SE3317WA
INTEGRATION GUIDE

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Warranty

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

Revision History

Changes to the original guide are listed below:

Change	Date	Description
Rev A	8/2013	Initial release

TABLE OF CONTENTS

Chapter 6: USB Interface

Chapter 7: Symbologies

ABOUT THIS GUIDE

Introduction

The *SE3317WA Integration Guide* discusses the theory of operation, installation, and specifications of the engine, and how to integrate the engine into data capture devices.

> ***NOTE*** This guide provides general instructions for the installation of the engine into a customer's device. Motorola recommends that an opto-mechanical engineer perform an opto-mechanical analysis prior to integration.

Chapter Descriptions

This guide includes the following topics:

- *Chapter 1, Getting Started* provides an overview of the engine and the theory of operation.
- *Chapter 2, Installation* explains how to install the engine, including information on grounding, ESD, and environmental considerations, as well as mounting, housing design, optical, and electrical information.
- *Chapter 3, Specifications* provides technical specifications for the engine, including decode ranges.
- *Chapter 4, User Preferences & Miscellaneous Options* describes features frequently used to customize how data transmits to the host device and programming bar codes for selecting user preference features for the engine.
- *Chapter 5, Imaging Preferences* provides imaging preference features and programming bar codes for selecting these features.
- *Chapter 6, USB Interface* describes how to set up the engine with a USB host.
- *Chapter 7, Symbologies* describes all symbology features and provides programming bar codes for selecting these features for the engine.
- *Chapter 8, 123Scan2* describes this PC-based scanner configuration tool which enables rapid and easy customized setup of Symbol scanners.
- *Chapter 9, Advanced Data Formatting* briefly describes ADF, a means of customizing data before transmission to the host device, and includes a reference to the *ADF Programmer Guide*.
- *Appendix A, Standard Default Parameters* provides a table of all host devices and miscellaneous defaults.

- *Appendix B, Programming Reference* provides a table of AIM code identifiers, ASCII character conversions, and keyboard maps.
- *Appendix C, Sample Bar Codes* includes sample bar codes of various code types.
- *Appendix D, Numeric Bar Codes* includes the numeric bar codes to scan for parameters requiring specific numeric values.

Notational Conventions

This document uses the following conventions:

- *Italics* are used to highlight chapters and sections in this and related documents
- bullets (•) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

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

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

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

Related Documents

- *Motorola Scanner SDK for Windows Developer's Guide*, p/n 72E-149784-xx
- *Aptina MT9V022 (mono) Wide VGA CMOS Digital Image Sensor Datasheet,* http://www.aptina.com

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

Service Information

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

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

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

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

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

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

CHAPTER 1 GETTING STARTED

CAUTION This device emits IEC Class 1M LED light. Do not view directly with optical instruments.

Introduction

The SE3317WA (SE3317 Wide Angle) is a 2D imager, and decoded engine optimized for capturing digital images for transmission to a host. The engine scans customer cell phones, and loyalty cards, and decodes additional bar codes of any format supported by the decoding software. The SE3317WA is based on the ATMEL AT91SAM9G20 architecture and utilizes the SE3300WA scan engine. Along with decoding 1D and 2D bar codes, it is also capable of transmitting video and images over the full speed USB 2.0 interface to the host.

The SE3317WA has an integrated infrared wakeup system that senses the presence of an object and attempts a decode session upon waking up. It has no mechanical trigger.

Theory of Operation

During image capture:

1. The image sensor array in the imager engine captures an image of the bar code through the engine's optical lens. If necessary, the engine automatically adjusts illumination, exposure, and other parameters to obtain the best quality image.
2. The decode within the imager engine processes the image to identify the target bar code(s), decodes them, and transmits the decoded data to the host.

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

Components and Features

The SE3317WA architecture is composed of an ARM core and related subsystems. The engine includes full speed USB 2.0 interface for power and data transfer.

The SE3317WA contains:

- a monochrome CMOS image sensor
- an LED based aiming system
- an illumination system
- Atmel AT91SAM9G20 processor core, 400 MHz
- 512 MB Mobile LPSDRAM
- 1 Gb asynchronous flash
- USB 2.0 full speed port for image and bar code data transfers

Figure 1-1 provides a block diagram of the imager system.

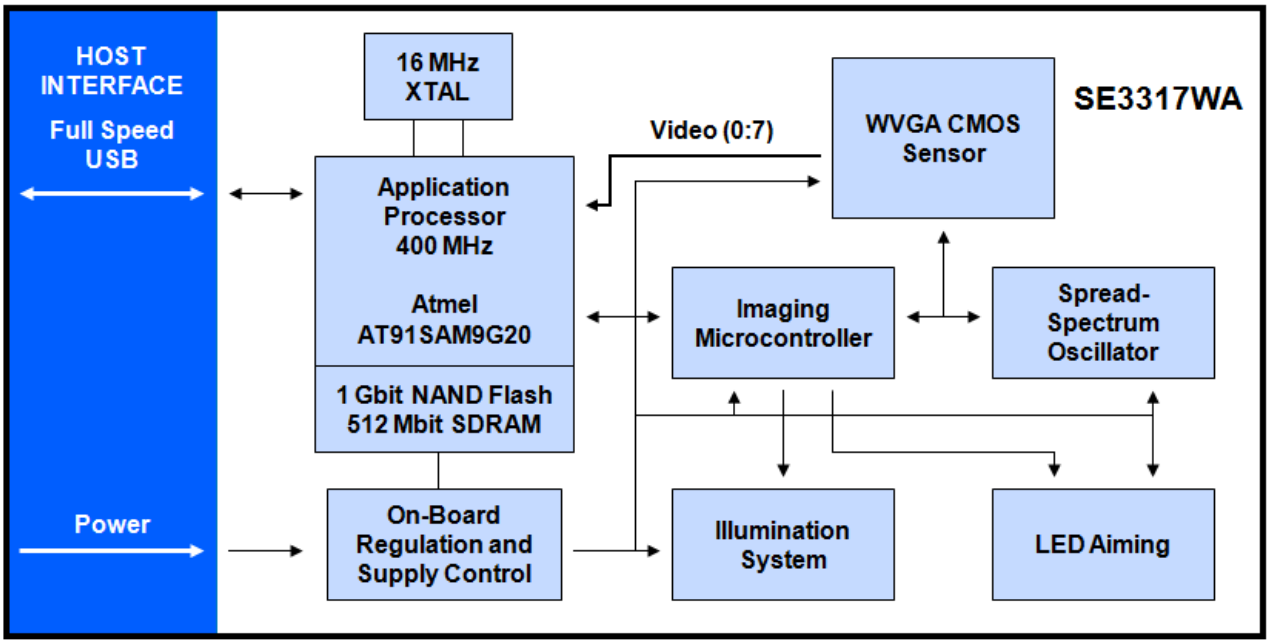


Figure 1-1 *SE3317WA Block Diagram*

The SE3317WA connects to a USB host via a Micro USB-B connector. A standard micro-USB type B to USB type A cable can be used.

The primary component of the SE3317WA imager is a 1/3" format CMOS wide VGA (752 H x 480 V) monochrome digital image sensor. The CMOS sensor converts photons to a digital representation (8 bits per pixel) of the image present on the sensor.

Atmel AT91SAM9G20 Processor

The digital system is built on an Atmel AT91SAM9G20, a RISC processor based on ARM v5TEJ architecture. The major features of the core are:

- CPU clock speed up to 400 MHz with external LP SDRAM bus speed of 133 MHz.
- 32 KB instruction/32 KB data cache, 256 KB instruction cache, 32 KB internal SRAM.

Aiming System

A 617 nm LED is used to generate a circular aiming pattern which indicates the center of the imager's field of view.

Aiming Pointing

The aiming pattern is rotated by 2.1^{o} relative to the imaging axis in the vertical plane to minimize parallax between the aiming axis and the imaging axis at 204 mm (8 in.) from the engine.

Illumination System

The illumination system consists of two high-output, red LEDs (625 nm) and a sophisticated drive system that allows image capture and decoding throughout a full range of lighting conditions (total darkness to full sunlight).

Illumination Control

The SE3317WA can capture images with the illumination subsystem turned on or off, accommodating images that are close to the wavelength of the illumination. For example, since the engine uses red LED illumination, it may be desirable to shut off the illumination when capturing an image printed in red ink.

LED illumination can also be turned off when taking images of documents printed on semi-glossy or glossy paper or on a substrate with security marks. In this case, ensure ambient illumination provides minimum 30 fcd on the document surface. See also *Thermal Considerations on page 2-2*.

Frame Rate Control

The SE3317WA captures images at 60 frames per second by default. When capturing images, use lower frame rates to increase image brightness. The aiming pattern appears to blink when the frame rate is below 30 fps.

IR System

The SE3317WA has an integrated infrared-based proximity sensing system that triggers a decode session when an object such as a cell phone, a bar code, or a hand is within several inches of the exit window. The wakeup system consists of two 850nm IR LEDs and a proximity sensing IC. The IC converts the amount of reflected IR into digital counts. When the counts exceed a predetermined threshold, a decode session is triggered. The wakeup system is adaptive in that it adjusts to different background IR levels.

Power Management

The SE3317WA automatically manages its power usage, including USB suspend mode. The SE3317WA does not exceed the USB limit of 500 mA and conforms to USB 2.0 inrush standard of not drawing 100mA until enumeration is completed.

NOTES The SE3317WA does not use Low Power mode.

In USB mode the engine defaults to SNAPI with Imaging Interface mode. To select another USB interface type, scan a bar code in *USB Device Type on page 6-3*.

Beeper and LED Signals

The SE3317WA has a visual green LED indicator as well as a beeper for user feedback. The decode LED has various pre-programmed flash sequences.

The SE3317WA beeper output ranges from 2.024 KHz to 2.694 KHz. The beeper output is a 50% duty cycle square wave at maximum volume, 12.5% at low volume.

Table 1-1 *User Interface Indications*

Description	Indication		Event
	Beeper	Decode LED	
No decode	n/a	n/a	NODECODE_MSG
Wakeup	n/a	n/a	WAKEUP
Video is off	n/a	n/a	VIDEO_OFF
Video is on	No Sound	Light	VIDEO_ON
Decode	Middle Tone	Flash of light	DECODE
Snapshot started	Low Tone	Blinking	SNAPSHOT_START
Snapshot is complete	Low Tone	No light	SNAPSHOT_COMPLETE
Bootup	Low Tone, Middle Tone, High Tone	No light	BOOTUP
Transmission error	Four Low Tones	No light	TRANSMIT_ERROR
Entry error	Low Tone, High Tone	Flash of light	ENTRY_ERROR
Defaults set	High Tone, Low Tone, High Tone, Low Tone	Flash of light	DEFAULTS_SET
Parameter entered			PARAM_ENTERED
Number entry expected	High Tone, Low Tone	Flash of light	NUMBER_EXPECTED

Supported Symbologies

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

1D Symbologies

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

2D Symbologies

PDF417
MicroPDF417
Data Matrix
Data Matrix Inverse
Maxicode
QR Code
MicroQR
QR Inverse
Aztec
Aztec Inverse

Postal Codes

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

Operating Modes

The SE3317WA supports the following operating modes. See *Operational Modes on page 5-4* for the bar codes to change between modes.

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

CHAPTER 2 INSTALLATION

Introduction

This chapter provides information for mounting and installing the SE3317WA, including physical and electrical considerations, and recommended window properties for the SE3317WA.

General Information

Electrostatic Discharge (ESD)

The SE3317WA is protected from ESD events that can occur in an uncontrolled environment. Use care when handling this component and apply standard ESD handling procedures such as using grounding wrist straps and handling in a properly grounded work area.

Environment

The engine must be sufficiently enclosed to prevent dust from gathering on the aiming lens, imaging lens, and illumination system LEDs. Dust and other external contaminants eventually degrade engine performance. Motorola does not guarantee performance of the SE3317WA when used in an exposed application.

Power Supply Noise

For reliable operation a low-noise power supply is required. Pay close attention to power supply quality and testing to ensure the best performance from the SE3317WA.

For a USB host that supplies 5V nominal, the SE3317WA maintains proper regulation. Large ripple, dips and transients on the supply line can adversely affect the infrared wakeup system and engine illumination that in the worst case can falsely trigger the infrared wakeup system. For optimum performance ensure a good quality 5V rail from the USB bus.

Thermal Considerations

The SE3317WA engine includes several high-power components (e.g., sensor, LEDs) that dissipate heat during operation. The engine temperature can rise above ambient temperature when the engine is running at 60 frames per second with full illumination and aiming on. These extreme conditions can increase sensor noise, degrade image quality, and impact the engine's longevity. Use care when designing the SE3317WA for integration into the target application.

Protective measures that reduce power consumption and/or facilitate heat removal within a target system include but are not limited to:

- Using reduced frame rates (e.g., 15 fps)
- Reducing internal illumination intensity
- Mounting on a solid metallic surface that facilitates heat removal
- Selecting a housing design that allows for natural or forced convection

Note that running in continuous 60 fps with both aiming and illumination enabled full time is highly uncommon. In typical decoding and image capture applications, any rise in engine temperature is minimal.

External Optics (Exit Window and Mirror)

To avoid smudges, scratches, or chips, do not touch the external optics on the SE3317WA. Do not subject external optical components on the engine to any external force. Do not hold the engine by an external optical component. This can place excessive stress in the mechanical joints that secure the components, which can cause failures such as joint cracking or breaking.

Image and Document Capture

For specific information on image and document capture applications, contact a Motorola sales representative for a technical document on image capture using the SE3317WA.

Regulatory Information

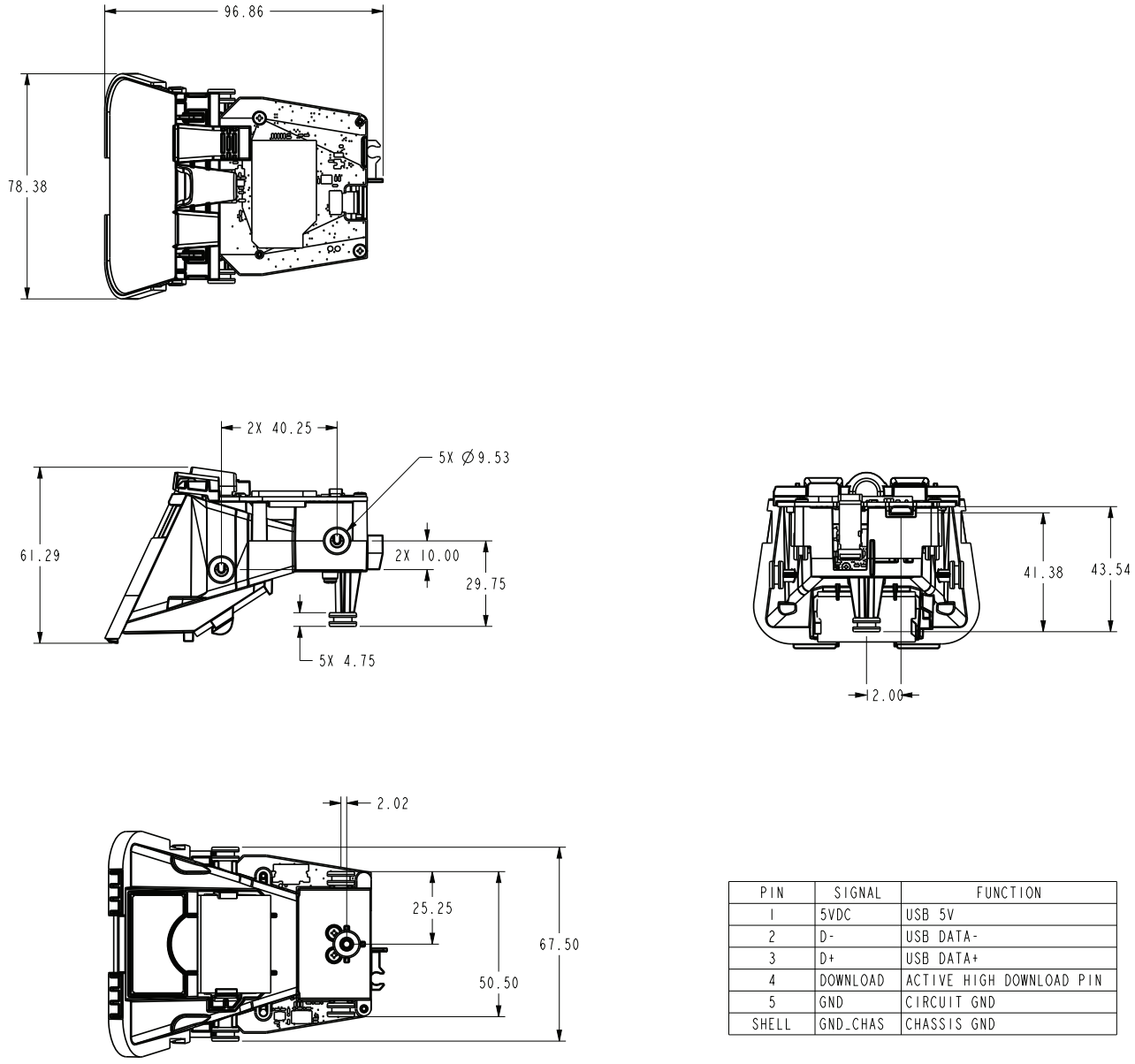
The SE3317WA imager engine meets the accessible LED light limits for an IEC Class 1M LED product. Any product containing the SE3317WA can meet these same regulations. Contact a Motorola sales representative for further details.

For devices intended for international sale, see the IEC/EN60825-1:2001 standard.

Complies with IEC 60825-1:2001 (for LED devices).

Mechanical Integration

Five grommets secure the SE3317WA. The grommets also act as an integrated shock mount for the device.



PIN	SIGNAL	FUNCTION
1	5VDC	USB 5V
2	D-	USB DATA-
3	D+	USB DATA+
4	DOWNLOAD	ACTIVE HIGH DOWNLOAD PIN
5	GND	CIRCUIT GND
SHELL	GND_CHAS	CHASSIS GND

Figure 2-1 *SE3317WA Mechanical Integration*

Housing Design

NOTE Perform an opto-mechanical analysis for the housing design to ensure optimal scanning or imaging performance.

NOTE To avoid internal reflections, use the window provided with the module.

Design the engine's housing so that internal reflections from the aiming and illumination system are not directed back toward the engine. The reflections from the housing can cause problems, and can bounce off the top or bottom of the housing and reach the engine. Also, keep all housing elements outside the imaging field of view and usable illumination volume (see *Figure 2-3 on page 2-5*). Avoid placing any bright objects around the window.

Exit Window Integration provides exit window integration dimensions. Consider using baffles or matte-finished dark internal housing colors.

Optical Information

The SE3317WA uses a sophisticated optical system that provides imaging performance that matches or exceeds the performance of much larger imagers. However, an improperly designed enclosure can affect the performance of the SE3317WA. For best results, do not add a secondary window as it can degrade performance due to internal reflections.

Exit Window Integration

Figure 2-2 illustrates exit window integration.

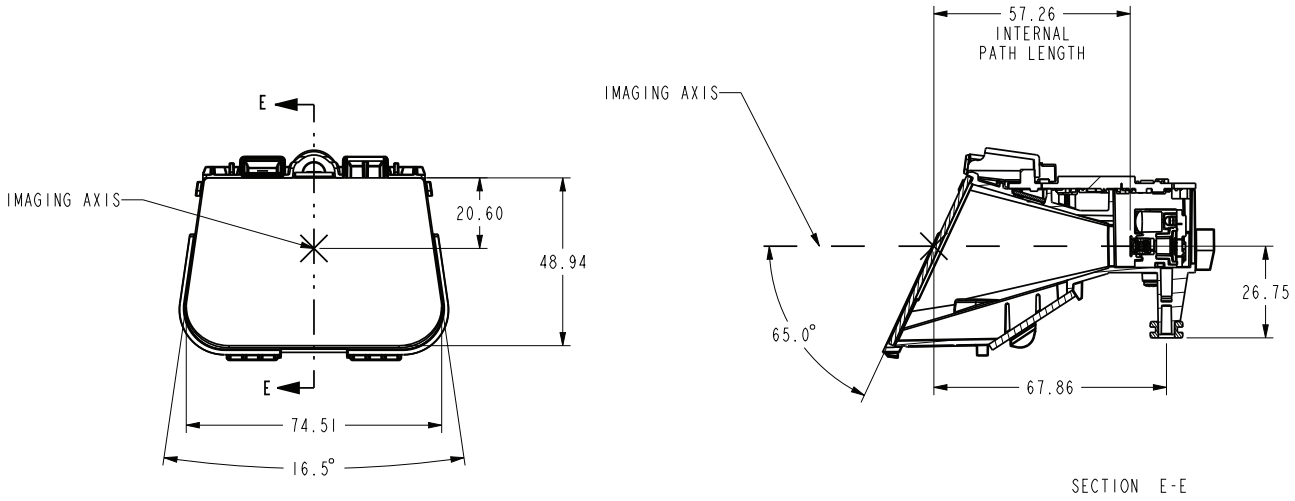


Figure 2-2 *SE3317WA Exit Window Integration*

Avoiding Scratched Windows

Scratches on the window can greatly reduce the performance of the imaging system. Motorola recommends recessing the window into the housing.

Recommended Clear Aperture

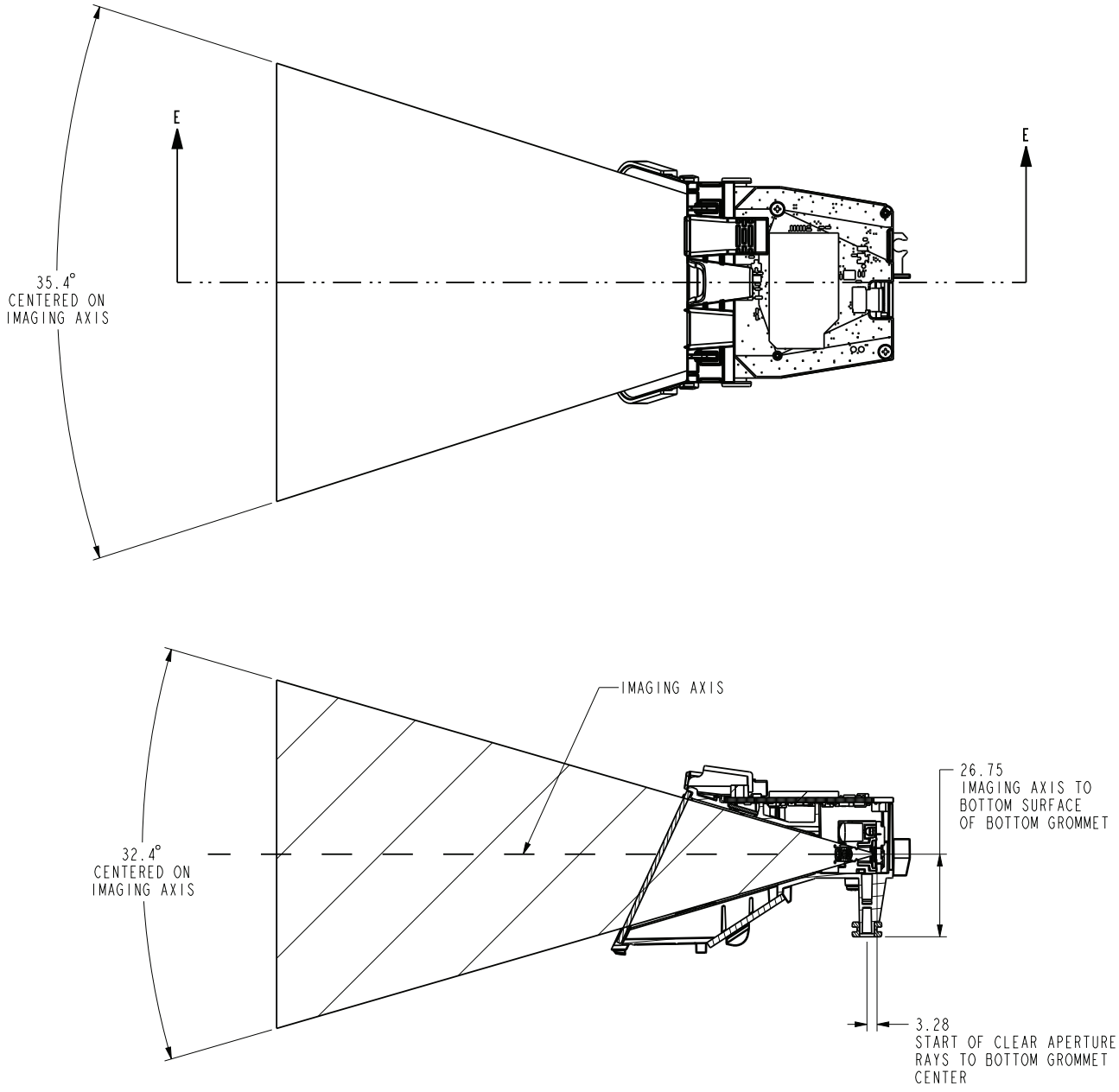


Figure 2-3 *SE3317WA Recommended Clear Aperture*

Table 2-1 *SE3317WA Imaging Field of View (FOV) and Focus Positions*

Engine Model	SE3317WA (Wide Angle)
Nom FOV (X x Y)	45.7^{o} x 29.8^{o}
Max FOV (X x Y)	50.1^{o} x 34.4^{o}
Conjugated Distance	115 mm
Dimension #1 (nom) Imaging lens flange to front surface of engine chassis	1.25 mm
Dimension #1 (max) Imaging lens flange to front surface of engine chassis	1.50 mm
Dimension #2 Imaging lens flange to imaging virtual origin	3.06 mm
Dimension #3 (typical) Imaging lens flange to exit window along the imaging axis	58.5 mm
Dimension #4 (typical) Rotation angle of the exit window	25^{o} with respect to the main imaging plane

Aiming Arrangement

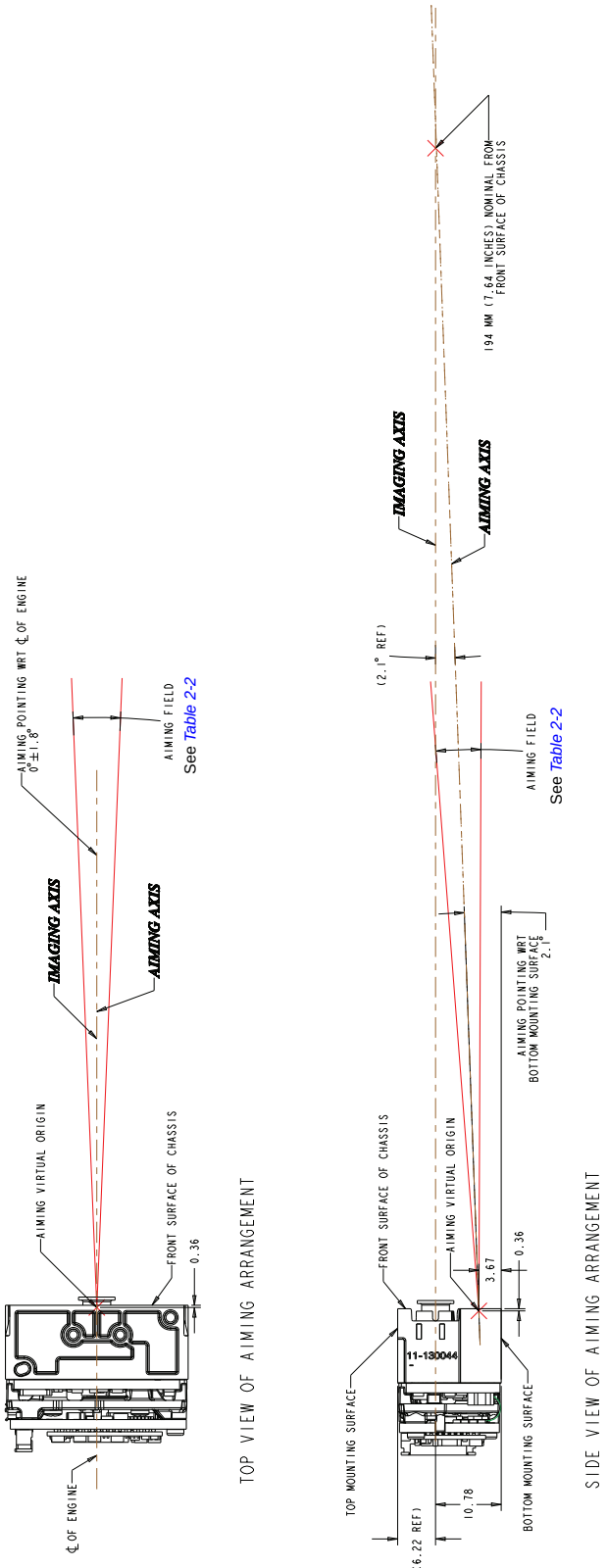


Figure 2-4 *SE3317WA Aiming Arrangement*

Table 2-2 *Aiming Pattern*

Aiming Pattern Intensity	Aiming Field
80%	4.6°
50%	5.0°
20%	5.4°
10%	5.6°

Electrical Information

Power Supply Requirements

The SE3317WA is powered by a USB 5V host. It uses the 5V for engine illumination, IR LEDs, indicator LED, and beeper. The 3.3V for the AT91SAM9G20 on the decoder board, and for the engine is from a linear regulator. The 3.3V for the image sensor is also from a linear regular. The 1 .8V for the memory and the 1 .0V for the core are from switching regulators. The power-up sequence is controlled by comparators and FETS to ensure that the AT91SAM9G20 is powered up properly. *Figure 2-5* summarizes this information.

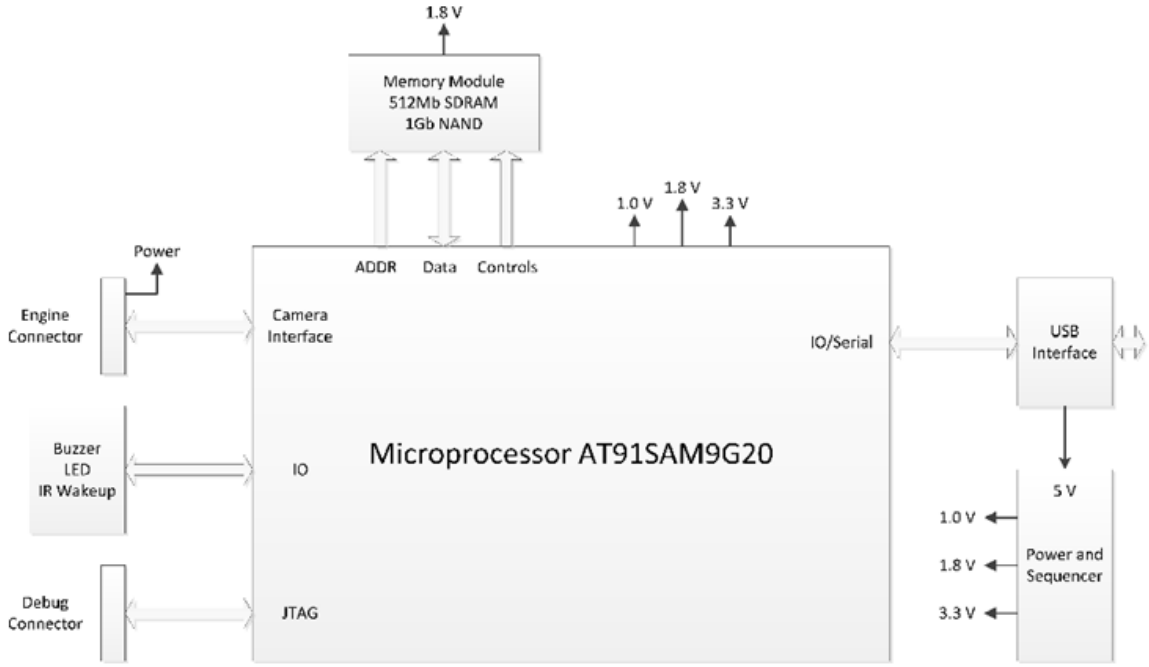


Figure 2-5 *SE3317WA Power Supply Requirements*

Figure 2-6 shows the typical current draw of the SE3317WA during idle (IR LED running).

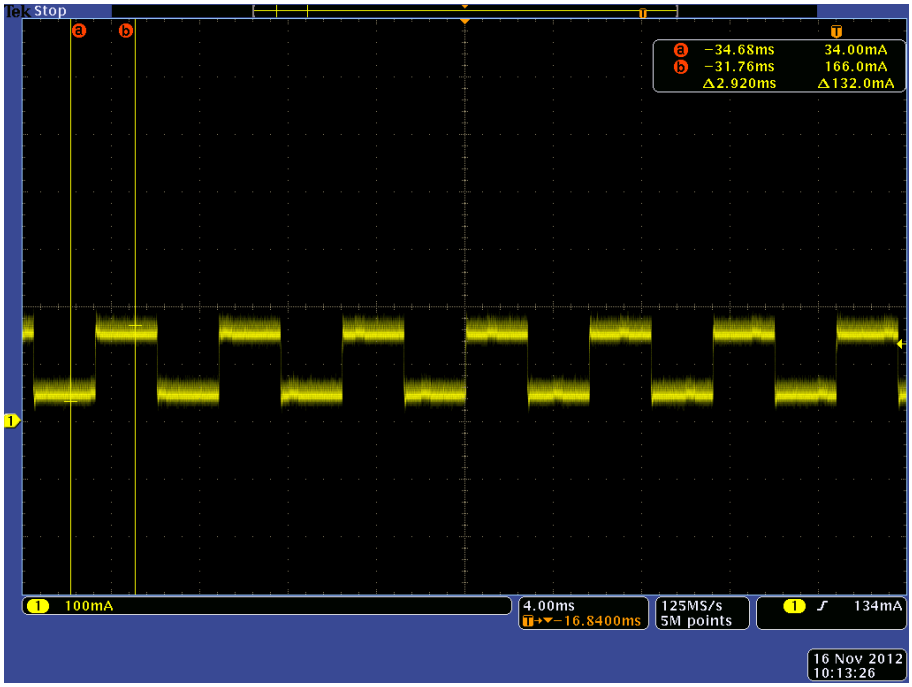


Figure 2-6 *Typical Current Draw During Idle*

Figure 2-7 shows the typical current draw of the SE3317WA during a scan/decode session.

Figure 2-7 *Typical Current Draw During Idle*

Table 2-3 *SE3317WA Electrical Characteristics*

Symbol	Parameter	Condition	Minimum	Typical	Maximum	Units
USB 5V	Supply Voltage		4.5	5.0	5.5	V
NOTE: Logic Levels are referred to AT91SAM9G20 GPIO supply (3.3V)						
VIH	Input High voltage		2		3.3 + 0.3	V
VIL	Input Low voltage		-0.3		0.8	V
I_{CC}					See *Table 3-1 on page 3-1*	mA
I_{iL}	Input Low Leakage current	V_{in} = GND, no pull up or pull down			± 1	uA
I_{iH}	Input High Leakage current	V_{in} = V_{CC}, no pull up or pull down			± 1	uA
I_{oL}	Output Low Current	V_{oL} = 0.4 V	-8			mA
I_{oH}	Output High Current	V_{oh} = HOST_3P3-0.4 V			8	mA
C_{i_usb}	Input capacitance, USB_OUT+/-				9.18	pF
Note: Supply current varies depending on factors such as what function the software is performing and which SE3317WA functions are being used.						

Electrical Interface

Table 2-4 lists the pins and signals of the micro-USB type B connector on the SE3317WA. See *Figure 2-1 on page 2-3* for the pin 1 location on the rear of the engine, on the side opposite the aiming/illumination system.

Table 2-4 *SE3317WA Signal Descriptions*

Pin	Signal	Function
1	5VDC	USB 5V
2	D-	USB Data-
3	D+	USB Data+
4	DOWNLOAD	Active High Download PIN
5	GND	Circuit GND
SHELL	GND_CHAS	Chassis GND

CHAPTER 3 SPECIFICATIONS

Introduction

This chapter provides the technical specifications of the SE3317WA, including decode range information.

Technical Specifications

Table 3-1 *SE3317WA Technical Specifications*

Item	Description
Power Requirements: Operating Voltage: Operating Current (Idle): Operating Current (decoding):	Supply currents listed below are typical values in mA 5VDC +/- 0.5V 180mA peak, 90mA average 450mA peak, 250mA average
Maximum Power Supply Noise* (at 23° C)	100 mVp-p - bar code and image capture applications, host supply = 5 VDC via USB
Optical Resolutions	4.0 mil (Code 39), 5.0 mil (PDF417), 7.5 mil (Data Matrix)
Specular Dead Zone Illumination On Illumination Off	 Up to 20º depending on target distance and substrate glossiness None
Skew Tolerance	± 60º (see *Figure 3-1 on page 3-3*)
Pitch Angle	± 60º (see *Figure 3-1 on page 3-3*)
Roll	360º (see *Figure 3-1 on page 3-3*)
Ambient Light Immunity (Sunlight)	8000 ft. candles (86,100 lux)

Table 3-1 *SE3317WA Technical Specifications (Continued)*

Item	Description
Imaging Sensor Image Resolution Gray Scale Field of View (FOV)	 752 H x 480 V pixels (Wide VGA) 256 levels (8 bits per pixel) 35.4º horizontal, 32.4º vertical
Focusing Distance from Front of Engine	4.5 in. / 11.5 cm
Aiming Element	Dot Optical Power: 0.19 mW (typical)
Illumination System LEDs Pattern Angle	 625 ± 5 nm (dominant wavelength) 60º x 40º at 80% center intensity
Shock*	250 G applied via PCB clamped to shock plate at 23º C for a period of 1.75 ± 2.5 msec (all three axes in + and -)
Vibration*	Unpowered SE3317WA withstands a standard POS random vibration along each of the X, Y, and Z axes for a period of one hour per axis, applied via PCB clamped to shock plate, defined as follows: 20 Hz to 2 KHz at 0.02 G^2/Hz
*For Shock and Vibration, performance improves if the module is mounted via 5x grommets, which act as a shock mounting feature.	
ESD	± 2 kV @ connector
LED Safety Class	IEC Class 1M
Temperature Operating Storage	 0º to 40º C (32º to 104º F) -40º to 70º C (-40º to 158ºF) See *Thermal Considerations on page 2-2* for more information.
Humidity Operating Storage	 95% RH, non-condensing at 40º C 85% RH, non-condensing at 70º C
Module Dimensions (max)	61.3 mm H x 78.4 mm W x 96.9 mm D (2.42 in. H x 3.09 in. W x 3.82 in. D)
Weight	70 grams (2.45 oz)
Electrical Interface	Micro USB-B

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

Skew, Pitch, and Roll

Measured on a 20 mil Code 39 symbol at a distance of 5 inches. Tolerance for skew and pitch is reduced at extreme ends of the working range.

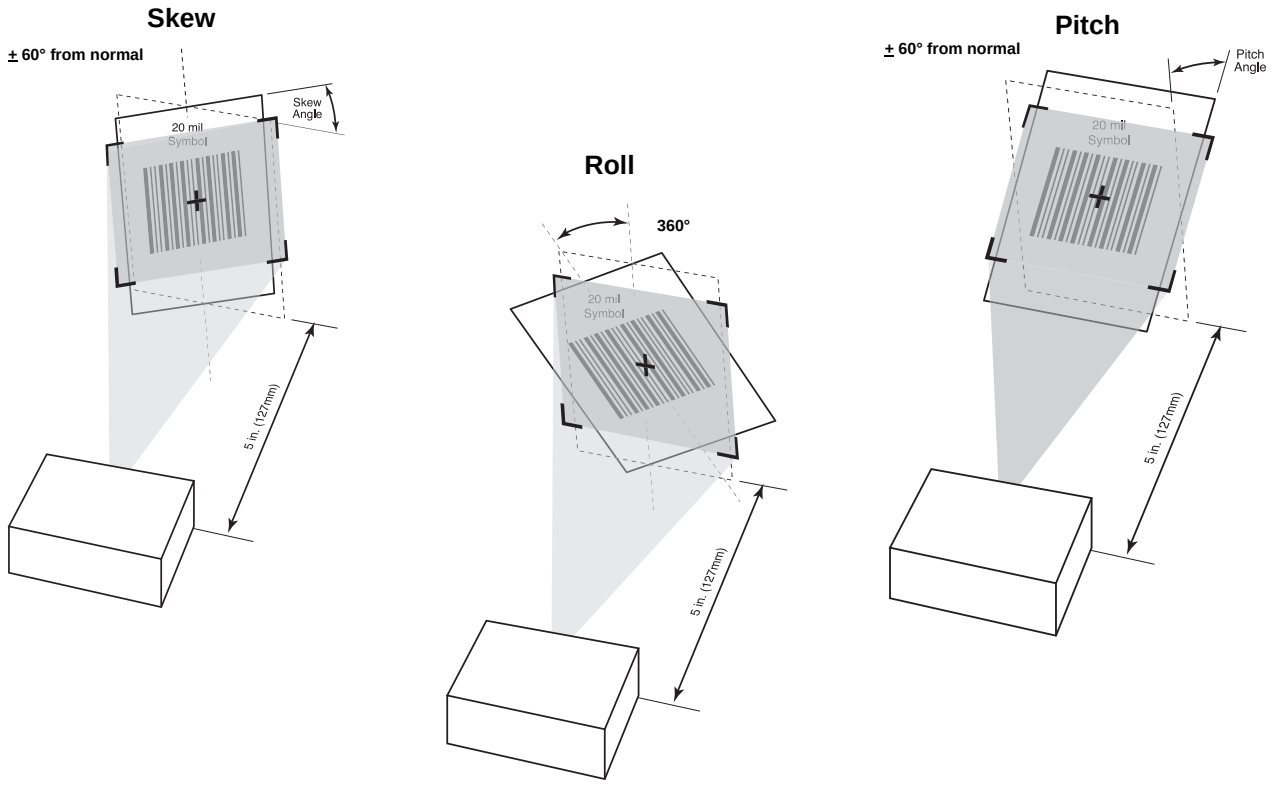


Figure 3-1 *Skew, Pitch, and Roll*

Decode Ranges

Table 3-2 *Decode Ranges*

Symbol Specifications	Symbol Part Number / Encoded Characters	FAT Distance (in)	Near Distance Typical (in)	Far Distance Typical (in)
UPCA, 13.0 mil, 80% MRD	64-05303-01 012345678905	7.75	Contact Read	9.55
PDF417, 6.67 mil, 80% MRD	64-14035-01 4 columns, 20 rows	2.0	Contact Read	2.75
Code 128, 15.0 mil, 80% MRD	64-142877-01 15 mil Code 128 2.175 Width	3.75	Contact Read	7.5

- Distances are measured starting at 2 inches forward the center axis of the front grommet dowels on the module chassis.
- Decode ranges are tested using photographic quality bar codes, pitch 20 ± 1^{o} with respect to optical axis.
- Bar code surfaces should be illuminated at ambient light of >15 ft.cd.
- All UPCs read security level = 1.

CHAPTER 4 USER PREFERENCES & MISCELLANEOUS OPTIONS

Introduction

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

Host Selection

USB is the only host selection available on the SE3317WA. The default is the SNAPI interface. To change the default, (such as changing it to HID keyboard emulation) scan one of the parameter bar codes.

Phantom Scan Session

The Phantom Scan Session feature places the system into a known state for two seconds immediately after the power-up beep sequence in order to decode a parameter bar code without intervention and regardless of existing settings and mode. This allows you to scan a **Set Defaults** or other parameter bar code without triggering the engine or initiating a host scan session in order to return an unresponsive system to its factory default settings. Aim and illumination are turned off and Phantom Scan exits upon a trigger pull, host command, or successful decode.

Changing Default Values

The engine ships with the settings shown in the *Table 4-1 on page 4-3* (also see *Appendix A, Standard Default Parameters* for all host and miscellaneous defaults). 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.
- For USB SNAPI hosts, send a “parameter send” command from the host system. Hexadecimal parameter numbers appear in this chapter below the parameter title, and options appear in parenthesis beneath the accompanying bar codes.

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 4-5*. Throughout the programming bar code menus, asterisks (*) indicate default values.

* Indicates Default — ***High Volume (00h)** — Feature/Option; Option Hex Value for programming via host 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 4-10*. The engine issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters, such as **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 4-1 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 4-5*.

NOTE See *Appendix A, Standard Default Parameters* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 4-1 *User Preferences Default Table*

Parameter	Parameter Number	Default	Page Number
User Preferences			
Set Default Parameter		Restore Defaults	*4-5*
Parameter Scanning	ECh	Enable	*4-6*
Lock Parameter Scanning	F2h 22h	Disable	*4-7*
Unlock Parameter Scanning	F2h 23h	Disable	*4-7*
User Parameter Pass Through	F1h 71h	Disable	*4-8*
Beep After Good Decode	38h	Enable	*4-9*
Beeper Tone	91h	Medium	*4-10*
Beeper Volume	8Ch	High	*4-11*
Beeper Duration	F1h 74h	Medium	*4-12*
Suppress Power-up Beeps	F1h D1h	Do not suppress	*4-12*
Trigger Modes	8Ah	Presentation Mode	*4-13*
Decode Session Timeout	88h	9.9 Sec	*4-13*
Timeout Between Decodes, Same Symbol	89h	0.6 Sec	*4-14*
Timeout Between Decodes, Different Symbols	90h	0.2 Sec	*4-14*
Motion Detect Range	F2h 3Bh	Full	*4-15*
Range Restrict	F1h 75h	Disable	*4-16*
Presentation Mode Field of View	F1h 61h	Medium Field of View	*4-17*
Fuzzy 1D Processing	F1h 02h	Enable	*4-18*
Mirrored Image	F1h 70h	Disable	*4-18*
Mobile Phone/Display Mode	F1h CCh	Disable	*4-19*
Validate Concatenated Parameter Bar Codes	F1h B4h	Disable	*4-19*
PDF Prioritization	F1h CFh	Disable	*4-20*
PDF Prioritization Timeout	F1h D0h	200 ms	*4-20*
Miscellaneous Scanning Parameters			
Transmit Code ID Character	2Dh	None	*4-21*
SSI Prefix Value	69h	<CR>	*4-22*
SSI Suffix 1 Value SSI Suffix 2 Value	68h 6Ah	<CR> <CR>	*4-22*

Table 4-1 *User Preferences Default Table*

Parameter	Parameter Number	Default	Page Number
Scan Data Transmission Format	EBh	Data as is	*4-23*
FN1 Substitution Values	67h, 6Dh	Set	*4-24*
Transmit “No Read” Message	5Eh	Disable	*4-25*
Report Version			*4-26*
Report Decoder Manufacturing Version			*4-26*
Report Scan Engine Manufacturing Version			*4-26*
Diagnostic Testing and Reporting			*4-27*

User Preferences

Set Default Parameter

You can reset the SE3317WA to two types of defaults: factory defaults or custom defaults. Scan the appropriate bar code below to reset the engine 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 engine's custom default settings.
  - If you did not set custom defaults, scan **Restore Defaults** to restore the factory default values listed in *Table A-1*.
- **Set Factory Defaults** - Scan this bar code to restore the factory default values listed in *Table A-1.* This deletes any custom defaults set.
- **Write to Custom Defaults** - Scan this bar code to set the current engine 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

Parameter # ECh

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

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

Disable Parameter Scanning
(00h)

Lock/Unlock Parameter Scanning

Lock: Parameter # F2h 22h

Unlock: Parameter # F2h 23h

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.

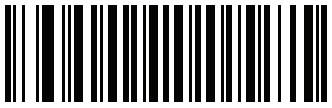
NOTE *Parameter Scanning* must be enabled in order to scan the **Lock** parameter bar code. Once parameter scanning is locked, scanning the **Enable** or **Disable Parameter Scanning** bar code results in a parameter error beep.

To lock parameter scanning:

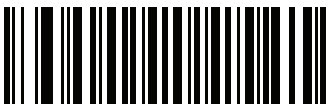
1. Scan the **Lock** bar code.
2. Scan four bar codes from *Appendix D, Numeric Bar Codes* that represent the desired code. Enter leading zeros for numbers below 1000, e.g., to program a code of 29, enter **0**, **0**, **2**, **9**. A "lock" beep sounds (two long high beeps) in addition to the parameter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

To unlock parameter scanning:

1. Scan the **Unlock** bar code.
2. Scan four bar codes from *Appendix D, 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

Locking/Unlocking via the Host Interface

Parameter scanning can also be locked or unlocked using a host interface such as USB SNAPI. To lock parameter scanning using the host interface, store a 4-digit code within the range of 1-9999 in the Lock parameter. Values outside this range are ignored. To unlock parameter scanning, store this code in the Unlock parameter. To persist the lock/unlock status through a power cycle, make this parameter value permanent.

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

User Parameter Pass Through

Parameter # F1h 71h

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 the SNAPI host (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

Parameter # 38h

Scan a bar code below to select whether or not the engine 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.

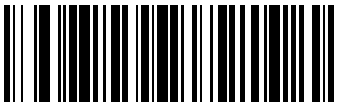
***Beep After Good Decode**
(Enable)
(01h)

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

Beeper Tone

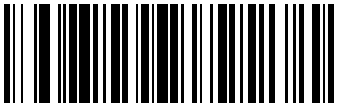
Parameter # 91h

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

Parameter # 8Ch

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

Low Volume
(02h)

Medium Volume
(01h)

***High Volume**
(00h)

Beeper Duration

Parameter # F1h 74h

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

Short
(00h)

*** Medium**
(01h)

Long
(02h)

Suppress Power-up Beeps

Parameter # F1h D1h

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

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

Suppress Power-up Beeps
(01h)

Trigger Modes

Parameter # 8Ah

- **Presentation Mode** (default) - When the engine detects an object in its field of view, it triggers and attempt to decode. The range of object detection does not vary under normal lighting conditions. This applies to decode mode only.
- **Host** - A host command issues the triggering signal. The engine interprets an actual trigger pull as a Level triggering option.

*** Presentation Mode**
(07h)

Host
(08h)

Decode Session Timeout

Parameter # 88h

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

To set a **Decode Session Timeout**, scan the bar code below. Next, scan two numeric bar codes from *Appendix D, 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 D-2*.

Decode Session Timeout

Timeout Between Decodes, Same Symbol

Parameter # 89h

Use this option in **Presentation Mode** to prevent multiple reads of a symbol left in the engine'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 D, 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

Parameter # 90h

Use this option in **Presentation Mode** to control the time the engine 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 D, Numeric Bar Codes* that correspond to the desired interval, in 0.1 second increments.

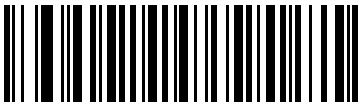
✓ ***NOTE*** The **Timeout Between Decodes, Different Symbols** value cannot be greater than or equal to the *Timeout Between Decodes, Same Symbol* or the *Decode Session Timeout on page 4-13* value.

Timeout Between Decodes, Different Symbols

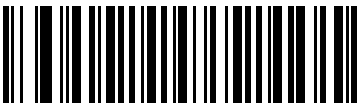
Motion Detect Range

Parameter # F2h 3Bh

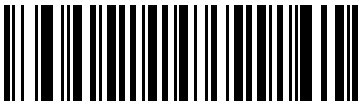
This parameter controls the distance, or range, at which the scanner detects object motion and then triggers while in Presentation Mode.



*** Full Range**
(01h)



Medium Range
(03h)



Short Range
(08h)

Range Restrict

Parameter # F1h 75h

Attribute # 629

Range restriction can be enabled by setting a parameter value greater than zero and disabled when setting a value of zero. When enabled it allows for reducing the reading range of a UPC family bar code to a restricted range in inches. The parameter value represents a maximum reading range of a 100% UPC family bar code.

The value is approximate and small variations to a restriction limit are to be expected.

When scanning bar codes of different densities (i.e., 60%, 80%, and 200%) the range limit is scaled up/down proportional to the density.

*** Disable**
(00h)

3 inches
(03h)

5 inches
(05h)

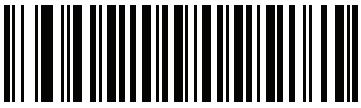
7 inches
(07h)

Presentation Mode Field of View

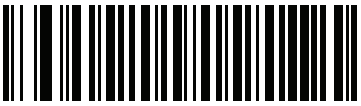
Parameter # F1h 61h

In **Presentation Mode**, the engine searches for a bar code in the region around the aiming pattern's center.

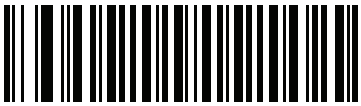
To search for a bar code in a smaller region around the aiming pattern in order to speed search time, select **Small Field of View**, or to search a larger area, select **Full Field of View**.



Small Field of View
(00h)



***Medium Field of View**
(01h)



Full Field of View
(02h)

Fuzzy 1D Processing

Parameter # F1h 02h

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

Parameter # F1h 70h

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 mode transmits images as mirrored images.

***Disable Mirrored Image**
(00h)

Enable Mirrored Image
(01h)

Mobile Phone/Display Mode

Parameter # F1h CCh

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

Parameter # F1h B4h

The engine 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 engine 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

Parameter # F1h CFh

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 engine 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 engine to report it. This parameter does not affect decoding other symbologies.

***Disable PDF Prioritization (00h)**

Enable PDF Prioritization (01h)

PDF Prioritization Timeout

Parameter # F1h D0h

When *PDF Prioritization* is enabled, this timeout specifies how long the engine 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 D, 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

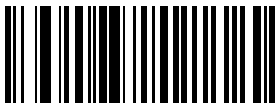
Transmit Code ID Character

Parameter # 2Dh

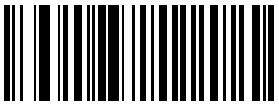
A Code ID character identifies the code type of a scanned bar code. This is useful when decoding more than one code type. In addition to any single character prefix already selected, the Code ID character is inserted between the prefix and the decoded symbol.

Select no Code ID character, a Symbol Code ID character, or an AIM Code ID character. For Code ID Characters, see *Symbol Code Identifiers on page B-1* and *AIM Code Identifiers on page B-3*.

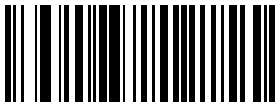
✓ ***NOTE*** If you enable Symbol Code ID Character or AIM Code ID Character, and enable *Transmit "No Read" Message on page 4-25*, the engine appends the code ID for Code 39 to the NR message.



Symbol Code ID Character (02h)



AIM Code ID Character (01h)



***None (00h)**

Prefix/Suffix Values

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

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

You can append a prefix and/or one or two suffixes to scan data for use in data editing. 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 D, 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 6-2 on page 6-20* 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 6-2 on page 6-20* for the four-digit codes.

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

NOTE To use Prefix/Suffix values, set the *Scan Data Transmission Format on page 4-23*.

Scan Prefix
(07h)

Scan Suffix 1
(06h)

Scan Suffix 2
(08h)

Scan Data Transmission Format

Parameter # EBh

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

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

To set values for the prefix and/or suffix, see *Prefix/Suffix Values on page 4-22*.

***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 Parameter # 67h

Decimal Value Parameter # 6Dh

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 D, Numeric Bar Codes*.

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

See *USB Keyboard FN 1 Substitution on page 6-13* to enable FN1 substitution for the USB HID keyboard.

Transmit “No Read” Message

Parameter # 5Eh

Scan a bar code below to select whether or not to transmit a No Read message. Enable this to transmit the characters NR when a successful decode does not occur before trigger release or the *Decode Session Timeout on page 4-13* 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 4-21*, the engine appends the code ID for Code 39 to the NR message.

Enable No Read
(01h)

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

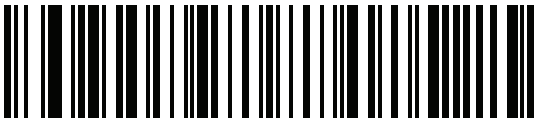
Report Version

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

Report Software Version

Report Decoder Manufacturing Information

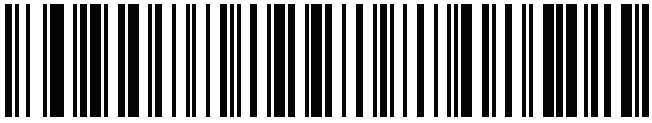
Scan the bar code below to report the part number, serial number, and manufacture date of the decoder.



Report Decoder Manufacturing Information

Report Scan Engine Manufacturing Information

Scan the bar code below to report the part number, serial number, and manufacture date of the scan engine.



Report Engine Manufacturing Information

Diagnostic Testing and Reporting (Attribute #10061)

This feature allows the host to retrieve diagnostic information relative to the scan engine's functionality. The host uses the RSM attribute get command to request the scan engine's diagnostic information. This is a read only attribute, and can be accessed through various the USB SNAPI host interface.

For command/response structures over USB SNAPI, see *Encapsulation of RSM Commands/Responses over SNAPI on page 6-18*.

Table 4-2 *Diagnostic Report Format*

Byte Offset	Test Name	Description	Results
Data byte 0/1	I^2C interface	Verifies communication between decoder and engine	Pass / Fail
Data byte 2/3	Laser reference current	Verifies the laser reference current is within preset limits	Pass / High / Low / Fail
Data byte 4/5	Laser operating current	Verifies the laser operating current is within preset limits	Pass / High / Low / Fail
Data byte 6/7	Operating temperature	Verifies the engine temperature is within preset limits	Pass / Warning / Critical / Fail
Data byte 8/9	Laser reference current stored	Indicates when laser reference current exceeds preset limits	Pass / High / Low / Fail
Data byte 10/11	Laser operating current stored	Indicates when laser operating current exceeds preset limits	Pass / High / Low / Fail
Data byte 12/13	Operating temperature stored	Indicates when engine temperature exceeds preset limits	Pass / Warning / Critical / Fail

Note: A Fail result for laser current and temperature tests indicates a communication failure between the scan engine and decoder.

Table 4-3 *Test Results*

Test Result	Description
0	Pass
1	Fail
2	Not tested
3	N/A
4	High
5	Low
6	Warning
7	Critical
8	Fatal

CHAPTER 5 IMAGING PREFERENCES

Introduction

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

✓ ***NOTE*** Only the Symbol Native API (SNAPI) with Imaging interface supports image capture. See *USB Device Type on page 6-3* to enable this host.

The engine ships with the settings in *Imager Preferences Default Table on page 5-2* (also see *Appendix A, Standard Default Parameters* for all host device and miscellaneous defaults). If the default values suit requirements, programming is not necessary.

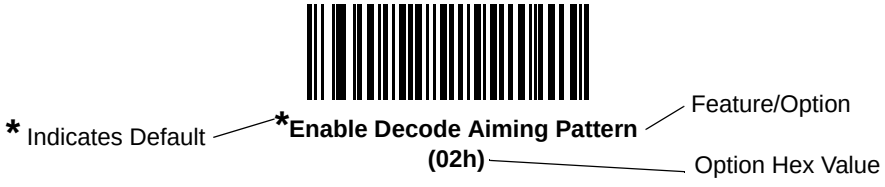
There are two ways to change a parameter value:

- Scan the appropriate bar codes in this guide. These new values replace the standard default values in memory.
- For the USB SNAPI host, send a “parameter send” command from the host system. Hexadecimal parameter numbers appear in this chapter below the parameter title, and options appear in parenthesis beneath the accompanying bar codes.

✓ ***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 4-5*. Throughout the programming bar code menus, asterisks (*) indicate default values.



Scanning Sequence Examples

In most cases scanning one bar code sets the parameter value. For example, to disable image capture illumination, scan the **Disable Image Capture Illumination** bar code under *Image Capture Illumination on page 5-12*. The engine issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

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

Errors While Scanning

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

Imaging Preferences Parameter Defaults

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

NOTE See *Appendix A, Standard Default Parameters* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 5-1 *Imager Preferences Default Table*

Parameter	Parameter Number	Default	Page Number
Imaging Options			
Aim Brightness	F0h 9Ch	0	*5-4*
Illumination Brightness	F0h 9Dh	10	*5-5*
Frame Rate	F1h A2h	Auto	*5-6*
LED Illumination	F0h ADh	Internal LED Illumination	*5-8*
Fixed Gain	F1h 38h	50	*5-9*
Exposure Time	F4h F1h 37h	100 (10 ms)	*5-9*
Decoding Autoexposure	F0h 29h	Enable	*5-10*
Decoding Illumination	F0h 2Ah	Enable	*5-10*
Decode Aiming Pattern	F0h 32h	Enable	*5-11*
Image Capture Autoexposure	F0h 68h	Enable	*5-12*
Image Capture Illumination	F0h 69h	Enable	*5-12*
Snapshot Mode Timeout	F0h 43h	0 (30 seconds)	*5-13*
Snapshot Aiming Pattern	F0h 2Ch	Enable	*5-13*

Table 5-1 *Imager Preferences Default Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Image Cropping	F0h 2Dh	Disable	*5-14*
Crop to Pixel Addresses	F4h F0h 3Bh; F4h F0h 3Ch; F4h F0h 3Dh; F4h F0h 3Eh	0 top, 0 left, 479 bottom, 751 right	*5-15*
Image Resolution	F0h 2Eh	Full	*5-16*
Image Brightness (Target White)	F0h 86h	180	*5-17*
Image File Format Selection	F0h 30h	JPEG	*5-18*
JPEG Image Options	F0h 2Bh	Quality	*5-18*
JPEG Quality Value	F0h 31h	65	*5-19*
JPEG Size Value	F1h 31h	160	*5-19*
Image File Meta Data	F1h B5h	Disable	*5-20*
Image Enhancement	F1h 34h	Low	*5-21*
Image Edge Sharpening	F1h 98h	Low	*5-22*
Image Contrast Enhancement	F1h 9Ah	Enable	*5-23*
Image Rotation	F1h 99h	0	*5-24*
Bits per Pixel (BPP)	F0h 2Fh	8 BPP	*5-25*

Imager Preferences

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

Operational Modes

The engine has two modes of operation:

- Decode Mode
- Snapshot Mode.

Decode Mode

By default, upon a trigger event, the engine attempts to locate and decode bar codes within its field of view. The engine 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 4-13*.

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

In Snapshot Mode, the engine turns on the imager engine's aiming pattern to highlight the area to capture in the image. The next trigger event instructs the engine 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 engine adjusts to the lighting conditions. Hold the engine steady until image capture, denoted by a single beep.

If a trigger event does not occur within the Snapshot Mode Timeout period, the engine returns to Decode Mode. Use *Snapshot Mode Timeout on page 5-13* to adjust this timeout period. The default timeout period is 30 seconds.

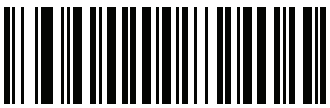
To disable the aiming pattern during Snapshot Mode, see *Snapshot Aiming Pattern on page 5-13*.

Aim Brightness

Parameter # F1h 9Ch

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 D, 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.



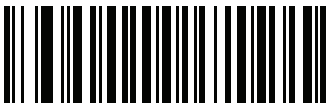
Aim Brightness

Illumination Brightness

Parameter # F1h 9Dh

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 D, 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.



Illumination Brightness

Frame Rate

Select an option to control the rate at which frames are captured and transmitted. When capturing images, using lower frame rates can improve image brightness.

NOTE The aiming pattern appears to blink when the frame rate is 30 frames per second (fps) or lower.

Settings for frame rate are:

- Auto - The SE3317WA controls the frame rate and changes dynamically based on the mode of operation to provide optimal performance.
- 60 fps - The frame rate is fixed at 60 frames per second
- 55 fps - The frame rate is fixed at 55 frames per second
- 50 fps - The frame rate is fixed at 50 frames per second
- 45 fps - The frame rate is fixed at 45 frames per second
- 40 fps - The frame rate is fixed at 40 frames per second
- 30 fps - The frame rate is fixed at 30 frames per second
- 20 fps - The frame rate is fixed at 20 frames per second
- 15 fps - The frame rate is fixed at 15 frames per second
- 10 fps - The frame rate is fixed at 10 frames per second

***Auto**
(00h)

60 fps
(01h)

55 fps
(05h)

50 fps
(06h)

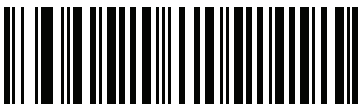
Frame Rate (continued)

45 fps
(07h)

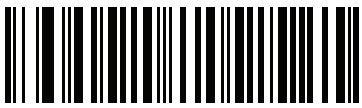
40 fps
(08h)

30 fps
(02h)

20 fps
(09h)



15 fps
(03h)



10 fps
(04h)

LED Illumination

Parameter # F0h ADh

Select the type of LED illumination to use:

- **Internal Illumination** - use the engine's illumination.
- **External Illumination** - assert the ILLUM_EN_OUT signal continuously during a decode session, and do not use the engine's illumination.
- **Internal and External Illumination** - use the engine's illumination and assert the ILLUM_EN_OUT signal continuously during a decode session.

This parameter only applies for decoding if *Decoding Illumination on page 5-10* is enabled, or for image capture if *Image Capture Illumination on page 5-12* is enabled. Disabling Decoding Illumination or Image Capture Illumination turns off all illumination for that mode, regardless of this LED Illumination setting.

***Internal Illumination (00h)**

External Illumination (01h)

Internal and External Illumination (02h)

Fixed Gain

Parameter # F1h 38h

This parameter only applies when Decoding or Image Capture Autoexposure is disabled. Gain is a means of amplifying the raw image data before it is converted into 8-bit grayscale values. Increasing the fixed gain increases brightness and contrast, but also increases noise (undesired electrical fluctuations in the image) which makes the image less attractive and/or harder to decode.

To set the fixed gain, scan the bar code below followed by 3 bar codes from *Appendix D, Numeric Bar Codes*, in the range of 1 to 100, representing the value. The default is 50.

Fixed Gain

Exposure Time

Parameter # F4h F1h 37h

This parameter only applies when Decoding or Image Capture Autoexposure is disabled. It configures the exposure for both Decode and Snapshot modes.

Each integer value represents 100 µs worth of exposure. The default value is 100 which results in an exposure setting of 10 ms.

NOTE The maximum exposure time is based on the configured *Frame Rate*. For example, for a frame rate of 60 fps, the maximum exposure time allowed is 15 ms. Setting exposure time to a larger value than the frame rate allows sets the value to the maximum allowed exposure time.

As exposure time lengthens, aim brightness decreases.

To set the Exposure Time parameter, scan **Fixed Exposure** followed by four numeric bar codes representing the value in the range of 1 - 1000. Insert leading zeros if necessary. For example, to set a Fixed Exposure value of 9.9 ms, scan 0, 0, 9, 9. See *Appendix D, Numeric Bar Codes* for numeric bar codes.

Exposure Time
(4 digits)

Decoding Autoexposure

Parameter # F0h 29h

Select **Enable Decoding Autoexposure** to allow the imager engine to control gain settings and exposure (integration) time to best capture an image for decode mode.

Select **Disable Decoding Autoexposure** to manually adjust the gain and exposure time (see *Fixed Gain* and *Exposure Time*). Motorola recommends this option only for advanced users with difficult decoding situations.

***Enable Decoding Autoexposure**
(01h)

Disable Decoding Autoexposure
(00h)

Decoding Illumination

Parameter # F0h 2Ah

Selecting **Enable Decoding Illumination** causes the engine to turn on illumination every image capture to aid decoding. Select **Disable Decoding Illumination** to prevent the engine 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)

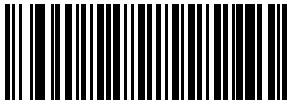
Disable Decoding Illumination
(00h)

Decode Aiming Pattern

Parameter # F0h 32h

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.

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



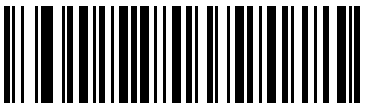
Disable Decode Aiming Pattern (00h)

Image Capture Autoexposure

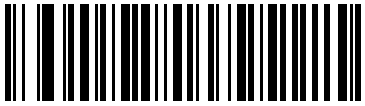
Parameter # F0h 68h

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

Select **Disable Image Capture Autoexposure** to manually adjust the gain and exposure time (see *Fixed Gain* and *Exposure Time*). Motorola recommends this option only for advanced users with difficult image capture situations.



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



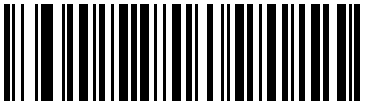
Disable Image Capture Autoexposure (00h)

Image Capture Illumination

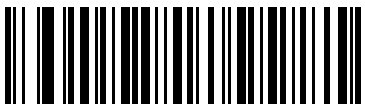
Parameter # F0h 69h

Selecting **Enable Image Capture Illumination** causes illumination to turn on during every image capture. Disable illumination to prevent the engine 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 Mode Timeout

Parameter # F0h 43h

This parameter sets the amount of time the engine remains in Snapshot Mode. The engine exits Snapshot Mode upon a trigger event, or when the Snapshot Mode Timeout elapses. To set this timeout value, scan the bar code below followed by a bar code from *Appendix D, Numeric Bar Codes*. The default value is 0 which represents 30 seconds; values increment by 30. For example, 1 = 60 seconds, 2 = 90 seconds, etc.

Snapshot Mode Timeout

Snapshot Aiming Pattern

Parameter # F0h 2Ch

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

***Enable Snapshot Aiming Pattern (01h)**

Disable Snapshot Aiming Pattern (00h)

Image Cropping

Parameter # F0h 2Dh

This parameter crops a captured image. Select **Disable Image Cropping** to present the full 742 x 480 pixels. Select **Enable** to crop the image to the pixel addresses set in *Crop to Pixel Addresses on page 5-15*.

NOTE The engine 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**
(Use Full 742 x 480 Pixels)
(00h)

Crop to Pixel Addresses

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

If Enable Image Cropping is selected, set the pixel addresses from (0,0) to (751,479) to crop to.

Columns are numbered from 0 to 751, rows from 0 to 479. 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 = 476, Bottom = 479, Left = 744, Right = 751

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

✓ ***NOTE*** The engine 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 - 479 Decimal)

Left Pixel Address
(0 - 751 Decimal)

Bottom Pixel Address
(0 - 479 Decimal)

Right Pixel Address
(0 - 751 Decimal)

Image Resolution

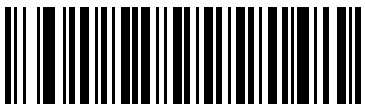
Parameter # F0h 2Eh

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.

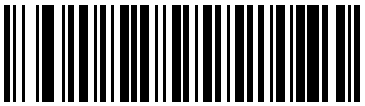
Select one of the following values:

Resolution Value	Uncropped Image Size
Full	752 x 480
1/2	376 x 240
1/4	188 x 120

***Full Resolution (00h)**



1/2 Resolution (01h)



1/4 Resolution (03h)

Image Brightness (Target White)

Parameter # F0h 86h

This parameter sets the Target White value used in Snapshot mode 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 D, Numeric Bar Codes* for numeric bar codes.

***180**

Image Brightness (3 digits)

Image File Format Selector

Parameter # F0h 30h

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

BMP File Format
(03h)

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

TIFF File Format
(04h)

JPEG Image Options

Parameter # F0h 2Bh

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

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

JPEG Size Selector
(00h)

JPEG Quality and Size Value

JPEG Quality = Parameter # F0h 31h
JPEG Size = Parameter # F1h 31h

If you select JPEG Quality Selector, scan the **JPEG Quality Value** bar code followed by 3 bar codes from *Appendix D, 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 D, 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)

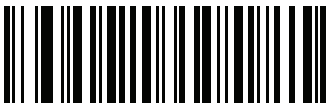
Image File Meta Data

Parameter # F1h B5h

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

Parameter # F1h 34h

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 5-22* and *Image Contrast Enhancement on page 5-23* 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

Parameter # F1h 98h

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 D, 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

Parameter # F1h 9Ah

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

Parameter # F1h 99h

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

Parameter # F0h 2Fh

Select the number of significant bits per pixel (BPP) to use when capturing an image. Select 1 BPP for a black and white image, 4 BPP to assign 1 of 16 levels of grey to each pixel, or 8 BPP to assign 1 of 256 levels of grey to each pixel. The engine ignores these settings for JPEG files, which always use 8 BPP.

1 BPP
(00h)

4 BPP
(01h)

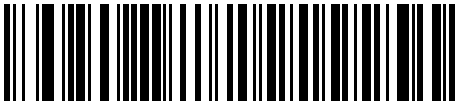
***8 BPP**
(02h)

CHAPTER 6 USB INTERFACE

Introduction

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

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



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

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

USB Parameter Defaults

Table 6-1 lists the defaults for USB host parameters. To change any option, scan the appropriate bar code(s) provided in the Parameter Descriptions section beginning on page *6-3*.

NOTE See *Appendix A, Standard Default Parameters* for all user preferences, hosts, symbologies, and miscellaneous default parameters.

Table 6-1 *USB Interface Parameter Defaults*

Parameter	Default	Page Number
USB Host Parameters		
USB Device Type	SNAPI with Imaging	*6-3*
Symbol Native API (SNAPI) Status Handshaking	Enable	*6-5*
USB Country Keyboard Types (Country Codes)	North American	*6-6*
USB Keystroke Delay	No Delay	*6-8*
Simulated Caps Lock	Disable	*6-9*
USB CAPS Lock Override	Disable	*6-9*
USB Ignore Unknown Characters	Enable	*6-10*
USB Convert Unknown to Code 39	Disable	*6-10*
USB Ignore Beep Directive	Honor	*6-11*
USB Ignore Type Directive	Honor	*6-11*
Emulate Keypad	Disable	*6-12*
Emulate Keypad with Leading Zero	Disable	*6-12*
USB FN1 Substitution	Disable	*6-13*
Function Key Mapping	Disable	*6-13*
Simulated Caps Lock	Disable	*6-9*
Convert Case	None	*6-14*
USB Static CDC	Enable	*6-14*
USB Polling Interval	8 msec	*6-15*
Quick Keypad Emulation	Disable	*6-17*

USB Host Parameters

USB Device Type

Select the desired USB device type.

NOTE When changing USB Device Types, the engine automatically resets and issues the standard startup beep sequences.

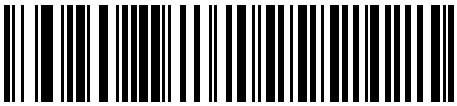
NOTE Before selecting **USB CDC Host**, install the CDC INF file on the host to ensure the engine does not stall during power up (due to a failure to enumerate USB). If the engine stalls, to recover it:

1) Install the CDC INF file
   or
2) After power-up, hold the trigger for 10 seconds, which allows the engine to power up using an alternate USB configuration. Upon power-up, scan another **USB Device Type**.

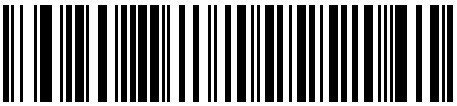
***Symbol Native API (SNAPI) with Imaging Interface**

Symbol Native API (SNAPI) without Imaging Interface

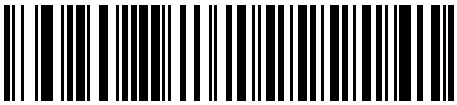
USB Device Type (continued)



HID Keyboard Emulation



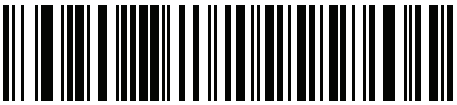
IBM Table Top USB



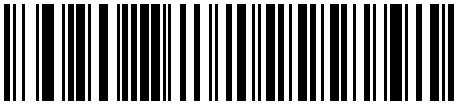
IBM Hand-Held USB

USB OPOS Hand-Held

Simple COM Port Emulation



USB CDC Host



SSI over USB CDC

Symbol Native API (SNAPI) Status Handshaking

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

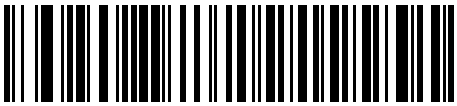
***Enable SNAPI Status Handshaking**

Disable SNAPI Status Handshaking

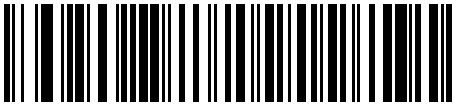
USB Country Keyboard Types - Country Codes

Scan the bar code corresponding to the keyboard type. This setting applies only to the USB HID Keyboard Emulation device.

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

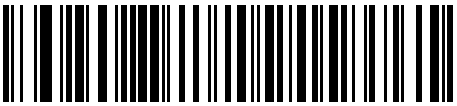


***North American Standard USB Keyboard**



German Windows

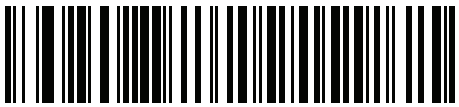
French Windows



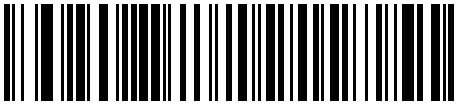
French Canadian Windows 95/98

French Canadian Windows 2000/XP

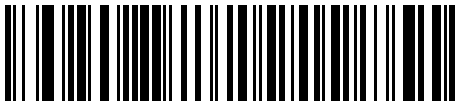
USB Country Keyboard Types - Country Codes (continued)



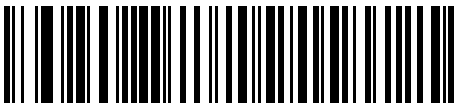
French Belgian Windows



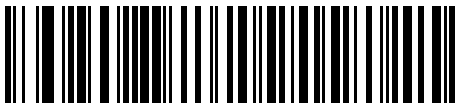
Spanish Windows



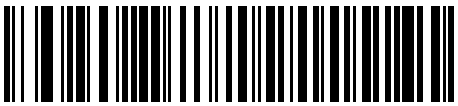
Italian Windows



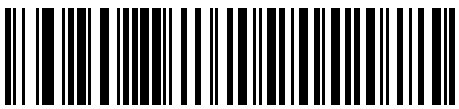
Swedish Windows



UK English Windows



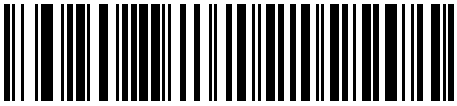
Japanese Windows (ASCII)



Portuguese-Brazilian Windows

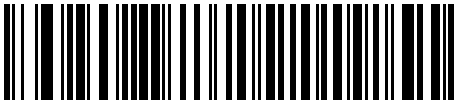
USB Keystroke Delay

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



***No Delay**

Medium Delay (20 msec)

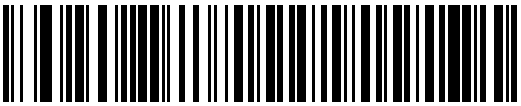


Long Delay (40 msec)

Simulated Caps Lock

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

***Disable Simulated Caps Lock**

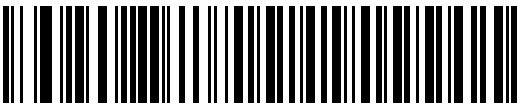


Enable Simulated Caps Lock

USB CAPS Lock Override

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

Override Caps Lock Key (Enable)



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

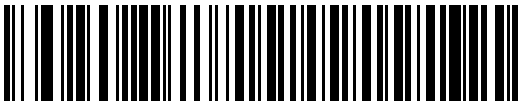
✓ ***NOTE*** If both Simulated Caps Lock and Caps Lock Override are enabled, Caps Lock Override takes precedence.

USB Ignore Unknown Characters

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

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

***Send Bar Codes with Unknown Characters (Transmit)**



Do Not Send Bar Codes with Unknown Characters (Disable)

USB Convert Unknown to Code 39

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

***Disable Convert Unknown to Code 39**

Enable Convert Unknown to Code 39

USB Ignore Beep Directive

This applies only to IBM hand-held, IBM tabletop, and OPOS devices. Scan one of the following bar codes to honor or ignore a beep directive. All directives are still acknowledged as if they were processed.

***Honor USB Beep Directive**

Ignore USB Beep Directive

USB Ignore Type Directive

This applies only to IBM hand-held, IBM tabletop, and OPOS devices. Scan one of the following bar codes to honor or ignore a code type enable/disable directive. All directives are still acknowledged as if they were processed.

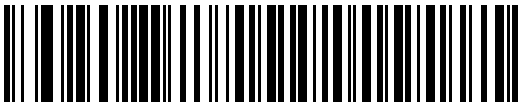
***Honor USB Ignore Type Directive**

Ignore USB Ignore Type Directive

Emulate Keypad

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

***Disable Keypad Emulation**



Enable Keypad Emulation

Emulate Keypad with Leading Zero

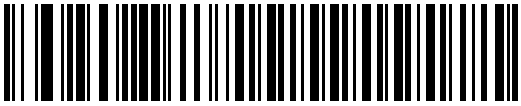
Enable this to send character sequences sent over the numeric keypad as ISO characters which have a leading zero. For example ASCII A transmits as “ALT MAKE” 0 0 6 5 “ALT BREAK”.

***Disable Keypad Emulation with Leading Zero**

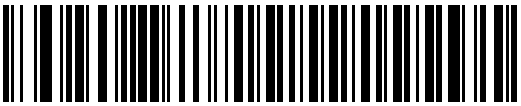
Enable Keypad Emulation with Leading Zero

USB Keyboard FN 1 Substitution

This option applies only to the USB HID Keyboard Emulation device. Enable this to replace any FN 1 characters in an EAN 128 bar code with a user-selected Key Category and value (see *FN1 Substitution Values on page 4-24* to set the Key Category and Key Value).



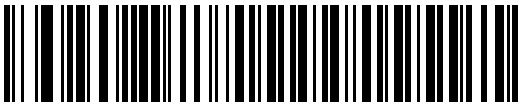
Enable



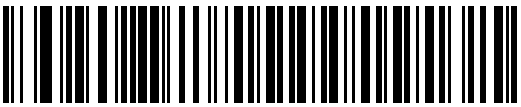
***Disable**

Function Key Mapping

ASCII values under 32 are normally sent as a control-key sequences (see *Table 6-2 on page 6-20*). Enable this parameter to send the keys in bold in place of the standard key mapping. Table entries that do not have a bold entry remain the same whether or not you enable this parameter.



***Disable Function Key Mapping**



Enable Function Key Mapping

Convert Case

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

***No Case Conversion**

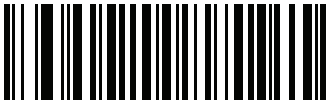
Convert All to Upper Case

Convert All to Lower Case

USB Static CDC

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

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



***Enable USB Static CDC**

Disable USB Static CDC

USB Polling Interval

This option speeds up the USB HID Keyboard Emulation Device. Scan a bar code below to set the polling interval. The polling interval determines the rate at which data can be sent between the engine and the host computer. A lower number indicates a faster data rate. The default value is 8 msec.

When the polling interval is changed the engine re-initializes.

CAUTION Ensure your host machine can handle the selected data rate. Selecting a data rate that is too fast for your host machine may result in lost data.

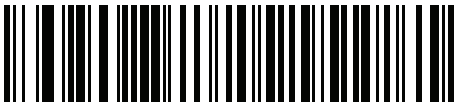
1 msec

2 msec

3 msec

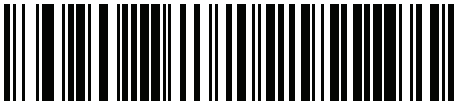
4 msec

USB Polling Interval (continued)

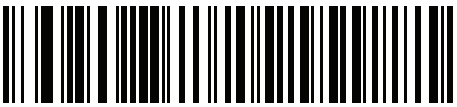


5 msec

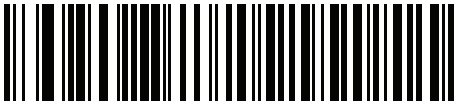
6 msec



7 msec



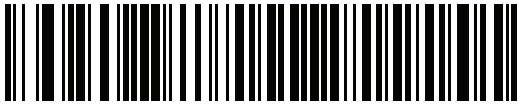
***8 msec**



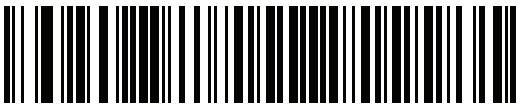
9 msec

Quick Keypad Emulation

This option applies only to the HID Keyboard Emulation Device when Emulate Keypad is enabled. This parameter enables a quicker method of emulation utilizing the numeric keypad. The default value is **Disable**.



Enable



***Disable**

Encapsulation of RSM Commands/Responses over SNAPI

The RSM commands, which may exceed the 31-byte SNAPI command length limitation, are multi-packeted over the following low level encapsulation frame.

The maximum response frame size is 32 bytes, therefore a response that is 256 bytes in length spans eleven 32-byte response frames.

Command Structure

SNAPI Low Level Management Encapsulate Command

Byte	7	6	5	4	3	2	1	0
0	SNAPI_REPORT_OUT_MGMT_ENCAP_CONTROL (0Dh)							
1	Cont'd packet	First packet	Reserved (0)					
2	Reserved for future use (0)							
3	Data Length (excluding itself) (0-26 bytes)							
4	Data byte 1							
5	Data byte 2							
6	Data byte 3							
.								
Data Len +3	Data byte 'Data Len'							

Encapsulation code indicates the data is encapsulated.

Continuation packet:

- (1) = more data is expected (this is not the last frame)
- (0) = last packet

First packet:

- (1) = first packet. Setting this bit resets the receive state machine of the device.
- (0) = not the first packet

Response Structure

SNAPI Low Level Management Encapsulate Response

Byte	7	6	5	4	3	2	1	0
0	SNAPI_REPORT_IN_MGMT_ENCAP_CONTROL (27h)							
1	Reserved (0)			Cont'd packet	Reserved (0)			
2	Data Length (excluding itself) (0 to 29 bytes)							
3 … Data Len + 2	Data (0-29 bytes)							

Example Transaction

The following example illustrates how to retrieve diagnostic information (*Diagnostic Testing and Reporting (Attribute #10061)* decimal) from the engine using RSM protocol encapsulation over SNAPI. Before sending any RSM command, the host must send the RSM Get Packet Size command to query the packet size supported by the device.

Command from Host to Query Packet Size Supported by Device

0D 40 00 06 00 06 20 00 32 00

Where:

- 0D 40 00 06 is encapsulation of RSM commands over SNAPI command header
- 00 06 20 00 00 32 is RSM Get Packet Size command

Response from Device with Packet Size Information

27 00 08 00 08 20 00 00 F0 00 32

Where:

- 27 00 08 is encapsulation of RSM response over SNAPI command header
- 00 08 20 00 00 F0 00 32 is RSM Get Packet Size response

Command from Host to Retrieve Diagnostic Information

0D 40 00 08 00 08 02 00 27 4D 42 00

Where:

- 0D 40 00 08 is encapsulation of RSM commands over SNAPI command header
- 00 08 02 00 27 4D 42 00 is RSM attribute Get command requesting attribute 10061 decimal

Response from Engine with Diagnostic Information

27 00 1D 00 1D 02 00 27 4D 41 01 42 00 0E 00 00 00 01 03 02 03 03 03 04 03 05 03 06 03 FF FF

Where:

- 27 00 1D is encapsulation of RSM responses over SNAPI command header
- 00 1D 02 00 27 4D 41 01 42 00 0E 00 00 00 00 01 03 02 03 03 03 04 03 05 03 06 03 is RSM attribute Get response which includes diagnostic report value
- FF FF is RSM attribute Get response packet termination bytes

ASCII Character Set for USB

Table 6-2 *USB Prefix/Suffix Values*

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

[1]The keystroke in bold transmits only if you enable *Function Key Mapping on page 6-13*. Otherwise, the unbolded keystroke transmits.

Table 6-2 *USB Prefix/Suffix Values (Continued)*

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

[1]The keystroke in bold transmits only if you enable *Function Key Mapping on page 6-13*. Otherwise, the unbolded keystroke transmits.

Table 6-2 *USB Prefix/Suffix Values (Continued)*

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

[1]The keystroke in bold transmits only if you enable *Function Key Mapping on page 6-13*. Otherwise, the unbolded keystroke transmits.

Table 6-2 *USB Prefix/Suffix Values (Continued)*

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

[1]The keystroke in bold transmits only if you enable *Function Key Mapping on page 6-13*. Otherwise, the unbolded keystroke transmits.

Table 6-2 *USB Prefix/Suffix Values (Continued)*

Prefix/ Suffix Value	Full ASCII Code 39 Encode Char.acter	Keystroke
1113	+Q	q
1114	+R	r
1115	+S	s
1116	+T	t
1117	+U	u
1118	+V	v
1119	+W	w
1120	+X	x
1121	+Y	y
1122	+Z	z
1123	%P	{
1124	%Q	|
1125	%R	}
1126	%S	~

[1]The keystroke in bold transmits only if you enable *Function Key Mapping on page 6-13*. Otherwise, the unbolded keystroke transmits.

Table 6-3 *USB ALT Key Character Set*

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

Table 6-4 *USB GUI Key Character Set*

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

F Keys	Keystroke
5001	F1
5002	F2
5003	F3
5004	F4
5005	F5
5006	F6
5007	F7
5008	F8
5009	F9
5010	F10
5011	F11
5012	F12

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

F Keys	Keystroke
5013	F13
5014	F14
5015	F15
5016	F16
5017	F17
5018	F18
5019	F19
5020	F20
5021	F21
5022	F22
5023	F23
5024	F24

Table 6-7 *USB Numeric Keypad Character Set*

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

Table 6-8 *USB Extended Keypad Character Set*

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

CHAPTER 7 SYMBOLOGIES

Introduction

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

The engine is shipped with the settings shown in *Table 7-1 on page 7-2* (also see *Appendix A, Standard Default Parameters* for all host device and miscellaneous defaults). If the default values suit requirements, programming is not necessary.

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.
- For the USB SNAPI host, send a “parameter send” command from the host system. Hexadecimal parameter numbers are shown in this chapter below the parameter title, and options are shown in parenthesis beneath the accompanying bar codes. See the *Simple Serial Interface (SSI) Programmer’s Guide* for detailed instructions for changing parameter values using this method.

✓ ***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 4-5*. Throughout the programming bar code menus, asterisks (*) indicate default values.

* Indicates Default — ***Enable UPC-A** **(01h)** — Feature/Option; 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 7-18*. The engine 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 7-1 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 4-5*.

NOTE See *Appendix A, Standard Default Parameters* for all user preferences, hosts, and miscellaneous default parameters.

Table 7-1 *Parameter Defaults*

Parameter	Parameter Number	Default	Page Number
Disable All Code Types			*7-8*
UPC/EAN			
UPC-A	01h	Enable	*7-9*
UPC-E	02h	Enable	*7-9*
UPC-E1	0Ch	Disable	*7-10*
EAN-8/JAN 8	04h	Enable	*7-10*
EAN-13/JAN 13	03h	Enable	*7-11*
Bookland EAN	53h	Enable	*7-11*
Bookland ISBN Format	F1h 40h	ISBN-10	*7-12*
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	10h	Ignore	*7-14*
User-Programmable Supplementals Supplemental 1: Supplemental 2:	 F1h 43h F1h 44h	N/A	*7-16*
UPC/EAN/JAN Supplemental Redundancy	50h	10	*7-16*

Table 7-1 *Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
Decode UPC/EAN/JAN Supplemental AIM ID	F1h A0h	Combined	*7-17*
Transmit UPC-A Check Digit	28h	Enable	*7-18*
Transmit UPC-E Check Digit	29h	Enable	*7-18*
Transmit UPC-E1 Check Digit	2Ah	Enable	*7-19*
UPC-A Preamble	22h	System Character	*7-19*
UPC-E Preamble	23h	System Character	*7-19*
UPC-E1 Preamble	24h	System Character	*7-21*
Convert UPC-E to A	25h	Disable	*7-22*
Convert UPC-E1 to A	26h	Disable	*7-22*
EAN-8/JAN-8 Extend	27h	Disable	*7-23*
UCC Coupon Extended Code	55h	Disable	*7-23*
Coupon Report	F1h DAh	New Coupon Symbols	*7-24*
ISSN EAN	F1h 69h	Disable	*7-25*
Code 128			
Code 128	08h	Enable	*7-26*
Set Length(s) for Code 128	D1h, D2h	Any Length	*7-26*
GS1-128 (formerly UCC/EAN-128)	0Eh	Enable	*7-27*
ISBT 128	54h	Enable	*7-28*
ISBT Concatenation	F1h 41h	Disable	*7-29*
Check ISBT Table	F1h 42h	Enable	*7-30*
ISBT Concatenation Redundancy	DFh	10	*7-30*
Code 39			
Code 39	00h	Enable	*7-31*
Trioptic Code 39	0Dh	Disable	*7-31*
Convert Code 39 to Code 32 (Italian Pharmacy Code)	56h	Disable	*7-32*
Code 32 Prefix	E7h	Disable	*7-32*
Set Length(s) for Code 39	12h, 13h	Length Within Range: 2 to 55	*7-33*
Code 39 Check Digit Verification	30h	Disable	*7-34*
Transmit Code 39 Check Digit	2Bh	Disable	*7-34*

Table 7-1 *Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
Code 39 Full ASCII Conversion	11h	Disable	*7-35*
Buffer Code 39	71h	Disable	*7-36*
Code 93			
Code 93	09h	Disable	*7-38*
Set Length(s) for Code 93	1Ah, 1Bh	Length Within Range: 4 to 55	*7-38*
Code 11			
Code 11	0Ah	Disable	*7-40*
Set Lengths for Code 11	1Ch, 1Dh	Length Within Range: 4 to 55	*7-40*
Code 11 Check Digit Verification	34h	Disable	*7-42*
Transmit Code 11 Check Digit(s)	2Fh	Disable	*7-43*
Interleaved 2 of 5 (ITF)			
Interleaved 2 of 5 (ITF)	06h	Disable	*7-44*
Set Lengths for I 2 of 5	16h, 17h	1 Length; Length = 14	*7-44*
I 2 of 5 Check Digit Verification	31h	Disable	*7-46*
Transmit I 2 of 5 Check Digit	2Ch	Disable	*7-46*
Convert I 2 of 5 to EAN 13	52h	Disable	*7-47*
Discrete 2 of 5 (DTF)			
Discrete 2 of 5	05h	Disable	*7-48*
Set Length(s) for D 2 of 5	14h, 15h	1 Length; Length = 12	*7-48*
Codabar (NW - 7)			
Codabar	07h	Disable	*7-50*
Set Lengths for Codabar	18h, 19h	Length Within Range: 5 to 55	*7-50*
CLSI Editing	36h	Disable	*7-52*
NOTIS Editing	37h	Disable	*7-52*
Codabar Upper or Lower Case Start/Stop Characters Detection	F2h 57h	Upper Case	*7-53*

Table 7-1 *Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
MSI			
MSI	0Bh	Disable	*7-54*
Set Length(s) for MSI	1Eh, 1Fh	Length Within Range: 4 to 55	*7-54*
MSI Check Digits	32h	One	*7-56*
Transmit MSI Check Digit	2Eh	Disable	*7-56*
MSI Check Digit Algorithm	33h	Mod 10/Mod 10	*7-57*
Chinese 2 of 5			
Chinese 2 of 5	F0h 98h	Disable	*7-57*
Matrix 2 of 5			
Matrix 2 of 5	F1h 6Ah	Disable	*7-58*
Matrix 2 of 5 Lengths	F1h 6Bh F1h 6Ch	Length; Length = 14	*7-59*
Matrix 2 of 5 Check Digit	F1h 6Eh	Disable	*7-60*
Transmit Matrix 2 of 5 Check Digit	F1h 6Fh	Disable	*7-60*
Korean 3 of 5			
Korean 3 of 5	F1h 45h	Disable	*7-61*
Inverse 1D	F1h 4Ah	Regular	*7-62*
Postal Codes			
US Postnet	59h	Disable	*7-63*
US Planet	5Ah	Disable	*7-63*
Transmit US Postal Check Digit	5Fh	Enable	*7-64*
UK Postal	5Bh	Disable	*7-64*
Transmit UK Postal Check Digit	60h	Enable	*7-65*
Japan Postal	F0h 22h	Disable	*7-65*
Australia Post	F0h 23h	Disable	*7-66*
Australia Post Format	F1h CEh	Autodiscriminate	*7-67*
Netherlands KIX Code	F0h 46h	Disable	*7-68*
USPS 4CB/One Code/Intelligent Mail	F1h 50h	Disable	*7-68*
UPU FICS Postal	F1h 63h	Disable	*7-69*

Table 7-1 *Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
GS1 DataBar			
GS1 DataBar (GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional)	F0h 52h	Enable	*7-70*
GS1 DataBar Limited	F0h 53h	Disable	*7-71*
GS1 DataBar Limited Security Level	F1h D8h	3	*7-72*
GS1 DataBar Expanded (GS1 DataBar Expanded, GS1 DataBar Expanded Stacked)	F0h 54h	Enable	*7-73*
Convert GS1 DataBar to UPC/EAN	F0h 8Dh	Disable	*7-73*
Composite			
Composite CC-C	F0h 55h	Disable	*7-74*
Composite CC-A/B	F0h 56h	Disable	*7-74*
Composite TLC-39	F0h 73h	Disable	*7-75*
UPC Composite Mode	F0h 58h	UPC Always Linked	*7-75*
Composite Beep Mode	F0h 8Eh	Beep As Each Code Type is Decoded	*7-76*
GS1-128 Emulation Mode for UCC/EAN Composite Codes	F0h ABh	Disable	*7-76*
2D Symbologies			
PDF417	0Fh	Enable	*7-77*
MicroPDF417	E3h	Disable	*7-77*
Code 128 Emulation	7Bh	Disable	*7-78*
Data Matrix	F0h 24h	Enable	*7-79*
Data Matrix Inverse	F1h 4Ch	Regular	*7-79*
Decode Mirror Images (Data Matrix Only)	F1h 19h	Auto	*7-80*
Maxicode	F0h 26h	Disable	*7-81*
QR Code	F0h 25h	Enable	*7-81*
QR Inverse	F1h 4Bh	Regular	*7-82*
MicroQR	F1h 3Dh	Enable	*7-82*
Aztec	F1h 3Eh	Enable	*7-83*
Aztec Inverse	F1h 4Dh	Inverse Autodetect	*7-83*

Table 7-1 *Parameter Defaults (Continued)*

Parameter	Parameter Number	Default	Page Number
Symbology-Specific Security Levels			
Redundancy Level	4Eh	1	*7-84*
Security Level (UPC/EAN and Code 93)	4Dh	1	*7-86*
Intercharacter Gap Size	F0h 7Dh	Normal	*7-87*
Macro PDF			
Macro PDF Transmit/Decode Mode Symbols	BCh	Passthrough Mode	*7-89*
Transmit Macro PDF Control Header	B8h	Disable	*7-90*
Escape Characters	E9h	None	*7-90*
Flush Macro PDF Buffer			*7-91*
Abort Macro PDF Entry			*7-91*

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

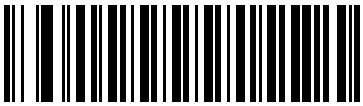
UPC/EAN

Enable/Disable UPC-A

Parameter # 01h

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

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



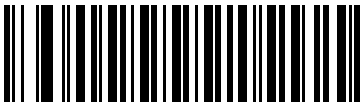
Disable UPC-A
(00h)

Enable/Disable UPC-E

Parameter # 02h

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

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



Disable UPC-E
(00h)

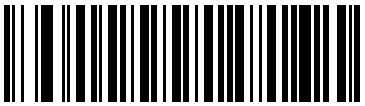
Enable/Disable UPC-E1

Parameter # 0Ch

UPC-E1 is disabled by default.

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

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



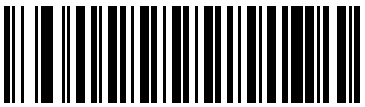
Enable UPC-E1
(01h)

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

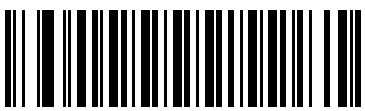
Enable/Disable EAN-8/JAN-8

Parameter # 04h

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



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

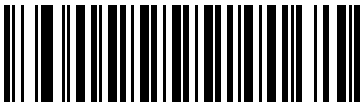


Disable EAN-8/JAN-8
(00h)

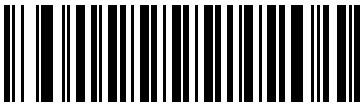
Enable/Disable EAN-13/JAN-13

Parameter # 03h

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



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



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

Enable/Disable Bookland EAN

Parameter # 53h

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

***Enable Bookland EAN**
(01h)

Disable Bookland EAN
(00h)

✓ ***NOTE*** If Bookland EAN is enabled, select a *Bookland ISBN Format on page 7-12*. 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 7-13*.

Bookland ISBN Format

Parameter # F1h 40h

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

- **Bookland ISBN-10** - The engine 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 engine 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 7-11*), 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 7-13*.

Decode UPC/EAN/JAN Supplementals

Parameter # 10h

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

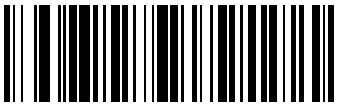
- If you select **Ignore UPC/EAN with Supplementals**, and the engine is presented with a UPC/EAN plus supplemental symbol, the engine decodes UPC/EAN and ignores the supplemental characters.
- If you select **Decode UPC/EAN with Supplementals**, the engine only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.
- If you select **Autodiscriminate UPC/EAN Supplementals**, the engine decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the engine must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 7-16* before transmitting its data to confirm that there is no supplemental.
- If you select one of the following **Supplemental Mode** options, the engine immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the engine must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 7-16* before transmitting its data to confirm that there is no supplemental. The engine 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 7-11* to enable Bookland EAN, and select a format using *Bookland ISBN Format on page 7-12*.

  - **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 7-16*.
  - **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 7-16***.**
  - **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 7-16*.
  - **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 7-16*.

  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

Supplemental 1: Parameter # F1h 43h

Supplemental 2: Parameter # F1h 44h

If you selected a Supplemental User-Programmable option from *Decode UPC/EAN/JAN Supplementals on page 7-13*, select **User-Programmable Supplemental 1** to set the 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on *page D-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 D-1*.

User-Programmable Supplemental 1

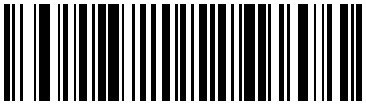
User-Programmable Supplemental 2

UPC/EAN/JAN Supplemental Redundancy

Parameter # 50h

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

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



UPC/EAN/JAN Supplemental Redundancy

UPC/EAN/JAN Supplemental AIM ID Format

Parameter # F1h A0h

Select an output format when reporting UPC/EAN/JAN bar codes with Supplementals with *Transmit Code ID Character on page 4-21* set to **AIM Code ID Character**:

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

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

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

  ]E3<data+supplemental data>

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

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

Separate
(00h)

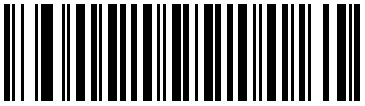
***Combined**
(01h)

Separate Transmissions
(02h)

Transmit UPC-A Check Digit

Parameter # 28h

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



***Transmit UPC-A Check Digit**
(01h)

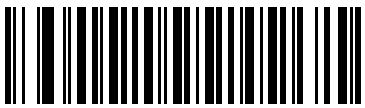
Do Not Transmit UPC-A Check Digit
(00h)

Transmit UPC-E Check Digit

Parameter # 29h

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

***Transmit UPC-E Check Digit**
(01h)



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

Transmit UPC-E1 Check Digit

Parameter # 2Ah

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

***Transmit UPC-E1 Check Digit (01h)**

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

UPC-A Preamble

Parameter # 22h

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

No Preamble (<DATA>) (00h)

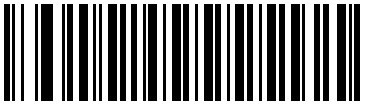
***System Character (<SYSTEM CHARACTER> <DATA>) (01h)**

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

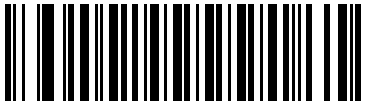
UPC-E Preamble

Parameter # 23h

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



No Preamble (<DATA>)
(00h)



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

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

UPC-E1 Preamble

Parameter # 24h

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

No Preamble (<DATA>)
(00h)

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

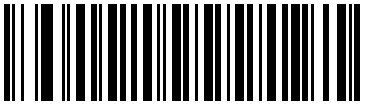
System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(02h)

Convert UPC-E to UPC-A

Parameter # 25h

Enable this to convert UPC-E (zero suppressed) decoded data to UPC-A format before transmission. After conversion, the data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit).

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



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

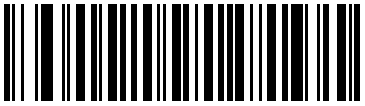
***Do Not Convert UPC-E to UPC-A (Disable)**
(00h)

Convert UPC-E1 to UPC-A

Parameter # 26h

Enable this to convert UPC-E1 decoded data to UPC-A format before transmission. After conversion, the data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit).

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



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

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

EAN-8/JAN-8 Extend

Parameter # 27h

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

Disable this to transmit EAN-8 symbols as is.

Enable EAN/JAN Zero Extend (01h)

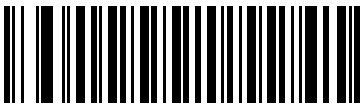
***Disable EAN/JAN Zero Extend (00h)**

UCC Coupon Extended Code

Parameter # 55h

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

Enable UCC Coupon Extended Code (01h)



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

✓ ***NOTE*** See *UPC/EAN/JAN Supplemental Redundancy on page 7-16* to control autodiscrimination of the GS1-128 (right half) of a coupon code.

Coupon Report

Parameter # F1h DAh

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.

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

Parameter # F1h 69h

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

Enable ISSN EAN
(01h)

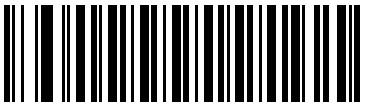
***Disable ISSN EAN**
(00h)

Code 128

Enable/Disable Code 128

Parameter # 08h

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



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

Disable Code 128 (00h)

Set Lengths for Code 128

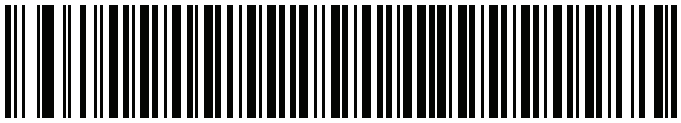
Parameter # L1 = D1h, L2 = D2h

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

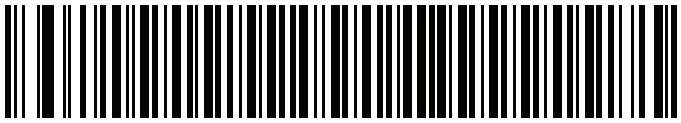
NOTE When setting lengths for different bar code types, enter a leading zero for single digit numbers.

- **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 D, 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 D-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 D, 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 D-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 D, 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 D-2*.
- **Any Length** - Select this option to decode Code 128 symbols containing any number of characters within the engine's capability.

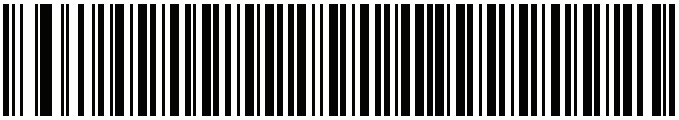
Set Lengths for Code 128 (continued)



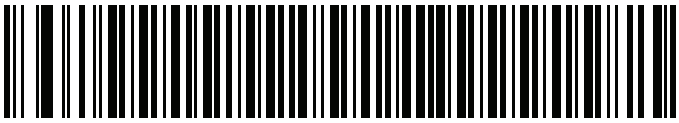
Code 128 - One Discrete Length



Code 128 - Two Discrete Lengths



Code 128 - Length Within Range



***Code 128 - Any Length**

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

Parameter # 0Eh

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

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

Disable GS1-128
(00h)

Enable/Disable ISBT 128

Parameter # 54h

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

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

Disable ISBT 128
(00h)

ISBT Concatenation

Parameter # F1h 41h

Select an option for concatenating pairs of ISBT code types:

- If you select **Disable ISBT Concatenation**, the engine 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 engine to decode and perform concatenation. The engine does not decode single ISBT symbols.
- If you select **Autodiscriminate ISBT Concatenation**, the engine decodes and concatenates pairs of ISBT codes immediately. If only a single ISBT symbol is present, the engine must decode the symbol the number of times set via *ISBT Concatenation Redundancy on page 7-30* before transmitting its data to confirm that there is no additional ISBT symbol.

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

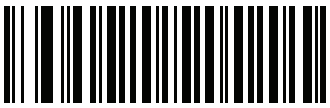
Enable ISBT Concatenation
(01h)

Autodiscriminate ISBT Concatenation
(00h)

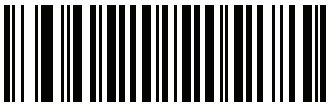
Check ISBT Table

Parameter # F1h 42h

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



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



Disable Check ISBT Table (00h)

ISBT Concatenation Redundancy

Parameter # DFh

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

ISBT Concatenation Redundancy

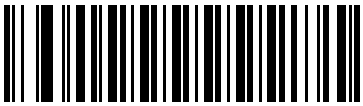
Code 39

Enable/Disable Code 39

Parameter # 00h

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

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



Disable Code 39
(00h)

Enable/Disable Trioptic Code 39

Parameter # 0Dh

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

Enable Trioptic Code 39
(01h)

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

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

Convert Code 39 to Code 32

Parameter # 56h

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

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

Enable Convert Code 39 to Code 32 (01h)

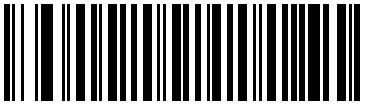
***Disable Convert Code 39 to Code 32 (00h)**

Code 32 Prefix

Parameter # E7h

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

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



Enable Code 32 Prefix (01h)

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

Set Lengths for Code 39

Parameter # L1 = 12h, L2 = 13h

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

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 D, Numeric Bar Codes*. For example, to decode only Code 39 symbols with 14 characters, scan **Code 39 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or change the selection, scan *Cancel on page D-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 D, 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 D-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 D, Numeric Bar Codes*. For example, to decode Code 39 symbols containing between 4 and 12 characters, first scan **Code 39 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page D-2*.
- **Any Length** - Select this option to decode Code 39 symbols containing any number of characters within the engine's capability.

Code 39 - One Discrete Length

Code 39 - Two Discrete Lengths

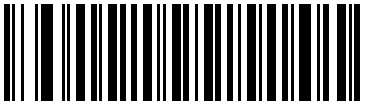
***Code 39 - Length Within Range**

Code 39 - Any Length

Code 39 Check Digit Verification

Parameter # 30h

Enable this feature to check the integrity of all Code 39 symbols to verify that the data complies with specified check digit algorithm. Only Code 39 symbols which include a modulo 43 check digit are decoded. Enable this feature if the Code 39 symbols contain a Modulo 43 check digit.



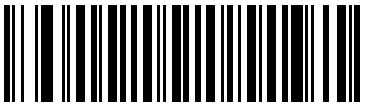
Enable Code 39 Check Digit (01h)

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

Transmit Code 39 Check Digit

Parameter # 2Bh

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



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

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

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

Code 39 Full ASCII Conversion

Parameter # 11h

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

Enable Code 39 Full ASCII
(01h)

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

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

Code 39 Full ASCII to Full ASCII Correlation is host-dependent, and is therefore described in the ASCII Character Set Table for the appropriate interface. See the *ASCII Character Set for USB on page 6-20*.

Code 39 Buffering - Scan & Store

Parameter # 71h

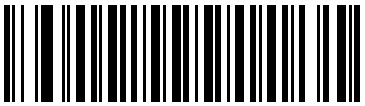
This feature allows the engine to accumulate data from multiple Code 39 symbols.

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.

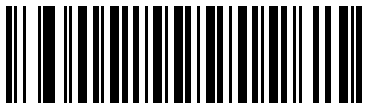
Decoding a Code 39 symbol with no leading space transmits in sequence all buffered data in a first-in first-out format, plus the “triggering” symbol. See the following pages for further details.

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 engine to decode Code 39 symbology only.



Buffer Code 39 (Enable)
(01h)



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

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

To disable Code 39 buffering when there is data in the transmission buffer, first force the buffer transmission (see *Transmit Buffer on page 7-37*) 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 engine issues a low/high beep to indicate successful decode and buffering. (For overflow conditions, see *Overfilling Transmission Buffer on page 7-37*.)
- The engine 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 engine issues a short high/low/high beep.
- The engine 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 engine transmits and clears the buffer.
   - The engine issues a low/high beep.

Transmit Buffer

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

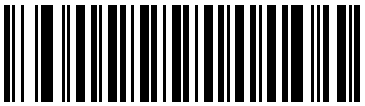
- A short low/high/low beep signals that the buffer is empty.
- No transmission occurs.
- The buffer remains empty.

Code 93

Enable/Disable Code 93

Parameter # 09h

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



Enable Code 93
(01h)

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

Set Lengths for Code 93

Parameter # L1 = 1Ah, L2 = 1Bh

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 93 to any length, one or two discrete lengths, or lengths within a specific range.

- **One Discrete Length** - Select this option to decode only Code 93 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only Code 93 symbols with 14 characters, scan **Code 93 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan *Cancel on page D-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 D, 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 D-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 D, Numeric Bar Codes*. For example, to decode Code 93 symbols containing between 4 and 12 characters, first scan **Code 93 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page D-2*.
- **Any Length** - Scan this option to decode Code 93 symbols containing any number of characters within the engine's capability.

Set Lengths for Code 93 (continued)

Code 93 - One Discrete Length

Code 93 - Two Discrete Lengths

***Code 93 - Length Within Range**

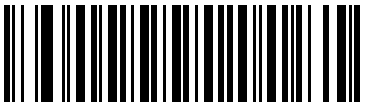
Code 93 - Any Length

Code 11

Code 11

Parameter # 0Ah

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

Parameter # L1 = 1Ch, L2 = 1Dh

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

- **One Discrete Length** - Select this option to decode only Code 11 symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only Code 11 symbols with 14 characters, scan **Code 11 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan *Cancel on page D-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 D, 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 D-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 D, Numeric Bar Codes*. For example, to decode Code 11 symbols containing between 4 and 12 characters, first scan **Code 11 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page D-2*.
- **Any Length** - Scan this option to decode Code 11 symbols containing any number of characters within the engine's capability.

Set Lengths for Code 11 (continued)

Code 11 - One Discrete Length

Code 11 - Two Discrete Lengths

***Code 11 - Length Within Range**

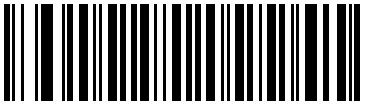
Code 11 - Any Length

Code 11 Check Digit Verification

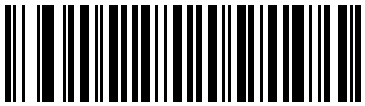
Parameter # 34h

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

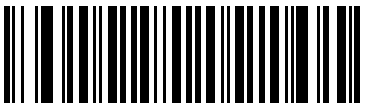
To enable this feature, scan the bar code below corresponding to the number of check digits encoded in the Code 11 symbols.



***Disable**
(00h)



One Check Digit
(01h)



Two Check Digits
(02h)

Transmit Code 11 Check Digits

Parameter # 2Fh

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

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

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

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

Interleaved 2 of 5 (ITF)

Enable/Disable Interleaved 2 of 5

Parameter # 06h

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

Enable Interleaved 2 of 5 (01h)

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

Set Lengths for Interleaved 2 of 5

Parameter # L1 = 16h, L2 = 17h

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for I 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The 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 D, Numeric Bar Codes*. For example, to decode only I 2 of 5 symbols with 14 characters, scan **I 2 of 5 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan *Cancel on page D-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 D, 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 D-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 D, Numeric Bar Codes*. For example, to decode I 2 of 5 symbols containing between 4 and 12 characters, first scan **I 2 of 5 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page D-2*.
- **Any Length** - Scan this option to decode I 2 of 5 symbols containing any number of characters within the engine's capability.

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

Set Lengths for Interleaved 2 of 5 (continued)

*I 2 of 5 - One Discrete Length

I 2 of 5 - Two Discrete Lengths

I 2 of 5 - Length Within Range

I 2 of 5 - Any Length

I 2 of 5 Check Digit Verification

Parameter # 31h

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

***Disable**
(00h)

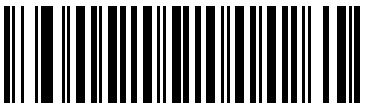
USS Check Digit
(01h)

OPCC Check Digit
(02h)

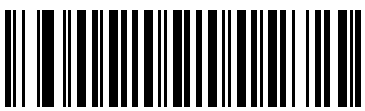
Transmit I 2 of 5 Check Digit

Parameter # 2Ch

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



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



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

Convert I 2 of 5 to EAN-13

Parameter # 52h

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

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

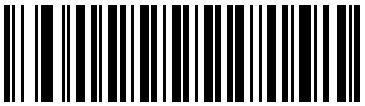
***Do Not Convert I 2 of 5 to EAN-13 (Disable) (00h)**

Discrete 2 of 5 (DTF)

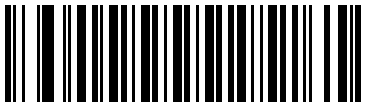
Enable/Disable Discrete 2 of 5

Parameter # 05h

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



Enable Discrete 2 of 5 (01h)



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

Set Lengths for Discrete 2 of 5

Parameter # L1 = 14h, L2 = 15h

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for D 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The 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 D, Numeric Bar Codes*. For example, to decode only D 2 of 5 symbols with 14 characters, scan **D 2 of 5 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan *Cancel on page D-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 D, 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 D-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 D, Numeric Bar Codes*. For example, to decode D 2 of 5 symbols containing between 4 and 12 characters, first scan **D 2 of 5 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page D-2*.
- **Any Length** - Scan this option to decode D 2 of 5 symbols containing any number of characters within the engine's capability.

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

Set Lengths for Discrete 2 of 5 (continued)

*D 2 of 5 - One Discrete Length

D 2 of 5 - Two Discrete Lengths

D 2 of 5 - Length Within Range

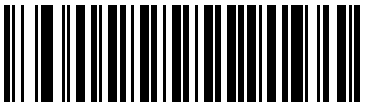
D 2 of 5 - Any Length

Codabar (NW - 7)

Enable/Disable Codabar

Parameter # 07h

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



Enable Codabar
(01h)

***Disable Codabar**
(00h)

Set Lengths for Codabar

Parameter # L1 = 18h, L2 = 19h

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

- **One Discrete Length** - Select this option to decode only Codabar symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only Codabar symbols with 14 characters, scan **Codabar - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan *Cancel on page D-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 D, Numeric Bar Codes*. For example, to decode only Codabar symbols containing either 2 or 14 characters, select **Codabar - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan *Cancel on page D-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 D, Numeric Bar Codes*. For example, to decode Codabar symbols containing between 4 and 12 characters, first scan **Codabar - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page D-2*.
- **Any Length** - Scan this option to decode Codabar symbols containing any number of characters within the engine's capability.

Set Lengths for Codabar (continued)

Codabar - One Discrete Length

Codabar - Two Discrete Lengths

***Codabar - Length Within Range**

Codabar - Any Length

CLSI Editing

Parameter # 36h

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

NOTE Symbol length does not include start and stop characters.

Enable CLSI Editing
(01h)

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

NOTIS Editing

Parameter # 37h

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

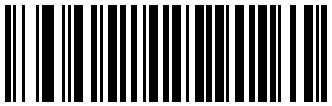
Enable NOTIS Editing
(01h)

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

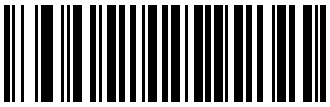
Codabar Upper or Lower Case Start/Stop Characters Detection

Parameter # F2h 57h

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



Lower Case
(01h)



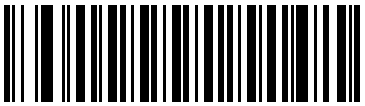
***Upper Case**
(00h)

MSI

Enable/Disable MSI

Parameter # 0Bh

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



Enable MSI
(01h)

***Disable MSI**
(00h)

Set Lengths for MSI

Parameter # L1 = 1Eh, L2 = 1Fh

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

- **One Discrete Length** - Select this option to decode only MSI symbols containing a selected length. Select the length using the numeric bar codes in *Appendix D, Numeric Bar Codes*. For example, to decode only MSI symbols with 14 characters, scan **MSI - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan *Cancel on page D-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 D, Numeric Bar Codes*. For example, to decode only MSI symbols containing either 2 or 14 characters, select **MSI - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan *Cancel on page D-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 D, Numeric Bar Codes*. For example, to decode MSI symbols containing between 4 and 12 characters, first scan **MSI - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (enter a leading zero for single digit numbers). To correct an error or change the selection, scan *Cancel on page D-2*.
- **Any Length** - Scan this option to decode MSI symbols containing any number of characters within the engine's capability.

Set Lengths for MSI (continued)

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

MSI - One Discrete Length

MSI - Two Discrete Lengths

***MSI - Length Within Range**

MSI - Any Length

MSI Check Digits

Parameter # 32h

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

See *MSI Check Digit Algorithm on page 7-57* for the selection of second digit algorithms.

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

Two MSI Check Digits
(01h)

Transmit MSI Check Digit(s)

Parameter # 2Eh

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

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

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

MSI Check Digit Algorithm

Parameter # 33h

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

MOD 10/MOD 11
(00h)

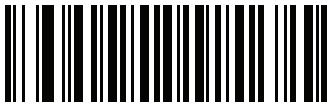
***MOD 10/MOD 10**
(01h)

Chinese 2 of 5

Enable/Disable Chinese 2 of 5

Parameter # F0h 98h

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



Enable Chinese 2 of 5
(01h)

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

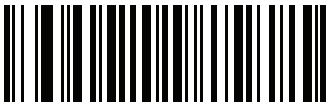
Matrix 2 of 5

Enable/Disable Matrix 2 of 5

Parameter # F1h 6Ah

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

Enable Matrix 2 of 5
(01h)



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

Set Lengths for Matrix 2 of 5

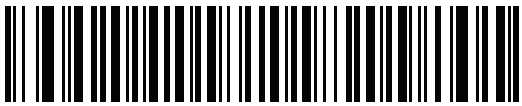
Parameter # L1 = F1h 6Bh, L2 = F1h 6Ch

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

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

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

Matrix 2 of 5 - Two Discrete Lengths



Matrix 2 of 5 - Length Within Range

Matrix 2 of 5 - Any Length

Matrix 2 of 5 Check Digit

Parameter # F1h 6Eh

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

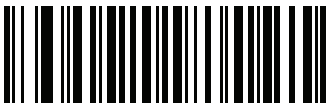
Enable Matrix 2 of 5 Check Digit (01h)

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

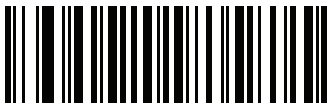
Transmit Matrix 2 of 5 Check Digit

Parameter # F1h 6Fh

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



Transmit Matrix 2 of 5 Check Digit (01h)



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

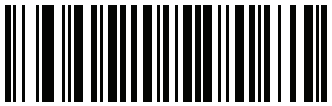
Korean 3 of 5

Enable/Disable Korean 3 of 5

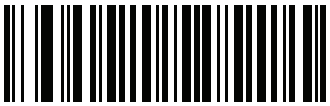
Parameter # F1h 45h

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

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



Enable Korean 3 of 5 (01h)



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

Inverse 1D

Parameter # F1h 4Ah

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

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

***Regular**
(00h)

Inverse Only
(01h)

Inverse Autodetect
(02h)

Postal Codes

US Postnet

Parameter # 59h

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

Enable US Postnet
(01h)

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

US Planet

Parameter # 5Ah

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

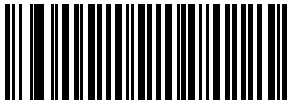
Enable US Planet
(01h)

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

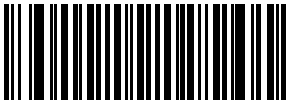
Transmit US Postal Check Digit

Parameter # 5Fh

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



***Transmit US Postal Check Digit (01h)**



Do Not Transmit US Postal Check Digit (00h)

UK Postal

Parameter # 5Bh

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

Parameter # 60h

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

Parameter # F0h, 22h

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

Enable Japan Postal (01h)

***Disable Japan Postal (00h)**

Australia Post

Parameter # F0h, 23h

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

Enable Australia Post
(01h)

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

Australia Post Format

Parameter # F1h, CEh

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

Parameter # F0h, 46h

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

Parameter # F1h 50h

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

Parameter # F1h 63h

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

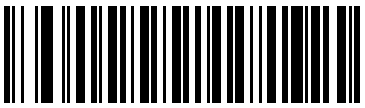
Scan the appropriate bar codes to enable or disable each type of GS1 DataBar.

GS1 DataBar

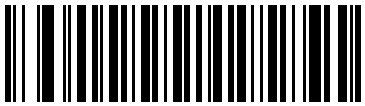
Parameter # F0h 52h

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

Parameter # F0h 53h

Enable GS1 DataBar Limited (01h)

***Disable GS1 DataBar Limited (00h)**

GS1 DataBar Limited Security Level

Parameter # F1h D8h

The engine offers four levels of decode security for GS1 DataBar Limited bar codes. There is an inverse relationship between security and engine 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 engine 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

Parameter # F0h 54h

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

Parameter # F0h, 8Dh

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)

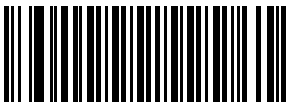
Composite

Composite CC-C

Parameter # F0h 55h

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

Parameter # F0h 56h

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 7-75*.

Enable CC-A/B
(01h)

***Disable CC-A/B**
(00h)

Composite TLC-39

Parameter # F0h 73h

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

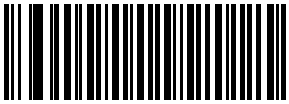
Parameter # F0h 58h

If you enable *Composite CC-A/B on page 7-74*, 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 engine 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)



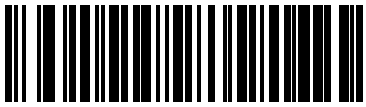
Autodiscriminate UPC Composites
(02h)

Composite Beep Mode

Parameter # F0h, 8Eh

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

Parameter # F0h, ABh

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

Parameter # 0Fh

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

***Enable PDF417**
(01h)

Disable PDF417
(00h)

Enable/Disable MicroPDF417

Parameter # E3h

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

Enable MicroPDF417
(01h)

***Disable MicroPDF417**
(00h)

Code 128 Emulation

Parameter # 7Bh

Enable this parameter to transmit data from certain MicroPDF417 symbols as Code 128. Select **Aim Code ID Character** in *Transmit Code ID Character on page 4-21* 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

Parameter # F0h, 24h

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

***Enable Data Matrix**
(01h)

Disable Data Matrix
(00h)

Data Matrix Inverse

Parameter # F1h 4Ch

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

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

***Regular**
(00h)

Inverse Only
(01h)

Inverse Autodetect
(02h)

Decode Mirror Images (Data Matrix Only)

Parameter # F1h 19h

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

Parameter # F0h, 26h

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

Enable Maxicode
(01h)

***Disable Maxicode**
(00h)

QR Code

Parameter # F0h,25h

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

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

Disable QR Code
(00h)

QR Inverse

Parameter # F1h 4Bh

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

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

***Regular**
(00h)

Inverse Only
(01h)

Inverse Autodetect
(02h)

MicroQR

Parameter # F1h 3Dh

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

***Enable MicroQR**
(01h)

Disable MicroQR
(00h)

Aztec

Parameter # F1h 3Eh

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

***Enable Aztec**
(01h)

Disable Aztec
(00h)

Aztec Inverse

Parameter # F1h 4Dh

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

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

Regular
(00h)

Inverse Only
(01h)

***Inverse Autodetect**
(02h)

Redundancy Level

Parameter # 4Eh

The engine offers four levels of decode redundancy. Select higher redundancy levels for decreasing levels of bar code quality. As redundancy levels increase, the engine'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 7-2 *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 7-3 *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 7-4 *Redundancy Level 3 Codes*

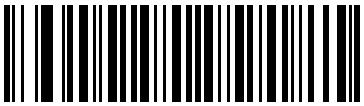
Code Type	Code Length
MSI	4 characters or less
D 2 of 5	8 characters or less
I 2 of 5	8 characters or less
Codabar	8 characters or less

Redundancy Level 4

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

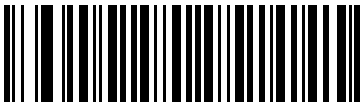
Table 7-5 *Redundancy Level 4 Codes*

Code Type	Code Length
All	All



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

Redundancy Level 2
(02h)



Redundancy Level 3
(03h)

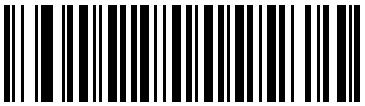
Redundancy Level 4
(04h)

Security Level

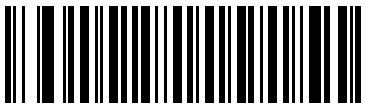
Parameter # 4Dh

The engine 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 engine aggressiveness, so choose only that level of security necessary for any given application.

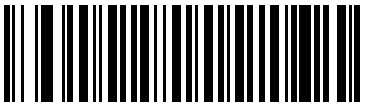
- **Security Level 0:** This setting allows the engine to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- **Security Level 1:** This default setting eliminates most misdecodes.
- **Security Level 2:** Select this option if Security level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



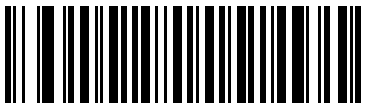
Security Level 0
(00h)



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



Security Level 2
(02h)



Security Level 3
(03h)

Intercharacter Gap Size

Parameter # F0h, 7Dh

The Code 39 and Codabar symbologies have an intercharacter gap that is typically quite small. Due to various bar code-printing technologies, this gap can grow larger than the maximum size allowed, preventing the engine 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 engine 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 engine provides the following feedback.

Table 7-6 *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

Parameter # BCh

Select one of the options below for handling Macro PDF decoding. In **Buffer All Symbols** the engine 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 SE3317WA 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 7-91* 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 7-6*). When selecting this mode, enable *Transmit Macro PDF Control Header on page 7-90*. Also use the beeper and LED signals provided with the SE3317WA 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.

  Use this mode when the engine's BEEPER_ON signal is not used to drive a beeper (see *Table 2-4 on page 2-10*). In the other modes, some Macro PDF scanning sequences provide audible feedback only, so if BEEPER_ON is not used no user feedback is provided. In *Table 7-6*, all actions marked **No Tranmission** provide no feedback unless the BEEPER_ON signal is used. 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

Parameter # B8h

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 7-89*, 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

Parameter # E9h

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 8 123SCAN2

Introduction

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

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

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

Communication with 123Scan^2

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

123Scan² Requirements

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

For more information on123Scan², go to:

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

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

http://www.motorolasolutions.com/scannerhowtovideos

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

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

Scanner SDK, Other Software Tools, and Videos

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

www.MotorolaSolutions.com/ScannerSoftware.

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

CHAPTER 9 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 engine 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 STANDARD DEFAULT PARAMETERS

Table A-1 *Standard Default Parameters Table*

Parameter	Parameter Number	Default	Page Number
User Preferences			
Set Default Parameter		Restore Defaults	*4-5*
Parameter Scanning	ECh	Enable	*4-6*
Lock Parameter Scanning	F2h 22h	Disable	*4-7*
Unlock Parameter Scanning	F2h 23h	Disable	*4-7*
User Parameter Pass Through	F1h 71h	Disable	*4-8*
Beep After Good Decode	38h	Enable	*4-9*
Beeper Tone	91h	Medium	*4-10*
Beeper Volume	8Ch	High	*4-11*
Beeper Duration	F1h 74h	Medium	*4-12*
Suppress Power-up Beeps	F1h D1h	Do not suppress	*4-12*
Trigger Modes	8Ah	Presentation Mode	*4-13*
Decode Session Timeout	88h	9.9 Sec	*4-13*
Timeout Between Decodes, Same Symbol	89h	0.6 Sec	*4-14*
Timeout Between Decodes, Different Symbols	90h	0.2 Sec	*4-14*
Motion Detect Range	F2h 3Bh	Full	*4-15*
Range Restrict	F1h 75h	Disable	*4-16*
Presentation Mode Field of View	F1h 61h	Medium Field of View	*4-17*

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

Table A-1 *Standard Default Parameters Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Fuzzy 1D Processing	F1h 02h	Enable	*4-18*
Mirrored Image	F1h 70h	Disable	*4-18*
Mobile Phone/Display Mode	F1h CCh	Disable	*4-19*
Validate Concatenated Parameter Bar Codes	F1h B4h	Disable	*4-19*
PDF Prioritization	F1h CFh	Disable	*4-20*
PDF Prioritization Timeout	F1h D0h	200 ms	*4-20*
Miscellaneous Scanning Parameters			
Transmit Code ID Character	2Dh	None	*4-21*
SSI Prefix Value	69h	<CR>	*4-22*
SSI Suffix 1 Value SSI Suffix 2 Value	68h 6Ah	<CR> <CR>	*4-22*
Scan Data Transmission Format	EBh	Data as is	*4-23*
FN1 Substitution Values	67h, 6Dh	Set	*4-24*
Transmit “No Read” Message	5Eh	Disable	*4-25*
Report Version			*4-26*
Report Decoder Manufacturing Version			*4-26*
Report Scan Engine Manufacturing Version			*4-26*
Diagnostic Testing and Reporting			*4-27*
Imaging Options			
Aim Brightness	F0h 9Ch	0	*5-4*
Illumination Brightness	F0h 9Dh	10	*5-5*
Frame Rate	F1h A2h	Auto	*5-6*
LED Illumination	F0h ADh	Internal LED Illumination	*5-8*
Fixed Gain	F1h 38h	50	*5-9*
Exposure Time	F4h F1h 37h	100 (10 ms)	*5-9*
Decoding Autoexposure	F0h 29h	Enable	*5-10*
Decoding Illumination	F0h 2Ah	Enable	*5-10*
Decode Aiming Pattern	F0h 32h	Enable	*5-11*
Image Capture Autoexposure	F0h 68h	Enable	*5-12*
Image Capture Illumination	F0h 69h	Enable	*5-12*

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

Table A-1 *Standard Default Parameters Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Snapshot Mode Timeout	F0h 43h	0 (30 seconds)	5-13
Snapshot Aiming Pattern	F0h 2Ch	Enable	5-13
Image Cropping	F0h 2Dh	Disable	5-14
Crop to Pixel Addresses	F4h F0h 3Bh; F4h F0h 3Ch; F4h F0h 3Dh; F4h F0h 3Eh	0 top, 0 left, 479 bottom, 751 right	5-15
Image Resolution	F0h 2Eh	Full	5-16
Image Brightness (Target White)	F0h 86h	180	5-17
Image File Format Selection	F0h 30h	JPEG	5-18
JPEG Image Options	F0h 2Bh	Quality	5-18
JPEG Quality Value	F0h 31h	65	5-19
JPEG Size Value	F1h 31h	160	5-19
Image File Meta Data	F1h B5h	Disable	5-20
Image Enhancement	F1h 34h	Low	5-21
Image Edge Sharpening	F1h 98h	Low	5-22
Image Contrast Enhancement	F1h 9Ah	Enable	5-23
Image Rotation	F1h 99h	0	5-24
Bits per Pixel (BPP)	F0h 2Fh	8 BPP	5-25
USB Host Parameters			
USB Device Type		SNAPI with Imaging	6-3
Symbol Native API (SNAPI) Status Handshaking		Enable	6-5
USB Country Keyboard Types (Country Codes)		North American	6-6
USB Keystroke Delay		No Delay	6-8
Simulated Caps Lock		Disable	6-9
USB CAPS Lock Override		Disable	6-9
USB Ignore Unknown Characters		Enable	6-10
USB Convert Unknown to Code 39		Disable	6-10
USB Ignore Beep Directive		Honor	6-11
USB Ignore Type Directive		Honor	6-11

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

Table A-1 *Standard Default Parameters Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Emulate Keypad		Disable	6-12
Emulate Keypad with Leading Zero		Disable	6-12
USB FN1 Substitution		Disable	6-13
Function Key Mapping		Disable	6-13
Convert Case		None	6-14
USB Static CDC		Enable	6-14
USB Polling Interval		8 msec	6-15
Quick Keypad Emulation		Disable	6-17
Symbology Parameters			
Disable All Code Types			7-8
UPC/EAN			
UPC-A	01h	Enable	7-9
UPC-E	02h	Enable	7-9
UPC-E1	0Ch	Disable	7-10
EAN-8/JAN 8	04h	Enable	7-10
EAN-13/JAN 13	03h	Enable	7-11
Bookland EAN	53h	Enable	7-11
Bookland ISBN Format	F1h 40h	ISBN-10	7-12
Decode UPC/EAN/JAN Supplementals (2 and 5 digits)	10h	Ignore	7-13
User-Programmable Supplementals Supplemental 1: Supplemental 2:	 F1h 43h F1h 44h	N/A	7-16
UPC/EAN/JAN Supplemental Redundancy	50h	10	7-16
Decode UPC/EAN/JAN Supplemental AIM ID	F1h A0h	Combined	7-17
Transmit UPC-A Check Digit	28h	Enable	7-18
Transmit UPC-E Check Digit	29h	Enable	7-18
Transmit UPC-E1 Check Digit	2Ah	Enable	7-19
UPC-A Preamble	22h	System Character	7-19
UPC-E Preamble	23h	System Character	7-20
UPC-E1 Preamble	24h	System Character	7-21

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

Table A-1 *Standard Default Parameters Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Convert UPC-E to A	25h	Disable	*7-22*
Convert UPC-E1 to A	26h	Disable	*7-22*
EAN-8/JAN-8 Extend	27h	Disable	*7-23*
UCC Coupon Extended Code	55h	Disable	*7-23*
Coupon Report	F1h DAh	New Coupon Symbols	*7-24*
ISSN EAN	F1h 69h	Disable	*7-25*
Code 128			
Code 128	08h	Enable	*7-26*
Set Length(s) for Code 128	D1h, D2h	Any Length	*7-26*
GS1-128 (formerly UCC/EAN-128)	0Eh	Enable	*7-27*
ISBT 128	54h	Enable	*7-28*
ISBT Concatenation	F1h 41h	Disable	*7-29*
Check ISBT Table	F1h 42h	Enable	*7-30*
ISBT Concatenation Redundancy	DFh	10	*7-30*
Code 39			
Code 39	00h	Enable	*7-31*
Trioptic Code 39	0Dh	Disable	*7-31*
Convert Code 39 to Code 32 (Italian Pharmacy Code)	56h	Disable	*7-32*
Code 32 Prefix	E7h	Disable	*7-32*
Set Length(s) for Code 39	12h, 13h	Length Within Range: 2 to 55	*7-33*
Code 39 Check Digit Verification	30h	Disable	*7-34*
Transmit Code 39 Check Digit	2Bh	Disable	*7-34*
Code 39 Full ASCII Conversion	11h	Disable	*7-35*
Buffer Code 39	71h	Disable	*7-36*
Code 93			
Code 93	09h	Disable	*7-38*
Set Length(s) for Code 93	1Ah, 1Bh	Length Within Range: 4 to 55	*7-38*

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

Table A-1 *Standard Default Parameters Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Code 11			
Code 11	0Ah	Disable	*7-40*
Set Lengths for Code 11	1Ch, 1Dh	Length Within Range: 4 to 55	*7-40*
Code 11 Check Digit Verification	34h	Disable	*7-42*
Transmit Code 11 Check Digit(s)	2Fh	Disable	*7-43*
Interleaved 2 of 5 (ITF)			
Interleaved 2 of 5 (ITF)	06h	Disable	*7-44*
Set Lengths for I 2 of 5	16h, 17h	1 Length; Length = 14	*7-44*
I 2 of 5 Check Digit Verification	31h	Disable	*7-46*
Transmit I 2 of 5 Check Digit	2Ch	Disable	*7-46*
Convert I 2 of 5 to EAN 13	52h	Disable	*7-47*
Discrete 2 of 5 (DTF)			
Discrete 2 of 5	05h	Disable	*7-48*
Set Length(s) for D 2 of 5	14h, 15h	1 Length; Length = 12	*7-48*
Codabar (NW - 7)			
Codabar	07h	Disable	*7-50*
Set Lengths for Codabar	18h, 19h	Length Within Range: 5 to 55	*7-50*
CLSI Editing	36h	Disable	*7-52*
NOTIS Editing	37h	Disable	*7-52*
Codabar Upper or Lower Case Start/Stop Characters Detection	F2h 57h	Upper Case	*7-53*
MSI			
MSI	0Bh	Disable	*7-54*
Set Length(s) for MSI	1Eh, 1Fh	Length Within Range: 4 to 55	*7-54*
MSI Check Digits	32h	One	*7-56*
Transmit MSI Check Digit	2Eh	Disable	*7-56*
MSI Check Digit Algorithm	33h	Mod 10/Mod 10	*7-57*
Chinese 2 of 5			
Chinese 2 of 5	F0h 98h	Disable	*7-57*

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

Table A-1 *Standard Default Parameters Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Matrix 2 of 5			
Matrix 2 of 5	F1h 6Ah	Disable	*7-58*
Matrix 2 of 5 Lengths	F1h 6Bh F1h 6Ch	Length; Length = 14	*7-59*
Matrix 2 of 5 Check Digit	F1h 6Eh	Disable	*7-60*
Transmit Matrix 2 of 5 Check Digit	F1h 6Fh	Disable	*7-60*
Korean 3 of 5			
Korean 3 of 5	F1h 45h	Disable	*7-61*
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Postal Codes			
US Postnet	59h	Disable	*7-63*
US Planet	5Ah	Disable	*7-63*
Transmit US Postal Check Digit	5Fh	Enable	*7-64*
UK Postal	5Bh	Disable	*7-64*
Transmit UK Postal Check Digit	60h	Enable	*7-65*
Japan Postal	F0h 22h	Disable	*7-65*
Australia Post	F0h 23h	Disable	*7-66*
Australia Post Format	F1h CEh	Autodiscriminate	*7-67*
Netherlands KIX Code	F0h 46h	Disable	*7-68*
USPS 4CB/One Code/Intelligent Mail	F1h 50h	Disable	*7-68*
UPU FICS Postal	F1h 63h	Disable	*7-69*
GS1 DataBar			
GS1 DataBar (GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional)	F0h 52h	Enable	*7-70*
GS1 DataBar Limited	F0h 53h	Disable	*7-71*
GS1 DataBar Limited Security Level	F1h D8h	3	*7-72*
GS1 DataBar Expanded (GS1 DataBar Expanded, GS1 DataBar Expanded Stacked)	F0h 54h	Enable	*7-73*
Convert GS1 DataBar to UPC/EAN	F0h 8Dh	Disable	*7-73*

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

Table A-1 *Standard Default Parameters Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Composite			
Composite CC-C	F0h 55h	Disable	*7-74*
Composite CC-A/B	F0h 56h	Disable	*7-74*
Composite TLC-39	F0h 73h	Disable	*7-75*
UPC Composite Mode	F0h 58h	UPC Always Linked	*7-75*
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GS1-128 Emulation Mode for UCC/EAN Composite Codes	F0h ABh	Disable	*7-76*
2D Symbologies			
PDF417	0Fh	Enable	*7-77*
MicroPDF417	E3h	Disable	*7-77*
Code 128 Emulation	7Bh	Disable	*7-78*
Data Matrix	F0h 24h	Enable	*7-79*
Data Matrix Inverse	F1h 4Ch	Regular	*7-79*
Decode Mirror Images (Data Matrix Only)	F1h 19h	Auto	*7-80*
Maxicode	F0h 26h	Disable	*7-81*
QR Code	F0h 25h	Enable	*7-81*
QR Inverse	F1h 4Bh	Regular	*7-82*
MicroQR	F1h 3Dh	Enable	*7-82*
Aztec	F1h 3Eh	Enable	*7-83*
Aztec Inverse	F1h 4Dh	Inverse Autodetect	*7-83*
Symbology-Specific Security Levels			
Redundancy Level	4Eh	1	*7-84*
Security Level (UPC/EAN and Code 93)	4Dh	1	*7-86*
Intercharacter Gap Size	F0h 7Dh	Normal	*7-87*
Macro PDF			
Macro PDF Transmit/Decode Mode Symbols	BCh	Passthrough Mode	*7-89*
Transmit Macro PDF Control Header	B8h	Disable	*7-90*

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

Table A-1 *Standard Default Parameters Table (Continued)*

Parameter	Parameter Number	Default	Page Number
Escape Characters	E9h	None	*7-90*
Flush Macro PDF Buffer			*7-91*
Abort Macro PDF Entry			*7-91*
[1]User selection is required to configure this interface and this is the most common selection.			

APPENDIX B PROGRAMMING REFERENCE

Symbol Code Identifiers

Table B-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 B-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

AIM Code Identifiers

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

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

Table B-2 *Aim Code Characters*

Code Character	Code Type
A	Code 39, Code 39 Full ASCII, Code 32
C	Code 128, ISBT 128, ISBT 128 Concatenated, GS1-128, Coupon (Code 128 portion)
d	Data Matrix
E	UPC/EAN, Coupon (UPC portion)
e	GS1 DataBar Family
F	Codabar
G	Code 93
H	Code 11
I	Interleaved 2 of 5
L	PDF417, Macro PDF417, Micro PDF417
L2	TLC 39
M	MSI
Q	QR Code, MicroQR
S	Discrete 2 of 5, IATA 2 of 5
U	Maxicode
z	Aztec, Aztec Rune
X	Bookland EAN, ISSN EAN, Trioptic Code 39, Chinese 2 of 5, Matrix 2 of 5, Korean 3 of 5, US Postnet, US Planet, UK Postal, Japan Postal, Australia Post, Netherlands KIX Code, USPS 4CB/One Code/ Intelligent Mail, UPU FICS Postal

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

Table B-3 *Modifier Characters*

Code Type	Option Value	Option
Code 39	0	No check character or Full ASCII processing.
	1	Reader has checked one check character.
	3	Reader has checked and stripped check character.
	4	Reader has performed Full ASCII character conversion.
	5	Reader has performed Full ASCII character conversion and checked one check character.
	7	Reader has performed Full ASCII character conversion and checked and stripped check character.
	Example: A Full ASCII bar code with check character W, **A+I+MI+DW**, is transmitted as **]A7**AIMID where 7 = (3+4).	
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 B-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 B-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 engines are set to this mode, unbuffered Macro symbols and symbols requiring the engine 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 B-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 C SAMPLE BAR CODES

Code 39

UPC/EAN

UPC-A, 100%

EAN-13, 100%

Code 128

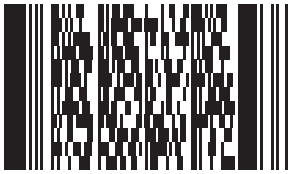
Interleaved 2 of 5

GS1 DataBar-14

NOTE DataBar-14 must be enabled to read the bar code below (see *GS1 DataBar on page 7-70*).

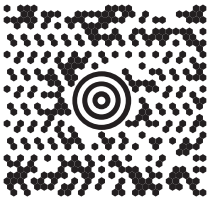
7612341562341

PDF417



Data Matrix

Maxicode



QR Code

US Postnet

UK Postal

APPENDIX D NUMERIC BAR CODES

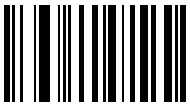
Numeric Bar Codes

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

0

1

2



3

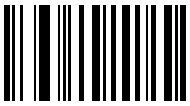
4

Numeric Bar Codes (continued)

5

6

7



8

9

Cancel

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

Cancel

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Numerics

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What topics need to be added to the index, if applicable?

_____
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What topics do you feel need to be better discussed? Please be specific.

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