

**GT2022**

**2D Imager Barcode Scanner  
Configuration Guide**

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0006010  
Enter Setup

## Chapter 1 Getting Started

### About This Guide

This guide provides programming instructions for the 2D Reader. Users can configure the 2D Reader by scanning the programming barcodes included in this manual.

The 2D reader has been properly configured for most applications and can be put into use without further configuration. Users may check the **Factory Defaults Table** in **Appendix** for reference. Throughout the manual, asterisks (\*\*) indicate factory default values.



0006000  
\*\* Exit Setup



## Barcode Scanning

The 2D Reader 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 EM30-M over the barcode.

## Barcode Programming

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

**Note: When programming the reader, the minimum interval of consecutive scans must exceed 0.5s. Otherwise the reader will fail to read the latter programming barcode and generate a bad read beep.**

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

Restarting the reader will automatically disable the transmission of programming barcode data to the Host.



**Transmit Programming Barcode Data**



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





0006010  
Enter Setup

---

## Factory Defaults

Scanning the following barcode can restore the 2D Reader to the factory defaults. See **Appendix 1: Factory Defaults Table** for more information.

**Note:** Use this feature with discretion.



0001000  
**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 reader to the factory defaults will not remove the custom defaults from the reader.



0001150  
**Save as Custom Defaults**



0001160  
**Restore All Custom Defaults**



0006000  
**\*\* Exit Setup**



0006010  
**Enter Setup**

## Chapter 2 Communication Interfaces

The 2D Reader 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 reader or to access/alter the configuration information of the reader via the interface.

### Power-Saving Mode

By default, the reader 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.



0009000

**\*\* Normal Mode**  
**(TTL-232 & USB supported)**



0009010

**Power-Saving Mode**  
**(TTL-232 supported)**



0006000  
**\*\* Exit Setup**



0006010  
Enter Setup

---

## TTL-232 Interface

Serial communication interface is usually used when connecting the reader 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 reader 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
Data Bits	8
Stop Bits	1
Hardware Flow Control	None



0006000  
**\*\* Exit Setup**



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.



0100030

**\*\* 9600**



0100000

**1200**



0100050

**19200**



0100010

**2400**



0100060

**38400**



0100020

**4800**



0100070

**57600**



0100040

**14400**



0100080

**115200**



0006000  
**\*\* Exit Setup**

---



0006010  
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.



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**

---

## **USB HID-KBW**

When you connect the reader to the Host via a USB connection, you can enable the **USB HID-KBW** feature by scanning the barcode below. Then reader 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**

---

## USB Country Keyboard Types

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



1103001

**\*\* U.S.**



1103002

**Japan**



1103003

**Denmark**



1103004

**Finland**



1103005

**France**



1103006

**Turkey\_F**



1103007

**Italy**



1103008

**Norway**



0006000  
**\*\* Exit Setup**



0006010  
**Enter Setup**

---



1103222

**Spain**



1103226

**Turkey\_Q**



1103227

**UK**



1103209

**Austria, Germany**



1103202

**Belgium**



1103220

**Russia**



1103223

**Sweden**



1103218

**Portugal**



---

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 reader 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 1ms increments from 0ms to 75ms. The default setting is 10ms. To learn how to program this parameter, see **Appendix 5**.



1103050

**\*\* No Delay**



1103051

**Short Delay (20ms)**



1103052

**Long Delay (40ms)**



1103053

**Custom Delay**



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

## 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:** ASCII characters falling into 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.



1103060

**\*\* Disable**



1103061

**Mode 1**



1103062

**Mode 2**



1103063

**Mode 3**

**Example:** Supposing US keyboard is selected, barcode data "ADF" (65/208/70) is sent as below:

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

"A" -- Keystroke "A"

"D" -- "ALT Make" + "208" + "ALT Break"

"F" -- Keystroke "F"

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

"A" -- "ALT Make" + "065" + "ALT Break"

"D" -- "ALT Make" + "208" + "ALT Break"

"F" -- "ALT Make" + "070" + "ALT Break"



0006000  
**\*\* Exit Setup**



0006010  
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**.



1103140


**Enable Function Key Mapping**



1103130

**\*\* Disable Function Key Mapping**

**Example:** Barcode data 0x16

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



0006000  
**\*\* 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

The **Code Page** programming feature is provided to support more international characters. 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 reader 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**



0006000  
**\*\* 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 and waits 20ms or longer before driving the TRIG pin low.



0302003  
**\*\* Batch Mode**



0006000  
**\*\* Exit Setup**



0006010  
Enter Setup

---

## Trigger Mode

If the Trigger Mode is enabled, driving the TRIG 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, waits 20ms or longer before driving the TRIG 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.



\*\* 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



0006000  
\*\* Exit 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)**





## 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 TRIG 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.



## 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**.



## 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**.





0006010  
Enter Setup

---

## 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.



\*\* Pause after Good Read



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.



\*\* Disable Timeout between Decodes



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**.



**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.



**Medium Sensitivity**



**Low Sensitivity**



**High Sensitivity**



**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

---

## 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**

---

## Cellphone Read Mode



0313140

**\*\*Disable Cellphone Read Mode**



0313142

**Enable Cellphone Read Mode**



0006000  
**\*\* Exit Setup**



0006010  
Enter Setup

## Chapter 4 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 it first reads.



**\*\* Whole Area Decoding**

#### Central Area Decoding

The engine attempts to decode barcode(s) within a specified central area and transmits the barcode that it first reads. 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, central area decoding in conjunction with appropriate pre-defined central area will insure that only the desired barcode is read.



**Central Area Decoding**



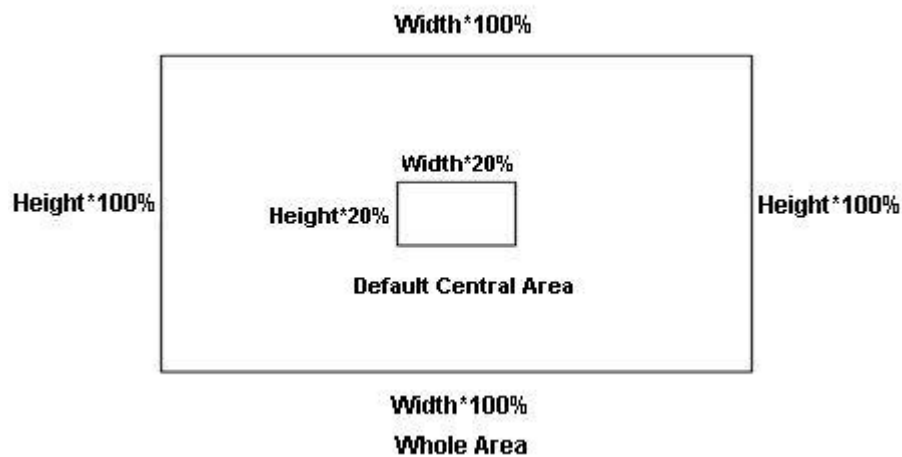
0006000  
**\*\* Exit Setup**



0006010  
Enter Setup

## Specify Central Area

The default central area is a (Width\*20%) by (Height\*20%) area in the center of the engine's field of view, as shown in the figure below. You can define the central area by scanning the **Specify Central Area** barcode and numeric barcode(s) corresponding to a desired percentage (1-100). If Central Area Decoding is enabled by scanning the **Central Area Decoding** barcode, the engine only reads barcodes that intersect the predefined central area.



To learn how to program this parameter, see the “**Appendix 5: Parameter Programming Examples**”.



0322020

Specify Central Area



0006000  
\*\* Exit Setup



0006010  
Enter Setup

## Chapter 5 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.



0200000

**\*\* Normal**



0200020

**OFF**



0200010

**Always ON**



0006000  
**\*\* Exit Setup**



0006010  
Enter Setup

---

## Aiming

When scanning/capturing barcode, 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.



0201000

**\*\* Normal**



0201020

**OFF**



0201010

**Always ON**



0006000  
**\*\* Exit Setup**





0006010  
**Enter Setup**

## Chapter 6 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

## Beep Type



0203020

Type 1



0203022

\*\* Type 3



0203021

Type 2



0006000  
\*\* Exit Setup



0006010  
**Enter Setup**

---

## 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 the appropriate barcode below to select whether or not to transmit a user-defined NGR (Not Good Read) message when the engine fails to decode a barcode.



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 that represent the ASCII values (hex) of desired characters and then scan the **Save** barcode.

An NGR message can contain 0-7 characters (ASCII value of character: 0x00-0xFF).



0320020

**Edit NGR Message**



0006000  
**\*\* Exit Setup**



## Chapter 7 Data Editing

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 editing 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]





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**



---

## 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.



Enable Custom Prefix



\*\* 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 11 characters.



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” and “5”.
5. Scan the **Save** barcode.
6. Scan the **Exit Setup** barcode.







## AIM ID Prefix

AIM (Automatic Identification Manufacturers) IDs and ISO/IEC 15424 standards define symbology identifiers and data carrier identifiers. (For the details, see the “**Appendix 2: AIM ID Table**” section). 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 the “**Appendix 3: Code ID Table**” section.



Restore All Default Code IDs

---





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 25 Code ID**



0004220

**Modify COOP 25 Code ID**



0004280

**Modify Code 11 Code ID**



0004270

**Modify Plessey Code ID**



0004290

**Modify MSI/Plessey Code ID**



0004310

**Modify GS1 Databar Code ID**



0006000  
**\*\* Exit 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.



**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.

**Note:** A custom suffix cannot exceed 11 characters.



**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.
- 





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 1-7 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 CR (0x0D) or CRLF (0x0D,0x0A) and enabling it by scanning the appropriate barcode below.



0310010

**\*\* Terminating Character CR (0x0D)**



0310020

**Terminating Character CRLF (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 7 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**



## Chapter 8 Symbologies

### Global 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.



**Enable All Symbologies**



**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.



**Enable 1D Symbologies**



**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.



**Enable 2D Symbologies**



**Disable 2D Symbologies**







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 allows 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.



Video Reverse ON



\*\* 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.



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





---

## 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**





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



---

## 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**





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.



0403060

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



0403050

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



0403080

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



0403070

**\*\* 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.



0403130

**UPC-E Add-On Code Required**



0403140

**\*\* 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.



**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**



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.)



0006000  
\*\* 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 digit.



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 digit.



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



**Set the Minimum Length**



**Set the Maximum Length**

### Check Digit Verification



**\*\* Disable**



**Transmit Check Digit After Verification**



**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.



**\*\* Enable Code 39 Full ASCII**



**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

### PDF 417 Twin Code

PDF417 twin code is 2 PDF417 barcodes paralleled vertically or horizontally. Two of them must have the same direction and 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.



0501070  
**\*\* Single PDF417 Only**



0501080  
**Twin PDF417 Only**



0501090  
**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.



0501110  
**\*\* Order 1**



0501100  
**Order 2**



0006000  
**\*\* Exit Setup**



0006010  
**Enter Setup**

---

## Character Encoding



0501350

**\*\* Default Character Encoding**



0501351

**UTF8**



---

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

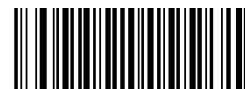
**Set the Maximum Length**

### Micro QR



0502110

**\*\* Enable Micro QR**



0502100

**Disable Micro QR**



0006000  
**\*\* Exit Setup**



0006010  
Enter Setup

---

## QR Twin Code

QR twin code is 2 QR barcodes paralleled vertically or horizontally. Two of them must have the same direction and 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.



**\*\* Single QR Only**



**Twin QR Only**



**Both Single & Twin**



0006000  
**\*\* Exit Setup**





0006010  
Enter Setup

### 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**

### Character Encoding



0502160

**\*\* Default Character Encoding**



0502161

**UTF8**



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

### Data Matrix Twin Code

Data Matrix twin code is 2 Data Matrix barcodes paralleled vertically or horizontally. Two of them must have the same direction and 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.



**\*\* Single Data Matrix Only**



**Twin Data Matrix Only**



**Both Single & Twin**

### Character Encoding



**\*\* Default Character Encoding**



**UTF8**



0006000  
**\*\* 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 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**

## 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



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 10 Troubleshooting

### FAQ

**Problem: Some barcodes cannot be read.**

Solution:

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.

**Problem: Incorrect output.**

Solution:

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.

**Problem: Barcodes can be read, but cannot be displayed.**

Solution: Verify that the serial port parameter (such as baud rate, data bit and stop bit) settings match the host requirements.



---

**Problem: Illumination and aiming beams are OFF.**

Solution:

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.

**Problem: Carriage Return/Line Feed settings.**

Solution: See the “**Terminating Character Suffix**” section 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>			
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 (optional)	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)	
<b>Scan Mode</b>			
Scan Mode		Trigger mode	Options: Batch mode, Trigger mode, Sense mode, Continuous mode.
Trigger Mode	Decode Session Timeout	3,000ms	Applicable to a Trigger mode, Sense mode, Continuous mode. 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

Parameter		Factory Default	Remark
Sense Mode	Decode Session Timeout	3,000ms	Applicable to Trigger mode, Sense mode, Continuous mode. 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	
Continuous Mode	Decode Session Timeout	3,000ms	Applicable to Trigger mode, Sense mode, Continuous mode. 0~3,600,000ms
	Timeout between Decodes	1000ms	0~65,535ms
Cellphone Read Mode		Disabled	
<b>Scanning Preferences</b>			
Decode Area		Whole Area Decoding	
Central Area		20%	
<b>Illumination &amp; Aiming</b>			
Illumination		Normal	
Aiming		Normal	
<b>Beep &amp; LED Notifications</b>			
Startup Beep		Enabled	
Good Read Beep for Non-Programming	Notification	Enabled	
	Beep Type	Type 3	
Barcode	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
<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	Carriage Return
<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"	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	Do not transmit	
Code 39 Full ASCII	Enabled	
Maximum Length	127	
Minimum Length	1	

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	
PDF 417 Twin Code	Read single PDF417 only	
Transmission Order of Twin Code	Order 1	
Character Encoding	Default Character Encoding	
<b>QR Code</b>		
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	
<b>Data Matrix</b>		
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	

## 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	]G0	Standard Code 93
Code 11	]H0	One check digit, MOD11; transmit check digit
	]H1	Two check digits, 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	One check digit, MOD10; transmit check digit
	]M1	One check digit, MOD10; do not transmit check digit
	]M8	Two check digits
	]M9	No check digit verification
Matrix 2 of 5	]X0	Specified by the manufacturer
	]X1	No check digit verification
	]X2	One check digit, MOD10; transmit check digit
	]X3	One check digit, 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).

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## 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

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## 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)

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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)

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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)

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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. (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.)
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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. (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.)
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## g. Program the Central Area

**Example: Set the percentage of central area to 20%**

1. Scan the **Enter Setup** barcode.
2. Scan the **Specify Central Area** barcode.
3. Scan the numeric barcodes “2” 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.)

## 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.)
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## 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 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.)
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### 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 Custom Inter-keystroke Delay

#### **Example: Set the inter-keystroke delay to 15ms**

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 “1” and “5”.
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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**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 8.
6. Scan the **Russia** barcode from the “**USB Country Keyboard Types**” section in Chapter 2.
7. Scan the **Mode 3** barcode from the “**Emulate ALT+Keypad**” section in Chapter 2.
8. 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 8.
  6. Scan the **Russia** barcode from the “**USB Country Keyboard Types**” section in Chapter 2.
  7. Scan the **Mode 3** barcode from the “**Emulate ALT+Keypad**” section in Chapter 2.
  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

---

**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.



## 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	Backspace	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	Delete	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	

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## 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+Ø	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+-

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## Appendix 9: Code Pages List

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