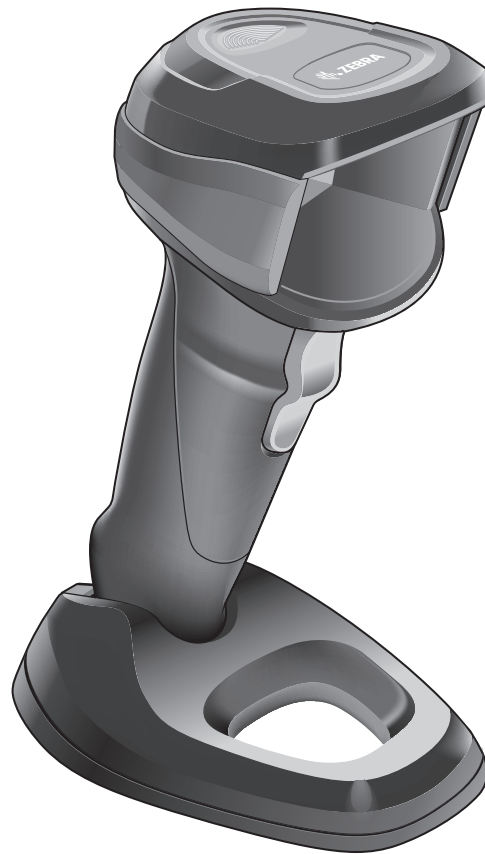


# DS9908

Hands-Free Imaging Scanner



## Product Reference Guide



**ZEBRA**

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## Revision History

Changes to the original guide are listed below:

| Change      | Date    | Description  |
|-------------|---------|--|
| -01 Rev A   | 10/2018 | Initial release.   |
| -02 Rev A   | 11/2018 | <ul style="list-style-type: none"> <li>- Added HD decode ranges.</li> <li>- Removed Simple COM Port Emulation.</li> <li>- Updated:               <ul style="list-style-type: none"> <li>- Default for Code 128 Security Level</li> <li>- Enable Presentation (Hands-free) Decode Aiming Pattern to Enable Presentation (Hands-free) Decode Aiming Pattern on PDF.</li> </ul> </li> </ul>   |
| -03 Rev A   | 3/2019  | <p>Added:</p> <ul style="list-style-type: none"> <li>- DotCode parameters - with enable as prioritize default.</li> <li>- Decode Range Limit parameter.</li> <li>- New Autodiscriminate ISBT Concatenation note.</li> </ul> <p>Updated:</p> <ul style="list-style-type: none"> <li>- Zebra copyright.</li> <li>- MSI Check Digits parameter to byte.</li> <li>- RS-232 Host Parameter settings for CUTE: Parity - None; ASCII Format - 8-Bit</li> <li>- Decode Range Limit Parameter values: Disable - 00h, Standard - 0Bh, Near - 16h, Far - 07h.</li> <li>- Decode Range Limit -&gt; Decode Range Limit (Hands-free)</li> </ul> <p>Removed:</p> <ul style="list-style-type: none"> <li>- Reference to Intellistand.</li> </ul> |
| -04 Rev A   | 10/2020 | <ul style="list-style-type: none"> <li>- Removed Feedback (no longer valid).</li> </ul> <p>Added:</p> <ul style="list-style-type: none"> <li>- CDC Beep on &lt;BEL&gt;</li> <li>- Added TGCS (IBM) USB Direct I/O Beep</li> <li>- Added new DotCode Erasure Limit</li> <li>- Re-added Hands-Free Decode Session Timeout</li> <li>- USB Cert information in Table 4-2.</li> </ul> <p>Updated</p> <ul style="list-style-type: none"> <li>- 123Scan Requirements</li> <li>- Electronic Article Surveillance (EAS)</li> <li>- Data Formatting: ADF, MDF, Preferred Symbol.</li> </ul>  |
| -05EN Rev A | 04/2021 | Added Data Parsing.  |
| -06EN Rev A | 07/2022 | Added Weblink QR.  |
| -07EN Rev A | 10/2023 | Removed TAA information from Table 1.  |

# Table of Contents

|                                      |           |
|--------------------------------------|-----------|
| Copyright .....                      | 2         |
| For Australia Only .....             | 2         |
| Terms of Use .....                   | 2         |
| Proprietary Statement .....          | 2         |
| Product Improvements .....           | 2         |
| Liability Disclaimer .....           | 2         |
| Limitation of Liability .....        | 3         |
| Revision History .....               | 3         |
| <br>                                 |           |
| <b>Table of Contents.....</b>        | <b>4</b>  |
| <br>                                 |           |
| <b>List of Figures .....</b>         | <b>20</b> |
| <br>                                 |           |
| <b>List of Tables.....</b>           | <b>21</b> |
| <br>                                 |           |
| <b>About This Guide</b>              |           |
| Introduction .....                   | 23        |
| Configurations .....                 | 23        |
| Accessories .....                    | 24        |
| Chapter Descriptions .....           | 25        |
| Notational Conventions .....         | 26        |
| Related Documents and Software ..... | 27        |
| Service Information .....            | 27        |
| <br>                                 |           |
| <b>Getting Started</b>               |           |
| Introduction .....                   | 28        |
| Interfaces .....                     | 29        |
| Unpacking .....                      | 29        |
| Features .....                       | 30        |
| Setting Up the Scanner .....         | 31        |
| Inserting the Interface Cable .....  | 31        |
| Removing the Interface Cable .....   | 32        |
| Connecting Power (if required) ..... | 32        |

# Table of Contents

|   |    |
|---|----|
| Configuring the Scanner .....                                     | 32 |
| Mounting the Scanner .....  | 33 |
| Table Top Mount With Adhesive Pad .....                           | 33 |
| Table Top Mount With Screws .....                                 | 34 |
| Mounting on a Wall .....  | 35 |
| <b>123Scan and Software Tools</b>                                 |    |
| Introduction .....  | 36 |
| 123Scan .....   | 36 |
| Communication with 123Scan .....                                  | 37 |
| 123Scan Requirements .....  | 37 |
| 123Scan Information .....   | 37 |
| Scanner SDK, Other Software Tools, and Videos .....               | 38 |
| <b>Data Capture</b>   |    |
| Introduction .....  | 39 |
| Speaker and LED Indicators .....                                  | 39 |
| Scanning .....  | 42 |
| Hands-free Scanning .....   | 42 |
| Hand-held Scanning .....  | 42 |
| Aiming .....  | 43 |
| Decode Ranges .....   | 44 |
| DS9908-SR/DL/HD/HL Configurations .....                           | 44 |
| Electronic Article Surveillance (EAS) .....                       | 45 |
| Installing .....  | 45 |
| Checkpoint EAS Model Compatibility .....                          | 45 |
| Considerations .....  | 45 |
| Checkpoint Contact Information .....                              | 45 |
| <b>Maintenance, Troubleshooting, and Technical Specifications</b> |    |
| Introduction .....  | 46 |
| Maintenance .....   | 46 |
| Known Harmful Ingredients .....                                   | 46 |
| Approved Cleaners for the Scanner .....                           | 46 |
| Cleaning the Scanner .....  | 47 |
| Troubleshooting .....   | 48 |
| Report Product Information .....                                  | 51 |
| Report Software Version .....                                     | 51 |
| Report Serial Number .....  | 51 |
| Report Manufacturing Information .....                            | 51 |
| Technical Specifications .....                                    | 52 |
| Scanner Signal Descriptions .....                                 | 55 |
| <b>User Preferences &amp; Miscellaneous Options</b>               |    |
| Introduction .....  | 56 |
| Setting Parameters .....  | 56 |
| Scanning Sequence Examples .....                                  | 56 |

## Table of Contents

|   |    |
|---|----|
| Errors While Scanning .....                                     | 57 |
| User Preferences/Miscellaneous Options Parameter Defaults ..... | 57 |
| Standard User Preferences .....                                 | 59 |
| Default Parameters .....  | 59 |
| Write to Custom Defaults .....                                  | 59 |
| Parameter Barcode Scanning .....                                | 60 |
| Beep After Good Decode .....                                    | 60 |
| Beep Volume .....   | 61 |
| Beep Tone .....   | 62 |
| Standard Beep Tones .....                                       | 62 |
| Special Tones .....   | 63 |
| Beep Duration .....   | 64 |
| Suppress Power Up Beeps .....                                   | 64 |
| Direct Decode Indicator .....                                   | 65 |
| Low Power Mode .....  | 66 |
| Time Delay to Low Power Mode .....                              | 67 |
| Hand-held Trigger Mode .....                                    | 69 |
| Hands-free Mode .....   | 70 |
| Pickup Activation .....   | 71 |
| Hand-held Decode Aiming Pattern .....                           | 72 |
| Presentation (Hands-free) Decode Aiming Pattern .....           | 73 |
| Picklist Mode .....   | 74 |
| Continuous Barcode Read .....                                   | 75 |
| Unique Barcode Reporting .....                                  | 75 |
| Decode Session Timeout .....                                    | 76 |
| Hands-Free Decode Session Timeout .....                         | 76 |
| Timeout Between Decodes, Same Symbol .....                      | 77 |
| Timeout Between Decodes, Different Symbols .....                | 77 |
| Triggered Timeout, Same Symbol .....                            | 78 |
| Mobile Phone/Display Mode .....                                 | 79 |
| PDF Prioritization .....  | 80 |
| PDF Prioritization Timeout .....                                | 80 |
| Decoding Illumination .....                                     | 81 |
| Illumination Brightness .....                                   | 81 |
| Motion Tolerance (Hand-held Trigger Modes Only) .....           | 82 |
| Product ID (PID) Type .....                                     | 82 |
| Product ID (PID) Value .....                                    | 83 |
| ECLevel .....   | 83 |
| Decode Range Limit (Hands-free) .....                           | 84 |
| Miscellaneous Scanner Parameters .....                          | 85 |
| Enter Key .....   | 85 |
| Tab Key .....   | 85 |
| Transmit Code ID Character .....                                | 86 |
| Prefix/Suffix Values .....                                      | 87 |
| Scan Data Transmission Format .....                             | 88 |
| FN1 Substitution Values .....                                   | 90 |
| Transmit "No Read" Message .....                                | 91 |
| Unsolicited Heartbeat Interval .....                            | 92 |
| securPharm Decoding .....                                       | 93 |
| securPharm Output Formatting .....                              | 94 |
| Sample GS1 Format .....   | 94 |

## Table of Contents

|  |     |
|--|-----|
| Sample IFA Format .....                            | 95  |
| securPharm Output Formatting Barcodes .....        | 96  |
| <b>Imager Preferences</b>                          |     |
| Introduction .....                                 | 97  |
| Setting Parameters .....                           | 97  |
| Scanning Sequence Examples .....                   | 98  |
| Errors While Scanning .....                        | 98  |
| Image Capture Preferences Parameter Defaults ..... | 98  |
| Image Capture Preferences .....                    | 100 |
| Operational Modes .....                            | 100 |
| Decode Mode .....                                  | 100 |
| Snapshot Mode .....                                | 100 |
| Video Mode .....                                   | 100 |
| Image Capture Illumination .....                   | 101 |
| Image Capture Autoexposure .....                   | 101 |
| Fixed Exposure .....                               | 102 |
| Analog and Digital Gain .....                      | 103 |
| Analog Gain .....                                  | 103 |
| Digital Gain .....                                 | 103 |
| Gain/Exposure Priority for Snapshot Mode .....     | 104 |
| Snapshot Mode Timeout .....                        | 105 |
| Snapshot Aiming Pattern .....                      | 106 |
| Silence Operational Mode Changes .....             | 106 |
| Image Cropping .....                               | 107 |
| Crop to Pixel Addresses .....                      | 107 |
| Image Size (Number of Pixels) .....                | 109 |
| Video Subsampling .....                            | 110 |
| Image Brightness (Target White) .....              | 111 |
| JPEG Image Options .....                           | 111 |
| JPEG Quality Value .....                           | 112 |
| JPEG Size Value .....                              | 112 |
| Image Enhancement .....                            | 113 |
| Image File Format Selector .....                   | 114 |
| Image Rotation .....                               | 115 |
| Bits Per Pixel .....                               | 116 |
| Signature Capture .....                            | 117 |
| Output File Format .....                           | 117 |
| Signature Capture File Format Selector .....       | 118 |
| Signature Capture Bits Per Pixel .....             | 119 |
| Signature Capture Width .....                      | 120 |
| Signature Capture Height .....                     | 120 |
| Signature Capture JPEG Quality .....               | 120 |
| Video Mode Format Selector .....                   | 121 |
| Video View Finder .....                            | 121 |
| Target Video Frame Size .....                      | 122 |
| Video View Finder Image Size .....                 | 122 |

**Symbologies**

|  |     |
|--|-----|
| Introduction .....                           | 123 |
| Setting Parameters .....                     | 123 |
| Scanning Sequence Examples .....             | 124 |
| Errors While Scanning .....                  | 124 |
| Symbology Parameter Defaults .....           | 124 |
| Enable/Disable All Code Types .....          | 131 |
| UPC/EAN/JAN .....                            | 131 |
| UPC-A .....                                  | 131 |
| UPC-E .....                                  | 132 |
| UPC-E1 .....                                 | 132 |
| EAN-8/JAN-8 .....                            | 133 |
| EAN-13/JAN-13 .....                          | 133 |
| Bookland EAN .....                           | 134 |
| Bookland ISBN Format .....                   | 135 |
| ISSN EAN .....                               | 136 |
| Decode UPC/EAN/JAN Supplementals .....       | 137 |
| User-Programmable Supplementals .....        | 140 |
| UPC/EAN/JAN Supplemental Redundancy .....    | 140 |
| UPC/EAN/JAN Supplemental AIM ID Format ..... | 141 |
| Transmit UPC-A Check Digit .....             | 142 |
| Transmit UPC-E Check Digit .....             | 142 |
| Transmit UPC-E1 Check Digit .....            | 143 |
| UPC-A Preamble .....                         | 144 |
| UPC-E Preamble .....                         | 145 |
| UPC-E1 Preamble .....                        | 146 |
| Convert UPC-E to UPC-A .....                 | 147 |
| Convert UPC-E1 to UPC-A .....                | 147 |
| EAN/JAN Zero Extend .....                    | 148 |
| UCC Coupon Extended Code .....               | 148 |
| Coupon Report .....                          | 149 |
| UPC Reduced Quiet Zone .....                 | 150 |
| Code 128 .....                               | 150 |
| Set Lengths for Code 128 .....               | 151 |
| GS1-128 (formerly UCC/EAN-128) .....         | 152 |
| ISBT 128 .....                               | 153 |
| ISBT Concatenation .....                     | 153 |
| Check ISBT Table .....                       | 154 |
| ISBT Concatenation Redundancy .....          | 155 |
| Code 128 <FNC4> .....                        | 155 |
| Code 128 Security Level .....                | 156 |
| Code 128 Reduced Quiet Zone .....            | 157 |
| Code 39 .....                                | 157 |
| Trioptic Code 39 .....                       | 158 |
| Convert Code 39 to Code 32 .....             | 158 |
| Code 32 Prefix .....                         | 159 |
| Set Lengths for Code 39 .....                | 159 |
| Code 39 Check Digit Verification .....       | 161 |
| Transmit Code 39 Check Digit .....           | 161 |
| Code 39 Full ASCII Conversion .....          | 162 |
| Code 39 Security Level .....                 | 163 |



## Table of Contents

|  |     |
|--|-----|
| Code 39 Reduced Quiet Zone .....   | 164 |
| Code 93 .....  | 164 |
| Set Lengths for Code 93 .....  | 165 |
| Code 11 .....  | 167 |
| Set Lengths for Code 11 .....  | 167 |
| Code 11 Check Digit Verification .....   | 169 |
| Transmit Code 11 Check Digits .....  | 170 |
| Interleaved 2 of 5 (ITF) .....   | 170 |
| Set Lengths for Interleaved 2 of 5 .....   | 171 |
| I 2 of 5 Check Digit Verification .....  | 172 |
| Transmit I 2 of 5 Check Digit .....  | 173 |
| Convert I 2 of 5 to EAN-13 .....   | 173 |
| Febraban .....   | 174 |
| I 2 of 5 Security Level .....  | 175 |
| I 2 of 5 Reduced Quiet Zone .....  | 176 |
| Discrete 2 of 5 (DTF) .....  | 176 |
| Set Lengths for Discrete 2 of 5 .....  | 177 |
| Codabar (NW - 7) .....   | 179 |
| Set Lengths for Codabar .....  | 179 |
| CLSI Editing .....   | 181 |
| NOTIS Editing .....  | 181 |
| Codabar Security Level .....   | 182 |
| Codabar Upper or Lower Case Start/Stop Characters .....  | 183 |
| Codabar Mod 16 Check Digit Verification .....  | 183 |
| Transmit Codabar Check Digit .....   | 184 |
| MSI .....  | 184 |
| Set Lengths for MSI .....  | 185 |
| MSI Check Digits .....   | 187 |
| Transmit MSI Check Digit(s) .....  | 188 |
| MSI Check Digit Algorithm .....  | 188 |
| MSI Reduced Quiet Zone .....   | 189 |
| Chinese 2 of 5 .....   | 189 |
| Matrix 2 of 5 .....  | 190 |
| Set Lengths for Matrix 2 of 5 .....  | 190 |
| Matrix 2 of 5 Check Digit .....  | 192 |
| Transmit Matrix 2 of 5 Check Digit .....   | 192 |
| Korean 3 of 5 .....  | 193 |
| Inverse 1D .....   | 193 |
| GS1 DataBar .....  | 195 |
| GS1 DataBar Omnidirectional (formerly GS1 DataBar-14), GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional ..... | 195 |
| GS1 DataBar Limited .....  | 196 |
| GS1 DataBar Expanded, GS1 DataBar Expanded Stacked .....   | 196 |
| Convert GS1 DataBar to UPC/EAN/JAN .....   | 197 |
| GS1 DataBar Security Level .....   | 198 |
| GS1 DataBar Limited Margin Check .....   | 199 |
| Symbology-Specific Security Features .....   | 200 |
| Redundancy Level .....   | 200 |
| Security Level .....   | 202 |
| 1D Quiet Zone Level .....  | 203 |
| Intercharacter Gap Size .....  | 204 |

## Table of Contents

|  |     |
|--|-----|
| Composite .....  | 204 |
| Composite CC-C .....                                     | 204 |
| Composite CC-A/B .....                                   | 205 |
| Composite TLC-39 .....                                   | 205 |
| Composite Inverse .....                                  | 206 |
| UPC Composite Mode .....                                 | 207 |
| Composite Beep Mode .....                                | 208 |
| GS1-128 Emulation Mode for UCC/EAN Composite Codes ..... | 208 |
| 2D Symbolologies .....                                   | 209 |
| PDF417 .....   | 209 |
| MicroPDF417 .....  | 209 |
| Code 128 Emulation .....                                 | 210 |
| Data Matrix .....  | 211 |
| GS1 Data Matrix .....                                    | 211 |
| Data Matrix Inverse .....                                | 212 |
| Decode Data Matrix Mirror Images .....                   | 213 |
| Maxicode .....   | 214 |
| QR Code .....  | 214 |
| Weblink QR .....   | 215 |
| GS1 QR .....   | 216 |
| MicroQR .....  | 216 |
| Linked QR Mode .....                                     | 217 |
| Aztec .....  | 218 |
| Aztec Inverse .....                                      | 218 |
| Han Xin .....  | 219 |
| Han Xin Inverse .....                                    | 219 |
| Grid Matrix .....  | 220 |
| Grid Matrix Inverse .....                                | 220 |
| Grid Matrix Mirror .....                                 | 221 |
| DotCode .....  | 222 |
| DotCode Inverse .....                                    | 223 |
| DotCode Mirrored .....                                   | 224 |
| DotCode Prioritize .....                                 | 225 |
| DotCode Erasure Limit .....                              | 225 |
| Macro PDF Features .....                                 | 226 |
| Flush Macro Buffer .....                                 | 226 |
| Abort Macro PDF Entry .....                              | 226 |
| Postal Codes .....                                       | 227 |
| US Postnet .....   | 227 |
| US Planet .....  | 227 |
| Transmit US Postal Check Digit .....                     | 228 |
| UK Postal .....  | 228 |
| Transmit UK Postal Check Digit .....                     | 229 |
| Japan Postal .....                                       | 229 |
| Australia Post .....                                     | 230 |
| Australia Post Format .....                              | 231 |
| Netherlands KIX Code .....                               | 232 |
| USPS 4CB/One Code/Intelligent Mail .....                 | 232 |
| UPU FICS Postal .....                                    | 233 |
| Mailmark .....   | 233 |

**USB Interface**

Introduction ..... 234

Setting Parameters ..... 234

    Scanning Sequence Examples ..... 234

    Errors While Scanning ..... 234

Connecting a USB Interface ..... 235

USB Parameter Defaults ..... 236

USB Host Parameters ..... 237

    USB Device Type ..... 237

    Symbol Native API (SNAPI) Status Handshaking ..... 239

    USB Keystroke Delay ..... 240

    USB Caps Lock Override ..... 240

    Barcodes with Unknown Characters ..... 241

    USB Convert Unknown to Code 39 ..... 241

    USB Fast HID ..... 242

    USB Polling Interval ..... 242

    Keypad Emulation ..... 244

    Quick Keypad Emulation ..... 244

    Keypad Emulation with Leading Zero ..... 245

    USB Keyboard FN1 Substitution ..... 245

    Function Key Mapping ..... 246

    Simulated Caps Lock ..... 246

    Convert Case ..... 247

    USB Static CDC ..... 247

    CDC Beep on <BEL> ..... 248

    TGCS (IBM) USB Direct I/O Beep ..... 248

    TGCS (IBM) USB Beep Directive ..... 249

    TGCS (IBM) USB Barcode Configuration Directive ..... 249

    TGCS (IBM) USB Specification Version ..... 249

ASCII Character Sets ..... 250

**SSI Interface**

Introduction ..... 251

Communication ..... 251

    SSI Commands ..... 252

SSI Transactions ..... 253

    General Data Transactions ..... 253

        ACK/NAK Handshaking ..... 253

    Decoded Data Transmission ..... 254

        ACK/NAK Enabled and Packeted Data ..... 254

        ACK/NAK Enabled and Unpacketed ASCII Data ..... 254

        ACK/NAK Disabled and Packeted DECODE\_DATA ..... 255

        ACK/NAK Disabled and Unpacketed ASCII Data ..... 255

Communication Summary ..... 255

    RTS/CTS Lines ..... 255

    ACK/NAK Option ..... 255

    Number of Data Bits ..... 255

    Serial Response Timeout ..... 256

    Retries ..... 256

    Baud Rate, Stop Bits, Parity, Response Timeout, ACK/NAK Handshaking ..... 256

## Table of Contents

|   |            |
|---|------------|
| Errors .....  | 256        |
| SSI Communication Notes .....   | 256        |
| Using Time Delay to Low Power Mode with SSI .....                       | 257        |
| Encapsulation of RSM Commands/Responses over SSI .....                  | 258        |
| Command Structure .....   | 258        |
| Response Structure .....  | 258        |
| Example Transaction .....   | 259        |
| <b>Command from Host to Query Packet Size Supported by Device .....</b> | <b>259</b> |
| <b>Response from Device with Packet Size Information .....</b>          | <b>259</b> |
| <b>Command from Host to Retrieve Diagnostic Information .....</b>       | <b>259</b> |
| <b>Response from Device with Diagnostic Information .....</b>           | <b>259</b> |
| Setting Parameters .....  | 260        |
| Scanning Sequence Examples .....  | 260        |
| Errors While Scanning .....   | 260        |
| Simple Serial Interface Parameter Defaults .....                        | 261        |
| SSI Host Parameters .....   | 262        |
| Select SSI Host .....   | 262        |
| Baud Rate .....   | 262        |
| Parity .....  | 264        |
| Check Parity .....  | 265        |
| Stop Bits .....   | 265        |
| Software Handshaking .....  | 266        |
| Host RTS Line State .....   | 267        |
| Decode Data Packet Format .....   | 268        |
| Host Serial Response Timeout .....                                      | 269        |
| Host Character Timeout .....  | 270        |
| Multipacket Option .....  | 271        |
| Interpacket Delay .....   | 272        |
| Event Reporting .....   | 273        |
| Decode Event .....  | 273        |
| Boot Up Event .....   | 274        |
| Parameter Event .....   | 274        |
| <br>  |            |
| <b>RS-232 Interface</b>   |            |
| Introduction .....  | 275        |
| Setting Parameters .....  | 275        |
| Scanning Sequence Examples .....  | 276        |
| Errors While Scanning .....   | 276        |
| Connecting an RS-232 Interface .....                                    | 276        |
| RS-232 Parameter Defaults .....   | 277        |
| RS-232 Host Parameters .....  | 278        |
| RS-232 Host Types .....   | 280        |
| Baud Rate .....   | 282        |
| Parity .....  | 283        |
| Stop Bits .....   | 283        |
| Data Bits .....   | 284        |
| Check Receive Errors .....  | 284        |
| Hardware Handshaking .....  | 285        |
| Software Handshaking .....  | 287        |
| Host Serial Response Timeout .....                                      | 289        |

# Table of Contents

|  |     |
|--|-----|
| RTS Line State .....                         | 290 |
| Beep on <BEL> .....                          | 290 |
| Intercharacter Delay .....                   | 291 |
| Nixdorf Beep/LED Options .....               | 292 |
| Barcodes with Unknown Characters .....       | 292 |
| ASCII Character Sets .....                   | 292 |
| <b>IBM Interface</b>                         |     |
| Introduction .....                           | 293 |
| Setting Parameters .....                     | 293 |
| Scanning Sequence Examples .....             | 293 |
| Errors While Scanning .....                  | 293 |
| Connecting an IBM 468X/469X Host .....       | 294 |
| IBM Parameter Defaults .....                 | 295 |
| IBM Host Parameters .....                    | 296 |
| Port Address .....                           | 296 |
| Convert Unknown to Code 39 .....             | 297 |
| RS-485 Beep Directive .....                  | 297 |
| RS-485 Barcode Configuration Directive ..... | 298 |
| IBM-485 Specification Version .....          | 298 |
| <b>Keyboard Wedge Interface</b>              |     |
| Introduction .....                           | 299 |
| Setting Parameters .....                     | 299 |
| Scanning Sequence Examples .....             | 299 |
| Errors While Scanning .....                  | 299 |
| Connecting a Keyboard Wedge Interface .....  | 300 |
| Keyboard Wedge Parameter Defaults .....      | 301 |
| Keyboard Wedge Host Parameters .....         | 302 |
| Keyboard Wedge Host Types .....              | 302 |
| Barcodes with Unknown Characters .....       | 302 |
| Keystroke Delay .....                        | 303 |
| Intra-keystroke Delay .....                  | 303 |
| Alternate Numeric Keypad Emulation .....     | 304 |
| Quick Keypad Emulation .....                 | 304 |
| Simulated Caps Lock .....                    | 305 |
| Caps Lock Override .....                     | 305 |
| Convert Case .....                           | 306 |
| Function Key Mapping .....                   | 306 |
| FN1 Substitution .....                       | 307 |
| Send Make and Break .....                    | 307 |
| Keyboard Map .....                           | 308 |
| ASCII Character Sets .....                   | 308 |
| <b>OCR Programming</b>                       |     |
| Introduction .....                           | 309 |
| Setting Parameters .....                     | 309 |
| Scanning Sequence Examples .....             | 310 |

# Table of Contents

|   |     |
|---|-----|
| Errors While Scanning .....                               | 310 |
| OCR Parameter Defaults .....                              | 310 |
| OCR Programming Parameters .....                          | 311 |
| OCR-A .....   | 311 |
| OCR-A Variant .....                                       | 312 |
| OCR-B .....   | 313 |
| OCR-B Variant .....                                       | 314 |
| MICR E13B .....   | 317 |
| US Currency Serial Number .....                           | 318 |
| OCR Orientation .....                                     | 318 |
| OCR Lines .....   | 320 |
| OCR Minimum Characters .....                              | 320 |
| OCR Maximum Characters .....                              | 321 |
| OCR Subset .....  | 321 |
| OCR Quiet Zone .....                                      | 322 |
| OCR Template .....  | 322 |
| Required Digit (9) .....                                  | 323 |
| Required Alpha (A) .....                                  | 323 |
| Optional Alphanumeric (1) .....                           | 323 |
| Optional Alpha (2) .....                                  | 324 |
| Alpha or Digit (3) .....                                  | 324 |
| Any Including Space & Reject (4) .....                    | 324 |
| Any except Space & Reject (5) .....                       | 325 |
| Optional Digit (7) .....                                  | 325 |
| Digit or Fill (8) .....                                   | 325 |
| Alpha or Fill (F) .....                                   | 326 |
| Optional Space ( ) .....                                  | 326 |
| Optional Small Special (.) .....                          | 326 |
| Other Template Operators .....                            | 327 |
| Repeat Previous (R) .....                                 | 330 |
| Multiple Templates .....                                  | 331 |
| Template Examples .....                                   | 331 |
| OCR Check Digit Modulus .....                             | 332 |
| OCR Check Digit Multiplier .....                          | 332 |
| OCR Check Digit Validation .....                          | 333 |
| None .....  | 333 |
| Product Add Left to Right .....                           | 334 |
| Digit Add Left to Right .....                             | 335 |
| Digit Add Right to Left .....                             | 336 |
| Product Add Right to Left Simple Remainder .....          | 336 |
| Digit Add Right To Left Simple Remainder .....            | 337 |
| Health Industry - HIBCC43 .....                           | 338 |
| Inverse OCR .....   | 339 |
| OCR Redundancy .....                                      | 340 |
| <br>  |     |
| <b>Intelligent Document Capture (Hand-held Mode Only)</b> |     |
| Introduction .....  | 341 |
| The IDC Process .....                                     | 341 |
| Barcode Acceptance Test .....                             | 341 |
| Capture Region Determination .....                        | 342 |

## Table of Contents

|   |     |
|---|-----|
| IDC Operating Mode = Anchored .....                   | 342 |
| IDC Operating Mode = Free-Form or Linked .....        | 342 |
| Image Post Processing .....                           | 343 |
| Data Transmission .....                               | 343 |
| PC Application and Programming Support .....          | 343 |
| Setting Parameters .....                              | 343 |
| Scanning Sequence Examples .....                      | 344 |
| Errors While Scanning .....                           | 344 |
| Image Document Capture Parameter Defaults .....       | 344 |
| IDC Operating Mode .....                              | 345 |
| IDC Symbology .....                                   | 346 |
| IDC X Coordinate .....                                | 347 |
| IDC Y Coordinate .....                                | 348 |
| IDC Width .....                                       | 348 |
| IDC Height .....                                      | 349 |
| IDC Aspect .....                                      | 349 |
| IDC File Format Selector .....                        | 350 |
| IDC Bits Per Pixel .....                              | 351 |
| IDC JPEG Quality .....                                | 351 |
| IDC Find Box Outline .....                            | 352 |
| IDC Minimum Text Length .....                         | 352 |
| IDC Maximum Text Length .....                         | 353 |
| IDC Captured Image Brighten .....                     | 353 |
| IDC Captured Image Sharpen .....                      | 354 |
| IDC Border Type .....                                 | 355 |
| IDC Delay Time .....                                  | 356 |
| IDC Zoom Limit .....                                  | 356 |
| IDC Maximum Rotation .....                            | 357 |
| Quick Start .....                                     | 358 |
| Sample IDC Setup .....                                | 358 |
| IDC Demonstrations .....                              | 359 |
| Anchored Mode Demo .....                              | 359 |
| Free-Form Mode Demo .....                             | 359 |
| Linked Mode Demo .....                                | 359 |
| Other Suggestions .....                               | 360 |
| Quick Start Form .....                                | 360 |
| <br>  |     |
| <b>Digimarc</b>                                       |     |
| Introduction .....                                    | 361 |
| Digimarc Symbology Selection .....                    | 361 |
| Picklist .....  | 361 |
| Digimarc Digital Watermarks .....                     | 362 |
| <br>  |     |
| <b>Data Formatting: ADF, MDF, Preferred Symbol</b>    |     |
| Introduction .....                                    | 363 |
| Advanced Data Formatting (ADF) .....                  | 363 |
| Multicode Data Formatting (Hand-held Mode Only) ..... | 363 |
| Programming a Scanner .....                           | 364 |
| MDF in Hands-Free Mode .....                          | 364 |

# Table of Contents

|  |     |
|--|-----|
| MDF Best Practices .....   | 365 |
| Preferred Symbol .....   | 366 |
| Data Parsing (UDI Scan+, Label Parse+ and Blood Bag Parse+) .....              | 366 |
| Scan a UDI Label using UDI Scan+ .....   | 367 |
| Scan a GS1 Label using Label Parse+ .....                                      | 367 |
| Scan a Blood Bag Label using Blood Bag Parse+ .....                            | 367 |
| <b>Driver's License Set Up (DS9908-DL/HL)</b>                                  |     |
| Introduction .....   | 368 |
| Driver's License Parsing .....   | 369 |
| Parsing Driver's License Data Fields (Embedded Driver's License Parsing) ..... | 370 |
| Embedded Driver's License Parsing Criteria - Code Type .....                   | 370 |
| Driver's License Parse Field Barcodes .....                                    | 371 |
| AAMVA Parse Field Barcodes .....   | 373 |
| Parser Version ID Barcode .....  | 382 |
| .....  | 382 |
| User Preferences .....   | 383 |
| Set Default Parameter .....  | 383 |
| Output Gender as M or F .....  | 383 |
| Date Format .....  | 384 |
| No Separator .....   | 385 |
| Send Keystroke (Control Characters and Keyboard Characters) .....              | 386 |
| Control Characters .....   | 386 |
| Keyboard Characters .....  | 390 |
| Parsing Rule Example .....   | 404 |
| Embedded Driver's License Parsing ADF Example .....                            | 408 |
| Introduction .....   | 410 |
| <b>Custom Tone</b>   |     |
| Downloading a Custom Tone via 123Scan .....                                    | 411 |
| Downloading a Custom Tone via Scanner SDK Sample Application .....             | 414 |
| <b>Parameter Defaults</b>  |     |
| <b>Numeric Barcodes</b>  |     |
| Cancel .....   | 432 |
| Numeric Barcodes .....   | 432 |
| <b>Alphanumeric Barcodes</b>   |     |
| Cancel .....   | 434 |
| Alphanumeric Barcodes .....  | 434 |
| <b>ASCII Character Sets</b>  |     |
| Introduction .....   | 451 |



|  |     |
|--|-----|
| <b>Programming Reference</b>   |     |
| Symbol Code Identifiers .....  | 462 |
| AIM Code Identifiers .....   | 463 |
| <br>   |     |
| <b>Communication Protocol Functionality</b>                              |     |
| Functionality Supported via Communication (Cable) Interface .....        | 469 |
| <br>   |     |
| <b>Country Codes</b>   |     |
| Introduction .....   | 471 |
| USB and Keyboard Wedge Country Keyboard Types (Country Codes) .....      | 472 |
| <br>   |     |
| <b>Country Code Pages</b>  |     |
| Introduction .....   | 487 |
| Country Code Page Defaults .....   | 487 |
| Country Code Page Barcodes .....   | 491 |
| <br>   |     |
| <b>CKJ Decode Control</b>  |     |
| Introduction .....   | 501 |
| CJK Control Parameters .....   | 501 |
| Unicode Output Control .....   | 501 |
| CJK Output Method to Windows Host .....                                  | 502 |
| Non-CJK UTF Barcode Output .....   | 504 |
| Country Keyboard Type Missing Characters .....                           | 504 |
| Unicode/CJK Decode Setup with Windows Host .....                         | 505 |
| Setting Up the Windows Registry Table for Unicode Universal Output ..... | 505 |
| Adding CJK IME on Windows .....  | 505 |
| Selecting the Simplified Chinese Input Method on the Host .....          | 507 |
| Selecting the Traditional Chinese Input Method on the Host .....         | 508 |
| <br>   |     |
| <b>Signature Capture</b>   |     |
| Introduction .....   | 509 |
| Code Structure .....   | 509 |
| Signature Capture Area .....   | 509 |
| CapCode Pattern Structure .....  | 510 |
| Start / Stop Patterns .....  | 510 |
| Dimensions .....   | 511 |
| Data Format .....  | 511 |
| Additional Capabilities .....  | 512 |
| Signature Boxes .....  | 512 |
| <br>   |     |
| <b>Non-Parameter Attributes (Attribute Data Dictionary)</b>              |     |
| Introduction .....   | 513 |
| Attributes .....   | 513 |
| Model Number .....   | 513 |
| Serial Number .....  | 513 |

## Table of Contents

|                                    |     |
|------------------------------------|-----|
| Date of Manufacture .....          | 514 |
| Date of First Programming .....    | 514 |
| Configuration Filename .....       | 514 |
| Beeper/LED .....                   | 515 |
| Parameter Defaults .....           | 516 |
| Parameter Buffer .....             | 516 |
| Beep on Next Bootup .....          | 516 |
| Reboot .....                       | 516 |
| Host Trigger Session .....         | 517 |
| Firmware Version .....             | 517 |
| Device Class .....                 | 517 |
| Scankit Version .....              | 517 |
| Combined Firmware Version .....    | 518 |
| RSM Version .....                  | 518 |
| Top Level Release Name .....       | 518 |
| Imagekit Version .....             | 518 |
| DL Parser Version .....            | 519 |
| DL Parser Activated .....          | 519 |
| ScanSpeed Analytics .....          | 519 |
| Introduction .....                 | 520 |
| Histogram Decode Information ..... | 520 |

### ScanSpeed Analytics

|  |     |
|--|-----|
| Image of Slowest Decoded Barcode ..... | 524 |
|--|-----|

### Sample Barcodes

|   |     |
|---|-----|
| UPC/EAN .....   | 526 |
| UPC-A, 100% .....   | 526 |
| UPC-A with 2-digit Add-on .....                             | 526 |
| UPC-A with 5-digit Add-on .....                             | 527 |
| UPC-E .....   | 527 |
| UPC-E with 2-digit Add-on .....                             | 527 |
| UPC-E with 5-digit Add-on .....                             | 528 |
| EAN-8 .....   | 528 |
| EAN-13, 100% .....  | 528 |
| EAN-13 with 2-digit Add-on .....                            | 529 |
| EAN-13 with 5-digit Add-on .....                            | 529 |
| Code 128 .....  | 529 |
| GS1-128 .....   | 530 |
| Code 39 .....   | 530 |
| Code 93 .....   | 530 |
| Code 11 with 2 Check Digits .....                           | 531 |
| Interleaved 2 of 5 .....                                    | 531 |
| MSI with 2 Check Digits .....                               | 531 |
| Chinese 2 of 5 .....  | 532 |
| Matrix 2 of 5 .....   | 532 |
| Korean 3 of 5 .....   | 532 |
| GS1 DataBar .....   | 533 |
| GS1 DataBar Omnidirectional (formerly GS1 DataBar-14) ..... | 533 |

## Table of Contents

|   |     |
|---|-----|
| GS1 DataBar Truncated .....               | 533 |
| GS1 DataBar Stacked .....                 | 533 |
| GS1 DataBar Stacked Omnidirectional ..... | 534 |
| GS1 DataBar Limited .....                 | 534 |
| GS1 DataBar Expanded .....                | 534 |
| GS1 DataBar Expanded Stacked .....        | 535 |
| 2D Symbologies .....                      | 535 |
| PDF417 .....                              | 535 |
| Data Matrix .....                         | 535 |
| GS1 Data Matrix .....                     | 536 |
| Maxicode .....                            | 536 |
| QR Code .....                             | 536 |
| GS1 QR .....                              | 536 |
| MicroQR .....                             | 537 |
| Aztec .....                               | 537 |
| Grid Matrix .....                         | 537 |
| Han Xin .....                             | 538 |
| Postal Codes .....                        | 538 |
| US Postnet .....                          | 538 |
| UK Postal .....                           | 538 |
| Japan Postal .....                        | 538 |
| Australian Post .....                     | 539 |
| OCR .....                                 | 539 |
| OCR-A .....                               | 539 |
| OCR-B .....                               | 539 |
| MICR E13B .....                           | 539 |
| US Currency .....                         | 540 |

## Index

# List of Figures

|  |            |
|--|------------|
| Figure 1. DS9908 Scanner                               | 28         |
| Figure 2. Parts of the Scanner                         | 30         |
| Figure 3. Inserting the Cable                          | 31         |
| Figure 4. Removing the Cable                           | 32         |
| Figure 5. Mounting With Adhesive On a Table Top        | 33         |
| Figure 6. Insert Three Screws                          | 34         |
| Figure 7. Insert the Scanner                           | 34         |
| Figure 8. Installing the Multi-Mount Bracket           | 35         |
| Figure 9. Insert the Scanner                           | 35         |
| Figure 10. Scanning in Hands-free Mode                 | 42         |
| Figure 11. Scanning in Hand-held Mode                  | 43         |
| Figure 12. Scanning Orientation with Imager Aiming Dot | 43         |
| Figure 13. Acceptable and Incorrect Aiming             | 43         |
| Figure 14. Scanner Cable Pinouts                       | 55         |
| Figure 15. USB Connection                              | 235        |
| Figure 16. RS-232 Connection                           | 276        |
| Figure 17. IBM Connection                              | 294        |
| Figure 18. Keyboard Wedge Connection                   | 300        |
| Figure 19. IBM PS2 Type Keyboard                       | 308        |
| Figure 20. Quick Start Form                            | 360        |
| Figure 21. Scanning Label in a Horizontal Orientation  | 364        |
| Figure 22. Scanning Label in a Vertical Orientation    | 365        |
| Figure 23. Figure Match Setting for Output             | 365        |
| Figure 24. 123Scan Utility                             | 411        |
| Figure 25. USB Parameter Change Window                 | 411        |
| Figure 26. General Parameters Section                  | 412        |
| Figure 27. <b>Enable Custom Scan Tone Window</b>       | <b>412</b> |
| Figure 28. Updated General Parameters Section          | 413        |
| Figure 29. Load Configuration Window                   | 413        |
| Figure 30. Load Configuration Complete Window          | 414        |
| Figure 31. Scanner SDK C++ Sample Application          | 415        |
| Figure 32. Sample Barcode                              | 416        |
| Figure 33. CapCode                                     | 509        |
| Figure 34. CapCode Structure                           | 510        |
| Figure 35. Acceptable Signature Boxes                  | 512        |
| Figure 36. 123Scan Statistics Tab - Histogram Data     | 521        |

# List of Tables

|   |     |
|---|-----|
| Table 1. DS9908 Scanner Only Configurations . . . . .   | 23  |
| Table 2. Scanner Accessories . . . . .  | 24  |
| Table 3. Scanner Speaker and LED Indications . . . . .  | 39  |
| Table 4. Typical Ranges . . . . .   | 44  |
| Table 5. Troubleshooting . . . . .  | 48  |
| Table 6. Technical Specifications . . . . .   | 52  |
| Table 7. DS9908 Scanner Signal Pin-outs . . . . .   | 55  |
| Table 8. User Preferences Parameter Defaults . . . . .  | 57  |
| Table 9. Image Capture Preferences Parameter Defaults . . . . .                                       | 98  |
| Table 10. Image Size . . . . .  | 109 |
| Table 11. Video Subsampling . . . . .   | 110 |
| Table 12. Output File Format . . . . .  | 117 |
| Table 13. Symbology Parameter Defaults . . . . .  | 124 |
| Table 14. USB Interface Parameter Defaults . . . . .  | 236 |
| Table 15. SSI Commands . . . . .  | 252 |
| Table 16. Values for Selecting Time Delay to Low Power . . . . .                                      | 257 |
| Table 17. SSI Interface Default Table . . . . .   | 261 |
| Table 18. Event Codes . . . . .   | 273 |
| Table 19. RS-232 Interface Parameter Defaults . . . . .   | 277 |
| Table 20. Terminal Specific RS-232 . . . . .  | 278 |
| Table 21. Terminal Specific Code ID Characters . . . . .  | 279 |
| Table 22. IBM 468X/469X Interface Parameter Defaults . . . . .  | 295 |
| Table 23. Keyboard Wedge Interface Parameter Defaults . . . . .                                       | 301 |
| Table 24. OCR Programming Default Table . . . . .   | 310 |
| Table 25. Table of Numeric Value Assignments for Computing HIBC LIC Data Format Check Digit . . . . . | 338 |
| Table 26. Intelligent Document Capture (IDC) Parameter Defaults . . . . .                             | 344 |
| Table 27. IDC Symbologies . . . . .   | 346 |
| Table 28. DL Parsing Parameter Table . . . . .  | 368 |
| Table 29. Parameter Defaults . . . . .  | 417 |
| Table 30. ASCII Character Set . . . . .   | 451 |
| Table 31. ALT Key Character Set . . . . .   | 456 |
| Table 32. GUI Key Character Set . . . . .   | 457 |
| Table 33. PF Key Character Set . . . . .  | 458 |
| Table 34. F Key Character Set . . . . .   | 459 |
| Table 35. Numeric Key Character Set . . . . .   | 459 |
| Table 36. Extended Key Character Set . . . . .  | 460 |
| Table 37. Symbol Code Characters . . . . .  | 462 |
| Table 38. Aim Code Characters . . . . .   | 463 |
| Table 39. Modifier Characters . . . . .   | 464 |
| Table 40. Communication Interface Functionality . . . . .   | 469 |
| Table 41. Country Code Page Defaults . . . . .  | 487 |
| Table 42. Missing Characters . . . . .  | 504 |

## List of Tables

|   |     |
|---|-----|
| Table 43. Missing Characters .....  | 505 |
| Table 44. Start / Stop Pattern Definitions .....                                  | 510 |
| Table 45. User Defined CapCode Parameters .....                                   | 510 |
| Table 46. Data Format.....  | 511 |
| Table 47. Attributes Numbers of Barcode Symbology Statistic Information .....     | 521 |
| Table 48. RSM Attributes to Store/Retrieve Image of Slowest Decoded Barcode ..... | 524 |

# About This Guide

---

## Introduction

The DS9908 scanner Product Reference Guide provides general instructions for setting up, operating, maintaining, and troubleshooting the DS9908 scanner.

---

## Configurations

This guide includes the DS9908 scanner configurations listed in [Table 1](#).

**Table 1** DS9908 Scanner Only Configurations

| Configuration      | Description  |
|--------------------|--|
| DS9908-DL00004ZZNA | Presentation Area Imager, DL Parsing, Corded, Midnight Black - North America Only                              |
| DS9908-DL00004ZCNA | Presentation Area Imager, DL Parsing, Corded, Midnight Black, Checkpoint EAS - North America Only              |
| DS9908-HD4000WZZWW | Presentation Area Imager, High Density, Corded, Alpine White   |
| DS9908-HD4000WZZY  | Presentation Area Imager, High Density, Corded, Alpine White - India Only                                      |
| DS9908-HL4000WZZNA | Presentation Area Imager, High Density With DL Parsing, Corded, Alpine White - North America Only              |
| DS9908-SR00004ZZY  | Presentation Area Imager, Standard Range, Corded, Midnight Black - India Only                                  |
| DS9908-SR00004ZZWW | Presentation Area Imager, Standard Range, Corded, Midnight Black   |
| DS9908-SR00004ZCWW | Presentation Area Imager, Standard Range, Corded, Midnight Black, Checkpoint EAS                               |
| DS9908-TT00004ZZJP | Presentation Area Imager, Standard Range With Toshiba TEC, Corded, Midnight Black - Japan Only                 |
| DS9908-TT00004ZCJP | Presentation Area Imager, Standard Range With Toshiba TEC, Corded, Midnight Black, Checkpoint EAS - Japan Only |

## Accessories



**NOTE:** Check Solution Builder for additional information regarding all available accessories, and the latest available configurations.

The scanner ships with the DS9908 Quick Start Guide. The following required accessories must be ordered:

- Interface cable for the appropriate interface. For example, a shielded connector cable when connecting via USB.



**IMPORTANT:** If you already have existing non shielded cables from legacy products (such as the DS9808) they can be reused. However, be aware that the shielded cables provide improved ESD performance.

- Universal power supply, if the interface requires this.

The product configurations related to the DS9908 scanner are listed in [Table 2](#).

**Table 2** Scanner Accessories

| Product Type                  | Part Number  | Description   |
|-------------------------------|--|---|
| Cables                        | For information about cables, cable compatibility, and the full list of supported cables go to the Zebra Partner Portal at:<br><a href="https://partnerportal.zebra.com/PartnerPortal/product_services/downloads_z/barcode_scanners/Universal-Cable-Guide-Bar-Code-Scanners.xlsx">https://partnerportal.zebra.com/PartnerPortal/product_services/downloads_z/barcode_scanners/Universal-Cable-Guide-Bar-Code-Scanners.xlsx</a> . |   |
| Stands and Holders (optional) | BRKT-MM0099C-04  | DS9908 Multi-mount bracket, Black. Can be used as wall mount or table mount. See <a href="#">Mounting the Scanner on page 33</a> for installation instructions. |
| Power Supplies (if required)  | PWR-WUA5V4W0US   | Power Supply, 5VDC, 100 - 240VAC, US/CA/MX/JP/TW  |
|                               | PWR-WUA5V4W0BR   | Power Supply, 5VDC, 100 - 240VAC, KR (Korea)  |
|                               | PWR-WUA5V4W0EU   | Power Supply, 5VDC, 100 - 240VAC, EU/UK   |
|                               | PWR-WUA5V4W0CN   | Power Supply, 5VDC, 100 - 240VAC, CN  |
|                               | PWR-WUA5V4W0AU   | Power Supply, 5VDC, 100 - 240VAC, HK/AU   |



---

# Chapter Descriptions

Topics covered in this guide are as follows:

- [Getting Started](#) provides a product overview, unpacking instructions, and cable connection information.
- [123Scan and Software Tools](#) describes the Zebra software tools available for customizing scanner operation.
- [Data Capture](#) describes parts of the scanner, speaker and LED definitions, and how to use the scanner in hand-held and hands-free (presentation) modes.
- [Maintenance, Troubleshooting, and Technical Specifications](#) provides information on how to care for the scanner, troubleshooting, and technical specifications.
- [User Preferences & Miscellaneous Options](#) describes features frequently used to customize how data transmits to the host device and programming barcodes for selecting user preference features for the scanner.
- [Imager Preferences](#) provides imaging preference features and programming barcodes for selecting these features.
- [Symbologies](#) describes all symbology features and provides programming barcodes for selecting these features for the scanner.
- [USB Interface](#) describes how to set up the scanner with a USB host.
- [SSI Interface](#) describes the system requirements of the Simple Serial Interface (SSI), which provides a communications link between Zebra decoders and a serial host.
- [RS-232 Interface](#) describes how to set up the scanner with an RS-232 host, such as point-of-sale devices, host computers, or other devices with an available RS-232 port.
- [IBM Interface](#) describes how to set up the scanner with IBM 468X/469X POS systems.
- [Keyboard Wedge Interface](#) describes how to set up a Keyboard Wedge interface with the scanner.
- [OCR Programming](#) describes how to set up the scanner for OCR programming.
- [Intelligent Document Capture \(Hand-held Mode Only\)](#) describes IDC, an advanced image processing firmware, including IDC functionality, parameter barcodes to control its features, and a quick start procedure.
- [Digimarc](#) provides barcodes to either enable or disable Digimarc Barcode, a machine-readable code that is invisible to people.
- [Data Formatting: ADF, MDF, Preferred Symbol](#) briefly describes the Zebra features available for customizing scanner operation.
- [Driver's License Set Up \(DS9908-DL/HL\)](#) describes how the DS9908-DL scanner can parse out information from standard US driver's licenses and certain other American Association of Motor Vehicle Administrators (AAMVA) compliant ID cards.
- [Custom Tone](#) provides information about downloading a custom tone to sound when a good decode occurs.
- [Parameter Defaults](#) provides a table of all host devices and miscellaneous scanner defaults.
- [Numeric Barcodes](#) includes the numeric barcodes to scan for parameters requiring specific numeric values.
- [Alphanumeric Barcodes](#) includes the barcodes representing the alphanumeric keyboard, used when setting ADF rules.
- [ASCII Character Sets](#) provides ASCII character value tables.

- [Programming Reference](#) provides a table of AIM code identifiers, ASCII character conversions, and keyboard maps.
- [Communication Protocol Functionality](#) lists supported scanner functionality by communication protocol.
- [Country Codes](#) provides barcodes for programming the country keyboard type for the USB keyboard (HID) device and the keyboard wedge host.
- [Country Code Pages](#) provides barcodes for selecting code pages for the country keyboard type.
- [CKJ Decode Control](#) describes control parameters for Unicode/CJK (Chinese, Japanese, Korean) barcode decode through USB HID Keyboard Emulation mode.
- [Signature Capture](#) provides information on CapCode, a signature capture code that encloses a signature area on a document and allows a scanner to capture a signature.
- [Non-Parameter Attributes \(Attribute Data Dictionary\)](#) defines non-parameter attributes.
- [ScanSpeed Analytics](#) describes the Zebra ScanSpeed Analytics software that allows the identification of barcodes that slow down processes.
- [Sample Barcodes](#) includes sample barcodes of various code types.

---

## Notational Conventions

The following conventions are used in this document:

- **Bold** text is used to highlight the following:
  - Dialog box, window and screen names
  - Drop-down list and list box names
  - Check box and radio button names
  - Icons on a screen
  - Key names on a keypad
  - Button names on a screen.
- Bullets (•) indicate:
  - Action items
  - Lists of alternatives
  - Lists of required steps that are not necessarily sequential.
- Sequential lists (e.g., those that describe step-by-step procedures) appear as numbered lists.

---

### Related Documents and Software

- DS9908 Quick Start Guide, p/n MN-003189-xx, provides general information for getting started with the DS9908 scanner, and includes basic set up and operation instructions.
- Advanced Data Formatting Programmer Guide, p/n 72E-69680-xx - provides information on ADF, a means of customizing data before transmission to a host.
- Multicode Data Formatting and Preferred Symbol (MDF) User Guide, p/n MN-002895-xx, provides programming instructions for using MDF and Preferred Symbol on the DS9908 scanner.
- Plural Stage Programmer's Guide, p/n 72E-67113-xx, provides the barcodes necessary to program the DS9908 scanner to decode Plural Stage barcodes and enable Supplemental Recognition Characters.
- Toshiba TEC Programmer's Guide, p/n MN-002707-xx, provides the barcodes necessary to program the DS9908 scanner for the Toshiba TEC host.

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

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### Service Information

If you have a problem with your equipment, contact Zebra Global Customer Support for your region. Contact information is available at: [zebra.com/support](https://zebra.com/support).

When contacting support, please have the following information available:

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

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

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

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

# Getting Started

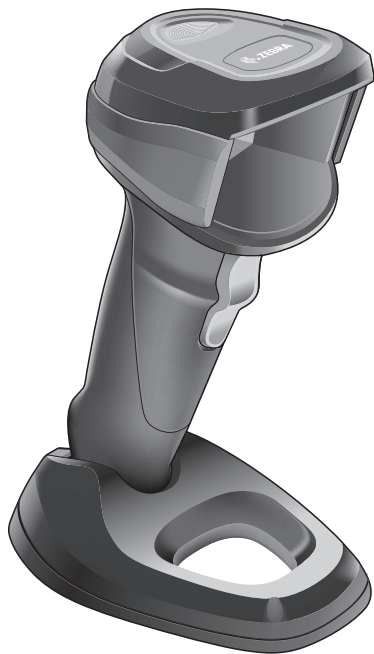
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## Introduction

The Zebra DS9908 is the newest generation premium hybrid hand-held/hands-free imager.

The DS9908 combines superior 1D and 2D barcode scanning with advanced imaging applications in a light-weight, hands-free/hand-held design. Its unique design offers the performance of a hands-free presentation scanner and the flexibility of a hand-held. The DS9908 automatically switches between hands-free and hand-held modes seamlessly accommodating both presentation and hand-held triggered operation.

**Figure 1** DS9908 Scanner



---

## Interfaces



**NOTE:** Only the Symbol Native API (SNAPI) with Imaging interface supports image capture. See [USB Device Type on page 237](#) to enable this host.

The DS9908 scanner supports:

- USB connection to a host. The scanner autodetects a USB host and defaults to the HID keyboard interface type. Select other USB interface types by scanning programming barcode menus. This interface supports the international keyboards (for Windows® environment) included in the chapter [Country Codes](#).
- Standard RS-232 connection to a host. Scan barcode menus to set up communication of the scanner with the host.
- Connection to IBM 468X/469X hosts. Scan barcode menus to set up communication of the scanner with the IBM terminal.
- Keyboard Wedge connection to a host. The host interprets scanned data as keystrokes. Scan barcode menus to set up communication of the scanner with the host. This interface supports the international keyboards (for Windows® environment) included in the chapter [Country Codes](#).

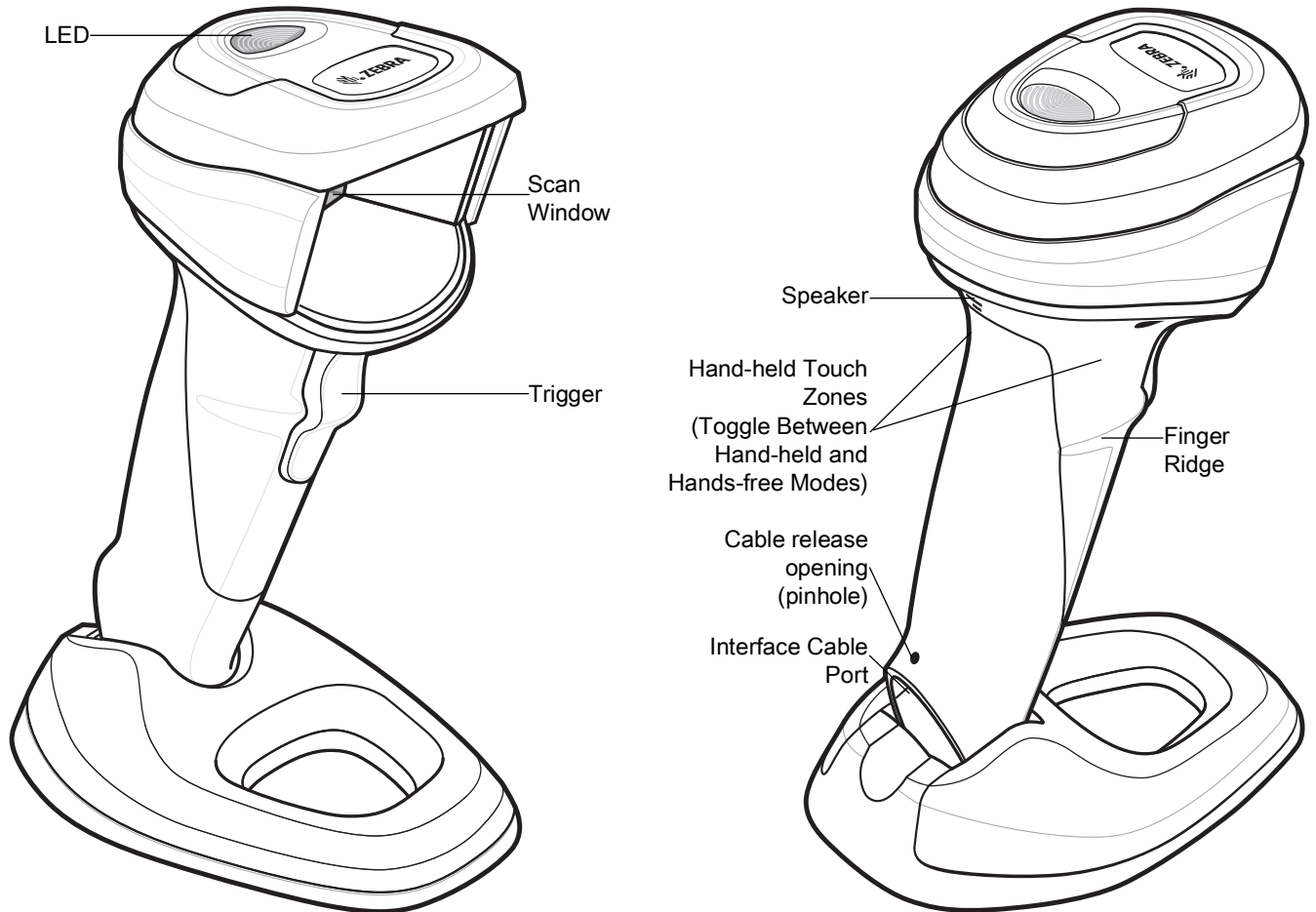
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## Unpacking

Remove the scanner from its packing and inspect it for damage. If the scanner was damaged in transit, contact support. See [page 27](#) for contact information. **KEEP THE PACKING.** It is the approved shipping container; use this to return the equipment for servicing.

## Features

Figure 2 Parts of the Scanner



**NOTE:** The hand-held touch zones are touch sensitive areas that enable the scanner to determine if it is sitting on the counter or picked up by the user. To activate the touch zones, fingers must be placed in the zone above the finger ridges on both sides of the scanner. See [Figure 11 on page 43](#) for proper finger placement.

## Setting Up the Scanner

### Inserting the Interface Cable



**NOTE:** Different hosts require different cables. The connectors illustrated in each host chapter are examples only. Connectors vary from those illustrated, but the steps to connect the scanner are the same.

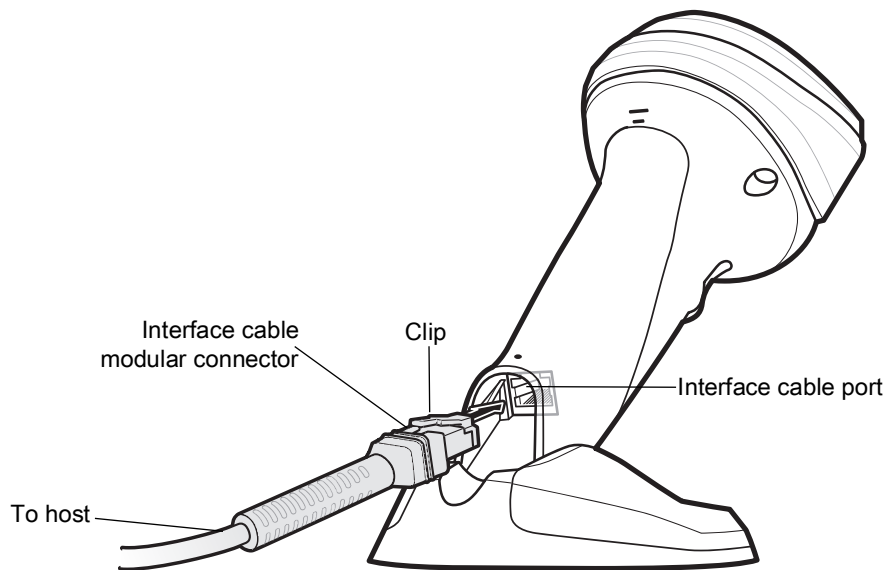
1. Plug the interface cable modular connector into the cable interface port on the bottom of the scanner handle (see [Figure 3](#)). It is recommended to rotate/ratchet the scanner all the way forward and then insert the cable.



**IMPORTANT:** If you already have existing non shielded cables from legacy products (such as the DS9808) they can be reused. However, be aware that the shielded cables provide improved ESD performance. For information about cables and cable compatibility, go to the Zebra Partner Portal at:

[https://partnerportal.zebra.com/PartnerPortal/product\\_services/downloads\\_z/barcode\\_scanners/Universal-Cable-Guide-Bar-Code-Scanners.xlsx](https://partnerportal.zebra.com/PartnerPortal/product_services/downloads_z/barcode_scanners/Universal-Cable-Guide-Bar-Code-Scanners.xlsx).

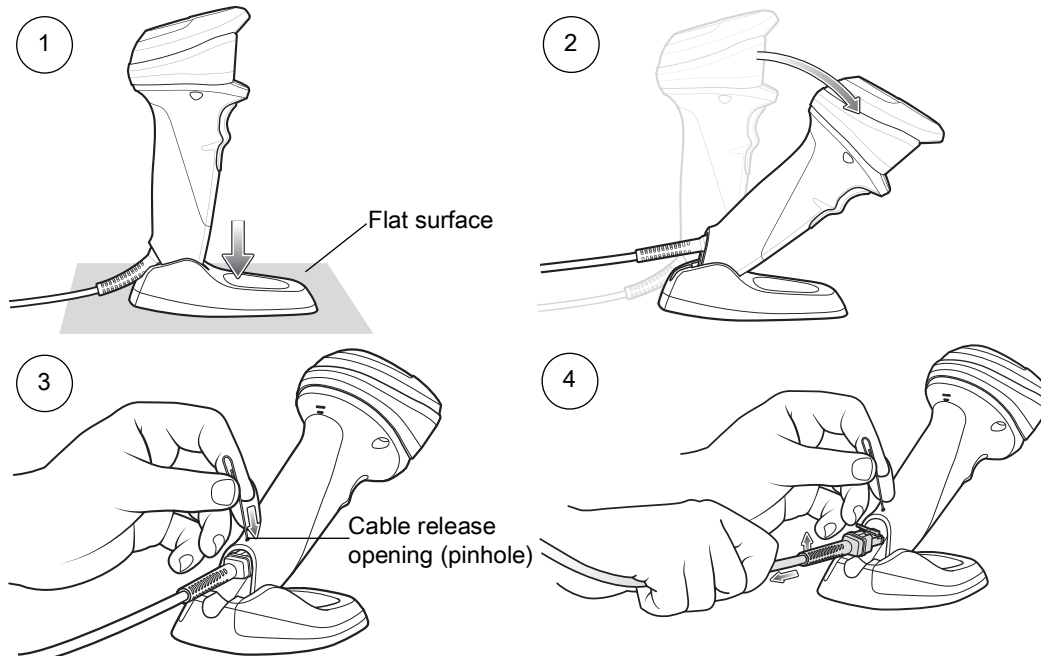
**Figure 3** Inserting the Cable



2. Gently tug the cable to ensure the connector is secure.
3. Connect the other end of the interface cable to the host (see the specific host chapter for information on host connections).

## Removing the Interface Cable

**Figure 4** Removing the Cable



1. Place the scanner on a flat surface.
2. Ratchet the scanner all the way forward.
3. Insert a paper clip into the circular cable release opening (pinhole) to compress the modular connector clip.
4. Pull the cable/connector UP and OUT of the connection and carefully slide out the cable.
5. Follow the steps for [Inserting the Interface Cable](#) to connect a new cable.

## Connecting Power (if required)

If the host does not provide power to the scanner, connect an external power supply:

1. Connect the interface cable to the base of the scanner, as described in [Inserting the Interface Cable on page 31](#).
2. Connect the other end of the interface cable to the host (refer to the host manual to locate the correct port).
3. Plug the power supply into the power jack on the interface cable. Plug the other end of the power supply into an AC outlet.

## Configuring the Scanner

To configure the scanner use the barcodes included in this manual. See [User Preferences & Miscellaneous Options](#) and [Imager Preferences](#) for information about programming the scanner using barcode menus. Also see each host-specific chapter to set up connection to a specific host type.



## Mounting the Scanner

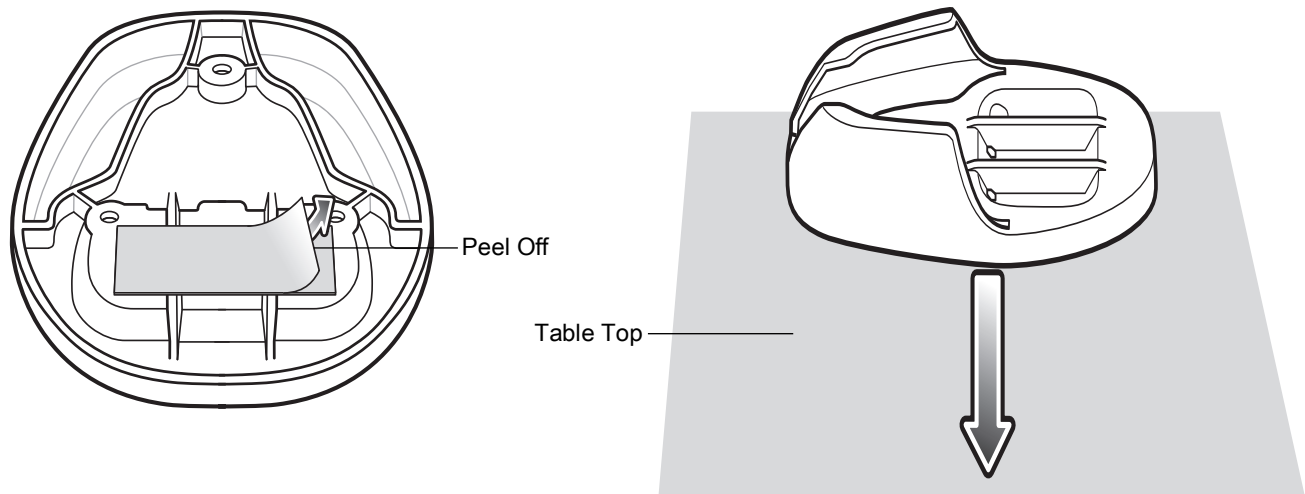
The optional multi-mount bracket is required when mounting the scanner to a table top or wall (or other vertical surface). When mounting to a table top, use either screws or the adhesive pad. When mounting to a wall (or other vertical surface) screws are required.



**NOTE:** When mounting to a table top screws are more secure than the adhesive pad.

### Table Top Mount With Adhesive Pad

**Figure 5** Mounting With Adhesive On a Table Top



To mount the optional multi-mount bracket using the adhesive pad:

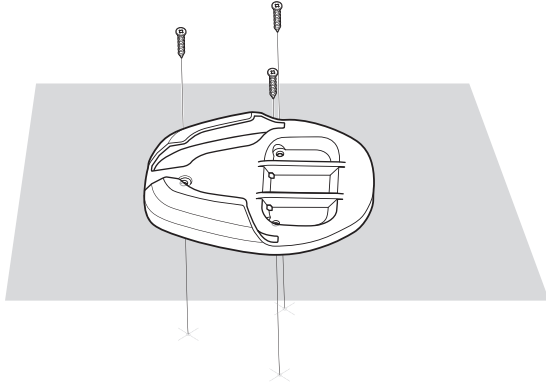
1. Clean the table top surface with Isopropyl alcohol to remove any dirt or debris.
2. Peel the corner of the paper liner off the tape on the bottom of the multi-mount bracket ([Figure 5](#)).
3. Press the bottom of the multi-mount bracket on the flat table top and apply uniform pressure for minimally 10 seconds to secure it to the surface ([Figure 5](#)).
4. Slide the base of the scanner into the bracket ([Figure 7](#)).

## Table Top Mount With Screws

To mount the optional multi-mount bracket with screws:

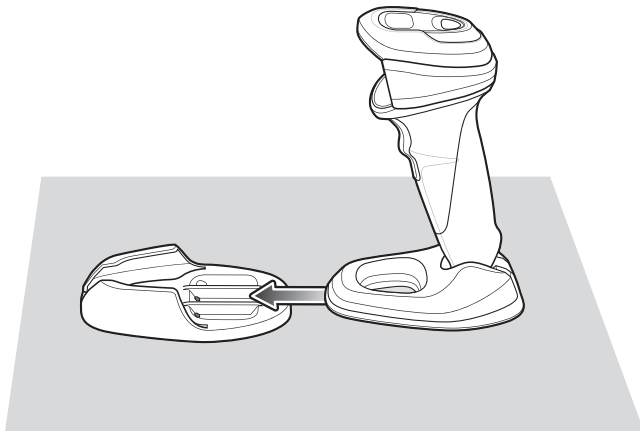
1. Place the bracket in the desired location on the table top.
2. Insert three #6 screws (not included) through each screw hole in the bracket.

**Figure 6** Insert Three Screws



3. Screw into place until secure.
4. Slide the base of the scanner into the bracket.

**Figure 7** Insert the Scanner

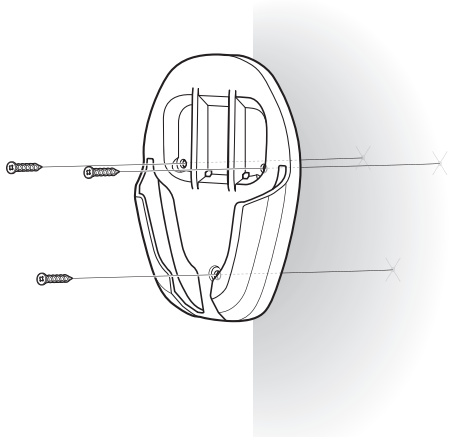


## Mounting on a Wall

To mount the DS9908 on a wall:

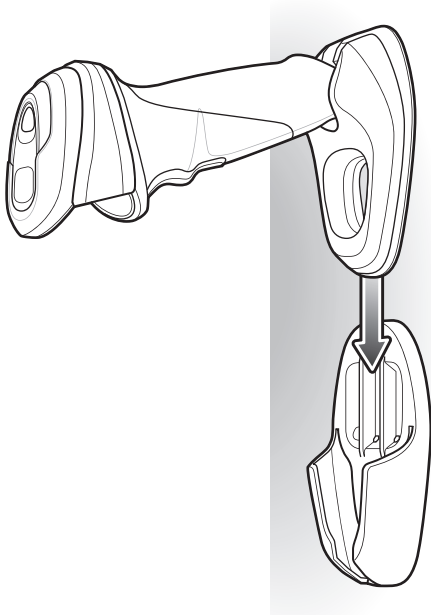
1. Place the bracket in its desired location on the wall and insert three #6 screws (not included) through each screw hole in the bracket.

**Figure 8** Installing the Multi-Mount Bracket



2. Tighten the screws to secure the bracket to the wall.
3. Slide the base of the scanner into the bracket, oriented so the scan window faces down ([Figure 9](#)).

**Figure 9** Insert the Scanner



# 123Scan and Software Tools

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## Introduction

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

---

## 123Scan

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

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

Through 123Scan a user can:

- Configure a scanner using a wizard.
  - Program the following scanner settings.
    - Speaker tone / volume settings.
    - Enable / disable symbologies.
    - Communication settings.
  - Modify data before transmission to a host using:
    - Advanced Data Formatting (ADF) - Scan one barcode per trigger pull.
    - Multicode Data Formatting (MDF) - Scan many barcodes in one trigger pull (select scanners).
    - Preferred Symbol - Single out one barcode on label of many (select scanners).
- Load parameter settings to a scanner via the following.
  - Barcode scanning.
    - Scan a paper barcode.
    - Scan a barcode from a PC screen.
    - Scan a barcode from a smart phone screen.
  - Download over a USB cable.
    - Load settings to one scanner.
    - Stage up to 10 scanners simultaneously (Powered USB Hub recommended with 0.5 amp / port).

- Validate scanner setup.
  - View scanned data within the utility's **Data** view screen.
  - Capture an image and save to a PC within the utility's **Data** view screen.
  - Review settings using the Parameter Report.
  - Clone settings from an already deployed scanner from the **Start** screen.
- Upgrade scanner firmware.
  - Load settings to one scanner.
  - Stage up to 10 scanners simultaneously (Powered USB Hub recommended with 0.5 amp / port).
- View statistics such as:
  - Asset tracking information.
  - Time and usage information.
  - Barcodes scanned by symbology.
  - Battery diagnostics (select scanners).
- Generate the following reports.
  - Barcode Report - Programming barcode, included parameter settings, and supported scanner models.
  - Parameter Report - Parameters programmed within a configuration file.
  - Inventory Report - Scanner asset tracking information.
  - Validation Report - Scanned data from the **Data** view.
  - Statistics Report - All statistics retrieved from the scanner.

For more information go to: [zebra.com/123Scan](https://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 7, 8, and 10
- Scanner
- USB cable.

## 123Scan Information

For more information on 123Scan, go to: [zebra.com/123Scan](https://zebra.com/123Scan).

For a 1 minute tour of 123Scan, go to: [zebra.com/ScannerHowToVideos](https://zebra.com/ScannerHowToVideos).

To see a list of all of our software tools, go to: [zebra.com/scannersoftware](https://zebra.com/scannersoftware).

## Scanner SDK, Other Software Tools, and Videos

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

To download any of the following free tools, go to: [zebra.com/scannersoftware](https://zebra.com/scannersoftware).

- 123Scan configuration utility
- SDKs
  - Scanner SDK for Windows
  - Scanner SDK for Linux
  - Scanner SDK for Android
- Drivers
  - OPOS driver
  - JPOS driver
  - USB CDC driver
  - TWAIN driver
- Scanner Management Service (SMS) for Remote Management
  - Windows
  - Linux
- How-To-Videos



**NOTE:** For a list of SDK supported scanner functionality by communication protocol, see [Communication Protocol Functionality](#).

# Data Capture

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## Introduction

This chapter provides speaker and LED definitions, general instructions and tips about scanning, and decode zone diagrams.

---

## Speaker and LED Indicators

In addition to beep sequences, the scanner uses a two-color LED to indicate status.

- The DS9908 scanner includes one LED indicator for system/decode indications.

[Table 3](#) defines beep sequences that occur during both normal scanning and while programming the scanner; LED colors that display during scanning.

**Table 3** Scanner Speaker and LED Indications

| Speaker Sequence                  | LED                              | Indication   |
|-----------------------------------|----------------------------------|--|
| <b>Standard Use</b>               |                                  |  |
| Low/medium/high beeps             | Green                            | Power up.  |
| Medium beep<br>(or as configured) | Green                            | A barcode was successfully decoded. (See <a href="#">User Preferences Parameter Defaults on page 57</a> for programming speaker sounds.) |
| None                              | Green (solid)                    | Presentation (Hands-free) Mode on.   |
| None                              | No LED (green LED is turned off) | Presentation (Hands-free) Mode off.  |
| Four long low beeps               | Red                              | A transmission error occurred. The data is ignored. This occurs if a unit is not properly configured. Check option setting.              |
| Five long low beeps               | Red                              | Conversion or format error.  |
| None                              | Red (blinking) on trigger pull   | Scanner is disabled by a host command to the scanner.  |
| <b>Image Capture</b>              |                                  |  |
| Low beep                          | Green (blinking)                 | Snapshot mode started.   |

**Table 3** Scanner Speaker and LED Indications (Continued)

| Speaker Sequence                            | LED   | Indication  |
|---|---|---|
| Low beep                                    | Default Green LED based upon hand-held or hands-free mode | Snapshot mode completed.  |
| High/low beeps                              | Default Green LED based upon hand-held or hands-free mode | Snapshot mode timed-out.  |
| <b>Parameter Programming</b>                |   |   |
| Long low/long high beeps                    | Red   | Input error; incorrect barcode or <b>Cancel</b> scanned, wrong entry, incorrect barcode programming sequence; remain in program mode. |
| High/low beeps                              | Green   | Number expected. Enter value using numeric barcodes.  |
| High/low/high/low beeps                     | Green   | Successful program exit with change in the parameter setting.   |
| <b>ADF Programming</b>                      |   |   |
| Low/high/low beeps                          | None  | ADF transmit error.   |
| High/low beeps                              | Green   | Number expected. Enter another digit. Add leading zeros to the front if necessary.  |
| Low/low beeps                               | Green   | Alphanumeric expected. Enter another alphanumeric character or scan the <b>End of Message</b> barcode.                                |
| High/high beeps                             | Green blinking  | ADF criteria or action is expected. Enter another criteria or action or scan the <b>Save Rule</b> barcode.                            |
| High/low/low beeps                          | Green   | All criteria or actions cleared for current rule, continue entering rule.   |
| High/low/high/low beeps                     | Green<br>(turns off after blinking)                       | Rule saved. Rule entry mode exited.   |
| Long low/long high beeps                    | Red   | Rule error. Entry error, wrong barcode scanned, or criteria/action list is too long for a rule. Re-enter criteria or action.          |
| Low beep                                    | Green   | Deleted last saved rule. The current rule is left intact.   |
| Low/high/high beeps                         | Green   | All rules deleted.  |
| Long low/long high/long low/long high beeps | Red   | Out of rule memory. Erase some existing rules, then try to save rule again.   |
| Long low/long high/long low beeps           | Green<br>(turns off after blinking)                       | Cancel rule entry. Rule entry mode exited because of an error or the user asked to exit rule entry.                                   |
| <b>Host Specific</b>                        |   |   |
| <b>USB only</b>                             |   |   |
| Four high beeps                             | None  | Scanner has not completed initialization. Wait several seconds and scan again.  |
| <b>RS-232 only</b>                          |   |   |
| Low/low/low/extra low beeps                 | Red   | RS-232 receive error (parity error).  |
| High beep                                   | None  | A <BEL> character is received when Beep on <BEL> is enabled (Point-to-Point mode only).   |



**Table 3** Scanner Speaker and LED Indications (Continued)

| Speaker Sequence  | LED                   | Indication  |
|---|-----------------------|---|
| <b>123Scan only (When in use, the utility controls the scanner LED)</b> |                       |   |
| None  | Green (slow blinking) | Scanner connected to 123Scan.   |
| None  | Red (fast blinking)   | File being transferred to the scanner (parameters and firmware).  |
| None  | Red (slow blinking)   | Firmware being activated on the scanner, loaded into memory.  |
| None  | Green (solid)         | Programming completed successfully (parameters and firmware).   |
| None  | Red (solid)           | Error state.  |
| <b>SMS only</b>   |                       |   |
| None  | Red (blinking)        | Loading the SMS package to scanner.   |
| <b>Maintenance Indications</b>  |                       |   |
| High/high beeps   | Red (stays on)        | Enter Bootloader.   |
| None  | Red (blinking)        | Firmware installation.  |
| <b>Macro PDF</b>  |                       |   |
| Low/low beeps   | None                  | Buffered File ID error. A barcode not in the current MPDF sequence was scanned.   |
| Long low/long low beeps (2 long low beeps)                              | None                  | File ID error. A barcode not in the current MPDF sequence was scanned.  |
| Long low/long low/long low beeps (3 long low beeps)                     | None                  | Out of memory. There is not enough buffer space to store the current MPDF symbol.   |
| Long low/long low/long low/long low beeps (4 long low beeps)            | None                  | Bad symbology. Scanned a 1D or 2D barcode in an MPDF sequence, a duplicate MPDF label, a label in an incorrect order, or trying to transmit an empty or illegal MPDF field. |
| Long low/long low/long low/long low/long low beeps (5 long low beeps)   | None                  | Flushing MPDF buffer.   |
| Fast Warble   | None                  | Aborting MPDF sequence.   |
| Low/high beeps  | None                  | Flushing an already empty MPDF buffer.  |

## Scanning

The DS9908 has a built-in, light-weight stand to easily accommodate both hands-free (presentation) and hand-held scanning.

Scanning features include hand-held touch zones which are touch sensitive areas that switch the scanner between hand-held and hands-free modes (see [Parts of the Scanner on page 30](#)). To enable the touch zones, fingers must be placed in the zone above the finger ridges on both sides of the scanner. See [Figure 11 on page 43](#) for proper finger placement.



**NOTE:** SR and DL models emit red illumination and a red aiming dot.

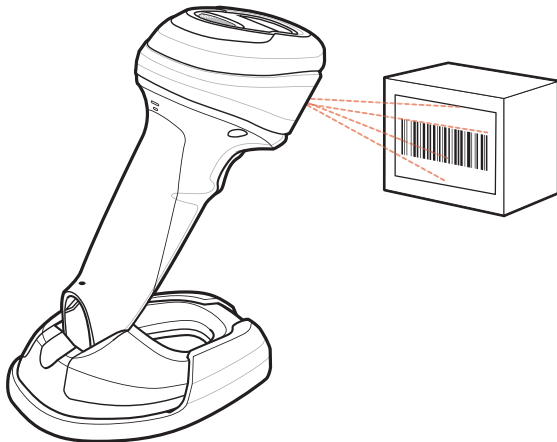
HD and HL models emit white illumination and green aiming dot.

## Hands-free Scanning

The scanner is in hands-free (presentation) mode when it sits on a counter top, or when it is mounted on a wall using the multi-mount bracket. In this mode, the scanner operates in continuous (constant-on) mode, where it automatically decodes a barcode presented in its field of view.

In hands-free mode the LED indicator turns solid green. An aiming dot may appear.

**Figure 10** Scanning in Hands-free Mode

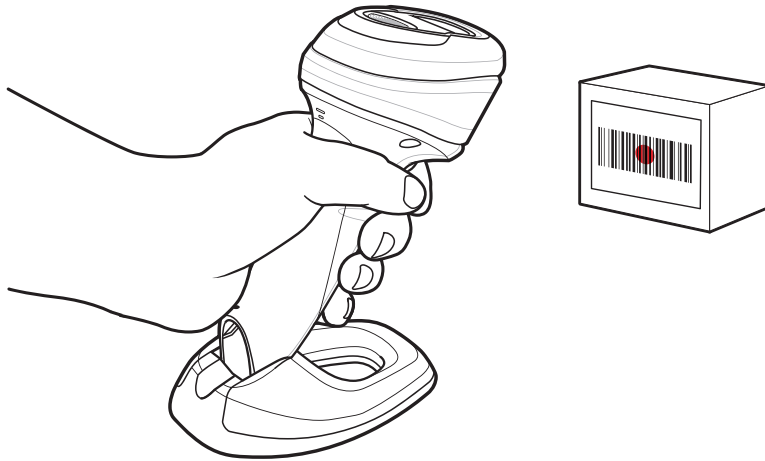


## Hand-held Scanning

When lifted off the counter or removed from the multi-mount bracket, the scanner operates in standard trigger mode. Aim the scanner at a barcode and pull the trigger to decode.

In hand-held mode the LED indicator turns off. An aiming dot may appear.

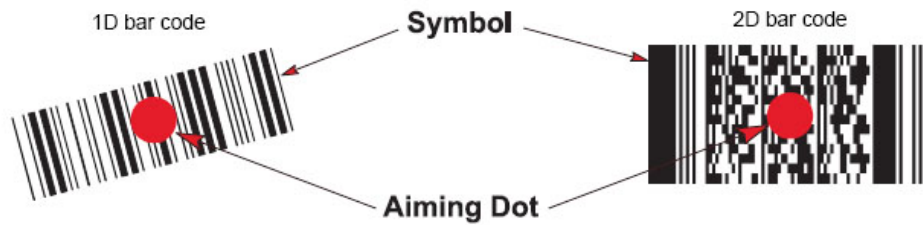
**Figure 11** Scanning in Hand-held Mode



## Aiming

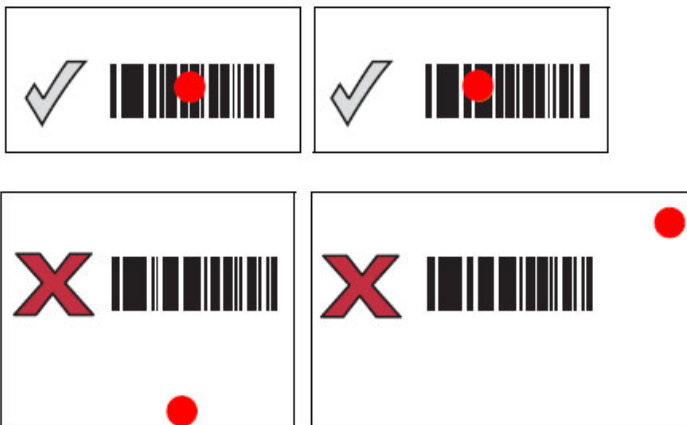
The scanner may project an LED dot which allows positioning the barcode within its field of view. See [Decode Ranges on page 44](#) for the proper distance to achieve between the scanner and a barcode.

**Figure 12** Scanning Orientation with Imager Aiming Dot



The scanner can also read a barcode presented within the aiming dot not centered. The top examples in [Figure 13](#) show acceptable aiming options, while the bottom examples can not be decoded.

**Figure 13** Acceptable and Incorrect Aiming



The aiming dot is smaller when the scanner is closer to the symbol and larger when it is farther from the symbol. Scan symbols with smaller bars or elements (mil size) closer to the scanner, and those with larger bars or elements (mil size) farther from the scanner.

The scanner beeps to indicate that it successfully decoded the barcode. For more information on speaker and LED definitions, see [Table 3 on page 39](#).

## Decode Ranges

### DS9908-SR/DL/HD/HL Configurations

Table 4 Typical Ranges

| Code Type   | Symbol Density | Range | Configuration      |                   |
|-------------|----------------|-------|--------------------|-------------------|
|             |                |       | SR/DL (cm/in)      | HD/HL (cm/in)     |
| Code 39     | 3 mil          | near  | 2.9 cm / 1.1 in    | 3.4 cm / 1.3 in   |
|             |                | far   | 7.7 cm / 3.0 in    | 9.5 cm / 3.7 in   |
|             | 20 mil         | near  | 2.5 cm / 1.0 in    | 0.8 cm / 0.3 in   |
|             |                | far   | 109.1 cm / 42.9 in | 67.6 cm / 26.6 in |
| Code 128    | 3 mil          | near  | 3.5 cm / 1.4 in    | 3.7 cm / 1.4 in   |
|             |                | far   | 9.0 cm / 3.5 in    | 10.6 cm / 4.2 in  |
|             | 5 mil          | near  | 2.6 cm / 1.0 in    | 1.9 cm / 0.8 in   |
|             |                | far   | 18.1 cm / 7.1 in   | 19.0 cm / 7.5 in  |
|             | 15 mil         | near  | 2.6 cm / 1.0 in    | 2.6 cm / 1.0 in   |
|             |                | far   | 70.3 cm / 27.7 in  | 50.8 cm / 20.0 in |
| 100% UPC    | 13 mil         | near  | 0.0 cm / 0.0 in    | 0.0 cm / 0.0 in   |
|             |                | far   | 62.6 cm / 24.7 in  | 48.5 cm / 19.1 in |
| PDF417      | 5 mil          | near  | 3.6 cm / 1.4 in    | 3.2 cm / 1.2 in   |
|             |                | far   | 12.7 cm / 5.0 in   | 14.5 cm / 5.7 in  |
|             | 6.67 mil       | near  | 3.1 cm / 1.2 in    | 2.1 cm / 0.8 in   |
|             |                | far   | 20.2 cm / 8.0 in   | 20.2 cm / 8.0 in  |
| Data Matrix | 5.0 mil        | near  | N/A                | 6.8 cm / 2.7 in   |
|             |                | far   | N/A                | 9.1 cm / 3.6 in   |
|             | 7.5 mil        | near  | 3.0 cm / 1.2 in    | 3.2 cm / 1.3 in   |
|             |                | far   | 17.4 cm / 6.9 in   | 16.6 cm / 6.5 in  |
|             | 10 mil         | near  | 3.3 cm / 1.3 in    | 1.2 cm / 0.5 in   |
|             |                | far   | 23.6 cm / 9.3 in   | 23.7 cm / 9.3 in  |
| QR Code     | 10 mil         | near  | 2.5 cm / 1.0 in    | 1.3 cm / 0.5 in   |
|             |                | far   | 19.3 cm / 7.6 in   | 18.4 cm / 7.2 in  |
|             | 20 mil         | near  | 2.6 cm / 1.0 in    | 0.0 cm / 0.0 in   |
|             |                | far   | 45.7 cm / 18.0 in  | 34.8 cm / 13.7 in |

---

## Electronic Article Surveillance (EAS)



**NOTE:** EAS is available only on scanner models that support Checkpoint EAS.

Some scanner configurations include an integrated Electronic Article Surveillance (EAS) antenna.

The scanner's integrated EAS deactivation antenna requires an EAS host cable. This Y-cable connects to the scanner's host port at one end, and splits to the host and the EAS system at the other end.

### Installing

#### Checkpoint EAS Model Compatibility

The scanner 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.

EAS range is as dependent on the Checkpoint system (which is calibrated onsite) as it is on the scanner. Therefore, we cannot provide estimated ranges, however these are some of the factors that contribute to EAS range:

- Antenna – Length, gauge, number of turns, placement in the scanner.
- Type of Checkpoint EAS system used (ie. CP-VII, CP-IX, and CP-XI).
- Length of wire connecting antenna to (Checkpoint) EAS (site/installation dependent)
- Settings done within Checkpoint system (site/installation dependent).

#### Checkpoint Contact Information

Contact your local Checkpoint representative to install the EAS cable to the Checkpoint Deactivation System.

# Maintenance, Troubleshooting, and Technical Specifications

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## Introduction

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

---

## Maintenance

### Known Harmful Ingredients

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

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

### Approved Cleaners for the Scanner

- Isopropyl alcohol 70% (including pre-moistened wipes).

## Cleaning the Scanner

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

To clean the scanner:

1. Dampen a soft cloth with one of the approved cleaning agents listed above or use pre-moistened wipes.
2. Gently wipe all surfaces, including the front, back, sides, top and bottom. Never apply liquid directly to the scanner. Be careful not to let liquid pool around the scanner window, trigger, cable connector or any other area on the device.
3. Be sure to clean the trigger and in between the trigger and the housing (use a cotton-tipped applicator to reach tight or inaccessible areas).
4. Do not spray water or other cleaning liquids directly into the exit window.
5. Wipe the scanner exit window with a lens tissue or other material suitable for cleaning optical material such as eyeglasses.
6. Immediately dry the scanner window after cleaning with a soft non-abrasive cloth to prevent streaking.
7. Allow the unit to air dry before use.
8. Scanner connectors:
  - a. Dip the cotton portion of a cotton-tipped applicator in isopropyl alcohol.
  - b. Rub the cotton portion of the cotton-tipped applicator back-and-forth across the connector on the Zebra scanner at least 3 times. Do not leave any cotton residue on the connector.
  - c. Use the cotton-tipped applicator dipped in alcohol to remove any grease and dirt near the connector area.
  - d. Use a dry cotton tipped applicator and rub the cotton portion of the cotton-tipped applicator back-and-forth across the connectors at least 3 times. Do not leave any cotton residue on the connectors.

## Troubleshooting



**NOTE:** If after performing the possible solutions in [Table 5](#) the scanner still experiences problems, contact the distributor or call support.

**Table 5** Troubleshooting

| Problem  | Possible Causes   | Possible Solutions   |
|--|---|--|
| The illumination does not appear when pressing the trigger.  | No power to the scanner.                                | If the configuration requires a power supply, re-connect the power supply.   |
|  | Incorrect host interface cable is used.                 | Connect the correct host interface cable.  |
|  | Interface/power cables are loose.                       | Re-connect cables.   |
|  | Scanner is disabled.                                    | For IBM 468x and USB IBM hand-held, IBM table-top, and OPOS modes, enable the scanner via the host interface. Otherwise, see the technical person in charge of scanning. |
|  | If using RS-232 Nixdorf B mode, CTS is not asserted.    | Assert CTS line.   |
|  | Illumination is disabled.                               | Enable the illumination. See <a href="#">Hand-held Decode Aiming Pattern on page 72</a> .  |
| Scanner emits illumination, but does not decode the barcode. | Scanner is not programmed for the correct barcode type. | Program the scanner to read that type of barcode. See <a href="#">Symbologies</a> .  |
|  | Barcode symbol is unreadable.                           | Scan test symbols of the same barcode type to determine if the barcode is defaced.   |
|  | The symbol is not completely inside illumination.       | Move the symbol completely within the illumination.<br>Move the symbol completely within the field of view (AIM pattern does NOT define FOV)                             |
|  | Distance between scanner and barcode is incorrect.      | Move the scanner closer to or further from the barcode. See <a href="#">Decode Ranges on page 44</a> .   |



**Table 5** Troubleshooting (Continued)

| Problem  | Possible Causes   | Possible Solutions  |
|--|---|---|
| Scanner decodes barcode, but does not transmit the data to the host.                                   | Scanner is not programmed for the correct host type.  | Scan the appropriate host type programming barcode. See the chapter corresponding to the host type.                   |
|  | Interface cable is loose.   | Re-connect the cable.   |
|  | If the scanner emits four long low beeps, a transmission error occurred.<br>This occurs if a unit is not properly configured or connected to the wrong host type. | Set the scanner's communication parameters to match the host's setting.   |
|  | If the scanner emits 5 low beeps, a conversion or format error occurred.  | Configure the scanner's conversion parameters properly.   |
|  | If the scanner emits low/high/low beeps, it detected an invalid ADF rule.   | Program the correct ADF rules. Refer to the Advanced Data Formatting Programmer Guide.                                |
| Host displays scanned data incorrectly.  | Scanner is not programmed to work with the host.  | Scan the appropriate host type programming barcode.   |
|  |   | For RS-232, set the scanner's communication parameters to match the host's settings.                                  |
|  |   | For a Keyboard Wedge configuration, program the system for the correct keyboard type, and turn off the CAPS LOCK key. |
|  |   | Program the proper editing options (e.g., UPC-E to UPC-A Conversion).   |
| Scanner emits short low/short medium/short high beep sequence (power-up beep sequence) more than once. | The USB bus may put the scanner in a state where power to the scanner is cycled on and off more than once.  | Normal during host reset.   |
| Scanner emits 4 short high beeps during decode attempt.  | Scanner has not completed USB initialization.   | Wait several seconds and scan again.  |
| Scanner emits Low/low/low/extra low beeps when not in use.   | RS-232 receive error.   | Normal during host reset. Otherwise, set the scanner's RS-232 parity to match the host setting.                       |
| Scanner emits low/high beeps during programming.   | Input error, incorrect barcode or <b>Cancel</b> barcode was scanned.  | Scan the correct numeric barcodes within range for the parameter programmed.  |

**Table 5** Troubleshooting (Continued)

| Problem   | Possible Causes  | Possible Solutions  |
|---|--|---|
| Scanner emits low/high/low/high beeps during programming.     | Out of host parameter storage space.   | Scan <a href="#">Default Parameters on page 59</a> .  |
|   | Out of memory for ADF rules.   | Reduce the number of ADF rules or the number of steps in the ADF rules.                                 |
|   | During programming, indicates out of ADF parameter storage space.  | Erase all rules and re-program with shorter rules.  |
| Scanner emits low/high/low beeps.                             | ADF transmit error.  | Refer to the Advanced Data Formatting Guide for information.  |
|   | Invalid ADF rule is detected.  | Refer to the Advanced Data Formatting Guide for information.  |
| Scanner emits a power-up beep after changing USB host type.   | The USB bus re-established power to the scanner.   | Normal when changing USB host type.   |
| Scanner emits one high beep when not in use.                  | In RS-232 mode, a <BEL> character was received and Beep on <BEL> option is enabled.  | Normal when <b>Beep on &lt;BEL&gt;</b> is enabled and the scanner is in RS-232 mode.                    |
| Scanner emits frequent beeps.                                 | No power to the scanner.   | Check the system power. If the configuration requires a power supply, re-connect the power supply.      |
|   | Incorrect host interface cable is used.  | Verify that the correct host interface cable is used. If not, connect the correct host interface cable. |
|   | Interface/power cables are loose.  | Check for loose cable connections and re-connect cables.  |
| Scanner emits five long low beeps after a barcode is decoded. | Conversion or format error was detected.<br>The scanner conversion parameters are not properly configured.                   | Ensure the scanner conversion parameters are properly configured.                                       |
|   | Conversion or format error was detected.<br>An ADF rule was set up with characters that can't be sent for the host selected. | Change the ADF rule, or change to a host that can support the ADF rule.                                 |
|   | Conversion or format error was detected.<br>A barcode was scanned with characters that can't be sent for that host.          | Change the barcode, or change to a host that can support the barcode.                                   |

## Report Product Information

### Report Software Version

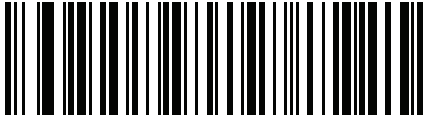
Scan the following barcode to send the version of software installed in the scanner.



**Report Software Version**

### Report Serial Number

Scan the following barcode to send the scanner serial number to the host.



**Serial Number**

### Report Manufacturing Information

Scan the following barcode to send the scanner manufacturing information to the host.



**Manufacturing Information**

## Technical Specifications

**Table 6** Technical Specifications

| Item                               | Description  |         |         |      |
|------------------------------------|--|---------|---------|------|
| <b>Physical Characteristics</b>    |  |         |         |      |
| Dimensions (SR, DL, and HD models) | 8 in. (max) H x 5.2 in. L x 3.7 in. W<br>20.3 cm (max) H x 13.2 cm L x 9.4 cm W                                      |         |         |      |
| Weight (SR, DL, and HD models)     | 11.6 oz.<br>330 g  |         |         |      |
| Available Colors                   | Midnight Black (SR/DL model only), Alpine White (HD/HL model only)   |         |         |      |
| Supported Host Interfaces          | USB, RS232, Keyboard Wedge, TGCS (IBM) 46XX over RS485   |         |         |      |
| USB Certification                  | DS9908 is USB2.0 Full Speed Compliant, visit <a href="http://USB.org">USB.org</a> for more details.                  |         |         |      |
| Keyboard Support                   | Supports over 90 international keyboards   |         |         |      |
| User Indicators                    | Direct Decode Indicator, Good Decode LEDs, Rear View LEDs, Speaker (Adjustable Tone & Volume), Hand-held Touch Zones |         |         |      |
| <b>Electrical Characteristics</b>  |  |         |         |      |
|                                    | <b>SR and DL Models</b>  |         |         |      |
|                                    | Minimum  | Typical | Maximum | Unit |
| Supply Voltage                     | 4.5  | 5.0     | 5.5     | V    |
| Idle current (Hand-held)           |  | 70      |         | mA   |
| Idle current (Hands-free)          |  | 132     |         | mA   |
| Scanning current (Hand-held)       |  | 321     |         | mA   |
| Scanning current (Hands-free)      |  | 297     |         | mA   |
|                                    | <b>HD Models</b>   |         |         |      |
|                                    | Minimum  | Typical | Maximum | Unit |
| Supply Voltage                     | 4.5  | 5.0     | 5.5     | V    |

**Table 6** Technical Specifications (Continued)

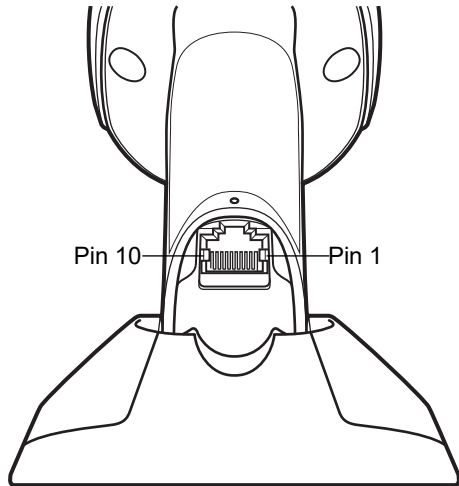
| Item   | Description  |
|--|--|
| Idle current (Hand-held)                         | 70 mA  |
| Idle current (Hands-free)                        | 136 mA   |
| Scanning current (Hand-held)                     | 356 mA   |
| Scanning current (Hands-free)                    | 330 mA   |
| <b>Performance Characteristics</b>               |  |
| Aiming Dot                                       | DS9908-SR/DL Amber 617nm LED<br>DS9908-HD/HL True Green 528nm LED    |
| Illumination                                     | DS9908-SR/DL Deep Red 657nm LED<br>DS9908-HD/HL Warm White 2700K LED |
| Field of View<br>(Horizontal x Vertical) Nominal | 48° H x 30.6° V  |
| Image Sensor                                     | 1280 x 800 pixels  |
| Minimum Print Contrast                           | 16% minimum reflective difference                                    |
| Skew Tolerance                                   | +/- 60°  |
| Pitch Tolerance                                  | +/- 60°  |
| Roll Tolerance                                   | 0-360°   |
| <b>Image Capture</b>                             |  |
| Graphics Format Support                          | Images can be exported as Bitmap, JPEG, or TIFF                      |
| Resolution (A4 document)                         | 109 PPI  |
| <b>User Environment</b>                          |  |
| Operating Temperature                            | 32° F to 122° F (0° C to 50° C)                                      |
| Storage Temperature                              | -40° to 158° F / -40° to 70° C                                       |
| Humidity   | 5% to 95% RH, non-condensing   |
| Drop Specifications                              | Designed to withstand multiple drops at 5.0 ft/1.5 m to concrete     |
| Tumble Specification (Scanner)                   | Designed to withstand 2,000 tumbles in 1.5 ft./0.5 m tumbler         |
| Ambient Light Immunity                           | 0 to 9000 Foot Candles/0 to 96,840 Lux                               |

**Table 6** Technical Specifications (Continued)

| Item   | Description  |         |       |         |         |        |       |             |       |
|--|--|---------|-------|---------|---------|--------|-------|-------------|-------|
| Environmental Sealing                            | IP52   |         |       |         |         |        |       |             |       |
| Electrostatic Discharge (ESD)                    | ESD per EN61000-4-2, +/-15 KV Air, +/-8 KV Direct, +/-8 KV Indirect  |         |       |         |         |        |       |             |       |
| <b>Accessories (see <a href="#">page 24</a>)</b> |  |         |       |         |         |        |       |             |       |
| <b>Symbol Decode Capability</b>                  |  |         |       |         |         |        |       |             |       |
| 1D   | Code 39, Code 128, Code 93, Codabar/NW7, Code 11, MSI, UPC/EAN, I 2 of 5, Korean 3 of 5, GS1 DataBar, Base 32 (Italian Pharma)   |         |       |         |         |        |       |             |       |
| 2D   | PDF417, Micro PDF417, Composite Codes, TLC-39, Aztec, Data Matrix, MaxiCode, QR Code, Micro QR, Han Xin, Postal Codes  |         |       |         |         |        |       |             |       |
| Digimarc   | Digital watermark technology   |         |       |         |         |        |       |             |       |
| Minimum Element Resolution                       | <table border="0"> <tr> <td>Code 39</td> <td>3 mil</td> </tr> <tr> <td>UPC 40%</td> <td>5.2 mil</td> </tr> <tr> <td>PDF417</td> <td>4 mil</td> </tr> <tr> <td>Data Matrix</td> <td>6 mil</td> </tr> </table> <p>See <a href="#">Decode Ranges on page 44</a> for typical working ranges.</p> | Code 39 | 3 mil | UPC 40% | 5.2 mil | PDF417 | 4 mil | Data Matrix | 6 mil |
| Code 39  | 3 mil  |         |       |         |         |        |       |             |       |
| UPC 40%  | 5.2 mil  |         |       |         |         |        |       |             |       |
| PDF417   | 4 mil  |         |       |         |         |        |       |             |       |
| Data Matrix                                      | 6 mil  |         |       |         |         |        |       |             |       |
| <b>Utilities and Management</b>                  |  |         |       |         |         |        |       |             |       |
| 123Scan  | <p>Programs scanner parameters, upgrades firmware, provides scanned barcode data and prints reports. See <a href="#">123Scan and Software Tools</a>.</p> <p><a href="http://zebra.com/123Scan">zebra.com/123Scan</a></p>   |         |       |         |         |        |       |             |       |
| Symbol Scanner SDK                               | <p>Generates a fully-featured scanner application, including documentation, drivers, test utilities and sample source code.</p> <p><a href="http://zebra.com/ScannerSDKforWindows">zebra.com/ScannerSDKforWindows</a></p>  |         |       |         |         |        |       |             |       |
| Scanner Management Service (SMS)                 | <p>Remotely manages your Zebra scanner and queries its asset information.</p> <p><a href="http://zebra.com/sms">zebra.com/sms</a></p>  |         |       |         |         |        |       |             |       |

## Scanner Signal Descriptions

**Figure 14** Scanner Cable Pinouts



The signal descriptions in [Table 7](#) apply to the connectors on the DS9908 scanner and are for reference only.

**Table 7** DS9908 Scanner Signal Pin-outs

| Pin | IBM         | RS-232      | Keyboard Wedge | USB         |
|-----|-------------|-------------|----------------|-------------|
| 1   | Cable ID    | Cable ID    | Cable ID       | Cable ID    |
| 2   | Power (+5V) | Power (+5V) | Power (+5V)    | Power (+5V) |
| 3   | Ground      | Ground      | Ground         | Ground      |
| 4   | IBM_OUT     | TxD         | KeyClock       | Reserved    |
| 5   | IBM_IN      | RxD         | TermData       | D +         |
| 6   | IBM_T/R     | RTS         | KeyData        | Reserved    |
| 7   | Reserved    | CTS         | TermClock      | D -         |
| 8   | Reserved    | Reserved    | Reserved       | Reserved    |
| 9   | See note    |             |                |             |
| 10  | See note    |             |                |             |

Note: EAS configurations use pins 9 and 10 for an EAS antenna. For other configurations pins 9 and 10 are open.

# User Preferences & Miscellaneous Options

---

## Introduction

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

The scanner ships with the settings shown in [Table 8 on page 57](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

---

## Setting Parameters

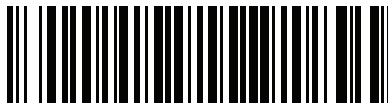
To set feature values, scan a single barcode or a short barcode sequence. The settings are stored in non-volatile memory and are preserved even when the scanner powers down.



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

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

To return all features to default values, see [Default Parameters on page 59](#). Throughout the programming barcode menus, asterisks indicate (\*) default values.



\* Indicates default — \*Enable Parameter — Feature/option  
(1) — Option value

## Scanning Sequence Examples

In most cases, scanning one barcode sets the parameter value. For example, to set the speaker tone to high, scan the **High Frequency** (beep tone) barcode listed under [Beep Tone on page 62](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. See the 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 8 lists defaults for user preferences parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 8** User Preferences Parameter Defaults

| Parameter                                       | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default   | Page Number        |
|---|-------------------------------|-------------------------|---|--------------------|
| <b>Standard User Preferences</b>                |                               |                         |   |                    |
| Set Default Parameter                           | N/A                           | N/A                     | N/A   | <a href="#">59</a> |
| Parameter Barcode Scanning                      | 236                           | ECh                     | Enable  | <a href="#">60</a> |
| Beep After Good Decode                          | 56                            | 38h                     | Enable  | <a href="#">60</a> |
| Beep Volume                                     | 140                           | 8Ch                     | High  | <a href="#">61</a> |
| Beep Tone                                       | 145                           | 91h                     | Medium  | <a href="#">62</a> |
| Beep Duration                                   | 628                           | F1h 74h                 | Short   | <a href="#">64</a> |
| Suppress Power Up Beeps                         | 721                           | F1h D1h                 | Do Not Suppress   | <a href="#">64</a> |
| Direct Decode Indicator                         | 859                           | F2h 5Bh                 | Disable   | <a href="#">65</a> |
| Low Power Mode                                  | 128                           | 80h                     | Disable   | <a href="#">66</a> |
| Time Delay to Low Power Mode                    | 146                           | 92h                     | 1 Hour  | <a href="#">67</a> |
| Trigger Mode (or Hand-held Trigger Mode)        | 138                           | 8Ah                     | Auto Aim  | <a href="#">69</a> |
| Hands-free Mode                                 | 630                           | F1h 76h                 | Enable  | <a href="#">70</a> |
| Pickup Activation                               | 1927                          | F8h 07h 87h             | Touch Plus  | <a href="#">71</a> |
| Hand-held Decode Aiming Pattern                 | 306                           | F0h 32h                 | Enable  | <a href="#">72</a> |
| Presentation (Hands-free) Decode Aiming Pattern | 590                           | F1h 4Eh                 | Disable Presentation (Hands-free) Decode Aiming Pattern | <a href="#">73</a> |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

**Table 8** User Preferences Parameter Defaults (Continued)

| Parameter                                      | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default                      | Page Number |
|--|-------------------------------|-------------------------|------------------------------|-------------|
| Picklist Mode                                  | 402                           | F0h 92h                 | Disable Picklist Mode Always | 74          |
| Continuous Barcode Read                        | 649                           | F1h 89h                 | Disable                      | 75          |
| Unique Barcode Reporting                       | 723                           | F1h D3h                 | Enable                       | 75          |
| Decode Session Timeout                         | 136                           | 88h                     | 9.9 Seconds                  | 76          |
| Hands-Free Decode Session Timeout              | 400                           | F0 90                   | 15                           | 76          |
| Timeout Between Decodes, Same Symbol           | 137                           | 89h                     | 0.5 Seconds                  | 77          |
| Timeout Between Decodes, Different Symbols     | 144                           | 90h                     | 0.1 Seconds                  | 77          |
| Triggered Timeout, Same Symbol                 | 724                           | F1h D4h                 | Disable                      | 78          |
| Mobile Phone/Display Mode                      | 716                           | F1h CCh                 | Normal                       | 79          |
| PDF Prioritization                             | 719                           | F1h CFh                 | Disable                      | 80          |
| PDF Prioritization Timeout                     | 720                           | F1h D0h                 | 200 ms                       | 80          |
| Decoding Illumination                          | 298                           | F0h 2Ah                 | Enable                       | 81          |
| Illumination Brightness                        | 669                           | F1h 9Dh                 | High                         | 81          |
| Motion Tolerance (Hand-held Trigger Mode Only) | 858                           | F2h 5Ah                 | Less Motion Tolerance        | 82          |
| Product ID (PID) Type                          | 1281                          | F8h 05h 01h             | Host Type Unique             | 82          |
| Product ID (PID) Value                         | 1725                          | F8h 06h BDh             | 0                            | 83          |
| ECLevel  | 1710                          | F8h 06h AEh             | 0                            | 83          |
| Decode Range Limit (Hands-free)                | 1950                          | F8h 07h 9Eh             | Standard                     | 84          |
| <b>Miscellaneous Options</b>                   |                               |                         |                              |             |
| Enter Key                                      | N/A                           | N/A                     | N/A                          | 85          |
| Tab Key  | N/A                           | N/A                     | N/A                          | 85          |
| Transmit Code ID Character                     | 45                            | 2Dh                     | None                         | 86          |
| Prefix Value                                   | 99, 105                       | 63h, 69h                | 7013 <CR><LF>                | 87          |
| Suffix 1 Value                                 | 98, 104                       | 62h, 68h                | 7013 <CR><LF>                | 87          |
| Suffix 2 Value                                 | 100, 106                      | 64h, 6Ah                |                              |             |
| Scan Data Transmission Format                  | 235                           | EBh                     | Data As Is                   | 88          |
| FN1 Substitution Values                        | 103, 109                      | 67h, 6Dh                | 7013 <CR><LF>                | 90          |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

**Table 8** User Preferences Parameter Defaults (Continued)

| Parameter                      | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default       | Page Number        |
|--------------------------------|-------------------------------|-------------------------|---------------|--------------------|
| Transmit “No Read” Message     | 94                            | 5E                      | Disable       | <a href="#">91</a> |
| Unsolicited Heartbeat Interval | 1118                          | F8h 04h 5Eh             | Disable       | <a href="#">92</a> |
| securPharm Decoding            | 1752                          | F8h 06h D8h             | Disable       | <a href="#">93</a> |
| securPharm Output Formatting   | 1753                          | F8h 06h D9h             | No Formatting | <a href="#">94</a> |

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

## Standard User Preferences

### Default Parameters

Scan one of the following barcodes to reset the scanner to its default settings as follows:

- **Restore Defaults** resets all default parameters as follows:
  - If you configured custom default parameter values via the **Write to Custom Defaults** barcode, scanning the **Restore Defaults** barcode restores these custom values.
  - If you did not configure custom default parameter values, scanning the **Restore Defaults** barcode restores the factory default values. See [Parameter Defaults](#) for these values.
- **Set Factory Defaults** clears all custom default values and sets the factory default values. See [Parameter Defaults](#) for these values.

### Write to Custom Defaults

To create a set of custom defaults, select the desired parameter values in this guide, and then scan **Write to Custom Defaults**.



Restore Defaults



Set Factory Defaults



Write to Custom Defaults

## Parameter Barcode Scanning

### Parameter # 236

#### SSI # ECh

Scan one of the following barcodes to select whether to enable or disable the decoding of parameter barcodes, including the **Set Defaults** barcodes.



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



**Disable Parameter Barcode Scanning  
(0)**

## Beep After Good Decode

### Parameter # 56

#### SSI # 38h

Scan one of the following barcodes to select whether or not the scanner beeps after a good decode. If you select **Do Not Beep After Good Decode**, the speaker still operates during parameter menu scanning and to indicate error conditions.



**\*Enable Beep After Good Decode  
(1)**



**Disable Beep After Good Decode  
(0)**

## Beep Volume

Parameter # 140

SSI # 8Ch

Scan one of the following barcodes to select a beep volume.



Low Volume  
(2)



Medium Volume  
(1)



\*High Volume  
(0)

## Beep Tone

Parameter # 145

SSI # 91h

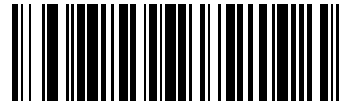
Scan one of the following barcodes to select a beep tone for audible feedback indicating a good decode. Select from the [Standard Beep Tones](#) below or from the [Special Tones on page 63](#).

Scan [Disable Beep Tone](#) to disable all tones.

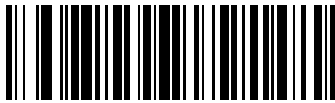


Disable Beep Tone  
(3)

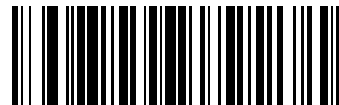
### Standard Beep Tones



Low Beep Tone  
(2)



\*Medium Beep Tone  
(1)



High Beep Tone  
(0)



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

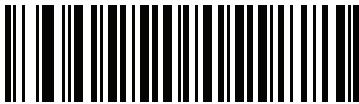
## Special Tones



Wood Block / Tone 1  
(6)



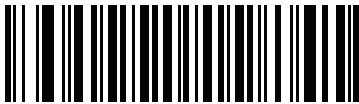
Pulse / Tone 2  
(7)



Chime / Tone 3  
(8)



Zap / Tone 4  
(9)



Triple Beep / Tone 5  
(10)



User Programmable / Tone 6  
(11)

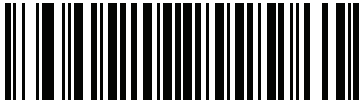
**Note:** See [Custom Tone](#) to download a custom tone.

## Beep Duration

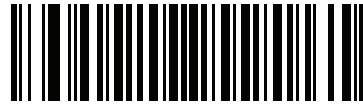
Parameter # 628

SSI # F1h 74h

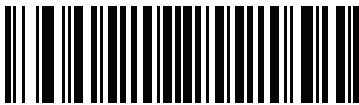
Scan one of the following barcodes to select the duration for the good decode beep.



\*Short Duration  
(0)



Medium Duration  
(1)



Long Duration  
(2)

## Suppress Power Up Beeps

Parameter # 721

SSI # F1h D1h

Scan one of the following barcodes to select whether or not to suppress the scanner's power-up beeps.



\*Do Not Suppress Power Up Beeps  
(0)



Suppress Power Up Beeps  
(1)



## Direct Decode Indicator

### Parameter # 859

### SSI # F2h 5Bh

This parameter is only supported in Auto Aim and Standard (Level) [Hand-held Trigger Mode](#). Scan one of the following barcodes to select optional blinking of the illumination on a successful decode if you continue to hold the trigger. If you release the trigger upon decode, the blinking does not occur. This allows you to choose additional feedback for a successful decode by holding the trigger, or to continue to scan as normal.

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



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



**1 Blink  
(1)**



**2 Blinks  
(2)**

## Low Power Mode

Parameter # 128

SSI # 80h



**NOTE:** The Low Power Mode parameter only applies for non-USB and non-RS485 host interfaces, and when [Hand-held Trigger Mode on page 69](#) is set to **Level (Standard)**.

Scan one of the following barcodes to select whether or not the scanner enters low power mode after a decode attempt or host communication. This applies to serial and keyboard wedge connections. If disabled, power remains on after each decode attempt.

If you enable this, see [Time Delay to Low Power Mode](#) to set the inactivity time period.



**Enable Low Power Mode  
(1)**



**\*Disable Low Power Mode  
(0)**

## Time Delay to Low Power Mode

Parameter # 146

SSI # 92h

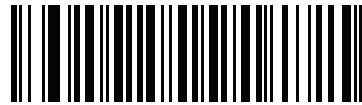


**NOTE:** This parameter only applies when [Low Power Mode](#) is enabled.

Scan one of the following barcodes to set the time the scanner remains active before entering low power mode. The scanner wakes upon trigger press or when the host attempts to communicate with the scanner.



**1 Second**  
(17)



**10 Seconds**  
(26)



**1 Minute**  
(33)

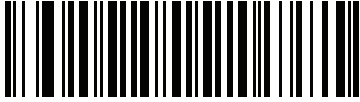


**5 Minutes**  
(37)

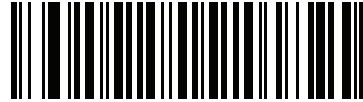


**15 Minutes**  
(43)

Time Delay to Low Power Mode (continued)



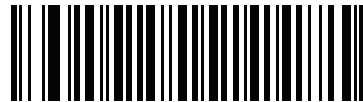
30 Minutes  
(45)



45 Minutes  
(46)



\*1 Hour  
(49)



3 Hours  
(51)



6 Hours  
(54)



9 Hours  
(57)

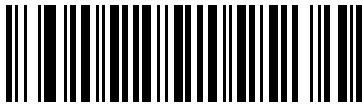
## Hand-held Trigger Mode

### Parameter # 138

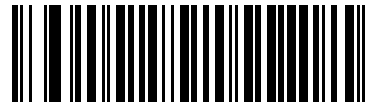
#### SSI # 8Ah

Scan one of the following barcodes to select a trigger mode for the scanner:

- **Standard (Level)** - A trigger press activates decode processing. Decode processing continues until the barcode decodes, you release the trigger, or the [Decode Session Timeout on page 76](#) occurs.
- **Presentation (Blink)** - The scanner activates decode processing when it detects a barcode in its field of view. After a period of non-use, the LEDs turn off until the scanner senses motion.
- **\*Auto Aim** - The scanner projects the aiming pattern when lifted. A trigger press activates decode processing. After a period of inactivity the aiming pattern shuts off.



Standard (Level)  
(0)



Presentation (Blink)  
(7)



\*Auto Aim  
(9)

## Hands-free Mode

Parameter # 630

SSI # F1h 76h

Scan one of the following barcodes to enable or disable hands-free mode.

- **Enable Hands-free Mode** - The scanner automatically triggers when presented with a barcode. Lifting the scanner or pulling the trigger causes it to behave according to the setting of the [Hand-held Trigger Mode on page 69](#).
- **Disable Hands-free Mode** - The scanner behaves according to the setting of the [Hand-held Trigger Mode on page 69](#) regardless of whether it is hand-held or hands-free.



\*Enable Hands-free Mode  
(1)



Disable Hands-free Mode  
(0)

## Pickup Activation

Parameter # 1927

SSI # F8h 07h 87h



**NOTE:** When the scanner is picked up it automatically switches into hand-held trigger mode.

There are two different ways to determine if the scanner is picked up: **Touch** and **Touch Plus**.

- **Touch** - The scanner touch sensors in the handle detect when the scanner is physically held. For proper hand placement see [Figure 2, Hand-held Touch Zones \(Toggle Between Hand-held and Hands-free Modes\) on page 30](#).  
Select this option if you want the scanner to remain in hands-free presentation mode when picked up by its head or base (i.e., avoiding the hand-held touch zones). This option may be desirable to quickly scan multiple items in a basket or shopping cart.
- **Touch Plus (default)** - The scanner touch and motion sensors detect when the scanner is physically held or when the scanner moves. The scanner reacts on whichever occurs first. When neither touch nor motion are detected, the scanner returns to hands-free mode.

Select this option if you want the scanner to switch to hand-held trigger mode however it is picked up.



**Touch**  
**(0)**



**\*Touch Plus**  
**(2)**

## Hand-held Decode Aiming Pattern

Parameter # 306

SSI # F0h 32h



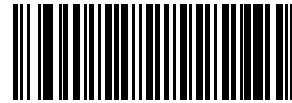
**NOTE:** With [Picklist Mode](#) enabled (page 74), the decode aiming pattern flashes even if you disable the **Hand-held Decode Aiming Pattern**.

Scan one of the following barcodes to select when to project the aiming pattern in hand-held mode:

- **Enable Hand-held Decode Aiming Pattern** - This projects the aiming pattern during barcode capture.
- **Disable Hand-held Decode Aiming Pattern** - This turns the aiming pattern off.
- **Enable Hand-held Decode Aiming Pattern on PDF** - This projects the aiming pattern when the scanner detects a PDF barcode.



\*Enable Hand-held Decode Aiming Pattern  
(2)



Disable Hand-held Decode Aiming Pattern  
(0)



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



## Presentation (Hands-free) Decode Aiming Pattern

Parameter # 590

SSI # F1h 4Eh

Scan one of the following barcodes to select when to project the aiming pattern in hands-free mode:

- **Enable Presentation (Hands-free) Decode Aiming Pattern** - This projects the aiming pattern during barcode capture.
- **Disable Presentation (Hands-free) Decode Aiming Pattern** - This turns the aiming pattern off.
- **Enable Presentation (Hands-free) Decode Aiming Pattern on PDF** - This projects the aiming pattern when the scanner detects a PDF barcode.



**NOTE:** With [Picklist Mode on page 74](#) enabled, the decode aiming pattern flashes even when you disable the **Hands-free Decode Aiming Pattern**.



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



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



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

## Picklist Mode

### Parameter # 402

### SSI # F0h 92h

Scan one of the following barcodes to select a Picklist Mode. In this mode, you can pick out and decode a barcode from a group of barcodes that are printed close together by placing the aiming pattern on the barcode you want to decode.



**NOTES:** Enabling Picklist Mode overrides the Disable Decode Aiming Pattern options. You can not disable the decode aiming pattern when Picklist Mode is enabled.

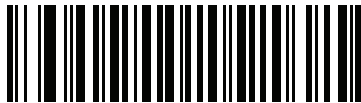
Enabling Picklist Mode can slow decode speed and hinder the ability to decode longer barcodes.

- **Enable Picklist Mode Always** - Picklist Mode is always enabled.
- **Enable Picklist Mode in Hand-held Mode** - Picklist Mode is enabled when the scanner is out of hands-free mode and disabled when the scanner is in presentation mode.
- **Enable Picklist Mode in Hands-free Mode** - Picklist Mode is enabled when the scanner is in hands-free mode only.



**NOTE:** When using **Picklist Mode in Hands-free Mode**, increase the time of the [Timeout Between Decodes, Same Symbol](#) on page 77.

- **Disable Picklist Mode Always** - Picklist Mode is always disabled.



Enable Picklist Mode Always  
(2)



Enable Picklist Mode in Hand-held Mode  
(1)



Enable Picklist Mode in Hands-free Mode  
(3)



\*Disable Picklist Mode Always  
(0)

## Continuous Barcode Read

Parameter # 649

SSI # F1h 89h

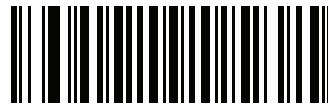
Scan **Enable Continuous Barcode Read** to report every barcode while the trigger is pressed.



**NOTE:** We strongly recommend enabling [Picklist Mode on page 74](#) with this parameter. Disabling Picklist Mode can cause accidental decodes when more than one barcode is in the scanner's field of view.



Enable Continuous Barcode Read  
(1)



\*Disable Continuous Barcode Read  
(0)

## Unique Barcode Reporting

Parameter # 723

SSI # F1h D3h

Scan **Enable Continuous Barcode Read Uniqueness** to report only unique barcodes while the trigger is pressed. This option only applies when [Continuous Barcode Read](#) is enabled.



\*Enable Unique Barcode Reporting  
(1)



Disable Unique Barcode Reporting  
(0)

## Decode Session Timeout

### Parameter # 136

#### SSI # 88h

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

To set a Decode Session Timeout, scan the following barcode, and then scan two barcodes from [Numeric Barcodes](#) that correspond to the desired on time. Enter a leading zero for single digit numbers. For example, to set a Decode Session Timeout of 0.5 seconds, scan this barcode, and then scan the **0** and **5** barcodes. To correct an error or change the selection, scan [Cancel](#).



Decode Session Timeout

## Hands-Free Decode Session Timeout

### Parameter # 400

#### SSI # F0 90

This parameter is the hands-free compliment to the **Decode Session Timeout**. It configures the minimum and maximum decode processing time during a hands-free scan attempt. It only applies to the hands-free trigger mode or when a scanner is place in the gooseneck stand. The default is 15; range = 2 - 255.

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

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

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

| Setting Value <sup>1</sup> | Minimum Time | Maximum Time |
|----------------------------|--------------|--------------|
| X < 25                     | 250 ms       | 2.5 Seconds  |
| X >= 25                    | X * 10 ms    | X * 100 ms   |

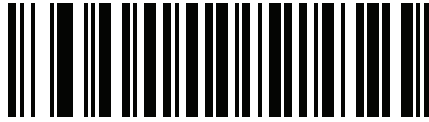
<sup>1</sup>Setting value must be three digits.

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

The default value of the setting is 15 which results in a minimum time of 250 ms and maximum time of 2.5 seconds.

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

To set a three digit value scan the following bar code, and then scan three bar codes from [Numeric Barcodes](#). Enter a leading zero for single digit numbers. To correct an error or change a selection, scan [Cancel](#).



**Hands-Free Decode Session Timeout**

### Timeout Between Decodes, Same Symbol

#### Parameter # 137

#### SSI # 89h

Use this option in presentation mode or [Continuous Barcode Read](#) mode to prevent the scanner from continuously decoding the same barcode when it is left in the scanner's field of view. The barcode must be out of the field of view for the timeout period before the scanner reads the same consecutive symbol. It is programmable in 0.1 second increments from 0.0 to 9.9 seconds. The default interval is 0.5 seconds.

To select the timeout between decodes for the same symbol, scan the following barcode, and then scan two barcodes from [Numeric Barcodes](#) that correspond to the desired interval, in 0.1 second increments.



**Timeout Between Decodes, Same Symbol**

### Timeout Between Decodes, Different Symbols

#### Parameter # 144

#### SSI # 90h

Use this option in presentation mode or [Continuous Barcode Read](#) to control the time the scanner waits before decoding a different symbol. It is programmable in 0.1 second increments from 0.1 to 9.9 seconds. The default is 0.1 seconds.

To select the timeout between decodes for different symbols, scan the following barcode, and then scan two barcodes from [Numeric Barcodes](#) that correspond to the desired interval, in 0.1 second increments.



**NOTE:** Timeout Between Decodes, Different Symbols cannot be greater than or equal to the [Decode Session Timeout](#).



Timeout Between Decodes, Different Symbols

## Triggered Timeout, Same Symbol

Parameter # 724 (SSI # F1h D4h)



**NOTE:** This feature does not apply to Timeout Between Decodes, Different Symbols.

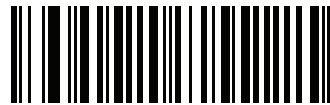


**NOTE:** Timeout Between Decodes, Same Symbol cannot be greater than or equal to the Time Delay to Low Power Mode (parameter #146 on page 67).

Scan **Enable Triggered Timeout, Same Symbol** below to apply **Timeout Between Decodes, Same Symbol** (parameter #137 on page 77) in hand-held trigger mode. Subsequent scans of **Enable Triggered Timeout, Same Symbol** are ignored until **Timeout Between Decodes, Same Symbol** expires.



Enable Triggered Timeout, Same Symbol  
(1)



\* Disable Triggered Timeout, Same Symbol  
(0)

## Mobile Phone/Display Mode

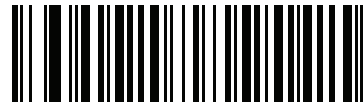
Parameter # 716

SSI # F1h CCh

This mode improves barcode reading performance off mobile phones and electronic displays. Scan one of the following barcodes to select the desired mode.



\*Normal Mobile Phone/Display Mode  
(0)



Enhanced in Hand-held Mode  
(1)



Enhanced in Hands-free Mode  
(2)



Enhanced in Both Modes  
(3)

## PDF Prioritization

### Parameter # 719

#### SSI # F1h CFh

Scan **Enable PDF Prioritization** to delay decoding certain 1D barcodes (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.

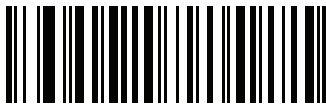


**NOTE:** The 1D Code 128 barcode lengths include the following:

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

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

- 8 characters
- 12 characters



Enable PDF Prioritization  
(1)



\*Disable PDF Prioritization  
(0)

## PDF Prioritization Timeout

### Parameter # 720

#### SSI # F1h D0h

If you enabled [PDF Prioritization](#), set this timeout to indicate how long the scanner attempts to decode a PDF417 symbol before reporting the 1D barcode in the field of view.

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



PDF Prioritization Timeout



## Decoding Illumination

Parameter # 298

SSI # F0h 2Ah

Scan one of the following barcodes to determine whether the scanner turns on illumination to aid decoding. Enabling illumination usually results in superior images and better decode performance. The effectiveness of the illumination decreases as the distance to the target increases.



**\*Enable Decoding Illumination**  
(1)



**Disable Decoding Illumination**  
(0)

## Illumination Brightness

Parameter # 669

SSI # F1h 9Dh

Scan one of the following barcodes to set the illumination brightness used during an active decode session. This only applies in hand-held mode (not in presentation mode).



**NOTE:** Selecting a lower brightness level can affect decode performance.



**Low Illumination Brightness**  
(0)



**Medium Illumination Brightness**  
(3)



**\*High Illumination Brightness**  
(9)

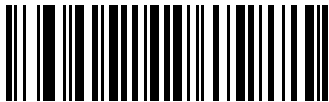
## Motion Tolerance (Hand-held Trigger Modes Only)

Parameter # 858

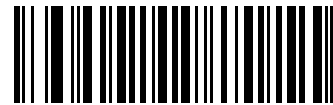
SSI # F2h 5Ah

Scan one of the following barcodes to select a motion tolerance option:

- **Less Motion Tolerance** - This provides optimal decoding performance on 1D barcodes.
- **More Motion Tolerance** - This increases motion tolerance and speeds decoding when scanning a series of 1D barcodes in rapid progression.



\*Less Motion Tolerance  
(0)



More Motion Tolerance  
(1)

## Product ID (PID) Type

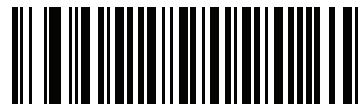
Parameter # 1281

SSI # F8h 05h 01h

Scan one of the following barcodes to define the PID value reported in USB enumeration.



\*Host Type Unique  
(0)



Product Unique  
(1)



IBM Unique  
(2)

## Product ID (PID) Value

### Parameter # 1725

### SSI # F8h 06h BDh

To set a Product ID value, scan **Set PID Value**, and then scan four numeric barcodes in [Numeric Barcodes](#) that correspond to the value. Enter a leading zero for single digit numbers. To correct an error, or change a selection, scan [Cancel on page 432](#). The range is (0,1600-1649).



**NOTE:** This parameter is applicable to customers using a Firmware Flash Update per the Toshiba Global Commerce Solutions (TGCS) Universal Serial Bus OEM Point-of-Sale Device Interface.



Set PID Value

## ECLevel

### Parameter # 1710

### SSI # F8h 06h AEh

To set an ECLevel value, scan **Set ECLevel**, and then scan five numeric barcodes in [Numeric Barcodes](#) that correspond to the desired level. Enter a leading zero for single digit numbers. To correct an error, or change a selection, scan [Cancel on page 432](#).



**NOTE:** This parameter is applicable to customers using a Firmware Flash Update per the Toshiba Global Commerce Solutions (TGCS) Universal Serial Bus OEM Point-of-Sale Device Interface. It allows a customer to define an ECLevel value in order to manage and control Flash Update operations on the 4690 operating system.

Contact the Zebra Customer Support Center online at: [zebra.com/support](http://zebra.com/support) for more information.



Set ECLevel

## Decode Range Limit (Hands-free)

Parameter # 1950

SSI # F8h 07h 9Eh

This parameter limits the range that the scanner decodes/reports the following symbologies in presentation (hands-free) mode only.

- UPC/EAN/JAN
- Code 128
- QR Code

Scan a barcode below to select the desired range. The default value is Standard.

- **Near** - Range is limited so that only nearby barcodes are reported. Used to reduce the chance of inadvertently scanning surrounding barcodes.
- **Standard** - Range is limited to fit most applications.
- **Far** - Range is limited slightly so that farther barcodes are also reported.
- **Disable** - Range is not limited (maximum range).



**\*Standard**  
(11)



**Disable**  
(0)



**Far**  
(7)



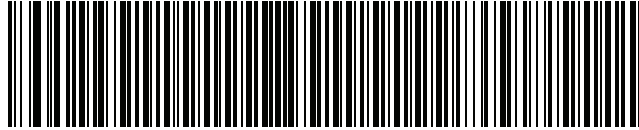
**Near**  
(22)

---

## Miscellaneous Scanner Parameters

### Enter Key

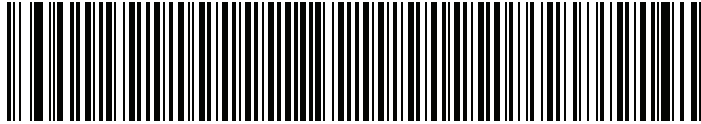
Scan the following barcode to add an Enter key (carriage return/line feed) after scanned data. To program other prefixes and/or suffixes, see [Prefix/Suffix Values on page 87](#).



Add Enter Key (Carriage Return/Line Feed)

### Tab Key

Scan the following barcode to add a Tab key after scanned data.



Tab Key

## Transmit Code ID Character

### Parameter # 45

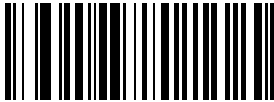
#### SSI # 2Dh

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

Select no Code ID character, a Symbol Code ID character, or an AIM Code ID character. For Code ID characters, see [Symbol Code Identifiers on page 462](#) and [AIM Code Identifiers on page 463](#).



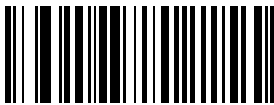
**NOTE:** If you enable Symbol Code ID Character or AIM Code ID Character, and enable [Transmit "No Read" Message on page 91](#), the scanner appends the code ID for Code 39 to the NR message.



Symbol Code ID Character  
(2)



AIM Code ID Character  
(1)



\*None  
(0)

### Prefix/Suffix Values

Key Category Parameter # P = 99, S1 = 98, S2 = 100

SSI # P = 63h, S1 = 62h, S2 = 64h

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

SSI # P = 69h, S1 = 68h, S2 = 6Ah

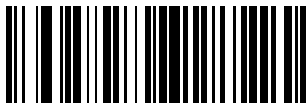


**NOTE:** To use Prefix/Suffix values, first set the [Scan Data Transmission Format on page 88](#).

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 one of the following barcodes, and then scan four barcodes from [Numeric Barcodes](#) that correspond to that value. See [ASCII Character Sets](#) for the four-digit codes.

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

The default prefix and suffix value is 7013 <CR><LF> (Enter key). To correct an error or change a selection, scan [Cancel on page 432](#).



Scan Prefix  
(7)



Scan Suffix 1  
(6)



Scan Suffix 2  
(8)



Data Format Cancel

## Scan Data Transmission Format

### Parameter # 235

### SSI # EBh



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

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

To set values for the prefix and/or suffix, see [Prefix/Suffix Values on page 87](#).



\*Data As Is  
(0)



<DATA> <SUFFIX 1>  
(1)



<DATA> <SUFFIX 2>  
(2)



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



## Scan Data Transmission Format (continued)



<PREFIX> <DATA >  
(4)



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



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



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

## FN1 Substitution Values

### Key Category Parameter # 103

### Key Category SSI # 67h

### Decimal Value Parameter # 109

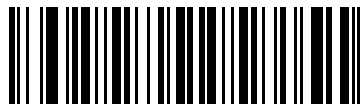
### Decimal Value SSI # 6Dh

Keyboard wedge and USB HID keyboard hosts support a FN1 substitution feature. Enabling this substitutes any FN1 character (0x1b) in an EAN128 barcode with a value. This value defaults to 7013 <CR><LF> (Enter key).

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

To select a FN1 substitution value via barcode menus:

1. Scan the following barcode.



**Set FN1 Substitution Value**

2. Locate the keystroke desired for FN1 Substitution in the ASCII Character Set table for the current host interface, and enter the 4-digit ASCII value by scanning four barcodes from [Numeric Barcodes](#).

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

To enable FN1 substitution for USB HID keyboard, scan **Enable USB Keyboard FN1 Substitution** on page [245](#). To enable FN1 substitution for keyboard wedge, scan **Enable FN1 Substitution** on page [307](#).

## Transmit “No Read” Message

### Parameter # 94

#### SSI # 5Eh

Scan one of the following barcodes to set an option for transmitting the No Read (NR) characters.



**NOTE:** If you enable **Transmit No Read**, and also enable Symbol Code ID Character or AIM Code ID Character for [Transmit Code ID Character on page 86](#), the scanner appends the code ID for Code 39 to the NR message.

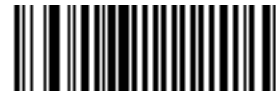


**NOTE:** This does not apply in presentation mode.

- **Enable No Read** - This transmits the characters NR when a successful decode does not occur before trigger release or the **Decode Session Timeout** expires. See [Decode Session Timeout on page 76](#).
- **Disable No Read** - This sends nothing to the host if a symbol does not decode.



**Enable No Read  
(1)**



**\*Disable No Read  
(0)**

## Unsolicited Heartbeat Interval

Parameter # 1118

SSI # F8h 04h 5Eh

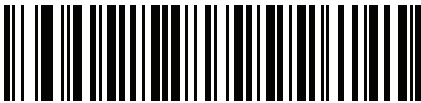
The scanner can send unsolicited heartbeat messages to assist in diagnostics. To enable this parameter and set the desired unsolicited heartbeat interval, scan one of the following time interval barcodes, or scan **Set Another Interval** followed by four barcodes from [Numeric Barcodes](#) that correspond to the desired number of seconds.

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

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

MOTEVTHB:nnn

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



10 Seconds  
(10)



1 Minute  
(60)



Set Another Interval



\*Disable Unsolicited Heartbeat Interval  
(0)

## securPharm Decoding

### Parameter # 1752

#### SSI # F8h 06h D8h

securPharm implements the IFA and GS1 Coding System for the European pharmaceutical industry. securPharm code is used to prevent pharmaceutical counterfeiting.

When this feature is enabled, if a GS1 symbol is decoded and includes any aspects of the Application Identifier associated with the securPharm GS1 specifications, the entire GS1 symbol is processed as a securPharm symbol. For this reason, it is expected that under certain circumstances, a GS1 barcode that is a securPharm symbol may not be processed properly; if the GS1 symbol is not created as per the specification. The output cannot be guaranteed as valid.

Although the GS1-128 type and the GS1 DataBar family are not specifically indicated in the IFA specification, they are supported.

The securPharm output is in XML format and can include the product number, serial number, lot number, expiration and Date of Manufacturing. The XML tags can be arranged in any order. Tags that are not in the barcode are omitted. For example:

```
<content dfi="value_dfi">
<Daten_1>value_Daten_1</Daten_1>
<Daten_2>value_Daten_2</Daten_2>
<Daten_n>value_Daten_n</Daten_n>
</content>
```

Where:

value\_dfi = IFA or GS1

Daten\_1 to Daten\_n is the production number, serial number, etc.

Scan a barcode below to enable or disable the ability to process pharmaceutical type barcodes.



**\*Disable securPharm Decoding**  
(0)



**Enable securPharm Decoding**  
(1)

## securPharm Output Formatting

### Parameter # 1753

### SSI # F8h 06h D9h



**NOTE:** securPharm output formatting is effective only when [securPharm Decoding on page 93](#) is enabled.

**securPharm Output Formatting** parameter options represent bit positions. Therefore, any combination of formatting can be used.

When you scan a securPharm Output Formatting barcode, the securPharm output is formatted in a number of ways.

#### Sample GS1 Format


Product Number: GTIN Data Identifier DI Data Format Identifier: GS1

Data Carrier

*FNC1*04150123456782

101A234B5*FNC1*

1717231



> Scanned Barcode >

```

<content dfi="GS1">
<gtin>04150123456782</gtin>
  <lot>1A234B5</lot>
  <exp>151231</exp>
  <sn>1234567890123456</sn>
</content>
```

#### Sample GS1 Output - Feature Disabled

The output has no format:

0104150123456782101A234B517151231211234567890123456

#### Sample GS1 Output - No Formatting (0)

The output is a single line of characters:

```
<content
dfi="GS1"><gtin>04150123456782</gtin><lot>1A234B5</lot><exp>151231</exp><sn>1234567890123456</sn></content>
```

#### Sample GS1 Output - Insert Tab (1)

The output is a single line of characters with a tab inserted in the XML body:

```
<content
dfi="GS1">[tab]<gtin>04150123456782</gtin>[tab]<lot>1A234B5</lot>[tab]<exp>151231</exp>[tab]<sn>12345
67890123456</sn></content>
```

#### Sample GS1 Output - Insert New Line (2)

The output consists of multiple lines of characters with a new line character at the end of each line.

```
<content dfi="GS1">
<gtin>04150123456782</gtin>
<lot>1A234B5</lot>
<exp>151231</exp>
<sn>1234567890123456</sn>
</content>
```

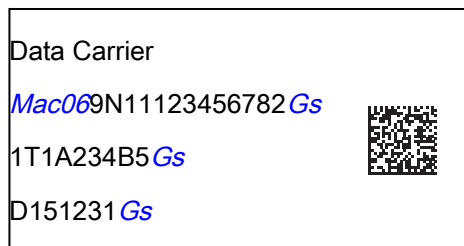
### Sample GS1 Output - Insert Tab and New Line (3)

The output consists of multiple lines of characters with tabs and a new line character at the end of each line.

```
<content dfi="GS1">
[tab]<gtin>04150123456782</gtin>
[tab]<lot>1A234B5</lot>
[tab]<exp>151231</exp>
[tab]<sn>1234567890123456</sn>
</content>
```

### Sample IFA Format

Product Number: PPNData Identifier DI Data Format Identifier: IFA



> Scanned Barcode >

```
<content dfi="IFA">
<ppn>111234567842</ppn>
<lot>1A234B5</lot>
<sn>1234567890123456</sn>
</content>
```

### Sample GS1 Output - Feature Disabled

The output has no format:

```
[ ]>069N1112345678421T1A234B5S1234567890123456
```

### Sample GS1 Output - No Formatting (0)

The output is a single line of characters:

```
<content
dfi="IFA"><ppn>111234567842</ppn><lot>1A234B5</lot><sn>1234567890123456</sn></content>
```

### Sample GS1 Output - Insert Tab (1)

The output is a single line of characters with a tab inserted in the XML body:

```
<content
dfi="IFA">[tab]<ppn>111234567842</ppn>[tab]<lot>1A234B5</lot>[tab]<sn>1234567890123456</sn></content>
```

### Sample GS1 Output - Insert New Line (2)

The output consists of multiple lines of characters with a new line character at the end of each line.

```
<content dfi="IFA">
<ppn>111234567842</ppn>
<lot>1A234B5</lot>
<sn>1234567890123456</sn>
</content>
```

### Sample GS1 Output - Insert Tab and New Line (3)

The output consists of multiple lines of characters with tabs and a new line character at the end of each line.

```
<content dfi="IFA">  
[tab]<ppn>111234567842</ppn>  
[tab]<lot>1A234B5</lot>  
[tab]<sn>1234567890123456</sn>  
</content>
```

### securPharm Output Formatting Barcodes

Scan a barcode below to format the securPharm output.



**\*No Formatting  
(0)**



**Insert Tab  
(1)**



**Insert New Line  
(2)**



**Insert Tab and New Line  
(3)**



# Imager Preferences

---

## Introduction

You can program the imager to perform various functions, or activate different features. This chapter describes image capture preference features and provides programming barcodes for selecting these features.



**NOTE:** Only the Symbol Native API (SNAPI) with Imaging interface supports image capture. See [USB Device Type on page 237](#) to enable this host.

The imager ships with the settings shown in [Table 9 on page 98](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

---

## Setting Parameters

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



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

To return all features to default values, scan the [Set Factory Defaults on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



\* Indicates default — \*Enable Parameter — Feature/option  
(1) — Option value

## Scanning Sequence Examples

In most cases scanning one barcode sets the parameter value. For example, to disable image capture illumination, scan the **Disable Image Capture Illumination** barcode under [Image Capture Illumination on page 101](#). The imager issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. See the 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.

## Image Capture Preferences Parameter Defaults

[Table 9](#) lists defaults for image capture preference parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 9** Image Capture Preferences Parameter Defaults

| Parameter                                  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default                  | Page Number         |
|--|-------------------------------|-------------------------|--------------------------|---------------------|
| <b>Image Capture Preferences</b>           |                               |                         |                          |                     |
| Operational Modes                          | N/A                           | N/A                     | N/A                      | <a href="#">100</a> |
| Image Capture Illumination                 | 361                           | F0h 69h                 | Enable                   | <a href="#">101</a> |
| Image Capture Autoexposure                 | 360                           | F0h 68h                 | Enable                   | <a href="#">101</a> |
| Fixed Exposure                             | 567                           | F4h F1h 37h             | 100                      | <a href="#">102</a> |
| Analog Gain                                | 1232                          | F4h D0h                 | Analog Gain x 2          | <a href="#">103</a> |
| Digital Gain                               | 1233                          | F4h D1h                 | 32                       | <a href="#">103</a> |
| Gain / Exposure Priority for Snapshot Mode | 562                           | F1h 32h                 | Autodetect               | <a href="#">104</a> |
| Snapshot Mode Timeout                      | 323                           | F0h 43h                 | 0 (30 seconds)           | <a href="#">105</a> |
| Snapshot Aiming Pattern                    | 300                           | F0h 2Ch                 | Enable                   | <a href="#">106</a> |
| Silence Operational Mode Changes           | 1293                          | F8h 05h 0Dh             | Disable (do not silence) | <a href="#">106</a> |
| Image Cropping                             | 301                           | F0h 2Dh                 | Disable                  | <a href="#">107</a> |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Imager Preferences

**Table 9** Image Capture Preferences Parameter Defaults (Continued)

| Parameter                                     | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup>                                  | Default                                     | Page Number |
|---|-------------------------------|--|---|-------------|
| Crop to Pixel Addresses                       | 315<br>316<br>317<br>318      | F4h F0h 3Bh<br>F4h F0h 3Ch<br>F4h F0h 3Dh<br>F4h F0h 3Eh | 0 top<br>0 left<br>799 bottom<br>1279 right | 107         |
| Image Size (Number of Pixels)                 | 302                           | F0h 2Eh  | Full  | 109         |
| Image Brightness (Target White)               | 390                           | F0h 86h  | 180   | 111         |
| JPEG Image Options                            | 299                           | F0h 2Bh  | Quality                                     | 111         |
| JPEG Quality Value                            | 305                           | F0h 31h  | 65  | 112         |
| JPEG Size Value                               | 561                           | F1h 31h  | 160 kB                                      | 112         |
| Image Enhancement                             | 564                           | F1h 34h  | Low (1)                                     | 113         |
| Image File Format Selection                   | 304                           | F0h 30h  | JPEG  | 114         |
| Image Rotation                                | 665                           | F1h 99h  | 0   | 115         |
| Bits per Pixel (BPP)                          | 303                           | F0h 2Fh  | 8 BPP                                       | 116         |
| Signature Capture                             | 93                            | 5Dh  | Disable                                     | 117         |
| Signature Capture Image File Format Selection | 313                           | F0h 39h  | JPEG  | 118         |
| Signature Capture Bits per Pixel (BPP)        | 314                           | F0h 3Ah  | 8 BPP                                       | 119         |
| Signature Capture Width                       | 366                           | F4h F0h 6Eh  | 400   | 120         |
| Signature Capture Height                      | 367                           | F4h F0h 6Fh  | 100   | 120         |
| Signature Capture JPEG Quality                | 421                           | F0h A5h  | 65  | 120         |
| Video Mode Format Selector                    | 916                           | F2h 94h  | JPEG  | 121         |
| Video View Finder                             | 324                           | F0h 44h  | Disable                                     | 121         |
| Target Video Frame Size                       | 328                           | F0h 48h  | 2200 bytes                                  | 122         |
| Video View Finder Image Size                  | 329                           | F0h 49h  | 1700 bytes                                  | 122         |
| Video Subsampling                             | 667                           | F1h 9Bh  | 1/4 Resolution                              | 110         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Image Capture Preferences

The parameters in this chapter control image capture characteristics.

### Operational Modes

The imager has three modes of operation:

- Decode Mode
- Snapshot Mode
- Video Mode

#### Decode Mode

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

#### Snapshot Mode

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

In Snapshot Mode, the imager turns on its aiming pattern to highlight the area to capture in the image. The next trigger press instructs the imager to capture a high quality image and transmit it to the host. A short time may pass (less than two seconds) between when the trigger is pressed and the image is captured as the imager adjusts to lighting conditions. Hold the imager steady until a single beep indicates that it captured the image.

If you do not press the trigger within the Snapshot Mode Timeout period, the imager returns to Decode Mode. Use [Snapshot Mode Timeout on page 105](#) to adjust this timeout period. The default timeout period is 30 seconds.

To disable the aiming pattern during Snapshot Mode, see [Snapshot Aiming Pattern on page 106](#).



**Snapshot Mode**

#### Video Mode

In this mode the imager behaves as a video camera as long as you press the trigger. Release the trigger to return to Decode Mode. Scan this barcode to temporarily enter Video Capture Mode.



**Video Mode**

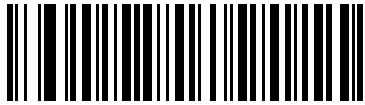
## Image Capture Illumination

Parameter # 361

SSI # F0h 69h

Scan **Enable Image Capture Illumination** to turn on illumination during every image capture. This usually results in superior images. The effectiveness of illumination decreases as the distance to the target increases.

Scan **Disable Image Capture Illumination** to prevent the imager from using illumination.



\*Enable Image Capture Illumination  
(1)



Disable Image Capture Illumination  
(0)

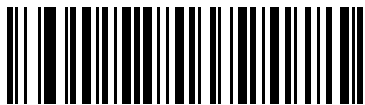
## Image Capture Autoexposure

Parameter # 360

SSI # F0h 68h

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

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



\*Enable Image Capture Autoexposure  
(1)



Disable Image Capture Autoexposure  
(0)

## Fixed Exposure

### Parameter # 567

### SSI # F4h F1h 37h

Type: Word

Range: 5 to 30,000

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

Each integer value represents 100  $\mu$ s of exposure. The default value is 100 which results in an exposure setting of 10 ms.

To set the exposure, scan the **Fixed Exposure** barcode, and then scan four numeric barcodes from [Numeric Barcodes](#) representing the value. Leading zeros are required. For example, to set a Fixed Exposure value of 99, scan 0, 0, 9, 9.



**Fixed Exposure**  
(4 digits)

## Analog and Digital Gain

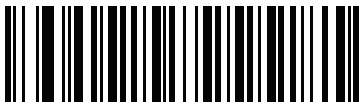
If you disable [Image Capture Autoexposure](#) you can modify the engine's analog and digital gain using these parameters. Total gain = analog gain x digital gain.

### Analog Gain

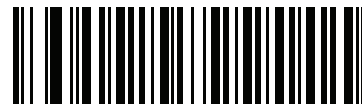
Parameter # 1232

SSI # F4h D0h

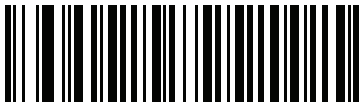
Select an option to set an analog gain value.



Analog Gain x 1  
(00h)



\*Analog Gain x 2  
(01h)



Analog Gain x 4  
(02h)



Analog Gain x 8  
(03h)

### Digital Gain

Parameter # 1233

SSI # F4h D1h

To set the digital gain, scan the following barcode, then scan two barcodes from [Numeric Barcodes](#) to enter a 2-digit value for the digital gain. The default is 32.

A value of 32 = x 1 digital gain; i.e., digital gain = 1/32 x digital gain parameter value.



Digital Gain

## Gain/Exposure Priority for Snapshot Mode

### Parameter # 562

### SSI # F1h 32h

This parameter alters the imager's gain exposure priority when it acquires an image in Snapshot Mode while in autoexposure mode. Scan one of the following barcodes:

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



Low Gain Priority  
(0)



Low Exposure Priority  
(1)



\*Autodetect  
(2)



## Snapshot Mode Timeout

Parameter # 323

SSI # F0h 43h

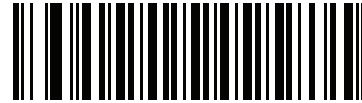
This parameter sets the amount of time the imager remains in Snapshot Mode. The imager exits Snapshot Mode when you press the trigger, or when the Snapshot Mode Timeout elapses. To set this timeout value, scan the **Set Snapshot Mode Timeout** barcode, and then scan a barcode from [Numeric Barcodes](#). The default value is 0 which represents 30 seconds; values increment by 30. For example, 0 = 30 seconds, 1 = 60 seconds, 2 = 90 seconds, etc. The maximum timeout value that can be set on the scanner is 9 = 300 seconds.

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

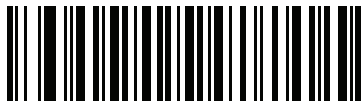
If you scan **No Timeout**, the imager remains in Snapshot Mode until you press the trigger.



Set Snapshot Mode Timeout



\*30 Seconds



No Timeout

## Snapshot Aiming Pattern

Parameter # 300

SSI # F0h 2Ch

Scan one of the following barcodes to select whether or not to project the aiming pattern when in Snapshot Mode.



**NOTE:** If enabled, the aiming pattern frames the image for aiming purposes and does not appear in the captured image.



**\*Enable Snapshot Aiming Pattern  
(1)**



**Disable Snapshot Aiming Pattern  
(0)**

## Silence Operational Mode Changes

Parameter # 1293

SSI # F8h 05h 0Dh

Scan **Silence Operational Mode Changes** to silence the speaker when switching between operational modes (e.g., from Decode Mode to Snapshot Mode).



**Silence Operational Mode Changes (Enable)  
(1)**



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

## Image Cropping

### Parameter # 301

#### SSI # F0h 2Dh

Scan the **Enable Image Cropping** barcode to crop a captured image to the pixel addresses set in [Crop to Pixel Addresses on page 107](#). Scan **Disable Image Cropping** to present the full 1280 x 800 pixels.



Enable Image Cropping  
(1)



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

## Crop to Pixel Addresses

### Parameter # 315

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

### Parameter # 316

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

### Parameter # 317

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

### Parameter # 318

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



**NOTE:** The imager has a cropping resolution of 4 pixels. Setting the cropping area to less than 4 pixels (after resolution adjustment, see [Image Size \(Number of Pixels\) on page 109](#)) transfers the entire image.

If you enabled [Image Cropping](#), set the pixel addresses from (0,0) to (1279 x 799) to crop to.

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

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

To set the pixel addresses, scan each of the following barcodes, and then scan four numeric barcodes from [Numeric Barcodes](#) representing the value. Leading zeros are required. For example, to crop the top pixel address to 3, scan 0, 0, 0, 3. The defaults are:

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

Crop to Pixel Address (continued)



Top Pixel Address  
(0 - 799 Decimal)



Left Pixel Address  
(0 - 1279 Decimal)



Bottom Pixel Address  
(0 - 799 Decimal)



Right Pixel Address  
(0 - 1279 Decimal)

## Image Size (Number of Pixels)

Parameter # 302

SSI # F0h 2Eh

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

Scan a barcode below to select an image size.

Table 10 Image Size

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



\*Full Resolution  
(0)



1/2 Resolution  
(1)



1/4 Resolution  
(3)

## Video Subsampling

Parameter # 667

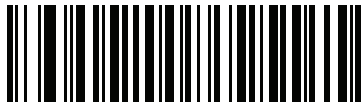
SSI # F1h 9Bh

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

Scan a barcode below to select the desired video subsampling.

Table 11 Video Subsampling

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



Full Resolution  
(0)



1/2 Resolution  
(1)



\*1/4 Resolution  
(3)

## Image Brightness (Target White)

Parameter # 390

SSI # F0h 86h

Type: Byte

Range: 1 - 240

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

Scan the **Image Brightness** barcode, and then scan three numeric barcodes from [Numeric Barcodes](#) representing the value. Leading zeros are required. For example, to set an Image Brightness value of 99, scan 0, 9, 9.



\*180



Image Brightness  
(3 digits)

## JPEG Image Options

Parameter # 299

SSI # F0h 2Bh

Scan one of the following barcodes to optimize JPEG images for either size or quality:

- **JPEG Quality Selector** - Enter a quality value via the [JPEG Quality Value](#) parameter; the imager then selects the corresponding image size.
- **JPEG Size Selector** - Enter a size value via the [JPEG Size Value](#) parameter; the imager then selects the best image quality.



\*JPEG Quality Selector  
(1)



JPEG Size Selector  
(0)

## JPEG Quality Value

Parameter # 305

SSI # F0h 31h

If you selected **JPEG Quality Selector**, scan the **JPEG Quality Value** barcode, and then scan three barcodes from [Numeric Barcodes](#) corresponding to a value from 5 to 100, where 100 represents the highest quality image. Leading zeros are required. For example, to set an image quality value of 55, scan 0, 5, 5.



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

## JPEG Size Value

Parameter # 561

SSI # F1h 31h

Type: Word

Range: 5-350

If you selected **JPEG Size Selector**, scan the **JPEG Size Value** barcode, and then scan three numeric barcodes from [Numeric Barcodes](#) representing the target JPEG file size in kilobytes (KB). Leading zeros are required. For example, to set an image file size value of 99, scan 0, 9, 9.



**CAUTION:** JPEG compression may take 10 to 15 seconds based on the amount of information in the target image. Scanning JPEG Quality Selector (default setting) on [page 111](#) produces a compressed image that is consistent in quality and compression time.



JPEG Size Value  
(Default: 160)  
(3 digits)



## Image Enhancement

### Parameter # 564

### SSI # F1h 34h

This parameter uses a combination of edge sharpening and contrast enhancement to produce an image that is visually pleasing.

Scan one of the following barcodes to select the level of image enhancement:

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



Off  
(0)



\*Low  
(1)



Medium  
(2)



High  
(3)

## Image File Format Selector

Parameter # 304

SSI # F0h 30h

Scan one of the following barcodes to select an image format appropriate for the system (BMP, TIFF, or JPEG). The imager stores captured images in the selected format.



**BMP File Format**  
(3)



**\*JPEG File Format**  
(1)



**TIFF File Format**  
(04h)

## Image Rotation

Parameter # 665

SSI # F1h 99h

Scan one of the following barcodes to rotate the image 0, 90, 180, or 270 degrees.



\*Rotate 0°  
(0)



Rotate 90°  
(1)



Rotate 180°  
(2)



Rotate 270°  
(3)

## Bits Per Pixel

### Parameter # 303

### SSI # F0h 2Fh

Scan one of the following barcodes to select the number of significant bits per pixel (BPP) to use when capturing an image:

- **1 BPP** - For a black and white image.
- **4 BPP** - Assigns 1 of 16 levels of grey to each pixel.
- **8 BPP** - Assigns 1 of 256 levels of grey to each pixel.



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

TIFF file formats only support **4 BPP** and **8 BPP**. Selecting **1 BPP** for TIFF applies the **4 BPP** option.



**1 BPP**  
(0)



**4 BPP**  
(1)



**\*8 BPP**  
(2)

## Signature Capture

### Parameter # 93

#### SSI # 5Dh

A signature capture barcode 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 barcode pattern is considered the signature capture area. See [Signature Capture](#) for more information.

### Output File Format

Decoding a signature capture barcode 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 12** Output File Format

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

Scan one of the following barcodes to enable or disable Signature Capture.



Enable Signature Capture  
(1)



\*Disable Signature Capture  
(0)

## Signature Capture File Format Selector

Parameter # 313

SSI # F0h 39h

Scan one of the following barcodes to select a signature file format appropriate for the system (BMP, TIFF, or JPEG). The imager stores captured signatures in the selected format.



**BMP Signature Format**  
(3)



**\*JPEG Signature Format**  
(1)



**TIFF Signature Format**  
(4)

## Signature Capture Bits Per Pixel

### Parameter # 314

### SSI # F0h 3Ah

Scan one of the following barcodes to select the number of significant bits per pixel (BPP) to use when capturing a signature:

- **1 BPP** - For a black and white image.
- **4 BPP** - Assigns 1 of 16 levels of grey to each pixel.
- **8 BPP** - Assigns 1 of 256 levels of grey to each pixel.



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



**1 BPP**  
(0)



**4 BPP**  
(1)



**\*8 BPP**  
(2)

## Signature Capture Width

Parameter # 366

SSI # F4h F0h 6Eh

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 requires a 4 to 1 aspect ratio of width to height.

To set the width of the signature capture box, scan the **Signature Capture Width** barcode, and then scan four barcodes from [Numeric Barcodes](#) corresponding to a value in the range of 16 to 1280 decimal.



Signature Capture Width (Default: 400)  
(16 - 1280 Decimal)

## Signature Capture Height

Parameter # 367

SSI # F4h F0h 6Fh

To set the height of the signature capture box, scan the **Signature Capture Height** barcode, and then scan three barcodes from [Numeric Barcodes](#) corresponding to a value in the range of 16 to 960 decimal.



Signature Capture Height (Default: 100)  
(16 - 960 Decimal)

## Signature Capture JPEG Quality

Parameter # 421

SSI # F0h A5h

Scan the **JPEG Quality Value** barcode, and then scan three barcodes from [Numeric Barcodes](#) corresponding to a value from 005 to 100, where 100 represents the highest quality image.



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

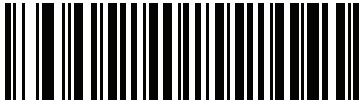


## Video Mode Format Selector

Parameter # 916

SSI # F2h 94h

When the digital imager scanner is in Video Mode, select whether to send data in BMP or JPEG format.



**BMP File Format**  
(3)



**\*JPEG File Format**  
(1)

## Video View Finder

Parameter # 324

SSI # F0h 44h

Scan one of the following barcodes to select whether to project the video view finder while in Snapshot Mode.



**Enable Video View Finder**  
(1)



**\*Disable Video View Finder**  
(0)

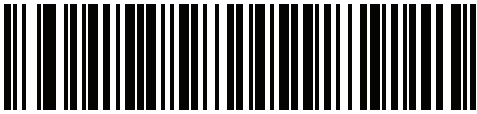
## Target Video Frame Size

### Parameter # 328

#### SSI # F0h 48h

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

To set the Target Video Frame Size, scan the barcode below followed by three barcodes from [Numeric Barcodes](#) corresponding to the 100-byte value from 800 to 20,000 bytes. For example, to select 1500 bytes, enter 0, 1, 5. To select 900 bytes, enter 0, 0, 9. The default is 2200 bytes.



Target Video Frame Size

## Video View Finder Image Size

### Parameter # 329

#### SSI # F0h 49h

This parameter sets the number of 100-byte blocks. Values range from 800 to 12,000 bytes. A smaller value transmits more frames per second, while a larger value increases video quality.

Scan the **Video View Finder Image Size** barcode, and then scan three barcodes from [Numeric Barcodes](#) corresponding to the 100-byte value from 800 to 12,000 bytes. For example, to select 1500 bytes, enter 0, 1, 5. To select 900 bytes, enter 0, 0, 9. The default is 1700 bytes.



Video View Finder Image Size

# Symbologies

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## Introduction

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

The scanner ships with the settings shown in [Table 13 on page 124](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

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## Setting Parameters

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



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

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

To return all features to default values, see [Default Parameters on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



\* Indicates default — \*Enable Parameter — Feature/option

## Scanning Sequence Examples

In most cases, scanning one barcode sets the parameter value. For example, to transmit barcode data without the UPC-A check digit, scan the **Do Not Transmit UPC-A Check Digit** barcode under [Transmit UPC-A Check Digit on page 142](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. See the 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.

## Symbology Parameter Defaults

[Table 13](#) lists defaults for all symbology parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall the default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 13** Symbology Parameter Defaults

| Parameter   | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default | Page Number         |
|---|-------------------------------|-------------------------|---------|---------------------|
| <b>Enable/Disable All Code Types</b>              |                               |                         |         | <a href="#">131</a> |
| <b>1D Symbologies</b>                             |                               |                         |         |                     |
| <b>UPC/EAN/JAN</b>                                |                               |                         |         |                     |
| UPC-A   | 1                             | 01h                     | Enable  | <a href="#">131</a> |
| UPC-E   | 2                             | 02h                     | Enable  | <a href="#">132</a> |
| UPC-E1  | 12                            | 0Ch                     | Disable | <a href="#">132</a> |
| EAN-8/JAN 8                                       | 4                             | 04h                     | Enable  | <a href="#">133</a> |
| EAN-13/JAN 13                                     | 3                             | 03h                     | Enable  | <a href="#">133</a> |
| Bookland EAN                                      | 83                            | 53h                     | Disable | <a href="#">134</a> |
| Bookland ISBN Format                              | 576                           | F1h 40h                 | ISBN-10 | <a href="#">135</a> |
| ISSN EAN  | 617                           | F1h 69h                 | Disable | <a href="#">136</a> |
| Decode UPC/EAN/JAN Supplementals (2 and 5 digits) | 16                            | 10h                     | Ignore  | <a href="#">137</a> |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

**Table 13** Symbology Parameter Defaults (Continued)

| Parameter                              | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default   | Page Number |
|--|-------------------------------|-------------------------|---|-------------|
| User-Programmable Supplementals        |                               |                         | 000   | 140         |
| Supplemental 1:                        | 579                           | F1h 43h                 |   |             |
| Supplemental 2:                        | 580                           | F1h 44h                 |   |             |
| UPC/EAN/JAN Supplemental Redundancy    | 80                            | 50h                     | 10  | 140         |
| Decode UPC/EAN/JAN Supplemental AIM ID | 672                           | F1h A0h                 | Combined  | 141         |
| Transmit UPC-A Check Digit             | 40                            | 28h                     | Enable  | 142         |
| Transmit UPC-E Check Digit             | 41                            | 29h                     | Enable  | 142         |
| Transmit UPC-E1 Check Digit            | 42                            | 2Ah                     | Enable  | 143         |
| UPC-A Preamble                         | 34                            | 22h                     | System Character                                | 144         |
| UPC-E Preamble                         | 35                            | 23h                     | System Character                                | 145         |
| UPC-E1 Preamble                        | 36                            | 24h                     | System Character                                | 146         |
| Convert UPC-E to UPC-A                 | 37                            | 25h                     | Disable   | 147         |
| Convert UPC-E1 to UPC-A                | 38                            | 26h                     | Disable   | 147         |
| EAN/JAN Zero Extend                    | 39                            | 27h                     | Disable   | 148         |
| UCC Coupon Extended Code               | 85                            | 55h                     | Disable   | 148         |
| Coupon Report                          | 730                           | F1h DAh                 | New Coupon Format                               | 149         |
| UPC Reduced Quiet Zone                 | 1289                          | F8h 05h 09h             | Disable   | 150         |
| <b>Code 128</b>                        |                               |                         |   |             |
| Code 128                               | 8                             | 08h                     | Enable  | 150         |
| Set Length(s) for Code 128             | 209, 210                      | D1h, D2h                | Any Length                                      | 151         |
| GS1-128 (formerly UCC/EAN-128)         | 14                            | 0Eh                     | Enable  | 152         |
| ISBT 128                               | 84                            | 54h                     | Enable  | 153         |
| ISBT Concatenation                     | 577                           | F1h 41h                 | Disable - SR/DL models<br>Enable - HD/HL models | 153         |
| Check ISBT Table                       | 578                           | F1h 42h                 | Enable  | 154         |
| ISBT Concatenation Redundancy          | 223                           | DFh                     | 10  | 155         |
| Code 128 <FNC4>                        | 1254                          | F8h 04h E6h             | Honor   | 155         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

**Table 13** Symbology Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default          | Page Number |
|--|-------------------------------|-------------------------|------------------|-------------|
| Code 128 Security Level                            | 751                           | F1h EFh                 | Security Level 1 | 156         |
| Code 128 Reduced Quiet Zone                        | 1208                          | F8h 04h B8h             | Disable          | 157         |
| <b>Code 39</b>                                     |                               |                         |                  |             |
| Code 39  | 0                             | 00h                     | Enable           | 157         |
| Trioptic Code 39                                   | 13                            | 0Dh                     | Disable          | 158         |
| Convert Code 39 to Code 32 (Italian Pharmacy Code) | 86                            | 56h                     | Disable          | 158         |
| Code 32 Prefix                                     | 231                           | E7h                     | Disable          | 159         |
| Set Length(s) for Code 39                          | 18, 19                        | 12h, 13h                | 1 to 55          | 159         |
| Code 39 Check Digit Verification                   | 48                            | 30h                     | Disable          | 161         |
| Transmit Code 39 Check Digit                       | 43                            | 2Bh                     | Disable          | 161         |
| Code 39 Full ASCII Conversion                      | 17                            | 11h                     | Disable          | 162         |
| Code 39 Security Level                             | 750                           | F1h EEh                 | Security Level 1 | 163         |
| Code 39 Reduced Quiet Zone                         | 1209                          | F8h 04h B9h             | Disable          | 164         |
| <b>Code 93</b>                                     |                               |                         |                  |             |
| Code 93  | 9                             | 09h                     | Enable           | 164         |
| Set Length(s) for Code 93                          | 26, 27                        | 1Ah, 1Bh                | 1 to 55          | 165         |
| <b>Code 11</b>                                     |                               |                         |                  |             |
| Code 11  | 10                            | 0Ah                     | Disable          | 167         |
| Set Lengths for Code 11                            | 28, 29                        | 1Ch, 1Dh                | 4 to 55          | 167         |
| Code 11 Check Digit Verification                   | 52                            | 34h                     | Disable          | 169         |
| Transmit Code 11 Check Digit(s)                    | 47                            | 2Fh                     | Disable          | 170         |
| <b>Interleaved 2 of 5 (ITF)</b>                    |                               |                         |                  |             |
| Interleaved 2 of 5 (ITF)                           | 6                             | 06h                     | Enable           | 170         |
| Set Lengths for I 2 of 5                           | 22, 23                        | 16h, 17h                | 6 to 55          | 171         |
| I 2 of 5 Check Digit Verification                  | 49                            | 31h                     | Disable          | 172         |
| Transmit I 2 of 5 Check Digit                      | 44                            | 2Ch                     | Disable          | 173         |
| Convert I 2 of 5 to EAN 13                         | 82                            | 52h                     | Disable          | 173         |
| Febraban   | 1750                          | F8h 06h D6h             | Disable          | 174         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

**Table 13** Symbology Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default             | Page Number         |
|--|-------------------------------|-------------------------|---------------------|---------------------|
| I 2 of 5 Security Level                                      | 1121                          | F8h 04h 61h             | Security Level 1    | <a href="#">175</a> |
| I 2 of 5 Reduced Quiet Zone                                  | 1210                          | F8h 04h BAh             | Disable             | <a href="#">176</a> |
| <b>Discrete 2 of 5 (DTF)</b>                                 |                               |                         |                     |                     |
| Discrete 2 of 5  | 5                             | 05h                     | Disable             | <a href="#">176</a> |
| Set Length(s) for D 2 of 5                                   | 20, 21                        | 14h 15h                 | 1 to 55             | <a href="#">177</a> |
| <b>Codabar (NW - 7)</b>                                      |                               |                         |                     |                     |
| Codabar  | 7                             | 07h                     | Enable              | <a href="#">179</a> |
| Set Lengths for Codabar                                      | 24, 25                        | 18h, 19h                | 4 to 55             | <a href="#">179</a> |
| CLSI Editing   | 54                            | 36h                     | Disable             | <a href="#">181</a> |
| NOTIS Editing  | 55                            | 37h                     | Disable             | <a href="#">181</a> |
| Codabar Security Level                                       | 1776                          | F8h 06h F0h             | Security Level 1    | <a href="#">182</a> |
| Codabar Upper or Lower Case Start/ Stop Characters Detection | 855                           | F2h 57h                 | Upper Case          | <a href="#">183</a> |
| Codabar Mod 16 Check Digit Verification                      | 1784                          | F8h 06h F8h             | Disable             | <a href="#">183</a> |
| Transmit Codabar Check Digit                                 | 704                           | F1h C0h                 | Disable             | <a href="#">184</a> |
| <b>MSI</b>   |                               |                         |                     |                     |
| MSI  | 11                            | 0Bh                     | Disable             | <a href="#">184</a> |
| Set Length(s) for MSI  | 30, 31                        | 1Eh, 1Fh                | 4 to 55             | <a href="#">185</a> |
| MSI Check Digits   | 50                            | 32h                     | One MSI Check Digit | <a href="#">187</a> |
| Transmit MSI Check Digit                                     | 46                            | 2Eh                     | Disable             | <a href="#">188</a> |
| MSI Check Digit Algorithm                                    | 51                            | 33h                     | Mod 10/Mod 10       | <a href="#">188</a> |
| MSI Reduced Quiet Zone                                       | 1392                          | F8h 05h 70h             | Disable             | <a href="#">189</a> |
| <b>Chinese 2 of 5</b>  |                               |                         |                     |                     |
| Chinese 2 of 5   | 408                           | F0h 98h                 | Disable             | <a href="#">189</a> |
| <b>Matrix 2 of 5</b>   |                               |                         |                     |                     |
| Matrix 2 of 5  | 618                           | F1h 6Ah                 | Disable             | <a href="#">190</a> |
| Matrix 2 of 5 Lengths  | 619<br>620                    | F1h 6Bh<br>F1h 6Ch      | 4 to 55             | <a href="#">190</a> |
| Matrix 2 of 5 Check Digit                                    | 622                           | F1h 6Eh                 | Disable             | <a href="#">192</a> |

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

**Table 13** Symbology Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default   | Page Number         |
|--|-------------------------------|-------------------------|---|---------------------|
| Transmit Matrix 2 of 5 Check Digit   | 623                           | F1h 6Fh                 | Disable   | <a href="#">192</a> |
| <b>Korean 3 of 5</b>   |                               |                         |   |                     |
| Korean 3 of 5  | 581                           | F1h 45h                 | Disable   | <a href="#">193</a> |
| <b>Inverse 1D</b>  |                               |                         |   |                     |
| Inverse 1D   | 586                           | F1h 4Ah                 | Regular   | <a href="#">193</a> |
| <b>GS1 DataBar</b>   |                               |                         |   |                     |
| GS1 DataBar Omnidirectional (formerly GS1 DataBar-14), GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional | 338                           | F0h 52h                 | Enable  | <a href="#">195</a> |
| GS1 DataBar Limited  | 339                           | F0h 53h                 | Enable  | <a href="#">196</a> |
| GS1 DataBar Expanded, GS1 DataBar Expanded Stacked   | 340                           | F0h 54h                 | Enable  | <a href="#">196</a> |
| Convert GS1 DataBar to UPC/EAN/JAN   | 397                           | F0h 8Dh                 | Disable   | <a href="#">197</a> |
| GS1 DataBar Security Level   | 1706                          | F8h 06h AAh             | Level 1   | <a href="#">198</a> |
| GS1 DataBar Limited Margin Check   | 728                           | F1h D8h                 | Level 3   | <a href="#">199</a> |
| <b>Symbology-Specific Security Features</b>  |                               |                         |   |                     |
| Redundancy Level   | 78                            | 4Eh                     | 1   | <a href="#">200</a> |
| Security Level   | 77                            | 4Dh                     | 1   | <a href="#">202</a> |
| 1D Quiet Zone Level  | 1288                          | F8h 05h 08h             | 1   | <a href="#">203</a> |
| Intercharacter Gap Size  | 381                           | F0h 7Dh                 | Normal  | <a href="#">204</a> |
| <b>Composite Codes</b>   |                               |                         |   |                     |
| Composite CC-C   | 341                           | F0h 55h                 | Disable - SR/DL models<br>Enable - HD/HL models | <a href="#">204</a> |
| Composite CC-A/B   | 342                           | F0h 56h                 | Disable - SR/DL models<br>Enable - HD/HL models | <a href="#">205</a> |
| Composite TLC-39   | 371                           | F0h 73h                 | Disable   | <a href="#">205</a> |
| Composite Inverse  | 1113                          | F8h 04h 59h             | Regular Only                                    | <a href="#">206</a> |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.



**Table 13** Symbology Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default                           | Page Number |
|--|-------------------------------|-------------------------|-----------------------------------|-------------|
| UPC Composite Mode                                 | 344                           | F0h 58h                 | UPC Never Linked                  | 207         |
| Composite Beep Mode                                | 398                           | F0h 8Eh                 | Beep As Each Code Type is Decoded | 208         |
| GS1-128 Emulation Mode for UCC/EAN Composite Codes | 427                           | F0h ABh                 | Disable                           | 208         |
| <b>2D Symbologies</b>                              |                               |                         |                                   |             |
| PDF417   | 15                            | 0Fh                     | Enable                            | 209         |
| MicroPDF417  | 227                           | E3h                     | Disable                           | 209         |
| Code 128 Emulation                                 | 123                           | 7Bh                     | Disable                           | 210         |
| Data Matrix  | 292                           | F0h 24h                 | Enable                            | 211         |
| GS1 Data Matrix                                    | 1336                          | F8h 05h 38h             | Disable                           | 211         |
| Data Matrix Inverse                                | 588                           | F1h 4Ch                 | Inverse Autodetect                | 212         |
| Decode Data Matrix Mirror Images                   | 537                           | F1h 19h                 | Auto                              | 213         |
| Maxicode   | 294                           | F0h 26h                 | Disable                           | 214         |
| QR Code  | 293                           | F0h 25h                 | Enable                            | 214         |
| Weblink QR   | 1947                          | F7 07 9B                | Enable                            | 215         |
| GS1 QR   | 1343                          | F8h 05h 3Fh             | Enable                            | 216         |
| MicroQR  | 573                           | F1h 3Dh                 | Enable                            | 216         |
| Linked QR Mode                                     | 1847                          | 737h                    | Linked QR Only                    | 217         |
| Aztec  | 574                           | F1h 3Eh                 | Enable                            | 218         |
| Aztec Inverse                                      | 589                           | F1h 4Dh                 | Inverse Autodetect                | 218         |
| Han Xin  | 1167                          | F8h 04h 8Fh             | Disable                           | 219         |
| Han Xin Inverse                                    | 1168                          | F8h 04h 90h             | Regular                           | 219         |
| Grid Matrix  | 1718                          | F8h 06h B6h             | Disable                           | 220         |
| Grid Matrix Inverse                                | 1719                          | F8h 06h B7h             | Regular Only                      | 220         |
| Grid Matrix Mirror                                 | 1736                          | F8h 06h C8h             | Regular Only                      | 221         |
| DotCode  | 1906                          | F8 07 72h               | Disable                           | 222         |
| DotCode Inverse                                    | 1907                          | F8 07 73h               | Autodetect                        | 223         |
| DotCode Mirrored                                   | 1908                          | F8 07 74h               | Autodetect                        | 224         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

**Table 13** Symbology Parameter Defaults (Continued)

| Parameter                          | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default          | Page Number         |
|------------------------------------|-------------------------------|-------------------------|------------------|---------------------|
| DotCode Prioritize                 | 1937                          | F8 07 91h               | Enable           | <a href="#">225</a> |
| DotCode Erasure Limit              | 2063                          | F8 08 0F                | 10               | <a href="#">225</a> |
| <b>Macro PDF</b>                   |                               |                         |                  |                     |
| Flush Macro PDF Buffer             | N/A                           | N/A                     | N/A              | <a href="#">226</a> |
| Abort Macro PDF Entry              | N/A                           | N/A                     | N/A              | <a href="#">226</a> |
| <b>Postal Codes</b>                |                               |                         |                  |                     |
| US Postnet                         | 89                            | 59h                     | Disable          | <a href="#">227</a> |
| US Planet                          | 90                            | 5Ah                     | Disable          | <a href="#">227</a> |
| Transmit US Postal Check Digit     | 95                            | 5Fh                     | Enable           | <a href="#">228</a> |
| UK Postal                          | 91                            | 5Bh                     | Disable          | <a href="#">228</a> |
| Transmit UK Postal Check Digit     | 96                            | 60h                     | Enable           | <a href="#">229</a> |
| Japan Postal                       | 290                           | F0h 22h                 | Disable          | <a href="#">229</a> |
| Australia Post                     | 291                           | F0h 23h                 | Disable          | <a href="#">230</a> |
| Australia Post Format              | 718                           | F1h CEh                 | Autodiscriminate | <a href="#">231</a> |
| Netherlands KIX Code               | 326                           | F0h 46h                 | Disable          | <a href="#">232</a> |
| USPS 4CB/One Code/Intelligent Mail | 592                           | F1h 50h                 | Disable          | <a href="#">232</a> |
| UPU FICS Postal                    | 611                           | F1h 63h                 | Disable          | <a href="#">233</a> |
| Mailmark                           | 1337                          | F8h 05h 39h             | Disable          | <a href="#">233</a> |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

---

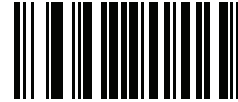
## Enable/Disable All Code Types

Scan the **Disable All Code Types** barcode to disable all symbologies. This is useful when enabling only a few code types.

Scan **Enable All Code Types** to enable all symbologies. This is useful if you need to disable only a few code types.



Disable All Code Types



Enable All Code Types

---

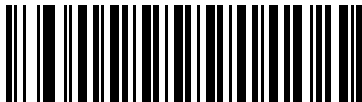
## UPC/EAN/JAN

### UPC-A

Parameter # 1

SSI # 01h

Scan one of the following barcodes to enable or disable UPC-A.



\*Enable UPC-A  
(1)



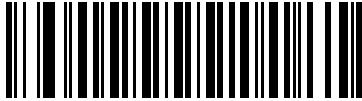
Disable UPC-A  
(0)

## UPC-E

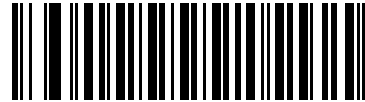
Parameter # 2

SSI # 02h

Scan one of the following barcodes to enable or disable UPC-E.



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



**Disable UPC-E**  
(0)

## UPC-E1

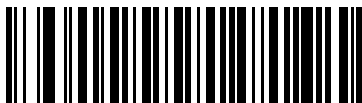
Parameter # 12

SSI # 0Ch

Scan one of the following barcodes to enable or disable UPC-E1.



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



**Enable UPC-E1**  
(1)



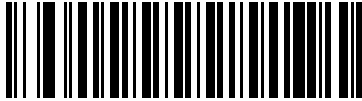
**\*Disable UPC-E1**  
(0)

## EAN-8/JAN-8

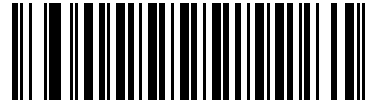
Parameter # 4

SSI # 04h

Scan one of the following barcodes to enable or disable EAN-8/JAN-8.



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



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

## EAN-13/JAN-13

Parameter # 3

SSI # 03h

Scan one of the following barcodes to enable or disable EAN-13/JAN-13.



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



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

## Bookland EAN

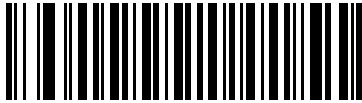
Parameter # 83

SSI # 53h



**NOTE:** If you enable Bookland EAN, select a [Bookland ISBN Format](#). Also set [Decode UPC/EAN/JAN Supplementals on page 137](#) to either Decode UPC/EAN/JAN with Supplementals Only, Autodiscriminate UPC/EAN/JAN With Supplementals, or Enable 978/979 Supplemental Mode.

Scan one of the following barcodes to enable or disable Bookland EAN.



Enable Bookland EAN  
(1)



\*Disable Bookland EAN  
(0)

## Bookland ISBN Format

Parameter # 576

SSI # F1h 40h



**NOTE:** For Bookland EAN to function properly, first enable Bookland EAN using [Bookland EAN on page 134](#), and then set [Decode UPC/EAN/JAN Supplementals on page 137](#) to either Decode UPC/EAN/JAN with Supplementals Only, Autodiscriminate UPC/EAN/JAN With Supplementals, or Enable 978/979 Supplemental Mode.

If you enabled Bookland EAN using [Bookland EAN on page 134](#), select one of the following formats for Bookland data:

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



\*Bookland ISBN-10  
(0)



Bookland ISBN-13  
(1)

## ISSN EAN

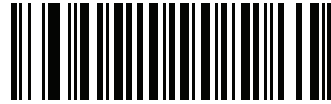
Parameter # 617

SSI # F1h 69h

Scan one of the following barcodes to enable or disable ISSN EAN.



Enable ISSN EAN  
(1)



\*Disable ISSN EAN  
(0)



## Decode UPC/EAN/JAN Supplementals

### Parameter # 16

### SSI # 10h

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

- **Decode UPC/EAN/JAN with Supplementals Only** - The scanner only decodes UPC/EAN/JAN symbols with supplemental characters, and ignores symbols without supplementals.
- **Ignore UPC/EAN/JAN Supplementals** - When presented with a UPC/EAN/JAN plus supplemental symbol, the scanner decodes UPC/EAN/JAN and ignores the supplemental characters.
- **Autodiscriminate UPC/EAN/JAN with Supplementals** - The scanner decodes UPC/EAN/JAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the scanner must decode the barcode the number of times set via [UPC/EAN/JAN Supplemental Redundancy on page 140](#) before transmitting its data to confirm that there is no supplemental.

Select one of the following **Supplemental Mode** options to immediately transmit EAN-13 barcodes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the scanner must decode the barcode the number of times set via [UPC/EAN/JAN Supplemental Redundancy on page 140](#) before transmitting the data to confirm that there is no supplemental. The scanner transmits UPC/EAN/JAN barcodes that do not have that prefix immediately.

- **Enable 378/379 Supplemental Mode**
- **Enable 978/979 Supplemental Mode**



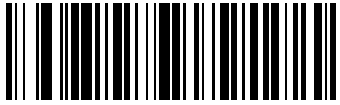
**NOTE:** If you select 978/979 Supplemental Mode and are scanning Bookland EAN barcodes, see [Bookland EAN on page 134](#) to enable Bookland EAN, and select a format using [Bookland ISBN Format on page 135](#).

- **Enable 977 Supplemental Mode**
- **Enable 414/419/434/439 Supplemental Mode**
- **Enable 491 Supplemental Mode**
- **Enable Smart Supplemental Mode** - This applies to EAN-13 barcodes starting with any prefix listed previously.
- **Supplemental User-Programmable Type 1** - This applies to EAN-13 barcodes starting with a 3-digit user-defined prefix. Set this using [User-Programmable Supplementals on page 140](#).
- **Supplemental User-Programmable Type 1 and 2** - This applies to EAN-13 barcodes starting with either of two 3-digit user-defined prefixes. Set the prefixes using [User-Programmable Supplementals on page 140](#).
- **Smart Supplemental Plus User-Programmable 1** - This applies to EAN-13 barcodes starting with any prefix listed previously or the prefix set using [User-Programmable Supplementals on page 140](#).
- **Smart Supplemental Plus User-Programmable 1 and 2** - This applies to EAN-13 barcodes starting with any prefix listed previously or one of the two user-defined prefixes set using [User-Programmable Supplementals on page 140](#).

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



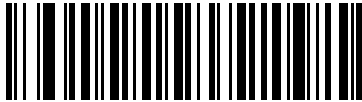
**NOTE:** To minimize the risk of invalid data transmission, select either to decode or ignore supplemental characters.



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



\*Ignore UPC/EAN/JAN Supplementals  
(0)



Autodiscriminate UPC/EAN/JAN with Supplementals  
(2)



Enable 378/379 Supplemental Mode  
(4)



Enable 978/979 Supplemental Mode  
(5)



Enable 977 Supplemental Mode  
(7)

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



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



Enable 491 Supplemental Mode  
(8)



Enable Smart Supplemental Mode  
(3)



Supplemental User-Programmable Type 1  
(9)



Supplemental User-Programmable Type 1 and 2  
(10)



Smart Supplemental Plus User-Programmable 1  
(11)



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

## User-Programmable Supplementals

Supplemental 1: Parameter # 579

SSI # F1h 43h

Supplemental 2: Parameter # 580

SSI # F1h 44h

If you selected a Supplemental User-Programmable option from [Decode UPC/EAN/JAN Supplementals on page 137](#), scan **User-Programmable Supplemental 1**, and then scan three barcodes from [Numeric Barcodes](#) to set the 3-digit prefix. To set a second 3-digit prefix, scan **User-Programmable Supplemental 2**, and then scan three barcodes from [Numeric Barcodes](#). The default is 000 (zeroes).



User-Programmable Supplemental 1



User-Programmable Supplemental 2

## UPC/EAN/JAN Supplemental Redundancy

Parameter # 80

SSI # 50h

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

Scan the barcode below to set a decode redundancy value. Next, scan two numeric barcodes in [Numeric Barcodes](#). Enter a leading zero for single digit numbers. To correct an error or change a selection, scan [Cancel on page 432](#).



UPC/EAN/JAN Supplemental Redundancy

## UPC/EAN/JAN Supplemental AIM ID Format

Parameter # 672

SSI # F1h A0h

If [Transmit Code ID Character on page 86](#) is set to **AIM Code ID Character**, scan one of the following barcodes to select an output format when reporting UPC/EAN/JAN barcodes with supplementals:

- **Separate** - Transmit UPC/EAN/JAN 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/JAN with supplementals with one AIM ID and one transmission, i.e.,  
]E3<data+supplemental data>
- **Separate Transmissions** - Transmit UPC/EAN/JAN with supplementals with separate AIM IDs and separate transmissions, i.e.,  
]E<0 or 4><data>  
]E<1 or 2>[supplemental data]



Separate  
(0)



\*Combined  
(1)



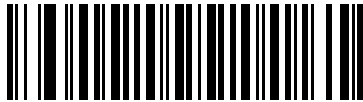
Separate Transmissions  
(2)

## Transmit UPC-A Check Digit

Parameter # 40

SSI # 28h

The check digit is the last character of the symbol used to verify the integrity of the data. Scan one of the following barcodes to transmit the barcode data with or without the UPC-A check digit. It is always verified to guarantee the integrity of the data.



\*Transmit UPC-A Check Digit  
(1)



Do Not Transmit UPC-A Check Digit  
(0)

## Transmit UPC-E Check Digit

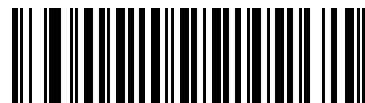
Parameter # 41

SSI # 29h

The check digit is the last character of the symbol used to verify the integrity of the data. Scan one of the following barcodes to transmit the barcode data with or without the UPC-E check digit. It is always verified to guarantee the integrity of the data.



\*Transmit UPC-E Check Digit  
(1)



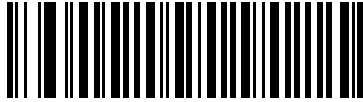
Do Not Transmit UPC-E Check Digit  
(0)

## Transmit UPC-E1 Check Digit

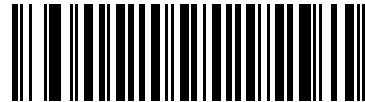
Parameter # 42

SSI # 2Ah

The check digit is the last character of the symbol used to verify the integrity of the data. Scan one of the following barcodes to transmit the barcode data with or without the UPC-E1 check digit. It is always verified to guarantee the integrity of the data.



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



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

## UPC-A Preamble

### Parameter # 34

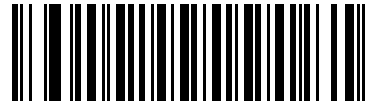
### SSI # 22h

Preamble characters are part of the UPC symbol, and include Country Code and System Character. Select the appropriate option for transmitting a UPC-A preamble to match the host system:

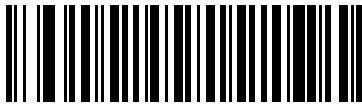
- Transmit System Character only
- Transmit System Character and Country Code ("0" for USA)
- Transmit no preamble.



No Preamble (<DATA>  
(0)



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



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



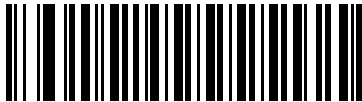
## UPC-E Preamble

Parameter # 35

SSI # 23h

Preamble characters are part of the UPC symbol, and include Country Code and System Character. Select the appropriate option for transmitting a UPC-E preamble to match the host system:

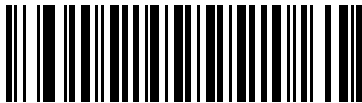
- Transmit System Character only
- Transmit System Character and Country Code ("0" for USA)
- Transmit no preamble.



No Preamble (<DATA>)  
(0)



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



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

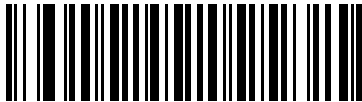
## UPC-E1 Preamble

### Parameter # 36

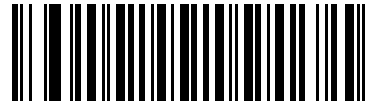
### SSI # 24h

Preamble characters are part of the UPC symbol, and include Country Code and System Character. Select the appropriate option for transmitting a UPC-E1 preamble to match the host system:

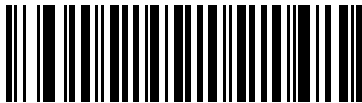
- Transmit System Character only
- Transmit System Character and Country Code ("0" for USA)
- Transmit no preamble.



No Preamble (<DATA>)  
(0)



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



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

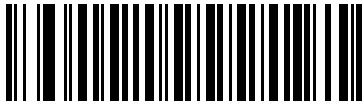
## Convert UPC-E to UPC-A

Parameter # 37

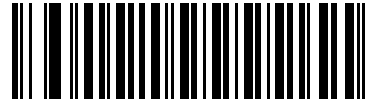
SSI # 25h

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

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



Convert UPC-E to UPC-A (Enable)  
(1)



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

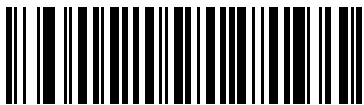
## Convert UPC-E1 to UPC-A

Parameter # 38

SSI # 26h

Scan **Convert UPC-E1 to UPC-A (Enable)** 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).

Scan **Do Not Convert UPC-E1 to UPC-A (Disable)** to transmit UPC-E1 decoded data as UPC-E1 data, without conversion.



Convert UPC-E1 to UPC-A (Enable)  
(1)



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

## EAN/JAN Zero Extend

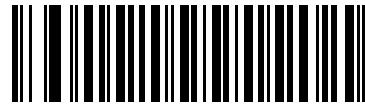
Parameter # 39

SSI # 27h

Scan **Enable EAN/JAN Zero Extend** to add five leading zeros to decoded EAN-8 symbols to make them compatible in length to EAN-13 symbols. Scan **Disable EAN/JAN Zero Extend** to transmit EAN-8 symbols as is.



Enable EAN/JAN Zero Extend  
(1)



\*Disable EAN/JAN Zero Extend  
(0)

## UCC Coupon Extended Code

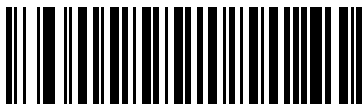
Parameter # 85

SSI # 55h

Scan **Enable UCC Coupon Extended Code** to decode UPC-A barcodes starting with digit '5', EAN-13 barcodes starting with digit '99', and UPC-A/GS1-128 coupon codes. UPC-A, EAN-13, and GS1-128 must be enabled to use this feature.



**NOTE:** See [UPC/EAN/JAN Supplemental Redundancy on page 140](#) to control autodiscrimination of the GS1-128 portion (right half) of a coupon code.



Enable UCC Coupon Extended Code  
(1)



\*Disable UCC Coupon Extended Code  
(0)

## Coupon Report

Parameter # 730

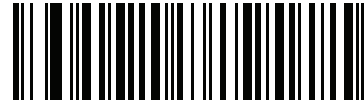
SSI # F1h DAh

Scan one of the following barcodes to select the type of coupon format to support.

- **Old Coupon Format** - Support UPC-A/GS1-128 and EAN-13/GS1-128.
- **New Coupon Format** - An interim format to support UPC-A/GS1-DataBar and EAN-13/GS1-DataBar.
- **Autodiscriminate Format** - Support both **Old Coupon Format** and **New Coupon Format**.



Old Coupon Format  
(0)



\*New Coupon Format  
(1)



Autodiscriminate Coupon Format  
(2)

## UPC Reduced Quiet Zone

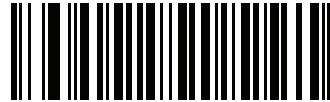
Parameter # 1289

SSI # F8h 05h 09h

Scan one of the following barcodes to enable or disable decoding UPC barcodes with reduced quiet zones (the margins on either side of the barcode). If you select **Enable**, select a [1D Quiet Zone Level on page 203](#).



Enable UPC Reduced Quiet Zone  
(1)



\*Disable UPC Reduced Quiet Zone  
(0)

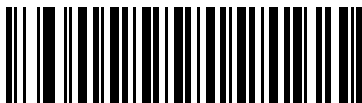
---

## Code 128

Parameter # 8

SSI # 08h

Scan one of the following barcodes to enable or disable Code 128.



\*Enable Code 128  
(1)



Disable Code 128  
(0)

## Set Lengths for Code 128

L1 = Parameter # 209

SSI # D1h

L2 = Parameter # 210

SSI # D2h

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

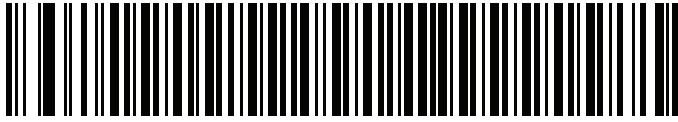


**NOTE:** When setting lengths, enter a leading zero for single digit numbers.

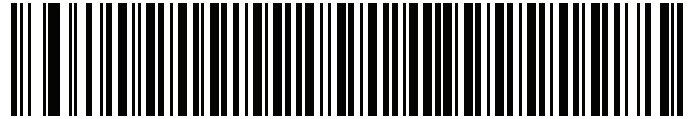
Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only Code 128 symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only Code 128 symbols with 14 characters, scan **Code 128 - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only Code 128 symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only Code 128 symbols containing either 2 or 14 characters, scan **Code 128 - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode Code 128 symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode Code 128 symbols containing between 4 and 12 characters, scan **Code 128 - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - Decode Code 128 symbols containing any number of characters within the scanner's capability.

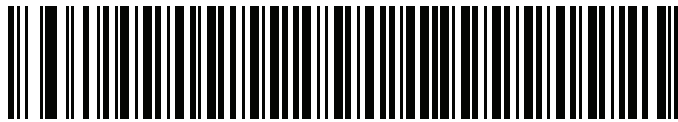
### Set Lengths for Code 128 (continued)



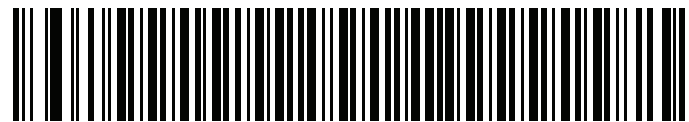
Code 128 - One Discrete Length



Code 128 - Two Discrete Lengths



Code 128 - Length Within Range



\*Code 128 - Any Length

### GS1-128 (formerly UCC/EAN-128)

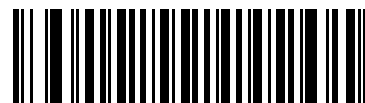
Parameter # 14

SSI # 0Eh

Scan one of the following barcodes to enable or disable GS1-128.



\*Enable GS1-128  
(1)



Disable GS1-128  
(0)



## ISBT 128

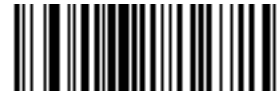
Parameter # 84

SSI # 54h

ISBT 128 is a variant of Code 128 used in the blood bank industry. Scan one of the following barcodes to enable or disable ISBT 128.



\*Enable ISBT 128  
(1)



Disable ISBT 128  
(0)

## ISBT Concatenation

Parameter # 577

SSI # F1h 41h



**NOTE:** The default for SR/DL models of the scanner is **Disable ISBT Concatenation**.

The default for HD/HL models of the scanner is **Enable ISBT Concatenation**.

When enabling ISBT Concatenation or Autodiscriminate ISBT Concatenation set Code 128 security level to Level 2.

Select an option for concatenating pairs of ISBT code types:

- **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. This is the default for HD/HL models.
- **Disable ISBT Concatenation** - The scanner does not concatenate pairs of ISBT codes it encounters. This is the default for SR/DL models.
- **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 155* before transmitting its data to confirm that there is no additional ISBT symbol.

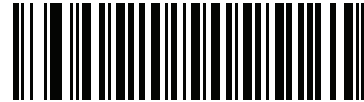


**NOTE:** For **Autodiscriminate ISBT Concatenation** to operate as expected when two barcodes are present, both ISBT barcodes must be in the field of view at the same time. This may be difficult to achieve in presentation mode.

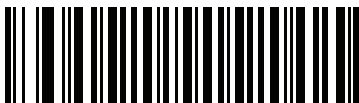
## ISBT Concatenation (continued)



\*Enable ISBT Concatenation  
(1)  
(Default - HD/HL Models)



\*Disable ISBT Concatenation  
(0)  
(Default - SR/DL Models)



Autodiscriminate ISBT Concatenation  
(2)

## Check ISBT Table

Parameter # 578

SSI # F1h 42h

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



\*Enable Check ISBT Table  
(1)



Disable Check ISBT Table  
(0)

## ISBT Concatenation Redundancy

Parameter # 223

SSI # DFh

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

Scan the following barcode, and then scan barcodes in [Numeric Barcodes](#) 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 432](#). The default is 10.



ISBT Concatenation Redundancy

## Code 128 <FNC4>

Parameter # 1254

SSI # F8h 04h E6h

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



\*Honor Code 128 <FNC4>  
(0)



Ignore Code 128 <FNC4>  
(1)

## Code 128 Security Level

Parameter # 751

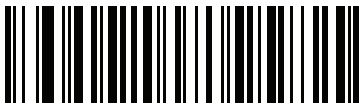
SSI # F1h EFh

Code 128 barcodes are vulnerable to misdecodes, particularly when Code 128 Lengths is set to **Any Length**. The scanner offers four levels of decode security for Code 128 barcodes. 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.

- **Code 128 Security Level 0** - The scanner operates in its most aggressive state, while providing sufficient security in decoding most in-spec barcodes.
- **Code 128 Security Level 1** - This option eliminates most misdecodes while maintaining reasonable aggressiveness. This is the default.
- **Code 128 Security Level 2** - This option applies greater barcode security requirements if **Security Level 1** fails to eliminate misdecodes.
- **Code 128 Security Level 3** - If you selected **Security Level 2**, and misdecodes still occur, select this security level to apply the highest safety requirements.



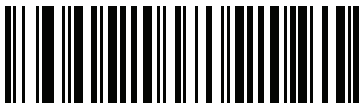
**NOTE:** Selecting this option is an extreme measure against mis-decoding severely out-of-spec barcodes, and significantly impairs the decoding ability of the scanner. If this level of security is required, try to improve the quality of the barcodes.



Code 128 Security Level 0  
(0)



\*Code 128 Security Level 1  
(1)



Code 128 Security Level 2  
(2)



Code 128 Security Level 3  
(3)

## Code 128 Reduced Quiet Zone

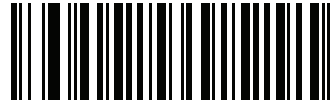
Parameter # 1208

SSI # F8h 04h B8h

Scan one of the following barcodes to enable or disable decoding Code 128 barcodes with reduced quiet zones (the margins on either side of the barcode). If you select **Enable**, select a [1D Quiet Zone Level on page 203](#).



Enable Code 128 Reduced Quiet Zone  
(1)



\*Disable Code 128 Reduced Quiet Zone  
(0)

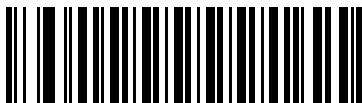
---

## Code 39

Parameter # 0

SSI # 00h

Scan one of the following barcodes to enable or disable Code 39.



\*Enable Code 39  
(1)



Disable Code 39  
(0)

## Trioptic Code 39

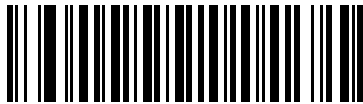
Parameter # 13

SSI # 0Dh

Trioptic Code 39 is a variant of Code 39 used in the marking of computer tape cartridges. Trioptic Code 39 symbols always contain six characters. Scan one of the following barcodes to enable or disable Trioptic Code 39.



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



Enable Trioptic Code 39  
(1)



\*Disable Trioptic Code 39  
(0)

## Convert Code 39 to Code 32

Parameter # 86

SSI # 56h

Code 32 is a variant of Code 39 used by the Italian pharmaceutical industry. Scan one of the following barcodes to enable or disable converting Code 39 to Code 32.



**NOTE:** Code 39 (on page 157) must be enabled for this parameter to function.



Enable Convert Code 39 to Code 32  
(1)



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

## Code 32 Prefix

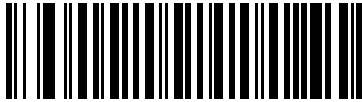
Parameter # 231

SSI # E7h

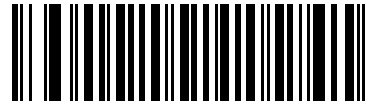
Scan one of the following barcodes to enable or disable adding the prefix character “A” to all Code 32 barcodes.



**NOTE:** Convert Code 39 to Code 32 (on page 158) must be enabled for this parameter to function.



Enable Code 32 Prefix  
(1)



\*Disable Code 32 Prefix  
(0)

## Set Lengths for Code 39

L1 = Parameter # 18

SSI # 12h

L2 = Parameter # 19

SSI # 13h

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 128 to any length, one or two discrete lengths, or lengths within a specific range. If Code 39 Full ASCII is enabled, **Length Within Range** or **Any Length** are the preferred options. The default is **Length Within Range: 1 to 55**.



**NOTE:** When setting lengths, enter a leading zero for single digit numbers.

## Set Lengths for Code 39 (continued)

Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only Code 39 symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only Code 39 symbols with 14 characters, scan **Code 39 - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only Code 39 symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only Code 39 symbols containing either 2 or 14 characters, scan **Code 39 - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode Code 39 symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode Code 39 symbols containing between 4 and 12 characters, scan **Code 39 - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - Decode Code 39 symbols containing any number of characters within the scanner's capability.



Code 39 - One Discrete Length



Code 39 - Two Discrete Lengths



\*Code 39 - Length Within Range



Code 39 - Any Length

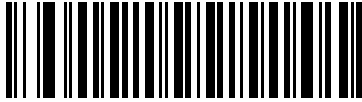


## Code 39 Check Digit Verification

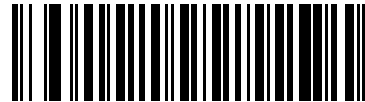
Parameter # 48

SSI # 30h

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



Enable Code 39 Check Digit  
(1)



\*Disable Code 39 Check Digit  
(0)

## Transmit Code 39 Check Digit

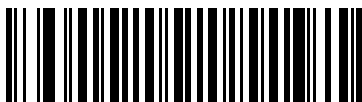
Parameter # 43

SSI # 2Bh

Scan one of the following barcodes to transmit Code 39 data with or without the check digit.



**NOTE:** [Code 39 Check Digit Verification](#) must be enabled for this parameter to function.



Transmit Code 39 Check Digit (Enable)  
(1)



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

## Code 39 Full ASCII Conversion

Parameter # 17

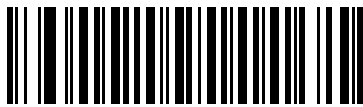
SSI # 11h

Code 39 Full ASCII is a variant of Code 39 which pairs characters to encode the full ASCII character set. Scan one of the following barcodes to enable or disable Code 39 Full ASCII.

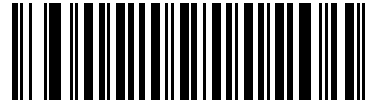


**NOTE:** You cannot enable Trioptic Code 39 and Code 39 Full ASCII simultaneously.

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 [Table 30 on page 451](#).



Enable Code 39 Full ASCII  
(1)



\*Disable Code 39 Full ASCII  
(0)

## Code 39 Security Level

Parameter # 750

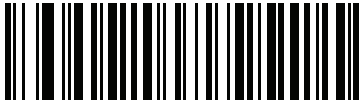
SSI # F1h EEh

The scanner offers four levels of decode security for Code 39 barcodes. 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.

- **Code 39 Security Level 0:** The scanner operates in its most aggressive state, while providing sufficient security in decoding most in-spec barcodes.
- **Code 39 Security Level 1:** This default setting eliminates most misdecodes.
- **Code 39 Security Level 2:** This option applies greater barcode security requirements if **Security Level 1** fails to eliminate misdecodes.
- **Code 39 Level 3:** If you selected **Security Level 2**, and misdecodes still occur, select this security level to apply the highest safety requirements.



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



Code 39 Security Level 0  
(0)



\*Code 39 Security Level 1  
(1)



Code 39 Security Level 2  
(2)



Code 39 Security Level 3  
(3)

## Code 39 Reduced Quiet Zone

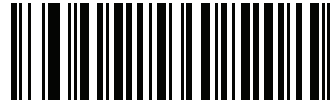
Parameter # 1209

SSI # F8h 04h B9h

Scan one of the following barcodes to enable or disable decoding Code 39 barcodes with reduced quiet zones (the margins on either side of the barcode). If you select **Enable**, select a [1D Quiet Zone Level on page 203](#).



Enable Code 39 Reduced Quiet Zone  
(1)



\*Disable Code 39 Reduced Quiet Zone  
(0)

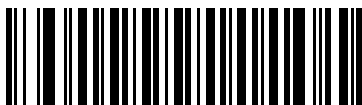
---

## Code 93

Parameter # 9

SSI # 09h

Scan one of the following barcodes to enable or disable Code 93.



\*Enable Code 93  
(1)



Disable Code 93  
(0)

## Set Lengths for Code 93

L1 = Parameter # 26

SSI # 1Ah

L2 = Parameter # 27

SSI # 1Bh

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 93 to any length, one or two discrete lengths, or lengths within a specific range. The default is **Length Within Range: 1 to 55**.



**NOTE:** When setting lengths, enter a leading zero for single digit numbers.

Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only Code 93 symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only Code 93 symbols with 14 characters, scan **Code 93 - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only Code 93 symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only Code 93 symbols containing either 2 or 14 characters, scan **Code 93 - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode Code 93 symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode Code 93 symbols containing between 4 and 12 characters, scan **Code 93 - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - 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



\*Code 93 - Length Within Range



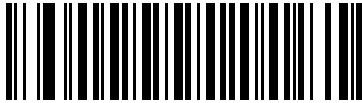
Code 93 - Any Length

## Code 11

Parameter # 10

SSI # 0Ah

Scan one of the following barcodes to enable or disable Code 11



Enable Code 11  
(1)



\*Disable Code 11  
(0)

## Set Lengths for Code 11

L1 = Parameter # 28

SSI # 1Ch

L2 = Parameter # 29

SSI # 1Dh

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 11 to any length, one or two discrete lengths, or lengths within a specific range. The default is **Length Within Range**: 4 to 55.



**NOTE:** When setting lengths, enter a leading zero for single digit numbers

Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only Code 11 symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only Code 11 symbols with 14 characters, scan **Code 11 - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only Code 11 symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only Code 11 symbols containing either 2 or 14 characters, scan **Code 11 - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode Code 11 symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode Code 11 symbols containing between 4 and 12 characters, scan **Code 11 - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - 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



\*Code 11 - Length Within Range



Code 11 - Any Length



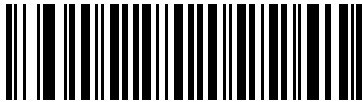
## Code 11 Check Digit Verification

Parameter # 52

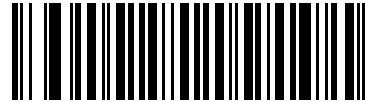
SSI # 34h

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.

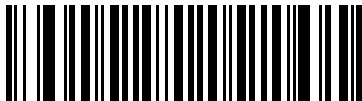
Scan one of the following barcodes to specify the number of check digits encoded in the Code 11 symbols, or to disable this feature.



**\*Disable**  
**(0)**



**One Check Digit**  
**(1)**



**Two Check Digits**  
**(2)**

## Transmit Code 11 Check Digits

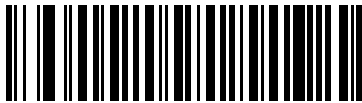
Parameter # 47

SSI # 2Fh

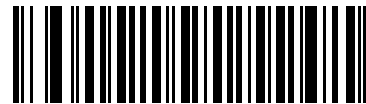
Scan one of the following barcodes to select whether or not to transmit the Code 11 check digit(s).



**NOTE:** [Code 11 Check Digit Verification](#) must be enabled for this parameter to function.



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



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

---

## Interleaved 2 of 5 (ITF)

Parameter # 6

SSI # 06h

Scan one of the following barcodes to enable or disable Interleaved 2 of 5.



\*Enable Interleaved 2 of 5  
(1)



Disable Interleaved 2 of 5  
(0)

## Set Lengths for Interleaved 2 of 5

L1 = Parameter # 22

SSI # 16h

L2 = Parameter # 23

SSI # 17h

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for I 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The range for Interleaved 2 of 5 lengths is 0 - 80. The default is **Length Within Range**: 6 to 55.



**NOTE:** When setting lengths, enter a leading zero for single digit numbers.

Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only I 2 of 5 symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only I 2 of 5 symbols with 14 characters, scan **I 2 of 5 - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only I 2 of 5 symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only I 2 of 5 symbols containing either 2 or 14 characters, scan **I 2 of 5 - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode I 2 of 5 symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode I 2 of 5 symbols containing between 4 and 12 characters, scan **I 2 of 5 - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - 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 barcode. To prevent this, select specific lengths (I 2 of 5 - One Discrete Length, Two Discrete Lengths) for I 2 of 5 applications, or increase the [I 2 of 5 Security Level on page 175](#).

## Set Lengths for Interleaved 2 of 5 (continued)



I 2 of 5 - One Discrete Length



I 2 of 5 - Two Discrete Lengths



\*I 2 of 5 - Length Within Range



I 2 of 5 - Any Length

## I 2 of 5 Check Digit Verification

Parameter # 49

SSI # 31h

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



\*Disable  
(0)



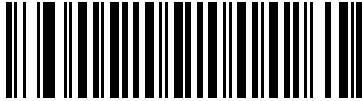
USS Check Digit  
(1)



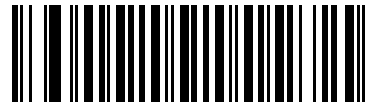
OPCC Check Digit  
(2)

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

Scan one of the following barcodes to transmit I 2 of 5 data with or without the check digit.



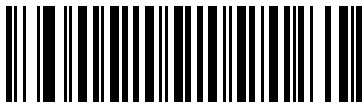
**Transmit I 2 of 5 Check Digit (Enable)**  
(1)



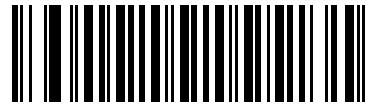
**\*Do Not Transmit I 2 of 5 Check Digit (Disable)**  
(0)

**Convert I 2 of 5 to EAN-13****Parameter # 82****SSI # 52h**

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



**Convert I 2 of 5 to EAN-13 (Enable)**  
(1)



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

## Febraban

Parameter # 1750

SSI # F8h 06h D6h

Febraban is an I 2 of 5 barcode of length 44 that requires special check characters to be inserted in the transmitted data stream. When enabled, the I 2 of 5 internal check digit calculation and transmission is disabled. When disabled, all I 2 of 5 functionality works as usual.

### ***Recommendations for Length Setting***

I 2 of 5 Length 1: Larger of the fixed length and the FEBRABAN length (==44).

I 2 of 5 Length 2: Smaller of the fixed length and the FEBRABAN length (==44).



**Enable Febraban  
(1)**



**\*Disable Febraban  
(0)**

## I 2 of 5 Security Level

Parameter # 1121

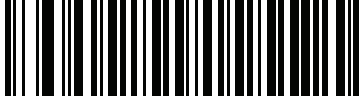
SSI # F8h 04h 61h

Interleaved 2 of 5 barcodes are vulnerable to misdecodes, particularly when I 2 of 5 Lengths is set to **Any Length**. The scanner offers four levels of decode security for Interleaved 2 of 5 barcodes. 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.

- **I 2 of 5 Security Level 0:** The scanner operates in its most aggressive state, while providing sufficient security in decoding most in-spec barcodes.
- **I 2 of 5 Security Level 1:** A barcode must be successfully read twice, and satisfy certain safety requirements before being decoded. This default setting eliminates most misdecodes.
- **I 2 of 5 Security Level 2:** This option applies greater barcode security requirements if **Security Level 1** fails to eliminate misdecodes.
- **I 2 of 5 Security Level 3:** If you selected **Security Level 2**, and misdecodes still occur, select this security level. The highest safety requirements are applied. A barcode must be successfully read three times before being decoded.



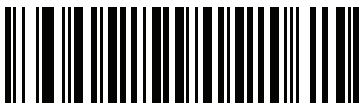
**NOTE:** Selecting this option is an extreme measure against mis-decoding severely out-of-spec barcodes, and significantly impairs the decoding ability of the scanner. If this level of security is required, try to improve the quality of the barcodes.



I 2 of 5 Security Level 0  
(0)



\*I 2 of 5 Security Level 1  
(1)



I 2 of 5 Security Level 2  
(2)



I 2 of 5 Security Level 3  
(3)

## I 2 of 5 Reduced Quiet Zone

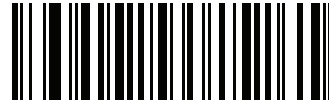
Parameter # 1210

SSI # F8h 04h BAh

Scan one of the following barcodes to enable or disable decoding I 2 of 5 barcodes with reduced quiet zones (the margins on either side of the barcode). If you select **Enable**, select a [1D Quiet Zone Level on page 203](#).



Enable I 2 of 5 Reduced Quiet Zone  
(1)



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

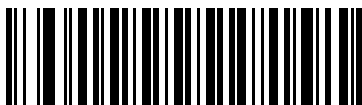
---

## Discrete 2 of 5 (DTF)

Parameter # 5

SSI # 05h

Scan one of the following barcodes to enable or disable Discrete 2 of 5.



Enable Discrete 2 of 5  
(1)



\*Disable Discrete 2 of 5  
(0)



## Set Lengths for Discrete 2 of 5

L1 = Parameter # 20

SSI # 14h

L2 = Parameter # 21

SSI # 15h

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for D 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The default is **Length Within Range**: 1 to 55.



**NOTE:** When setting lengths, enter a leading zero for single digit numbers.

Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only D 2 of 5 symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only D 2 of 5 symbols with 14 characters, scan **D 2 of 5 - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only D 2 of 5 symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only D 2 of 5 symbols containing either 2 or 14 characters, scan **D 2 of 5 - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode D 2 of 5 symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode D 2 of 5 symbols containing between 4 and 12 characters, scan **D 2 of 5 - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - Decode D 2 of 5 symbols containing any number of characters within the scanner's capability.

## Set Lengths for Discrete 2 of 5 (continued)



**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 barcode. To prevent this, select specific lengths (D 2 of 5 - One Discrete Length, Two Discrete Lengths) for D 2 of 5 applications.



D 2 of 5 - One Discrete Length



D 2 of 5 - Two Discrete Lengths



\*D 2 of 5 - Length Within Range



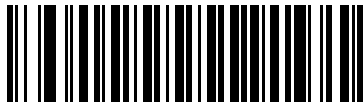
D 2 of 5 - Any Length

## Codabar (NW - 7)

Parameter # 7

SSI # 07h

Scan one of the following barcodes to enable or disable Codabar.



\*Enable Codabar  
(1)



Disable Codabar  
(0)

## Set Lengths for Codabar

L1 = Parameter # 24

SSI # 18h

L2 = Parameter # 25

SSI # 19h

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Codabar to any length, one or two discrete lengths, or lengths within a specific range. The default is **Length Within Range**: 4 to 55.



**NOTE:** When setting lengths, enter a leading zero for single digit numbers.

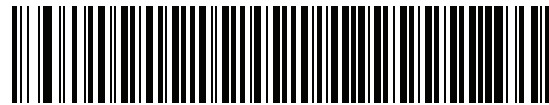
Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only Codabar symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only Codabar symbols with 14 characters, scan **Codabar - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only Codabar symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only Codabar symbols containing either 2 or 14 characters, scan **Codabar - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode Codabar symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode Codabar symbols containing between 4 and 12 characters, scan **Codabar - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - Decode Codabar symbols containing any number of characters within the scanner's capability.

## Set Lengths for Codabar (continued)



Codabar - One Discrete Length



Codabar - Two Discrete Lengths



\*Codabar - Length Within Range



Codabar - Any Length

## CLSI Editing

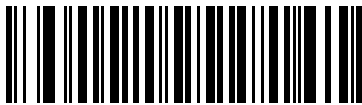
Parameter # 54

SSI # 36h

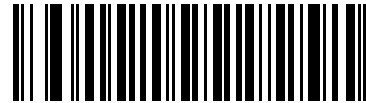
Scan **Enable CLSI Editing** to strip the start and stop characters and insert a space after the first, fifth, and tenth characters of a 14-character Codabar symbol if the host system requires this data format.



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



Enable CLSI Editing  
(1)



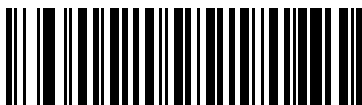
\*Disable CLSI Editing  
(0)

## NOTIS Editing

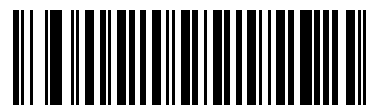
Parameter # 55

SSI # 37h

Scan **Enable NOTIS Editing** to strip the start and stop characters from a decoded Codabar symbol if the host system requires this data format.



Enable NOTIS Editing  
(1)



\*Disable NOTIS Editing  
(0)

## Codabar Security Level

Parameter # 1776

SSI # F8h 06h F0h

The scanner offers four levels of decode security for Codabar barcodes. 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.

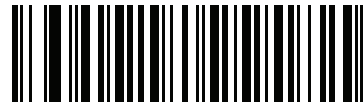
- **Codabar Security Level 0:** This setting allows the scanner to operate in its most aggressive state, while providing sufficient security in decoding most in-spec barcodes.
- **Codabar Security Level 1:** This default setting eliminates most misdecodes.
- **Codabar Security Level 2:** Select this option with greater barcode 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 barcodes, and significantly impairs the decoding ability of the scanner. If this level of security is required, try to improve the quality of the barcodes.



Codabar Security Level 0  
(0)



\*Codabar Security Level 1  
(1)



Codabar Security Level 2  
(2)



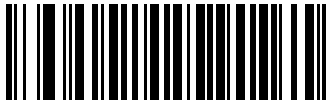
Codabar Security Level 3  
(3)

## Codabar Upper or Lower Case Start/Stop Characters

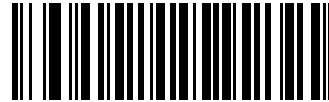
Parameter # 855

SSI # F2h 57h

Scan one of the following barcodes to select whether to transmit upper case or lower case Codabar start/stop characters.



Lower Case  
(1)



\*Upper Case  
(0)

## Codabar Mod 16 Check Digit Verification

Parameter # 1784

SSI # F8h 06h F8h

Enable this feature to check the Codabar Mod 16 Check Digit to verify that the data complies with the specified check digit algorithm.



Enable Codabar Mod 16 Check Digit  
(1)



\* Disable Codabar Mod 16 Check Digit  
(0)

## Transmit Codabar Check Digit

Parameter # 704

SSI # F1h C0h

Scan one of the following barcodes to select whether or not to transmit the Codabar check digit(s).



**NOTE:** [Codabar Mod 16 Check Digit Verification](#) must be enabled for this parameter to function.



Enable Codabar Check Digit Transmission  
(1)



\* Disable Codabar Check Digit Transmission  
(0)

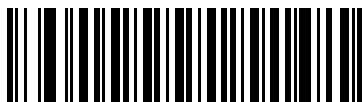
---

## MSI

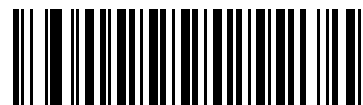
Parameter # 11

SSI # 0Bh

Scan one of the following barcodes to enable or disable MSI.



Enable MSI  
(1)



\*Disable MSI  
(0)



## Set Lengths for MSI

L1 = Parameter # 30

SSI # 1Eh

L2 = Parameter # 31

SSI # 1Fh

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for MSI to any length, one or two discrete lengths, or lengths within a specific range. The default is **Length Within Range: 4 to 55**.



**NOTE:** When setting lengths, enter a leading zero for single digit numbers.

Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only MSI symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only MSI symbols with 14 characters, scan **MSI - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only MSI symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only MSI symbols containing either 2 or 14 characters, scan **MSI - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode MSI symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode MSI symbols containing between 4 and 12 characters, scan **MSI - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - Decode MSI symbols containing any number of characters within the scanner's capability.

## Set Lengths for MSI (continued)



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



**MSI - One Discrete Length**



**MSI - Two Discrete Lengths**



**\*MSI - Length Within Range**



**MSI - Any Length**

## MSI Check Digits

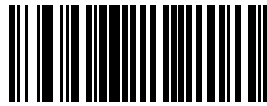
Parameter # 50

SSI # 32h

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

- 0 - Does not check the MSI check digit; decodes MSI with no check digit.
- 1 - This is for MSI barcodes with one check digit. This is the default.
- 2 - This is for MSI barcodes with two check digits.

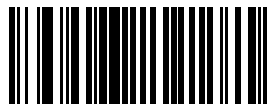
See [MSI Check Digit Algorithm on page 188](#) to select second digit algorithms.



No MSI Check Digit  
(0)



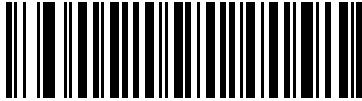
\*One MSI Check Digit  
(1)



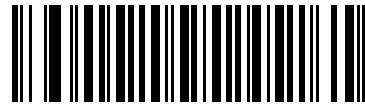
Two MSI Check Digits  
(2)

**Transmit MSI Check Digit(s)****Parameter # 46****SSI # 2Eh**

Scan one of the following barcodes to transmit MSI data with or without the check digit.



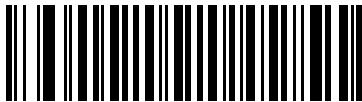
**Transmit MSI Check Digit(s) (Enable)**  
(1)



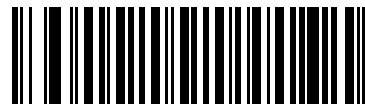
**\*Do Not Transmit MSI Check Digit(s) (Disable)**  
(0)

**MSI Check Digit Algorithm****Parameter # 51****SSI # 33h**

Two algorithms are available for verifying the second MSI check digit. Scan one of the following barcodes to select the algorithm used to encode the check digit.



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



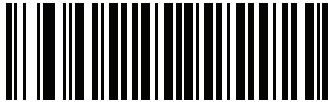
**\*MOD 10/MOD 10**  
(1)

## MSI Reduced Quiet Zone

Parameter # 1392

SSI # F8h 05h 70h

Scan one of the following barcodes to enable or disable decoding MSI barcodes with reduced quiet zones. If you select **Enable**, select a [1D Quiet Zone Level on page 203](#).



\*Disable MSI Reduced Quiet Zone  
(0)



Enable MSI Reduced Quiet Zone  
(1)

---

## Chinese 2 of 5

Parameter # 408

SSI # F0h 98h

Scan one of the following barcodes to enable or disable Chinese 2 of 5.



Enable Chinese 2 of 5  
(1)



\*Disable Chinese 2 of 5  
(0)

## Matrix 2 of 5

Parameter # 618

SSI # F1h 6Ah

Scan one of the following barcodes to enable or disable Matrix 2 of 5.



Enable Matrix 2 of 5  
(1)



\*Disable Matrix 2 of 5  
(0)

## Set Lengths for Matrix 2 of 5

L1 = Parameter # 619

SSI # F1h 6Bh

L2 = Parameter # 620

SSI # F1h 6Ch

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Matrix 2 of 5 to any length, one or two discrete lengths, or lengths within a specific range. The default is **Length Within Range: 4 to 55**.



**NOTE:** When setting lengths, enter a leading zero for single digit numbers.

Scan one of the following barcodes to select a length option:

- **One Discrete Length** - Decode only Matrix 2 of 5 symbols containing a selected length. Select the length using the barcodes in [Numeric Barcodes](#). For example, to decode only Matrix 2 of 5 symbols with 14 characters, scan **Matrix 2 of 5 - One Discrete Length**, and then scan **1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Two Discrete Lengths** - Decode only Matrix 2 of 5 symbols containing either of two lengths. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode only Matrix 2 of 5 symbols containing either 2 or 14 characters, scan **Matrix 2 of 5 - Two Discrete Lengths**, and then scan **0, 2, 1, 4**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Length Within Range** - Decode Matrix 2 of 5 symbols with a specific length range. Select lengths using the barcodes in [Numeric Barcodes](#). For example, to decode Matrix 2 of 5 symbols containing between 4 and 12 characters, scan **Matrix 2 of 5 - Length Within Range**, and then scan **0, 4, 1, 2**. To correct an error or change the selection, scan [Cancel on page 432](#).
- **Any Length** - 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 - One Discrete Length



Matrix 2 of 5 - Two Discrete Lengths



\*Matrix 2 of 5 - Length Within Range



Matrix 2 of 5 - Any Length

## Matrix 2 of 5 Check Digit

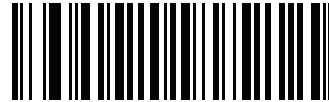
Parameter # 622

SSI # F1h 6Eh

The check digit is the last character of the symbol used to verify the integrity of the data. Scan one of the following barcodes to determine whether to include the Matrix 2 of 5 check digit with the barcode data.



Enable Matrix 2 of 5 Check Digit  
(1)



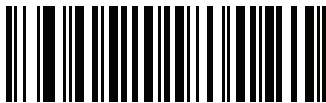
\*Disable Matrix 2 of 5 Check Digit  
(0)

## Transmit Matrix 2 of 5 Check Digit

Parameter # 623

SSI # F1h 6Fh

Scan one of the following barcodes to transmit Matrix 2 of 5 data with or without the check digit.



Transmit Matrix 2 of 5 Check Digit  
(1)



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



## Korean 3 of 5

Parameter # 581

SSI # F1h 45h

Scan one of the following barcodes to enable or disable Korean 3 of 5.



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



Enable Korean 3 of 5  
(1)



\*Disable Korean 3 of 5  
(0)

## Inverse 1D

Parameter # 586

SSI # F1h 4Ah



**NOTE:** The Inverse 1D setting may impact Composite or Inverse Composite decoding. See [Composite Inverse on page 206](#).

Scan one of the following barcodes to set the 1D inverse decoder setting:

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

## Inverse 1D (continued)



**\*Regular**  
**(0)**



**Inverse Only**  
**(1)**



**Inverse Autodetect**  
**(2)**

## GS1 DataBar

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

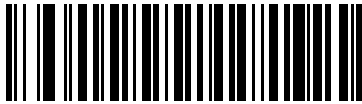
### GS1 DataBar Omnidirectional (formerly GS1 DataBar-14), GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional

Parameter # 338

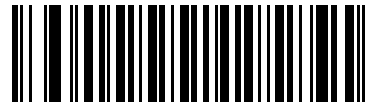
SSI # F0h 52h



**NOTE:** When GS1 DataBar Omnidirectional is enabled the variants are also enabled.



\*Enable GS1 DataBar Omnidirectional  
(1)

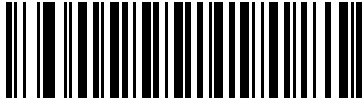


Disable GS1 DataBar Omnidirectional  
(0)

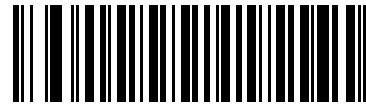
## GS1 DataBar Limited

Parameter # 339

SSI # F0h 53h



\*Enable GS1 DataBar Limited  
(1)



Disable GS1 DataBar Limited  
(0)

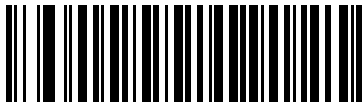
## GS1 DataBar Expanded, GS1 DataBar Expanded Stacked

Parameter # 340

SSI # F0h 54h



**NOTE:** When GS1 DataBar Expanded is enabled GS1 DataBar Expanded Stacked is also enabled.



\*Enable GS1 DataBar Expanded  
(1)



Disable GS1 DataBar Expanded  
(0)

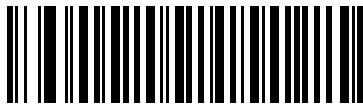
## Convert GS1 DataBar to UPC/EAN/JAN

Parameter # 397

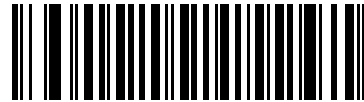
SSI # F0h, 8Dh

This parameter only applies to GS1 DataBar Omnidirectional and GS1 DataBar Limited symbols not decoded as part of a Composite symbol. Scan **Enable Convert GS1 DataBar to UPC/EAN/JAN** to strip the leading '010' from DataBar-14 and DataBar Limited symbols encoding a single zero as the first digit, and report the barcode as EAN-13.

For barcodes beginning with between two and five zeros, this strips the leading '0100' and reports the barcode as UPC-A. The [UPC-A Preamble](#) option that transmits the system character and country code applies to converted barcodes. Note that neither the system character nor the check digit can be stripped.



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



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

## GS1 DataBar Security Level

Parameter # 1706

SSI # F8h 06h AAh

The scanner offers four levels of decode security for GS1 DataBar (GS1 DataBar Omnidirectional, GS1 DataBar Limited, GS1 DataBar Expanded) barcodes.

- **Security Level 0** - The scanner operates in its most aggressive state, while providing sufficient security decoding most in-spec barcodes.
- **Security Level 1** - This setting eliminates most misdecodes while maintaining reasonable aggressiveness.
- **Security Level 2** - Select this option with greater barcode 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 0  
(0)



\*GS1 DataBar Security Level 1  
(1)



GS1 DataBar Security Level 2  
(2)



GS1 DataBar Security Level 3  
(3)

## GS1 DataBar Limited Margin Check

Parameter # 728

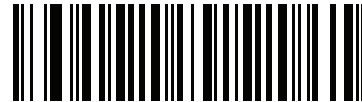
SSI # F1h D8h

The scanner offers four levels of decode security for GS1 DataBar Limited barcodes. 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.

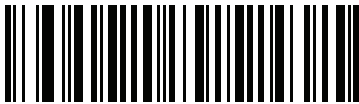
- **Margin Check Level 1** – No clear margin required. This complies with the original GS1 standard, yet can result in erroneous decoding of a DataBar Limited barcode when scanning some UPC symbols that start with digits 9 and 7.
- **Margin Check Level 2** – Automatic risk detection. This level of margin check can result in erroneous decoding of DataBar Limited barcodes 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** – Security 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 Margin Check Level 1  
(1)



GS1 DataBar Limited Margin Check Level 2  
(2)



\*GS1 DataBar Limited Margin Check Level 3  
(3)



GS1 DataBar Limited Margin Check Level 4  
(4)

---

## Symbology-Specific Security Features

### Redundancy Level

#### Parameter # 78

#### SSI # 4Eh

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

Scan one of the following barcodes to select the redundancy level appropriate for the barcode quality:

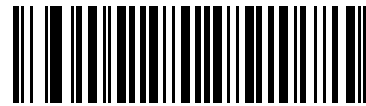
- **Redundancy Level 1** - The scanner must read the following code types twice before decoding:
  - Codabar (8 characters or less)
  - MSI (4 characters or less)
  - D 2 of 5 (8 characters or less)
  - I 2 of 5 (8 characters or less)
- **Redundancy Level 2** - The scanner must read all code types twice before decoding.
- **Redundancy Level 3** - The scanner must read code types other than the following twice before decoding, but must read the following codes three times:
  - Codabar (8 characters or less)
  - MSI (4 characters or less)
  - D 2 of 5 (8 characters or less)
  - I 2 of 5 (8 characters or less)
- **Redundancy Level 4** - The scanner must read all code types three times before decoding.



## Redundancy Level (continued)



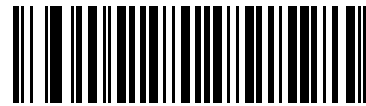
\*Redundancy Level 1  
(1)



Redundancy Level 2  
(2)



Redundancy Level 3  
(3)



Redundancy Level 4  
(4)

## Security Level

### Parameter # 77

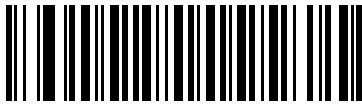
### SSI # 4Dh

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

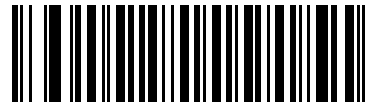
- **Security Level 0** - The scanner operates in its most aggressive state, while providing sufficient security decoding most in-spec barcodes.
- **Security Level 1** - This default setting eliminates most misdecodes.
- **Security Level 2** - Select this option if Security Level 1 fails to eliminate misdecodes.
- **Security Level 3** - If you selected Security Level 2 and misdecodes still occur, select this security level.



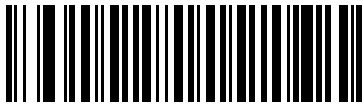
**NOTE:** Selecting this option is an extreme measure against mis-decoding severely out-of-spec barcodes, and significantly impairs the decoding ability of the scanner. If this level of security is required, try to improve the quality of the barcodes.



Security Level 0  
(0)



\*Security Level 1  
(1)



Security Level 2  
(2)



Security Level 3  
(3)

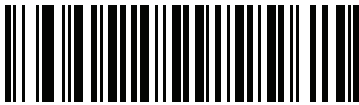
## 1D Quiet Zone Level

Parameter # 1288

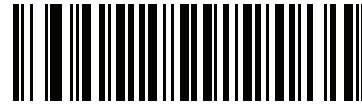
SSI # F8h 05h 08h

This feature sets the level of aggressiveness when decoding barcodes with a reduced quiet zone (the margin on either side of a barcode), and applies to symbologies enabled by a Reduced Quiet Zone parameter. Because higher levels increase the decoding time and risk of misdecodes, Zebra strongly recommends enabling only the symbologies which require higher quiet zone levels, and leaving Reduced Quiet Zone disabled for all other symbologies. Options are:

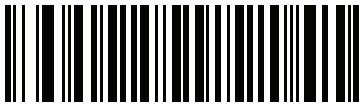
- **1D Quiet Zone Level 0** - The scanner performs normally in terms of quiet zone.
- **1D Quiet Zone Level 1** - The scanner performs more aggressively in terms of quiet zone.
- **1D Quiet Zone Level 2** - The scanner only requires a quiet zone at the end of barcode for decoding.
- **1D Quiet Zone Level 3** - The scanner decodes anything in terms of quiet zone or end of barcode.



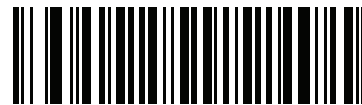
1D Quiet Zone Level 0  
(0)



\*1D Quiet Zone Level 1  
(1)



1D Quiet Zone Level 2  
(2)



1D Quiet Zone Level 3  
(3)

## Intercharacter Gap Size

Parameter # 381

SSI # F0h, 7Dh

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



\*Normal Intercharacter Gaps  
(6)



Large Intercharacter Gaps  
(10)

---

## Composite

Composite CC-C

Parameter # 341

SSI # F0h 55h

Scan one of the following barcodes to enable or disable Composite barcodes of type CC-C.



**NOTE:** The default value is based on model type: The default for SR/DL models is disable; The default for HD/HL models is enable.



\* Enable CC-C  
(1)  
(Default - HD/HL Models)



\* Disable CC-C  
(0)  
(Default - SR/DL Models)

## Composite CC-A/B

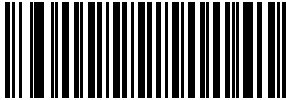
Parameter # 342

SSI # F0h 56h

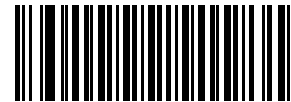
Scan one of the following barcodes to enable or disable Composite barcodes of type CC-A/B.



**NOTE:** The default value is based on model type: The default for SR/DL models is disable; The default for HD/HL models is enable.



**\*Enable CC-A/B**  
(1)  
(Default - HD/HL Models)



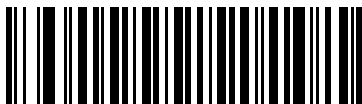
**\*Disable CC-A/B**  
(0)  
(Default - SR/DL Models)

## Composite TLC-39

Parameter # 371

SSI # F0h 73h

Scan one of the following barcodes to enable or disable Composite barcodes of type TLC-39.



**Enable TLC39**  
(1)



**\*Disable TLC39**  
(0)

## Composite Inverse

Parameter # 1113

SSI # F8h 04h 59h

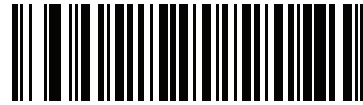
Select an option to set Composite for either regular decode or inverse decode. This mode only supports Composite Inverse that includes DataBar combined with CCAB, and does not support other 1D/2D combinations.

For this parameter to function, first enable [Composite CC-A/B on page 205](#).

- **Regular Only** - The scanner decodes regular Composite barcodes only. Before selecting this, set [Inverse 1D on page 193](#) to **Regular Only** or **Inverse Autodetect**.
- **Inverse Only** - The scanner decodes inverse Composite barcodes only. Before selecting this, set [Inverse 1D on page 193](#) to **Inverse Only** or **Inverse Autodetect**.



\*Regular Only  
(0)



Inverse Only  
(1)

## UPC Composite Mode

Parameter # 344

SSI # F0h 58h

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

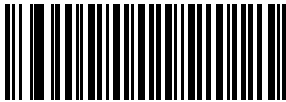
- **UPC Never Linked** - Transmit UPC barcodes regardless of whether a 2D symbol is detected.
- **UPC Always Linked** - Transmit UPC barcodes and the 2D portion. If 2D is not present, do not transmit the barcode.
- **Autodiscriminate UPC Composites** - The scanner determines if there is a 2D portion,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



\*UPC Never Linked  
(0)



UPC Always Linked  
(1)



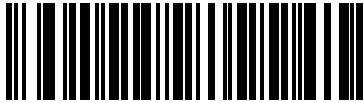
Autodiscriminate UPC Composites  
(2)

## Composite Beep Mode

Parameter # 398

SSI # F0h, 8Eh

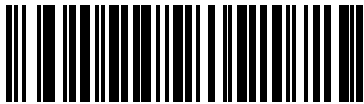
Scan one of the following barcodes to select the number of decode beeps that sound upon decoding a Composite barcode.



Single Beep After Both are Decoded  
(0)



\*Beep as Each Code Type is Decoded  
(1)



Double Beep After Both are Decoded  
(2)

## GS1-128 Emulation Mode for UCC/EAN Composite Codes

Parameter # 427

SSI # F0h, ABh

Scan one of the following barcodes to enable or disable this mode.



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



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



---

## 2D Symbologies

### PDF417

Parameter # 15

SSI # 0Fh

Scan one of the following barcodes to enable or disable PDF417.



**\*Enable PDF417**  
(1)



**Disable PDF417**  
(0)

### MicroPDF417

Parameter # 227

SSI # E3h

Scan one of the following barcodes to enable or disable MicroPDF417.



**Enable MicroPDF417**  
(1)



**\*Disable MicroPDF417**  
(0)

## Code 128 Emulation

### Parameter # 123

### SSI # 7Bh

Enable this parameter to transmit data from certain MicroPDF417 symbols as Code 128. You must enable [AIM Code ID Character \(1\)](#) on page 86 for this parameter to work.



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

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

]C1 if the first codeword is 903-905

]C2 if the first codeword is 908 or 909

]C0 if the first codeword is 910 or 911

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

]L3 if the first codeword is 903-905

]L4 if the first codeword is 908 or 909

]L5 if the first codeword is 910 or 911

Scan one of the following barcodes to enable or disable Code 128 Emulation.



Enable Code 128 Emulation  
(1)



\*Disable Code 128 Emulation  
(0)

## Data Matrix

Parameter # 292

SSI # F0h, 24h

Scan one of the following barcodes to enable or disable Data Matrix.



**\*Enable Data Matrix  
(1)**



**Disable Data Matrix  
(0)**

## GS1 Data Matrix

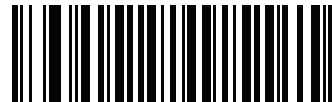
Parameter # 1336

SSI # F8h 05h 38h

Scan one of the following barcodes to enable or disable GS1 Data Matrix.



**Enable GS1 Data Matrix  
(1)**



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

## Data Matrix Inverse

Parameter # 588

SSI # F1h 4Ch

Scan one of the following barcodes to select the Data Matrix inverse decoder setting:

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



**Regular Only**  
(0)



**Inverse Only**  
(1)



**\*Inverse Autodetect**  
(2)

## Decode Data Matrix Mirror Images

Parameter # 537

SSI # F1h 19h

Scan one of the following barcodes to select an option for decoding mirror image Data Matrix barcodes:

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



**Never**  
**(0)**



**Always**  
**(1)**



**\*Auto**  
**(2)**

## Maxicode

Parameter # 294

SSI # F0h, 26h

Scan one of the following barcodes to enable or disable Maxicode.



Enable Maxicode  
(1)



\*Disable Maxicode  
(0)

## QR Code

Parameter # 293

SSI # F0h, 25h

Scan one of the following barcodes to enable or disable QR Code.



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



\*Enable QR Code  
(1)



Disable QR Code  
(0)

**Weblink QR**

**Parameter #1947**

**SSI # F7 07 9B**

Scan one of the following barcodes to enable or disable Weblink QR barcode.



**\*Enable Weblink QR Codes  
(1)**



**Disable Weblink QR Codes  
(0)**

## GS1 QR

Parameter # 1343

SSI # F8h 05h 3Fh

Scan one of the following barcodes to enable or disable GS1 QR.



\*Enable GS1 QR  
(1)



Disable GS1 QR  
(0)

## MicroQR

Parameter # 573

SSI # F1h 3Dh

Scan one of the following barcodes to enable or disable MicroQR.



\*Enable MicroQR  
(1)



Disable MicroQR  
(0)



## Linked QR Mode

Parameter # 1847

SSI # 737h

Scan one of the following barcodes to select a linked QR mode.

- **Linked QR Only** - Does not decode individual QRs from a set of linked QR codes.
- **Individual QR With Headers** - Decodes individual QRs from a set of linked QR codes and keeps the header information and data.
- **Individual QR No Headers** - Decodes individual QRs from a set of linked QR codes and just transmits data without header information.



\* **Linked QR Only**  
(0)



**Individual QR With Headers**  
(1)



**Individual QR No Headers**  
(2)

## Aztec

Parameter # 574

SSI # F1h 3Eh

Scan one of the following barcodes to enable or disable Aztec.



**NOTE:** Enabling Aztec also enables Linked Aztec.



**\*Enable Aztec  
(1)**



**Disable Aztec  
(0)**

## Aztec Inverse

Parameter # 589

SSI # F1h 4Dh

Scan one of the following barcodes to select the Aztec inverse decoder setting:

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



**Regular Only  
(0)**



**Inverse Only  
(1)**



**\*Inverse Autodetect  
(2)**

## Han Xin

Parameter # 1167

SSI # F8h 04h 8Fh

Scan one of the following barcodes to enable or disable Han Xin.



Enable Han Xin  
(1)



\*Disable Han Xin  
(0)

## Han Xin Inverse

Parameter # 1168

SSI # F8h 04h 90h

Scan one of the following barcodes to select a Han Xin inverse decoder setting:

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



\*Regular Only  
(0)



Inverse Only  
(1)



Inverse Autodetect  
(2)

## Grid Matrix

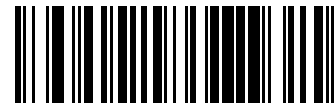
Parameter # 1718

SSI # F8h 06h B6h

Scan one of the following barcodes to enable or disable Grid Matrix.



Enable  
(1)



\*Disable  
(0)

## Grid Matrix Inverse

Parameter # 1719

SSI # F8h 06h B7h

Scan one of the following barcodes to select a Grid Matrix inverse decoder setting:

- **Regular Only** - The scanner decodes regular Grid Matrix barcodes only.
- **Inverse Only** - The scanner decodes inverse Grid Matrix barcodes only.
- **Autodiscriminate** - The scanner decodes both regular and inverse Grid Matrix barcodes.



\*Regular Only  
(0)



Inverse Only  
(1)



Autodiscriminate  
(2)

## Grid Matrix Mirror

Parameter # 1736

SSI # F8h 06h C8h

Scan one of the following barcodes to select a Grid Matrix mirror decoder setting:

- **Regular Only** - The scanner decodes regular Grid Matrix barcodes only.
- **Mirrored Only** - The scanner decodes mirrored Grid Matrix barcodes only.
- **Auto-discriminate** - The scanner decodes both regular and mirrored Grid Matrix barcodes.



**\*Regular Only**  
(0)



**Mirrored Only**  
(1)



**Autodiscriminate**  
(2)

**DotCode**

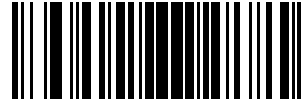
**Parameter # 1906**

**SSI # F8 07 72h**

Scan one of the following barcodes to enable or disable DotCode.



**\* Disable DotCode  
(0)**



**Enable DotCode  
(1)**

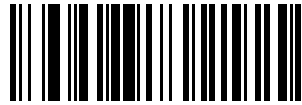
## DotCode Inverse

Parameter # 1907

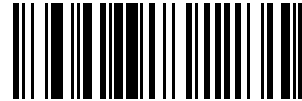
SSI # F8 07 73h

Scan one of the following barcodes to select a DotCode Inverse decoder setting. Setting options are:

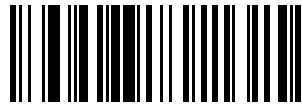
- **Regular Only** - Decoder decodes DotCode barcodes with normal reflectance only.
- **Inverse Only** - Decoder decodes DotCode barcodes with inverse reflectance only.
- **Inverse Autodetect** - Decoder decodes both regular and inverse DotCode barcodes.



**Regular**  
(0)



**Inverse Only**  
(1)



**\* Autodetect**  
(2)

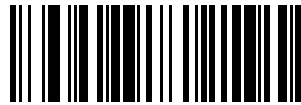
## DotCode Mirrored

Parameter # 1908

SSI # F8 07 74h

Scan one of the following barcodes to select a DotCode Mirror decoder setting:

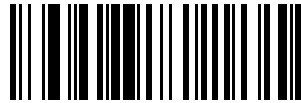
- **Non-Mirrored Only** - Digital scanner decodes non-mirrored DotCode barcodes only.
- **Mirrored Only** - Digital scanner decodes mirrored DotCode barcodes only.
- **Autodetect** - Digital scanner decodes both mirrored and non-mirrored DotCode barcodes.



**Never**  
**(0)**



**Always**  
**(1)**



**\* Autodetect**  
**(2)**



## DotCode Prioritize

Parameter # 1937

SSI # F8 07 91h

Enable DotCode Prioritize to give priority to DotCode decoding as compared to other symbologies.



Disable



\* Enable

## DotCode Erasure Limit

Parameter # 2063

SSI # F8 08 0F

This parameter sets the maximum number of erasures in DotCode codewords before passing the codewords for error correction. The value range is from 4 to 20. The default value is 10.

A bigger value means that DotCode barcodes are easier to decode, but the chance of getting a misdecode is higher.

To set a DotCode Erasure Limit value, scan the following barcode, and then scan two barcodes from [Numeric Barcodes](#) that correspond to the desired value. Enter a leading zero for single digit numbers. For example, to set an erasure value of 4, scan this barcode, and then scan the **0** and **4** barcodes. To correct an error or change the selection, scan [Cancel](#).



DotCode Erasure Limit

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## Macro PDF Features

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



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

### Flush Macro Buffer

Scan the following barcode to flush the buffer of all decoded Macro PDF data stored to that point, transmit it to the host device, and abort from Macro PDF mode.



Flush Macro PDF Buffer

### Abort Macro PDF Entry

Scan the following barcode to clear all currently-stored Macro PDF data in the buffer without transmission and abort from Macro PDF mode.



Abort Macro PDF Entry

---

## Postal Codes

### US Postnet

Parameter # 89

SSI # 59h

Scan one of the following barcodes to enable or disable US Postnet.



Enable US Postnet  
(1)



\*Disable US Postnet  
(0)

### US Planet

Parameter # 90

SSI # 5Ah

Scan one of the following barcodes to enable or disable US Planet.



Enable US Planet  
(1)



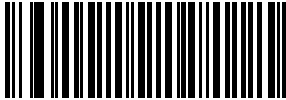
\*Disable US Planet  
(0)

## Transmit US Postal Check Digit

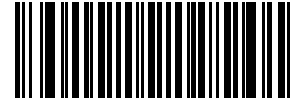
Parameter # 95

SSI # 5Fh

Scan one of the following barcodes to select whether to transmit US Postal data, which includes both US Postnet and US Planet, with or without the check digit.



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



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

## UK Postal

Parameter # 91

SSI # 5Bh

Scan one of the following barcodes to enable or disable UK Postal.



**Enable UK Postal  
(1)**



**\*Disable UK Postal  
(0)**

## Transmit UK Postal Check Digit

Parameter # 96

SSI # 60h

Scan one of the following barcodes to select whether to transmit UK Postal data with or without the check digit.



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



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

## Japan Postal

Parameter # 290

SSI # F0h, 22h

Scan one of the following barcodes to enable or disable Japan Postal.



**Enable Japan Postal  
(1)**



**\*Disable Japan Postal  
(0)**

## Australia Post

Parameter # 291

SSI # F0h, 23h

Scan one of the following barcodes to enable or disable Australia Post.



Enable Australia Post  
(1)



\*Disable Australia Post  
(0)

## Australia Post Format

### Parameter # 718

### SSI # F1h, CEh

Scan one of the following barcodes to select a format for Australia Post:

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



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

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

For more information on Australia Post Encoding Tables, refer to the Australia Post Customer Barcoding Technical Specifications available at [auspost.com.au](http://auspost.com.au).



\*Autodiscriminate  
(0)



Raw Format  
(1)



Alphanumeric Encoding  
(2)



Numeric Encoding  
(3)

## Netherlands KIX Code

Parameter # 326

SSI # F0h, 46h

Scan one of the following barcodes to enable or disable Netherlands KIX Code.



Enable Netherlands KIX Code  
(1)



\*Disable Netherlands KIX Code  
(0)

## USPS 4CB/One Code/Intelligent Mail

Parameter # 592

SSI # F1h 50h

Scan one of the following barcodes to enable or disable USPS 4CB/One Code/Intelligent Mail.



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



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



## UPU FICS Postal

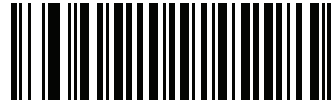
Parameter # 611

SSI # F1h 63h

Scan one of the following barcodes to enable or disable UPU FICS Postal.



Enable UPU FICS Postal  
(1)



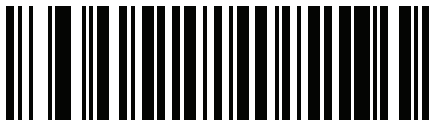
\*Disable UPU FICS Postal  
(0)

## Mailmark

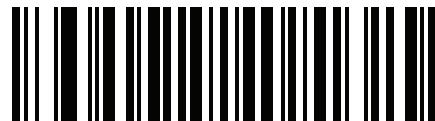
Parameter # 1337

SSI # F8h 05h 39h

Scan one of the following barcodes to enable or disable Mailmark.



\*Disable Mailmark  
(0)



Enable Mailmark  
(1)

# USB Interface

---

## Introduction

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

The scanner ships with the settings shown in [Table 14 on page 236](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

---

## Setting Parameters

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



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

To return all features to default values, scan [Set Factory Defaults on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



\* Indicates default      \*Enable Parameter      Feature/option

## Scanning Sequence Examples

In most cases scanning one barcode sets the parameter value. For example, to set the USB keystroke delay to medium, scan the **Medium Delay (20 msec)** barcode under [USB Keystroke Delay on page 240](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

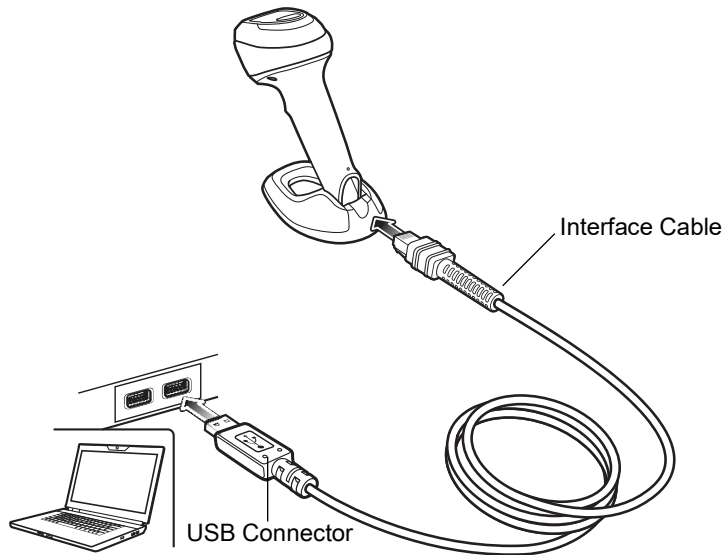
Other parameters require scanning several barcodes. See the parameter descriptions for this procedure.

## Errors While Scanning

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

## Connecting a USB Interface

Figure 15 USB Connection



**NOTE:** When connecting via USB use the shielded connector cable (e.g., p/n CBA-U21-S07ZBR). Refer to Solution Builder for guidance about cables.

If you already have existing non shielded cables from legacy products (such as the DS9808) they can be reused. However, be aware that the shielded cables provide improved ESD performance. For information about cables and cable compatibility, go to the Zebra Partner Portal at: [https://partnerportal.zebra.com/PartnerPortal/product\\_services/downloads\\_z/barcode\\_scanners/Universal-Cable-Guide-Bar-Code-Scanners.xlsx](https://partnerportal.zebra.com/PartnerPortal/product_services/downloads_z/barcode_scanners/Universal-Cable-Guide-Bar-Code-Scanners.xlsx).

The scanner connects to USB-capable hosts including:

- TGCS (IBM) terminals
- Apple™ desktop and notebooks
- Other network computers that support more than one keyboard.

The following operating systems support the scanner through USB:

- Windows® XP, 7, 8, 10
- MacOS 8.5 - MacOS 10.6
- IBM 4690 OS
- Linux.

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

To set up the scanner:

1. Connect the modular connector of the USB interface cable to the cable interface port on the scanner. See [Inserting the Interface Cable on page 31](#).



**NOTE:** Interface cables vary depending on configuration. The connectors illustrated in [Figure 15](#) are examples only. The connectors may be different than those illustrated, but the steps to connect the scanner are the same.

2. Plug the series A connector in the USB host or hub, or plug the PowerPlus connector in an available port of the IBM SurePOS terminal.
3. The scanner automatically detects the host and uses the default USB device type. If the default (\*) does not meet your requirements, select another USB device type by scanning the appropriate barcode from [USB Device Type on page 237](#).
4. On first installation when using Windows, the software may prompt to select or install the Human Interface Device driver. To install this driver, provided by Windows, click **Next** at all choices and click **Finished** on the last choice. The scanner powers up during this installation.
5. To modify any other parameter options, scan the appropriate barcodes in this chapter.

If problems occur with the system, see [Troubleshooting on page 48](#).

## USB Parameter Defaults

[Table 14](#) lists defaults for USB host parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 14** USB Interface Parameter Defaults

| Parameter                                    | Default                               | Page Number         |
|--|---------------------------------------|---------------------|
| <b>USB Host Parameters</b>                   |                                       |                     |
| USB Device Type                              | USB Keyboard HID                      | <a href="#">237</a> |
| Symbol Native API (SNAPI) Status Handshaking | Enable                                | <a href="#">239</a> |
| USB Keystroke Delay                          | No Delay                              | <a href="#">240</a> |
| USB Caps Lock Override                       | Disable                               | <a href="#">240</a> |
| Barcodes with Unknown Characters             | Send Barcodes with Unknown Characters | <a href="#">241</a> |
| USB Convert Unknown to Code 39               | Disable                               | <a href="#">241</a> |
| USB Fast HID                                 | Enable                                | <a href="#">242</a> |
| USB Polling Interval                         | 3 msec                                | <a href="#">242</a> |
| Keypad Emulation                             | Enable                                | <a href="#">244</a> |
| Quick Keypad Emulation                       | Enable                                | <a href="#">244</a> |
| Keypad Emulation with Leading Zero           | Enable                                | <a href="#">245</a> |
| USB FN1 Substitution                         | Disable                               | <a href="#">245</a> |
| Function Key Mapping                         | Disable                               | <a href="#">246</a> |

**Table 14** USB Interface Parameter Defaults (Continued)

| Parameter                                      | Default     | Page Number         |
|--|-------------|---------------------|
| Simulated Caps Lock                            | Disable     | <a href="#">246</a> |
| Convert Case                                   | None        | <a href="#">247</a> |
| USB Static CDC                                 | Enable      | <a href="#">247</a> |
| CDC Beep on <BEL>                              | Enable      | <a href="#">248</a> |
| TGCS (IBM) USB Direct I/O Beep                 | Honor       | <a href="#">248</a> |
| TGCS (IBM) USB Beep Directive                  | Ignore      | <a href="#">249</a> |
| TGCS (IBM) USB Barcode Configuration Directive | Ignore      | <a href="#">249</a> |
| TGCS (IBM) USB Specification Version           | Version 2.2 | <a href="#">249</a> |

## USB Host Parameters

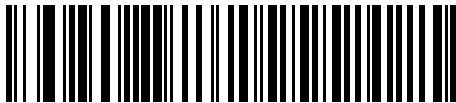
### USB Device Type

Scan one of the following barcodes to select the USB device type. To select a country keyboard type for the **USB Keyboard HID** host, see [Country Codes](#).



**NOTES:**

- When changing USB Device Types, the scanner resets and issues the standard startup beep sequences.
- When connecting two scanners to a host, IBM does not allow selecting two of the same device type. If you require two connections, select IBM Table-top USB for one scanner and IBM Hand-held USB for the second scanner.
- Select **IBM Hand-held USB** to disable data transmission when an IBM register issues a Scan Disable command. Aim, illumination, and decoding is still permitted. Select **IBM OPOS (IBM Hand-held USB with Full Scan Disable)** to completely shut off the scanner when an IBM register issues a Scan Disable command, including aim, illumination, decoding, and data transmission.
- To select the Toshiba TEC device type, refer to the Toshiba TEC Programmer's Guide.



**\*USB Keyboard HID**



**IBM Table-top USB**

USB Device Type (continued)



IBM Hand-held USB

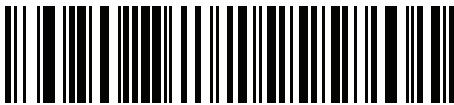


OPOS  
(IBM Hand-held with Full Disable)



NOTES:

- Before selecting [USB CDC Host on page 238](#) or [SSI over USB CDC on page 238](#), install the appropriate USB CDC Driver on the host to ensure the scanner does not stall during power up (due to a failure to enumerate USB). Go to [zebra.com/support](http://zebra.com/support), Support & Downloads > Barcode Scanners > USB CDC Driver, select the appropriate Windows platform, and download the appropriate CDC Driver (64 bit or 32 bit). To recover a stalled scanner:  
Install the USB CDC Driver  
or  
After power-up, hold the trigger for 10 seconds, which allows the scanner to power up using an alternate USB configuration. Upon power-up, scan another **USB Device Type**.
- Select **USB HID POS** to communicate over a USB cable with Universal Windows Platform (UWP) applications running on Windows 10 devices.



USB CDC Host



SSI over USB CDC



Symbol Native API (SNAPI) with Imaging Interface

## USB Device Type (continued)



Symbol Native API (SNAPI) without Imaging Interface



USB HID POS  
(for Windows 10 devices only)

## Symbol Native API (SNAPI) Status Handshaking

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



\*Enable SNAPI Status Handshaking



Disable SNAPI Status Handshaking

## USB Keystroke Delay

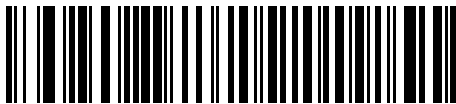
Scan one of the following barcodes to set the delay, in milliseconds, between emulated keystrokes. Select a longer delay for hosts that require slower data transmission.



\*No Delay



Medium Delay (20 msec)



Long Delay (40 msec)

## USB Caps Lock Override

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



Override Caps Lock Key  
(Enable)



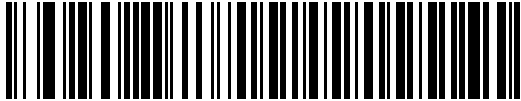
\*Do Not Override Caps Lock Key  
(Disable)



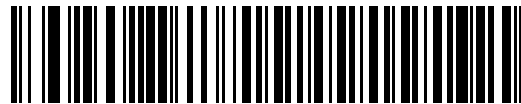
## Barcodes with Unknown Characters

This option applies only to the USB Keyboard HID and IBM devices. Unknown characters are characters the host does not recognize. Scan **Send Barcodes With Unknown Characters** to send all barcode data except for unknown characters. The scanner issues no error beeps.

Scan **Do Not Send Barcodes With Unknown Characters** for IBM devices to prevent sending barcodes containing at least one unknown character to the host, or for USB Keyboard HID devices to send the barcode characters up to the unknown character. The scanner issues an error beep.



**\*Send Barcodes with Unknown Characters**



**Do Not Send Barcodes with Unknown Characters**

## USB Convert Unknown to Code 39

This option applies only to the IBM hand-held, IBM table-top, and OPOS devices. Scan one of the following barcodes to enable or disable converting unknown barcode type data to Code 39.



**Enable Convert Unknown to Code 39**



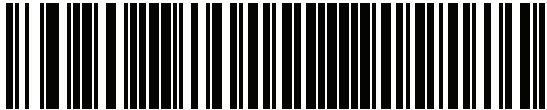
**\*Disable Convert Unknown to Code 39**

## USB Fast HID

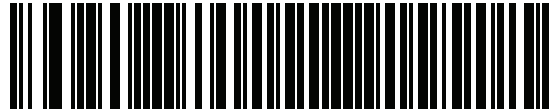
Scan **Enable USB Fast HID** to transmit USB HID data at a faster rate.



**NOTE:** Disable **USB Fast HID** if there are problems with transmission.



**\*Enable USB Fast HID**



**Disable USB Fast HID**

## USB Polling Interval

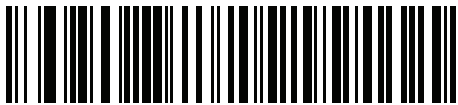
Scan one of the following barcodes to set the polling interval, which is the rate at which data transmits between the scanner and host computer. A lower number indicates a faster data rate.



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



**IMPORTANT:** Ensure the host supports the selected data rate.

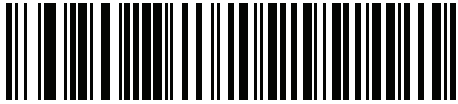


**1 msec**



**2 msec**

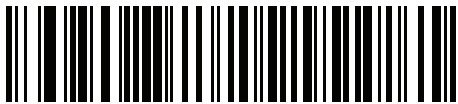
USB Polling Interval (continued)



\*3 msec



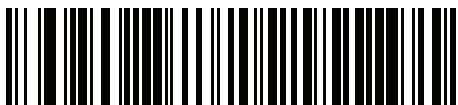
4 msec



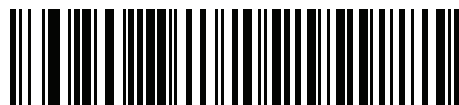
5 msec



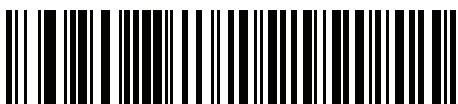
6 msec



7 msec



8 msec



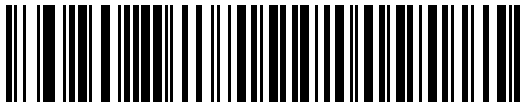
9 msec

## Keypad Emulation

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



**NOTE:** If your keyboard type is not listed in the country code list (see [Country Codes](#)), disable [Quick Keypad Emulation](#) and enable **Keypad Emulation** below.



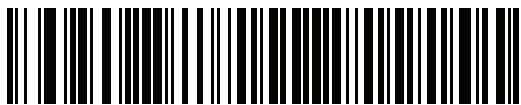
**\*Enable Keypad Emulation**



**Disable Keypad Emulation**

## Quick Keypad Emulation

This option applies only to the USB Keyboard HID device when [Keypad Emulation](#) is enabled. Scan **Enable Quick Keypad Emulation** for a quicker method of emulation using the numeric keypad where ASCII sequences are only sent for ASCII characters not found on the keyboard.



**\*Enable Quick Keypad Emulation**



**Disable Quick Keypad Emulation**

## Keypad Emulation with Leading Zero

Scan **Enable Keypad Emulation with Leading Zero** to send character sequences sent over the numeric keypad as ISO characters which have a leading zero. For example, ASCII A transmits as "ALT MAKE" 0 0 6 5 "ALT BREAK".



**\*Enable Keypad Emulation with Leading Zero**



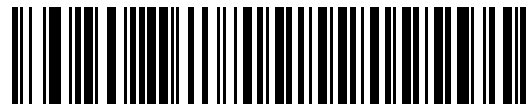
**Disable Keypad Emulation with Leading Zero**

## USB Keyboard FN1 Substitution

This option applies only to the USB Keyboard HID device. Scan **Enable USB Keyboard FN1 Substitution** to replace any FN1 character in a GS1 128 barcode with a user-selected Key Category and value. See [FN1 Substitution Values on page 90](#) to set the Key Category and Key Value.



**Enable USB Keyboard FN1 Substitution**



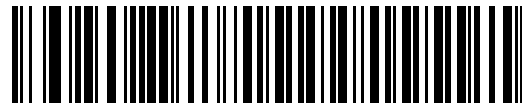
**\*Disable USB Keyboard FN1 Substitution**

## Function Key Mapping

ASCII values under 32 are normally sent as a control-key sequence (see [Table 30 on page 451](#)). Scan **Enable Function Key Mapping** to send the keys in bold in place of the standard key mapping. Table entries that do not have a bold equivalent remain the same regardless of whether you enable this parameter.



Enable Function Key Mapping



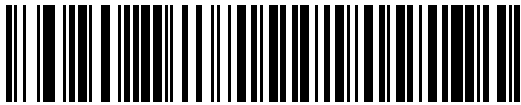
\*Disable Function Key Mapping

## Simulated Caps Lock

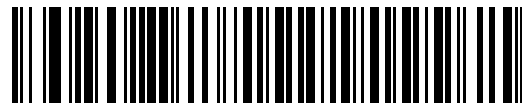
Scan **Enable Simulated Caps Lock** to invert upper and lower case characters on the barcode as if the Caps Lock state is enabled on the keyboard. This inversion occurs regardless of the keyboard's **Caps Lock** state.



- NOTES:** - Simulated Caps Lock applies to ASCII characters only.
- Do not enable this parameter if any of the following parameters are enabled:
    - [USB Caps Lock Override on page 240](#)
    - [Convert All to Upper Case on page 247](#)
    - [Convert All to Lower Case on page 247](#)



Enable Simulated Caps Lock



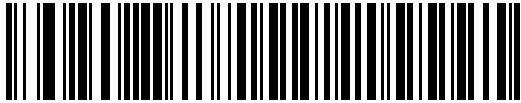
\*Disable Simulated Caps Lock

## Convert Case

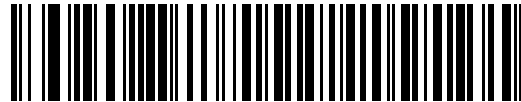
Scan one of the following barcodes to convert all barcode data to the selected case.



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



**\*No Case Conversion**



**Convert All to Upper Case**



**Convert All to Lower Case**

## USB Static CDC

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

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



**\*Enable USB Static CDC**



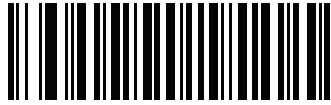
**Disable USB Static CDC**

## CDC Beep on <BEL>

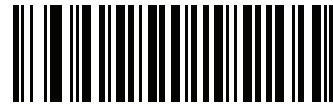
Parameter #150

SSI # 96h

If you enable this parameter, the scanner issues a beep when it detects a <BEL> character in USB CDC communications. <BEL> indicates an illegal entry or other important event.



\*Enable CDC Beep on <BEL>



Disable CDC Beep on <BEL>

## TGCS (IBM) USB Direct I/O Beep

Parameter #1360

SSI # F8h 05h 50h

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.



\*Honor Direct I/O Beep  
(1)



Ignore Direct I/O Beep  
(0)



## TGCS (IBM) USB Beep Directive

The host can send a beep 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 USB host as if they were processed.



Honor Beep Directive



\*Ignore Beep Directive

## TGCS (IBM) USB Barcode Configuration Directive

The host can enable and disable code types. Scan **Ignore Barcode Configuration Directive** to prevent the scanner from processing the host request. All directives are still acknowledged to the USB host as if they were processed.



Honor Barcode Configuration Directive



\*Ignore Barcode Configuration Directive

## TGCS (IBM) USB Specification Version

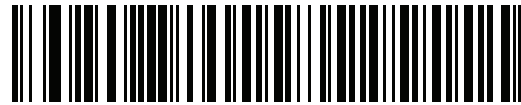
Select **IBM Specification Level Version 0 (Original)** to send the following code types as Unknown:

- Data Matrix
- GS1 Data Matrix
- QR Code
- GS1 QR
- MicroQR Code
- Aztec

Select **IBM Specification Level Version 2.2** to send the code types with the appropriate IBM identifiers.



IBM Specification Level Version 0 (Original)



\*IBM Specification Level Version 2.2

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## ASCII Character Sets

See [ASCII Character Sets](#) for the following information:

- ASCII Character Set, [Table 30 on page 451](#)
- ALT Key Character Set, [Table 31 on page 456](#)
- GUI Key Character Set, [Table 32 on page 457](#)
- PF Key Character Set, [Table 33 on page 458](#)
- F Key Character Set, [Table 34 on page 459](#)
- Numeric Key Character Set, [Table 35 on page 459](#)
- Extended Key Character Set, [Table 36 on page 460](#)

# SSI Interface

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## 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.

---

## Communication

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

The host and the scanner 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).

Depending on the configuration, the scanner can send decode data as ASCII data (unpacketed), or as part of a larger message (packeted).

SSI performs the following functions for the host device:

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

The SSI environment consists of a scanner, a serial cable which attaches to the host device, and if required, 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 scanner can also send parameter information, product identification information, or event codes to the host.

All commands sent between the scanner and host must use the format described in the SSI Message Formats section. [SSI Transactions on page 253](#) describes the required sequence of messages in specific cases.

## SSI Commands

Table 15 lists all the SSI opcodes the scanner supports. The host transmits opcodes designated type H. The scanner (decoder) transmits type D opcodes, and either can transmit Host/Decoder (H/D) types.

**Table 15** SSI Commands

| Name                 | Type | Opcode | Description   |
|----------------------|------|--------|---|
| AIM_OFF              | H    | 0xC4   | Deactivate aim pattern.   |
| AIM_ON               | H    | 0xC5   | Activate aim pattern.   |
| BEEP                 | H    | 0xE6   | Sound the speaker.  |
| CAPABILITIES_REPLY   | D    | 0xD4   | Reply to CAPABILITIES_REQUEST; contains a list of the capabilities and commands the decoder supports. |
| CAPABILITIES_REQUEST | H    | 0xD3   | Request capabilities report from the decoder.   |
| CMD_ACK              | H/D  | 0xD0   | Positive acknowledgment of received packet.   |
| CMD_NAK              | H/D  | 0xD1   | Negative acknowledgment of received packet.   |
| DECODE_DATA          | D    | 0xF3   | Decode data in SSI packet format.   |
| EVENT                | D    | 0xF6   | Event indicated by associated event code.   |
| LED_OFF              | H    | 0xE8   | De-activate LED output.   |
| LED_ON               | H    | 0xE7   | Activate LED output.  |
| PARAM_DEFAULTS       | H    | 0xC8   | Set parameter default values.   |
| PARAM_REQUEST        | H    | 0xC7   | Request values of certain parameters.   |
| PARAM_SEND           | H/D  | 0xC6   | Send parameter values.  |
| REPLY_REVISION       | D    | 0xA4   | Reply to REQUEST_REVISION, contains the decoder's software/hardware configuration.                    |
| REQUEST_REVISION     | H    | 0xA3   | Request the decoder's configuration.  |
| SCAN_DISABLE         | H    | 0xEA   | Prevent the operator from scanning barcodes.  |
| SCAN_ENABLE          | H    | 0xE9   | Permit barcode scanning.  |
| SLEEP                | H    | 0xEB   | Request to place the decoder into low power.  |
| START_DECODE         | H    | 0xE4   | Tell the decoder to attempt to decode a barcode.  |
| STOP_DECODE          | H    | 0xE5   | Tell the decoder to abort a decode attempt.   |
| WAKEUP               | H    | N/A    | Wake the decoder from low power mode.   |

For details of the SSI protocol, refer to the *Simple Serial Interface Programmer's Guide*.

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## SSI Transactions

### General Data Transactions

#### ACK/NAK Handshaking

If you enable ACK/NAK handshaking (the default), all packeted messages must have a CMD\_ACK or CMD\_NAK response, unless the command description states otherwise. Zebra recommends leaving this handshaking enabled to provide feedback to the host. Raw decode data and WAKEUP do 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 scanner to change the baud rate from 9600 to 19200.
- The scanner cannot interpret the message.
- The scanner 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 scanner cannot interpret the message.
- The scanner CMD\_NAKs the message.
- The host resends the message.
- The scanner receives the message successfully, responds with CMD\_ACK, and implements parameter changes.

## Decoded Data Transmission

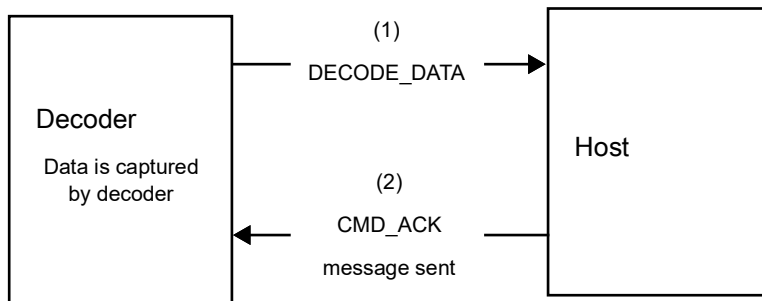
The [Decode Data Packet Format](#) parameter controls how decode data is sent to the host. Set this parameter to send the data in a `DECODE_DATA` packet. Clear this parameter to transmit the data as raw ASCII data.



**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.

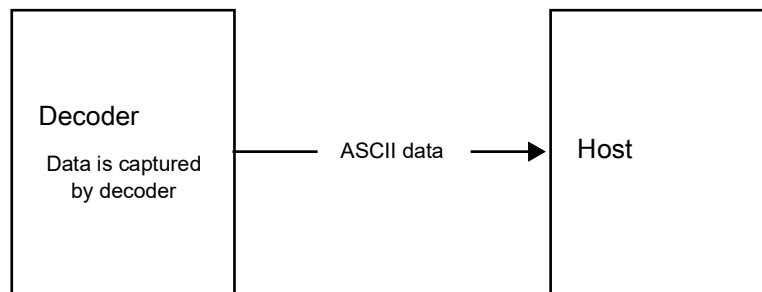
### ACK/NAK Enabled and Packeted Data

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



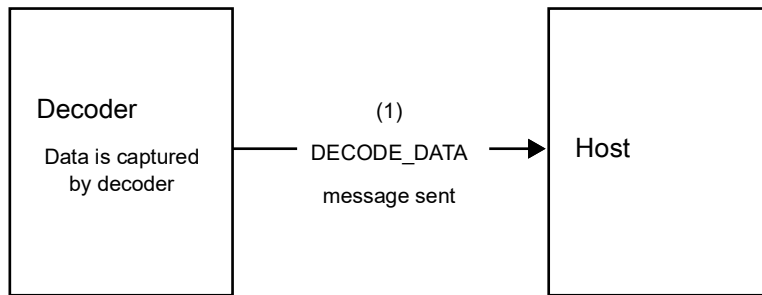
### ACK/NAK Enabled and Unpacketed ASCII Data

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



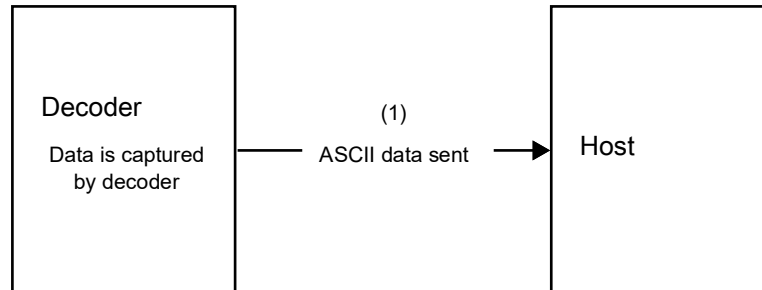
### ACK/NAK Disabled and Packeted DECODE\_DATA

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 Unpacketed ASCII Data

The decoder sends captured data 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 72E-40451-xx. If bypassing hardware handshaking, the host must send the WAKEUP command before all other communication or the first byte of a message can be lost during the scanner wakeup sequence. Zebra recommends not bypassing RTS/CTS hardware handshaking.

### ACK/NAK Option

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

### Number of Data Bits

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

## Serial Response Timeout

The [Host Serial Response Timeout](#) parameter determines how long to wait for a handshaking response before trying again or aborting further attempts. Set the same value for both the host and scanner.



**NOTE:** You can temporarily change the [Host Serial Response Timeout](#) 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

The host resends data twice after the initial send if the scanner 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 scanner replies with a NAK RESEND, the host resends the data. All resent messages must have the resend bit set in the Status byte.

The scanner 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 Timeout, ACK/NAK Handshaking

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 scanner issues a communication error when:

- The CTS line is asserted when the scanner tries to transmit, and is still asserted on each of two successive retries
- The scanner does not receive an ACK or NAK after initial transmit and two resends.

## SSI Communication Notes

- When not using hardware handshaking, space messages sufficiently apart. The host must not communicate with the scanner if the scanner is transmitting.
- When using hardware handshaking, frame each message properly with 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 scanner discards temporary changes. Permanent changes are written to non-volatile memory. Frequent changes shorten the life of the non-volatile memory.



## Using Time Delay to Low Power Mode with SSI

[Time Delay to Low Power Mode on page 67](#) provides options to select a general time delay. To program a more specific delay value, use an SSI command according to [Table 16](#).

**Table 16** Values for Selecting Time Delay to Low Power

| Value | Timeout | Value | Timeout | Value | Timeout | Value | Timeout  |
|-------|---------|-------|---------|-------|---------|-------|----------|
| 0x00  | 15 Min  | 0x10  | 1 Sec   | 0x20  | 1 Min   | 0x30  | 1 Hour   |
| 0x01  | 30 Min  | 0x11  | 1 Sec   | 0x21  | 1 Min   | 0x31  | 1 Hour   |
| 0x02  | 60 Min  | 0x12  | 2 Sec   | 0x22  | 2 Min   | 0x32  | 2 Hours  |
| 0x03  | 90 Min  | 0x13  | 3 Sec   | 0x23  | 3 Min   | 0x33  | 3 Hours  |
| N/A   | N/A     | 0x14  | 4 Sec   | 0x24  | 4 Min   | 0x34  | 4 Hours  |
| N/A   | N/A     | 0x15  | 5 Sec   | 0x25  | 5 Min   | 0x35  | 5 Hours  |
| N/A   | N/A     | 0x16  | 6 Sec   | 0x26  | 6 Min   | 0x36  | 6 Hours  |
| N/A   | N/A     | 0x17  | 7 Sec   | 0x27  | 7 Min   | 0x37  | 7 Hours  |
| N/A   | N/A     | 0x18  | 8 Sec   | 0x28  | 8 Min   | 0x38  | 8 Hours  |
| N/A   | N/A     | 0x19  | 9 Sec   | 0x29  | 9 Min   | 0x39  | 9 Hours  |
| N/A   | N/A     | 0x1A  | 10 Sec  | 0x2A  | 10 Min  | 0x3A  | 10 Hours |
| N/A   | N/A     | 0x1B  | 15 Sec  | 0x2B  | 15 Min  | 0x3B  | 15 Hours |
| N/A   | N/A     | 0x1C  | 20 Sec  | 0x2C  | 20 Min  | 0x3C  | 20 Hours |
| N/A   | N/A     | 0x1D  | 30 Sec  | 0x2D  | 30 Min  | 0x3D  | 30 Hours |
| N/A   | N/A     | 0x1E  | 45 Sec  | 0x2E  | 45 Min  | 0x3E  | 45 Hours |
| N/A   | N/A     | 0x1F  | 60 Sec  | 0x2F  | 60 Min  | 0x3F  | 60 Hours |



**CAUTION:** With hardware handshaking disabled, the scanner wakes from low power mode upon receiving a character. However, the scanner does not process this character or any others it receives during the 10 ms period following wakeup. Wait at least 10 ms after wakeup to send valid characters.

## 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 scanner does not support this. The host must fragment packets using the provisions in the RSM protocol.

### Command Structure

| Byte      | 7  | 6 | 5 | 4            | 3 | 2            | 1             | 0          |
|-----------|--|---|---|--------------|---|--------------|---------------|------------|
| 0         | Length (not including the checksum)      |   |   |              |   |              |               |            |
| 1         | SSI_MGMT_COMMAND (0x80)                  |   |   |              |   |              |               |            |
| 2         | Message Source (4 - Host)                |   |   |              |   |              |               |            |
| 3         | Reserved (0)                             |   |   | Reserved (0) |   | Reserved (0) | Cont'd packet | Retransmit |
| 4         | Payload data (see the following example) |   |   |              |   |              |               |            |
| ...       |  |   |   |              |   |              |               |            |
| Length -1 |  |   |   |              |   |              |               |            |
| Length    | 2's complement checksum (MSB)            |   |   |              |   |              |               |            |
| Length +1 | 2's complement checksum (LSB)            |   |   |              |   |              |               |            |

The expected positive response is SSI\_MGMT\_COMMAND which can be a multi-packet response. Devices that do not support this command respond with the standard SSI\_NAK.

### Response Structure

| Byte      | 7  | 6 | 5 | 4            | 3 | 2            | 1             | 0          |
|-----------|--|---|---|--------------|---|--------------|---------------|------------|
| 0         | Length (not including the checksum)      |   |   |              |   |              |               |            |
| 1         | SSI_MGMT_COMMAND (0x80)                  |   |   |              |   |              |               |            |
| 2         | Message Source (0 - Decoder)             |   |   |              |   |              |               |            |
| 3         | Reserved (0)                             |   |   | Reserved (0) |   | Reserved (0) | Cont'd packet | Retransmit |
| 4         | Payload data (see the following example) |   |   |              |   |              |               |            |
| ...       |  |   |   |              |   |              |               |            |
| Length -1 |  |   |   |              |   |              |               |            |
| Length    | 2's complement checksum (MSB)            |   |   |              |   |              |               |            |
| Length +1 | 2's complement checksum (LSB)            |   |   |              |   |              |               |            |

## Example Transaction

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

### Command from Host to Query Packet Size Supported by Device

```
0A 80 04 00 00 06 20 00 FF FF FD 4E
```

Where:

- 0A 80 04 00 is encapsulation of RSM commands over SSI command header
- 00 06 20 00 FF FF is RSM Get Packet Size command
- FD 4E is SSI command checksum

### Response from Device with Packet Size Information

```
0C 80 00 00 00 08 20 00 00 F0 00 F0 FD 6C
```

Where:

- 0C 80 00 00 is encapsulation of RSM command over SSI command header
- 00 08 20 00 00 F0 00 F0 is RSM Get Packet Size response
- FD 6C is SSI response checksum

### Command from Host to Retrieve Diagnostic Information

```
0C 80 04 00 00 08 02 00 27 4D 42 00 FE B0
```

Where:

- 0C 80 04 00 is encapsulation of RSM commands over SSI command header
- 00 08 02 00 27 4D 42 00 is attribute Get command requesting attribute 10061 decimal
- FE B0 is SSI command checksum

### Response from Device with Diagnostic Information

```
21 80 00 00 00 1D 02 00 27 4D 41 01 42 00 0E 00 00 00 00 01 03 02 03 03 03 04 03 05 03 06 03 FF FF FC 15
```

Where:

- 21 80 00 00 00 1D 02 00 27 4D 41 01 42 00 0E 00 00 is encapsulation of RSM responses over SSI command header
- 00 00 01 03 02 03 03 03 04 03 05 03 06 03 is attribute Get response which includes diagnostic report value
- FF FF is attribute Get response, packet termination
- FC 15 is SSI response checksum

## Setting Parameters

This section describes how to set up the scanner with an SSI host. When using SSI, program the scanner via barcode menu or SSI hosts commands.

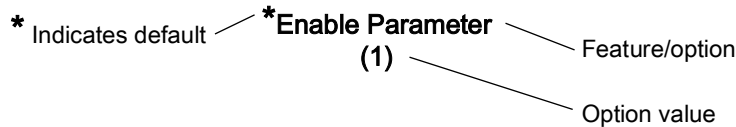
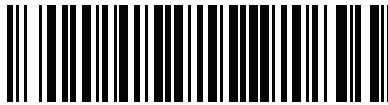
The scanner ships with the settings shown in [Table 17 on page 261](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

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



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

To return all features to default values, scan [Set Factory Defaults on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



## Scanning Sequence Examples

In most cases scanning one barcode sets the parameter value. For example, to set the baud rate to 19,200, scan the **Baud Rate 19,200** barcode under [Baud Rate on page 262](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. See the 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.

## Simple Serial Interface Parameter Defaults

Table 15 lists defaults for SSI host parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Download data through the device’s serial port using SSI. Hexadecimal parameter numbers appear in this chapter below the parameter title, and option values appear in parenthesis beneath the accompanying barcodes. Refer to the *Simple Serial Interface (SSI) Programmer’s Guide* for detailed instructions for changing parameters using this method.



**NOTE:** SSI interprets Prefix, Suffix1, and Suffix2 values listed in [ASCII Character Set on page 451](#) 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.



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 17** SSI Interface Default Table

| Parameter                    | Parameter Number | SSI Number | Default              | Page Number         |
|------------------------------|------------------|------------|----------------------|---------------------|
| <b>SSI Host Parameters</b>   |                  |            |                      |                     |
| Select SSI Host              | N/A              | N/A        | N/A                  | <a href="#">262</a> |
| Baud Rate                    | 156              | 9Ch        | 9600                 | <a href="#">262</a> |
| Parity                       | 158              | 9Eh        | None                 | <a href="#">264</a> |
| Check Parity                 | 151              | 97h        | Disable              | <a href="#">265</a> |
| Stop Bits                    | 157              | 9Dh        | 1                    | <a href="#">265</a> |
| Software Handshaking         | 159              | 9Fh        | ACK/NAK              | <a href="#">266</a> |
| Host RTS Line State          | 154              | 9Ah        | Low                  | <a href="#">267</a> |
| Decode Data Packet Format    | 238              | EEh        | Send Raw Decode Data | <a href="#">268</a> |
| Host Serial Response Timeout | 155              | 9Bh        | Low - 2 Seconds      | <a href="#">269</a> |
| Host Character Timeout       | 239              | EFh        | Low - 200 msec       | <a href="#">270</a> |
| Multipacket Option           | 334              | F0h 4Eh    | Multipacket Option 1 | <a href="#">271</a> |
| Interpacket Delay            | 335              | F0h 4Fh    | Minimum - 0 msec     | <a href="#">272</a> |
| <b>Event Reporting</b>       |                  |            |                      |                     |
| Decode Event                 | 256              | F0h 00h    | Disable              | <a href="#">273</a> |
| Boot Up Event                | 258              | F0h 02h    | Disable              | <a href="#">274</a> |
| Parameter Event              | 259              | F0h 03h    | Disable              | <a href="#">274</a> |

## SSI Host Parameters

### Select SSI Host

To select SSI as the host interface, scan the following barcode.



SSI Host

### Baud Rate

#### Parameter # 156

#### SSI # 9Ch

Baud rate is the number of bits of data transmitted per second. Scan one of the following barcodes to set the scanner'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.



\*Baud Rate 9600  
(6)



Baud Rate 19,200  
(7)



Baud Rate 38,400  
(8)



Baud Rate 57,600  
(10)

Baud Rate (continued)



Baud Rate 115,200  
(11)



Baud Rate 230,400  
(13)



Baud Rate 460,800  
(14)



Baud Rate 921,600  
(15)

## Parity

### Parameter # 158

### SSI # 9Eh

A parity check bit is the most significant bit of each ASCII coded character. Scan one of the following barcodes to select the parity type according to host device requirements:

- **Odd** - This sets the parity bit value to 0 or 1, based on data, to ensure that the coded character contains an odd number of 1 bits.
- **Even** - This sets the parity bit value to 0 or 1, based on data, to ensure that the coded character contains an even number of 1 bits.
- **None** - No parity bit is required.



Odd  
(2)



Even  
(1)



\*None  
(0)



## Check Parity

Parameter # 151

SSI # 97h

Scan one of the following barcodes to select whether to check the parity of received characters. See [Parity](#) to select the type of parity.



**\*Do Not Check Parity  
(0)**



**Check Parity  
(1)**

## Stop Bits

Parameter # 157

SSI # 9Dh

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. Scan one of the following barcodes to set the number of stop bits (one or two) based on the number the receiving host can accommodate.



**\*1 Stop Bit  
(1)**



**2 Stop Bits  
(2)**

## Software Handshaking

### Parameter # 159

#### SSI # 9Fh

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

Options:

- **Disable ACK/NAK Handshaking** - The scanner neither generates nor expects ACK/NAK handshaking packets.
- **Enable ACK/NAK Handshaking** - After transmitting data, the scanner expects either an ACK or NAK response from the host. The scanner also ACKs or NAKs messages from the host.

The scanner waits up to the programmable [Host Serial Response Timeout](#) to receive an ACK or NAK. If the scanner does not get a response in this time, it resends its data up to two times before discarding the data and declaring a transmission error.



**Disable ACK/NAK**  
(0)



**\*Enable ACK/NAK**  
(1)

## Host RTS Line State

### Parameter # 154

### SSI # 9Ah

Scan one of the following barcodes to set 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 scanner 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 268](#)). If transmission errors occur in this mode, the host PC may be asserting hardware handshaking lines which interfere with the SSI protocol. Scan the **High** barcode to address this problem.



\*Low  
(0)



High  
(1)

## Decode Data Packet Format

### Parameter # 238

#### SSI # EEh

Scan one of the following barcodes to select whether to transmit decoded data in raw format (unpacketed), or with the packet format defined by the serial protocol.

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



**\*Send Raw Decode Data  
(0)**



**Send Packeted Decode Data  
(1)**

## Host Serial Response Timeout

### Parameter # 155

### SSI # 9Bh

Scan one of the following barcodes to specify how long the scanner waits for an ACK or NAK before resending. Also, if the scanner wants to send, and the host has already been granted permission to send, the scanner waits for the designated timeout before declaring an error.



**NOTE:** Other values are available via SSI commands.



**\*Low - 2 Seconds  
(20)**



**Medium - 5 Seconds  
(50)**



**High - 7.5 Seconds  
(75)**



**Maximum - 9.9 Seconds  
(99)**

## Host Character Timeout

### Parameter # 239

#### SSI # EFh

Scan one of the following barcodes to specify the maximum time the scanner waits between characters transmitted by the host before discarding the received data and declaring an error.



**NOTE:** Other values are available via SSI commands.



**\*Low - 200 msec  
(20)**



**Medium - 500 msec  
(50)**



**High - 750 msec  
(75)**



**Maximum - 990 msec  
(99)**

## Multipacket Option

### Parameter # 334

### SSI # F0h 4Eh

Scan one of the following barcodes to control 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 scanner sends data packets continuously, with no ACK/NAK handshaking to pace the transmission. The host, if overrun, can use hardware handshaking to temporarily delay scanner transmissions. At the end of transmission, the scanner waits for a CMD\_ACK or CMD\_NAK.
- **Multi-Packet Option 3** - This is the same as option 2 with the addition of a programmable interpacket delay. See [Interpacket Delay on page 272](#) to set this delay.



\*Multipacket Option 1  
(0)



Multipacket Option 2  
(1)



Multipacket Option 3  
(2)

## Interpacket Delay

Parameter # 335

SSI # F0h 4Fh

Scan one of the following barcodes to specify the interpacket delay if you selected **Multipacket Option 3**.



**NOTE:** Other values are available via SSI commands.



**\*Minimum - 0 msec  
(0)**



**Low - 25 msec  
(25)**



**Medium - 50 msec  
(50)**



**High - 75 msec  
(75)**



**Maximum - 99 msec  
(99)**



## Event Reporting

The host can request the scanner to provide certain information (events) relative to scanner behavior. Scan the following barcodes to enable or disable the events listed in [Table 18](#) and on the following pages.

**Table 18** Event Codes

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

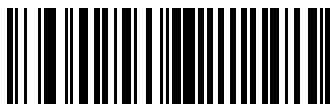
### Decode Event

#### Parameter # 256

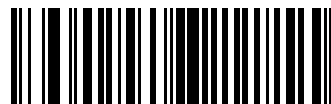
#### SSI # F0h 00h

Scan one of the following barcodes to enable or disable Decode Event.

- **Enable Decode Event** - The scanner generates a message to the host upon a successful barcode decode.
- **Disable Decode Event** - No notification is sent.



**Enable Decode Event**  
(1)



**\*Disable Decode Event**  
(0)

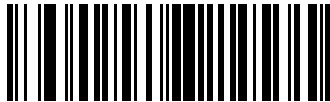
## Boot Up Event

Parameter # 258

SSI # F0h 02h

Scan one of the following barcodes to enable or disable Boot Up Event:

- **Enable Boot Up Event** - The scanner generates a message to the host whenever power is applied.
- **Disable Boot Up Event** - No notification is sent.



Enable Boot Up Event  
(1)



\*Disable Boot Up Event  
(0)

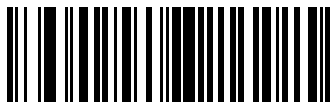
## Parameter Event

Parameter # 259

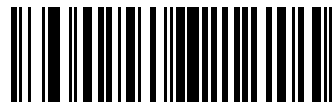
SSI # F0h 03h

Scan one of the following barcodes to enable or disable Parameter Event:

- **Enable Parameter Event** - The scanner generates a message to the host when one of the events specified in [Table 18 on page 273](#) occurs.
- **Disable Parameter Event** - No notification is sent.



Enable Parameter Event  
(1)



\*Disable Parameter Event  
(0)

# RS-232 Interface

---

## Introduction

This chapter describes how to set up the scanner with an RS-232 host. The scanner uses the RS-232 interface to connect to point-of-sale devices, host computers, or other devices with an available RS-232 port (e.g., com port).

The scanner ships with the settings shown in [Table 19 on page 277](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

If your host does not appear in [Table 20](#), refer to the documentation for the host device to set communication parameters to match the host.



**NOTE:** The scanner uses TTL RS-232 signal levels, which interface with most system architectures. For system architectures requiring RS-232C signal levels, Zebra offers different cables providing TTL-to-RS-232C conversion. Contact support for more information.

---

## Setting Parameters

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



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

To return all features to default values, scan [Set Factory Defaults on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



\* Indicates default    \*Enable Parameter    Feature/option

## Scanning Sequence Examples

In most cases scanning one barcode sets the parameter value. For example, to set the baud rate to 19,200, scan the **Baud Rate 19,200** barcode under [Baud Rate on page 282](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. See the parameter descriptions for this procedure.

## Errors While Scanning

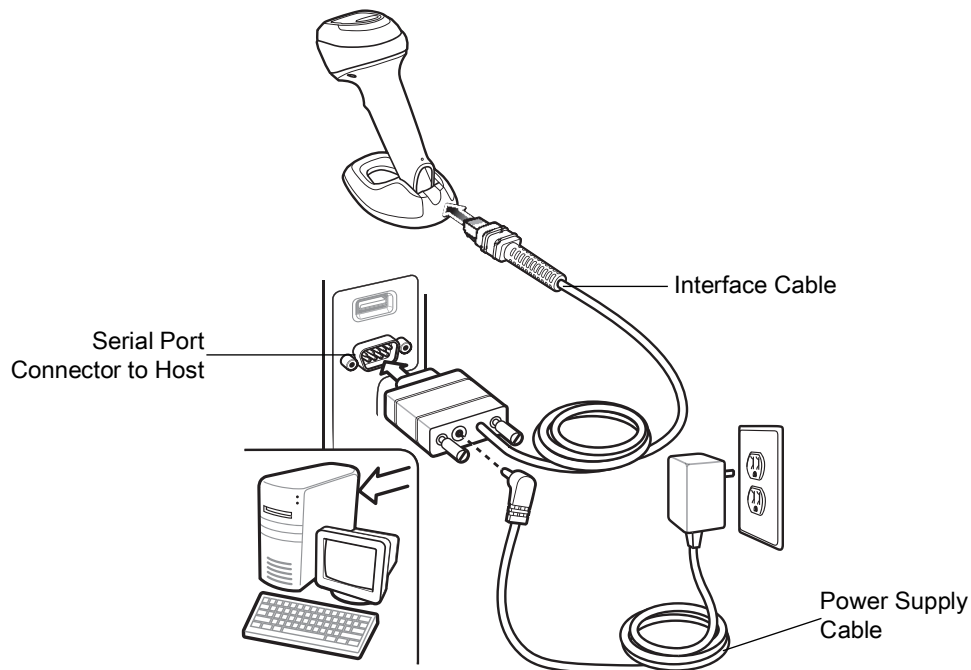
Unless otherwise specified, to correct an error during a scanning sequence, just re-scan the correct parameter.

---

## Connecting an RS-232 Interface

Connect the scanner directly to the host computer.

**Figure 16** RS-232 Connection



1. Attach the modular connector of the RS-232 interface cable to the cable interface port on the scanner. See [Inserting the Interface Cable on page 31](#).



**NOTE:** Interface cables vary depending on configuration. The connectors can be different than those illustrated in [Figure 1](#), but the steps to connect the scanner are the same.

2. Connect the other end of the RS-232 interface cable to the serial port on the host.
3. If required, connect the power supply to the serial connector end of the RS-232 interface cable. Plug the power supply into an appropriate outlet.
4. The scanner automatically detects the host interface type and uses the default setting. If the default (\*) does not meet your requirements, select another RS-232 host type by scanning the appropriate barcode from [RS-232 Host Types on page 280](#).
5. To modify any other parameter options, scan the appropriate barcodes in this chapter.

If problems occur with the system, see [Troubleshooting on page 48](#).

## RS-232 Parameter Defaults

Table 19 lists defaults for RS-232 host parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 19** RS-232 Interface Parameter Defaults

| Parameter                        | Default                              | Page Number         |
|----------------------------------|--------------------------------------|---------------------|
| <b>RS-232 Host Parameters</b>    |                                      |                     |
| RS-232 Host Types                | Standard                             | <a href="#">280</a> |
| Baud Rate                        | 9600                                 | <a href="#">282</a> |
| Parity                           | None                                 | <a href="#">283</a> |
| Stop Bits                        | 1 Stop Bit                           | <a href="#">283</a> |
| Data Bits                        | 8-bit                                | <a href="#">284</a> |
| Check Receive Errors             | Enable                               | <a href="#">284</a> |
| Hardware Handshaking             | None                                 | <a href="#">285</a> |
| Software Handshaking             | None                                 | <a href="#">287</a> |
| Host Serial Response Timeout     | 2 Seconds                            | <a href="#">289</a> |
| RTS Line State                   | Low RTS                              | <a href="#">290</a> |
| Beep on <BEL>                    | Disable                              | <a href="#">290</a> |
| Intercharacter Delay             | 0 msec                               | <a href="#">291</a> |
| Nixdorf Beep/LED Options         | Normal Operation                     | <a href="#">292</a> |
| Barcodes with Unknown Characters | Send Barcode With Unknown Characters | <a href="#">292</a> |

## RS-232 Host Parameters

Various RS-232 hosts use their own parameter default settings. Selecting standard, ICL, Fujitsu, Wincor-Nixdorf Mode A, Wincor-Nixdorf Mode B, OPOS/JPOS, Olivetti, Omron, or Common Use Terminal Equipment (CUTE-LP/LG barcode readers) sets the defaults listed in [Table 20](#).

**Table 20** Terminal Specific RS-232

| Parameter                | ICL              | Fujitsu     | Wincor-Nixdorf Mode A | Wincor-Nixdorf Mode B/OPOS/JPOS | Olivetti           | Omron       | CUTE                    |
|--------------------------|------------------|-------------|-----------------------|---------------------------------|--------------------|-------------|-------------------------|
| Transmit Code ID         | Yes              | Yes         | Yes                   | Yes                             | Yes                | Yes         | Yes                     |
| Data Transmission Format | Data/Suffix      | Data/Suffix | Data/Suffix           | Data/Suffix                     | Prefix/Data/Suffix | Data/Suffix | Prefix/Data/Suffix      |
| Suffix                   | CR (1013)        | CR (1013)   | CR (1013)             | CR (1013)                       | ETX (1002)         | CR (1013)   | CR (1013)<br>ETX (1003) |
| Baud Rate                | 9600             | 9600        | 9600                  | 9600                            | 9600               | 9600        | 9600                    |
| Parity                   | Even             | None        | Odd                   | Odd                             | Even               | None        | None                    |
| Hardware Handshaking     | RTS/CTS Option 3 | None        | RTS/CTS Option 3      | RTS/CTS Option 3                | None               | None        | None                    |
| Software Handshaking     | None             | None        | None                  | None                            | ACK/NAK            | None        | None                    |
| Serial Response Timeout  | 9.9 Sec.         | 2 Sec.      | None                  | None                            | 9.9 Sec.           | 9.9 Sec.    | 9.9 Sec.                |
| Stop Bit Select          | One              | One         | One                   | One                             | One                | One         | One                     |
| ASCII Format             | 8-Bit            | 8-Bit       | 8-Bit                 | 8-Bit                           | 7-Bit              | 8-Bit       | 8-Bit                   |
| Beep On <BEL>            | Disable          | Disable     | Disable               | Disable                         | Disable            | Disable     | Disable                 |

In the Wincor-Nixdorf Mode A/B, if CTS is low, scanning is disabled. When CTS is high, scanning is enabled.

If you scan Wincor-Nixdorf RS-232 Mode A/B without connecting the scanner 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.

The CUTE host disables all parameter scanning, including Set Defaults. If you inadvertently select CUTE, scan [\\*Enable Parameter Barcode Scanning \(1\) on page 60](#), then change the host selection.

**Table 20** Terminal Specific RS-232 (Continued)

| Parameter      | ICL  | Fujitsu | Wincor-Nixdorf Mode A | Wincor-Nixdorf Mode B/OPOS/JPOS | Olivetti   | Omron | CUTE       |
|----------------|------|---------|-----------------------|---------------------------------|------------|-------|------------|
| RTS Line State | High | Low     | Low                   | Low = No data to send           | Low        | High  | High       |
| Prefix         | None | None    | None                  | None                            | STX (1003) | None  | STX (1002) |

In the Wincor-Nixdorf Mode A/B, if CTS is low, scanning is disabled. When CTS is high, scanning is enabled. If you scan Wincor-Nixdorf RS-232 Mode A/B without connecting the scanner 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.

The CUTE host disables all parameter scanning, including Set Defaults. If you inadvertently select CUTE, scan [\\*Enable Parameter Barcode Scanning \(1\) on page 60](#), then change the host selection.

Selecting ICL, Fujitsu, Wincor-Nixdorf Mode A, Wincor-Nixdorf Mode B, OPOS/JPOS, Olivetti, Omron, or CUTE-LP/LG barcode readers transmits the code ID characters listed in [Table 21](#). 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 21** Terminal Specific Code ID Characters

| Code Type          | ICL     | Fujitsu | Wincor-Nixdorf Mode A | Wincor-Nixdorf Mode B/OPOS/JPOS | Olivetti | Omron   | CUTE |
|--------------------|---------|---------|-----------------------|---------------------------------|----------|---------|------|
| UPC-A              | A       | A       | A                     | A                               | A        | A       | A    |
| UPC-E              | E       | E       | C                     | C                               | C        | E       | None |
| EAN-8/JAN-8        | FF      | FF      | B                     | B                               | B        | FF      | None |
| EAN-13/JAN-13      | F       | F       | A                     | A                               | A        | F       | A    |
| Code 39            | C <len> | None    | M                     | M                               | M <len>  | C <len> | 3    |
| Code 39 Full ASCII | None    | None    | M                     | M                               | None     | None    | 3    |
| Codabar            | N <len> | None    | N                     | N                               | N <len>  | N <len> | None |
| Code 128           | L <len> | None    | K                     | K                               | K <len>  | L <len> | 5    |
| I 2 of 5           | I <len> | None    | I                     | I                               | I <len>  | I <len> | 1    |
| Code 93            | None    | None    | L                     | L                               | L <len>  | None    | None |
| D 2 of 5           | H <len> | None    | H                     | H                               | H <len>  | H <len> | 2    |
| GS1-128            | L <len> | None    | P                     | P                               | P <len>  | L <len> | 5    |
| MSI                | None    | None    | O                     | O                               | O <len>  | None    | None |
| Bookland EAN       | F       | F       | A                     | A                               | A        | F       | None |
| Trioptic           | None    | None    | None                  | None                            | None     | None    | None |
| Code 11            | None    | None    | None                  | None                            | None     | None    | None |

**Table 21** Terminal Specific Code ID Characters (Continued)

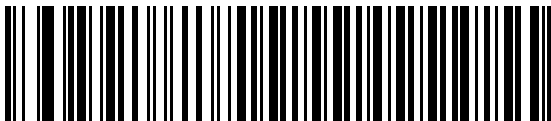
| Code Type            | ICL    | Fujitsu | Wincor-Nixdorf Mode A | Wincor-Nixdorf Mode B/ OPOS/JPOS | Olivetti | Omron  | CUTE |
|----------------------|--------|---------|-----------------------|----------------------------------|----------|--------|------|
| IATA                 | H<len> | None    | H                     | H                                | H<len>   | H<len> | 2    |
| Code 32              | None   | None    | None                  | None                             | None     | None   | None |
| GS1 DataBar Variants | None   | None    | E                     | E                                | None     | None   | None |
| PDF417               | None   | None    | Q                     | Q                                | None     | None   | 6    |
| Data Matrix          | None   | None    | R                     | R                                | None     | None   | 4    |
| GS1 Data Matrix      | None   | None    | W                     | W                                | None     | None   | None |
| QR Codes             | None   | None    | U                     | U                                | None     | None   | 7    |
| GS1 QR               | None   | None    | X                     | X                                | None     | None   | None |
| Aztec/Aztec Rune     | None   | None    | V                     | V                                | None     | None   | 8    |
| Maxicode             | None   | None    | T                     | T                                | None     | None   | None |
| MicroPDF             | None   | None    | S                     | S                                | None     | None   | 6    |

## RS-232 Host Types

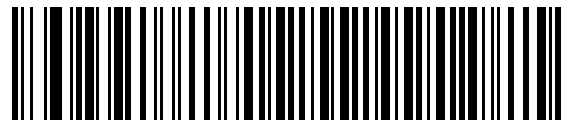
To select an RS-232 host interface, scan one of the following barcodes.



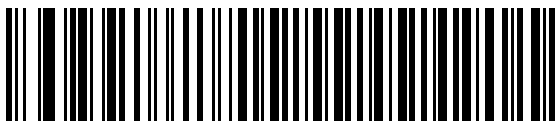
**NOTE:** For a list of supported scanner functionality by communication protocol, see [Communication Protocol Functionality](#).



\*Standard RS-232<sup>1</sup>



ICL RS-232



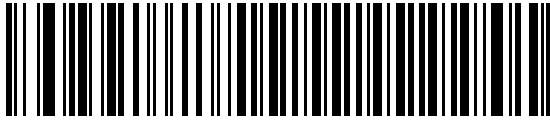
Wincor-Nixdorf RS-232 Mode A



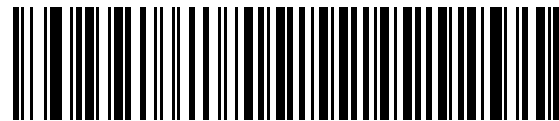
## RS-232 Host Types (continued)



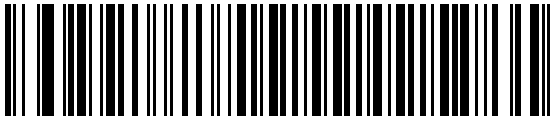
Wincor-Nixdorf RS-232 Mode B



Olivetti ORS4500



Omron



OPOS/JPOS



Fujitsu RS-232

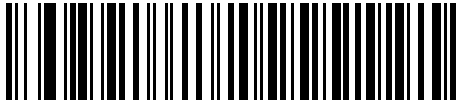
CUTE<sup>2</sup>

<sup>1</sup>Scanning Standard RS-232 activates the RS-232 driver, but does not change port settings (e.g., parity, data bits, handshaking). Selecting another RS-232 host type barcode changes these settings.

<sup>2</sup>The CUTE host disables all parameter scanning, including Set Defaults. If you inadvertently select CUTE, scan [\\*Enable Parameter Barcode Scanning \(1\) on page 60](#), and then change the host selection.

## Baud Rate

Baud rate is the number of bits of data transmitted per second. Scan one of the following barcodes to set the scanner'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.



**Baud Rate 4800**



**\*Baud Rate 9600**



**Baud Rate 19,200**



**Baud Rate 38,400**



**Baud Rate 57,600**

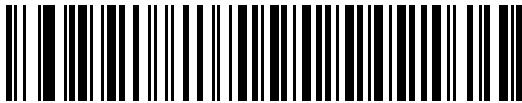


**Baud Rate 115,200**

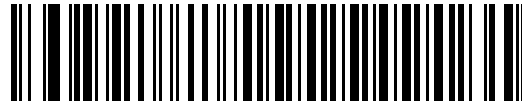
## Parity

A parity check bit is the most significant bit of each ASCII coded character. Scan one of the following barcodes to select the parity type according to host device requirements:

- **Odd** - This sets the parity bit value to 0 or 1, based on data, to ensure that the coded character contains an odd number of 1 bits.
- **Even** - This sets the parity bit value to 0 or 1, based on data, to ensure that the coded character contains an even number of 1 bits.
- **None** - No parity bit is required.



Odd



Even



\*None

## Stop Bits

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. Scan one of the following barcodes to set the number of stop bits (one or two) based on the number the receiving host can accommodate.



\*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.



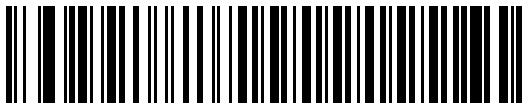
7-bit



\*8-bit

## Check Receive Errors

Scan one of the following barcodes to set whether to check the parity, framing, and overrun of received characters. The parity value of received characters is verified against the value set for [Parity on page 283](#).



\*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 hardware handshaking and software handshaking are both enabled, hardware handshaking takes precedence.



**NOTE:** The DTR signal is jumpered to the active state.

Options:

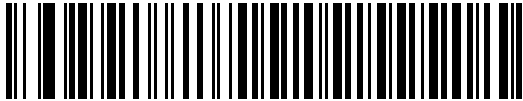
- **None** - This disables hardware handshaking and transmits scan data as it becomes available.
- **Standard RTS/CTS** - This sets standard RTS/CTS hardware handshaking and transmits scanned data according to the following sequence:
  - a. The scanner reads the CTS line for activity:
    - If the CTS line is de-asserted, the scanner asserts the RTS line and waits up to [Host Serial Response Timeout on page 289](#) for the host to assert CTS, and then transmits data when asserted. If, after the timeout, the CTS line is not asserted, the scanner sounds a transmit error and discards the data.
    - If CTS is asserted, the scanner waits up to [Host Serial Response Timeout](#) for the host to de-assert CTS. If after this timeout the CTS line is still asserted, the scanner sounds a transmit error and discards the scanned data.
  - b. The scanner de-asserts RTS after sending the last character of data.
  - c. The host negates CTS. The scanner checks for a de-asserted CTS upon the next data transmission.

During data transmission, if CTS is deasserted for more than 50 ms between characters, the scanner sounds a transmit error and discards the data. The data must be re-scanned.

- **RTS/CTS Option 1** - The scanner asserts RTS before transmitting and ignores the state of CTS. The scanner de-asserts RTS when transmission completes.
- **RTS/CTS Option 2** - RTS is always high or low (user-programmed logic level). However, the scanner waits for the host to assert CTS before transmitting data. If CTS is not asserted within the [Host Serial Response Timeout](#), the scanner sounds a transmit error and discards the data. During data transmission, if CTS is deasserted for more than 50 ms between characters, the scanner sounds a transmit error and discards the data.
- **RTS/CTS Option 3** - This transmits scanned data according to the following sequence:
  - d. The scanner asserts RTS before data transmission, regardless of the state of CTS.
  - e. The scanner waits up to the [Host Serial Response Timeout](#) for the host to assert CTS, and then transmits data when asserted. If, after the timeout, the CTS line is not asserted, the scanner sounds a transmit error and discards the data.
  - f. The scanner de-asserts RTS after sending the last character of data.
  - g. The host negates CTS. The scanner checks for a de-asserted CTS upon the next data transmission.

During data transmission, if CTS is deasserted for more than 50 ms between characters, the scanner sounds a transmit error and discards the data. The data must be re-scanned.

Hardware Handshaking (continued)



\*None



Standard RTS/CTS



RTS/CTS Option 1



RTS/CTS Option 2



RTS/CTS Option 3

## Software Handshaking

This parameter offers control of data transmission in addition to, or instead of, that offered by hardware handshaking. If software handshaking and hardware handshaking are both enabled, hardware handshaking takes precedence.

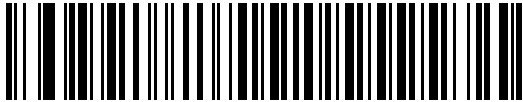
Options:

- **None** - This transmits data immediately. The scanner expects no response from the host.
- **ACK/NAK** - After transmitting data, the scanner waits for an ACK or NAK response from the host. If it receives a NAK, the scanner transmits the data again and waits for an ACK or NAK. After three unsuccessful attempts to send data after receiving NAKs, the scanner sounds a transmit error and discards the data.

The scanner waits up to the programmable [Host Serial Response Timeout](#) to receive an ACK or NAK. If the scanner does not get a response in this time, it sounds a transmit error and discards the data. There are no reattempts.

- **ENQ** - The scanner waits for an ENQ character from the host before transmitting data. If it does not receive an ENQ within the [Host Serial Response Timeout](#), the scanner sounds a transmit error and discards the data. The host must transmit an ENQ character at least every [Host Serial Response Timeout](#) to prevent transmission errors.
- **ACK/NAK with ENQ** - This combines the two previous options. An additional ENQ is not required to re-transmit data due to a NAK from the host.
- **XON/XOFF** - An XOFF character stops data transmission until the scanner receives an XON character. There are two situations for XON/XOFF:
  - The scanner receives an XOFF before it has data to send. When the scanner has data, it waits up to the [Host Serial Response Timeout](#) for an XON character before transmitting. If it does not receive the XON within this time, the scanner sounds a transmit error and discards the data.
  - The scanner receives an XOFF during data transmission and stops transmission after sending the current byte. When the scanner receives an XON character, it sends the rest of the data. The scanner waits indefinitely for the XON.

Software Handshaking (continued)



\*None



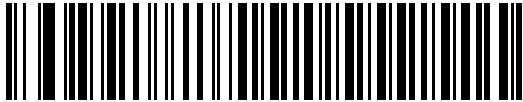
ACK/NAK



ENQ



ACK/NAK with ENQ



XON/XOFF



## Host Serial Response Timeout

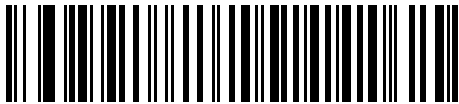
Scan one of the following barcodes to specify how long the scanner waits for an ACK, NAK, or CTS before determining that a transmission error occurred. This only applies when in one of the ACK/NAK software handshaking modes, or RTS/CTS hardware handshaking mode.



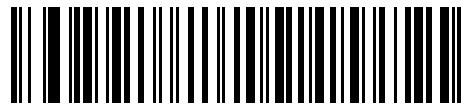
**\*Minimum: 2 Seconds**



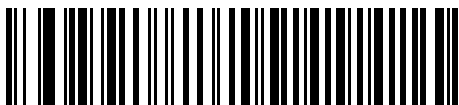
**Low: 2.5 Seconds**



**Medium: 5 Seconds**



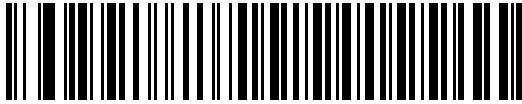
**High: 7.5 Seconds**



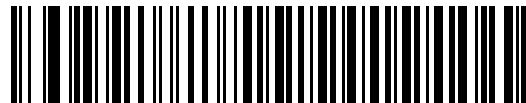
**Maximum: 9.9 Seconds**

## RTS Line State

Scan one of the following barcodes to set the idle state of the serial host RTS line to **Low RTS** or **High RTS**.



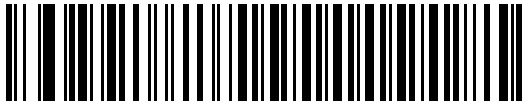
\*Host: Low RTS



Host: High RTS

## Beep on <BEL>

Scan one of the following barcodes to set whether the scanner issues a beep when it detects a <BEL> character on the RS-232 serial line. <BEL> indicates an illegal entry or other important event.



Beep On <BEL> Character  
(Enable)



\*Do Not Beep On <BEL> Character  
(Disable)

## Intercharacter Delay

Scan one of the following barcodes to specify the intercharacter delay inserted between character transmissions.



**\*Minimum: 0 msec**



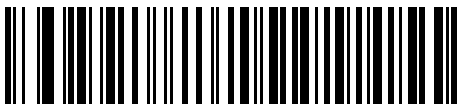
**Low: 25 msec**



**Medium: 50 msec**



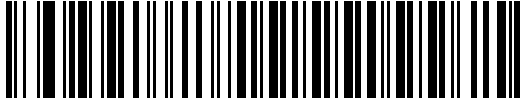
**High: 75 msec**



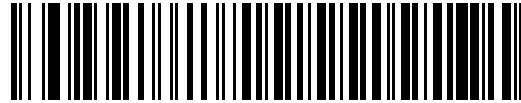
**Maximum: 99 msec**

## Nixdorf Beep/LED Options

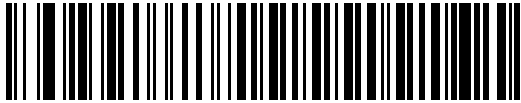
If you selected Nixdorf Mode B, scan one of the following barcodes to indicate when the scanner beeps and turns on its LED after a decode.



**\*Normal Operation**  
(Beep/LED Immediately After Decode)



**Beep/LED After Transmission**

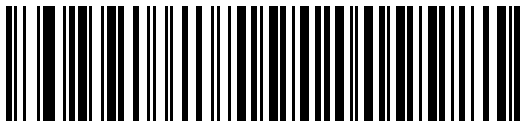


**Beep/LED After CTS Pulse**

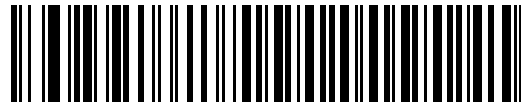
## Barcodes with Unknown Characters

Unknown characters are characters the host does not recognize. Scan **Send Barcodes With Unknown Characters** to send all barcode data except for unknown characters. The scanner issues no error beeps.

Scan **Do Not Send Barcodes With Unknown Characters** to send barcode data up to the first unknown character. The scanner issues an error beep.



**\*Send Barcodes With Unknown Characters**



**Do Not Send Barcodes With Unknown Characters**

---

## ASCII Character Sets

See ASCII Character Set, [Table 30 on page 451](#), for prefix/suffix values

# IBM Interface

---

## Introduction

This chapter describes how to set up the scanner with an IBM 468X/469X host.

The scanner ships with the settings shown in [Table 22 on page 295](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

---

## Setting Parameters

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



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

To return all features to default values, scan [Set Factory Defaults on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



\* Indicates default      \*Enable Parameter      Feature/option

## Scanning Sequence Examples

In most cases scanning one barcode sets the parameter value. For example, to select the Port 9B address, scan the **Hand-held Scanner Emulation (Port 9B)** barcode under [Port Address on page 296](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. See the parameter descriptions for this procedure.

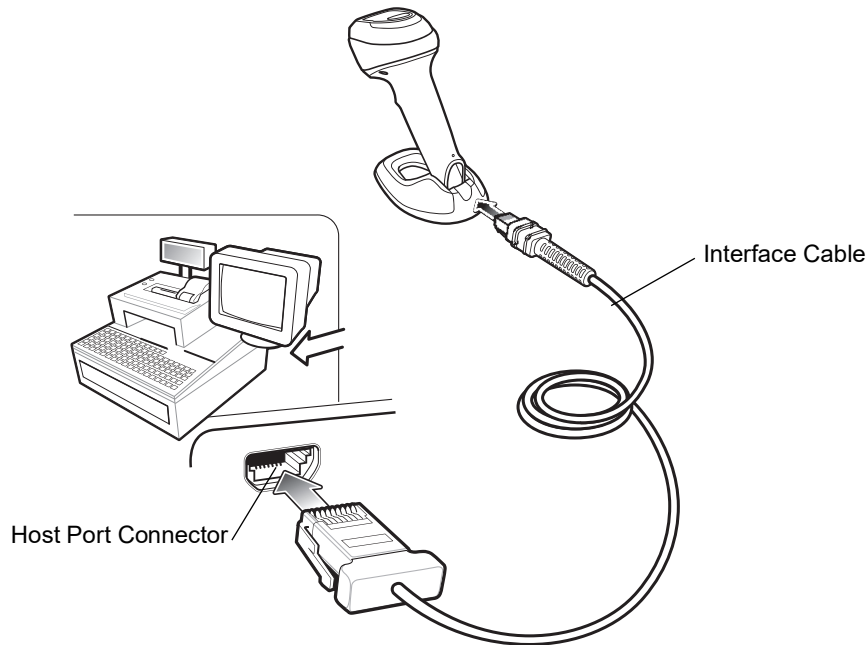
## Errors While Scanning

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

## Connecting an IBM 468X/469X Host

Connect the scanner directly to the host computer.

**Figure 17** IBM Connection



1. Attach the modular connector of the IBM 46XX interface cable to the cable interface port on the scanner. See [Inserting the Interface Cable on page 31](#).



**NOTE:** Interface cables vary depending on configuration. The connectors can be different than those illustrated in [Figure 17](#), but the steps to connect the scanner are the same.

2. Connect the other end of the IBM 46XX interface cable to the appropriate port on the host (typically Port 9).
3. The scanner automatically detects the host interface type, but there is no default setting. Scan the appropriate barcode from [Port Address on page 296](#) to select the port address.
4. To modify any other parameter options, scan the appropriate barcodes in this chapter.



**NOTE:** The only required configuration is the port address. The IBM system typically controls other scanner parameters.

If problems occur with the system, see [Troubleshooting on page 48](#).

## IBM Parameter Defaults

Table 22 lists defaults for IBM host parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 22** IBM 468X/469X Interface Parameter Defaults

| Parameter                              | Default                | Page Number         |
|--|------------------------|---------------------|
| <b>IBM 468X/469X Host Parameters</b>   |                        |                     |
| Port Address                           | None                   | <a href="#">296</a> |
| Convert Unknown to Code 39             | Disable                | <a href="#">297</a> |
| RS-485 Beep Directive                  | Ignore                 | <a href="#">297</a> |
| RS-485 Barcode Configuration Directive | Ignore                 | <a href="#">298</a> |
| IBM-485 Specification Version          | Original Specification | <a href="#">298</a> |

---

## IBM Host Parameters

### Port Address

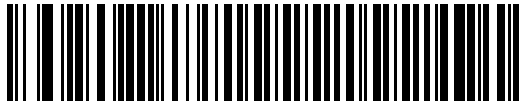
Scan one of the following barcodes to select the IBM 468X/469X port.



**NOTE:** Scanning a Port Address barcode enables the RS-485 interface on the scanner.



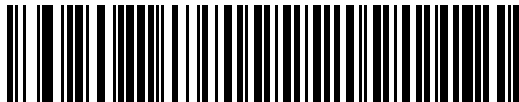
**NOTE:** For a list of supported scanner functionality by communication protocol, see [Communication Protocol Functionality](#).



\*None



Hand-held Scanner Emulation (Port 9B)



Non-IBM Scanner Emulation (Port 5B)

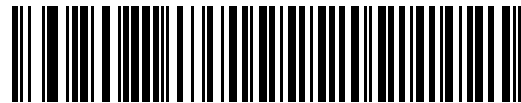


Table-top Scanner Emulation (Port 17)

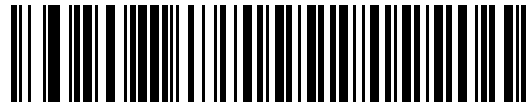


## Convert Unknown to Code 39

Scan one of the following barcodes to enable or disable converting unknown barcode type data to Code 39.



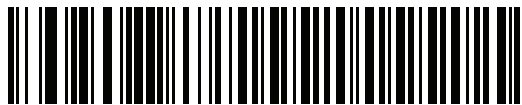
Enable Convert Unknown to Code 39



\*Disable Convert Unknown to Code 39

## RS-485 Beep Directive

The IBM RS-485 host can send a beep 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.



Honor Beep Directive



\*Ignore Beep Directive

## RS-485 Barcode Configuration Directive

The IBM RS-485 host can enable and disable code types. Scan **Ignore Barcode 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.



Honor Barcode Configuration Directive



\*Ignore Barcode Configuration Directive

## IBM-485 Specification Version

### Parameter # 1729 (SSI # F8h 06h C1h)

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

When you scan **Original Specification**, only Symbologies that were historically supported on each individual port are reported as known. When you scan 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)

# Keyboard Wedge Interface

---

## Introduction

This chapter describes how to set up a keyboard wedge interface with the scanner. The scanner connects between the keyboard and host computer and translates barcode data into keystrokes, which the host accepts as if they originated from the keyboard. This mode adds barcode reading functionality to a system designed for manual keyboard input. Keyboard keystrokes are simply passed through.

The scanner ships with the settings shown in [Table 23 on page 301](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

---

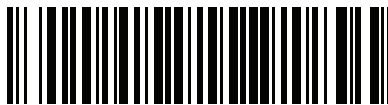
## Setting Parameters

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



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

To return all features to default values, scan a barcode in [Default Parameters on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



\* Indicates default      \*Enable Parameter      Feature/option

## Scanning Sequence Examples

In most cases, scanning one barcode sets the parameter value. For example, to select a medium keystroke delay, scan the **Medium Delay (20 msec)** barcode under [Keystroke Delay on page 303](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

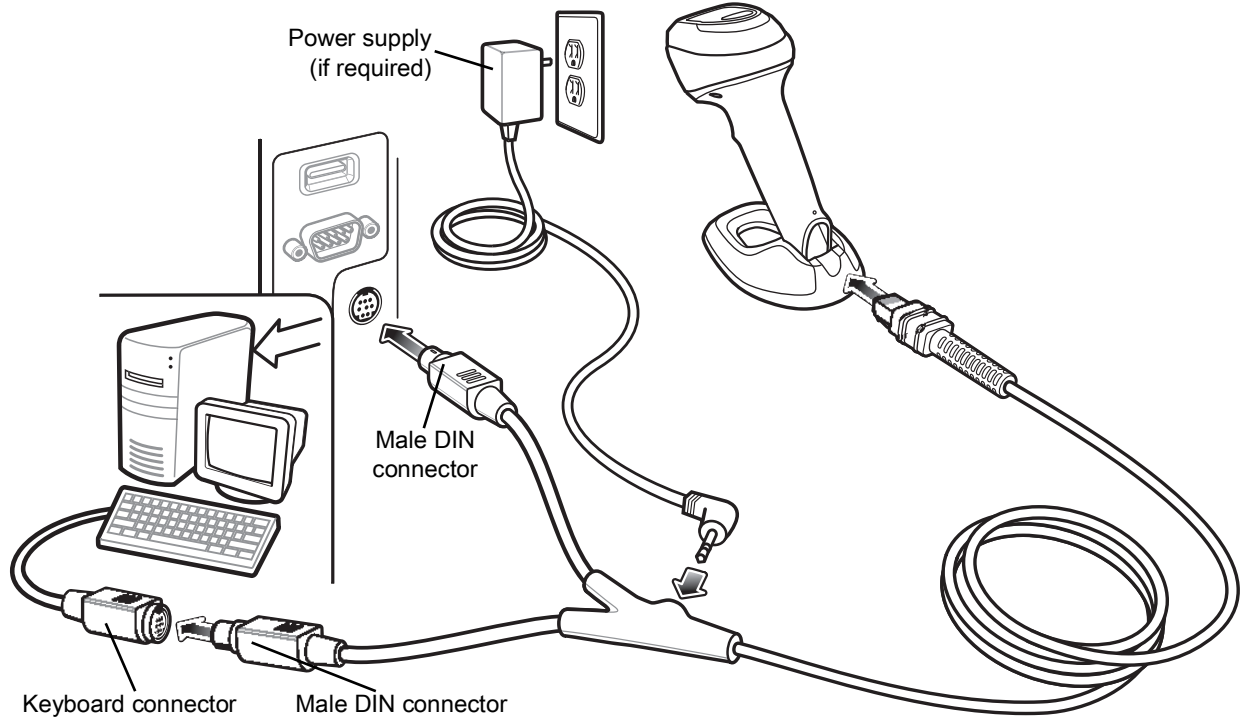
Other parameters require scanning several barcodes. See the parameter descriptions for this procedure.

## Errors While Scanning

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

## Connecting a Keyboard Wedge Interface

Figure 18 Keyboard Wedge Connection



**NOTE:** Interface cables vary depending on configuration. The connectors can be different than those illustrated in Figure 18, but the steps to connect the scanner are the same.

1. Turn off the host and unplug the keyboard connector.
2. Attach the modular connector of the Y-cable to the cable interface port on the scanner. See [Inserting the Interface Cable on page 31](#).
3. Connect the round male DIN host connector of the Y-cable to the keyboard port on the host device.
4. Connect the round female DIN keyboard connector of the Y-cable to the keyboard connector.
5. If required, attach the optional power supply to the connector in the middle of the Y-cable.
6. Ensure that all connections are secure.
7. Turn on the host system.
8. The scanner automatically detects the host interface type and uses the default setting. If the default (\*) does not meet your requirements, scan [IBM PC/AT & IBM PC Compatibles on page 302](#).
9. To modify other parameter options, scan the appropriate barcodes in this guide.

If problems occur with the system, see [Troubleshooting on page 48](#).

## Keyboard Wedge Parameter Defaults

Table 23 lists defaults for keyboard wedge host parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 23** Keyboard Wedge Interface Parameter Defaults

| Parameter                             | Default                               | Page Number         |
|---------------------------------------|---------------------------------------|---------------------|
| <b>Keyboard Wedge Host Parameters</b> |                                       |                     |
| Keyboard Wedge Host Type              | IBM AT Notebook                       | <a href="#">302</a> |
| Barcodes with Unknown Characters      | Send Barcodes with Unknown Characters | <a href="#">302</a> |
| Keystroke Delay                       | No Delay                              | <a href="#">303</a> |
| Intra-keystroke Delay                 | Disable                               | <a href="#">303</a> |
| Alternate Numeric Keypad Emulation    | Enable                                | <a href="#">304</a> |
| Quick Keypad Emulation                | Enable                                | <a href="#">304</a> |
| Simulated Caps Lock                   | Disable                               | <a href="#">305</a> |
| Caps Lock Override                    | Disable                               | <a href="#">305</a> |
| Convert Case                          | Do Not Convert                        | <a href="#">306</a> |
| Function Key Mapping                  | Disable                               | <a href="#">306</a> |
| FN1 Substitution                      | Disable                               | <a href="#">307</a> |
| Send Make and Break                   | Send Make and Break Scan Codes        | <a href="#">307</a> |

---

## Keyboard Wedge Host Parameters

### Keyboard Wedge Host Types

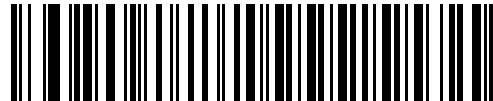
Scan one of the following barcodes to select the keyboard wedge host.



**NOTE:** For a list of supported scanner functionality by communication protocol, see [Communication Protocol Functionality](#).



IBM PC/AT & IBM PC Compatibles

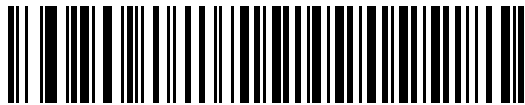


\*IBM AT Notebook

### Barcodes with Unknown Characters

Unknown characters are characters the host does not recognize. Scan **Send Barcodes With Unknown Characters** to send all barcode data except for unknown characters. The scanner issues no error beeps.

Scan **Do Not Send Barcodes With Unknown Characters** to send barcode data up to the first unknown character. The scanner issues an error beep.



\*Send Barcodes with Unknown Characters



Do Not Send Barcodes with Unknown Characters

## Keystroke Delay

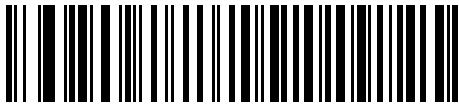
This is the delay in milliseconds between emulated keystrokes. Scan one of the following barcodes to increase the delay when hosts require a slower data transmission.



\*No Delay



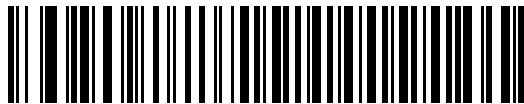
Medium Delay (20 msec)



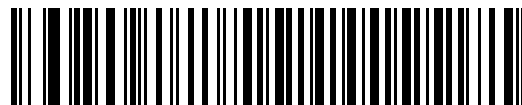
Long Delay (40 msec)

## Intra-keystroke Delay

Scan **Enable Intra-keystroke Delay** to insert an additional delay between each emulated key press and release. This also sets [Keystroke Delay](#) to a minimum of 5 msec.



Enable Intra-keystroke Delay



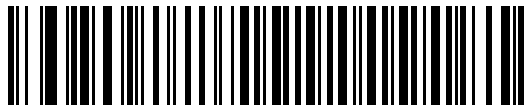
\*Disable Intra-keystroke Delay

## Alternate Numeric Keypad Emulation

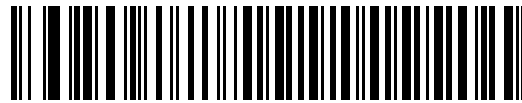
This allows emulation of most other country keyboard types not listed in [Country Codes](#) in a Microsoft® operating system environment.



**NOTE:** If your keyboard type is not listed in the country code list (see [Country Codes](#)), disable [Quick Keypad Emulation on page 304](#) and ensure [Alternate Numeric Keypad Emulation on page 304](#) is enabled.



\*Enable Alternate Numeric Keypad



Disable Alternate Numeric Keypad

## Quick Keypad Emulation

This 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](#) is enabled.



\*Enable Quick Keypad Emulation



Disable Quick Keypad Emulation

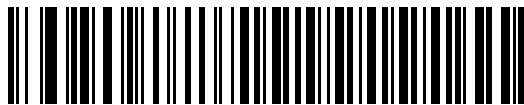


## Simulated Caps Lock

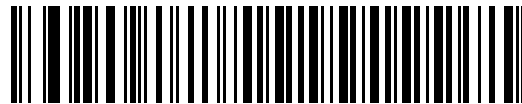
Scan **Enable Caps Lock** to invert upper and lower case characters on the barcode as if the Caps Lock state is enabled on the keyboard. This inversion occurs regardless of the keyboard's Caps Lock state. Note that this only applies to alpha characters.



- NOTES:** - Simulated Caps Lock applies to ASCII characters only.
- Do not enable this parameter if either of the following parameters are enabled:  
[Convert to Upper Case on page 306](#)  
[Convert to Lower Case on page 306](#)



Enable Caps Lock



\*Disable Caps Lock

## Caps Lock Override

Scan **Enable Caps Lock Override** for AT or AT Notebook hosts to preserve the case of the data regardless of the state of the Caps Lock key. Therefore, an 'A' in the barcode transmits as an 'A' regardless of the setting of the keyboard's Caps Lock key.



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



Enable Caps Lock Override



\*Disable Caps Lock Override

## Convert Case

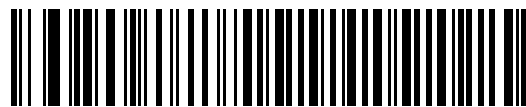
Scan one of the following barcodes to convert all barcode data to the selected case.



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



Convert to Upper Case



Convert to Lower Case



\*Do Not Convert

## Function Key Mapping

ASCII values under 32 are normally sent as control key sequences (see [Table 30 on page 451](#)). Scan **Enable Function Key Mapping** to send the keys in bold in place of the standard key mapping. Table entries that do not have a bold entry remain the same whether or not you enable this parameter.



Enable Function Key Mapping



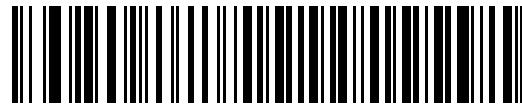
\*Disable Function Key Mapping

## FN1 Substitution

Scan **Enable FN1 Substitution** to replace FN1 characters in an EAN128 barcode with a user-selected keystroke (see [FN1 Substitution Values on page 90](#)).



Enable FN1 Substitution



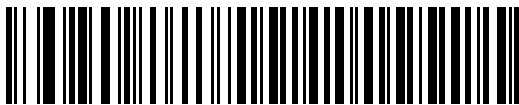
\*Disable FN1 Substitution

## Send Make and Break

Scan **Send Make and Break Scan Codes** to prevent sending the scan codes for releasing a key.



**NOTE:** Windows-based systems must use **Send Make and Break Scan Codes**.



\*Send Make and Break Scan Codes

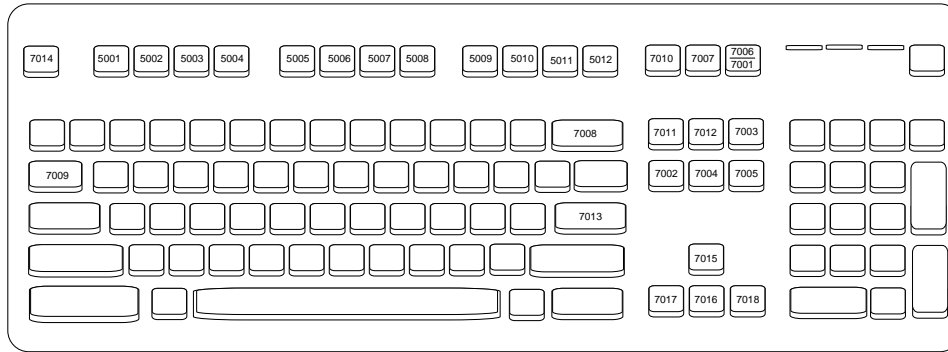


Send Make Scan Code Only

## Keyboard Map

The following keyboard map is a reference for prefix/suffix keystroke parameters. To program the prefix/suffix values, see [Prefix/Suffix Values on page 87](#).

**Figure 19** IBM PS2 Type Keyboard



## ASCII Character Sets

See [ASCII Character Sets](#) for the following information:

- ASCII Character Set, [Table 30 on page 451](#)
- ALT Key Character Set, [Table 31 on page 456](#)
- GUI Key Character Set, [Table 32 on page 457](#)
- PF Key Character Set, [Table 33 on page 458](#)
- F Key Character Set, [Table 34 on page 459](#)
- Numeric Key Character Set, [Table 35 on page 459](#)
- Extended Key Character Set, [Table 36 on page 460](#)

# 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, OCR-B, MICR E13B, and US Currency Serial Number.

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

All OCR fonts are disabled by default. Enabling OCR could slow barcode decoding. You can enable OCR-A and OCR-B at the same time, but not other combined font types.

---

## Setting Parameters

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



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

To return all features to default values, scan the [Set Factory Defaults on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



\* Indicates default — \*Enable Parameter — Feature/option  
(1) — Option value

## Scanning Sequence Examples

In most cases scanning one barcode sets the parameter value. For example, to enable OCR-B, scan the **Enable OCR-B** barcode under [OCR-B on page 313](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. See the 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.

## OCR Parameter Defaults

[Table 24](#) lists the defaults for OCR parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

**Table 24** OCR Programming Default Table

| Parameter                         | Parameter Number | SSI Number | Default               | Page Number         |
|-----------------------------------|------------------|------------|-----------------------|---------------------|
| <b>OCR Programming Parameters</b> |                  |            |                       |                     |
| OCR-A                             | 680              | F1h A8h    | Disable               | <a href="#">311</a> |
| OCR-A Variant                     | 684              | F1h ACh    | OCR-A Full ASCII      | <a href="#">312</a> |
| OCR-B                             | 681              | F1h A9h    | Disable               | <a href="#">313</a> |
| OCR-B Variant                     | 685              | F1h ADh    | OCR-B Full ASCII      | <a href="#">314</a> |
| MICR E13B                         | 682              | F1h AAh    | Disable               | <a href="#">317</a> |
| US Currency Serial Number         | 683              | F1h ABh    | Disable               | <a href="#">318</a> |
| OCR Orientation                   | 687              | F1h AFh    | 0°                    | <a href="#">318</a> |
| OCR Lines                         | 691              | F1h B3h    | 1                     | <a href="#">320</a> |
| OCR Minimum Characters            | 689              | F1h B1h    | 3                     | <a href="#">320</a> |
| OCR Maximum Characters            | 690              | F1h B2h    | 100                   | <a href="#">321</a> |
| OCR Subset                        | 686              | F1h AEh    | Selected font variant | <a href="#">321</a> |
| OCR Quiet Zone                    | 695              | F1h B7h    | 50                    | <a href="#">322</a> |

**Table 24** OCR Programming Default Table (Continued)

| Parameter                  | Parameter Number | SSI Number  | Default      | Page Number         |
|----------------------------|------------------|-------------|--------------|---------------------|
| OCR Template               | 547              | F1h 23h     | 999999999    | <a href="#">322</a> |
| OCR Check Digit Modulus    | 688              | F1h B0h     | 1            | <a href="#">332</a> |
| OCR Check Digit Multiplier | 700              | F1h BCh     | 121212121212 | <a href="#">332</a> |
| OCR Check Digit Validation | 694              | F1h B6h     | None         | <a href="#">333</a> |
| Inverse OCR                | 856              | F2h 58h     | Regular      | <a href="#">339</a> |
| OCR Redundancy             | 1770             | F8h 06h EAh | Level 1      | <a href="#">340</a> |

## OCR Programming Parameters

### OCR-A

**Parameter # 680**

**SSI # F1h A8h**

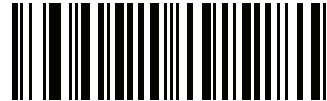


**NOTE:** OCR is not as secure as a barcode. To decrease OCR misdecodes and speed OCR reading, set an accurate OCR template and character subset, and use a check digit. See [OCR Subset on page 321](#) and [OCR Template on page 322](#).

Scan one of the following barcodes to enable or disable OCR-A.



**Enable OCR-A  
(1)**



**\*Disable OCR-A  
(0)**

## OCR-A Variant

### Parameter # 684

### SSI # F1 ACh



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

The font variant sets a processing algorithm and default character subset for the given font. To choose a variant, scan one of the following barcodes. Select the most appropriate font variant to optimize 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<> Ψ ϣ ϣ

Special banking characters output as the following representative characters:

- Ψ outputs as f
- ϣ outputs as c
- ϣ outputs as h



\*OCR-A Full ASCII  
(0)



OCR-A Reserved 1  
(1)



### OCR-A Variant (continued)



OCR-A Reserved 2  
(2)



OCR-A Banking  
(3)

### OCR-B

Parameter # 681

SSI # F1h A9h



**NOTE:** OCR is not as secure as a barcode. 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 321](#) and [OCR Template on page 322](#).

Scan one of the following barcodes to enable or disable OCR-B.



Enable OCR-B  
(1)



\*Disable OCR-B  
(0)

## OCR-B Variant

### Parameter # 685

### SSI # F1h ADh



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

OCR-B has the following variants. Select the most appropriate font variant to optimize 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.

Scanning any ISBN Book Number automatically applies the appropriate ISBN checksum.

To choose a variant, scan one of the barcodes below. Selecting the following OCR-B variants automatically sets the appropriate [OCR Lines on page 320](#). These five variants invoke extensive special algorithms and checking for that particular document type:

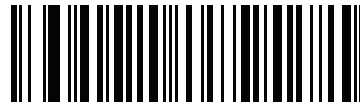
| Variant      | OCR Lines Setting |
|--------------|-------------------|
| Passport     | 2                 |
| TD1 ID Cards | 3                 |
| TD2 ID Cards | 2                 |
| Visa Type A  | 2                 |
| Visa Type B  | 2                 |



**NOTE:** When setting one of the variants above with both OCR-A and OCR-B enabled, the scanner reads the specified travel document but does not read OCR-A. When the OCR-B variant is set back to the default (OCR-B Full ASCII), the scanner reads OCR-A.



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



**OCR-B Banking  
(1)**



**OCR-B Limited  
(2)**



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

OCR-B Variant (continued)



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



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



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



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



OCR-B Passport  
(4)



OCR-B Visa Type A  
(9)

OCR-B Variant (continued)



OCR-B Visa Type B  
(10)



OCR-B ICAO Travel Documents  
(11)

MICR E13B

Parameter # 682

SSI # F1h AAh



**NOTE:** OCR is not as secure as a barcode. 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 321](#) and [OCR Template on page 322](#).

Scan one of the following barcodes to enable or disable MICR E13B.

MICR E 13B uses the following characters:



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

- ▣ outputs as t
- ▤ outputs as a
- ▥ outputs as o
- ▦ outputs as d



Enable MICR E13B  
(1)



\*Disable MICR E13B  
(0)

## US Currency Serial Number

Parameter # 683

SSI # F1h ABh

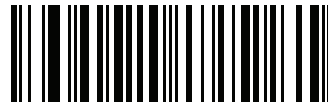
Scan one of the following barcodes to enable or disable US Currency Serial Number.



**NOTE:** OCR is not as secure as a barcode. 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 321](#) and [OCR Template on page 322](#).



Enable US Currency  
(1)



\*Disable US Currency  
(0)

## OCR Orientation

Parameter # 687

SSI # F1h AFh

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

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

Setting an incorrect orientation can cause misdecodes.

## OCR Orientation (continued)



\*OCR Orientation 0°  
(0)



OCR Orientation 270° Clockwise  
(1)



OCR Orientation 180° Clockwise  
(2)



OCR Orientation 90° Clockwise  
(3)



OCR Orientation Omnidirectional  
(4)

## OCR Lines

Parameter # 691

SSI # F1h B3h

To select the number of OCR lines to decode, scan one of the following barcodes. Selecting Visas, TD1, or TD2 ID cards automatically sets the appropriate **OCR Lines**. Also see [OCR-B Variant on page 314](#).



\*OCR 1 Line  
(1)



OCR 2 Lines  
(2)



OCR 3 Lines  
(3)

## OCR Minimum Characters

Parameter # 689

SSI # F1h B1h

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



OCR Minimum Characters



## OCR Maximum Characters

### Parameter # 690

### SSI # F1h B2h

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



OCR Maximum Characters

## OCR Subset

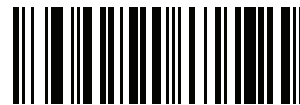
### Parameter # 686

### SSI # F1h AEh

Create 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:

1. Enable the appropriate OCR font(s).
2. Scan the **OCR Subset** barcode.
3. Scan numbers and letters to form the OCR Subset from [Alphanumeric Barcodes](#).
4. Scan [End of Message on page 322](#).



OCR Subset

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

For MICR E13B or US Currency Serial Number, create a subset which includes all allowed characters in that character set, or scan an option from the [Default Parameters on page 59](#) and re-program the scanner.

## OCR Quiet Zone

### Parameter # 695

### SSI # F1h B7h

This option sets the OCR 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 approximately a count of 8 for a character width. For example, if set to 15, then two character widths are an end of line indicator for the parser. Larger end of field numbers require bigger quiet zones at each end of text line.

To set a quiet zone, scan the following barcode, then scan a two-digit number using the numeric keypad in [Numeric Barcodes](#). The range of the quiet zone is 20 - 99 and the default is 50, indicating a six character width quiet zone.



OCR Quiet Zone

## OCR Template

### Parameter # 547

### SSI # F1h 23h

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](#) barcode, and then scan barcodes on the following pages that correspond to numbers and letters to form the template expression. Then scan **End of Message**. The default is 999999999 which accepts OCR strings containing any character.



OCR Template



End of Message

### Required Digit (9)

Only a numeric character is accepted in this position.

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



9

### Required Alpha (A)

Only an alpha character is accepted in this position.

| Template | Valid data | Valid data | Invalid data |
|----------|------------|------------|--------------|
| AAAAA    | ABCDE      | UVWXY      | 12FGH        |



A

### Optional Alphanumeric (1)

An alphanumeric character is accepted in this position if present. Optional characters are not allowed as the first character(s) in a field of like characters.

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



1

### Optional Alpha (2)

An alpha character is accepted in this position if present. Optional characters are not allowed as the first character(s) in a field of like characters.

| Template | Valid data | Valid data | Invalid data |
|----------|------------|------------|--------------|
| AAAA2    | ABCDE      | WXYZ       | ABCD6        |



2

### Alpha or Digit (3)

An alphanumeric character is required in this position to validate the incoming data.

| Template | Valid data | Valid data | Invalid data |
|----------|------------|------------|--------------|
| 33333    | 12ABC      | WXYZ34     | 12AB<        |



3

### Any Including Space & Reject (4)

Any character is accepted in this position, including space and reject. An underscore (\_) represents rejects in the output. This is a good selection for troubleshooting.

| Template | Valid data | Valid data |
|----------|------------|------------|
| 99499    | 12\$34     | 34 98      |



4

**Any except Space & Reject (5)**

Any character is accepted in this position, except a space or reject.

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



5

**Optional Digit (7)**

A numeric character is accepted if present. Optional characters are not allowed as the first character(s) in a field of like characters.

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



7

**Digit or Fill (8)**

Any numeric or fill character is accepted in this position.

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



8

### Alpha or Fill (F)

Any alpha or fill character is accepted in this position.

| Template | Valid data | Valid data | Valid data |
|----------|------------|------------|------------|
| AAAF     | ABCXY      | LMN>>      | ABC<5      |



F

### Optional Space ( )

A space is accepted if present. Optional characters are not allowed as the first character(s) in a field of like characters.

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



Space

### Optional Small Special (.)

A special character is accepted if present. Optional characters are not allowed as the first character(s) in a field of like characters. Small special characters are - , and .

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



.

## Other Template Operators

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

### Literal String (" and +)

Use either of these delimiting characters surrounding characters from the alphanumeric keyboard in [Alphanumeric Barcodes](#) to define a literal string within a template that must be present in scanned OCR data. There are two characters used to delimit required literal strings; if one of the delimiter characters is present in the desired literal string, use the other delimiter.

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



"



+

### New Line (E)

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

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



E

### String Extract (C)

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

CbPe

Where:

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

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

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



**C**

### 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:

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



**D**

### Skip Until (P1)

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

P1ct

Where:

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

P1"s"t

Where:

- P1 is the Skip Until operator
- "s" is one or more literal string characters (see [Literal String \(" and +\) on page 327](#)) that trigger the start of output
- t is one or more template characters



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

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



P



1

### Skip Until Not (P0)

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

`P0ct`

Where:

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

`P0"s"t`

Where:

- P0 is the Skip Until Not operator
- "s" is one or more literal string characters (see [Literal String \(" and +\) on page 327](#)) that trigger the start of output
- t is one or more template characters

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

| Template | Incoming data | Output    |
|----------|---------------|-----------|
| P0A9999  | BP3456        | 3456      |
|          | PN1234        | 1234      |
|          | 5341          | No output |

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



P



0

## Repeat Previous (R)

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

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



R

## Scroll Until Match (S)

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

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



S

## Multiple Templates

This feature sets up multiple templates for OCR decoding. To do this, follow the procedure described in [OCR Template on page 322](#) (scan the [OCR Template](#) barcode, and then barcodes corresponding to numbers and letters to form the template expression, and then **End of Message**) for each template in the multiple template string, using a capital letter **X** as a separator between templates.

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

## Template Examples

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

### Field Definition Description

"M"99977 M followed by three digits and two optional digits.

"X"997777"X" X followed by two digits, four optional digits, and an X.

9959775599 Two digits followed by any character, a digit, two optional digits, any two characters, and two digits.

A55"- "999"- "99 A letter followed by two characters, a dash, three digits, a dash, and two digits.

33A" . "99 Two alphanumeric characters followed by a letter, a period, and two digits.

999992991 Five digits followed by an optional alpha, two digits, and an optional alphanumeric.

"PN98" Literal field - **PN98**

## OCR Check Digit Modulus

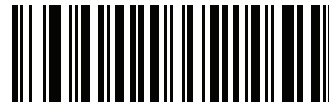
### Parameter # 688

#### SSI # F1h B0h

The check digit is the last digit (in the right-most position) in an OCR string and improves the accuracy of the collected data. This option sets OCR module check digit calculation. The calculation is performed on incoming data to determine this check digit, based on the numeric weight of the alpha and numeric characters. See [OCR Check Digit Multiplier on page 332](#). 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 on page 333](#).

To choose the Check Digit Modulus, such as 10 for Modulus 10, scan the following barcode, and then scan a three-digit number from 001 to 099 representing the check digit using the numeric keypad in [Numeric Barcodes](#). The default is 1.



OCR Check Digit

## OCR Check Digit Multiplier

### Parameter # 700

#### SSI # F1h BCh

This option sets OCR check digit multipliers for character positions. For check digit validation, each character in scanned data has an assigned weight to use in calculating the check digit. The scanner OCR ships with the following weight equivalents:

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

All other characters are equivalent to one (1).

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

121212121212 (default)

123456789A (for ISBN, Product Add Right to Left. See [OCR Check Digit Validation on page 333](#))

For example:

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

ISBN uses Modulus 11 for the 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 barcode, and then scan numbers and letters to form the multiplier string from [Alphanumeric Barcodes](#). Then scan [End of Message on page 322](#).



OCR Check Digit Multiplier

## OCR Check Digit Validation

### Parameter # 694

### SSI # F1h B6h

Use the following options to protect against scanning errors by applying a check digit validation scheme.

#### None

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



\*No Check Digit  
(0)

### Product Add Left to Right

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 332](#)). Each digit representing a character in the scanned data is multiplied by its corresponding digit in the multiplier, and the sum of these products is computed. The check digit passes if this sum modulo Check Digit Modulus is zero.

Example:

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

Check digit multiplier string is 123456

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

The Check Digit Modulus is 10. It passes because 90 is divisible by 10 (the remainder is zero).



Product Add Left to Right  
(3)

### Product Add Right to Left

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 332](#)). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of these products is computed. The check digit passes if this sum modulo Check Digit Modulus is zero.

Example:

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

Check digit multiplier string is 123456

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

The Check Digit Modulus is 10. It passes because 60 is divisible by 10 (the remainder is 0).



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

## Digit Add Left to Right

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 332](#)). Each value representing a character in the scanned data is multiplied by its corresponding digit in the multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products is then calculated. The check digit passes if this sum modulo Check Digit Modulus is zero.

Example:

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

Check digit multiplier string is 123456

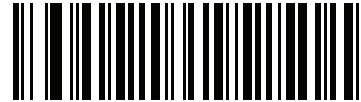
Digit 1 3 2 4 5 6

|            |   |   |   |   |   |   |
|------------|---|---|---|---|---|---|
| Multiplier | 1 | 2 | 3 | 4 | 5 | 6 |
|------------|---|---|---|---|---|---|

Product 1 6 6 16 25 36

Digit add  $1+6+6+1+6+2+5+3+6=36$

The Check Digit Modulus is 12. It passes because 36 is divisible by 12 (the remainder is 0).



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

## Digit Add Right to Left

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 332](#)). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products is then calculated. The check digit passes if this sum modulo Check Digit Modulus is zero.

Example:

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

Check digit multiplier string is 123456

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

The Check Digit Modulus is 10. It passes because 30 is divisible by 10 (the remainder is 0).



Digit Add Right to Left  
(2)

## Product Add Right to Left Simple Remainder

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 332](#)). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of these products **except for the check digit's product** is computed. The check digit passes if this sum modulo Check Digit Modulus is equal to the check digit's product.

Example:

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

Check digit multiplier string is 123456

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



The Check Digit Modulus is 10. It passes because 46 divided by 10 leaves a remainder of 6.



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

### Digit Add Right To Left Simple Remainder

Each character in the scanned data is assigned a numeric value (see [OCR Check Digit Multiplier on page 332](#)). The check digit multiplier is reversed in order. Each value representing a character in the scanned data is multiplied by its corresponding digit in the reversed multiplier, resulting in a product for each character in the scanned data. The sum of each individual digit in all of the products **except for the check digit's product** is then calculated. The check digit passes if this sum modulo Check Digit Modulus is equal to the check digit's product.

Example:

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

Check digit multiplier string is 123456

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

The Check Digit Modulus is 10. It passes because 19 divided by 10 leaves a remainder of 9.



**Digit Add Right to Left Simple Remainder  
(6)**

### Health Industry - HIBCC43

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

Example:

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

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

Divide 145 by 43. The quotient is 3 with a remainder of 16. The check digit is the character corresponding to the value of the remainder (see [Table 25](#)), which in this example is 16, or **G**. The complete Supplier Labeling Data Structure, including the check digit, therefore is:

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

**Table 25** Table of Numeric Value Assignments for Computing HIBC LIC Data Format Check Digit

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



Health Industry - HIBCC43  
(9)

## Inverse OCR

Parameter # 856

SSI # F2h 58h

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** - Decode both regular and inverse OCR strings.



\*Regular Only  
(0)



Inverse Only  
(1)



Autodiscriminate  
(2)

## OCR Redundancy

### Parameter # 1770

### SSI # F8h 06h EAh

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  
(1)



OCR Redundancy Level 2  
(2)



OCR Redundancy Level 3  
(3)

# Intelligent Document Capture (Hand-held Mode Only)

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## Introduction

Intelligent Document Capture (IDC) is Zebra advanced image processing firmware for select imager based scanners. This chapter describes the IDC functionality, provides parameter barcodes to control IDC features, and includes a quick start procedure.

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## The IDC Process

Intelligent Document Capture:

1. Verifies a barcode is appropriate to use as an IDC anchor or link. See [Barcode Acceptance Test on page 341](#).
2. Determines the rectangular region to capture as an image. See [Capture Region Determination on page 342](#).
3. Processes the captured image. See [Image Post Processing on page 343](#).
4. Transmits the data. See [Data Transmission on page 343](#).

## Barcode Acceptance Test

Upon decoding a barcode, the scanner checks that the barcode fits the description of a barcode that anchors or links to an IDC form. To be accepted as an IDC barcode:

- The symbology must be enabled for decode, and also enabled via [IDC Symbology on page 346](#). The IDC firmware allows enabling between zero and eight symbologies simultaneously: Code 128, Code 39, Interleaved 2 of 5, Discrete 2 of 5, Codabar, PDF417, Data Matrix, and EAN-128.
- The decoded data must satisfy the values set in the [IDC Minimum Text Length](#) and [IDC Maximum Text Length](#) parameters. To disable either of these checks, set the value to zero.

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

An IDC barcode is required when [IDC Operating Mode on page 345](#) is set to **Anchored** or **Linked**.

**Free-Form** operating mode does not require a barcode, but transmits decoded data if one is found and satisfies the requirements. If no barcode is decoded, the document capture process starts but may require specifying a non-zero value for the [IDC Delay Time on page 356](#). The scanner must wait for at least this amount of time after trigger pull before capturing a document, unless a barcode is decoded before the time expires.

If [Picklist Mode on page 74](#) is enabled, the barcode must be directly under the aiming pattern and within the scanner's decode range, and the region to capture must be completely within the scanner's field-of-view.

## Capture Region Determination

After accepting an IDC barcode, the firmware establishes the region to capture as an image. The method used depends on the setting of the [IDC Operating Mode](#) as follows.

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

### IDC Operating Mode = Anchored

A coordinate system is built based on the barcode in its rectified (de-skewed) form. The origin is the center of the barcode, and the x-axis is set toward the right, from the barcode's point of view. The unit module width of the barcode is the unit for x. Similarly, the y-axis is set toward the up direction. The unit for the y-axis is specified via the parameter [IDC Aspect on page 349](#). This is the aspect ratio of a thin bar or space - the barcode's height is divided by this value to get this unit. Set [IDC Aspect](#) to zero to automatically calculate the aspect ratio. The barcode can be of different sizes for the same form, as long as the center of the barcode is the same when the barcode's length changes.

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

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

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

The [IDC Maximum Rotation](#) parameter controls the maximum rotation any edge of the form can have in relation to the scanner's horizontal or vertical axis.

### IDC Operating Mode = Free-Form or Linked

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

By default, the scanner captures the largest rectangular region within the field-of-view. To specify a particular border type, use the [IDC Border Type](#) parameter.

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

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

## Image Post Processing

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

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

IDC compresses and transmits the image in one of the standard image formats selected by the [IDC File Format Selector](#), [IDC Bits Per Pixel](#), and [IDC JPEG Quality](#) parameters.

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

## Data Transmission

After processing the captured image, IDC assembles the image with the decoded barcode data (if applicable) into an ISO/IEC 15434 style packet and transmits it to the host. The scanner issues the standard decode beep and the trigger can be released. Be sure to set the [USB Device Type on page 237](#) to **Symbol Native API (SNAPI) with Imaging Interface**.

---

## PC Application and Programming Support

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

---

## Setting Parameters

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

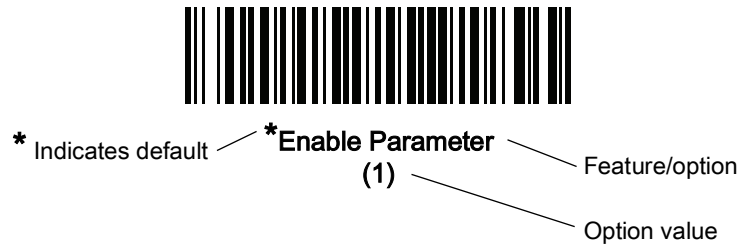
The scanner ships with the settings shown in [Table 26 on page 344](#) (also see [Parameter Defaults](#) for all defaults). If the default values suit requirements, programming is not necessary.

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



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

To return all features to default values, scan the [Set Factory Defaults on page 59](#). Throughout the programming barcode menus, asterisks (\*) indicate default values.



## Scanning Sequence Examples

In most cases scanning one barcode sets the parameter value. For example, to set the document capture file format to BMP, scan the **BMP** barcode under [IDC File Format Selector on page 350](#). The scanner issues a fast warble beep and the LED turns green, signifying a successful parameter entry.

Other parameters require scanning several barcodes. See the 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.

## Image Document Capture Parameter Defaults

[Table 26](#) lists defaults for IDC parameters. Change these values in one of two ways:

- Scan the appropriate barcodes in this chapter. The new value replaces the standard default value in memory. To recall default parameter values, see [Default Parameters on page 59](#).
- Configure the scanner using the 123Scan configuration program. See [123Scan and Software Tools](#).



**NOTE:** See [Parameter Defaults](#) for all user preference, host, symbology, and miscellaneous default parameters.

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

**Table 26** Intelligent Document Capture (IDC) Parameter Defaults

| Parameter  | Parameter Name   | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default | Page Number         |
|--|------------------|-------------------------------|-------------------------|---------|---------------------|
| <b>Intelligent Document Capture (IDC) Parameters</b> |                  |                               |                         |         |                     |
| IDC Operating Mode                                   | DocCap_MODE      | 594                           | F1h 52h                 | Off     | <a href="#">345</a> |
| IDC Symbology  | DocCap_SYMBODOGY | 655                           | F1h 8Fh                 | 001     | <a href="#">346</a> |
| IDC X Coordinate                                     | DocCap_X         | 596                           | F4h F1h 54h             | -151    | <a href="#">347</a> |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.



**Table 26** Intelligent Document Capture (IDC) Parameter Defaults (Continued)

| Parameter                   | Parameter Name   | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default | Page Number         |
|-----------------------------|------------------|-------------------------------|-------------------------|---------|---------------------|
| IDC Y Coordinate            | DocCap_Y         | 597                           | F4h F1h 55h             | -050    | <a href="#">348</a> |
| IDC Width                   | DocCap_WIDTH     | 598                           | F1h 56h                 | 0300    | <a href="#">348</a> |
| IDC Height                  | DocCap_HEIGHT    | 599                           | F1h 57h                 | 0050    | <a href="#">349</a> |
| IDC Aspect                  | DocCap_ASPECT    | 595                           | F1h 53h                 | 000     | <a href="#">349</a> |
| IDC File Format Selector    | DocCap_FMT       | 601                           | F1h 59h                 | JPEG    | <a href="#">350</a> |
| IDC Bits Per Pixel          | DocCap_BPP       | 602                           | F1h 5Ah                 | 8 BPP   | <a href="#">351</a> |
| IDC JPEG Quality            | DocCap_JPEG_Qual | 603                           | F1h 5Bh                 | 065     | <a href="#">351</a> |
| IDC Find Box Outline        | Sig_FINDBOX      | 727                           | F1h D7h                 | Disable | <a href="#">352</a> |
| IDC Minimum Text Length     | DocCap_MIN_TEXT  | 656                           | F1h 90h                 | 00      | <a href="#">352</a> |
| IDC Maximum Text Length     | DocCap_MAX_TEXT  | 657                           | F1h 91h                 | 00      | <a href="#">353</a> |
| IDC Captured Image Brighten | Sig_BRIGHTEN     | 654                           | F1h 8Eh                 | Enable  | <a href="#">353</a> |
| IDC Captured Image Sharpen  | Sig_SHARPEN      | 658                           | F1h 92h                 | Enable  | <a href="#">354</a> |
| IDC Border Type             | DocCap_BORDER    | 829                           | F2h 3Dh                 | None    | <a href="#">355</a> |
| IDC Delay Time              | DocCap_DELAY     | 830                           | F2h 3Eh                 | 000     | <a href="#">356</a> |
| IDC Zoom Limit              | Sig_MIN_PERCENT  | 651                           | F1h 8Bh                 | 000     | <a href="#">356</a> |
| IDC Maximum Rotation        | Sig_MAX_ROT      | 652                           | F1h 8Ch                 | 00      | <a href="#">357</a> |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## IDC Operating Mode

**Parameter Name: DocCap\_MODE**

**Parameter # 594**

**SSI # F1h 52h**

Select the operating mode of the Intelligent Document Capture firmware:

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

- **Linked** - A printed border or page edge defines the image capture region. A barcode is required.

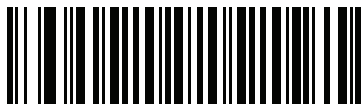
### IDC Operating Mode (continued)



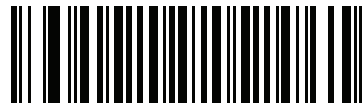
\*Off  
(0)



Anchored  
(1)



Free-Form  
(2)



Linked  
(3)

### IDC Symbology

Parameter Name: DocCap\_SYMBOLOGY

Parameter # 655

SSI # F1h 8Fh

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

Scan the following barcode, and then scan three barcodes from [Numeric Barcodes](#) in the range of 001 to 511 decimal. The default is 001.

**Table 27** IDC Symbologies

| Symbology | Value (Decimal) |
|-----------|-----------------|
| Code 128  | 1               |
| Code 39   | 2               |
| I 2 of 5  | 4               |

**Table 27** IDC Symbologies (Continued)

| Symbology   | Value (Decimal) |
|-------------|-----------------|
| D 2 of 5    | 8               |
| Codabar     | 16              |
| PDF417      | 32              |
| Data Matrix | 64              |
| EAN 128     | 128             |
| Aztec       | 256             |



IDC Symbology

### IDC X Coordinate

Parameter Name: DocCap\_X

Parameter # 596

SSI # F4h F1h 54h

This parameter only applies when [IDC Operating Mode](#) is set to **Anchored**. Specify the horizontal offset to the top left corner of the region to capture relative to the center of the barcode. Negative values move toward the left.

Scan the following barcode, and then scan four barcodes from [Numeric Barcodes](#) in the range of +/- 1279. The default is -151. Note that you must use an application to set a negative value.



IDC X Coordinate

## IDC Y Coordinate

Parameter Name: DocCap\_Y

Parameter # 597

SSI # F4h F1h 55h

This parameter only applies when [IDC Operating Mode](#) is set to **Anchored**. Specify the vertical offset to the top left corner of the region to capture relative to the center of the barcode. Negative values move toward the top.

Scan the following barcode, and then scan four barcodes from [Numeric Barcodes](#) in the range of +/- 1023. The default is -050. Note that you must use an application to set a negative value.



IDC Y Coordinate

## IDC Width

Parameter Name: DocCap\_WIDTH

Parameter # 598

SSI # F1h 56h

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

Scan the following barcode, and then scan four barcodes from [Numeric Barcodes](#) in the range of 0000 to 1279. The default is 0300.



IDC Width

## IDC Height

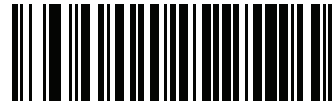
Parameter Name: DocCap\_HEIGHT

Parameter # 599

SSI # F1h 57h

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

Scan the following barcode, and then scan four barcodes from [Numeric Barcodes](#) in the range of 0000 to 1279. The default is 0050.



IDC Height

## IDC Aspect

Parameter Name: DocCap\_ASPECT

Parameter # 595

SSI # F1h 53h

This parameter only applies when [IDC Operating Mode](#) is set to **Anchored**. Specify the barcode's aspect ratio of a thin bar or space. The barcode's height is divided by this value to obtain the unit in the y-axis. Set this parameter to zero to calculate the aspect value automatically.

Scan the following barcode, and then scan three barcodes from [Numeric Barcodes](#) in the range of 000 to 255. The default is 000.



IDC Aspect

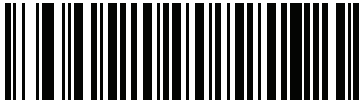
## IDC File Format Selector

Parameter Name: DocCap\_FMT

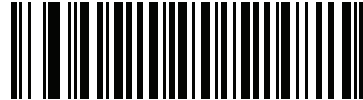
Parameter # 601

SSI # F1h 59h

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



\*JPEG  
(1)



BMP  
(3)



TIFF  
(4)

## IDC Bits Per Pixel

Parameter Name: DocCap\_BPP

Parameter # 602

SSI # F1h 5Ah

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.



1 BPP  
(0)



4 BPP  
(1)



\*8 BPP  
(2)

## IDC JPEG Quality

Parameter Name: DocCap\_JPEG\_Qual

Parameter # 603

SSI # F1h 5Bh

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

Scan the following barcode, and then scan three barcodes from [Numeric Barcodes](#) in the range of 005 to 100 decimal. The default is 065.



IDC JPEG Quality

## IDC Find Box Outline

Parameter Name: Sig\_FINDBOX

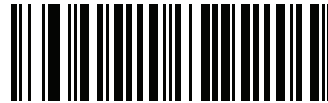
Parameter # 727

SSI # F1h D7h

This parameter only applies when [IDC Operating Mode](#) is set to **Anchored**. Scan **Enable Find Box Outline** to search for a rectangular border during document capture.



Enable Find Box Outline  
(1)



\*Disable Find Box Outline  
(0)

## IDC Minimum Text Length

Parameter Name: DocCap\_MIN\_TEXT

Parameter # 656

SSI # F1h 90h

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

Scan the following barcode, and then scan two barcodes from [Numeric Barcodes](#) in the range of 00 to 55 decimal. The default is 00.



IDC Minimum Text Length



## IDC Maximum Text Length

Parameter Name: DocCap\_MAX\_TEXT

Parameter # 657

SSI # F1h 91h

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

Scan the following barcode, and then scan two barcodes from [Numeric Barcodes](#) in the range of 00 to 55 decimal. The default is 00.



IDC Maximum Text Length

## IDC Captured Image Brighten

Parameter Name: Sig\_BRIGH滕EN

Parameter # 654

SSI # F1h 8Eh

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



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



\*Enable Captured Image Brighten  
(1)



Disable Captured Image Brighten  
(0)

## IDC Captured Image Sharpen

Parameter Name: Sig\_SHARPEN

Parameter # 658

SSI # F1h 92h

Enable this to enhance the sharpness of the image.



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



\*Enable Captured Image Sharpen  
(1)



Disable Captured Image Sharpen  
(0)

## IDC Border Type

Parameter Name: DocCap\_BORDER

Parameter # 829

SSI # F2h 3Dh

This parameter only applies when [IDC Operating Mode](#) is set to **Free-Form** or **Linked**. Select the style of border used to determine the outline of the capture region:

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



\*None  
(0)



Black  
(1)



White  
(2)



Advanced Edge Detection (AED)  
(3)

## IDC Delay Time

Parameter Name: DocCap\_DELAY

Parameter # 830

SSI # F2h 3Eh

This parameter only applies when [IDC Operating Mode](#) is set to **Free-Form**. Set the delay for capturing a document after a trigger pull. Decoding a barcode aborts this delay.

Scan the following barcode, and then scan three barcodes from [Numeric Barcodes](#) in the range of 000 to 200 decimal in units of 10 msec. The default is 000.



IDC Delay Time

## IDC Zoom Limit

Parameter Name: Sig\_MIN\_PERCENT

Parameter # 651

SSI # F1h 8Bh

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

Set this to zero (the default) to disable all checking.

Scan the following barcode, and then scan three barcodes from [Numeric Barcodes](#) in the range of 000 to 100 percent. The default is 000.



IDC Zoom Limit

## IDC Maximum Rotation

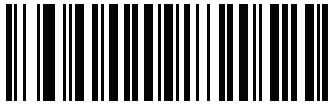
Parameter Name: Sig\_MAX\_ROT

Parameter # 652

SSI # F1h 8Ch

This parameter only applies when [IDC Operating Mode](#) is set to **Anchored**. Set the maximum rotation any edge of the form can have in relation to the scanner's horizontal or vertical axis for it to be considered for capture. Set this to zero (the default) to disable all checking.

Scan the following barcode, and then scan two barcodes from [Numeric Barcodes](#) in the range of 00 to 45 decimal. The default is 00.



IDC Maximum Rotation

---

## Quick Start

This section familiarizes you with some of the Intelligent Document Capture features. [IDC Demonstrations on page 359](#) includes instructions to demonstrate the Anchored, Free-Form, and Linked modes using a sample form to provide an understanding of how to use IDC. These examples do not illustrate all capabilities of the advanced IDC firmware. Build upon these using different parameter settings and forms.

### Sample IDC Setup

To set up IDC:

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



**Set Defaults**



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

3. Start the sample application and select the scanner in the **SNAPI Scanners** drop-down menu.
4. Set parameters as specified in [IDC Demonstrations on page 359](#) using the sample application or by scanning parameter barcodes in this guide. The barcode in the sample form is Code 128, which is enabled by default for decoding and as a Document Capture symbology. You can change these settings for your IDC application.
5. Perform each demo. When scanning, aim the scanner at the barcode in the center of the rectangle. Pull the scanner back so the rectangle is fully contained in the aiming pattern. When you pull the trigger, the scanner emits a low tone to indicate that the IDC firmware identified and captured an image, then a decode beep to indicate that the data transmitted. There may be several seconds between the two beeps, depending on the size of the captured image and options selected (de-skew, brighten, etc). You can move the scanner after the first beep, but continue to hold the trigger or the scanner may end the session before sending the data.

## IDC Demonstrations

### Anchored Mode Demo

- Set [IDC Operating Mode on page 345](#) to **Anchored**.
- Set parameters to these values:
  - Set [IDC Height on page 349](#) to **100**.
  - Set [IDC Width on page 348](#) to **90**.
  - Set [IDC X Coordinate on page 347](#) to **-175**.
  - Set [IDC Y Coordinate on page 348](#) to **-50**.
- Pull the trigger. The scanner decodes the barcode and captures an image of the text scroll.
- Rotate the form clockwise so the word **Capture** is along the bottom edge, and pull the trigger. The scanner decodes the barcode and captures the same image, including orientation. (This example also works with the form rotated counter-clockwise or upside down).
- Modify the values for height, width, x, and y. Pull the trigger. The captured area changes in size and location.
- Cover the barcode with a small piece of paper (or your finger) and pull the trigger. The scanner does not decode the barcode or capture an image.

### What This Demonstrates

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

### Free-Form Mode Demo

- Set [IDC Operating Mode on page 345](#) to **Free-Form**.
- Pull the trigger. The scanner decodes the barcode and captures an image of the entire rectangle, including the contents.
- Modify the values for height, width, x, and y. Pull the trigger. Note that the captured image is not affected.
- Rotate the form clockwise so the word **Capture** is along the bottom edge, and pull the trigger. The scanner decodes the barcode and captures the same image, including orientation. (This example also works with the form rotated counterclockwise or upside down).
- Cover the barcode with a small piece of paper and pull the trigger. The scanner does not decode the barcode and does not re-orient the captured image to the normal position, i.e., with the logo in the upper-left corner.

### What This Demonstrates

Free-Form mode captures an image where a rectangular border on the page determines the size and position. It adjusts the image to the upright orientation if a barcode is found and decoded in the image.

### Linked Mode Demo

Set [IDC Operating Mode on page 345](#) to **Linked**.

Use the examples from the [Free-Form Mode Demo](#), noting that the last item (covering the barcode) does not decode the barcode or capture an image.

### What This Demonstrates

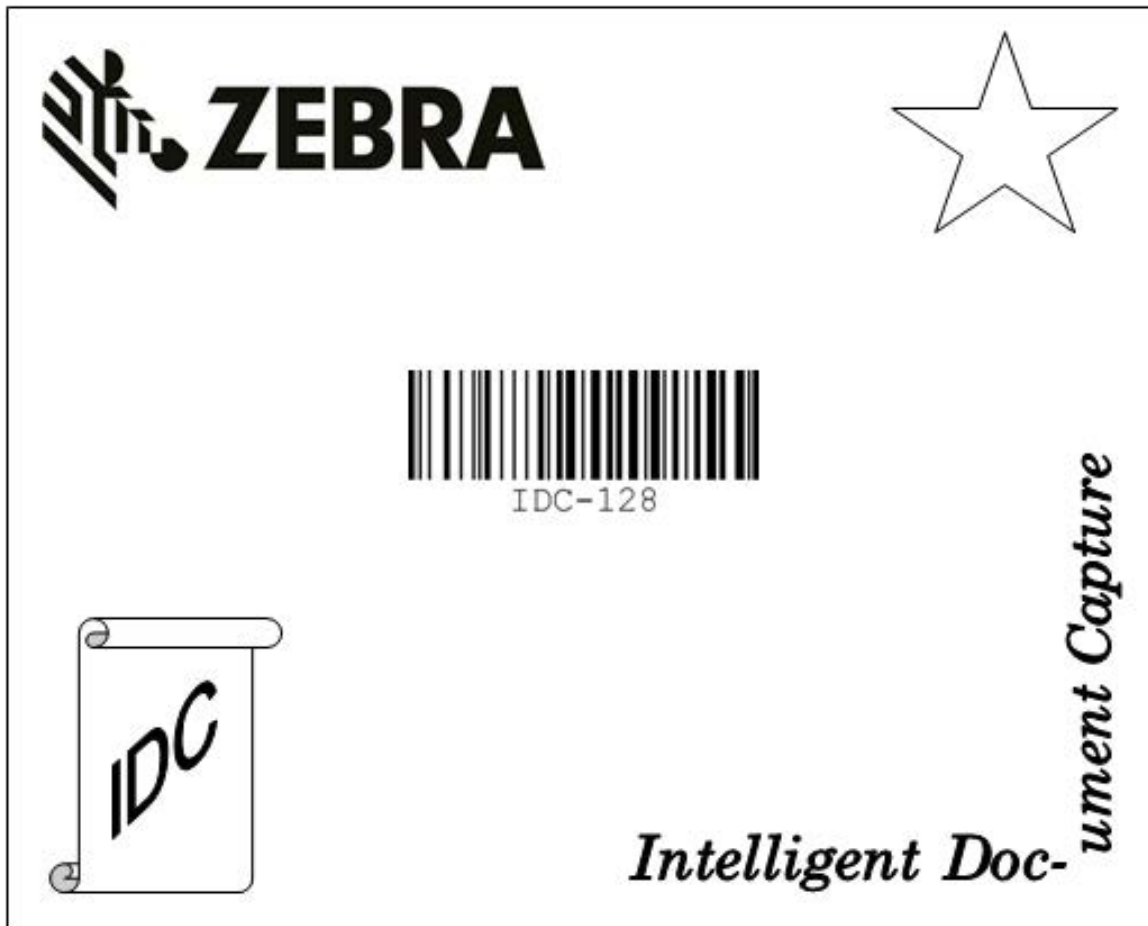
Linked mode captures an image where a rectangular border on the page determines the size and position. The IDC firmware requires that a barcode is present in order to capture an image. It decodes the barcode and uses it to adjust the image to the upright orientation.

### Other Suggestions

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

### Quick Start Form

Figure 20 Quick Start Form





# Digimarc

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## Introduction

Digimarc Barcode is a machine-readable code that is invisible to people.



**NOTE:** SR and DL models support Digimarc.  
HD and HL (HD focus with DL parsing) models do not support Digimarc.

---

## Digimarc Symbology Selection

Digimarc codes are reported as UPC-A, UPC-E, EAN-13 or GS1 DataBar Expanded.



**NOTE:** Conversion of the Digimarc reported code types to other barcode types is not supported.

AIM and Symbol code IDs are supported for the reported Digimarc code types.

## Picklist

The Digimarc decoder searches configured block areas of the image for Digimarc codes. The Digimarc decoder works the same whether or not Picklist is enabled or disabled.



**NOTE:** Decode time could be greater given the extra processing done by system and decoder when in Picklist mode.

---

## Digimarc Digital Watermarks

Parameter # 1687

SSI # F8h 06h 97h

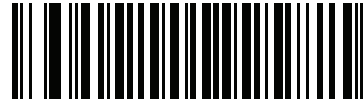
To enable or disable the Digimarc Digital Watermarks code scan the appropriate barcode below.



Enabling Digimarc Digital Watermarks/DW increases decode times slightly. Increasing the [Timeout Between Decodes, Same Symbol on page 77](#) may be required to avoid double decodes.



Enable Digimarc Digital Watermarks/DW  
(1)



\*Disable Digimarc Digital Watermarks/DW  
(0)

# Data Formatting: ADF, MDF, Preferred Symbol

---

## Introduction

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

---

## Advanced Data Formatting (ADF)

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

For a video on Creating an Advanced Data Formatting (ADF) Rule using 123Scan, go to: [zebra.com/ScannerHowToVideos](https://zebra.com/ScannerHowToVideos).

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

---

## Multicode Data Formatting (Hand-held Mode Only)

Multicode Data Formatting (MDF) enables a 2D scanner to scan all barcodes on a label with a single trigger pull, and then modify and transmit the data to meet host application requirements. MDF supports programming up to nine unique labels into one scanner. MDF also supports scanning multiple barcodes on opposite sides of a box by holding the trigger.

MDF options include:

- Output all or specific barcodes.
- Control the barcode output sequence.
- Apply unique multicode data formatting (MDF) to each output barcode.
- Discard scanned data if all required barcodes are not present.

## Programming a Scanner

- Using 123Scan, programming an MDF is similar to programming an ADF rule. MDF programming is saved in a 123Scan configuration file.
- MDF can be deployed to a fleet of 2D scanners using the Scanner Management Service (SMS) through a traditional SMS package.

For more information, refer to the Multicode Data Formatting and Preferred Symbol User Guide, p/n MN-002895-xx.

For a video on Creating an Multicode Data Formatting (MDF) Rule using 123Scan, go to: [zebra.com/ScannerHowToVideos](http://zebra.com/ScannerHowToVideos).

## MDF in Hands-Free Mode

MDF in a hands-free scanning mode may yield multiple unexpected and undesired outputs when a label (most likely on a complex label) passes through the scanner's field of view. This problem happens when the complex label's barcodes can be matched by more than one group (for example, Group 1 represents all barcodes present and Group 2 represent some barcodes present).

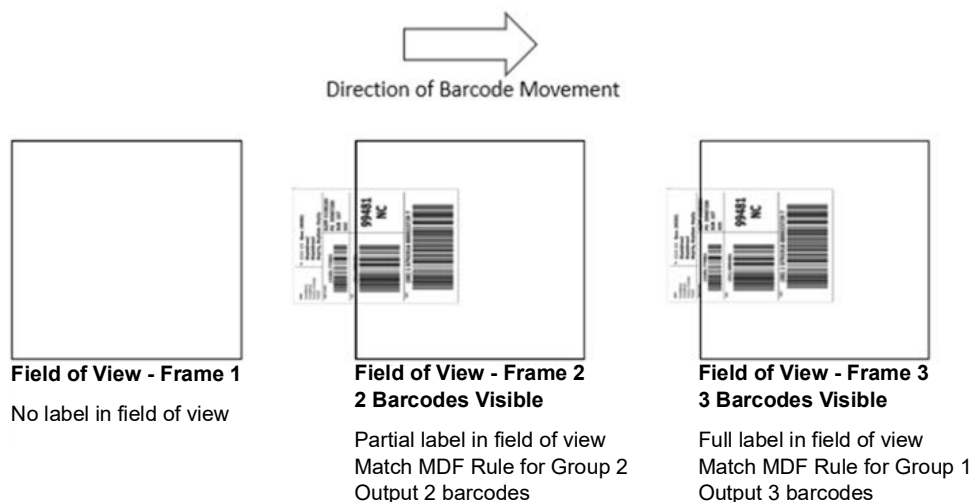


**NOTE:** A similar problem can also occur in the hand-held trigger mode. If multiple MDF rules/groups exist and all the label is not in the field of view when pressing the trigger, the output may vary depending on which MDF rules/groups match.

The problem is demonstrated in [Figure 21](#) and as follows:

1. As the label is moving through the field of view, it is first partially read (some of the barcodes in the field of view in Frame 2).
2. Then, the second decode occurs as it is fully read (all the barcodes in the field of view in Frame 3).
3. This yields two different outputs (instead of the expected single output) from the presentation of a label. This problem is driven by a complex label inadvertently matching two different MDF rules/groups, thereby yielding two outputs.

**Figure 21** Scanning Label in a Horizontal Orientation



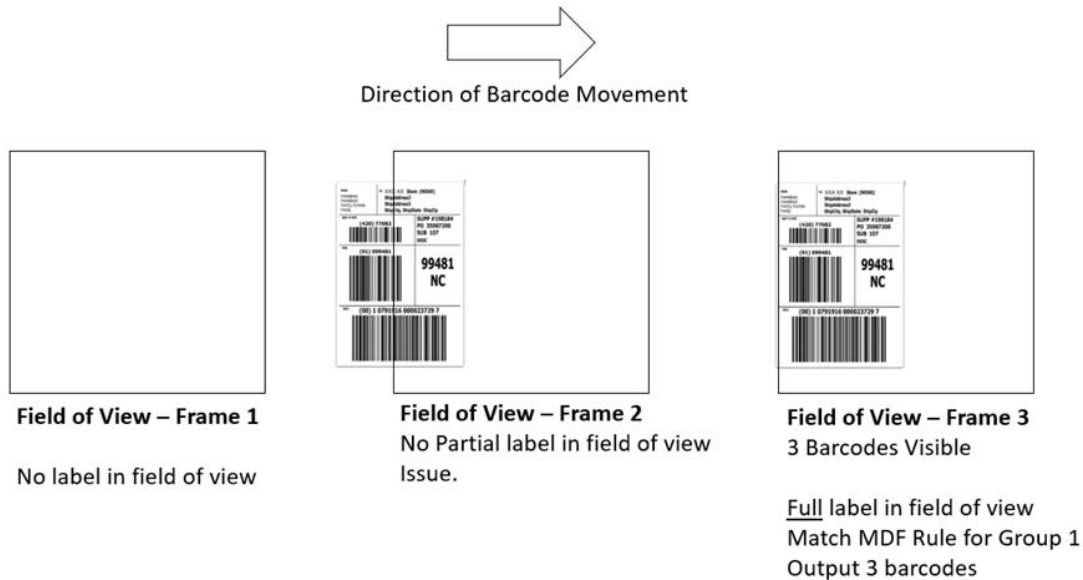
**NOTE:** To minimize issues associated with MDF hands-free mode, see [MDF Best Practices on page 365](#).

## MDF Best Practices

Suggestions to minimize the undesired multiple outputs during the MDF scanning in hands-free mode are as follows:

- Scan barcodes in a vertical orientation (see [Figure 22](#)).

**Figure 22** Scanning Label in a Vertical Orientation



- When creating the MDF programming with multiple groups, the Group 1's pattern match should be the most complicated (hardest to match), which equals to the most number of barcodes and criteria. Then Group 2, 3, and so on should be progressively matched more easily.
- When defining criteria, avoid enabling an output when the pattern is not matched. Set **Output if NO pattern match set** as **Discard bar code** (see [Figure 23](#)).

**Figure 23** Figure Match Setting for Output

**Pattern Match**

A pattern match is the criteria used to determine if a set of scanned bar codes qualify for manipulation with Multicode Data Formatting.  
 If the pattern match criteria are met, the MDF will be applied to the output of "Output if pattern match".  
 If the pattern match criteria are not met, the MDF will be applied to the output of "Output if NO pattern match".

Is bar code required for pattern match [What is this?](#)

Required for match  
 Not part of match

Output if pattern match.

[What is this?](#)

Output if NO pattern match.

[What is this?](#)

Discard bar code

- Select **Discard barcode(s) NOT within the pattern match** in the 123Scan MDF setting. For more details, select **What is this?** located next to this selection.

Discard scanned bar code(s) NOT within pattern match [What is this?](#)

- To prevent double decodes of the same symbol, increase the **Timeout Between Same Symbols** setting. See [Timeout Between Decodes, Same Symbol on page 77](#) for more details.
- Turn the scanner's aimer on to assist operators in scanning the barcode in a more consistent manner.
- Other reasons a label/barcode may not be decoded while in the field of view are as follows:
- The label out of focus (too close or too far away). See [Decode Ranges on page 44](#) for correct working range.
- Specular reflection (reflection off a shiny surface).
- The label is presented at extreme angle to scanner.

---

## Preferred Symbol

Preferred Symbol is a barcode prioritization technique that enables favored decoding of high priority barcode(s). The Preferred Symbol is the only barcode that is decoded and output within the preset Preferred Symbol Timeout. During this time, the scanner attempts to decode the prioritized barcode and reports only this barcode.

For more information, refer to the Multicode Data Formatting and Preferred Symbol User Guide, p/n MN-002895-xx.

To program Preferred Symbol via 123Scan, select 123Scan > Configuration Wizard > Symbologies screen, and then select Preferred Symbol from the drop-down menu. Preferred Symbol programming is saved in the 123Scan configuration file.

---

## Data Parsing (UDI Scan+, Label Parse+ and Blood Bag Parse+)

Data Parsing allows a Zebra scanner to scan a UDI label, GS1 label, or Blood Bags with one or more barcodes encoded with multiple data fields (such as date of manufacture, expiration date, batch number, GTIN, and SSCC) and transmit select data fields and not others, in a specific order to a host application. Simply wave the scanner over all the barcodes while holding the trigger and the scanner takes care of the rest.

The scanner finds and transmits only the required data fields, even if they are spread across multiple barcodes and on different sides of the container. In addition, the scanner can insert field separators (such as tab, enter, and slash) to automate data entry into a host application.

Programming your scanner is easy using 123Scan's intuitive drag and drop interface. For more information on writing a Data Parsing Rule, refer to the Data Parsing (UDI, GS1 Label, Blood Bag) on Zebra Scanners User Guide available at: [zebra.com/support](http://zebra.com/support).

To watch a video on Creating a Data Parsing Rule using 123Scan, go to: [zebra.com/ScannerHowToVideos](http://zebra.com/ScannerHowToVideos).

## Scan a UDI Label using UDI Scan+

Government regulatory agencies<sup>1</sup> establish Unique Device Identification (UDI) standards to identify and monitor the distribution and use of medical devices within healthcare environments. These UDI standards identify medical devices from manufacturing through distribution to patient use - enabling complete traceability of the millions of individual medical devices utilized for patient care. To enable UDI compliance, all medical devices must carry a UDI label to enable “track and trace” from the point of production, during shipment, through the product’s use and disposal.



**NOTE:** <sup>1</sup> United States Food and Drug Administration (FDA), European Commission, International Medical Device Regulatory Forum.

## Scan a GS1 Label using Label Parse+

The GS1 Organization, an international standards body, has released specifications used worldwide for generating shipping labels. These labels are used when shipping packages (logistics), raw materials and produce.

## Scan a Blood Bag Label using Blood Bag Parse+

The ICCBBA Organization, an international standards body, has released a specification used worldwide for generating blood bag labels. These labels are used when shipping, storing and using blood bags. For more information, go to: [icbba.org/tech-library/icbba-documents/standards-documents/standard-labeling-blood2](http://icbba.org/tech-library/icbba-documents/standards-documents/standard-labeling-blood2).

# Driver's License Set Up (DS9908-DL/HL)

## Introduction

The scanner uses internally embedded algorithms to parse out barcode information from standard US driver's licenses and certain other American Association of Motor Vehicle Administrators (AAMVA) compliant ID cards. Scanning these barcodes produces formatted data for use in age verification, credit card application information, and more.

This chapter describes how to program the scanner to read and use the data contained in the 2D barcodes on US driver's licenses and AAMVA compliant ID cards.

**Table 28** DL Parsing Parameter Table

| Parameter                                     | Default                     | Page Number         |
|---|-----------------------------|---------------------|
| <b>DL Parsing Parameters</b>                  |                             |                     |
| Driver's License Parsing                      | No Driver's License Parsing | <a href="#">369</a> |
| Parsing Driver's License Data Fields          | N/A                         | <a href="#">370</a> |
| Driver's License Parse Field Barcodes         | N/A                         | <a href="#">371</a> |
| AAMVA Parse Field Barcodes                    | N/A                         | <a href="#">373</a> |
| Parser Version ID Barcode                     | N/A                         | <a href="#">382</a> |
| Set Default Parameter                         | N/A                         | <a href="#">383</a> |
| Output Gender as M or F                       | N/A                         | <a href="#">383</a> |
| Date Format                                   | CCYYMMDD                    | <a href="#">384</a> |
| No Separator                                  | N/A                         | <a href="#">385</a> |
| Send Keystroke                                | N/A                         | <a href="#">386</a> |
| Control Characters                            |                             | <a href="#">386</a> |
| Keyboard Characters                           |                             | <a href="#">390</a> |
| Parsing Rule Example                          | N/A                         | <a href="#">404</a> |
| Embedded Driver's License Parsing ADF Example | N/A                         | <a href="#">408</a> |



---

## Driver's License Parsing

### Parameter # 645

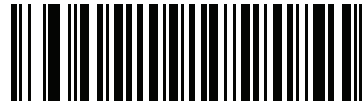
### SSI # F1 85

To enable driver's license parsing on the scanner, scan the **Embedded Driver's License Parsing** barcode. This does not require Zebra software (.DLL).

Scan the barcodes on the following pages in the order indicating the sequence of data fields that the scanner outputs. See [Parsing Driver's License Data Fields \(Embedded Driver's License Parsing\) on page 370](#) for more information.



**\*No Driver's License Parsing**



**Embedded Driver's License Parsing**

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

To program a parsing rule:

1. Scan [Begin New Driver's License Parse Rule on page 371](#).
2. Scan any of the field barcodes on the following pages, or [Send Keystroke \(Control Characters and Keyboard Characters\) on page 386](#).
3. After entering the entire rule, scan [Save Driver's License Parse Rule on page 371](#) to save the rule.



**NOTE:** The scanner stores only one driver's license parsing rule in memory at a time. Saving a new rule replaces the prior rule.

To abort the programming sequence at any time during programming, scan [Quit Entering Driver's License Rule on page 371](#). Any previously saved rule is retained.

To erase a saved rule, scan [Erase Driver's License Parse Rules on page 371](#).

## Embedded Driver's License Parsing Criteria - Code Type

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



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

See [Embedded Driver's License Parsing ADF Example on page 408](#) for a sample ADF rule using this code type criterion.

## Driver's License Parse Field Barcodes



**Begin New Driver's License Parse Rule**



**Save Driver's License Parse Rule**



**Quit Entering Driver's License Rule**



**Erase Driver's License Parse Rules**

The supported parse fields begin below. Not all IDs present data in the same format. For example, some IDs can have separate fields for first name, last name, and middle initial, while others have a single field with the entire name. Also, some IDs expire on the subject's birth date while the expiration date field only indicates the year. To present data in a consistent format, use the following nine barcodes to return data calculated from the actual data contained in the ID barcode.



**First Name**



**Middle Name/Initial**

Driver's License Parse Field Barcodes (continued)



Last Name



Name Suffix



Name Prefix



Expiration Date



Birth Date



Issue Date



ID Number (Formatted)

### AAMVA Parse Field Barcodes



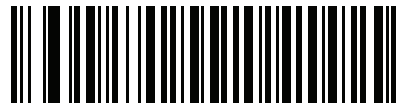
AAMVA Issuer ID



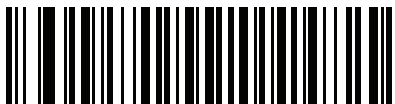
Full Name



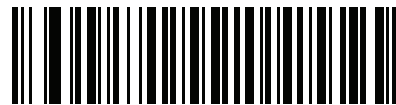
Last Name



First Name



Middle Name / Initial



Name Suffix

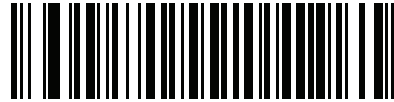


Name Prefix

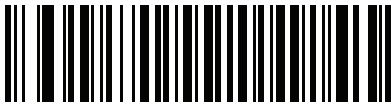
AAMVA Parse Field Barcodes (continued)



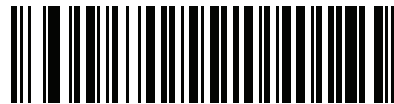
Mailing Address Line 1



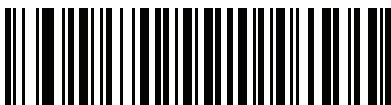
Mailing Address Line 2



Mailing Address City



Mailing Address State



Mailing Address Postal Code



Home Address Line 1



Home Address Line 2

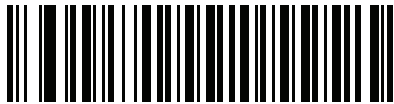
AAMVA Parse Field Barcodes (continued)



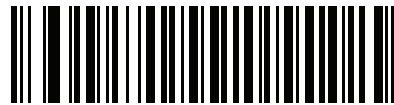
Home Address City



Home Address State



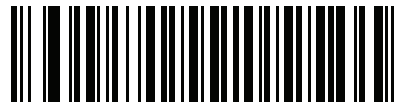
Home Address Postal Code



License ID Number



License Class



License Restrictions



License Endorsements

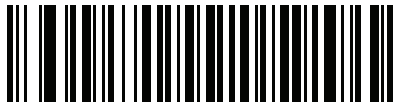
AAMVA Parse Field Barcodes (continued)



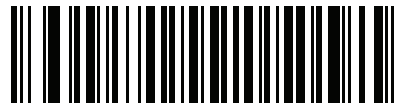
Height (Feet and/or Inches)



Height (Centimeters)



Weight (Pounds)



Weight (Kilograms)



Eye Color



Hair Color



License Expiration Date



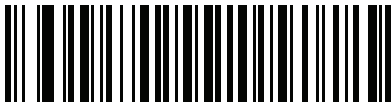
AAMVA Parse Field Barcodes (continued)



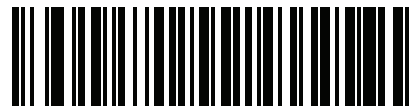
Birth Date



Gender



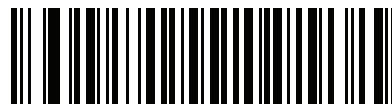
License Issue Date



License Issue State



Social Security Number



Permit Class

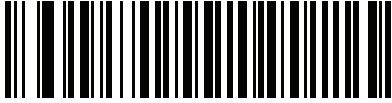


Permit Expiration Date

AAMVA Parse Field Barcodes (continued)



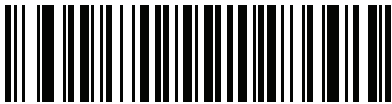
Permit ID Number



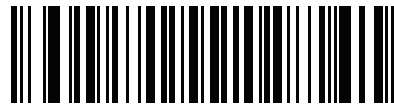
Permit Issue Date



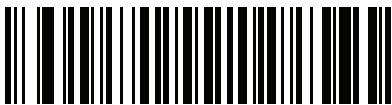
Permit Restrictions



Permit Endorsements



AKA Social Security Name



AKA Full Name

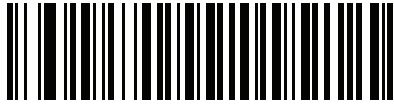


AKA Last Name



AKA First Name

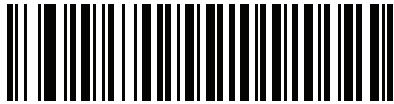
AAMVA Parse Field Barcodes (continued)



AKA Middle Name / Initial



AKA Name Suffix



AKA Name Prefix



AKA Birth Date



Issue Timestamp



Number of Duplicates



Medical Codes

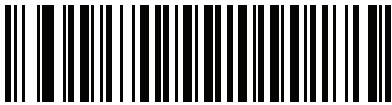
AAMVA Parse Field Barcodes (continued)



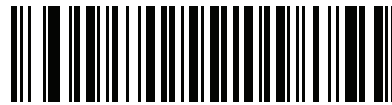
Organ Donor



Nonresident



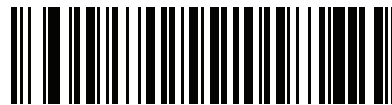
Customer ID



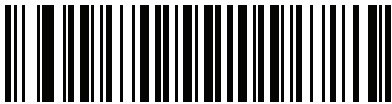
Weight Range



Document Discriminator



Country



Federal Commission Codes

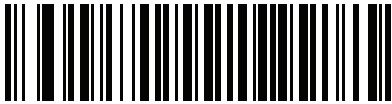
AAMVA Parse Field Barcodes (continued)



Place of Birth



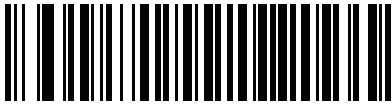
Audit Information



Inventory Control



Race / Ethnicity



Std Vehicle Class



Std Endorsements

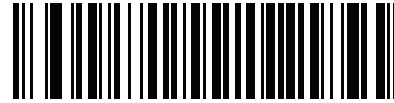


Std Restrictions

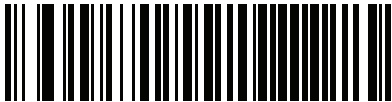
## AAMVA Parse Field Barcodes (continued)



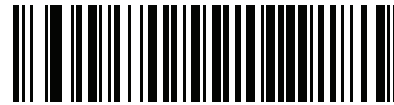
Class Description



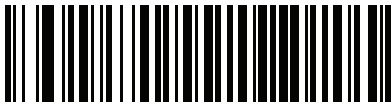
Endorsement Description



Restrictions Description



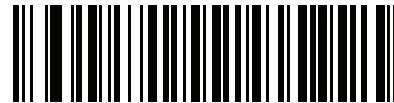
Height in Inches



Height in Centimeters

### Parser Version ID Barcode

Include this field to emit embedded parser software version identification



Parser Version ID

---

## User Preferences

### Set Default Parameter

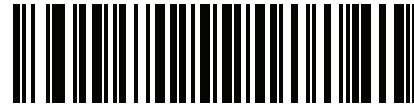
Scan this barcode to return all parameters to the default values listed in [Table 29 on page 417](#).



\*Set All Defaults

### Output Gender as M or F

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



Output gender as M or F

## Date Format

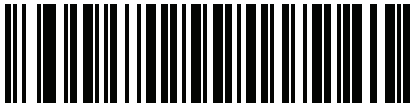
Use these barcodes to select the date format to display. Date fields include the following:

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

The default is **CCYYMMDD**.



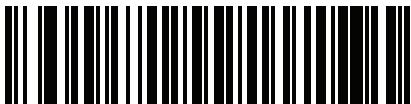
**NOTE:** To specify a date separator, i.e., a character separating each field of the date, scan the **Send <character>** barcode that corresponds to the alphanumeric character to use as the date separator immediately following the date format barcode. To select no date separator, scan the **No Separator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



\*CCYYMMDD



CCYYDDMM



MMDDCCYY



MMCCYYDD



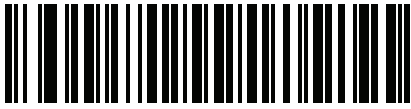
DDMMCCYY



DDCCYYMM



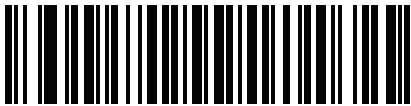
### Date Format (continued)



YYMMDD



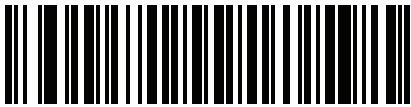
YYDDMM



MMDDYY



MMYYDD



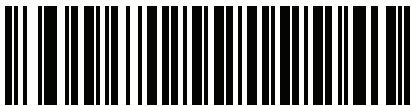
DDMMYY



DDYYMM

### No Separator

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



No Separator

## Send Keystroke (Control Characters and Keyboard Characters)

### Control Characters

Scan a **Send** barcode for the keystroke to send.



Send Control B



Send Control A



Send Control C



Send Control D



Send Control E



Send Control F



Send Control G



Send Control H

Control Characters (continued)



Send Control I



Send Control J



Send Control K



Send Control L



Send Control M



Send Control N



Send Control O



Send Control P

Control Characters (continued)



Send Control Q



Send Control R



Send Control S



Send Control T



Send Control U



Send Control V



Send Control W

Control Characters (continued)



Send Control X



Send Control Y



Send Control Z



Send Control [



Send Control \



Send Control ]

Control Characters (continued)



Send Control 6



Send Control -

Keyboard Characters

Scan a **Send** barcode for the keyboard characters to send.



Send Space



Send !



Keyboard Characters (continued)



Send \$



Send %



Send &



Send '



Send (



Send )



Send \*

Keyboard Characters (continued)



Send +



Send ,



Send -



Send .



Send /



Send 0



Send 1



Keyboard Characters (continued)



Send 2



Send 3



Send 4



Send 5



Send 6



Send 7



Send 8

Keyboard Characters (continued)



Send 9



Send :



Send ;



Send <



Send =



Send >



Send ?

Keyboard Characters (continued)



Send @



Send A



Send B



Send C



Send D



Send E



Send F

Keyboard Characters (continued)



Send G



Send H



Send I



Send J



Send K



Send L



Send M

Keyboard Characters (continued)



Send N



Send O



Send P



Send Q



Send R



Send S



Send T

Keyboard Characters (continued)



Send U



Send V



Send W



Send X



Send Y



Send Z



Send [

Keyboard Characters (continued)



Send \



Send ]



Send ^



Send \_



Send `



Send a



Send b

Keyboard Characters (continued)



Send c



Send d



Send e



Send f



Send g



Send h



Send i



Keyboard Characters (continued)



Send j



Send k



Send l



Send m



Send n



Send o



Send p

Keyboard Characters (continued)



Send q



Send r



Send s



Send t



Send u



Send v



Send w

Keyboard Characters (continued)



Send x



Send y



Send z



Send {



Send |



Send }



Send ~

## Keyboard Characters (continued)



Send Tab Key



Send Enter Key

---

## Parsing Rule Example

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



**NOTE:** This example applies to RS-232. To use this example with a USB interface, enable [Function Key Mapping on page 246](#) to send the **Enter** key properly.

1



Embedded Driver's License Parsing

2



Begin New Driver's License Parse Rule

3



First Name

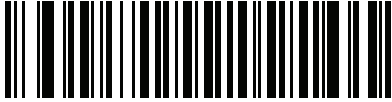
Parsing Rule Example (continued)

4



Send Space

5



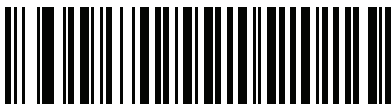
Middle Name / Initial

6



Send Space

7



Last Name

8



Send Enter Key

9



Mailing Address Line 1

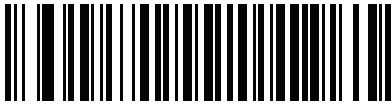
Parsing Rule Example (continued)

10



Send Space

11



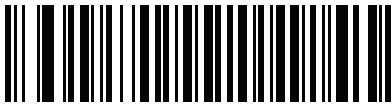
Mailing Address Line 2

12



Send Enter Key

13



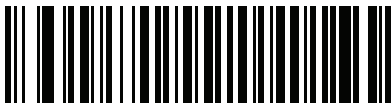
Mailing Address City

14



Send Space

15



Mailing Address State

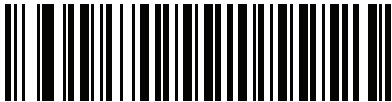
Parsing Rule Example (continued)

16



Send Space

17



Mailing Address Postal Code

18



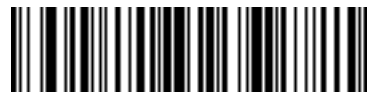
Send Enter Key

19



Birth Date

20



Send Enter Key

21



Save Driver's License Parse Rule

## Embedded Driver's License Parsing ADF Example

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

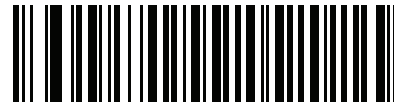
**Last Name, First Name**

**1**



**Begin New Driver's License Parse Rule**

**2**



**Last Name**

**3**



**Send ,**

**4**



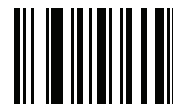
**Send Space**

**5**



**First Name**

**6**



**Save Driver's License Parse Rule**



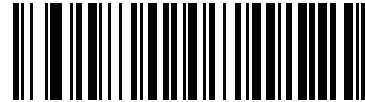
Then, in order to limit the full name to 15 characters, create the following ADF rule:

**1**



**Begin New Rule**

**2**



**Criterion: Parsed Driver's License**

**3**



**Action: Send Next 15 Characters**

**4**



**Save Rule**

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

# Custom Tone

---

## Introduction

The imager supports downloading a custom tone to sound when a good decode occurs. Create the audio tone according to the following specifications:

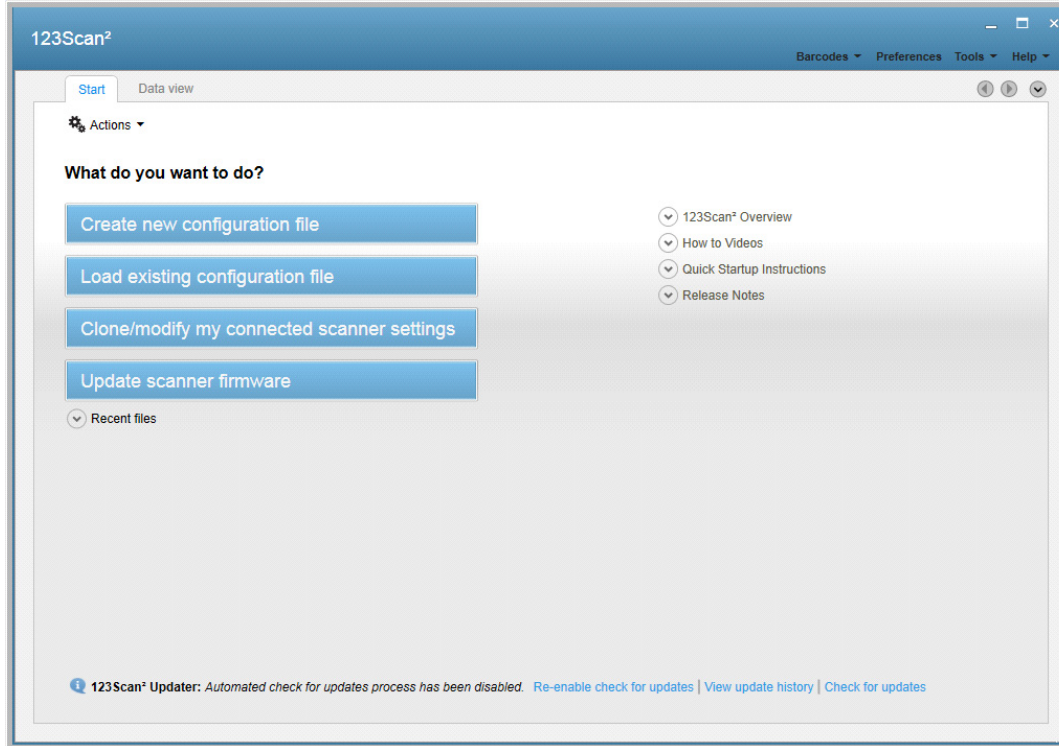
- Use a WAV audio file format; acceptable file extensions are .wav and .wave.
- Encode the audio file at 16 samples per second, i.e., 16 kHz sampling rate.
- Encode the audio file at 16 bits per sample.
- Encode the audio file with a single channel (mono).
- WAVE audio type/format = PCM (Pulse Coded Modulation).
- Ensure the audio file does not exceed 65 kBytes.
- Ensure the audio file name does not exceed 31 bytes.

## Downloading a Custom Tone via 123Scan

Download the custom audio file to the imager using 123Scan. See [123Scan and Software Tools](#) for more information on this utility.

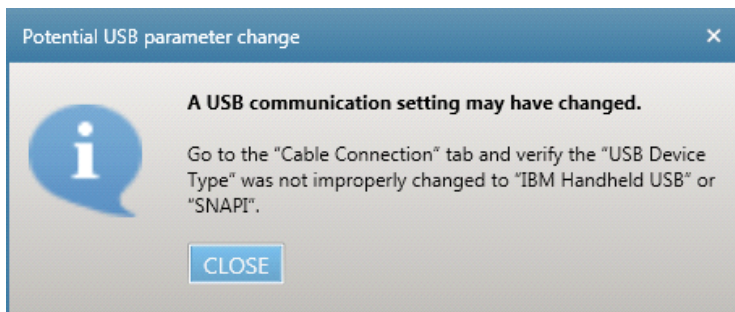
1. Download and install Zebra's 123Scan Scanner Configuration Utility from the support web site: [zebra.com/123Scan](http://zebra.com/123Scan).
2. Open 123Scan.

**Figure 24** 123Scan Utility



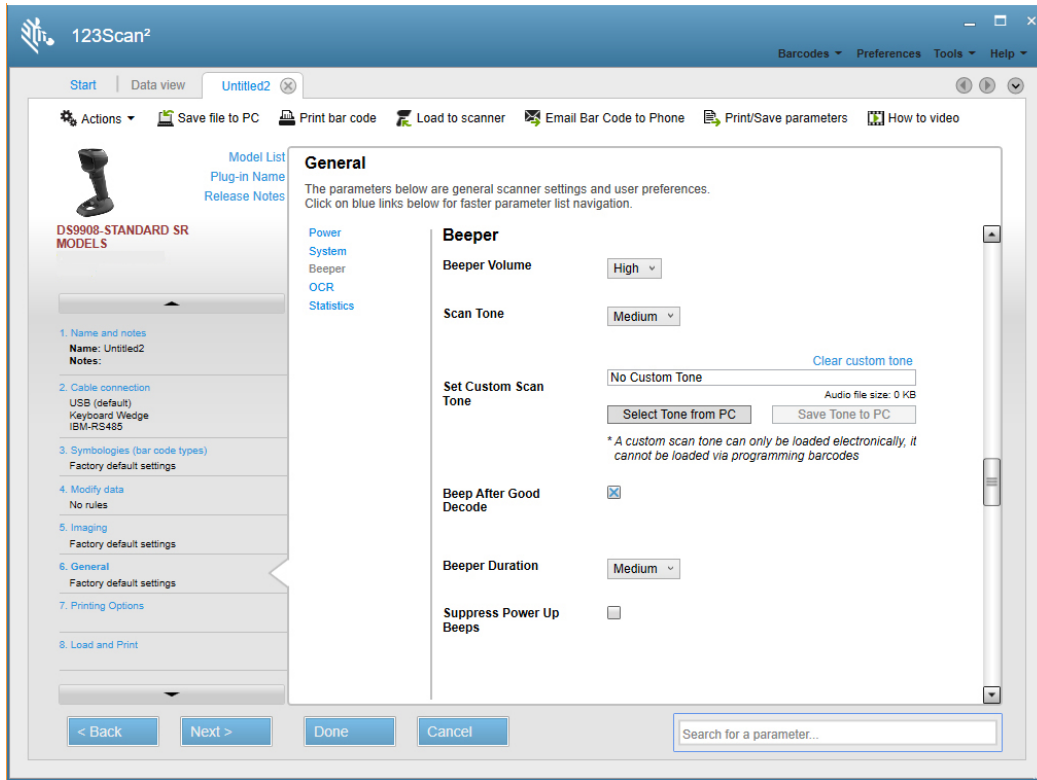
3. Select **Clone/modify my connected scanner settings**.

**Figure 25** USB Parameter Change Window



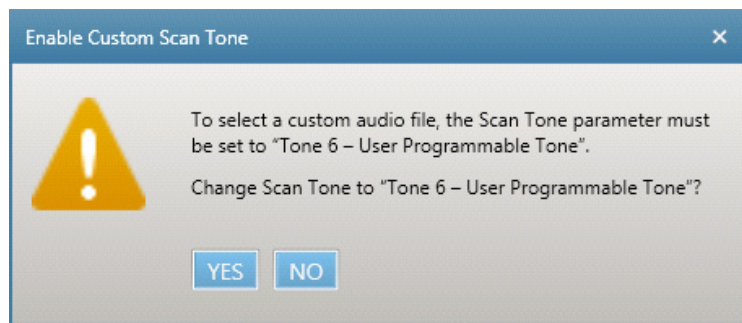
4. Select **CLOSE** on the pop-up window.

**Figure 26** General Parameters Section



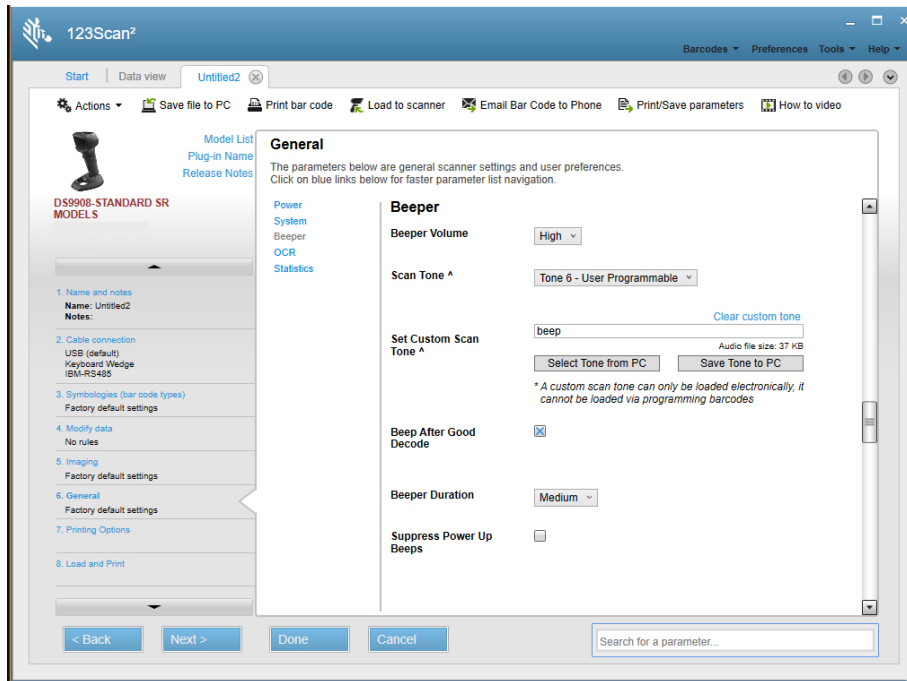
5. Select **General > Beeper**.
6. Choose the **Select Tone from PC** button to navigate to and select the custom tone.

**Figure 27** Enable Custom Scan Tone Window



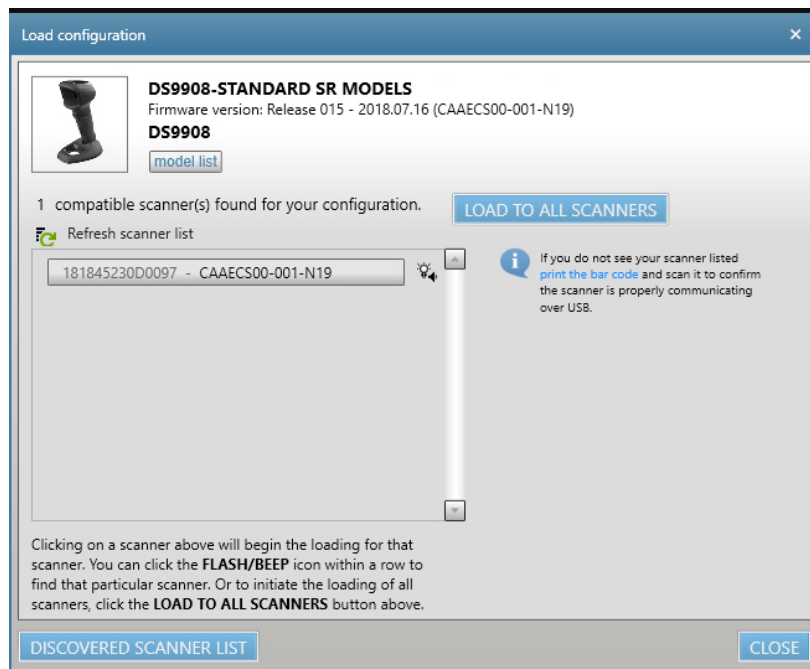
7. Select **YES** on the pop-up window to set the **Scan Tone** parameter to the **User Programmable/Tone 6** option. The **Scan Tone** field indicates **Tone 6 - User Programmable**, and the **Set Custom Scan Tone** field now reflects the selected WAV file name.

**Figure 28** Updated General Parameters Section



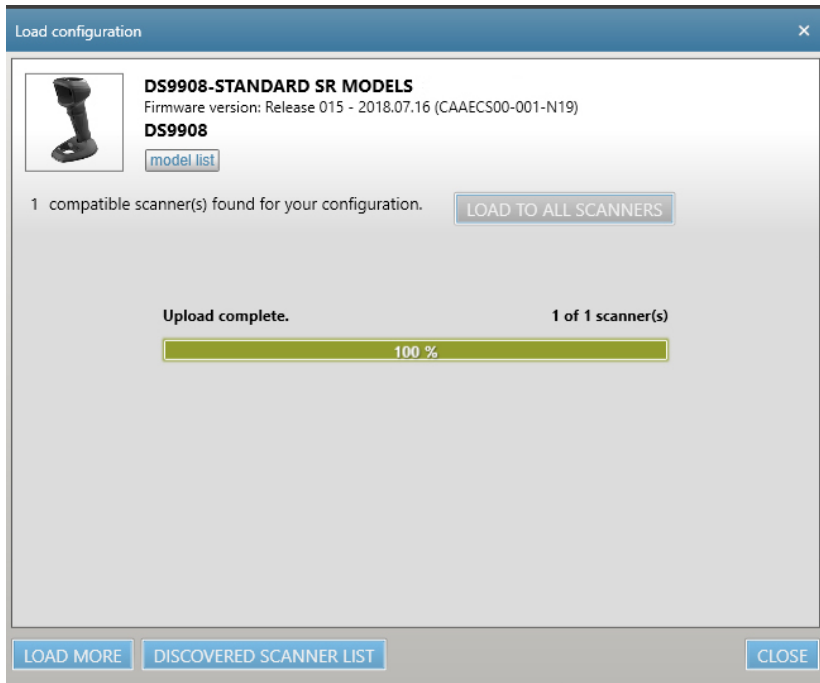
8. Select **Load to scanner** at the top of the window.

**Figure 29** Load Configuration Window



9. Select a scanner in the list, or select **LOAD TO ALL SCANNERS** to send the configuration file to all scanners listed.

**Figure 30** Load Configuration Complete Window



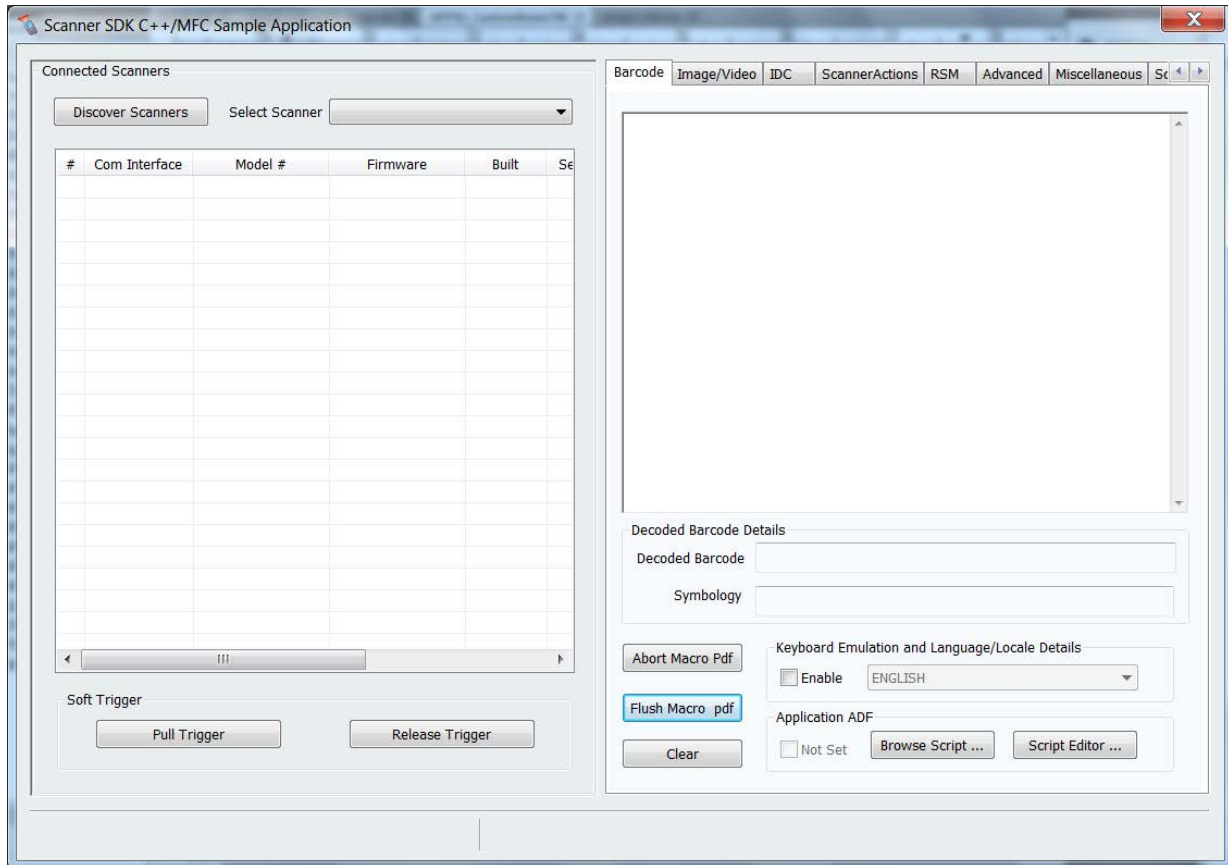
10. Select **CLOSE** when the upload completes.
11. Verify that the custom tone was successfully downloaded to the scanner by scanning a barcode.

## Downloading a Custom Tone via Scanner SDK Sample Application

Download a custom audio file to the imager using the **Scanner SDK C++ Sample Application**. The user-defined tone is represented by a unique attribute number.

1. Place the imager in SNAPI USB communication mode by scanning [Symbol Native API \(SNAPI\) with Imaging Interface on page 238](#).
2. Ensure the imager is disconnected from the host PC.
3. To launch the **Scanner SDK C++ Sample Application**, on the host PC select **Start > Scanner > Scanner SDK > C++ Sample Application**.

**Figure 31** Scanner SDK C++ Sample Application



4. Connect the imager to a USB port on the PC and wait for the power-up tone.
5. Verify imager is operational by touching the trigger to turn on illumination.
6. Select **Discover Scanners** in the SDK application. The imager appears in the **Connected Scanners** list.
7. Select the **Advanced** tab.
8. In the **Custom Good Decode Tone** section of the window, select **Browse**.
9. Select the WAV file to download. Ensure the file does not exceed 65 kB.
10. Select **Upload**. After a few seconds the status bar on the bottom of the window displays **UPDATE\_AUDIO\_FILE - Command Success**.
11. Scan the **Scan Tone 6** barcode below to select the downloaded tone. This barcode is also available via the parameter [Beep Tone on page 62](#).



**Scan Tone 6**

12. Scan a barcode (e.g., the sample below) to verify that the imager sounds the downloaded scan tone.

Figure 32 Sample Barcode



**NOTE:** The imager sounds a system-defined tone on a good decode if you select Scan Tone 6 but did not download a custom tone.



# Parameter Defaults

**Table 29** Parameter Defaults

| Parameter                                | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default         | Page Number |
|--|-------------------------------|-------------------------|-----------------|-------------|
| Serial Number                            | N/A                           | N/A                     | N/A             | 51          |
| Report Software Version                  | N/A                           | N/A                     | N/A             | 51          |
| Manufacturing Information                | N/A                           | N/A                     | N/A             | 51          |
| <b>Standard User Preferences</b>         |                               |                         |                 |             |
| Set Default Parameter                    | N/A                           | N/A                     | N/A             | 59          |
| Parameter Barcode Scanning               | 236                           | ECh                     | Enable          | 60          |
| Beep After Good Decode                   | 56                            | 38h                     | Enable          | 60          |
| Beep Volume                              | 140                           | 8Ch                     | High            | 61          |
| Beep Tone                                | 145                           | 91h                     | Medium          | 62          |
| Beep Duration                            | 628                           | F1h 74h                 | Short           | 64          |
| Suppress Power Up Beeps                  | 721                           | F1h D1h                 | Do Not Suppress | 64          |
| Direct Decode Indicator                  | 859                           | F2h 5Bh                 | Disable         | 65          |
| Low Power Mode                           | 128                           | 80h                     | Disable         | 66          |
| Time Delay to Low Power Mode             | 146                           | 92h                     | 1 Hour          | 67          |
| Trigger Mode (or Hand-held Trigger Mode) | 138                           | 8Ah                     | Auto Aim        | 69          |
| Hands-free Mode                          | 630                           | F1h 76h                 | Enable          | 70          |
| Hand-held Decode Aiming Pattern          | 306                           | F0h 32h                 | Enable          | 72          |
| Pickup Activation                        | 1927                          | F8h 07h 87h             | Touch Plus      | 71          |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter                                       | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default   | Page Number |
|---|-------------------------------|-------------------------|---|-------------|
| Presentation (Hands-free) Decode Aiming Pattern | 590                           | F1h 4Eh                 | Disable Presentation (Hands-free) Decode Aiming Pattern | 73          |
| Picklist Mode                                   | 402                           | F0h 92h                 | Disable Picklist Mode Always                            | 74          |
| Continuous Barcode Read                         | 649                           | F1h 89h                 | Disable   | 75          |
| Unique Barcode Reporting                        | 723                           | F1h D3h                 | Enable  | 75          |
| Decode Session Timeout                          | 136                           | 88h                     | 9.9 Seconds   | 76          |
| Hands-Free Decode Session Timeout               | 400                           | F0 90                   | 15  | 76          |
| Timeout Between Decodes, Same Symbol            | 137                           | 89h                     | 0.5 Seconds   | 77          |
| Timeout Between Decodes, Different Symbols      | 144                           | 90h                     | 0.1 Seconds   | 77          |
| Triggered Timeout, Same Symbol                  | 724                           | F1h D4h                 | Disable   | 78          |
| Mobile Phone/Display Mode                       | 716                           | F1h CCh                 | Normal  | 79          |
| PDF Prioritization                              | 719                           | F1h CFh                 | Disable   | 80          |
| PDF Prioritization Timeout                      | 720                           | F1h D0h                 | 200 ms  | 80          |
| Decoding Illumination                           | 298                           | F0h 2Ah                 | Enable  | 81          |
| Illumination Brightness                         | 669                           | F1h 9Dh                 | High  | 81          |
| Motion Tolerance (Hand-held Trigger Mode Only)  | 858                           | F2h 5Ah                 | Less Motion Tolerance                                   | 82          |
| Product ID (PID) Type                           | 1281                          | F8h 05h 01h             | Host Type Unique  | 82          |
| Product ID (PID) Value                          | 1725                          | F8h 06h BDh             | 0   | 83          |
| ECLLevel  | 1710                          | F8h 06h AEh             | 0   | 83          |
| Decode Range Limit (Hands-free)                 | 1950                          | F8h 07h 9Eh             | Standard  | 84          |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter                                  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup>                                  | Default                                     | Page Number |
|--|-------------------------------|--|---|-------------|
| <b>Miscellaneous Options</b>               |                               |  |   |             |
| Enter Key                                  | N/A                           | N/A  | N/A   | 85          |
| Tab Key                                    | N/A                           | N/A  | N/A   | 85          |
| Transmit Code ID Character                 | 45                            | 2Dh  | None  | 86          |
| Prefix Value                               | 99, 105                       | 63h, 69h   | 7013 <CR><LF>                               | 87          |
| Suffix 1 Value                             | 98, 104                       | 62h, 68h   | 7013 <CR><LF>                               | 87          |
| Suffix 2 Value                             | 100, 106                      | 64h, 6Ah   |   |             |
| Scan Data Transmission Format              | 235                           | EBh  | Data As Is                                  | 88          |
| FN1 Substitution Values                    | 103, 109                      | 67h, 6Dh   | 7013 <CR><LF>                               | 90          |
| Transmit "No Read" Message                 | 94                            | 5E   | Disable                                     | 91          |
| Unsolicited Heartbeat Interval             | 1118                          | F8h 04h 5Eh  | Disable                                     | 92          |
| securPharm Decoding                        | 1752                          | F8h 06h D8h  | Disable                                     | 93          |
| securPharm Output Formatting               | 1753                          | F8h 06h D9h  | No Formatting                               | 94          |
| <b>Image Capture Preferences</b>           |                               |  |   |             |
| Operational Modes                          | N/A                           | N/A  | N/A   | 100         |
| Image Capture Illumination                 | 361                           | F0h 69h  | Enable                                      | 101         |
| Image Capture Autoexposure                 | 360                           | F0h 68h  | Enable                                      | 101         |
| Fixed Exposure                             | 567                           | F4h F1h 37h  | 100   | 102         |
| Analog Gain                                | 1232                          | F4h D0h  | Analog Gain x 2                             | 103         |
| Digital Gain                               | 1233                          | F4h D1h  | 32  | 103         |
| Gain / Exposure Priority for Snapshot Mode | 562                           | F1h 32h  | Autodetect                                  | 104         |
| Snapshot Mode Timeout                      | 323                           | F0h 43h  | 0 (30 seconds)                              | 105         |
| Snapshot Aiming Pattern                    | 300                           | F0h 2Ch  | Enable                                      | 106         |
| Silence Operational Mode Changes           | 1293                          | F8h 05h 0Dh  | Disable (do not silence)                    | 106         |
| Image Cropping                             | 301                           | F0h 2Dh  | Disable                                     | 107         |
| Crop to Pixel Addresses                    | 315<br>316<br>317<br>318      | F4h F0h 3Bh<br>F4h F0h 3Ch<br>F4h F0h 3Dh<br>F4h F0h 3Eh | 0 top<br>0 left<br>799 bottom<br>1279 right | 107         |
| Image Size (Number of Pixels)              | 302                           | F0h 2Eh  | Full  | 109         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter                                     | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default        | Page Number |
|---|-------------------------------|-------------------------|----------------|-------------|
| Image Brightness (Target White)               | 390                           | F0h 86h                 | 180            | 111         |
| JPEG Image Options                            | 299                           | F0h 2Bh                 | Quality        | 111         |
| JPEG Quality Value                            | 305                           | F0h 31h                 | 65             | 112         |
| JPEG Size Value                               | 561                           | F1h 31h                 | 160 kB         | 112         |
| Image Enhancement                             | 564                           | F1h 34h                 | Low (1)        | 113         |
| Image File Format Selection                   | 304                           | F0h 30h                 | JPEG           | 114         |
| Image Rotation                                | 665                           | F1h 99h                 | 0              | 115         |
| Bits per Pixel (BPP)                          | 303                           | F0h 2Fh                 | 8 BPP          | 116         |
| Signature Capture                             | 93                            | 5Dh                     | Disable        | 117         |
| Signature Capture Image File Format Selection | 313                           | F0h 39h                 | JPEG           | 118         |
| Signature Capture Bits per Pixel (BPP)        | 314                           | F0h 3Ah                 | 8 BPP          | 119         |
| Signature Capture Width                       | 366                           | F4h F0h 6Eh             | 400            | 120         |
| Signature Capture Height                      | 367                           | F4h F0h 6Fh             | 100            | 120         |
| Signature Capture JPEG Quality                | 421                           | F0h A5h                 | 65             | 120         |
| Video Mode Format Selector                    | 916                           | F2h 94h                 | JPEG           | 121         |
| Video View Finder                             | 324                           | F0h 44h                 | Disable        | 121         |
| Target Video Frame Size                       | 328                           | F0h 48h                 | 2200 bytes     | 122         |
| Video View Finder Image Size                  | 329                           | F0h 49h                 | 1700 bytes     | 122         |
| Video Subsampling                             | 667                           | F1h 9Bh                 | 1/4 Resolution | 110         |
| <b>Enable/Disable All Code Types</b>          |                               |                         |                | 131         |
| <b>1D Symbologies</b>                         |                               |                         |                |             |
| <b>UPC/EAN/JAN</b>                            |                               |                         |                |             |
| UPC-A   | 1                             | 01h                     | Enable         | 131         |
| UPC-E   | 2                             | 02h                     | Enable         | 132         |
| UPC-E1  | 12                            | 0Ch                     | Disable        | 132         |
| EAN-8/JAN 8                                   | 4                             | 04h                     | Enable         | 133         |
| EAN-13/JAN 13                                 | 3                             | 03h                     | Enable         | 133         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter   | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default           | Page Number |
|---|-------------------------------|-------------------------|-------------------|-------------|
| Bookland EAN                                      | 83                            | 53h                     | Disable           | 134         |
| Bookland ISBN Format                              | 576                           | F1h 40h                 | ISBN-10           | 135         |
| ISSN EAN  | 617                           | F1h 69h                 | Disable           | 136         |
| Decode UPC/EAN/JAN Supplementals (2 and 5 digits) | 16                            | 10h                     | Ignore            | 137         |
| User-Programmable Supplementals                   | 579                           | F1h 43h                 | 000               | 140         |
| Supplemental 1:                                   | 580                           | F1h 44h                 |                   |             |
| Supplemental 2:                                   |                               |                         |                   |             |
| UPC/EAN/JAN Supplemental Redundancy               | 80                            | 50h                     | 10                | 140         |
| Decode UPC/EAN/JAN Supplemental AIM ID            | 672                           | F1h A0h                 | Combined          | 141         |
| Transmit UPC-A Check Digit                        | 40                            | 28h                     | Enable            | 142         |
| Transmit UPC-E Check Digit                        | 41                            | 29h                     | Enable            | 142         |
| Transmit UPC-E1 Check Digit                       | 42                            | 2Ah                     | Enable            | 143         |
| UPC-A Preamble                                    | 34                            | 22h                     | System Character  | 144         |
| UPC-E Preamble                                    | 35                            | 23h                     | System Character  | 145         |
| UPC-E1 Preamble                                   | 36                            | 24h                     | System Character  | 146         |
| Convert UPC-E to UPC-A                            | 37                            | 25h                     | Disable           | 147         |
| Convert UPC-E1 to UPC-A                           | 38                            | 26h                     | Disable           | 147         |
| EAN/JAN Zero Extend                               | 39                            | 27h                     | Disable           | 148         |
| UCC Coupon Extended Code                          | 85                            | 55h                     | Disable           | 148         |
| Coupon Report                                     | 730                           | F1h DAh                 | New Coupon Format | 149         |
| UPC Reduced Quiet Zone                            | 1289                          | F8h 05h 09h             | Disable           | 150         |
| <b>Code 128</b>                                   |                               |                         |                   |             |
| Code 128  | 8                             | 08h                     | Enable            | 150         |
| Set Length(s) for Code 128                        | 209, 210                      | D1h, D2h                | Any Length        | 151         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default   | Page Number |
|--|-------------------------------|-------------------------|---|-------------|
| GS1-128 (formerly UCC/EAN-128)                     | 14                            | 0Eh                     | Enable  | 152         |
| ISBT 128   | 84                            | 54h                     | Enable  | 153         |
| ISBT Concatenation                                 | 577                           | F1h 41h                 | Disable - SR/DL models<br>Enable - HD/HL models | 153         |
| Check ISBT Table                                   | 578                           | F1h 42h                 | Enable  | 154         |
| ISBT Concatenation Redundancy                      | 223                           | DFh                     | 10  | 155         |
| Code 128 <FNC4>                                    | 1254                          | F8h 04h E6h             | Honor   | 155         |
| Code 128 Security Level                            | 751                           | F1h EFh                 | Security Level 1                                | 156         |
| Code 128 Reduced Quiet Zone                        | 1208                          | F8h 04h B8h             | Disable   | 157         |
| <b>Code 39</b>                                     |                               |                         |   |             |
| Code 39  | 0                             | 00h                     | Enable  | 157         |
| Trioptic Code 39                                   | 13                            | 0Dh                     | Disable   | 158         |
| Convert Code 39 to Code 32 (Italian Pharmacy Code) | 86                            | 56h                     | Disable   | 158         |
| Code 32 Prefix                                     | 231                           | E7h                     | Disable   | 159         |
| Set Length(s) for Code 39                          | 18, 19                        | 12h, 13h                | 1 to 55   | 159         |
| Code 39 Check Digit Verification                   | 48                            | 30h                     | Disable   | 161         |
| Transmit Code 39 Check Digit                       | 43                            | 2Bh                     | Disable   | 161         |
| Code 39 Full ASCII Conversion                      | 17                            | 11h                     | Disable   | 162         |
| Code 39 Security Level                             | 750                           | F1h EEh                 | Security Level 1                                | 163         |
| Code 39 Reduced Quiet Zone                         | 1209                          | F8h 04h B9h             | Disable   | 164         |
| <b>Code 93</b>                                     |                               |                         |   |             |
| Code 93  | 9                             | 09h                     | Enable  | 164         |
| Set Length(s) for Code 93                          | 26, 27                        | 1Ah, 1Bh                | 1 to 55   | 165         |
| <b>Code 11</b>                                     |                               |                         |   |             |
| Code 11  | 10                            | 0Ah                     | Disable   | 167         |
| Set Lengths for Code 11                            | 28, 29                        | 1Ch, 1Dh                | 4 to 55   | 167         |
| Code 11 Check Digit Verification                   | 52                            | 34h                     | Disable   | 169         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default             | Page Number |
|--|-------------------------------|-------------------------|---------------------|-------------|
| Transmit Code 11 Check Digit(s)                              | 47                            | 2Fh                     | Disable             | 170         |
| <b>Interleaved 2 of 5 (ITF)</b>                              |                               |                         |                     |             |
| Interleaved 2 of 5 (ITF)                                     | 6                             | 06h                     | Enable              | 170         |
| Set Lengths for I 2 of 5                                     | 22, 23                        | 16h, 17h                | 6 to 55             | 171         |
| I 2 of 5 Check Digit Verification                            | 49                            | 31h                     | Disable             | 172         |
| Transmit I 2 of 5 Check Digit                                | 44                            | 2Ch                     | Disable             | 173         |
| Convert I 2 of 5 to EAN 13                                   | 82                            | 52h                     | Disable             | 173         |
| Febraban   | 1750                          | F8h 06h D6h             | Disable             | 174         |
| I 2 of 5 Security Level                                      | 1121                          | F8h 04h 61h             | Security Level 1    | 175         |
| I 2 of 5 Reduced Quiet Zone                                  | 1210                          | F8h 04h BAh             | Disable             | 176         |
| <b>Discrete 2 of 5 (DTF)</b>                                 |                               |                         |                     |             |
| Discrete 2 of 5  | 5                             | 05h                     | Disable             | 176         |
| Set Length(s) for D 2 of 5                                   | 20, 21                        | 14h 15h                 | 1 to 55             | 177         |
| <b>Codabar (NW - 7)</b>                                      |                               |                         |                     |             |
| Codabar  | 7                             | 07h                     | Enable              | 179         |
| Set Lengths for Codabar                                      | 24, 25                        | 18h, 19h                | 4 to 55             | 179         |
| CLSI Editing   | 54                            | 36h                     | Disable             | 181         |
| NOTIS Editing  | 55                            | 37h                     | Disable             | 181         |
| Codabar Security Level                                       | 1776                          | F8h 06h F0h             | Security Level 1    | 182         |
| Codabar Upper or Lower Case Start/ Stop Characters Detection | 855                           | F2h 57h                 | Upper Case          | 183         |
| Codabar Mod 16 Check Digit Verification                      | 1784                          | F8h 06h F8h             | Disable             | 183         |
| Transmit Codabar Check Digit                                 | 704                           | F1h C0h                 | Disable             | 184         |
| <b>MSI</b>   |                               |                         |                     |             |
| MSI  | 11                            | 0Bh                     | Disable             | 184         |
| Set Length(s) for MSI  | 30, 31                        | 1Eh, 1Fh                | 4 to 55             | 185         |
| MSI Check Digits   | 50                            | 32h                     | One MSI Check Digit | 187         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default       | Page Number |
|--|-------------------------------|-------------------------|---------------|-------------|
| Transmit MSI Check Digit   | 46                            | 2Eh                     | Disable       | 188         |
| MSI Check Digit Algorithm  | 51                            | 33h                     | Mod 10/Mod 10 | 188         |
| MSI Reduced Quiet Zone   | 1392                          | F8h 05h 70h             | Disable       | 189         |
| <b>Chinese 2 of 5</b>  |                               |                         |               |             |
| Chinese 2 of 5   | 408                           | F0h 98h                 | Disable       | 189         |
| <b>Matrix 2 of 5</b>   |                               |                         |               |             |
| Matrix 2 of 5  | 618                           | F1h 6Ah                 | Disable       | 190         |
| Matrix 2 of 5 Lengths  | 619<br>620                    | F1h 6Bh<br>F1h 6Ch      | 4 to 55       | 190         |
| Matrix 2 of 5 Check Digit  | 622                           | F1h 6Eh                 | Disable       | 192         |
| Transmit Matrix 2 of 5 Check Digit   | 623                           | F1h 6Fh                 | Disable       | 192         |
| <b>Korean 3 of 5</b>   |                               |                         |               |             |
| Korean 3 of 5  | 581                           | F1h 45h                 | Disable       | 193         |
| <b>Inverse 1D</b>  |                               |                         |               |             |
| Inverse 1D   | 586                           | F1h 4Ah                 | Regular       | 193         |
| <b>GS1 DataBar</b>   |                               |                         |               |             |
| GS1 DataBar Omnidirectional (formerly GS1 DataBar-14), GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional | 338                           | F0h 52h                 | Enable        | 195         |
| GS1 DataBar Limited  | 339                           | F0h 53h                 | Enable        | 196         |
| GS1 DataBar Expanded, GS1 DataBar Expanded Stacked   | 340                           | F0h 54h                 | Enable        | 196         |
| Convert GS1 DataBar to UPC/EAN/JAN   | 397                           | F0h 8Dh                 | Disable       | 197         |
| GS1 DataBar Security Level   | 1706                          | F8h 06h AAh             | Level 1       | 198         |
| GS1 DataBar Limited Margin Check   | 728                           | F1h D8h                 | Level 3       | 199         |
| <b>Symbology-Specific Security Features</b>  |                               |                         |               |             |
| Redundancy Level   | 78                            | 4Eh                     | 1             | 200         |
| Security Level   | 77                            | 4Dh                     | 1             | 202         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.



## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default   | Page Number |
|--|-------------------------------|-------------------------|---|-------------|
| 1D Quiet Zone Level                                | 1288                          | F8h 05h 08h             | 1   | 203         |
| Intercharacter Gap Size                            | 381                           | F0h 7Dh                 | Normal  | 204         |
| <b>Composite Codes</b>                             |                               |                         |   |             |
| Composite CC-C                                     | 341                           | F0h 55h                 | Disable - SR/DL models<br>Enable - HD/HL models | 204         |
| Composite CC-A/B                                   | 342                           | F0h 56h                 | Disable - SR/DL models<br>Enable - HD/HL models | 205         |
| Composite TLC-39                                   | 371                           | F0h 73h                 | Disable   | 205         |
| Composite Inverse                                  | 1113                          | F8h 04h 59h             | Regular Only                                    | 206         |
| UPC Composite Mode                                 | 344                           | F0h 58h                 | UPC Never Linked                                | 207         |
| Composite Beep Mode                                | 398                           | F0h 8Eh                 | Beep As Each Code Type is Decoded               | 208         |
| GS1-128 Emulation Mode for UCC/EAN Composite Codes | 427                           | F0h ABh                 | Disable   | 208         |
| <b>2D Symbolologies</b>                            |                               |                         |   |             |
| PDF417   | 15                            | 0Fh                     | Enable  | 209         |
| MicroPDF417  | 227                           | E3h                     | Disable   | 209         |
| Code 128 Emulation                                 | 123                           | 7Bh                     | Disable   | 210         |
| Data Matrix  | 292                           | F0h 24h                 | Enable  | 211         |
| GS1 Data Matrix                                    | 1336                          | F8h 05h 38h             | Disable   | 211         |
| Data Matrix Inverse                                | 588                           | F1h 4Ch                 | Inverse Autodetect                              | 212         |
| Decode Data Matrix Mirror Images                   | 537                           | F1h 19h                 | Auto  | 213         |
| Maxicode   | 294                           | F0h 26h                 | Disable   | 214         |
| QR Code  | 293                           | F0h 25h                 | Enable  | 214         |
| Weblink QR   | 1947                          | F7 07 9B                | Enable  | 215         |
| GS1 QR   | 1343                          | F8h 05h 3Fh             | Enable  | 216         |
| MicroQR  | 573                           | F1h 3Dh                 | Enable  | 216         |
| Linked QR Mode                                     | 1847                          | 737h                    | Linked QR Only                                  | 217         |
| Aztec  | 574                           | F1h 3Eh                 | Enable  | 218         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter                          | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default            | Page Number |
|------------------------------------|-------------------------------|-------------------------|--------------------|-------------|
| Aztec Inverse                      | 589                           | F1h 4Dh                 | Inverse Autodetect | 218         |
| Han Xin                            | 1167                          | F8h 04h 8Fh             | Disable            | 219         |
| Han Xin Inverse                    | 1168                          | F8h 04h 90h             | Regular            | 219         |
| Grid Matrix                        | 1718                          | F8h 06h B6h             | Disable            | 220         |
| Grid Matrix Inverse                | 1719                          | F8h 06h B7h             | Regular Only       | 220         |
| Grid Matrix Mirror                 | 1736                          | F8h 06h C8h             | Regular Only       | 221         |
| DotCode                            | 1906                          | F8 07 72h               | Disable            | 222         |
| DotCode Inverse                    | 1907                          | F8 07 73h               | Autodetect         | 223         |
| DotCode Mirrored                   | 1908                          | F8 07 74h               | Autodetect         | 224         |
| DotCode Prioritize                 | 1937                          | F8 07 91h               | Enable             | 225         |
| DotCode Erasure Limit              | 2063                          | F8 08 0F                | 10                 | 225         |
| <b>Macro PDF</b>                   |                               |                         |                    |             |
| Flush Macro PDF Buffer             | N/A                           | N/A                     | N/A                | 226         |
| Abort Macro PDF Entry              | N/A                           | N/A                     | N/A                | 226         |
| <b>Postal Codes</b>                |                               |                         |                    |             |
| US Postnet                         | 89                            | 59h                     | Disable            | 227         |
| US Planet                          | 90                            | 5Ah                     | Disable            | 227         |
| Transmit US Postal Check Digit     | 95                            | 5Fh                     | Enable             | 228         |
| UK Postal                          | 91                            | 5Bh                     | Disable            | 228         |
| Transmit UK Postal Check Digit     | 96                            | 60h                     | Enable             | 229         |
| Japan Postal                       | 290                           | F0h 22h                 | Disable            | 229         |
| Australia Post                     | 291                           | F0h 23h                 | Disable            | 230         |
| Australia Post Format              | 718                           | F1h CEh                 | Autodiscriminate   | 231         |
| Netherlands KIX Code               | 326                           | F0h 46h                 | Disable            | 232         |
| USPS 4CB/One Code/Intelligent Mail | 592                           | F1h 50h                 | Disable            | 232         |
| UPU FICS Postal                    | 611                           | F1h 63h                 | Disable            | 233         |
| Mailmark                           | 1337                          | F8h 05h 39h             | Disable            | 233         |

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

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter                                      | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default                               | Page Number         |
|--|-------------------------------|-------------------------|---------------------------------------|---------------------|
| <b>USB Host Parameters</b>                     |                               |                         |                                       |                     |
| USB Device Type                                | N/A                           | N/A                     | USB Keyboard HID                      | <a href="#">237</a> |
| Symbol Native API (SNAPI) Status Handshaking   | N/A                           | N/A                     | Enable                                | <a href="#">239</a> |
| USB Keystroke Delay                            | N/A                           | N/A                     | No Delay                              | <a href="#">240</a> |
| USB Caps Lock Override                         | N/A                           | N/A                     | Disable                               | <a href="#">240</a> |
| Barcodes with Unknown Characters               | N/A                           | N/A                     | Send Barcodes with Unknown Characters | <a href="#">241</a> |
| USB Convert Unknown to Code 39                 | N/A                           | N/A                     | Disable                               | <a href="#">241</a> |
| USB Fast HID                                   | N/A                           | N/A                     | Enable                                | <a href="#">242</a> |
| USB Polling Interval                           | N/A                           | N/A                     | 3 msec                                | <a href="#">242</a> |
| Keypad Emulation                               | N/A                           | N/A                     | Enable                                | <a href="#">244</a> |
| Quick Keypad Emulation                         | N/A                           | N/A                     | Enable                                | <a href="#">244</a> |
| Keypad Emulation with Leading Zero             | N/A                           | N/A                     | Enable                                | <a href="#">245</a> |
| USB FN1 Substitution                           | N/A                           | N/A                     | Disable                               | <a href="#">245</a> |
| Function Key Mapping                           | N/A                           | N/A                     | Disable                               | <a href="#">246</a> |
| Simulated Caps Lock                            | N/A                           | N/A                     | Disable                               | <a href="#">246</a> |
| Convert Case                                   | N/A                           | N/A                     | None                                  | <a href="#">247</a> |
| USB Static CDC                                 | N/A                           | N/A                     | Enable                                | <a href="#">247</a> |
| CDC Beep on <BEL>                              | 150                           | 96h                     | Enable                                | <a href="#">248</a> |
| TGCS (IBM) USB Direct I/O Beep                 | 1360                          | F8h 05h 50h             | Honor                                 | <a href="#">248</a> |
| TGCS (IBM) USB Beep Directive                  | N/A                           | N/A                     | Ignore                                | <a href="#">249</a> |
| TGCS (IBM) USB Barcode Configuration Directive | N/A                           | N/A                     | Ignore                                | <a href="#">249</a> |
| TGCS (IBM) USB Specification Version           | N/A                           | N/A                     | Version 2.2                           | <a href="#">249</a> |
| <b>SSI Host Parameters</b>                     |                               |                         |                                       |                     |
| Select SSI Host                                | N/A                           | N/A                     | N/A                                   | <a href="#">262</a> |
| Baud Rate                                      | 156                           | 9Ch                     | 9600                                  | <a href="#">262</a> |
| Parity   | 158                           | 9Eh                     | None                                  | <a href="#">264</a> |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter                        | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default                              | Page Number |
|----------------------------------|-------------------------------|-------------------------|--------------------------------------|-------------|
| Check Parity                     | 151                           | 97h                     | Disable                              | 265         |
| Stop Bits                        | 157                           | 9Dh                     | 1                                    | 265         |
| Software Handshaking             | 159                           | 9Fh                     | ACK/NAK                              | 266         |
| Host RTS Line State              | 154                           | 9Ah                     | Low                                  | 267         |
| Decode Data Packet Format        | 238                           | EEh                     | Send Raw Decode Data                 | 268         |
| Host Serial Response Timeout     | 155                           | 9Bh                     | Low - 2 Seconds                      | 269         |
| Host Character Timeout           | 239                           | EFh                     | Low - 200 msec                       | 270         |
| Multipacket Option               | 334                           | F0h 4Eh                 | Multipacket Option 1                 | 271         |
| Interpacket Delay                | 335                           | F0h 4Fh                 | Minimum - 0 msec                     | 272         |
| <b>Event Reporting</b>           |                               |                         |                                      |             |
| Decode Event                     | 256                           | F0h 00h                 | Disable                              | 273         |
| Boot Up Event                    | 258                           | F0h 02h                 | Disable                              | 274         |
| Parameter Event                  | 259                           | F0h 03h                 | Disable                              | 274         |
| <b>RS-232 Host Parameters</b>    |                               |                         |                                      |             |
| RS-232 Host Types                | N/A                           | N/A                     | Standard                             | 280         |
| Baud Rate                        | N/A                           | N/A                     | 9600                                 | 282         |
| Parity                           | N/A                           | N/A                     | None                                 | 283         |
| Stop Bits                        | N/A                           | N/A                     | 1 Stop Bit                           | 283         |
| Data Bits                        | N/A                           | N/A                     | 8-bit                                | 284         |
| Check Receive Errors             | N/A                           | N/A                     | Enable                               | 284         |
| Hardware Handshaking             | N/A                           | N/A                     | None                                 | 285         |
| Software Handshaking             | N/A                           | N/A                     | None                                 | 287         |
| Host Serial Response Timeout     | N/A                           | N/A                     | 2 Seconds                            | 289         |
| RTS Line State                   | N/A                           | N/A                     | Low RTS                              | 290         |
| Beep on <BEL>                    | N/A                           | N/A                     | Disable                              | 290         |
| Intercharacter Delay             | N/A                           | N/A                     | 0 msec                               | 291         |
| Nixdorf Beep/LED Options         | N/A                           | N/A                     | Normal Operation                     | 292         |
| Barcodes with Unknown Characters | N/A                           | N/A                     | Send Barcode With Unknown Characters | 292         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter                              | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default                               | Page Number |
|--|-------------------------------|-------------------------|---------------------------------------|-------------|
| <b>IBM 468X/469X Host Parameters</b>   |                               |                         |                                       |             |
| Port Address                           | N/A                           | N/A                     | None                                  | 296         |
| Convert Unknown to Code 39             | N/A                           | N/A                     | Disable                               | 297         |
| RS-485 Beep Directive                  | N/A                           | N/A                     | Ignore                                | 297         |
| RS-485 Barcode Configuration Directive | N/A                           | N/A                     | Ignore                                | 298         |
| IBM-485 Specification Version          | N/A                           | N/A                     | Original Specification                | 298         |
| <b>Keyboard Wedge Host Parameters</b>  |                               |                         |                                       |             |
| Keyboard Wedge Host Type               | N/A                           | N/A                     | IBM AT Notebook                       | 302         |
| Barcodes with Unknown Characters       | N/A                           | N/A                     | Send Barcodes with Unknown Characters | 302         |
| Keystroke Delay                        | N/A                           | N/A                     | No Delay                              | 303         |
| Intra-keystroke Delay                  | N/A                           | N/A                     | Disable                               | 303         |
| Alternate Numeric Keypad Emulation     | N/A                           | N/A                     | Enable                                | 304         |
| Quick Keypad Emulation                 | N/A                           | N/A                     | Enable                                | 304         |
| Simulated Caps Lock                    | N/A                           | N/A                     | Disable                               | 305         |
| Caps Lock Override                     | N/A                           | N/A                     | Disable                               | 305         |
| Convert Case                           | N/A                           | N/A                     | Do Not Convert                        | 306         |
| Function Key Mapping                   | N/A                           | N/A                     | Disable                               | 306         |
| FN1 Substitution                       | N/A                           | N/A                     | Disable                               | 307         |
| Send Make and Break                    | N/A                           | N/A                     | Send Make and Break Scan Codes        | 307         |
| <b>OCR Programming Parameters</b>      |                               |                         |                                       |             |
| OCR-A                                  | 680                           | F1h A8h                 | Disable                               | 311         |
| OCR-A Variant                          | 684                           | F1h ACh                 | OCR-A Full ASCII                      | 312         |
| OCR-B                                  | 681                           | F1h A9h                 | Disable                               | 313         |
| OCR-B Variant                          | 685                           | F1h ADh                 | OCR-B Full ASCII                      | 314         |
| MICR E13B                              | 682                           | F1h AAh                 | Disable                               | 317         |
| US Currency Serial Number              | 683                           | F1h ABh                 | Disable                               | 318         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter  | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default               | Page Number |
|--|-------------------------------|-------------------------|-----------------------|-------------|
| OCR Orientation                                      | 687                           | F1h AFh                 | 0°                    | 318         |
| OCR Lines  | 691                           | F1h B3h                 | 1                     | 320         |
| OCR Minimum Characters                               | 689                           | F1h B1h                 | 3                     | 320         |
| OCR Maximum Characters                               | 690                           | F1h B2h                 | 100                   | 321         |
| OCR Subset   | 686                           | F1h AEh                 | Selected font variant | 321         |
| OCR Quiet Zone                                       | 695                           | F1h B7h                 | 50                    | 322         |
| OCR Template   | 547                           | F1h 23h                 | 999999999             | 322         |
| OCR Check Digit Modulus                              | 688                           | F1h B0h                 | 1                     | 332         |
| OCR Check Digit Multiplier                           | 700                           | F1h BCh                 | 1212121212            | 332         |
| OCR Check Digit Validation                           | 694                           | F1h B6h                 | None                  | 333         |
| Inverse OCR  | 856                           | F2h 58h                 | Regular               | 339         |
| OCR Redundancy                                       | 1770                          | F8h 06h EAh             | Level 1               | 340         |
| <b>Intelligent Document Capture (IDC) Parameters</b> |                               |                         |                       |             |
| IDC Operating Mode                                   | 594                           | F1h 52h                 | Off                   | 345         |
| IDC Symbology  | 655                           | F1h 8Fh                 | 001                   | 346         |
| IDC X Coordinate                                     | 596                           | F4h F1h 54h             | -151                  | 347         |
| IDC Y Coordinate                                     | 597                           | F4h F1h 55h             | -050                  |             |
| IDC Width  | 598                           | F1h 56h                 | 0300                  | 348         |
| IDC Height   | 599                           | F1h 57h                 | 0050                  |             |
| IDC Aspect   | 595                           | F1h 53h                 | 000                   | 349         |
| IDC File Format Selector                             | 601                           | F1h 59h                 | JPEG                  |             |
| IDC Bits Per Pixel                                   | 602                           | F1h 5Ah                 | 8 BPP                 | 351         |
| IDC JPEG Quality                                     | 603                           | F1h 5Bh                 | 065                   |             |
| IDC Find Box Outline                                 | 727                           | F1h D7h                 | Disable               |             |
| IDC Minimum Text Length                              | 656                           | F1h 90h                 | 00                    | 353         |
| IDC Maximum Text Length                              | 657                           | F1h 91h                 | 00                    |             |
| IDC Captured Image Brighten                          | 654                           | F1h 8Eh                 | Enable                |             |
| IDC Captured Image Sharpen                           | 658                           | F1h 92h                 | Enable                | 354         |
| IDC Border Type                                      | 829                           | F2h 3Dh                 | None                  | 355         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

## Parameter Defaults

**Table 29** Parameter Defaults (Continued)

| Parameter   | Parameter Number <sup>1</sup> | SSI Number <sup>2</sup> | Default                     | Page Number |
|---|-------------------------------|-------------------------|-----------------------------|-------------|
| IDC Delay Time  | 830                           | F2h 3Eh                 | 000                         | 356         |
| IDC Zoom Limit  | 651                           | F1h 8Bh                 | 000                         |             |
| IDC Maximum Rotation  | 652                           | F1h 8Ch                 | 00                          | 357         |
| <b>Digimarc Digital Watermarks</b>                          |                               |                         |                             |             |
| Digimarc Digital Watermarks/DW                              | 1687                          | F8h 06h 97h             | Disable                     | 362         |
| <b>DL Parsing Parameters</b>                                |                               |                         |                             |             |
| Driver's License Parsing                                    | N/A                           | N/A                     | No Driver's License Parsing | 369         |
| Parsing Driver's License Data Fields                        | N/A                           | N/A                     | N/A                         | 370         |
| Driver's License Parse Field Barcodes                       | N/A                           | N/A                     | N/A                         | 371         |
| AAMVA Parse Field Barcodes                                  | N/A                           | N/A                     | N/A                         | 373         |
| Parser Version ID Barcode                                   | N/A                           | N/A                     | N/A                         | 382         |
| Set Default Parameter                                       | N/A                           | N/A                     | N/A                         | 383         |
| Output Gender as M or F                                     | N/A                           | N/A                     | N/A                         | 383         |
| Date Format   | N/A                           | N/A                     | CCYYMMDD                    | 384         |
| No Separator  | N/A                           | N/A                     | N/A                         | 385         |
| Send Keystroke<br>Control Characters<br>Keyboard Characters | N/A                           | N/A                     | N/A                         | 386         |
| Parsing Rule Example  | N/A                           | N/A                     | N/A                         | 404         |
| Embedded Driver's License<br>Parsing ADF Example            | N/A                           | N/A                     | N/A                         | 408         |

1. Parameter number decimal values are used for programming via RSM commands.

2. SSI number hex values are used for programming via SSI commands.

# Numeric Barcodes

---

## Cancel

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

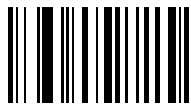


Cancel

---

## Numeric Barcodes

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



0



1



2



3



---

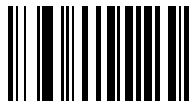
Numeric Barcodes (continued)



4



5



6



7



8



9

# Alphanumeric Barcodes

---

## Cancel

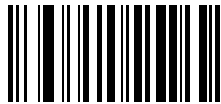
To correct an error or change a selection, scan the following barcode.



Cancel

---

## Alphanumeric Barcodes



Space



#

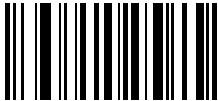


\$

Alphanumeric Barcodes (continued)



\*



%



+



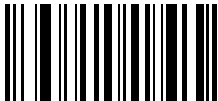
-



.



/



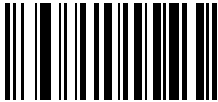
!

---

Alphanumeric Barcodes (continued)



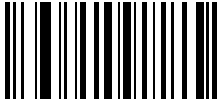
“



&



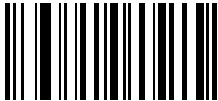
’



(



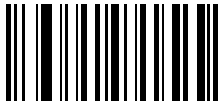
)



:

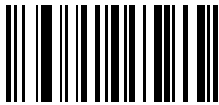
---

Alphanumeric Barcodes (continued)



;

Alphanumeric Barcodes



=



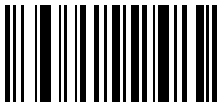
<



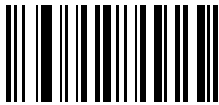
>



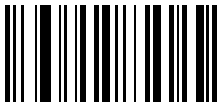
?



@

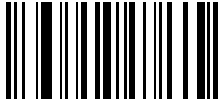


[

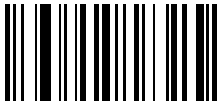


\

Alphanumeric Barcodes (continued)



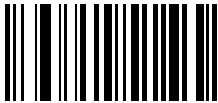
1



2



3



4

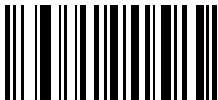
# Alphanumeric Barcodes (continued)



**NOTE:** Do not confuse the following barcodes with those on the numeric keypad.



0



1



2



3



4

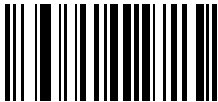


5

Alphanumeric Barcodes (continued)



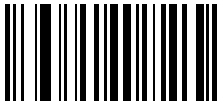
6



7



8



9



End of Message



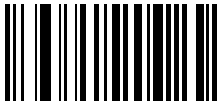
Cancel



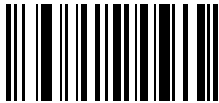
Alphanumeric Barcodes (continued)



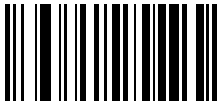
A



B



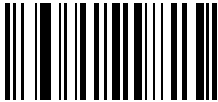
C



D

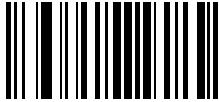


E

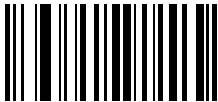


F

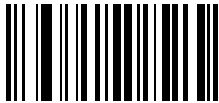
Alphanumeric Barcodes (continued)



G



H



I



J



K



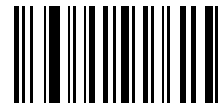
L

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Alphanumeric Barcodes (continued)



M



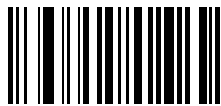
N



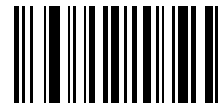
O



P



Q

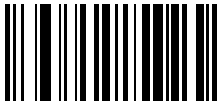


R

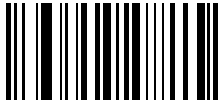
Alphanumeric Barcodes (continued)



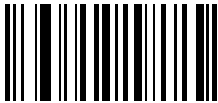
S



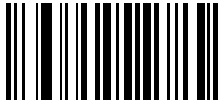
T



U



V

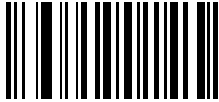


W

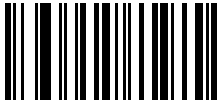


X

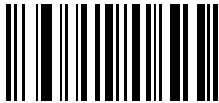
Alphanumeric Barcodes (continued)



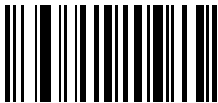
Y



Z



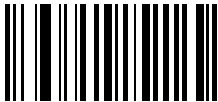
a



b



c



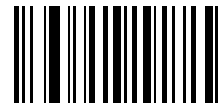
d

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Alphanumeric Barcodes (continued)



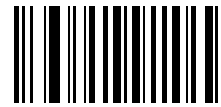
e



f



g



h



i



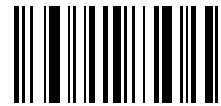
j

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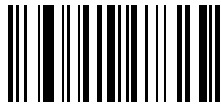
Alphanumeric Barcodes (continued)



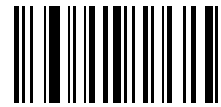
k



l



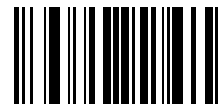
m



n



o



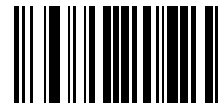
p

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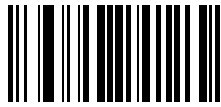
Alphanumeric Barcodes (continued)



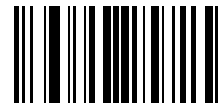
q



r



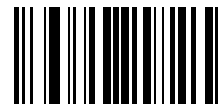
s



t



u



v

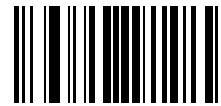


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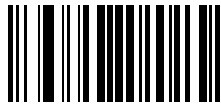
Alphanumeric Barcodes (continued)



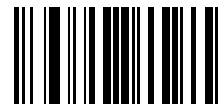
w



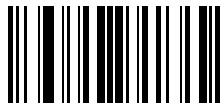
x



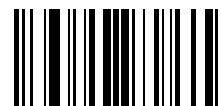
y



z



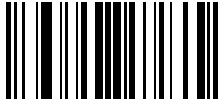
{



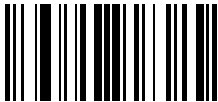
|

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Alphanumeric Barcodes (continued)



}



~

# ASCII Character Sets

## Introduction



**NOTE:** For the Keyboard Wedge Interface, Code 39 Full ASCII interprets the barcode 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 **@**. Scanning **ABC%i** outputs the keystroke equivalent of **ABC >**.

**Table 30** ASCII Character Set

| ASCII Value<br>(Prefix/Suffix Value) | Full ASCII Code 39<br>Encode Char | Keystroke                                  | ASCII Character<br>(Applies to RS-232 Only) |
|--------------------------------------|-----------------------------------|--|---|
| 1000                                 | %U                                | CTRL 2                                     | NUL   |
| 1001                                 | \$A                               | CTRL A                                     | SOH   |
| 1002                                 | \$B                               | CTRL B                                     | STX   |
| 1003                                 | \$C                               | CTRL C                                     | ETX   |
| 1004                                 | \$D                               | CTRL D                                     | EOT   |
| 1005                                 | \$E                               | CTRL E                                     | ENQ   |
| 1006                                 | \$F                               | CTRL F                                     | ACK   |
| 1007                                 | \$G                               | CTRL G                                     | BELL  |
| 1008                                 | \$H                               | CTRL H/ <b>BACKSPACE</b> <sup>1</sup>      | BCKSPC                                      |
| 1009                                 | \$I                               | CTRL I/ <b>HORIZONTAL TAB</b> <sup>1</sup> | HORIZ TAB                                   |
| 1010                                 | \$J                               | CTRL J                                     | LF/NW LN                                    |
| 1011                                 | \$K                               | CTRL K                                     | VT  |
| 1012                                 | \$L                               | CTRL L                                     | FF  |
| 1013                                 | \$M                               | CTRL M/ <b>ENTER</b> <sup>1</sup>          | CR/ENTER                                    |
| 1014                                 | \$N                               | CTRL N                                     | SO  |

<sup>1</sup>The keystroke in bold transmits only if you enabled [Function Key Mapping on page 246](#) or [Function Key Mapping on page 306](#). Otherwise, the unbold keystroke transmits.

## ASCII Character Sets

**Table 30** ASCII Character Set (Continued)

| ASCII Value<br>(Prefix/Suffix Value) | Full ASCII Code 39<br>Encode Char | Keystroke | ASCII Character<br>(Applies to RS-232 Only) |
|--------------------------------------|-----------------------------------|-----------|---|
| 1015                                 | \$O                               | CTRL O    | SI  |
| 1016                                 | \$P                               | CTRL P    | DLE   |
| 1017                                 | \$Q                               | CTRL Q    | DC1/XON                                     |
| 1018                                 | \$R                               | CTRL R    | DC2   |
| 1019                                 | \$S                               | CTRL S    | DC3/XOFF                                    |
| 1020                                 | \$T                               | CTRL T    | DC4   |
| 1021                                 | \$U                               | CTRL U    | NAK   |
| 1022                                 | \$V                               | CTRL V    | SYN   |
| 1023                                 | \$W                               | CTRL W    | ETB   |
| 1024                                 | \$X                               | CTRL X    | CAN   |
| 1025                                 | \$Y                               | CTRL Y    | EM  |
| 1026                                 | \$Z                               | CTRL Z    | SUB   |
| 1027                                 | %A                                | CTRL [    | ESC   |
| 1028                                 | %B                                | CTRL \    | FS  |
| 1029                                 | %C                                | CTRL ]    | GS  |
| 1030                                 | %D                                | CTRL 6    | RS  |
| 1031                                 | %E                                | CTRL -    | US  |
| 1032                                 | Space                             | Space     | Space                                       |
| 1033                                 | /A                                | !         | !   |
| 1034                                 | /B                                | "         | "   |
| 1035                                 | /C                                | #         | #   |
| 1036                                 | /D                                | \$        | \$  |
| 1037                                 | /E                                | %         | %   |
| 1038                                 | /F                                | &         | &   |
| 1039                                 | /G                                | '         | '   |
| 1040                                 | /H                                | (         | (   |
| 1041                                 | /I                                | )         | )   |
| 1042                                 | /J                                | *         | *   |
| 1043                                 | /K                                | +         | +   |

<sup>1</sup>The keystroke in bold transmits only if you enabled [Function Key Mapping on page 246](#) or [Function Key Mapping on page 306](#). Otherwise, the unbold keystroke transmits.

## ASCII Character Sets

**Table 30** ASCII Character Set (Continued)

| ASCII Value<br>(Prefix/Suffix Value) | Full ASCII Code 39<br>Encode Char | Keystroke | ASCII Character<br>(Applies to RS-232 Only) |
|--------------------------------------|-----------------------------------|-----------|---|
| 1044                                 | /L                                | ,         | ,   |
| 1045                                 | -                                 | -         | -   |
| 1046                                 | .                                 | .         | .   |
| 1047                                 | /o                                | /         | /   |
| 1048                                 | 0                                 | 0         | 0   |
| 1049                                 | 1                                 | 1         | 1   |
| 1050                                 | 2                                 | 2         | 2   |
| 1051                                 | 3                                 | 3         | 3   |
| 1052                                 | 4                                 | 4         | 4   |
| 1053                                 | 5                                 | 5         | 5   |
| 1054                                 | 6                                 | 6         | 6   |
| 1055                                 | 7                                 | 7         | 7   |
| 1056                                 | 8                                 | 8         | 8   |
| 1057                                 | 9                                 | 9         | 9   |
| 1058                                 | /Z                                | :         | :   |
| 1059                                 | %F                                | ;         | ;   |
| 1060                                 | %G                                | <         | <   |
| 1061                                 | %H                                | =         | =   |
| 1062                                 | %I                                | >         | >   |
| 1063                                 | %J                                | ?         | ?   |
| 1064                                 | %V                                | @         | @   |
| 1065                                 | A                                 | A         | A   |
| 1066                                 | B                                 | B         | B   |
| 1067                                 | C                                 | C         | C   |
| 1068                                 | D                                 | D         | D   |
| 1069                                 | E                                 | E         | E   |
| 1070                                 | F                                 | F         | F   |
| 1071                                 | G                                 | G         | G   |
| 1072                                 | H                                 | H         | H   |

<sup>1</sup>The keystroke in bold transmits only if you enabled [Function Key Mapping on page 246](#) or [Function Key Mapping on page 306](#). Otherwise, the unbold keystroke transmits.

## ASCII Character Sets

**Table 30** ASCII Character Set (Continued)

| ASCII Value<br>(Prefix/Suffix Value) | Full ASCII Code 39<br>Encode Char | Keystroke | ASCII Character<br>(Applies to RS-232 Only) |
|--------------------------------------|-----------------------------------|-----------|---|
| 1073                                 | I                                 | I         | I   |
| 1074                                 | J                                 | J         | J   |
| 1075                                 | K                                 | K         | K   |
| 1076                                 | L                                 | L         | L   |
| 1077                                 | M                                 | M         | M   |
| 1078                                 | N                                 | N         | N   |
| 1079                                 | O                                 | O         | O   |
| 1080                                 | P                                 | P         | P   |
| 1081                                 | Q                                 | Q         | Q   |
| 1082                                 | R                                 | R         | R   |
| 1083                                 | S                                 | S         | S   |
| 1084                                 | T                                 | T         | T   |
| 1085                                 | U                                 | U         | U   |
| 1086                                 | V                                 | V         | V   |
| 1087                                 | W                                 | W         | W   |
| 1088                                 | X                                 | X         | X   |
| 1089                                 | Y                                 | Y         | Y   |
| 1090                                 | Z                                 | Z         | Z   |
| 1091                                 | %K                                | [         | [   |
| 1092                                 | %L                                | \         | \   |
| 1093                                 | %M                                | ]         | ]   |
| 1094                                 | %N                                | ^         | ^   |
| 1095                                 | %O                                | _         | _   |
| 1096                                 | %W                                | '         | '   |
| 1097                                 | +A                                | a         | a   |
| 1098                                 | +B                                | b         | b   |
| 1099                                 | +C                                | c         | c   |
| 1100                                 | +D                                | d         | d   |
| 1101                                 | +E                                | e         | e   |

<sup>1</sup>The keystroke in bold transmits only if you enabled [Function Key Mapping on page 246](#) or [Function Key Mapping on page 306](#). Otherwise, the unbold keystroke transmits.

## ASCII Character Sets

**Table 30** ASCII Character Set (Continued)

| ASCII Value<br>(Prefix/Suffix Value) | Full ASCII Code 39<br>Encode Char | Keystroke | ASCII Character<br>(Applies to RS-232 Only) |
|--------------------------------------|-----------------------------------|-----------|---|
| 1102                                 | +F                                | <b>f</b>  | f   |
| 1103                                 | +G                                | <b>g</b>  | g   |
| 1104                                 | +H                                | <b>h</b>  | h   |
| 1105                                 | +I                                | <b>i</b>  | i   |
| 1106                                 | +J                                | <b>j</b>  | j   |
| 1107                                 | +K                                | <b>k</b>  | k   |
| 1108                                 | +L                                | <b>l</b>  | l   |
| 1109                                 | +M                                | <b>m</b>  | m   |
| 1110                                 | +N                                | <b>n</b>  | n   |
| 1111                                 | +O                                | <b>o</b>  | o   |
| 1112                                 | +P                                | <b>p</b>  | p   |
| 1113                                 | +Q                                | <b>q</b>  | q   |
| 1114                                 | +R                                | <b>r</b>  | r   |
| 1115                                 | +S                                | <b>s</b>  | s   |
| 1116                                 | +T                                | <b>t</b>  | t   |
| 1117                                 | +U                                | <b>u</b>  | u   |
| 1118                                 | +V                                | <b>v</b>  | v   |
| 1119                                 | +W                                | <b>w</b>  | w   |
| 1120                                 | +X                                | <b>x</b>  | x   |
| 1121                                 | +Y                                | <b>y</b>  | y   |
| 1122                                 | +Z                                | <b>z</b>  | z   |
| 1123                                 | %P                                | <b>{</b>  | {   |
| 1124                                 | %Q                                | <b> </b>  |   |
| 1125                                 | %R                                | <b>}</b>  | }   |
| 1126                                 | %S                                | <b>~</b>  | ~   |
| 1127                                 |                                   |           | Undefined                                   |
| 7013                                 |                                   |           | ENTER                                       |

<sup>1</sup>The keystroke in bold transmits only if you enabled [Function Key Mapping on page 246](#) or [Function Key Mapping on page 306](#). Otherwise, the unbold keystroke transmits.

**Table 31** ALT Key Character Set

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



**Table 32** GUI Key Character Set

| GUI Key | Keystroke         |
|---------|-------------------|
| 3000    | Right Control Key |
| 3048    | GUI 0             |
| 3049    | GUI 1             |
| 3050    | GUI 2             |
| 3051    | GUI 3             |
| 3052    | GUI 4             |
| 3053    | GUI 5             |
| 3054    | GUI 6             |
| 3055    | GUI 7             |
| 3056    | GUI 8             |
| 3057    | GUI 9             |
| 3065    | GUI A             |
| 3066    | GUI B             |
| 3067    | GUI C             |
| 3068    | GUI D             |
| 3069    | GUI E             |
| 3070    | GUI F             |
| 3071    | GUI G             |
| 3072    | GUI H             |
| 3073    | GUI I             |
| 3074    | GUI J             |
| 3075    | GUI K             |
| 3076    | GUI L             |
| 3077    | GUI M             |
| 3078    | GUI N             |
| 3079    | GUI O             |
| 3080    | GUI P             |
| 3081    | GUI Q             |
| 3082    | GUI R             |

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 32** GUI Key Character Set (Continued)

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

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

**Table 33** PF Key Character Set

| PF Keys | Keystroke |
|---------|-----------|
| 4001    | PF 1      |
| 4002    | PF 2      |
| 4003    | PF 3      |
| 4004    | PF 4      |
| 4005    | PF 5      |
| 4006    | PF 6      |
| 4007    | PF 7      |
| 4008    | PF 8      |
| 4009    | PF 9      |
| 4010    | PF 10     |
| 4011    | PF 11     |
| 4012    | PF 12     |
| 4013    | PF 13     |
| 4014    | PF 14     |
| 4015    | PF 15     |
| 4016    | PF 16     |

**Table 34** F Key Character Set

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

**Table 35** Numeric Key Character Set

| Numeric Keypad | Keystroke |
|----------------|-----------|
| 6042           | *         |
| 6043           | +         |
| 6044           | Undefined |
| 6045           | -         |

**Table 35** Numeric Key Character Set (Continued)

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

**Table 36** Extended Key Character Set

| Extended Keypad | Keystroke    |
|-----------------|--------------|
| 7001            | Break        |
| 7002            | Delete       |
| 7003            | Pg Up        |
| 7004            | End          |
| 7005            | Pg Dn        |
| 7006            | Pause        |
| 7007            | Scroll Lock  |
| 7008            | Backspace    |
| 7009            | Tab          |
| 7010            | Print Screen |
| 7011            | Insert       |
| 7012            | Home         |
| 7013            | Enter        |
| 7014            | Escape       |

**Table 36** Extended Key Character Set (Continued)

| Extended Keypad | Keystroke   |
|-----------------|-------------|
| 7015            | Up Arrow    |
| 7016            | Dn Arrow    |
| 7017            | Left Arrow  |
| 7018            | Right Arrow |

# Programming Reference

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## Symbol Code Identifiers

**Table 37** Symbol Code Characters

| Code Character | Code Type                                    |
|----------------|--|
| A              | UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13          |
| B              | Code 39, Code 32                             |
| C              | Codabar                                      |
| D              | Code 128, ISBT 128, ISBT 128 Concatenated    |
| E              | Code 93                                      |
| F              | Interleaved 2 of 5                           |
| G              | Discrete 2 of 5, or Discrete 2 of 5 IATA     |
| H              | Code 11                                      |
| J              | MSI  |
| K              | GS1-128                                      |
| L              | Bookland EAN                                 |
| M              | Trioptic Code 39                             |
| N              | Coupon Code                                  |
| R              | GS1 DataBar Family                           |
| S              | Matrix 2 of 5                                |
| T              | UCC Composite, TLC 39                        |
| U              | Chinese 2 of 5                               |
| V              | Korean 3 of 5                                |
| X              | ISSN EAN, PDF417, Macro PDF417, Micro PDF417 |
| z              | Aztec, Aztec Rune                            |
| P00            | Data Matrix                                  |

**Table 37** Symbol Code Characters (Continued)

| Code Character | Code Type  |
|----------------|--|
| P01            | QR Code, MicroQR                                     |
| P02            | Maxicode   |
| P03            | US Postnet   |
| P04            | US Planet  |
| P05            | Japan Postal   |
| P06            | UK Postal  |
| P08            | Netherlands KIX Code                                 |
| P09            | Australia Post                                       |
| P0A            | USPS 4CB/One Code/Intelligent Mail                   |
| P0B            | UPU FICS Postal                                      |
| P0C            | Mailmark   |
| P0D            | Grid Matrix, Grid Matrix Inverse, Grid Matrix Mirror |
| P0G            | GS1 Data Matrix                                      |
| P0H            | Han Xin  |
| P0Q            | GS1 QR   |
| P0X            | Signature Capture                                    |

## AIM Code Identifiers

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

- j = Flag Character (ASCII 93)
- c = Code Character (see [Table 38](#))
- m = Modifier Character (see [Table 39](#))

**Table 38** Aim Code Characters

| Code Character | Code Type   |
|----------------|---|
| A              | Code 39, Code 39 Full ASCII, Code 32  |
| C              | Code 128, ISBT 128, ISBT 128 Concatenated, GS1-128, Coupon (Code 128 portion) |
| d              | Data Matrix, GS1 Data Matrix  |
| E              | UPC/EAN, Coupon (UPC portion)   |
| e              | GS1 DataBar Family  |
| F              | Codabar   |

**Table 38** Aim Code Characters (Continued)

| Code Character | Code Type   |
|----------------|---|
| G              | Code 93   |
| H              | Code 11   |
| h              | Han Xin   |
| I              | Interleaved 2 of 5  |
| L              | PDF417, Macro PDF417, Micro PDF417  |
| L2             | TLC 39  |
| M              | MSI   |
| Q              | QR Code, MicroQR, GS1 QR  |
| S              | Discrete 2 of 5, IATA 2 of 5  |
| U              | Maxicode  |
| z              | Aztec, Aztec Rune   |
| X              | Bookland EAN, ISSN EAN, Trioptic Code 39, Chinese 2 of 5, Matrix 2 of 5, Korean 3 of 5, US Postnet, US Planet, UK Postal, Japan Postal, Australia Post, Netherlands KIX Code, USPS 4CB/One Code/ Intelligent Mail, UPU FICS Postal, Mailmark, Signature Capture |
| ]g             | Grid Matrix, Grid Matrix Inverse, Grid Matrix Mirror  |

The modifier character is the sum of the applicable option values based on [Table 39](#).

**Table 39** Modifier Characters

| Code Type               | Option Value  | Option   |
|-------------------------|---|--|
| <b>Code 39</b>          | 0   | No check character or Full ASCII processing.   |
|                         | 1   | Reader has checked one check character.  |
|                         | 3   | Reader has checked and stripped check character.   |
|                         | 4   | Reader has performed Full ASCII character conversion.  |
|                         | 5   | Reader has performed Full ASCII character conversion and checked one check character.          |
|                         | 7   | Reader has performed Full ASCII character conversion and checked and stripped check character. |
|                         | Example: A Full ASCII barcode with check character W, <b>A+I+MI+DW</b> , is transmitted as <b>JA7AIMID</b> where 7 = (3+4). |  |
| <b>Trioptic Code 39</b> | 0   | No option specified at this time. Always transmit 0.   |
|                         | Example: A Trioptic barcode 412356 is transmitted as <b>JX0412356</b>   |  |



**Table 39** Modifier Characters (Continued)

| Code Type           | Option Value   | Option   |
|---------------------|--|--|
| <b>Code 128</b>     | 0  | Standard data packet, no Function code 1 in first symbol position.   |
|                     | 1  | Function code 1 in first symbol character position.  |
|                     | 2  | Function code 1 in second symbol character position.   |
|                     | Example: A Code (EAN) 128 barcode with Function 1 character <sup>FNC1</sup> in the first position, AIMID is transmitted as <b>JC1AIMID</b> |  |
| <b>I 2 of 5</b>     | 0  | No check digit processing.   |
|                     | 1  | Reader has validated check digit.  |
|                     | 3  | Reader has validated and stripped check digit.   |
|                     | Example: An I 2 of 5 barcode without check digit, 4123, is transmitted as <b>J104123</b>   |  |
| <b>Codabar</b>      | 0  | No check digit processing.   |
|                     | 1  | Reader has checked check digit.  |
|                     | 3  | Reader has stripped check digit before transmission.   |
|                     | Example: A Codabar barcode without check digit, 4123, is transmitted as <b>JF04123</b>   |  |
| <b>Code 93</b>      | 0  | No options specified at this time. Always transmit 0.  |
|                     | Example: A Code 93 barcode 012345678905 is transmitted as <b>JG0012345678905</b>   |  |
| <b>MSI</b>          | 0  | Check digits are sent.   |
|                     | 1  | No check digit is sent.  |
|                     | Example: An MSI barcode 4123, with a single check digit checked, is transmitted as <b>JM14123</b>  |  |
| <b>D 2 of 5</b>     | 0  | No options specified at this time. Always transmit 0.  |
|                     | Example: A D 2 of 5 barcode 4123, is transmitted as <b>JS04123</b>   |  |
| <b>UPC/EAN</b>      | 0  | Standard data packet in full EAN format, i.e., 13 digits for UPC-A, UPC-E, and EAN-13 (not including supplemental data). |
|                     | 1  | Two digit supplemental data only.  |
|                     | 2  | Five digit supplemental data only.   |
|                     | 3  | Combined data packet comprising 13 digits from EAN-13, UPC-A or UPC-E symbol and 2 or 5 digits from supplemental symbol. |
|                     | 4  | EAN-8 data packet.   |
|                     | Example: A UPC-A barcode 012345678905 is transmitted as <b>JE00012345678905</b>  |  |
| <b>Bookland EAN</b> | 0  | No options specified at this time. Always transmit 0.  |
|                     | Example: A Bookland EAN barcode 123456789X is transmitted as <b>JX0123456789X</b>  |  |
| <b>ISSN EAN</b>     | 0  | No options specified at this time. Always transmit 0.  |
|                     | Example: An ISSN EAN barcode 123456789X is transmitted as <b>JX0123456789X</b>   |  |

**Table 39** Modifier Characters (Continued)

| Code Type   | Option Value | Option   |
|---|--------------|--|
| <b>Code 11</b>  | 0            | Single check digit   |
|   | 1            | Two check digits   |
|   | 3            | Check characters validated but not transmitted.  |
| <b>GS1 DataBar Family</b>   |              | No option specified at this time. Always transmit 0. GS1 DataBar Omnidirectional and GS1 DataBar Limited transmit with an Application Identifier "01".<br>Note: In GS1-128 emulation mode, GS1 DataBar is transmitted using Code 128 rules (i.e., ]C1).  |
|   |              | Example: A GS1 DataBar Omnidirectional barcode 0110012345678902 is transmitted as ]e00110012345678902.   |
| <b>EAN.UCC Composites (GS1 DataBar, GS1-128, 2D portion of UPC composite)</b> |              | Native mode transmission.<br>Note: UPC portion of composite is transmitted using UPC rules.  |
|   | 0            | Standard data packet.  |
|   | 1            | Data packet containing the data following an encoded symbol separator character.   |
|   | 2            | Data packet containing the data following an escape mechanism character. The data packet does not support the ECI protocol.  |
|   | 3            | Data packet containing the data following an escape mechanism character. The data packet supports the ECI protocol.  |
|   |              | GS1-128 emulation<br>Note: UPC portion of composite is transmitted using UPC rules.  |
|   | 1            | Data packet is a GS1-128 symbol (i.e., data is preceded with ]JC1).  |
| <b>PDF417, Micro PDF417</b>   | 0            | Reader set to conform to protocol defined in 1994 PDF417 symbology specifications. <b>Note:</b> When this option is transmitted, the receiver cannot reliably determine whether ECIs have been invoked or whether data byte 92 <sub>DEC</sub> has been doubled in transmission.                          |
|   | 1            | Reader set to follow the ECI protocol (Extended Channel Interpretation). All data characters 92 <sub>DEC</sub> are doubled.  |
|   | 2            | Reader set for Basic Channel operation (no escape character transmission protocol). Data characters 92 <sub>DEC</sub> are not doubled. <b>Note:</b> When decoders are set to this mode, unbuffered Macro symbols and symbols requiring the decoder to convey ECI escape sequences cannot be transmitted. |
|   | 3            | The barcode contains a GS1-128 symbol, and the first codeword is 903-907, 912, 914, 915.   |
|   | 4            | The barcode contains a GS1-128 symbol, and the first codeword is in the range 908-909.   |
|   | 5            | The barcode contains a GS1-128 symbol, and the first codeword is in the range 910-911.   |
|   |              | Example: A PDF417 barcode ABCD, with no transmission protocol enabled, is transmitted as ]L2ABCD.  |

**Table 39** Modifier Characters (Continued)

| Code Type              | Option Value | Option   |
|------------------------|--------------|--|
| <b>Data Matrix</b>     | 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.   |
| <b>GS1 Data Matrix</b> | 2            | ECC 200, FNC1 in first or fifth position.  |
| <b>MaxiCode</b>        | 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.  |
| <b>QR Code</b>         | 0            | Model 1 symbol.  |
|                        | 1            | Model 2 / MicroQR symbol, ECI protocol not implemented.  |
|                        | 2            | Model 2 symbol, ECI protocol implemented.  |
|                        | 3            | Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.                                    |
|                        | 4            | Model 2 symbol, ECI protocol implemented, FNC1 implied in first position.  |
|                        | 5            | Model 2 symbol, ECI protocol not implemented, FNC1 implied in second position.                                   |
|                        | 6            | Model 2 symbol, ECI protocol implemented, FNC1 implied in second position.                                       |
| <b>GS1 QR</b>          | 3            | Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.                                    |
| <b>Aztec</b>           | 0            | Aztec symbol.  |
|                        | C            | Aztec Rune symbol.   |
| <b>Han Xin</b>         | 0            | Generic data, no special features are set. The transmitted data does not follow the AIM ECI protocol.            |
|                        | 1            | ECI protocol enabled. There is at least one ECI mode encoded. Transmitted data must follow the AIM ECI protocol. |

**Table 39** Modifier Characters (Continued)

| Code Type   | Option Value | Option  |
|---|--------------|---|
| <b>Grid Matrix, Grid Matrix Inverse, Grid Matrix Mirror</b> | 0            | No options specified at this time. Always transmit 0. |
| <b>Mailmark</b>   | 0            | No option specified at this time. Always transmit 0.  |

# Communication Protocol Functionality

## Functionality Supported via Communication (Cable) Interface

Table 40 lists supported scanner functionality by communication protocol.

**Table 40** Communication Interface Functionality

| Communication Interfaces                            | Functionality     |                   |                              |
|---|-------------------|-------------------|------------------------------|
|   | Data Transmission | Remote Management | Image and Video Transmission |
| <b>USB</b>  |                   |                   |                              |
| HID Keyboard Emulation                              | Supported         | Not Available     | Not Available                |
| CDC COM Port Emulation                              | Supported         | Not Available     | Not Available                |
| SSI over CDC COM Port Emulation                     | Supported         | Supported         | Supported                    |
| IBM Table-top USB                                   | Supported         | Supported         | Not Available                |
| IBM Hand-held USB                                   | Supported         | Supported         | Not Available                |
| USB OPOS Hand-held                                  | Supported         | Supported         | Not Available                |
| Symbol Native API (SNAPI) without Imaging Interface | Supported         | Supported         | Not Available                |
| Symbol Native API (SNAPI) with Imaging Interface    | Supported         | Supported         | Supported                    |
| <b>RS-232</b>                                       |                   |                   |                              |
| Standard RS-232                                     | Supported         | Not Available     | Not Available                |
| ICL RS-232  | Supported         | Not Available     | Not Available                |
| Fujitsu RS-232                                      | Supported         | Not Available     | Not Available                |
| Wincor-Nixdorf RS-232 Mode A                        | Supported         | Not Available     | Not Available                |
| Wincor-Nixdorf RS-232 Mode B                        | Supported         | Not Available     | Not Available                |
| Olivetti ORS4500                                    | Supported         | Not Available     | Not Available                |
| Omron   | Supported         | Not Available     | Not Available                |

**Table 40** Communication Interface Functionality (Continued)

| Communication Interfaces              | Functionality     |                   |                              |
|---------------------------------------|-------------------|-------------------|------------------------------|
|                                       | Data Transmission | Remote Management | Image and Video Transmission |
| CUTE                                  | Supported         | Not Available     | Not Available                |
| OPOS/JPOS                             | Supported         | Not Available     | Not Available                |
| SSI                                   | Supported         | Supported         | Supported                    |
| <b>IBM 4690</b>                       |                   |                   |                              |
| Hand-held Scanner Emulation (Port 9B) | Supported         | Not Available     | Not Available                |
| Table-top Scanner Emulation (Port 17) | Supported         | Supported         | Not Available                |
| Non-IBM Scanner Emulation (Port 5B)   | Supported         | Supported         | Not Available                |
| <b>Keyboard Wedge</b>                 |                   |                   |                              |
| IBM PC/AT & IBM PC Compatibles        | Supported         | Not Available     | Not Available                |
| IBM AT Notebook                       | Supported         | Not Available     | Not Available                |

# Country Codes

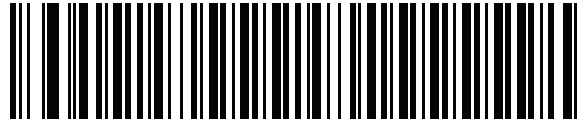
---

## Introduction

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

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

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



\*Indicates Default — \*US English (North American) — Feature/Option

## USB and Keyboard Wedge Country Keyboard Types (Country Codes)

Scan the barcode 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 [Keypad Emulation on page 244](#) for the USB HID host. For a keyboard wedge host, see [Alternate Numeric Keypad Emulation on page 304](#).



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

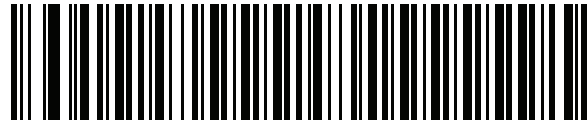


**NOTE:** For best results when using international keyboards, enable [Quick Keypad Emulation on page 244](#).



**IMPORTANT:**

- Some country keyboard barcode types are specific to certain Windows operating systems (that is, XP and Windows 7 or higher). Barcodes requiring a specific Windows OS are noted in the barcode captions.
- Use the **French International** barcode for Belgian French keyboards.



\*US English (North American)



US English (Mac)



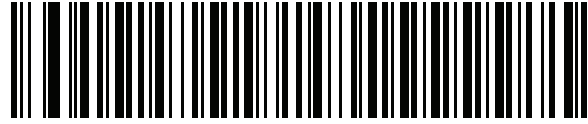
Albanian



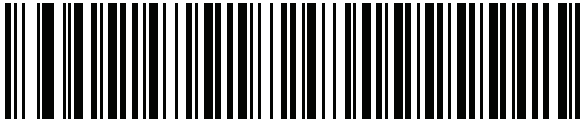
Arabic (101)



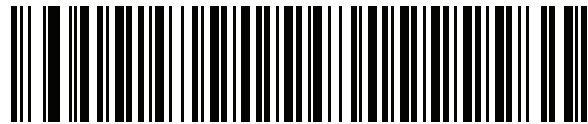
Country Codes (Continued)



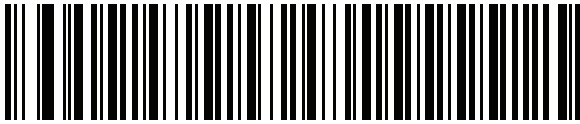
Arabic (102)



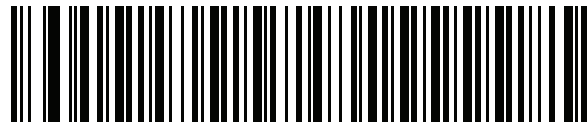
Arabic (102) AZERTY



Azeri (Latin)



Azeri (Cyrillic)



Belarusian



Bosnian (Latin)

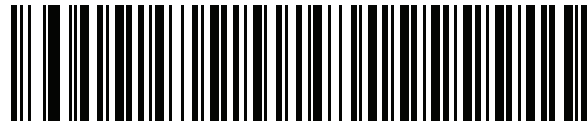


Bosnian (Cyrillic)

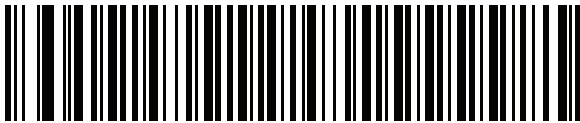
**Country Codes (Continued)**



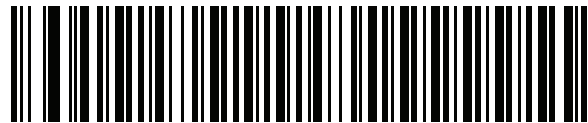
**Bulgarian (Latin)**



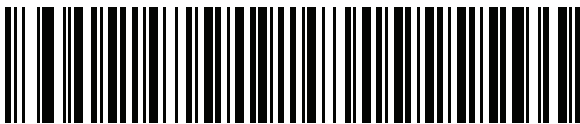
**Bulgarian Cyrillic (Typewriter)  
(Bulgarian -Windows XP  
Typewriter - Windows 7 or higher)**



**Canadian French Win7**



**Canadian French (Legacy)**



**Canadian Multilingual Standard**

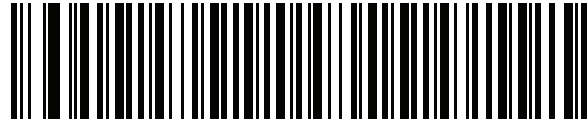


**Chinese (ASCII)**

**Country Codes (Continued)**

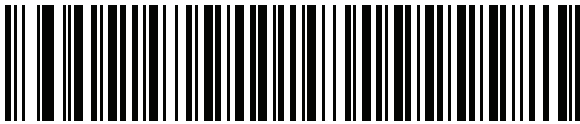


Chinese (Simplified)\*

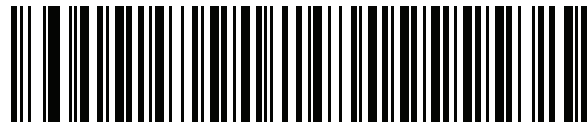


Chinese (Traditional)\*

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



Croatian



Czech



Czech (Programmer)



Czech (QWERTY)

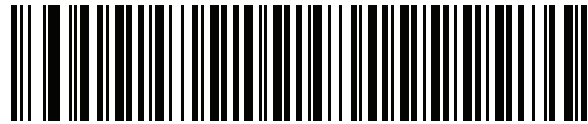


Danish

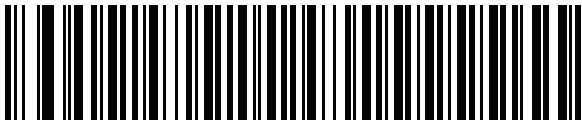
**Country Codes (Continued)**



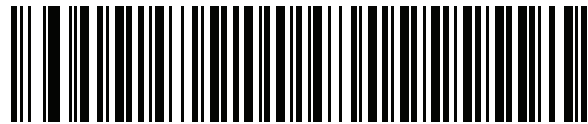
**Dutch (Netherlands)**



**Estonian**



**Faeroese**



**Finnish**



**French (France)**

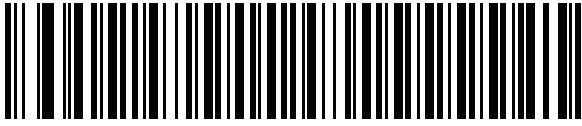


**French International  
(Belgian French)**



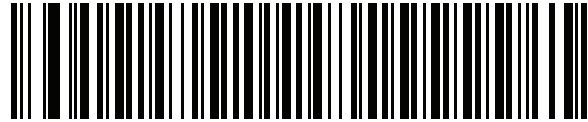
**French (Canada) 95/98**

### Country Codes (Continued)

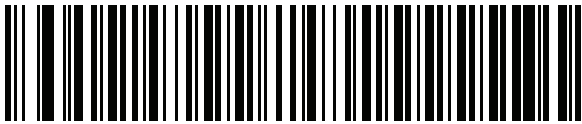


French (Canada) 2000/XP\*

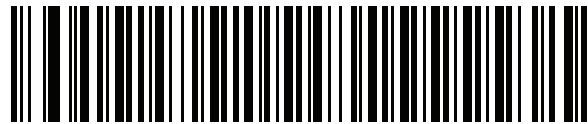
\*There is also a country code barcode for [Canadian Multilingual Standard on page 474](#). Be sure to select the appropriate barcode for your host system.



Galician



German



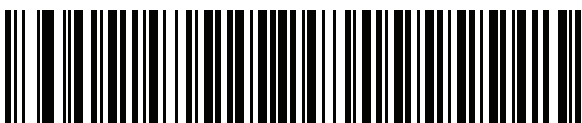
Greek Latin



Greek (220) Latin

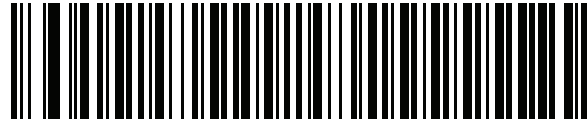


Greek (319) Latin

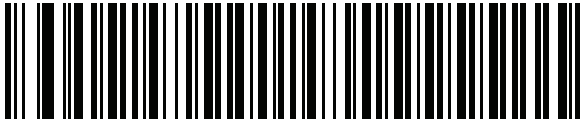


Greek

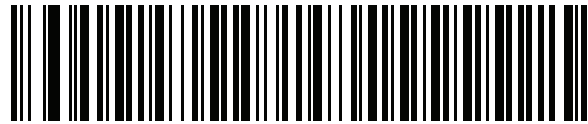
Country Codes (Continued)



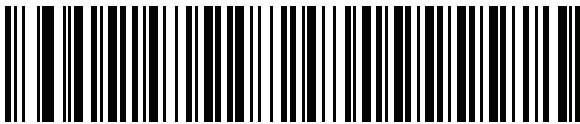
Greek (220)



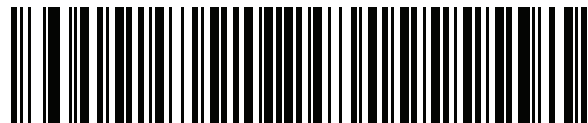
Greek (319)



Greek Polytonic



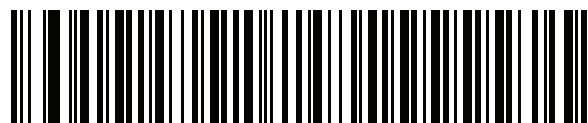
Hebrew Israel



Hungarian

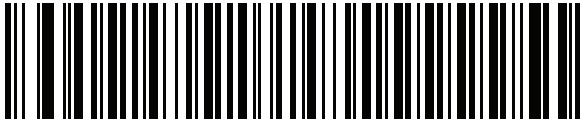


Hungarian\_101KEY

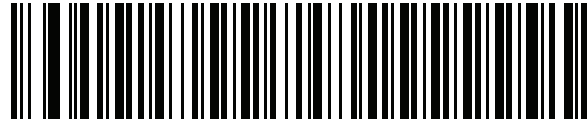


Icelandic

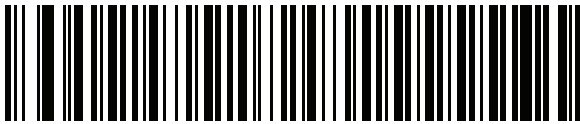
**Country Codes (Continued)**



Irish



Italian



Italian (142)



Japanese (ASCII)



Japanese (SHIFT-JIS)\*

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

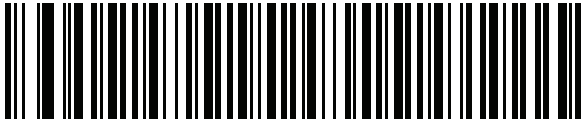


Kazakh



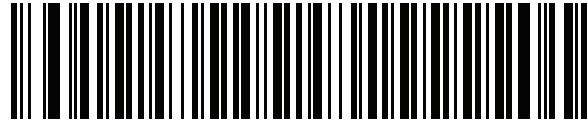
Korean (ASCII)

### Country Codes (Continued)

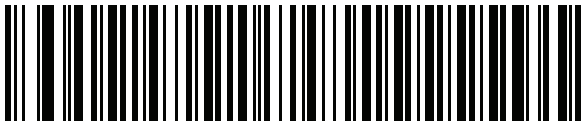


Korean (Hangul)\*

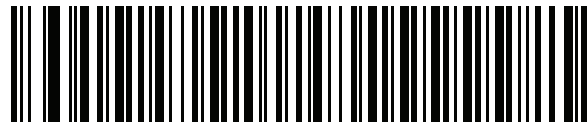
\*For CJK keyboard types, see [CKJ Decode Control](#).



Kyrgyz



Latin American



Latvian



Latvian (QWERTY)



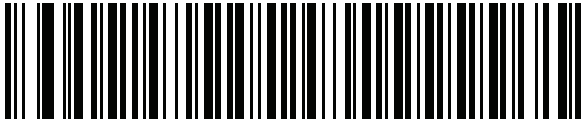
Lithuanian



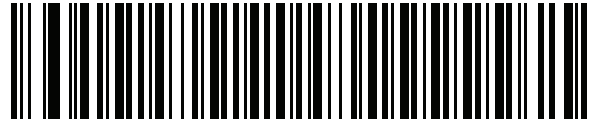
Lithuanian (IBM)



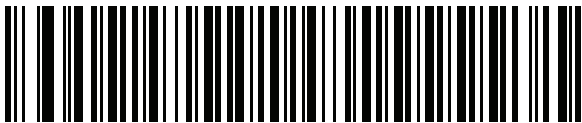
Country Codes (Continued)



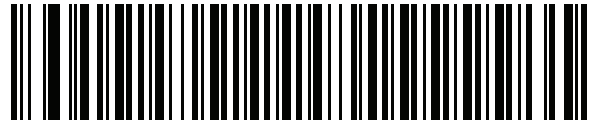
Macedonian (FYROM)



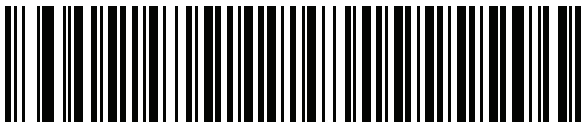
Maltese\_47KEY



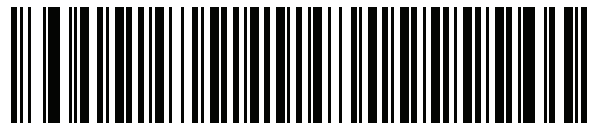
Mongolian



Norwegian



Polish (214)

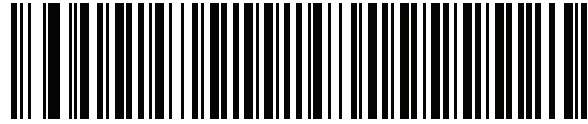


Polish (Programmer)

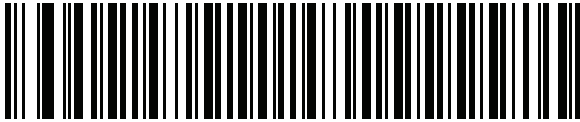


Portuguese (Brazil)  
(Windows XP)

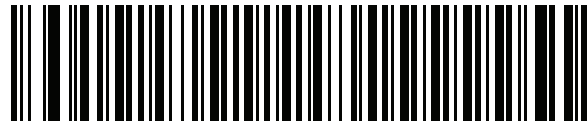
**Country Codes (Continued)**



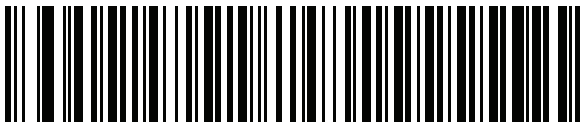
**Portuguese (Brazilian ABNT)**



**Portuguese (Brazilian ABNT2)**



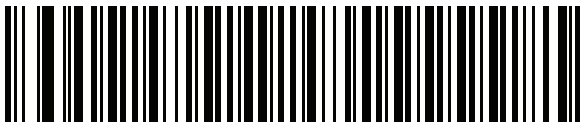
**Portuguese (Portugal)**



**Romanian  
(Windows XP)**



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

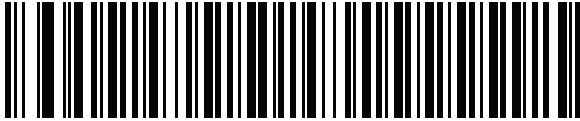


**Romanian (Standard)  
(Windows 7 or higher)**

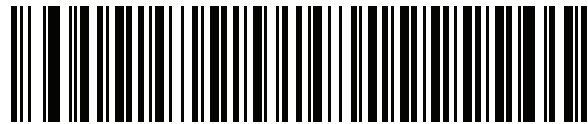
Country Codes (Continued)



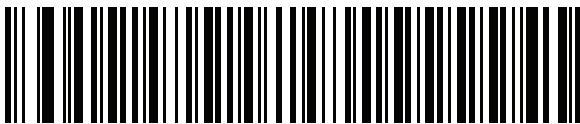
Romanian (Programmer)  
(Windows 7 or higher)



Russian



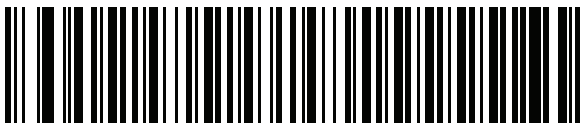
Russian (Typewriter)



Serbian (Latin)



Serbian (Cyrillic)

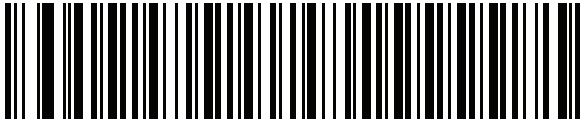


Slovak

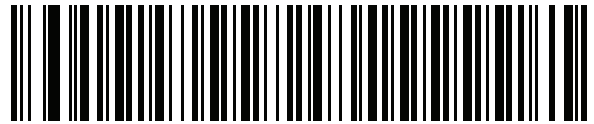
Country Codes (Continued)



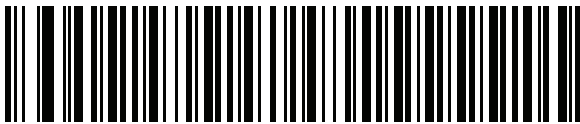
Slovak (QWERTY)



Slovenian



Spanish



Spanish (Variation)



Swedish

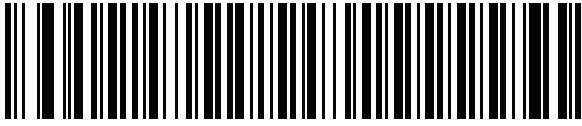


Swiss French

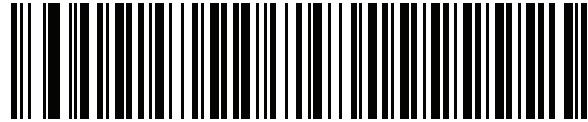


Swiss German

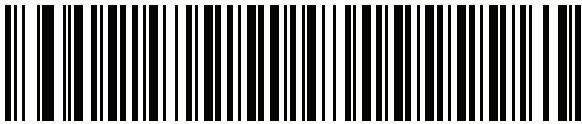
Country Codes (Continued)



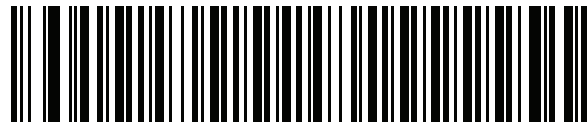
Tatar



Thai (Kedmanee)



Turkish F



Turkish Q



UK English

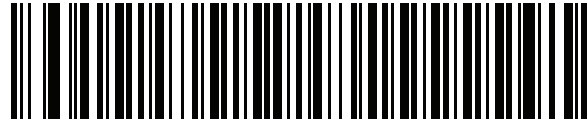


Ukrainian

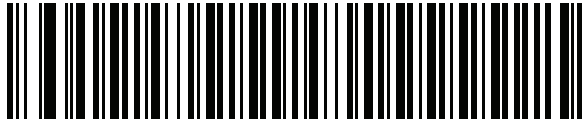


US Dvorak

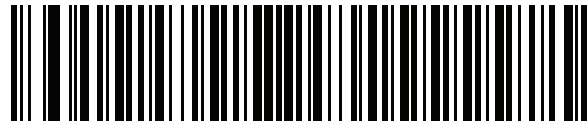
**Country Codes (Continued)**



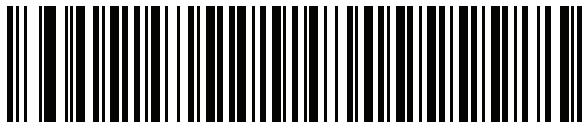
US Dvorak Left



US Dvorak Right



US International



Uzbek



Vietnamese

# Country Code Pages

---

## Introduction

This chapter provides barcodes for selecting code pages for the country keyboard type selected in [Country Codes](#). If the default code page in [Table 41](#) is appropriate for your selected country keyboard type, you do not need to scan a country code page barcode.



**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 41](#) lists the code page default for each country keyboard.

**Table 41** Country Code Page Defaults

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

**Table 41** Country Code Page Defaults (Continued)

| Country Keyboard                      | Code Page Default |
|---------------------------------------|-------------------|
| Canadian French Win7                  | Windows 1252      |
| Canadian French (Legacy)              | Windows 1252      |
| Canadian Multilingual                 | Windows 1252      |
| Croatian                              | Windows 1250      |
| Chinese ASCII                         | Windows 1252      |
| Chinese (Simplified)                  | Windows 936, GBK  |
| Chinese (Traditional)                 | Windows 950, Big5 |
| Czech                                 | Windows 1250      |
| Czech Programmers                     | Windows 1250      |
| Czech QWERTY                          | Windows 1250      |
| Danish                                | Windows 1252      |
| Dutch Netherland                      | Windows 1252      |
| Estonian                              | Windows 1257      |
| Faeroese                              | Windows 1252      |
| Finnish                               | Windows 1252      |
| French (France)                       | Windows 1252      |
| French (Canada) 95/98                 | Windows 1252      |
| French (Canada) 2000/XP               | Windows 1252      |
| French International (Belgian French) | Windows 1252      |
| Galician                              | Windows 1252      |
| German                                | Windows 1252      |
| Greek Latin                           | Windows 1252      |
| Greek220 Latin                        | Windows 1253      |
| Greek319 Latin                        | Windows 1252      |
| Greek                                 | Windows 1253      |
| Greek220                              | Windows 1253      |
| Greek319                              | Windows 1253      |
| Greek Polytonic                       | Windows 1253      |
| Hebrew Israel                         | Windows 1255      |
| Hungarian                             | Windows 1250      |
| Hungarian_101KEY                      | Windows 1250      |



**Table 41** Country Code Page Defaults (Continued)

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

**Table 41** Country Code Page Defaults (Continued)

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

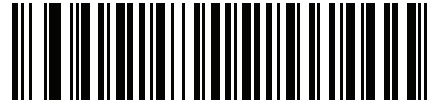
---

## Country Code Page Barcodes

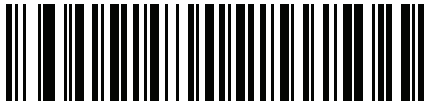
Scan the barcode corresponding to the country keyboard code page.



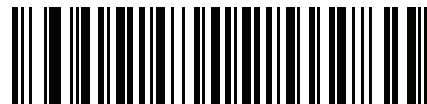
**Windows 1250**  
Latin 2, Central European



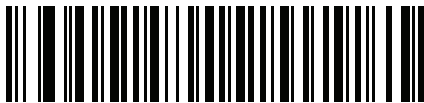
**Windows 1251**  
Cyrillic, Slavic



**Windows 1252**  
Latin 1, Western European



**Windows 1253**  
Greek

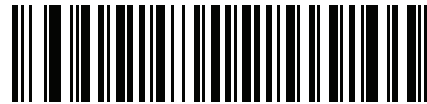


**Windows 1254**  
Latin 5, Turkish

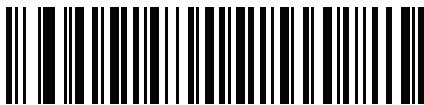
**Country Code Pages (Continued)**



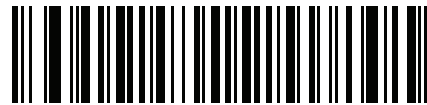
**Windows 1255  
Hebrew**



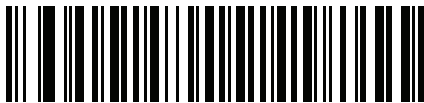
**Windows 1256  
Arabic**



**Windows 1257  
Baltic**



**Windows 1258  
Vietnamese**

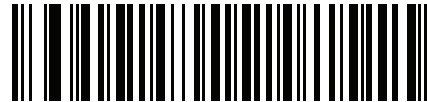


**Windows 874  
Thai**

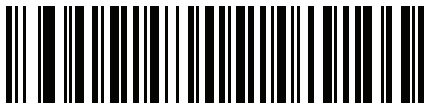
**Country Code Pages (Continued)**



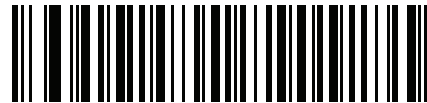
**Windows 20866  
Cyrillic KOI8-R**



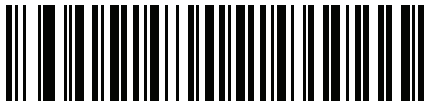
**Windows 932  
Japanese Shift-JIS**



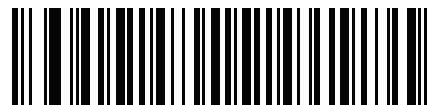
**Windows 936  
Simplified Chinese GBK**



**Windows 54936  
Simplified Chinese GB18030**



**Windows 949  
Korean Hangul**

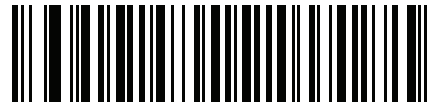


**Windows 950  
Traditional Chinese Big5**

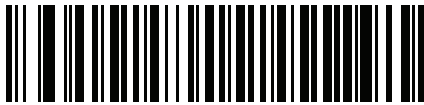
Country Code Pages (Continued)



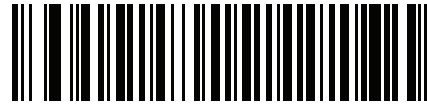
MS-DOS 437  
Latin US



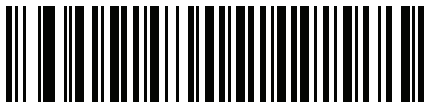
MS-DOS 737  
Greek



MS-DOS 775  
Baltic



MS-DOS 850  
Latin 1

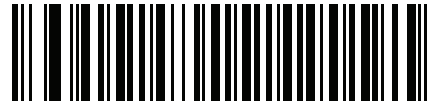


MS-DOS 852  
Latin 2

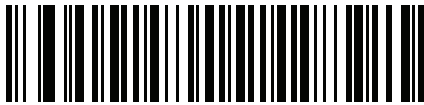
Country Code Pages (Continued)



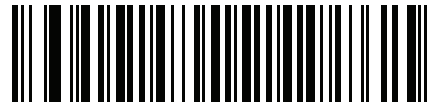
MS-DOS 855  
Cyrillic



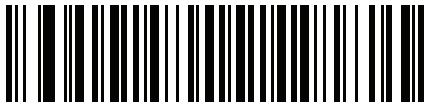
MS-DOS 857  
Turkish



MS-DOS 860  
Portuguese



MS-DOS 861  
Icelandic

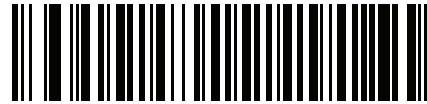


MS-DOS 862  
Hebrew

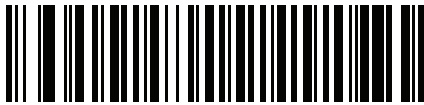
**Country Code Pages (Continued)**



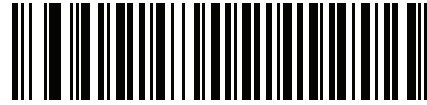
**MS-DOS 863  
French Canada**



**MS-DOS 865  
Nordic**



**MS-DOS 866  
Cyrillic**



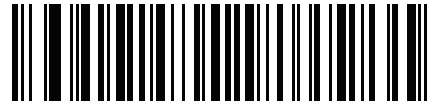
**MS-DOS 869  
Greek 2**



**Country Code Pages (Continued)**



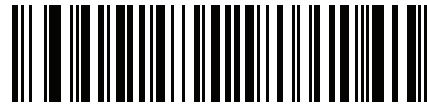
**ISO 8859-1**  
Latin 1, Western European



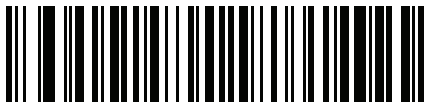
**ISO 8859-2**  
Latin 2, Central European



**ISO 8859-3**  
Latin 3, South European



**ISO 8859-4**  
Latin 4, North European

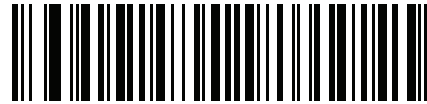


**ISO 8859-5**  
Cyrillic

**Country Code Pages (Continued)**



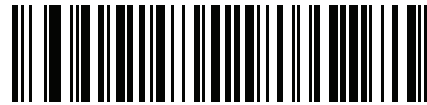
**ISO 8859-6**  
Arabic



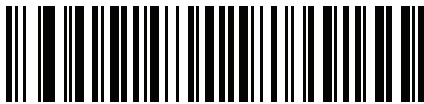
**ISO 8859-7**  
Greek



**ISO 8859-8**  
Hebrew



**ISO 8859-9**  
Latin 5, Turkish

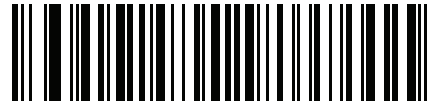


**ISO 8859-10**  
Latin 6, Nordic

Country Code Pages (Continued)



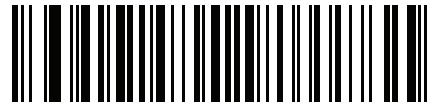
ISO 8859-11  
Thai



ISO 8859-13  
Latin 7, Baltic



ISO 8859-14  
Latin 8, Celtic



ISO 8859-15  
Latin 9

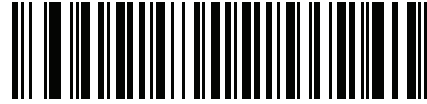


ISO 8859-16  
Latin 10, South-Eastern European

**Country Code Pages (Continued)**



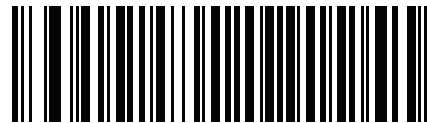
UTF-8



UTF-16LE  
UTF-16 Little Endian



UTF-16BE  
UTF-16 Big Endian



Mac CP10000  
Roman

# CKJ Decode Control

---

## Introduction

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



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

---

## CJK Control Parameters

### Unicode Output Control

#### Parameter # 973

For a Unicode encoded CJK barcode, 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 505](#).

- **Output to Unicode Application Only** - This method applies only to Unicode expected applications, such as MS Word and WordPad, but not Notepad.



\*Universal Output  
(0)



Unicode Application Only  
(1)

## CJK Output Method to Windows Host

### Parameter # 972

For a national standard encoded CJK barcode, 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.

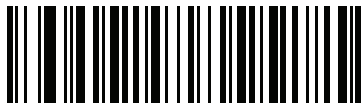


**NOTE:** To support universal CJK output, set up the registry table for the Windows host. See [Unicode/CJK Decode Setup with Windows Host on page 505](#).

- **Other options for CJK output** - With the following methods, the scanner sends the CJK character hexadecimal internal code (Nei Ma) value to the host, or converts the CJK character to Unicode and sends the hexadecimal Unicode value to the 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 505](#).
  - **Japanese Unicode Output**
  - **Simplified Chinese GBK Code Output**
  - **Simplified Chinese Unicode Output**
  - **Korean Unicode Code Output**
  - **Traditional Chinese Big5 Code Output (Windows XP)**
  - **Traditional Chinese Big5 Code Output (Windows 7)**
  - **Traditional Chinese Unicode Code Output (Windows XP)**
  - **Traditional Chinese Unicode Code Output (Windows 7)**



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



\*Universal CJK Output  
(0)



Japanese Unicode Output  
(34)

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

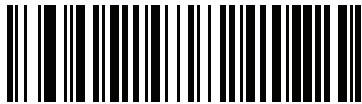
## CJK Output Method to Windows Host (continued)



Chinese (Simplified) GBK Output  
(1)

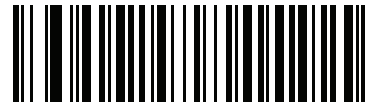


Chinese (Simplified) Unicode Output  
(2)

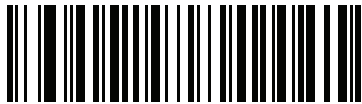


Korean Unicode Output  
(50)

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



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



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



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



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

## Non-CJK UTF Barcode Output

### Parameter # 960

Some country keyboard type layouts contain characters that do not exist in the default code page (see [Country Keyboard Type Missing Characters on page 504](#)). Although the default code page can not encode these characters in a barcode, they can be encoded in the UTF-8 barcode. Scan the following barcode to output the Unicode values by emulation mode.



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

Use US English IME on Windows. See [Unicode Output Control on page 501](#).



Non-CJK UTF-8 Emulation Output

## Country Keyboard Type Missing Characters

Country keyboard type: Tatar, Uzbek, Mongolian, Kyrgyz, Kazakh and Azeri

Default code page: CP1251

**Table 42** Missing Characters

|   |   |
|---|---|
| ƒ | F |
| х | Ҥ |
| к | Қ |
| h | Һ |
| ө | Ө |
| ә | Ә |
| Ү | У |
| ң | Ң |
| ж | Ж |
| Ғ |   |
| н | Ң |
| Ү | У |
| к | Қ |



**Table 42** Missing Characters (Continued)

|   |   |
|---|---|
| ı | Ț |
| κ | Κ |

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

Default code page: CP1250

**Table 43** Missing Characters

|   |   |
|---|---|
| ş | Ș |
| ț | Ț |

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

Default code page: CP1252

Missing character: **€**

Country keyboard type: **Azeri-Latin**

Default code page: CP1254

Missing characters: ə, Ə

---

## Unicode/CJK Decode Setup with Windows Host

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

### Setting Up the Windows Registry Table for Unicode Universal Output

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

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

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

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

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

3. Reboot the computer to implement the registry change.

### Adding CJK IME on Windows

To add the desired CJK input language:

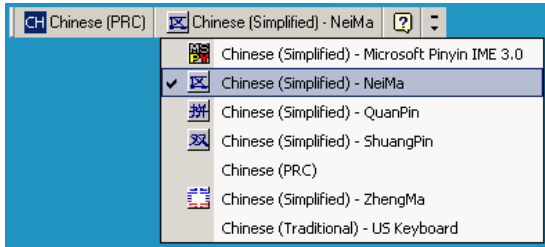
1. Click **Start > Control Panel**.

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

## Selecting the Simplified Chinese Input Method on the Host

To select the Simplified Chinese input method:

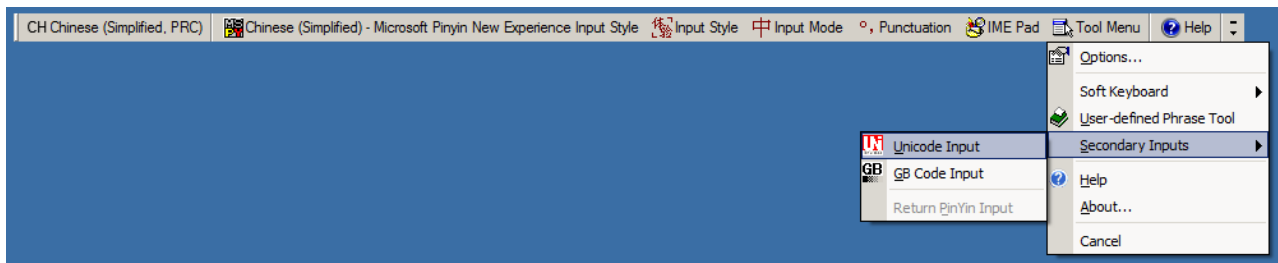
- Select Unicode/GBK input on Windows XP: **Chinese (Simplified) - NeiMa**, then click the input bar to select **Unicode** or **GBK NeiMa** input.



Or



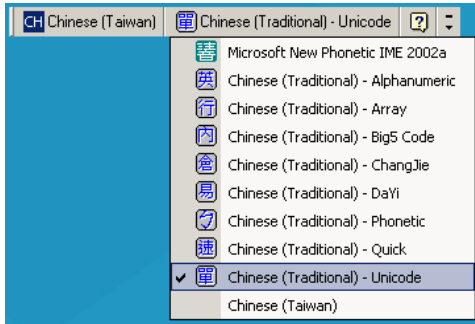
- Select Unicode/GBK input on Windows 7: **Chinese (Simplified) - Microsoft Pinyin New Experience Input Style**, then select **Tool Menu > Secondary Inputs > Unicode Input** or **GB Code Input**.



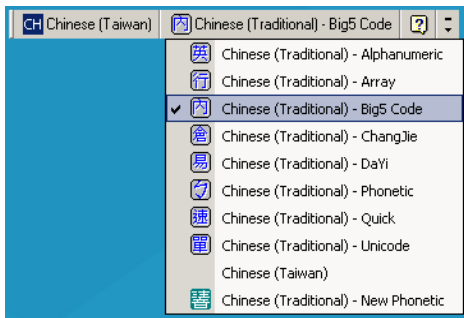
## Selecting the Traditional Chinese Input Method on the Host

To select the Traditional Chinese input method:

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



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



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



# Signature Capture

---

## 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 33](#). 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.

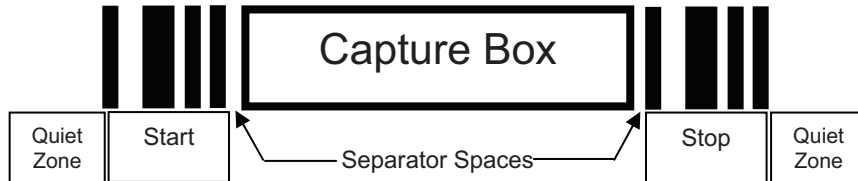
**Figure 33** CapCode



## CapCode Pattern Structure

A CapCode pattern structure consists of a start pattern followed by a separator space, a signature capture box, a second separator space, and then a stop pattern. Assuming that  $X$  is the dimension of the thinnest element, the start and stop patterns each contains  $9X$  total width in 4 bars and 3 spaces. A  $7X$  quiet zone is required to the left and to the right of the CapCode pattern.

**Figure 34** CapCode Structure



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

## Start / Stop Patterns

Table 44 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 44** Start / Stop Pattern Definitions

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

Table 45 lists selectable parameters used to generate the image of the captured signature.

**Table 45** User Defined CapCode Parameters

| Parameter    | Defined                                    |
|--------------|--|
| Width        | Number of pixels                           |
| Height       | Number of pixels                           |
| Format       | JPEG, BMP, TIFF                            |
| JPEG quality | 1 (most compression) to 100 (best quality) |

**Table 45** User Defined CapCode Parameters

| Parameter   | Defined        |
|---|----------------|
| Bits Per Pixel<br>(not applicable to JPEG format) | 1 (2 levels)   |
|   | 4 (16 levels)  |
|   | 8 (256 levels) |

BMP format does not use compression, JPEG and TIFF formats do.

---

## Dimensions

The size of the signature capture box is determined by the height and separation of the start and stop patterns. The line width of the signature capture box is insignificant.

The thinnest element width, referred to here as X, is nominally 10 mils (1 mil = 0.0254 mm). Select this as an exact multiple of the pixel pitch of the printer used. For example, when using a 203 DPI (dots-per-inch) printer and printing 2 dots per module, the resulting X dimension is 9.85 mils.

---

## Data Format

The decoder output is formatted according to [Table 46](#). Zebra decoders allow different user options to output or inhibit barcode type. Selecting "Symbol ID" as the barcode type for output identifies the CapCode with letter "i".

**Table 46** Data Format

| File Format<br>(1 byte)         | Type (1 byte)                              | Image Size<br>(4 bytes, BIG Endian) | Image Data                      |
|---------------------------------|--|-------------------------------------|---------------------------------|
| JPEG - 1<br>BMP - 3<br>TIFF - 4 | See <a href="#">Table 44</a> , last column |                                     | (Same bytes as in a data file.) |

---

## Additional Capabilities

Regardless of how the signature is captured, the output signature image is de-skewed and right-side up.

A scanner that captures signatures automatically determines whether it is scanning a signature or a barcode. You can disable the signature capturing capability in a decoder.

---

## Signature Boxes

Figure 35 illustrates the five acceptable signature boxes.

**Figure 35** Acceptable Signature Boxes

Type 2:



Type 5:



Type 7:



Type 8:



Type 9:





# Non-Parameter Attributes (Attribute Data Dictionary)

---

## Introduction

This chapter 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 DS9908-SR00004ZCWW.

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

### Serial Number

#### Attribute #534

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

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

## Date of Manufacture

### Attribute #535

Date of device manufacture assigned in the manufacturing facility. This electronic output matches the printout on the physical device label, for example **31OCT18** (which reads the 31st of October 2018).

|                  |          |
|------------------|----------|
| Type             | S        |
| Size (Bytes)     | 7        |
| User Mode Access | R        |
| Values           | Variable |

## Date of First Programming

### Attribute #614

Date of first electronic programming represents the first time settings were electronically loaded to the scanner either by 123Scan or via SMS, for example **18MAY17** (which reads the 18th of May 2017).

|                  |          |
|------------------|----------|
| Type             | S        |
| Size (Bytes)     | 7        |
| User Mode Access | R        |
| Values           | Variable |

## Configuration Filename

### Attribute #616

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



**NOTE:** Scanning the **Set Defaults** barcode 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 barcode.

|                  |          |
|------------------|----------|
| Type             | S        |
| Size (Bytes)     | 17       |
| User Mode Access | RW       |
| Values           | Variable |

**Beeper/LED****Attribute #6000**

Activates the beeper and/or LED.

|                         |     |
|-------------------------|-----|
| <b>Type</b>             | X   |
| <b>Size (Bytes)</b>     | N/A |
| <b>User Mode Access</b> | W   |

**Values:**

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

## Parameter Defaults

### Attribute #6001

This attribute restores all parameters to their factory defaults.

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

## Parameter Buffer

### Attribute #6002

Retrieves entire parameter buffer.

|                  |          |
|------------------|----------|
| Type             | A        |
| Size (Bytes)     | Variable |
| User Mode Access | R        |
| Values           | Variable |

## 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<br>1 = Enable beep on next bootup |

## Reboot

### Attribute #6004

This attribute initiates a device reboot.

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

## Host Trigger Session

### Attribute #6005

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

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

## Firmware Version

### Attribute #20004

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

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

## Device Class

### Attribute #20007

Description of the device's hardware, for example, **Imager** or **Cordless 2D Imager**.

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

## Scankit Version

### Attribute #20008

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

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

## Combined Firmware Version

### Attribute #20009

Reports firmware version of the multiple CPU's on the single product with space delimiters, for example **NBRPUAAA NBRPUAAA**.

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

## RSM Version

### Attribute #20011

Identifies the RSM version resident in the device, for example **2.0**.

|                  |          |
|------------------|----------|
| Type             | S        |
| Size (Bytes)     | 3        |
| User Mode Access | R        |
| Values           | Variable |

## Top Level Release Name

### Attribute #20012

Returns top level combined image firmware name, for example **CAAABS00-008-R00**.

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

## Imagekit Version

### Attribute #20013

Identifies the 2D decode package resident in the device, for example **IMGKIT\_4.04T02**.

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

## DL Parser Version

### Attribute #25011

|              |            |
|--------------|------------|
| Type         | Type Array |
| Size (Bytes) | Variable   |
| Values       | Variable   |

## DL Parser Activated

### Attribute #25012

|              |   |
|--------------|---|
| Type         | Flag  |
| Size (bytes) | 1   |
| Values       | 0 = Not Activated (SR Model)<br>1 = Activated (DL/HL Model) |

## ScanSpeed Analytics



**IMPORTANT:** Decodes times are only reported for barcodes decoded in hand-held mode.

Identifies problematic barcodes to speed up scanning processes.

Zebra ScanSpeed Analytics software allows you to visually identify barcodes that slow down processing and impact efficiency. Over time, the software uses collected data to eliminate poor performing barcodes from inventory. For more information go to [zebra.com/scanspeedanalytics](http://zebra.com/scanspeedanalytics).

# ScanSpeed Analytics

---

## Introduction



**IMPORTANT:** Decode times are only reported for barcodes decoded in hand-held mode.

This chapter describes the Zebra ScanSpeed Analytics software that allows the identification of barcodes that slow down processes. Over time, the collected data can be used to eliminate poor performing barcodes from inventory. When scanners capture and read data faster, processes run faster.

For more information go to [zebra.com/scanspeedanalytics](https://zebra.com/scanspeedanalytics).

---

## Histogram Decode Information

Within the scanner, each barcode symbology has a series of RSM attributes ([Table 47](#)) to access its statistic information: Decode Count; Minimum Decode Time; Slowest Decode Time; Average Decode Time; Slowest Decode Data; and, ScanSpeed Histogram.

ScanSpeed Histogram is an array of eight items of double WORD (4 bytes). Each bin holds the count of decoded barcodes per range of decode time. For example, the range of Bin1 decode times is from 0 ms to 75 ms. All the Bin time ranges are show below:

Bin1 <= 75ms

Bin2 <= 110ms

Bin3 <= 170ms

Bin4 <= 300ms

Bin5 <= 600ms

Bin6 <= 1000ms

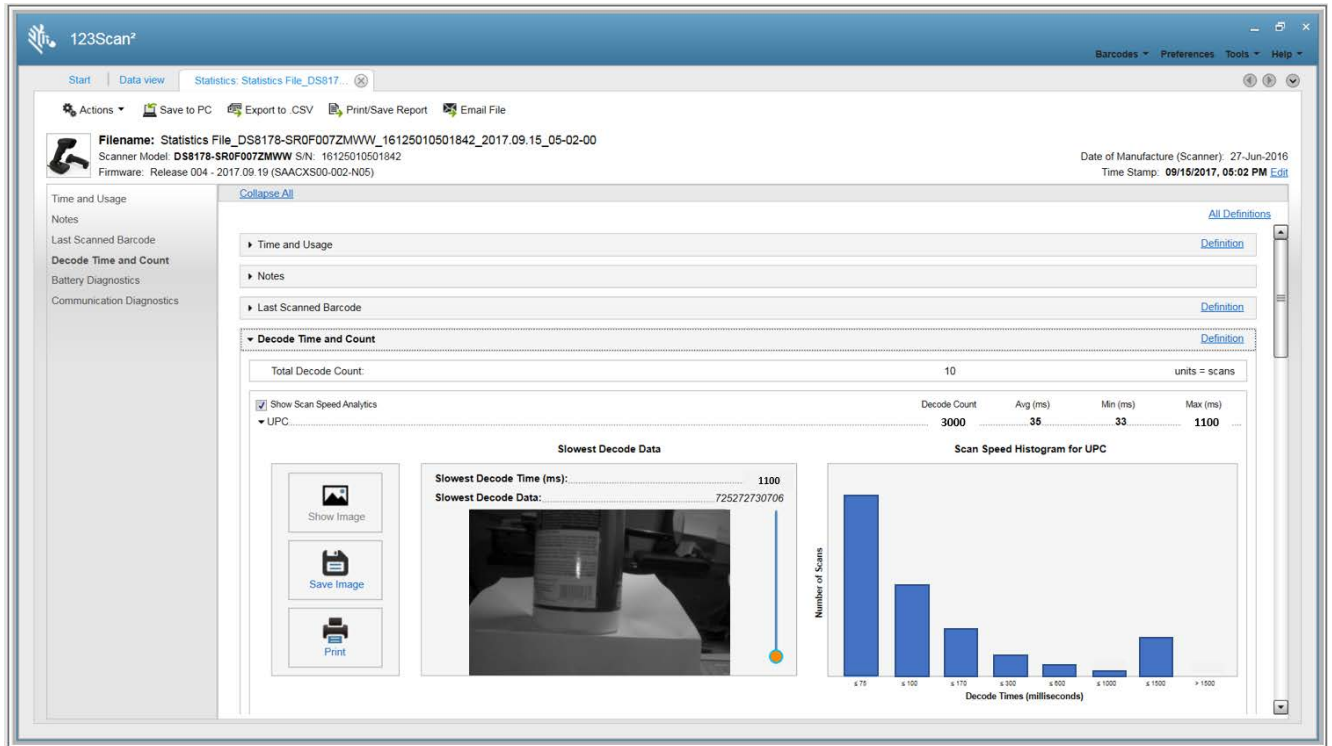
Bin7 <= 1500ms

Bin8 > 1500ms

123Scan displays this histogram data in its **Statistics** tab shown in [Figure 36 on page 521](#).



**Figure 36** 123Scan Statistics Tab - Histogram Data



**Table 47** Attributes Numbers of Barcode Symbology Statistic Information

| Barcode Name | Decode Count  |   | Minimum Decode Time | Slowest Decode Time (Max Decode Time) | Average Decode Time | Slowest Decode Data | ScanSpeed Histogram |
|--------------|---------------|---|---------------------|---------------------------------------|---------------------|---------------------|---------------------|
|              | Decimal Value | Hex Value (Shown in Little Endian Format) |                     |                                       |                     |                     |                     |
| UPC          | 15421         | 0x3D, 0x3C                                | 15424               | 15425                                 | 15426               | 15707               | 15706               |
| EAN/JAN      | 15428         | 0x44, 0x3C                                | 15431               | 15432                                 | 15433               | 15709               | 15708               |
| 2 of 5       | 15449         | 0x59, 0x3C                                | 15452               | 15453                                 | 15454               | 15715               | 15714               |
| Codabar      | 15456         | 0x60, 0x3C                                | 15459               | 15460                                 | 15461               | 15717               | 15716               |
| Code 11      | 15477         | 0x75, 0x3C                                | 15480               | 15481                                 | 15482               | 15723               | 15722               |
| Code 128     | 15442         | 0x52, 0x3C                                | 15445               | 15446                                 | 15447               | 15713               | 15712               |
| Code 39      | 15435         | 0x4B, 0x3C                                | 15438               | 15439                                 | 15440               | 15711               | 15710               |

**Table 47** Attributes Numbers of Barcode Symbology Statistic Information (Continued)

| Barcode Name    | Decode Count  |   | Minimum Decode Time | Slowest Decode Time (Max Decode Time) | Average Decode Time | Slowest Decode Data | ScanSpeed Histogram |
|-----------------|---------------|---|---------------------|---------------------------------------|---------------------|---------------------|---------------------|
|                 | Decimal Value | Hex Value (Shown in Little Endian Format) |                     |                                       |                     |                     |                     |
| Code 93         | 15463         | 0x67, 0x3C                                | 15466               | 15467                                 | 15468               | 15719               | 15718               |
| Composite       | 15519         | 0x9F, 0x3C                                | 15522               | 15523                                 | 15524               | 15735               | 15734               |
| GS1 DataBar     | 15512         | 0x98, 0x3C                                | 15515               | 15516                                 | 15517               | 15733               | 15732               |
| MSI             | 15470         | 0x6E, 0x3C                                | 15473               | 15474                                 | 15475               | 15721               | 15720               |
| Data Matrix     | 15491         | 0x83, 0x3C                                | 15494               | 15495                                 | 15496               | 15727               | 15726               |
| PDF             | 15484         | 0x7C, 0x3C                                | 15487               | 15488                                 | 15489               | 15725               | 15724               |
| Postal Codes    | 15505         | 0x91, 0x3C                                | 15508               | 15509                                 | 15510               | 15731               | 15730               |
| QR              | 15498         | 0x8A, 0x3C                                | 15501               | 15502                                 | 15503               | 15729               | 15728               |
| Aztec           | 15533         | 0xAD, 0x3C                                | 15536               | 15537                                 | 15538               | 15739               | 15738               |
| OCR             | 15526         | 0xA6, 0x3C                                | 15529               | 15530                                 | 15531               | 15737               | 15736               |
| Maxicode        | 15659         | 0x2B, 0x3D                                | 15662               | 15663                                 | 15664               | 15755               | 15754               |
| GS1-Data Matrix | 15673         | 0x39, 0x3D                                | 15676               | 15677                                 | 15678               | 15747               | 15746               |
| GS1-QR Code     | 15680         | 0x40, 0x3D                                | 15683               | 15684                                 | 15685               | 15749               | 15748               |
| Coupon          | 15666         | 0x32, 0x3D                                | 15669               | 15670                                 | 15671               | 15757               | 15756               |
| Other 1D        | 15540         | 0xB4, 0x3C                                | 15543               | 15544                                 | 15545               | 15741               | 15740               |
| Other 2D        | 15547         | 0xBB, 0x3C                                | 15550               | 15551                                 | 15552               | 15743               | 15742               |
| Other           | 15554         | 0xC2, 0x3C                                | 15557               | 15558                                 | 15559               | 15745               | 15744               |

**Table 47** Attributes Numbers of Barcode Symbology Statistic Information (Continued)

| Barcode Name        | Decode Count  |   | Minimum Decode Time | Slowest Decode Time (Max Decode Time) | Average Decode Time | Slowest Decode Data | ScanSpeed Histogram |
|---------------------|---------------|---|---------------------|---------------------------------------|---------------------|---------------------|---------------------|
|                     | Decimal Value | Hex Value (Shown in Little Endian Format) |                     |                                       |                     |                     |                     |
| Unused Statistic ID | 19999         | 0x1F, 0x4E                                | 19999               | 19999                                 | 19999               | 19999               | 19999               |

**Example**

The UPC data below is taken from the first row of [Table 47](#) above.

**UPC DECODE COUNT**

Attribute #: 15421

Type: DWORD (4 bytes)

Description: Returns the UPC barcode decode count, including all variants (UPC-A, UPC-E, UPC-E1, etc.).

**UPC MINIMUM DECODE TIME**

Attribute #: 15424

Type: DWORD (4 bytes)

Description: Returns the Minimum Decode Time in milliseconds of all UPC barcode decodes.

**UPC SLOWEST DECODE TIME**

Attribute #: 15425

Type: DWORD (4 bytes)

Description: Returns the Slowest Decode Time in milliseconds of all UPC barcode decodes.

**UPC AVERAGE DECODE TIME**

Attribute #: 15426

Type: DWORD (4 bytes)

Description: Returns the Average Decode Time in milliseconds of all UPC barcode decodes.

**UPC SLOWEST DECODE DATA**

Attribute #: 15707

Type: Array of BYTE (25 bytes)

Description: Returns the UPC barcode data with the Slowest Decode Time.

**UPC SCANSPEED HISTOGRAM**

Attribute #: 15706

Type: Array of DWORD (32 bytes)

Description: Returns the UPC barcode ScanSpeed Histogram.

## Image of Slowest Decoded Barcode

The user can configure the scanner to store the image(s) of the slowest decoded barcode.

**Table 48** RSM Attributes to Store/Retrieve Image of Slowest Decoded Barcode

| Attribute # | Type          | Property | Default Value   | Description  |
|-------------|---------------|----------|---|--|
| 1755        | Array of WORD | RW       | Default format =<br>{0x1F, 0x4E}<br>0x1F, 0x4E<br>No image retained<br>Barcode name =<br>Unused Statistic ID<br>Decimal value = 19999<br>see last row in <a href="#">Table 47 on page 521</a><br>0x3D, 0x3C<br>Image retained for UPC<br>Decimal value = 15421<br>Sample image retained<br>for UPC only = {0x3D,<br>0x3C} | Attribute 1755 is named List of Stored Images.<br>This attribute defines which image, by symbology, of the slowest decoded barcode will be stored in the scanner.<br>One symbology image can be stored in the scanner.<br><b>Note:</b><br>{0x1F, 0x4E} = a 1 WORD value which is in little-endian format.  |
| 1756        | WORD          | RW       | 0   | Attribute 1756 is named Threshold To Store Slowest Decode Barcode Image.<br>This attribute defines the threshold above which the scanner stores the image of the slowest decoded barcode.<br>Specify a Histogram Bin value (0, 1, 2, 3, 4, 5, 6 or 7).<br>The purpose of setting up this threshold is to reduce the barcode image storage frequency.<br>0 - No threshold check (default value)<br>1 - Specifies the decode time threshold as Histogram Bin 1 value of 75 ms<br>Similarly, the other Histogram Bins specify the corresponding threshold time as follows:<br>Bin 1 <= 75ms<br>Bin 2 <= 110ms<br>Bin 3 <= 170ms<br>Bin 4 <= 300ms<br>Bin 5 <= 600ms<br>Bin 6 <= 1000ms<br>Bin 7 <= 1500ms |

**Table 48** RSM Attributes to Store/Retrieve Image of Slowest Decoded Barcode (Continued)

| Attribute # | Type | Property | Default Value | Description   |
|-------------|------|----------|---------------|---|
| 6036        | WORD | WO       | N/A           | <p>Attribute 6036 is named Retrieve Slowest Decoded Barcode Image.</p> <p>The image must be retrieved using the SNAPI communication protocol.</p> <p>This attribute allows you to retrieve from the scanner a single image, by symbology, of the slowest decoded data.</p> <p>For example, to retrieve the slowest decoded barcode image for a UPC symbology, enter its hex value, 0x3D, 0x3C (decimal value 15421), using a SET command.</p> <p>See <a href="#">Table 47 on page 521</a> for symbology hex and decimal values.</p> |

# Sample Barcodes



**IMPORTANT:** To read a sample barcode the parameter must be enabled. To enable a parameter scan the appropriate **Enable** barcode in [Symbologies](#).

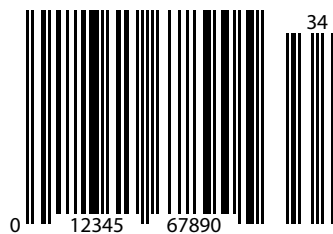
---

## UPC/EAN

### UPC-A, 100%



### UPC-A with 2-digit Add-on



UPC-A with 5-digit Add-on



UPC-E



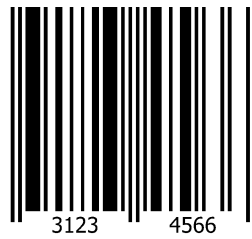
UPC-E with 2-digit Add-on



UPC-E with 5-digit Add-on



EAN-8



EAN-13, 100%





### EAN-13 with 2-digit Add-on

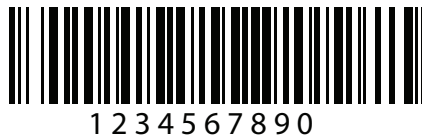


### EAN-13 with 5-digit Add-on

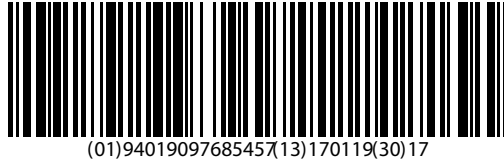


---

### Code 128



GS1-128



---

Code 39



---

Code 93



---

Code 11 with 2 Check Digits



---

Interleaved 2 of 5



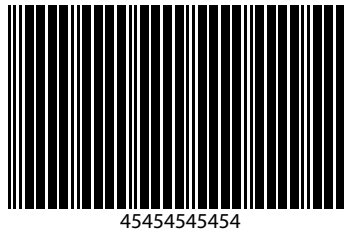
---

MSI with 2 Check Digits



---

Chinese 2 of 5



---

Matrix 2 of 5



---

Korean 3 of 5



---

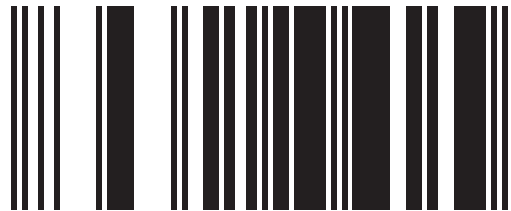
## GS1 DataBar

### GS1 DataBar Omnidirectional (formerly GS1 DataBar-14)



7612341562341

### GS1 DataBar Truncated



(01)00614141999996

### GS1 DataBar Stacked



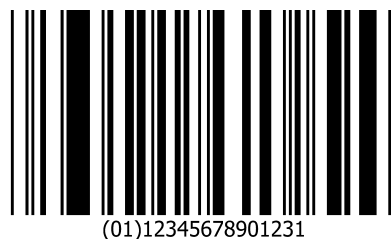
GS1 DataBar Stacked Omnidirectional



GS1 DataBar Limited



GS1 DataBar Expanded



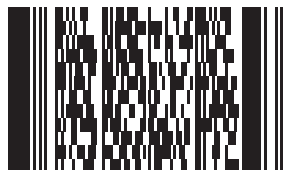
## GS1 DataBar Expanded Stacked



---

## 2D Symbologies

### PDF417



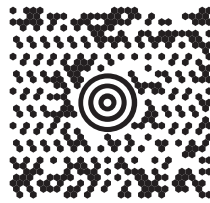
### Data Matrix



GS1 Data Matrix



Maxicode



QR Code



GS1 QR





## MicroQR



## Aztec

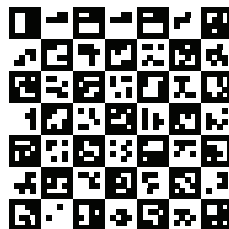


0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ01234567890123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

## Grid Matrix



**NOTE** Grid Matrix must be enabled to read the following barcode (see [Grid Matrix on page 220](#)).



Han Xin



---

## Postal Codes

US Postnet



UK Postal



Japan Postal



Australian Post



---

OCR

OCR-A

WFSGH67890

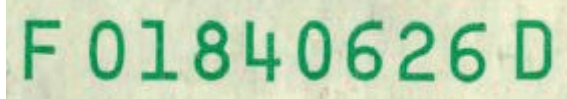
OCR-B

12345ABMKP

MICR E13B

! : 0 1 2 3 || 4 5 6 ... 7 8 9 0 , ' !

US Currency

A barcode consisting of the alphanumeric string "F 01840626 D" printed in green ink on a light-colored, textured background.

F 01840626 D

# Index

## Numerics

|                                     |     |
|-------------------------------------|-----|
| 123Scan                             | 36  |
| requirements                        | 37  |
| 123scan LED indicators (on scanner) | 41  |
| 2D bar codes                        |     |
| aztec                               | 218 |
| aztec inverse                       | 218 |
| code 128 emulation                  | 210 |
| data matrix                         | 211 |
| data matrix inverse                 | 212 |
| data matrix mirror images           | 213 |
| grid matrix                         | 220 |
| grid matrix inverse                 | 220 |
| GS1 data matrix                     | 211 |
| GS1 QR                              | 216 |
| han xin                             | 219 |
| han xin inverse                     | 219 |
| linked QR mode                      | 217 |
| maxicode                            | 214 |
| microPDF417                         | 209 |
| microQR                             | 216 |
| PDF417                              | 209 |
| QR code                             | 214 |
| 2D barcodes                         |     |
| dotcode                             | 222 |
| dotcode erasure limit               | 225 |
| dotcode inverse                     | 223 |
| dotcode mirrored                    | 224 |
| dotcode prioritize                  | 225 |
| grid matrix mirror                  | 221 |

## A

|                     |            |
|---------------------|------------|
| AAMVA field parsing | 373        |
| accessories         |            |
| cables              | 24         |
| configurations      | 24         |
| EAS                 | 45         |
| interface cable     | 24         |
| mounting bracket    | 33, 34, 35 |
| partner portal      | 24         |

|                            |         |
|----------------------------|---------|
| power supplies             | 24      |
| stands and holders         | 24      |
| ADF                        | 363     |
| invalid rule               | 50      |
| transmit error             | 50      |
| ADF programming indicators | 40      |
| advanced data formatting   | 50, 363 |
| aiming                     |         |
| pattern, hand-held         | 72      |
| pattern, hands-free        | 73      |
| pattern, snapshot          | 106     |
| snapshot mode timeout      | 105     |
| video view finder          | 121     |
| aiming pattern             |         |
| orientation                | 43      |
| ASCII character sets       | 451     |
| attributes, non-parameter  |         |
| beep on next bootup        | 516     |
| configuration filename     | 514     |
| date of first programming  | 514     |
| date of manufacture        | 514     |
| firmware version           | 517     |
| host trigger session       | 517     |
| model number               | 513     |
| parameter defaults         | 516     |
| reboot                     | 516     |
| scankit version            | 517     |
| scanspeed analytics        | 519     |
| serial number              | 513     |
| autoexposure               | 101     |
| aztec bar codes            | 218     |
| inverse                    | 218     |
| sample                     | 537     |

## B

|                     |     |
|---------------------|-----|
| bar codes           |     |
| 1D quiet zone level | 203 |
| alphanumeric        | 434 |
| aztec               | 218 |
| inverse             | 218 |
| cancel              | 432 |

- Chinese 2 of 5 . . . . . 189
- CJK
  - non-CJK UTF bar code output . . . . . 504
  - output method . . . . . 502
  - unicode output control . . . . . 501
- codabar . . . . . 179
  - CLSI editing . . . . . 181
  - lengths . . . . . 179
  - NOTIS editing . . . . . 181
  - start and stop characters . . . . . 183
- codabar security level . . . . . 182
- code 11 . . . . . 167
  - check digit verification . . . . . 169
  - lengths . . . . . 167
  - transmit check digits . . . . . 170
- code 128 . . . . . 150
  - check ISBT table . . . . . 154
  - code 128 fnc4 . . . . . 155
  - GS1-128 . . . . . 152
  - ISBT 128 . . . . . 153
  - ISBT concatenation . . . . . 153
  - ISBT concatenation redundancy . . . . . 155
  - lengths . . . . . 151
  - reduced quiet zone . . . . . 157
  - security level . . . . . 156
- code 128 emulation . . . . . 210
- code 39 . . . . . 157
  - check digit verification . . . . . 161
  - code 32 prefix . . . . . 159
  - convert code 39 to code 32 . . . . . 158
  - full ASCII conversion . . . . . 162
  - lengths . . . . . 159
  - reduced quiet zone . . . . . 164
  - security level . . . . . 163
  - transmit check digit . . . . . 161
  - trioptic code 39 . . . . . 158
- code 93 . . . . . 164
  - lengths . . . . . 165
- composite
  - beep mode . . . . . 208
  - composite CC-A/B . . . . . 205
  - composite CC-C . . . . . 204
  - composite inverse . . . . . 206
  - composite TLC-39 . . . . . 205
  - GS1-128 emulation mode . . . . . 208
  - UPC composite mode . . . . . 207
- country code page defaults . . . . . 487
- country code pages . . . . . 491
- country codes . . . . . 472
- country keyboard types (country codes) . . . . . 472
- data matrix . . . . . 211
  - data matrix inverse . . . . . 212
  - GS1 data matrix . . . . . 211
  - mirror images . . . . . 213
- decode session timeout . . . . . 76
- digimarc digital watermarks/dw . . . . . 362
- disable all code types . . . . . 131
- discrete 2 of 5 . . . . . 176
  - lengths . . . . . 177
- driver's license parsing . . . . . 369
  - AAMVA field parsing . . . . . 373
  - driver's license date format . . . . . 384
  - driver's license gender format . . . . . 383
  - no separator . . . . . 385
  - parser version ID . . . . . 382
  - parsing field . . . . . 371
  - send control characters . . . . . 386
  - send keyboard characters . . . . . 390
  - set defaults . . . . . 383
- enable all code types . . . . . 131
- febraban . . . . . 174
- grid matrix . . . . . 220
- grid matrix inverse . . . . . 220
- GS1 databar . . . . . 195
  - convert to UPC/EAN/JAN . . . . . 197
  - GS1 databar expanded . . . . . 196
  - GS1 databar limited . . . . . 196
  - GS1 databar limited margin check . . . . . 199
  - GS1 databar omnidirectional . . . . . 195
  - security level . . . . . 198
- han xin . . . . . 219
  - inverse . . . . . 219
- IBM
  - bar code configuration directive . . . . . 298
  - beep directive . . . . . 297
  - convert unknown to code 39 . . . . . 297
  - default table . . . . . 295
  - IBM specification version . . . . . 298
  - port address . . . . . 296
- IDC
  - aspect . . . . . 349
  - bits per pixel . . . . . 351
  - border type . . . . . 355
  - captured image brighten . . . . . 353
  - captured image sharpen . . . . . 354
  - default table . . . . . 344
  - delay time . . . . . 356
  - file format selector . . . . . 350
  - find box outline . . . . . 352
  - height . . . . . 349
  - JPEG quality . . . . . 351
  - maximum rotation . . . . . 357
  - maximum text length . . . . . 353
  - minimum text length . . . . . 352
  - operating mode . . . . . 345
  - symbology . . . . . 346
  - width . . . . . 348
  - X coordinate . . . . . 347
  - Y coordinate . . . . . 348
  - zoom limit . . . . . 356

- intercharacter gap size . . . . . 204
- interleaved 2 of 5 . . . . . 170
  - check digit verification . . . . . 172
  - convert to EAN-13 . . . . . 173, 174
  - lengths . . . . . 171, 172
  - reduced quiet zone . . . . . 176
  - security level . . . . . 175
  - transmit check digit . . . . . 173
- inverse 1D . . . . . 193
- keyboard wedge
  - alternate numeric keypad emulation . . . . . 304
  - caps lock override . . . . . 305
  - convert case . . . . . 306
  - default table . . . . . 301
  - FN1 substitution . . . . . 307
  - function key mapping . . . . . 306
  - host types . . . . . 302
  - intra-keystroke delay . . . . . 303
  - keystroke delay . . . . . 303
  - quick keypad emulation . . . . . 304
  - send make and break . . . . . 307
  - simulated caps lock . . . . . 305
  - unknown characters . . . . . 302
- Korean 3 of 5 . . . . . 193
- linked QR mode . . . . . 217
- matrix 2 of 5 . . . . . 190
  - check digit . . . . . 192
  - lengths . . . . . 190
  - transmit check digit . . . . . 192
- maxicode . . . . . 214
- microPDF417 . . . . . 209
- MSI . . . . . 184
  - check digit algorithm . . . . . 188
  - check digits . . . . . 187
  - lengths . . . . . 185
  - reduced quiet zone . . . . . 189
  - transmit check digit . . . . . 188
- numeric . . . . . 432
- numeric bar codes . . . . . 432
- OCR
  - check digit . . . . . 332
  - check digit multiplier . . . . . 332
  - check digit validation . . . . . 333
  - default table . . . . . 310
  - inverse OCR . . . . . 339
  - lines . . . . . 320
  - maximum characters . . . . . 321
  - MICR E13B . . . . . 317
  - minimum character . . . . . 320
  - OCR-A . . . . . 311
  - OCR-A variant . . . . . 312
  - OCR-B . . . . . 313
  - OCR-B variant . . . . . 314
  - orientation . . . . . 318
  - parameters . . . . . 311
- quiet zone . . . . . 322
- redundancy . . . . . 340
  - subset . . . . . 321
  - template . . . . . 322
  - US currency serial number . . . . . 318
- PDF417 . . . . . 209
- postal
  - Australia post . . . . . 230
  - Australia post format . . . . . 231
  - Japan postal . . . . . 229
  - mailmark . . . . . 233
  - Netherlands KIX code . . . . . 232
  - transmit UK postal check digit . . . . . 229
  - transmit US postal check digit . . . . . 228
  - UK postal . . . . . 228
  - UPU FICS postal . . . . . 233
  - US planet . . . . . 227
  - US postnet . . . . . 227
  - USPS 4CB/One Code/Intelligent Mail . . . . . 232
- QR code . . . . . 214
  - GS1 QR . . . . . 216
  - microQR . . . . . 216
- redundancy level . . . . . 200
- RS-232
  - baud rate . . . . . 282
  - beep on bel . . . . . 290
  - check receive errors . . . . . 284
  - data bits . . . . . 284
  - default table . . . . . 277
  - hardware handshaking . . . . . 285
  - host serial response timeout . . . . . 289
  - host types . . . . . 280
  - intercharacter delay . . . . . 291
  - nixdorf beep LED options . . . . . 292
  - parity . . . . . 283
  - RTS line state . . . . . 290
  - software handshaking . . . . . 287, 288
  - stop bits . . . . . 283
  - unknown characters . . . . . 292
- samples . . . . . 526
- security level . . . . . 202
- SSI
  - baud rate . . . . . 262
  - boot up event . . . . . 274
  - check parity . . . . . 265
  - data packet format . . . . . 268
  - decode event . . . . . 273
  - host character timeout . . . . . 270
  - host RTS line state . . . . . 267
  - host serial response timeout . . . . . 269
  - interpacket delay . . . . . 272
  - multipacket option . . . . . 271
  - parameter event . . . . . 274
  - parity . . . . . 264
  - selecting . . . . . 262

- software handshaking . . . . . 266
- stop bits . . . . . 265
- UPC/EAN supplemental redundancy . . . . . 140
- UPC/EAN/JAN
  - bookland EAN . . . . . 134
  - bookland ISBN . . . . . 135
  - convert UPC-E to UPC-A . . . . . 147
  - convert UPC-E1 to UPC-A . . . . . 147
  - coupon report . . . . . 149
  - EAN-13/JAN-13 . . . . . 133
  - EAN-8/JAN-8 . . . . . 133
  - ISSN EAN . . . . . 136
  - supplemental AIM ID format . . . . . 141
  - supplementals . . . . . 137
  - transmit UPC-A check digit . . . . . 142
  - transmit UPC-E check digit . . . . . 142
  - transmit UPC-E1 check digit . . . . . 143
  - UCC coupon extended code . . . . . 148
  - UPC reduced quiet zone . . . . . 150
  - UPC-A . . . . . 131
  - UPC-A preamble . . . . . 144
  - UPC-E . . . . . 132
  - UPC-E preamble . . . . . 145
  - UPC-E1 . . . . . 132
  - UPC-E1 preamble . . . . . 146
  - user programmable supplementals . . . . . 140
- USB
  - bar code configuration directive . . . . . 249
  - beep directive . . . . . 249
  - caps lock override . . . . . 240
  - convert case . . . . . 247
  - convert unknown to code 39 . . . . . 241
  - default table . . . . . 236
  - device type . . . . . 237
  - fast HID . . . . . 242
  - function key mapping . . . . . 246
  - IBM specification version . . . . . 249
  - keyboard FN1 substitution . . . . . 245
  - keypad emulation . . . . . 244
  - keypad emulation with leading zero . . . . . 245
  - keystroke delay . . . . . 240
  - polling interval . . . . . 242
  - quick keypad emulation . . . . . 244
  - simulated caps lock . . . . . 246
  - SNAPI handshaking . . . . . 239
  - static CDC . . . . . 247
  - unknown characters . . . . . 241
  - weblink QR . . . . . 215
- barcodes
  - analog gain . . . . . 103
  - autoexposure . . . . . 101
  - beep after good decode . . . . . 60
  - beep duration . . . . . 64
  - beep tones
    - special beep tones . . . . . 63
    - standard tones . . . . . 62
  - bits per pixel . . . . . 116
  - continuous barcode read . . . . . 75
  - crop to address . . . . . 107
  - decode range limit (hands-free) . . . . . 84
  - decode session timeout . . . . . 76
  - digital gain . . . . . 103
  - direct decode indicator . . . . . 65
  - dotcode . . . . . 222
  - dotcode erasure limit . . . . . 225
  - dotcode inverse . . . . . 223
  - dotcode mirrored . . . . . 224
  - dotcode prioritize . . . . . 225
  - eclevel . . . . . 83
  - enter . . . . . 85
  - fixed exposure . . . . . 102
  - FN1 substitution values . . . . . 90
  - gain and exposure priority for snapshot mode . . . . . 104
  - grid matrix mirror . . . . . 221
  - hand-held decode aiming pattern . . . . . 72
  - hand-held trigger mode . . . . . 69
  - hands-free decode aiming pattern . . . . . 73
  - hands-free mode . . . . . 70
  - illumination . . . . . 81, 101
  - illumination brightness . . . . . 81
  - image brightness (target white) . . . . . 111
  - image capture
    - default table . . . . . 98
  - image cropping . . . . . 107
  - image enhancement . . . . . 113
  - image file format . . . . . 114
  - image rotation . . . . . 115
  - image size . . . . . 109
  - JPEG image options . . . . . 111
  - JPEG quality . . . . . 112
  - JPEG size . . . . . 112
  - low power mode . . . . . 66
  - macro PDF
    - abort entry . . . . . 226
    - flush buffer . . . . . 226
  - mobile phone/display mode . . . . . 79
  - motion tolerance . . . . . 82
  - operational modes . . . . . 100
  - parameter scanning . . . . . 60
  - PDF prioritization . . . . . 80
  - PDF prioritization timeout . . . . . 80
  - picklist mode . . . . . 74
  - pickup activation . . . . . 71
  - PID type . . . . . 82
  - PID value . . . . . 83
  - postal . . . . . 227
  - prefix/suffix values . . . . . 87
  - product information
    - manufacturing info . . . . . 51
    - serial number . . . . . 51



|  |     |                                     |        |
|--|-----|-------------------------------------|--------|
| software version                           | 51  | scanning                            | 39     |
| scan data options                          | 88  | SMS                                 | 41     |
| securPharm                                 | 93  | USB host specific                   | 40     |
| securPharm output formatting               | 94  |                                     |        |
| set defaults                               | 59  | <b>C</b>                            |        |
| signature capture                          | 117 | cables                              |        |
| signature capture bits per pixel           | 119 | inserting                           | 31     |
| signature capture file format              | 118 | interface                           | 24, 32 |
| signature capture height                   | 120 | removing                            | 32     |
| signature capture JPEG quality             | 120 | signal descriptions                 | 55     |
| signature capture width                    | 120 | character sets                      |        |
| silence operational mode changes           | 106 | ALT key                             | 456    |
| snapshot aiming pattern                    | 106 | ASCII                               | 451    |
| snapshot mode timeout                      | 105 | extended key                        | 460    |
| speaker volume                             | 61  | F key                               | 459    |
| suppress power up beeps                    | 64  | GUI key                             | 457    |
| symbologies                                |     | numeric key                         | 459    |
| default table                              | 124 | PF key                              | 458    |
| tab key                                    | 85  | Chinese 2 of 5 bar codes            | 189    |
| time delay to low power mode               | 67  | sample                              | 532    |
| timeout between decodes, different symbols | 77  | CJK                                 | 501    |
| timeout between decodes, same symbol       | 77  | control parameters                  | 501    |
| transmit code ID character                 | 86  | country keyboard missing characters | 504    |
| transmit no read message                   | 91  | decode setup                        | 505    |
| triggered timeout, same symbol             | 78  | input method                        | 507    |
| unique barcode reporting                   | 75  | cleaning the devices                |        |
| unsolicited heartbeat interval             | 92  | approved for standard devices       | 46     |
| UPC/EAN/JAN                                |     | how to                              | 47     |
| EAN/JAN extend                             | 148 | known harmful ingredients           | 46     |
| USB  |     | codabar bar codes                   | 179    |
| CDC beep on bel                            | 248 | CLSI editing                        | 181    |
| direct I/O beep                            | 248 | lengths                             | 179    |
| user preferences                           |     | NOTIS editing                       | 181    |
| default table                              | 57  | security level                      | 182    |
| video frame size                           | 122 | start and stop characters           | 183    |
| video image size                           | 122 | code 11 bar codes                   | 167    |
| video mode format selector                 | 121 | check digit verification            | 169    |
| video subsampling                          | 110 | lengths                             | 167    |
| video view finder                          | 121 | sample                              | 531    |
| beep                                       |     | transmit check digits               | 170    |
| duration                                   | 64  | code 128 bar codes                  | 150    |
| beep tone adjustment                       |     | check ISBT table                    | 154    |
| special beep tones                         | 63  | fnc4                                | 155    |
| standard beep tones                        | 62  | GS1-128                             | 152    |
| beeper                                     |     | ISBT 128                            | 153    |
| beep after good decode                     | 60  | ISBT concatenation                  | 153    |
| suppress on power up                       | 64  | ISBT concatenation redundancy       | 155    |
| beeper indicators                          |     | lengths                             | 151    |
| 123scan host specific                      | 41  | reduced quiet zone                  | 157    |
| ADF programming                            | 40  | sample                              | 529    |
| image capture                              | 39  | security level                      | 156    |
| macro PDF                                  | 41  | code 128 emulation bar codes        | 210    |
| maintenance                                | 41  | code 39 bar codes                   | 157    |
| parameter programming                      | 40  | check digit verification            | 161    |
| RS-232 host specific                       | 40  |                                     |        |

- code 32 prefix . . . . . 159
  - code 39 security level . . . . . 163
  - convert code 39 to code 32 . . . . . 158
  - full ASCII conversion . . . . . 162
  - lengths . . . . . 159
  - reduced quiet zone . . . . . 164
  - sample . . . . . 526, 530
  - transmit check digit . . . . . 161
  - trioptic . . . . . 158
  - code 93 bar codes . . . . . 164
    - lengths . . . . . 165
    - sample . . . . . 530
  - code identifiers
    - AIM . . . . . 463
    - modifier characters . . . . . 464
    - Symbol . . . . . 462
    - transmitting . . . . . 86
  - communication protocol
    - cable interface . . . . . 469
  - composite bar codes
    - beep mode . . . . . 208
    - composite CC-A/B . . . . . 205
    - composite CC-C . . . . . 204
    - composite inverse . . . . . 206
    - composite TLC-39 . . . . . 205
    - GS1-128 emulation mode . . . . . 208
    - UPC composite mode . . . . . 207
  - configurations
    - accessories . . . . . 24
    - cables . . . . . 24
    - scanner . . . . . 23
    - stands and holders . . . . . 24
  - connecting
    - IBM interface . . . . . 294
    - interface cable . . . . . 31
    - keyboard wedge interface . . . . . 300
    - power . . . . . 32
    - RS-232 interface . . . . . 276
    - USB interface . . . . . 235
  - conventions
    - notational . . . . . 26
  - country code pages . . . . . 491
    - defaults . . . . . 487
  - country codes . . . . . 472
  - cropping images . . . . . 107
  - custom tone . . . . . 414
- D**
- data matrix bar codes . . . . . 211
    - data matrix inverse . . . . . 212
    - GS1 data matrix . . . . . 211
    - mirror images . . . . . 213
    - sample . . . . . 537, 538, 539
  - data parsing . . . . . 366
  - decode range limit (hands-free) . . . . . 84
  - decode ranges
    - ds9908-hd/hl . . . . . 44
    - ds9908-sr/dl . . . . . 44
  - default parameters . . . . . 57
    - all . . . . . 417
    - DL parsing . . . . . 368
    - IBM . . . . . 295
    - IDC . . . . . 344
    - image capture . . . . . 98
    - keyboard wedge . . . . . 301
    - OCR . . . . . 310
    - RS-232 . . . . . 277
    - setting . . . . . 59
    - SSI . . . . . 261
    - USB . . . . . 236
    - user preferences . . . . . 57
  - digimarc digital watermarks/dw . . . . . 362
  - discrete 2 of 5 bar codes . . . . . 176
    - lengths . . . . . 177
  - downloading custom tone
    - via scanner SDK . . . . . 414
  - driver's license parsing
    - AAMVA field parsing . . . . . 373
    - ADF example . . . . . 408
    - bar codes . . . . . 369
    - control characters . . . . . 386
    - data fields . . . . . 370
    - date format . . . . . 384
    - default parameters . . . . . 368
    - field parsing bar codes . . . . . 371
    - gender format . . . . . 383
    - keyboard characters . . . . . 390
    - no separator . . . . . 385
    - parser version ID . . . . . 382
    - rule example . . . . . 404
- E**
- EAS . . . . . 45
  - elevel . . . . . 83
  - error indications
    - ADF . . . . . 50
    - format . . . . . 50
    - input . . . . . 49
  - exposure options
    - analog gain . . . . . 103
    - autoexposure . . . . . 101
    - digital gain . . . . . 103
    - fixed exposure . . . . . 102
    - gain and exposure priority for snapshot mode . . . . . 104
    - illumination . . . . . 81, 101

- F**
- features, scanner
    - cable release opening ..... 30
    - hand-held touch zones ..... 30
    - interface cable port ..... 30
    - LED ..... 30
    - scan window ..... 30
    - speaker ..... 30
    - trigger ..... 30
  - firmware
    - flash update ..... 83
- G**
- gain
    - analog ..... 103
    - digital ..... 103
  - grid matrix bar codes
    - sample ..... 537
  - gs1 data matrix bar codes
    - sample ..... 536
  - GS1 databar bar codes ..... 195
    - convert GS1 databar to UPC/EAN/JAN ..... 197
    - GS1 databar expanded ..... 196
    - GS1 databar limited ..... 196
    - GS1 databar limited margin check ..... 199
    - GS1 databar omnidirectional ..... 195
    - sample ..... 533
    - security level ..... 198
  - GS1 QR bar codes
    - sample ..... 536
- H**
- han xin bar codes ..... 219
    - inverse ..... 219
    - sample ..... 538
  - hand-held touch zones ..... 30
  - host specific indicators
    - 123scan ..... 41
    - RS-232 ..... 40
    - USB ..... 40
  - host types
    - IBM ..... 296
    - keyboard wedge ..... 302
    - RS-232 ..... 280
    - SSI ..... 262
    - USB ..... 237
- I**
- IBM
    - bar codes ..... 296
    - connection ..... 294
    - default parameters ..... 295
  - IDC ..... 341
    - bar code acceptance test ..... 341
    - bar codes ..... 345
    - capture region ..... 342
    - data transmission ..... 343
    - default parameters ..... 344
    - demonstrations ..... 359
    - image post processing ..... 343
    - operating mode ..... 342
    - quick start ..... 358
    - quick start form ..... 360
    - sample setup ..... 358
    - support ..... 343
  - illumination ..... 81, 101
    - brightness ..... 81
  - image capture
    - default parameters ..... 98
    - operational modes ..... 100
  - image capture beeper and LED indicators ..... 39
  - image options
    - bits per pixel ..... 116
    - cropping ..... 107
    - file formats ..... 114
    - image brightness (target white) ..... 111
    - image enhancement ..... 113
    - image rotation ..... 115
    - image size ..... 109
    - JPEG image options ..... 111
    - JPEG quality ..... 112
    - JPEG size ..... 112
    - signature capture ..... 117
    - signature capture file format ..... 118
  - information, service ..... 27
  - interface
    - cables ..... 24
  - interleaved 2 of 5 bar codes ..... 170
    - check digit verification ..... 172
    - convert to EAN-13 ..... 173
    - febraban ..... 174
    - lengths ..... 171, 172
    - reduced quiet zone ..... 176
    - sample ..... 531
    - security level ..... 175
    - transmit check digit ..... 173
- J**
- JPEG image options ..... 111
    - quality ..... 112
    - size ..... 112
- K**
- keyboard types (country codes)

|                                 |     |                              |     |
|---------------------------------|-----|------------------------------|-----|
| Albanian                        | 472 | Lithuanian                   | 480 |
| Arabic (101)                    | 472 | Lithuanian (IBM)             | 480 |
| Arabic (102)                    | 473 | Macedonian (FYROM)           | 481 |
| Arabic (102) Azerty             | 473 | Maltese_47KEY                | 481 |
| Azeri (Cyrillic)                | 473 | Mongolian                    | 481 |
| Azeri (Latin)                   | 473 | Norwegian                    | 481 |
| Belarusian                      | 473 | Polish (214)                 | 481 |
| Bosnian (Cyrillic)              | 473 | Polish (Programmer)          | 481 |
| Bosnian (Latin)                 | 473 | Portuguese (Brazil)          | 481 |
| Bulgarian (Latin)               | 474 | Portuguese (Brazilian ABNT)  | 482 |
| Bulgarian Cyrillic (Typewriter) | 474 | Portuguese (Brazilian ABNT2) | 482 |
| Canadian French (Legacy)        | 474 | Portuguese (Portugal)        | 482 |
| Canadian French Win7            | 474 | Romanian                     | 482 |
| Canadian Multilingual Standard  | 474 | Romanian (Legacy)            | 482 |
| Chinese (ASCII)                 | 474 | Romanian (Programmer)        | 483 |
| Chinese (Simplified)            | 475 | Romanian (Standard)          | 482 |
| Chinese (Traditional)           | 475 | Russian                      | 483 |
| Croatian                        | 475 | Russian (Typewriter)         | 483 |
| Czech                           | 475 | Serbian (Cyrillic)           | 483 |
| Czech (Programmer)              | 475 | Serbian (Latin)              | 483 |
| Czech (QWERTY)                  | 475 | Slovak                       | 483 |
| Danish                          | 475 | Slovak (QWERTY)              | 484 |
| Dutch (Netherlands)             | 476 | Slovenian                    | 484 |
| Estonian                        | 476 | Spanish                      | 484 |
| Faeroese                        | 476 | Spanish (Variation)          | 484 |
| Finnish                         | 476 | Swedish                      | 484 |
| French (Canada) 2000/XP         | 477 | Swiss French                 | 484 |
| French (Canada) 95/98           | 476 | Swiss German                 | 484 |
| French (France)                 | 476 | Tatar                        | 485 |
| French International            | 476 | Thai (Kedmanee)              | 485 |
| Galician                        | 477 | Turkish F                    | 485 |
| German                          | 477 | Turkish Q                    | 485 |
| Greek                           | 477 | UK English                   | 485 |
| Greek (220) Latin               | 477 | Ukranian                     | 485 |
| Greek (319) Latin               | 477 | US Dvorak                    | 485 |
| Greek 220                       | 478 | US Dvorak Left               | 486 |
| Greek 319                       | 478 | US Dvorak Right              | 486 |
| Greek Latin                     | 477 | US English                   | 472 |
| Greek Polytonic                 | 478 | US International             | 486 |
| Hebrew Israel                   | 478 | Uzbek                        | 486 |
| Hungarian                       | 478 | Vietnamese                   | 486 |
| Hungarian_101KEY                | 478 | keyboard wedge               |     |
| Irish                           | 479 | bar codes                    | 302 |
| Islandic                        | 478 | connection                   | 300 |
| Italian                         | 479 | default parameters           | 301 |
| Italian (142)                   | 479 | keyboard map                 | 308 |
| Japanese (ASCII)                | 479 | Korean 3 of 5 bar codes      | 193 |
| Japanese (SHIFT-JIS)            | 479 | sample                       | 532 |
| Kazakh                          | 479 |                              |     |
| Korean (ASCII)                  | 479 | L                            |     |
| Korean (Hangul)                 | 480 | LED indicators               |     |
| Kyrgyz                          | 480 | 123scan host specific        | 41  |
| Latin American                  | 480 | ADF programming              | 40  |
| Latvian                         | 480 | image capture                | 39  |
| Latvian (QWERTY)                | 480 |                              |     |

|  |        |                                    |               |
|--|--------|------------------------------------|---------------|
| macro PDF                              | 41     | scanspeed analytics                | 519           |
| maintenance                            | 41     | serial number                      | 513           |
| parameter programming                  | 40     |                                    |               |
| RS-232 host specific                   | 40     | <b>O</b>                           |               |
| scanning                               | 39     | OCR                                |               |
| SMS                                    | 41     | bar codes                          | 311           |
| USB host specific                      | 40     | default parameters                 | 310           |
|  |        |                                    |               |
| <b>M</b>                               |        | <b>P</b>                           |               |
| macro PDF                              | 226    | parameter programming indicators   | 40            |
| abort entry                            | 226    | partner portal                     | 24            |
| flush buffer                           | 226    | PDF417 bar codes                   | 209           |
| macro PDF beeper and LED indicators    | 41     | sample                             | 535           |
| maintenance                            | 46     | PDF417 barcodes                    |               |
| approved cleaners for standard devices | 46     | PDF prioritization                 | 80            |
| how to clean the devices               | 47     | pickup activation                  | 71            |
| known harmful ingredients              | 46     | pinouts                            |               |
| matrix 2 of 5 bar codes                | 190    | scanner signal descriptions        | 55            |
| check digit                            | 192    | postal code bar codes              |               |
| lengths                                | 190    | Australia post                     | 230           |
| sample                                 | 532    | Australia post format              | 231           |
| transmit check digit                   | 192    | Japan postal                       | 229           |
| maxicode bar codes                     | 214    | mailmark                           | 233           |
| MDF                                    | 363    | Netherlands KIX code               | 232           |
| microPDF417 bar codes                  | 209    | sample                             | 538           |
| microQR code bar codes                 |        | transmit UK postal check digit     | 229           |
| sample                                 | 537    | transmit US postal check digit     | 228           |
| mounting                               |        | UK postal                          | 228           |
| wall                                   | 24     | UPU FICS postal                    | 233           |
| mounting bracket                       |        | US planet                          | 227           |
| table top                              | 33, 34 | US postnet                         | 227           |
| wall mount                             | 35     | USPS 4CB/One Code/Intelligent Mail | 232           |
| MSI bar codes                          | 184    | postal code barcodes               | 227           |
| check digit algorithm                  | 188    | power supplies                     | 24            |
| check digits                           | 187    | power supply                       |               |
| lengths                                | 185    | connecting                         | 32            |
| reduced quiet zone                     | 189    | preferred symbol                   | 366           |
| sample                                 | 531    | product id (PID) value             | 83            |
| transmit check digit                   | 188    | product id type                    | 82            |
| multicode data formatting              | 363    | product information                |               |
|  |        | manufacturing info                 | 51            |
|  |        | report software version            | 51            |
|  |        | serial number                      | 51            |
|  |        |                                    |               |
| <b>N</b>                               |        | <b>Q</b>                           |               |
| non-parameter attributes               |        | QR code bar codes                  | 214           |
| beep on next bootup                    | 516    | GS1 QR                             | 216           |
| configuration filename                 | 514    | microQR                            | 216           |
| date of first programming              | 514    | sample                             | 537, 538, 539 |
| date of manufacture                    | 514    |                                    |               |
| firmware version                       | 517    |                                    |               |
| host trigger session                   | 517    |                                    |               |
| model number                           | 513    |                                    |               |
| parameter defaults                     | 516    |                                    |               |
| reboot                                 | 516    |                                    |               |
| scankit version                        | 517    |                                    |               |

## R

|                                 |     |
|---------------------------------|-----|
| related documents               | 27  |
| related software                | 27  |
| RS-232                          |     |
| bar codes                       | 280 |
| connection                      | 276 |
| default parameters              | 277 |
| host parameters                 | 278 |
| RSM                             |     |
| commands and responses over SSI | 258 |

## S

|                                    |               |
|------------------------------------|---------------|
| sample bar codes                   |               |
| aztec                              | 537           |
| Chinese 2 of 5                     | 532           |
| code 11                            | 531           |
| code 128                           | 529           |
| code 39                            | 526, 530      |
| code 93                            | 530           |
| data matrix                        | 537, 538, 539 |
| grid matrix                        | 537           |
| gs1 data matrix                    | 536           |
| GS1 databar                        | 533           |
| GS1 QR                             | 536           |
| han xin                            | 538           |
| interleaved 2 of 5                 | 531           |
| Korean 3 of 5                      | 532           |
| matrix 2 of 5                      | 532           |
| microQR code                       | 537           |
| MSI                                | 531           |
| PDF417                             | 535           |
| QR code                            | 537, 538, 539 |
| UK postal                          | 538           |
| UPC/EAN                            | 526           |
| US postnet                         | 538           |
| scanning                           |               |
| aiming                             | 43            |
| scanning beeper and LED indicators | 39            |
| scanspeed analytics                | 520           |
| security                           |               |
| 1D quiet zone level                | 203           |
| intercharacter gap size            | 204           |
| redundancy level                   | 200           |
| security level                     | 202           |
| service information                | 27            |
| setting defaults                   | 59            |
| setup                              |               |
| connecting a keyboard wedge host   | 300           |
| connecting a USB interface         | 235           |
| connecting an IBM most             | 294           |
| connecting an RS-232 interface     | 276           |
| connecting power                   | 32            |
| inserting interface cable          | 31            |

|                                 |          |
|---------------------------------|----------|
| unpacking                       | 29       |
| signal descriptions             | 55       |
| signature capture               | 117      |
| bits per pixel                  | 119      |
| code structure                  | 509      |
| data format                     | 511      |
| dimensions                      | 511      |
| file format selector            | 118      |
| height                          | 120      |
| JPEG quality                    | 120      |
| signature boxes                 | 512      |
| start and stop patterns         | 510      |
| width                           | 120      |
| SMS LED indicators (on scanner) | 41       |
| software tools                  |          |
| 123Scan                         | 36       |
| ADF                             | 363      |
| MDF                             | 363      |
| preferred symbol                | 366      |
| speaker                         |          |
| speaker volume                  | 61       |
| specifications                  | 52       |
| SSI                             |          |
| bar codes                       | 262      |
| commands                        | 252      |
| communications                  | 251, 255 |
| data transmission               | 254      |
| default parameters              | 261      |
| event reporting                 | 273      |
| handshaking                     | 253, 255 |
| low power mode                  | 257      |
| RSM commands and responses      | 258      |
| RTS CTS                         | 255      |
| transactions                    | 253      |
| symbolologies                   |          |
| bar codes                       | 131      |
| default parameters              | 124      |

## T

|                          |     |
|--------------------------|-----|
| technical specifications | 52  |
| tone                     |     |
| customizing              | 414 |
| trigger mode, hand-held  | 69  |
| troubleshooting          | 48  |

## U

|                         |     |
|-------------------------|-----|
| unicode                 |     |
| output control          | 501 |
| unpacking               | 29  |
| UPC/EAN bar codes       |     |
| supplemental redundancy | 140 |
| UPC/EAN/JAN bar codes   |     |
| bookland EAN            | 134 |

|                                 |     |
|---------------------------------|-----|
| bookland ISBN                   | 135 |
| convert UPC-E to UPC-A          | 147 |
| convert UPC-E1 to UPC-A         | 147 |
| coupon report                   | 149 |
| decode supplementals            | 137 |
| EAN-13/JAN-13                   | 133 |
| EAN-8/JAN-8                     | 133 |
| ISSN EAN                        | 136 |
| samples                         | 526 |
| supplemental AIM ID format      | 141 |
| transmit UPC-A check digit      | 142 |
| transmit UPC-E check digit      | 142 |
| transmit UPC-E1 check digit     | 143 |
| UCC coupon extended code        | 148 |
| UPC reduced quiet zone          | 150 |
| UPC-A                           | 131 |
| UPC-A preamble                  | 144 |
| UPC-E                           | 132 |
| UPC-E preamble                  | 145 |
| UPC-E1                          | 132 |
| UPC-E1 preamble                 | 146 |
| user programmable supplementals | 140 |
| UPC/EAN/JAN barcodes            |     |
| EAN/JAN zero extend             | 148 |
| USB                             |     |
| bar codes                       | 237 |
| connection                      | 235 |
| default parameters              | 236 |
| V                               |     |
| video                           |     |
| image size                      | 122 |
| subsampling                     | 110 |
| view finder                     | 121 |
| video formats                   | 121 |
| video view finder               |     |
| frame size                      | 122 |
| W                               |     |
| weblink QR code bar codes       | 215 |

