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**Warranty**

For the complete Zebra hardware product warranty statement, go to:

# Revision History

Changes to the original guide are listed below:

<table>
<thead>
<tr>
<th>Change</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-01 Rev A</td>
<td>3/2015</td>
<td>Initial Release</td>
</tr>
<tr>
<td>-03 Rev A</td>
<td>7/2015</td>
<td>Updated PIN #2 usage.</td>
</tr>
</tbody>
</table>
| -04 Rev A | 12/2015 | Updated:  
- Beeper Tone default from Medium to High.  
- Table 12-2 on page 12-42 to reflect the correct behavior in the new image kit. |
| -05 Rev A | 7/2018 | - Added Note to PDF Prioritization parameter to update length ranges  
- Added Product ID (PID) Type parameter  
- Renamed USB Device Type OPOS, and added Note  
- Added Direct I/O Beep parameter  
- Updated Beep Directive and Bar Code Configuration Directive for the IBM host  
- Added IBM-485 Specification Version parameter  
- Updated SSI Baud Rate option values  
- Added Codabar Security Level parameter  
- Added MSI Reduced Quiet Zone parameter  
- Added Note for Inverse 1D parameter  
- Added Mailmark parameter  
- Added GS1 Databar Security Level parameter  
- Renamed GS1 DataBar Limited Security Level parameter to GS1 DataBar Limited Margin Check and updated description  
- Added Composite Inverse parameter  
- Added Grid Matrix, Grid Matrix Inverse, and Grid Matrix Mirrored parameters  
- Removed QR Inverse parameter  
- Removed OCR statements regarding slow decoding  
- Added OCR-B Passport option  
- Added OCR Redundancy parameter  
- Changed OCR Template default  
- Updated 123Scan chapter  
- Updated Code Identifiers and Modifier Characters tables |
| -06 Rev | 06/2019 | - Code 39 as a section heading in Chapter 12.  
- Updated copyright statement. |
| -07EN Rev | 02/2020 | - Added Weblink QR code  
- Updated default of Parameter #144 Timeout Between Decodes, Different Symbols to 1 second. |
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Index
Introduction
The DS7708 2D Vertical Slot Scanner Product Reference Guide provides general instructions for setting up, operating, maintaining, and troubleshooting the scanner.

Scanner Configurations
Table a lists the configurations of the DS7708 2D Vertical Slot Scanner.

Table a. DS7708 2D Vertical Slot Scanner Configurations

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS7708-SR00004ZCWW</td>
<td>Vertical Presentation Area Imager, Standard Range, Corded, Midnight Black, Checkpoint EAS</td>
</tr>
</tbody>
</table>
## Accessories

*Table b* lists the accessories available for the DS7708 2D Vertical Slot Scanner.

### Table b. Mounting Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-TM0077-04</td>
<td>Table Mount Bracket - DS7708 (Midnight Black). Allows the scanner to be fixed to the table top with a double sided tape or screws.</td>
</tr>
<tr>
<td>11-WM0077-04</td>
<td>Wall Mount Bracket Kit - DS7708 (Midnight Black). Allows the scanner to be fixed to the wall using screws.</td>
</tr>
</tbody>
</table>

### Table c. Power Supplies

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWRS-14000-255R</td>
<td>Power Supply, 100 - 220VAC, Output 5V - Brazil Korea</td>
</tr>
<tr>
<td>PWRS-14000-256R</td>
<td>Power Supply, 100 - 220VAC, Output 5V - EU/UK</td>
</tr>
<tr>
<td>PWRS-14000-257R</td>
<td>Power Supply, 100 - 220VAC, Output 5V - CH</td>
</tr>
<tr>
<td>PWRS-14000-258R</td>
<td>Power Supply, 100 - 220VAC, Output 5V - HK/AU</td>
</tr>
<tr>
<td>PWRS-14000-148R</td>
<td>Power Supply, 100 - 220VAC, Output 12V - Worldwide</td>
</tr>
<tr>
<td>PWRS-14000-148C</td>
<td>Power Supply, 100 - 240VAC, Output 12V - Worldwide</td>
</tr>
</tbody>
</table>

*Note:* This power supply is required for Keyboard Wedge only.

### Table d. USB Cables

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBA-U21-S07ZAR</td>
<td>USB Cable (Shielded Series A Connector, 7ft. Straight)</td>
</tr>
<tr>
<td>CBA-U23-S07ZAR</td>
<td>USB Cable (Shielded Power Plus Connector, 7ft. Straight)</td>
</tr>
<tr>
<td>CBA-U28-C15ZAR</td>
<td>USB Cable (Shielded Power Plus Connector, 15ft. Coiled)</td>
</tr>
<tr>
<td>CBA-U29-C15ZAR</td>
<td>USB Cable (Shielded Series A Connector, 15ft. Coiled)</td>
</tr>
<tr>
<td>CBA-U30-S15ZAR</td>
<td>USB Cable (Shielded Series A Connector, 15ft. Straight)</td>
</tr>
<tr>
<td>CBA-U32-C09ZAR</td>
<td>USB Cable (Shielded Series A Connector, 9ft. Coiled)</td>
</tr>
<tr>
<td>CBA-U34-C09ZAR</td>
<td>USB Cable (Shielded Power Plus Connector, 9ft. Coiled)</td>
</tr>
<tr>
<td>CBA-U35-S15ZAR</td>
<td>USB Cable (Shielded Power Plus Connector, 15ft. Straight)</td>
</tr>
<tr>
<td>CBA-U42-S07PAR</td>
<td>USB Cable (Shielded Series A Connector, 7ft. Straight), 12V</td>
</tr>
</tbody>
</table>

For the DS7708 with an auxiliary scanner the PWRS-14000-148R power is required.
### Table d. USB Cables (Continued)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBA-U44-S15PAR</td>
<td>USB Cable (Shielded Series A Connector, 15ft. Straight), 12V For the DS7708 with an auxiliary scanner the PWRS-14000-148R power supply is required.</td>
</tr>
<tr>
<td>CBA-U43-S07ZAR</td>
<td>USB Cable (Shielded Power Plus Connector, 7ft. Straight), 12V For the DS7708 with an auxiliary scanner, 12Volts from host.</td>
</tr>
<tr>
<td>CBA-U45-S15ZAR</td>
<td>USB Cable (Shielded Power Plus Connector, 15ft. Straight), 12V For the DS7708 with an auxiliary scanner, 12Volts from host.</td>
</tr>
</tbody>
</table>

### Table e. RS-232 Cables

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBA-R01-S07PAR</td>
<td>RS-232 Cable (DB9 Female, TxD on 2, 7 ft. Straight)</td>
</tr>
<tr>
<td>CBA-R03-C12PAR</td>
<td>RS-232 Cable (DB9 Female, TxD on 2, 12ft. Coiled)</td>
</tr>
<tr>
<td>CBA-R08-S07ZAR</td>
<td>RS-232 (Nixdorf Beetle- 5V Direct Power) Cable (7ft. Straight)</td>
</tr>
<tr>
<td>CBA-R10-S07ZAR</td>
<td>RS-232 (Nixdorf Beetle- Direct Power) Cable (7ft. Straight)</td>
</tr>
<tr>
<td>CBA-R16-S07ZAR</td>
<td>RS-232 (IBM Sure One) Cable (DB15 TxD on 2, 7ft Straight)</td>
</tr>
<tr>
<td>CBA-R20-S07PAR</td>
<td>RS-232 (Olivetti - ORS500) Cable (7ft straight)</td>
</tr>
<tr>
<td>CBA-R23-S07ZAR</td>
<td>RS-232 (Fujitsu Team POS 500 ICL) Cable (7ft straight)</td>
</tr>
<tr>
<td>CBA-R27-S07ZAR</td>
<td>RS-232 (NCR 7452 DYNAKEY) Cable (7ft. Straight)</td>
</tr>
<tr>
<td>CBA-R28-C09ZAR</td>
<td>RS-232 (VeriFone Ruby) Cable (9ft, Coiled)</td>
</tr>
<tr>
<td>CBA-R29-C12ZAR</td>
<td>RS-232 (NCR 7452 DYNAKEY) Cable (12ft. Coiled)</td>
</tr>
<tr>
<td>CBA-R31-C09ZAR</td>
<td>RS-232 (NCR 7448) Cable (9ft. Coiled)</td>
</tr>
<tr>
<td>CBA-R32-S07PAR</td>
<td>RS-232 (True TTL, DB9 Female, TxD on 2, 7ft. Straight)</td>
</tr>
<tr>
<td>CBA-R36-C09ZAR</td>
<td>RS-232 (DB9F PWR Pin 9, 9ft coiled)</td>
</tr>
<tr>
<td>CBA-R38-C09ZAR</td>
<td>RS-232 (DB25F PWR Pin 12, 9ft coiled)</td>
</tr>
<tr>
<td>CBA-R40-C09SAR</td>
<td>RS-232 (Split DB9F &amp; PWR line, 9ft coiled)</td>
</tr>
<tr>
<td>CBA-R41-S12ZAR</td>
<td>RS-232 (Nixdorf Beetle- Direct Power) Cable (12ft. Straight)</td>
</tr>
<tr>
<td>CBA-R21-S15PAR</td>
<td>RS-232 Cable (DB9 Female, TxD on 2, 15 ft. Straight), 12V For the DS7708 with an auxiliary scanner the PWRS-14000-148R power supply is required.</td>
</tr>
<tr>
<td>CBA-R07-S07PAR</td>
<td>RS-232 Cable (DB9 Female, TxD on 2, 7 ft. Straight), 12V For the DS7708 with an auxiliary scanner the PWRS-14000-148R power supply is required.</td>
</tr>
</tbody>
</table>
Chapter Descriptions

Following are brief descriptions of each chapter in this guide.

- **Chapter 1, GETTING STARTED** provides a product overview and unpacking instructions.

- **Chapter 2, DATA CAPTURE** describes parts of the scanner, beeper and LED definitions, and how to use the scanner.

- **Chapter 3, MAINTENANCE, TECHNICAL SPECIFICATIONS, MOUNTING TEMPLATES** provides information on how to care for the scanner, troubleshooting, technical specifications and mounting templates to assist in proper placement of the scanner when attaching it to a surface.

- **Chapter 4, USER PREFERENCES & MISCELLANEOUS OPTIONS** provides the programming bar codes necessary for selecting user preference features and commonly used bar codes to customize how data is transmitted to the host device.

- **Chapter 5, IMAGING PREFERENCES** provides the programming bar codes necessary for selecting user preference features for the scanner.

- **Chapter 6, USB INTERFACE** provides information for setting up the scanner for USB operation.

- **Chapter 7, RS-232 INTERFACE** provides information for setting up the scanner for RS-232 operation.

- **Chapter 8, IBM 468X/469X INTERFACE** provides information for setting up the scanner with IBM 468X/469X POS systems.

- **Chapter 9, KEYBOARD WEDGE INTERFACE** provides information for setting up the scanner for Keyboard Wedge operation.

---

Table f. *Keyboard Wedge Cables*

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBA-K61-S07PAR</td>
<td>Keyboard Wedge PS/2 Auto-Detect (7ft. Power Port, Straight), 5V</td>
</tr>
<tr>
<td>CBA-K63-S07PAR</td>
<td>Keyboard Wedge PS/2 Auto-Detect (7ft. Power Port, Straight), 12V</td>
</tr>
<tr>
<td>For the DS7708 with an auxiliary scanner the PWRS-14000-148R power supply is required.</td>
<td></td>
</tr>
<tr>
<td>CBA-K65-S15PAR</td>
<td>Keyboard Wedge PS/2 Auto-Detect (15ft. Power Port, Straight), 5V</td>
</tr>
</tbody>
</table>

Table g. *IBM Cables*

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBA-M61-S07ZAR</td>
<td>IBM 468x/9x (Port 9B) Auto-Detect (7ft. Straight)</td>
</tr>
<tr>
<td>CBA-M64-S07ZAR</td>
<td>IBM 468x/9x (Port 5) Auto-Detect (7ft. Straight)</td>
</tr>
<tr>
<td>CBA-M65-S07ZAR</td>
<td>IBM 468x/9x (Port 9B) Auto-Detect (7 ft. Straight), 12V</td>
</tr>
<tr>
<td>For the DS7708 with an auxiliary scanner, 12Volts from host.</td>
<td></td>
</tr>
<tr>
<td>CBA-M66-S15ZAR</td>
<td>IBM 468x/9x (Port 9B) Auto-Detect (15ft. Straight), 12V</td>
</tr>
<tr>
<td>For the DS7708 with an auxiliary scanner, 12Volts from host.</td>
<td></td>
</tr>
</tbody>
</table>
• Chapter 10, SSI INTERFACE describes the system requirements of the Simple Serial Interface (SSI), which provides a communications link between Zebra decoders.

• Chapter 11, AUXILIARY SCANNER provides information for setting up the optional auxiliary scanner.

• Chapter 12, SYMBOLOGIES describes all symbology features and provides the programming bar codes necessary for selecting these features for the scanner.

• Chapter 13, OCR PROGRAMMING describes how to set up the scanner for OCR programming.

• Chapter 14, 123SCAN describes this PC based scanner configuration tool.

• Chapter 15, ADVANCED DATA FORMATTING is a means of customizing data before transmission to the host device. This chapter provides the name and location of the Advanced Data Formatting Programmer Guide.

• Appendix A, STANDARD DEFAULT PARAMETERS provides a table of all host devices and miscellaneous scanner defaults.

• Appendix B, COUNTRY CODES provides instructions for programming the keyboard to interface with a USB, or Keyboard Wedge host.

• Appendix C, COUNTRY CODE PAGES provides bar codes for selecting code pages for the country keyboard type selected in Appendix B, COUNTRY CODES.

• Appendix D, CJK DECODE CONTROL describes control parameters for CJK (Chinese, Japanese, Korean) bar code decode through USB HID Keyboard Emulation mode.

• Appendix E, PROGRAMMING REFERENCE provides a table of AIM code identifiers, ASCII character conversions, and keyboard maps.

• Appendix F, SAMPLE BAR CODES includes sample bar codes.

• Appendix G, NUMERIC BAR CODES includes the numeric bar codes to scan for parameters requiring specific numeric values.

• Appendix H, SIGNATURE CAPTURE CODE includes information about signature capture codes and patterns that enclose a signature area on a document allowing a scanner to capture a signature.

• Appendix I, NON-PARAMETER ATTRIBUTES includes non parameter attributes.

---

**Notational Conventions**

This document uses these conventions:

• “User” refers to anyone operating the device.

• “Device” refers to the scanner.

• *Italics* are used to highlight specific items in the general text, and to identify chapters and sections in this and related documents. It also identifies names of windows, menus, menu items, and fields within windows.

• **Bold** identifies buttons, and switches to be tapped or clicked, and bar code names.

• Bullets (•) indicate:
  - lists of alternatives or action items.
  - lists of required steps that are not necessarily sequential.
Numbered lists indicate a set of sequential steps, i.e., those that describe step-by-step procedures.

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

**IMPORTANT**  This symbol indicates something of importance to the reader. Failure to read the note may impair the 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.

Throughout the programming bar code menus, asterisks (*) are used to denote default parameter settings.

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

---

**Related Publications**

Following is a list of documents that provide additional information about configuring the DS7708:


For the latest version of this guide and all guides, go to: [http://www.zebra.com/support](http://www.zebra.com/support).

---

**Service Information**

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

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

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

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

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

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

The DS7708 2D Vertical Slot Scanner provides intuitive, hands-free scanning. The scanner reads all retail symbologies and has multi-interface capability to interface to all popular POS devices. The scanner can be mounted to a table top or vertical surface such as a wall using optional mounting accessories.

Unpacking the Scanner

Remove the scanner from its packing and inspect it for damage. The following items are included in the package:

- Scanner

If any items are missing or damaged, call the Zebra Technologies Support Center. See page x for contact information. KEEP THE PACKING. It is the approved shipping container and should be used if it is ever necessary to return the equipment for servicing.

Protective Cover

Before using the scanner peel off the protective cover from the scan window.

Figure 1-1  Peeling Off Protective Covering
Features

Figure 1-2 DS7708 Views - Front and Back

Figure 1-3 DS7708 Views - Bottom and With and Without Cables
The DS7708 Vertical 2D Slot Scanner supports the following interfaces:

- **USB connection to a host.** The scanner defaults to the HID keyboard interface type. To select other USB interface types, scan programming bar code menus or use the Windows-based programming tool 123Scan². International keyboards are supported. See Appendix B, COUNTRY CODES to program the keyboard to interface with a USB host.

- **TTL-level RS-232 connection to a host.** The scanner defaults to the standard RS-232 interface type. Modify communication between the scanner and the host either by scanning bar code menus or using the Windows-based programming tool 123Scan².

- **Connection to IBM 468X/469X hosts.** User selection is required to configure this interface. Modify communication between the scanner and the IBM terminal either by scanning bar code menus or using the Windows-based programming tool 123Scan².

- **Keyboard Wedge connection to a host.** The scanner defaults to the IBM AT Notebook interface type. The host interprets scanned data as keystrokes. International keyboards are supported. See Appendix B, COUNTRY CODES to program the keyboard to interface with a Keyboard Wedge host.

- **SSI communications link between the scanner and a serial host.** It provides the means for the host to control the scanner.

The DS7708 automatically adapts to the host to which it is connected.
Setting Up the Scanner

Power Options

The DS7708 does not have an on/off switch. It is powered via the host through the host cable and is ready to scan when connected to a host.

- **When an auxiliary scanner is not connected**: If an auxiliary scanner is not connected, the DS7708 requires 5VDC from the host. If the host cannot provide 5VDC, or cannot provide sufficient power (for example, RS-232 or Keyboard Wedge hosts) then an external 5VDC power supply is required.

- **When an auxiliary scanner is connected**: If an auxiliary scanner is connected, the DS7708 requires 12VDC from the host. If the host cannot provide 12VDC, or cannot provide sufficient power (for example, USB Series A type connector, or RS-232) then a cable with a 12VDC power port and external 12VDC power supply is required.

When the scanner receives power, the green LED lights and three short high beeps sound, indicating that the scanner is operational.

Ports

**Host Port.** A 10-pin RS-45 type connector is provided to connect various host interface cables.

**Auxiliary (Hand-held) Scanner Port.** A Series A type USB connector is provided to connect an auxiliary scanner, such as the DS4308. The auxiliary scanner’s host interface is automatically set to match the DS7708 host interface.

Note: For detailed connection information, see the applicable host interface chapter.

Connecting the Host and/or Auxiliary Scanner Cable

Different hosts require different cables. The connectors illustrated in each host chapter are examples only. Connectors may be different from those illustrated, but the steps to connect the scanner are the same. See each individual host interface chapter for interface specific connections.

The back cover must be removed prior to connecting cables (see *Removing and Replacing the Back Cover on page 1-5*).
Removing and Replacing the Back Cover

*Note* For instructions on host and auxiliary scanner cable connections, see the applicable host interface chapter.

Removing the Back Cover

To remove the back cover, lightly press on the indentations at the top of the cover, slide downward until it becomes free, and lift up off the scanner.

![Removing the Back Cover](image)

**Figure 1-5  Removing the Back Cover**

Installing the Cable(s)

Insert the host cable into the RJ-45 connector on the back right of the scanner. Insert auxiliary scanner cable (optional) into the USB connector on the back left of the scanner. Replace the back cover (see *Replacing the Back Cover on page 1-6*).

![Installing Cables](image)

**Figure 1-6  Installing Cables**
Removing the Back Cover with Cables Installed

To remove the back cover with cables installed, slide the cable(s) out of the cable retaining slots to ensure they can move freely, lightly press on the indentations at the top of the cover, slide downward until it becomes free, and lift up off the scanner.

Replacing the Back Cover

The back cover has three channels to route the outgoing cables so that they are organized and do not hinder the scanner’s placement. Place the back cover on the back of the scanner and ensure the cables are positioned appropriately to be routed through one or more of the cable routing channels. Route the cables through the nearest channel.

Press the cover and slide upwards until it snaps into place.

Configuring the Scanner

To configure the scanner, use the bar codes in this manual, or use the 123Scan² configuration program (see Chapter 14, 123SCAN).

The scanner supports RS-232, IBM 468X/469X, Keyboard Wedge, and USB to interface with a host system. Each host-specific chapter describes how to set up each of these connections.
Synchronization of Settings

Host Requested Setting Changes

The IBM 4683, IBM Hand-held, and USB hosts can change a limited set of the scanner's settings. The 123Scan² host maintains all the scanner settings. When an auxiliary scanner is connected, all setting changes the host requests are processed by both the DS7708 and the auxiliary scanner. Only a limited set of auxiliary scanner settings are updated, including code type enable/disable, code type lengths, beeper settings, redundancy, and security level settings.

For example, if the IBM 4683 host requests to disable the Code 39 symbology, then Code 39 is disabled on both the DS7708 and the auxiliary scanner.

Bar Code Menu Symbols Scanned on the DS7708

A limited set of bar code menu symbols scanned on the DS7708 are synchronized with the auxiliary scanner (if attached). These settings are code type enable/disable, code type lengths, beeper settings, redundancy, and security level settings.

Bar Code Menu Symbols Scanned on the Hand-held Scanner

By default, the auxiliary scanner can program the DS7708 settings (primary only mode).

The auxiliary programming mode setting All Scanners Mode allows programming both the auxiliary scanner and the DS7708 simultaneously. In this mode, scanning Set Defaults returns the DS7708 to the default mode.

Another setting isolates the auxiliary scanner so that the bar code menu symbols scanned apply only to the auxiliary scanner. To return to the default functionality change the setting on the DS7708 directly.

Regardless of the auxiliary scanner mode, all parameter changes requested by the host and via bar code menu settings on the DS7708 are synchronized on the auxiliary scanner for applicable settings.
Mounting the Scanner (Optional Hardware Required)

Note The scanner should not be installed behind an additional protective window; this would create blind decode zones in the imaging field of view.

The DS7708 is designed to sit on top of a table, but optional mounting kits are available to mount the DS7708 to a table top or a wall. The mounting bracket slots in the bottom of the scanner accept the various mounting brackets.

Mounting the Scanner to the Table Top

Mounting the Scanner to a Table Top with Double-sided Tape

The recommended method of installation is attaching the scanner to the table top using the double-sided tape provided. Determine the location for installing the scanner; attach the scanner to the mounting bracket; peel off the paper on the two strips of double-sided tape; position the bracket; and press down onto the table surface.

Mounting the Scanner to a Table Top with Screws

Figure 1-9 Mounting Overview

Figure 1-10 Table Top Mounting Diagram
1. See *Removing and Replacing the Back Cover on page 1-5* to connect all interface and power cables to the scanner. Ensure the back cover is replaced and the cables are routed appropriately.

2. Determine the location for installing the scanner.

3. *Figure 1-10 - 1:* Mount the table bracket with three screws (not included).

4. *Figure 1-10 - 2:* Invert the scanner slightly and align the mounting slots over the plastic tabs on the bracket.

5. *Figure 1-10 - 3:* Insert the plastic tabs into the mounting slots on the scanner, and slide the scanner back until it clicks into place.

**Mounting the Scanner to a Wall**

1. Follow the steps in *Removing and Replacing the Back Cover on page 1-5* to connect all interface and power cables to the scanner. Ensure the back cover is replaced and the cables are routed appropriately.

2. Determine the location for installing the scanner.

3. Use the *Wall Mount Template on page 1-12* as a guide to mark the four mounting holes.

4. *Figure 1-11 - 1:* Insert the back metal bracket under the plastic hook in the base plate and set in place so that the thumb screw holes align.

5. Place the mounting bracket in position over the drilled holes with its flat surface facing the mounting surface.
6. *Figure 1-11* - 2: Insert four screws (provided) through the holes and fasten to the mounting surface.

7. *Figure 1-12* - 3: Invert the scanner slightly and align the mounting slots over the plastic tabs on the bracket.

8. *Figure 1-12* - 4: Insert the plastic tabs into the mounting slots on the scanner, and slide the scanner back until it clicks into place.

9. *Figure 1-12* - 5: To secure the scanner in the bracket, insert the thumb screw (provided) through the hole in the bottom of the bracket and fasten to the scanner bottom.

**Removing the Scanner from the Mounting Bracket**

To remove the scanner:

1. Grasp the scanner firmly on both sides.

2. Slide the scanner forward and lift out.
Operating the Scanner

Indicator Lights

The scanner includes an array of three bi-color (green/red) LEDs to display system status and alerts. Center LED conditions: Off, Dim, Full; Outer LED conditions: Off, Full.

Adjusting Speaker Volume

To change the volume of the beep, scan the a bar code in the section *Beeper Volume on page 4-11*, or use the two-function Volume/Tone button on the front of the scanner (see *Figure 1-2 on page 1-2*).

Press and release the Volume/Tone button repeatedly until the desired volume level sounds (high, medium or low).

Adjusting Speaker Tone

To change the tone of the beep, scan the a bar code in the section *Beeper Tone on page 4-8*, or use the two-function Volume/Tone button on the front of the scanner (see *Figure 1-2 on page 1-2*).

Press and hold the Volume/Tone button for three seconds to change to a different tone. Repeat this process until the desired tone sounds (high, medium, low or medium to high tone).

**Note** If the decode tone is set to Off, the Volume/Tone button cannot be used to change the decode tone. To allow the tone change using the Volume/Tone button, scan a tone other than Off.

If the Volume/Tone Button Control parameter is set to Disable Volume and Tone Change, the Volume/Tone button on the scanner cannot be used to change the volume and tone of the beeps.
Wall Mount Template

To use this template:

1. **Print the actual size of this page. Do not scale.**
2. Determine the location for installing the scanner.
3. Tape the template to the wall.
4. Drill the four holes using the template.
5. Place the mounting bracket in position over the drilled holes with its flat surface facing the mounting surface.
6. Insert four screws (provided) through the holes and fasten to the mounting surface.

---

**Figure 1-13**  *Wall Mount Template*
Table Mount Template

The recommended method of installation is attaching the scanner to the table top using the double-sided tape provided on the bottom of the bracket. If you wish to mount the bracket to the table top with screws use the template provided in Figure 1-14.

To use this template:

1. **Print the actual size of this page. Do not scale.**
2. Determine the location for installing the scanner.
3. Tape the template to the table.
4. Drill the three holes using the template.
5. Place the mounting bracket in position over the drilled holes with the Symbol logo facing up.
6. Insert three screws (not provided) through the holes and fasten to the table surface.

Figure 1-14  *Table Mount Template*
Overview

This chapter covers the techniques involved in scanning bar codes, beeper and LED definitions, and general instructions and tips about scanning. See Chapter 1, GETTING STARTED for information on scanner components. See each host chapter for information about connecting host cables and power supplies, when necessary.
Scanning Bar Codes on Products

Install and program the scanner.

For the best scanning performance, the table top or surface area covered by the active scan area should be free of any designs (for example, stripes or patterns). Ideally, that area should be a light, solid color.

The DS7708 includes an automatic Object Detection wakeup system that provides a high swipe speed and reduces power consumption. The red Illumination has two power levels mode: Idle Mode for object detection and Full Illumination for scanning. When any object is presented in front of the window opening, the red illumination changes from Idle Mode to Full Mode, but automatically returns to Idle Mode when the object is removed. When the object presented in the Field of View (FOV) includes a bar code, the DS7708 scans the bar code, and if the bar code is successfully decoded, the illumination LEDs automatically return to Idle Mode when the object is removed.

The DS7708 is able to adjust the FOV by a reading a command bar code and prevent decoding undesired bar codes that are in the FOV.

Active Scan Area

The active scan area is the area in front of the scanner window opening in which a bar code can be decoded. The dotted area represents the active scan area.

To scan a bar code:

1. Ensure all cable connections are secure.
2. Orient the item with the bar code facing the scanner window.
3. Present the item anywhere within the active scan area.
4. Upon successful decode, the scanner beeps and the green LED flashes momentarily.

Figure 2-1  Active Scan Area
Decode Ranges

Table 2-1 includes the paper bar code decode ranges for the scanner.

<table>
<thead>
<tr>
<th>Symbol Specifications</th>
<th>Typical Ranges (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code 39, 5mil</td>
<td>0 - 7.20</td>
</tr>
<tr>
<td>UPCA, 10.0mil (80%)</td>
<td>0 - 10.0</td>
</tr>
<tr>
<td>UPCA, 13.0mil (100%)</td>
<td>0 - 10.3</td>
</tr>
<tr>
<td>PDF417, 4mil</td>
<td>0 - 2.20</td>
</tr>
<tr>
<td>PDF417, 5mil</td>
<td>0 - 3.50</td>
</tr>
<tr>
<td>PDF417, 6.6mil</td>
<td>0 - 5.20</td>
</tr>
<tr>
<td>PDF417, 10 mil</td>
<td>0 - 7.30</td>
</tr>
<tr>
<td>PDF417, 15 mil</td>
<td>0 - 9.90</td>
</tr>
<tr>
<td>Data Matrix, 10mil</td>
<td>0 - 5.00</td>
</tr>
<tr>
<td>Data Matrix, 20mil</td>
<td>0 - 9.50</td>
</tr>
<tr>
<td>QR cell phone 23mil</td>
<td>0 - 7.0</td>
</tr>
</tbody>
</table>
User Indicators

*Table 2-2* lists beeper and LED indicators.

**Beeper Volume/ Beeper Tone**

If the decode tone is set to **Off**, the **Volume/Tone** button cannot be used to change the decode tone. To allow the tone change using the **Volume/Tone** button, scan a tone other than **Off**.

See *Adjusting Speaker Volume on page 1-11* and *Adjusting Speaker Tone on page 1-11* to change the volume and/or tone of the beep.

**LED and Beeper Indicators**

The scanner includes an array of three bi-color (green/red) LEDs to display system status and alerts.

Center LED conditions: Off, Full; Outer LED conditions: Off, Full.

*Table 2-2  Beeper and LED Indicators*

<table>
<thead>
<tr>
<th>Event</th>
<th>Beeper Sequence</th>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard Use</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bootup</td>
<td>Low, medium, high beeps</td>
<td>Green</td>
<td>Power up.</td>
</tr>
<tr>
<td>Decode</td>
<td>(as configured)</td>
<td>Center green full on, followed by outer LEDs green full on</td>
<td>A bar code symbol was decoded.</td>
</tr>
<tr>
<td>Presentation Mode</td>
<td>None</td>
<td>Center green LED remains ON</td>
<td>Presentation Mode is on.</td>
</tr>
<tr>
<td>Transmit Error</td>
<td>4 low beeps</td>
<td>Red</td>
<td>Transmission error</td>
</tr>
<tr>
<td>Convert Error</td>
<td>5 low beeps</td>
<td>Red</td>
<td>Conversion or Format error</td>
</tr>
<tr>
<td>Parity Error</td>
<td>Low, low, low, extra low beeps</td>
<td>Red</td>
<td>RS-232 Receive error</td>
</tr>
<tr>
<td>BELL (RS-232)</td>
<td>High beep</td>
<td>None</td>
<td>A &lt;BEL&gt; character is received over RS-232</td>
</tr>
<tr>
<td><strong>Image Capture</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snapshot Start</td>
<td>Low beep</td>
<td>All green, blinking</td>
<td>Snapshot mode started.</td>
</tr>
<tr>
<td>Snapshot Complete</td>
<td>Low beep</td>
<td>Green (default) LED mode based upon Hands-free mode state</td>
<td>Snapshot mode completed.</td>
</tr>
<tr>
<td>Snapshot Timeout</td>
<td>High, low beeps</td>
<td>Green (default) LED mode based upon Hand-held/Hands-free mode state</td>
<td>Snapshot mode timed-out.</td>
</tr>
</tbody>
</table>

**Parameter Programming**

Unless otherwise specified, both red and green LEDs display across all three LED indicators (center and outer).
Table 2-2  
**Beeper and LED Indicators (Continued)**

<table>
<thead>
<tr>
<th>Event</th>
<th>Beeper Sequence</th>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry Error</td>
<td>Low, high beeps</td>
<td>Red</td>
<td>Input error: incorrect bar code, programming sequence, or <strong>Cancel</strong> scanned.</td>
</tr>
<tr>
<td>Number Expected</td>
<td>High, low beeps</td>
<td>Green</td>
<td>Number expected. Enter value using numeric bar codes.</td>
</tr>
<tr>
<td>Parameter Entered</td>
<td>High, low, high, low beeps</td>
<td>Green</td>
<td>Successful program exit with change in parameter setting.</td>
</tr>
</tbody>
</table>

**ADF Programming**
(Refer to the *Advanced Data Formatting Programmer Guide*, p/n 72E-69680-xx. for ADF bar codes.)

<table>
<thead>
<tr>
<th>Event</th>
<th>Beeper Sequence</th>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Expected</td>
<td>High, low beeps</td>
<td>Green</td>
<td>Enter another digit. Add leading zeros to the front if necessary.</td>
</tr>
<tr>
<td>Alpha Expected</td>
<td>Low, low beeps</td>
<td>Green</td>
<td>Enter another alphabetic character or scan the <strong>End of Message</strong> bar code.</td>
</tr>
<tr>
<td>Criteria Action Expected</td>
<td>High, high beeps</td>
<td>Green blinking</td>
<td>ADF criteria or action is expected. Enter another criterion or action, or scan the <strong>Save Rule</strong> bar code.</td>
</tr>
<tr>
<td>Rule Saved</td>
<td>High, low, high, low beeps</td>
<td>Green (turns off blinking)</td>
<td>Rule saved. Rule entry mode exited.</td>
</tr>
<tr>
<td>Criteria Action Cleared</td>
<td>High, low, low beeps</td>
<td>Green</td>
<td>All criteria or actions cleared for current rule. Continue entering rule.</td>
</tr>
<tr>
<td>Last Rule Deleted</td>
<td>Low beep</td>
<td>Green</td>
<td>Delete last saved rule. The current rule is left in tact.</td>
</tr>
<tr>
<td>All Rules Deleted</td>
<td>Low, high, high beeps</td>
<td>Green</td>
<td>All rules are deleted.</td>
</tr>
<tr>
<td>Out Of Rule Memory</td>
<td>Low, high, low, high beeps</td>
<td>Red</td>
<td>Out of rule memory. Erase some existing rules, then try to save rule again.</td>
</tr>
<tr>
<td>Cancel Rule Entry</td>
<td>Low, high, low beeps</td>
<td>Green (turns off blinking)</td>
<td>Cancel rule entry. Rule entry mode exited because of an error, or the user asked to exit rule entry.</td>
</tr>
<tr>
<td>Rule Error</td>
<td>Low, high beeps</td>
<td>Red</td>
<td>Entry error, wrong bar code scanned, or criteria/action list is too long for a rule. Re-enter criterion or action.</td>
</tr>
</tbody>
</table>

**Macro PDF**

Unless otherwise specified, both red and green LEDs display across all three LED indicators (center and outer).
### Table 2-2  *Beeper and LED Indicators (Continued)*

<table>
<thead>
<tr>
<th>Event</th>
<th>Beeper Sequence</th>
<th>LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macro PDF Buffered</td>
<td>2 Low beeps</td>
<td>None</td>
<td>File ID error. A bar code not in the current Macro PDF sequence was scanned.</td>
</tr>
<tr>
<td>Macro PDF File ID Error</td>
<td>2 Long low beeps</td>
<td>None</td>
<td>File ID error. A bar code not in the current Macro PDF sequence was scanned.</td>
</tr>
<tr>
<td>Macro PDF Out Of Memory</td>
<td>3 Long low beeps</td>
<td>None</td>
<td>Out of memory. There is not enough buffer space to store the current Macro PDF symbol.</td>
</tr>
<tr>
<td>Macro PDF Bad Symbology</td>
<td>4 Long low beeps</td>
<td>None</td>
<td>Bad symbology. Scanned a 1D or 2D bar code in a Macro PDF sequence, a duplicate Macro PDF label, a label in an incorrect order, or trying to transmit an empty or illegal Macro PDF field.</td>
</tr>
<tr>
<td>Macro PDF Flush Buffer</td>
<td>5 Long low beeps</td>
<td>None</td>
<td>Flushing Macro PDF buffer.</td>
</tr>
<tr>
<td>Macro PDF Abort</td>
<td>Fast warble beep</td>
<td>None</td>
<td>Aborting Macro PDF sequence.</td>
</tr>
<tr>
<td>Macro PDF Flush No Data</td>
<td>Low, high beeps</td>
<td>None</td>
<td>Flushing an already empty Macro PDF buffer.</td>
</tr>
</tbody>
</table>

*Unless otherwise specified, both red and green LEDs display across all three LED indicators (center and outer).*
Electronic Article Surveillance (EAS)

The scanner includes an integrated Electronic Article Surveillance (EAS) antenna. The scanner and EAS system can operate independently of each other. The deactivation range is mapped suitable to the scanning range, so both can be accomplished almost simultaneously.

A pair of EAS leads in the back of the DS7708 allow the EAS deactivation antenna to be connected to the Checkpoint EAS system at the other end.

Installing

Checkpoint EAS Model Compatibility

The DS7708 is intended for use with Checkpoint CP-VII, CP-IX, and CP-XI systems. It does not support CP-IV and other low-power receiver-based EAS deactivation systems.

Considerations

The Checkpoint CP-VII system generates a periodic burst of electromagnetic energy that deactivates EAS tags brought near the scanner. To avoid interference with the scanner’s operation, take the following precautions when installing the EAS system:

- Position the EAS antenna box as far as possible from the scanner (at least 6 in. / 15.24 cm.)
- Position the EAS antenna, EAS antenna box, EAS control cable, and EAS controller box as far as possible from the scanner’s host and power cables.

Checkpoint Contact Information

Contact your local Checkpoint representative to install the EAS cable to the Checkpoint Deactivation System.
CHAPTER 3  MAINTENANCE, TECHNICAL SPECIFICATIONS, MOUNTING TEMPLATES

Introduction

This chapter covers suggested scanner maintenance, troubleshooting, technical specifications, and signal descriptions (pinouts).

Maintenance

Cleaning the exit window is the only maintenance required. A dirty window can affect scanning accuracy.

- Do not allow abrasive material to touch the window.
- Remove dirt particles with a damp cloth.
- Wipe the window using a tissue moistened with ammonia/water.
- Do not spray water or other cleaning liquids directly into the window.
## Troubleshooting

Note If after performing the checks in Table 3-1 the problem persists, contact the distributor or call the Zebra Support Center. See Service Information on page x for more information.

### Table 3-1  Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Possible Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The red LED illumination does not come on when the directions for installing the host cable are followed.</td>
<td>No power to the scanner.</td>
<td>Ensure the host has power, and is on. If the scanner uses a separate power supply, ensure it is connected to a working AC outlet. Power-up sequence is incorrect. Refer to the Product Reference Guide for more information.</td>
</tr>
<tr>
<td></td>
<td>Interface cable is not properly connected.</td>
<td>Check for loose cable connections.</td>
</tr>
<tr>
<td>The red LED illumination gets brighter when the bar code is presented in the field of view, but bar code cannot be read.</td>
<td>Scanner is not programmed to read the bar code type.</td>
<td>Ensure scanner is programmed to read the bar code type scanned.</td>
</tr>
<tr>
<td></td>
<td>Bar code is damaged.</td>
<td>Try scanning other barcodes of the same bar code type.</td>
</tr>
<tr>
<td></td>
<td>Bar code is not within the scanner’s decode range.</td>
<td>Move the bar code to the region within the scanner’s decode range.</td>
</tr>
<tr>
<td></td>
<td>The host has disabled scanning or overridden parameter settings.</td>
<td>See the technical person in charge of scanning.</td>
</tr>
<tr>
<td>The red LED illumination turns on dim and does not get brighter (the scanner does not change to active decoding mode) when a bar code is presented in the field of view.</td>
<td>Bar code is not within the scanner’s detection range.</td>
<td>Move the bar code to the region within the scanner’s detection range.</td>
</tr>
</tbody>
</table>
### Table 3-1  Troubleshooting (Continued)

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Causes</th>
<th>Possible Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar code is decoded, but not transmitted to the host.</td>
<td>Scanner is not programmed for the correct host type.</td>
<td>Scan the appropriate host type bar code.</td>
</tr>
<tr>
<td>Scanned data is incorrectly displayed on the host.</td>
<td>Scanner is not programmed to work with the host. Check scanner host type parameters or editing options.</td>
<td>Ensure proper host is selected. For RS-232, ensure the scanner’s communication parameters match the host’s settings. For Keyboard Wedge, ensure scanner is programmed with the correct country code and that the CAPS LOCK key is off. Ensure editing options (for example, UPCE to UPCA Conversion) are properly programmed.</td>
</tr>
<tr>
<td>USB host not functioning properly.</td>
<td>Scanner does not recognize host.</td>
<td>Remove and reinset the USB cable and the external power supply, if applicable.</td>
</tr>
</tbody>
</table>
## Technical Specifications

### Table 3-2  Technical Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical Characteristics</strong></td>
<td></td>
</tr>
</tbody>
</table>
| Dimensions                  | Scanner only 5.63 in. H x 5.86 in. W x 3.81 in. D 14.3 cm H x 14.9 cm W x 9.7 cm D  
|                             | Scanner with Table Mount Kit 6.06 in. H x 5.93 in. W x 3.85 in. D 15.4 cm H x 15.1 cm W x 9.8 cm D |
| Weight                      | 17.6 oz. / 500 g                                                           |
| Voltage and Current         | Without auxiliary scanner  
|                             | Standby: 5 VDC +/-10% @ 125ma average  
|                             | Operating: 5 VDC +/-10% @ 480ma average  
|                             | With auxiliary scanner  
|                             | Standby: 12 VDC +/-10% @ 100ma average  
|                             | Operating: 12 VDC +/-10% @ 400ma average                                    |
| Color                       | Midnight Black                                                             |
| Host Interfaces             | USB, RS-232, Keyboard Wedge, TGCS (IBM) 46XX over RS485                     |
| Keyboard Support            | Over 90 international keyboards                                            |
| Auxiliary Scanner Interface| USB                                                                         |
| Electronic Article Surveillance| Compatible with Checkpoint EAS deactivation systems                      |
| User Feedback               | Speaker (Adjustable Tone & Volume), Good Decode LEDs                        |
| **Performance Characteristics**|                                                                             |
| Swipe Speed                 | Up to 100 in/sec (254 cm/sec) for 13 mil UPC in out-of box mode             |
| Light Source                | Two deep red LEDs (660nm)                                                  |
| Imager Field of View        | 48.0°x 36.7° (bar-code reading), 48.0°x 33.7° (image capture)              |
| Image Sensor                | Global shutter 1280x 960 (bar-code reading), 1280x 880 (image capture)    |
| Minimum Print Contrast      | 25% minimum reflective difference                                          |
| Roll / Pitch / Yaw (Skew)   | 360°, ±70°, ±70° typical with Code 39 20mil bar code at 3 inches            |
| **Imaging Characteristics** |                                                                             |
| Graphics Format Support     | Images can be exported as Bitmap, JPEG or TIFF                              |
### Table 3-2  Technical Specifications (Continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Image Transfer Speed** | USB 2.0: Up to 12 Megabits/second  
RS-232: Up to 115 kb/second |
| **Image Transfer Time** | Typical USB application is ~0.25 seconds with a compressed JPEG of 100kb |
| **Image Quality** | 210 PPI (Minimum Font Size resolution: 7) on a 4 x 6 in. (10.2 x 15.2 cm) document @ 3.0 in. (7.62 cm) |
| **User Environment** |  |
| Operating Temperature | 32˚F to 104˚F / 0˚C to 40˚C |
| Storage Temperature | -40˚F to 158˚F / -40˚F to 70˚C |
| Humidity | 5% to 85% RH, non-condensing |
| Environmental Sealing: | IP52 |
| Electrostatic Discharge (ESD) | ESD per EN61000-4-2, +/- 25 KV Air Direct, +/- 8 KV Indirect (without auxiliary scanner) |
| Ambient Light Range | From darkness (0 fcd) to 450 fcd artificial light and 10000 fcd direct sunlight |
| **Utilities and Management** |  |
| 123Scan2, Scanner Management Services (SMS), Symbol Scanner SDK |  |
| **Accessories** |  |
| Hands-Free Options | Table Mount Bracket (Midnight Black)  
Wall Mount Bracket (Midnight Black) |
| Power Supplies | Power supplies are available for applications that do not supply power over the host cable or utilize an auxiliary scanner. |
| **Symbology Decode Capability** |  |
Table 3-2  Technical Specifications (Continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2D</td>
<td>PDF417 (Standard, Macro), MicroPDF417 (Standard, Macro), Composite Codes (CC-A, CC-B, CC-C), TLC-39, Aztec (Standard, Inverse), MaxiCode, DataMatrix/ECC 200 (Standard, Inverse, GS1), QR Code (Standard, Inverse, Micro, GS1), Chinese Sensible (Han Xin)</td>
</tr>
<tr>
<td>Postal</td>
<td>U.S. Postnet and Planet, U.K. Post, Japan Post, Australian Post, Netherlands KIX Code, Royal Mail 4 State Customer, UPU FICS 4 State Postal, USPS 4CB</td>
</tr>
</tbody>
</table>
| Minimum Element Resolution| Code 39 – 3 mil  
UPC – 7.8 mil (60%), there is no higher density UPC bar code  
PDF417 – 4 mil  
Datamatrix – 7.5 mil  
QR Code – 7.5 mil |
Scanner Signal Descriptions

The signal descriptions in Table 3-3 apply to the connectors on the scanner and are for reference only.

Table 3-3  Scanner/Host Signal Pin-outs

<table>
<thead>
<tr>
<th>Pin</th>
<th>IBM</th>
<th>RS-232</th>
<th>Keyboard</th>
<th>USB</th>
<th>Download</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Jump to Pin 6</td>
<td>Reserved</td>
</tr>
<tr>
<td>2</td>
<td>+5v</td>
<td>+5v</td>
<td>+5v</td>
<td>+5v</td>
<td>+5v</td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
<td>Ground</td>
<td>Ground</td>
<td>Ground</td>
<td>Ground</td>
</tr>
<tr>
<td>4</td>
<td>IBM_A(+)</td>
<td>TxD</td>
<td>KeyClock</td>
<td>Reserved</td>
<td>TxD</td>
</tr>
<tr>
<td>5</td>
<td>Reserved</td>
<td>RXD</td>
<td>TermData</td>
<td>D +</td>
<td>Reserved</td>
</tr>
<tr>
<td>6</td>
<td>IBM_B(-)</td>
<td>RTS</td>
<td>KeyData</td>
<td>Jump to Pin 1</td>
<td>RXD</td>
</tr>
<tr>
<td>7</td>
<td>Reserved</td>
<td>CTS</td>
<td>TermClock</td>
<td>D -</td>
<td>Reserved</td>
</tr>
<tr>
<td>8</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
<td>Reserved</td>
</tr>
<tr>
<td>9</td>
<td>Passive Detect</td>
<td>Passive Detect</td>
<td>Passive Detect</td>
<td>Reserved</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>+12v</td>
<td>+12v</td>
<td>+12v</td>
<td>+12v</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

Table 3-4  USB Auxiliary Scanner Port Pinouts

<table>
<thead>
<tr>
<th>Pin 1</th>
<th>Pin 2</th>
<th>Pin 3</th>
<th>Pin 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCC</td>
<td>D-</td>
<td>D+</td>
<td>GND</td>
</tr>
</tbody>
</table>
You can program the scanner to perform various functions, or activate different features. This chapter describes each user preference feature and provides programming bar codes for selecting these features.

The scanner ships with the settings shown in Table 4-1 on page 4-2 (also see Appendix A, STANDARD DEFAULT PARAMETERS for all host device and miscellaneous defaults). If the default values suit requirements, programming is not necessary.

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

If not using a USB cable, select a host type (see each host chapter for specific host information) after the power-up beeps sound. This is only necessary upon the first power-up when connected to a new host.

To return all features to default values, scan the Set Default Parameter on page 4-4. Throughout the programming bar code menus, asterisks indicate (*) default values.
Scanning Sequence Examples

In most cases, scanning one bar code sets the parameter value. For example, to set the beeper tone to high, scan the **High Tone** (beeper tone) bar code in the **Beeper Tone** section on page 4-8. Other parameters, such as **Serial Response Timeout** or **Data Transmission Formats**, require scanning several bar codes. See these parameter descriptions for this procedure.

Errors While Scanning

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

User Preferences/Miscellaneous Options Parameter Defaults

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

![Image]

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

### Table 4-1  User Preferences Parameter Defaults

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number ¹</th>
<th>Parameter Number ²</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User Preferences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set Default Parameter</td>
<td>N/A</td>
<td>N/A</td>
<td>Set Defaults</td>
<td>4-4</td>
</tr>
<tr>
<td>Parameter Bar Code Scanning</td>
<td>ECh</td>
<td>236</td>
<td>Enable</td>
<td>4-6</td>
</tr>
<tr>
<td>Beep After Good Decode</td>
<td>38h</td>
<td>56</td>
<td>Enable</td>
<td>4-7</td>
</tr>
<tr>
<td>Beeper Tone</td>
<td>91h</td>
<td>145</td>
<td>High</td>
<td>4-8</td>
</tr>
<tr>
<td>Beeper Volume</td>
<td>8Ch</td>
<td>140</td>
<td>High</td>
<td>4-11</td>
</tr>
<tr>
<td>Beeper Duration</td>
<td>F1h 74h</td>
<td>628</td>
<td>Medium</td>
<td>4-13</td>
</tr>
<tr>
<td>Volume/Tone Button Control</td>
<td>F8h 05h 07h</td>
<td>1287</td>
<td>Enable (both)</td>
<td>4-15</td>
</tr>
<tr>
<td>Suppress Power-up Beeps</td>
<td>F1h D1h</td>
<td>721</td>
<td>Do not suppress</td>
<td>4-17</td>
</tr>
<tr>
<td>Timeout Between Decodes, Same Symbol</td>
<td>89h</td>
<td>137</td>
<td>0.5 Sec</td>
<td>4-18</td>
</tr>
<tr>
<td>Timeout Between Decodes, Different Symbols</td>
<td>90h</td>
<td>144</td>
<td>1 Sec</td>
<td>4-18</td>
</tr>
<tr>
<td>Fuzzy 1D Processing</td>
<td>F1h 02h</td>
<td>514</td>
<td>Enable</td>
<td>4-19</td>
</tr>
<tr>
<td>Decode Mirror Images (Data Matrix Only)</td>
<td>F1h 19h</td>
<td>537</td>
<td>Auto</td>
<td>4-20</td>
</tr>
<tr>
<td>PDF Prioritization</td>
<td>F1h CFh</td>
<td>719</td>
<td>Disable</td>
<td>4-22</td>
</tr>
<tr>
<td>PDF Prioritization Timeout</td>
<td>F1h D0h</td>
<td>720</td>
<td>200 ms</td>
<td>4-23</td>
</tr>
</tbody>
</table>

¹ **SSI number hex values are used for programming via SSI commands.**

² **Parameter number decimal values are used for programming via RSM commands.**
## Table 4-1  User Preferences Parameter Defaults (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Phone/Display Mode</td>
<td>F1h CCh</td>
<td>716</td>
<td>Enable</td>
<td>4-24</td>
</tr>
<tr>
<td>Field of View</td>
<td>F1h 61h</td>
<td>609</td>
<td>Full Field of View</td>
<td>4-25</td>
</tr>
<tr>
<td>Product ID (PID) Type</td>
<td>F8h 05h 01h</td>
<td>1281</td>
<td>Host Type Unique</td>
<td>4-27</td>
</tr>
</tbody>
</table>

**Miscellaneous Options**

<table>
<thead>
<tr>
<th>Parameter</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmit Code ID Character</td>
<td>2Dh</td>
<td>45</td>
<td>None</td>
<td>4-29</td>
</tr>
<tr>
<td>Prefix Value</td>
<td>63h, 69h</td>
<td>99, 105</td>
<td>7013 &lt;CR&gt;&lt;LF&gt;</td>
<td>4-31</td>
</tr>
<tr>
<td>Suffix 1 Value</td>
<td>62h, 68h</td>
<td>98, 104</td>
<td>7013 &lt;CR&gt;&lt;LF&gt;</td>
<td>4-31</td>
</tr>
<tr>
<td>Suffix 2 Value</td>
<td>64h, 6Ah</td>
<td>100, 106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scan Data Transmission Format</td>
<td>EBh</td>
<td>235</td>
<td>Data as is</td>
<td>4-34</td>
</tr>
<tr>
<td>FN1 Substitution Values</td>
<td>67h, 6Dh</td>
<td>103, 109</td>
<td>7013 &lt;CR&gt;&lt;LF&gt;</td>
<td>4-38</td>
</tr>
<tr>
<td>Unsolicited Heartbeat Interval</td>
<td>F8h 04h 5Eh</td>
<td>1118</td>
<td>Disable</td>
<td>4-39</td>
</tr>
</tbody>
</table>

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

Set Default Parameter

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

Options:

• *Set 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 Set Defaults to retrieve and restore the scanner custom default settings.
  • If you did not set custom defaults, scan Set 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 scanner settings as custom defaults. Once set, you can recover custom default settings by scanning Set Defaults.

*Set Defaults

Set Factory Defaults
Set Default Parameter (continued)

Write to Custom Defaults
Parameter Bar Code Scanning
SSI # ECh
Parameter # 236

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

Options:

- *Enable Parameter Bar Code Scanning
- Disable Parameter Bar Code Scanning.

---

*Enable Parameter Bar Code Scanning
(01h)

---

Disable Parameter Bar Code Scanning
(00h)
Beep After Good Decode
SSI # 38h
Parameter # 56

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

Options:

• *Beep After Good Decode (Enable)
• Do Not Beep After Good Decode (Disable).

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

Do Not Beep After Good Decode
(Disable)
(00h)
Beeper Tone
SSI # 91h
Parameter # 145

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

If the decode tone is set to Off, the Volume/Tone button cannot be used to change the decode tone. To allow the tone change using the Volume/Tone button, scan a tone other than Off.

Options:
- Off
- Low Tone
- Medium Tone
- *High Tone
- Medium to High Tone (2-tone).

![Barcode Image](image-url)

Off
(03h)

![Barcode Image](image-url)

Low Tone
(02
Beeper Tone (continued)

Medium Tone
(01h)

*High Tone
(00h)
Beep Tons (continued)

- Medium to High Tone (2-tone) (04h)
Beeper Volume
SSI # 8Ch
Parameter # 140

To select a beeper volume, scan the one of the bar codes that follows.

Options:
- Low Volume
- Medium Volume
- *High Volume

---

Low Volume
(02h)

---

Medium Volume
(01h)
Beeper Volume (continued)

*High Volume
(00h)
Beeper Duration
SSI # F1h 74h
Parameter # 628

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

Options:

- Short
- * Medium
- Long.

Short
(00h)

* Medium
(01h)
Beeper Duration (continued)

Long
(02h)
Volume/Tone Button Control
SSI # F8h 05h 07h
Parameter # 1287

When this parameter is enabled the physical Volume/Tone button on the front panel of the scanner can be used to change the speaker volume and tone.

When this parameter is disabled the speaker volume and tone cannot be changed using the physical Volume/Tone button on the front panel of the scanner.

Options:

• *Enable Volume and Tone Change
• Disable Tone Change and Enable Volume Change
• Enable Tone Change and Disable Volume Change
• Disable Volume and Tone Change

*Enable Volume and Tone Change
(1)
Volume/Tone Button Control (continued)

Disable Tone Change and Enable Volume Change
(2)

Enable Tone Change and Disable Volume Change
(3)
Suppress Power-up Beeps
SSI # F1h D1h
Parameter # 721

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

Options:

• * Do Not Suppress Power-up Beeps
• Suppress Power-up Beeps.

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

Suppress Power-up Beeps
(01h)
Timeout Between Decodes, Same Symbol
SSI # 89h
Parameter # 137

Use this option to prevent the beeper from continuously beeping when a symbol is left in the scanner’s field of view. It is programmable in 0.1 second increments from 0.0 to 9.9 seconds. The default interval is 0.5 seconds.

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

---

Timeout Between Decodes, Different Symbols
SSI # 90h
Parameter # 144

Use this option to control the time the scanner is inactive between decoding different symbols. It is programmable in 0.1 second increments from 0 to 9.9 seconds. The default is 1 second.

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

---
**Fuzzy 1D Processing**
SSI # F1h 02h
Parameter # 514

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

Options:

- *Enable Fuzzy 1D Processing*
- Disable Fuzzy 1D Processing.

---

*Enable Fuzzy 1D Processing (01h)"

---

Disable Fuzzy 1D Processing (00h)"
Decode Mirror Images (Data Matrix Only)
SSI # F1h 19h
Parameter # 537

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

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

Never
(0)

Always
(1)
Decode Mirror Images (Data Matrix Only - continued)

*Auto
(2)
PDF Prioritization

SSI # F1h CFh
Parameter # 719

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

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

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

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

- 8 characters
- 12 characters

Options:

- *Disable PDF Prioritization
- Enable PDF Prioritization.
PDF Prioritization Timeout

SSI # F1h D0h
Parameter # 720

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

Scan the following bar code, then scan four digits from Appendix G, NUMERIC BAR CODES that specify the timeout in milliseconds. For example, to enter 400 ms, scan the following bar code, then scan 0400. The range is 0 to 5000 ms, and the default is 200 ms.
Mobile Phone/Display Mode
SSI # F1h CCh
Parameter # 716

When enabled, this mode allows bar code reading from mobile phones and electronic displays.

Options:

• Disable Mobile Phone/Display Mode
• *Enable Mobile Phone/Display Mode.

*Enable Mobile Phone/Display Mode
(02h)

Disable Mobile Phone/Display Mode
(00h)
Field of View
SSI # F1h 61h
Parameter # 609

By default, the scanner searches the full field of view.

To search for a bar code in a smaller region, in order to speed search time and prevent unintended bar code reads, select **Small Field of View** or **Medium Field of View**.

**Note** When the scanner is set to **Small Field of View** or **Medium Field of View** and a bar code is only partially presented into the field of view, the scanner automatically opens to **Full Field of View** to scan the bar code. It then returns to the mode set.

Options:

- Small Field of View
- Medium Field of View
- *Full Field of View.

---

**Small Field of View**

(00h)

**Medium Field of View**

(01h)
Field of View (continued)

*Full Field of View (02h)
Product ID (PID) Type
SSI # F8h 05h 01h
Parameter # 1281

Defines the PID value reported in USB enumeration.

Options:

- *Host Type Unique
- Product Unique
- IBM Unique.
PID Type (continued)

IBM Unique
(2)
Miscellaneous Scanner Parameters

Transmit Code ID Character
SSI # 2Dh
Parameter # 45

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


Options:

- Symbol Code ID Character
- AIM Code ID Character
- *None.

Symbol Code ID Character
(02h)

AIM Code ID Character
(01h)
Transmit Code ID Character (continued)

*None
(00h)
Prefix/Suffix Values

Key Category SSI # P = 63h, S1 = 62h, S2 = 64h
Decimal Value SSI # P = 69h, S1 = 68h, S2 = 6Ah
Key Category Parameter # P = 99, S1 = 98, S2 = 100
Decimal Value Parameter # P = 105, S1 = 104, S2 = 106

You can append a prefix and/or one or two suffixes to scan data for use in data editing. To set a value for a prefix or suffix, scan a four-digit number (i.e., four bar codes from Appendix G, NUMERIC BAR CODES) that corresponds to that value. See ASCII Character Set for USB on page 6-34 and ASCII Character Set for RS-232 on page 7-37 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.

To correct an error or change a selection, scan Cancel on page G-10.

Note To use Prefix/Suffix values, first set the Scan Data Transmission Format on page 4-34.

Options:

• Scan Prefix
• Scan Suffix 1
• Scan Suffix 2
• Data Format Cancel.
Prefix/Suffix Values (continued)

Scan Suffix 1
(06h)
Prefix/Suffix Values (continued)

Scan Suffix 2
(08h)
Scan Data Transmission Format
SSI # EBh
Parameter # 235

To set the scan data format, scan one of the following bar codes.

✓ **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 4-31.

Options:
- *Data As Is*
- `<DATA> <SUFFIX 1>`
- `<DATA> <SUFFIX 2>`
- `DATA> <SUFFIX 1> <SUFFIX 2>`
- `<PREFIX> <DATA>`
- `<PREFIX> <DATA> <SUFFIX 1>`
- `<PREFIX> <DATA> <SUFFIX 2>`
- `<PREFIX> <DATA> <SUFFIX 1> <SUFFIX 2>`.
Scan Data Transmission Format (continued)

<DATA> <SUFFIX 2>
(02h)

<DATA> <SUFFIX 1> <SUFFIX 2>
(03h)
Scan Data Transmission Format (continued)

\[
\text{<PREFIX> <DATA> (04h)}
\]

\[
\text{<PREFIX> <DATA> <SUFFIX 1> (05h)}
\]
Scan Data Transmission Format (continued)

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

<PREFIX> <DATA> <SUFFIX 1> <SUFFIX 2>
(07h)
FN1 Substitution Values

Key Category SSI # 67h
Decimal Value SSI # 6Dh
Key Category Parameter # 103
Decimal Value Parameter # 109

The wedge and USB HID keyboard hosts support a FN1 Substitution feature. Enabling this substitutes any FN1 character (0x1b) in a GS1 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 Set FN1 Substitution Value bar code below.

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 G, NUMERIC BAR CODES.

To correct an error or change the selection, scan Cancel on page G-10.

See USB Keyboard FN1 Substitution on page 6-17 to enable FN1 substitution for the USB HID keyboard.
Unsolicited Heartbeat Interval

SSI # F8h 04h 5Eh
Parameter # 1118

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

Options:
- 10 seconds
- 1 minute
- Set Another Interval
- *Disable Unsolicited Heartbeat Interval.

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

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

```
MOTEVTHB:nnn
```

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

---

**10 seconds**

---

**1 minute**
Unsolicited Heartbeat Interval (continued)

Set Another Interval

*Disable Unsolicited Heartbeat Interval
CHAPTER 5  IMAGING PREFERENCES

Introduction

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

The scanner ships with the settings shown in Table 5-1 on page 5-2 (also see Appendix A, STANDARD DEFAULT PARAMETERS for all host device and miscellaneous defaults). If the default values suit requirements, programming is not necessary.

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

If not using a USB cable, select a host type (see each host chapter for specific host information) after the power-up beeps sound. This is only necessary upon the first power-up when connected to a new host.

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

* Indicates Default

*Full Resolution (00h)

Feature/Option

Option Hex Value
Scanning Sequence Examples

In most cases scanning one bar code sets the parameter value. For example, to enable signature capture, scan the Enable Signature Capture bar code under Signature Capture on page 5-20. The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

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

Errors While Scanning

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

Imaging Preferences Parameter Defaults

Table 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 4-4.

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imaging Preferences</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operational Modes</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>5-4</td>
</tr>
<tr>
<td>Snapshot Mode Timeout</td>
<td>F0h 43h</td>
<td>323</td>
<td>0 (30 seconds)</td>
<td>5-5</td>
</tr>
<tr>
<td>Image Size (Number of Pixels)</td>
<td>F0h 2Eh</td>
<td>302</td>
<td>Full</td>
<td>5-6</td>
</tr>
<tr>
<td>Image Brightness (Target White)</td>
<td>F0h 86h</td>
<td>390</td>
<td>180</td>
<td>5-8</td>
</tr>
<tr>
<td>JPEG Image Options</td>
<td>F0h 2Bh</td>
<td>299</td>
<td>Quality</td>
<td>5-9</td>
</tr>
<tr>
<td>JPEG Target File Size</td>
<td>F1h 31h</td>
<td>561</td>
<td>160 kB</td>
<td>5-10</td>
</tr>
<tr>
<td>JPEG Quality and Size Value</td>
<td>F0h 31h</td>
<td>305</td>
<td>65</td>
<td>5-11</td>
</tr>
<tr>
<td>Image Enhancement</td>
<td>F1h 34h</td>
<td>564</td>
<td>Low (1)</td>
<td>5-12</td>
</tr>
<tr>
<td>Image File Format Selection</td>
<td>F0h 30h</td>
<td>304</td>
<td>JPEG</td>
<td>5-14</td>
</tr>
<tr>
<td>Image Rotation</td>
<td>F1h 99h</td>
<td>665</td>
<td>0</td>
<td>5-16</td>
</tr>
<tr>
<td>Bits per Pixel (BPP)</td>
<td>F0h 2Fh</td>
<td>303</td>
<td>8 BPP</td>
<td>5-18</td>
</tr>
<tr>
<td>Signature Capture</td>
<td>5Dh</td>
<td>93</td>
<td>Disable</td>
<td>5-20</td>
</tr>
<tr>
<td>Signature Capture Image File Format Selection</td>
<td>F0h 39h</td>
<td>313</td>
<td>JPEG</td>
<td>5-21</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
### Table 5-1  Imaging Preferences Parameter Defaults (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signature Capture Bits per Pixel (BPP)</td>
<td>F0h 3Ah</td>
<td>314</td>
<td>8 BPP</td>
<td>5-23</td>
</tr>
<tr>
<td>Signature Capture Width</td>
<td>F4h F0h 6Eh</td>
<td>366</td>
<td>400</td>
<td>5-25</td>
</tr>
<tr>
<td>Signature Capture Height</td>
<td>F4h F0h 6Fh</td>
<td>367</td>
<td>100</td>
<td>5-26</td>
</tr>
<tr>
<td>Signature Capture JPEG Quality</td>
<td>F0h A5h</td>
<td>421</td>
<td>65</td>
<td>5-27</td>
</tr>
<tr>
<td>Video View Finder</td>
<td>F0h 44h</td>
<td>324</td>
<td>Disable</td>
<td>5-28</td>
</tr>
<tr>
<td>Video View Finder Image Size</td>
<td>F0h 49h</td>
<td>329</td>
<td>1700 bytes</td>
<td>5-29</td>
</tr>
</tbody>
</table>

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

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

Operational Modes

The scanner has two modes of operation:

- Decode Mode
- Snapshot Mode.

Decode Mode

In decode mode, the scanner attempts to locate and decode enabled bar codes within its field of view. The scanner remains in this mode until it decodes a bar code.

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

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

If you do not send a soft trigger command within the Snapshot Mode Timeout period, the scanner returns to Decode Mode. Use Snapshot Mode Timeout on page 5-5 to adjust this timeout period. The default timeout period is 30 seconds.
Snapshot Mode Timeout
SSI # F0h, 43h
Parameter # 323

This parameter sets the amount of time the scanner remains in Snapshot Mode. The scanner exits Snapshot Mode when you send a soft trigger command, or when the Snapshot Mode Timeout elapses. To set this timeout value, scan the bar code below followed by a bar code from Appendix G, NUMERIC BAR CODES. The default value is 0 which represents 30 seconds; values increment by 30. For example, 1 = 60 seconds, 2 = 90 seconds, etc.
Image Size (Number of Pixels)
SSI # F0h, 2Eh
Parameter # 302

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

Select one of the following values:

<table>
<thead>
<tr>
<th>Resolution Value</th>
<th>Image Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>1280 x 880</td>
</tr>
<tr>
<td>1/2</td>
<td>640 x 440</td>
</tr>
<tr>
<td>1/4</td>
<td>320 x 220</td>
</tr>
</tbody>
</table>

*Full Resolution (00h)
Image Size (Number of Pixels - continued)
Image Brightness (Target White)

SSI # F0h 86h
Parameter # 390

Type: Byte  
Range: 1 - 240

Options:

• *180
• Image Brightness.

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

To set the Image Brightness parameter, scan Image Brightness below followed by three numeric bar codes representing the value. Leading zeros are required. For example, to set an Image Brightness value of 99, scan 0, 9, 9. See Appendix G, NUMERIC BAR CODES for numeric bar codes.
JPEG Image Options
SSI # F0h, 2Bh
Parameter # 299

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

Options:
- *JPEG Quality Selector
- JPEG Size Selector.

*JPEG Quality Selector (01h)

JPEG Size Selector (00h)
JPEG Target File Size
SSI # F1h, 31h
Parameter # 561

Type: Word
Range: 5-350

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

⚠️ caution JPEG compress may take 10 to 15 seconds based on the amount of information in the target image. Scanning JPEG Quality Selector (default setting) on page 5-9 produces a compressed image that is consistent in quality and compression time.

To set the JPEG Target File Size parameter, scan JPEG Target File Size below followed by three numeric bar codes representing the value. Leading zeros are required. For example, to set an image file size value of 99, scan 0, 9, 9 in Appendix G, NUMERIC BAR CODES.
JPEG Quality and Size Value
SSI # F0h, 31h
Parameter # 305

If you selected JPEG Quality Selector, scan the JPEG Quality Value bar code followed by 3 bar codes from Appendix G, NUMERIC BAR CODES corresponding to a value from 5 to 100, where 100 represents the highest quality image.
Image Enhancement
SSI # F1h, 34h
Parameter # 564

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

The levels of image enhancement are:

- Off (0)
- *Low (1)
- Med (2)
- High (3).
Image Enhancement (continued)

<table>
<thead>
<tr>
<th>Medium</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>(3)</td>
</tr>
</tbody>
</table>
**Image File Format Selection**

SSI # F0h, 30h  
Parameter # 304

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

Options:
- BMP File Format
- *JPEG File Format
- TIFF File Format.

<table>
<thead>
<tr>
<th>BMP File Format (03h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPEG File Format (01h)</td>
</tr>
</tbody>
</table>
Image File Format Selection (continued)

TIFF File Format
(04h)
Image Rotation
SSI # F1h 99h
Parameter # 665

This parameter controls the rotation of the image.

Rotation Options:
• *0 degrees
• 90 degrees
• 180 degrees
• 270 degrees.

*Rotate 0°
(00h)

Rotate 90°
(01h)
Image Rotation (continued)

Rotate 180°
(02h)

Rotate 270°
(03h)
Bits Per Pixel (BPP)
SSI # F0h, 2Fh
Parameter # 303

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

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

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

Options:

• 1 BPP
• 4 BPP
• *8 BPP.

1 BPP
(00h)

4 BPP
(01h)
Bits Per Pixel (continued)

*8 BPP
(02h)
Signature Capture
SSI # 5Dh
Parameter # 93

A signature capture bar code is a special-purpose symbology which delineates a signature capture area in a document with a machine-readable format. The recognition pattern is variable so it can optionally provide an index to various signatures. The region inside the bar code pattern is considered the signature capture area. See Appendix H, SIGNATURE CAPTURE CODE for more information.

Output File Format

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

<table>
<thead>
<tr>
<th>Output Format (1 byte)</th>
<th>Signature Type (1 byte)</th>
<th>Signature Image Size (4 bytes) (BIG Endian)</th>
<th>Signature Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPEG - 1</td>
<td>1-8</td>
<td>0x00000400</td>
<td>0x00010203....</td>
</tr>
<tr>
<td>BMP - 3</td>
<td>1-8</td>
<td>0x00000400</td>
<td>0x00010203....</td>
</tr>
<tr>
<td>TIFF - 4</td>
<td>1-8</td>
<td>0x00000400</td>
<td>0x00010203....</td>
</tr>
</tbody>
</table>

Options:
- Enable Signature Capture
- Disable Signature Capture.
Signature Capture File Format Selection
SSI # F0h, 39h
Parameter # 313

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

Options:
- BMP Signature Format
- JPEG Signature Format
- TIFF Signature Format.
Signature Capture File Format Selection (continued)

TIFF Signature Format (04h)
Signature Capture Bits Per Pixel
SSI # F0h, 3Ah
Parameter # 314

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

Options:
- 1 BPP
- 4 BPP
- *8 BPP.

Note The scanner ignores these settings for JPEG file formats, which only support 8 BPP.
Signature Capture Bits Per Pixel (continued)

*8 BPP (02h)
Signature Capture Width
SSI # F4h, F0h, 6Eh
Parameter # 366

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

To set the width of the signature capture box, scan the **Signature Capture Width** bar code, followed by 4 bar codes from *Appendix G, NUMERIC BAR CODES* corresponding to a value in the range of 0001 to 1280 decimal.
**Signature Capture Height**

SSI # F4h, F0h, 6Fh

Parameter # 367

To set the height of the signature capture box, scan the **Signature Capture Height** bar code, followed by 3 bar codes from *Appendix G, NUMERIC BAR CODES* corresponding to a value in the range of 001 to 960 decimal.
Signature Capture JPEG Quality
SSI # F0h, A5h
Parameter # 421

Scan the JPEG Quality Value bar code followed by 3 bar codes from Appendix G, NUMERIC BAR CODES corresponding to a value from 005 to 100, where 100 represents the highest quality image.
Video View Finder
SSI # F0h 44h
Parameter # 324

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

Options:

• *Disable Video View Finder
• Enable Video View Finder.
Video View Finder Image Size

SSI # F0h 49h
Parameter # 329

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

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

This chapter provides information on setting up the scanner with a USB host. The scanner attaches directly to a USB host computer.

If no auxiliary scanner is used, the host can power the scanner through the interface cable. If an auxiliary scanner is used, an external power supply is necessary.

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

* No Delay

* Indicates Default Feature/Option
Connecting a USB Interface

The scanner connects with most USB-capable hosts including:

- Desktop PCs and Notebooks
- Apple™
- IBM SurePOS terminals.

The scanner supports a number of Operating Systems including:

- Windows® XP, 7, and 8
- MacOS
- IBM 4690 OS.

The scanner also interfaces with other USB hosts that support USB Human Interface Devices (HID).

Figure 6-1  USB Connection - Host Supplies Power
To set up the DS7708 with a USB interface:

1. Remove the back cover from the DS7708. See Removing the Back Cover on page 1-5.
2. Plug the host interface cable modular connector into the scanner’s host port.
3. Connect the other end of the interface cable to the host.
4. Select the USB device type. See USB Device Type on page 6-5.
5. If not using a North American keyboard, scan the appropriate country bar code in Appendix B, COUNTRY CODES.
6. If using an auxiliary scanner:
   a. Connect the auxiliary scanner cable to the auxiliary scanner port on the DS7708.
   b. Connect a 12 volt external power supply to the host cable as shown in Figure 6-2, or connect a 12 volt Power Plus host connector.
7. Replace the DS7708 back cover (see Removing and Replacing the Back Cover on page 1-5).
USB Default Parameters

Table 6-1 lists the defaults for USB host parameters. To change any option, scan the appropriate bar code(s) beginning in USB Host Parameters on page 6-5.

Note See Appendix B, COUNTRY CODES for USB Country Keyboard Types (Country Codes).

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

### Table 6-1  USB Host Default Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USB Host Parameters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB Device Type</td>
<td>USB HID (Human Interface Device) Keyboard</td>
<td>6-5</td>
</tr>
<tr>
<td>Symbol Native API (SNAPI) Status Handshaking</td>
<td>Enable</td>
<td>6-9</td>
</tr>
<tr>
<td>USB Keystroke Delay</td>
<td>No Delay</td>
<td>6-10</td>
</tr>
<tr>
<td>USB CAPS Lock Override</td>
<td>Disable</td>
<td>6-12</td>
</tr>
<tr>
<td>USB Ignore Unknown Characters</td>
<td>Send Bar Codes</td>
<td>6-13</td>
</tr>
<tr>
<td>USB Convert Unknown to Code 39</td>
<td>Disable</td>
<td>6-14</td>
</tr>
<tr>
<td>Emulate Keypad</td>
<td>Enable</td>
<td>6-15</td>
</tr>
<tr>
<td>Keypad Emulation with Leading Zero</td>
<td>Enable</td>
<td>6-16</td>
</tr>
<tr>
<td>USB Keyboard FN1 Substitution</td>
<td>Disable</td>
<td>6-17</td>
</tr>
<tr>
<td>Function Key Mapping</td>
<td>Disable</td>
<td>6-18</td>
</tr>
<tr>
<td>Simulated Caps Lock</td>
<td>Disable</td>
<td>6-19</td>
</tr>
<tr>
<td>Convert Case</td>
<td>Disable</td>
<td>6-20</td>
</tr>
<tr>
<td>USB Static CDC</td>
<td>Enable</td>
<td>6-22</td>
</tr>
<tr>
<td>Direct I/O Beep</td>
<td>Honor</td>
<td>6-23</td>
</tr>
<tr>
<td><strong>USB Transmission Speed Parameters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB HID Polling Interval</td>
<td>3 msec</td>
<td>6-24</td>
</tr>
<tr>
<td>Fast HID Keyboard</td>
<td>Enable</td>
<td>6-29</td>
</tr>
<tr>
<td>Quick Keypad Emulation</td>
<td>Enable</td>
<td>6-30</td>
</tr>
<tr>
<td>IBM Specification Version</td>
<td>2.2</td>
<td>6-31</td>
</tr>
<tr>
<td><strong>Optional USB Parameters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beep Directive</td>
<td>Ignore</td>
<td>6-32</td>
</tr>
<tr>
<td>Bar Code Configuration Directive</td>
<td>Ignore</td>
<td>6-33</td>
</tr>
</tbody>
</table>
USB Host Parameters

USB Device Type

Select the desired USB device type.

✓ notes When changing USB Device Types, the scanner automatically restarts and issues the standard startup beep sequences.

Select IBM Hand-held USB to transmit data only once when an IBM register issues a Scan Disable command. If the register issues a Scan Enable command before the timeout expires, scanning can continue. If a Scan Enable does not occur within the timeout, the scanner issues 4 long low transmission error beeps, and data does not transmit. You can then scan again under the same criteria. Select OPOS (IBM Hand-held with Full Disable) to completely shut off the scanner when an IBM register issues a Scan Disable command, including aim, illumination, decoding, and data transmission.

Options:

- * USB HID Keyboard
- IBM Table-Top USB
- IBM Hand-Held USB
- OPOS (IBM Hand-Held with Full Disable)
- Simple COM Port Emulation
- USB CDC Host
- Symbol Native API (SNAPI) with Imaging Interface
- Symbol Native API (SNAPI) without Imaging Interface.

---

* USB HID Keyboard

---

IBM Table-Top USB
USB Device Type (continued)

IBM Hand-Held USB

OPOS
(IBM Hand-Held with Full Disable)
USB Device Type (continued)

Simple COM Port Emulation

USB CDC Host
USB Device Type (continued)

Symbol Native API (SNAPI) with Imaging Interface

Symbol Native API (SNAPI) without Imaging Interface
Symbol Native API (SNAPI) Status Handshaking

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

Options:
- Enable SNAPI Status Handshaking
- Disable SNAPI Status Handshaking.

*Enable SNAPI Status Handshaking

Disable SNAPI Status Handshaking
USB Keystroke Delay

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

Options:

- No Delay
- Medium Delay (20 msec)
- Long Delay (40 msec).
USB Keystroke Delay (continued)

Long Delay (40 msec)
USB CAPS Lock Override

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

Options:
- Override Caps Lock Key (Enable)
- * Do Not Override Caps Lock Key (Disable).

* Do Not Override Caps Lock Key (Disable)
USB Ignore Unknown Characters

This option applies only to the HID Keyboard Emulation device and IBM device. Unknown characters are characters the host does not recognize. When **Send Bar Codes With Unknown Characters** is selected, all bar code data is sent except for unknown characters, and no error beeps sound. When **Do Not Send Bar Codes With Unknown Characters** is selected, bar codes containing at least one unknown character are not sent to the host, and an error beep sounds.

Options:

- *Send Bar Codes With Unknown Characters*
- **Do Not Send Bar Codes With Unknown Characters**

*Send Bar Codes With Unknown Characters*

---

**Do Not Send Bar Codes With Unknown Characters**
USB Convert Unknown to Code 39

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

Options:

- *Disable Convert Unknown to Code 39
- Enable Convert Unknown to Code 39.

*Disable Convert Unknown to Code 39

Enable Convert Unknown to Code 39
Emulate Keypad

When enabled, all characters are sent as ASCII sequences over the numeric keypad. For example ASCII A would be sent as “ALT make” 0 6 5 “ALT Break.”

Options:
- Disable Emulate Keypad
- *Enable Emulate Keypad.
Keypad Emulation 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”.

Options:

- Disable Keypad Emulation with Leading Zero
USB Keyboard FN1 Substitution

This option applies only to the USB HID Keyboard Emulation device. Enable this to replace any FN1 characters in a GS1 bar code with a selected Key Category and value (see FN1 Substitution Values on page 4-38 to set the Key Category and Key Value).

Options:
- Enable Keyboard FN1 Substitution
- *Disable Keyboard FN1 Substitution.

Enable

*Disable
Function Key Mapping

ASCII values under 32 are normally sent as a control-key sequences (see Table 6-2 on page 6-34). Enable this parameter to send the keys in bold in place of the standard key mapping. Items that do not have a bold entry remain the same whether or not this parameter is enabled.

Options:
- *Disable Function Key Mapping
- Enable Function Key Mapping

*Disable Function Key Mapping

Enable Function Key Mapping
Simulated Caps Lock

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

Note  Simulated Caps Lock applies to ASCII characters only.

Options:
- *Disable Simulated Caps Lock
- Enable Simulated Caps Lock.
Convert Case

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

Options:

- *No Case Conversion
- Convert All To Upper Case
- Convert All To Lower Case.
Convert Case (continued)

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.

Options:

- *Enable USB Static CDC
- Disable USB Static CDC.
Direct I/O Beep

The host can send a direct I/O beep request to the scanner. If you select Ignore Direct I/O Beep, the scanner does not sound beeps on this command. All directives are still acknowledged to the USB host as if they were processed.

Options:
- *Honor Direct IO Beep
- Ignore Direct IO Beep.
USB Transmission Speed Parameters

Use the following parameters to speed USB data transmission:

- **USB HID Polling Interval** - When using more current USB systems, use this parameter to set a lower interval in order to increase data transmission speed.

- **Fast HID Keyboard** - When configured as a USB HID keyboard device, use this parameter to increase the data transmission speed of printable (7-bit) ASCII characters.

- **Quick Keypad Emulation** - When configured as a USB HID keyboard device, use this parameter to increase the data transmission speed of a mix of both printable (7-bit) and full (8-bit) ASCII characters.

  ✓ **Note** Enabling *Emulate Keypad on page 6-15* or *Quick Keypad Emulation on page 6-30* overrides *Fast HID Keyboard*.

**USB HID Polling Interval**

This option speeds data transmission for all USB devices except CDC. Scan the appropriate bar code to set the polling interval. The polling interval determines the rate at which data can be sent between the scanner and the host computer. A lower number indicates a faster data rate. The default value is 3 msec.

Options:

- 1 msec
- 2 msec
- * 3 msec
- 4 msec
- 5 msec
- 6 msec
- 7 msec
- 8 msec.

Changing the polling interval re-initializes the scanner.

**caution** Ensure the host can handle the selected data rate. Selecting a data rate that is too fast for the host can result in lost data.
USB HID Polling Interval (continued)

2 msec

*3 msec
USB HID Polling Interval (continued)

4 msec

5 msec
USB HID Polling Interval (continued)

- 6 msec
- 7 msec
USB HID Polling Interval (continued)

8 msec

9 msec
Fast HID Keyboard

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

Options:

- * Enable Fast HID Keyboard
- Disable Fast HID Keyboard.

**Note**  Enabling *Emulate Keypad on page 6-15* or *Quick Keypad Emulation on page 6-30* overrides *Fast HID Keyboard*.
Quick Keypad Emulation

This option applies only to the HID keyboard emulation device when Emulate Keypad on page 6-15 is enabled. This parameter enables a quicker method of emulation utilizing the numeric keypad. The default value is Disable.

Options:

- *Enable Quick Keypad Emulation
- Disable Quick Keypad Emulation.

**Note** Enabling Emulate Keypad on page 6-15 or Quick Keypad Emulation on page 6-30 overrides Fast HID Keyboard.

*Enable

Disable
IBM Specification Version

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

Options:

- Original Specification
- *Version 2.2.
Optional USB Parameters

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

**Beep Directive**

Scan one of the following bar codes to honor or ignore a beep directive from the USB host. When enabled, the request is **not** sent to the scanner. All directives are still acknowledged to the USB host as if they were processed.

Options:
- *Ignore Beep Directive
- Honor Beep Directive

---

![Bar Code Image](image1)

*Ignore Beep Directive

---

![Bar Code Image](image2)

Honor Beep Directive
Bar Code Configuration Directive

Scan one of the following bar codes to honor or ignore a bar code configuration (type) directive from the USB host. When this parameter is enabled, this request is not sent to the scanner. All directives are still acknowledged to the USB host as if they were processed.

Options:
- Honor Bar Code Configuration Directive

---

Honor Bar Code Configuration Directive

---

*Ignore Bar Code Configuration Directive
## ASCII Character Set for USB

### Table 6-2  USB Prefix/Suffix Values

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

<sup>1</sup>The keystroke in bold transmits only if you enable Function Key Mapping on page 6-18. Otherwise, the unbolded keystroke transmits.
## Table 6-2  USB Prefix/Suffix Values (Continued)

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

\1The keystroke in bold transmits only if you enable Function Key Mapping on page 6-18. Otherwise, the unbolded keystroke transmits.
### Table 6-2  USB Prefix/Suffix Values (Continued)

<table>
<thead>
<tr>
<th>Prefix/ Suffix Value</th>
<th>Full ASCII Code 39 Encode Character</th>
<th>Keystroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>1055</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>1056</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>1057</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>1058</td>
<td>/Z</td>
<td>:</td>
</tr>
<tr>
<td>1059</td>
<td>%F</td>
<td>;</td>
</tr>
<tr>
<td>1060</td>
<td>%G</td>
<td>&lt;</td>
</tr>
<tr>
<td>1061</td>
<td>%H</td>
<td>=</td>
</tr>
<tr>
<td>1062</td>
<td>%I</td>
<td>&gt;</td>
</tr>
<tr>
<td>1063</td>
<td>%J</td>
<td>?</td>
</tr>
<tr>
<td>1064</td>
<td>%V</td>
<td>@</td>
</tr>
<tr>
<td>1065</td>
<td>A</td>
<td>A</td>
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<tr>
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</tr>
</tbody>
</table>

1 The keystroke in bold transmits only if you enable **Function Key Mapping on page 6-18**. Otherwise, the unbolded keystroke transmits.
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<th>Prefix/ Suffix Value</th>
<th>Full ASCII Code 39 Encode Character</th>
<th>Keystroke</th>
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</tr>
<tr>
<td>1085 U</td>
<td>U</td>
<td></td>
</tr>
<tr>
<td>1086 V</td>
<td>V</td>
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</tr>
<tr>
<td>1087 W</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>1088 X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>1089 Y</td>
<td>Y</td>
<td></td>
</tr>
<tr>
<td>1090 Z</td>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>1091 %K</td>
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</tr>
<tr>
<td>1092 %L</td>
<td>\</td>
<td></td>
</tr>
<tr>
<td>1093 %M</td>
<td>]</td>
<td></td>
</tr>
<tr>
<td>1094 %N</td>
<td>^</td>
<td></td>
</tr>
<tr>
<td>1095 %O</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>1096 %W</td>
<td>`</td>
<td></td>
</tr>
<tr>
<td>1097 +A</td>
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<td>1098 +B</td>
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<td></td>
</tr>
<tr>
<td>1099 +C</td>
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</tr>
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<tr>
<td>1104 +H</td>
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</tr>
<tr>
<td>1105 +I</td>
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<tr>
<td>1106 +J</td>
<td>j</td>
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</tr>
<tr>
<td>1107 +K</td>
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<td></td>
</tr>
<tr>
<td>1108 +L</td>
<td>l</td>
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<tr>
<td>1109 +M</td>
<td>m</td>
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<tr>
<td>1110 +N</td>
<td>n</td>
<td></td>
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<td>1111 +O</td>
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<td>1112 +P</td>
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1 The keystroke in bold transmits only if you enable Function Key Mapping on page 6-18. Otherwise, the unbolded keystroke transmits.
Table 6-2   USB Prefix/Suffix Values (Continued)

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<tr>
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<tr>
<td>1125</td>
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<td>}</td>
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<tr>
<td>1126</td>
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</table>

\[1\] The keystroke in bold transmits only if you enable Function Key Mapping on page 6-18. Otherwise, the unbolded keystroke transmits.
Table 6-3  USB ALT Key Character Set

<table>
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<th>ALT Keys</th>
<th>Keystroke</th>
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<td>2066</td>
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<tr>
<td>2067</td>
<td>ALT C</td>
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<tr>
<td>2068</td>
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<tr>
<td>2070</td>
<td>ALT F</td>
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<tr>
<td>2071</td>
<td>ALT G</td>
</tr>
<tr>
<td>2072</td>
<td>ALT H</td>
</tr>
<tr>
<td>2073</td>
<td>ALT I</td>
</tr>
<tr>
<td>2074</td>
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<tr>
<td>2089</td>
<td>ALT Y</td>
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<td>2090</td>
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Table 6-4  *USB GUI Key Character Set*

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</tr>
<tr>
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<td>GUI Q</td>
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*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>
<thead>
<tr>
<th>GUI Key</th>
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<tbody>
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<td>GUI T</td>
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</table>

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.
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Table 6-6  *USB Numeric Keypad Character Set*

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<tr>
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<td>End</td>
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<td>Pg Dn</td>
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<td>7006</td>
<td>Pause</td>
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<td>Scroll Lock</td>
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<tr>
<td>7014</td>
<td>Escape</td>
</tr>
<tr>
<td>7015</td>
<td>Up Arrow</td>
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<tr>
<td>7016</td>
<td>Down Arrow</td>
</tr>
<tr>
<td>7017</td>
<td>Left Arrow</td>
</tr>
<tr>
<td>7018</td>
<td>Right Arrow</td>
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</tbody>
</table>
CHAPTER 7  RS-232 INTERFACE

Introduction

This chapter provides information for setting up the scanner with an RS-232 host. Use the RS-232 interface to attach the scanner to point-of-sale devices, host computers, or other devices with an available RS-232 port (e.g., com port). This scanner uses TTL RS-232 levels to interface with all PC's without additional hardware.

*Note* Particularly noisy electrical environments may require a cable with an RS-232 transceiver. To obtain this cable, contact the Zebra Support Center.

If the particular host is not listed in *Table 7-1*, set the communication parameters to match the host device. See the documentation for the host device.

Throughout the programming bar code menus, asterisks (*) indicate default values.
Connecting an RS-232 Interface

There are two possible configurations for connecting to an RS-232 host. The DS7708 connects directly to the host computer; and an auxiliary scanner can connect to the DS7708. Both configurations require a power supply; 5 volt without an auxiliary scanner, and 12 volt with an auxiliary scanner.

Figure 7-1  RS-232 Connection - 5 Volt Power Supplied Externally
To set up the DS7708 with an RS-232 interface:

1. Remove the back cover from the DS7708. See *Removing the Back Cover on page 1-5*.
2. Plug the host interface cable modular connector into the scanner’s host port host port.
3. Connect the other end of the interface cable to the serial port on the host.
4. Scan the appropriate bar codes in this chapter, or use 123Scan² to match the host settings.
5. If using an auxiliary scanner:
   a. Connect the auxiliary scanner cable to the auxiliary scanner port on the DS7708.
   b. Connect a 12 volt external power supply to a 12 volt Power Plus host connector as shown in *Figure 7-2*.
6. Replace the DS7708 back cover (see *Removing and Replacing the Back Cover on page 1-5*).

---

**Figure 7-2**  *RS-232 Connection with Auxiliary Scanner - 12 Volt Power Supplied Externally*

**Note**  Interface cables vary depending on configuration. The connectors may be different from the examples illustrated, but the steps to connect the scanner are the same. See *RS-232 Cables on page vii* for cable information and part numbers.

**IMPORTANT:** A 12 volt power connection is required when using an auxiliary scanner. (See available cables under *Accessories on page vi*.)
RS-232 Default Parameters

Table 7-1 lists the defaults for RS-232 host parameters. To change any option, scan the appropriate bar code(s) beginning in RS-232 Host Parameters on page 7-5.

\[\text{notes} \quad \text{See Appendix A, STANDARD DEFAULT PARAMETERS for all user preferences, hosts, symbologies, and miscellaneous default parameters.}\]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Page Number</th>
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<td>RS-232 Host Parameters</td>
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<td></td>
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<tr>
<td>RS-232 Host Types</td>
<td>Standard</td>
<td>7-7</td>
</tr>
<tr>
<td>Baud Rate</td>
<td>9600</td>
<td>7-11</td>
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<td>Enable</td>
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</tr>
<tr>
<td>Software Handshaking</td>
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<td>7-24</td>
</tr>
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<td>Low RTS</td>
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</tr>
<tr>
<td>Stop Bit Select</td>
<td>1 Stop Bit</td>
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<td>8-Bit</td>
<td>7-29</td>
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<td>Disable</td>
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<td>Ignore Unknown Characters</td>
<td>Send Bar Codes</td>
<td>7-36</td>
</tr>
</tbody>
</table>

Table 7-1 RS-232 Host Default Table
RS-232 Host Parameters

Various RS-232 hosts are set up with their own parameter default settings. Selecting the ICL, Fujitsu, Wincor-Nixdorf Mode A, Wincor-Nixdorf Mode B, Olivetti, Omron, or terminal sets the defaults listed in Table 7-2.

Table 7-2  Terminal Specific RS-232

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard (Default)</th>
<th>ICL</th>
<th>Fujitsu</th>
<th>Wincor-Nixdorf Mode A</th>
<th>Wincor-Nixdorf Mode B/OPPOS</th>
<th>Olivetti</th>
<th>Omron</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmit Code ID</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Data Transmission Format</td>
<td>Data as is</td>
<td>Data/Suffix</td>
<td>Data/Suffix</td>
<td>Data/Suffix</td>
<td>Data/Suffix</td>
<td>Prefix/Data/Suffix</td>
<td>Data/Suffix</td>
</tr>
<tr>
<td>Suffix</td>
<td>CR/LF (7013)</td>
<td>CR (1013)</td>
<td>CR (1013)</td>
<td>CR (1013)</td>
<td>ETX (1002)</td>
<td>CR (1013)</td>
<td></td>
</tr>
<tr>
<td>Baud Rate</td>
<td>9600</td>
<td>9600</td>
<td>9600</td>
<td>9600</td>
<td>9600</td>
<td>9600</td>
<td>9600</td>
</tr>
<tr>
<td>Parity</td>
<td>None</td>
<td>Even</td>
<td>None</td>
<td>Odd</td>
<td>Odd</td>
<td>Even</td>
<td>None</td>
</tr>
<tr>
<td>Hardware Handshaking</td>
<td>None</td>
<td>RTS/CTS Option 3</td>
<td>None</td>
<td>RTS/CTS Option 3</td>
<td>RTS/CTS Option 3</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Software Handshaking</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Ack/Nak</td>
<td>None</td>
</tr>
<tr>
<td>Serial Response Time-out</td>
<td>2 Sec.</td>
<td>9.9 Sec.</td>
<td>2 Sec.</td>
<td>9.9 Sec.</td>
<td>9.9 Sec.</td>
<td>9.9 Sec.</td>
<td></td>
</tr>
<tr>
<td>Stop Bit Select</td>
<td>One</td>
<td>One</td>
<td>One</td>
<td>One</td>
<td>One</td>
<td>One</td>
<td>One</td>
</tr>
<tr>
<td>ASCII Format</td>
<td>8-Bit</td>
<td>8-Bit</td>
<td>8-Bit</td>
<td>8-Bit</td>
<td>8-Bit</td>
<td>7-Bit</td>
<td>8-Bit</td>
</tr>
<tr>
<td>Beep On &lt;BEL&gt;</td>
<td>Disable</td>
<td>Disable</td>
<td>Disable</td>
<td>Disable</td>
<td>Disable</td>
<td>Disable</td>
<td>Disable</td>
</tr>
<tr>
<td>RTS Line State</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Low = No data to send</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>STX (1003)</td>
<td>None</td>
</tr>
</tbody>
</table>

*In the Nixdorf Mode B, if CTS is Low, scanning is disabled. When CTS is High, the user can scan bar codes.

**If Nixdorf Mode B is scanned without the scanner connected to the proper host, it may appear unable to scan. If this happens, scan a different RS-232 host type within 5 seconds of cycling power to the scanner.
Selecting the ICL, Fujitsu, Wincor-Nixdorf Mode A, Wincor-Nixdorf Mode B, OPOS, JPOS terminal enables the transmission of code ID characters listed in Table 7-3. These code ID characters are not programmable and are separate from the Transmit Code ID feature. Do not enable the Transmit Code ID feature for these terminals.

Table 7-3  Terminal Specific Code ID Characters

<table>
<thead>
<tr>
<th>Code Type</th>
<th>ICL</th>
<th>Fujitsu</th>
<th>Wincor-Nixdorf Mode A</th>
<th>Wincor-Nixdorf Mode B/OPOS/JPOS</th>
<th>Olivetti</th>
<th>Omron</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPC-A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>UPC-E</td>
<td>E</td>
<td>E</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>E</td>
</tr>
<tr>
<td>EAN-8/JAN-8</td>
<td>FF</td>
<td>FF</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>FF</td>
</tr>
<tr>
<td>EAN-13/JAN-13</td>
<td>F</td>
<td>F</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td>Code 39</td>
<td>C &lt;len&gt;</td>
<td>None</td>
<td>M</td>
<td>M</td>
<td>M &lt;len&gt;</td>
<td>C &lt;len&gt;</td>
</tr>
<tr>
<td>Code 39 Full ASCII</td>
<td>None</td>
<td>None</td>
<td>M</td>
<td>M</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Codabar</td>
<td>N &lt;len&gt;</td>
<td>None</td>
<td>N</td>
<td>N</td>
<td>N &lt;len&gt;</td>
<td>N &lt;len&gt;</td>
</tr>
<tr>
<td>Code 128</td>
<td>L &lt;len&gt;</td>
<td>None</td>
<td>K</td>
<td>K</td>
<td>K &lt;len&gt;</td>
<td>L &lt;len&gt;</td>
</tr>
<tr>
<td>I 2 of 5</td>
<td>I &lt;len&gt;</td>
<td>None</td>
<td>I</td>
<td>I</td>
<td>I &lt;len&gt;</td>
<td>I &lt;len&gt;</td>
</tr>
<tr>
<td>Code 93</td>
<td>None</td>
<td>None</td>
<td>L</td>
<td>L</td>
<td>L &lt;len&gt;</td>
<td>None</td>
</tr>
<tr>
<td>D 2 of 5</td>
<td>H &lt;len&gt;</td>
<td>None</td>
<td>H</td>
<td>H</td>
<td>H &lt;len&gt;</td>
<td>H &lt;len&gt;</td>
</tr>
<tr>
<td>GS1-128</td>
<td>L &lt;len&gt;</td>
<td>None</td>
<td>P</td>
<td>P</td>
<td>P &lt;len&gt;</td>
<td>L &lt;len&gt;</td>
</tr>
<tr>
<td>MSI</td>
<td>None</td>
<td>None</td>
<td>O</td>
<td>O</td>
<td>O &lt;len&gt;</td>
<td>None</td>
</tr>
<tr>
<td>Bookland EAN</td>
<td>F</td>
<td>F</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>F</td>
</tr>
<tr>
<td>Trioptic</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Code 11</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>IATA</td>
<td>H&lt;len&gt;</td>
<td>None</td>
<td>H</td>
<td>H</td>
<td>H&lt;len&gt;</td>
<td>H&lt;len&gt;</td>
</tr>
<tr>
<td>Code 32</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>GS1 DataBar</td>
<td>None</td>
<td>None</td>
<td>E</td>
<td>E</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Variants</td>
<td>None</td>
<td>None</td>
<td>Q</td>
<td>Q</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>PDF417</td>
<td>None</td>
<td>None</td>
<td>Q</td>
<td>Q</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Data Matrix</td>
<td>None</td>
<td>None</td>
<td>R</td>
<td>R</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>QR Codes</td>
<td>None</td>
<td>None</td>
<td>U</td>
<td>U</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Aztec/Aztec Rune</td>
<td>None</td>
<td>None</td>
<td>V</td>
<td>V</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>MAXICODE</td>
<td>None</td>
<td>None</td>
<td>T</td>
<td>T</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>microPDF</td>
<td>None</td>
<td>None</td>
<td>S</td>
<td>S</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>GS1-Datamatrix</td>
<td>None</td>
<td>None</td>
<td>W</td>
<td>W</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>GS1-QR</td>
<td>None</td>
<td>None</td>
<td>X</td>
<td>X</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
RS-232 Host Types

To select an RS-232 host interface, scan one of the following bar codes.

Options:
- *Standard RS-232
- ICL RS-232
- Wincor-Nixdorf RS-232 Mode A
- Wincor-Nixdorf RS-232 Mode B
- Fujitsu RS-232
- Olivetti ORS4500
- Omron
- OPOS/JPOS.

*Standard RS-232

ICL RS-232
RS-232 Host Types (continued)

Wincor-Nixdorf RS-232 Mode A

Wincor-Nixdorf RS-232 Mode B
RS-232 Host Types (continued)

Fujitsu RS-232

Olivetti ORS4500
RS-232 Host Types (continued)

Omron

OPOS/JPOS
**Baud Rate**

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

Options:
- *9600
- 19,200
- 38,400
- 57,600
- 115,200.

*Baud Rate 9600

Baud Rate 19,200
Baud Rate (continued)

Baud Rate 38,400

Baud Rate 57,600
Baud Rate (continued)

Baud Rate 115,200
Parity

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

Select **Odd** parity and the parity bit value is set to 0 or 1, based on data, to ensure that an odd number of 1 bits are contained in the coded character.

Options:

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

*None
Check Receive Errors

Select whether or not the parity, framing, and overrun of received characters are checked. The parity value of received characters is verified against the parity parameter selected above.

Options:
- *Check For Received Errors
- Do Not Check For Received Errors.
Hardware Handshaking

The data interface consists of an RS-232 port designed to operate either with or without the hardware handshaking lines, Request to Send (RTS), and Clear to Send (CTS).

If Standard RTS/CTS handshaking is not selected, scan data is transmitted as it becomes available. If Standard RTS/CTS handshaking is selected, scan data is transmitted according to the following sequence:

- The scanner reads the CTS line for activity. If CTS is asserted, the scanner waits up to 2 seconds for the host to negate the CTS line. If, after 2 seconds (default), the CTS line is still asserted, the scanner sounds a transmit error, and any scanned data is lost.
- When the CTS line is negated, the scanner asserts the RTS line and waits up to 2 seconds for the host to assert CTS. When the host asserts CTS, data is transmitted. If, after 2 seconds (default), the CTS line is not asserted, the scanner sounds a transmit error, and discards the data.
- When data transmission is complete, the scanner negates RTS 10 msec after sending the last character.
- The host should respond by negating CTS. The scanner checks for a negated CTS upon the next transmission of data.

During the transmission of data, the CTS line should be asserted. If CTS is deasserted for more than 50 ms between characters, the transmission is aborted, the scanner sounds a transmission error, and the data is discarded.

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

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

**Note** The DTR signal is jumpered to the active state.

Options:
- *None
- Standard RTS/CTS
- RTS/CTS Option 1
- RTS/CTS Option 2
- RTS/CTS Option 3.
Hardware Handshaking (continued)

None

Scan the bar code below if no Hardware Handshaking is desired.

*None

Standard RTS/CTS

Scan the bar code below to select Standard RTS/CTS Hardware Handshaking.

Standard RTS/CTS
Hardware Handshaking (continued)

RTS/CTS Option 1

When RTS/CTS Option 1 is selected, the scanner asserts RTS before transmitting and ignores the state of CTS. The scanner de-asserts RTS when the transmission is complete.

RTS/CTS Option 1

RTS/CTS Option 2

When Option 2 is selected, RTS is always high or low (user-programmed logic level). However, the scanner waits for CTS to be asserted before transmitting data. If CTS is not asserted within 2 seconds (default), the scanner issues an error indication and discards the data.

RTS/CTS Option 2
Hardware Handshaking (continued)

RTS/CTS Option 3

When Option 3 is selected, the scanner asserts RTS prior to any data transmission, regardless of the state of CTS. The scanner waits up to 2 seconds (default) for CTS to be asserted. If CTS is not asserted during this time, the scanner issues an error indication and discards the data. The scanner de-asserts RTS when transmission is complete.
Software Handshaking

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

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

Options:
- *None
- ACK/NAK
- ENQ
- ACK/NAK with ENQ
- XON/XOFF.

None

When this option is selected, data is transmitted immediately.

ACK/NAK

When this option is selected, after transmitting data, the scanner expects either an ACK or NAK response from the host. When a NAK is received, the scanner transmits the same data again and waits for either an ACK or NAK. After three unsuccessful attempts to send data when NAKs are received, the scanner issues an error indication and discards the data.

The scanner waits up to the programmable Host Serial Response Time-out to receive an ACK or NAK. If the scanner does not get a response in this time, it issues an error indication and discards the data. There are no retries when a time-out occurs.
Software Handshaking (continued)

ENQ

When this option is selected, the scanner waits for an ENQ character from the host before transmitting data. If an ENQ is not received within the Host Serial Response Time-out, the scanner issues an error indication and discards the data. The host must transmit an ENQ character at least every Host Serial Response Time-out to prevent transmission errors.

ACK/NAK with ENQ

This combines the two previous options.
Software Handshaking (continued)

XON/XOFF

An XOFF character turns the scanner transmission off until the scanner receives an XON character. There are two situations for XON/XOFF:

- XOFF is received before the scanner has data to send. When the scanner has data to send, it waits up to 2 seconds for an XON character before transmission. If the XON is not received within this time, the scanner issues an error indication and discards the data.
- XOFF is received during a transmission. Data transmission then stops after sending the current byte. When the scanner receives an XON character, it sends the rest of the data message. The scanner waits indefinitely for the XON.

Host Serial Response Time-out

This parameter specifies how long the scanner waits for an ACK, NAK, or CTS before determining that a transmission error has occurred. This only applies when in one of the ACK/NAK Software Handshaking modes, or RTS/CTS Hardware Handshaking option.
Options:

- *Minimum: 2 Sec
- Low: 2.5 Sec.
- Medium: 5 Sec
- High: 7.5 Sec
- Maximum: 9.9 Sec.
Host Serial Response Time-out (continued)

Medium: 5 Sec

High: 7.5 Sec
Host Serial Response Time-out (continued)

Maximum: 9.9 Sec
**RTS Line State**

This parameter sets the idle state of the Serial Host RTS line. Scan a bar code below to select **Low RTS** or **High RTS** line state.

Options:
- *Host: Low RTS*
- Host: High RTS.

* *Host: Low RTS

Host: High RTS
**Stop Bit Select**

The stop bit(s) at the end of each transmitted character marks the end of transmission of one character and prepares the receiving device for the next character in the serial data stream. The number of stop bits selected (one or two) depends on the number the receiving terminal is programmed to accommodate. Set the number of stop bits to match host device requirements.

Options:
- *1 Stop Bit
- 2 Stop Bits.
Data Bits

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

Options:
- 7-Bit
- *6-Bit.
Beep on \(<\text{BEL}\>\)

When this parameter is enabled, the scanner issues a beep when a \(<\text{BEL}\>\) character is detected on the RS-232 serial line. \(<\text{BEL}\>\) is issued to gain a user's attention to an illegal entry or other important event.

Options:

- Beep On \(<\text{BEL}\>\) Character (Enable)
- *Do Not Beep On \(<\text{BEL}\>\) Character (Disable).

*Do Not Beep On \(<\text{BEL}\>\) Character (Disable)
**Intercharacter Delay**

This parameter specifies the intercharacter delay inserted between character transmissions.

Options:
- *Minimum: 0 msec
- Low: 25 msec
- Medium: 50 msec
- High: 75 msec
- Maximum: 99 msec.

*Minimum: 0 msec

Low: 25 msec
Intercharacter Delay (continued)

Medium: 50 msec

High: 75 msec
Intercharacter Delay (continued)

Maximum: 99 msec
Nixdorf Beep/LED Options

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

Options:

- *Normal Operation (Beep/LED immediately after decode)
- Beep/LED After Transmission
- Beep/LED After CTS Pulse.

*Normal Operation
(Beep/LED immediately after decode)

Beep/LED After Transmission
Nixdorf Beep/LED Options (continued)

Beep/LED After CTS Pulse
Ignore Unknown Characters

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

Options:
- *Send Bar Code (With Unknown Characters)*
- Do Not Send Bar Codes (With Unknown Characters).
# ASCII Character Set for RS-232

You can assign the values in Table 7-4 as prefixes or suffixes for ASCII character data transmission.

**Table 7-4  Prefix/Suffix Values**

<table>
<thead>
<tr>
<th>Prefix/Suffix Value</th>
<th>Full ASCII Code 39 Encode Character</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>%U</td>
<td>NUL</td>
</tr>
<tr>
<td>1001</td>
<td>$A</td>
<td>SOH</td>
</tr>
<tr>
<td>1002</td>
<td>$B</td>
<td>STX</td>
</tr>
<tr>
<td>1003</td>
<td>$C</td>
<td>ETX</td>
</tr>
<tr>
<td>1004</td>
<td>$D</td>
<td>EOT</td>
</tr>
<tr>
<td>1005</td>
<td>$E</td>
<td>ENQ</td>
</tr>
<tr>
<td>1006</td>
<td>$F</td>
<td>ACK</td>
</tr>
<tr>
<td>1007</td>
<td>$G</td>
<td>BELL</td>
</tr>
<tr>
<td>1008</td>
<td>$H</td>
<td>BCKSPC</td>
</tr>
<tr>
<td>1009</td>
<td>$I</td>
<td>HORIZ TAB</td>
</tr>
<tr>
<td>1010</td>
<td>$J</td>
<td>LF/NW LN</td>
</tr>
<tr>
<td>1011</td>
<td>$K</td>
<td>VT</td>
</tr>
<tr>
<td>1012</td>
<td>$L</td>
<td>FF</td>
</tr>
<tr>
<td>1013</td>
<td>$M</td>
<td>CR/ENTER</td>
</tr>
<tr>
<td>1014</td>
<td>$N</td>
<td>SO</td>
</tr>
<tr>
<td>1015</td>
<td>$O</td>
<td>SI</td>
</tr>
<tr>
<td>1016</td>
<td>$P</td>
<td>DLE</td>
</tr>
<tr>
<td>1017</td>
<td>$Q</td>
<td>DC1/XON</td>
</tr>
<tr>
<td>1018</td>
<td>$R</td>
<td>DC2</td>
</tr>
<tr>
<td>1019</td>
<td>$S</td>
<td>DC3/XOFF</td>
</tr>
<tr>
<td>1020</td>
<td>$T</td>
<td>DC4</td>
</tr>
<tr>
<td>1021</td>
<td>$U</td>
<td>NAK</td>
</tr>
<tr>
<td>1022</td>
<td>$V</td>
<td>SYN</td>
</tr>
<tr>
<td>1023</td>
<td>$W</td>
<td>ETB</td>
</tr>
<tr>
<td>1024</td>
<td>$X</td>
<td>CAN</td>
</tr>
<tr>
<td>1025</td>
<td>$Y</td>
<td>EM</td>
</tr>
<tr>
<td>1026</td>
<td>$Z</td>
<td>SUB</td>
</tr>
<tr>
<td>1027</td>
<td>%A</td>
<td>ESC</td>
</tr>
</tbody>
</table>
Table 7-4  Prefix/Suffix Values (Continued)

<table>
<thead>
<tr>
<th>Prefix/Suffix Value</th>
<th>Full ASCII Code 39 Encode Character</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>1028</td>
<td>%B</td>
<td>FS</td>
</tr>
<tr>
<td>1029</td>
<td>%C</td>
<td>GS</td>
</tr>
<tr>
<td>1030</td>
<td>%D</td>
<td>RS</td>
</tr>
<tr>
<td>1031</td>
<td>%E</td>
<td>US</td>
</tr>
<tr>
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<td>1033</td>
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<td>!</td>
</tr>
<tr>
<td>1034</td>
<td>/B</td>
<td>&quot;</td>
</tr>
<tr>
<td>1035</td>
<td>/C</td>
<td>#</td>
</tr>
<tr>
<td>1036</td>
<td>/D</td>
<td>$</td>
</tr>
<tr>
<td>1037</td>
<td>/E</td>
<td>%</td>
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<tr>
<td>1038</td>
<td>/F</td>
<td>&amp;</td>
</tr>
<tr>
<td>1039</td>
<td>/G</td>
<td>'</td>
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<td>/I</td>
<td>)</td>
</tr>
<tr>
<td>1042</td>
<td>/J</td>
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<tr>
<td>1043</td>
<td>/K</td>
<td>+</td>
</tr>
<tr>
<td>1044</td>
<td>/L</td>
<td>,</td>
</tr>
<tr>
<td>1045</td>
<td>-</td>
<td>-</td>
</tr>
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<td>1046</td>
<td>.</td>
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<td>1047</td>
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<td>/</td>
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<td>1057</td>
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<tr>
<td>1058</td>
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Table 7-4 Prefix/Suffix Values (Continued)

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<th>Prefix/Suffix Value</th>
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<th>ASCII Character</th>
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<tr>
<td>1059</td>
<td>%F</td>
<td>;</td>
</tr>
<tr>
<td>1060</td>
<td>%G</td>
<td>&lt;</td>
</tr>
<tr>
<td>1061</td>
<td>%H</td>
<td>=</td>
</tr>
<tr>
<td>1062</td>
<td>%I</td>
<td>&gt;</td>
</tr>
<tr>
<td>1063</td>
<td>%J</td>
<td>?</td>
</tr>
<tr>
<td>1064</td>
<td>%V</td>
<td>@</td>
</tr>
<tr>
<td>1065</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>1066</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td>1067</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>1068</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>1069</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>1070</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>1071</td>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>1072</td>
<td>H</td>
<td>H</td>
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<tr>
<td>1073</td>
<td>I</td>
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</tr>
<tr>
<td>1074</td>
<td>J</td>
<td>J</td>
</tr>
<tr>
<td>1075</td>
<td>K</td>
<td>K</td>
</tr>
<tr>
<td>1076</td>
<td>L</td>
<td>L</td>
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<tr>
<td>1077</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>1078</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>1079</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>1080</td>
<td>P</td>
<td>P</td>
</tr>
<tr>
<td>1081</td>
<td>Q</td>
<td>Q</td>
</tr>
<tr>
<td>1082</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>1083</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>1084</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>1085</td>
<td>U</td>
<td>U</td>
</tr>
<tr>
<td>1086</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>1087</td>
<td>W</td>
<td>W</td>
</tr>
<tr>
<td>1088</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>1089</td>
<td>Y</td>
<td>Y</td>
</tr>
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</table>
Table 7-4  Prefix/Suffix Values (Continued)

<table>
<thead>
<tr>
<th>Prefix/Suffix Value</th>
<th>Full ASCII Code 39 Encode Character</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>1090</td>
<td>Z</td>
<td>Z</td>
</tr>
<tr>
<td>1091</td>
<td>%K</td>
<td>[</td>
</tr>
<tr>
<td>1092</td>
<td>%L</td>
<td>\</td>
</tr>
<tr>
<td>1093</td>
<td>%M</td>
<td>]</td>
</tr>
<tr>
<td>1094</td>
<td>%N</td>
<td>^</td>
</tr>
<tr>
<td>1095</td>
<td>%O</td>
<td>_</td>
</tr>
<tr>
<td>1096</td>
<td>%W</td>
<td>`</td>
</tr>
<tr>
<td>1097</td>
<td>+A</td>
<td>a</td>
</tr>
<tr>
<td>1098</td>
<td>+B</td>
<td>b</td>
</tr>
<tr>
<td>1099</td>
<td>+C</td>
<td>c</td>
</tr>
<tr>
<td>1100</td>
<td>+D</td>
<td>d</td>
</tr>
<tr>
<td>1101</td>
<td>+E</td>
<td>e</td>
</tr>
<tr>
<td>1102</td>
<td>+F</td>
<td>f</td>
</tr>
<tr>
<td>1103</td>
<td>+G</td>
<td>g</td>
</tr>
<tr>
<td>1104</td>
<td>+H</td>
<td>h</td>
</tr>
<tr>
<td>1105</td>
<td>+I</td>
<td>i</td>
</tr>
<tr>
<td>1106</td>
<td>+J</td>
<td>j</td>
</tr>
<tr>
<td>1107</td>
<td>+K</td>
<td>k</td>
</tr>
<tr>
<td>1108</td>
<td>+L</td>
<td>l</td>
</tr>
<tr>
<td>1109</td>
<td>+M</td>
<td>m</td>
</tr>
<tr>
<td>1110</td>
<td>+N</td>
<td>n</td>
</tr>
<tr>
<td>1111</td>
<td>+O</td>
<td>o</td>
</tr>
<tr>
<td>1112</td>
<td>+P</td>
<td>p</td>
</tr>
<tr>
<td>1113</td>
<td>+Q</td>
<td>q</td>
</tr>
<tr>
<td>1114</td>
<td>+R</td>
<td>r</td>
</tr>
<tr>
<td>1115</td>
<td>+S</td>
<td>s</td>
</tr>
<tr>
<td>1116</td>
<td>+T</td>
<td>t</td>
</tr>
<tr>
<td>1117</td>
<td>+U</td>
<td>u</td>
</tr>
<tr>
<td>1118</td>
<td>+V</td>
<td>v</td>
</tr>
<tr>
<td>1119</td>
<td>+W</td>
<td>w</td>
</tr>
<tr>
<td>1120</td>
<td>+X</td>
<td>x</td>
</tr>
</tbody>
</table>
Table 7-4  Prefix/Suffix Values (Continued)

<table>
<thead>
<tr>
<th>Prefix/Suffix Value</th>
<th>Full ASCII Code 39 Encode Character</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>1121</td>
<td>+Y</td>
<td>y</td>
</tr>
<tr>
<td>1122</td>
<td>+Z</td>
<td>z</td>
</tr>
<tr>
<td>1123</td>
<td>%P</td>
<td>{</td>
</tr>
<tr>
<td>1124</td>
<td>%Q</td>
<td></td>
</tr>
<tr>
<td>1125</td>
<td>%R</td>
<td>}</td>
</tr>
<tr>
<td>1126</td>
<td>%S</td>
<td>~</td>
</tr>
<tr>
<td>1127</td>
<td></td>
<td>Undefined</td>
</tr>
<tr>
<td>7013</td>
<td></td>
<td>ENTER</td>
</tr>
</tbody>
</table>
CHAPTER 8  IBM 468X/469X INTERFACE

Introduction

This chapter provides information on setting up the scanner with an IBM 468X/469X host. Throughout the programming bar code menus, asterisks (*) indicate default values.
Connecting to an IBM 468X/469X Host

The DS7708 connects directly to an IBM host interface. This configuration requires an external power supply regardless of whether peripherals are attached.

Figure 8-1 IBM Connection - Host Supplies Power

Figure 8-2 IBM Connection with Optional Auxiliary Scanner

Note Interface cables vary depending on configuration. The connectors may be different from the examples illustrated, but the steps to connect the scanner are the same. See IBM Cables on page viii for cable information and part numbers.
To set up the DS7708 with an IBM interface:

1. Remove the back cover from the DS7708. See *Removing the Back Cover on page 1-5.*
2. Plug the host interface cable into the scanner’s host port.
3. Connect the other end of the interface cable to the appropriate port on the host (typically, Port 9).
4. Scan the appropriate bar codes in this chapter, or use 123Scan² to match the host settings.
5. If using an auxiliary scanner:
   a. Connect the auxiliary scanner cable to the auxiliary scanner port on the DS7708.
   b. Connect either a CBA-M65-S07ZAR or CBA-M66-S15ZAR 12 volt cable to the host as shown in *Figure 8-2.*
6. Replace the DS7708 back cover (see *Removing and Replacing the Back Cover on page 1-5.*)
IBM Default Parameters

Table 8-1 lists the defaults for IBM host parameters. To change any option, scan the appropriate bar code(s) beginning in IBM 468X/469X Host Parameters on page 8-5.

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

Table 8-1  IBM Host Default Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM 468X/469X Host Parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port Address</td>
<td>None Selected&lt;sup&gt;1&lt;/sup&gt;</td>
<td>8-5</td>
</tr>
<tr>
<td>Convert Unknown to Code 39</td>
<td>Disable</td>
<td>8-7</td>
</tr>
<tr>
<td>Beep Directive</td>
<td>Honor</td>
<td>8-8</td>
</tr>
<tr>
<td>Bar Code Configuration Directive</td>
<td>Honor</td>
<td>8-9</td>
</tr>
<tr>
<td>IBM-485 Specification Version</td>
<td>Original Specification</td>
<td>8-10</td>
</tr>
</tbody>
</table>

<sup>1</sup>User selection is required to configure this interface and this is the most common selection.
IBM 468X/469X Host Parameters

Port Address

This parameter sets the IBM 468X/469X port used.

*Note* Scanning one of these bar codes enables the RS-485 interface on the scanner.

Options:
- *None Selected*
- Hand-held Scanner Emulation (Port 9B)
- Hand-Held Scanner Emulation (Port 5B)
- Table-top Scanner Emulation (Port 17)

* None Selected

Hand-held Scanner Emulation (Port 9B)
Port Address (continued)

Hand-Held Scanner Emulation (Port 5B)

Table-top Scanner Emulation (Port 17)
Convert Unknown to Code 39

Scan a bar code below to enable or disable the conversion of unknown bar code type data to Code 39.

Options:
- Enable Convert Unknown to Code 39

Enable Convert Unknown to Code 39

* Disable Convert Unknown to Code 39
RS-485 Beep Directive

The IBM RS-485 host can send a beeper configuration request to the scanner. Scan Ignore Beep Directive to prevent the scanner from processing the host request. All directives are still acknowledged to the host as if they were processed.

Options:

- Ignore Beep Directive
RS-485 Bar Code Configuration Directive

The IBM RS-485 host can enable and disable code types. Scan *Ignore Bar Code Configuration Directive* to prevent the scanner from processing the host request. All directives are still acknowledged to the IBM RS-485 host as if they were processed.

Options:
- *Honor Bar Code Configuration Directive*

---

*Honor Bar Code Configuration Directive

---

Ignore Bar Code Configuration Directive
IBM-485 Specification Version
SSI # F8h 06h C1h
Parameter # 1729

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

Options:

- *Original Specification* - only symbologies that were historically supported on each individual port are reported as known.
- Version 2.0 - all symbologies covered in the newer IBM specification are reported as known with their respective code types.

*Original Specification
(0)

Version 2.0
(1)
CHAPTER 9 KEYBOARD WEDGE INTERFACE

Introduction

This chapter provides information for setting up the scanner with a Keyboard Wedge interface. Use this interface type to attach the scanner between the keyboard and host computer. The scanner translates bar code data into keystrokes which the host computer accepts as if they originate from the keyboard.

This mode of operation allows adding bar code reading functionality to a system designed for manual keyboard input. In this mode the keyboard keystrokes are simply passed through.

Throughout the programming bar code menus, asterisks (*) indicate default values.
Connecting a Keyboard Wedge Interface

There are two possible configurations for connecting to a Keyboard Wedge host:

- The DS7708 connects directly to the host computer and keyboard using the keyboard wedge Y-cable (see Figure 9-1).
- The DS7708 connects directly to the host computer and keyboard using the keyboard wedge Y-cable, and an auxiliary scanner connects to the DS7708. A 12 volt power connection is required when using an auxiliary scanner (see Figure 9-2).

![Figure 9-1 Keyboard Wedge Connection - 5 Volt Power Supplied Externally](image-url)
To set up the DS7708 with a Keyboard Wedge interface:

1. Switch off the host and unplug the keyboard connector.
2. Remove the back cover from the DS7708. See *Removing the Back Cover on page 1-5*.
3. Plug the modular connector of the Y-cable into the scanner’s host port.
4. Connect the round male DIN host connector of the Y-cable to the keyboard port on the host.
5. Connect the round female DIN keyboard connector of the Y-cable to the keyboard connector.
6. Connect the power supply to the scanner’s power port.

**Note** When connecting an auxiliary scanner, the required 12 Volt power supply is PWRS-14000-148C.

7. Ensure that all connections are secure.
8. Turn on the host system.
9. If not using a North American keyboard, scan the appropriate country bar code in *Appendix B, COUNTRY CODES*.
10. If using an auxiliary scanner:
    a. Connect the auxiliary scanner cable to the auxiliary scanner port on the DS7708.
    b. Connect a 12 volt external power supply as shown in Figure 9-2.
11. Replace the DS7708 back cover (see *Removing and Replacing the Back Cover on page 1-5*).
12. Scan the appropriate bar codes in this chapter or use 123Scan² to configure the scanner.
Keyboard Wedge Default Parameters

Table 9-1 lists the defaults for Keyboard Wedge host parameters. To change any option, scan the appropriate bar code(s) beginning in Keyboard Wedge Host Types on page 9-5.

Table 9-1  Keyboard Wedge Host Default Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard Wedge Host Type</td>
<td>IBM AT Notebook</td>
<td>9-5</td>
</tr>
<tr>
<td>Ignore Unknown Characters</td>
<td>Send Bar Codes</td>
<td>9-6</td>
</tr>
<tr>
<td>Keystroke Delay</td>
<td>No Delay</td>
<td>9-7</td>
</tr>
<tr>
<td>Intra-Keystroke Delay</td>
<td>Disable</td>
<td>9-9</td>
</tr>
<tr>
<td>Alternate Numeric Keypad Emulation</td>
<td>Enable</td>
<td>9-10</td>
</tr>
<tr>
<td>Quick Keypad Emulation</td>
<td>Enable</td>
<td>9-11</td>
</tr>
<tr>
<td>Caps Lock On</td>
<td>Disable</td>
<td>9-12</td>
</tr>
<tr>
<td>Caps Lock Override</td>
<td>Disable</td>
<td>9-13</td>
</tr>
<tr>
<td>Convert Wedge Data</td>
<td>No Convert</td>
<td>9-14</td>
</tr>
<tr>
<td>Function Key Mapping</td>
<td>Disable</td>
<td>9-16</td>
</tr>
<tr>
<td>FN1 Substitution</td>
<td>Disable</td>
<td>9-17</td>
</tr>
<tr>
<td>Send Make Break</td>
<td>Send</td>
<td>9-18</td>
</tr>
</tbody>
</table>

Note  See Appendix B, COUNTRY CODES for USB Country Keyboard Types (Country Codes).
See Appendix A, STANDARD DEFAULT PARAMETERS for all user preferences, hosts, symbologies, and miscellaneous default parameters.
Keyboard Wedge Host Types

Select the keyboard wedge host by scanning one of the following bar codes.

Options:

- IBM PC/AT & IBM PC Compatibles
- *IBM AT NOTEBOOK.

IBM PC/AT & IBM PC Compatibles

*IBM AT NOTEBOOK
Ignore Unknown Characters

Unknown characters are characters the host does not recognize. When Send Bar Codes With Unknown Characters is selected, all bar code data is sent except for unknown characters, and no error beeps sound on the scanner. When Do Not Send Bar Codes With Unknown Characters is selected, bar code data is sent up to the first unknown character and then four (error) beeps sound on the scanner.

Options:
- *Send Bar Codes With Unknown Characters
- Do Not Send Bar Codes With Unknown Characters.
Keystroke Delay

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

Options:

- *No Delay
- Medium Delay (20 msec)
- Long Delay (40 msec).
Keystroke Delay (continued)

Long Delay (40 msec)
Intra-Keystroke Delay

Enable this to insert an additional delay between each emulated key depression and release. This sets the Keystroke Delay parameter to a minimum of 5 msec as well.

Options:

- Enable Intra-Keystroke Delay
- *Disable Intra-Keystroke Delay.
Alternate Numeric Keypad Emulation

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

Options

• *Enable Alternate Numeric Keypad
• Disable Alternate Numeric Keypad.
Quick Keypad Emulation

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

Note  This option applies only when Alternate Numeric Keypad Emulation on page 9-10 is enabled.

Options:
- *Enable Quick Keypad Emulation
- Disable Quick Keypad Emulation.
Caps Lock On

When enabled, the scanner emulates keystrokes as if the Caps Lock key is always pressed.

Options:

- Enable Caps Lock On
- *Disable Caps Lock On.

Enable Caps Lock On

*Disable Caps Lock On
Caps Lock Override

When enabled, on AT or AT Notebook hosts, the keyboard ignores the state of the Caps Lock key. Therefore, an ‘A’ in the bar code is sent as an ‘A’ regardless of the state of the keyboard’s Caps Lock key.

*Note* If both Caps Lock On and Caps Lock Override are enabled, Caps Lock Override takes precedence.

Options:
- Enable Caps Lock Override
- *Disable Caps Lock Override.

---

Enable Caps Lock Override

*Disable Caps Lock Override*
Convert Wedge Data

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

Options:

- Convert to Upper Case
- Convert to Lower Case
- *No Convert

Convert to Upper Case

Convert to Lower Case
Convert Wedge Data (continued)

*No Convert
Function Key Mapping

ASCII values under 32 are normally sent as a control-key sequences (see Table 9-2 on page 9-19). Enable this parameter to send the keys in bold in place of the standard key mapping. Items that do not have a bold entry remain the same whether or not this parameter is enabled.

Options:

- Enable Function Key Mapping
- *Disable Function Key Mapping.

Enable

*Disable
FN1 Substitution

Enable this to replace any FN1 characters in a GS1 bar code with a selected Key Category and Key Value (see FN1 Substitution Values on page 4-38).

Options:

- Enable FN1 Substitution
- *Disable FN1 Substitution.
Send Make Break

When enabled, the scan codes for releasing a key are not sent.

Options:

• *Send Make and Break Scan Codes
• Send Make Scan Code Only.
## ASCII Character Set for Keyboard Wedge

Note Code 39 Full ASCII interprets the bar code special character ($ + % /) preceding a Code 39 character and assigns an ASCII character value to the pair. For example, if you enable Code 39 Full ASCII and scan $B, it transmits as $b, %J as $?, and %V as $V. Scanning ABC%I outputs the keystroke equivalent of ABC >.

Table 9-2  Keyboard Wedge ASCII Character Set

<table>
<thead>
<tr>
<th>ASCII Value</th>
<th>Full ASCII Code 39 Encode Character</th>
<th>Keystroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>$A</td>
<td>CTRL A</td>
</tr>
<tr>
<td>1002</td>
<td>$B</td>
<td>CTRL B</td>
</tr>
<tr>
<td>1003</td>
<td>$C</td>
<td>CTRL C</td>
</tr>
<tr>
<td>1004</td>
<td>$D</td>
<td>CTRL D</td>
</tr>
<tr>
<td>1005</td>
<td>$E</td>
<td>CTRL E</td>
</tr>
<tr>
<td>1006</td>
<td>$F</td>
<td>CTRL F</td>
</tr>
<tr>
<td>1007</td>
<td>$G</td>
<td>CTRL G</td>
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<sup>1</sup>The keystroke in bold transmits only if you enabled Function Key Mapping on page 9-16. Otherwise, the unbolded keystroke transmits.
Table 9-2  Keyboard Wedge ASCII Character Set (Continued)

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¹The keystroke in bold transmits only if you enabled Function Key Mapping on page 9-16. Otherwise, the unbolded keystroke transmits.
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¹The keystroke in bold transmits only if you enabled Function Key Mapping on page 9-16. Otherwise, the unbolded keystroke transmits.
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Table 9-2  Keyboard Wedge ASCII Character Set (Continued)

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1The keystroke in bold transmits only if you enabled Function Key Mapping on page 9-16. Otherwise, the unbolded keystroke transmits.
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### Table 9-6  Keyboard Wedge Numeric Keypad Character Set

<table>
<thead>
<tr>
<th>Numeric Keypad</th>
<th>Keystroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>6042</td>
<td>*</td>
</tr>
<tr>
<td>6043</td>
<td>+</td>
</tr>
<tr>
<td>6044</td>
<td>undefined</td>
</tr>
<tr>
<td>6045</td>
<td>-</td>
</tr>
<tr>
<td>6046</td>
<td>.</td>
</tr>
<tr>
<td>6047</td>
<td>/</td>
</tr>
<tr>
<td>6048</td>
<td>0</td>
</tr>
<tr>
<td>6049</td>
<td>1</td>
</tr>
<tr>
<td>6050</td>
<td>2</td>
</tr>
<tr>
<td>6051</td>
<td>3</td>
</tr>
<tr>
<td>6052</td>
<td>4</td>
</tr>
<tr>
<td>6053</td>
<td>5</td>
</tr>
<tr>
<td>6054</td>
<td>6</td>
</tr>
<tr>
<td>6055</td>
<td>7</td>
</tr>
<tr>
<td>6056</td>
<td>8</td>
</tr>
<tr>
<td>6057</td>
<td>9</td>
</tr>
<tr>
<td>6058</td>
<td>Enter</td>
</tr>
<tr>
<td>6059</td>
<td>Num Lock</td>
</tr>
</tbody>
</table>
Table 9-7  *Keyboard Wedge Extended Keypad Character Set*

<table>
<thead>
<tr>
<th>Extended Keypad</th>
<th>Keystroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>7001</td>
<td>Break</td>
</tr>
<tr>
<td>7002</td>
<td>Delete</td>
</tr>
<tr>
<td>7003</td>
<td>Pg Up</td>
</tr>
<tr>
<td>7004</td>
<td>End</td>
</tr>
<tr>
<td>7005</td>
<td>Pg Dn</td>
</tr>
<tr>
<td>7006</td>
<td>Pause</td>
</tr>
<tr>
<td>7007</td>
<td>Scroll Lock</td>
</tr>
<tr>
<td>7008</td>
<td>Backspace</td>
</tr>
<tr>
<td>7009</td>
<td>Tab</td>
</tr>
<tr>
<td>7010</td>
<td>Print Screen</td>
</tr>
<tr>
<td>7011</td>
<td>Insert</td>
</tr>
<tr>
<td>7012</td>
<td>Home</td>
</tr>
<tr>
<td>7013</td>
<td>Enter</td>
</tr>
<tr>
<td>7014</td>
<td>Escape</td>
</tr>
<tr>
<td>7015</td>
<td>Up Arrow</td>
</tr>
<tr>
<td>7016</td>
<td>Dn Arrow</td>
</tr>
<tr>
<td>7017</td>
<td>Left Arrow</td>
</tr>
<tr>
<td>7018</td>
<td>Right Arrow</td>
</tr>
</tbody>
</table>
### Introduction

This chapter describes the system requirements of the Simple Serial Interface (SSI), which provides a communications link between Zebra decoders (e.g., scan engines, slot scanners, hand-held scanners, two-dimensional scanners, hands-free scanners, and RF base stations) and a serial host. It provides the means for the host to control the decoder or scanner.

### Communications

All communication between the decoder and host occurs over the hardware interface lines using the SSI protocol. Refer to the *Simple Serial Interface Programmer’s Guide*, p/n 72-40451-xx, for more information on SSI.

The host and the decoder exchange messages in packets. A packet is a collection of bytes framed by the proper SSI protocol formatting bytes. The maximum number of bytes per packet that the SSI protocol allows for any transaction is 257 (255 bytes + 2 byte checksum).

Decode data can be sent as ASCII data (unpacketeted), or as part of a larger message (packeted), depending on the decoder configuration.

SSI performs the following functions for the host device:

- Maintains a bi-directional interface with the decoder
- Allows the host to send commands that control the decoder
- Passes data from the decoder to a host device in SSI packet format or straight decode message.

The working environment of the SSI consists of a decoder, a serial cable which attaches to the host device, and in some instances, a power supply.

SSI transmits all decode data including special formatting (e.g., AIM ID). Parameter settings can control the format of the transmitted data.

The decoder can also send parameter information, product identification information, or event codes to the host.

All commands sent between the decoder and host must use the format described in the SSI Message Formats section. *SSI Transactions on page 10-2* describes the required sequence of messages in specific cases.
Table 10-1 lists all the SSI opcodes the decoder supports. It identifies the SSI partner allowed to send a message of each type. The host transmits opcodes designated type H. The decoder transmits type D opcodes, and either partner can transmit Host/Decoder (H/D) types.

Table 10-1  SSI Commands

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Opcode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEEP</td>
<td>H</td>
<td>0xE6</td>
<td>Sound the beeper.</td>
</tr>
<tr>
<td>CAPABILITIES_REPLY</td>
<td>D</td>
<td>0xD4</td>
<td>Reply to CAPABILITIES_REQUEST; contains a list of the capabilities and commands the decoder supports.</td>
</tr>
<tr>
<td>CAPABILITIES_REQUEST</td>
<td>H</td>
<td>0xD3</td>
<td>Request capabilities report from the decoder.</td>
</tr>
<tr>
<td>CMD_ACK</td>
<td>H/D</td>
<td>0xD0</td>
<td>Positive acknowledgment of received packet.</td>
</tr>
<tr>
<td>CMD_NAK</td>
<td>H/D</td>
<td>0xD1</td>
<td>Negative acknowledgment of received packet.</td>
</tr>
<tr>
<td>DECODE_DATA</td>
<td>D</td>
<td>0xF3</td>
<td>Decode data in SSI packet format.</td>
</tr>
<tr>
<td>EVENT</td>
<td>D</td>
<td>0xF6</td>
<td>Event indicated by associated event code.</td>
</tr>
<tr>
<td>LED_OFF</td>
<td>H</td>
<td>0xE8</td>
<td>De-activate LED output.</td>
</tr>
<tr>
<td>LED_ON</td>
<td>H</td>
<td>0xE7</td>
<td>Activate LED output.</td>
</tr>
<tr>
<td>PARAM_DEFAULTS</td>
<td>H</td>
<td>0xC8</td>
<td>Set parameter default values.</td>
</tr>
<tr>
<td>PARAM_REQUEST</td>
<td>H</td>
<td>0xC7</td>
<td>Request values of certain parameters.</td>
</tr>
<tr>
<td>PARAM_SEND</td>
<td>H/D</td>
<td>0xC6</td>
<td>Send parameter values.</td>
</tr>
<tr>
<td>REPLY_ID</td>
<td>D</td>
<td>0xA6</td>
<td>Reply to REQUEST_ID; contains decoder's serial number.</td>
</tr>
<tr>
<td>REPLY_REVISION</td>
<td>D</td>
<td>0xA4</td>
<td>Reply to REQUEST_REVISION contains decoder's software/hardware configuration.</td>
</tr>
<tr>
<td>REQUEST_ID</td>
<td>H</td>
<td>0xA3</td>
<td>Request the decoder's serial number.</td>
</tr>
<tr>
<td>REQUEST_REVISION</td>
<td>H</td>
<td>0xA3</td>
<td>Request the decoder's configuration.</td>
</tr>
<tr>
<td>SCAN_DISABLE</td>
<td>H</td>
<td>0xEA</td>
<td>Prevent the operator from scanning bar codes.</td>
</tr>
<tr>
<td>SCAN_ENABLE</td>
<td>H</td>
<td>0xE9</td>
<td>Permit bar code scanning.</td>
</tr>
<tr>
<td>START_DECODE</td>
<td>H</td>
<td>0xE4</td>
<td>Tell decoder to attempt to decode a bar code.</td>
</tr>
<tr>
<td>STOP_DECODE</td>
<td>H</td>
<td>0xE5</td>
<td>Tell decoder to abort a decode attempt.</td>
</tr>
</tbody>
</table>

For details of the SSI protocol, refer to the Simple Serial Interface Programmer’s Guide (72-40451-xx).

SSI Transactions

General Data Transactions

ACK/NAK Handshaking

If you enable ACK/NAK handshaking, all packeted messages must have a CMD_ACK or CMD_NAK response, unless the command description states otherwise. This parameter is enabled by default. Zebra recommends leaving this handshaking enabled to provide feedback to the host. Raw decode data does not use ACK/NAK handshaking since they are not packeted data.
Following is an example of a problem which can occur if you disable ACK/NAK handshaking:

- The host sends a PARAM_SEND message to the decoder to change the baud rate from 9600 to 19200.
- The decoder cannot interpret the message.
- The decoder does not implement the change the host requested.
- The host assumes that the parameter change occurred and acts accordingly.
- Communication is lost because the change did not occur on both sides.

If you enable ACK/NAK handshaking, the following occurs:

- The host sends a PARAM_SEND message.
- The decoder cannot interpret the message.
- The decoder CMD_NAKs the message.
- The host resends the message.
- The decoder receives the message successfully, responds with CMD_ACK, and implements parameter changes.
Transfer of Decode Data

The Decode Data Packet Format parameter controls how decode data is sent to the host. Set this parameter to send the data in a DECODE_DATA packet. Clear this parameter to transmit the data as raw ASCII data.

\[ \text{Note} \] When transmitting decode data as raw ASCII data, ACK/NAK handshaking does not apply regardless of the state of the ACK/NAK handshaking parameter.

ACK/NAK Enabled and Packeted Data

The decoder sends a DECODE_DATA message after a successful decode. The decoder waits for a programmable time-out for a CMD_ACK response. If it does not receive the response, the decoder tries to send two more times before issuing a host transmission error. If the decoder receives a CMD_NAK from the host, it may attempt a retry depending on the cause field of the CMD_NAK message.

ACK/NAK Enabled and Unpacketed ASCII Data

Even though the ACK/NAK handshaking is enabled, no handshaking occurs because the handshaking applies only to packeted data. In this example the packeted_decode parameter is disabled.

ACK/NAK Disabled and Packeted DECODE_DATA

In this example ACK/NAK does not occur even though packeted_decode is enabled because the ACK/NAK handshaking parameter is disabled.
ACK/NAK Disabled and Unpacketized ASCII Data

Data captured by the decoder is sent to the host.

Communication Summary

RTS/CTS Lines

All communication must use RTS/CTS handshaking as described in the Simple Serial Interface Programmer's Guide, p/n 72-40451-xx.

ACK/NAK Option

Enable or disable ACK/NAK handshaking. This handshaking is enabled by default and Zebra recommends leaving it enabled. Disabling this handshaking can cause communication problems, as handshaking is the only acknowledgment that a message was received, and if it was received correctly. ACK/NAK is not used with unpacketized decode data regardless of whether or not it is enabled.

Number of Data Bits

All communication with the decoder must use 8-bit data.

Serial Response Time-out

The Serial Response Time-out parameter determines how long to wait for a handshaking response before trying again, or aborting any further attempts. Set the same value for both the host and decoder.

Note You can temporarily change the Serial Response Time-out when the host takes longer to process an ACK or longer data string. Zebra does not recommend frequent permanent changes due to limited write cycles of non-volatile memory.

Retries

When sending data, the host should resend twice after the initial send if the decoder does not respond with an ACK or NAK (if ACK/NAK handshaking is enabled), or response data (e.g., PARAM_SEND, REPLY_REVISION). If the decoder replies with a NAK RESEND, the host resends the data. All resent messages must have the resend bit set in the Status byte.

The decoder resends data two times after the initial send if the host fails to reply with an ACK or NAK (if ACK/NAK handshaking is enabled).

Baud Rate, Stop Bits, Parity, Response Time-out, ACK/NAK Handshake

If you use PARAM_SEND to change these serial parameters, the ACK response to the PARAM_SEND uses the previous values for these parameters. The new values then take effect for the next transaction.
Errors

The decoder issues a communication error when:

- The CTS line is asserted when the decoder tries to transmit, and is still asserted on each of 2 successive retries
- Failure to receive an ACK or NAK after initial transmit and two resends.

Things to Remember When Using SSI Communication

When not using hardware handshaking, space messages sufficiently apart. The host must not communicate with the decoder if the decoder is transmitting.

When using hardware handshaking, frame each message properly with the handshaking signals. Do not try to send two commands within the same handshaking frame.

There is a permanent/temporary bit in the PARAM_SEND message. Removing power from the decoder discards temporary changes. Permanent changes are written to non-volatile memory. Frequent changes shorten the life of the non-volatile memory.
Encapsulation of RSM Commands/Responses Over SSI

The SSI protocol allows the host to send a command that is variable in length up to 255 bytes. Although there is a provision in the protocol to multi-packet commands from the host, the scan engine does not support this. The host must fragment packets using the provisions in the RSM protocol.

Command Structure

<table>
<thead>
<tr>
<th>Byte</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Length (not including the checksum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SSI_MGMT_COMMAND (0x80)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Message Source (4 - Host)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Reserved (0)</td>
<td>Reserved (0)</td>
<td>Reserved (0)</td>
<td>Cont'd packet</td>
<td>Retransmit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Payload data (see the following example)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length -1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>2's complement checksum (MSB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length +1</td>
<td>2's complement checksum (LSB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The expected response in the positive case is SSI_MGMT_COMMAND which may be a multi-packet response. For devices that do not support the SSI_MGMT_COMMAND, the response is the standard SSI_NAK.

Response Structure

<table>
<thead>
<tr>
<th>Byte</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Length (not including the checksum)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>SSI_MGMT_COMMAND (0x80)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Message Source (0 - Decoder)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Reserved (0)</td>
<td>Reserved (0)</td>
<td>Reserved (0)</td>
<td>Cont'd packet</td>
<td>Retransmit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Payload data (see the following example)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length -1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>2's complement checksum (MSB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length +1</td>
<td>2's complement checksum (LSB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Simple Serial Interface Default Parameters

This section describes how to set up the decoder with a SSI host. When using SSI, program the decoder via bar code menu or SSI hosts commands.

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

Table 10-2 lists the defaults for the SSI host. There are two ways 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 bar code *Set Defaults on page 4-4.
- Download data through the device’s serial port using SSI. Hexadecimal parameter numbers appear in this chapter below the parameter title, and options appear in parenthesis beneath the accompanying bar codes. Refer to the Simple Serial Interface (SSI) Programmer’s Guide for detailed instructions for changing parameters 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 you can see the bar code clearly, and bars and/or spaces are not merging.

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✓ 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.

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

Table 10-2  SSI Default Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select SSI Host</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>10-10</td>
</tr>
<tr>
<td>Baud Rate</td>
<td>9Ch</td>
<td>156</td>
<td>9600</td>
<td>10-11</td>
</tr>
<tr>
<td>Parity</td>
<td>9Eh</td>
<td>158</td>
<td>None</td>
<td>10-15</td>
</tr>
<tr>
<td>Check Parity</td>
<td>97h</td>
<td>151</td>
<td>Disable</td>
<td>10-17</td>
</tr>
<tr>
<td>Stop Bits</td>
<td>9Dh</td>
<td>157</td>
<td>1</td>
<td>10-18</td>
</tr>
<tr>
<td>Software Handshaking</td>
<td>9Fh</td>
<td>159</td>
<td>ACK/NAK</td>
<td>10-19</td>
</tr>
<tr>
<td>Host RTS Line State</td>
<td>9Ah</td>
<td>154</td>
<td>Low</td>
<td>10-20</td>
</tr>
<tr>
<td>Decode Data Packet Format</td>
<td>EEh</td>
<td>238</td>
<td>Send Raw Decode Data</td>
<td>10-21</td>
</tr>
<tr>
<td>Host Serial Response Time-out</td>
<td>9Bh</td>
<td>155</td>
<td>2 sec</td>
<td>10-22</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
### Table 10-2  SSI Default Table (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Host Character Time-out</td>
<td>EFh</td>
<td>239</td>
<td>200 msec</td>
<td>10-24</td>
</tr>
<tr>
<td>Multipacket Option</td>
<td>F0h 4Eh</td>
<td>334</td>
<td>Option 1</td>
<td>10-26</td>
</tr>
<tr>
<td>Interpacket Delay</td>
<td>F0h 4Fh</td>
<td>335</td>
<td>0 ms</td>
<td>10-28</td>
</tr>
</tbody>
</table>

### Event Reporting

<table>
<thead>
<tr>
<th>Event Type</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decode Event</td>
<td>F0h 00h</td>
<td>256</td>
<td>Disable</td>
<td>10-31</td>
</tr>
<tr>
<td>Boot Up Event</td>
<td>F0h 02h</td>
<td>258</td>
<td>Disable</td>
<td>10-32</td>
</tr>
<tr>
<td>Parameter Event</td>
<td>F0h 03h</td>
<td>259</td>
<td>Disable</td>
<td>10-33</td>
</tr>
</tbody>
</table>

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

**Note**  SSI interprets Prefix, Suffix1, and Suffix2 values listed in [ASCII Character Set for USB on page 6-34](#) and [Prefix/Suffix Values on page 7-37](#) differently than other interfaces. SSI does not recognize key categories, only the 3-digit decimal value. The default value of 7013 is interpreted as CR only.
SSI Parameters

Select SSI Host

To select SSI as the host interface, scan the following bar code.
Baud Rate

SSI # 9Ch
Parameter # 156

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

Options:
- *9600
- 19,200
- 38,400
- 57,600
- 115,200
- 230,400
- 460,800
- 921,600.

*Baud Rate 9600 (06h)

Baud Rate 19,200 (07h)
Baud Rate (continued)

Baud Rate 38,400
(08h)

Baud Rate 57,600
(0Ah)
Baud Rate (continued)

Baud Rate 115,200
(0Bh)

Baud Rate 230,400
(0Bh)
Baud Rate (continued)

Baud Rate 460,800
(0Ch)

Baud Rate 921,600
(0Dh)
Parity
SSI # 9Eh
Parameter # 158

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

- Select **Odd** parity and the parity bit has a value 0 or 1, based on data, to ensure that an odd number of 1 bits is contained in the coded character.
- Select **Even** parity and the parity bit has a value 0 or 1, based on data, to ensure that an even number of 1 bits is contained in the coded character.
- If no parity is required, select **None**.
Parity (continued)

*None
(00h)
Check Parity

SSI # 97h
Parameter # 151

Select whether or not to check the parity of received characters. Use the Parity parameter to select the type of parity.

Options:
- *Do Not Check Parity
- Check Parity.

*Do Not Check Parity
(00h)

Check Parity
(01h)
Stop Bits

SSI # 9Dh
Parameter # 157

The stop bit(s) at the end of each transmitted character marks the end of transmission of one character and prepares the receiving (host) device for the next character in the serial data stream. Set the number of stop bits (one or two) to match host device requirements.

Options:
- *1 Stop Bit
- 2 Stop Bits.
Software Handshaking

SSI # 9Fh
Parameter # 159

This parameter offers control of data transmission in addition to the control hardware handshaking offers. Hardware handshaking is always enabled; you cannot disable it.

- **Disable ACK/NAK Handshaking**: When this option is selected, the decoder neither generates nor expects ACK/NAK handshaking packets.

- **Enable ACK/NAK Handshaking**: When this option is selected, after transmitting data, the decoder expects either an ACK or NAK response from the host. The decoder also ACKs or NAKs messages from the host.

The decoder waits up to the programmable Host Serial Response Time-out to receive an ACK or NAK. If the decoder does not get a response in this time, it resends its data up to two times before discarding the data and declaring a transmit error.
Host RTS Line State

SSI # 9Ah
Parameter # 154

This parameter sets the expected idle state of the Serial Host RTS line.

The SSI Interface is used with host applications which also implement the SSI protocol. However, you can use the decoder in a "scan-and-transmit" mode to communicate with any standard serial communication software on a host PC (see Decode Data Packet Format on page 10-21). If transmission errors occur in this mode, the host PC may be asserting hardware handshaking lines which interfere with the SSI protocol. Scan the Host: RTS High bar code to address this problem.

Options:
- *Host: Low RTS
- Host: High RTS.

*Host: RTS Low (00h)

Host: RTS High (01h)
Decode Data Packet Format

SSI # EEh
Parameter # 238

This parameter selects whether to transmit decoded data in raw format (unpacketted), or with the packet format defined by the serial protocol.

Selecting the raw format disables ACK/NAK handshaking for decode data.

Options:
- *Send Raw Decode Data
- Send Packeted Decode Data.

---

*Send Raw Decode Data  
(00h)

---

Send Packeted Decode Data  
(01h)
Host Serial Response Timeout

SSI # 9Bh
Parameter # 155

This parameter specifies how long the decoder waits for an ACK or NAK before resending. Also, if the decoder wants to send, and the host has already been granted permission to send, the decoder waits for the designated time-out before declaring an error.

To set the delay period (options are 2, 5, 7.5, or 9.9 seconds), scan one of the following bar codes.

Options:

• *Low - 2 Seconds
• Medium - 5 Seconds
• High - 7.5 Seconds
• Maximum - 9.9 Seconds.

Other values are available via SSI command.
Host Serial Response Timeout (continued)

High - 7.5 Seconds
(4Bh)

Maximum - 9.9 Seconds
(63h)
Host Character Timeout

SSI # EFh
Parameter # 239

This parameter determines the maximum time the decoder waits between characters transmitted by the host before discarding the received data and declaring an error.

To set the delay period (options are 200, 500, 750, or 990 ms), scan one of the following bar codes.

✓ Note Other values are available via SSI command.

Options:
- *Low - 200 ms
- Medium - 500 ms
- High - 750 ms
- Maximum - 990 ms.

*Low - 200 ms
(14h)

Medium - 500 ms
(32h)

*Low - 200 ms
(14h)
Host Character Timeout (continued)

- **High** - 750 ms
  - (4Bh)

- **Maximum** - 990 ms
  - (63h)
Multipacket Option

SSI # F0h, 4Eh
Parameter # 334

This parameter controls ACK/NAK handshaking for multi-packet transmissions.

- **Multi-Packet Option 1**: The host sends an ACK / NAK for each data packet during a multi-packet transmission.

- **Multi-Packet Option 2**: The decoder sends data packets continuously, with no ACK/NAK handshaking to pace the transmission. The host, if overrun, can use hardware handshaking to temporarily delay decoder transmissions. At the end of transmission, the decoder waits for a CMD_ACK or CMD_NAK.

- **Multi-Packet Option 3**: Option 3 is the same as option 2 with the addition of a programmable interpacket delay.
Multipacket Option (continued)

Multipacket Option 3
(02h)
Interpacket Delay

SSI # F0h, 4Fh
Parameter # 335

This parameter specifies the interpacket delay if you selected **Multipacket Option 3**.

To set the delay period (options are 0, 25, 50, 75, or 99 ms), scan one of the following bar codes.

- **Minimum - 0 ms** (00h)
- **Low - 25 ms** (19h)
- **Medium - 50 ms**
- **High - 75 ms**
- **Maximum - 99 ms**.

*Note* Other values are available via SSI command.
Interpacket Delay (continued)

Medium - 50 ms
(32h)

High - 75 ms
(4Bh)
Interpacket Delay (continued)

Maximum - 99 ms
(63h)
Event Reporting

The host can request the decoder to provide certain information (events) relative to the decoder’s behavior. Enable or disable the events listed in Table 10-3 and on the following pages by scanning the appropriate bar codes.

Table 10-3  Event Codes

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

Decode Event

SSI # F0h, 00h
Parameter # 256

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

Options:

- Enable Decode Event
- *Disable Decode Event.
Boot Up Event

SSI # F0h, 02h
Parameter # 258

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

Options:

- Enable Boot Up Event
- *Disable Boot Up Event.

---

Enable Boot Up Event
(01h)

---

*Disable Boot Up Event
(00h)
Parameter Event

SSI # F0h, 03h
Parameter # 259

When enabled, the decoder generates a message to the host when one of the events specified in Table 10-3 on page 10-31 occurs. When disabled, no notification is sent.

Options:
• Enable Parameter Event
• *Disable Parameter Event.
CHAPTER 11 AUXILIARY SCANNER

Connecting an Auxiliary Scanner
The DS7708 provides a USB port to connect an auxiliary hand-held scanner. See the diagrams in each interface chapter for host and auxiliary scanner connection details.

Auxiliary scanners that are supported by the DS7708 include but are not limited to Zebra's LS2208, DS4208, DS4308, DS4308P and DS6878.

Programming the Auxiliary Scanner
The auxiliary scanner can be programmed in the following ways:

• Connect the auxiliary scanner to the DS7708 and connect the DS7708 to a PC running 123Scan². You can program both (independently) via 123Scan².

• Scan a macro programming bar code from this guide, or one created via 123Scan² using the auxiliary scanner.

• Scan the programming bar codes in this guide using the auxiliary scanner.

    ✚ Note Programming done on the DS7708 is not automatically transferred to the auxiliary scanner.

    ✚ Note When the DS7708 powers up it automatically configures the auxiliary scanner host type to be the same as the DS7708 host type. All of the other auxiliary scanner settings and user parameters remain as is.

Downloading Firmware
Updating firmware on the auxiliary scanner can be done in the following ways:

• Connect the auxiliary scanner to a PC running 123Scan². Update firmware via 23Scan².

• Connect the auxiliary scanner to the DS7708 and connect the DS7708 to a PC running 123Scan². You can update firmware in both (independently) via 123Scan².
12VDC Power Requirement

The DS7708 requires 12VDC when an auxiliary scanner is connected.

12VDC is provided as follows:

- USB (Series A) - A 12VDC USB (Series A) cable and 12VDC power supply is required.
- USB (PowerPlus) - A 12VDC USB (PowerPlus) cable is required. 12VDC provided by host.
- RS-232 - A 12VDC RS-232 cable and 12VDC power supply is required.
- IBM (RS485) - A 12VDC IBM (RS485) cable is required. 12VDC provided by host.
- Keyboard Wedge - A 12VDC Keyboard Wedge cable and 12VDC power supply is required.

Note  Power supply model PWRS-14000-148R is required for USB (Series A) and RS-232.

Power supply model PWRS-14000-148C is required for USB (Series A) and RS-232.

Using Auxiliary Scanners

Using a Zebra Scanner as an Auxiliary Scanner

When the DS7708 powers up it automatically configures the auxiliary scanner host type to be the same as the DS7708 host type. This feature is supported by Zebra scanners that support RSM commands. Some Zebra scanners, such as the LS1203 and older LS2208s, do not support this feature. (See Using a Zebra Scanner That Does Not Support RSM Commands as an Auxiliary Scanner below.) All of the other auxiliary scanner settings and user parameters remain as is.

Notes An auxiliary cordless scanner, such as the Li4278, LS4278, or DS6878, can be attached to the DS7708. If a presentation cradle is used with any of these scanners, a separate cradle power supply (12VDC) is required.

If a standard cradle is used with the DS6878, a separate cradle power supply (5VDC) is required.

Using a Zebra Scanner That Does Not Support RSM Commands as an Auxiliary Scanner

When connecting a Zebra scanner that does not support RSM commands (for example, the LS1203) as an auxiliary scanner you must disable automatic host switching and RSM communication to the auxiliary scanner by setting the parameter Disable Aux Scanner RSM Communication (page 11-3), prior to connecting the auxiliary scanner. Zebra scanners that do not support RSM commands must be programmed separately and pre-configured for the appropriate host type before connecting to the DS7708 as an auxiliary scanner.

Using a Non-Zebra Scanner as an Auxiliary Scanner

The DS7708 provides a USB port to connect an auxiliary hand-held scanner. Non-Zebra scanners must be programmed separately and pre-configured for the appropriate host type before connecting to DS7708.

Note Zebra does not guarantee that a non-Zebra scanner will operate as an auxiliary scanner on the DS7708.
Auxiliary RSM Communication Bar Codes
SSI # F8 05 4E
Parameter # 1358

Prior to connecting the auxiliary scanner, scan Disable Aux Scanner RSM Communication when connecting a Zebra auxiliary scanner that does not support RSM commands. This disables automatic host switching and RSM communication to the auxiliary scanner.


![Barcode Image]

Disable Aux RSM Communication
(00h)

Note This option is not recommended for Zebra scanners that do support RSM, since an auxiliary scanner cannot be configured by 123scan^2 with this option selected.


![Barcode Image]

*Enable Aux RSM Communication
(01h)
CHAPTER 12 SYMBOLOGIES

Introduction

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

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

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

Scanning Sequence Examples

In most cases, scanning one bar code sets the parameter value. For example, to transmit bar code data without the UPC-A check digit, simply scan the Do Not Transmit UPC-A Check Digit bar code under Transmit UPC-A Check Digit on page 12-29. The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

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

Errors While Scanning

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

Table 12-1 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 4-4.

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

### Table 12-1 Parameter Defaults

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable/Disable All Code Types</td>
<td></td>
<td></td>
<td></td>
<td>12-8</td>
</tr>
<tr>
<td><strong>UPC/EAN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPC-A</td>
<td>01h</td>
<td>1</td>
<td>Enable</td>
<td>12-9</td>
</tr>
<tr>
<td>UPC-E</td>
<td>02h</td>
<td>2</td>
<td>Enable</td>
<td>12-10</td>
</tr>
<tr>
<td>UPC-E1</td>
<td>0Ch</td>
<td>12</td>
<td>Disable</td>
<td>12-11</td>
</tr>
<tr>
<td>EAN-8/JAN 8</td>
<td>04h</td>
<td>4</td>
<td>Enable</td>
<td>12-12</td>
</tr>
<tr>
<td>EAN-13/JAN 13</td>
<td>03h</td>
<td>3</td>
<td>Enable</td>
<td>12-13</td>
</tr>
<tr>
<td>Bookland EAN</td>
<td>53h</td>
<td>83</td>
<td>Disable</td>
<td>12-14</td>
</tr>
<tr>
<td>Decode UPC/EAN/JAN Supplementals (2 and 5 digits)</td>
<td>10h</td>
<td>16</td>
<td>Ignore</td>
<td>12-17</td>
</tr>
<tr>
<td>User-Programmable Supplementals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplemental 1:</td>
<td>F1h 43h</td>
<td>579</td>
<td>N/A</td>
<td>12-24</td>
</tr>
<tr>
<td>Supplemental 2:</td>
<td>F1h 44h</td>
<td>580</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPC/EAN/JAN Supplemental Redundancy</td>
<td>50h</td>
<td>80</td>
<td>10</td>
<td>12-25</td>
</tr>
<tr>
<td>Decode UPC/EAN/JAN Supplemental AIM ID Format</td>
<td>F1h A0h</td>
<td>672</td>
<td>Combined</td>
<td>12-26</td>
</tr>
<tr>
<td>UPC Reduced Quiet Zone</td>
<td>F8h 05h 09h</td>
<td>1289</td>
<td>Disable</td>
<td>12-28</td>
</tr>
<tr>
<td>Transmit UPC-A Check Digit</td>
<td>28h</td>
<td>40</td>
<td>Enable</td>
<td>12-29</td>
</tr>
<tr>
<td>Transmit UPC-E Check Digit</td>
<td>29h</td>
<td>41</td>
<td>Enable</td>
<td>12-30</td>
</tr>
<tr>
<td>Transmit UPC-E1 Check Digit</td>
<td>2Ah</td>
<td>42</td>
<td>Enable</td>
<td>12-31</td>
</tr>
<tr>
<td>UPC-A Preamble</td>
<td>22h</td>
<td>34</td>
<td>System Character</td>
<td>12-32</td>
</tr>
<tr>
<td>UPC-E Preamble</td>
<td>23h</td>
<td>35</td>
<td>System Character</td>
<td>12-34</td>
</tr>
<tr>
<td>UPC-E1 Preamble</td>
<td>24h</td>
<td>36</td>
<td>System Character</td>
<td>12-36</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
### Table 12-1  Parameter Defaults (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convert UPC-E to A</td>
<td>25h</td>
<td>37</td>
<td>Disable</td>
<td>12-38</td>
</tr>
<tr>
<td>Convert UPC-E1 to A</td>
<td>26h</td>
<td>38</td>
<td>Disable</td>
<td>12-39</td>
</tr>
<tr>
<td>EAN-8/JAN-8 Extend</td>
<td>27h</td>
<td>39</td>
<td>Disable</td>
<td>12-40</td>
</tr>
<tr>
<td>UCC Coupon Extended Code</td>
<td>55h</td>
<td>85</td>
<td>Disable</td>
<td>12-41</td>
</tr>
<tr>
<td>Coupon Report</td>
<td>F1h DAh</td>
<td>730</td>
<td>New Coupon Symbols</td>
<td>12-42</td>
</tr>
<tr>
<td>ISSN EAN</td>
<td>F1h 69h</td>
<td>617</td>
<td>Disable</td>
<td>12-44</td>
</tr>
</tbody>
</table>

#### Code 128

| Code 128                                      | 08h          | 8                  | Enable        | 12-45       |
| Set Length(s) for Code 128                    | D1h, D2h     | 209, 210           | 1 - 55        | 12-46       |
| GS1-128 (formerly UCC/EAN-128)                | 0Eh          | 14                 | Enable        | 12-49       |
| ISBT 128                                      | 54h          | 84                 | Disable       | 12-50       |
| ISBT Concatenation                            | F1h 41h      | 577                | Disable       | 12-51       |
| Check ISBT Table                              | F1h 42h      | 578                | Enable        | 12-53       |
| ISBT Concatenation Redundancy                 | DFh          | 223                | 10            | 12-54       |
| Code 128 Reduced Quiet Zone                   | F8h 04h B8h  | 1208               | Disable       | 12-55       |
| Code 128 Security Level                       | F1h EFh      | 751                | Security Level 1 | 12-56 |
| Ignore Code 128 <FNC4>                        | F8h 04h E6h  | 1254               | Disable       | 12-58       |

#### Code 39

| Code 39                                       | 00h          | 0                  | Enable        | 12-59       |
| Trioptic Code 39                               | 0Dh          | 13                 | Disable       | 12-60       |
| Convert Code 39 to Code 32 (Italian Pharmacy Code) | 56h          | 86                 | Disable       | 12-61       |
| Code 32 Prefix                                 | E7h          | 231                | Disable       | 12-62       |
| Set Length(s) for Code 39                     | 12h, 13h     | 18, 19             | 2 - 55        | 12-63       |
| Code 39 Check Digit Verification              | 30h          | 48                 | Disable       | 12-66       |
| Transmit Code 39 Check Digit                  | 2Bh          | 43                 | Disable       | 12-67       |
| Code 39 Full ASCII Conversion                 | 11h          | 17                 | Disable       | 12-68       |
| Code 39 Security Level                        | F1h EEh      | 750                | Security Level 1 | 12-69 |
| Code 39 Reduced Quiet Zone                    | F8h 04h B9h  | 1209               | Disable       | 12-71       |

1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
### Table 12-1  Parameter Defaults (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code 93</strong></td>
<td>09h</td>
<td>9</td>
<td>Disable</td>
<td>12-72</td>
</tr>
<tr>
<td>Set Length(s) for Code 93</td>
<td>1Ah, 1Bh</td>
<td>26, 27</td>
<td>1 - 55</td>
<td>12-73</td>
</tr>
<tr>
<td><strong>Code 11</strong></td>
<td>0Ah</td>
<td>10</td>
<td>Disable</td>
<td>12-76</td>
</tr>
<tr>
<td>Set Lengths for Code 11</td>
<td>1Ch, 1Dh</td>
<td>28, 29</td>
<td>4 - 55</td>
<td>12-77</td>
</tr>
<tr>
<td>Code 11 Check Digit Verification</td>
<td>34h</td>
<td>52</td>
<td>Disable</td>
<td>12-80</td>
</tr>
<tr>
<td>Transmit Code 11 Check Digit(s)</td>
<td>2Fh</td>
<td>47</td>
<td>Disable</td>
<td>12-82</td>
</tr>
<tr>
<td><strong>Interleaved 2 of 5 (I 2 of 5)</strong></td>
<td>06h</td>
<td>6</td>
<td>Enable</td>
<td>12-83</td>
</tr>
<tr>
<td>Set Lengths for I 2 of 5</td>
<td>16h, 17h</td>
<td>22, 23</td>
<td>6 - 55</td>
<td>12-84</td>
</tr>
<tr>
<td>I 2 of 5 Check Digit Verification</td>
<td>31h</td>
<td>49</td>
<td>Disable</td>
<td>12-87</td>
</tr>
<tr>
<td>Transmit I 2 of 5 Check Digit</td>
<td>2Ch</td>
<td>44</td>
<td>Disable</td>
<td>12-89</td>
</tr>
<tr>
<td>Convert I 2 of 5 to EAN 13</td>
<td>52h</td>
<td>82</td>
<td>Disable</td>
<td>12-90</td>
</tr>
<tr>
<td>I 2 of 5 Security Level</td>
<td>F8h 04h 61h</td>
<td>1121</td>
<td>I 2 of 5 Security Level 1</td>
<td>12-91</td>
</tr>
<tr>
<td>I 2 of 5 Reduced Quiet Zone</td>
<td>F8h 04h BAh</td>
<td>1210</td>
<td>Disable</td>
<td>12-93</td>
</tr>
<tr>
<td><strong>Discrete 2 of 5 (D 2 of 5)</strong></td>
<td>05h</td>
<td>5</td>
<td>Disable</td>
<td>12-94</td>
</tr>
<tr>
<td>Set Length(s) for D 2 of 5</td>
<td>14h, 15h</td>
<td>20, 21</td>
<td>1 - 55</td>
<td>12-95</td>
</tr>
<tr>
<td><strong>Codabar (NW - 7)</strong></td>
<td>07h</td>
<td>7</td>
<td>Disable</td>
<td>12-98</td>
</tr>
<tr>
<td>Set Lengths for Codabar</td>
<td>18h, 19h</td>
<td>24, 25</td>
<td>4 - 55</td>
<td>12-99</td>
</tr>
<tr>
<td>CLSI Editing</td>
<td>36h</td>
<td>54</td>
<td>Disable</td>
<td>12-102</td>
</tr>
<tr>
<td>NOTIS Editing</td>
<td>37h</td>
<td>55</td>
<td>Disable</td>
<td>12-103</td>
</tr>
<tr>
<td>Codabar Security Level</td>
<td>F8h 06h F0h</td>
<td>1776</td>
<td>Security Level 1</td>
<td>12-104</td>
</tr>
<tr>
<td>Codabar Upper or Lower Case Start/Stop Characters Detection</td>
<td>F2h 57h</td>
<td>855</td>
<td>Upper Case</td>
<td>12-107</td>
</tr>
<tr>
<td><strong>MSI</strong></td>
<td>0Bh</td>
<td>11</td>
<td>Disable</td>
<td>12-108</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
### Table 12-1  Parameter Defaults (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Length(s) for MSI</td>
<td>1Eh, 1Fh</td>
<td>30, 31</td>
<td>4 to 55</td>
<td>12-109</td>
</tr>
<tr>
<td>MSI Check Digits</td>
<td>32h</td>
<td>50</td>
<td>One</td>
<td>12-112</td>
</tr>
<tr>
<td>Transmit MSI Check Digit</td>
<td>2Eh</td>
<td>46</td>
<td>Disable</td>
<td>12-113</td>
</tr>
<tr>
<td>MSI Check Digit Algorithm</td>
<td>33h</td>
<td>51</td>
<td>Mod 10/Mod 10</td>
<td>12-114</td>
</tr>
<tr>
<td>MSI Reduced Quiet Zone</td>
<td>F8h 05h 70h</td>
<td>1392</td>
<td>Disable</td>
<td>12-115</td>
</tr>
</tbody>
</table>

#### Chinese 2 of 5

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese 2 of 5</td>
<td>F0h 98h</td>
<td>408</td>
<td>Disable</td>
<td>12-116</td>
</tr>
</tbody>
</table>

#### Matrix 2 of 5

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matrix 2 of 5</td>
<td>F1h 6Ah</td>
<td>618</td>
<td>Disable</td>
<td>12-117</td>
</tr>
<tr>
<td>Matrix 2 of 5 Lengths</td>
<td>F1h 6Bh F1h 6Ch</td>
<td>619, 620</td>
<td>4 - 55</td>
<td>12-118</td>
</tr>
<tr>
<td>Matrix 2 of 5 Check Digit</td>
<td>F1h 6Eh</td>
<td>622</td>
<td>Disable</td>
<td>12-120</td>
</tr>
<tr>
<td>Transmit Matrix 2 of 5 Check Digit</td>
<td>F1h 6Fh</td>
<td>623</td>
<td>Disable</td>
<td>12-121</td>
</tr>
</tbody>
</table>

#### Korean 3 of 5

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korean 3 of 5</td>
<td>F1h 45h</td>
<td>581</td>
<td>Disable</td>
<td>12-122</td>
</tr>
</tbody>
</table>

#### Postal Codes

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Postnet</td>
<td>59h</td>
<td>89</td>
<td>Disable</td>
<td>12-123</td>
</tr>
<tr>
<td>US Planet</td>
<td>5Ah</td>
<td>90</td>
<td>Disable</td>
<td>12-124</td>
</tr>
<tr>
<td>Transmit US Postal Check Digit</td>
<td>5Fh</td>
<td>95</td>
<td>Enable</td>
<td>12-125</td>
</tr>
<tr>
<td>UK Postal</td>
<td>5Bh</td>
<td>91</td>
<td>Disable</td>
<td>12-126</td>
</tr>
<tr>
<td>Transmit UK Postal Check Digit</td>
<td>60h</td>
<td>96</td>
<td>Enable</td>
<td>12-127</td>
</tr>
<tr>
<td>Japan Post</td>
<td>F0h 22h</td>
<td>290</td>
<td>Disable</td>
<td>12-128</td>
</tr>
<tr>
<td>Australia Post</td>
<td>F0h 23h</td>
<td>291</td>
<td>Disable</td>
<td>12-129</td>
</tr>
<tr>
<td>Australia Post Format</td>
<td>F1h CEh</td>
<td>718</td>
<td>Autodiscriminate</td>
<td>12-130</td>
</tr>
<tr>
<td>Netherlands KIX Code</td>
<td>F0h 46h</td>
<td>326</td>
<td>Disable</td>
<td>12-132</td>
</tr>
<tr>
<td>USPS 4CB/One Code/Intelligent Mail</td>
<td>F1h 50h</td>
<td>592</td>
<td>Disable</td>
<td>12-133</td>
</tr>
<tr>
<td>UPU FICS Postal</td>
<td>F1h 63h</td>
<td>611</td>
<td>Disable</td>
<td>12-134</td>
</tr>
<tr>
<td>Mailmark</td>
<td>F8h 05h 39h</td>
<td>1337</td>
<td>Disable</td>
<td>12-135</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
Table 12-1  Parameter Defaults (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverse 1D</td>
<td>F1h 4Ah</td>
<td>586</td>
<td>Regular</td>
<td>12-136</td>
</tr>
<tr>
<td><strong>GS1 DataBar</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GS1 DataBar (GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked Omnidirectional)</td>
<td>F0h 52h</td>
<td>338</td>
<td>Enable</td>
<td>12-138</td>
</tr>
<tr>
<td>GS1 DataBar Limited</td>
<td>F0h 53h</td>
<td>339</td>
<td>Enable</td>
<td>12-139</td>
</tr>
<tr>
<td>GS1 DataBar Security Level</td>
<td>F8h 06h AAh</td>
<td>1706</td>
<td>1</td>
<td>12-141</td>
</tr>
<tr>
<td>GS1 DataBar Limited Margin Check</td>
<td>F1h D8h</td>
<td>728</td>
<td>3</td>
<td>12-143</td>
</tr>
<tr>
<td>GS1 DataBar Expanded (GS1 DataBar Expanded, GS1 DataBar Expanded Stacked)</td>
<td>F0h 54h</td>
<td>340</td>
<td>Enable</td>
<td>12-140</td>
</tr>
<tr>
<td>Convert GS1 DataBar to UPC/EAN</td>
<td>F0h 8Dh</td>
<td>397</td>
<td>Disable</td>
<td>12-145</td>
</tr>
<tr>
<td><strong>Composite</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composite CC-C</td>
<td>F0h 55h</td>
<td>341</td>
<td>Disable</td>
<td>12-146</td>
</tr>
<tr>
<td>Composite CC-A/B</td>
<td>F0h 56h</td>
<td>342</td>
<td>Disable</td>
<td>12-147</td>
</tr>
<tr>
<td>Composite TLC-39</td>
<td>F0h 73h</td>
<td>371</td>
<td>Disable</td>
<td>12-148</td>
</tr>
<tr>
<td>Composite Inverse</td>
<td>F8h 04h 59h</td>
<td>1113</td>
<td>Regular</td>
<td>12-149</td>
</tr>
<tr>
<td>UPC Composite Mode</td>
<td>F0h 58h</td>
<td>344</td>
<td>UPC Never Linked</td>
<td>12-150</td>
</tr>
<tr>
<td>Composite Beep Mode</td>
<td>F0h 8Eh</td>
<td>398</td>
<td>Beep As Each Code Type is Decoded</td>
<td>12-152</td>
</tr>
<tr>
<td>GS1-128 Emulation Mode for UCC/EAN Composite Codes</td>
<td>F0h ABh</td>
<td>427</td>
<td>Disable</td>
<td>12-154</td>
</tr>
<tr>
<td><strong>2D Symbologies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDF417</td>
<td>0Fh</td>
<td>15</td>
<td>Enable</td>
<td>12-155</td>
</tr>
<tr>
<td>MicroPDF417</td>
<td>E3h</td>
<td>227</td>
<td>Disable</td>
<td>12-156</td>
</tr>
<tr>
<td>Code 128 Emulation</td>
<td>7Bh</td>
<td>123</td>
<td>Disable</td>
<td>12-157</td>
</tr>
<tr>
<td>Data Matrix</td>
<td>F0h 24h</td>
<td>292</td>
<td>Disable</td>
<td>12-158</td>
</tr>
<tr>
<td>Data Matrix Inverse</td>
<td>F1h 4Ch</td>
<td>588</td>
<td>Inverse Autodetect</td>
<td>12-159</td>
</tr>
<tr>
<td>GS1 Data Matrix</td>
<td>F8h 05h 38h</td>
<td>1336</td>
<td>Disable</td>
<td>12-161</td>
</tr>
<tr>
<td>Decode Mirror Images (Data Matrix Only)</td>
<td>F1h 19h</td>
<td>537</td>
<td>Auto</td>
<td>12-162</td>
</tr>
<tr>
<td>Maxicode</td>
<td>F0h 26h</td>
<td>294</td>
<td>Disable</td>
<td>12-164</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
Table 12-1  Parameter Defaults (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>QR Code</td>
<td>F0h 25h</td>
<td>293</td>
<td>Enable</td>
<td>12-165</td>
</tr>
<tr>
<td>Weblink QR</td>
<td>F7 07 9B</td>
<td>1947</td>
<td>Enable</td>
<td>12-166</td>
</tr>
<tr>
<td>GS1 QR</td>
<td>F8h 05h 3Eh</td>
<td>1343</td>
<td>Disable</td>
<td>12-167</td>
</tr>
<tr>
<td>Micro QR</td>
<td>F1h 3Dh</td>
<td>573</td>
<td>Disable</td>
<td>12-168</td>
</tr>
<tr>
<td>Aztec</td>
<td>F1h 3Eh</td>
<td>574</td>
<td>Disable</td>
<td>12-169</td>
</tr>
<tr>
<td>Aztec Inverse</td>
<td>F1h 4Dh</td>
<td>589</td>
<td>Inverse Autodetect</td>
<td>12-170</td>
</tr>
<tr>
<td>Han Xin</td>
<td>F8h 04h 8Fh</td>
<td>1167</td>
<td>Disable</td>
<td>12-172</td>
</tr>
<tr>
<td>Han Xin Inverse</td>
<td>F8h 04h 90h</td>
<td>1168</td>
<td>Regular</td>
<td>12-173</td>
</tr>
<tr>
<td>Grid Matrix</td>
<td>F8h 06h B6h</td>
<td>1718</td>
<td>Disable</td>
<td>12-175</td>
</tr>
<tr>
<td>Grid Matrix Inverse</td>
<td>F8h 06h B7h</td>
<td>1719</td>
<td>Regular</td>
<td>12-176</td>
</tr>
<tr>
<td>Grid Matrix Mirrored</td>
<td>F8h 06h C8h</td>
<td>1736</td>
<td>Non-Mirrored</td>
<td>12-178</td>
</tr>
</tbody>
</table>

**Symbology-Specific Security Levels**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redundancy Level</td>
<td>4Eh</td>
<td>78</td>
<td>1</td>
<td>12-180</td>
</tr>
<tr>
<td>Security Level (UPC/EAN and Code 93)</td>
<td>4Dh</td>
<td>77</td>
<td>1</td>
<td>12-183</td>
</tr>
<tr>
<td>Intercharacter Gap Size</td>
<td>F0h 7Dh</td>
<td>381</td>
<td>Normal</td>
<td>12-185</td>
</tr>
<tr>
<td>1D Quiet Zone Level</td>
<td>F8h 05h 08h</td>
<td>1288</td>
<td>1</td>
<td>12-186</td>
</tr>
</tbody>
</table>

**Macro PDF**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flush Macro PDF Buffer</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>12-188</td>
</tr>
<tr>
<td>Abort Macro PDF Entry</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>12-189</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
Enable/Disable All Code Types

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

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

Enable/Disable UPC-A  
SSI # 01h  
Parameter # 1

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

Options:

- *Enable UPC-A*
- *Disable UPC-A.*

---

*Enable UPC-A*  
(01h)

---

Disable UPC-A  
(00h)
Enable/Disable UPC-E
SSI # 02h
Parameter # 2

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

Options:

- *Enable UPC-E
- Disable UPC-E.

*Enable UPC-E
(01h)

Disable UPC-E
(00h)
Enable/Disable UPC-E1
SSI # 0Ch
Parameter # 12

UPC-E1 is disabled by default.

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

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

Options:

• Enable UPC-E1
• *Disable UPC-E1.

---

Enable UPC-E1
(01h)

---

*Disable UPC-E1
(00h)
Enable/Disable EAN-8/JAN-8
SSI # 04h
Parameter # 4

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

Options:

- *Enable EAN-8/JAN-8
- Disable EAN-8/JAN-8.

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

Disable EAN-8/JAN-8
(00h)
Enable/Disable EAN-13/JAN-13
SSI # 03h
Parameter # 3

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

Options:

- *Enable EAN-13/JAN-13

---

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

---

Disable EAN-13/JAN-13
(00h)
Enable/Disable Bookland EAN
SSI # 53h
Parameter # 83

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

Options:

- Enable Bookland EAN
- *Disable Bookland EAN.

**Note** If Bookland EAN is enabled, select a Bookland ISBN Format on page 12-15. 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 12-16.

---

Enable Bookland EAN
(01h)

---

*Disable Bookland EAN
(00h)
Bookland ISBN Format
SSI # F1h 40h
Parameter # 576

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

Options:

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


Note For Bookland EAN to function properly, ensure Bookland EAN is enabled (see Enable/Disable Bookland EAN on page 12-14), 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 12-16.
Decode UPC/EAN/JAN Supplementals
SSI # 10h
Parameter # 16

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

Options:

- Decode UPC/EAN/JAN with Supplementals - the scanner only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.

- *Ignore UPC/EAN/JAN with Supplementals - if the scanner is presented with a UPC/EAN plus supplemental symbol, the scanner decodes UPC/EAN and ignores the supplemental characters.

- Autodiscriminate UPC/EAN/JAN Supplementals - the scanner decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the scanner must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 12-25* before transmitting its data to confirm that there is no supplemental.

- If you select one of the following **Supplemental Mode** options, the scanner immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the scanner must decode the bar code the number of times set via *UPC/EAN/JAN Supplemental Redundancy on page 12-25* before transmitting its data to confirm that there is no supplemental. The scanner transmits UPC/EAN bar codes that do not have that prefix immediately.
  - Enable 378/379 Supplemental Mode.
  - Enable 978/979 Supplemental Mode.
  - 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 12-24*.
  - 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 12-24*.
  - 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 12-24*.
  - 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 12-24*.

**Note** If you select 978/979 Supplemental Mode and are scanning Bookland EAN bar codes, see *Enable/Disable Bookland EAN on page 12-14* to enable Bookland EAN, and select a format using *Bookland ISBN Format on page 12-15*.

- Enable 977 Supplemental Mode.
- Enable 414/419/434/439 Supplemental Mode.
- Enable 491 Supplemental Mode.

**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)
Decode UPC/EAN/JAN Supplementals (continued)

Enable 378/379 Supplemental Mode
(04h)
Decode UPC/EAN/JAN Supplementals (continued)

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)
Decode UPC/EAN/JAN Supplementals (continued)

Enable Smart Supplemental Mode (03h)

Supplemental User-Programmable Type 1 (09h)
Decode UPC/EAN/JAN Supplementals (continued)

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

- Smart Supplemental Plus User-Programmable 1
  (0Bh)
Decode UPC/EAN/JAN Supplementals (continued)

Smart Supplemental Plus User-Programmable 1 and 2
(0Ch)
User-Programmable Supplementals
Supplemental 1: SSI # F1h 43h
Supplemental 2: SSI # F1h 44h
Supplemental 1: Parameter # 579
Supplemental 2: Parameter # 580

Options:

- If you selected a Supplemental User-Programmable option from Decode UPC/EAN/JAN Supplementals on page 12-16, select User-Programmable Supplemental 1 to set the 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on page G-1.

- Select User-Programmable Supplemental 2 to set a second 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning on page G-1.

User-Programmable Supplemental 1

User-Programmable Supplemental 2
UPC/EAN/JAN Supplemental Redundancy

SSI # 50h
Parameter # 80

If you selected Autodiscriminate UPC/EAN/JAN Supplementals, this option adjusts the number of times to decode a symbol without supplementals before transmission. The range is from 2 to 16 times. Five or above is recommended when decoding a mix of UPC/EAN/JAN symbols with and without supplementals. The default is 10.

Scan UPC/EAN/JAN Supplemental Redundancy below to set a decode redundancy value. Next, scan two numeric bar codes in Appendix G, NUMERIC BAR CODES. Enter a leading zero for single digit numbers. To correct an error or change a selection, scan Cancel on page G-10.
UPC/EAN/JAN Supplemental AIM ID Format
SSI # F1h A0h
Parameter # 672

Select an output format when reporting UPC/EAN/JAN bar codes with Supplementals with Transmit Code ID Character on page 4-29 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]
UPC/EAN/JAN Supplemental AIM ID Format (continued)

Separate Transmissions
(02h)
UPC Reduced Quiet Zone
SSI # F8h 05h 09h
Parameter # 1289

Scan one of the following bar codes to enable or disable decoding UPC bar codes with reduced quiet zones. If you select Enable, select a 1D Quiet Zone Level on page 12-186.

Options:
- Enable UPC Reduced Quiet Zone
- *Disable UPC Reduced Quiet Zone.

*Enable UPC Reduced Quiet Zone
(1)

*Disable UPC Reduced Quiet Zone
(0)
**Transmit UPC-A Check Digit**

SSI # 28h

Parameter # 40

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

Options:

- *Transmit UPC-A Check Digit*
- Do Not Transmit UPC-A Check Digit.

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

Do Not Transmit UPC-A Check Digit  
(00h)
Transmit UPC-E Check Digit
SSI # 29h
Parameter # 41

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

Options:

- *Transmit UPC-E Check Digit
- Do Not Transmit UPC-E Check Digit.

*Transmit UPC-E Check Digit
(01h)

Do Not Transmit UPC-E Check Digit
(00h)
Transmit UPC-E1 Check Digit
SSI # 2Ah
Parameter # 42

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

Options:

- *Transmit UPC-E1 Check Digit
- Do Not Transmit UPC-E1 Check Digit.

*Transmit UPC-E1 Check Digit
(01h)

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

**SSI # 22h**

**Parameter # 34**

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

Options:

- No Preamble (<DATA>)
- *System Character (<SYSTEM CHARACTER> <DATA>)

---

```
No Preamble (<DATA>)
(00h)
```

---

```
*System Character (<SYSTEM CHARACTER> <DATA>)
(01h)
```
UPC-A Preamble (continued)

System Character & Country Code
(<COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(02h)
UPC-E Preamble
SSI # 23h
Parameter # 35

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

Options:

- No Preamble (<DATA>)
- *System Character (<SYSTEM CHARACTER> <DATA>)

No Preamble (<DATA>)
(00h)

*System Character (<SYSTEM CHARACTER> <DATA>)
(01h)
UPC-E Preamble (continued)

System Character & Country Code
(<COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(02h)
UPC-E1 Preamble
SSI # 24h
Parameter # 36

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

Options:

• No Preamble (<DATA>)
• *System Character (<SYSTEM CHARACTER> <DATA>)
• System Character & Country Code (< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>).
UPC-E1 Preamble (continued)

System Character & Country Code
(<COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
(02h)
Convert UPC-E to UPC-A
SSI # 25h
Parameter # 37

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

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

Options:

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

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

*Do Not Convert UPC-E to UPC-A (Disable)
(00h)
Convert UPC-E1 to UPC-A
SSI # 26h
Parameter # 38

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

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

Options:
- Convert UPC-E1 to UPC-A (Enable)
- *Do Not Convert UPC-E1 to UPC-A (Disable).
EAN-8/JAN-8 Extend
SSI # 27h
Parameter # 39

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

Disable this to transmit EAN-8 symbols as is.

Options:

• Enable EAN/JAN Zero Extend
• *Disable EAN/JAN Zero Extend.

Enable EAN/JAN Zero Extend
(01h)

*Disable EAN/JAN Zero Extend
(00h)
UCC CouponExtended Code
SSI # 55h
Parameter # 85

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

Options:

• Enable UCC Coupon Extended Code
• *Disable UCC Coupon Extended Code.

Note  See UPC/EAN/JAN Supplemental Redundancy on page 12-25 to control autodiscrimination of the GS1-128 (right half) of a coupon code.
Coupon Report
SSI # F1h DAh
Parameter # 730

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

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

Scan a bar code following Table 12-2 to select one of the scan option modes in Table 12-2 for decoding coupon symbols.

Table 12-2 Scanning Coupon Symbols

<table>
<thead>
<tr>
<th>Scan Option Mode</th>
<th>Scan an Old Coupon Symbol</th>
<th>Scanning an Interim Coupon Symbol</th>
<th>Scanning an New Coupon Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>*New Coupon Symbols</td>
<td>Report UPC or CODE 128 (whichever is seen first).</td>
<td>Report UPC or DataBar (whichever is seen first).</td>
<td>Reports DataBar.</td>
</tr>
<tr>
<td></td>
<td>If UPC is covered then report Code 128.</td>
<td>If UPC is covered then report DataBar.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If Code 128 is covered then report UPC.</td>
<td>If DataBar is covered then report UPC.</td>
<td></td>
</tr>
<tr>
<td>Both Coupon Formats</td>
<td>Report UPC and Code 128.</td>
<td>Report UPC or DataBar (whichever is seen first).</td>
<td>Reports DataBar.</td>
</tr>
<tr>
<td></td>
<td>If UPC is covered then report Code 128.</td>
<td>If UPC is covered then report DataBar.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If Code 128 is covered then report UPC.</td>
<td>If DataBar is covered then report UPC.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If UPC is covered then report Code 128.</td>
<td>If UPC is covered then report nothing.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If Code 128 is covered then report UPC.</td>
<td>If DataBar is covered then report UPC.</td>
<td></td>
</tr>
</tbody>
</table>
Coupon Report (continued)

*New Coupon Symbols
(01h)

Both Coupon Formats
(02h)
ISSN EAN
SSI # F1h 69h
Parameter # 617

Options:

- Enable ISSN EAN
- *Disable ISSN EAN.

Enable ISSN EAN
(01h)

*Disable ISSN EAN
(00h)
Code 128

Enable/Disable Code 128
SSI # 08h
Parameter # 8

Options:

- *Enable Code 128
- Disable Code 128.

*Enable Code 128
(01h)

Disable Code 128
(00h)
Set Lengths for Code 128
SSI # L1 = D1h, L2 = D2h
Parameter # L1 = 209, L2 = 210

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

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

Options:

• Code 128 One Discrete Length - Select this option to decode only Code 128 symbols containing a
selected length. Select the length using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Code 128 symbols with 14 characters, scan Code 128 - One Discrete
Length, then scan 1 followed by 5. To correct an error or change the selection, scan Cancel on page G-10.

• Code 128 Two Discrete Lengths - Select this option to decode only Code 128 symbols containing
either of two selected lengths. Select lengths using the numeric bar codes in Appendix G, NUMERIC
BAR CODES. For example, to decode only Code 128 symbols containing either 2 or 14 characters,
select Code 128 - Two Discrete Lengths, then scan 0, 2, 1, and then 4. To correct an error or
change the selection, scan Cancel on page G-10.

• Code 128 Length Within Range - Select this option to decode a Code 128 symbol with a specific
length range. Select lengths using numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode Code 128 symbols containing between 4 and 12 characters, first scan Code 128
- Length Within Range. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To
correct an error or change the selection, scan Cancel on page G-10.

• Code 128 Any Length - Select this option to decode Code 128 symbols containing any number of
characters within the scanner’s capability.
Set Lengths for Code 128 (continued)

Code 128 - One Discrete Length

Code 128 - Two Discrete Lengths
Set Lengths for Code 128 (continued)

*Code 128 - Length Within Range

Code 128 - Any Length
Enable/Disable GS1-128 (formerly UCC/EAN-128)
SSI # 0Eh
Parameter # 14

Options:

- *Enable GS1-128
- Disable GS1-128.

*Enable GS1-128
(01h)

Disable GS1-128
(00h)
Enable/Disable ISBT 128

SSI # 54h

Parameter # 84

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

Options:

- Enable ISBT 128
- *Disable ISBT 128.
ISBT Concatenation
SSI # F1h 41h
Parameter # 577

Select an option for concatenating pairs of ISBT code types:

- *Disable ISBT Concatenation - The scanner does not concatenate pairs of ISBT codes it ens.
- Enable ISBT Concatenation - There must be two ISBT codes in order for the scanner to decode and perform concatenation. The scanner does not decode single ISBT symbols.
- Autodiscriminate ISBT Concatenation - The scanner decodes and concatenates pairs of ISBT codes immediately. If only a single ISBT symbol is present, the scanner must decode the symbol the number of times set via ISBT Concatenation Redundancy on page 12-54 before transmitting its data to confirm that there is no additional ISBT symbol.
ISBT Concatenation (continued)

Enable ISBT Concatenation
(01h)

Autodiscriminate ISBT Concatenation
(02h)
Check ISBT Table
SSI # F1h 42h
Parameter # 578

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

Options:

• *Enable Check ISBT Table
• Disable Check ISBT Table.

*Enable Check ISBT Table (01h)

Disable Check ISBT Table (00h)
ISBT Concatenation Redundancy

SSI # DFh
Parameter # 223

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

Scan the bar code below, then scan two numeric bar codes in Appendix G, NUMERIC BAR CODES to set a value between 2 and 20. Enter a leading zero for single digit numbers. To correct an error or change a selection, scan Cancel on page G-10. The default is 10.
Code 128 Reduced Quiet Zone
SSI # F8h 04h B8h
Parameter # 1208

Scan one of the following bar codes to enable or disable decoding Code 128 bar codes with reduced quiet zones. If you select Enable, select a 1D Quiet Zone Level on page 12-186.

Options:
• Enable Code 128 Reduced Quiet Zone
• *Disable Code 128 Reduced Quiet Zone.

Enable Code 128 Reduced Quiet Zone
(1)

*Disable Code 128 Reduced Quiet Zone
(0)
Code 128 Security Level
SSI # F1h EFh
Parameter # 751

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

Options:

- **Code 128 Security Level 0**: This setting allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding the most in-spec bar codes.

- **Code 128 Security Level 1**: A bar code must be successfully read twice, and satisfy certain safety requirements before being decoded. This default setting eliminates most misdecodes.

- **Code 128 Security Level 2**: Select this option with higher safety requirements to the bar codes if Security Level 1 fails to eliminate misdecodes.

- **Code 128 Security Level 3**: If you selected Security Level 2, and misdecodes still occur, select this security level. The highest safety requirements are applied. A bar code must be successfully read three times before being decoded.

  ✓ **Note**  Selecting this option is an extreme measure against mis-decoding severely out-of-spec bar codes. Selecting this level of security significantly impairs the decoding ability of the scanner. If this level of security is required, it is recommended that you try to improve the quality of the bar codes.
Code 128 Security Level (continued)

Code 128 Security Level 2
(02h)

Code 128 Security Level 3
(03h)
Ignore Code 128 <FNC4>
SSI # F8h 04h E6h
Parameter # 1254

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

Options:
- Enable Ignore Code 128 <FNC4>

Enable Ignore Code 128 <FNC4>
(1)

*Disable Ignore Code 128 <FNC4>
(0)
Code 39

Enable/Disable Code 39
SSI # 00h
Parameter # 0

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

Options:

- *Enable Code 39
- Disable Code 39.

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

*Enable Code 39
(01h)

Disable Code 39
(00h)
Enable/Disable Trioptic Code 39
SSI # 0Dh
Parameter # 13

Trioptic Code 39 is a variant of Code 39 used in the marking of computer tape cartridges. Trioptic Code 39 symbols always contain six characters.

Options:
- Enable Trioptic Code 39

Enable Trioptic Code 39
(01h)

*Disable Trioptic Code 39
(00h)
Convert Code 39 to Code 32
SSI # 56h
Parameter # 86

Code 32 is a variant of Code 39 used by the Italian pharmaceutical industry.

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

Options:
- Enable Convert Code 39 to Code 32

---

Enable Convert Code 39 to Code 32
(01h)

---

*Disable Convert Code 39 to Code 32
(00h)
Code 32 Prefix
SSI # E7h
Parameter # 231

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

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

Options:
- Enable Code 32 Prefix
- *Disable Code 32 Prefix.

Enable Code 32 Prefix
(01h)

*Disable Code 32 Prefix
(00h)
Set Lengths for Code 39

SSI # L1 = 12h, L2 = 13h
Parameter # L1 = 18, L2 = 19

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 39 to any length, one or two discrete lengths, or lengths within a specific range. If Code 39 Full ASCII is enabled, Length Within a Range or Any Length are the preferred options. The supported range for Code 39 lengths is 0 - 99; the default range is 2 - 55.

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

Options:

• Code 39 One Discrete Length - Select this option to decode only Code 39 symbols containing a selected length. Select the length using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Code 39 symbols with 14 characters, scan Code 39 - One Discrete Length, then scan 1 followed by 4. To correct an error or change the selection, scan Cancel on page G-10.

• Code 39 Two Discrete Lengths - Select this option to decode only Code 39 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Code 39 symbols containing either 2 or 14 characters, select Code 39 - Two Discrete Lengths, then scan 0, 2, 1, and then 4. To correct an error or change the selection, scan Cancel on page G-10.

• *Code 39 Length Within Range - Select this option to decode a Code 39 symbol with a specific length range. Select lengths using numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode Code 39 symbols containing between 4 and 12 characters, first scan Code 39 - Length Within Range. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To correct an error or change the selection, scan Cancel on page G-10.

• Code 39 Any Length - Select this option to decode Code 39 symbols containing any number of characters within the scanner's capability.
Set Lengths for Code 39 (continued)

Code 39 - One Discrete Length

Code 39 - Two Discrete Lengths
Set Lengths for Code 39 (continued)

*Code 39 - Length Within Range

---

Code 39 - Any Length
**Code 39 Check Digit Verification**

SSI # 30h  
Parameter # 48

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

Options:

- Enable Code 39 Check Digit
- *Disable Code 39 Check Digit.

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

```
*Disable Code 39 Check Digit
(00h)
```
Transmit Code 39 Check Digit
SSI # 2Bh
Parameter # 43

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

Options:

- Transmit Code 39 Check Digit (Enable)
- *Do Not Transmit Code 39 Check Digit (Disable).

Note: Code 39 Check Digit Verification on page 12-66 must be enabled for this parameter to function.

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

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

SSI # 11h
Parameter # 17

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

Options:

- Enable Code 39 Full ASCII
- *Disable Code 39 Full ASCII.

**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 6-34.
Code 39 Security Level
SSI # F1h EEh
Parameter # 750

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

Options:

- **Code 39 Security Level 0**: This setting allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.

- **Code 39 Security Level 1**: This default setting eliminates most misdecodes.

- **Code 39 Security Level 2**: Select this option if Security level 1 fails to eliminate misdecodes.

- **Code 39 Security Level 3**: If you selected Security Level 2 and misdecodes still occur, select this security level. Be advised, selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. Selecting this level of security significantly impairs the decoding ability of the scanner. If you need this level of security, try to improve the quality of the bar codes.
Code 39 Security Level (continued)

Code 39 Security Level 2
(02h)

Code 39 Security Level 3
(03h)
Code 39 Reduced Quiet Zone
SSI # F8h 04h B9h
Parameter # 1209

Scan one of the following bar codes to enable or disable decoding Code 39 bar codes with reduced quiet zones. If you select Enable, select a 1D Quiet Zone Level on page 12-186.

Options:

• Enable Code 39 Reduced Quiet Zone
• *Disable Code 39 Reduced Quiet Zone.

*Disable Code 39 Reduced Quiet Zone
(0)
Code 93

Enable/Disable Code 93
SSI # 09h
Parameter # 9

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

Options:

- Enable Code 93
- *Disable Code 93.

Enable Code 93
(01h)

*Disable Code 93
(00h)
Set Lengths for Code 93  
SSI # L1 = 1Ah, L2 = 1Bh  
Parameter # L1 = 26, L2 = 27

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 93 to any length, one or two discrete lengths, or lengths within a specific range. The supported range for Code 93 lengths is 0 - 55; the default range is 1 - 55.

Options:

- Code 93 One Discrete Length - Select this option to decode only Code 93 symbols containing a selected length. Select the length using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Code 93 symbols with 14 characters, scan Code 93 - One Discrete Length, then scan 1 followed by 4. To correct an error or to change the selection, scan Cancel on page G-10.

- Code 93 Two Discrete Lengths - Select this option to decode only Code 93 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Code 93 symbols containing either 2 or 14 characters, select Code 93 - Two Discrete Lengths, then scan 0, 2, 1, and then 4. To correct an error or to change the selection, scan Cancel on page G-10.

- *Code 93 Length Within Range - Select this option to decode a Code 93 symbol with a specific length range. Select lengths using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode Code 93 symbols containing between 4 and 12 characters, first scan Code 93 - Length Within Range. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To correct an error or change the selection, scan Cancel on page G-10.

- Code 93 Any Length - Scan this option to decode Code 93 symbols containing any number of characters within the scanner’s capability.
Set Lengths for Code 93 (continued)

Code 93 - One Discrete Length

Code 93 - Two Discrete Lengths
Set Lengths for Code 93 (continued)

*Code 93 - Length Within Range

Code 93 - Any Length
Code 11  
SSI # 0Ah  
Parameter # 10

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

Options:
- Enable Code 11
- **Disable Code 11**.

Enable Code 11
(01h)

**Disable Code 11**
(00h)
Set Lengths for Code 11

SSI # L1 = 1Ch, L2 = 1Dh
Parameter # 28, 29

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 11 to any length, one or two discrete lengths, or lengths within a specific range. The default range is 4 - 55.

Options:

- **One Discrete Length** - Select this option to decode only Code 11 symbols containing a selected length. Select the length using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Code 11 symbols with 14 characters, scan Code 11 - One Discrete Length, then scan 1 followed by 4. To correct an error or to change the selection, scan Cancel on page G-10.

- **Two Discrete Lengths** - Select this option to decode only Code 11 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Code 11 symbols containing either 2 or 14 characters, select Code 11 - Two Discrete Lengths, then scan 0, 2, 1, and then 4. To correct an error or to change the selection, scan Cancel on page G-10.

- **Length Within Range** - Select this option to decode a Code 11 symbol with a specific length range. Select lengths using numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode Code 11 symbols containing between 4 and 12 characters, first scan Code 11 - Length Within Range. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To correct an error or change the selection, scan Cancel on page G-10.

- **Any Length** - Scan this option to decode Code 11 symbols containing any number of characters within the scanner's capability.
Set Lengths for Code 11 (continued)

Code 11 - One Discrete Length

Code 11 - Two Discrete Lengths
Set Lengths for Code 11 (continued)
Code 11 Check Digit Verification
SSI # 34h
Parameter # 52

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

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

Options:
- **Disable**
- One Check Digit
- Two Check Digits.

*Disable (00h)

One Check Digit (01h)
Code 11 Check Digit Verification (continued)

Two Check Digits (02h)
Transmit Code 11 Check Digits
SSI # 2Fh
Parameter # 47

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

✔

Note  Code 11 Check Digit Verification on page 12-80 must be enabled for this parameter to function.

Options:
- Transmit Code 11 Check Digit(s) (Enable)
- *Do Not Transmit Code 11 Check Digit(s) (Disable).

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

*Do Not Transmit Code 11 Check Digit(s) (Disable) (00h)
Interleaved 2 of 5 (ITF)

Enable/Disable Interleaved 2 of 5  
SSI # 06h  
Parameter # 6

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

Options:

- *Enable Interleaved 2 of 5
- Disable Interleaved 2 of 5.

*Enable Interleaved 2 of 5  
(01h)

Disable Interleaved 2 of 5  
(00h)
Set Lengths for Interleaved 2 of 5 (I 2 of 5)
SSI # L1 = 16h, L2 = 17h
Parameter # L1 = 22, L2 = 23

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for I 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The range for Interleaved 2 of 5 lengths is 6 - 55.

Options:

- **I 2 of 5 One Discrete Length** - Select this option to decode only I 2 of 5 symbols containing a selected length. Select the length using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only I 2 of 5 symbols with 14 characters, scan **I 2 of 5 - One Discrete Length**, then scan 1 followed by 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **I 2 of 5 Two Discrete Lengths** - Select this option to decode only I 2 of 5 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only I 2 of 5 symbols containing either 2 or 14 characters, select **I 2 of 5 - Two Discrete Lengths**, then scan 0, 2, 1, and then 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **I 2 of 5 Length Within Range** - Select this option to decode an I 2 of 5 symbol with a specific length range. Select lengths using numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode I 2 of 5 symbols containing between 4 and 12 characters, first scan **I 2 of 5 - Length Within Range**. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To correct an error or change the selection, scan **Cancel on page G-10**.

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

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

I 2 of 5 - Two Discrete Lengths

*1 2 of 5 - Length Within Range
Set Lengths for Interleaved 2 of 5 (continued)

I 2 of 5 - Any Length
I 2 of 5 Check Digit Verification
SSI # 31h
Parameter # 49

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

Options:
- *Disable I 2 of 5 Check Digit Verification
- USS Check Digit
- OPCC Check Digit.

*Disable
(00h)

USS Check Digit
(01h)
I 2 of 5 Check Digit Verification (continued)

OPCC Check Digit (02h)
Transmit I 2 of 5 Check Digit
SSI # 2Ch
Parameter # 44

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

Options:

- Transmit I 2 of 5 Check Digit (Enable)
- *Do Not Transmit I 2 of 5 Check Digit (Disable).

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

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

SSI # 52h  
Parameter # 82

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

Options:

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

---

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

(01h)

---

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

(00h)
I 2 of 5 Security Level

SSI # F8h 04h 61h

Parameter # 1121

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

Options:

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

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

---

I 2 of 5 Security Level 0
(00h)

---

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

12 of 5 Security Level 2
(02h)

12 of 5 Security Level 3
(03h)
I 2 of 5 Reduced Quiet Zone

SSI # F8h 04h BAh

Parameter # 1210

Scan one of the following bar codes to enable or disable decoding I 2 of 5 bar codes with reduced quiet zones.

If you select Enable, select a 1D Quiet Zone Level on page 12-186.

Options:

- Enable I 2 of 5 Reduced Quiet Zone
- *Disable I 2 of 5 Reduced Quiet Zone.

---

Enable I 2 of 5 Reduced Quiet Zone
(01h)

*Disable I 2 of 5 Reduced Quiet Zone
(00h)
Discrete 2 of 5 (D 2 of F)
SSI # 05h
Parameter # 5

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

• Enable Discrete 2 of 5
• *Disable Discrete 2 of 5

Enable Discrete 2 of 5
(01h)

*Disable Discrete 2 of 5
(00h)
Set Lengths for Discrete 2 of 5

SSI # L1 = 14h, L2 = 15h  
Parameter # L1 = 20, L2 = 21

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for D 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The supported range for Discrete 2 of 5 lengths is 0 - 55; the default range is 1 - 55.

Options:

- **D 2 of 5 One Discrete Length** - Select this option to decode only D 2 of 5 symbols containing a selected length. Select the length using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only D 2 of 5 symbols with 14 characters, scan **D 2 of 5 - One Discrete Length**, then scan 1 followed by 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **D 2 of 5 Two Discrete Lengths** - Select this option to decode only D 2 of 5 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only D 2 of 5 symbols containing either 2 or 14 characters, select **D 2 of 5 - Two Discrete Lengths**, then scan 0, 2, 1, and then 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **D 2 of 5 Length Within Range** - Select this option to decode a D 2 of 5 symbol with a specific length range. Select lengths using numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode D 2 of 5 symbols containing between 4 and 12 characters, first scan **D 2 of 5 - Length Within Range**. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To correct an error or change the selection, scan **Cancel on page G-10**.

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

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

D 2 of 5 - Two Discrete Lengths

D 2 of 5 - Length Within Range
Set Lengths for Discrete 2 of 5 (continued)

*D 2 of 5 - Any Length
Codabar (NW - 7)

Enable/Disable Codabar
SSI # 07h
Parameter # 7

Options:

- Enable Codabar
- *Disable Codabar.

```
Enable Codabar
(01h)
```

```
*Disable Codabar
(00h)
```
Set Lengths for Codabar
SSI # L1 = 18h, L2 = 19h
Parameter # L1 = 24, L2 = 25

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Codabar to any length, one or two discrete lengths, or lengths within a specific range. The supported range for Codabar lengths is 0 - 55; the default range is 4 - 55.

Options:

- **Codabar One Discrete Length** - Select this option to decode only Codabar symbols containing a selected length. Select the length using the numeric bar codes in *Appendix G, NUMERIC BAR CODES*. For example, to decode only Codabar symbols with 14 characters, scan **Codabar - One Discrete Length**, then scan 1 followed by 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **Codabar Two Discrete Lengths** - Select this option to decode only Codabar symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix G, NUMERIC BAR CODES*. For example, to decode only Codabar symbols containing either 2 or 14 characters, select **Codabar - Two Discrete Lengths**, then scan 0, 2, 1, and then 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **Codabar Length Within Range** - Select this option to decode a Codabar symbol with a specific length range. Select lengths using numeric bar codes in *Appendix G, NUMERIC BAR CODES*. For example, to decode Codabar symbols containing between 4 and 12 characters, first scan **Codabar - Length Within Range**. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To correct an error or change the selection, scan **Cancel on page G-10**.

- **Codabar Any Length** - Scan this option to decode Codabar symbols containing any number of characters within the scanner’s capability.
Set Lengths for Codabar (continued)

Codabar - Two Discrete Lengths

*Codabar - Length Within Range
Set Lengths for Codabar (continued)

Codabar - Any Length
**CLSI Editing**

SSI # 36h
Parameter # 54

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

![Enable CLSI Editing](01h)

* Disable CLSI Editing

(00h)

**Note**  Symbol length does not include start and stop characters.

Options:

- Enable CLSI Editing
- *Disable CLSI Editing.
NOTIS Editing
SSI # 37h
Parameter # 55

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

Options:

- Enable NOTIS Editing
- *Disable NOTIS Editing.

Enable NOTIS Editing
(01h)

*Disable NOTIS Editing
(00h)
Codabar Security Level
SSI # F8h 06h F0h
Parameter # 1776

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

- Codabar Security Level 0 - This setting allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding most in-spec bar codes.
- *Codabar Security Level 1 - This default setting eliminates most misdecodes.
- Codabar Security Level 2 - Select this option with greater bar code security requirements if Security Level 1 fails to eliminate misdecodes.
- Codabar Security Level 3 - If you selected Security Level 2, and misdecodes still occur, select this security level to apply the highest safety requirements.

Note: Selecting this option is an extreme measure against mis-decoding severely out-of-spec bar codes, and significantly impairs the decoding ability of the scanner. If this level of security is required, try to improve the quality of the bar codes.
Codabar Security Level (continued)

*Codabar Security Level 1  
(01h)

Codabar Security Level 2  
(02h)
Codabar Security Level (continued)

*Codabar Security Level 3
(03h)
Codabar Upper or Lower Case Start/Stop Characters Detection
SSI # F2h 57h
Parameter # 855

Select whether to detect upper case or lower case Codabar start/stop characters.
Options:
- *Upper Case
- Lower Case.
MSI

Enable/Disable MSI
SSI # 0Bh
Parameter # 11

Options:

- Enable MSI
- *Disable MSI.

Enable MSI
(01h)

*Disable MSI
(00h)
Set Lengths for MSI

SSI # L1 = 1Eh, L2 = 1Fh
Parameter # L1 = 30, L2 = 31

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for MSI to any length, one or two discrete lengths, or lengths within a specific range. The supported range for MSI lengths is 0 - 55; the default range is 4 - 55.

Options:

- **MSI One Discrete Length** - Select this option to decode only MSI symbols containing a selected length. Select the length using the numeric bar codes in *Appendix G, NUMERIC BAR CODES*. For example, to decode only MSI symbols with 14 characters, scan **MSI - One Discrete Length**, then scan 1 followed by 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **MSI Two Discrete Lengths** - Select this option to decode only MSI symbols containing either of two selected lengths. Select lengths using the numeric bar codes in *Appendix G, NUMERIC BAR CODES*. For example, to decode only MSI symbols containing either 2 or 14 characters, select **MSI - Two Discrete Lengths**, then scan 0, 2, 1, and then 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **MSI Length Within Range** - Select this option to decode a MSI symbol with a specific length range. Select lengths using numeric bar codes in *Appendix G, NUMERIC BAR CODES*. For example, to decode MSI symbols containing between 4 and 12 characters, first scan **MSI - Length Within Range**. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To correct an error or change the selection, scan **Cancel on page G-10**.

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

**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.

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MSI - One Discrete Length
Set Lengths for MSI (continued)

MSI - Two Discrete Lengths

*MSI - Length Within Range
Set Lengths for MSI (continued)

MSI - Any Length
**MSI Check Digits**

SSI # 32h

Parameter # 50

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

See *MSI Check Digit Algorithm on page 12-114* for the selection of second digit algorithms.

Options:

- *One MSI Check Digit*
- Two MSI Check Digits.
Transmit MSI Check Digit(s)
SSI # 2Eh
Parameter # 46

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

Options:
- Transmit MSI Check Digit(s) (Disable)
- *Do Not Transmit MSI Check Digit(s) (Disable).

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

*Do Not Transmit MSI Check Digit(s) (Disable)
(00h)
MSI Check Digit Algorithm
SSI # 33h
Parameter # 51

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

Options:

- MOD 11/MOD 10
- *MOD 10/MOD 10.
MSI Reduced Quiet Zone
SSI # F8h 05h 70h
Parameter # 1392

Scan one of the following bar codes to enable or disable decoding MSI bar codes with reduced quiet zones. If you select **Enable**, select a *1D Quiet Zone Level on page 12-186*.

Options:

- Enable MSI Reduced Quiet Zone
- *Disable MSI Reduced Quiet Zone*
Chinese 2 of 5

Enable/Disable Chinese 2 of 5
SSI # F0h 98h
Parameter # 408

Options:

• Enable Chinese 2 of 5
• *Disable Chinese 2 of 5.

Enable Chinese 2 of 5
(01h)

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

Enable/Disable Matrix 2 of 5
SSI # F1h 6Ah
Parameter # 618

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

Options:

- Enable Matrix 2 of 5
- *Disable Matrix 2 of 5.
Set Lengths for Matrix 2 of 5
SSI # L1 = F1h 6Bh, L2 = F1h 6Ch
Parameter # L1 = 619, L2 = 620

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Matrix 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The range for Matrix 2 of 5 lengths is 4 - 55

Options:

- **One Discrete Length** - Select this option to decode only Matrix 2 of 5 symbols containing a selected length. Select the length using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Matrix 2 of 5 symbols with 14 characters, scan **Matrix 2 of 5 - One Discrete Length**, then scan 1 followed by 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **Two Discrete Lengths** - Select this option to decode only Matrix 2 of 5 symbols containing either of two selected lengths. Select lengths using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode only Matrix 2 of 5 symbols containing either 2 or 14 characters, select **Matrix 2 of 5 - Two Discrete Lengths**, then scan 0, 2, 1, and then 4. To correct an error or to change the selection, scan **Cancel on page G-10**.

- **Length Within Range** - Select this option to decode a Matrix 2 of 5 symbol with a specific length range. Select lengths using the numeric bar codes in Appendix G, NUMERIC BAR CODES. For example, to decode Matrix 2 of 5 symbols containing between 4 and 12 characters, first scan **Matrix 2 of 5 - Length Within Range**. Then scan 0, 4, 1, and 2 (enter a leading zero for single digit numbers). To correct an error or change the selection, scan **Cancel on page G-10**.

- **Any Length** - Scan this option to decode Matrix 2 of 5 symbols containing any number of characters within the scanner’s capability.
Set Lengths for Matrix 2 of 5 (continued)
Matrix 2 of 5 Check Digit
SSI # F1h 6Eh
Parameter # 622

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

Options:
- Enable Matrix 2 of 5 Check Digit
- *Disable Matrix 2 of 5 Check Digit.
Transmit Matrix 2 of 5 Check Digit
SSI # F1h 6Fh
Parameter # 623

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

Options:

• Transmit Matrix 2 of 5 Check Digit
• *Do Not Transmit Matrix 2 of 5 Check Digit.

*Do Not Transmit Matrix 2 of 5 Check Digit
(00h)
Korean 3 of 5

Enable/Disable Korean 3 of 5

SSI # F1h 45h
Parameter # 581

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

☑️  Note  The length for Korean 3 of 5 is fixed at 6.

Options:

- Enable Korean 3 of 5
- *Disable Korean 3 of 5.

---

Enable Korean 3 of 5
(01h)

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

US Postnet
SSI # 59h
Parameter # 89

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

Options:

• Enable US Postnet
• *Disable US Postnet.
US Planet
SSI # 5Ah
Parameter # 90

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

Options:
- Enable US Planet
- *Disable US Planet.
Transmit US Postal Check Digit
SSI # 5Fh
Parameter # 95

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

Options:

- *Transmit US Postal Check Digit
- Do Not Transmit US Postal Check Digit.

![Barcode Image]
*Transmit US Postal Check Digit
(01h)

![Barcode Image]
Do Not Transmit US Postal Check Digit
(00h)
UK Postal
SSI # 5Bh
Parameter # 91

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

Options:

- Enable UKPostal
- Disable UK Postal.

Enable UK Postal
(01h)

*Disable UK Postal
(00h)
Transmit UK Postal Check Digit
SSI # 60h
Parameter # 96

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

Options:

- *Transmit UK Postal Check Digit
- Do Not Transmit UK Postal Check Digit.
Japan Post
SSI # F0h, 22h
Parameter # 290

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

Options:

• Enable Japan Post
• *Disable Japan Post.

[Bar Code Image]
Enable Japan Post
(01h)

[Bar Code Image]
*Disable Japan Post
(00h)
Australia Post
SSI # F0h, 23h
Parameter # 291

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

Options:

- Enable Australia Post
- *Disable Australia Post.
Australia Post Format
SSI # F1h, CEh
Parameter # 718

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

Options:

- **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.

Australia Post Format (continued)
Netherlands KIX Code
SSI # F0h, 46h
Parameter # 326

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

Options:

• Enable Netherlands KIX Code
• *Enable Netherlands KIX Code.

Enable Netherlands KIX Code
(01h)

*Disable Netherlands KIX Code
(00h)
USPS 4CB/One Code/Intelligent Mail
SSI # F1h 50h
Parameter # 592

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

Options:

- Enable USPS 4CB/One Code/Intelligent Mail
- *Enable USPS 4CB/One Code/Intelligent Mail.

*Enable USPS 4CB/One Code/Intelligent Mail (01h)

*Disable USPS 4CB/One Code/Intelligent Mail (00h)
UPU FICS Postal
SSI # F1h 63h
Parameter # 611

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

Options:

• Enable UPU FICS Postal
• *Disable UPU FICS Postal.

---

Enable UPU FICS Postal
(01h)

---

*Disable UPU FICS Postal
(00h)
Mailmark
SSI # F8h 05h 39h
Parameter # 1337

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

Options:

- Enable UPU FICS Postal
- *Disable UPU FICS Postal.

Enable Mailmark
(01h)

*Disable Mailmark
(00h)
Inverse 1D

SSI # F1h 4Ah
Parameter # 586

This parameter sets the 1D inverse scanner setting.

✓  Note  The Inverse 1D setting may impact Composite or Inverse Composite decoding. See Composite Inverse on page 12-149.

Options:

•  *Regular Only - the scanner decodes regular 1D bar codes only.
•  Inverse Only - the scanner decodes inverse 1D bar codes only.
•  Inverse Autodetect - the scanner decodes both regular and inverse 1D bar codes.
Inverse 1D (continued)

Inverse Autodetect
(02h)
GS1 DataBar

SSI # F0h 52h
Parameter # 338

When **Enable GS1 DataBar** is scanned, the following GS1 DataBar types are supported:

- GS1 DataBar Omnidirectional
- GS1 DataBar Truncated
- GS1 DataBar Stacked
- GS1 DataBar Stacked Omnidirectional.

Options:

- *Enable GS1 DataBar
- Disable GS1 DataBar.
GS1 DataBar Limited
SSI # F0h 53h
Parameter # 339

Options:

- *Enable GS1 DataBar Limited
- Disable GS1 DataBar Limited.
GS1 DataBar Expanded
SSI # F0h 54h
Parameter # 340

When **Enable GS1 DataBar Expanded** is scanned, the following GS1 DataBar Expanded types are supported:

- GS1 DataBar Expanded
- GS1 DataBar Expanded Stacked.

Options:

- *Enable GS1 DataBar Expanded
- Disable GS1 DataBar Expanded.

*Enable GS1 DataBar Expanded (01h)

Disable GS1 DataBar Expanded (00h)
GS1 DataBar Security Level

SSI # F8h 06h AAh
Parameter # 1706

The scanner offers four levels of decode security for GS1 DataBar (GS1 DataBar Omnidirectional, GS1 DataBar Limited, GS1 DataBar Expanded) bar codes.

Options:

- Security Level 0 - The scanner operates in its most aggressive state, while providing sufficient security decoding most in-spec bar codes.
- Security Level 1 - This setting eliminates most misdecodes while maintaining reasonable aggressiveness.
- Security Level 2 - Select this option with greater bar code security requirements 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 to apply the highest safety requirements.
GS1 DataBar Security Level (continued)

*GS1 DataBar Security Level 2
(02h)

GS1 DataBar Security Level 3
(03h)
The scanner offers four levels of decode security for GS1 DataBar Limited bar codes. There is an inverse relationship between the level of margin check and scanner aggressiveness. Increasing the level of margin check can reduce scanning aggressiveness, so select only the level of margin check necessary.

Options:

- Margin Check Level 1 – No clear margin required. This complies with the original GS1 standard, yet can result in erroneous decoding of a DataBar Limited bar code when scanning some UPC symbols that start with digits 9 and 7.
- Margin Check Level 2 – Automatic risk detection. This level of margin check can result in erroneous decoding of DataBar Limited bar codes when scanning some UPC symbols. If a misdecode is detected, the scanner operates in Level 3 or Level 1.
- Margin Check Level 3 – Margin check level reflects the newly proposed GS1 standard that requires a five times trailing clear margin.
- Margin Check Level 4 – Margin check level extends beyond the standard required by GS1. This level of margin check requires a five times leading and trailing clear margin.
GS1 DataBar Limited Security Level (continued)

*GS1 DataBar Limited Margin Check Level 3  
(03h)

*GS1 DataBar Limited Margin Check Level 4  
(04h)
Convert GS1 DataBar to UPC/EAN
SSI # F0h 8Dh
Parameter # 397

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

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

Options:

- Enable Convert GS1 DataBar to UPC/EAN
- *Disable Convert GS1 DataBar to UPC/EAN.

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

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

Composite CC-C
SSI # F0h 55h
Parameter # 341

Options:

- Enable CC-C
- *Disable CC-C.
Composite CC-A/B
SSI # F0h 56h
Parameter # 342

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

✓

Note If you enable this code type, also see UPC Composite Mode on page 12-150.

Options:

- Enable CC-A/B
- *Disable CC-A/B.

Enable CC-A/B
(01h)

*Disable CC-A/B
(00h)
Composite TLC-39
SSI # F0h 73h
Parameter # 371

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

Options:

- Enable TLC39
- *Disable TLC39.

Enable TLC39
(01h)

*Disable TLC39
(00h)
Composite Inverse  
SSI # F8h 04h 59h  
Parameter # 1113

Select an option to set Composite for either regular decode or inverse decode.

Options:

- Regular Only - The scanner decodes regular Composite bar codes only. Before selecting this, set Inverse 1D on page 12-136 to Regular Only or Inverse Autodetect.

- Inverse Only - The scanner decodes inverse Composite bar codes only. This mode only supports Composite Inverse that includes DataBar combined with CCAB, and does not support other 1D/2D combinations. Before selecting this, enable Composite CC-A/B on page 12-147, and set Inverse 1D on page 12-136 to Inverse Only or Inverse Autodetect.

---

*Regular Only  
(01h)
UPC Composite Mode
SSI # F0h 58h
Parameter # 344

If you enable Composite CC-A/B on page 12-147, select an option for linking UPC symbols with a 2D symbol during transmission as if they were one symbol.

Options:

- *UPC Never Linked - Transmit UPC bar codes regardless of whether a 2D symbol is detected.
- UPC Always Linked - Transmit UPC bar codes and the 2D portion. If 2D is not present, the UPC bar code does not transmit.
- Autodiscriminate UPC Composites - The scanner determines if there is a 2D portion, then transmits the UPC, as well as the 2D portion if present.

*UPC Never Linked

(00h)

UPC Always Linked

(01h)
UPC Composite Mode (continued)

Autodiscriminate UPC Composites
(02h)
Composite Beep Mode
SSI # F0h 8Eh
Parameter # 398

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

Options:

- Single Beep After Both are Decoded
- *Beep as Each Code Type is Decoded
- Double Beep After Both are Decoded.

---

**Single Beep After Both are Decoded**
(00h)

---

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

Double Beep After Both are Decoded
(02h)
GS1-128 Emulation Mode for UCC/EAN Composite Codes
SSI # F0h ABh
Parameter # 427

Options:

- Enable GS1-128 Emulation Mode for UCC/EAN Composite Codes
- *Disable GS1-128 Emulation Mode for UCC/EAN Composite Codes.
2D Symbologies

Enable/Disable PDF417
SSI # 0Fh
Parameter # 15

Enable or disable PDF417.

Options:

- *Enable PDF417
- Disable PDF417.
Enable/Disable MicroPDF417
SSI # E3h
Parameter # 227

Enable or disable MicroPDF417.

Options:

• Enable MicroPDF417
• *Disable MicroPDF417.
Code 128 Emulation
SSI # 7Bh
Parameter # 123

Enable this parameter to transmit data from certain MicroPDF417 symbols as Code 128. *AIM Code ID Character (01h) on page 4-29* must be enabled for this parameter to work.

Enable Code 128 Emulation to transmit these MicroPDF417 symbols with one of the following prefixes:
- JC1 if the first codeword is 903-905
- JC2 if the first codeword is 908 or 909
- JC0 if the first codeword is 910 or 911

Disable Code 128 Emulation to transmit these MicroPDF417 symbols with one of the following prefixes:
- JL3 if the first codeword is 903-905
- JL4 if the first codeword is 908 or 909
- JL5 if the first codeword is 910 or 911

Enable or disable Code 128 Emulation.

Note: Linked MicroPDF codewords 906, 907, 912, 914, and 915 are not supported. Use GS1 Composites instead.

Options:
- Enable Code 128 Emulation
- *Disable Code 128 Emulation.*
Data Matrix
SSI # F0h 24h
Parameter # 292

Options:

- Enable Data Matrix
- Disable Data Matrix.
Data Matrix Inverse
SSI # F1h 4Ch
Parameter # 588

This parameter sets the Data Matrix inverse scanner setting.

Options:

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

![Regular Only (00h)]

![Inverse Only (01h)]
Data Matrix Inverse (continued)

*Inverse Autodetect
(02h)
GS1 Data Matrix
SSI # F8h 05h 38h
Parameter # 1336

Enable or disable GS1 Data Matrix.

Options:

- Enable GS1 Data Matrix
- *Disable GS1 Data Matrix.

Enable GS1 Data Matrix (01h)

*Disable GS1 Data Matrix (00h)
Decode Mirror Images (Data Matrix Only)
SSI # F1h 19h
Parameter # 537

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

Options:

• 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.
Decode Mirror Images (Data Matrix Only)

* Auto
(02h)
Maxicode
SSI # F0h 26h
Parameter # 294

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

Options:

• Enable Maxicode
• *Disable Maxicode.
**QR Code**
SSI # F0h 25h
Parameter # 293

Enable or disable QR Code.

Options:

- *Enable QR Code
- Disable QR Code.

---

*Enable QR Code
(01h)

---

Disable QR Code
(00h)
Weblink QR
Parameter #1947
SSI # F7 07 9B

Enable or disable Weblink QR bar code.

Options:

• *Enable Weblink QR Codes
• Disable Weblink QR Codes.

*Enable Weblink QR Codes  
(1)

Disable Weblink QR Codes  
(0)
GS1 QR
SSI # F8h 05h 3Eh
Parameter # 1343

Enable or disable GS1 QR.

Options:

- Enable GS1 QR
- *Disable GS1 QR.

Enable GS1 QR
(01h)

*Disable GS1 QR
(00h)
MicroQR
SSI # F1h 3Dh
Parameter # 573

Enable or disable MicroQR.

Options:

• Enable MicroQR
• *Disable MicroQR.

Enable MicroQR
(01h)

*Disable MicroQR
(00h)
Aztec
SSI # F1h 3Eh
Parameter # 574

Enable or disable Aztec.

Options:

- Enable Aztec
- *Disable Aztec.
Aztec Inverse

SSI # F1h 4Dh

Parameter # 589

This parameter sets the Aztec inverse scanner setting.

Options:

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

Regular Only
(00h)

Inverse Only
(01h)
Aztec Inverse (continued)

*Inverse Autodetect (02h)
Han Xin
SSI # F3h 8Fh
Parameter # 1167

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

Options:

- Enable Han Xin
- *Disable Han Xin.

Enable Han Xin
(01h)

*Disable Han Xin
(00h)
Han Xin Inverse
SSI # F3h 90h
Parameter # 1168

Select a Han Xin inverse scanner setting.
Options:

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

Inverse Autodetect
(02h)
Grid Matrix
SSI # F8h 06h B6h
Parameter # 1718

To enable or disable Grid Matrix, scan one of the following bar codes.

Options:

- Enable Grid Matrix
- *Disable Grid Matrix.
Grid Matrix Inverse
SSI # F8h 06h B7h
Parameter # 1719

Select a Grid Matrix inverse scanner setting.

Options:

• Regular Only - the scanner decodes Grid Matrix bar codes with normal reflectance only.
• Inverse Only - the scanner decodes Grid Matrix bar codes with inverse reflectance only.
• Inverse Autodetect - the scanner decodes both regular and inverse Grid Matrix bar codes.
Grid Matrix Inverse (continued)
**Grid Matrix Mirrored**

SSI # F8h 06h C8h  
**Parameter # 1736**

Select a mirror image Grid Matrix setting.

Options:

- *Non-Mirrored Only* - the scanner decodes non-mirrored Grid Matrix barcodes only.
- Mirrored Only - the scanner decodes mirrored Grid Matrix barcodes only.
- Autodetect - the scanner decodes both mirrored and non-mirrored Grid Matrix barcodes
Grid Matrix Mirrored (continued)
Redundancy Level

SSI # 4Eh
Parameter # 78

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

Select the redundancy level appropriate for the bar code quality.

Options:
- **Redundancy Level 1**
- Redundancy Level 2
- Redundancy Level 3
- Redundancy Level 4.

### Redundancy Level 1

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

<table>
<thead>
<tr>
<th>Table 12-3 Redundancy Level 1 Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code Type</strong></td>
</tr>
<tr>
<td>Codabar</td>
</tr>
<tr>
<td>MSI</td>
</tr>
<tr>
<td>D 2 of 5</td>
</tr>
<tr>
<td>I 2 of 5</td>
</tr>
</tbody>
</table>

### Redundancy Level 2

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

<table>
<thead>
<tr>
<th>Table 12-4 Redundancy Level 2 Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code Type</strong></td>
</tr>
<tr>
<td>All</td>
</tr>
</tbody>
</table>

### 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>
<thead>
<tr>
<th>Table 12-5 Redundancy Level 3 Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code Type</strong></td>
</tr>
<tr>
<td>MSI</td>
</tr>
<tr>
<td>D 2 of 5</td>
</tr>
<tr>
<td>I 2 of 5</td>
</tr>
<tr>
<td>Codabar</td>
</tr>
</tbody>
</table>
Redundancy Level (continued)

Redundancy Level 4

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

**Table 12-6  Redundancy Level 4 Codes**

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Code Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>All</td>
</tr>
</tbody>
</table>

*Redundancy Level 1  
(01h)  

Redundancy Level 2  
(02h)
Redundancy Level (continued)

Redundancy Level 3
(03h)

Redundancy Level 4
(04h)
Security Level

SSI # 4Dh
Parameter # 77

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

Options:

- Security Level 0 - This setting allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- *Security Level 1 - This default setting eliminates most misdecodes.
- Security Level 2 - Select this option if Security level 1 fails to eliminate misdecodes.
- Security Level 3 - If you selected Security Level 2 and misdecodes still occur, select this security level. Be advised, selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. Selecting this level of security significantly impairs the decoding ability of the scanner. If you need this level of security, try to improve the quality of the bar codes.
Security Level (continued)

Security Level 2
(02h)

Security Level 3
(03h)
Intercharacter Gap Size
SSI # F0h 7Dh
Parameter # 381

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

Options:

- *Normal Intercharacter Gaps
- Large Intercharacter Gaps.
1D Quiet Zone Level
SSI # F8h 05h 08h
Parameter # 1288

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

Options:

- 0 - The scanner performs normally in terms of quiet zone.
- *1 - The scanner performs more aggressively in terms of quiet zone.
- 2 - The scanner only requires one side EB (end of bar code) for decoding.
- 3 - The scanner decodes anything in terms of quiet zone or end of bar code.
1D Quiet Zone Level (continued)

1D Quiet Zone Level 2
(2)

1D Quiet Zone Level 3
(3)
Macro PDF Features

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

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

Flush Macro Buffer

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

Flush Macro PDF Buffer
**Abort Macro PDF Entry**

This clears all currently-stored Macro PDF data in the buffer without transmission and aborts from Macro PDF mode.
CHAPTER 13  OCR PROGRAMMING

Introduction

This chapter describes how to set up the scanner for OCR programming. The scanner can read 6 to 60 point OCR typeface. It supports font types OCR-A and OCR-B.

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

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

* Indicates Default  *Disable OCR-A  Feature/Option

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

Table 13-1 lists the defaults for OCR parameters. To change any option, scan the appropriate bar code(s) provided in the Parameter Descriptions section beginning on page 13-3.

![Checkmark]

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

## Table 13-1 OCR Programming Default Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OCR Programming Parameters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCR-A</td>
<td>F1h A8h</td>
<td>680</td>
<td>Disable</td>
<td>13-3</td>
</tr>
<tr>
<td>OCR-A Variant</td>
<td>F1h ACh</td>
<td>685</td>
<td>Full ASCII</td>
<td>13-4</td>
</tr>
<tr>
<td>OCR-B</td>
<td>F1h A9h</td>
<td>681</td>
<td>Disable</td>
<td>13-7</td>
</tr>
<tr>
<td>OCR-B Variant</td>
<td>F1h ADh</td>
<td>685</td>
<td>Full ASCII</td>
<td>13-8</td>
</tr>
<tr>
<td>MICR E13B</td>
<td>F1h AAh</td>
<td>682</td>
<td>Disable</td>
<td>13-15</td>
</tr>
<tr>
<td>US Currency</td>
<td>F1h ABh</td>
<td>683</td>
<td>Disable</td>
<td>13-16</td>
</tr>
<tr>
<td>OCR Orientation</td>
<td>F1h AFh</td>
<td>687</td>
<td>0°</td>
<td>13-17</td>
</tr>
<tr>
<td>OCR Lines</td>
<td>F1h B3h</td>
<td>691</td>
<td>1</td>
<td>13-20</td>
</tr>
<tr>
<td>OCR Minimum Characters</td>
<td>F1h B1h</td>
<td>689</td>
<td>3</td>
<td>13-22</td>
</tr>
<tr>
<td>OCR Maximum Characters</td>
<td>F1h B2h</td>
<td>690</td>
<td>100</td>
<td>13-22</td>
</tr>
<tr>
<td>OCR Subset</td>
<td>F1h AEh</td>
<td>686</td>
<td>Selected font variant</td>
<td>13-23</td>
</tr>
<tr>
<td>OCR Reduced Quiet Zone</td>
<td>F1h B7h</td>
<td>695</td>
<td>50</td>
<td>13-24</td>
</tr>
<tr>
<td>OCR Template</td>
<td>F1h 23h</td>
<td>547</td>
<td>9999999999</td>
<td>13-25</td>
</tr>
<tr>
<td>OCR Check Digit Modulus</td>
<td>F1h B0h</td>
<td>688</td>
<td>1</td>
<td>13-37</td>
</tr>
<tr>
<td>OCR Check Digit Multiplier</td>
<td>F1h BCb</td>
<td>700</td>
<td>121212121212</td>
<td>13-39</td>
</tr>
<tr>
<td>OCR Check Digit Validation</td>
<td>F1h B6h</td>
<td>694</td>
<td>None</td>
<td>13-40</td>
</tr>
<tr>
<td>Inverse OCR</td>
<td>F2h 58h</td>
<td>856</td>
<td>Regular</td>
<td>13-44</td>
</tr>
<tr>
<td>OCR Redundancy</td>
<td>F8h 06h EAh</td>
<td>1770</td>
<td>Level 1</td>
<td>13-46</td>
</tr>
</tbody>
</table>

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

Enable/Disable OCR-A

SSI # F1h A8h
Parameter # 680

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

| **notes** | OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See *OCR Subset on page 13-23* and *OCR Template on page 13-25*. |

All OCR fonts are disabled by default.
OCR-A Variant

SSI # F1 ACh
Parameter # 685

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

OCR-A supports the following variants:

- **OCR-A Full ASCII**
  
  !"#$()*+,-./0123456789<>ABCDEFGHIJKLMNOPQRSTUVWXYZ\

- **OCR-A Reserved 1**
  
  $*+-./0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

- **OCR-A Reserved 2**
  
  $*+-./0123456789<>ABCDEFGHIJKLMNOPQRSTUVWXYZ

- **OCR-A Banking**
  
  -0123456789<> Ń Ħ Ŧ

Special banking characters output as the following representative characters:

- Ń outputs as f
- Ħ outputs as c
- Ŧ outputs as h

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

*OCR-A Full ASCII (00h)

OCR-A Reserved 1 (01h)
OCR-A Variant (continued)

OCR-A Reserved 2
(02h)

OCR-A Banking
(03h)
Enable/Disable OCR-B

SSI # F1h A9h
Parameter # 681

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

✔️ **notes** OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See [OCR Subset on page 13-23](#) and [OCR Template on page 13-25](#).

All OCR fonts are disabled by default.
OCR-B Variant
SSI # F1h ADh
Parameter # 685

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

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

To choose a variant, scan one of the following bar codes. Selecting the following OCR-B variants automatically sets the appropriate OCR Lines on page 13-20. These five variants invoke extensive special algorithms and checking for that particular document type:

<table>
<thead>
<tr>
<th>Variant</th>
<th>OCR Lines Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passport</td>
<td>2</td>
</tr>
<tr>
<td>TD1 ID Cards</td>
<td>3</td>
</tr>
<tr>
<td>TD2 ID Cards</td>
<td>2</td>
</tr>
<tr>
<td>Visa Type A</td>
<td>2</td>
</tr>
<tr>
<td>Visa Type B</td>
<td>2</td>
</tr>
</tbody>
</table>

Selecting one of the ISBN Book Numbers automatically applies the appropriate ISBN checksum, so you do not need to set this.
OCR-B Variant (continued)

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

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

OCR-B Limited
(02h)

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

![Barcode Image]

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

![Barcode Image]

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

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

Travel Document 2 or 3-Line ID Cards Auto-Detect
(14h)
OCR-B Variant (continued)

OCR-B Passport
(04h)

OCR-B Visa Type A
(09h)
OCR-B Variant (continued)

OCR-B Visa Type B
(0Ah)

OCR-B ICAO Travel Documents
(0Bh)
Enable/Disable MICR E13B

SSI # F1h AAh
Parameter # 682

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

MICR E 13B uses the following characters:

0 1 2 3 4 5 6 7 8 9 \t \a \o \d

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

\t outputs as t
\a outputs as a
\o outputs as o
\d outputs as d

Note OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See OCR Subset on page 13-23 and OCR Template on page 13-25.

Note All OCR fonts are disabled by default.
Enable/Disable US Currency Serial Number

SSI # F1h ABh
Parameter # 683

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

✓ **notes** OCR is not as secure as a bar code. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See *OCR Subset on page 13-23* and *OCR Template on page 13-25*.

All OCR fonts are disabled by default.

---

Enable US Currency

---

!*Disable US Currency*
OCR Orientation

SSI # F1 AFh
Parameter # 687

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

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

Setting an incorrect orientation can cause misdecodes.
OCR Orientation (continued)

OCR Orientation 180° Clockwise
(02h)

OCR Orientation 90° Clockwise
(03h)
OCR Orientation (continued)

OCR Orientation Omnidirectional
(04h)
OCR Lines

SSI # F1 B3h
Parameter # 691

To select the number of OCR lines to decode, scan one of the following bar codes. Selecting Visas, TD1, or TD2 ID cards automatically sets the appropriate OCR Lines. Also see OCR-B Variant on page 13-8.

*OCR 1 Line
(001h)

OCR 2 Lines
(002h)
OCR Lines (continued)

OCR 3 Lines
(003h)
OCR Minimum Characters

SSI # F1 B1h
Parameter # 689

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

OCR Minimum Characters

OCR Maximum Characters

SSI # F1 B2h
Parameter # 690

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

OCR Maximum Characters
OCR Subset

SSI # F1 AEh
Parameter # 686

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

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

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

For MICR E13B or US Currency Serial Number, create a subset which includes all allowed characters in that character set, or scan an option from the Set Default Parameter on page 4-4 and re-program the scanner.
OCR Reduced Quiet Zone

SSI # F1h B7h
Parameter # 695

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

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

SSI # F1 23h
Parameter # 547

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

To set or modify the OCR decode template, scan the OCR Template bar code, then bar codes corresponding to numbers and letters on the following pages to form the template expression. Then scan End of Message in the Advanced Data Formatting Guide. The default is 99999999 which accepts any character OCR strings.
## OCR Template (continued)

### Required Digit (9)

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>99999</td>
<td>12987</td>
<td>30517</td>
<td>123AB</td>
</tr>
</tbody>
</table>

Only a numeric character is allowed in this position.

### Required Alpha (A)

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
</tbody>
</table>
**OCR Template (continued)**

Only an alpha character is allowed in this position.

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA</td>
<td>ABC</td>
<td>WXY</td>
<td>12F</td>
</tr>
</tbody>
</table>

**Optional Alphanumeric (1)**

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>99991</td>
<td>1234A</td>
<td>12345</td>
<td>1234&lt;</td>
</tr>
</tbody>
</table>

**Optional Alpha (2)**
OCR Template (continued)

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAAA2</td>
<td>ABCDE</td>
<td>WXY2</td>
<td>ABCD6</td>
</tr>
</tbody>
</table>

**Alpha or Digit (3)**

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>33333</td>
<td>12ABC</td>
<td>WXY34</td>
<td>12AB&lt;</td>
</tr>
</tbody>
</table>

**Any Including Space & Reject (4)**
OCR Template (continued)

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>99499</td>
<td>12$34</td>
<td>34_98</td>
</tr>
</tbody>
</table>

Any except Space & Reject (5)

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>55999</td>
<td>A.123</td>
<td>*2456</td>
<td>A. BCD</td>
</tr>
</tbody>
</table>

Optional Digit (7)
OCR Template (continued)

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>99977</td>
<td>12345</td>
<td>789</td>
<td>789AB</td>
</tr>
</tbody>
</table>

Digit or Fill (8)

```
8
```

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Valid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>88899</td>
<td>12345</td>
<td>&gt;&gt;789</td>
<td>&lt;&lt;789</td>
</tr>
</tbody>
</table>

Alpha or Fill (F)

```
F
```
OCR Template (continued)

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Valid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAAFF</td>
<td>ABCXY</td>
<td>LMN&gt;&gt;</td>
<td>ABC&lt;5</td>
</tr>
</tbody>
</table>

Optional Space ( )

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>99 99</td>
<td>12 34</td>
<td>1234</td>
<td>67891</td>
</tr>
</tbody>
</table>

Optional Small Special (.)
OCR Template (continued)

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA.99</td>
<td>MN.35</td>
<td>XY98</td>
<td>XY212</td>
</tr>
</tbody>
</table>

Other Template Operators

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

**Literal String (" and +)**

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;35+BC&quot;</td>
<td>35+BC</td>
<td>AB+22</td>
</tr>
</tbody>
</table>
**New Line (E)**

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Valid data</th>
<th>Valid data</th>
<th>Invalid data</th>
</tr>
</thead>
<tbody>
<tr>
<td>999EAAAA</td>
<td>321</td>
<td>987</td>
<td>XYZW</td>
</tr>
<tr>
<td>BCAD</td>
<td>2XYW</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**String Extract (C)**
OCR Template (continued)

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

\[ \text{CbPe} \]

Where:

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

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Incoming data</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>C&gt;A&gt;</td>
<td>XQ3&gt;ABCDE&gt;</td>
<td>&gt;ABCDE&gt;</td>
</tr>
<tr>
<td></td>
<td>-&gt;ATHRUZ&gt;123</td>
<td>&gt;ATHRUZ&gt;</td>
</tr>
<tr>
<td></td>
<td>1ABCZXYZ</td>
<td>No Output</td>
</tr>
</tbody>
</table>

*Ignore to End of Field (D)*

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Incoming data</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>999D</td>
<td>123-PED</td>
<td>123</td>
</tr>
<tr>
<td></td>
<td>357298</td>
<td>357</td>
</tr>
<tr>
<td></td>
<td>193</td>
<td>193</td>
</tr>
</tbody>
</table>

*Skip Until (P1)*

This operator allows the scanner to skip until the next instance of the character specified in the template.
This operator allows skipping over characters until a specific character type or a literal string is detected. It can be used in two ways:

\[ \text{P1ct} \]

Where:

- \( \text{P1} \) is the Skip Until operator
- \( c \) is the type of character that triggers the start of output
- \( t \) is one or more template characters

\[ \text{P1"s"t} \]

Where:

- \( \text{P1} \) is the Skip Until operator
- \( "s" \) is one or more literal string characters (see \textit{Literal String (" and ") on page 13-32}) that trigger the start of output
- \( t \) is one or more template characters

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Incoming data</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1&quot;PN&quot;AA999</td>
<td>123PN9876</td>
<td>PN9876</td>
</tr>
<tr>
<td></td>
<td>PN1234</td>
<td>PN1234</td>
</tr>
<tr>
<td></td>
<td>X-PN3592</td>
<td>PN3592</td>
</tr>
</tbody>
</table>

\textit{Skip Until Not (P0)}
This operator allows skipping over characters until a specific character type or a literal string is not matched in the output stream. It can be used in two ways:

\texttt{P0ct}

Where:

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

\texttt{P0"s"t}

Where:

- \texttt{P0} is the Skip Until Not operator
- \texttt{"s"} is one or more literal string characters (see \textit{Literal String (" and +) on page 13-32}) that trigger the start of output
- \texttt{t} is one or more template characters

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Incoming data</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0A9999</td>
<td>BPN3456</td>
<td>3456</td>
</tr>
<tr>
<td></td>
<td>PN1234</td>
<td>1234</td>
</tr>
<tr>
<td></td>
<td>5341</td>
<td>No output</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Template</th>
<th>Incoming data</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0&quot;PN&quot;9999</td>
<td>PN3456</td>
<td>3456</td>
</tr>
<tr>
<td></td>
<td>5341</td>
<td>No output</td>
</tr>
<tr>
<td></td>
<td>PNPN7654</td>
<td>7654</td>
</tr>
</tbody>
</table>

\textit{Repeat Previous (R)}
OCR Template (continued)

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

<table>
<thead>
<tr>
<th>Template</th>
<th>Incoming data</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA9R</td>
<td>AB34</td>
<td>AB34</td>
</tr>
<tr>
<td>PN12345</td>
<td>PN12345</td>
<td></td>
</tr>
<tr>
<td>32RM52700</td>
<td></td>
<td>No output</td>
</tr>
</tbody>
</table>

Scrolled Until Match (S)

<table>
<thead>
<tr>
<th>Template</th>
<th>Incoming data</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>S99999</td>
<td>AB3</td>
<td>No Output</td>
</tr>
<tr>
<td>PN12345</td>
<td>12345</td>
<td></td>
</tr>
<tr>
<td>32RM52700</td>
<td>52700</td>
<td></td>
</tr>
</tbody>
</table>

Multiple Templates

This feature sets up multiple templates for OCR decoding. To do this, follow the procedure described in OCR Template on page 13-25 (scan the OCR Template bar code, then bar codes corresponding to numbers and letters to form the template expression, then End of Message) for each template in the multiple template string, using a capital letter X as a separator between the templates.

For example, set the OCR Template as 99999XAAAAA to decode OCR strings of either 12345 or ABCDE. Up to 99 templates are permitted.

Template Examples

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

<table>
<thead>
<tr>
<th>Field Definition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;M&quot;99977</td>
<td>M followed by three digits and two optional digits.</td>
</tr>
<tr>
<td>&quot;X&quot;997777&quot;X&quot;</td>
<td>X followed by two digits, four optional digits, and an X.</td>
</tr>
<tr>
<td>9959775599</td>
<td>Two digits followed by any character, a digit, two optional digits, any two characters, and two digits.</td>
</tr>
<tr>
<td>A55&quot;-&quot;999&quot;-&quot;99</td>
<td>A letter followed by two characters, a dash, three digits, a dash, and two digits.</td>
</tr>
<tr>
<td>33A&quot;.&quot;99</td>
<td>Two alphanumeric characters followed by a letter, a period, and two digits.</td>
</tr>
<tr>
<td>999992991</td>
<td>Five digits followed by an optional alpha, two digits, and an optional alphanumeric.</td>
</tr>
<tr>
<td>&quot;PN98&quot;</td>
<td>Literal field - PN98</td>
</tr>
</tbody>
</table>

OCR Check Digit Modulus

SSI # F1h B0h
Parameter # 688

Note: This feature is currently only partially supported, and will be fully supported in future versions.

This option sets OCR module check digit calculation. The check digit is the last digit (in the right most position) in an OCR string and improves the accuracy of the collected data. The check digit is the end product of a
calculation made on the incoming data. For check digit calculation, for example Modulus 10, alpha and numeric characters are assigned numeric weights (see OCR Check Digit Multiplier on page 13-39). The calculation is applied to the character weights and the resulting check digit is added to the end of the data. If the incoming data does not match the check digit, the data is considered corrupt.

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

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

SSI # F1h BCh
Parameter # 700

This option sets OCR check digit multipliers for the character positions. For check digit validation, each character in scanned data has an equivalent weight used in the check digit calculation. PL3307 OCR ships with the following weight equivalents:

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

All other characters are equivalent to one (1).

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

- 121212121212 (default)
- 123456789A (for ISBN, Product Add Right to Left. See OCR Check Digit Validation on page 13-40)

For example:

<table>
<thead>
<tr>
<th>ISBN</th>
<th>0</th>
<th>2</th>
<th>0</th>
<th>1</th>
<th>1</th>
<th>8</th>
<th>3</th>
<th>9</th>
<th>9</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplier</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Product</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>7</td>
<td>6</td>
<td>40</td>
<td>12</td>
<td>27</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>Product add</td>
<td>0+</td>
<td>18+</td>
<td>0+</td>
<td>7+</td>
<td>6+</td>
<td>40+</td>
<td>12+</td>
<td>27+</td>
<td>18+</td>
<td>4= 132</td>
</tr>
</tbody>
</table>

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

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

SSI # F1h B6h
Parameter # 694

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

**None**

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

---

**Product Add Left to Right**

Each character in the scanned data is assigned a numeric value (see *OCR Check Digit Multiplier on page 13-39*). Each digit representing a character in the scanned data is multiplied by its corresponding digit in the multiplier, and the sum of these products is computed. The check digit passes if this sum modulo Check Digit Modulus is zero.

Example:

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

Check digit multiplier string is 123456

<table>
<thead>
<tr>
<th>Digit</th>
<th>1</th>
<th>3</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplier</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Product</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>16</td>
<td>25</td>
<td>36</td>
</tr>
</tbody>
</table>

Product add: $1 + 6 + 6 + 16 + 25 + 36 = 90$

The Check Digit Modulus is 10. It passes because 90 is divisible by 10 (the remainder is zero).
OCR Check Digit Validation (continued)

Product Add Right to Left

Each character in the scanned data is assigned a numeric value (see OCR Check Digit Multiplier on page 13-39). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of these products is computed. The check digit passes if this sum modulo Check Digit Modulus is zero.

Example:

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

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

The Check Digit Modulus is 10. It passes because 60 is divisible by 10 (the remainder is 0).

Digit Add Left to Right

Each character in the scanned data is assigned a numeric value (see OCR Check Digit Multiplier on page 13-39). Each value representing a character in the scanned data is multiplied by its corresponding digit in the multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products is then calculated. The check digit passes if this sum modulo Check Digit Modulus is zero.

Example:

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

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

The Check Digit Modulus is 12. It passes because 36 is divisible by 12 (the remainder is 0).
OCR Check Digit Validation (continued)

Digit Add Right to Left

Each character in the scanned data is assigned a numeric value (see OCR Check Digit Multiplier on page 13-39). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products is then calculated. The check digit passes if this sum modulo Check Digit Modulus is zero.

Example:

Scanned data numeric value is 132456 (check digit is 6)
Check digit multiplier string is 123456

<table>
<thead>
<tr>
<th>Digit</th>
<th>1</th>
<th>3</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplier</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Product</td>
<td>6</td>
<td>15</td>
<td>8</td>
<td>12</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Digit add</td>
<td>6+ 1+5+ 8+1+2+1+0+6=</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Check Digit Modulus is 10. It passes because 30 is divisible by 10 (the remainder is 0).

Product Add Right to Left Simple Remainder

Each character in the scanned data is assigned a numeric value (see OCR Check Digit Multiplier on page 13-39). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of these products except for the check digit's product is computed. The check digit passes if this sum modulo Check Digit Modulus is equal to the check digit's product.

Example:

Scanned data numeric value is 122456 (check digit is 6)
Check digit multiplier string is 123456

<table>
<thead>
<tr>
<th>Digit</th>
<th>1</th>
<th>2</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplier</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Product</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>12</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Product add</td>
<td>6+ 10+8+12+10=</td>
<td>46 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Check Digit Modulus is 10. It passes because 46 divided by 10 leaves a remainder of 6.
OCR Check Digit Validation (continued)

**Digit Add Right To Left Simple Remainder**

Each character in the scanned data is assigned a numeric value (see *OCR Check Digit Multiplier on page 13-39*). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products *except for the check digit's product* is then calculated. The check digit passes if this sum modulo Check Digit Modulus is equal to the check digit's product.

**Example:**

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

Check digit multiplier string is 123456

<table>
<thead>
<tr>
<th>Digit</th>
<th>1</th>
<th>2</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiplier</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Product</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>12</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Digit add</td>
<td>6+</td>
<td>1+0+</td>
<td>8+</td>
<td>1+2+</td>
<td>1+0=</td>
<td>19</td>
</tr>
</tbody>
</table>

The Check Digit Modulus is 10. It passes because 19 divided by 10 leaves a remainder of 9.

**Digit Add Right to Left Simple Remainder**

(06h)

**Health Industry - HIBCC43**

This is the health industry module 43 check digit standard.
Inverse OCR

SSI # F2h 58h
Parameter # 856

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

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

*Regular Only
(00h)

Inverse Only
(01h)
Inverse OCR (continued)

Autodiscriminate
(02h)
OCR Redundancy

SSI # F8h 06h EAh
Parameter # 1770

This option adjusts the number of times to decode an OCR text string before transmission. There are three levels of OCR decode redundancy. There is an inverse relationship between the redundancy level and OCR decoding aggressiveness. Increasing the level of the redundancy can reduce OCR scanning aggressiveness, so select only the level of redundancy necessary.

- **OCR Redundancy Level 1**: This default setting allows the scanner to operate in its most aggressive state while providing sufficient accuracy in decoding most in-spec OCR text strings.

- **OCR Redundancy Level 2**: This setting eliminates most misdecodes while maintaining reasonable aggressiveness.

- **OCR Redundancy Level 3**: Select this option with greater redundancy requirements if OCR Redundancy Level 2 fails to eliminate misdecodes.

*OCR Redundancy Level 1 (01h)*

OCR Redundancy Level 2

*OCR Redundancy Level 2 (02h)*
OCR Redundancy (continued)

OCR Redundancy Level 3
(03h)
Introduction

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

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

Through 123Scan a user can:

- Configure a scanner using a wizard
  - Program the following scanner settings:
    - Beeper tone / volume settings
    - Enable / disable symbologies
    - Communication settings
    - Preferred Symbol
  - Modify data before transmission to a host using:
    - Advanced Data Formatting (ADF) - Scan one bar code per trigger pull
    - Multicode Data Formatting (MDF) - Scan many bar codes in one trigger pull
- Load parameter settings to a scanner via:
  - Bar code scanning:
    - Scan a paper bar code
    - Scan a bar code from a PC screen
    - Scan a bar code from a smart phone screen
  - Download over a USB cable:
    - Load settings to one scanner
    - Stage up to 10 scanners simultaneously
• Validate scanner setup:
  • View scanned data within the utility's Data View screen
  • Capture an image and save to a PC within the utility's Data View screen
  • Review settings using the Parameter Report
  • Clone settings from an already deployed scanner

• Upgrade scanner firmware:
  • Load settings to one scanner
  • Stage up to 10 scanners simultaneously with a power USB hub

• View statistics such as:
  • Asset tracking information
  • Time and usage information
  • Bar codes scanned by symbology
  • Battery diagnostics
  • Communication diagnostics

• Generate the following reports:
  • Barcode Report - Programming bar code, included parameter settings, and supported scanner models
  • Parameter Report - Lists parameters programmed within a configuration file
  • Activity Report - Lists activities performed on a scanner(s)
  • Inventory Report - Lists scanner asset tracking information
  • Validation Report - Printout of scanned data
  • Statistics Report - Lists all statistics retrieved from the scanner

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

---

**Communication with 123Scan**

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

---

**123Scan Requirements**

• Host computer running Windows
• Scanner
• USB cable
**123Scan Information**

For more information on 123Scan, go to: [http://www.zebra.com/123Scan](http://www.zebra.com/123Scan)

For a 1 minute tour of 123Scan, go to: [http://www.zebra.com/ScannerHowToVideos](http://www.zebra.com/ScannerHowToVideos)

To download any of the following free tools, go to: [http://www.zebra.com/scannersoftware](http://www.zebra.com/scannersoftware)

- 123Scan configuration utility (described in this chapter)
- How-to-videos

---

**Scanner SDK, Other Software Tools, and Videos**

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

To download any of the following free tools, go to: [http://www.zebra.com/scannersoftware](http://www.zebra.com/scannersoftware).

- 123Scan configuration utility
- SDKs
  - Scanner SDK for Windows
  - Scanner SDK for Android
  - Scanner SDK for iOS
  - Scanner SDK for Linux
- Drivers
  - OPOS driver
  - JPOS driver
  - TWAIN driver
  - USB CDC driver
  - Virtual COM port driver
- Scanner Management Service (SMS) for Remote Management
  - Windows
  - Linux
  - IBM 4690
- Mobile Apps
  - Scanner Control App
    - Android
    - iOS
    - Windows
    - Zebra AppGallery
  - Scan-To-Connect Utility
    - Android
    - iOS
• Windows
• Zebra AppGallery
• How-To-Videos
• User documentation
CHAPTER 15 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 scanner with ADF rules.

For information and programming bar codes for ADF, refer to the Advanced Data Formatting Programmer Guide, p/n 72E-69680-xx. All guides are located on the web at: http://www.zebra.com/support.
### Table A-1  Standard Default Parameters Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User Preferences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set Default Parameter</td>
<td>N/A</td>
<td>N/A</td>
<td>Set Defaults</td>
<td>4-4</td>
</tr>
<tr>
<td>Parameter Bar Code Scanning</td>
<td>ECh</td>
<td>236</td>
<td>Enable</td>
<td>4-6</td>
</tr>
<tr>
<td>Beep After Good Decode</td>
<td>38h</td>
<td>56</td>
<td>Enable</td>
<td>4-7</td>
</tr>
<tr>
<td>Beeper Tone</td>
<td>91h</td>
<td>145</td>
<td>High</td>
<td>4-9</td>
</tr>
<tr>
<td>Beeper Volume</td>
<td>8Ch</td>
<td>140</td>
<td>High</td>
<td>4-12</td>
</tr>
<tr>
<td>Beeper Duration</td>
<td>F1h 74h</td>
<td>628</td>
<td>Medium</td>
<td>4-13</td>
</tr>
<tr>
<td>Volume/Tone Button Control</td>
<td>F8h 05h 07h</td>
<td>1287</td>
<td>Enable</td>
<td>4-15</td>
</tr>
<tr>
<td>Suppress Power-up Beeps</td>
<td>F1h D1h</td>
<td>721</td>
<td>Do not suppress</td>
<td>4-17</td>
</tr>
<tr>
<td>Timeout Between Decodes, Same Symbol</td>
<td>89h</td>
<td>137</td>
<td>0.5 Sec</td>
<td>4-18</td>
</tr>
<tr>
<td>Timeout Between Decodes, Different Symbols</td>
<td>90h</td>
<td>144</td>
<td>1 Sec</td>
<td>4-18</td>
</tr>
<tr>
<td>Fuzzy 1D Processing</td>
<td>F1h 02h</td>
<td>514</td>
<td>Enable</td>
<td>4-19</td>
</tr>
<tr>
<td>Decode Mirror Images (Data Matrix Only)</td>
<td>F1h 19h</td>
<td>537</td>
<td>Auto</td>
<td>4-21</td>
</tr>
<tr>
<td>PDF Prioritization</td>
<td>F1h CFh</td>
<td>719</td>
<td>Disable</td>
<td>4-22</td>
</tr>
<tr>
<td>PDF Prioritization Timeout</td>
<td>F1h D0h</td>
<td>720</td>
<td>200 ms</td>
<td>4-22</td>
</tr>
<tr>
<td>Mobile Phone/Display Mode</td>
<td>F1h CCh</td>
<td>716</td>
<td>Enable</td>
<td>4-24</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.  
2 Parameter number decimal values are used for programming via RSM commands.
### Table A-1  Standard Default Parameters Table (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field of View</td>
<td>F1h 61h</td>
<td>609</td>
<td>Full Field of View</td>
<td>4-26</td>
</tr>
<tr>
<td>Product ID (PID) Type</td>
<td>F8h 05h 01h</td>
<td>1281</td>
<td>Host Type Unique</td>
<td>4-27</td>
</tr>
</tbody>
</table>

**Miscellaneous Options**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmit Code ID Character</td>
<td>2Dh</td>
<td>45</td>
<td>None</td>
<td>4-30</td>
</tr>
<tr>
<td>Prefix Value</td>
<td>F0h 43h</td>
<td>323</td>
<td>0 (30 seconds)</td>
<td>5-5</td>
</tr>
<tr>
<td>Suffix 1 Value</td>
<td>2Dh</td>
<td>45</td>
<td>None</td>
<td>4-31</td>
</tr>
<tr>
<td>Suffix 2 Value</td>
<td>62h, 68h</td>
<td>98, 104</td>
<td>7013 &lt;CR&gt;&lt;LF&gt;</td>
<td>4-32</td>
</tr>
<tr>
<td>Scan Data Transmission Format</td>
<td>EBh</td>
<td>235</td>
<td>Data as is</td>
<td>4-34</td>
</tr>
<tr>
<td>FN1 Substitution Values</td>
<td>F0h 31h</td>
<td>1281</td>
<td>Full</td>
<td>4-35</td>
</tr>
<tr>
<td>Unsolicited Heartbeat Interval</td>
<td>F8h 04h 5Eh</td>
<td>1118</td>
<td>Disable</td>
<td>4-40</td>
</tr>
</tbody>
</table>

**Imager Preferences**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational Modes</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>5-4</td>
</tr>
<tr>
<td>Snapshot Mode Timeout</td>
<td>F0h 43h</td>
<td>323</td>
<td>0 (30 seconds)</td>
<td>5-5</td>
</tr>
<tr>
<td>Image Size (Number of Pixels)</td>
<td>60</td>
<td>250</td>
<td>128</td>
<td>5-5</td>
</tr>
<tr>
<td>Image Brightness (Target White)</td>
<td>60</td>
<td>250</td>
<td>128</td>
<td>5-5</td>
</tr>
<tr>
<td>JPEG Image Options</td>
<td>F0h 2Bh</td>
<td>299</td>
<td>Quality</td>
<td>5-9</td>
</tr>
<tr>
<td>JPEG Target File Size</td>
<td>F1h 31h</td>
<td>561</td>
<td>160 kB</td>
<td>5-10</td>
</tr>
<tr>
<td>JPEG Quality and Size Value</td>
<td>60</td>
<td>250</td>
<td>128</td>
<td>5-5</td>
</tr>
<tr>
<td>Image Enhancement</td>
<td>F1h 34h</td>
<td>564</td>
<td>Low (1)</td>
<td>5-12</td>
</tr>
<tr>
<td>Image File Format Selection</td>
<td>F0h 30h</td>
<td>304</td>
<td>JPEG</td>
<td>5-14</td>
</tr>
<tr>
<td>Image Rotation</td>
<td>F1h 39h</td>
<td>314</td>
<td>8 BPP</td>
<td>5-20</td>
</tr>
<tr>
<td>Bits per Pixel (BPP)</td>
<td>60</td>
<td>250</td>
<td>128</td>
<td>5-5</td>
</tr>
<tr>
<td>Signature Capture</td>
<td>5Dh</td>
<td>93</td>
<td>Disable</td>
<td>5-20</td>
</tr>
<tr>
<td>Signature Capture Image File Format</td>
<td>F0h 39h</td>
<td>313</td>
<td>JPEG</td>
<td>5-21</td>
</tr>
<tr>
<td>Signature Capture Bits per Pixel (BPP)</td>
<td>F0h 3Ah</td>
<td>314</td>
<td>8 BPP</td>
<td>5-24</td>
</tr>
<tr>
<td>Signature Capture Width</td>
<td>60</td>
<td>250</td>
<td>128</td>
<td>5-5</td>
</tr>
<tr>
<td>Signature Capture Height</td>
<td>F4h 44h</td>
<td>324</td>
<td>Disable</td>
<td>5-28</td>
</tr>
<tr>
<td>Signature Capture Jpeg Quality</td>
<td>F4h 45h</td>
<td>325</td>
<td>Disable</td>
<td>5-28</td>
</tr>
</tbody>
</table>

1. SSI number hex values are used for programming via SSI commands.
2. Parameter number decimal values are used for programming via RSM commands.
Table A-1  *Standard Default Parameters Table (Continued)*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video View Finder Image Size</td>
<td>F0h 49h</td>
<td>329</td>
<td>1700 bytes</td>
<td>5-29</td>
</tr>
</tbody>
</table>

**USB Host Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB Device Type</td>
<td>n/a</td>
<td>n/a</td>
<td>USB HID (Human Interface Device) Keyboard</td>
<td>6-5</td>
</tr>
<tr>
<td>Symbol Native API (SNAPI) Status Handshaking</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>6-9</td>
</tr>
<tr>
<td>USB Keystroke Delay</td>
<td>n/a</td>
<td>n/a</td>
<td>No Delay</td>
<td>6-10</td>
</tr>
<tr>
<td>USB CAPS Lock Override</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>6-12</td>
</tr>
<tr>
<td>USB Ignore Unknown Characters</td>
<td>n/a</td>
<td>n/a</td>
<td>Send Bar Codes</td>
<td>6-13</td>
</tr>
<tr>
<td>USB Convert Unknown to Code 39</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>6-14</td>
</tr>
<tr>
<td>Emulate Keypad</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>6-15</td>
</tr>
<tr>
<td>Keypad Emulation with Leading Zero</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>6-16</td>
</tr>
<tr>
<td>USB Keyboard FN1 Substitution</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>6-17</td>
</tr>
<tr>
<td>Function Key Mapping</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>6-18</td>
</tr>
<tr>
<td>Simulated Caps Lock</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>6-19</td>
</tr>
<tr>
<td>Convert Case</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>6-20</td>
</tr>
<tr>
<td>USB Static CDC</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>6-22</td>
</tr>
<tr>
<td>Direct I/O Beep</td>
<td>n/a</td>
<td>n/a</td>
<td>Honor</td>
<td>6-23</td>
</tr>
</tbody>
</table>

**USB Transmission Speed Parameters**

<table>
<thead>
<tr>
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<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB HID Polling Interval</td>
<td>n/a</td>
<td>n/a</td>
<td>3 msec</td>
<td>6-25</td>
</tr>
<tr>
<td>Fast HID Keyboard</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>6-29</td>
</tr>
<tr>
<td>Quick Keypad Emulation</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>6-30</td>
</tr>
<tr>
<td>IBM Specification Version</td>
<td>n/a</td>
<td>n/a</td>
<td>2.2</td>
<td>6-31</td>
</tr>
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**Optional USB Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beep Directive</td>
<td>n/a</td>
<td>n/a</td>
<td>Ignore</td>
<td>6-32</td>
</tr>
<tr>
<td>Bar Code Configuration Directive</td>
<td>n/a</td>
<td>n/a</td>
<td>Ignore</td>
<td>6-33</td>
</tr>
</tbody>
</table>

**RS-232 Host Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-232 Host Types</td>
<td>n/a</td>
<td>n/a</td>
<td>Standard</td>
<td>7-7</td>
</tr>
<tr>
<td>Baud Rate</td>
<td>n/a</td>
<td>n/a</td>
<td>9600</td>
<td>7-11</td>
</tr>
<tr>
<td>Parity</td>
<td>n/a</td>
<td>n/a</td>
<td>None</td>
<td>7-15</td>
</tr>
</tbody>
</table>

1  SSI number hex values are used for programming via SSI commands.
2  Parameter number decimal values are used for programming via RSM commands.
### Table A-1  Standard Default Parameters Table (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check Receive Errors</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>7-16</td>
</tr>
<tr>
<td>Hardware Handshaking</td>
<td>n/a</td>
<td>n/a</td>
<td>None</td>
<td>7-18</td>
</tr>
<tr>
<td>Software Handshaking</td>
<td>n/a</td>
<td>n/a</td>
<td>None</td>
<td>7-21</td>
</tr>
<tr>
<td>Host Serial Response Time-out</td>
<td>n/a</td>
<td>n/a</td>
<td>2 Sec</td>
<td>7-24</td>
</tr>
<tr>
<td>RTS Line State</td>
<td>n/a</td>
<td>n/a</td>
<td>Low RTS</td>
<td>7-27</td>
</tr>
<tr>
<td>Stop Bit Select</td>
<td>n/a</td>
<td>n/a</td>
<td>1 Stop Bit</td>
<td>7-28</td>
</tr>
<tr>
<td>Data Bits</td>
<td>n/a</td>
<td>n/a</td>
<td>8-Bit</td>
<td>7-29</td>
</tr>
<tr>
<td>Beep on &lt;BEL&gt;</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>7-30</td>
</tr>
<tr>
<td>Intercharacter Delay</td>
<td>n/a</td>
<td>n/a</td>
<td>0 msec</td>
<td>7-31</td>
</tr>
<tr>
<td>Nixdorf Beep/LED Option</td>
<td>n/a</td>
<td>n/a</td>
<td>Normal Operation</td>
<td>7-34</td>
</tr>
<tr>
<td>Ignore Unknown Characters</td>
<td>n/a</td>
<td>n/a</td>
<td>Send Bar Codes</td>
<td>7-36</td>
</tr>
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</table>

**IBM 468X/469X Host Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
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<th>Default</th>
<th>Page Number</th>
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</thead>
<tbody>
<tr>
<td>Port Address</td>
<td>n/a</td>
<td>n/a</td>
<td>None Selected&lt;sup&gt;1&lt;/sup&gt;</td>
<td>8-5</td>
</tr>
<tr>
<td>Convert Unknown to Code 39</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>8-7</td>
</tr>
<tr>
<td>Beep Directive</td>
<td>n/a</td>
<td>n/a</td>
<td>Honor</td>
<td>8-8</td>
</tr>
<tr>
<td>Bar Code Configuration Directive</td>
<td>n/a</td>
<td>n/a</td>
<td>Honor</td>
<td>8-9</td>
</tr>
<tr>
<td>IBM-485 Specification Version</td>
<td>F8h 06h C1h</td>
<td>1729</td>
<td>Original Specification</td>
<td>8-10</td>
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**Keyboard Wedge Host Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number</th>
<th>Parameter Number</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard Wedge Host Type</td>
<td>n/a</td>
<td>n/a</td>
<td>IBM AT Notebook</td>
<td>9-5</td>
</tr>
<tr>
<td>Ignore Unknown Characters</td>
<td>n/a</td>
<td>n/a</td>
<td>Send Bar Codes</td>
<td>9-6</td>
</tr>
<tr>
<td>Keystroke Delay</td>
<td>n/a</td>
<td>n/a</td>
<td>No Delay</td>
<td>9-7</td>
</tr>
<tr>
<td>Intra-Keystroke Delay</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>9-9</td>
</tr>
<tr>
<td>Alternate Numeric Keypad Emulation</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>9-10</td>
</tr>
<tr>
<td>Quick Keypad Emulation</td>
<td>n/a</td>
<td>n/a</td>
<td>Enable</td>
<td>9-11</td>
</tr>
<tr>
<td>Caps Lock On</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>9-12</td>
</tr>
<tr>
<td>Caps Lock Override</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>9-13</td>
</tr>
<tr>
<td>Convert Wedge Data</td>
<td>n/a</td>
<td>n/a</td>
<td>No Convert</td>
<td>9-15</td>
</tr>
<tr>
<td>Function Key Mapping</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>9-16</td>
</tr>
<tr>
<td>FN1 Substitution</td>
<td>n/a</td>
<td>n/a</td>
<td>Disable</td>
<td>9-17</td>
</tr>
</tbody>
</table>

<sup>1</sup> SSI number hex values are used for programming via SSI commands.

<sup>2</sup> Parameter number decimal values are used for programming via RSM commands.
Table A-1  Standard Default Parameters Table (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send Make Break</td>
<td>n/a</td>
<td>n/a</td>
<td>Send</td>
<td>9-18</td>
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</table>

**SSI Host Parameters**

<table>
<thead>
<tr>
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<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select SSI Host</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>10-10</td>
</tr>
<tr>
<td>Baud Rate</td>
<td>9Ch</td>
<td>156</td>
<td>9600</td>
<td>10-11</td>
</tr>
<tr>
<td>Parity</td>
<td>9Eh</td>
<td>158</td>
<td>None</td>
<td>10-16</td>
</tr>
<tr>
<td>Check Parity</td>
<td>97h</td>
<td>151</td>
<td>Do Not Check Parity</td>
<td>10-17</td>
</tr>
<tr>
<td>Stop Bits</td>
<td>9Dh</td>
<td>157</td>
<td>1</td>
<td>10-18</td>
</tr>
<tr>
<td>Software Handshaking</td>
<td>9Fh</td>
<td>159</td>
<td>Enable ACK/NAK</td>
<td>10-19</td>
</tr>
<tr>
<td>Host RTS Line State</td>
<td>9Ah</td>
<td>154</td>
<td>Low</td>
<td>10-20</td>
</tr>
<tr>
<td>Decode Data Packet Format</td>
<td>EEh</td>
<td>238</td>
<td>Send Raw Decode Data</td>
<td>10-21</td>
</tr>
<tr>
<td>Host Serial Response Time-out</td>
<td>9Bh</td>
<td>155</td>
<td>2 sec</td>
<td>10-22</td>
</tr>
<tr>
<td>Host Character Time-out</td>
<td>EFh</td>
<td>239</td>
<td>200 msec</td>
<td>10-24</td>
</tr>
<tr>
<td>Multipacket Option</td>
<td>F0h 4Eh</td>
<td>334</td>
<td>Option 1</td>
<td>10-26</td>
</tr>
<tr>
<td>Interpacket Delay</td>
<td>F0h 4Fh</td>
<td>335</td>
<td>0 ms</td>
<td>10-28</td>
</tr>
</tbody>
</table>

**SSI Event Reporting**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decode Event</td>
<td>F0h 00h</td>
<td>256</td>
<td>Disable</td>
<td>10-31</td>
</tr>
<tr>
<td>Boot Up Event</td>
<td>F0h 02h</td>
<td>258</td>
<td>Disable</td>
<td>10-32</td>
</tr>
<tr>
<td>Parameter Event</td>
<td>F0h 03h</td>
<td>259</td>
<td>Disable</td>
<td>10-33</td>
</tr>
</tbody>
</table>

**Auxiliary RSM Communication**

<table>
<thead>
<tr>
<th>Auxiliary RSM Communication</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F8 05 4E</td>
<td>1358</td>
<td>Enable</td>
<td>11-3</td>
</tr>
</tbody>
</table>

**Symbology Parameters**

**Enable/Disable All Code Types**

**UPC/EAN**

<table>
<thead>
<tr>
<th>Code Type</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPC-A</td>
<td>01h</td>
<td>1</td>
<td>Enable</td>
<td>12-9</td>
</tr>
<tr>
<td>UPC-E</td>
<td>02h</td>
<td>2</td>
<td>Enable</td>
<td>12-10</td>
</tr>
<tr>
<td>UPC-E1</td>
<td>0Ch</td>
<td>12</td>
<td>Disable</td>
<td>12-11</td>
</tr>
<tr>
<td>EAN-8/JAN 8</td>
<td>04h</td>
<td>4</td>
<td>Enable</td>
<td>12-12</td>
</tr>
<tr>
<td>EAN-13/JAN 13</td>
<td>03h</td>
<td>3</td>
<td>Enable</td>
<td>12-13</td>
</tr>
<tr>
<td>Bookland EAN</td>
<td>53h</td>
<td>83</td>
<td>Disable</td>
<td>12-14</td>
</tr>
</tbody>
</table>

\(^1\) SSI number hex values are used for programming via SSI commands.

\(^2\) Parameter number decimal values are used for programming via RSM commands.
Table A-1  Standard Default Parameters Table (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decode UPC/EAN/JAN Supplementals (2 and 5 digits)</td>
<td>10h</td>
<td>16</td>
<td>Ignore</td>
<td>12-17</td>
</tr>
<tr>
<td>User-Programmable Supplementals</td>
<td></td>
<td></td>
<td>n/a</td>
<td>12-24</td>
</tr>
<tr>
<td>Supplemental 1:</td>
<td>F1h 43h</td>
<td>579</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplemental 2:</td>
<td>F1h 44h</td>
<td>580</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPC/EAN/JAN Supplemental Redundancy</td>
<td>50h</td>
<td>80</td>
<td>10</td>
<td>12-25</td>
</tr>
<tr>
<td>Decode UPC/EAN/JAN Supplemental AIM ID Format</td>
<td>F1h A0h</td>
<td>672</td>
<td>Combined</td>
<td>12-26</td>
</tr>
<tr>
<td>UPC Reduced Quiet Zone</td>
<td>F8h 05h 09h</td>
<td>1289</td>
<td>Disable</td>
<td>12-28</td>
</tr>
<tr>
<td>Transmit UPC-A Check Digit</td>
<td>28h</td>
<td>40</td>
<td>Enable</td>
<td>12-29</td>
</tr>
<tr>
<td>Transmit UPC-E Check Digit</td>
<td>29h</td>
<td>41</td>
<td>Enable</td>
<td>12-30</td>
</tr>
<tr>
<td>Transmit UPC-E1 Check Digit</td>
<td>2Ah</td>
<td>42</td>
<td>Enable</td>
<td>12-31</td>
</tr>
<tr>
<td>UPC-A Preamble</td>
<td>22h</td>
<td>34</td>
<td>System Character</td>
<td>12-32</td>
</tr>
<tr>
<td>UPC-E Preamble</td>
<td>23h</td>
<td>35</td>
<td>System Character</td>
<td>12-34</td>
</tr>
<tr>
<td>UPC-E1 Preamble</td>
<td>24h</td>
<td>36</td>
<td>System Character</td>
<td>12-36</td>
</tr>
<tr>
<td>Convert UPC-E to A</td>
<td>25h</td>
<td>37</td>
<td>Disable</td>
<td>12-38</td>
</tr>
<tr>
<td>Convert UPC-E1 to A</td>
<td>26h</td>
<td>38</td>
<td>Disable</td>
<td>12-39</td>
</tr>
<tr>
<td>EAN-8/JAN-8 Zero Extend</td>
<td>27h</td>
<td>39</td>
<td>Disable</td>
<td>12-40</td>
</tr>
<tr>
<td>UCC Coupon Extended Code</td>
<td>55h</td>
<td>85</td>
<td>Disable</td>
<td>12-41</td>
</tr>
<tr>
<td>Coupon Report</td>
<td>F1h DAh</td>
<td>730</td>
<td>New Coupon Symbols</td>
<td>12-43</td>
</tr>
<tr>
<td>ISSN EAN</td>
<td>F1h 69h</td>
<td>617</td>
<td>Disable</td>
<td>12-44</td>
</tr>
</tbody>
</table>

### Code 128

| Code 128                                      | 08h          | 8                  | Enable      | 12-45       |
| Set Length(s) for Code 128                    | D1h, D2h     | 209, 210           | 1 - 55      | 12-48       |
| GS1-128 (formerly UCC/EAN-128)                | 0Eh          | 14                 | Enable      | 12-49       |
| ISBT 128                                      | 54h          | 84                 | Disable     | 12-50       |
| ISBT Concatenation                            | F1h 41h      | 577                | Disable     | 12-51       |
| Check ISBT Table                              | F1h 42h      | 578                | Enable      | 12-53       |
| ISBT Concatenation Redundancy                 | DFh          | 223                | 10          | 12-54       |

1. SSI number hex values are used for programming via SSI commands.
2. Parameter number decimal values are used for programming via RSM commands.
Table A-1  Standard Default Parameters Table (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SSI Number 1</th>
<th>Parameter Number 2</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code 128 Reduced Quiet Zone</td>
<td>F8h 04h B8h</td>
<td>1208</td>
<td>Disable</td>
<td>12-55</td>
</tr>
<tr>
<td><strong>Code 128 Security Level</strong></td>
<td>F1h EFh</td>
<td>751</td>
<td>Security Level 1</td>
<td>12-56</td>
</tr>
<tr>
<td>Ignore Code 128 &lt;FNC4&gt;</td>
<td>F8h 04h E6h</td>
<td>1254</td>
<td>Disable</td>
<td>12-58</td>
</tr>
<tr>
<td><strong>Code 39</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code 39</td>
<td>00h</td>
<td>0</td>
<td>Enable</td>
<td>12-59</td>
</tr>
<tr>
<td>Trioptic Code 39</td>
<td>0Dh</td>
<td>13</td>
<td>Disable</td>
<td>12-60</td>
</tr>
<tr>
<td>Convert Code 39 to Code 32 (Italian Pharmacy Code)</td>
<td>56h</td>
<td>86</td>
<td>Disable</td>
<td>12-61</td>
</tr>
<tr>
<td>Code 32 Prefix</td>
<td>E7h</td>
<td>231</td>
<td>Disable</td>
<td>12-62</td>
</tr>
<tr>
<td>Set Length(s) for Code 39</td>
<td>12h, 13h</td>
<td>18, 19</td>
<td>Length Within Range: 2 - 55</td>
<td>12-65</td>
</tr>
<tr>
<td>Code 39 Check Digit Verification</td>
<td>30h</td>
<td>48</td>
<td>Disable</td>
<td>12-66</td>
</tr>
<tr>
<td>Transmit Code 39 Check Digit</td>
<td>2Bh</td>
<td>43</td>
<td>Disable</td>
<td>12-67</td>
</tr>
<tr>
<td>Code 39 Full ASCII Conversion</td>
<td>11h</td>
<td>17</td>
<td>Disable</td>
<td>12-68</td>
</tr>
<tr>
<td>Code 39 Security Level</td>
<td>F1h EEh</td>
<td>750</td>
<td>Security Level 1</td>
<td>12-69</td>
</tr>
<tr>
<td>Code 39 Reduced Quiet Zone</td>
<td>F8h 04h B9h</td>
<td>1209</td>
<td>Disable</td>
<td>12-71</td>
</tr>
<tr>
<td><strong>Code 93</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code 93</td>
<td>09h</td>
<td>9</td>
<td>Disable</td>
<td>12-72</td>
</tr>
<tr>
<td>Set Length(s) for Code 93</td>
<td>1Ah, 1Bh</td>
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<sup>1</sup> SSI number hex values are used for programming via SSI commands.
<sup>2</sup> Parameter number decimal values are used for programming via RSM commands.
Table A-1  **Standard Default Parameters Table (Continued)**

<table>
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<th>Parameter</th>
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1 SSI number hex values are used for programming via SSI commands.
2 Parameter number decimal values are used for programming via RSM commands.
### Standard Default Parameters Table (Continued)

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1. SSI number hex values are used for programming via SSI commands.
2. Parameter number decimal values are used for programming via RSM commands.
### Table A-1  Standard Default Parameters Table (Continued)

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<td>Composite Beep Mode</td>
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<td>Beep As Each Code Type is Decoded</td>
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#### 2D Symbologies

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#### Symbology-Specific Security Levels

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1. SSI number hex values are used for programming via SSI commands.
2. Parameter number decimal values are used for programming via RSM commands.
Table A-1  Standard Default Parameters Table (Continued)

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<td>1770</td>
<td>Level 1</td>
<td>13-46</td>
</tr>
<tr>
<td><strong>CJK Control Parameters</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unicode Output Control</td>
<td>F2 CD</td>
<td>973</td>
<td>Universal Output</td>
<td>D-2</td>
</tr>
<tr>
<td>CJK Output Method to Windows Host</td>
<td>F2 CC</td>
<td>972</td>
<td>Universal CJK Output</td>
<td>D-3</td>
</tr>
<tr>
<td>Non-CJK UTF Bar Code Output</td>
<td>F2 C0</td>
<td>960</td>
<td>n/a</td>
<td>D-8</td>
</tr>
</tbody>
</table>

1 SSI number hex values are used for programming via SSI commands.

2 Parameter number decimal values are used for programming via RSM commands.
Introduction

This chapter provides instructions for programming the keyboard to interface with a USB, or Keyboard Wedge host. The host can power the scanner. For host setup information, see Chapter 6, USB INTERFACE and Chapter 9, KEYBOARD WEDGE INTERFACE.

Throughout the programming bar code menus, default values are indicated with asterisks (*).
USB and Keyboard Wedge Country Keyboard Types (Country Codes)

Scan the bar code corresponding to the keyboard type. For a USB host, this setting applies only to the USB Keyboard (HID) device. If the keyboard type is not listed, see Emulate Keypad on page 6-15 for the USB HID host. For a Keyboard Wedge host, see Alternate Numeric Keypad Emulation on page 9-10.

**Note** When changing USB country keyboard types the scanner automatically resets. The scanner issues the standard startup beep sequences.

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

2. Use the French International bar code for Belgium French keyboards.

**Note** For best results when using international keyboards, enable Quick Keypad Emulation on page 6-30.
Country Codes (continued)

Albanian

Arabic (101)
Country Codes (continued)

Arabic (102)

Arabic (102) AZERTY
Country Codes (continued)

Azeri (Latin)

Azeri (Cyrillic)
Country Codes (continued)

Belarusian

Bosnian (Latin)
Country Codes (continued)

Bosnian (Cyrillic)

Bulgarian (Latin)
Country Codes (continued)

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

Canadian French Win7
Country Codes (continued)

Canadian French (Legacy)

Canadian Multilingual Standard
Country Codes (continued)

Chinese (Simplified)*

Chinese (Traditional)*

*For CJK keyboard types, see Appendix D, CJK DECODE CONTROL.
Country Codes (continued)

Chinese (ASCII)

Croatian
Country Codes (continued)

Czech

Czech (Programmer)
Country Codes (continued)

Czech (QWERTY)

Danish
Country Codes (continued)

Dutch (Netherlands)

Estonian
Country Codes (continued)

Faeroese

Finnish
Country Codes (continued)

French (France)

French International (Belgian French)
Country Codes (continued)

French (Canada) 95/98

French (Canada) 2000/XP
Country Codes (continued)

Galician

German
Country Codes (continued)

Greek Latin

Greek (220) Latin
Country Codes (continued)

Greek (319) Latin

Greek
Country Codes (continued)

Greek (220)

Greek (319)
Country Codes (continued)

Greek Polytonic

Hebrew Israel
Country Codes (continued)

Hungarian

Hungarian_101KEY
Country Codes (continued)

Icelandic

Irish
Country Codes (continued)

Italian

Italian (142)
Country Codes (continued)

Japanese (ASCII)

*For CJK keyboard types, see Appendix D, CJK DECODE CONTROL.*
Country Codes (continued)

Kazakh

Korean (ASCII)
Country Codes (continued)

Korean (Hangul)*

*For CJK keyboard types, see Appendix D, CJK DECODE CONTROL.

Kyrgyz
Country Codes (continued)

Latin American

Latvian
Country Codes (continued)

Latvian (QWERTY)

Lithuanian
Country Codes (continued)

Lithuanian (IBM)

Macedonian (FYROM)
Country Codes (continued)

Maltese_47KEY

Mongolian
Country Codes (continued)

Norwegian

Polish (214)
Country Codes (continued)

Polish (Programmer)

Portuguese (Brazil)
Country Codes (continued)

Portuguese (Brazilian ABNT)

Portuguese (Brazilian ABNT2)
Country Codes (continued)

Portuguese (Portugal)

Romanian
Country Codes (continued)

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Description</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Romanian (Legacy)</td>
<td></td>
<td>(Win 7, or higher)</td>
</tr>
<tr>
<td>Romanian (Standard)</td>
<td></td>
<td>(Win 7, or higher)</td>
</tr>
</tbody>
</table>
Country Codes (continued)

Romanian (Programmer)
(Win 7, or higher)

Russian
Country Codes (continued)

Russian (Typewriter)

Serbian (Latin)
Country Codes (continued)

Serbian (Cyrillic)

Slovak
Country Codes (continued)

Slovak (QWERTY)

Slovenian
Country Codes (continued)

Spanish

Spanish (Variation)
Country Codes (continued)

Swedish

Swiss French
Country Codes (continued)

- Swiss German

- Tatar
Country Codes (continued)

Thai (Kedmanee)

Turkish F
Country Codes (continued)

Turkish Q

UK English
Country Codes (continued)

Ukrainian

US Dvorak
Country Codes (continued)

US Dvorak Left

US Dvorak Right
Country Codes (continued)

US International

Uzbek
Country Codes (continued)

Vietnamese
APPENDIX C  COUNTRY CODE PAGES

Introduction

This chapter provides bar codes for selecting code pages for the country keyboard type selected in Appendix B, COUNTRY CODES. If the default code page in Table C-1 is appropriate for your selected country keyboard type, you do not need to scan a country code page bar code.

Note  ADF rules can also specify a code page based on the symbology and other ADF criteria. Refer to the Advanced Data Formatting Programmer Guide.
Country Code Page Defaults

Table C-1 lists the code page default for each country keyboard.

<table>
<thead>
<tr>
<th>Country Keyboard</th>
<th>Code Page Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>US English (North American)</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>US English (Mac)</td>
<td>Mac CP10000</td>
</tr>
<tr>
<td>Albanian</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Arabic 101</td>
<td>Windows 1256</td>
</tr>
<tr>
<td>Arabic 102</td>
<td>Windows 1256</td>
</tr>
<tr>
<td>Arabic 102 AZERTY</td>
<td>Windows 1256</td>
</tr>
<tr>
<td>Azeri Latin</td>
<td>Windows 1254</td>
</tr>
<tr>
<td>Azeri Cyrillic</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Belarusian</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Bosnian Latin</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Bosnian Cyrillic</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Bulgarian Latin</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Bulgarian Cyrillic</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Canadian French Win7</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Canadian French (Legacy)</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Canadian Multilingual</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Croatian</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Chinese ASCII</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Chinese (Simplified)</td>
<td>Windows 936, GBK</td>
</tr>
<tr>
<td>Chinese (Traditional)</td>
<td>Windows 950, Big5</td>
</tr>
<tr>
<td>Czech</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Czech Programmers</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Czech QWERTY</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Danish</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Dutch Netherland</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Estonian</td>
<td>Windows 1257</td>
</tr>
<tr>
<td>Faeroese</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Finnish</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Country Keyboard</td>
<td>Code Page Default</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>French (France)</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>French (Canada) 95/98</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>French (Canada) 2000/XP</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>French International (Belgian French)</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Galician</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>German</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Greek Latin</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Greek220 Latin</td>
<td>Windows 1253</td>
</tr>
<tr>
<td>Greek319 Latin</td>
<td>Windows 1253</td>
</tr>
<tr>
<td>Greek Polytonic</td>
<td>Windows 1253</td>
</tr>
<tr>
<td>Hebrew Israel</td>
<td>Windows 1255</td>
</tr>
<tr>
<td>Hungarian</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Hungarian_101KEY</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Icelandic</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Irish</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Italian</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Italian_142</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Japanese ASCII</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Japanese (Shift-JIS)</td>
<td>Windows 932, Shift-JIS</td>
</tr>
<tr>
<td>Kazakh</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Korean ASCII</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Korean (Hangul)</td>
<td>Windows 949, Hangul</td>
</tr>
<tr>
<td>Kyrgyz</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Latin America</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Latvian</td>
<td>Windows 1257</td>
</tr>
<tr>
<td>Latvian QWERTY</td>
<td>Windows 1257</td>
</tr>
<tr>
<td>Lithuanian</td>
<td>Windows 1257</td>
</tr>
<tr>
<td>Lithuanian IBM</td>
<td>Windows 1257</td>
</tr>
<tr>
<td>Country Keyboard</td>
<td>Code Page Default</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Macedonian-FYROM</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Maltese_47KEY</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Mongolian-Cyrillic</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Norwegian</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Polish_214</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Polish Programmer</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Portuguese Brazil</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Portuguese Brazilian ABNT</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Portuguese Brazilian ABNT2</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Portuguese Portugal</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Romanian</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Romanian Legacy</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Romanian Standard</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Romanian Programmer</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Russian</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Russian Typewriter</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Serbian Latin</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Serbian Cyrillic</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Slovak</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Slovak QWERTY</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Slovenian</td>
<td>Windows 1250</td>
</tr>
<tr>
<td>Spanish</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Spanish Variation</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Swedish</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Swiss French</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Swiss German</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Tatar</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Thai-Kedmanee</td>
<td>Windows 874</td>
</tr>
<tr>
<td>Turkish F</td>
<td>Windows 1254</td>
</tr>
<tr>
<td>Turkish Q</td>
<td>Windows 1254</td>
</tr>
<tr>
<td>Ukrainian</td>
<td>Windows 1251</td>
</tr>
</tbody>
</table>
Table C-1  *Country Code Page Defaults (Continued)*

<table>
<thead>
<tr>
<th>Country Keyboard</th>
<th>Code Page Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Kingdom</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>United States</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>US Dvorak</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>US Dvorak Left Hand</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>US Dvorak Right Hand</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>US International</td>
<td>Windows 1252</td>
</tr>
<tr>
<td>Uzbek Cyrillic</td>
<td>Windows 1251</td>
</tr>
<tr>
<td>Vietnamese</td>
<td>Windows 1258</td>
</tr>
</tbody>
</table>
Country Code Page Bar Codes

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

- Windows 1250
  - Latin 2, Central European

- Windows 1251
  - Cyrillic, Slavic
Country Code Pages (continued)

Windows 1252
Latin 1, Western European

Windows 1253
Greek
Country Code Pages (continued)

Windows 1254
Latin 5, Turkish

Windows 1255
Hebrew
Country Code Pages (continued)

Windows 1256
Arabic

Windows 1257
Baltic
Country Code Pages (continued)

Windows 1258
Vietnamese

Windows 874
Thai
Country Code Pages (continued)

Windows 20866
Cyrillic KOI8-R

Windows 932
Japanese Shift-JIS
Country Code Pages (continued)

- Windows 936
  Simplified Chinese GBK

- Windows 54936
  Simplified Chinese GB18030
Country Code Pages (continued)

Windows 949
Korean Hangul

Windows 950
Traditional Chinese Big5
Country Code Pages (continued)

- MS-DOS 437
  - Latin US

- MS-DOS 737
  - Greek
Country Code Pages (continued)

MS-DOS 775
Baltic

MS-DOS 850
Latin 1
Country Code Pages (continued)

MS-DOS 852
Latin 2

MS-DOS 855
Cyrillic
Country Code Pages (continued)

MS-DOS 857
Turkish

MS-DOS 860
Portuguese
Country Code Pages (continued)

MS-DOS 861
Icelandic

MS-DOS 862
Hebrew
Country Code Pages (continued)

MS-DOS 863
French Canada

MS-DOS 865
Nordic
Country Code Pages (continued)

MS-DOS 866
Cyrillic

MS-DOS 869
Greek 2
Country Code Pages (continued)

ISO 8859-1
Latin 1, Western European

ISO 8859-2
Latin 2, Central European
Country Code Pages (continued)

ISO 8859-3
Latin 3, South European

ISO 8859-4
Latin 4, North European
Country Code Pages (continued)

ISO 8859-5
Cyrillic

ISO 8859-6
Arabic
Country Code Pages (continued)

ISO 8859-7
Greek

ISO 8859-8
Hebrew
Country Code Pages (continued)

ISO 8859-9
Latin 5, Turkish

ISO 8859-10
Latin 6, Nordic
Country Code Pages (continued)

ISO 8859-11
Thai

ISO 8859-13
Latin 7, Baltic
Country Code Pages (continued)

ISO 8859-14
Latin 8, Celtic

ISO 8859-15
Latin 9
Country Code Pages (continued)

ISO 8859-16
Latin 10, South-Eastern European

UTF-8
Country Code Pages (continued)

UTF-16LE
UTF-16 Little Endian

UTF-16BE
UTF-16 Big Endian
Country Code Pages (continued)

Mac CP10000
Roman
APPENDIX D  CJK DECODE CONTROL

Introduction

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

Note  Because ADF does not support CJK character processing, there is no format manipulation for CJK output.
CJK Control Parameters

Unicode Output Control

SSI # F2 CD

Parameter # 973

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

- **Universal Output to Unicode and MBCS Application** - This default method applies to Unicode and MBCS expected applications, such as MS Word and Notepad on a Windows host.

  **Note** To support Unicode universal output, set up the registry table for the Windows host. See [Unicode/CJK Decode Setup with Windows Host on page D-10](#).

- **Output to Unicode Application Only** - This method applies only to Unicode expected applications, such as MS Word and WordPad, but not Notepad.

---

*Universal Output (0)

Unidecode Application Only (1)
CJK Output Method to Windows Host
SSI # F2 CC
Parameter # 972

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

- **Universal CJK Output** - This is the default universal CJK output method for US English IME or Chinese/Japanese/Korean ASCII IME on a Windows host. This method converts CJK characters to Unicode and emulates the characters when transmitting to the host. Use the *Unicode Output Control* parameter to control Unicode output.

  **Note** To support universal CJK output, set up the registry table for the Windows host. See *Unicode/CJK Decode Setup with Windows Host on page D-10*.

- **Other options for CJK output** - With the following methods, the scanner sends the CJK character hexadecimal internal code (Nei Ma) value to host, or converts the CJK character to Unicode and sends the hexadecimal Unicode value to host. When using these methods, the Windows host must select the corresponding IME to accept the CJK character. See *Unicode/CJK Decode Setup with Windows Host on page D-10*.
  - Japanese Unicode Output
  - Simplified Chinese GBK Code Output
  - Simplified Chinese Unicode Output
  - Korean Unicode Code Output
  - Traditional Chinese Big5 Code Output (Windows XP)
  - Traditional Chinese Big5 Code Output (Windows 7)
  - Traditional Chinese Unicode Code Output (Windows XP)
  - Traditional Chinese Unicode Code Output (Windows 7)

  **Note** The Unicode emulate output method depends on the host system (Windows XP or Windows 7).
CJK Output Method to Windows Host (continued)

(34)

Japanese Unicode Output

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

Chinese (Simplified) GBK Output

(1)
CJK Output Method to Windows Host (continued)

Chinese (Simplified) Unicode Output

(2)

Korean Unicode Output

(50)

(for Korean Unicode Output, select Simplified Chinese Unicode IME on the Windows host)
CJK Output Method to Windows Host (continued)

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

Chinese (Traditional) Big5 Output (Windows 7)
(19)
CJK Output Method to Windows Host (continued)

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

Chinese (Traditional) Unicode Output (Windows 7)
(20)
Non-CJK UTF Bar Code Output

SSI # F2 C0

Parameter # 960

Some country keyboard type layouts contain characters that do not exist in the default code page (see Country Keyboard Type Missing Characters on page D-9). Although the default code page can not encode these characters in a bar code, they can be encoded in the UTF-8 bar code. Scan this parameter bar code to output the Unicode values by emulation mode.

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

Country Keyboard Type Missing Characters

Country keyboard type: **Tatar, Uzbek, Mongolian, Kyrgyz, Kazakh and Azeri**
Default code page: CP1251
Missing characters:

<table>
<thead>
<tr>
<th>ғ</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>ҳ</td>
<td>Х</td>
</tr>
<tr>
<td>қ</td>
<td>К</td>
</tr>
<tr>
<td>Һ</td>
<td>h</td>
</tr>
<tr>
<td>О</td>
<td>Θ</td>
</tr>
<tr>
<td>Э</td>
<td>Э</td>
</tr>
<tr>
<td>І</td>
<td>І</td>
</tr>
<tr>
<td>Ж</td>
<td>Ж</td>
</tr>
<tr>
<td>Т</td>
<td>Т</td>
</tr>
<tr>
<td>Н</td>
<td>Н</td>
</tr>
<tr>
<td>𭜭</td>
<td>І</td>
</tr>
<tr>
<td>қ</td>
<td>К</td>
</tr>
</tbody>
</table>

Country keyboard type: **Romanian (Standard)**
Default code page: CP1250
Missing characters:

| § | $ |
| † | † |

Country keyboard type: **Portuguese-Brazilian (ABNT), Portuguese-Brazilian (ABNT2)**
Default code page: CP1252
Missing character: ғ

Country keyboard type: **Azeri-Latin**
Default code page: CP1254
Missing characters: ə, θ
Unicode/CJK Decode Setup with Windows Host

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

Setting Up the Windows Registry Table for Unicode Universal Output

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

1. Select **Start > Run > regedt32** to start the registry editor.
2. Under **HKEY_Current_User\Control Panel\Input Method**, set **EnableHexNumpad** to 1 as follows:
   
   ![Registry Key](image)

   If this key does not exist, add it as type **REG_SZ** (string value).
3. Reboot the computer to implement the registry change.

Adding CJK IME on Windows

To add the desired CJK input language:

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

To select the Simplified Chinese input method:

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

![Input Method Selection on Windows XP](image1)

Or

![Input Method Selection on Windows 7](image2)

- Select Unicode/GBK input on Windows7: Chinese (Simplified) - Microsoft Pinyin New Experience Input Style, then select Tool Menu > Secondary Inputs > Unicode Input or GB Code Input.

![Input Method Selection on Windows 7](image3)
Selecting the Traditional Chinese Input Method on the Host

To select the Traditional Chinese input method:

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

![Unicode input interface](image1.png)

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

![Big5 input interface](image2.png)

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

![New Quick input interface](image3.png)
Symbol Code Identifiers

<table>
<thead>
<tr>
<th>Code Character</th>
<th>Code Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13</td>
</tr>
<tr>
<td>B</td>
<td>Code 39, Code 32</td>
</tr>
<tr>
<td>C</td>
<td>Codabar</td>
</tr>
<tr>
<td>D</td>
<td>Code 128, ISBT 128, ISBT 128 Concatenated</td>
</tr>
<tr>
<td>E</td>
<td>Code 93</td>
</tr>
<tr>
<td>F</td>
<td>Interleaved 2 of 5</td>
</tr>
<tr>
<td>G</td>
<td>Discrete 2 of 5, or Discrete 2 of 5 IATA</td>
</tr>
<tr>
<td>H</td>
<td>Code 11</td>
</tr>
<tr>
<td>J</td>
<td>MSI</td>
</tr>
<tr>
<td>K</td>
<td>GS1-128</td>
</tr>
<tr>
<td>L</td>
<td>Bookland EAN</td>
</tr>
<tr>
<td>M</td>
<td>Trioptic Code 39</td>
</tr>
<tr>
<td>N</td>
<td>Coupon Code</td>
</tr>
<tr>
<td>R</td>
<td>GS1 DataBar Family</td>
</tr>
<tr>
<td>S</td>
<td>Matrix 2 of 5</td>
</tr>
<tr>
<td>T</td>
<td>UCC Composite, TLC 39</td>
</tr>
<tr>
<td>U</td>
<td>Chinese 2 of 5</td>
</tr>
<tr>
<td>V</td>
<td>Korean 3 of 5</td>
</tr>
<tr>
<td>Code Character</td>
<td>Code Type</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------------------------------------------</td>
</tr>
<tr>
<td>X</td>
<td>ISSN EAN, PDF417, Macro PDF417, Micro PDF417</td>
</tr>
<tr>
<td>z</td>
<td>Aztec, Aztec Rune</td>
</tr>
<tr>
<td>P00</td>
<td>Data Matrix</td>
</tr>
<tr>
<td>P01</td>
<td>QR Code, MicroQR</td>
</tr>
<tr>
<td>P02</td>
<td>Maxicode</td>
</tr>
<tr>
<td>P03</td>
<td>US Postnet</td>
</tr>
<tr>
<td>P04</td>
<td>US Planet</td>
</tr>
<tr>
<td>P05</td>
<td>Japan Post</td>
</tr>
<tr>
<td>P06</td>
<td>UK Postal</td>
</tr>
<tr>
<td>P08</td>
<td>Netherlands KIX Code</td>
</tr>
<tr>
<td>P09</td>
<td>Australia Post</td>
</tr>
<tr>
<td>P0A</td>
<td>USPS 4CB/One Code/Intelligent Mail</td>
</tr>
<tr>
<td>P0B</td>
<td>UPU FICS Postal</td>
</tr>
<tr>
<td>P0C</td>
<td>Mailmark</td>
</tr>
<tr>
<td>P0D</td>
<td>Grid Matrix, Grid Matrix Inverse, Grid Matrix Mirror</td>
</tr>
<tr>
<td>P0G</td>
<td>GS1 Data Matrix</td>
</tr>
<tr>
<td>P0H</td>
<td>Han Xin</td>
</tr>
<tr>
<td>P0Q</td>
<td>GS1 QR</td>
</tr>
<tr>
<td>P0X</td>
<td>Signature Capture</td>
</tr>
</tbody>
</table>
AIM Code Identifiers

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

- J = Flag Character (ASCII 93)
- c = Code Character (see Table E-2)
- m = Modifier Character (see Table E-3)

Table E-2  Aim Code Characters

<table>
<thead>
<tr>
<th>Code Character</th>
<th>Code Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Code 39, Code 39 Full ASCII, Code 32</td>
</tr>
<tr>
<td>C</td>
<td>Code 128, ISBT 128, ISBT 128 Concatenated, GS1-128, Coupon (Code 128 portion)</td>
</tr>
<tr>
<td>d</td>
<td>Data Matrix</td>
</tr>
<tr>
<td>d2</td>
<td>GS1 Data Matrix</td>
</tr>
<tr>
<td>E</td>
<td>UPC/EAN, Coupon (UPC portion)</td>
</tr>
<tr>
<td>e</td>
<td>GS1 DataBar Family</td>
</tr>
<tr>
<td>F</td>
<td>Codabar</td>
</tr>
<tr>
<td>G</td>
<td>Code 93</td>
</tr>
<tr>
<td>g</td>
<td>Grid Matrix, Grid Matrix Inverse, Grid Matrix Mirror</td>
</tr>
<tr>
<td>H</td>
<td>Code 11</td>
</tr>
<tr>
<td>h</td>
<td>Han Xin</td>
</tr>
<tr>
<td>I</td>
<td>Interleaved 2 of 5</td>
</tr>
<tr>
<td>L</td>
<td>PDF417, Macro PDF417, Micro PDF417</td>
</tr>
<tr>
<td>L2</td>
<td>TLC 39</td>
</tr>
<tr>
<td>M</td>
<td>MSI</td>
</tr>
<tr>
<td>Q</td>
<td>QR Code, MicroQR</td>
</tr>
<tr>
<td>Q3</td>
<td>GS1 QR</td>
</tr>
<tr>
<td>S</td>
<td>Discrete 2 of 5, IATA 2 of 5</td>
</tr>
<tr>
<td>U</td>
<td>Maxicode</td>
</tr>
<tr>
<td>z</td>
<td>Aztec, Aztec Rune</td>
</tr>
<tr>
<td>X</td>
<td>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 Post, Australia Post, Netherlands KIX Code, USPS 4CB/One Code/Intelligent Mail, UPU FICS Postal, Signature Capture</td>
</tr>
<tr>
<td>X0</td>
<td>Mailmark</td>
</tr>
</tbody>
</table>
The modifier character is the sum of the applicable option values based on Table E-3.

### Table E-3  Modifier Characters

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Option Value</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code 39</td>
<td>0</td>
<td>No check character or Full ASCII processing.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Reader has checked one check character.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Reader has checked and stripped check character.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Reader has performed Full ASCII character conversion.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Reader has performed Full ASCII character conversion and checked one check character.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Reader has performed Full ASCII character conversion and checked and stripped check character.</td>
</tr>
</tbody>
</table>

Example: A Full ASCII bar code with check character W, \texttt{A+I+MI+DW}, is transmitted as \texttt{A7AIMID} where 7 = (3+4).

<table>
<thead>
<tr>
<th>Trioptic Code 39</th>
<th>0</th>
<th>No option specified at this time. Always transmit 0.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Example: A Trioptic bar code 412356 is transmitted as \texttt{X0412356}</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code 128</th>
<th>0</th>
<th>Standard data packet, no Function code 1 in first symbol position.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Function code 1 in first symbol character position.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Function code 1 in second symbol character position.</td>
</tr>
</tbody>
</table>

Example: A Code (EAN) 128 bar code with Function 1 character $\text{FNC1}$ in the first position, AIMID is transmitted as \texttt{C1AIMID}.

<table>
<thead>
<tr>
<th>I 2 of 5</th>
<th>0</th>
<th>No check digit processing.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Reader has validated check digit.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Reader has validated and stripped check digit.</td>
</tr>
</tbody>
</table>

Example: An I 2 of 5 bar code without check digit, 4123, is transmitted as \texttt{I04123}.

<table>
<thead>
<tr>
<th>Codabar</th>
<th>0</th>
<th>No check digit processing.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Reader has checked check digit.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Reader has stripped check digit before transmission.</td>
</tr>
</tbody>
</table>

Example: A Codabar bar code without check digit, 4123, is transmitted as \texttt{F04123}.

<table>
<thead>
<tr>
<th>Code 93</th>
<th>0</th>
<th>No options specified at this time. Always transmit 0.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Example: A Code 93 bar code 012345678905 is transmitted as \texttt{G0012345678905}</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MSI</th>
<th>0</th>
<th>Check digits are sent.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>No check digit is sent.</td>
</tr>
</tbody>
</table>

Example: An MSI bar code 4123, with a single check digit checked, is transmitted as \texttt{M14123}.
Table E-3  Modifier Characters  (Continued)

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Option Value</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 2 of 5</td>
<td>0</td>
<td>No options specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A D 2 of 5 bar code 4123, is transmitted as <strong>J04123</strong></td>
</tr>
<tr>
<td>UPC/EAN</td>
<td>0</td>
<td>Standard data packet in full EAN format, i.e. 13 digits for UPC-A,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UPC-E, and EAN-13 (not including supplemental data).</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Two digit supplemental data only.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Five digit supplemental data only.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Combined data packet comprising 13 digits from EAN-13, UPC-A or UPC-E</td>
</tr>
<tr>
<td></td>
<td></td>
<td>symbol and 2 or 5 digits from supplemental symbol.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>EAN-8 data packet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A UPC-A bar code 012345678905 is transmitted as <strong>E00012345678905</strong></td>
</tr>
<tr>
<td>Bookland EAN</td>
<td>0</td>
<td>No options specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A Bookland EAN bar code 123456789X is transmitted as <strong>X0123456789X</strong></td>
</tr>
<tr>
<td>ISSN EAN</td>
<td>0</td>
<td>No options specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: An ISSN EAN bar code 123456789X is transmitted as <strong>X0123456789X</strong></td>
</tr>
<tr>
<td>Code 11</td>
<td>0</td>
<td>Single check digit</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Two check digits</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Check characters validated but not transmitted.</td>
</tr>
<tr>
<td>GS1 DataBar Family</td>
<td></td>
<td>No option specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GS1 DataBar Omnidirectional and GS1 DataBar Limited transmit with an</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Application Identifier &quot;01&quot;.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: In GS1-128 emulation mode, GS1 DataBar is transmitted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>using Code 128 rules (i.e., JC1).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A GS1 DataBar Omnidirectional bar code 0110012345678902 is</td>
</tr>
<tr>
<td></td>
<td></td>
<td>transmitted as <strong>e00110012345678902</strong></td>
</tr>
<tr>
<td>EAN.UCC Composites</td>
<td></td>
<td>Native mode transmission. Note: UPC portion of composite is</td>
</tr>
<tr>
<td>(GS1 DataBar, GS1-128, 2D portion</td>
<td></td>
<td>transmitted using UPC rules.</td>
</tr>
<tr>
<td>of UPC composite)</td>
<td>0</td>
<td>Standard data packet.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Data packet containing the data following an encoded symbol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>separator character.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Data packet containing the data following an escape mechanism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>character. The data packet does not support the ECI protocol.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Data packet containing the data following an escape mechanism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>character. The data packet supports the ECI protocol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GS1-128 emulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: UPC portion of composite is transmitted using UPC rules.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Data packet is a GS1-128 symbol (i.e., data is preceded with JC1).</td>
</tr>
</tbody>
</table>
Table E-3  Modifier Characters  (Continued)

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Option Value</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PDF417, Micro PDF417</strong></td>
<td>0</td>
<td>Reader set to conform to protocol defined in 1994 PDF417 symbology specifications. <strong>Note:</strong> When this option is transmitted, the receiver cannot reliably determine whether ECIs have been invoked or whether data byte ( 92_{\text{DEC}} ) has been doubled in transmission.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Reader set to follow the ECI protocol (Extended Channel Interpretation). All data characters ( 92_{\text{DEC}} ) are doubled.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Reader set for Basic Channel operation (no escape character transmission protocol). Data characters ( 92_{\text{DEC}} ) are not doubled. <strong>Note:</strong> When decoders are set to this mode, unbuffered Macro symbols and symbols requiring the decoder to convey ECI escape sequences cannot be transmitted.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>The bar code contains a GS1-128 symbol, and the first codeword is 903-907, 912, 914, 915.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>The bar code contains a GS1-128 symbol, and the first codeword is in the range 908-909.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>The bar code contains a GS1-128 symbol, and the first codeword is in the range 910-911.</td>
</tr>
<tr>
<td>Example: A PDF417 bar code ABCD, with no transmission protocol enabled, is transmitted as JL2ABCD.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Data Matrix**            | 0            | ECC 000-140, not supported.                                                                                                               |
|                            | 1            | ECC 200.                                                                                                                               |
|                            | 2            | ECC 200, FNC1 in first or fifth position.                                                                                               |
|                            | 3            | ECC 200, FNC1 in second or sixth position.                                                                                               |
|                            | 4            | ECC 200, ECI protocol implemented.                                                                                                        |
|                            | 5            | ECC 200, FNC1 in first or fifth position, ECI protocol implemented.                                                                       |
|                            | 6            | ECC 200, FNC1 in second or sixth position, ECI protocol implemented.                                                                       |

| **GS1 Data Matrix**        | 2            | ECC 200, FNC1 in first or fifth position.                                                                                               |

| **MaxiCode**               | 0            | Symbol in Mode 4 or 5.                                                                                                                    |
|                            | 1            | Symbol in Mode 2 or 3.                                                                                                                     |
|                            | 2            | Symbol in Mode 4 or 5, ECI protocol implemented.                                                                                           |
|                            | 3            | Symbol in Mode 2 or 3, ECI protocol implemented in secondary message.                                                                     |
### Table E-3  Modifier Characters  (Continued)

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Option Value</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>QR Code</td>
<td>0</td>
<td>Model 1 symbol.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Model 2 / MicroQR symbol, ECI protocol not implemented.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Model 2 symbol, ECI protocol implemented.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Model 2 symbol, ECI protocol implemented, FNC1 implied in first position.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Model 2 symbol, ECI protocol not implemented, FNC1 implied in second position.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Model 2 symbol, ECI protocol implemented, FNC1 implied in second position.</td>
</tr>
<tr>
<td>GS1 QR</td>
<td>3</td>
<td>Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.</td>
</tr>
<tr>
<td>Aztec</td>
<td>0</td>
<td>Aztec symbol.</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Aztec Rune symbol.</td>
</tr>
<tr>
<td>Han Xin</td>
<td>0</td>
<td>Generic data, no special features are set. The transmitted data does not follow the AIM ECI protocol.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>ECI protocol enabled. There is at least one ECI mode encoded. Transmitted data must follow the AIM ECI protocol.</td>
</tr>
<tr>
<td>Grid Matrix, Grid</td>
<td>0</td>
<td>No option specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td>Matrix Inverse,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grid Matrix Mirror</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mailmark</td>
<td>0</td>
<td>No option specified at this time. Always transmit 0.</td>
</tr>
</tbody>
</table>
APPENDIX F  SAMPLE BAR CODES

Code 39

UPC/EAN

UPC-A, 100%
EAN-13, 100%

Code 128

Interleaved 2 of 5
GS1 DataBar Omnidirectional

Note: GS1 DataBar Omnidirectional must be enabled to read the bar code below (see GS1 DataBar on page 12-138).

---

GS1 DataBar Omnidirectional Bar Code:

7612341562341

---

PDF417

---

Data Matrix

---

Maxicode
APPENDIX G  NUMERIC BAR CODES

Numeric Bar Codes

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

0

1
Cancel

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

CapCode, a signature capture code, is a special pattern that encloses a signature area on a document and allows a scanner to capture a signature.

There are several accepted patterns that allow automatic identification of different signatures on the same form. For example, on the federal tax return 1040 form there are three signature areas, one each for two joint filers, and one for a professional preparer. By using different patterns, a program can correctly identify all three, so they can be captured in any sequence and still be identified correctly.

Code Structure

Signature Capture Area

A CapCode is printed as two identical patterns on either side of a signature capture box, as shown in Figure H-1. Each pattern extends the full height of the signature capture box.

The box is optional, so you can omit it, replace it with a single baseline, or print a baseline with an "X" on top of it towards the left, as is customarily done in the US to indicate a request for signature. However, if an "X" or other markings are added in the signature box area, these are captured with the signature.

Figure H-1  CapCode
CapCode Pattern Structure

A CapCode pattern structure consists of a start pattern followed by a separator space, a signature capture box, a second separator space, and then a stop pattern. Assuming that X is the dimension of the thinnest element, the start and stop patterns each contain 9X total width in 4 bars and 3 spaces. A 7X quiet zone is required to the left and to the right of the CapCode pattern.

![Capture Box Diagram](image)

**Figure H-2  CapCode Structure**

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

## Start / Stop Patterns

*Table H-1* lists the accepted start / stop patterns. The bar and space widths are expressed as multiples of X. You must use the same pattern on either side of a signature capture box. The type value is reported with the captured signature to indicate the purpose of the signature captured.

**Table H-1  Start / Stop Pattern Definitions**

<table>
<thead>
<tr>
<th>Bar/Space Patterns</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>S</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
Table H-2 lists selectable parameters used to generate the image of the captured signature.

**Table H-2  User Defined CapCode Parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Defined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Number of pixels</td>
</tr>
<tr>
<td>Height</td>
<td>Number of pixels</td>
</tr>
<tr>
<td>Format</td>
<td>JPEG, BMP, TIFF</td>
</tr>
<tr>
<td>JPEG quality</td>
<td>1 (most compression) to 100 (best quality)</td>
</tr>
<tr>
<td>Bits Per Pixel (not applicable to JPEG format)</td>
<td>1 (2 levels)</td>
</tr>
<tr>
<td></td>
<td>4 (16 levels)</td>
</tr>
<tr>
<td></td>
<td>8 (256 levels)</td>
</tr>
</tbody>
</table>

BMP format does not use compression, JPEG and TIFF formats do.

**Dimensions**

The size of the signature capture box is determined by the height and separation of the start and stop patterns. The line width of the signature capture box is insignificant.

The thinnest element width, referred to here as X, is nominally 10 mils (1 mil = 0.0254 mm). Select this as an exact multiple of the pixel pitch of the printer used. For example, when using a 203 DPI (dots-per-inch) printer and printing 2 dots per module, the resulting X dimension is 9.85 mils.

**Data Format**

The decoder output is formatted according to Table H-3. Symbol Technologies decoders allow different user options to output or inhibit bar code type. Selecting "Symbol ID" as the bar code type for output identifies the CapCode with letter "i".

**Table H-3  Data Format**

<table>
<thead>
<tr>
<th>File Format (1 byte)</th>
<th>Type (1 byte)</th>
<th>Image Size (4 bytes, BIG Endian)</th>
<th>Image Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPEG - 1</td>
<td>See Table H-1, last column</td>
<td></td>
<td>(Same bytes as in a data file)</td>
</tr>
<tr>
<td>BMP - 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIFF - 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Additional Capabilities**

Regardless of how the signature is captured, the output signature image is de-skewed and right-side up.

A scanner that captures signatures automatically determines whether it is scanning a signature or a bar code. You can disable the signature capturing capability in a decoder.

**Signature Boxes**

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

Type 2:

![Type 2](image1)

Type 5:

![Type 5](image2)

Type 7:

![Type 7](image3)

Type 8:

![Type 8](image4)

Type 9:

![Type 9](image5)

*Figure H-3  Acceptable Signature Boxes*
APPENDIX I  NON-PARAMETER ATTRIBUTES

Introduction
This appendix defines non-parameter attributes.

Attributes

Model Number
Attribute #533

Model number of the scanner. This electronic output matches the printout on the physical device label, for example DS7708-SR00004ZCWW.

<table>
<thead>
<tr>
<th>Type</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (Bytes)</td>
<td>18</td>
</tr>
<tr>
<td>User Mode Access</td>
<td>R</td>
</tr>
<tr>
<td>Values</td>
<td>Variable</td>
</tr>
</tbody>
</table>

Serial Number
Attribute #534

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

<table>
<thead>
<tr>
<th>Type</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (Bytes)</td>
<td>16</td>
</tr>
<tr>
<td>User Mode Access</td>
<td>R</td>
</tr>
<tr>
<td>Values</td>
<td>Variable</td>
</tr>
</tbody>
</table>

Date of Manufacture
Attribute #535

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

| Type     | S |
Size (Bytes) 7
User Mode Access R
Values Variable

**Date of First Programming**

Attribute #614

Date of first electronic programming represents the first time settings where electronically loaded to the scanner either by 123Scan² or via SMS, for example **18MAY14** (which reads the 18th of May 2014).

Type S
Size (Bytes) 7
User Mode Access R
Values Variable

**Configuration Filename**

Attribute #616

The name assigned to the configuration settings loaded electronically to the device either by 123Scan² or via SMS.

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

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

Type S
Size (Bytes) 17
User Mode Access RW
Values Variable
Beep/LED

Attribute #6000

Activate the beep and/or LED.

<table>
<thead>
<tr>
<th>Type</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (Bytes)</td>
<td>N/A</td>
</tr>
<tr>
<td>User Mode Access</td>
<td>W</td>
</tr>
</tbody>
</table>

Values:

<table>
<thead>
<tr>
<th>Beep / LED Action</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 high short beep</td>
<td>0</td>
</tr>
<tr>
<td>2 high short beeps</td>
<td>1</td>
</tr>
<tr>
<td>3 high short beeps</td>
<td>2</td>
</tr>
<tr>
<td>4 high short beeps</td>
<td>3</td>
</tr>
<tr>
<td>5 high short beeps</td>
<td>4</td>
</tr>
<tr>
<td>1 low short beep</td>
<td>5</td>
</tr>
<tr>
<td>2 low short beeps</td>
<td>6</td>
</tr>
<tr>
<td>3 low short beeps</td>
<td>7</td>
</tr>
<tr>
<td>4 low short beeps</td>
<td>8</td>
</tr>
<tr>
<td>5 low short beeps</td>
<td>9</td>
</tr>
<tr>
<td>1 high long beep</td>
<td>10</td>
</tr>
<tr>
<td>2 high long beeps</td>
<td>11</td>
</tr>
<tr>
<td>3 high long beeps</td>
<td>12</td>
</tr>
<tr>
<td>4 high long beeps</td>
<td>13</td>
</tr>
<tr>
<td>5 high long beeps</td>
<td>14</td>
</tr>
<tr>
<td>1 low long beep</td>
<td>15</td>
</tr>
<tr>
<td>2 low long beeps</td>
<td>16</td>
</tr>
<tr>
<td>3 low long beeps</td>
<td>17</td>
</tr>
<tr>
<td>4 low long beeps</td>
<td>18</td>
</tr>
<tr>
<td>5 low long beeps</td>
<td>19</td>
</tr>
<tr>
<td>Fast warble beep</td>
<td>20</td>
</tr>
<tr>
<td>Slow warble beep</td>
<td>21</td>
</tr>
<tr>
<td>High-low beep</td>
<td>22</td>
</tr>
<tr>
<td>Low-high beep</td>
<td>23</td>
</tr>
<tr>
<td>High-low-high beep</td>
<td>24</td>
</tr>
<tr>
<td>Low-high-low beep</td>
<td>25</td>
</tr>
<tr>
<td>High-high-low-low beep</td>
<td>26</td>
</tr>
<tr>
<td>Green LED off</td>
<td>42</td>
</tr>
<tr>
<td>Green LED on</td>
<td>43</td>
</tr>
<tr>
<td>Red LED on</td>
<td>47</td>
</tr>
<tr>
<td>Red LED off</td>
<td>48</td>
</tr>
</tbody>
</table>
Parameter Defaults
Attribute #6001
This attribute restores all parameters to their factory defaults.

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

Beep on Next Bootup
Attribute #6003
This attribute configures (enables or disables) beep on next boot up of scanner.

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

Reboot
Attribute #6004
This attribute initiates a device reboot.

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

Host Trigger Session
Attribute #6005
This attribute triggers a decode session similar to manually depressing the scanner trigger button.

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

Firmware Version
Attribute #20004
The scanner's operating system version. For example, PAACHS00-001-R00.

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

Attribute #20013

Identifies 1D/2D decode algorithms resident on the device, for example `IMGKIT_6.04T05.11`.

<table>
<thead>
<tr>
<th>Type</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (Bytes)</td>
<td>Variable</td>
</tr>
<tr>
<td>User Mode Access</td>
<td>R</td>
</tr>
<tr>
<td>Values</td>
<td>Variable</td>
</tr>
</tbody>
</table>
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</thead>
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<td>12-87</td>
</tr>
<tr>
<td>convert to EAN-13</td>
<td>12-90</td>
</tr>
<tr>
<td>reduced quiet zone</td>
<td>12-93</td>
</tr>
<tr>
<td>security level</td>
<td>12-91</td>
</tr>
<tr>
<td>transmit check digit</td>
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</tr>
</tbody>
</table>

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Tell Us What You Think...

We’d like to know what you think about this Manual. Please take a moment to fill out this questionnaire and fax this form to: (631) 627-7184, or mail to:

Zebra Technologies, Inc.
Lincolnshire, IL 60069 USA
Attention: Technical Publications Manager
Data Capture Solutions

IMPORTANT: If you need product support, please call the appropriate customer support number provided. Unfortunately, we cannot provide customer support at the fax number above.

Manual Title: _____________________________________________
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How familiar were you with this product before using this manual?

☐ Very familiar  ☐ Slightly familiar  ☐ Not at all familiar

Did this manual meet your needs? If not, please explain.

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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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What can we do to further improve our manuals?

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Thank you for your input—We value your comments.