



**EM20**

**OEM Scan Engine**

User Guide

## **Disclaimer**

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## Revision History

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0006010

Enter Setup

## Chapter 1 Getting Started

### Introduction

The EM20 OEM scan engines, armed with the Newland patented **UIMG**<sup>®</sup>, a computerized image recognition system, bring about a new era of 2D barcode scan engines.

The EM20's 2D barcode decoder chip ingeniously blends **UIMG**<sup>®</sup> technology and advanced chip design & manufacturing, which significantly simplifies application design and delivers superior performance and solid reliability with low power consumption.

The EM20 supports all mainstream 1D and standard 2D barcode symbologies (e.g., PDF417, QR Code M1/M2/Micro and Data Matrix) as well as GS1-DataBar<sup>™</sup>(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 equipment such as data collectors, meter readers, ticket validators and PDAs.

### About This Guide

This guide provides programming instructions for the EM20. Users can configure the EM20 by scanning the programming barcodes included in this manual.

The EM20 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 EM20. 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 EM20 and receive decoded data through virtual serial port.



0006000

\*\* Exit Setup



0006010

**Enter Setup**

## Barcode Scanning

Powered by area-imaging technology and Newland patented **UING** technology, the EM20 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 EM20 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.



0006010

**Enter Setup**



0006000

**\*\* 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 transmission of programming barcode data to the Host.



0002010

**Transmit Programming Barcode Data**



0002000

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



0006000

**\*\* Exit Setup**



0006010

Enter Setup

---

## 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.



0001000

Restore All Factory Defaults



0006000

\*\* Exit Setup



0006010  
Enter Setup

## Chapter 2 Communication Interfaces

The EM20 provides a TTL-232 interface and a USB interface (optional) 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.

### 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.



**\*\* 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



0006000  
**\*\* Exit Setup**



0006010

Enter Setup

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## Baud Rate

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



0100030

**\*\* 9600**



0100000

**1200**



0100050

**19200**



0100010

**2400**



0100060

**38400**



0100020

**4800**



0100070

**57600**



0100040

**14400**



0100080

**115200**



0006000

**\*\* Exit Setup**



0006010

Enter Setup

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## 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.



0101000

\*\* None



0101010

Even Parity



0101020

Odd Parity

## Data Bit

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



0103020

7 Data Bits



0103030

\*\* 8 Data Bits



0006000

\*\* Exit Setup





0006010

Enter Setup

---

## Data Bit & Parity Check



0105010

7 Data Bits/Even Parity



0105020

7 Data Bits/Odd Parity



0105030

\*\* 8 Data Bits/ No Parity



0105040

8 Data Bits/Even Parity



0105050

8 Data Bits/Odd Parity

## Stop Bit



0102000

\*\* 1 Stop Bit



0102010

2 Stop Bits



0006000

\*\* Exit Setup



0006010

Enter Setup

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### 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.



0104100

**\*\* No Flow Control**



0104110

**RTS Flow Control**



0104120

**CTS Flow Control**



0104130

**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.



0006000

**\*\* Exit Setup**



0006010

Enter Setup

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## 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.



1100210

Enumeration Using S/N



1100200

\*\* 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.



1100020

USB HID-KBW



0006000

\*\* Exit Setup



0006010

**Enter Setup**

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## USB Country Keyboard Types

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



1103001

**\*\* 1 - U.S.**



1103002

**2 - Japan**



1103003

**3 - Denmark**



1103004

**4 - Finland**



1103005

**5 - France**



1103006

**6 - Turkey\_F**



1103007

**7 - Italy**



1103008

**8 - Norway**



0006000

**\*\* Exit Setup**



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.



1103050

**\*\* No Delay**



1103051

**Short Delay (20ms)**



1103052

**Long Delay (40ms)**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

### Convert Case

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



1103040

**\*\* No Case Conversion**



1103043

**Invert Upper and Lower Case Characters**



1103041

**Convert All to Upper Case**



1103042

**Convert All to Lower Case**

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



0006000

**\*\* Exit Setup**



0006010

Enter Setup

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## 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](http://www.USB.org).

---



0006000

**\*\* Exit Setup**



0006010  
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)
EM20	USB HID-KBW	1303	4867
	USB COM Port Emulation	1306	4870
	USB HID-POS	1310	4880



0006000  
\*\* Exit Setup





0006010

Enter Setup

## Chapter 3 Scan Mode

### 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.



0302000

**\*\* 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 0ms to 3,600,000ms. The default setting is 3,000ms. To learn how to program this parameter, see **Appendix 5**.



0313000

**Decode Session Timeout**



0006000

**\*\* Exit Setup**



0006010

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.



0313090

**\*\* Level Trigger**



0313091

**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.



0313060

**\*\* Enable Auto Sleep**



0313070

**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**.



0313050

**Time Period from Idle to Sleep**



0006000

**\*\* 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.



0313161

**\*\* Disable Timeout between Decodes**



0313171

**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**



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 0ms to 3,600,000ms. The default setting is 3,000ms. To learn how to program this parameter, see **Appendix 5**.



0313000

Decode Session Timeout

## Image Stabilization Timeout

The image stabilization timeout 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

---



0006000

\*\* Exit Setup



0006010

Enter Setup

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## Continue after Good Read

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

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



0313130

**\*\* Pause after Good Read**



0313131

**Continue after Good Read**

## 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.



0313020

**\*\* Disable Timeout between Decodes**



0313030

**Enable Timeout between Decodes**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

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)**

## 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**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

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**



0006010

Enter Setup

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## 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.



0302020

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 0ms to 3,600,000ms. The default setting is 3,000ms. To learn how to program this parameter, see **Appendix 5**.



0313000

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**.



0313040

Timeout between Decodes

---



0006000

\*\* Exit Setup





0006010

Enter Setup

## Chapter 4 Illumination

### 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.



0200000

**\*\* Normal**



0200020

**OFF**



0200010

**Always ON**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

## Chapter 5 Beep & LED Notifications

### Startup Beep

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



0204001

**\*\* Enable Startup Beep**



0204000

**Disable Startup Beep**



0006000

**\*\* 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



0006010

Enter Setup

## Good Read Beep Volume



0203030

**\*\* Loud**



0203032

**Low**



0203031

**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.



1103031

**Beep on Unknown Character**



1103030

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



0006000

**\*\* Exit Setup**



0006010

Enter 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**



0006000

**\*\* Exit Setup**



0006010

**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.



0320010

**Transmit NGR Message**



0320000

**\*\* 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).



0320020

**Edit NGR Message**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

## Chapter 6 Data Formatting

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.



0006000

**\*\* Exit Setup**



0006010

Enter Setup

## General 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.



0311010

Enable All Prefix/Suffix



0311000

Disable All Prefix/Suffix

## Prefix Sequences



0317010

Code ID+Custom Prefix+AIM ID



0317040

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



0006000

\*\* 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 10 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.

**Note:** A custom prefix cannot exceed 10 characters.



0300000

Set Custom Prefix

#### 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.
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.



0006000

\*\* Exit Setup



0006010  
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.



0308030  
Enable AIM ID Prefix



0308000  
\*\* 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.



0307010  
Enable Code ID Prefix



0307000  
\*\* Disable Code ID Prefix

## Restore All Default Code IDs

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



0307020  
Restore All Default Code IDs



0006000  
\*\* Exit Setup



0006010

**Enter Setup**

---

## Modify Code ID

Code ID of each symbology can be programmed separately. See the following example to learn how to program a Code ID.

### Example: Set the Code ID of PDF417 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.
4. Scan the numeric barcodes “7” and “0”.
5. Scan the **Save** barcode.
6. Scan the **Exit Setup** barcode.



0005000

**Modify PDF417 Code ID**



0005030

**Modify Data Matrix Code ID**



0005010

**Modify QR Code Code ID**



0004020

**Modify Code 128 Code ID**



0004030

**Modify GS1-128 Code ID**



0004210

**Modify AIM-128 Code ID**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---



0004040

**Modify EAN-8 Code ID**



0004050

**Modify EAN-13 Code ID**



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**

---



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---



0004100

**Modify ITF-6 Code ID**



0004150

**Modify Codabar Code ID**



0004250

**Modify Industrial 25 Code ID**



0004260

**Modify Standard 25 Code ID**



0004110

**Modify Matrix 25Code ID**



0004280

**Modify Code 11**



0004270

**Modify Plessey Code ID**



0004290

**Modify MSI/Plessey Code ID**



0004310

**Modify GS1 Databar Code ID**



0006000

**\*\* Exit Setup**



0006010

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 10 characters.



0306010

Enable Custom Suffix



0306000

\*\* 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.

**Note:** A custom suffix cannot exceed 10 characters.



0301000

Set Custom Suffix

#### Example: Set the custom suffix 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 Suffix** barcode.
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.



0006000

\*\* Exit Setup



0006010

**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 can contain one or two characters.

### Enable/Disable Terminating Character Suffix

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



0309010

**\*\* Enable Terminating Character Suffix**



0309000

**Disable Terminating Character Suffix**



0006000

**\*\* Exit Setup**



0006010

Enter Setup

---

## Set Terminating Character Suffix

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



0310010

Terminating Character 0x0D



0310020

\*\* 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.

**Note:** A terminating character suffix cannot exceed 2 characters.



0310000

Set 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.
3. Scan the numeric barcodes “0” and “D”.
4. Scan the **Save** barcode.
5. Scan the **Exit Setup** barcode.



0006000

\*\* 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

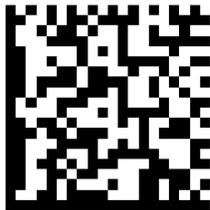
---

## Video Reverse

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



0400000

**Restore the Factory Defaults of Code 128**

#### Enable/Disable Code 128



0400020

**\*\* Enable Code 128**



0400010

**Disable Code 128**

#### Set Length Range for Code 128



0400030

**Set the Minimum Length**



0400040

**Set the Maximum Length**



0006000

**\*\* 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



0423000

Restore the Factory Defaults of AIM-128

### Enable/Disable AIM-128



0423020

\*\* Enable AIM-128



0423010

Disable AIM-128

### Set Length Range for AIM-128



0423030

Set the Minimum Length



0423040

Set the Maximum Length



0006000

\*\* Exit Setup



0006010

**Enter Setup**

---

## **EAN-8**

### **Restore Factory Defaults**



0401000

**Restore the Factory Defaults of EAN-8**

### **Enable/Disable EAN-8**



0401020

**\*\* Enable EAN-8**



0401010

**Disable EAN-8**



0006000

**\*\* Exit Setup**



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.



1234 567



1234 567

89012



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 to 13 digits.



0401100

**Enable EAN-8 Zero Extend**



0401090

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



0006000

**\*\* Exit Setup**





0006010

Enter Setup

---

## EAN-13

### Restore Factory Defaults



0402000

Restore the Factory Defaults of EAN-13

### Enable/Disable EAN-13



0402020

\*\* Enable EAN-13



0402010

Disable EAN-13

### Transmit Check Digit



0402040

\*\* Transmit EAN-13 Check Digit



0402030

Do Not Transmit EAN-13 Check Digit



0006000

\*\* Exit Setup



0006010  
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**



0006000  
**\*\* Exit Setup**



0006010

**Enter Setup**

---

## ISSN

### Restore Factory Defaults



0421000

**Restore the Factory Defaults of ISSN**

### Enable/Disable ISSN



0421020

**Enable ISSN**



0421010

**\*\* Disable ISSN**



0006000

**\*\* Exit Setup**



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.



**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 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.



**ISSN Add-On Code Required**



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



0006000  
**\*\* Exit Setup**



0006010

**Enter Setup**

---

## ISBN

### Restore Factory Default



0416000

**Restore the Factory Defaults of ISBN**

### Enable/Disable ISBN



0416020

**\*\* Enable ISBN**



0416010

**Disable ISBN**

### Set ISBN Format



0416030

**\*\*ISBN-13**



0416040

**ISBN-10**



0006000

**\*\* 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



0006000

\*\* Exit Setup



0006010

Enter Setup

---

## UPC-E

### Restore Factory Defaults



0403000

Restore the Factory Defaults of UPC-E

### Enable/Disable UPC-E



0403020

\*\* Enable UPC-E



0403010

Disable UPC-E

### Transmit Check Digit



0403040

\*\* Transmit UPC-E Check Digit



0403030

Do Not Transmit UPC-E Check Digit



0006000

\*\* Exit Setup



0006010  
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



0006000  
\*\* Exit Setup





0006010

Enter Setup

---

### Transmit System Character "0"

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



0403100

Transmit System Character "0"



0403090

\*\* Do Not Transmit System Character "0"

### UPC-E Extension

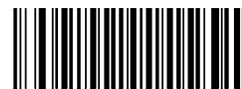
**Disable UPC-E Extend:** Transmit UPC-E barcodes as is.

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



0403120

Enable UPC-E Extend



0403110

\*\* Disable UPC-E Extend



0006000

\*\* Exit Setup



0006010

**Enter Setup**

## **UPC-A**

### **Restore Factory Defaults**



0404000

**Restore the Factory Defaults of UPC-A**

### **Enable/Disable UPC-A**



0404020

**\*\* Enable UPC-A**



0404010

**Disable UPC-A**

### **Transmit Check Digit**



0404040

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



0404030

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



0006000

**\*\* Exit Setup**



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.



0404060

**Enable 2-Digit Add-On Code**



0404050

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



0404080

**Enable 5-Digit Add-On Code**



0404070

**\*\* 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.



0404110

**UPC-A Add-On Code Required**



0404120

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



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

### **Transmit Preamble Character "0"**



0404100

**Transmit Preamble Character "0"**



0404090

**\*\* Do not Transmit Preamble Character "0"**

**Note:** The preamble character "0" usually does not appear in printed UPC-A barcodes.



0006000

**\*\* 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.



**\*\* Disable**



**Do Not Transmit Check Digit After Verification**



**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.)



**\*\* Exit Setup**



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.



0405260

Restore the Factory Defaults of ITF-14



0405080

Disable ITF-14



0405090

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



0405100

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



0006010

**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.



0405270

**Restore the Factory Defaults of ITF-6**



0405110

**\*\* Disable ITF-6**



0405120

**Enable ITF-6 But Do Not Transmit Check Digit**



0405130

**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.



0006000

**\*\* Exit Setup**





0006010

**Enter Setup**

---

## **Matrix 2 of 5**

### **Restore Factory Defaults**



0406000

**Restore the Factory Defaults of Matrix 2 of 5**

### **Enable/Disable Matrix 2 of 5**



0406020

**Enable Matrix 2 of 5**



0406010

**\*\* Disable Matrix 2 of 5**

### **Set Length Range for Matrix 2 of 5**



0406030

**Set the Minimum Length**



0406040

**Set the Maximum Length**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

### Check Digit Verification



0406050

**Disable**



0406060

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



0406070

**Transmit Check Digit After Verification**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

## **Industrial 2 of 5**

### **Restore Factory Defaults**



0417000

**Restore the Factory Defaults of Industrial 2 of 5**

### **Enable/Disable Industrial 2 of 5**



0417020

**\*\* Enable Industrial 2 of 5**



0417010

**Disable Industrial 2 of 5**

### **Set Length Range for Industrial 2 of 5**



0417030

**Set the Minimum Length**



0417040

**Set the Maximum Length**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

### Check Digit Verification



0417050

**\*\* Disable**



0417070

**Transmit Check Digit After Verification**



0417060

**Do Not Transmit Check Digit After Verification**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

## Standard 2 of 5 (IATA 2 of 5)

### Restore Factory Defaults



0418000

**Restore the Factory Defaults of Standard 25**

### Enable/Disable Standard 25



0418020

**\*\* Enable Standard 25**



0418010

**Disable Standard 25**

### Set Length Range for Standard 25



0418030

**Set the Minimum Length**



0418040

**Set the Maximum Length**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

### Check Digit Verification



0418050

**\*\* Disable**



0418070

**Transmit Check Digit After Verification**



0418060

**Do Not Transmit Check Digit After Verification**



0006000

**\*\* Exit Setup**



0006010

Enter Setup

---

## Code 39

### Restore Factory Defaults



0408000

Restore the Factory Defaults of Code 39

### Enable/Disable Code 39



0408020

\*\* Enable Code 39



0408010

Disable Code 39

### Transmit Start/Stop Character



0408090

\*\* Transmit Start/Stop Character



0408080

Do not Transmit Start/Stop Character



0006000

\*\* 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



0409000

Restore the Factory Defaults of Codabar

### Enable/Disable Codabar



0409020

\*\* Enable Codabar



0409010

Disable Codabar

### Set Length Range for Codabar



0409030

Set the Minimum Length



0409040

Set the Maximum Length



0006000

\*\* Exit Setup



0006010

**Enter Setup**

### Check Digit Verification



0409050

**\*\* Disable**



0409070

**Transmit Check Digit After Verification**



0409060

**Do Not Transmit Check Digit After Verification**

### Transmit Start/Stop Character



0409090

**\*\* Transmit Start/Stop Character**



0409080

**Do not Transmit Start/Stop Character**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

## Start/Stop Character Format

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



0409100

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



0409110

**ABCD/TN\*E as the Start/Stop Character**



0409120

**Start/Stop Character in Uppercase**



0409130

**Start/Stop Character in Lowercase**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

## **Code 93**

### **Restore Factory Defaults**



0410000

**Restore the Factory Defaults of Code 93**

### **Enable/Disable Code 93**



0410020

**\*\* Enable Code 93**



0410010

**Disable Code 93**

### **Set Length Range for Code 93**



0410030

**Set the Minimum Length**



0410040

**Set the Maximum Length**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

## Check Digit Verification



0410050

**Disable**



0410060

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



0410070

**Transmit Check Digit After Verification**



0006000

**\*\* 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



0415000

**Restore the Factory Defaults of Code 11**

### Enable/Disable Code 11



0415020

**\*\* Enable Code 11**



0415010

**Disable Code 11**

### Set Length Range for Code 11



0415030

**Set the Minimum Length**



0415040

**Set the Maximum Length**



0006000

**\*\* Exit Setup**



0006010

Enter Setup

### Transmit Check Digit



0415120

Transmit Check Digit



0415110

\*\* Do Not Transmit Check Digit

### Check Digit Verification



0415050

Disable



0415060

\*\* One Check Digit, MOD11



0415070

Two Check Digits, MOD11/MOD11



0415080

Two Check Digits, MOD11/MOD9



0415090

One Check Digit, MOD11 (Len<=10)  
Two Check Digits, MOD11/MOD11 (Len>10)



0415100

One Check Digit, MOD11 (Len<=10)  
Two Check Digits, MOD11/MOD9 (Len>10)



0006000

\*\* Exit Setup





0006010

Enter Setup

---

## Plessey

### Restore Factory Defaults



0419000

Restore the Factory Defaults of Plessey

### Enable/Disable Plessey



0419020

\*\* Enable Plessey



0419010

Disable Plessey

### Set Length Range for Plessey



0419030

Set the Minimum Length



0419040

Set the Maximum Length



0006000

\*\* Exit Setup



0006010

**Enter Setup**

---

### Check Digit Verification



0419050

**Disable**



0419060

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



0419070

**Transmit Check Digit After Verification**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

## **MSI-Plessey**

### **Restore Factory Defaults**



0420000

**Restore the Factory Defaults of MSI-Plessey**

### **Enable/Disable MSI-Plessey**



0420020

**\*\* Enable MSI-Plessey**



0420010

**Disable MSI-Plessey**

### **Set Length Range for MSI-Plessey**



0420030

**Set the Minimum Length**



0420040

**Set the Maximum Length**



0006000

**\*\* Exit Setup**



0006010

Enter Setup

---

### Transmit Check Digit



0420100

Transmit Check Digit



0420090

\*\* Do Not Transmit Check Digit

### Check Digit Verification



0420050

Disable



0420060

\*\* One Check Digit, MOD10



0420070

Two Check Digits, MOD10/MOD10



0420080

Two Check Digits, MOD10/MOD11



0006000

\*\* Exit Setup



0006010

**Enter Setup**

---

## 2D Symbologies

### PDF 417

#### Restore Factory Defaults



0501000

**Restore the Factory Defaults of PDF 417**

#### Enable/Disable PDF 417



0501020

**\*\* Enable PDF 417**



0501010

**Disable PDF 417**

#### Set Length Range for PDF 417



0501030

**Set the Minimum Length**



0501040

**Set the Maximum Length**



0006000

**\*\* 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**

---

## Data Matrix

### Restore Factory Defaults



0504000

**Restore the Factory Defaults of Data Matrix**

### Enable/Disable Data Matrix



0504020

**\*\* Enable Data Matrix**



0504010

**Disable Data Matrix**

### Set Length Range for Data Matrix



0504030

**Set the Minimum Length**



0504040

**Set the Maximum Length**



0006000

**\*\* Exit Setup**



0006010

**Enter Setup**

---

### Rectangular Barcode



0504110

**\*\* Enable Rectangular Barcode**



0504100

**Disable Rectangular Barcode**

### Mirror Image



0504331

**\*\* Decode Mirror Images**



0504330

**Do Not Decode Mirror Images**



0006000

**\*\* Exit Setup**





0006010

Enter Setup

## Chapter 8 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 environments 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**



0006010  
Enter 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.8-1 Standard Image: Image the engine should get when it is installed properly and no reflector is used in its optical imaging system.
- ✧ Fig.8-2 Horizontal Flipped Image: It happens when horizontal reflection occurs along the optical path. To get standard images, enable the **Flip Horizontally** option.
- ✧ Fig.8-3 Vertical Flipped Image: It happens when vertical reflection occurs along the optical path. To get standard images, enable the **Flip Vertically** option.
- ✧ Fig.8-4 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.8-1 Standard Image



Fig.8-2 Horizontal Flipped Image



Fig.8-3 Vertical Flipped Image



Fig.8-4 Horizontal and Vertical Flipped Image



0006000  
\*\* Exit Setup



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**

## Chapter 9 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 utility.

**Q: Illumination beam is 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.

**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
<b>Programming Barcode</b>			
Barcode Programming		Disabled	
Programming Barcode Data		Do not send	
<b>Communication Settings</b>			
Interface		TTL-232	Other options: USB HID-KBW, USB COM Port Emulation
TTL-232	Baud Rate	9600	
	Parity Check	None	
	Number of Data Bits	8	
	Number of Stop Bits	1	
	Hardware Flow Control	No flow control	
HID-KBW	USB Country Keyboard Type	U.S.	
	Convert Case	No conversion	
	Inter-Keystroke Delay	No delay	
	Beep on Unknown Character	Do not beep	
<b>Scan Mode</b>			
Scan Mode		Trigger mode	Other options: sense mode, Continuous mode.
Trigger Mode	Decode Session Timeout	3,000ms	Applicable to all three scan modes. 0~3,600,000ms
	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
Sense Mode	Decode Session Timeout	3,000ms	Applicable to all three scan modes. 0~3,600,000ms
	Image Stabilization Timeout	500ms	0~1,600ms
	Operation after Good Read	Pause after good read	
	Timeout between Decodes (Same Barcode)	Disabled 1,500ms	0~65,535ms
	Threshold Value of Illumination Change	2	1~20

Parameter		Factory Default	Remark
Continuous Mode	Decode Session Timeout	3,000ms	Applicable to all three scan modes. 0~3,600,000ms
	Timeout between Decodes	1,000ms	0~65,535ms
<b>Illumination</b>			
Illumination		Normal	
<b>Beep &amp; LED Notifications</b>			
Startup Beep		Enabled	
Good Read Beep (Non-Programming Barcode)	Notification	Enabled	
	Beep Type	Type 3	
	Beep Volume	Loud	
Good Read Beep (Programming Barcode)		Enabled	
Good Read LED Notification		Enabled	
NGR (Not Good Read) Message		Do not transmit	
		None	
<b>Data Formatting</b>			
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, 0x0A	Carriage Return /Line Feed
<b>Image Control</b>			
Ambient Illumination		Normal illuminance	
Image Flipping		Do not flip	

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



Parameter	Factory Default	Remark
<b>ISBN</b>		
ISBN	Enabled	
ISBN Format	ISBN-13	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
<b>UPC-E</b>		
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"	Do not transmit	
<b>UPC-A</b>		
UPC-A	Enabled	
Check Digit	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
Preamble Character "0"	Do not transmit	
<b>Interleaved 2 of 5</b>		
Interleaved 2 of 5	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Maximum Length	100	
Minimum Length	6	
<b>ITF-6</b>		
ITF-6	Disabled	
Check Digit	Do not transmit	

Parameter	Factory Default	Remark
<b>ITF-14</b>		
ITF-14	Enabled	
Check Digit	Do not transmit	
<b>Matrix 2 of 5</b>		
Matrix 2 of 5	Disabled	
Check Digit Verification	Enabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	6	
<b>Industrial 2 of 5</b>		
Industrial 2 of 5	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	6	
<b>Standard 2 of 5</b>		
Standard 2 of 5	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	6	
<b>Code 39</b>		
Code 39	Enabled	
Check Digit Verification	Disabled	
Check Digit	Do not transmit	
Start/Stop Character	Transmit	
Code 39 Full ASCII	Enabled	
Maximum Length	127	
Minimum Length	4	

Parameter	Factory Default	Remark
<b>Codabar</b>		
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	1	
<b>Code 93</b>		
Code 93	Enabled	
Check Digit Verification	Enabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	3	
<b>GS1 Databar</b>		
GS1 Databar	Enabled	
Application Identifier "01"	Transmit	
<b>Code 11</b>		
Code 11	Enabled	
Check Digit Verification	One check digit, MOD11	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	2	
<b>Plessey</b>		
Plessey	Enabled	
Check Digit Verification	Enabled	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	1	

---

Parameter	Factory Default	Remark
<b>MSI-Plessey</b>		
MSI-Plessey	Enabled	
Check Digit Verification	One check digit, MOD10	
Check Digit	Do not transmit	
Maximum Length	127	
Minimum Length	2	
<b>PDF 417</b>		
PDF 417	Enabled	
Maximum Length	2710	
Minimum Length	1	
<b>QR Code</b>		
QR Code	Enabled	
Micro QR	Enabled	
Maximum Length	7089	
Minimum Length	1	
<b>Data Matrix</b>		
Data Matrix	Enabled	
Rectangular Barcode	Enabled	
Mirror Image	Decode	
Maximum Length	3116	
Minimum Length	1	

---

## 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	One check digit, MOD10; do not transmit check digit
	]R9	One check digit, MOD10; transmit check digit
Code 39	]A0	Transmit barcodes as is; Full ASCII disabled; no check digit verification
	]A1	One check digit, MOD43; transmit check digit
	]A3	One check digit, 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	JG0	Standard Code 93
Code 11	JH0	One check digit MOD11; transmit check digit
	JH1	Two check digits, MOD11/MOD11; transmit check digit
	JH3	Do not transmit check digit after verification
	JH9	No check digit verification
GS1-DataBar (RSS)	Je0	Standard GS1-DataBar
Plessey	JP0	Standard Plessey
MSI-Plessey	JM0	One check digit, MOD10; transmit check digit
	JM1	One check digit, MOD10; do not transmit check digit
	JM8	Two check digits
	JM9	No check digit verification
Matrix 2 of 5	JX0	Specified by the manufacturer
	JX1	No check digit verification
	JX2	One check digit, MOD10; transmit check digit
	JX3	One check digit, MOD11; do not transmit check digit
ISBN	JX4	Standard ISBN
ISSN	JX5	Standard ISSN
PDF417	JL0	Comply with 1994 PDF417 specifications
Data Matrix	jd0	ECC000 - ECC140
	jd1	ECC200
	jd2	ECC200, FNC1 is the 1st or 5th character after the start character
	jd3	ECC200, FNC1 is the 2nd or 6th character after the start character
	jd4	ECC200, ECI included
	jd5	ECC200, FNC1 is the 1st or 5th character after the start character, ECI included
	jd6	ECC200, FNC1 is the 2nd or 6th character after the start character, ECI included
QR Code	JQ0	QR1
	JQ1	2005 version, ECI excluded
	JQ2	2005 version, ECI included
	JQ3	QR Code 2005, ECI excluded, FNC1 is the 1st character after the start character
	JQ4	QR Code 2005, ECI included, FNC1 is the 1st character after the start character
	JQ5	QR Code 2005, ECI excluded, FNC1 is the 2nd character after the start character
	JQ6	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 Acknowledgement)
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	( (Right / Closing 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)

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## 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.
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.
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.
  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.)
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#### **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.
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.
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.
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 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.
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.)

## h. 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.
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.)

## i. 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.
  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.)
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## j. 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.
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.)

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

**Note:** For 1D symbologies, 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.
  3. Scan the numeric barcode “8”.
  4. Scan the **Save** barcode.
  5. Scan the **Set the Maximum Length** barcode.
  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.)
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## Appendix 6: Digit Barcodes

0-9



0000000

**0**



0000050

**5**



0000010

**1**



0000060

**6**



0000020

**2**



0000070

**7**



0000030

**3**



0000080

**8**



0000040

**4**



0000090

**9**



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**A-F**



**A**



**B**



**C**



**D**



**E**



**F**

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## 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**



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