Newland

NLS-EM2039 Series

OEM Scan Engine

User Guide

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Revision History

Version	Description	Date
V1.0.0	Initial release.	June 4, 2013
V1.0.1	1. Added the **USB HID-POS** feature in Chapter 2. 2. Added the **Timeout between Decodes (Same Barcode)** feature for the Trigger mode in Chapter 3. **Note: You must have firmware version V1.03.083 or later to use the new features above.**	June 1, 2015
V1.0.2	1. Added the **Polling Rate** feature in Chapter 2. 2. Added the **Character Encoding** feature for PDF417, QR Code and Data Matrix in Chapter 7. **Note: You must have firmware version V1.04.032 or later to use the new features above.**	April 25, 2016
V1.0.3	1. Added the **Specify Decoding Area (Top**, **Bottom**, **Left**, **Right)** feature in Chapter 8. 2. Added **Chapter 10 Batch Programming**. **Note: You must have firmware version V1.04.060 or later to use the new features above.**	September 9, 2016

Table of Contents

Chapter 1 Getting Started

Introduction

NLS-EM2039 series OEM scan engines (hereinafter referred to as “the EM2039” or “the engine”), armed with the Newland patented UIMG®, a computerized image recognition system, bring about a new era of 2D barcode scan engines.

The EM2039s’ 2D barcode decoder chip ingeniously blends UIMG® technology and advanced chip design & manufacturing, which significantly simplifies application design and delivers superior performance and solid reliability with low power consumption.

The EM2039s support all mainstream 1D and standard 2D barcode symbologies (e.g., PDF417, QR Code M1/M2/Micro and Data Matrix) as well as GS1-DataBar™(RSS) (Limited/Stacked/Expanded versions). It can read barcodes on virtually any medium - paper, plastic card, mobile phones and LCD displays.

This compact, lightweight engine fits easily into even the most space-constrained equipments such as data collectors, meter readers, ticket validators and PDAs.

About This Guide

This guide provides programming instructions for the EM2039. Users can configure the EM2039 by scanning the programming barcodes included in this manual.

The EM2039 has been properly configured for most applications and can be put into use without further configuration. Users may check **Appendix 1: Factory Defaults Table** for reference. Throughout the manual, asterisks (**) indicate factory default values.

Connecting EVK to PC

The EVK tool is provided to assist users in application development for the EM2039. You can connect the EVK to PC via a USB connection or an RS-232 connection. In case of USB connection, a driver is required if EVK wants to communicate with EM2039 and receive decoded data through virtual serial port.

Barcode Scanning

Powered by area-imaging technology and Newland patented NIMG® technology, the EM2039 features fast scanning and accurate decoding. Barcodes rotated at any angle can still be read with ease. When scanning a barcode, simply center the aiming beam or pattern projected by the EM2039 over the barcode.

Barcode Programming

Scanning the **Enter Setup** barcode can enable the engine to enter the setup mode. Then you can scan a number of programming barcodes to configure your engine. To exit the setup mode, scan the **Exit Setup** barcode.

If the engine has exited the setup mode, only some special programming barcodes, such as the **Enter Setup** barcode and **Restore All Factory Defaults** barcode, can be read.

Enter Setup

**** Exit Setup**

Programming barcode data (i.e. the characters under programming barcode) can be transmitted to the Host. Scan the appropriate barcode below to enable or disable the transmission of programming barcode data to the Host.

Restarting the engine will automatically disable the transmisison of programming barcode data to the Host.

Transmit Programming Barcode Data

**** Do Not Transmit Programming Barcode Data**

Factory Defaults

Scanning the following barcode can restore the engine to the factory defaults. See **Appendix 1: Factory Defaults Table** for more information.

Note: Use this feature with discretion.

Restore All Factory Defaults

Custom Defaults

Custom defaults make it possible to save the frequently-used settings on the engine.

Scanning the **Save as Custom Defaults** barcode can save the current settings as custom defaults. Once custom default settings are stored, they can be recovered at any time by scanning the **Restore All Custom Defaults** barcode.

Custom defaults are stored in the non-volatile memory. Restoring the engine to the factory defaults will not remove the custom defaults from the engine.

Save as Custom Defaults

Restore All Custom Defaults

Inquire Product Information

You can scan the barcode below to inquire the engine information (such as firmware version, model number, serial number, manufacture date). The result will be sent to the Host.

Inquire Product Information

Enter Setup

Chapter 2 Communication Interfaces

The EM2039 provides a TTL-232 interface and a USB interface to communicate with the host device. The host device can receive scanned data and send commands to control the engine or to access/alter the configuration information of the engine via the TTL-232 or USB interface.

Power-Saving Mode

By default, the engine adopts the Normal Mode which supports both TTL-232 and USB. The Power-Saving Mode is designed to conserve power. However, you can only use TTL-232 communication in the Power-Saving Mode.

**** Normal Mode**

(TTL-232 & USB supported)

Power-Saving Mode

(TTL-232 supported)

**** Exit Setup**

0006010

Enter Setup

TTL-232 Interface

Serial communication interface is usually used when connecting the engine to a host device (like PC, POS). However, to ensure smooth communication and accuracy of data, you need to set communication parameters (including baud rate, parity check, data bit and stop bit) to match the host device.

The serial communication interface provided by the engine is based on TTL-level signals. TTL-232 can be used for most application architectures. For those requiring RS-232, an external conversion circuit is needed. The conversion circuit is available only to some models.

1100000

Serial Communication

Default serial communication parameters are listed below. Make sure all parameters match the host requirements.

Parameter	Factory Default
Serial Communication	Standard TTL-232
Baud Rate	9600
Parity Check	None
Number of Data Bits	8
Number of Stop Bits	1
Hardware Flow Control	None

0006010

Enter Setup

Baud Rate

Baud rate is the number of bits of data transmitted per second. Set the baud rate to match the Host requirements.

**** 9600**

1200

19200

2400

38400

4800

57600

14400

115200

**** Exit Setup**

Enter Setup

Parity Check

When the number of data bits is set to 7, you can only select either **Even Parity** or **Odd Parity**. The **None** option will be regarded as **Even Parity** in this case.

**** None**

Even Parity

Odd Parity

Data Bit

When the number of data bits is set to 7, you can only select either **Even Parity** or **Odd Parity**.

7 Data Bits

**** 8 Data Bits**

**** Exit Setup**

0006010

Enter Setup

Data Bit & Parity Check

7 Data Bits/Even Parity

7 Data Bits/Odd Parity

**** 8 Data Bits/ No Parity**

8 Data Bits/Even Parity

8 Data Bits/Odd Parity

Stop Bit

**** 1 Stop Bit**

2 Stop Bits

**** Exit Setup**

Enter Setup

Hardware Flow Control

If CTS flow control is enabled, the engine determines whether to transmit data based on CTS signal level. When CTS signal is at low level which means the serial port's cache memory of receiving device (such as PC) is full, the engine stops sending data through serial port until CTS signal is set to high level by receiving device. If RTS flow control is enabled, whether the engine receives data or not is dependent on RTS signal level. If the engine is not ready for receiving, it will set RTS signal to low level. When sending device (such as PC) detects it, it will not send data to the engine any more to prevent data loss.

If **No Flow Control** is selected, reception/transmission of serial data will not be influenced by RTS/CTS signal.

**** No Flow Control**

RTS Flow Control

CTS Flow Control

CTS/RTS Flow Control

Note: Before enabling hardware flow control, make sure that RTS/CTS signal line is contained in RS-232 cable. Without the signal line, serial communication errors will occur.

**** Exit Setup**

Enter Setup

USB Interface

USB Enumeration

If the engine is connected to the Host via a USB connection, the engine will be enumerated using S/N or “00000000” after power-up. **Enumeration using S/N** enables the Host to distinguish between engines of same model. **Enumeration using “00000000”** disables the Host from distinguishing between engines of same model.

Driver installation is required for each USB device distinguished from others by the Host in the process of enumeration.

Enumeration Using S/N

**** Enumeration Using “00000000”**

USB HID-KBW

When you connect the engine to the Host via a USB connection, you can enable the **USB HID-KBW** feature by scanning the barcode below. Then engine’s transmission will be simulated as USB keyboard input. The Host receives keystrokes on the virtual keyboard. It works on a Plug and Play basis and no driver is required.

**** USB HID-KBW**

**** Exit Setup**

Enter Setup

Polling Rate

This parameter specifies the polling rate for a USB keyboard. If the Host drops characters, change the polling rate to a bigger value.

**** 1ms**

2ms

3ms

4ms

5ms

6ms

7ms

8ms

9ms

10ms

**** Exit Setup**

Enter Setup

USB Country Keyboard Types

Keyboard layouts vary from country to country. The default setting is 1-U.S. keyboard.

**** U.S.**

Japan

Denmark

Finland

France

Turkey_F

Italy

Norway

**** Exit Setup**

0006010

Enter Setup

Spain

Turkey_Q

UK

Austria, Germany

Belgium

Russia

Sweden

Portugal

Note: To program the engine to get proper output for Russian encoded with Windows 1251 or UTF-8 (PDF417/QR Code/Data Matrix), see **Appendix 5**.

0006010

Enter Setup

Beep on Unknown Character

Due to the differences in keyboard layouts, some characters contained in barcode data may be unavailable on the selected keyboard. As a result, the engine fails to transmit the unknown characters.

Scan the appropriate barcode below to enable or disable the emission of beep when an unknown character is detected.

1103031

Beep on Unknown Character

1103030

** **Do Not Beep on Unknown Character**

Inter-Keystroke Delay

This parameter specifies the delay between emulated keystrokes. It is programmable in 5ms increments from 0ms to 75ms. Single-digit values must have a leading zero. To learn how to program custom delay, see **Appendix 5**. The default setting is 10ms.

1103050

No Delay

1103051

Short Delay (20ms)

1103052

Long Delay (40ms)

1103053

Custom Delay

0006000

** **Exit Setup**

Enter Setup

Convert Case

Scan the appropriate barcode below to convert barcode data to your desired case.

**** No Case Conversion**

Invert Upper and Lower Case Characters

Convert All to Upper Case

Convert All to Lower Case

Example: When the **Convert All to Lower Case** feature is enabled, barcode data “AbC” is transmitted as “abc”.

**** Exit Setup**

Enter Setup

Emulate ALT+Keypad

This feature allows any ASCII character (0x00 - 0xFF) to be sent over the numeric keypad no matter which keyboard type is selected. Since sending a character involves multiple keystroke emulations, this method appears less efficient.

The following options are available:

- **Disable:** No ASCII character is sent in the ALT+Keypad way.
- **Mode 1:** ASCII characters not supported by the selected keyboard type but falling into 0x20~0xFF are sent in the ALT+Keypad way.
- **Mode 2:** ASCII characters falling into 0x20~0xFF are sent in the ALT+Keypad way.
- **Mode 3:** All ASCII characters (0x00~0xFF) are sent in the ALT+Keypad way.

Note: In the event of a conflict between **Function Key Mapping** and **Mode 3**, **Function Key Mapping** shall govern.

**** Disable**

Mode 1

Mode 2

Mode 3

Example: Supposing US keyboard is selected, barcode data ”AÐF” (65/208/70) is sent as below:

(1) **Mode 1** is enabled:

“A” -- Keystroke “A”

“Ð” -- “ALT Make” + “208” + “ALT Break”

“F” -- Keystroke “F”

(2) **Mode 3** is enabled:

“A” – “ALT Make” + “065” + “ALT Break”

“Ð” -- “ALT Make” + “208” + “ALT Break”

“F” -- “ALT Make” + “070” + “ALT Break”

**** Exit Setup**

Enter Setup

Function Key Mapping

When Function Key Mapping is enabled, function characters (0x00 - 0x1F) are sent as ASCII sequences over the keypad. For more information, see **Appendix 8: ASCII Function Key Mapping Table**.

Enable Function Key Mapping

**** Disable Function Key Mapping**

Example: Barcode data 0x16

 T	Enable Function Key Mapping	Ctrl+V
	Disable Function Key Mapping	F1

**** Exit Setup**

0006010

Enter Setup

Emulate Numeric Keypad

When this feature is disabled, sending barcode data is emulated as keystroke(s) on main keyboard.

To enable this feature, scan the **Emulate Numeric Keypad** barcode. Sending a number (0-9) is emulated as keystroke(s) on numeric keypad, whereas sending other characters like “+”, “_”, “*” , “/” and “.” is still emulated as keystrokes on main keyboard.

1103110

**** Do Not Emulate Numeric Keypad**

1103120

Emulate Numeric Keypad

Code Page

In order to support more international characters, the **Code Page** programming feature is provided. This feature is only effective when ASCII characters are sent in the ALT+Keypad way. Programming a code page requires scanning numeric barcode (For more information, see **Appendix 9: Code Pages List**). The default code page is Windows 1252 (Latin I). To learn how to program it, see **Appendix 5**.

1103180

Set the Code Page

0006000

**** Exit Setup**

0006010

Enter Setup

USB COM Port Emulation

If you connect the engine to the Host via a USB connection, the **USB COM Port Emulation** feature allows the Host to receive data in the way as a serial port does. A driver is required for this feature.

1100060

USB COM Port Emulation

USB HID-POS

Introduction

The USB HID-POS interface is recommended for new application programs. It can send up to 56 characters in a single USB report and appears more efficient than keyboard emulation.

Features:

- ✧ HID based, no custom driver required.
- ✧ Way more efficient in communication than keyboard emulation and traditional RS-232 interface.

Note: USB HID-POS does not require a custom driver. However, a HID interface on Windows 98 does. All HID interfaces employ standard driver provided by the operating system. Use defaults when installing the driver.

1100080

USB HID-POS

Access the Engine with Your Program

Use CreateFile to access the engine as a HID device and then use ReadFile to deliver the scanned data to the application program. Use WriteFile to send data to the engine.

For detailed information about USB and HID interfaces, go to www.USB.org.

Enter Setup

Acquire Scanned Data

After scanning and decoding a barcode, the engine sends the following input report:

	Bit							
Byte	7	6	5	4	3	2	1	0
0	Report ID = 0x02							
1	Length of the barcode							
2-57	Decoded data (1-56)							
58-60	AIM ID							
61-62	Reserved							
63	-	-	-	-	-	-	-	Decoded Data Continued

Send Data to the Engine

This output report is used to send data to the device. All programming commands can be used.

	Bit							
Byte	7	6	5	4	3	2	1	0
0	Report ID = 0x04							
1	Length of the output data							
2-63	Output data (1-62)							

VID/PID

USB uses VID (Vendor ID) and PID (Product ID) to identify and locate a device. The VID is assigned by USB Implementers Forum. Newland's vendor ID is 1EAB (Hex). A PID is assigned to each interface.

Product	Interface	PID (Hex)	PID (Dec)
EM2039	USB HID-KBW	1303	4867
	USB COM Port Emulation	1306	4870
	USB HID-POS	1310	4880

** Exit Setup

0006010

Enter Setup

Chapter 3 Scan Mode

Batch Mode

If the Batch Mode is enabled, driving the TRIG pin on the host interface connector low activates a round of multiple decode sessions. This round of multiple scans continues until the active trigger signal is no longer present. Rereading the same barcode is not allowed if it was decoded previously in the same round. For good read, the engine transmits decoded data via communication port. To activate another round of multiple scans, the Host needs to first negate the trigger, waits 20ms or longer and then drive the TRIG pin low.

0302003

Batch Mode

0006000

**** Exit Setup**

Enter Setup

Trigger Mode

If the Trigger Mode is enabled, driving the nTrig pin on the host interface connector low activates a decode session. The session continues until the barcode is decoded or decode session timeout expires or the active trigger signal is no longer present. For good read, the engine transmits decoded data via communication port. To activate another session, the Host needs to first negate the trigger, wait 20ms or longer and then drive the nTrig pin low.

**** Trigger Mode**

Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. It is programmable in 1ms increments from 1ms to 3,600,000ms. When it is set to 0, the timeout is infinite. The default setting is 3,000ms. To learn how to program this parameter, see **Appendix 5**.

Decode Session Timeout

**** Exit Setup**

Enter Setup

Level Trigger/Pulse Trigger

Level trigger: Decode session is activated and continued by constant active trigger signal. The decode session ends once the barcode is decoded or decode session timeout expires.

Pulse trigger: Decode session is activated by electric pulse of trigger signal. The decode session continues until the barcode is decoded or decode session timeout expires.

**** Level Trigger**

Pulse Trigger

Auto Sleep

Auto Sleep allows the engine in the Trigger Mode to automatically enter the sleep or low power mode if no operation or communication is performed for a time period (user programmable). When the engine is in the sleep mode, receiving trigger signal or communication from the Host can awake the engine. The engine returns to full operation within 100ms.

**** Enable Auto Sleep**

Disable Auto Sleep

The parameter below specifies how long the engine remains idle (no operation or communication occurs) before it is put into sleep mode. It is programmable in 1ms increments from 0ms to 65,535ms. The default setting is 500ms. To learn how to program this parameter, see **Appendix 5**.

Time Period from Idle to Sleep

**** Exit Setup**

Enter Setup

Timeout between Decodes (Same Barcode)

Timeout between Decodes (Same Barcode) can avoid undesired rereading of same barcode in a given period of time.

To enable/disable the Timeout between Decodes (Same Barcode), scan the appropriate barcode below.

Enable Timeout between Decodes: Do not allow the engine to re-read same barcode before the timeout between decodes (same barcode) expires.

Disable Timeout between Decodes: Allow the engine to re-read same barcode.

**** Disable Timeout between Decodes**

Enable Timeout between Decodes

The following parameter sets the timeout between decodes for same barcode. It is programmable in 1ms increments from 0ms to 65,535ms. The default setting is 1,500ms.

To learn how to program this parameter, see **Appendix 5**.

Timeout between Decodes (Same Barcode)

** **Exit Setup**

0006010

Enter Setup

Sense Mode

If the Sense Mode is enabled, the engine activates a decode session every time it detects a change in ambient illumination. The decode session continues until the barcode is decoded or the decode session timeout expires.

Driving the nTrig pin on the host interface connector low can also activate a decode session. The decode session continues until the active trigger signal is no longer present or the barcode is decoded or the decode session timeout expires. The trigger signal needs to be negated before the engine is able to monitor ambient illumination again.

0302010

Sense Mode

Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. If the timeout expires or the barcode is decoded, the engine goes back to monitoring ambient illumination. It is programmable in 1ms increments from 1ms to 3,600,000ms. When it is set to 0, the timeout is infinite. The default setting is 3,000ms. To learn how to program this parameter, see **Appendix 5**.

0313000

Decode Session Timeout

0006010

Enter Setup

Image Stabilization Timeout

This parameter defines the amount of time that the engine waits for the image to stabilize to a point that it can be decoded with more accuracy. It is programmable in 1ms increments from 0ms to 1,600ms. The default setting is 500ms.To learn how to program this parameter, see **Appendix 5**.

0313120

Image Stabilization Timeout

Timeout between Decodes

This parameter sets the timeout between decode sessions. When a decode session ends, next session will not happen until the timeout between decodes expires. It is programmable in 1ms increments from 0ms to 65,535ms. The default setting is 1,000ms. To learn how to program this parameter, see **Appendix 5**.

0313040

Timeout between Decodes

Continue after Good Read

Continue after Good Read: The engine starts next decode session after good read.

Pause after Good Read: The engine starts another round of illumination monitoring and image stabilization after good read.

0313130

**** Pause after Good Read**

0313131

Continue after Good Read

0006000

**** Exit Setup**

Enter Setup

Timeout between Decodes (Same Barcode)

Timeout between Decodes (Same Barcode) can avoid undesired rereading of same barcode in a given period of time.

To enable/disable the Timeout between Decodes (Same Barcode), scan the appropriate barcode below.

Enable Timeout between Decodes: Do not allow the engine to re-read same barcode before the timeout between decodes (same barcode) expires.

Disable Timeout between Decodes: Allow the engine to re-read same barcode.

**** Disable Timeout between Decodes**

Enable Timeout between Decodes

The following parameter sets the timeout between decodes for same barcode. It is programmable in 1ms increments from 0ms to 65,535ms. The default setting is 1,500ms.

To learn how to program this parameter, see **Appendix 5**.

Timeout between Decodes (Same Barcode)

**** Exit Setup**

0006010

Enter Setup

Sensitivity

Sensitivity specifies the degree of acuteness of the engine's response to changes in ambient illumination. The higher the sensitivity, the lower requirement in illumination change to trigger the engine. You can select an appropriate degree of sensitivity that fits the ambient environment.

0312010

Medium Sensitivity

0312000

Low Sensitivity

0312020

High Sensitivity

0312030

Enhanced Sensitivity

If the above four options fail to meet your needs, you may program the threshold value of illumination change.

Illumination changes that reaches or surpasses the predefined threshold value will cause the engine to start a decode session. The lower the threshold value, the greater the sensitivity of the engine. The default threshold value is 2.

To learn how to program this parameter, see **Appendix 5**.

0312040

Threshold Value of Illumination Change (1-20)

0006000

**** Exit Setup**

Enter Setup

Continuous Mode

This mode enables the engine to scan/capture, decode and transmit over and over again.

When the engine is operating in Continuous Mode, barcode reading can be suspended/resumed through control over the trigger signal. When barcode reading is in progress, negating the trigger signal after having maintained it for 30ms or longer will suspend barcode reading; when barcode reading is suspended, performing the same control over the trigger signal will resume barcode reading.

Continuous Mode

Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. It is programmable in 1ms increments from 1ms to 3,600,000ms. When it is set to 0, the timeout is infinite. The default setting is 3,000ms. To learn how to program this parameter, see **Appendix 5**.

Decode Session Timeout

Timeout between Decodes

This parameter sets the timeout between decode sessions. When a decode session ends, next session will not happen until the timeout between decodes expires. It is programmable in 1ms increments from 0ms to 65,535ms. The default setting is 1,000ms. To learn how to program this parameter, see **Appendix 5**.

Timeout between Decodes

**** Exit Setup**

0006010

Enter Setup

Timeout between Decodes (Same Barcode)

Timeout between Decodes (Same Barcode) can avoid undesired rereading of same barcode in a given period of time.

To enable/disable the Timeout between Decodes (Same Barcode), scan the appropriate barcode below.

Enable Timeout between Decodes: Do not allow the engine to re-read same barcode before the timeout between decodes (same barcode) expires.

Disable Timeout between Decodes: Allow the engine to re-read same barcode.

0313160

**** Disable Timeout between Decodes**

0313170

Enable Timeout between Decodes

The following parameter sets the timeout between decodes for same barcode. It is programmable in 1ms increments from 0ms to 65,535ms. The default setting is 1,500ms.

To learn how to program this parameter, see **Appendix 5**.

0313010

Timeout between Decodes (Same Barcode)

0006000

**** Exit Setup**

Enter Setup

Chapter 4 Illumination & Aiming

Illumination

A couple of illumination options are provided to improve the lighting conditions during every image capture:

Normal: Illumination LEDs are turned on during image capture.

Always ON: Illumination LEDs keep ON after the engine is powered on.

OFF: Illumination LEDs are OFF all the time.

**** Normal**

OFF

Always ON

**** Exit Setup**

Enter Setup

Aiming

When scanning/capturing image, the engine projects an aiming pattern which allows positioning the target barcode within its field of view and thus makes decoding easier.

Normal: The engine projects an aiming pattern only during barcode scanning/capture.

Always ON: Aiming pattern is constantly ON after the engine is powered on.

OFF: Aiming pattern is OFF all the time.

**** Normal**

OFF

Always ON

**** Exit Setup**

Enter Setup

Chapter 5 Beep & LED Notifications

Startup Beep

If startup beep is enabled, the engine will beep after being turned on.

**** Enable Startup Beep**

Disable Startup Beep

**** Exit Setup**

0006010

Enter Setup

Good Read Beep for Non-programming Barcode

The engine can provide a PWM output to an external driver circuit to drive a beeper after decoding a non-programming barcode. Scan the appropriate barcode below to enable or disable the emission of good read beep. Beep type (frequency) and volume are also user programmable.

0203010

**** Good Read Beep On for Non-programming barcode**

0203000

Good Read Beep Off for Non-programming barcode

Good Read Beep Type

0203020

Type 1

0203022

**** Type 3**

0203021

Type 2

0006000

**** Exit Setup**

Enter Setup

Good Read Beep Volume

**** Loud**

Low

Medium

Beep on Unknown Character

Due to the differences in keyboard layouts, some characters contained in barcode data may be unavailable on the selected keyboard (USB HID-KBW). As a result, the engine fails to transmit the unknown characters.

Scan the appropriate barcode below to enable or disable the emission of beep when an unknown character is detected.

Beep on Unknown Character

**** Do Not Beep on Unknown Character**

**** Exit Setup**

Good Read Beep for Programming Barcode

0203041

**** Good Read Beep On for Programming Barcode**

0203040

Good Read Beep Off for Programming Barcode

Good Read LED

0206011

**** Good Read LED On**

0206010

Good Read LED Off

Enter Setup

Transmit NGR Message

Scan a barcode below to select whether or not to transmit a user-defined NGR (Not Good Read) message when a barcode is not decoded.

Transmit NGR Message

**** Do Not Transmit NGR Message**

Edit NGR Message

To edit an NGR message, scan the **Edit NGR Message** barcode and the numeric barcodes corresponding to the ASCII values (decimal) of desired characters and then scan the **Save** barcode.

An NGR message can contain 0-7 characters (ASCII value of character: 0-255).

Edit NGR Message

**** Exit Setup**

Enter Setup

Chapter 6 Prefix & Suffix

In many applications, barcode data needs to be edited and distinguished from one another.

Usually AIM ID and Code ID can be used as identifiers, but in some special cases customized prefix and terminating character suffix like Carriage Return or Line Feed can also be the alternatives.

Data formatting may include:

- ✧ Append AIM ID/Code ID/custom prefix before the decoded data
- ✧ Append custom suffix after the decoded data
- ✧ Append terminating character to the end of the data

The following formats can be used when editing barcode data:

- ✧ [Code ID] + [Custom Prefix] + [AIM ID] + [DATA] + [Custom Suffix] + [Terminating Character]
- ✧ [Custom Prefix] + [Code ID] + [AIM ID] + [DATA] + [Custom Suffix] + [Terminating Character]

Note: [DATA] must be transmitted while user can decide whether to transmit any of the rest parts.

**** Exit Setup**

Enter Setup

Global Settings

Enable/Disable All Prefix/Suffix

Disable All Prefix/Suffix: Transmit barcode data with no prefix/suffix.

Enable All Prefix/Suffix: Allow user to append Code ID prefix, AIM ID prefix, custom prefix/suffix and terminating character to the barcode data before the transmission.

Enable All Prefix/Suffix

Disable All Prefix/Suffix

Prefix Sequences

Code ID+Custom Prefix+AIM ID

**** Custom Prefix+Code ID+AIM ID**

**** Exit Setup**

0006010

Enter Setup

Custom Prefix

Enable/Disable Custom Prefix

If custom prefix is enabled, you are allowed to append to the data a user-defined prefix that cannot exceed 11 characters.

0305010

Enable Custom Prefix

0305000

**** Disable Custom Prefix**

Set Custom Prefix

To set a custom prefix, scan the **Set Custom Prefix** barcode and the numeric barcodes representing the hexadecimal values of a desired prefix and then scan the **Save** barcode. Refer to **Appendix 4: ASCII Table** for hexadecimal values of characters. To learn how to program this parameter, see **Appendix 5**.

Note: A custom prefix cannot exceed 11 characters.

0300000

Set Custom Prefix

0006000

**** Exit Setup**

Enter Setup

AIM ID Prefix

AIM (Automatic Identification Manufacturers) IDs and ISO/IEC 15424 standards define symbology identifiers and data carrier identifiers. (For the details, see **Appendix 2: AIM ID Table**). If AIM ID prefix is enabled, the engine will add the symbology identifier before the scanned data after decoding.

Enable AIM ID Prefix

**** Disable AIM ID Prefix**

Code ID Prefix

Code ID can also be used to identify barcode type. Unlike AIM ID, Code ID is user programmable. Code ID can only consist of one or two English letters.

Enable Code ID Prefix

**** Disable Code ID Prefix**

Restore All Default Code IDs

For the information of default Code IDs, see **Appendix 3: Code ID Table**.

Restore All Default Code IDs

**** Exit Setup**

Enter Setup

Modify Code ID

Code ID of each symbology can be programmed separately. To learn how to program this parameter, see **Appendix 5**.

Modify PDF417 Code ID

Modify Data Matrix Code ID

Modify QR Code Code ID

Modify Code 128 Code ID

Modify GS1-128 Code ID

Modify AIM-128 Code ID

Modify EAN-8 Code ID

Modify EAN-13 Code ID

**** Exit Setup**


0006010

Enter Setup


0004060

Modify UPC-E Code ID


0004070

Modify UPC-A Code ID


0004240

Modify ISBN Code ID


0004230

Modify ISSN Code ID


0004130

Modify Code 39 Code ID


0004170

Modify Code 93 Code ID


0004080

Modify Interleaved 2 of 5 Code ID


0004090

Modify ITF-14 Code ID


0004100

Modify ITF-6 Code ID


0004150

Modify Codabar Code ID


0006000

**** Exit Setup**

0006010

Enter Setup

Modify Industrial 25 Code ID

Modify Standard 25 Code ID

Modify Matrix 25Code ID

Modify Code 11

Modify Plessey Code ID

Modify MSI/Plessey Code ID

Modify GS1 Databar Code ID

0006000

** **Exit Setup**

Enter Setup

Custom Suffix

Enable/Disable Custom Suffix

If custom suffix is enabled, you are allowed to append to the data a user-defined suffix that cannot exceed 11 characters.

Enable Custom Suffix

** **Disable Custom Suffix**

Set Custom Suffix

To set a custom suffix, scan the **Set Custom Suffix** barcode and the numeric barcodes representing the hexadecimal values of a desired suffix and then scan the **Save** barcode. Refer to **Appendix 4: ASCII Table** for hexadecimal values of characters. To learn how to program this parameter, see **Appendix 5**.

Note: A custom suffix cannot exceed 11 characters.

Set Custom Suffix

** **Exit Setup**

Enter Setup

Terminating Character Suffix

A terminating character can be used to mark the end of data, which means nothing can be added after it.

A terminating character suffix cannot exceed 7 characters.

Enable/Disable Terminating Character Suffix

To enable/disable terminating character suffix, scan the appropriate barcode below.

** **Enable Terminating Character Suffix**

Disable Terminating Character Suffix

** **Exit Setup**

Enter Setup

Set Terminating Character Suffix

The engine provides a shortcut for setting the terminating character suffix to 0x0D (CR) or 0x0D,0x0A (CRLF) and enabling it by scanning the following barcode.

**** Terminating Character 0x0D**

Terminating Character 0x0D,0x0A

To set a terminating character suffix, scan the **Set Terminating Character Suffix** barcode and the numeric barcodes representing the hexadecimal value of a desired terminating character and then scan the **Save** barcode. Refer to **Appendix 4: ASCII Table** for hexadecimal values of terminating characters. To learn how to program this parameter, see **Appendix 5**.

Note: A terminating character suffix cannot exceed 2 characters.

Set Terminating Character Suffix

**** Exit Setup**

0006010

Enter Setup

Chapter 7 Symbologies

General Settings

Enable/Disable All Symbologies

If the **Disable All Symbologies** feature is enabled, the engine will not be able to read any non-programming barcodes except the programming barcodes.

0001020

Enable All Symbologies

0001010

Disable All Symbologies

Enable/Disable 1D Symbologies

If the **Disable 1D Symbologies** feature is enabled, the engine will not be able to read any 1D barcodes.

0001040

Enable 1D Symbologies

0001030

Disable 1D Symbologies

Enable/Disable 2D Symbologies

If the **Disable 2D Symbologies** feature is enabled, the engine will not be able to read any 2D barcodes.

0001060

Enable 2D Symbologies

0001050

Disable 2D Symbologies

0006000

**** Exit Setup**

0006010

Enter Setup

Video Reverse

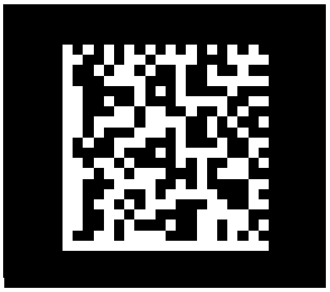
The **Video Reverse** feature only applies to 2D barcodes.

Regular barcode: Dark image on a bright background.

Inverse barcode: Bright image on a dark background.

The examples of regular barcode and inverse barcode are shown below.

Regular Barcode



Inverse Barcode

Video Reverse is used to allow the engine to read barcodes that are inverted.

Video Reverse ON: Read both regular barcodes and inverse barcodes.

Video Reverse OFF: Read regular barcodes only.

The engine shows a slight decrease in scanning speed when Video Reverse is ON.

0001021

Video Reverse ON

0001011

**** Video Reverse OFF**

0006000

**** Exit Setup**

0006010

Enter Setup

1D Symbologies

Code 128

Restore Factory Defaults

Restore the Factory Defaults of Code 128

Enable/Disable Code 128

**** Enable Code 128**

Disable Code 128

Set Length Range for Code 128

Set the Minimum Length

Set the Maximum Length

**** Exit Setup**

0006010

Enter Setup

GS1-128 (UCC/EAN-128)

Restore Factory Defaults

0412000

Restore the Factory Defaults of GS1-128

Enable/Disable GS1-128

0412020

** **Enable GS1-128**

0412010

Disable GS1-128

Set Length Range for GS1-128

0412030

Set the Minimum Length

0412040

Set the Maximum Length

0006000

** **Exit Setup**

0006010

Enter Setup

AIM-128

Restore Factory Defaults

Restore the Factory Defaults of AIM-128

Enable/Disable AIM-128

**** Enable AIM-128**

Disable AIM-128

Set Length Range for AIM-128

Set the Minimum Length

Set the Maximum Length

0006010

Enter Setup

EAN-8

Restore Factory Defaults

Restore the Factory Defaults of EAN-8

Enable/Disable EAN-8

**** Enable EAN-8**

Disable EAN-8

0006010

Enter Setup

Transmit Check Digit

EAN-8 is 8 digits in length with the last one as its check digit used to verify the integrity of the data.

0401040

**** Transmit EAN-8 Check Digit**

0401030

Do Not Transmit EAN-8 Check Digit

Add-On Code

An EAN-8 barcode can be augmented with a two-digit or five-digit add-on code to form a new one. In the examples below, the part surrounded by blue dotted line is an EAN-8 barcode while the part circled by red dotted line is add-on code.

0401060

Enable 2-Digit Add-On Code

0401050

**** Disable 2-Digit Add-On Code**

0401080

Enable 5-Digit Add-On Code

0401070

**** Disable 5-Digit Add-On Code**

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The engine decodes a mix of EAN-8 barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The engine decodes EAN-8 and ignores the add-on code when presented with an EAN-8 plus add-on barcode. It can also decode EAN-8 barcodes without add-on codes.

0006000

**** Exit Setup**

0006010

Enter Setup

Add-On Code Required

When **EAN-8 Add-On Code Required** is selected, the engine will only read EAN-8 barcodes that contain add-on codes.

0401110

EAN-8 Add-On Code Required

0401120

**** EAN-8 Add-On Code Not Required**

EAN-8 Extension

Disable EAN-8 Zero Extend: Transmit EAN-8 barcodes as is.

Enable EAN-8 Zero Extend: Add five leading zeros to decoded EAN-8 barcodes to extend to13 digits.

0401100

Enable EAN-8 Zero Extend

0401090

**** Disable EAN-8 Zero Extend**

Enter Setup

EAN-13

Restore Factory Defaults

Restore the Factory Defaults of EAN-13

Enable/Disable EAN-13

**** Enable EAN-13**

Disable EAN-13

Transmit Check Digit

**** Transmit EAN-13 Check Digit**

Do Not Transmit EAN-13 Check Digit

**** Exit Setup**

Enter Setup

Add-On Code

An EAN-13 barcode can be augmented with a two-digit or five-digit add-on code to form a new one.

Enable 2-Digit Add-On Code

**** Disable 2-Digit Add-On Code**

Enable 5-Digit Add-On Code

**** Disable 5-Digit Add-On Code**

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The engine decodes a mix of EAN-13 barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The engine decodes EAN-13 and ignores the add-on code when presented with an EAN-13 plus add-on barcode. It can also decode EAN-13 barcodes without add-on codes.

Add-On Code Required

When **EAN-13 Add-On Code Required** is selected, the engine will only read EAN-13 barcodes that contain add-on codes.

EAN-13 Add-On Code Required

**** EAN-13 Add-On Code Not Required**

**** Exit Setup**

0006010

Enter Setup

ISSN

Restore Factory Defaults

Restore the Factory Defaults of ISSN

Enable/Disable ISSN

Enable ISSN

**** Disable ISSN**

0006010

Enter Setup

Add-On Code

An ISSN barcode can be augmented with a two-digit or five-digit add-on code to form a new one.


0421030

Enable 2-Digit Add-On Code


0421040

**** Disable 2-Digit Add-On Code**


0421050

Enable 5-Digit Add-On Code


0421060

**** Disable 5-Digit Add-On Code**

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The engine decodes a mix of ISSN barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The engine decodes ISSN and ignores the add-on code when presented with an ISSN plus add-on barcode. It can also decode ISSN barcodes without add-on codes.

Add-On Code Required

When **ISSN Add-On Code Required** is selected, the engine will only read ISSN barcodes that contain add-on codes.


0421070

ISSN Add-On Code Required


0421080

**** ISSN Add-On Code Not Required**

0006010

Enter Setup

ISBN

Restore Factory Default

Restore the Factory Defaults of ISBN

Enable/Disable ISBN

**** Enable ISBN**

Disable ISBN

Set ISBN Format

****ISBN-13**

ISBN-10

**** Exit Setup**

0006010

Enter Setup

Add-On Code

An ISBN barcode can be augmented with a two-digit or five-digit add-on code to form a new one.


0416050

Enable 2-Digit Add-On Code


0416060

**** Disable 2-Digit Add-On Code**


0416070

Enable 5-Digit Add-On Code


0416080

**** Disable 5-Digit Add-On Code**

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The engine decodes a mix of ISBN barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The engine decodes ISBN and ignores the add-on code when presented with an ISBN plus add-on barcode. It can also decode ISBN barcodes without add-on codes.

Add-On Code Required

When **ISBN Add-On Code Required** is selected, the engine will only read ISBN barcodes that contain add-on codes.


0416090

ISBN Add-On Code Required


0416100

**** ISBN Add-On Code Not Required**

UPC-E

Restore Factory Defaults

Restore the Factory Defaults of UPC-E

Enable/Disable UPC-E

**** Enable UPC-E**

Disable UPC-E

Transmit Check Digit

**** Transmit UPC-E Check Digit**

Do Not Transmit UPC-E Check Digit

Enter Setup

Add-On Code

A UPC-E barcode can be augmented with a two-digit or five-digit add-on code to form a new one.

Enable 2-Digit Add-On Code

Enable 2-Digit Add-On Code

Enable 5-Digit Add-On Code

**** Disable 5-Digit Add-On Code**

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The engine decodes a mix of UPC-E barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The engine decodes UPC-E and ignores the add-on code when presented with a UPC-E plus add-on barcode. It can also decode UPC-E barcodes without add-on codes.

Add-On Code Required

When **UPC-E Add-On Code Required** is selected, the engine will only read UPC-E barcodes that contain add-on codes.

UPC-E Add-On Code Required

**** UPC-E Add-On Code Not Required**

**** Exit Setup**

Enter Setup

Transmit System Character “0”

The first character of UPC-E barcode is the system character “0”.

**** Transmit System Character “0”**

Do Not Transmit System Character “0”

UPC-E Extension

Disable UPC-E Extend: Transmit UPC-E barcodes as is.

Enable UPC-E Extend: Extend UPC-E barcodes to make them compatible in length to UPC-A.

Enable UPC-E Extend

**** Disable UPC-E Extend**

**** Exit Setup**

0006010

Enter Setup

UPC-A

Restore Factory Defaults

Restore the Factory Defaults of UPC-A

Enable/Disable UPC-A

**** Enable UPC-A**

Disable UPC-A

Transmit Check Digit

**** Transmit UPC-A Check Digit**

Do Not Transmit UPC-A Check Digit

0006010

Enter Setup

Add-On Code

A UPC-A barcode can be augmented with a two-digit or five-digit add-on code to form a new one.

Enable 2-Digit Add-On Code

**** Disable 2-Digit Add-On Code**

Enable 5-Digit Add-On Code

**** Disable 5-Digit Add-On Code**

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The engine decodes a mix of UPC-A barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The engine decodes UPC-A and ignores the add-on code when presented with a UPC-A plus add-on barcode. It can also decode UPC-A barcodes without add-on codes.

Add-On Code Required

When **UPC-A Add-On Code Required** is selected, the engine will only read UPC-A barcodes that contain add-on codes.

UPC-A Add-On Code Required

**** UPC-A Add-On Code Not Required**

**** Exit Setup**

Enter Setup

Transmit Preamble Character

Preamble characters (Country Code and System Character) can be transmitted as part of a UPC-A barcode. Select one of the following options for transmitting UPC-A preamble to the host device: transmit system character only or transmit system character and country code (“0” for USA).

System Character & Country Code

**** System Character**

**** Exit Setup**

0006010

Enter Setup

Interleaved 2 of 5

Restore Factory Defaults

0405000

Restore the Factory Defaults of Interleaved 2 of 5

Enable/Disable Interleaved 2 of 5

0405020

**** Enable Interleaved 2 of 5**

0405010

Disable Interleaved 2 of 5

Set Length Range for Interleaved 2 of 5

0405030

Set the Minimum Length

0405040

Set the Maximum Length

0006000

**** Exit Setup**

0006010

Enter Setup

Check Digit Verification

A check digit is optional for Interleaved 2 of 5 and can be added as the last digit. It is a calculated value used to verify the integrity of the data.

Disable: The engine transmits Interleaved 2 of 5 barcodes as is.

Do Not Transmit Check Digit After Verification: The engine checks the integrity of all Interleaved 2 of 5 barcodes to verify that the data complies with the check digit algorithm. Barcodes passing the check will be transmitted except the last digit, whereas those failing it will not be transmitted.

Transmit Check Digit After Verification: The engine checks the integrity of all Interleaved 2 of 5 barcodes to verify that the data complies with the check digit algorithm. Barcodes passing the check will be transmitted, whereas those failing it will not be transmitted.

0405050

**** Disable**

0405060

Do Not Transmit Check Digit After Verification

0405070

Transmit Check Digit After Verification

Note: If the **Do Not Transmit Check Digit After Verification** option is enabled, Interleaved 2 of 5 barcodes with a length that is less than the configured minimum length after having the check digit excluded will not be decoded. (For example, when the **Do Not Transmit Check Digit After Verification** option is enabled and the minimum length is set to 4, Interleaved 2 of 5 barcodes with a total length of 4 characters including the check digit cannot be read.)

0006010

Enter Setup

ITF-14

ITF-14 is a special kind of Interleaved 2 of 5 with a length of 14 characters and the last character as the check character.

Restore the Factory Defaults of ITF-14

Disable ITF-14

** **Enable ITF-14 But Do Not Transmit Check Digit**

Enable ITF-14 and Transmit Check Digit

Note: It is advisable not to enable ITF-14 and Interleaved 2 of 5 at the same time.

0006000

****Exit Setup**

Enter Setup

ITF-6

ITF-6 is a special kind of Interleaved 2 of 5 with a length of 6 characters and the last character as the check character.

Restore the Factory Defaults of ITF-6

**** Disable ITF-6**

Enable ITF-6 But Do Not Transmit Check Digit

Enable ITF-6 and Transmit Check Digit

Note: It is advisable not to enable ITF-6 and Interleaved 2 of 5 at the same time.

**** Exit Setup**

0006010

Enter Setup

Matrix 2 of 5

Restore Factory Defaults

Restore the Factory Defaults of Matrix 2 of 5

Enable/Disable Matrix 2 of 5

Enable Matrix 2 of 5

**** Disable Matrix 2 of 5**

Set Length Range for Matrix 2 of 5

Set the Minimum Length

Set the Maximum Length

**** Exit Setup**

Enter Setup

Check Digit Verification

Disable

**** Do Not Transmit Check Digit After Verification**

Transmit Check Digit After Verification

**** Exit Setup**

0006010

Enter Setup

Industrial 2 of 5

Restore Factory Defaults

Restore the Factory Defaults of Industrial 2 of 5

Enable/Disable Industrial 2 of 5

**** Enable Industrial 2 of 5**

Disable Industrial 2 of 5

Set Length Range for Industrial 2 of 5

Set the Minimum Length

Set the Maximum Length

**** Exit Setup**

0006010

Enter Setup

Check Digit Verification

**** Disable**

Transmit Check Digit After Verification

Do Not Transmit Check Digit After Verification

**** Exit Setup**

0006010

Enter Setup

Standard 2 of 5（IATA 2 of 5）

Restore Factory Defaults

Restore the Factory Defaults of Standard 25

Enable/Disable Standard 25

**** Enable Standard 25**

Disable Standard 25

Set Length Range for Standard 25

Set the Minimum Length

Set the Maximum Length

**** Exit Setup**

0006010

Enter Setup

Check Digit Verification

**** Disable**

Transmit Check Digit After Verification

Do Not Transmit Check Digit After Verification

**** Exit Setup**

0006010

Enter Setup

Code 39

Restore Factory Defaults

Restore the Factory Defaults of Code 39

Enable/Disable Code 39

**** Enable Code 39**

Disable Code 39

Transmit Start/Stop Character

Transmit Start/Stop Character

**** Do not Transmit Start/Stop Character**

**** Exit Setup**

0006010

Enter Setup

Set Length Range for Code 39

0408030

Set the Minimum Length

0408040

Set the Maximum Length

Check Digit Verification

0408050

**** Disable**

0408070

Transmit Check Digit After Verification

0408060

Do Not Transmit Check Digit After Verification

Enable/Disable Code 39 Full ASCII

The engine can be configured to identify all ASCII characters by scanning the appropriate barcode below.

0408110

**** Enable Code 39 Full ASCII**

0408100

Disable Code 39 Full ASCII

0006000

**** Exit Setup**

0006010

Enter Setup

Codabar

Restore Factory Defaults

Restore the Factory Defaults of Codabar

Enable/Disable Codabar

**** Enable Codabar**

Disable Codabar

Set Length Range for Codabar

Set the Minimum Length

Set the Maximum Length

**** Exit Setup**

0006010

Enter Setup

Check Digit Verification

**** Disable**

Transmit Check Digit After Verification

Do Not Transmit Check Digit After Verification

Transmit Start/Stop Character

Transmit Start/Stop Character

**** Do not Transmit Start/Stop Character**

Enter Setup

Start/Stop Character Format

You can choose your desired start/stop character format by scanning the appropriate barcode below.

**** ABCD/ABCD as the Start/Stop Character**

ABCD/TN*E as the Start/Stop Character

Start/Stop Character in Uppercase

Start/Stop Character in Lowercase

**** Exit Setup**

0006010

Enter Setup

Code 93

Restore Factory Defaults

Restore the Factory Defaults of Code 93

Enable/Disable Code 93

**** Enable Code 93**

Disable Code 93

Set Length Range for Code 93

Set the Minimum Length

Set the Maximum Length

Enter Setup

Check Digit Verification

Disable

**** Do Not Transmit Check Digit After Verification**

Transmit Check Digit After Verification

**** Exit Setup**

0006010

Enter Setup

GS1-Databar (RSS)

Restore Factory Defaults

0413000

Restore the Factory Defaults of GS1-Databar

Enable/Disable GS1 Databar

0413020

**** Enable GS1-DataBar**

0413010

Disable GS1-DataBar

Transmit Application Identifier “01”

0413060

**** Transmit Application Identifier “01”**

0413050

Do Not Transmit Application Identifier “01”

0006000

**** Exit Setup**

0006010

Enter Setup

Code 11

Restore Factory Defaults

Restore the Factory Defaults of Code 11

Enable/Disable Code 11

**** Enable Code 11**

Disable Code 11

Set Length Range for Code 11

Set the Minimum Length

Set the Maximum Length

**** Exit Setup**

Enter Setup

Transmit Check Digit

Transmit Check Digit

**** Do Not Transmit Check Digit**

Check Digit Verification

Disable

**** One Check Digit, MOD11**

Two Check Digits, MOD11/MOD11

Two Check Digits, MOD11/MOD9

One Check Digit, MOD11 (Len<=10)

Two Check Digits, MOD11/MOD11 (Len>10)

One Check Digit, MOD11 (Len<=10)

Two Check Digits, MOD11/MOD9 (Len>10)

**** Exit Setup**

0006010

Enter Setup

Plessey

Restore Factory Defaults

Restore the Factory Defaults of Plessey

Enable/Disable Plessey

**** Enable Plessey**

Disable Plessey

Set Length Range for Plessey

Set the Minimum Length

Set the Maximum Length

**** Exit Setup**

0006010

Enter Setup

Check Digit Verification

Disable

**** Do Not Transmit Check Digit After Verification**

Transmit Check Digit After Verification

**** Exit Setup**

0006010

Enter Setup

MSI-Plessey

Restore Factory Defaults

Restore the Factory Defaults of MSI-Plessey

Enable/Disable MSI-Plessey

**** Enable MSI-Plessey**

Disable MSI-Plessey

Set Length Range for MSI-Plessey

Set the Minimum Length

Set the Maximum Length

Enter Setup

Transmit Check Digit

Transmit Check Digit

**** Do Not Transmit Check Digit**

Check Digit Verification

Disable

**** One Check Digit, MOD10**

Two Check Digits, MOD10/MOD10

Two Check Digits, MOD10/MOD11

**** Exit Setup**

0006010

Enter Setup

2D Symbologies

PDF 417

Restore Factory Defaults

Restore the Factory Defaults of PDF 417

Enable/Disable PDF 417

**** Enable PDF 417**

Disable PDF 417

Set Length Range for PDF 417

Set the Minimum Length

Set the Maximum Length

Enter Setup

PDF 417 Twin Code

PDF417 twin code is 2 PDF417 barcodes paralleled vertically or horizontally. They must both be either regular or inverse barcodes. They must have similar specifications and be placed closely together.

There are 3 options for reading PDF417 twin codes:

Single PDF417 Only: Read either PDF417 code.

Twin PDF417 Only: Read both PDF417 codes.

Both Single & Twin: Read both PDF417 codes. If successful, transmit as twin PDF417 only. Otherwise, try single PDF417 only.

**** Single PDF417 Only**

Twin PDF417 Only

Both Single & Twin

Transmission order of twin code

Order 1: Transmit the one containing more information first.

Order 2: Transmit the one containing less information first.

**** Order 1**

Order 2

**** Exit Setup**

Enter Setup

Character Encoding

**** Default Character Encoding**

UTF-8

**** Exit Setup**

0006010

Enter Setup

QR Code

Restore Factory Defaults

0502000

Restore the Factory Defaults of QR Code

Enable/Disable QR Code

0502020

**** Enable QR Code**

0502010

Disable QR Code

Set Length Range for QR Code

0502030

Set the Minimum Length

0502040

Set the Maximum Length

Micro QR

0502110

**** Enable Micro QR**

0502100

Disable Micro QR

0006000

**** Exit Setup**

0006010

Enter Setup

QR Twin Code

QR twin code is 2 QR barcodes paralleled vertically or horizontally. They must both be either regular or inverse barcodes. They must have similar specifications and be placed closely together.

There are 3 options for reading QR twin codes:

Single QR Only: Read either QR code.

Twin QR Only: Read both QR codes.

Both Single & Twin: Read both QR codes. If successful, transmit as twin QR only. Otherwise, try single QR only.

0502070

**** Single QR Only**

0502080

Twin QR Only

0502090

Both Single & Twin

Transmission order of twin code

Order 1: Transmit the one containing more information first.

Order 2: Transmit the one containing less information first.

Order 3: If the twin code is paralleled horizontally, transmit the one on the left first; if it is paralleled vertically, transmit the one in the upper position first.

0502140

Order 1

0502130

Order 2

0502120

**** Order 3**

0006000

**** Exit Setup**

0006010

Enter Setup

Character Encoding

**** Default Character Encoding**

UTF-8

0006000

**** Exit Setup**

0006010

Enter Setup

Data Matrix

Restore Factory Defaults

Restore the Factory Defaults of Data Matrix

Enable/Disable Data Matrix

**** Enable Data Matrix**

Disable Data Matrix

Set Length Range for Data Matrix

Set the Minimum Length

Set the Maximum Length

Enter Setup

Rectangular Barcode

**** Enable Rectangular Barcode**

Disable Rectangular Barcode

Mirror Image

**** Decode Mirror Images**

Do Not Decode Mirror Images

**** Exit Setup**

0006010

Enter Setup

Data Matrix Twin Code

Data Matrix twin code is 2 Data Matrix barcodes paralleled vertically or horizontally. They must both be either regular or inverse barcodes. They must have similar specifications and be placed closely together.

There are 3 options for reading Data Matrix twin codes:

Single Data Matrix Only: Read either Data Matrix code.

Twin Data Matrix Only: Read both Data Matrix codes. Transmission order: Data Matrix code on the left (in the upper position) followed by the one on the right (in the lower position).

Both Single & Twin: Read both Data Matrix codes. If successful, transmit as twin Data Matrix only. Otherwise, try single Data Matrix only.

0504070

**** Single Data Matrix Only**

0504080

Twin Data Matrix Only

0504090

Both Single & Twin

Character Encoding

0504350

**** Default Character Encoding**

0504351

UTF-8

0006000

**** Exit Setup**

0006010

Enter Setup

Chapter 8 Scanning Preferences

Introduction

This chapter contains information as to how to adapt your engine to various applications with preference setting. For instance, to narrow the field of view of the engine to make sure it reads only those barcodes intended by the user.

Decode Area

Whole Area Decoding

When this option is enabled, the engine attempts to decode barcode(s) within its field of view, from the center to the periphery, and transmits the barcode that has been first decoded.

**** Whole Area Decoding**

Specific Area Decoding

The engine attempts to read barcode(s) within a specified decoding area and transmits the barcode that has been first decoded. This option allows the engine to narrow its field of view to make sure it reads only those barcodes intended by the user. For instance, if multiple barcodes are placed closely together, specific area decoding in conjunction with appropriate pre-defined decoding area will insure that only the desired barcode is read.

Specific Area Decoding

0006000

**** Exit Setup**

0006010

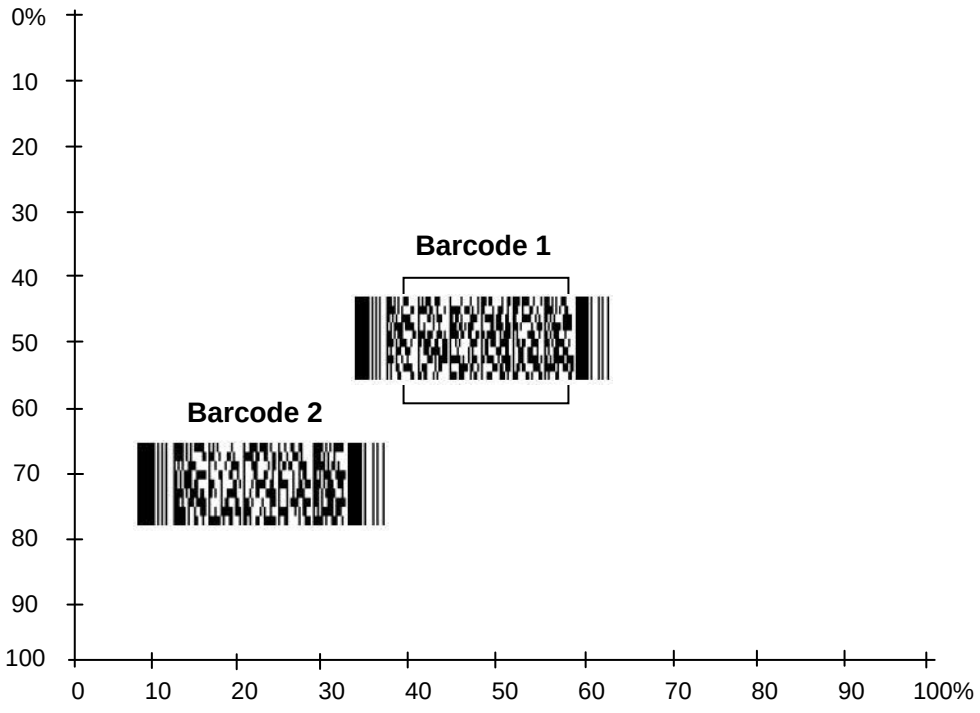
Enter Setup

Specify Decoding Area

If **Specific Area Decoding** is enabled, the engine only reads barcodes that intersect the predefined decoding area.

The default decoding area is an area of 40% top, 60% bottom, 40% left and 60% right of the engine's field of view, as shown in the figure below. In the following example, the white box is the decoding area. Since Barcode 1 passes through the decoding area, it will be read. Barcode 2 does not pass through the decoding area, so it will not be read.

You can define the decoding area using the **Top of Decoding Area**, **Bottom of Decoding Area**, **Left of Decoding Area** and **Right of Decoding Area** barcodes as well as numeric barcode(s) that represent(s) a desired percentage (0-100). To learn how to program decoding area, see **Appendix 5**.



0006000

**** Exit Setup**

Enter Setup

Top of Decoding Area

Bottom of Decoding Area

Left of Decoding Area

Right of Decoding Area

**** Exit Setup**

0006010

Enter Setup

Chapter 9 Image Control

Ambient Illumination

Ambient lighting conditions may vary from one operating environment to another, such as fluorescent lit warehouses or sunlit open spaces. Fluorescent lights may flicker when using AC power source in 50-60Hz. Usually indoor illuminance is around 1,000 lux while outdoor illuminance may reach 60,000 lux or even over 100,000 lux.

Two options are provided for ambient illumination settings:

Normal Illuminance: applicable to most indoor/outdoor environments.

High Illuminance: applicable to special enviroments with super-intense light source.

Change to this settings will not take effect until the engine reboots or wakes up from sleep.

0313150

**** Normal Illuminance (0~60000lux)**

0313151

High Illuminance (60000~120000lux)

0006000

**** Exit Setup**

Image Flipping

The user may get reversed images when the engine is installed in non-standard ways. When it happens, image flipping can be used to right the “wrong”.

The following figures illustrate standard image and three flipped images.

- ✧ Fig.9-1 Standard Image: Image the engine should get when it is installed properly and no reflector is used in its optical imaging system.
- ✧ Fig.9-2 Horizontal Flipped Image: It happens when horizontal reflection occurs along the optical path. To get standard images, enable the **Flip Horizontally** option.
- ✧ Fig.9-3 Vertical Flipped Image: It happens when vertical reflection occurs along the optical path. To get standard images, enable the **Flip Vertically** option.
- ✧ Fig.9-4 Horizontal and Vertical Flipped Image: It happens when the engine is installed upside down. To get standard images, enable the **Flip Horizontally and Vertically** option.

Fig.9-1 Standard Image

Fig.9-2 Horizontal Flipped Image

Fig.9-3 Vertical Flipped Image

Fig.9-4 Horizontal and Vertical Flipped Image

0006010

Enter Setup

Flip

0202000

**** Do Not Flip**

0202030

Flip Vertically

0202031

Flip Horizontally

0202032

Flip Horizontally and Vertically

Flip Vertically

0202033

Flip Vertically

0202034

Do Not Flip Vertically

Flip Horizontally

0202035

Flip Horizontally

0202036

Do Not Flip Horizontally

0006000

**** Exit Setup**

Enter Setup

Chapter 10 Batch Programming

Introduction

Batch programming enables users to integrate a batch of commands into a single batch barcode.

Listed below are batch programming rules:

1. Command format: Command + “=” + Parameter Value.
2. Each command is terminated by a semicolon (;). Note that there is no space between a command and its terminator semicolon.
3. Use the barcode generator software to generate a 2D batch barcode.

Example: Create a batch barcode for **Illumination Always On** (0200010), **Sense Mode** (0302010), **Decode Session Timeout** (0313000) = 2s:

1. Input the commands:

   0200010;0302010;0313000=2000;

2. Generate a batch barcode.

   When setting up an engine with the above configuration, scan the **Enable Batch Barcode** barcode and then the batch barcode generated.

Enable Batch Barcode

**** Exit Setup**

Enter Setup

Create a Batch Command

A batch command may contain a number of individual commands each of which is terminated by a semicolon (;).

Command Structure: Command (+ “=” + Parameter Value)

4 command syntaxes are described as below:

1. Syntax 1: Command

This syntax applies to most configuration situations.

Example:

Set the Baud Rate to 38400bps: **0100060**
Enable the Sense Mode: **0302010**

2. Syntax 2: Command + “=” + Decimal Digit(s)

This syntax applies to the options/features programming which requires the entry of parameter value (decimal), such as the Maximum/Minimum Length, Decode Session Timeout, Timeout between Decodes (Same Barcode) and Sensitivity.

Example:

Set the Decode Session Timeout to 3000ms: **0313000=3000**
Set the Sensitivity to (level) 10: **0312040=10**

3. Syntax 3: Command + “=” + Hexadecimal Digit(s) (e.g., 0x101A, 0x2C03)

This syntax applies to the features/options programming like the Custom Prefix/Suffix, Terminating Character Suffix, Code ID Suffix, which requires the entry of parameter value (hexadecimal).

Example:
Set the Terminating Character Suffix to CR/LF: **0310000=0x0D0A**

4. Syntax 4: Command + “=” + Double Quotation Marks

For situations where the parameter value is visible character in Syntax 3, this syntax is also appropriate.

Example:
Set the Custom Prefix to AUTO-ID: **0300000=“AUTO-ID”**

**** Exit Setup**

0006010

Enter Setup

Create a Batch Barcode

Batch barcodes can be produced in the format of PDF417, QR Code or Data Matrix.

Example: Create a batch barcode for **Illumination Always On**, **Sense Mode**, **Decode Session Timeout** = 2s:

1. Input the following commands:

   0200010;0302010;0313000=2000;

2. Generate a QR batch barcode.

0006000

**** Exit Setup**

Enter Setup

Use Batch Barcode

To put a batch barcode into use, scan the following barcodes. (Use the example above.)

Enter Setup

Enable Batch Barcode

Batch Barcode

Exit Setup

Chapter 11 Troubleshooting

FAQ

Q: Barcodes cannot be read.

A:

1. Find out the barcode type and verify that the barcode type is enabled. If the barcode parameters include check digit verification, select the **Disable** option.
2. If you do not know the barcode type, enable all symbologies.
3. If they are inverse barcodes (bright images on a dark background), enable the **Video Reverse** feature.

Q: Incorrect output.

A:

1. If this problem happens to all barcodes and additional characters appear before/after barcode data, disable all prefix/suffix.
2. If this problem only happens to some barcodes and matches one of the following situations:

a) incomplete barcode data: Enable the check digit verification

b) both the first and last characters are asterisks (*): Disable the transmission of start/stop characters of Code 39.

c) “a” transmitted as “+A”: Enable Code 39 Full ASCII.

Q: Barcodes can be read, but cannot be displayed.

A: Modify the serial port properties or change the communication mode.

1. Serial communication:

Verify that the parameters (such as baud rate, data bit and stop bit) settings match the host requirements.

2. USB communication:

a. USB HID-KBW: No driver is required. It can provide output to a text file, but only alphanumeric characters can be displayed.

b. USB COM Port Emulation: A driver is required. You can get the output via a serial port debug tool.

Q: Illumination and aiming beams are OFF.

A:

1. Verify that the engine is properly powered up.
2. Send “?” to the engine. If the engine returns a reply of “!”, then send programming commands to turn on illumination and aimer.

Q: Carriage Return/Line Feed settings.

A: See the ***Terminating Character Suffix*** in Chapter 7.

Appendix

Appendix 1: Factory Defaults Table

Parameter		Factory Default	Remark
Programming Barcode			
Barcode Programming		Disabled	
Programming Barcode Data		Do not send	
Communication Settings			
Normal Mode (TTL-232 & USB supported)		Enabled	Power-Saving Mode: Only TTL-232 supported
TTL-232	Baud Rate	9600	
	Parity Check	None	
	Data Bit	8	
	Stop Bit	1	
	Hardware Flow Control	No flow control	
HID-KBW	Polling Rate	1ms	
	USB Country Keyboard Type	U.S.	
	Convert Case	No conversion	
	Inter-Keystroke Delay	10ms	
	Beep on Unknown Character	Do not beep	
	Emulate ALT + Keypad	Disabled	
	Function Key Mapping	Disabled	
	Emulate Numeric Keypad	Disabled	
	Code Page	Windows 1252 (Latin I)	
Scan Mode			
Scan Mode		Trigger mode	
Trigger Mode	Decode Session Timeout	3,000ms	Applicable to Trigger mode, Sense mode and Continuous mode 1~3,600,000ms; 0: Infinite.
	Trigger Condition	Electric level	
	Auto Sleep	Enabled	
	Time Period from Idle to Sleep	500ms	0~65,535ms
	Timeout between Decodes (Same Barcode)	Disabled	
		1,500ms	0~65,535ms

Parameter		Factory Default	Remark
Sense Mode	Decode Session Timeout	3,000ms	Applicable to Trigger mode, Sense mode and Continuous mode 1~3,600,000ms; 0: Infinite
	Image Stabilization Timeout	500ms	0~1,600ms
	Timeout between Decodes	1000ms	Applicable to Sense mode and Continuous mode. 0~65,535ms
	Operation after Good Read	Pause after good read	
	Timeout between Decodes	Disabled	
	(Same Barcode)	1,500ms	0~65,535ms
	Threshold Value of Illumination Change	2	1~20
Continuous Mode	Decode Session Timeout	3,000ms	Applicable to Trigger mode, Sense mode and Continuous mode 1~3,600,000ms; 0: Infinite
	Timeout between Decodes	1000ms	Applicable to Sense mode and Continuous mode. 0~65,535ms
	Timeout between Decodes	Disabled	
	(Same Barcode)	1,500ms	0~65,535ms
Illumination & Aiming			
Illumination		Normal	
Aiming		Normal	
Beep & LED Notifications			
Startup Beep		Enabled	
Good Read Beep for Non-Programming Barcode	Notification	Enabled	
	Beep Type	Type 3	
	Beep Volume	Loud	
Good Read Beep for Programming Barcode		Enabled	
Good Read LED		Enabled	
NGR (Not Good Read) Message		Do not transmit	
		None	

Parameter	Factory Default	Remark
Prefix & Suffix		
Prefix Sequence	Custom Prefix+Code ID+AIM ID	
Custom Prefix	Disabled	
	None	
AIM ID Prefix	Disabled	
Code ID Prefix	Disabled	
Custom Suffix	Disabled	
	None	
Terminating Character Suffix	Enabled	
	0x0D	Carriage Return
Scanning Preferences		
Decode Area	Whole Area Decoding	
Specify Decoding Area	40% top, 60% bottom, 40% left, 60% right	
Image Control		
Ambient Illumination	Normal illuminance	
Image Flipping	Do not flip	

Parameter	Factory Default	Remark
Symbologies		
Video Reverse	Disabled	Applicable to all symbologies.
Code 128		
Code 128	Enabled	
Maximum Length	127	
Minimum Length	1	
GS1-128（UCC/EAN-128）		
GS1-128	Enabled	
Maximum Length	127	
Minimum Length	1	
AIM-128		
AIM-128	Enabled	
Maximum Length	127	
Minimum Length	1	
EAN-8		
EAN-8	Enabled	
Check Digit	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
Extend to EAN-13	Disabled	
EAN-13		
EAN-13	Enabled	
Check Digit	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
ISSN		
ISSN	Disabled	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	

Parameter	Factory Default	Remark
ISBN		
ISBN	Enabled	
ISBN Format	ISBN-13	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
UPC-E		
UPC-E	Enabled	
Check Digit	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
Extend to UPC-A	Disabled	
System Character “0”	Transmit	
UPC-A		
UPC-A	Enabled	
Check Digit	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
System Character	Transmit	
Country Code	Do not transmit	
Interleaved 2 of 5		
Interleaved 2 of 5	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Maximum Length	100	
Minimum Length	6	
ITF-6		
ITF-6	Disabled	
Check Digit	Do not transmit	

Parameter	Factory Default	Remark
ITF-14		
ITF-14	Enabled	
Check Digit	Do not transmit	
Matrix 2 of 5		
Matrix 2 of 5	Disabled	
Check Digit Verification	Enabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	6	
Industrial 2 of 5		
Industrial 2 of 5	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	6	
Standard 2 of 5		
Standard 2 of 5	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	6	
Code 39		
Code 39	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Start/Stop Character	Do not transmit	
Code 39 Full ASCII	Enabled	
Maximum Length	127	
Minimum Length	2	

Parameter	Factory Default	Remark
Codabar		
Codabar	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Start/Stop Character	Do not transmit	
Start/Stop Character Format	ABCD/ABCD	
Maximum Length	127	
Minimum Length	2	
Code 93		
Code 93	Enabled	
Check Digit Verification	Enabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	3	
GS1 Databar		
GS1 Databar	Enabled	
Application Identifier “01”	Transmit	
Code 11		
Code 11	Enabled	
Check Digit Verification	One check digit, MOD11	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	2	
Plessey		
Plessey	Enabled	
Check Digit Verification	Enabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	1	

Parameter	Factory Default	Remark
MSI-*Plessey*		
MSI-Plessey	Enabled	
Check Digit Verification	One check digit, MOD10	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	2	
PDF 417		
PDF 417	Enabled	
Maximum Length	2710	
Minimum Length	1	
PDF 417 Twin Code	Read single PDF417 only	
Transmission Order of Twin Code	Order 1	
Character Encoding	Default Character Encoding	
QR Code		
QR Code	Enabled	
Micro QR	Enabled	
Maximum Length	7089	
Minimum Length	1	
QR Twin Code	Read single QR only	
Transmission Order of Twin Code	Order 3	
Character Encoding	Default Character Encoding	
Data Matrix		
Data Matrix	Enabled	
Rectangular Barcode	Enabled	
Mirror Image	Decode	
Maximum Length	3116	
Minimum Length	1	
DM Twin Code	Read single DM only	
Character Encoding	Default Character Encoding	

Note: The information in the tables above is for reference only. Factory default values may differ from model to model.

Appendix 2: AIM ID Table

Symbology	AIM ID	Remark
EAN-13	]E0	Standard EAN-13
	]E3	EAN-13 + 2/5-Digit Add-On Code
EAN-8	]E4	Standard EAN-8
	]E4…]E1…	EAN-8 + 2-Digit Add-On Code
	]E4…]E2…	EAN-8 + 5-Digit Add-On Code
UPC-E	]E0	Standard UPC-E
	]E3	UPC-E + 2/5-Digit Add-On Code
UPC-A	]E0	Standard UPC-A
	]E3	UPC-A + 2/5-Digit Add-On Code
Code 128	]C0	Standard Code 128
GS1-128 (UCC/EAN-128)	]C1	FNC1 is the character right after the start character
AIM-128	]C2	FNC1 is the 2nd character after the start character
ISBT-128	]C4	
Interleaved 2 of 5	]I0	No check digit verification
	]I1	Transmit check digit after verification
	]I3	Do not transmit check digit after verification
ITF-6	]I1	Transmit check digit
	]I3	Do not transmit check digit
ITF-14	]I1	Transmit check digit
	]I3	Do not transmit check digit
Industrial 2 of 5	]S0	Not specified
Standard 2 of 5	]R0	No check digit verification
	]R8	MOD10; do not transmit check digit
	]R9	MOD10; transmit check digit
Code 39	]A0	Transmit barcodes as is; Full ASCII disabled; no check digit verification
	]A1	MOD43; transmit check digit
	]A3	MOD43; do not transmit check digit
	]A4	Full ASCII enabled; no check digit verification
	]A5	Full ASCII enabled; transmit check digit
	]A7	Full ASCII enabled; do not transmit check digit
Codabar	]F0	Standard Codabar
	]F2	Transmit check digit after verification
	]F4	Do not transmit check digit after verification

Symbology	AIM ID	Remark
Code 93	]G0	Standard Code 93
Code 11	]H0	MOD11; transmit check digit
	]H1	MOD11/MOD11; transmit check digit
	]H3	Do not transmit check digit after verification
	]H9	No check digit verification
GS1-DataBar (RSS)	]e0	Standard GS1-DataBar
Plessey	]P0	Standard Plessey
MSI-Plessey	]M0	MOD10; transmit check digit
	]M1	MOD10; do not transmit check digit
	]M7	MOD10/MOD11; do not transmit check digit
	]M8	MOD10/MOD11; transmit check digit
	]M9	No check digit verification
Matrix 2 of 5	]X0	Specified by the manufacturer
	]X1	No check digit verification
	]X2	MOD10; transmit check digit
	]X3	MOD11; do not transmit check digit
ISBN	]X4	Standard ISBN
ISSN	]X5	Standard ISSN
PDF417	]L0	Comply with 1994 PDF417 specifications
Data Matrix	]d0	ECC000 - ECC140
	]d1	ECC200
	]d2	ECC200, FNC1 is the 1st or 5th character after the start character
	]d3	ECC200, FNC1 is the 2nd or 6th character after the start character
	]d4	ECC200, ECI included
	]d5	ECC200, FNC1 is the 1st or 5th character after the start character,ECI included
	]d6	ECC200, FNC1 is the 2nd or 6th character after the start character,ECI included
QR Code	]Q0	QR1
	]Q1	2005 version, ECI excluded
	]Q2	2005 version, ECI included
	]Q3	QR Code 2005, ECI excluded, FNC1 is the 1st character after the start character
	]Q4	QR Code 2005, ECI included, FNC1 is the 1st character after the start character
	]Q5	QR Code 2005,ECI excluded,FNC1 is the 2nd character after the start character
	]Q6	QR Code 2005, ECI included, FNC1 is the 2nd character after the start character

Reference: ISO/IEC 15424:2008 Information technology – Automatic identification and data capture techniques – Data Carrier Identifiers (including Symbology Identifiers).

Appendix 3: Code ID Table

Symbology	Code ID
Code 128	j
GS1-128(UCC/EAN-128)	j
AIM-128	f
EAN-8	d
EAN-13	d
ISSN	n
ISBN	B
UPC-E	c
UPC-A	c
Interleaved 2 of 5	e
ITF-6	e
ITF-14	e
Matrix 2 of 5	v
Industrial 2 of 5	D
Standard 2 of 5	s
Code 39	b
Codabar	a
Code 93	i
Code 11	H
Plessey	p
MSI-Plessey	m
GS1 Databar	R
PDF417	r
QR Code	Q
Data Matrix	u

Appendix 4: ASCII Table

Hex	Dec	Char
00	0	NUL (Null char.)
01	1	SOH (Start of Header)
02	2	STX (Start of Text)
03	3	ETX (End of Text)
04	4	EOT (End of Transmission)
05	5	ENQ (Enquiry)
06	6	ACK (Acknowledgment)
07	7	BEL (Bell)
08	8	BS (Backspace)
09	9	HT (Horizontal Tab)
0a	10	LF (Line Feed)
0b	11	VT (Vertical Tab)
0c	12	FF (Form Feed)
0d	13	CR (Carriage Return)
0e	14	SO (Shift Out)
0f	15	SI (Shift In)
10	16	DLE (Data Link Escape)
11	17	DC1 (XON) (Device Control 1)
12	18	DC2 (Device Control 2)
13	19	DC3 (XOFF) (Device Control 3)
14	20	DC4 (Device Control 4)
15	21	NAK (Negative Acknowledgment)
16	22	SYN (Synchronous Idle)
17	23	ETB (End of Trans. Block)
18	24	CAN (Cancel)
19	25	EM (End of Medium)
1a	26	SUB (Substitute)
1b	27	ESC (Escape)
1c	28	FS (File Separator)
1d	29	GS (Group Separator)

Hex	Dec	Char
1e	30	RS (Request to Send)
1f	31	US (Unit Separator)
20	32	SP (Space)
21	33	! (Exclamation Mark)
22	34	" (Double Quote)
23	35	# (Number Sign)
24	36	$ (Dollar Sign)
25	37	% (Percent)
26	38	& (Ampersand)
27	39	` (Single Quote)
28	40	((Left / Opening Parenthesis)
29	41	) (Right / Closing Parenthesis)
2a	42	* (Asterisk)
2b	43	+ (Plus)
2c	44	, (Comma)
2d	45	- (Minus / Dash)
2e	46	. (Dot)
2f	47	/ (Forward Slash)
30	48	0
31	49	1
32	50	2
33	51	3
34	52	4
35	53	5
36	54	6
37	55	7
38	56	8
39	57	9
3a	58	: (Colon)
3b	59	; (Semi-colon)
3c	60	< (Less Than)
3d	61	= (Equal Sign)

Hex	Dec	Char
3e	62	> (Greater Than)
3f	63	? (Question Mark)
40	64	@ (AT Symbol)
41	65	A
42	66	B
43	67	C
44	68	D
45	69	E
46	70	F
47	71	G
48	72	H
49	73	I
4a	74	J
4b	75	K
4c	76	L
4d	77	M
4e	78	N
4f	79	O
50	80	P
51	81	Q
52	82	R
53	83	S
54	84	T
55	85	U
56	86	V
57	87	W
58	88	X
59	89	Y
5a	90	Z
5b	91	[(Left / Opening Bracket)
5c	92	\ (Back Slash)
5d	93	] (Right / Closing Bracket)

Hex	Dec	Char
5e	94	^ (Caret / Circumflex)
5f	95	_ (Underscore)
60	96	' (Grave Accent)
61	97	a
62	98	b
63	99	c
64	100	d
65	101	e
66	102	f
67	103	g
68	104	h
69	105	i
6a	106	j
6b	107	k
6c	108	l
6d	109	m
6e	110	n
6f	111	o
70	112	p
71	113	q
72	114	r
73	115	s
74	116	t
75	117	u
76	118	v
77	119	w
78	120	x
79	121	y
7a	122	z
7b	123	{ (Left/ Opening Brace)
7c	124	| (Vertical Bar)
7d	125	} (Right/Closing Brace)
7e	126	~ (Tilde)
7f	127	DEL (Delete)

Appendix 5: Parameter Programming Examples

The following examples show you how to program parameters by scanning programming barcodes.

a. Program the Decode Session Timeout

Example: Set the decode session timeout to 1500ms

1. Scan the **Enter Setup** barcode.
2. Scan the **Decode Session Timeout** barcode. (See the **"Decode Session Timeout"** section in Chapter 3)
3. Scan the numeric barcodes "1", "5", "0" and "0".
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

b. Program the Time Period from Idle to Sleep

Example: Set the time period from idle to sleep to 500ms

1. Scan the **Enter Setup** barcode.
2. Scan the **Time Period from Idle to Sleep** barcode. (See the **"Auto Sleep"** section in Chapter 3)
3. Scan the numeric barcodes "5", "0" and "0".
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

c. Program the Image Stabilization Timeout

Example: Set the image stabilization timeout to 500ms

1. Scan the **Enter Setup** barcode.
2. Scan the **Image Stabilization Timeout** barcode. (See the **"Image Stabilization Timeout"** section in Chapter 3)
3. Scan the numeric barcodes "5", "0" and "0".
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

d. Program the Timeout between Decodes (Same Barcode)

Example: Set the timeout between decodes (same barcode) to 1000ms

1. Scan the **Enter Setup** barcode.
2. Scan the **Timeout between Decodes (Same Barcode)** barcode. (See the **"Timeout between Decodes (Same Barcode)"** section in Chapter 3)
3. Scan the numeric barcodes "1", "0", "0" and "0".
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

e. Program the Threshold Value of Illumination Change

Example: Set the threshold value of illumination change to 4

1. Scan the **Enter Setup** barcode.
2. Scan the **Threshold Value of Illumination Change** barcode. (See the **"Sensitivity"** section in Chapter 3)
3. Scan the numeric barcode "4".
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

f. Program the Timeout between Decodes

Example: Set the timeout between decodes to 500ms

1. Scan the **Enter Setup** barcode.
2. Scan the **Timeout between Decodes** barcode. (See the **"Timeout between Decodes"** section in Chapter 3)
3. Scan the numeric barcodes "5","0" and "0".
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

g. Program the Decoding Area

Example: Set the decoding area to 20% top, 80% bottom, 20% left and 80% right.

1. Scan the **Enter Setup** barcode.
2. Scan the **Specific Area Decoding** barcode. (See the **"Specific Area Decoding"** section in Chapter 8)
3. Scan the **Top of Decoding Area** barcode. (See the **"Specify Decoding Area"** section in Chapter 8)
4. Scan the numeric barcodes "2" and "0".
5. Scan the **Save** barcode.
6. Scan the **Bottom of Decoding Area** barcode.
7. Scan the numeric barcodes "8" and "0".
8. Scan the **Save** barcode.
9. Scan the **Left of Decoding Area** barcode.
10. Scan the numeric barcodes "2" and "0".
11. Scan the **Save** barcode.
12. Scan the **Right of Decoding Area** barcode.
13. Scan the numeric barcodes "8" and "0".
14. Scan the **Save** barcode.
15. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

h. Program the Custom Prefix/Suffix

Example: Set the custom prefix to "CODE"

1. Check the hex values of "CODE" in the ASCII Table. ("CODE": 43, 4F, 44, 45)
2. Scan the **Enter Setup** barcode.
3. Scan the **Set Custom Prefix** barcode. (See the **"Set Custom Prefix"** section in Chapter 6)
4. Scan the numeric barcodes "4", "3", "4", "F", "4", "4", "4" and "5".
5. Scan the **Save** barcode.
6. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

i. Program the Terminating Character Suffix

Example: Set the terminating character suffix to 0x0D

1. Scan the **Enter Setup** barcode.
2. Scan the **Set Terminating Character Suffix** barcode. (See the **"Set Terminating Character Suffix"** section in Chapter 6)
3. Scan the numeric barcodes "0" and "D".
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

j. Program the Code ID

Example: Set the Code ID of PDF 417 to "p"

1. Check the hex value of "p" in the ASCII Table. ("p": 70)
2. Scan the **Enter Setup** barcode.
3. Scan the **Modify PDF417 Code ID** barcode. (See the **"Modify Code ID"** section in Chapter 6)
4. Scan the numeric barcodes "7" and "0".
5. Scan the **Save** barcode.
6. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

k. Program the NGR Message

Example: Set the NGR message to "!ERR"

1. Check the hex values of "!ERR" in the ASCII Table. ("!ERR": 21, 45, 52, 52)
2. Scan the **Enter Setup** barcode.
3. Scan the **Edit NGR Message** barcode. (See the **"Edit NGR Message"** section in Chapter 5)
4. Scan the numeric barcodes "2", "1", "4", "5", "5", "2", "5" and "2".
5. Scan the **Save** barcode.
6. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

l. Program the Custom Inter-keystroke Delay

Example: Set the inter-keystroke delay to 5ms

1. Scan the **Enter Setup** barcode.
2. Scan the **Custom Delay** barcode. (See the **"Inter-Keystroke Delay"** section in Chapter 2)
3. Scan the numeric barcodes "0" and "5".
4. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

m. Program the Length Range (Maximum/Minimum Lengths) for a Symbology

Note: If minimum length is set to be greater than maximum length, the engine only decodes barcodes with either the minimum or maximum length. If you only want to read barcodes with a specific length, set both minimum and maximum lengths to be that desired length.

Example: Set the engine to decode Code 128 barcodes containing between 8 and 12 characters

1. Scan the **Enter Setup** barcode.
2. Scan the **Set the Minimum Length** barcode. (See the **"Set Length Range for Code 128"** section in Chapter 7)
3. Scan the numeric barcode "8".
4. Scan the **Save** barcode.
5. Scan the **Set the Maximum Length** barcode. (See the **"Set Length Range for Code 128"** section in Chapter 7)
6. Scan the numeric barcodes "1" and "2".
7. Scan the **Save** barcode.
8. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

n. Program the Code Page

Example: Set the code page to Windows 1251 (Cyrillic)

1. Scan the **Enter Setup** barcode.
2. Scan the **Set the Code Page** barcode. (See the **"Code Page"** section in Chapter 2)
3. Scan the numeric barcode "1".
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

o. Program the engine to get proper output for Russian encoded with Windows 1251

1. Scan the **Enter Setup** barcode.
2. Scan the **Set the Code Page barcode** from the **"Code Page"** section in Chapter 2.
3. Scan the numeric barcode "1" from Appendix 6.
4. Scan the **Save** barcode from Appendix 7.
5. Scan the appropriate **Default Character Encoding** barcode according to the symbology your application needs from the **"Character Encoding"** section in Chapter 7.
6. Scan the **Mode 3** barcode from the **"Emulate ALT+Keypad"** section in Chapter 2.
7. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

p. Program the engine to get proper output for Russian encoded with UTF-8

1. Scan the **Enter Setup** barcode.
2. Scan the **Set the Code Page** barcode from the **"Code Page"** section in Chapter 2.
3. Scan the numeric barcode "1" from Appendix 6.
4. Scan the **Save** barcode from Appendix 7.
5. Scan the appropriate **UTF-8** barcode according to the symbology your application needs from the **"Character Encoding"** section in Chapter 7.
6. Scan the **Mode 3** barcode from the **"Emulate ALT+Keypad"** section in Chapter 2.
7. Scan the **Exit Setup** barcode. (If you still need to program other parameter/feature, skip this step.)

Appendix 6: Digit Barcodes

0-9

0

5

1

6

2

7

3

8

4

9

A-F

A

B

C

D

E

F

Appendix 7: Save/Cancel Barcodes

After reading numeric barcode(s), you need to scan the **Save** barcode to save the data. If you scan the wrong digit(s), you can either scan the **Cancel** barcode and then start the configuration all over again, or scan the **Delete the Last Digit** barcode and then the correct digit, or scan the **Delete All Digits** barcode and then the digits you want.

For instance, after reading the **Maximum Length** barcode and numeric barcodes “1”, “2” and “3”, you scan:

- **Delete the Last Digit:** The last digit “3” will be removed.
- **Delete All Digits:** All digits “123” will be removed.
- **Cancel:** The maximum length configuration will be cancelled. And the engine is still in the setup mode.

Save

Delete the Last Digit

Delete All Digits

Cancel

Appendix 8: ASCII Function Key Mapping Table

ASCII Function	ASCII Value (HEX)	No Function Key Mapping	Function Key Mapping
NUL (Null char.)	00	Null	Ctrl+2
SOH (Start of Header)	01	Keypad Enter	Ctrl+A
STX (Start of Text)	02	Caps Lock	Ctrl+B
ETX (End of Text)	03	Null	Ctrl+C
EOT (End of Transmission)	04	Null	Ctrl+D
ENQ (Enquiry)	05	Null	Ctrl+E
ACK (Acknowledgment)	06	Null	Ctrl+F
BEL (Bell)	07	Enter	Ctrl+G
BS (Backspace)	08	Left Arrow	Ctrl+H
HT (Horizontal Tab)	09	Horizontal Tab	Ctrl+I
LF (Line Feed)	0A	Down Arrow	Ctrl+J
VT (Vertical Tab)	0B	Vertical Tab	Ctrl+K
FF (Form Feed)	0C	Delete	Ctrl+L
CR (Carriage Return)	0D	Enter	Ctrl+M
SO (Shift Out)	0E	Insert	Ctrl+N
SI (Shift In)	0F	Esc	Ctrl+O
DLE (Data Link Escape)	10	F11	Ctrl+P
DC1 (XON) (Device Control 1)	11	Home	Ctrl+Q
DC2 (Device Control 2)	12	Print Screen	Ctrl+R
DC3 (XOFF) (Device Control 3)	13	Backspace	Ctrl+S
DC4 (Device Control 4)	14	tab+shift	Ctrl+T
NAK (Negative Acknowledgment)	15	F12	Ctrl+U
SYN (Synchronous Idle)	16	F1	Ctrl+V
ETB (End of Trans. Block)	17	F2	Ctrl+W
CAN (Cancel)	18	F3	Ctrl+X
EM (End of Medium)	19	F4	Ctrl+Y
SUB (Substitute)	1A	F5	Ctrl+Z
ESC (Escape)	1B	F6	See the following table
FS (File Separator)	1C	F7	
GS (Group Separator)	1D	F8	
RS (Request to Send)	1E	F9	
US (Unit Separator)	1F	F10	

ASCII Function Key Mapping Table (Continued)

The function key mappings of the last five characters in the previous table differ from one keyboard layout to another.

Country/ Keyboard Layout	Function Key Mapping				
	1B	1C	1D	1E	1F
United States	Ctrl+[	Ctrl+\	Ctrl+]	Ctrl+6	Ctrl+-
Belgium	Ctrl+[	Ctrl+<	Ctrl+]	Ctrl+6	Ctrl+-
Scandinavia	Ctrl+8	Ctrl+<	Ctrl+9	Ctrl+6	Ctrl+-
France	Ctrl+^	Ctrl+8	Ctrl+$	Ctrl+6	Ctrl+=
Germany		Ctrl+Ã	Ctrl++	Ctrl+6	Ctrl+-
Italy		Ctrl+\	Ctrl++	Ctrl+6	Ctrl+-
Switzerland		Ctrl+<	Ctrl+.	Ctrl+6	Ctrl+-
United Kingdom	Ctrl+[	Ctrl+¢	Ctrl+]	Ctrl+6	Ctrl+-
Denmark	Ctrl+8	Ctrl+\	Ctrl+9	Ctrl+6	Ctrl+-
Norway	Ctrl+8	Ctrl+\	Ctrl+9	Ctrl+6	Ctrl+-
Spain	Ctrl+[	Ctrl+\	Ctrl+]	Ctrl+6	Ctrl+-

Appendix 9: Code Pages List

Numeric Barcode Needed	Code Page
0	Windows 1252 (Latin I)
1	Windows 1251 (Cyrillic)

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