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Warranty

For the complete Motorola hardware product warranty statement, go to:
Changes to the original manual are listed below:

<table>
<thead>
<tr>
<th>Change</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-01 Rev A</td>
<td>7/2012</td>
<td>Initial release</td>
</tr>
</tbody>
</table>
| -02 Rev A | 11/2013 | • Added support for the SE4750 engine  
• Updated Theory of Operation  
• Updated Software Installation and Setting Up Build Environment sections  
• Added Enabling and Disabling All Symbologies, Get Decode Count, and Get Last Decoded Image  
• Added following parameters: Mobile Phone/Display Mode, Multi Decode Mode, Bar Codes to Read, Full Read Mode, Illumination Power Level, Video Scaling, Retrieve Last Decoded Image, Han Xin, and Han Xin Inverse  
• Updated Sample Application section  
• Add Signature Capture Code appendix          |
| -03 Rev A | 1/2014 | Updated Video Capture section                                               |
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**Index**
Introduction

The Software Decode SDK for Android Developer Guide provides installation and programming information for the Software Decode Software Developer Kit (SDK) for Android operating systems.

Chapter Descriptions

This guide includes the following topics:

- **Chapter 1, Getting Started** provides an overview and a theory of operation of the product and its components, and includes information on installing Software Decode SDK for Android and a file list for the system library.

- **Chapter 2, Software Decode Library Operation** describes how the Software Decode Library interacts with scanning devices and provides operational information.

- **Chapter 3, Software Decode Library API** provides a reference to the BarCodeReader Java class, and includes configuration information.

- **Chapter 4, User and Imaging Parameters** describes the programmable user preference and imaging parameters available via Software Decode.

- **Chapter 5, Symbology Parameters** describes the programmable symbology parameters available via Software Decode.

- **Appendix A, SDK Demonstration Program** describes a sample application that demonstrates how to interact with the Software Decode Library.

- **Appendix B, Programming Reference** provides reference information such as Symbol and AIM code identifiers and SDL bar code type identifiers.

- **Appendix C, Signature Capture Code** describes CapCode, a signature capture code that is a special pattern that encloses a signature area on a document and allows a scanner to capture a signature.
Notational Conventions

This document uses the following conventions:

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

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

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

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

Related Documents

- *SE4500 Integration Guide*, p/n 72E-112996-xx
- *SE3300 Integration Guide*, p/n 72E-148589-xx
- *SE4750 Integration Guide*, p/n 72E-171726-xx
- Java Class *BarCodeReader*.html document, available with the Software Decode Software Developer Kit (SDK) for Android

For the latest version of this guide and all guides, go to: http://www.motorolasolutions.com/support.
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When contacting Motorola Solutions support, please have the following information available:

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- Model number or product name
- Software type and version number.

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

If you purchased your business product from a Motorola business partner, contact that business partner for support.
CHAPTER 1 GETTING STARTED

Introduction

The Motorola Software Decode SDK for Android empowers devices to receive and decode images from the imager engine. The Software Decode Library enables host-resident applications to access data decoded from captured images and set system parameters using the Software Decode API.

The imager engine is used with the SDK’s software decode library and low-level acquisition drivers to make up a complete bar code decoding solution, including the camera data stream interface and I^2C interface for sensor control. Developers can update the sample camera drivers to accommodate their hardware, provided drivers are based on industry standard board support packages.
This guide describes the installation and configuration of the Software Decode SDK for Android.

**Theory of Operation**

During image capture:

1. The image sensor in the imager engine captures an image of the bar code through the engine’s optical lens. If necessary, the engine automatically adjusts illumination, exposure, and other parameters to obtain the best quality image.

2. The imager engine transmits the image through the V4L2 compliant camera driver, through the hardware abstraction layer, to the JNI layer.

3. The decoding libraries at the JNI layer receive the image and decode any bar code found in the image.

4. The bar code data is sent to the Java host application using a callback mechanism.
Supported Symbologies

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

**1D Symbologies**

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

**2D Symbologies**

- PDF417
- MicroPDF417
- Data Matrix
- Data Matrix Inverse
- Maxicode
- QR Code
- MicroQR
- QR Inverse
- Aztec
- Aztec Inverse
- Han Xin
- Han Xin Inverse

**Postal Codes**

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

Operating Modes

The Software Decode SDK supports the following operating modes.

- **Decode** (default mode) - for decoding a bar code
- **Snapshot** - for capturing an image
- **Video** - provides a video of the subject
System Requirements

The SDK supports the following:

- Processor: TI OMAP3
- Engines:
  - SE4500 imager engine (refer to the SE4500 Integration Guide, p/n 72E-112996-xx)
  - SE3300 imager engine (refer to the SE3300 Integration Guide, p/n 72E-148589-xx)
  - SE4750 imager engine (refer to the SE4750 Integration Guide, p/n 72E-171726-xx)
- Operating Systems: Android versions 2.3, 4.0, 4.1, 4.2
- RAM (decoding system): 3 MB RAM
Software Installation

The Software Decode SDK for Android is supplied as a tarball file. This section provides information on installing the SDK as well as the contents of the tarball.

Software Decode SDK File Structure

Uncompressing the tarball creates the directory structure shown in Figure 1-2. Note that the Android_Sources/<SOC Vendor>/<SOC>/Drivers directory is broken out separately for clarity. The structure below is an example representation of the TI OMAP3 and OMAP4 Android source tree with support added for the SE4500, SE3300, and SE4750.
Table 1-1 lists and defines the files within each directory.

<table>
<thead>
<tr>
<th>Directory</th>
<th>Filename</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)</td>
<td></td>
<td>This folder has a structure and layout identical to the Android GB Source root folder</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/kernel/arch/arm/configs</td>
<td>omap3_evm_android_defconfig</td>
<td>Add kernel menu setting for Motorola Solutions SE4500/SE3300 engine</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/kernel/arch/arm/mach-omap2</td>
<td>omap3_evm_defconfig</td>
<td>Add kernel menu setting for Motorola Solutions SE4500/SE3300 engine</td>
</tr>
<tr>
<td></td>
<td>board-omap3evm.c</td>
<td>Changed I²C bus speed to communicate to SE4500/SE3300 to 100KHz</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/kernel/drivers/media/video</td>
<td>board-omap3evm-camera.c</td>
<td>Add support for Motorola Solutions SE4500/SE3300 engine</td>
</tr>
<tr>
<td></td>
<td>KConfig</td>
<td>Add menu option for Motorola Solutions SE4500/SE3300 engine</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/kernel/drivers/media/video/isp</td>
<td>Makefile</td>
<td>Support to build the driver file for Motorola Solutions SE4500/SE3300 engine</td>
</tr>
<tr>
<td></td>
<td>se4500.c</td>
<td>Driver support for Motorola Solutions SE4500/SE3300 engine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Support for the Motorola Solutions SE4500/SE3300 engine</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/kernel/include/media</td>
<td>se4500.h</td>
<td>Header file to support the SE4500/SE3300 driver</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/kernel/Drivers/system/core/rootdir</td>
<td>ueventd.rc</td>
<td>Add device support for Motorola Solutions SE4500/SE3300 engine</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/Texas Instruments/OMAP3/device/ti/omap3evm</td>
<td>init.rc</td>
<td>Changes to support debugging over ethernet</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/Texas Instruments/OMAP3/frameworks/base/include/camera</td>
<td>CameraParameters.h</td>
<td>Support for grayscale picture format</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/Texas Instruments/OMAP3/frameworks/base/libs/camera</td>
<td>CameraParameters.cpp</td>
<td>Support for grayscale picture format</td>
</tr>
<tr>
<td>Android_Sources/Ginger Bread (2.3x)/Texas Instruments/OMAP3/hardware/ti/omap3/camera</td>
<td></td>
<td>Add support inside the camera HAL driver for Motorola Solutions SE4500/SE3300 engine</td>
</tr>
</tbody>
</table>
Table 1-1  Motorola Software Decode SDK Files (Continued)

<table>
<thead>
<tr>
<th>Directory</th>
<th>Filename</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)</td>
<td>Kconfig</td>
<td>Add support for pre-allocating memory for OMAP4 video buffers</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/kernel/arch/arm/mach-omap2/</td>
<td>Omap4xx.h</td>
<td>Add OMAP4 support for SE4500</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/kernel/arch/arm/mach-omap2/include/plat</td>
<td>Omap4-cam.h</td>
<td>Add omap4 header file. TI doesn't include OMAP4 files by default in the Android source.</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/kernel/arch/arm/mach-omap2/include/mach</td>
<td>Omap4xiss folder</td>
<td>Add the omap4xiss folder to add OMAP4 support. It includes files for ISP support and OMAP4 registers.</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/kernel/drivers/media/video</td>
<td>Soc_camera.c</td>
<td>Add support for SE4500</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/kernel/include/media/video</td>
<td>SE4500.c</td>
<td>Add the camera driver file for SE4500</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/kernel/include/media/video</td>
<td>Makefile</td>
<td>Add support for compiling SE4500 and OMAP4</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/kernel/include/media/video</td>
<td>Kconfig</td>
<td>Add support for compiling SE4500 and OMAP4</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/Texas Instruments/OMAP4/mydroid/</td>
<td>V4l2-subdev.h</td>
<td>Add support for SE4500</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/Texas Instruments/OMAP4/mydroid/</td>
<td>Soc_camera.h</td>
<td>Add support for SE4500</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/Texas Instruments/OMAP4/mydroid/</td>
<td>Omap4_camera.h</td>
<td>Add this file to support OMAP4</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/Texas Instruments/OMAP4/mydroid/</td>
<td>CameraParameters.h</td>
<td>Support for grayscale picture format</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/Texas Instruments/OMAP4/mydroid/</td>
<td>CameraParameters.cpp</td>
<td>Support for grayscale picture format</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/Texas Instruments/OMAP4/mydroid/hardware/ti/omap3/camera</td>
<td>CameraParameters.cpp</td>
<td>Add support inside the Camera HAL driver for Motorola Solutions SE4500 engine</td>
</tr>
<tr>
<td>Android_Sources/Ice Cream Sandwich (4.0.x)/Texas Instruments/OMAP4/mydroid/system/core/rootdir</td>
<td>ueventd.rc</td>
<td>Add support to expose I²C device to the application</td>
</tr>
</tbody>
</table>
Table 1-1  Motorola Software Decode SDK Files (Continued)

<table>
<thead>
<tr>
<th>Directory</th>
<th>Filename</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)</td>
<td></td>
<td>This folder has a structure and layout identical to the Android JB source root folder</td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/kernel/android-3.0/</td>
<td>Kconfig</td>
<td>Add support for pre-allocating memory for OMAP4 video buffers</td>
</tr>
<tr>
<td>arch/arm/mach-omap2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/kernel/android-3.0/arch/arm/</td>
<td>Omap4-cam.h</td>
<td>Add omap4 header file. TI doesn't include OMAP4 files by default in the Android source.</td>
</tr>
<tr>
<td>mach-mach-omap2/include/mach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/kernel//arch/arm/plat-omap/</td>
<td>Omap44xx.h</td>
<td>Add OMAP4 support for SE4500/SE4750</td>
</tr>
<tr>
<td>include/plat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/kernel/android-3.0/drivers/</td>
<td>Omap4xiss folder</td>
<td>Add the omap4xiss folder to add OMAP4 support. It includes files for ISP support and OMAP4 registers.</td>
</tr>
<tr>
<td>media/video</td>
<td>Soc_camera.c</td>
<td>Add support for SE4500/SE4750</td>
</tr>
<tr>
<td></td>
<td>SE4500.c</td>
<td>Add the camera driver file for SE4500/SE4750</td>
</tr>
<tr>
<td></td>
<td>Makefile</td>
<td>Add support for compiling SE4500/SE4750 and OMAP4</td>
</tr>
<tr>
<td></td>
<td>Kconfig</td>
<td>Add support for compiling SE4500/SE4750 and OMAP4</td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/kernel/android-3.0/</td>
<td>V4l2-subdev.h</td>
<td>Add support for SE4500/SE4750</td>
</tr>
<tr>
<td>include/media/video</td>
<td>Soc_camera.h</td>
<td>Add support for SE4500/SE4750</td>
</tr>
<tr>
<td></td>
<td>Omap4_camera.h</td>
<td>Add this file to support OMAP4</td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/Texas Instruments/OMAP4/mydroid</td>
<td>CameraParameters.cpp</td>
<td>Support for grayscale picture format</td>
</tr>
<tr>
<td>frameworks/av/camera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CameraParameters.h</td>
<td></td>
<td>Support for grayscale picture format</td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/Texas Instruments/OMAP4/mydroid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>frameworks/av/include/camera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CameraParameters.cpp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/Texas Instruments/OMAP4/mydroid</td>
<td></td>
<td>Add support inside the camera HAL driver for Motorola Solutions SE4500 engine</td>
</tr>
<tr>
<td>OMAP4/mydroid/hardware/ti/omap4xxx/camera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Android_Sources/Jelly Bean (4.1.x 4.2.x)/Texas Instruments/OMAP4/mydroid</td>
<td></td>
<td>Add support to expose I²C device to the application</td>
</tr>
<tr>
<td>system/core/rootdir</td>
<td>ueventd.rc</td>
<td></td>
</tr>
</tbody>
</table>
Setting Up the Build Environment

Refer to the following developer guide to set up the build environment for TI OMAP3 and OMAP4 with Ubuntu:

- Ginger Bread 2.3.4
  Platform: OMAP3

- Ice Cream Sandwich 4.0.x
  Platform: OMAP4
  http://www.omappedia.com/wiki/4Al.1.7_OMAP4_Icecream_Sandwich_Release_Notes#Preparing_Android_binaries

- Jelly Bean 4.1.x and 4.2.x
  Platform: OMAP4
  http://www.omappedia.com/wiki/4AJ.1.1_OMAP4_Jelly_Bean_Release_Notes
CHAPTER 2 SOFTWARE DECODE LIBRARY
OPERATION

Introduction

This chapter describes how the Software Decode Library interacts with scanning devices and provides operational information to Android Java applications.

Initialization

The user application initializes the Software Decode Library. The Software Decode Library is accessed via the BarCodeReader class (see the Java Class BarCodeReader .html document) which interfaces with the Motorola imager. The user Java class (e.g., the Android Activity class) must implement BarCodeReader.DecodeCallback, BarCodeReader.PictureCallback, and BarCodeReader.PreviewCallback and load the required libraries using:

```java
static
{
    System.loadLibrary("IAL");
    System.loadLibrary("SDL");
    System.loadLibrary("barcodereader");
}
```

Scanner Connection and Setup

When an application accesses the Software Decode Library to scan a bar code or perform other scanner-specific operations, it first calls BarCodeReader.open() which attempts to locate a scanner and connect to it. If BarCodeReader.open() returns success, the connection is established between the application and the scanner, and the application can request various configuration and image processing functions.
Properties and Parameters

To provide maximum flexibility and compatibility with various imaging devices, the Software Decode Library and the application must be able to determine the properties and configuration settings associated with a specific scanner device. Since some hardware maintains its own property and configuration information while others do not, the various levels of software may extend or emulate pieces of this information as it progresses through the call stack.

This SDK defines two types of information about the Software Decode Library and the scanner objects: properties and parameters. Properties are a fixed list of immutable data objects that identify aspects and capabilities of the system or a specific scanner object. Parameters are configurable data objects that can alter the operation of the device.

The `BarCodeReader.PropertyNum` class lists the available scanner-specific properties. This list defines the properties available from each scanner object and is mainly used for identification or for altering the software operation to appropriately manage the device, such as model name and serial number. Properties can be of various data types including signed and unsigned integers and character strings. The application uses `BarCodeReader.getNumProperty()` to access numeric scanner properties and `BarCodeReader.getStrProperty()` to access scanner string properties.

A property can be read after successfully calling `BarCodeReader.open()` and connecting to the scanner. Properties are read-only and therefore cannot be changed.

To control and monitor a scanner device, access device-specific parameters with calls to `BarCodeReader.getNumParameter()`, `BarCodeReader.getStrParameter()`, `BarCodeReader.setParameter()`, and `BarCodeReader.setDefaultParameters()`.

The parameter numbering scheme is unique to each device, but must fit within a 32-bit field. Although all Motorola scan engines use a common list of parameter numbers, parameters supported are unique to each device. Since property IDs are common to all implemented scanner devices, they can be used to identify the specific scanner type and therefore aid in interpreting the parameter IDs used.

For the interfaces defined in this SDK, the Motorola parameter number is used while the SSI format for extended (larger than 8-bit) number identification is not.

The Software Decode Library implements a set of parameters that alters decoding and image manipulation processing in various ways. This subset of parameters the scanner provides is defined in the `BarCodeReader.ParamNum` class.

The `BarCodeReader.Parameters` class parallels the Android `Camera.Parameters` class. `BarCodeReader.getParameters()` and `BarCodeReader.setParameters()` configure the camera service. These parameters relate to camera settings and do not affect bar code decoder settings.

`BarCodeReader.getNumParameter()` and `BarCodeReader.getStrParameter()` are used to get specific numeric and string decoder parameters, respectively. `BarCodeReader.setParameter()` with the correct argument is used to set either the numeric or string decoder parameter. The `BarCodeReader.ParamNum` class contains constants for all decoder parameters. The `BarCodeReader.ParamVal` class contains constants for parameters that do not have simple boolean or range values.

To access parameters for a scanner device, first establish a connection to the device with a call to `BarCodeReader.open()`.
Image Frame Management

When a snapshot image frame is available, the user's `onPictureTaken()` method is called. When video frames are received, the user's `onVideoFrame()` method is called. When preview frames are received, the user's `onPreviewFrame()` method is called.

To pass image frames efficiently through the various layers of software, a set of buffers is allocated to hold the raw image data. Additionally, a pool of frame descriptors is allocated to hold meta data for each frame.

The low level camera interface in the Software Decode Library allocates the frame buffer and frame descriptor memory when `BarCodeReader.open()` is called. The application is not directly involved in memory allocation for raw frames. The low level camera interface performs this function based on its knowledge of the needs of the Software Decode Library.

Once the frame buffers and descriptors are allocated, the Software Decode Library and application can begin processing frames as necessary by calling `BarCodeReader.takePicture()` for snapshot or `startVideoCapture()` for video which enable low level acquisition and delivery of frames.

Once the Software Decode Library has processed a frame that satisfies the current operating parameters, it reformats the image data according to the parameter settings. The Software Decode Library then issues the `onPictureTaken()` callback for snapshot mode or the `onVideoFrame()` callback for video mode with the frame data.

BarCodeReader `startPreview()` bypasses the Software Decode Library's frame processing and passes the raw frames to the user's application via the `onPreviewFrame()` callback. The Software Decode Library continues to process incoming frames while the application has not returned from the callback. During this time, the additional frames are discarded by the low level camera interface and are not available to the application.
Bar Code Decoding

The application must implement the `BarcodeReader.DecodeCallback()` and call the `setDecodeCallback()` method to register for decode data callbacks.

Various parameters alter the operation of a decode session.

The `BarcodeReader.ParamNum.LASER_ON_PRIM` parameter sets a timeout value for the session from 0.5 to 9.9 seconds.

The `BarcodeReader.ParamNum.PRIM_TRIG_MODE` controls when and how to initiate a decode session and how to process images. It offers the following options:

- **Level mode** - initiates a decode session when the application calls `BarcodeReader.startDecode`. When the session starts, the decode session timer is set with the timeout value specified in the `BarcodeReader.ParamNum.LASER_ON_PRIM` parameter and the Software Decode Library starts a video session from the scanner and begins processing frames through its decoding algorithms. The decode session terminates when an image decodes, the session timer expires, or the application calls `BarcodeReader.stopDecode()`. In each case the `onDecodeComplete()` method is called with the length parameter set to the decoded bar code length, `BarcodeReader.DECODE_STATUS_TIMEOUT` or `BarcodeReader.DECODE_STATUS_CANCELED` respectively.

- **Presentation mode** - an application call to `BarcodeReader.startHandsFreeDecode(int mode)` with the mode parameter set to `BarcodeReader.ParamVal.HANDSFREE` initiates a video session from the low level camera interface and monitors the video stream for the presence of an object using motion detection algorithms. When motion is detected, the `DecodeCallback.onEvent` function is called with an event argument of `BCRDR_EVENT_MOTION_DETECTED`. The video images are then processed through the decoding algorithms. On a successful decode, the Software Decode Library issues a call to the `DecodeCallback.onDecodeComplete()` method and returns to motion detection mode.

- **Auto-aim mode** - an application call to `BarcodeReader.startHandsFreeDecode(int mode)` with the mode parameter set to `BarcodeReader.ParamVal.AUTO_AIM` initiates a video session from the low level camera interface and monitors the video stream for the presence of an object using motion detection algorithms. When motion is detected, the aim pattern is enabled, the decode session timer is set with the timeout value specified in the `BarcodeReader.ParamNum.LASER_ON_PRIM` parameter, and the `DecodeCallback.onEvent` function is called with an event argument of `BCRDR_EVENT_MOTION_DETECTED`. When the bar code is within the aiming pattern, the application issues a call to `BarcodeReader.startDecode()` and the Software Decode Library processes video images through its decode algorithms. If a successful decode occurs before the timer expires, the Software Decode Library issues a call to the `DecodeCallback.onDecodeComplete()` method and returns to motion detection mode. If the decode session timer expires, the Software Decode Library reverts to motion detection mode and issues a call to the `DecodeCallback.onDecodeComplete()` method function with the timeout status code `BarcodeReader.DECODE_STATUS_TIME_OUT` set in the length parameter.
**Snapshot Capture**

The Software Decode Library can also operate in snapshot mode where it does not attempt to decode images but simply formats the images based on the current parameter settings and passes them to the application.

The application must implement the `BarcodeReader.PictureCallback()` interface and call `BarcodeReader.takePicture()` to start this mode. The snapshot image is delivered by a callback to the application's `onPictureTaken()` method.

The session terminates when the application's `onPictureTaken()` returns.

To implement a snapshot preview (i.e., video viewfinder), call `BarcodeReader.setPreviewDisplay()` to set the live preview surface and `BarcodeReader.startViewFinder()` to start previewing frames. To take the snapshot call `BarcodeReader.stopPreview()` followed by `BarcodeReader.takePicture()` as described above.

**Video Capture**

To initiate video capture, the application must implement `BarcodeReader.VideoCallback()` and call `BarcodeReader.startVideoCapture()`. Once the Software Decode Library has processed a frame that satisfies the current operating parameters, it reformats the image data according to the parameter settings then calls the application's `onVideoFrame()` method to deliver the frame data. To terminate a video session the application must call the `BarcodeReader.stopPreview()` method.

**Enabling all Symbologies**

To enable the decoding of all bar code types, call `BarcodeReader.enableAllCodeTypes()`.

**Disabling all Symbologies**

To disable the decoding of all bar code types, call `BarcodeReader.disableAllCodeTypes()`.

**Get Decode Count**

To retrieve the number of bar codes decoded during a multiple bar code decoding session, call `BarcodeReader.getDecodeCount()`.

**Get Last Decoded Image**

To retrieve the last decoded image, call `BarcodeReader.getLastDecImage()`.

**Shutdown**

When the application is about to pause or exit it should call `BarcodeReader.release()` to free any system resources.
CHAPTER 3 SOFTWARE DECODE LIBRARY
API

Introduction

This chapter demonstrates use of the BarCodeReader Java class. BarCodeReader is a generic Android camera interface with special additions for the Motorola imager engine. For more information refer to Documentation/BarCodeReader.javadoc/overview-tree.html.

Configuration

The Android Software Decode Library reads system configuration values from the configuration file /mnt/sdcard/sdl.conf at startup. If the file is not found, system defaults are used. Table 3-1 lists the configuration key names. Also see sdl.conf Sample File.

Table 3-1  Configuration Keys

<table>
<thead>
<tr>
<th>Key</th>
<th>Type</th>
<th>Default</th>
<th>Value Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DebugMode</td>
<td>byte</td>
<td>0</td>
<td>0 = Off</td>
<td>Debug output is sent to the serial port</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1 = On, Serial</td>
<td>Debug output is sent to the $&lt;DebugFile&gt;$</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 = On, File</td>
<td></td>
</tr>
<tr>
<td>DebugLevel</td>
<td>byte</td>
<td>0</td>
<td>0 - 255</td>
<td>Debug output is sent to the serial port</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0 = off, 255 = most detail</td>
<td>Debug output is sent to the $&lt;DebugFile&gt;$</td>
</tr>
<tr>
<td>DebugFile</td>
<td>string</td>
<td>(none)</td>
<td></td>
<td>Debug filename, used when DebugMode is set to 2</td>
</tr>
<tr>
<td>CamDevice</td>
<td>string</td>
<td>/dev/video0</td>
<td></td>
<td>Name of the camera device to acquire frames</td>
</tr>
<tr>
<td>I2CDevice</td>
<td>string</td>
<td>/dev/moto SDL</td>
<td></td>
<td>Name of the device used for i^2C communications</td>
</tr>
</tbody>
</table>
# sdl.conf Sample File

#--------------------------------------------
# Linux/Android SDL Property/Config file
# # format:
# # <property name> = <hex>
# # <property name> = <decimal>
# # <property name> = <string>
# # where:
# # <hex> = 0x64
# # <decimal> = 100
# # <string> = "string"
# #--------------------------------------------

# decoding
AllowParamBarcodes = 0
PicklistMode = 0

# system
PlatformName = "Android"
EngineModel = 0

## DecodeThreadPriority = 100
## SystemThreadPriority = 100

IALPriority = 0

# devices
CamDevName = "/dev/video0"
I2CDevName = "/dev/moto_sdl"

# debug
DebugMode = 2
DebugLevel = 50
DebugFile = "mnt/sdcard/sdl.log"

#--------------------------------------- [end]
CHAPTER 4 USER AND IMAGING PARAMETERS

Introduction

This chapter describes the programmable user preference and imaging parameters available via the Software Decode SDK for Android, and includes the parameter numbers and option values to use.

NOTE Parameter bar codes found in other guides can not be used to program these parameters.

User and Imaging Parameter Defaults

Table 4-1 lists defaults for all supported user parameters.

Table 4-1  User Preferences Default Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Number (Decimal)</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Preferences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trigger Mode</td>
<td>138</td>
<td>Level</td>
<td>4-3</td>
</tr>
<tr>
<td>Picklist Mode</td>
<td>402</td>
<td>Disabled Always</td>
<td>4-3</td>
</tr>
<tr>
<td>Decode Session Timeout</td>
<td>136</td>
<td>9.9 Sec</td>
<td>4-3</td>
</tr>
<tr>
<td>Timeout Between Decodes, Same Symbol</td>
<td>137</td>
<td>0.6 Sec</td>
<td>4-3</td>
</tr>
<tr>
<td>Transmit Code ID Character</td>
<td>45</td>
<td>None</td>
<td>4-4</td>
</tr>
<tr>
<td>Transmit “No Read” Message</td>
<td>94</td>
<td>Disable</td>
<td>4-4</td>
</tr>
<tr>
<td>Mobile Phone/Display Mode</td>
<td>716</td>
<td>0</td>
<td>4-4</td>
</tr>
<tr>
<td>Multi Decode Mode</td>
<td>900</td>
<td>0</td>
<td>4-4</td>
</tr>
<tr>
<td>Bar Codes to Read</td>
<td>902</td>
<td>1</td>
<td>4-5</td>
</tr>
<tr>
<td>Full Read Mode</td>
<td>901</td>
<td>1</td>
<td>4-5</td>
</tr>
</tbody>
</table>
## Imaging Options

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Number (Decimal)</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illumination Power Level</td>
<td>764</td>
<td>10</td>
<td>4-6</td>
</tr>
<tr>
<td>Decoding Illumination</td>
<td>298</td>
<td>Enable</td>
<td>4-6</td>
</tr>
<tr>
<td>Decode Aiming Pattern</td>
<td>306</td>
<td>Enable</td>
<td>4-6</td>
</tr>
<tr>
<td>Hands-free Decode Aiming Pattern</td>
<td>590</td>
<td>Enable</td>
<td>4-6</td>
</tr>
<tr>
<td>Image Capture Illumination</td>
<td>361</td>
<td>Enable</td>
<td>4-7</td>
</tr>
<tr>
<td>Motion Illumination</td>
<td>762</td>
<td>Enable</td>
<td>4-7</td>
</tr>
<tr>
<td>Snapshot Mode Timeout</td>
<td>323</td>
<td>0 (30 seconds)</td>
<td>4-7</td>
</tr>
<tr>
<td>Snapshot Aiming Pattern</td>
<td>300</td>
<td>Enable</td>
<td>4-7</td>
</tr>
<tr>
<td>Image Cropping</td>
<td>301</td>
<td>Disable</td>
<td>4-7</td>
</tr>
<tr>
<td>Crop to Pixel Addresses</td>
<td>315; 316; 317; 318</td>
<td>SE3300/SE4500: 0 top, 0 left, 479 bottom, 751 right SE4750: 0 top, 0 left, 959 bottom, 1279 right</td>
<td>4-8</td>
</tr>
<tr>
<td>Image Resolution</td>
<td>302</td>
<td>Full</td>
<td>4-8</td>
</tr>
<tr>
<td>Image File Format Selection</td>
<td>304</td>
<td>JPEG</td>
<td>4-8</td>
</tr>
<tr>
<td>JPEG Quality Value</td>
<td>305</td>
<td>65</td>
<td>4-9</td>
</tr>
<tr>
<td>Image Enhancement</td>
<td>564</td>
<td>Off</td>
<td>4-9</td>
</tr>
<tr>
<td>Bits per Pixel (BPP)</td>
<td>303</td>
<td>8 BPP</td>
<td>4-9</td>
</tr>
<tr>
<td>Signature Capture</td>
<td>93</td>
<td>Disable</td>
<td>4-10</td>
</tr>
<tr>
<td>Signature Capture Image File Format Selection</td>
<td>313</td>
<td>JPEG</td>
<td>4-10</td>
</tr>
<tr>
<td>Signature Capture Bits per Pixel (BPP)</td>
<td>314</td>
<td>8 BPP</td>
<td>4-10</td>
</tr>
<tr>
<td>Signature Capture Width</td>
<td>366</td>
<td>400</td>
<td>4-11</td>
</tr>
<tr>
<td>Signature Capture Height</td>
<td>367</td>
<td>100</td>
<td>4-11</td>
</tr>
<tr>
<td>Signature Capture JPEG Quality</td>
<td>421</td>
<td>65</td>
<td>4-11</td>
</tr>
<tr>
<td>Video View Finder</td>
<td>324</td>
<td>Disable</td>
<td>4-11</td>
</tr>
<tr>
<td>Video Scaling</td>
<td>761</td>
<td>2</td>
<td>4-11</td>
</tr>
<tr>
<td>Retrieve Last Decoded Image</td>
<td>905</td>
<td>Disable</td>
<td>4-11</td>
</tr>
</tbody>
</table>

### Table 4-1 User Preferences Default Table
User Preferences

In this section, * indicates the default option.

**Trigger Mode**

Parameter # 138

Select a trigger mode:

- **0 - Level** - A trigger event activates decode processing, which continues until the trigger event ends, a valid decode, or the decode session time-out occurs.
- **7 - Presentation Mode** - When the imager engine detects an object in its field of view, it triggers and attempts to decode. The range of object detection does not vary under normal lighting conditions. This applies to decode mode only.
- **9 - Auto Aim** - This trigger mode turns on the red laser aiming pattern when the imager engine senses motion. A trigger pull activates decode processing. After 2 seconds of inactivity the red laser aiming pattern automatically shuts off.

**Picklist Mode**

Parameter # 402

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

- **0 - Disabled Always** - Picklist mode is always disabled.
- **2 - Enabled Always** - Picklist mode is always enabled.

**NOTE**  Picklist mode works via an approximation of the aiming pattern center. In most cases this approximation is fully accurate. However, decodes can occur when the target bar code is near but not directly under the center of the aiming pattern.

**Decode Session Timeout**

Parameter # 136

Set the maximum time decode processing continues during a scan attempt, available in 0.1 second increments from 0.5 to 9.9 seconds. The default timeout is 9.9 seconds.

For example, to set a decode session timeout of 0.5 seconds, set this parameter to a value of 5. To set a timeout of 2.5 seconds, enter the value 25.

**Timeout Between Decodes, Same Symbol**

Parameter # 137

Use this option in presentation mode to prevent multiple reads of a symbol left in the imager engine’s field of view. The timeout begins when you remove the symbol from the field of view.

Set the timeout between decodes for the same symbol, available in 0.1 second increments from 0.0 to 9.9 seconds. The default interval is 0.6 seconds. For example, to set this timeout to 0.5 seconds, enter a value of 5. To set a timeout of 2.5 seconds, enter the value 25.
Transmit Code ID Character

Parameter # 45

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

\[\text{\textbf{NOTE}}\] If you enable Symbol Code ID Character or AIM Code ID Character, and enable \textit{Transmit “No Read” Message}, the decoder appends the code ID for Code 39 to the NR message.

Select one of the following Code ID options:

- *0 - None
- 1 - AIM Code ID Character
- 2 - Symbol Code ID Character

Transmit “No Read” Message

Parameter # 94

Select whether or not to transmit a No Read message.

\[\text{\textbf{NOTE}}\] If you enable \textit{Transmit No Read}, and also enable Symbol Code ID Character or AIM Code ID Character for \textit{Transmit Code ID Character}, the decoder appends the code ID for Code 39 to the NR message.

Select one of the following options:

- *0 - Disable No Read - the decoder sends nothing to the host if a symbol does not decode.
- 1 - Enable No Read - the decoder sends the characters NR when a successful decode does not occur before trigger release or the Decode Session Timeout expires. See \textit{Decode Session Timeout} on page 4-3.

Mobile Phone/Display Mode

Parameter # 716

This mode improves bar code reading performance on mobile phones and electronic displays. Select one of the following options:

- *0 - Disable Mobile Phone/Display Mode
- 1 - Enable Mobile Phone/Display Mode

Multi Decode Mode

Parameter # 900

This mode enables decoding multiple bar codes within the scanner’s field of view. Select one of the following options:

- *0 - Disable Multi Decode Mode
- 1 - Enable Multi Decode Mode
Bar Codes to Read

Parameter # 902

This parameter sets the number of bar codes to read when Multi Decode Mode is enabled. The range is 1 to 10 bar codes. The default is 1.

Full Read Mode

Parameter # 901

Select when to generate a decode event to the calling application when Multi Decode Mode is enabled.

- 0 - Generate a decode event after one or more bar codes are decoded.
- *1 - Only generate the callback to onDecodeComplete() when at least the number of bar codes set in Bar Codes to Read are decoded.
Imager Preferences

In this section, * indicate the default option.

Illumination Power Level

Parameter # 764

This parameter sets the level of illumination by altering laser/LED power. The default is 10, which is maximum illumination. For values from 0 to 10, illumination varies from lowest to highest level. This parameter affects both decoding and motion illumination.

Decoding Illumination

Parameter # 298

Enable or disable illumination:

- *1 - Enable Decoding Illumination - the decoder turns on illumination every image capture to aid decoding.
- 0 - Disable Decoding Illumination - the decoder does not use decoding illumination.

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

Decode Aiming Pattern

Parameter # 306

This parameter only applies in Decode Mode.

- *1 - Enable Decode Aiming Pattern - this projects the aiming pattern during bar code capture.
- 0 - Disable Decode Aiming Pattern - this turns off the aiming pattern.

Hands-free Decode Aiming Pattern

Parameter # 590

This parameter only applies in hands-free mode.

- *1 - Enable Hands-free Decode Aiming Pattern - this projects the aiming pattern during hands-free mode.
- 0 - Disable Hands-free Decode Aiming Pattern - this turns off the aiming pattern during hands-free mode.
Image Capture Illumination

Parameter # 361
Enable or disable image capture illumination:

- *1 - Enable Image Capture Illumination - the decoder turns on illumination during every image capture.
- 0 - Disable Image Capture Illumination - prevents the decoder from using image capture illumination.

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

Motion Illumination

Parameter # 762
This parameter only applies to hands-free and auto aim trigger modes.

- *1 - Enable Motion Illumination - turns on motion illumination in hands-free and auto aim trigger modes.
- 0 - Disable Motion Illumination - turns off motion illumination.

Snapshot Mode Timeout

Parameter # 323
This parameter sets the amount of time the decoder remains in Snapshot Mode. The decoder exits Snapshot Mode upon a trigger event, or when the Snapshot Mode Timeout elapses. The default value is 0 which represents 30 seconds; values increment by 30. For example, 1 = 60 seconds, 2 = 90 seconds, etc.

Snapshot Aiming Pattern

Parameter # 300
Enable or disable the Snapshot Aiming Pattern:

- *1 - Enable Snapshot Aiming Pattern - projects the aiming pattern when in Snapshot Mode.
- 0 - Disable Snapshot Aiming Pattern - turns the aiming pattern off.

Image Cropping

Parameter # 301
Enable or disable the Image Cropping:

- *0 - Disable Image Cropping - presents the full 752 x 480 pixels for SE3300/SE4500 and 1280 x 960 for SE4750.
- 1 - Enable Image Cropping - crops the image to the pixel addresses set in Crop to Pixel Addresses on page 4-8.

**NOTE** The decoder has a cropping resolution of 4 pixels. Setting the cropping area to less than 3 pixels transfers the entire image.
Crop to Pixel Addresses

Parameter # 315 (Top)
Parameter # 316 (Left)
Parameter # 317 (Bottom)
Parameter # 318 (Right)

If you selected Enable Image Cropping, set the pixel addresses to crop to. Values range from (0,0) to (751,479) for the SE3300/SE4500, and (0,0) to (1279,959) for the SE4750.

For the SE3300/SE4500, columns are numbered from 0 to 751, rows from 0 to 479.
For the SE4750, columns are numbered from 0 to 1279, rows from 0 to 959.
Specify four values for Top, Left, Bottom, and Right, where Top and Bottom correspond to row pixel addresses, and Left and Right correspond to column pixel addresses. For example, for a 4 row x 8 column image in the extreme bottom-right section of the image, set the following values:

SE3300/SE4500: Top = 476, Bottom = 479, Left = 744, Right = 751
SE4750: Top = 955, Bottom = 959, Left = 1271, Right = 1279

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

Image Resolution

Parameter # 302

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

Select one of the following values:

<table>
<thead>
<tr>
<th>Value</th>
<th>Resolution</th>
<th>Uncropped Image Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SE3300, SE4500</td>
</tr>
<tr>
<td>*0</td>
<td>Full</td>
<td>752 x 480</td>
</tr>
<tr>
<td>1</td>
<td>1/2</td>
<td>376 x 240</td>
</tr>
<tr>
<td>3</td>
<td>1/4</td>
<td>188 x 120</td>
</tr>
</tbody>
</table>

Image File Format Selector

Parameter # 304

Select an image format appropriate for the system. The decoder stores captured images in the selected format:

- *1 - JPEG File Format
- 3 - BMP File Format
- 4 - TIFF File Format
**JPEG Quality Value**

**JPEG Quality = Parameter # 305**

Set the JPEG Quality to a value from 5 to 100, where 100 represents the highest quality image. The default is 65.

**Image Enhancement**

**Parameter # 564**

This feature uses a combination of edge sharpening and contrast enhancement to produce an image that is visually pleasing. Select a level of image enhancement:

- *0 - Off
- 1 - Low
- 2 - Medium
- 3 - High

**Bits per Pixel**

**Parameter # 303**

Select the number of significant bits per pixel (BPP) to use when capturing an image:

- *2 - 8 BPP to assign 1 of 256 levels of grey to each pixel
- 0 - 1 BPP for a black and white image
- 1 - 4 BPP to assign 1 of 16 levels of grey to each pixel

The decoder ignores these settings for JPEG files, which always use 8 BPP.
Signature Capture

Parameter # 93

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

Output File Format

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

<table>
<thead>
<tr>
<th>File Descriptor</th>
<th>Signature Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Format</td>
<td>Signature Type</td>
</tr>
<tr>
<td>(1 byte)</td>
<td>(1 byte)</td>
</tr>
<tr>
<td>JPEG - 1</td>
<td>1-8</td>
</tr>
<tr>
<td>BMP - 3</td>
<td></td>
</tr>
<tr>
<td>TIFF - 4</td>
<td></td>
</tr>
</tbody>
</table>

Enable or disable Signature Capture:

- *0 - Disable Signature Capture
- 1 - Enable Signature Capture

Signature Capture File Format Selector

Parameter # 313

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

- *1 - JPEG Signature Format
- 3 - BMP Signature Format
- 4 - TIFF Signature Format

Signature Capture Bits per Pixel

Parameter # 314

Select the number of significant bits per pixel (BPP) to use when capturing a signature:

- *2 - 8 BPP to assign 1 of 256 levels of grey to each pixel
- 0 - 1 BPP for a black and white image
- 1 - 4 BPP to assign 1 of 16 levels of grey to each pixel

The decoder ignores these settings for JPEG files, which always use 8 BPP.
Signature Capture Width
Parameter # 366

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

Set the width of the signature capture box to a value in the range of 001 to 752 decimal for the
SE3300/SE4500, and 001 to 1280 for the SE4750. The default is 400.

Signature Capture Height
Parameter # 367

Set the height of the signature capture box to a value in the range of 001 to 480 decimal for the
SE3300/SE4500, and 001 to 960 for the SE4750. The default is 100.

Signature Capture JPEG Quality
Parameter # 421

Set the Signature Capture JPEG Quality to a value from 005 to 100, where 100 represents the highest
quality image. The default is 65.

Video View Finder
Parameter # 324

Select a Video View Finder option:
- *0 - Disable Video View Finder - turns the video view finder off.
- 1 - Enable Video View Finder - projects the video view finder while in Image Mode.

Video Scaling
Parameter # 761

Set the resolution of the image in video mode.
- 0 - Full Resolution (752 x 480 for SE3300, SE4500 and 1280 x 960 for SE4750)
- 1 - 1/2 Resolution
- *2 - 1/3 Resolution
- 3 - 1/4 Resolution

Retrieve Last Decoded Image
Parameter # 905

This parameter retrieves the last decoded frame in the most recent decode session. To receive the last
decoded image call barcodereader.getLastDecImage(). Enable or disable this parameter:
- *0 - Disable Retrieve Last Decoded Image
- 1 - Enable Retrieve Last Decoded Image
CHAPTER 5 SYMBOLOGY PARAMETERS

Introduction

This chapter describes the programmable symbology parameters available via the Software Decode SDK for Android, and includes the parameter numbers and option values to use.

Symbology Parameter Defaults

Table 5-1 lists defaults for all supported symbology parameters.

Table 5-1  Symbology Preferences Default Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Number (Decimal)</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPC/EAN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPC-A</td>
<td>1</td>
<td>Enable</td>
<td>5-6</td>
</tr>
<tr>
<td>UPC-E</td>
<td>2</td>
<td>Enable</td>
<td>5-6</td>
</tr>
<tr>
<td>UPC-E1</td>
<td>12</td>
<td>Disable</td>
<td>5-6</td>
</tr>
<tr>
<td>EAN-8/JAN 8</td>
<td>4</td>
<td>Enable</td>
<td>5-6</td>
</tr>
<tr>
<td>EAN-13/JAN 13</td>
<td>3</td>
<td>Enable</td>
<td>5-6</td>
</tr>
<tr>
<td>Bookland EAN</td>
<td>83</td>
<td>Disable</td>
<td>5-7</td>
</tr>
<tr>
<td>Decode UPC/EAN/JAN Supplementals (2 and 5 digits)</td>
<td>16</td>
<td>Ignore</td>
<td>5-7</td>
</tr>
<tr>
<td>User-Programmable Supplementals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplemental 1:</td>
<td>579</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplemental 2:</td>
<td>580</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPC/EAN/JAN Supplemental Redundancy</td>
<td>80</td>
<td>10</td>
<td>5-8</td>
</tr>
<tr>
<td>Decode UPC/EAN/JAN Supplemental AIM ID</td>
<td>672</td>
<td>Combined</td>
<td>5-8</td>
</tr>
</tbody>
</table>
### Table 5-1  Symbology Preferences Default Table (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Number (Decimal)</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmit UPC-A Check Digit</td>
<td>40</td>
<td>Enable</td>
<td>5-9</td>
</tr>
<tr>
<td>Transmit UPC-E Check Digit</td>
<td>41</td>
<td>Enable</td>
<td>5-9</td>
</tr>
<tr>
<td>Transmit UPC-E1 Check Digit</td>
<td>42</td>
<td>Enable</td>
<td>5-9</td>
</tr>
<tr>
<td>UPC-A Preamble</td>
<td>34</td>
<td>System Character</td>
<td>5-9</td>
</tr>
<tr>
<td>UPC-E Preamble</td>
<td>35</td>
<td>System Character</td>
<td>5-10</td>
</tr>
<tr>
<td>UPC-E1 Preamble</td>
<td>36</td>
<td>System Character</td>
<td>5-10</td>
</tr>
<tr>
<td>Convert UPC-E to A</td>
<td>37</td>
<td>Disable</td>
<td>5-10</td>
</tr>
<tr>
<td>Convert UPC-E1 to A</td>
<td>38</td>
<td>Disable</td>
<td>5-10</td>
</tr>
<tr>
<td>EAN-8/JAN-8 Extend</td>
<td>39</td>
<td>Disable</td>
<td>5-11</td>
</tr>
<tr>
<td>UCC Coupon Extended Code</td>
<td>85</td>
<td>Disable</td>
<td>5-11</td>
</tr>
<tr>
<td>Coupon Report</td>
<td>730</td>
<td>New Coupon Symbols</td>
<td>5-12</td>
</tr>
<tr>
<td>ISSN EAN</td>
<td>617</td>
<td>Disable</td>
<td>5-12</td>
</tr>
</tbody>
</table>

**Code 128**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Number (Decimal)</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code 128</td>
<td>8</td>
<td>Enable</td>
<td>5-13</td>
</tr>
<tr>
<td>Set Length(s) for Code 128</td>
<td>209 210</td>
<td>Any Length</td>
<td>5-13</td>
</tr>
<tr>
<td>GS1-128 (formerly UCC/EAN-128)</td>
<td>14</td>
<td>Enable</td>
<td>5-13</td>
</tr>
<tr>
<td>ISBT 128</td>
<td>84</td>
<td>Enable</td>
<td>5-14</td>
</tr>
<tr>
<td>ISBT Concatenation</td>
<td>577</td>
<td>Disable</td>
<td>5-14</td>
</tr>
<tr>
<td>Check ISBT Table</td>
<td>578</td>
<td>Enable</td>
<td>5-14</td>
</tr>
<tr>
<td>ISBT Concatenation Redundancy</td>
<td>223</td>
<td>10</td>
<td>5-14</td>
</tr>
</tbody>
</table>

**Code 39**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Number (Decimal)</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code 39</td>
<td>0</td>
<td>Enable</td>
<td>5-15</td>
</tr>
<tr>
<td>Trioptic Code 39</td>
<td>13</td>
<td>Disable</td>
<td>5-15</td>
</tr>
<tr>
<td>Convert Code 39 to Code 32 (Italian Pharmacy Code)</td>
<td>86</td>
<td>Disable</td>
<td>5-15</td>
</tr>
<tr>
<td>Code 32 Prefix</td>
<td>231</td>
<td>Disable</td>
<td>5-15</td>
</tr>
<tr>
<td>Set Length(s) for Code 39</td>
<td>18 19</td>
<td>2 to 55</td>
<td>5-16</td>
</tr>
<tr>
<td>Code 39 Check Digit Verification</td>
<td>48</td>
<td>Disable</td>
<td>5-16</td>
</tr>
<tr>
<td>Parameter</td>
<td>Parameter Number (Decimal)</td>
<td>Default</td>
<td>Page Number</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------------------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Transmit Code 39 Check Digit</td>
<td>43</td>
<td>Disable</td>
<td>5-18</td>
</tr>
<tr>
<td>Code 39 Full ASCII Conversion</td>
<td>17</td>
<td>Disable</td>
<td>5-17</td>
</tr>
<tr>
<td><strong>Code 93</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code 93</td>
<td>9</td>
<td>Disable</td>
<td>5-17</td>
</tr>
<tr>
<td>Set Length(s) for Code 93</td>
<td>26</td>
<td>4 to 55</td>
<td>5-17</td>
</tr>
<tr>
<td><strong>Code 11</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code 11</td>
<td>10</td>
<td>Disable</td>
<td>5-18</td>
</tr>
<tr>
<td>Set Lengths for Code 11</td>
<td>28</td>
<td>4 to 55</td>
<td>5-18</td>
</tr>
<tr>
<td>Code 11 Check Digit Verification</td>
<td>52</td>
<td>Disable</td>
<td>5-18</td>
</tr>
<tr>
<td>Transmit Code 11 Check Digit(s)</td>
<td>47</td>
<td>Disable</td>
<td>5-18</td>
</tr>
<tr>
<td><strong>Interleaved 2 of 5 (ITF)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interleaved 2 of 5 (ITF)</td>
<td>6</td>
<td>Enable</td>
<td>5-19</td>
</tr>
<tr>
<td>Set Lengths for I 2 of 5</td>
<td>22</td>
<td>14</td>
<td>5-19</td>
</tr>
<tr>
<td>I 2 of 5 Check Digit Verification</td>
<td>49</td>
<td>Disable</td>
<td>5-19</td>
</tr>
<tr>
<td>Transmit I 2 of 5 Check Digit</td>
<td>44</td>
<td>Disable</td>
<td>5-20</td>
</tr>
<tr>
<td>Convert I 2 of 5 to EAN 13</td>
<td>82</td>
<td>Disable</td>
<td>5-20</td>
</tr>
<tr>
<td><strong>Discrete 2 of 5 (DTF)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discrete 2 of 5</td>
<td>5</td>
<td>Disable</td>
<td>5-20</td>
</tr>
<tr>
<td>Set Length(s) for D 2 of 5</td>
<td>20</td>
<td>12</td>
<td>5-20</td>
</tr>
<tr>
<td><strong>Codabar (NW - 7)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Codabar</td>
<td>7</td>
<td>Disable</td>
<td>5-21</td>
</tr>
<tr>
<td>Set Lengths for Codabar</td>
<td>24</td>
<td>5 to 55</td>
<td>5-21</td>
</tr>
<tr>
<td>CLSI Editing</td>
<td>54</td>
<td>Disable</td>
<td>5-21</td>
</tr>
<tr>
<td>NOTIS Editing</td>
<td>55</td>
<td>Disable</td>
<td>5-21</td>
</tr>
<tr>
<td><strong>MSI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSI</td>
<td>11</td>
<td>Disable</td>
<td>5-22</td>
</tr>
<tr>
<td>Set Length(s) for MSI</td>
<td>30</td>
<td>4 to 55</td>
<td>5-22</td>
</tr>
</tbody>
</table>
Table 5-1  *Symbology Preferences Default Table (Continued)*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Number (Decimal)</th>
<th>Default</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSI Check Digits</td>
<td>50</td>
<td>One</td>
<td>5-22</td>
</tr>
<tr>
<td>Transmit MSI Check Digit</td>
<td>46</td>
<td>Disable</td>
<td>5-23</td>
</tr>
<tr>
<td>MSI Check Digit Algorithm</td>
<td>51</td>
<td>Mod 10/Mod 10</td>
<td>5-23</td>
</tr>
</tbody>
</table>

**Chinese 2 of 5**

| Chinese 2 of 5                              |                           | Disable            | 5-23        |

**Korean 3 of 5**

| Korean 3 of 5                               |                           | Disable            | 5-23        |

**Matrix 2 of 5**

| Matrix 2 of 5                               |                           | Disable            | 5-24        |
| Matrix 2 of 5 Lengths                       | 618                        | Disable            | 5-24        |
| Matrix 2 of 5 Lengths 14                    | 620                        |                    |             |
| Matrix 2 of 5 Redundancy                    | 621                        | Disable            | 5-24        |
| Matrix 2 of 5 Check Digit                   | 622                        | Disable            | 5-24        |
| Transmit Matrix 2 of 5 Check Digit          | 623                        | Disable            | 5-25        |
| Inverse 1D                                   | 586                        | Regular            | 5-25        |

**Postal Codes**

<table>
<thead>
<tr>
<th>Postal Codes</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>US Postnet</td>
<td>89</td>
<td>Enable</td>
<td>5-25</td>
</tr>
<tr>
<td>US Planet</td>
<td>90</td>
<td>Enable</td>
<td>5-25</td>
</tr>
<tr>
<td>Transmit US Postal Check Digit</td>
<td>95</td>
<td>Enable</td>
<td>5-25</td>
</tr>
<tr>
<td>UK Postal</td>
<td>91</td>
<td>Enable</td>
<td>5-26</td>
</tr>
<tr>
<td>Transmit UK Postal Check Digit</td>
<td>96</td>
<td>Enable</td>
<td>5-26</td>
</tr>
<tr>
<td>Japan Postal</td>
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**GS1 DataBar (formerly RSS, Reduced Space Symbology)**

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Symbologies

Enable/Disable UPC-A
Parameter # 1
Enable or disable UPC-A:
• *1 - Enable UPC-A
• 0 - Disable UPC-A

Enable/Disable UPC-E
Parameter # 2
Enable or disable UPC-E:
• *1 - Enable UPC-E
• 0 - Disable UPC-E

Enable/Disable UPC-E1
Parameter # 12
Enable or disable UPC-E1. UPC-E1 is disabled by default.
• *0 - Disable UPC-E1
• 1 - Enable UPC-E1

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

Enable/Disable EAN-8/JAN-8
Parameter # 4
Enable or disable EAN-8/JAN-8:
• *1 - Enable EAN-8/JAN-8
• 0 - Disable EAN-8/JAN-8

Enable/Disable EAN-13/JAN-13
Parameter # 3
Enable or disable EAN-13/JAN-13:
• *1 - Enable EAN-13/JAN-13
• 0 - Disable EAN-13/JAN-13
Enable/Disable Bookland EAN

Parameter # 83

Enable or disable Bookland EAN:

- *0 - Disable Bookland EAN
- 1 - Enable Bookland EAN

**NOTE** If you enable Bookland EAN, select a Bookland ISBN Format on page 5-11. Also select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in Decode UPC/EAN/JAN Supplementals on page 5-7.

Decode UPC/EAN/JAN Supplementals

Parameter # 16

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

- *0 - Ignore UPC/EAN with Supplementals - if the decoder is presented with a UPC/EAN plus supplemental symbol, the decoder decodes UPC/EAN and ignores the supplemental characters.
- 1 - Decode UPC/EAN with Supplementals - the decoder only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.
- 2 - Autodiscriminate UPC/EAN Supplementals - decoder decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the decoder must decode the bar code the number of times set via UPC/EAN/JAN Supplemental Redundancy on page 5-8 before transmitting its data to confirm that there is no supplemental.
- If you select one of the following Supplemental Mode options, the decoder immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the decoder must decode the bar code the number of times set via UPC/EAN/JAN Supplemental Redundancy on page 5-8 before transmitting its data to confirm that there is no supplemental. The decoder transmits UPC/EAN bar codes that do not have that prefix immediately.
  - 4 - Enable 378/379 Supplemental Mode
  - 5 - Enable 978/979 Supplemental Mode
- 7 - Enable 977 Supplemental Mode
- 6 - Enable 414/419/434/439 Supplemental Mode
- 8 - Enable 491 Supplemental Mode
- 3 - Enable Smart Supplemental Mode - applies to EAN-13 bar codes starting with any prefix listed previously.
- 9 - Supplemental User-Programmable Type 1 - applies to EAN-13 bar codes starting with a 3-digit user-defined prefix. Set this 3-digit prefix using User-Programmable Supplementals on page 5-8.
- 10 - Supplemental User-Programmable Type 1 and 2 - applies to EAN-13 bar codes starting with either of two 3-digit user-defined prefixes. Set the 3-digit prefixes using User-Programmable Supplementals on page 5-8.

**NOTE** If you select 978 Supplemental Mode and are scanning Bookland EAN bar codes, see Enable/Disable Bookland EAN on page 5-7 to enable Bookland EAN, and select a format using Bookland ISBN Format on page 5-11.
• **11 - Smart Supplemental Plus User-Programmable 1** - applies to EAN-13 bar codes starting with any prefix listed previously or the user-defined prefix set using *User-Programmable Supplementals on page 5-8*.

• **12 - Smart Supplemental Plus User-Programmable 1 and 2** - applies to EAN-13 bar codes starting with any prefix listed previously or one of the two user-defined prefixes set using *User-Programmable Supplementals on page 5-8*.

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

**User-Programmable Supplementals**

**Supplemental 1: Parameter # 579**

**Supplemental 2: Parameter # 580**

If you selected a Supplemental User-Programmable option from *Decode UPC/EAN/JAN Supplementals*, select **User-Programmable Supplemental 1** to set the 3-digit prefix. Select **User-Programmable Supplemental 2** to set a second 3-digit prefix.

**UPC/EAN/JAN Supplemental Redundancy**

**Parameter # 80**

With *Autodiscriminate UPC/EAN/JAN Supplementals* selected, this option adjusts the number of times a symbol without supplementals is decoded before transmission. The range is from two to 30 times. Five or above is recommended when decoding a mix of UPC/EAN/JAN symbols with and without supplementals, and the autodiscriminate option is selected. The default is set at 10.

**UPC/EAN/JAN Supplemental AIM ID Format**

**Parameter # 672**

Select an output format when reporting UPC/EAN/JAN bar codes with Supplementals with *Transmit Code ID Character on page 5-4* set to **AIM Code ID Character**:

- **0 - Separate** - transmit UPC/EAN with supplementals with separate AIM IDs but one transmission, i.e.:
  \[E<0 or 4><data>E<1 or 2>[supplemental data]\]

- **1 - Combined** – transmit UPC/EAN with supplementals with one AIM ID and one transmission, i.e.:
  \[E3<data+supplemental data]\]

- **2 - Separate Transmissions** - transmit UPC/EAN with supplementals with separate AIM IDs and separate transmissions, i.e.:
  \[E<0 or 4><data>
  \[E<1 or 2>[supplemental data]\]
Transmit UPC-A Check Digit

Parameter # 40

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

- *1 - Transmit UPC-A Check Digit
- 0 - Do Not Transmit UPC-A Check Digit

Transmit UPC-E Check Digit

Parameter # 41

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

- *1 - Transmit UPC-E Check Digit
- 0 - Do Not Transmit UPC-E Check Digit

Transmit UPC-E1 Check Digit

Parameter # 42

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

- *1 - Transmit UPC-E1 Check Digit
- 0 - Do Not Transmit UPC-E1 Check Digit

UPC-A Preamble

Parameter # 34

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

- *1 - Transmit System Character Only (<SYSTEM CHARACTER> <DATA>)
- 2 - Transmit System Character and Country Code ("0" for USA)
  (< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
- 0 - Transmit no preamble (<DATA>)
UPC-E Preamble

Parameter # 35

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

- *1 - Transmit System Character Only (<SYSTEM CHARACTER> <DATA>)
- 2 - Transmit System Character and Country Code ("0" for USA) (<COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
- 0 - Transmit no preamble (<DATA>)

UPC-E1 Preamble

Parameter # 36

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

- *1 - Transmit System Character Only (<SYSTEM CHARACTER> <DATA>)
- 2 - Transmit System Character and Country Code ("0" for USA) (<COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)
- 0 - Transmit no preamble (<DATA>)

Convert UPC-E to UPC-A

Parameter # 37

Enable this to convert UPC-E (zero suppressed) decoded data to UPC-A format before transmission. After conversion, the data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit). When disabled, UPC-E decoded data is transmitted as UPC-E data, without conversion.

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

Convert UPC-E1 to UPC-A

Parameter # 38

Enable this to convert UPC-E1 decoded data to UPC-A format before transmission. After conversion, the data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit). When disabled, UPC-E1 decoded data is transmitted as UPC-E1 data, without conversion.

- *0 - Do Not Convert UPC-E to UPC-A (Disable)
- 1 - Convert UPC-E to UPC-A (Enable)
EAN-8/JAN-8 Extend

Parameter # 39

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

- *0 - Disable EAN/JAN Zero Extend
- 1 - Enable EAN/JAN Zero Extend

Bookland ISBN Format

Parameter # 576

If you enabled Bookland EAN using Enable/Disable Bookland EAN on page 5-7, select one of the following formats for Bookland data:

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

NOTE For Bookland EAN to function properly, first enable Bookland EAN using Enable/Disable Bookland EAN on page 5-7, then select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in Decode UPC/EAN/JAN Supplementals on page 5-7.

UCC Coupon Extended Code

Parameter # 85

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

- *0 - Disable UCC Coupon Extended Code
- 1 - Enable UCC Coupon Extended Code

NOTE Use the Decode UPC/EAN Supplemental Redundancy parameter to control autodiscrimination of the EAN128 (right half) of a coupon code.
**Coupon Report**

**Parameter # 730**

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

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

Select one of the following options for decoding coupon symbols:

- **0 - Old Coupon Symbols** - Scanning an old coupon symbol reports both UPC and Code 128, scanning an interim coupon symbol reports UPC, and scanning a new coupon symbol reports nothing (no decode).
- **1 - New Coupon Symbols** - Scanning an old coupon symbol reports either UPC or Code 128, and scanning an interim coupon symbol or a new coupon symbol reports Databar Expanded.
- **2 - Both Coupon Formats** - Scanning an old coupon symbol reports both UPC and Code 128, and scanning an interim coupon symbol or a new coupon symbol reports Databar Expanded.

**ISSN EAN**

**Parameter # 617**

Enable or disable ISSN EAN.

- **0 - Disable ISSN EAN**
- **1 - Enable ISSN EAN**
Enable/Disable Code 128

Parameter # 8

Enable or disable Code 128:

- *1 - Enable Code 128
- 0 - Disable Code 128

Set Lengths for Code 128

Length1 Parameter #209 [Range: 0..55]
Length2 Parameter #210 [Range: 0..55]

Default: Length1=0, Length2=0

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

- **One Discrete Length** - To limit the decoding of Code 128 to one specific length, assign this length to the Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14, Length2 = 0.

- **Two Discrete Lengths** - To limit the decoding of Code 128 to either of two specific lengths, assign the greater length to the Length1 parameter and the lesser to Length2. For example, to decode Code 128 codes of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.

- **Length Within Range** - To decode only Code 128 codes that fall within a specific length range, assign the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example, to decode Code 128 codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.

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

Parameter # 14

Enable or disable GS1-128:

- *1 - Enable GS1-128
- 0 - Disable GS1-128
Enable/Disable ISBT 128

Parameter # 84

ISBT 128 is a variant of Code 128 used in the blood bank industry. Enable or disable ISBT 128. If necessary, the host must perform concatenation of the ISBT data.

- *1 - Enable ISBT 128
- 0 - Disable ISBT 128

ISBT Concatenation

Parameter # 577

Select an option for concatenating pairs of ISBT code types:

- *0 - Disable ISBT Concatenation - The device does not concatenate pairs of ISBT codes it encounters.
- 1 - Enable ISBT Concatenation - There must be two ISBT codes in order for the device to decode and perform concatenation. The device does not decode single ISBT symbols.
- 2 - Autodiscriminate ISBT Concatenation - The device decodes and concatenates pairs of ISBT codes immediately. If only a single ISBT symbol is present, the device must decode the symbol the number of times set via ISBT Concatenation Redundancy before transmitting its data to confirm that there is no additional ISBT symbol.

Check ISBT Table

Parameter # 578

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

- *1 - Enable Check ISBT Table
- 0 - Disable Check ISBT Table

ISBT Concatenation Redundancy

Parameter # 223

With ISBT Concatenation set to Autodiscriminate, this option sets the number of times the device must decode an ISBT symbol before determining that there is no additional symbol. The range is from two to 20 times. The default is 10.
Enable/Disable Code 39

Parameter # 0
Enable or disable Code 39:

- *1 - Enable Code 39
- 0 - Disable Code 39

Enable/Disable Trioptic Code 39

Parameter # 13

- *0 - Disable Code 39
- 1 - Enable Code 39

**NOTE**  Trioptic Code 39 and Code 39 Full ASCII cannot be enabled simultaneously.

Convert Code 39 to Code 32

Parameter # 86
Code 32 is a variant of Code 39 used by the Italian pharmaceutical industry. Enable or disable converting Code 39 to Code 32.

- *0 - Disable Convert Code 39 to Code 32
- 1 - Enable Convert Code 39 to Code 32

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

Code 32 Prefix

Parameter # 231
Enable or disable adding the prefix character "A" to all Code 32 bar codes.

- *0 - Disable Code 32 Prefix
- 1 - Enable Code 32 Prefix

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

Length1 Parameter #18 [Range: 0..55]
Length2 Parameter #19 [Range: 0..55]
Default: Length1=2, Length2=55

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Assign lengths for Code 39 to decode either one or two discrete lengths, or a length within a specific range.

- **One Discrete Length** - To limit the decoding of Code 39 to one specific length, assign this length to the Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14, Length2 = 0.

- **Two Discrete Lengths** - To limit the decoding of Code 39 to either of two specific lengths, assign the greater length to the Length1 parameter and the lesser to Length2. For example, to decode Code 39 codes of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.

- **Length Within Range** - To decode only Code 39 codes that fall within a specific length range, assign the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example, to decode Code 39 codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.

Code 39 Check Digit Verification

Parameter # 48

Enable this 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.

- *0 - Disable Code 39 Check Digit Verification
- 1 - Enable Code 39 Check Digit Verification

Transmit Code 39 Check Digit

Parameter # 43

Select whether to transmit Code 39 data with or without the check digit.

- *0 - Do Not Transmit Code 39 Check Digit (Disable)
- 1 - Transmit Code 39 Check Digit (Enable)

**NOTE** Code 39 Check Digit Verification must be enabled for this parameter to function.
Code 39 Full ASCII Conversion

Parameter # 17

Code 39 Full ASCII is a variant of Code 39 which pairs characters to encode the full ASCII character set. Enable or disable Code 39 Full ASCII:

- *0 - Disable Code 39 Full ASCII
- 1 - Enable Code 39 Full ASCII

**NOTE**  Trioptic Code 39 and Code 39 Full ASCII cannot be enabled simultaneously.

Enable/Disable Code 93

Parameter # 9

Enable or disable Code 93:

- *0 - Disable Code 93
- 1 - Enable Code 93

Set Lengths for Code 93

Length1 Parameter #26 [Range: 0..55]
Length2 Parameter #27 [Range: 0..55]

Default: Length1=4, Length2=55

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

- **One Discrete Length** - To limit the decoding of Code 93 to one specific length, assign this length to the Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14, Length2 = 0.

- **Two Discrete Lengths** - To limit the decoding of Code 93 to either of two specific lengths, assign the greater length to the Length1 parameter and the lesser to Length2. For example, to decode Code 93 codes of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.

- **Length Within Range** - To decode only Code 93 codes that fall within a specific length range, assign the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example, to decode Code 93 codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.
Code 11

Parameter # 10

Enable or disable Code 11:

- *0 - Disable Code 11
- 1 - Enable Code 11

Set Lengths for Code 11

Length1 Parameter #28 [Range: 0..55]
Length2 Parameter #29 [Range: 0..55]
Default: Length1=4, Length2=55

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

- **One Discrete Length** - To limit the decoding of Code 11 to one specific length, assign this length to the Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14, Length2 = 0.

- **Two Discrete Lengths** - To limit the decoding of Code 11 to either of two specific lengths, assign the greater length to the Length1 parameter and the lesser to Length2. For example, to decode Code 11 codes of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.

- **Length Within Range** - To decode only Code 11 codes that fall within a specific length range, assign the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example, to decode Code 11 codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.

Code 11 Check Digit Verification

Parameter # 52

This feature allows the decoder to check the integrity of all Code 11 symbols to verify that the data complies with the specified check digit algorithm. This selects the check digit mechanism for the decoded Code 11 bar code. To enable this feature, set the number of check digits encoded in the Code 11 symbols:

- *0 - Disable Code 11 Check Digit Verification
- 1 - 1 Check Digit
- 2 - 2 Check Digits

Transmit Code 11 Check Digits

Parameter # 47

Select whether or not to transmit the Code 11 check digit(s).

- *0 - Do Not Transmit Code 11 Check Digit(s) (Disable)
- 1 - Transmit Code 11 Check Digit(s) (Enable)

**NOTE** Code 11 Check Digit Verification must be enabled for this parameter to function.
Enable/Disable Interleaved 2 of 5

Parameter # 6

Enable or disable Interleaved 2 of 5:

- *1 - Enable Interleaved 2 of 5
- 0 - Disable Interleaved 2 of 5

Set Lengths for Interleaved 2 of 5

Length1 Parameter #22 [Range: 0..55]

Length2 Parameter #23 [Range: 0..55]

Default: Length1=14, Length2=0

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

- **One Discrete Length** - To limit the decoding of I 2 of 5 to one specific length, assign this length to the Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14, Length2 = 0.

- **Two Discrete Lengths** - To limit the decoding of I 2 of 5 to either of two specific lengths, assign the greater length to the Length1 parameter and the lesser to Length2. For example, to decode I 2 of 5 codes of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.

- **Length Within Range** - To decode only I 2 of 5 codes that fall within a specific length range, assign the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example, to decode I 2 of 5 codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.

**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 be interpreted as a complete scan, yielding less data than is encoded in the bar code. To prevent this, select specific lengths (one or two discrete lengths) for I 2 of 5 applications.

I 2 of 5 Check Digit Verification

Parameter # 49

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

- *0 - Disable
- 1 - USS Check Digit
- 2 - OPCC Check Digits
Transmit I 2 of 5 Check Digit

Parameter # 44

Select whether to transmit I 2 of 5 data with or without the check digit:

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

Convert I 2 of 5 to EAN-13

Parameter # 82

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

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

Enable/Disable Discrete 2 of 5

Parameter # 5

Enable or disable Discrete 2 of 5:

- *0 - Disable Discrete 2 of 5
- 1 - Enable Discrete 2 of 5

Set Lengths for Discrete 2 of 5

Length1 Parameter #20 [Range: 0..55]
Length2 Parameter #21 [Range: 0..55]

Default: Length1=12, Length2=0

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

- **One Discrete Length** - To limit the decoding of D 2 of 5 to one specific length, assign this length to the Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14, Length2 = 0.
- **Two Discrete Lengths** - To limit the decoding of D 2 of 5 to either of two specific lengths, assign the greater length to the Length1 parameter and the lesser to Length2. For example, to decode D 2 of 5 codes of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.
- **Length Within Range** - To decode only D 2 of 5 codes that fall within a specific length range, assign the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example, to decode D 2 of 5 codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.

**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 be interpreted as a complete scan, yielding less data than is encoded in the bar code. To prevent this, select specific lengths (one or two discrete lengths) for D 2 of 5 applications.
Enable/Disable Codabar

Parameter # 7

Enable or disable Codabar:

- *0 - Disable Codabar
- 1 - Enable Codabar

Set Lengths for Codabar

Length1 Parameter #24 [Range: 0..55]
Length2 Parameter #25 [Range: 0..55]

Default: Length1=5, Length2=55

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

- **One Discrete Length** - To limit the decoding of Codabar to one specific length, assign this length to the Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14, Length2 = 0.

- **Two Discrete Lengths** - To limit the decoding of Codabar to either of two specific lengths, assign the greater length to the Length1 parameter and the lesser to Length2. For example, to decode Codabar codes of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.

- **Length Within Range** - To decode only Codabar codes that fall within a specific length range, assign the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example, to decode Codabar codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.

CLSI Editing

Parameter # 54

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

- *0 - Disable CLSI Editing
- 1 - Enable CLSI Editing

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

NOTIS Editing

Parameter # 55

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

- *0 - Disable NOTIS Editing
- 1 - Enable NOTIS Editing
Enable/Disable MSI

Parameter # 11

Enable or disable MSI.

- *0  - Disable MSI
- 1   - Enable MSI

Set Lengths for MSI

Length1 Parameter #30 [Range: 0..55]
Length2 Parameter #31 [Range: 0..55]
Default: Length1=4, Length2=55

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

- **One Discrete Length** - To limit the decoding of MSI to one specific length, assign this length to the
  Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14,
  Length2 = 0.

- **Two Discrete Lengths** - To limit the decoding of MSI to either of two specific lengths, assign the
greater length to the Length1 parameter and the lesser to Length2. For example, to decode MSI codes
  of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.

- **Length Within Range** - To decode only MSI codes that fall within a specific length range, assign
  the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example,
  to decode MSI codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.

**NOTE** Due to the construction of the MSI symbology, it is possible for a scan line covering only a portion of the
code to be interpreted as a complete scan, yielding less data than is encoded in the bar code. To prevent
this, select specific lengths (one or two discrete lengths) for MSI applications.

MSI Check Digits

Parameter # 50

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

- *0  - One MSI Check Digit
- 1   - Two MSI Check Digits

See **MSI Check Digit Algorithm on page 5-23** to select second digit algorithms.
Transmit MSI Check Digit(s)

Parameter # 46

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

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

MSI Check Digit Algorithm

Parameter # 51

Select one of two algorithms for the verification of the second MSI check digit:

- *1 - MOD 10/MOD 10
- 0 - MOD 10/MOD 11

Enable/Disable Chinese 2 of 5

Parameter # 408

Enable or disable Chinese 2 of 5:

- *0 - Disable Chinese 2 of 5
- 1 - Enable Chinese 2 of 5

Enable/Disable Korean 3 of 5

Parameter # 581

Enable or disable Korean 3 of 5:

- *0 - Disable Korean 3 of 5
- 1 - Enable Korean 3 of 5

✓ **NOTE** The length for Korean 3 of 5 is fixed at 6.
Enable/Disable Matrix 2 of 5

Parameter # 618

Enable or disable Matrix 2 of 5.

- *0 - Disable Matrix 2 of 5
- 1 - Enable Matrix 2 of 5

Set Lengths for Matrix 2 of 5

Length1 Parameter #619 [Range: 0..55]
Length2 Parameter #620 [Range: 0..55]

Default: Length1=14, Length2=0

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

- **One Discrete Length** - To limit the decoding of Matrix 2 of 5 to one specific length, assign this length to the Length1 parameter and 0 to the Length2 parameter. For example, for fixed length 14, set Length1 = 14, Length2 = 0.

- **Two Discrete Lengths** - To limit the decoding of Matrix 2 of 5 to either of two specific lengths, assign the greater length to the Length1 parameter and the lesser to Length2. For example, to decode Matrix 2 of 5 codes of either 2 or 14 characters only, set Length1 = 14, Length2 = 2.

- **Length Within Range** - To decode only Matrix 2 of 5 codes that fall within a specific length range, assign the lesser length to the Length1 parameter and the greater to the Length2 parameter. For example, to decode Matrix 2 of 5 codes of length 4 through 12 characters, set Length1 = 4, Length2 = 12.

Matrix 2 of 5 Redundancy

Parameter # 621

Enable or disable Matrix 2 of 5 redundancy:

- *0 - Disable Matrix 2 of 5 Redundancy
- 1 - Enable Matrix 2 of 5 Redundancy

Matrix 2 of 5 Check Digit

Parameter # 622

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

- *0 - Disable Matrix 2 of 5 Check Digit
- 1 - Enable Matrix 2 of 5 Check Digit
Transmit Matrix 2 of 5 Check Digit

Parameter # 623

Select whether to transmit Matrix 2 of 5 data with or without the check digit.

- *0 - Do Not Transmit Matrix 2 of 5 Check Digit
- 1 - Transmit Matrix 2 of 5 Check Digit

Inverse 1D

Parameter # 586

Set the 1D inverse decoder setting:

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

US Postnet

Parameter # 89

Enable or disable US Postnet:

- *1 - Enable US Postnet
- 0 - Disable US Postnet

US Planet

Parameter # 90

Enable or disable US Planet:

- *1 - Enable US Planet
- 0 - Disable US Planet

 Transmit US Postal Check Digit

Parameter # 95

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

- *1 - Transmit US Postal Check Digit
- 0 - Do Not Transmit US Postal Check Digit
UK Postal
Parameter # 91
Enable or disable UK Postal:

• *1 - Enable UK Postal
• 0 - Disable UK Postal

Transmit UK Postal Check Digit
Parameter # 96
Select whether to transmit UK Postal data with or without the check digit:

• *1 - Transmit UK Postal Check Digit
• 0 - Do Not Transmit UK Postal Check Digit

Japan Postal
Parameter # 290
Enable or disable Japan Postal:

• *1 - Enable Japan Postal
• 0 - Disable Japan Postal

Australia Post
Parameter # 291
Enable or disable Australia Post:

• *1 - Enable Australia Post
• 0 - Disable Australia Post

Australia Post Format
Parameter # 718
Select one of the following formats for Australia Post:

• *0 - Autodiscriminate (or Smart mode) - Attempt to decode the Customer Information Field using the N and C Encoding Tables.

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

• 1 - Raw Format - Output raw bar patterns as a series of numbers 0 through 3.
• 2 - Alphanumeric Encoding - Decode the Customer Information Field using the C Encoding Table.
• 3 - Numeric Encoding - Decode the Customer Information Field using the N Encoding Table.

Netherlands KIX Code
Parameter # 326
Enable or disable Netherlands KIX Code:
• *1 - Enable Netherlands KIX Code
• 0 - Disable Netherlands KIX Code

USPS 4CB/One Code/Intelligent Mail
Parameter # 592
Enable or disable USPS 4CB/One Code/Intelligent Mail:
• *0 - Disable USPS 4CB/One Code/Intelligent Mail
• 1 - Enable USPS 4CB/One Code/Intelligent Mail

UPU FICS Postal
Parameter # 611
Enable or disable UPU FICS Postal:
• *0 - Disable UPU FICS Postal
• 1 - Enable UPU FICS Postal

GS1 DataBar-14
Parameter # 338
Enable or disable GS1 DataBar-14:
• *1 - Enable GS1 DataBar-14
• 0 - Disable GS1 DataBar-14

GS1 DataBar Limited
Parameter # 339
Enable or disable GS1 DataBar Limited:
• *0 - Disable GS1 DataBar Limited
• 1 - Enable GS1 DataBar Limited
GS1 DataBar Limited Security Level

Parameter # 728

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

- **1 - Level 1** – No clear margin required. This complies with the original GS1 standard, yet might result in erroneous decoding of the DataBar Limited bar codes when scanning some UPC symbols that start with the digits “9” and “7”.

- **2 - Level 2** – Automatic risk detection. This level of security may result in erroneous decoding of DataBar Limited bar codes when scanning some UPC symbols. If a misdecode is detected, the scanner operates in Level 3 or Level 1.

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

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

GS1 DataBar Expanded

Parameter # 340

Enable or disable GS1 DataBar Expanded:

- **0** - Disable GS1 DataBar Expanded
- **1** - Enable GS1 DataBar Expanded

Convert GS1 DataBar to UPC/EAN

Parameter # 397

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

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

- **0** - Disable Convert GS1 DataBar to UPC/EAN
- **1** - Enable Convert GS1 DataBar to UPC/EAN
Composite CC-C
Parameter # 341

Enable or disable Composite bar codes of type CC-C:

- *0 - Disable CC-C
- 1 - Enable CC-C

**NOTE** Before enabling a composite code, first enable Multi Decode Mode on page 5-5.

Composite CC-A/B
Parameter # 342

Enable or disable Composite bar codes of type CC-A/B:

- *0 - Disable CC-A/B
- 1 - Enable CC-A/B

Composite TLC-39
Parameter # 371

Enable or disable Composite bar codes of type TLC-39:

- *0 - Disable TLC39
- 1 - Enable TLC39

UPC Composite Mode
Parameter # 344

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

- 1 - **UPC Always Linked** - transmit UPC bar codes and the 2D portion. If 2D is not present, the UPC bar code does not transmit.
- *0 - **UPC Never Linked** - transmit UPC bar codes regardless of whether a 2D symbol is detected.
- 2 - **Autodiscriminate UPC Composites** - the imager engine determines if there is a 2D portion, then transmits the UPC, as well as the 2D portion if present.

GS1-128 Emulation Mode for UCC/EAN Composite Codes
Parameter # 427

Enable or disable this mode:

- *0 - Disable GS1-128 Emulation Mode for UCC/EAN Composite Codes
- 1 - Enable GS1-128 Emulation Mode for UCC/EAN Composite Codes
Enable/Disable PDF417

Parameter # 15

Enable or disable PDF417:

- *1 - Enable PDF417
- 0 - Disable PDF417

Enable/Disable MicroPDF417

Parameter # 227

Enable or disable MicroPDF417:

- *0 - Disable MicroPDF417
- 1 - Enable MicroPDF417

Code 128 Emulation

Parameter # 123

Enable this parameter to transmit data from certain MicroPDF417 symbols as if it was encoded in Code 128 symbols. Transmit AIM Symbology Identifiers must be enabled for this parameter to work.

- *0 - Disable Code 128 Emulation - transmits these MicroPDF417 symbols with one of the following prefixes:
  - LJ3  if the first codeword is 903-905
  - LJ4  if the first codeword is 908 or 909
  - LJ5  if the first codeword is 910 or 911

- 1 - Enable Code 128 Emulation - transmits these MicroPDF417 symbols with one of the following prefixes:
  - JC1  if the first codeword is 903-905
  - JC2  if the first codeword is 908 or 909
  - JC0  if the first codeword is 910 or 911

✓ NOTE Linked MicroPDF codewords 906, 907, 912, 914, and 915 are not supported. Use GS1 Composites instead.
Data Matrix

Parameter # 292

Enable or disable Data Matrix:
- *1 - Enable Data Matrix
- 0 - Disable Data Matrix

Data Matrix Inverse

Parameter # 588

Set the Data Matrix inverse decoder setting:
- *0 - Regular Only - the decoder decodes regular Data Matrix bar codes only.
- 1 - Inverse Only - the decoder decodes inverse Data Matrix bar codes only.
- 2 - Inverse Autodetect - the decoder decodes both regular and inverse Data Matrix bar codes.

Decode Mirror Images (Data Matrix Only)

Parameter # 537

Select an option for decoding mirror image Data Matrix bar codes:
- *0 - Never - do not decode Data Matrix bar codes that are mirror images
- 1 - Always - decode only Data Matrix bar codes that are mirror images
- 2 - Auto - decode both mirrored and unmirrored Data Matrix bar codes.

Maxicode

Parameter # 294

Enable or disable Maxicode:
- *1 - Enable Maxicode
- 0 - Disable Maxicode
**QR Code**

Parameter # 293

Enable or disable QR Code:

- *1 - Enable QR Code
- 0 - Disable QR Code

**QR Inverse**

Parameter # 587

Set the QR inverse decoder setting:

- *0 - Regular Only - the decoder decodes regular QR bar codes only.
- 1 - Inverse Only - the decoder decodes inverse QR bar codes only.
- 2 - Inverse Autodetect - the decoder decodes both regular and inverse QR bar codes.

**MicroQR**

Parameter # 573

Enable or disable MicroQR:

- *1 - Enable MicroQR
- 0 - Disable MicroQR

**Aztec**

Parameter # 574

Enable or disable Aztec:

- *1 - Enable Aztec
- 0 - Disable Aztec

**Aztec Inverse**

Parameter # 589

Set the Aztec inverse decoder setting:

- *0 - Regular Only - the decoder decodes regular Aztec bar codes only.
- 1 - Inverse Only - the decoder decodes inverse Aztec bar codes only.
- 2 - Inverse Autodetect - the decoder decodes both regular and inverse Aztec bar codes.
Han Xin

Parameter # 1167

Enable or disable Han Xin:

- *0 - Disable Han Xin
- 1 - Enable Han Xin

Han Xin Inverse

Parameter # 1168

Set the Han Xin inverse decoder setting:

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

Parameter # 78

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

Select the redundancy level appropriate for the bar code quality:

1 - Redundancy Level 1

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

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Code Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codabar</td>
<td>8 characters or less</td>
</tr>
<tr>
<td>MSI</td>
<td>4 characters or less</td>
</tr>
<tr>
<td>D 2 of 5</td>
<td>8 characters or less</td>
</tr>
<tr>
<td>I 2 of 5</td>
<td>8 characters or less</td>
</tr>
</tbody>
</table>

2 - Redundancy Level 2

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

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Code Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>All</td>
</tr>
</tbody>
</table>

3 - Redundancy Level 3

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

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Code Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSI Plessey</td>
<td>4 characters or less</td>
</tr>
<tr>
<td>D 2 of 5</td>
<td>8 characters or less</td>
</tr>
<tr>
<td>I 2 of 5</td>
<td>8 characters or less</td>
</tr>
<tr>
<td>Codabar</td>
<td>8 characters or less</td>
</tr>
</tbody>
</table>

4 - Redundancy Level 4

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

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Code Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>All</td>
</tr>
</tbody>
</table>
Security Level

Parameter # 77

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

- **0 - Security Level 0**: This setting allows the decoder to operate in its most aggressive state, while providing sufficient security in decoding most “in-spec” bar codes.
- **1 - Security Level 1**: Select this option if misdecodes occur. This default setting eliminates most misdecodes.
- **2 - Security Level 2**: Select this option if Security level 1 fails to eliminate misdecodes.
- **3 - Security Level 3**: If misdecodes still occur with Security Level 2, select this security level. Be advised, selecting this option is an extreme measure against mis-decoding severely out of spec bar codes. Selecting this level of security significantly impairs the decoding ability of the decoder. If this level of security is necessary, try to improve the quality of the bar codes.

Intercharacter Gap Size

Parameter # 381

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

- **6 - Normal Intercharacter Gaps**
- **A - Large Intercharacter Gaps**
Software Decode SDK Demonstration Programs

The Motorola Software Decode SDK for Android includes a sample application that demonstrates how to interact with the Software Decode Library.

Sample Source Code

This application includes source code for use in designing systems. This source code is included for demonstration purposes only and is not intended as a commercially viable solution.

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Sample Application

The sample application SDLgui demonstrates the following common interactions with a Software Decode Library device:

- Manipulating the trigger to start/stop sessions
- Obtaining and interpreting decoded data
- Reading and writing parameters
- Obtaining and displaying snapshot images from the device
- Displaying video images from the device

Install the sample application on the device and open it. Use this application to perform the following functions:

- To decode a bar code, select the Decode button and present the bar code to the imager engine. A successful decode displays the decoded bar code in the data: text area and the device beeps if the beep checkbox is checked.
- For a hands-free decode, select the Hands Free button and present the bar code to the imager engine.
- To capture an image (take a picture), point the imager engine at the intended target and select the Snapshot button. An image screen appears with the acquired image. Click the image to close the window.
- To display a video image select the Video button. A video screen displays the live video. Click the screen to close the window.
- To enable all the symbologies, select EnableAll.
- To disable all the symbologies, select DisableAll.
- To scan a bar code from digital media, check the Reading Pane box.
- To get the last decoded image, set Retrieve Last Decoded Image on page 4-11 (parameter #905) to 1, decode, and then select GetDecodedImage to decode the last image.
- To display the imager engine properties select the Properties button.
- Use the parameter Get, Set, and Defaults buttons to manipulate the Software Decode Library parameters:
  - To query the current parameter setting, enter the decimal parameter identification number in the Number text box and select Get. For example, to read the current JPEG compression quality setting, enter 305 (from JPEG Quality Value on page 4-9) in the Number text box. By default, 65 appears in the Value field after selecting Get.
  - To alter a parameter, enter the parameter identification number in Number and the value to assign in Value and select Set. For example, to increase the JPEG compression quality, enter 305 in the Number text box and 90 in the Value field and select Set.

If you specify an illegal (out of range) value for a parameter, an error is reported in the status field.

Sample Application Source Code

Sample applications reside in the directory Applications, within the directory selected during SDK installation. This directory includes the complete source in addition to an Eclipse project you can use to create the executable. Sample applications use Java and assume a basic understanding of this environment.
## Symbol Code Identifiers

### Table B-1  Symbol Code Characters

<table>
<thead>
<tr>
<th>Code Character</th>
<th>Code Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13</td>
</tr>
<tr>
<td>B</td>
<td>Code 39, Code 32</td>
</tr>
<tr>
<td>C</td>
<td>Codabar</td>
</tr>
<tr>
<td>D</td>
<td>Code 128, ISBT 128, ISBT 128 Concatenated</td>
</tr>
<tr>
<td>E</td>
<td>Code 93</td>
</tr>
<tr>
<td>F</td>
<td>Interleaved 2 of 5</td>
</tr>
<tr>
<td>G</td>
<td>Discrete 2 of 5, or Discrete 2 of 5 IATA</td>
</tr>
<tr>
<td>H</td>
<td>Code 11</td>
</tr>
<tr>
<td>J</td>
<td>MSI</td>
</tr>
<tr>
<td>K</td>
<td>GS1-128</td>
</tr>
<tr>
<td>L</td>
<td>Bookland EAN</td>
</tr>
<tr>
<td>M</td>
<td>Trioptic Code 39</td>
</tr>
<tr>
<td>N</td>
<td>Coupon Code</td>
</tr>
<tr>
<td>R</td>
<td>GS1 DataBar Family</td>
</tr>
<tr>
<td>S</td>
<td>Matrix 2 of 5</td>
</tr>
<tr>
<td>T</td>
<td>UCC Composite, TLC 39</td>
</tr>
<tr>
<td>U</td>
<td>Chinese 2 of 5</td>
</tr>
</tbody>
</table>
### Table B-1  Symbol Code Characters (Continued)

<table>
<thead>
<tr>
<th>Code Character</th>
<th>Code Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>Korean 3 of 5</td>
</tr>
<tr>
<td>X</td>
<td>ISSN EAN, PDF417, Macro PDF417, Micro PDF417</td>
</tr>
<tr>
<td>z</td>
<td>Aztec, Aztec Rune</td>
</tr>
<tr>
<td>P00</td>
<td>Data Matrix</td>
</tr>
<tr>
<td>P01</td>
<td>QR Code, MicroQR</td>
</tr>
<tr>
<td>P02</td>
<td>Maxicode</td>
</tr>
<tr>
<td>P03</td>
<td>US Postnet</td>
</tr>
<tr>
<td>P04</td>
<td>US Planet</td>
</tr>
<tr>
<td>P05</td>
<td>Japan Postal</td>
</tr>
<tr>
<td>P06</td>
<td>UK Postal</td>
</tr>
<tr>
<td>P08</td>
<td>Netherlands KIX Code</td>
</tr>
<tr>
<td>P09</td>
<td>Australia Post</td>
</tr>
<tr>
<td>P0A</td>
<td>USPS 4CB/One Code/Intelligent Mail</td>
</tr>
<tr>
<td>P0B</td>
<td>UPU FICS Postal</td>
</tr>
<tr>
<td>P0H</td>
<td>Han Xin</td>
</tr>
<tr>
<td>P0X</td>
<td>Signature Capture</td>
</tr>
</tbody>
</table>
AIM Code Identifiers

Each AIM Code Identifier contains the three-character string \[ \text{Jcm} \] where:

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

Table B-2  Aim Code Characters

<table>
<thead>
<tr>
<th>Code Character</th>
<th>Code Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Code 39, Code 39 Full ASCII, Code 32</td>
</tr>
<tr>
<td>C</td>
<td>Code 128, ISBT 128, ISBT 128 Concatenated, GS1-128, Coupon (Code 128 portion)</td>
</tr>
<tr>
<td>d</td>
<td>Data Matrix</td>
</tr>
<tr>
<td>E</td>
<td>UPC/EAN, Coupon (UPC portion)</td>
</tr>
<tr>
<td>e</td>
<td>GS1 DataBar Family</td>
</tr>
<tr>
<td>F</td>
<td>Codabar</td>
</tr>
<tr>
<td>G</td>
<td>Code 93</td>
</tr>
<tr>
<td>H</td>
<td>Code 11</td>
</tr>
<tr>
<td>h</td>
<td>Han Xin</td>
</tr>
<tr>
<td>I</td>
<td>Interleaved 2 of 5</td>
</tr>
<tr>
<td>L</td>
<td>PDF417, Macro PDF417, Micro PDF417</td>
</tr>
<tr>
<td>L2</td>
<td>TLC 39</td>
</tr>
<tr>
<td>M</td>
<td>MSI</td>
</tr>
<tr>
<td>Q</td>
<td>QR Code, MicroQR</td>
</tr>
<tr>
<td>S</td>
<td>Discrete 2 of 5, IATA 2 of 5</td>
</tr>
<tr>
<td>U</td>
<td>Maxicode</td>
</tr>
<tr>
<td>z</td>
<td>Aztec, Aztec Rune</td>
</tr>
<tr>
<td>X</td>
<td>Bookland EAN, ISSN EAN, Trioptic Code 39, Chinese 2 of 5, Matrix 2 of 5, Korean 3 of 5, US Postnet, US Planet, UK Postal, Japan Postal, Australia Post, Netherlands KIX Code, USPS 4CB/One Code/ Intelligent Mail, UPU FICS Postal, Signature Capture</td>
</tr>
</tbody>
</table>
The modifier character is the sum of the applicable option values based on Table B-3.

**Table B-3  Modifier Characters**

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Option Value</th>
<th>Option Value Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Code 39</strong></td>
<td>0</td>
<td>No check character or Full ASCII processing.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Reader has checked one check character.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Reader has checked and stripped check character.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Reader has performed Full ASCII character conversion.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Reader has performed Full ASCII character conversion and checked one check character.</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Reader has performed Full ASCII character conversion and checked and stripped check character.</td>
</tr>
<tr>
<td></td>
<td>Example: A Full ASCII bar code with check character W, A+I+MI+DW, is transmitted as JA7AIMID where 7 = (3+4).</td>
<td></td>
</tr>
<tr>
<td><strong>Trioptic Code 39</strong></td>
<td>0</td>
<td>No option specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td>Example: A Trioptic bar code 412356 is transmitted as X0412356</td>
<td></td>
</tr>
<tr>
<td><strong>Code 128</strong></td>
<td>0</td>
<td>Standard data packet, no Function code 1 in first symbol position.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Function code 1 in first symbol character position.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Function code 1 in second symbol character position.</td>
</tr>
<tr>
<td></td>
<td>Example: A Code (EAN) 128 bar code with Function 1 character FNC1 in the first position, AIMID is transmitted as JC1AIMID</td>
<td></td>
</tr>
<tr>
<td><strong>I 2 of 5</strong></td>
<td>0</td>
<td>No check digit processing.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Reader has validated check digit.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Reader has validated and stripped check digit.</td>
</tr>
<tr>
<td></td>
<td>Example: An I 2 of 5 bar code without check digit, 4123, is transmitted as JO4123</td>
<td></td>
</tr>
<tr>
<td><strong>Codabar</strong></td>
<td>0</td>
<td>No check digit processing.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Reader has checked check digit.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Reader has stripped check digit before transmission.</td>
</tr>
<tr>
<td></td>
<td>Example: A Codabar bar code without check digit, 4123, is transmitted as FO4123</td>
<td></td>
</tr>
<tr>
<td><strong>Code 93</strong></td>
<td>0</td>
<td>No options specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td>Example: A Code 93 bar code 012345678905 is transmitted as G0012345678905</td>
<td></td>
</tr>
<tr>
<td><strong>MSI</strong></td>
<td>0</td>
<td>Check digits are sent.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>No check digit is sent.</td>
</tr>
<tr>
<td></td>
<td>Example: An MSI bar code 4123, with a single check digit checked, is transmitted as MJ14123</td>
<td></td>
</tr>
</tbody>
</table>
### Table B-3  Modifier Characters (Continued)

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Option Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D 2 of 5</td>
<td>0</td>
<td>No options specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A D 2 of 5 bar code 4123, is transmitted as ]S04123</td>
</tr>
<tr>
<td>UPC/EAN</td>
<td>0</td>
<td>Standard data packet in full EAN format, i.e. 13 digits for UPC-A, UPC-E, and EAN-13 (not including supplemental data).</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Two digit supplemental data only.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Five digit supplemental data only.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Combined data packet comprising 13 digits from EAN-13, UPC-A or UPC-E symbol and 2 or 5 digits from supplemental symbol.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>EAN-8 data packet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A UPC-A bar code 012345678905 is transmitted as ]E00012345678905</td>
</tr>
<tr>
<td>Bookland EAN</td>
<td>0</td>
<td>No options specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A Bookland EAN bar code 123456789X is transmitted as ]X0123456789X</td>
</tr>
<tr>
<td>ISSN EAN</td>
<td>0</td>
<td>No options specified at this time. Always transmit 0.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: An ISSN EAN bar code 123456789X is transmitted as ]X0123456789X</td>
</tr>
<tr>
<td>Code 11</td>
<td>0</td>
<td>Single check digit</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Two check digits</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Check characters validated but not transmitted.</td>
</tr>
<tr>
<td>GS1 DataBar Family</td>
<td></td>
<td>No option specified at this time. Always transmit 0. GS1 DataBar and GS1 DataBar Limited transmit with an Application Identifier “01”. Note: In GS1-128 emulation mode, GS1 DataBar is transmitted using Code 128 rules (i.e., ]C1).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A GS1 DataBar bar code 0110012345678902 is transmitted as ]e00110012345678902.</td>
</tr>
<tr>
<td>EAN.UCC Composites (GS1 DataBar, GS1-128, 2D portion of UPC composite)</td>
<td>0</td>
<td>Native mode transmission. Note: UPC portion of composite is transmitted using UPC rules.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Example: A EAN.UCC Composite bar code is transmitted as ]J0E001012345678902.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Data packet containing the data following an encoded symbol separator character.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Data packet containing the data following an escape mechanism character. The data packet does not support the ECI protocol.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Data packet containing the data following an escape mechanism character. The data packet supports the ECI protocol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GS1-128 emulation Note: UPC portion of composite is transmitted using UPC rules.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Data packet is a GS1-128 symbol (i.e., data is preceded with ]JC1).</td>
</tr>
</tbody>
</table>
Table B-3  Modifier Characters  (Continued)

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Option Value</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PDF417, Micro PDF417</strong></td>
<td>0</td>
<td>Reader set to conform to protocol defined in 1994 PDF417 symbology specifications. <strong>Note:</strong> When this option is transmitted, the receiver cannot reliably determine whether ECIs have been invoked or whether data byte (92_{DEC}) has been doubled in transmission.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Reader set to follow the ECI protocol (Extended Channel Interpretation). All data characters (92_{DEC}) are doubled.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Reader set for Basic Channel operation (no escape character transmission protocol). Data characters (92_{DEC}) are not doubled. <strong>Note:</strong> When decoders are set to this mode, unbuffered Macro symbols and symbols requiring the decoder to convey ECI escape sequences cannot be transmitted.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>The bar code contains a GS1-128 symbol, and the first codeword is 903-907, 912, 914, 915.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>The bar code contains a GS1-128 symbol, and the first codeword is in the range 908-909.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>The bar code contains a GS1-128 symbol, and the first codeword is in the range 910-911.</td>
</tr>
<tr>
<td><strong>Data Matrix</strong></td>
<td>0</td>
<td>ECC 000-140, not supported.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>ECC 200.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>ECC 200, FNC1 in first or fifth position.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>ECC 200, FNC1 in second or sixth position.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>ECC 200, ECI protocol implemented.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>ECC 200, FNC1 in first or fifth position, ECI protocol implemented.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>ECC 200, FNC1 in second or sixth position, ECI protocol implemented.</td>
</tr>
<tr>
<td><strong>MaxiCode</strong></td>
<td>0</td>
<td>Symbol in Mode 4 or 5.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Symbol in Mode 2 or 3.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Symbol in Mode 4 or 5, ECI protocol implemented.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Symbol in Mode 2 or 3, ECI protocol implemented in secondary message.</td>
</tr>
</tbody>
</table>
Table B-3  Modifier Characters  (Continued)

<table>
<thead>
<tr>
<th>Code Type</th>
<th>Option Value</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>QR Code</td>
<td>0</td>
<td>Model 1 symbol.</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Model 2 / MicroQR symbol, ECI protocol not implemented.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Model 2 symbol, ECI protocol implemented.</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position.</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Model 2 symbol, ECI protocol implemented, FNC1 implied in first position.</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Model 2 symbol, ECI protocol not implemented, FNC1 implied in second position.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Model 2 symbol, ECI protocol implemented, FNC1 implied in second position.</td>
</tr>
<tr>
<td>Aztec</td>
<td>0</td>
<td>Aztec symbol.</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>Aztec Rune symbol.</td>
</tr>
</tbody>
</table>
# SDL Bar Code Type Identifiers

<table>
<thead>
<tr>
<th>SDL Code Type ID</th>
<th>Bar Code Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Code 39</td>
</tr>
<tr>
<td>2</td>
<td>Codabar</td>
</tr>
<tr>
<td>3</td>
<td>Code 128</td>
</tr>
<tr>
<td>4</td>
<td>Discrete (Standard) 2 of 5</td>
</tr>
<tr>
<td>5</td>
<td>IATA</td>
</tr>
<tr>
<td>6</td>
<td>Interleaved 2 of 5</td>
</tr>
<tr>
<td>7</td>
<td>Code 93</td>
</tr>
<tr>
<td>8</td>
<td>UPC-A</td>
</tr>
<tr>
<td>9</td>
<td>UPC-E0</td>
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<tr>
<td>10</td>
<td>EAN-8</td>
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<td>Code 11</td>
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<td>Code 16K</td>
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<td>Code 39 Full ASCII</td>
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<td>UPC-D</td>
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<td>Code 39 Trioptic</td>
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<td>Bookland</td>
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<td>Coupon Code</td>
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<td>Aztec Rune</td>
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<td>GS1 DataBar-14</td>
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<tr>
<td>49</td>
<td>GS1 DataBar Limited</td>
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<tr>
<td>50</td>
<td>GS1 DataBar Expanded</td>
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<td>52</td>
<td>USPS 4CB</td>
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<td>53</td>
<td>UPU 4State</td>
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<td>54</td>
<td>ISSN</td>
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<td>55</td>
<td>Scanlet</td>
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<td>56</td>
<td>CueCode</td>
</tr>
<tr>
<td>57</td>
<td>Matrix 2 of 5</td>
</tr>
<tr>
<td>72</td>
<td>UPC-A + 2 Supplemental</td>
</tr>
<tr>
<td>73</td>
<td>UPC-E0 + 2 Supplemental</td>
</tr>
<tr>
<td>74</td>
<td>EAN-8 + 2 Supplemental</td>
</tr>
<tr>
<td>75</td>
<td>EAN-13 + 2 Supplemental</td>
</tr>
<tr>
<td>80</td>
<td>UPC-E1 + 2 Supplemental</td>
</tr>
<tr>
<td>81</td>
<td>CCA EAN-128</td>
</tr>
<tr>
<td>SDL Code Type ID</td>
<td>Bar Code Type</td>
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<td>CCA GS1 DataBar Expanded</td>
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<td>CCA GS1 DataBar Limited</td>
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<td>CCA GS1 DataBar-14</td>
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<td>CCA UPC-A</td>
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<td>88</td>
<td>CCA UPC-E</td>
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<td>89</td>
<td>CCC EAN-128</td>
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<td>TLC-39</td>
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<td>97</td>
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<td>98</td>
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<tr>
<td>99</td>
<td>CCB EAN-8</td>
</tr>
<tr>
<td>100</td>
<td>CCB GS1 DataBar Expanded</td>
</tr>
<tr>
<td>101</td>
<td>CCB GS1 DataBar Limited</td>
</tr>
<tr>
<td>102</td>
<td>CCB GS1 DataBar-14</td>
</tr>
<tr>
<td>103</td>
<td>CCB UPC-A</td>
</tr>
<tr>
<td>104</td>
<td>CCB UPC-E</td>
</tr>
<tr>
<td>105</td>
<td>Signature Capture</td>
</tr>
<tr>
<td>114</td>
<td>Chinese 2 of 5</td>
</tr>
<tr>
<td>115</td>
<td>Korean 3 of 5</td>
</tr>
<tr>
<td>136</td>
<td>UPC-A + 5 supplemental</td>
</tr>
<tr>
<td>137</td>
<td>UPC-E0 + 5 supplemental</td>
</tr>
<tr>
<td>138</td>
<td>EAN-8 + 5 supplemental</td>
</tr>
<tr>
<td>139</td>
<td>EAN-13 + 5 supplemental</td>
</tr>
<tr>
<td>144</td>
<td>UPC-E1 + 5 Supplemental</td>
</tr>
<tr>
<td>154</td>
<td>Macro Micro PDF</td>
</tr>
<tr>
<td>180</td>
<td>GS1 Databar Coupon</td>
</tr>
<tr>
<td>183</td>
<td>Han Xin</td>
</tr>
</tbody>
</table>
Decode Data

If the decoded data contains more structure than can be presented in the standard format, the Bar Code Type field is set to 0x99 and the decode data is formatted into packets. The first byte of the Decode Data field contains the actual bar code type, the second byte contains the number of packets, and the remaining data is the packeted form of decode data. For example, a packeted Decode Data message for Micro PDF417 would have the following format, where the Decode Data field is broken out as follows:

<table>
<thead>
<tr>
<th>Bar Code Type</th>
<th>Decode Data Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Bar code Type</td>
<td># of Packets</td>
</tr>
<tr>
<td>0x99</td>
<td>1A</td>
</tr>
</tbody>
</table>

Note that the Packet Length subfields consist of two bytes, where the first byte represents the high value of length x 256.
APPENDIX C SIGNATURE CAPTURE CODE

Introduction

CapCode, a signature capture code, is a special pattern that encloses a signature area on a document and allows a scanner to capture a signature.

There are several accepted patterns that allow automatic identification of different signatures on the same form. For example, on the federal tax return 1040 form there are three signature areas, one each for two joint filers, and one for a professional preparer. By using different patterns, a program can correctly identify all three, so they can be captured in any sequence and still be identified correctly.

Code Structure

Signature Capture Area

A CapCode is printed as two identical patterns on either side of a signature capture box, as shown in Figure C-1. Each pattern extends the full height of the signature capture box.

The box is optional, so you can omit it, replace it with a single baseline, or print a baseline with an "X" on top of it towards the left, as is customarily done in the US to indicate a request for signature. However, if an "X" or other markings are added in the signature box area, these are captured with the signature.

Figure C-1  CapCode
**CapCode Pattern Structure**

A CapCode pattern structure consists of a start pattern followed by a separator space, a signature capture box, a second separator space, and then a stop pattern. Assuming that X is the dimension of the thinnest element, the start and stop patterns each contain 9X total width in 4 bars and 3 spaces. A 7X quiet zone is required to the left and to the right of the CapCode pattern.

![Capture Box Diagram](image)

**Figure C-2  CapCode Structure**

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

---

**Start / Stop Patterns**

*Table C-1* lists the accepted start / stop patterns. The bar and space widths are expressed as multiples of X. You must use the same pattern on either side of a signature capture box. The type value is reported with the captured signature to indicate the purpose of the signature captured.

<table>
<thead>
<tr>
<th>Bar/Space Patterns</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1 2 2 1 1 1 1</td>
<td>2</td>
</tr>
<tr>
<td>1 2 2 1 1 1 1</td>
<td>5</td>
</tr>
<tr>
<td>2 1 1 2 1 1 1</td>
<td>7</td>
</tr>
<tr>
<td>2 2 1 1 1 1</td>
<td>8</td>
</tr>
<tr>
<td>3 1 1 1 1 1</td>
<td>9</td>
</tr>
</tbody>
</table>
Table C-2 lists selectable parameters used to generate the image of the captured signature.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Defined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Number of pixels</td>
</tr>
<tr>
<td>Height</td>
<td>Number of pixels</td>
</tr>
<tr>
<td>Format</td>
<td>JPEG, BMP, TIFF</td>
</tr>
<tr>
<td>JPEG quality</td>
<td>1 (most compression) to 100 (best quality)</td>
</tr>
<tr>
<td>Bits Per Pixel</td>
<td>1 (2 levels)</td>
</tr>
<tr>
<td></td>
<td>4 (16 levels)</td>
</tr>
<tr>
<td></td>
<td>8 (256 levels)</td>
</tr>
</tbody>
</table>

BMP format does not use compression, JPEG and TIFF formats do.

**Dimensions**

The size of the signature capture box is determined by the height and separation of the start and stop patterns. The line width of the signature capture box is insignificant.

The thinnest element width, referred to here as X, is nominally 10 mils (1 mil = 0.0254 mm). Select this as an exact multiple of the pixel pitch of the printer used. For example, when using a 203 DPI (dots-per-inch) printer and printing 2 dots per module, the resulting X dimension is 9.85 mils.

**Data Format**

The scanner output is formatted according to Table C-3. Symbol scanners allow different user options to output or inhibit bar code type. Selecting "Symbol ID" as the bar code type for output identifies the CapCode with letter "i".

<table>
<thead>
<tr>
<th>File Format (1 byte)</th>
<th>Type (1 byte)</th>
<th>Image Size (4 bytes, BIG Endian)</th>
<th>Image Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPEG - 1</td>
<td>See Table C-1, last column</td>
<td></td>
<td>(Same bytes as in a data file)</td>
</tr>
<tr>
<td>BMP - 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIFF - 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Additional Capabilities**

Regardless of how the signature is captured, the output signature image is de-skewed and right-side up.

A scanner that captures signatures automatically determines whether it is scanning a signature or a bar code. You can disable the signature capturing capability in a scanner.

**Signature Boxes**

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

Type 2:

```
  ______________________________________
  |                                    |
  |                                    |
  |                                    |
  |                                    |
  |___________________________________|
```

Type 5:

```
  ______________________________________
  |                                    |
  |                                    |
  |                                    |
  |                                    |
  |___________________________________|
```

Type 7:

```
  ______________________________________
  |                                    |
  |                                    |
  |                                    |
  |                                    |
  |___________________________________|
```

Type 8:

```
  ______________________________________
  |                                    |
  |                                    |
  |                                    |
  |                                    |
  |___________________________________|
```

Type 9:

```
  ______________________________________
  |                                    |
  |                                    |
  |                                    |
  |                                    |
  |___________________________________|
```

*Figure C-3*  *Acceptable Signature Boxes*
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How familiar were you with this product before using this manual?

☐ Very familiar  ☐ Slightly familiar  ☐ Not at all familiar

Did this manual meet your needs? If not, please explain.

______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________

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

______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________

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

______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________

What can we do to further improve our manuals?

______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________

Thank you for your input—We value your comments.