convert GS1 DataBar to UPC/EAN
(01h)

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

Composite

Composite CC-C

SSI # F0h 55h
Parameter # 341

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

Enable CC-C
(01h)

*Disable CC-C
(00h)

Composite CC-A/B

SSI # F0h 56h
Parameter # 342

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

✓ *NOTE*   If you enable this code type, also see *UPC Composite Mode on page 4-80*.

Enable CC-A/B
(01h)

*Disable CC-A/B
(00h)

Composite TLC-39

SSI # F0h 73h
Parameter # 371

Scan a bar code below to enable or disable Composite bar codes of type TLC-39.
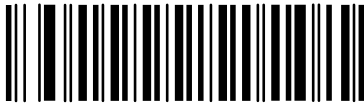
Enable TLC39
(01h)

***Disable TLC39**
(00h)

UPC Composite
Mode

SSI # F0h 58h
Parameter # 344

If you enable *Composite CC-A/B on page 4-79*, 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 barcode scanner determines if there is a 2D portion, then   transmits the UPC, as well as the 2D portion if present.

UPC Never Linked
(00h)

***UPC Always Linked**
(01h)

Autodiscriminate UPC Composites
(02h)

Composite Beep Mode

SSI # F0h, 8Eh
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
(00h)

*Beep as Each Code Type is Decoded
(01h)

Double Beep After Both are Decoded
(02h)

GS1-128 Emulation Mode for UCC/EAN Composite Codes

SSI # F0h, ABh
Parameter # 427

Select whether to enable or disable this mode.

Enable GS1-128 Emulation Mode for
UCC/EAN Composite Codes
(01h)

*Disable GS1-128 Emulation Mode for
UCC/EAN Composite Codes
(00h)

2D Symbologies

Enable/Disable PDF417

SSI # 0Fh
Parameter # 15

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

*Enable PDF417
(01h)

Disable PDF417
(00h)

Enable/Disable MicroPDF417

SSI # E3h
Parameter # 227

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

Enable MicroPDF417
(01h)
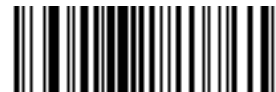
*Disable MicroPDF417
(00h)

Code 128 Emulation

SSI # 7Bh
Parameter # 123

Enable this parameter to transmit data from certain MicroPDF417 symbols as Code 128. *AIM Code ID Character (01h) on page 1-22* 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
(01h)**

***Disable Code 128 Emulation
(00h)**

Data Matrix

SSI # F0h, 24h
Parameter # 292

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

*Enable Data Matrix
(01h)

Disable Data Matrix
(00h)

Data Matrix Inverse

SSI # F1h 4Ch
Parameter # 588

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

- **Regular Only** - the barcode scanner decodes regular Data Matrix bar codes only.

- **Inverse Only** - the barcode scanner decodes inverse Data Matrix bar codes only.

- **Inverse Autodetect** - the barcode scanner decodes both regular and inverse Data Matrix bar codes.

*Regular
(00h)

Inverse Only
(01h)

Inverse Autodetect
(02h)

Decode Mirror Images (Data Matrix Only)

SSI # F1h 19h
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
(00h)**

**Always
(01h)**

*** Auto
(02h)**

Maxicode

SSI # F0h 26h
Parameter # 294

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

**Enable Maxicode
(01h)**

***Disable Maxicode
(00h)**

QR Code

SSI # F0h 25h
Parameter # 293

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

***Enable QR Code
(01h)**

**Disable QR Code
(00h)**

QR Inverse

SSI # F1h 4Bh
Parameter # 587

This parameter sets the QR inverse barcode scanner setting. Options are:

- **Regular Only** - the barcode scanner decodes regular QR bar codes only.

- **Inverse Only** - the barcode scanner decodes inverse QR bar codes only.

- **Inverse Autodetect** - the barcode scanner decodes both regular and inverse QR bar codes.

***Regular
(00h)**

**Inverse Only
(01h)**

**Inverse Autodetect
(02h)**

MicroQR

SSI # F1h 3Dh
Parameter # 573

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

***Enable MicroQR
(01h)**

**Disable MicroQR
(00h)**

Aztec

SSI # F1h 3Eh
Parameter # 574

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

||||||||||||||||||||||||||
*Enable Aztec
(01h)

||||||||||||||||||||||||||
Disable Aztec
(00h)

Aztec Inverse

SSI # F1h 4Dh
Parameter # 589

This parameter sets the Aztec inverse barcode scanner setting. Options are:

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

||||||||||||||||||||||||||
Regular
(00h)

||||||||||||||||||||||||||
Inverse Only
(01h)

||||||||||||||||||||||||||
*Inverse Autodetect
(02h)

Han Xin

SSI # F8h 04h 8Fh
Parameter # 1167

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

**Enable Han Xin
(01h)**

***Disable Han Xin
(00h)**

Han Xin Inverse

SSI # F8h 04h 90h
Parameter # 1168

Select a Han Xin inverse barcode scanner setting:

- **Regular Only** - the barcode scanner decodes Han Xin bar codes with normal reflectance only.

- **Inverse Only** - the barcode scanner decodes Han Xin bar codes with inverse reflectance only.

- **Inverse Autodetect** - the barcode scanner decodes both regular and inverse Han Xin bar codes.

***Regular
(00h)**

**Inverse Only
(01h)**

**Inverse Autodetect
(02h)**

Redundancy Level

SSI # 4Eh
Parameter # 78

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

Select the redundancy level appropriate for the bar code quality.

Redundancy Level 1

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

Table 12-2   *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 12-3   *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 12-4   *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 12-5 *Redundancy Level 4 Codes*

Code Type	Code Length
All	All

*Redundancy Level 1
(01h)

Redundancy Level 2
(02h)

Redundancy Level 3
(03h)

Redundancy Level 4
(04h)

Security Level

SSI # 4Dh
Parameter # 77

The barcode scanner offers four levels of decode security for delta bar codes, which include 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 barcode scanner aggressiveness, so choose only that level of security necessary for any given application.

- **Security Level 0:** This setting allows the barcode scanner 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 barcode scanner. If you need this level of security, try to improve the quality of the bar codes.

Security Level 0
(00h)
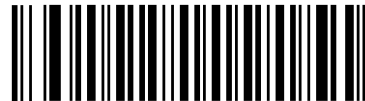
*Security Level 1
(01h)

Security Level 2
(02h)

Security Level 3
(03h)

1D Quiet Zone Level

SSI # F8h 05h 08h
Parameter # 1288

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

- 0 - The digital scanner performs normally in terms of quiet zone.

- 1 - The digital scanner performs more aggressively in terms of quiet zone.

- 2 - The digital scanner only requires one side EB (end of bar code) for decoding.

- 3 - The digital scanner decodes anything in terms of quiet zone or end of bar code.

1D Quiet Zone Level 0
(0)

*1D Quiet Zone Level 1
(1)

1D Quiet Zone Level 2
(2)

1D Quiet Zone Level 3
(3)

Intercharacter Gap Size

SSI # F0h, 7Dh
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 barcode scanner 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)**

Macro PDF Features

Macro PDF is a special feature for concatenating multiple PDF symbols into one file. The barcode scanner can decode   symbols that are encoded with this feature, and can store more than 64 Kb of decoded data stored in up to 50   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 sequence without interruption. When scanning a mixed sequence, two long low beeps (Low/Low) indicates an inconsistent file ID or inconsistent symbology error.

Macro PDF User Indications

In this mode the barcode scanner provides the following feedback.

Table 12-6   *Macro PDF User Indications*

User Scans	Passthrough All Symbols		Transmit Any Symbol in Set		Buffer All Symbols	
	Beep	T	Beep	T	Beep	T
Last Macro PDF in set	Decode Beep	Y	Decode Beep	Y	Decode Beep	Y
Any Macro PDF in set except last	Decode Beep	Y	Decode Beep	Y	2 Short Low	N
Macro PDF is not in current Set	Decode Beep	Y	2 Long Low	N	2 Long Low	N
Invalid formatted Macro PDF	Decode Beep	Y	2 Long Low	N	2 Long Low	N
Macro PDF from a set has already been scanned	Decode Beep	Y	4 Long Low	N	4 Long Low	N
Out of Macro PDF memory	n/a		3 Long Low	N	3 Long Low	N
Any non-Macro PDF scanned during a set	n/a	-	4 Long Low	N	4 Long Low	N
Flush Macro PDF	Low High	N	5 Long Low	N	5 Long Low	Y
Abort Macro PDF	High Low High Low	N	High Low High Low	N	High Low High Low	N

Notes:
1. The beep only sounds if the *BEEPER_ON signal is connected.
2. The column marked T indicates whether the symbol is transmitted to the host. N = No transmission.

Macro PDF Transmit / Decode Mode Symbols

SSI # BCh
Parameter # 188

Select one of the options below for handling Macro PDF decoding. In **Buffer All Symbols** the barcode scanner can   handle sets of up to 50 maximum-sized Macro PDF symbols. In all other modes there is no limit to the size of   the MacroPDF set.

- **Buffer All Symbols / Transmit Macro PDF When Complete**: This transmits all decode data from an entire Macro PDF sequence only when the entire sequence is scanned and decoded. Use the beeper and LED signals provided with the PL3307 when using this mode to ensure proper user feedback. If the decode data exceeds the limit of 50 symbols, there is no transmission because the entire sequence was not scanned. Use the parameter *Flush Macro Buffer on page 4-98* to purge the buffer.

- **Transmit Any Symbol in Set / No Particular Order**: This transmits data from each Macro PDF symbol as decoded, regardless of the sequence (although some error handling is performed; see *Table 4-6*). When selecting this mode, enable *Transmit Macro PDF Control Header on page 4-97*. Also use the beeper and LED signals provided with the PL3307 to ensure proper user feedback.

- **Passthrough All Symbols**: This transmits and decodes all Macro PDF symbols and performs no processing. In this mode the host is responsible for detecting and parsing the Macro PDF sequences.

  By using **Passthrough All Symbols** mode every user decode is transmitted to the host where the host software can provide the appropriate feedback.

Buffer All Symbols / Transmit Macro PDF When Complete
(00h)

Transmit Any Symbol in Set / No Particular Order
(01h)

*Passthrough All Symbols
(04h)

Transmit Macro PDF Control Header

SSI # B8h
Parameter # 184

When enabled, this activates transmission of the control header, which contains the segment index and the file ID, in Macro PDF symbols. For example, the field may be: \92800000\725\120\343. The five digits after the \928 are the segment index (or block index), and \725\120\343 is the file ID.

Enable this when selecting **Transmit Any Symbol in Set / No Particular Order** for the *Macro PDF Transmit / Decode Mode Symbols on page 4-96*, and disable this when selecting **Buffer All Symbols / Transmit Macro PDF When Complete**. This parameter has no effect when **Passthrough All Symbols** is selected.

***Enable Macro PDF Control Header Transmit
(01h)**

**Disable Macro PDF Control Header Transmit
(00h)**

Escape Characters

SSI # E9h
Parameter # 233

This enables the backslash (\) character as an Escape character for systems that can process transmissions containing special data sequences. Scan a bar code below to either format special data according to the GLI (Global Label Identifier) protocol, or to disable this parameter. This parameter only affects the data portion of a Macro PDF symbol transmission; the Macro PDF Control Header (if enabled) is always sent with GLI formatting.

**GLI Protocol
(02h)**

***None
(00h)**

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 5

INTELLIGENT DOCUMENT CAPTURE

Introduction

Intelligent Document Capture (IDC) is Zebra advanced image processing firmware for select imager based barcode scanners. 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 5-2*.

3. Processes the captured image. See *Image Post Processing on page 5-3*.

4. Transmits the data. See *Data Transmission on page 5-3*.

Bar Code Acceptance Test

Upon decoding a bar code, the barcode scanner 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 barcode scanner. 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 5-5* 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 5-16*. The barcode scanner 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 1-16* is enabled, the bar code must be directly under the aiming pattern, within the barcode scanner'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 5-9*. 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 barcode scanner 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 barcode scanner issues the standard decode beep and   the trigger can be released.

PC Application and Programming Support

For a sample application running on the Microsoft Windows operating system, contact your Zebra representative. This application displays bar code data and/or captured images from Intelligent Document Capture enabled barcode scanners 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 B, 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 5-1   *Intelligent Document Capture (IDC) Parameter Defaults*

Parameter	Parameter Name	SSI Number [1]	Parameter Number [2]	Default	Page Number
Intelligent Document Capture (IDC)					
IDC Operating Mode	DocCap_MODE	F1h 52h	594	Off	*5-5*
IDC Symbology	DocCap_SYMBOLOGY	F1h 8Fh	655	001	*5-6*
IDC X Coordinate	DocCap_X	F4h F1h 54h	596	-151	*5-7*
IDC Y Coordinate	DocCap_Y	F4h F1h 55h	597	-050	*5-7*
IDC Width	DocCap_WIDTH	F1h 56h	598	0300	*5-8*
IDC Height	DocCap_HEIGHT	F1h 57h	599	0050	*5-8*
IDC Aspect	DocCap_ASPECT	F1h 53h	595	000	*5-9*
IDC File Format Selector	DocCap_FMT	F1h 59h	601	JPEG	*5-9*
IDC Bits Per Pixel	DocCap_BPP	F1h 5Ah	602	8 BPP	*5-10*
IDC JPEG Quality	DocCap_JPEG_Qual	F1h 5Bh	603	065	*5-11*
IDC Find Box Outline	Sig_FINDBOX	F1h D7h	727	Disable	*5-11*
IDC Minimum Text Length	DocCap_MIN_TEXT	F1h 90h	656	00	*5-12*
IDC Maximum Text Length	DocCap_MAX_TEXT	F1h 91h	657	00	*5-12*
IDC Captured Image Brighten	Sig_BRIGHTEN	F1h 8Eh	654	Enable	*5-13*
IDC Captured Image Sharpen	Sig_SHARPEN	F1h 92h	658	Enable	*5-14*
IDC Border Type	DocCap_BORDER	F2h 3Dh	829	None	*5-15*
IDC Delay Time	DocCap_DELAY	F2h 3Eh	830	000	*5-16*
IDC Zoom Limit	Sig_MIN_PERCENT	F1h 8Bh	651	000	*5-16*
IDC Maximum Rotation	Sig_MAX_ROT	F1h 8Ch	652	00	*5-17*

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

IDC Operating Mode

Parameter Name: DocCap_MODE

SSI # F1h 52h
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.
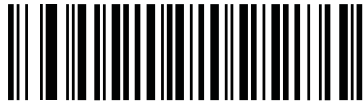
***Off
(00h)**

**Anchored
(01h)**

**Free-Form
(02h)**

**Linked
(03h)**

IDC Symbology

Parameter Name: DocCap_SYMBOLOGY

SSI # F1h 8Fh
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 B, Numeric Bar Codes* in the range of 000 to 255 decimal. The default is 001.

Table 5-2 *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

SSI # F4h F1h 54h
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 B, 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

SSI # F4h F1h 55h
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 B, 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

SSI # F1h 56h
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 B, Numeric Bar Codes* in the range of 0010 to 1279. The default is 0300.

IDC Width

IDC Height

Parameter Name: DocCap_HEIGHT

SSI # F1h 57h
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 B, Numeric Bar Codes* in the range of 0010 to 1023. The default is 0050.
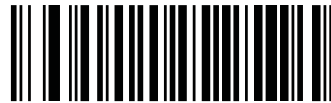
IDC Height

IDC Aspect

Parameter Name: DocCap_ASPECT

SSI # F1h 53h
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 B, Numeric Bar Codes* in the range of 000 to 255. The default is 000.

IDC Aspect

IDC File Format Selector

Parameter Name: DocCap_FMT

SSI # F1h 59h
Parameter # 601

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

*JPEG
(01h)

BMP
(03h)

TIFF
(04h)

IDC Bits Per Pixel

Parameter Name: DocCap_BPP

SSI # F1h 5Ah
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 barcode scanner ignores these settings for JPEG file formats, which only support 8 BPP.

1 BPP
(00h)

4 BPP
(01h)

*8 BPP
(02h)

IDC JPEG Quality

Parameter Name: DocCap_JPEG_Qual

SSI # F1h 5Bh
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 B, 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

SSI # F1h D7h
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
(00h)**

**Enable Find Box Outline
(01h)**

IDC Minimum Text Length

Parameter Name: DocCap_MIN_TEXT

SSI # F1h 90h
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 B, 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

SSI # F1h 91h
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 B, 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

SSI # F1h 8Eh
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
(00h)**

***Enable Captured Image Brighten
(01h)**

IDC Captured Image Sharpen

Parameter Name: Sig_SHARPEN

SSI # F1h 92h
Parameter # 658

Enable this to enhance the sharpness of the image.

NOTE   This parameter is also used for Signature Capture.

**Disable Captured Image Sharpen
(00h)**
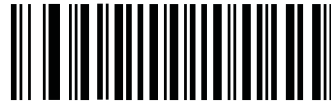
***Enable Captured Image Sharpen
(01h)**

IDC Border Type

Parameter Name: DocCap_BORDER

SSI # F2h 3Dh
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
(00h)**

**Black
(01h)**

**White
(02h)**

**Advanced Edge Detection (AED)
(03h)**

IDC Delay Time

Parameter Name: DocCap_DELAY

SSI # F2h 3Eh
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 B, 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

SSI # F1h 8Bh
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 B, 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

SSI # F1h 8Ch
Parameter # 652

Set the maximum rotation any edge of the form can have in relation to the barcode scanner'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 B, 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 5-19* 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 barcode scanner:

1. Connect a barcode scanner equipped with the Intelligent Document Capture feature to the host computer's USB port.

2. To set the barcode scanner 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 barcode scanner to reset and the USB connection to re-enumerate after each scan before continuing.

Set Defaults

Symbol Native API (SNAPI) with Imaging Interface

3. Start the sample application and select the barcode scanner in the **SNAPI Scanners** drop-down menu.

4. Set the parameters as specified in *IDC Demonstrations on page 5-19* 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 barcode scanner 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 barcode scanner after the first beep, but continue to hold the trigger or the barcode scanner may end the session before sending the data.

IDC Demonstrations

Anchored Mode Demo

Set parameters to these values:

Table 13-3   *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 barcode scanner 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 barcode scanner 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 barcode scanner 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 barcode scanner 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 barcode scanner 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 barcode scanner does not decode the bar   code and does not re-orient the captured image to the normal position, i.e., with the Zebra 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 barcode scanner 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 barcode scanner is held at less than ideal conditions.

Quick Start Form
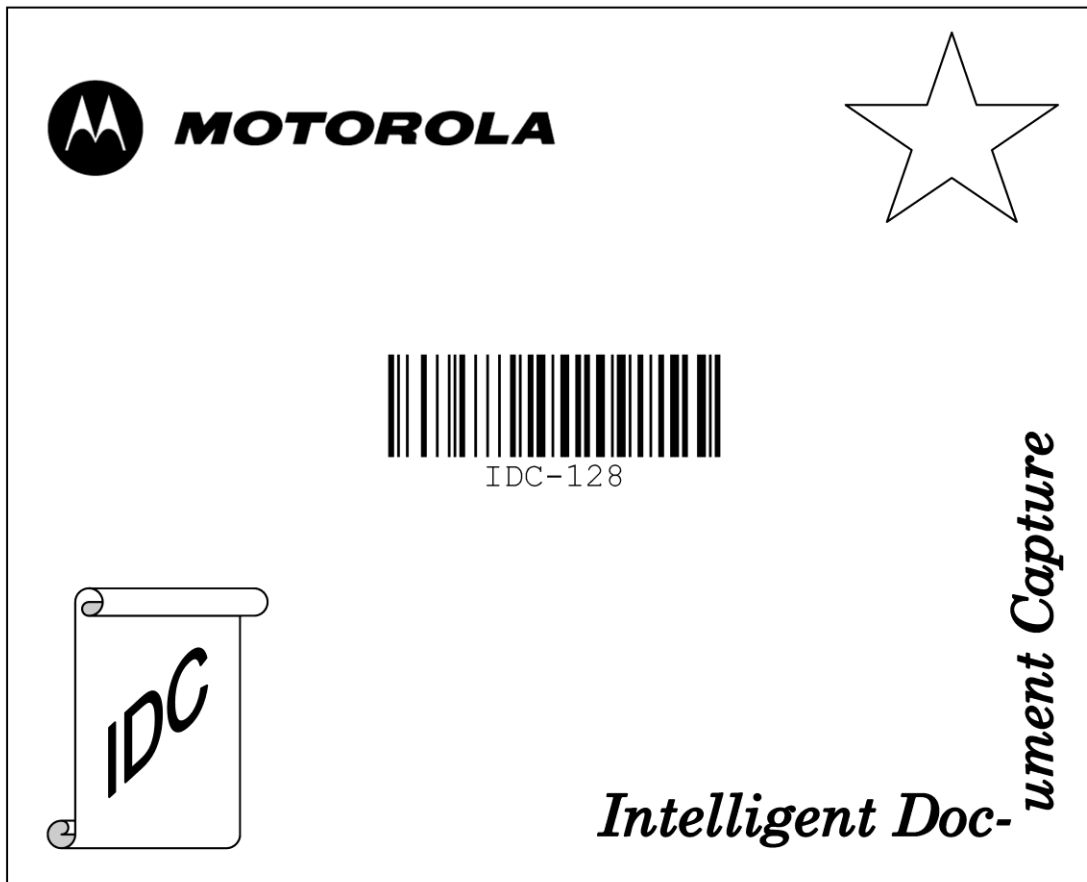
Figure 5-1   *Quick Start Form*

CHAPTER 6

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 barcode scanner with ADF rules.

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

APPENDIX A

PROGRAMMING REFERENCE

Symbol Code Identifiers

Table A-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   A-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
P0H	Han Xin

AIM Code Identifiers

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

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

Table A-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
h	Han Xin
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

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

Table A-3   *Modifier Characters*

Code Type	Option Value	Option
Code 39	0	No check character or Full ASCII processing.
	1	Reader has checked one check character.
	3	Reader has checked and stripped check character.
	4	Reader has performed Full ASCII character conversion.
	5	Reader has performed Full ASCII character conversion and checked one check character.
	7	Reader has performed Full ASCII character conversion and checked and stripped check character.
	Example: A Full ASCII bar code with check character W, **A+I+MI+DW**, is transmitted as **]A7**AIMID where 7 = (3+4).	
Trioptic Code 39	0	No option specified at this time. Always transmit 0.
	Example: A Trioptic bar code 412356 is transmitted as **]X0**412356	
Code 128	0	Standard data packet, no Function code 1 in first symbol position.
	1	Function code 1 in first symbol character position.
	2	Function code 1 in second symbol character position.
	Example: A Code (EAN) 128 bar code with Function 1 character ^{FNC1} in the first position, AIMID is transmitted as **]C1**AIMID	
I 2 of 5	0	No check digit processing.
	1	Reader has validated check digit.
	3	Reader has validated and stripped check digit.
	Example: An I 2 of 5 bar code without check digit, 4123, is transmitted as **]I0**4123	
Codabar	0	No check digit processing.
	1	Reader has checked check digit.
	3	Reader has stripped check digit before transmission.
	Example: A Codabar bar code without check digit, 4123, is transmitted as **]F0**4123	
Code 93	0	No options specified at this time. Always transmit 0.
	Example: A Code 93 bar code 012345678905 is transmitted as **]G0**012345678905	
MSI	0	Check digits are sent.
	1	No check digit is sent.
	Example: An MSI bar code 4123, with a single check digit checked, is transmitted as **]M1**4123	

Table A-3   *Modifier Characters (Continued)*

Code Type	Option Value	Option
D 2 of 5	0	No options specified at this time. Always transmit 0.
	Example: A D 2 of 5 bar code 4123, is transmitted as **]S0**4123	
UPC/EAN	0	Standard data packet in full EAN format, i.e. 13 digits for UPC-A, UPC-E, and EAN-13 (not including supplemental data).
	1	Two digit supplemental data only.
	2	Five digit supplemental data only.
	3	Combined data packet comprising 13 digits from EAN-13, UPC-A or UPC-E symbol and 2 or 5 digits from supplemental symbol.
	4	EAN-8 data packet.
	Example: A UPC-A bar code 012345678905 is transmitted as **]E0**0012345678905	
Bookland EAN	0	No options specified at this time. Always transmit 0.
	Example: A Bookland EAN bar code 123456789X is transmitted as **]X0**123456789X	
ISSN EAN	0	No options specified at this time. Always transmit 0.
	Example: An ISSN EAN bar code 123456789X is transmitted as **]X0**123456789X	
Code 11	0	Single check digit
	1	Two check digits
	3	Check characters validated but not transmitted.
GS1 DataBar Family		No option specified at this time. Always transmit 0. GS1 DataBar and GS1 DataBar Limited transmit with an Application Identifier "01". Note: In GS1-128 emulation mode, GS1 DataBar is transmitted using Code 128 rules (i.e.,]C1).
	Example: A GS1 DataBar bar code 0110012345678902 is transmitted as **]e**00110012345678902.	
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 A-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 barcode scanners are set to this mode, unbuffered Macro symbols and symbols requiring the barcode scanner 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 A-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 B

NUMERIC BAR CODES

Numeric Bar Codes

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

0
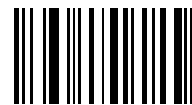
1

2

3

4

Numeric Bar Codes (continued)

5

6

7

8

9

Cancel

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

Cancel

APPENDIX C

ASCII CHARACTER SETS

Table C-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 C-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 C-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 C-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 C-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	l
1125	%R	}
1126	%S	~

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

Table C-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 C-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 C-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 C-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 C-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 C-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 C-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 D

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 D-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 D-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.
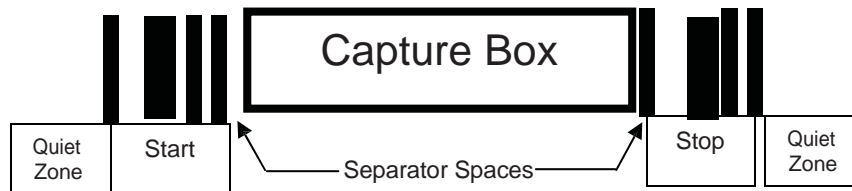

Figure D-2   *CapCode Structure*

The separator spaces on either side of the signature capture box can be between 1X and 3X wide.

Start / Stop Patterns

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 D-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 D-2 lists selectable parameters used to generate the image of the captured signature.

Table D-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 barcode scanner output is formatted according to *Table D-3*. Zebra barcode scanners 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 D-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 D-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.
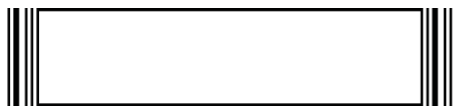
A scanner that captures signatures automatically determines whether it is scanning a signature or a bar code. You can disable the signature capturing capability in a barcode scanner.

Signature Boxes

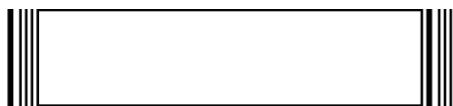*Figure D-3* illustrates the five acceptable signature boxes:

Type 2:

Type 5:

Type 7:

Type 8:

Type 9:

Figure D-3   *Acceptable Signature Boxes*

ZEBRA

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