



PowerScan™

Handheld Laser Scanner



Programming Guide

PSC Scanning, Inc.

959 Terry Street
Eugene, Oregon 97402
Telephone: (541) 683-5700
Telefax: (541) 345-7140

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Table of Contents

Introduction	1
Understanding the Basics	1
Integrating the Scanner With Your Host System	2
Changing Interfaces	2
Hardware	2
Software	4
Customizing Your Scanner's Operation	5
Programming Overview	6
What Is Programming Mode?	6
Programming Session	7
Programming Sequence	9
LED and Beeper Indicators.....	11
LED Indicators	11
The Beeper	11
If You Make a Mistake... ..	12
Return to Factory Settings	12
Where To Go From Here	13
Interface Selection	14
Wand Emulation Interface	14
Wand Emulation Settings	15
Wand Emulation Pre/Post-Noise Settings	18
RS-232 Interface/WN-RS-232 (SNI) Interface	20
RS-232 Communication Parameters	20
Baud Rate	21
Data Format Settings	22
Handshaking	24
RS-232 ACK/NAK Options	29
RS-232 Intercharacter Delay	30
Keyboard Wedge Interface	32
PC Keyboard Wedge Interface Selection	33
Connect to a Laptop/No Keyboard Attached	36
Caps Lock	38
Country Mode	39
Keyboard Wedge Intercharacter Delay	41
Quiet Interval	43

IBM Interface	44
Transmit Labels in Code 39 Format	45
Label Transmit Configuration (RS-232 and Keyboard Wedge Interfaces only)	46
Prefix, Suffix, and Label I.D.	46
Setting Global Prefix(es)	47
Setting Global Suffix(es)	48
Single Character Prefix or Suffix	50
Disabling Prefix or Suffix	52
Setting Label I.D.	53
Label Identifiers	53
Setting Label I.D. Location	53
Setting Label I.D. by Symbology	55
Label I.D. Symbology Selection	56
Setting Single Character Label I.D.	59
Disabling Label I.D. for a Specific Symbology	59
Symbologies Supported	60
Symbology Overview	61
Symbology Selection	63
Symbology Options	66
Code 39/PharmaCode 39	66
Code 39 Options	66
Configuring the Code 39 Options	67
PharmaCode 39 Options	72
Configuring the PharmaCode 39 Options	73
Code128 and UCC/EAN 128 Options	74
Configuring the Code 128/and UCC/EAN 128 Options	75
Interleaved 2 of 5 Options	79
Configuring the Interleaved 2 of 5 Options	81
Codabar Options	88
Configuring the Codabar Options	90
UPC/EAN Options	98
Configuring the UPC/EAN Options	100
Code 93 Options	110
Configuring the Code 93 Options	111
Standard 2 of 5/IATA Options	114
Configuring the Standard 2 of 5 Options	115
IATA	121
MSI/Plessey Options	122

Configuring the MSI /Plessey Options	124
General Features.....	130
Programming the General Features	130
Green LED Lamp Idle State	130
Beeper Settings	131
Marker Beam Settings	134
AutoSense® Stand Mode	136
Low Power Mode	137
Low Power Shut-down Delay	138
Half-Angle	139
Multiple Read Mode	140
Appendix A: Additional Information.....	143
RS-232 Host Commands	143
Need More Information?	144
Appendix B: Sample Bar Codes	145
Appendix C: Keypad.....	147
ASCII Character Set	149

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Introduction

The programming bar code labels contained in this manual will allow you to customize and configure features and settings for your PSC[®] PowerScan[™] scanner. To ensure full compatibility and proper function, use only the programming bar codes in this manual and other product-specific publications to program scanner features.

This manual has been developed to make it quick and easy for users of all levels to find the information needed to understand and configure scanner features. The following descriptions will help you to determine where to go from here.

Understanding the Basics

If you have little or no prior experience with programming using bar code labels, you should review this introductory section to familiarize yourself with the basics of scanner programming before performing any changes to your scanner's configuration. Contents of this section are:

- Integrating the Scanner With Your Host System
 - *Changing Interfaces*
- Customizing Your Scanner's Operation
- Programming Overview
 - What Is Programming Mode?
- Programming Session
 - Programming Sequence
- *LED and Beeper Indicators*
- If You Make a Mistake...
 - Return to Factory Settings
- Where To Go From Here

Integrating the Scanner With Your Host System

Your scanner **MUST** be equipped with the correct hardware (interface board, cable, etc.) to properly communicate with your host system. Contact your PSC dealer for information if you have questions about your scanner's hardware compatibility.

You may also want to contact the dealer or your system administrator if you have no record of how your scanner was pre-programmed at the factory. Scanners are typically programmed with the default settings for specific interface types, however, your scanner may have been custom configured with settings that are unique to your company or application.

Once you know the scanner's current settings, you can determine what changes will be required to allow communication with your host system and/or optional features you choose to modify to customize your installation. After recording the modifications needed, finish reading this section, then turn to the appropriate page and follow the instructions to program the scanner.

When all scanner features are programmed to your satisfaction, the scanner is ready to be placed into operation.

Changing Interfaces

When moving the scanner to a host terminal of a different interface type than previously connected, it may be necessary to alter the scanner's hardware and/or software to allow connection and communication between the two devices.

Hardware

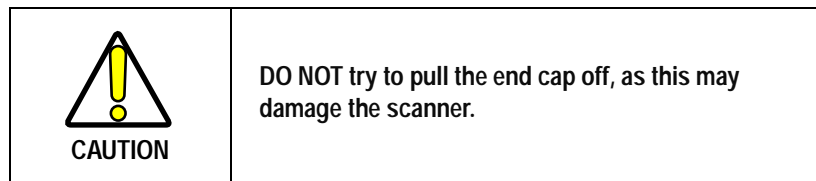
Interface Board

An interface board swap is usually unnecessary, since multiple host interface protocols are supported in combination on most interface boards. For example, RS-232, Standard Keyboard Wedge, and Wand Emulation are all available on a single interface board. Activation of alternate available interfaces on these boards requires only that you connect the scanner to the new host using the appropriate interface cable. The scanner will automatically change to the interface functions specific to that cable.

To determine if your desired new interface is available on your scanner, check the following section titled *Software* on page 4. The section lists host interface types supported by each interface board available at the time of this writing. If you are still unsure of your scanner's available interface connectivity, consult your PSC dealer.

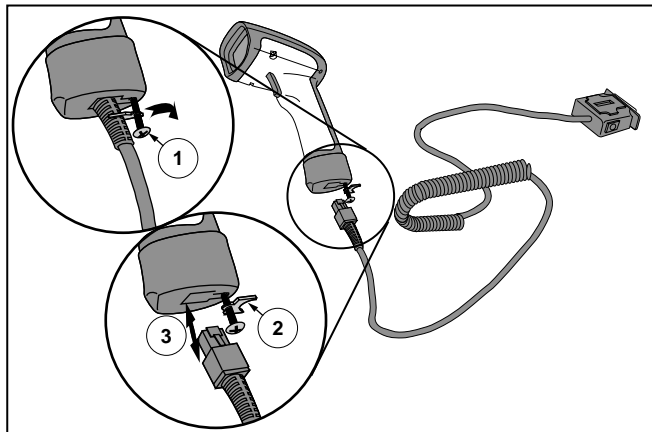
The scanner will need to be sent to a Level I Service repair depot if the interface board must be swapped; however, if necessary, you can change your scanner's interface cable by following these instructions. (Refer to Figure 1.):

1. Loosen the screw at the bottom of the handle. This screw is captive and does not come all the way out.



2. Swing the forked cable retainer clear of the square hole in the end cap and rotate away from the cable.
3. Holding the scanner handle and end cap together in one hand, pull the connector out of the handle end cap to free the interface cable.
4. Connect the new interface cable at the scanner and rotate the forked cable retainer to secure it. Tighten the screw to between 6 and 10 in-lbs.

Figure 1. Removing/Replacing the Interface Cable



Software Verify that your scanner supports the desired interface¹. The list below indicates the interface groupings the scanner supports. Contact your nearest PSC service depot if you don't know your scanner's group, or need assistance to change the scanner to another interface group.

The Standard Keyboard Wedge/Wand Emulation/RS-232 Group supports:

- I/F Type A - PC/XT w/Alternate Key Encoding
- I/F Type B - AT, PS/2 25-286, 30-286, 50, 50Z, 60, 70, 80, 90 & 95 w/Alternate Key Encoding
- I/F Type C - PS/2 25 and 30 w/Alternate Key Encoding
- I/F Type D - PC/XT w/Standard Key Encoding
- I/F Type E - AT, PS/2 25-286, 30-286, 50, 50Z, 60, 70, 80, 90 & 95 w/Standard Key Encoding
- I/F Type F - PS/2 25 and 30 w/Standard Key Encoding
- I/F Type H - IBM[®] 3xxx w/102 keyboard
- I/F Type I - PS/555530T w/104 keyboard
- I/F Type J - NEC[®] 9801 keyboard
- Wand Emulation
- RS-232
- WN²-RS-232 (SNI)

The IBM/RS-232 Group supports:

- IBM Port 5B
- IBM Port 9B
- IBM Port 17
- IBM Port E
- RS-232
- WN-RS-232

For interface groupings supported by the Universal [Keyboard] Wedge Group:

- Consult the *Universal Wedge Programming Guide* for more information.

1. Contact your dealer or sales representative if your desired interface is not listed. Interface group definitions are subject to change without notice.
2. Wincor Nixdorf[®] (formally SNI)


After familiarizing yourself with the basic scanner programming procedures in this section, turn to the appropriate interface programming section (RS-232, Wand Emulation, etc.) of this manual to set other interface features, completing the scanner's conversion to a new interface type.

Upon changing a scanner's interface setting, scan a bar code to verify that the scanner communicates correctly with the new host system. Some sample bar codes are provided in *Appendix B: Sample Bar Codes* on page 145. If any changes to the scanner's factory settings are needed, consult *Customizing Your Scanner's Operation* below.

Customizing Your Scanner's Operation

Most scanner programming falls within three general categories:

- **Interface Selection and Settings** - are the mandatory settings necessary to allow communication with your host terminal. Examples of these settings are: RS-232 baud rate and parity.

 <p>NOTE</p>	<p>Ensure that your planned modifications are compatible with the current interface. For example, baud rate selections are only valid in the RS-232 interface. The scanner will sound an error tone when scanning programming labels for features invalid to the current interface group.</p>
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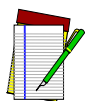
- **Symbology Selection and Settings** - gives the scanner the capability to autodiscriminate as few as one, and as many as all available symbologies. For optimal scanner performance enable only those symbologies required. Additionally the scanner may be programmed with the standard options available for the various symbologies, such as check digit, minimum label length, fixed and variable length bar codes, QuadraLogic Decoding, etc.
- **General Feature Settings** - are features common to all interface types. Examples include beeper adjustments such as volume and length, read verification settings, etc.

If you experience difficulties, have questions or require additional information, contact your local distributor, or call your dealer or sales representative.

Programming Overview

The scanner's programmable feature settings can be modified to accommodate your system's unique requirements. These settings can be communicated to the scanner in one of two ways:

1. Commands can be sent directly from the host. A limited set of host commands are available. Refer to *Appendix A: Additional Information* on page 143 for more details.
2. The easiest, most comprehensive way to program the scanner is to use the *Configurator Express™ On-Screen Programming Kit*. Ask your dealer for more information about this product.
3. Programming bar code labels can also be used to modify the scanner's programmable settings. This manual provides the bar code labels and instructions necessary to configure the scanner's features/options.



NOTE

When you program the scanner using any of the methods above, the scanner will store the changes until reprogrammed or returned to factory defaults.

What Is Programming Mode?


Programming Mode is a state in which the scanner must be placed in order to accept programming commands. When programming using the bar code labels in this manual, the scanner is typically placed in Programming Mode by scanning the "SET" label at the top of most programming feature pages.


While in the Programming Mode, the scanner only recognizes the special programming bar codes contained in this programming guide. See the section, *LED and Beeper Indicators* on page 11 for information about scanner indications while in the Programming Mode.

Programming Session

A typical programming session is conducted as follows:

1. Scan the SET bar code at the beginning of each set of programming bar codes to place the scanner in Programming Mode. The scanner will emit three beeps, indicating it has read the bar code and the green LED will flash on and off slowly while the scanner remains in Programming Mode. Normal scanning functions are disabled.
2. Scan the programming label(s) that is (are) specially encoded to make the desired changes. With few exceptions¹, the scanner will emit a triple beep each time you scan a valid programming bar code.

 <p>NOTE</p>	<p>Not all features are available for all interfaces and the scanner will sound an error tone when scanning programming bar codes for features invalid to the current interface. Only features supported by the currently active interface will be implemented.</p>
--	--

 <p>NOTE</p>	<p>If a label is scanned that changes the scanner's interface, all previous configuration items scanned in the programming session are lost.</p>
--	---

Additionally, when programming a feature requiring you to scan single digits to set a multi-digit number, such as Minimum Label Length, scanning the END bar code (or any item tag/item value bar code) before completing all input will result in an error tone and cause the scanner to exit Programming Mode. Under these circumstances, the current feature you were trying to set is thrown out; any previous bar codes scanned during the session will take effect.

1. Some features, such as Minimum Label Length, require you to select the label's length by scanning a series of single-digit bar codes. A single 'good read' beep is sounded when scanning these single digits in Programming Mode. Only the final required digit in the sequence will produce a triple beep when scanned, indicating a successfully programmed feature.



NOTE

It is recommended that programming sessions be limited to one feature at a time. Should you make a mistake in the programming sequence, it can be difficult to discover where an error has been made if several features are programmed at once. Additionally, it can be confusing to determine which features may or may not have been successfully set following such a session.

3. Scan the END label at the bottom of the page to save any new settings and exit Programming Mode. The scanner will sound a beep and reset upon exiting Programming Mode, and the green LED will return to its usual state (on steady or off).

The scanner will not exit Programming Mode unless the END bar code is scanned or power is disconnected. Disconnecting power during Programming Mode, before scanning the END label, will cause all new settings to be ignored. On power-up, the scanner will return to previous settings.

4. Maintain a good record of all changes made to ensure that you know if the original factory settings have been changed.

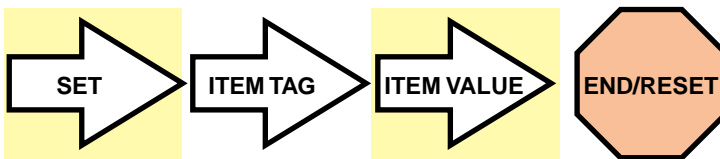
Programming Sequence






To modify a scanner feature (item), the programming bar codes contained in this manual must be scanned in a given sequence depending upon the feature being programmed (as shown in Table 1). There are three possible programming sequences:

- A. Programming sample A (the most commonly used format) demonstrates how three bar codes are scanned in sequence to do the following:
 1. Place the scanner in Programming Mode (SET bar code).
 2. Scan the Item Tag¹ that will enable the new feature.
 3. End the programming session and reset the scanner (END bar code).
- B. Sample B provides an example of a programming feature requiring the entry of a range value. Like sample A, the scanner is placed in Programming Mode and an Item Tag¹ is scanned. Then, a value must be entered before ending the programming session. In the example, three digits must be scanned from the number pad in *Appendix C: Keypad*. This type of format, requiring a total of as many as six programming bar codes, is necessary to allow flexible programming with larger item value numeric ranges.
- C. The programming sequence shown in example C requires scanning of a single, extended length bar code. This special programming bar code contains all the data necessary to enter Programming Mode, set the Item Tag¹ and Item Value, and exit Programming Mode (all in one step).

1. An "Item Tag" is a term used to describe an assigned number, which is encoded in a programming bar code, that toggles (selects, enables, disables, etc.) a specific programming feature.

Table 1. Programming Sequence



A	1	2		3		
	SET 	ENABLE NEW FEATURE 		END 		
B	1	2	3	4	5	6
	SET 	ENABLE NEW FEATURE USING THE FOLLOWING SETTINGS... 	0  0  8 			END 
C	1					
	ONE BAR CODE CONTAINS SET + ITEM TAG + ITEM VALUE + END 					

LED and Beeper Indicators

The scanner provides a set of indicators that verify/announce the various scanner functions.

LED Indicators The Amber “Laser ON” LED (located on top rear of scanner)

- lights whenever laser power is on.

The Green “Good Read” LED (also located on top rear of scanner)

- Flashes¹ once to indicate when a “good read” has occurred.
- Flashes¹ slowly on and off to indicate the scanner is in Programming Mode.

The Beeper *While in Scanning mode...*

- Sounds¹ four times at power-up.
- Sounds¹ once following a “good read.”
- Sounds¹ six rapid “chirps” to indicate an error (error tone).

While in Programming mode...

- Sounds¹ one time when entering/exiting the Programming Mode.
- Sounds¹ three times to indicate a successfully programmed feature.


1. The green LED and Beeper are configurable features and may have been modified or disabled at an earlier programming session. See the section in this manual titled *General Features* for more details.

If You Make a Mistake...

If, during a programming session, you find that you are unsure of the scanner's settings or wish to reset the scanner's configuration, use the Return to Factory Settings label below to return the scanner's configuration to the factory settings. Scanning this label will also reset any changes made during previous programming sessions.

Return to Factory Settings

Scan this label to return the scanner to the default settings configured at the factory. This label is typically used to return the scanner to a "known" operating state when the present programming status is not known, faulty, or suspect.

 CAUTION	Use this label with caution, since it will reset ALL features that may have been programmed for that interface type since the scanner's installation.
--	---

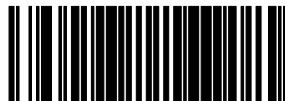
SET -----



Return to Factory Setting -----




END -----



If you don't have a record of your site/system's original configuration, you may need to contact your sale representative for assistance to return the scanner to normal function. Please be prepared to provide information about the company, location, host terminal system and other pertinent information about the scanner being repaired.

Where To Go From Here

Programming is easy and straightforward if you follow these steps:

 <p>NOTE</p>	<p>If you are changing some interface types (for example; if you are moving the scanner from a Universal Keyboard Wedge to an RS-232 host) you must first change the hardware. Replace the scanner's interface board (if required) and connect the scanner using the new interface cable BEFORE performing any programming changes.</p>
---	--

1. If you are changing the scanner's interface type, follow the instructions in the section titled, *Changing Interfaces* on page 2 before proceeding.
2. Scan any feature bar codes that are unique to the interface you are currently programming. These interface specific programming bar codes immediately follow each interface selection label.
3. Turn to *Symbologies Supported* on page 60 if you are going to change any bar code symbologies or modify any symbology-related features.
4. Turn to *General Features* on page 130 if you wish to change or modify any of the scanner's other features.

Once the necessary changes have been made, and you have scanned the END bar code, you are ready to scan.

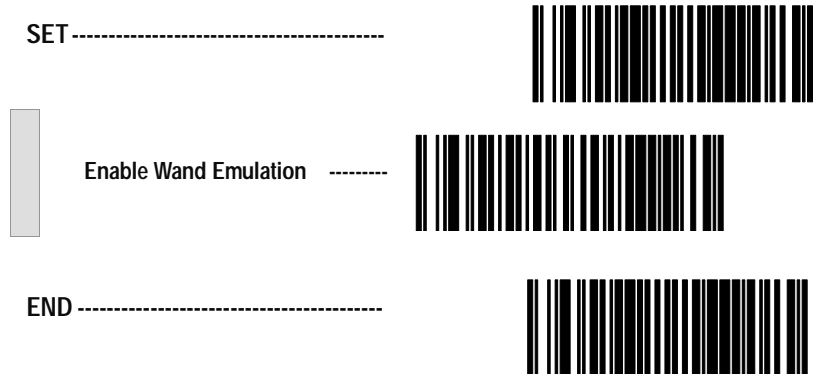
Interface Selection

This section contains programming bar code labels to select the following interfaces:

- Wand Emulation Interface
- Pre-Noise Settings
- Keyboard Wedge Interface
- IBM Interface

Wand Emulation Interface

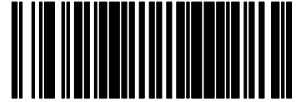
Scan these labels to enable the Wand Emulation Interface.



Wand Emulation Settings

Use these programming bar codes to configure the settings for the Wand Emulation Interface.

SET -----



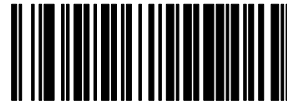
Polarity



Space Low, Bar High -----



Space High, Bar Low -----



Signal Speed



Low (660 μ s) -----



High (330 μ s) -----



Data Format



Transmit in Normal
Format



Transmit in C39
Format



Transmit in C39 Full ASCII
Format



Transmit in C128
Format



Idle State



Low



High



Transmit C128 Function Characters




- a. This feature should only be enabled when the Wand Data Format is configured for Transmit in Normal Format or Transmit in Code 128 Format.

Wand Emulation Pre/Post-Noise Settings

The number of noise transitions generated prior to or following label transitions are independently configurable options. To set either pre- or post-noise transitions, enter Programming Mode by scanning the SET bar code, then follow these steps:

1. Scan Don't Transmit Pre-Noise or Don't Transmit Post-Noise, followed by the END bar code to disable noise transitions, or...
2. Scan the Set Pre- or Post -Noise Transitions bar code followed by the digits from *Appendix C: Keypad* that represent the desired number of noise transitions. Select from one to twenty¹ noise transitions for either pre- or post-noise. Complete the programming sequence by scanning the END bar code.

 NOTE	<p>Settings for this feature have been enhanced since the product was originally released, adding the option to select a specific quantity of noise transitions. If your scanner has a date code of February, 2001 or before, pre-noise/post-noise transitions are enabled by following Step 2 above, EXCEPT the single digit selected from <i>Appendix C: Keypad</i> MUST be one (1). This will either set the pre-noise transitions to one or the post-noise transitions to three depending on which feature is being programmed. The feature is disabled in the same manner as Step 1 above.</p>
--	---

Pre-Noise Settings

SET -----



Pre-Noise



Don't Transmit Pre-Noise



1. Scanners with a date code of February of 2001 or before MUST select the digits zero-one (01). See the note on this page for details.

Set Pre-Noise Transitions -----



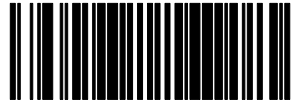
Scan two digits representing the desired number of Pre-Noise Transitions using the number pad from Appendix C: Keypad, padded with leading zeros (example: 03 = three transitions, 08 = eight, 15 = fifteen, etc.)

END -----



Post-Noise Settings

SET -----



Post-Noise

Don't Transmit Post-Noise -----



Set Post-Noise Transitions -----



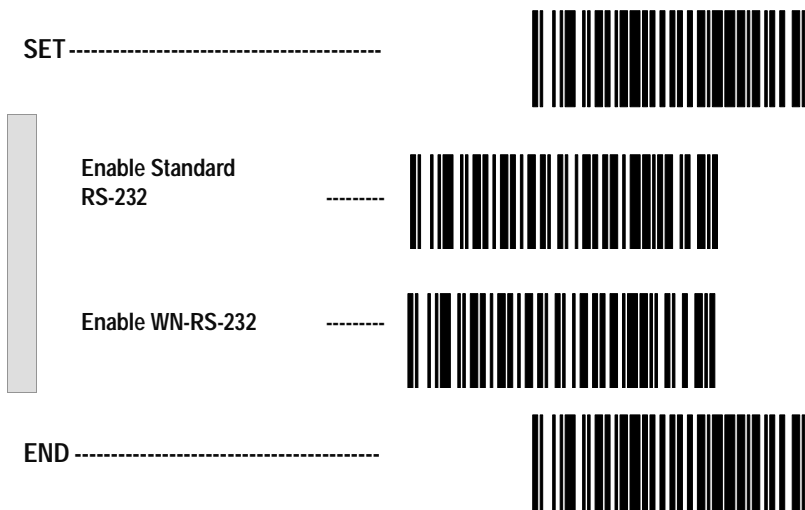
Scan two digits representing the desired number of Post-Noise Transitions using the number pad from Appendix C: Keypad, padded with leading zeros (example: 03 = three transitions, 08 = eight, 15 = fifteen, etc.)

END -----



RS-232 Interface/WN-RS-232 (SNI) Interface

Scan these labels to enable either the standard RS-232 interface (PSC RS-232) or the WN-RS-232 (SNI) Interface.



RS-232 Communication Parameters

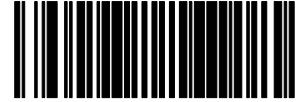
This section contains the following RS-232 communication parameters in the order listed:

- Baud Rate
- Data Format Settings
 - Data Bit
 - Parity Bit
 - Stop Bit(s)
- Handshaking
 - Hardware Handshaking (CTS/RTS)
 - Software Handshaking (Xon/Xoff)
- ACK/NAK Options
- Intercharacter Delay

Go to the sections titled *Symbology Selection* starting on page 63 and *General Features* on page 130 if you want to change any other settings for this interface.

Baud Rate Use the bar codes on this page to select the communications Baud Rate. Only one Baud Rate selection may be active at any one time. The last Baud Rate label you scan during a programming session will be the setting that is stored when you scan the END label.

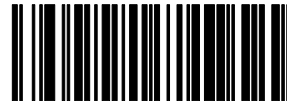
SET -----



Baud Rate = 1200 -----



Baud Rate = 2400 -----



Baud Rate = 4800 -----



Baud Rate = 9600 -----



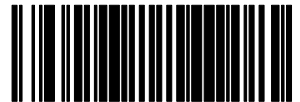
Baud Rate = 19200 -----



Baud Rate = 38400 -----



END -----



Data Format Settings

The bar codes on this page can be used to select the data format configuration needed to communicate with your system. Refer to Table 1, RS-232 Data Format below for acceptable combinations of these setting.

Data Format Table

There are many possible data format configurations for an RS-232 interface. Check your host system manual to find out your system's communications requirements.

Table 1. RS-232 Data Format

Data Bit	Parity Bit	Stop Bit(s)	Start Bit
Seven	0	2	1
Seven	1	1	1
Seven	1	2	1
Eight	0	0	1
Eight	0	2	1
Eight	1	1	1

Use these bar codes to set the Data Format options desired.

SET -----



Data Bit



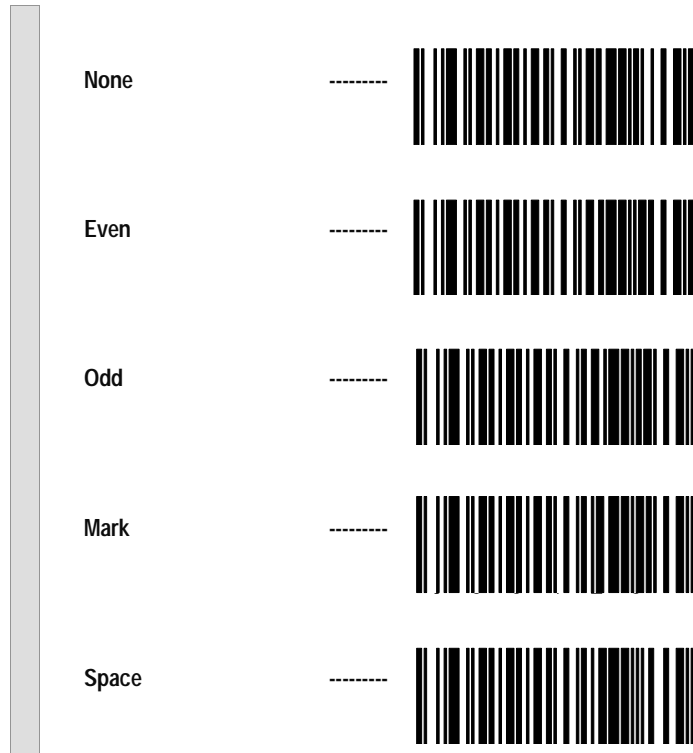
Seven -----



Eight -----



Parity Bit



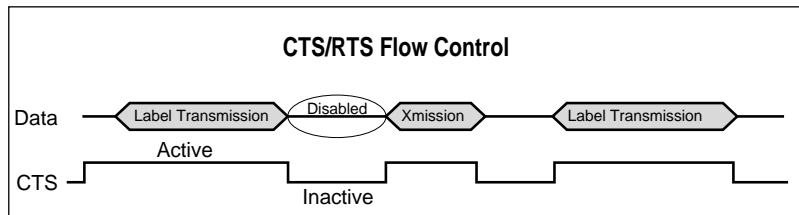
Stop Bit(s)



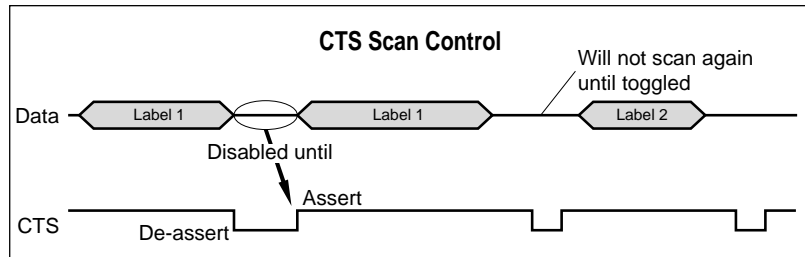
Handshaking Review your system documentation to identify handshaking requirements, and use these labels to change the settings if required. The following brief descriptions explain each selection.

Hardware Handshaking

CTS/RTS Flow Control - is hardware handshaking. The scanner activates the RTS (Request to Send) line when it is ready to send data to the host. The scanner waits for an active Clear to Send (CTS) signal from the host before transmitting data. If hardware control is disabled, CTS/RTS communication will not take place. If the host deactivates the CTS line during data transmission, the host will receive additional characters for no more than 2ms¹.




CTS Scan Control - is also a hardware handshaking. When scan control is enabled, label scanning is disabled until CTS is asserted and de-asserted as illustrated below.



1. Timing varies slightly depending upon the baud rate selected.

Handshaking controls are mutually exclusive. The settings below allow only one of these features to be enabled at a time, as enabling multiple controls will produce unpredictable results.

 <p>NOTE</p>	<p>Each of the handshaking features requires that a series of bar codes (Step #1, Step #2) in the sequence given. That is, you must enter Programming Mode by scanning the SET bar code, scan the bar codes required to set one handshaking feature, then scan the END bar code.</p>
--	--

Scan the SET bar code label then the Step #1, Step #2 below, followed by the END bar code labels to enable CTS/RTS Flow Control.

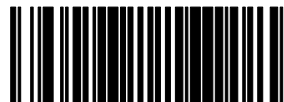
Enable CTS/RTS Flow Control

	SET -----	
|	Step #1 -----	
	Step #2 -----	
	END -----	

Scan the SET bar code label then the Step #1, Step #2 below, followed by the END bar code labels to enable CTS Scan Control.

Enable CTS Scan Control

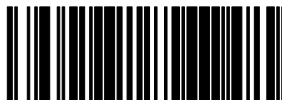
SET -----



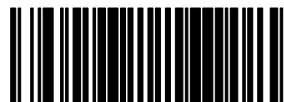
Step #1



Step #2



END -----



Software Handshaking

Xon/Xoff - is software handshaking that allows the host to control data transmission. If the host sends an Xoff command to the scanner, the scanner will not send the bar code data until it receives an Xon command from the host. If the host sends the Xoff command during data transmission, the host will receive additional characters for no more than 2ms¹.

Scan the SET bar code label then the Step #1, Step #2 below, followed by the END bar code labels to enable Xon/Xoff Control.


Enable Xon/Xoff Control



1. Timing varies slightly depending upon the baud rate selected.

Disable both CTS/RTS and Xon/Xoff Controls - disables both the CTS/RTS and Xon/Xoff software controls.

Scan the SET bar code label then the Step #1, Step #2 below, followed by the END bar code labels to disable both CTS/RTS and Xon/Xoff Control.

 <p>NOTE</p>	<p>To disable either CTS/RTS or Xon/Xoff, you must first DISABLE BOTH CTS/RTS and Xon/Xoff Control using the programming labels below. Then ENABLE the desired handshaking feature from page 25 or page 27.</p>
--	---

Disable both CTS/RTS and Xon/Xoff Control

SET ----- 

 Step #1 ----- 

Step #2 ----- 

END ----- 

**RS-232 ACK/
NAK Options**

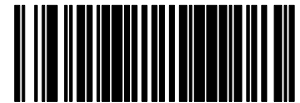
Several ACK/NAK parameters can be set for your scanner.

Options for RS-232 ACK/NAK are:

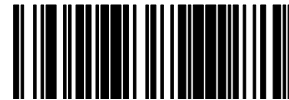
- Disable ACK/NAK
- Enable ACK/NAK for bar code transmission
- Enable ACK/NAK for host command acknowledge
- Enable ACK/NAK for bar code transmission and host command acknowledge

RS-232 ACK/NAK Options

SET -----



Disable ACK/NAK -----



Enable for Bar Code
Transmission -----



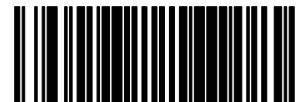
Enable for Host Command
Acknowledge -----



Enable for Bar Code
Transmission and
Host Command
Acknowledge -----

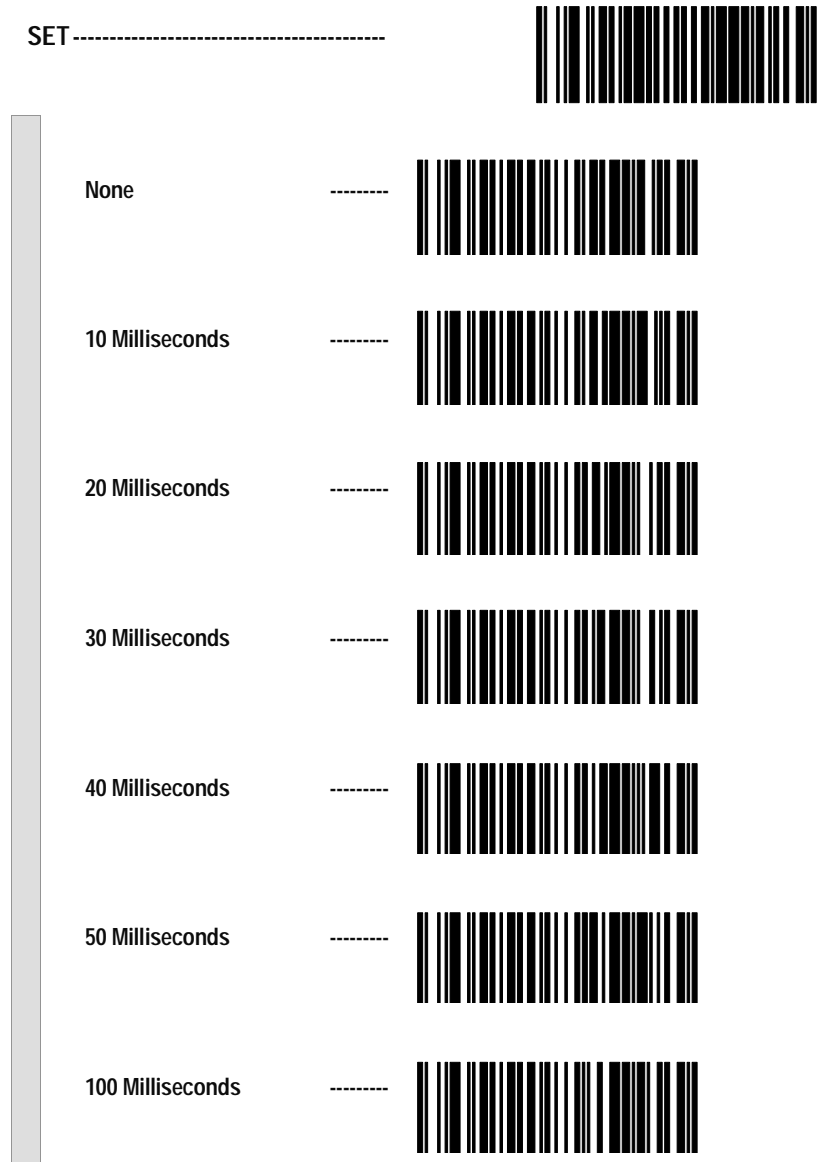


END -----



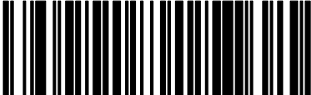
**RS-232
Intercharacter
Delay**

Intercharacter Delay refers to the pause, if any, between each character before it is sent to the host. This time delay is used to control the flow of data from the scanner.

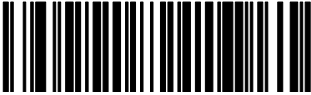




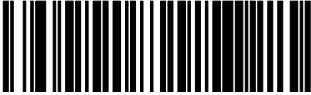
200 Milliseconds



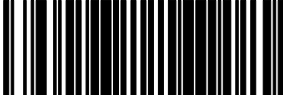
500 Milliseconds



1 Second



END



Keyboard Wedge Interface

This section contains the following PC Keyboard Wedge interface parameters in the order listed:

- Interface Selection
- Connect to a Laptop
- Caps Lock
- Country Mode
- Intercharacter Delay
- Quiet Interval

Go to the sections titled *Symbology Selection* starting on page 63 and *General Features* starting on page 130 if you want to change any other settings.



NOTE

If the transmission parameters are configured such that a label results in no actual data to send, the label will be accepted, beeped, and no data transmitted.

**PC Keyboard
Wedge
Interface
Selection**

This scanner supports a variety of PC Keyboard interfaces. The table below defines the different interface selections. Scan the corresponding bar code starting on page 34 to select the desired keyboard interface.

I/F Type	PCs Supported
A	PC/XT w/Alternate Key Encoding
B	AT, PS/2 25-286, 30-286, 50, 50Z, 60, 70, 80, 90 & 95 w/Alternate Key Encoding
C	PS/2 25 and 30 w/Alternate Key Encoding
D	PC/XT w/Standard Key Encoding
E	AT, PS/2 25-286, 30-286, 50, 50Z, 60, 70, 80, 90 & 95 w/Standard Key Encoding
F	PS/2 25 and 30 w/Standard Key Encoding
G	IBM 3xxx w/122 keyboard
H	IBM 3xxx w/102 keyboard
I	PS/55 5530T w/104 keyboard
J	NEC 9801



NOTE

We recommend that you disconnect power before plugging/unplugging cables to avoid any possibility of equipment damage.

Scan the bar codes corresponding to the applicable Keyboard type listed on page 33.

PC Keyboard Interface Type

SET ----- 



A ----- 

B ----- 

C ----- 

D ----- 

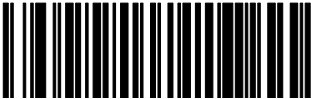
E ----- 

F ----- 

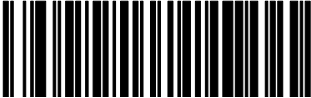
G ----- 



H



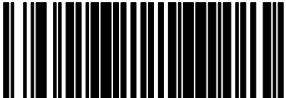
I



J



END -----



Connect to a Laptop/No Keyboard Attached

If no keyboard is attached, the scanner must provide the acknowledge signal to the PC. In this case, enable the "Laptop/No External Keyboard" mode. If a keyboard is attached, enable "Keyboard Attached."

Laptop (integrated keyboard) -provides the acknowledge signal to the PC when the scanner is connected to a laptop computer or when the scanner is operated with no external keyboard.

PC (external keyboard) - is enabled when the scanner is connected to a standard PC."

Send Control Characters - transmits all ASCII characters except NUL (00h) . Disabling this feature limits transmission of ASCII characters to the following:

- Only ASCII characters between 20h..127h, plus.
 - Carriage Return (CR=0Dh)
 - BackSpace (BS=08h)
 - Right Tab (HT=09h)
 - Left Tab (0Bh)
 - Esc (1Bh)

Send Function Character - transmits characters between 00H - IFH which are not in the normal ASCII set.

Scan the bar code below below to select the applicable option for connecting to a laptop or PC.

SET -----



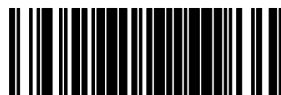
Connect to Laptop or PC



Laptop/No external Keyboard -----



Keyboard Attached -----



Send Control/Function Characters



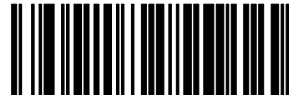
Enable Control Characters



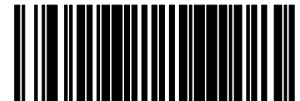
Enable Function Characters



Disable



END



Caps Lock Three caps lock settings are available. These are:

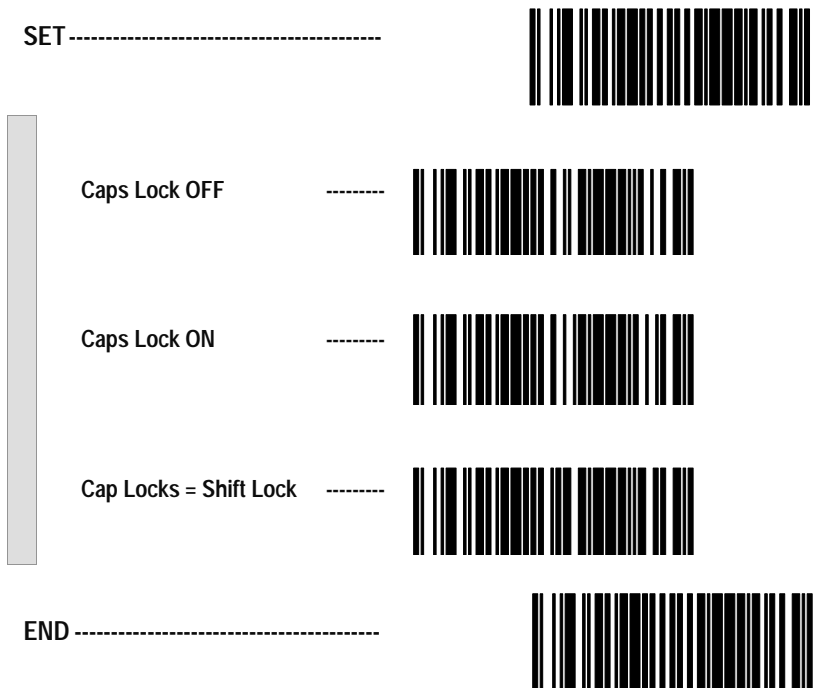
- Caps Lock Off - sends character data (to the host in normal format.
- Caps Lock On - sends character data (to the host) in reverse case:

(a.z) = (A.Z)

(A.Z) = (a.z)

Use this feature if your keyboard's caps lock key is on.

- Caps Lock = Shift-Lock - sends character data (to the host) in shifted case. Use this feature if you choose to use the keyboard with the shift lock key left on. **For use with interface type G (IBM 3xxx 122-keyboard) ONLY.**



Country Mode The following country/languages can be selected when configured for I/F Type E only:

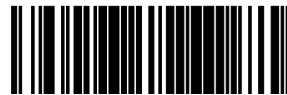
- USA
- France
- Portugal
- Japanese 106-Key
- Belgium
- Germany
- Spain
- Britain
- Italy
- Sweden
- Denmark
- Norway
- Switzerland

Scan the bar code below to selected the desired country.

SET-----



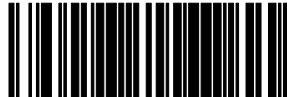
USA



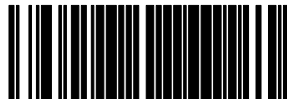
Belgium



Britain



Denmark

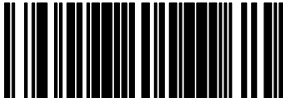


France

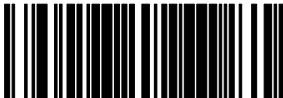




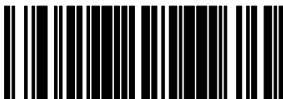
Germany



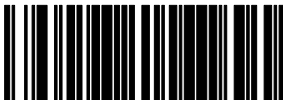
Italy



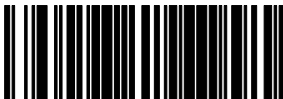
Norway



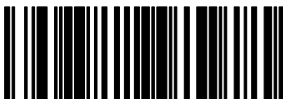
Portugal



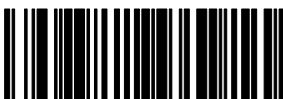
Spain



Sweden



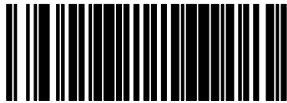
Switzerland



Japanese 106-Key

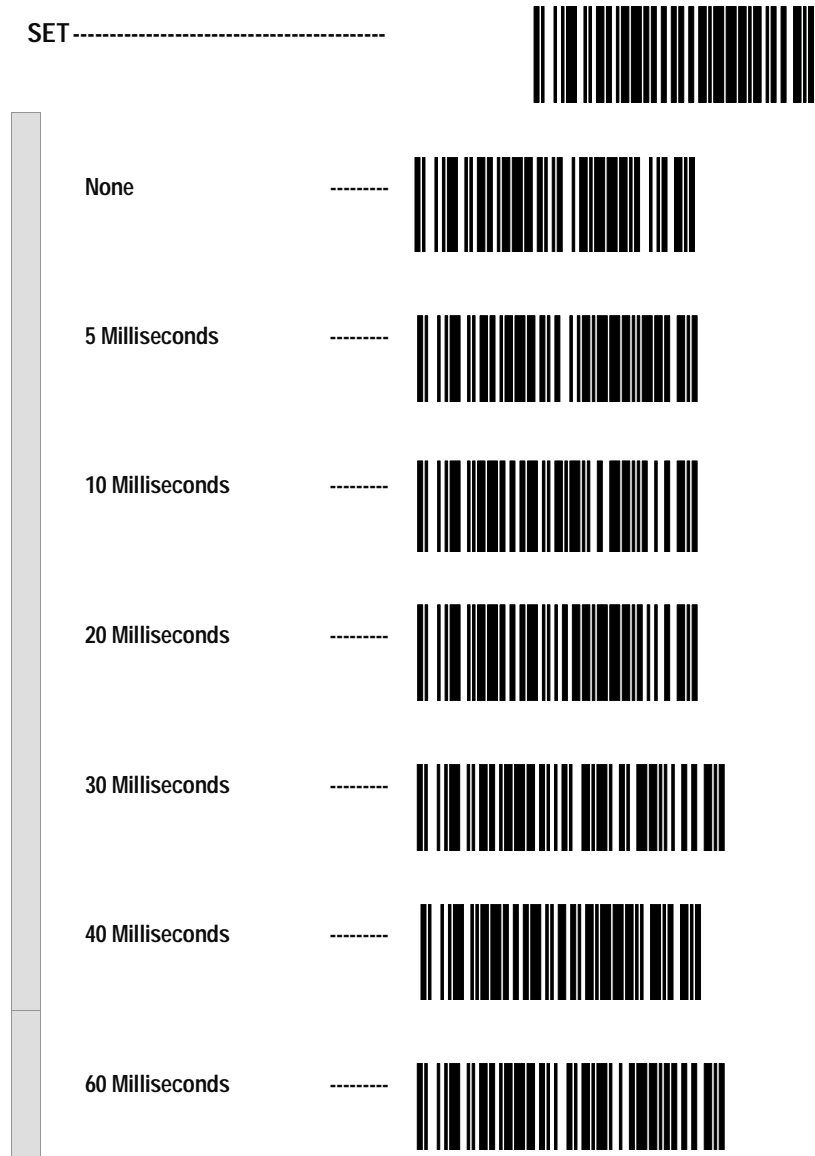


END -----



**Keyboard
Wedge
Intercharacter
Delay**

Intercharacter Delay refers to the pause, if any, between each character before it is sent to the host. This time delay is used to control the flow of data from the scanner. Use these labels to select the desired Intercharacter Delay.

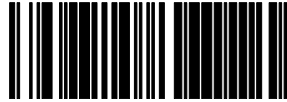




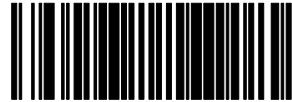
80 Milliseconds



90 Milliseconds



END



Quiet Interval Quiet Interval is the amount of time to look for keyboard activity before the scanner breaks the keyboard connection in order to transmit data to the host.

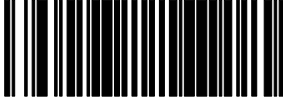




IBM Interface


The IBM Group supports:


- Port 5B
- Port 9B
- Port 17
- Port E


Scan the SET bar code to enter the programming mode, then scan the programming bar code below to activate the desired interface, followed by the END bar code to exit the programming mode and reset the scanner.

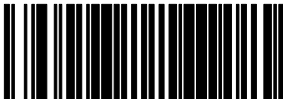
SET ----- 

 Enable Port 5B ----- 

Enable Port 9B ----- 

Enable Port 17 ----- 

Enable Port E ----- 

END ----- 

**Transmit
Labels in Code
39 Format**

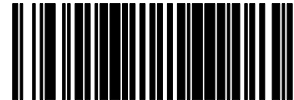
When this feature is enabled, the symbology identifier for the specified label will be set to Code 39 and the label will be transmitted. No data checking or conversion is done. Table 2 below shows the symbologies converted.

Table 2. Symbologies Converted to Code 39

Port	Symbology Converted
Port 5B	Code 128, Code 93, Codabar
Port 9B	Code 93, Codabar
Port 17	No Effect
Port E	No Effect

Scan the bar codes below to enable/disable the Conversion to Code 39 option.

SET -----



Enable Conversion to
Code 39



Disable Conversion to
Code 39



END -----



Label Transmit Configuration (RS-232 and Keyboard Wedge Interfaces only)

If you need to send information in addition to bar code label data, the scanner can be configured to transmit Global Prefixes (also known as preambles), Global Suffixes (also known as postambles), and symbol-ogy specific identifier characters (termed Label I.D.).

Prefix, Suffix, and Label I.D.

The table below shows examples of how Prefix, Suffix, and Label I.D. characters can be applied.

Column three contains the label data, while columns one, two, four and five contain the additional characters added by way of the Prefix, Label I.D. as Prefix, Label I.D. as Suffix, and Global Suffix respectively. The last column shows the resulting data that will be transmitted when the additional characters are applied.


 NOTE	<p>Using this feature requires a thorough understanding of your specific system requirements. If you have questions or need assistance with these features, call your system specialist or PSC technical support.</p>
--	---

Table 3. Prefix, Suffix, Label I.D. Examples

Global Prefix (00 = No Char.)		Label I.D. as Prefix		Label Data	Label I.D. as Suffix		Global Suffix (00 = No Char)		Resulting Label Format
1st Char	2nd Char	1st Char	2nd Char	(Examples)	1st Char	2nd Char	1st Char	2nd Char	
00	00	None		0998875	None		00	00	0998875
50	51	None		0011223344	None		000	000	PQ0011223344
00	00	46	46	00210126	None		00	00	FF00210126
50	51	41	00 ^a	00210126	None		00	00	PQA210126
00	00	None		\$99.95	25	00 ^a	00	00	\$99.95%
50	51	None		998875	25	00 ^a	00	00	PQ998875E
00	00	None		101234567891	None		53	57	10123456789SW
50	51	None		Code39Test	None		53	57	PQCode39TestSW
00	00	45	00 ^a	Code128	None		53	00	ECode128S
50	00	45	46	0998875	None		53	57	PFF0998875SW
00	00	None		0998875	46	46	53	57	0998875FFSW
50	51	None		0011223344	46	00*	53	57	PQ0011223344FSW

a. No second character

Setting Global Prefix(es)


One or two prefix characters may be added to the standard label format when desired. For the addition of more than two prefix characters, contact your distributor or technical support representative for Full Label Edit (FLE) options.


Identify your specific system requirements before adding or modifying these settings, then follow these steps:

1. Look at the ASCII chart shown on the inside back cover of this manual, and identify the ASCII character(s) and the corresponding Hex Code(s) for the ASCII characters you will use as prefixes.

For example, if you are going to send two prefix characters as 'STX' (start transmit) and 'SP' (Space), the ASCII chart shows that 'STX' equals 02 hex and 'SP' equals 20 hex.

2. Scan the SET bar code on page 48.
3. Scan the SET PREFIX bar code.
4. Turn to *Appendix C: Keypad* on page 147, and scan the four digits corresponding to the hex values determined in step one above. (For the example, scan 0, 2, 2, 0). Return to this page and go to step five.

 <p>NOTE</p>	<p>Successful programming of a prefix requires 4 digits.</p>
---	--

 <p>NOTE</p>	<p>If you make a mistake or lose your place while setting this option, scan the END bar code to exit Programming Mode. The scanner will sound a two-beep error tone to indicate that programming was incomplete, and the setting will remain as it was before entering Programming Mode.</p>
---	--

5. Scan the END bar code.

You have added a two character prefix to all bar code data, regardless of label symbology, that will be added to the label data before it is sent to the host.

Setting Global Prefix(es)



Setting Global Suffix(es)


One or two suffix characters may be added to the standard label format when desired. For the addition of more than two suffix characters, contact your distributor or technical support representative for Full Label Edit (FLE) options.


Identify your specific system requirements before adding or modifying these settings, then follow these steps:

1. Look at the ASCII chart shown on the inside back cover of this manual, and identify the ASCII character(s) and the corresponding Hex Code(s) for the ASCII characters you will use as suffixes.

For example, if you are going to send two suffix characters as 'LF' (Line Feed) and 'CR' (Carriage Return). The ASCII chart shows that 'LF' equals 0A hex and 'CR' equals 0D hex.

2. Scan the SET bar code on page 49.
3. Scan the Set Suffix bar code.
4. Turn to *Appendix C: Keypad* on page 147, and scan the four digits corresponding to the Hex Values determined in step one above. (For the example, scan 0, A, 0, D). Return to this page and go to step five.

 NOTE	<p>Successful programming of a suffix requires 4 digits.</p>
--	--

 NOTE	<p>If you make a mistake or lose your place while setting this option, scan the END bar code to exit Programming Mode. The scanner will sound a two-beep error tone to indicate that programming was incomplete, and the setting will remain as it was before entering Programming Mode.</p>
--	--

5. Scan the END bar code.

You have added a two character suffix to all bar code data, regardless of label symbology, that will be added to the label data before it is sent to the host.

Setting Global Suffix(es)





**Single
Character
Prefix or Suffix**

The scanner will not transmit a prefix, or suffix character if its hex value is set to zero. To set a prefix or suffix that has only one character, follow these steps:

1. Scan the SET bar code on page 51.
2. Scan SET PREFIX or SET SUFFIX bar code.
3. Turn to the keypad (*Appendix C: Keypad* on page 147) and scan the two-digit hex code that represents your desired character (refer to the ASCII chart on the inside back cover of this manual for this conversion).
4. Scan the digit '0' two times to disable transmission of a second character.

For example, if 'Space' (SP) is desired, the chart shows that the corresponding hex code for 'SP' is 20, thus you would scan the digit 2, then the digit 0 for the first character, followed by 00 digits from the keypad for the second character, (e.g., scan 2,0,0,0). Return to this page and go to step five.

 <p>NOTE</p>	<p>Successful programming of a prefix or suffix requires 4 digits.</p>
--	--

 <p>NOTE</p>	<p>If you make a mistake or lose your place while setting this option, scan the END bar code to exit Programming Mode. The scanner will sound a two-beep error tone to indicate that programming was incomplete, and the setting will remain as it was before entering Programming Mode.</p>
---	--

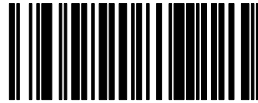
5. Scan the END bar code on page 51.

Setting a Single Character Prefix/Suffix

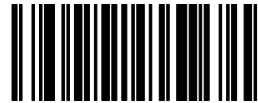
SET -----



Set Prefix



Set Suffix



END -----

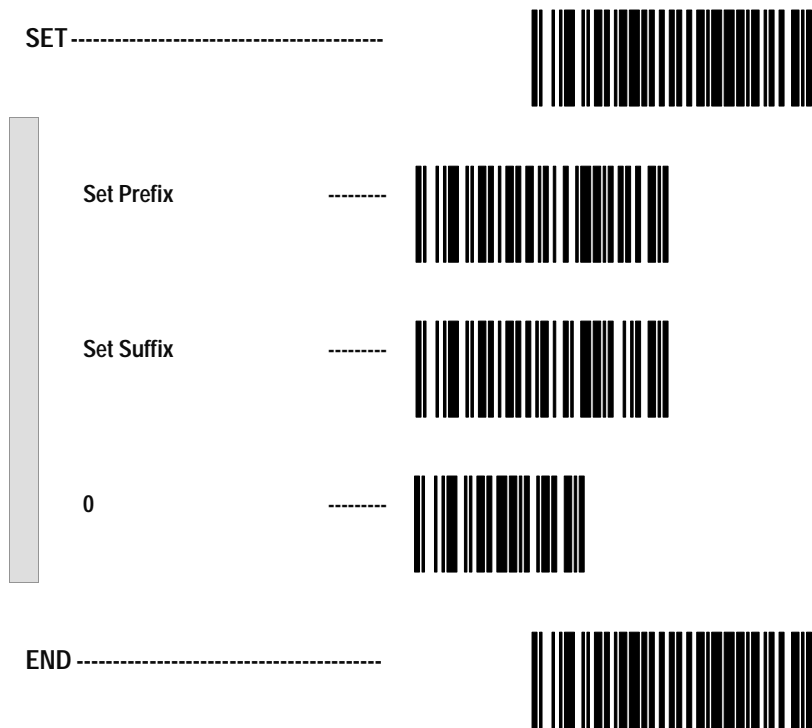


Disabling Prefix or Suffix

To disable global prefix or suffix characters, follow these instructions:

1. Scan the SET bar code below.
2. Scan SET PREFIX or SET SUFFIX.
3. Scan the digit '0' four times to disable the prefix or suffix characters. Go to step four.
4. Scan the END bar code.

Disabling Global Prefix/Suffix Characters



Setting Label I.D. Setting the Label I.D. feature can be a complex task requiring multiple steps to enable all necessary options. You'll want to familiarize yourself with the contents of this section before proceeding. Here is a brief listing of the order of its contents:

- Label Identifiers
- Setting Label I.D. Locations
- Setting Label I.D. Characters by Symbology
- Label I.D. Symbology Selection
- Setting Single Character Label I.D.
- Disabling Label I.D. for a Specific Symbology

Label Identifiers Symbology-specific label identifiers comprise one or two ASCII characters that can precede or follow bar code label data as it is transmitted to the host. The host may use these characters as a means of distinguishing between symbologies.


Industry standards have been established for symbology-specific label identifiers, and are listed in the table below. Most scanners will have factory default identifiers preset to these standards.

Table 4. Industry Standard Label Identifiers (all are prefixes)

Symbology	ID	Symbology	ID
UPC-A	A	EAN-8 (8 Add-ons)	FF
UPC-E	E	EAN-13 (2 Add-ons)	F
EAN-8	FF	EAN-13 (5 Add-ons)	F
EAN-13	F	EAN-13 (8 Add-ons)	F
UPC-A (2 Add-ons)	A	Code 39	*
UPC-A (5 Add-ons)	A	PharmaCode	A
UPC-A (8 Add-ons)	A	Codabar	%
UPC-E (2 Add-ons)	E	Interleaved 2 of 5	i
UPC-E (5 Add-ons)	E	Standard 2 of 5	i
UPC-E (8 Add-ons)	E	Code 93	&
EAN-8 (2 Add-ons)	FF	Code 128	#
EAN-8 (5 Add-ons)	FF	UCC/EAN 128	None
		MSI/Plessey	@

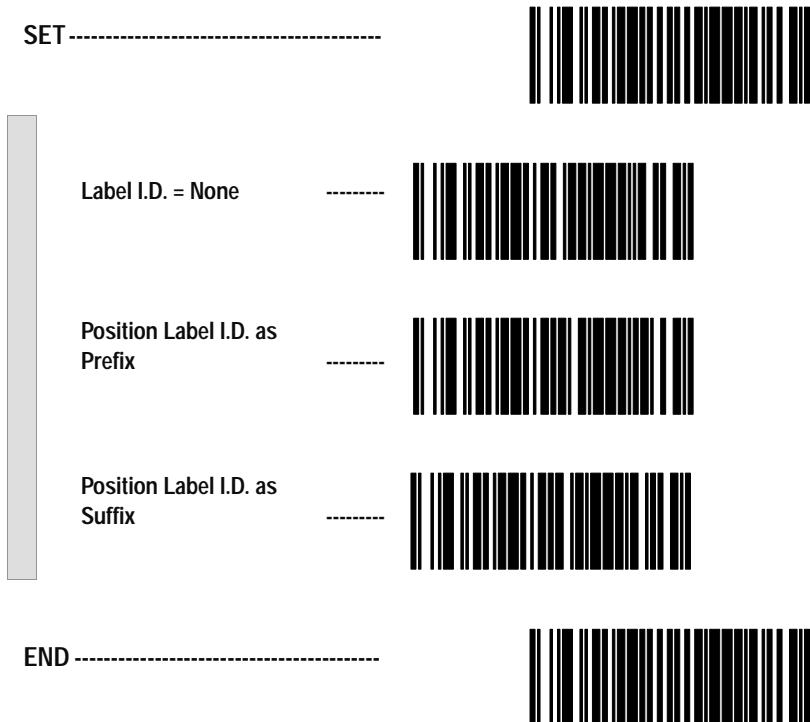
Setting Label I.D. Location Use the following bar codes to choose the position where Label I.D. characters will be placed in relation to scanned label data:

- None (no Label I.D.), (e.g., prefix, label data, suffix)
- Prefix (before), (e.g., prefix, **label I.D.**, label data, suffix)
- Suffix (after) , (e.g., prefix, label data, **label I.D.**, suffix).

 NOTE	<p>Your selection (prefix, suffix, or none) will apply universally to all symbologies and cannot be individually selected for each.</p>
--	---

1. Scan the SET bar code.
2. Scan the bar code for the desired position.
3. Scan the END bar code.

Setting Label I.D. Location



**Setting Label
I.D. by
Symbology**

To set symbology-specific label identifiers (Label I.D.):

1. Look at the ASCII chart on the inside back cover, and identify the ASCII character(s) and the corresponding Hex Code(s) for the ASCII characters you will use as identifiers.

For example: You need to change the Label I.D. for UPC-A to 'A1'.

2. Scan the SET bar code on page 56.
3. Scan the bar code starting on page 56 representing the symbology whose Label I.D. you wish to modify. Scan only one symbology type per programming session.

In our example, we would scan the 'UPC-A' symbology bar code.

4. Identify and scan the four digits from the *Appendix C: Keypad* on page 147 that correspond to the Hex Values you determined in step one above. Return to this page and go to step five.

The hex values from the ASCII chart that correspond to 'A1' from our example are as follows: 41 hex = 'A', and 31 hex = '1'. Thus, we would scan digit programming bar codes in this order: 4, 1, 3, 1.

5. Scan the END bar code on page 58.



NOTE

Successful programming requires 4 digits for the Label I.D.

You have changed the default Label I.D. for UPC-A from 'A' to 'A1'.

**Label I.D.
Symbology
Selection**

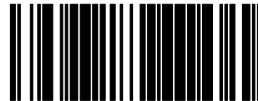
Scan the bar code representing the symbology whose label you want to modify. Scan only one symbology type per programming session.

Setting Label I.D. Characters by Symbology

SET -----



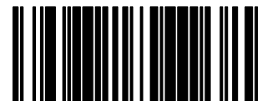
Code 39



PharmaCode 39



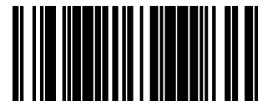
Code 128



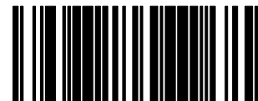
UCC/EAN 128



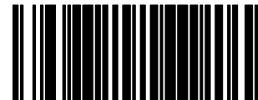
Interleaved 2 of 5



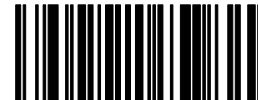
Codabar



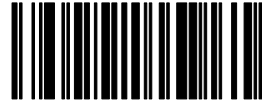
UPC-A



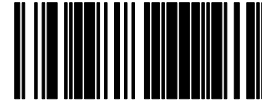
UPC-A w/2 digit
Add-ons



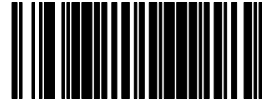
UPC-A w/5 digit
Add-ons



UPC-A w/C128
Add-ons



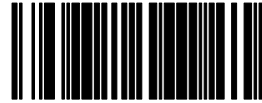
UPC-E



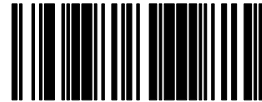
UPC-E w/2 digit
Add-ons



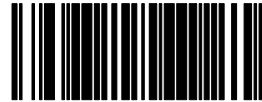
UPC-E w/5 digit
Add-ons



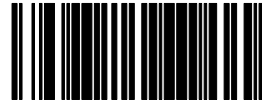
UPC-E w/C128
Add-ons



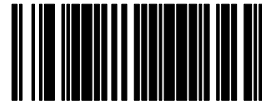
EAN-13



EAN-13 w/2 digit
Add-ons



EAN-13 w/5 digit
Add-ons



EAN-13 w/C128
Add-ons





EAN-8



EAN-8 w/2 digit
Add-ons



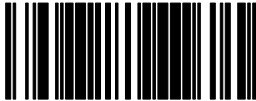
EAN-8 w/5 digit
Add-ons



EAN-8 w/C128
Add-ons



Code 93



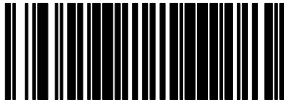
Standard 2 of 5



MSI/Plessey



END -----



Setting Single Character Label I.D.

The scanner will not transmit a label I.D. character if its hex value is set to zero. If you have determined that you need a Label I.D. that contains only a single character, follow this modified procedure:

1. Scan the SET bar code on page on page 56.
2. Scan your selection from the list starting on page 56 for the symbology identifier you plan to change.

For example, scan the EAN-8 bar code to select that symbology.

3. Turn to the keypad (*Appendix C: Keypad* on page 147) and scan the two-digit hex code that represents your desired character (refer to the ASCII chart on the inside back cover of this manual for this conversion).
4. Scan the digit '0' *two* times to disable transmission of a second character. Return to this page.

As an example, assume that you want to change the Label I.D. for EAN-8 from the default setting "FF" to the single character "8". In this example, note that the chart shows that the ASCII character '8' is equivalent to 38 hex, therefore the digits 3, then 8 should be scanned followed by two zeros (00) to indicate a single character I.D. (e.g., scan 3,8,0,0)

5. Scan the END bar code on page 58.



NOTE

Successful programming requires 4 digits for the Label I.D.



NOTE

If you make a mistake or lose your place while setting this option, scan the END bar code to exit Programming Mode. The scanner will sound a two-beep error tone to indicate that programming was incomplete, and the setting will remain as it was before entering Programming Mode.

Disabling Label I.D. for a Specific Symbology

This procedure is the same as Setting Single Character Label I.D. above, except you should scan *four* zeros before scanning the END bar code.

Symbologies Supported

Symbology selection (bar code type) determines which symbologies the scanner will decode. The chart below shows the symbologies that are supported by each interface. Once you have identified the symbologies you wish to enable, turn to the following pages, enable those symbologies and set the data format options (e.g. check digit, start/stop characters) required by your host system for each symbology type. You must enable the symbology format options settings that are compatible with your host system.

The factory settings for each interface were chosen to meet the standard industry requirements and in most cases you will not need to change the symbology format settings. If you are unsure of your system requirements, test the scanner using the factory settings before making any changes.

SYBLOGIES SUPPORTED

● = Supports this symbology

INTERFACE TYPE	Code 39/PharmaCode	Code128	EAN 128	Interleaved 2 of 5	Codabar	UPC-A & E, EAN-13 & 8	UPC/EAN w/P2 Add-ons	UPC/EAN w P5 Add-ons	UPC/EAN w/C128 Add-ons	Code 93	Standard 2 of 5/IATA	MSI/Plessey
RS-232-STD	●	●	●	●	●	●	●	●	●	●	●	●
WN*-RS-232	●	●	●	●	●	●	●	●	●	●	●	●
Wand Emulation	●	●	●	●	●	●	●	●	●	●	●	●
Keyboard Wedge (all subtypes)	●	●	●	●	●	●	●	●	●	●	●	●
IBM Port 5B	●	●		●	●	●	●	●	●	●		
IBM Port 9B	●	●		●	●	●	●	●	●	●	●	
IBM Port 17	●	●		●	●	●	●	●	●	●		
IBM Port E	●	●		●	●	●	●	●	●	●		


*Wincor Nixdorf

Symbology Overview

This section provides a brief descriptions of each of the many symbology features and options available.

Enable Code 39 - selects Code 39 as an active symbology and allows selection of Check Digit, Start/Stop and Single Digit options.

Enable PharmaCode 39 - is a symbology subset of Code 39. Enabling PharmaCode 39 allows the scanner to read both PharmaCode 39 and Standard Code 39 labels.

 <p>NOTE</p>	<p>Standard Code 39 must be enabled before PharmaCode can be enabled.</p>
---	---

Enable Code 128 - selects Code 128 as an active symbology. The scanner is preset to recognize all Code 128 bar codes that have between 1 and 50 characters.

Enable UCC/EAN 128 - chooses EAN 128 as an active symbology. The Automatic Identification Manufacturers, Inc. of the United States (AIM USA) have standardized the reporting of data sources from bar code reading devices. Sending the AIM symbology prefix identifies the symbology to the host terminal, allowing it to specifically differentiate between UCC/EAN-128 (Code 128 with Function Character 1 in the first position) and standard Code 128 symbols. When this feature is disabled, the host cannot differentiate between these symbols.

Enable Interleaved 2 of 5 - selects Interleaved 2 of 5 as an active symbology. Allows change of Check Digit or label format (fixed or variable length) options.

Enable Codabar - selects Codabar as an active symbology. Allows selection of Check Digit, Start/Stop character and format, or label format (fixed or variable length) options.

Enable UPC-A - enables UPC-A as an active symbology. If you enable this symbology, additional options for symbology expansion and reading add-ons are available.

Enable UPC-E - tells the scanner to recognize UPC-E as an active symbology. Like UPC-A, UPC-E offers options for symbology expansion and reading of add-ons.

Enable EAN-13 - selects EAN-13 as an active symbology. EAN-13 options are similar to those of the EAN-8 symbology.

Enable EAN-8 - selects EAN-8 as an active symbology. EAN-8 symbology selection also allows options for symbology expansion and reading of add-ons.

Enable Code 93 - enables Code 93 as an active symbology. The scanner is preset to recognize all Code 93 bar codes that have between 1 and 50 characters.

Enable Standard 2 of 5 - selects Standard 2 of 5 as an active symbology. Options for this symbology are similar to Interleaved 2 of 5 features.

IATA - is a special symbology subset of Standard 2 of 5. Enabling IATA selects this custom code as the active Standard 2 of 5 symbology (superseding any other Standard 2 of 5 features).




NOTE

Standard 2 of 5 must be enabled in order for IATA to be active, however, when IATA is enabled, Standard 2 of 5 will not be decoded.

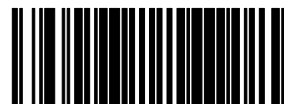
Enable MSI/Plessey - selects MSI/Plessey as an active symbology. Allows selection of Check Digit or label format (fixed or variable length) options.


Symbology Selection

The bar code programming labels on the following pages allow you to enable specific symbologies or disable all symbologies.

 <p>NOTE</p>	<p>If you enable a symbology that has additional features that should be set, turn to the pages that support that symbology and its programmable features.</p>
--	--

SET -----



 <p>NOTE</p>	<p>To optimize your scanner's performance, first disable all symbologies by scanning the DISABLE ALL SYMBOLOGIES bar code, then enable ONLY those symbologies required by your site.</p>
--	--

Disable all Symbologies -----



Symbology Selections

Enable Code 39 -----



Enable
PharmaCode 39^a -----



Enable Code 128



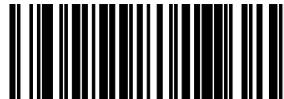
Enable UCC/EAN 128



Enable Interleaved
2 of 5



Enable Codabar



Enable UPC-A



Enable UPC-E



Enable EAN-13



Enable EAN-8

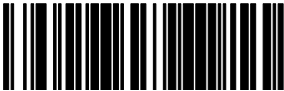


Enable Code 93

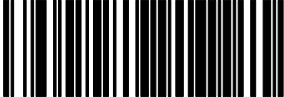




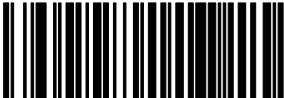
Enable Standard 2 of 5 -----



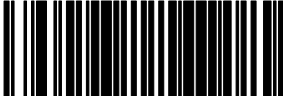
Enable IATA^b -----



Enable MSI/Plessey -----



END -----



- a. Code 39 must first be enabled for the scanner to read PharmaCode 39 labels.
- b. Standard 2 of 5 must first be enabled for IATA to be active, however, when IATA is enabled, Standard 2 of 5 will not be decoded.

Symbology Options

After enabling the desired symbology, you can use the bar codes labels in this section to configure the specific options/features required for your site.

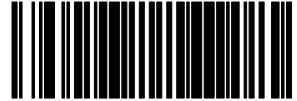
Code 39/PharmaCode 39

- Code 39 Options** The Code 39 symbology has the following programmable features:
- Check Digit
 - Start/Stop Characters
 - Code 39 Full ASCII
 - Minimum Label Length
 - Read Verification
 - QuadraLogic Decoding
- Check Digit** Check Digit calculates the Check Digit to verify that the Check Digit contained in the bar code label is correct. If you enable this feature, your bar codes must contain a Check Digit.
- Start/Stop Characters** Start/Stop Characters selects either Send or Don't Send depending on your host's interface requirement.
- Code 39 Full ASCII** Code 39 Full ASCII enables or disables the ability to decode Code 39 Full ASCII labels.
- Minimum Label Length** Minimum Label Length sets the minimum label length required for the Code 39 symbology. This feature causes the scanner to ignore small label segments, reducing the possibility that a portion of a good label is incorrectly seen as an entire label.
- Read Verification** Read Verification is the number of times the scanner is required to read the bar code data before sending the label data to the host.
- QuadraLogic Decoding** QuadraLogic Decoding directs the scanner to decode labels with wide-spread problems of spots, voids, and/or non-uniform widths.
- To optimize your scanner's performance activate this option only for symbologies for which it is necessary.
- There are many additional ways to configure the scanner to read and decode extremely poor labels. Contact your sales representative or service provider for other advanced QuadraLogic Decoding settings.

**Configuring
the Code 39
Options**

Use the special bar codes in this section to configure the Code 39 options

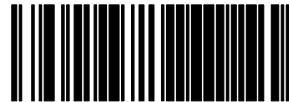
SET -----



Check Digit



Don't Calculate -----



Calculate -----



Don't Transmit -----



Transmit -----



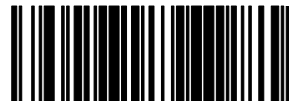
Start/ Stop



Don't Transmit -----



Transmit -----



Code 39 Full ASCII



Minimum Label Length

Follow these steps to set Code 39 Minimum Label Length:

1. Identify the minimum label length setting you want to make. The selectable range is 00 to 48¹ characters.
2. Scan the SET bar code.
3. Scan the SET MINIMUM LABEL LENGTH bar code.
4. Set the minimum label length by scanning the applicable digits from the bar codes on page 70. Return to this page and go to step five.



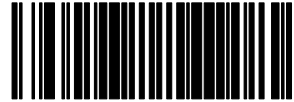
NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

5. Scan the END barcode.

Minimum Label Length

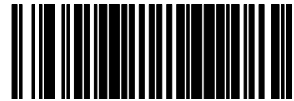
SET -----



Set Minimum Label Length



END -----

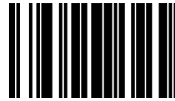


1. For this symbology, the scanner will decode up to 48 characters, but the actual length read will vary depending upon interface type, and bar code physical size and quality. Code 39 bar codes containing one or more full ASCII characters can also limit the amount of characters that will be decoded (in these circumstances, the scanner will decode at least 24 data characters).

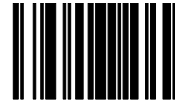
Digits



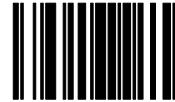
0



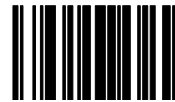
1



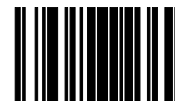
2



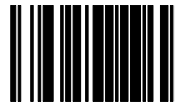
3



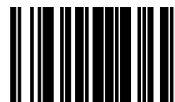
4



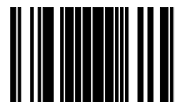
5



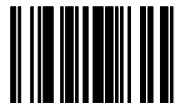
6



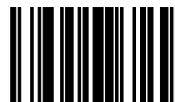
7




8

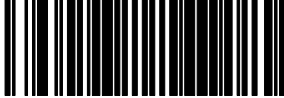
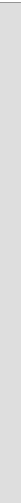




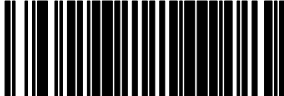


9



Read Verification Scan the bar codes below to set the minimum number of reads required to verify Code 39/Pharmacode 39 symbologies.

 <p>NOTE</p>	<p>The more times the scanner is required to read and compare the bar codes data, the longer the scanner will take to validate and transmit a label.</p>
--	--

	SET -----	
	Set to One read -----	
	Set to Two reads -----	
	Set to Three reads -----	
	Set to Four reads -----	
	END -----	

**QuadraLogic
Decoding**

Scan these bar codes to activate/deactivate the QuadraLogic Decoding feature for Code 39/PharmaCode 39 symbologies.



**PharmaCode
39 Options**

PharmaCode 39 symbology has the following programmable features:

- Transmit Check Digit
- Start/Stop Characters

**Transmit Check
Digit**

Transmit Check Digit selects whether the Check Digit will/won't be transmitted to the host terminal.

**Start/Stop
Characters**

Start/Stop Characters directs the scanner to either Send or Don't Send depending on your host's interface requirement.



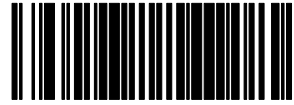
NOTE

In order for PharmaCode 39 labels to be read and transmitted as PharmaCode 39, the Code 39 symbology must first be enabled.

**Configuring
the
PharmaCode
39 Options**

Scan the bar codes below to configure the PharmaCode 39 options for Check Digit and Start/Stop Characters.

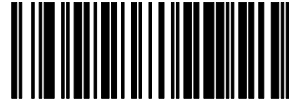
SET -----



Check Digit



Don't Transmit -----



Transmit -----



Start/Stop



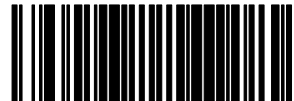
Don't Transmit -----



Transmit -----



END -----



Code128 and UCC/EAN 128 Options

The Code 128 and UCC/EAN 128 symbologies have the following programmable feature.

- Minimum Label Length
- Read Verification
- QuadraLogic Decoding

Setting Minimum Label Length	Setting Minimum Label Length sets the minimum length required for Code 128 and UCC/EAN symbology. This feature causes the scanner to ignore small label segments, reducing the possibility that a portion of a good label is incorrectly seen as an entire label.
Read Verification	Read Verification is the number of times the scanner is required to read the bar code data before sending the label data to the host.
QuadraLogic Decoding	<p>QuadraLogic Decoding directs the scanner to decode labels with widespread problems of spots, voids, and/or non-uniform widths.</p> <p>To optimize your scanner's performance activate this option only for symbologies for which it is necessary.</p> <p>There are many additional ways to configure the scanner to read and decode extremely poor labels. Contact your sales representative or service provider for other advanced QuadraLogic Decoding settings.</p>

Configuring the Code 128/ and UCC/EAN 128 Options

Use the bar codes in this section to configure the Code 128 and UCC/EAN 128 options.

Minimum Label Length

Follow these steps to set Code 128 and UCC/EAN 128 Minimum Label Length.

1. Identify the minimum length setting you want to make. The selectable range is 00 to 50¹ characters.
2. Scan the SET bar code on page 75.
3. Scan the SET MINIMUM LABEL LENGTH bar code.
4. Set the minimum label length by scanning the applicable digits from the bar codes on page 76. Return to this page and go to step five



NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

5. Scan the END bar code

Minimum Label Length

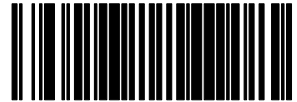
SET -----



Set Minimum Label Length -----



END -----

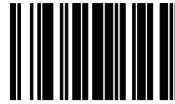


1. The scanner will decode up to 50 characters, but the actual length read will vary depending upon interface type, the physical size of the bar codes, print quality and whether the bar code data consists of Code 128 code set A, set B, or set C characters. (The C128 character set C allows for more densely packed data, thus if the bar code includes all or mostly C128 set C characters, more characters can be decoded).

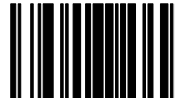
Digits



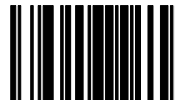
0



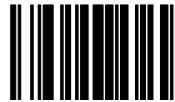
1



2



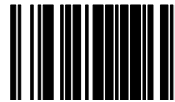
3



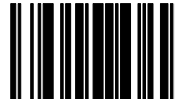
4



5



6



7




8

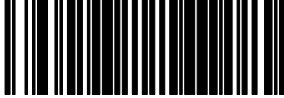
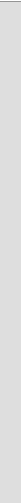




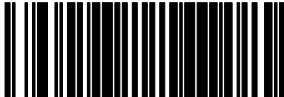


9



Read Verification Scan the bar codes below to set the minimum number of reads required to verify Code 128 and UCC/EAN symbologies.

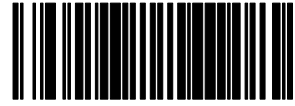
 <p>NOTE</p>	<p>The more times the scanner is required to read and compare the bar codes data, the longer the scanner will take to validate and transmit a label.</p>
--	--

	SET -----	
	Set to One read -----	
	Set to Two reads -----	
	Set to Three reads -----	
	Set to Four reads -----	
	END -----	

**QuadraLogic
Decoding**

Scan these bar codes to activate/deactivate the QuadraLogic Decoding feature for the Code 128 and UCC/EAN 128 symbologies.

SET -----



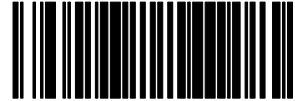
Activate for C128 and
UCC/EAN 128 -----



Deactivate for C128 and
UCC/EAN 128 -----



END -----



Interleaved 2 of 5 Options

The Interleaved 2 of 5 symbology has the following programmable features:

- Check Digit
- Label Length Format
- Read Verification
- QuadraLogic Decoding

Check Digit Check Digit calculates the Check Digit to verify that the Check Digit contained in the bar code label is correct. If you enable this feature, your bar codes must contain a Check Digit.

If the Check Digit is not calculated, the digit will be sent regardless of settings for transmit or don't transmit. For example, if you choose to Transmit Check Digit, but not calculate, the scanner sends the Check Digit encoded in the bar code without verifying its accuracy.

Label Length Format Label length format permits the selection between variable length or fixed length formats. For best performance it is recommended to use the Fixed Length settings when your application requires only one or two label lengths.

Variable Length Format - directs the scanner to read all labels from the minimum label length to 50. Set Minimum Length as high as your application allows.

Minimum Label Length - selects the minimum label length that the scanner will recognize. The minimum label length for this symbology must be an *even* number of characters between 02 and 50¹.

Fixed length Format - directs the scanner to read only one or two label lengths.

If you select fixed length format, there are three bar code labels for programming your scanner to read either one or two fixed lengths. The labels are:

Set First Fixed Length - instructs the scanner that the next two programming labels scanned will define the first fixed label length. This setting can be any *even* number of characters between 02 and 50¹ characters.

1. For this symbology, the scanner will decode up to 50 characters, but the actual length read will vary depending upon the interface type, and bar code physical size and quality.

Set Second Fixed Length - instructs the scanner that the next two programming labels scanned will define the second fixed label length. This setting can be any *even* number of characters between 02 and 50¹ characters.

No Second Fixed Length - configures the scanner to recognize only the first fixed length.

Read Verification Read Verification is the number of times the scanner is required to read the bar code data before sending the label data to the host.

QuadraLogic Decoding QuadraLogic Decoding directs the scanner to decode labels with wide-spread problems of spots, void, and/or non-uniform widths.

To optimize your scanner's performance activate this option only for symbologies for which it is necessary.

There are many additional ways to configure the scanner to read and decode extremely poor labels. Contact your sales representative or service provider for other advanced QuadraLogic Decoding settings.

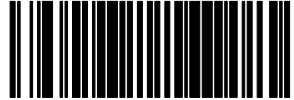
1. For this symbology, the scanner will decode up to 50 characters, but the actual length read will vary depending upon the interface type, and bar code physical size and quality.

**Configuring
the Interleaved
2 of 5 Options**

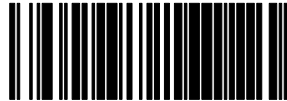
Use the special bar codes in this section to configure the Interleaved 2 of 5 symbology options.

Check Digit

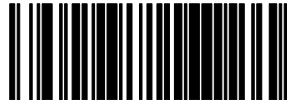
SET -----



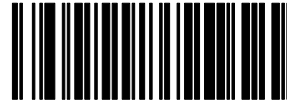
Don't Calculate -----



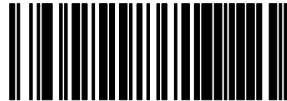
Calculate -----



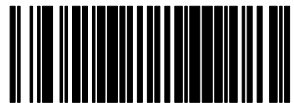
Don't Transmit -----



Transmit -----



END -----



Label Length Format

Follow the steps below to set the Interleaved 2 of 5 label Length Format to select either the *Variable Length* or *Fixed Length Format*.

Variable Length Format

Follow the steps below to set the Interleaved 2 of 5 symbology to Variable Length Format.

1. Identify the minimum length setting you want to make. The selectable range is any *even* number between 02 to 50¹ characters.
2. Scan the SET bar code below.
3. Scan the ENABLE VARIABLE LENGTH FORMAT bar code.
4. Scan the SET MINIMUM LABEL LENGTH bar code.
5. Set the minimum label length by scanning the correct digits from page 85. Return to this page and go to step six.



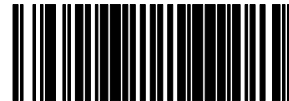
NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

6. Scan the END bar code.

Variable Length Format

SET -----



Enable Variable Length Format -----



Set Minimum Label Length -----



END -----



1. For this symbology, the scanner will decode up to 50 characters, but the actual length read will vary depending upon the interface type, and bar code physical size and quality.

Fixed Length Format

All interfaces that are shipped with the standard factory configuration are set to read variable length labels. If you switch from the variable to fixed length format, the default label lengths are 14 characters and 8 digits. All fixed length settings must be an *even* number.

Follow the steps below to set Interleaved 2 of 5 symbology to Fixed Length Format.

1. Identify the fixed length settings you want to make.
2. Scan the SET bar code.
3. Scan the ENABLE FIXED LENGTH FORMAT bar code.
4. Scan the SET FIRST FIXED LENGTH bar code.
5. Set the first fixed label length by scanning the digit bar codes from page 85 (even number only). Return to this page.



NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

If you need to set a second fixed length, continue to step six. If you do not need to set a second fixed length skip to step nine.

6. Scan the SET SECOND FIXED LENGTH bar code.
7. Set the second fixed label length by scanning the applicable digit bar codes from page 85.
8. Return to this page and go to step ten.



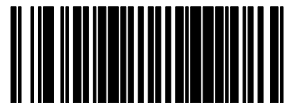
NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

9. Scan the NO SECOND FIXED LENGTH bar code.
10. Scan the END bar code.

Fixed Length Format

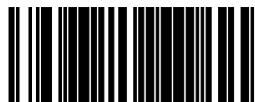
SET -----



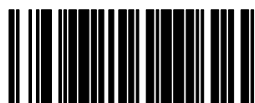
Enable Fixed Length
Format -----



Set First Fixed Length -----



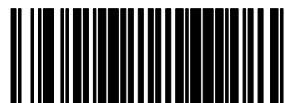
Set Second Fixed Length -----






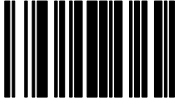

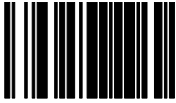




No Second Fixed Length -----



END -----



Digits

0	-----	
1	-----	
2	-----	
3	-----	
4	-----	
5	-----	
6	-----	
7	-----	
8	-----	
9	-----	

Read Verification Scan the bar codes below to set the number of reads desired to verify Interleaved 2 of 5 symbology.



NOTE

The more times the scanner is required to read and compare the bar codes data, the longer the scanner will take to validate and transmit a label.

SET -----



Set to One read



Set to Two reads



Set to Three reads



Set to Four reads



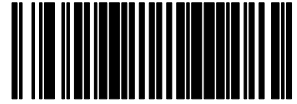
END -----



**QuadraLogic
Decoding**

Scan these bar codes to activate/deactivate the QuadraLogic Decoding feature for Interleaved 2 of 5 symbology.

SET -----



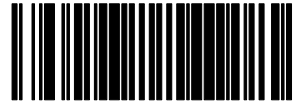
Activate for Interleaved
2 of 5 -----



Deactivate for Interleaved
2 of 5 -----



END -----



Codabar Options

The Codabar symbology has the following programmable features:

- Check Digit
- Gap Check
- Label Length Format
- Start/Stop Character
- Start/Stop Match
- Start/Stop Format
- Read Verification
- QuadraLogic Decoding

Check Digit Check Digit calculates the Check Digit to verify the label's contents have been read correctly. If you enable this feature, your labels must include a Check Digit. You may also choose to transmit or not transmit the Check Digit.

If the Check Digit is not calculated, the digit will be sent regardless of settings for transmit or don't transmit. For example, if you choose to Transmit Check Digit, but not calculate, the scanner sends the Check Digit encoded in the label without verifying its accuracy.

Gap Check Disabling Gap Check allows the scanner to combine two label halves printed in close proximity to each other that may have been printed at different times and perhaps different locations.

Label Length Format Label length format permits the selection between variable length or fixed length formats. For best performance it is recommended to use the Fixed Length settings when your application requires only one or two label lengths.

Variable Length Format - directs the scanner to read all labels from minimum label length to 50. Set Minimum Length as high as your application allows.

Minimum Label Length - selects the minimum label length that the scanner will recognize. The minimum label length for this symbology must be between 03 and 50¹.

Fixed length Format - directs the scanner to read only one or two label lengths.

1. For this symbology, the scanner will decode up to 50 characters, but the actual length read will vary depending upon the interface type, and bar code physical size and quality.

If you select fixed length format, there are three bar code labels for programming your scanner to read either one or two fixed lengths. The labels are:

Set First Fixed Length - instructs the scanner that the next two programming labels scanned will define the first fixed label length. This setting must be between 03 and 50¹ characters.

Set Second Fixed Length - instructs the scanner that the next two programming labels scanned will define the second fixed label length. This setting must be between 03 and 50¹ characters.

No Second Fixed Length - configures the scanner to recognize only the first fixed length.

Start/Stop Characters	Start/Stop Characters can be either Send or Don't Send depending on your host's interface requirement. Refer to your host user's manual to identify your system requirements.
Start/Stop Match	Start/Stop Match can be enabled or disabled.
Start/Stop Format	Start/Stop Format can be set to one of four standard format options: ABCD/TN*E, ABCD/ABCD, abcd/tn*e, or abcd/abcd. This setting must match your system requirements. If you select one of these options, it determines how the ASCII characters A, B, C, D (used for Start/Stop characters) are translated before being sent to the host.
Read Verification	Read Verification is the number of times the scanner is required to read the bar code data before sending the label data to the host.
QuadraLogic Decoding	<p>QuadraLogic Decoding directs the scanner to decode labels with wide-spread problems of spots, voids, and/or non-uniform widths.</p> <p>To optimize your scanner's performance activate this option only for symbologies for which it is necessary.</p> <p>There are many additional ways to configure the scanner to read and decode extremely poor labels. Contact your sales representative or service provider for other advanced QuadraLogic Decoding settings.</p>

1. For this symbology, the scanner will decode up to 50 characters, but the actual length read will vary depending upon the interface type, and bar code physical size and quality.

Configuring the Codabar Options

Use the special bar codes in this section to configure the Codabar symbology options.

SET -----



Check Digit



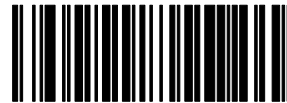
Don't Calculate -----



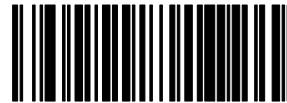
Calculate -----



Don't Transmit -----



Transmit -----



Gap Check



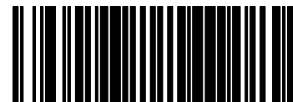
Enable -----



Disable -----



END -----




Label Length Format

Follow the steps below to set the Codabar label Length Format to select either the *Variable Length* or *Fixed Length Format*.

Variable Length Format

Follow the steps below to set the Codabar symbology to Variable Length Format.

1. Identify the minimum length setting you want to make. The selectable range is 03 to 50¹ characters.
2. Scan the SET bar code below.
3. Scan the ENABLE VARIABLE LENGTH FORMAT bar code.
4. Scan the SET MINIMUM LABEL LENGTH bar code.
5. Set the minimum label length by scanning the correct digits from page 94. Return to this page and go to step six.

 NOTE	<p>If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).</p>
--	--

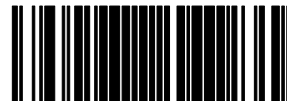
6. Scan the END bar code.

Variable Length Format

SET -----



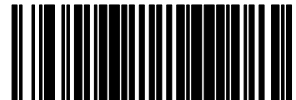
Enable Variable Length Format -----



Set Minimum Label Length -----



END -----



1. For this symbology, the scanner will decode up to 50 characters, but the actual length read will vary depending upon the interface type, and bar code physical size and quality.

Fixed Length Format

The scanner offers the option of requiring Codabar labels to have one or two fixed lengths in the Fixed Label Format. Follow the steps below to set Codabar symbology to Fixed Length Format.

1. Identify the fixed length settings you want to make.
2. Scan the SET bar code.
3. Scan the ENABLE FIXED LENGTH FORMAT bar code.
4. Scan the SET FIRST FIXED LENGTH bar code.
5. Set the first fixed label length by scanning the applicable digit bar codes from the page 94. Return to this page.



NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

If you need to set a second fixed length, continue with step six. If you do not need to set a second fixed length skip to step nine.

6. Scan the SET SECOND FIXED LENGTH bar code.
7. Set the second fixed label length by scanning the applicable digits bar codes from the page 94.
8. Return to this page and go to step ten.



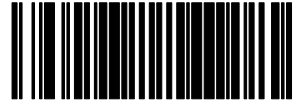
NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

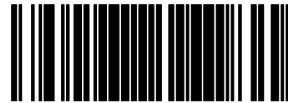
9. Scan the NO SECOND FIXED LENGTH bar code.
10. Scan the END bar code.

Fixed Length Format

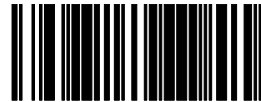
SET -----



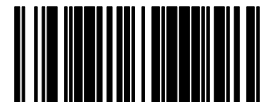
Enable Fixed Length
Format -----



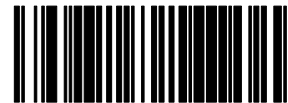
Set First Fixed Length -----



Set Second Fixed Length -----



No Second Fixed Length -----



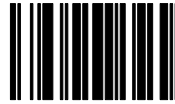
END -----



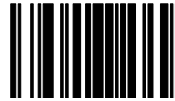
Digits



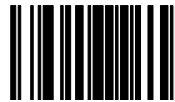
0



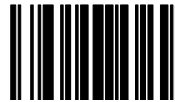
1



2



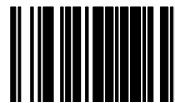
3



4



5



6



7



8

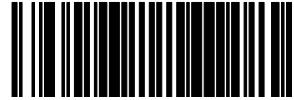


9

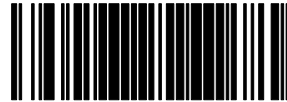


Start/Stop Characters

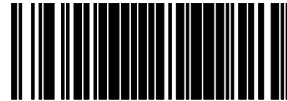
SET -----



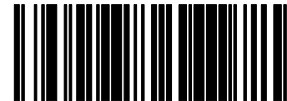
Match not required -----



Match Required -----



Don't Transmit -----



Transmit ^a
(requires Format) -----



Format = ABCD/TN*E -----



Format = abcd/tn*e -----



Format = ABCD/ABCD -----



Format = abcd/abcd -----



END -----



- a. Choosing Transmit *Start/Stop* characters requires selecting one of these four data format selections: ABCD/TN*E, abcd/tn*e, ABCD/ABCD, or abcd/abcd.

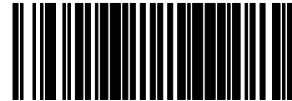
Read Verification Scan the bar codes below to set the number of reads desired to verify Codabar symbology.



NOTE

The more times the scanner is required to read and compare the bar codes data, the longer the scanner will take to validate and transmit a label.

SET -----



Set Read to One read -----



Set to Two reads -----



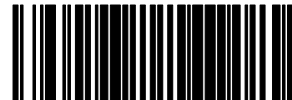
Set Read to Three reads -----



Set to Four reads -----




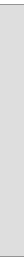

END -----

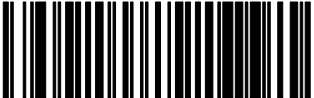


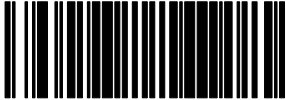
**QuadraLogic
Decoding**

Scan these bar codes to activate/deactivate the QuadraLogic Decoding feature for the Codabar symbology.

SET ----- 

 Activate for Codabar ----- 

Deactivate for Codabar ----- 

END ----- 

UPC/EAN Options

The UPC/EAN symbologies have the following programmable features:

- Data Format Settings
- UPC/EAN Expansion
- UPC/EAN Add-ons
- Price/Weight Check Digit
- Read Verification
- QuadraLogic Decoding.

Data Format Settings UPC/EAN Data Format Settings provides options for transmitting Check Digits or Number System Digits (NSD).

UPC/EAN Expansion Expand UPC-A to EAN-13 adds a leading zero to a UPC-A label which 'expands' the label to the EAN-13 data format. Selecting this feature also changes the symbology ID to match those required for EAN-13.

Expand UPC-E to UPC-A expands UPC-E labels to UPC-A data format. Selecting this feature also changes the symbology ID to match those required for UPC-A.

Expand EAN-8 to EAN-13 adds five zeros in front of an EAN-8 label. Data is sent in EAN-13 data format. Selecting this feature also changes the symbology ID to match those required for EAN-13.

Expand UPC-E to EAN-13 expands UPC-E labels to EAN-13 data format. Selecting this feature also changes the symbology ID to match those required for EAN-13.

UPC/EAN Add-ons **UPC-A or UPC-E and EAN-8 or EAN-13 Two and Five Digit Add-ons filters**

Required means UPC/EAN bar codes must have add-ons or label will not be read.

Optional means scanner will read UPC/EAN bar codes with or without add-ons.

Disable directs the scanner not to recognize/read add-on portions of UPC/EAN labels, but will read the main body of the label.

Price/Weight Check Digit Price/Weight Check Digit provides options for enabling price/weight check digits. The feature includes selections for domestic four or five digit, and European four or five digit, as well as the option to disable the price/weight check.

Read Verification Read Verification is the number of times the scanner is required to read the bar code data before sending the label data to the host.

QuadraLogic Decoding QuadraLogic Decoding directs the scanner to decode labels with wide-spread problems of spots, voids, and/or non-uniform widths.

To optimize your scanner's performance activate this option only for symbologies for which it is necessary.

There are many additional ways to configure the scanner to read and decode extremely poor labels. Contact your sales representative or service provider for other advanced QuadraLogic Decoding settings.

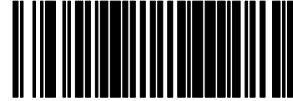
**Configuring
the UPC/EAN
Options**

Use the special bar codes in this section to configure the UPC/ EAN options.

**UPC Data Format
Settings**

These settings affect UPC data format. Number System Digit (NSD) settings operate with RS-232 and Keyboard Wedge interfaces ONLY. Scan the bar codes below to send or not send the Check Digit/NSD.

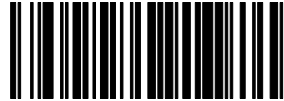
SET -----



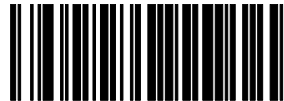
UPC-A



Send Check Digit -----



Don't Send Check Digit -----



Send NSD^a -----



Don't Send NSD^a -----



UPC-E



- a. NSD = Number System Digit. The NSD character is the character that precedes the UPC bar code. The NSD for regular UPC-A bar codes is a zero. Other commonly used Number System Digits used with UPC-A are:
 - "2" - used for random weight items such as meat and produce.
 - "3" - used for the drug and health items.
 - "4" - used for in-store non-food items.
 - "5" - used for coupons.
- b. If UPC-E is expanded to UPC-A, the transmission of Check Digit (CD) and NSD will be determined by the UPC-A settings on this page.

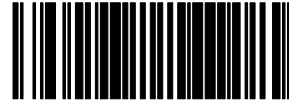
Example: UPC-A
w/NSD



EAN Data Format Settings

These settings affect EAN data format.

SET



EAN-13



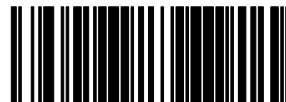
Send Check Digit



Don't Send Check Digit



Send NSD^a



Don't Send NSD^a



EAN-8



Send Check Digit



Don't Send Check Digit



END



- a. NSD = Number System Digit. The NSD character is the character that precedes the EAN bar code, as in this example.

Example: EAN
with NSD

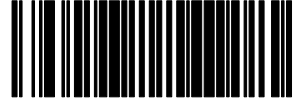


**UPC/EAN
Expansion**

Use these labels to activate:

- Expand UPC-A to EAN-13
- Expand UPC-E to UPC-A
- Expand EAN-8 to EAN-13
- Expand UPC-E to EAN-13

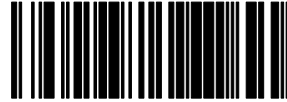
SET -----



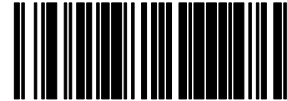
UPC-A to EAN-13 Expansion



Expand^a -----



Don't Expand -----



UPC-E to UPC-A Expansion



Expand^a -----



Don't Expand -----



EAN-8 to EAN-13 Expansion



Expand^a -----



Don't Expand -----



UPC-E to EAN-13 Expansion




- a. When any expansion features is activated, the transmission of the Prefix, Suffix, Check Digit and Number System Digit (NSD) are controlled by your selections for the symbology 'expanded to' rather than the symbology 'expanded from'. For example, if you expand OPC-E to UPC-A, settings for UPC-A determine how the scanner sends a bar code's contents.

**UPC/EAN
Add-ons**


There are many ways to configure the scanner to handle add-ons. The scanner uses four filters that can be specified to define how add-ons will be handled. The following is true for each filter.

- Each add-on type can be disabled, required or optional.
- Any combination of the four UPC/EAN symbologies can be affected.
- The 2-digit, 5-digit and C128 add-ons can be individually configured.
- The leading digits of the base labels affected can be specified.

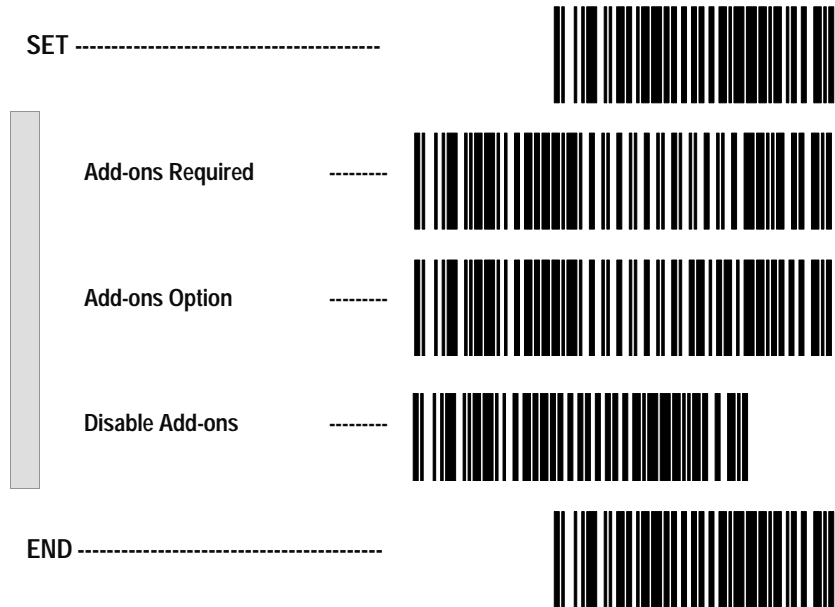
 <p>NOTE</p>	<p>The settings below represent only a small portion of the options available for this feature. Contact your sales representative or service provider if you need more assistance with advanced add-on settings.</p>
--	--

This programming guide supports the following add-on filters for UPC/EAN:

- **Required** means that UPC/EAN labels **MUST** contain a 2-digit, 5-digit or C128 add-on segment in order for the scanner to recognize or decode them.
- **Optional** directs the scanner to recognize UPC/EAN bar codes with or without P2, P5 or C128 2-digit add-on segments.
- **Disable Add-ons** means the scanner will not recognize or decode any add-on segment of UPC/EAN labels, but will read and decode the standard UPC/EAN portion of the label.

 <p>NOTE</p>	<p>Due to the structure of add-on codes, selecting the optional setting makes it impossible to ensure that the scanner will always read the add-on portion of the label. PSC makes no guarantee, either written or implied, that scanners with optional add-on decoding enabled will perform with the speed and accuracy required for any given application.</p>
--	--

The following bar codes affect all four UPC/EAN symbologies, and will be applied to all labels regardless of the leading digits of the base label.



Custom Add-ons A wide array of add-on options are available to streamline your installation to its best advantage. Call your sales representative or service provider for assistance in customizing your scanner's add-on capabilities to your own unique specifications.

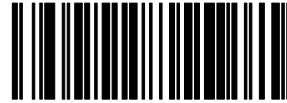
**Price/Weight
Check Digit**

The price/weight check digit selections allow you to specify whether the scanner should calculate an extra check digit based on a four or five-digit price/weight block and compare it with the price/weight check digit contained in the bar code. If the calculated check digit does not match the value of the check digit contained in the bar code, the label will be rejected as invalid. Select domestic four or five digit, European four or five digit, or disable the price/weight check.

SET -----



Disable P/W Check -----



Enable 4-Digit Check -----



Enable 5-Digit -----



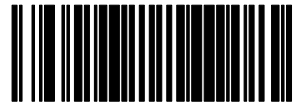
Enable Euro 4-Digit -----



Enable Euro 5-Digit -----



END -----



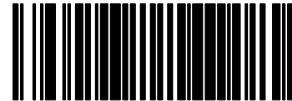
Read Verification Follow the steps below to set the number of minimum reads required to verify UPC/EAN symbologies.

To set the minimum read requirement for a desired symbology:

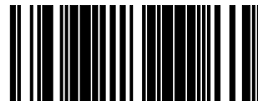
1. Scan the SET bar code.
2. Scan one symbology label from the list below to be verified.
3. Scan the bar code on page 109 that represents the number of times you wish a bar codes label of that symbology type to be read before transmission to the host from the list.
4. Repeat steps two through three above until read verification has been modified for each of the the desired symbologies.
5. Scan the END bar code on page 109.

Read Verification

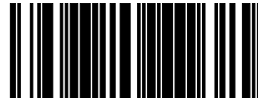
SET -----



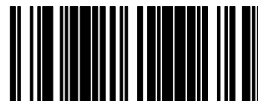
Verify UPC-A -----



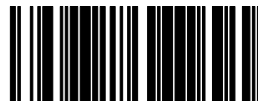
Verify UPC-E -----



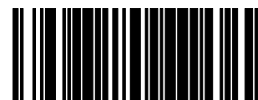
Verify EAN-13 -----



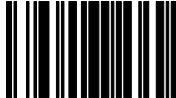
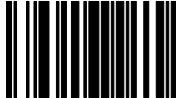

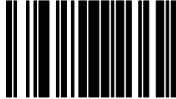
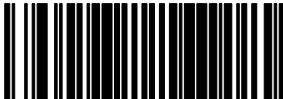
Verify EAN-8 -----




Verify Instore Label -----



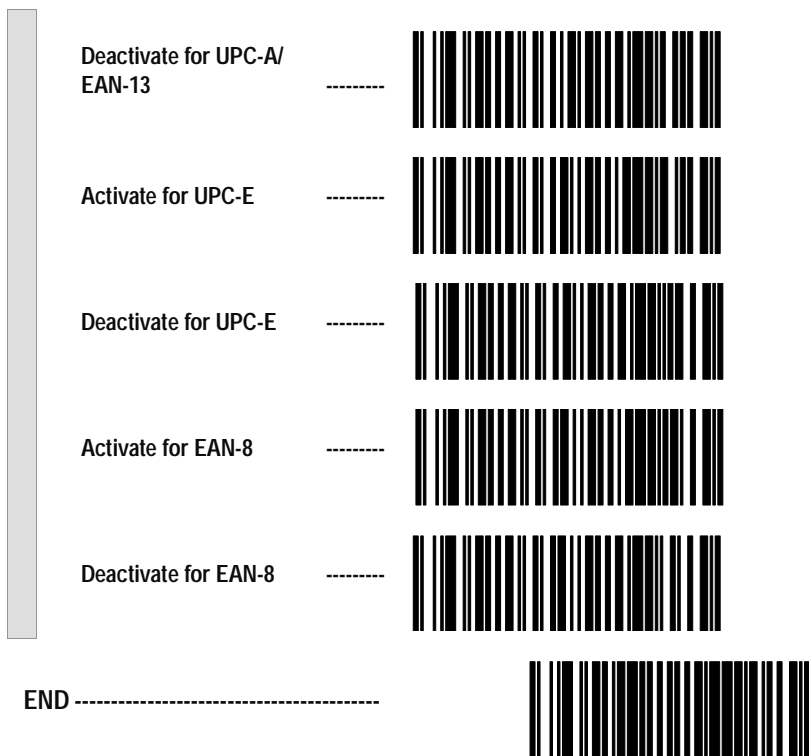
Number of Reads to Verify

	One Read	-----	
	Two Reads	-----	
	Three Reads	-----	
	Four Reads	-----	
	END	-----	

QuadraLogic Decoding Scan these bar codes to activate/deactivate the QuadraLogic Decoding feature for the UPC/EAN symbologies.

 NOTE	<p>To optimize your scanner's performance activate this option only for symbologies for which it is necessary.</p>
---	--

	SET	-----	
	Activate for UPC-A/ EAN-13	-----	



Code 39 Options

The Code 39 symbology has the following programmable features:

- Minimum Label Length
- Read Verification

Minimum Label Length Minimum Label Length sets the minimum label length required for Code 39 symbology. This feature causes the scanner to ignore small label segments, reducing the possibility that a portion of a good label is incorrectly seen as an entire label.

Read Verification Read Verification is the number of times the scanner is required to read the bar code data before sending the label data to the host.

Configuring the Code 93 Options

Use these special bar codes to configure the Code 93 options.

Minimum Label Length

1. Identify the minimum length setting you want to make. The selectable range is 01 to 50¹ characters.
2. Scan the SET bar code.
3. Scan the SET MINIMUM LABEL LENGTH bar code.
4. Set the minimum label length by scanning the applicable digits from page 112. The range is 01 to 50¹ characters. Return to this page and go to step five.

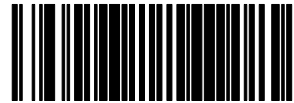


NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

5. Scan the END bar code.

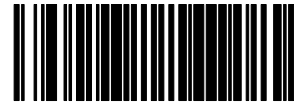
SET -----



Set Minimum Label Length -----



END -----

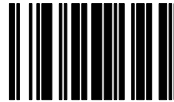


1. For this symbology, the scanner will decode up to 50 characters, but the actual length read will vary depending upon interface type, and bar code physical size and quality. The IBM POS interface is limited to 32 character labels. Code 93 bar codes containing one or more shift characters can also limit the amount of characters that will be decoded (in these circumstances, the scanner will decode at least 39 data characters).

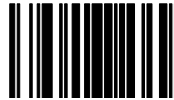
Digits



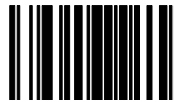
0



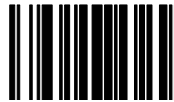
1



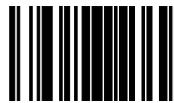
2



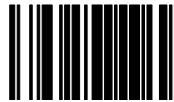
3



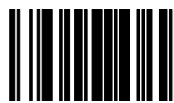
4



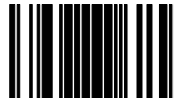
5



6



7




8

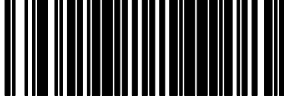
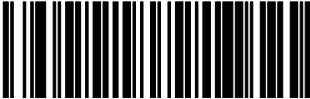



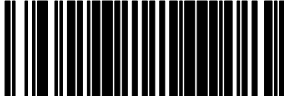


9



Read Verification Scan the bar codes below to set the number of reads desired to verify Code 93 symbology.

 <p>NOTE</p>	<p>The more times the scanner is required to read and compare the bar codes data, the longer the scanner will take to validate and transmit a label.</p>
--	--

	SET -----	
|	Set to One read -----	
	Set to Two reads -----	
	Set to Three reads -----	
	Set to Four reads -----	
	END -----	

Standard 2 of 5/IATA Options

The Standard 2 of 5/IATA symbologies have the following programmable features:

- Check Digit
- Label Length Format
- Read Verification

Check Digit Check Digit calculates the Check Digit to verify that the Check Digit contained in the bar code label is correct. If you enable this feature, your bar codes must contain a Check Digit.

If the Check Digit is not calculated, the digit will be sent regardless of settings for transmit or don't transmit. For example, if you choose to Transmit Check Digit, but not calculate, the scanner sends the Check Digit encoded in the bar code without verifying its accuracy.

Label Length Format Label length format permits the selection between variable length or fixed length formats. For best performance it is recommended to use the Fixed Length settings when your application requires only one or two label lengths.

Variable Length Format - directs the scanner to read all labels from the minimum label length to 50. Set Minimum Length as high as your application allows.

Minimum Label Length - selects the minimum label length that the scanner will recognize. The minimum label length for this symbology must be between 01 and 50¹.

Fixed length Format - directs the scanner to read only one or two label lengths.

If you select fixed length format, there are three bar code labels for programming your scanner to read either one or two fixed lengths. The labels are:

Set First Fixed Length - instructs the scanner that the next two programming labels scanned will define the first fixed label length. This setting must be between 01 and 50¹ characters.

Set Second Fixed Length - instructs the scanner that the next two programming labels scanned will define the second fixed label length. This setting must be between 01 and 50¹ characters.

1. For this symbology, the scanner will decode up to 50 characters, but the actual length read will vary depending upon the interface type, and bar code physical size and quality.

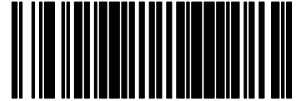
No Second Fixed Length - configures the scanner to recognize only the first fixed length.

Read Verification Read Verification is the number of times the scanner is required to read the bar code data before sending the label data to the host.

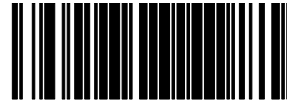
Configuring the Standard 2 of 5 Options Use the special bar codes in this section to configure the Standard 2 of 5/IATA symbology options.

Check Digit

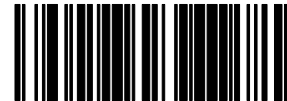
SET -----



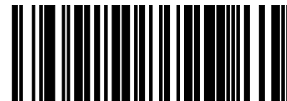
Don't Calculate -----



Calculate -----



Don't Transmit -----



Transmit -----



END -----



Label Length Format

Follow the steps below to set the Standard 2 of 5/IATA label length format to select either *Variable Length* or *Fixed Length* format.

Variable Length Format

Follow the steps below to set the Standard 2 of 5/IATA symbology to read Variable Length Format.

1. Identify the minimum length setting you want to make. The selectable range is 02 to 50¹ characters.
2. Scan the SET bar code below.
3. Scan the ENABLE VARIABLE LENGTH FORMAT bar code.
4. Scan the SET MINIMUM LABEL LENGTH bar code.
5. Set the minimum label length by scanning the applicable digits on page 119. Return to this page and go to step six.



NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

6. Scan the END bar code.

Variable Length Format

SET -----



Enable Variable Length Format -----



Set Minimum Label Length -----



END -----



1. For this symbology, the scanner will decode up to 50 characters , but the actual length read will vary depending upon the interface type, and bar code physical size and quality.

**Fixed Length
Format**

All interfaces that are shipped with the standard factory configuration are set to read variable length labels. If you switch from variable length to fixed length format, the default fixed labels are 14 characters and 8 digits. Follow the steps below to change these defaults for the Standard 2 of 5/IATA symbology.

1. Identify the fixed length settings you want to make.
2. Scan the SET bar code.
3. Scan the ENABLE FIXED LENGTH FORMAT bar code .
4. Scan the SET FIRST FIXED LENGTH bar code.
5. Set the first fixed label length by scanning the applicable digits bar codes on page 119. Return to this page.

**NOTE**

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

If you need to set a second fixed length, continue with step six. If you do not need to set a second fixed length skip to step nine.

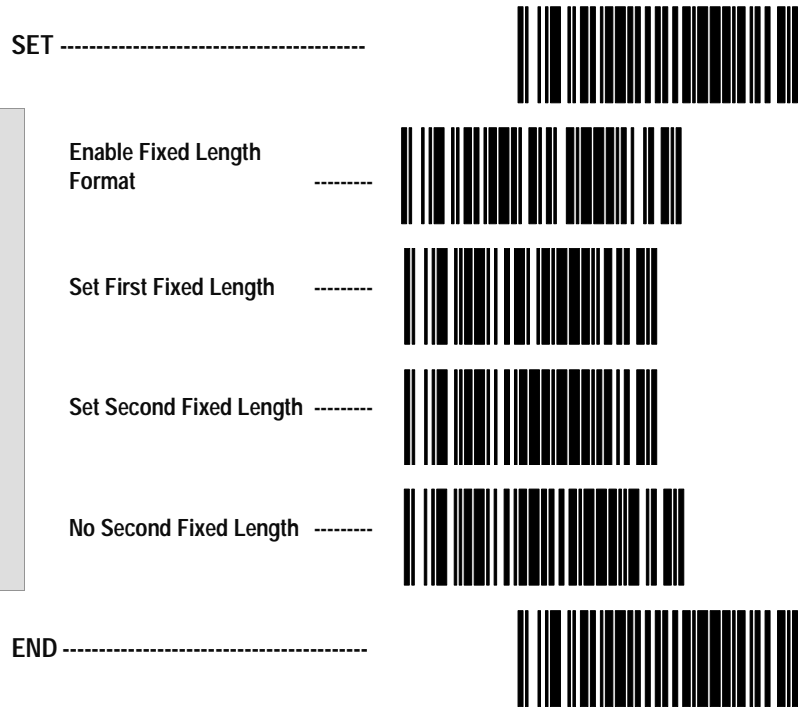
6. Scan the SET SECOND FIXED LENGTH bar code.
7. Set the second fixed label length by scanning the applicable digits bar codes on page 119.
8. Return to this page and go to step ten.

**NOTE**




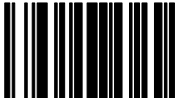
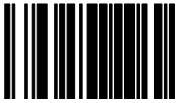




If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

9. Scan the NO SECOND FIXED LENGTH bar code.
10. Scan the END bar code.

Fixed Length Format



Digits

0	-----	
1	-----	
2	-----	
3	-----	
4	-----	
5	-----	
6	-----	
7	-----	
8	-----	
9	-----	

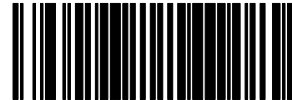
Read Verification Scan the bar codes below to set the number of reads desired to verify Standard 2 of 5/IATA symbologies.



NOTE

The more times the scanner is required to read and compare the bar codes data, the longer the scanner will take to validate and transmit a label.

SET -----



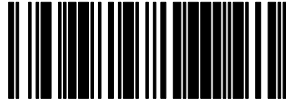
Set to One read



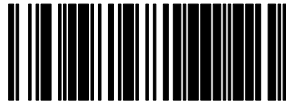
Set to Two reads



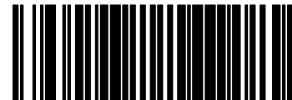
Set to Three reads



Set to Four reads



END -----



IATA

IATA is a special symbology subset of Standard 2 of 5. Enabling IATA selects this custom code as the active Standard 2 of 5 symbology. When IATA is enabled, Standard 2 of 5 labels will not be read. Scan the bar code labels below to enable/disable IATA.



MSI/Plessey Options

The MSI/Plessey symbology has the following programmable features:

- Check Digit
- Label Length Format
- Read Verification

Check Digit Check Digit calculates the Check Digit(s) to verify the labels contents have been read correctly. If you enable this feature, your bar codes must include a Check Digit(s). You may also choose to transmit or not transmit the Check Digit(s).

Check Digit Calculation - enables or disables calculation of the Check Digit(s).

Transmit Check Digit - enables or disables transmission of MSI/Plessey Check Digit(s).

Number of Check Digits - specifies either one or two Check Digits.

Label Length Format Label length format permits the selection between variable length or fixed length formats. For best performance it is recommended to use the Fixed Length settings when your application requires only one or two label lengths.

Variable Length Format - directs the scanner to read all labels from the minimum label length to 16. Set Minimum Length as high as your application allows.

Minimum Label Length - selects the minimum label length that the scanner will recognize. The minimum label length for this symbology must be between 04 and 16.

Fixed Length Format - directs the scanner to read only one or two label lengths.

If you select fixed length format, there are three bar code labels for programming your scanner to read either one or two fixed lengths. The labels are:

Set First Fixed Length - instructs the scanner that the next two programming labels scanned will define the first fixed label length. This setting must be between 04 and 16 characters.

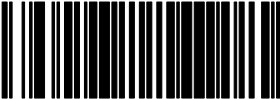

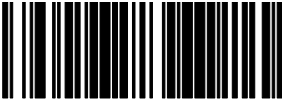
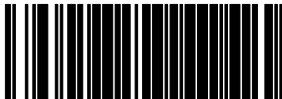





Set Second Fixed Length - instructs the scanner that the next two programming labels scanned will define the second fixed label length. This setting must be between 04 and 16 characters.

No Second Fixed Length - configures the scanner to recognize only the label length chosen as the first fixed length.

Read Verification Read Verification is the number of times the scanner is required to read the bar code data before sending the label data to the host.

**Configuring
the MSI /
Plessey
Options**

Use the special bar codes in this section to configure the MSI/Plessey symbology options.

Check Digit	
SET -----	
 Calculate -----	
Don't Calculate -----	
Transmit -----	
Don't Transmit -----	
One Check Digit -----	
Two Check Digits -----	
END -----	

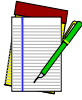
Label Length Format

Follow the steps below to set the MSI/Plessey label length format to either the *Variable Length* or *Fixed Length* format.

Variable Length Format

Follow the steps below to set the MSI/Plessey to read Variable Length Format.

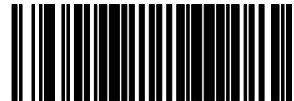
1. Identify the minimum length setting you want to make. The selectable range is 04 to 16 characters.
2. Scan the SET bar code.
3. Scan the ENABLE VARIABLE LENGTH FORMAT bar code.
4. Scan the SET MINIMUM LABEL LENGTH bar code.
5. Set the minimum label length by scanning the applicable digits bar codes on page 128. Return to this page.

 <p>NOTE</p>	<p>If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).</p>
--	--

6. Scan the END bar code.

Variable Length

SET -----



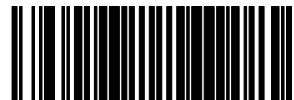
Enable Variable Length Format -----



Set Minimum Label Length -----



END -----



Fixed Length Format

The scanner offers the option of requiring MSI/Plessey labels to have one or two fixed length(s) in the Fixed Label Format. Follow the steps below to set the MSI/Plessey symbology to fixed length format.

1. Identify the fixed length setting(s) you wish to make. Fixed lengths can be set from 04 to 16 characters.
2. Scan the SET bar code on page 127.
3. Scan the ENABLE FIXED LENGTH FORMAT bar code.
4. Scan the SET FIRST FIXED LENGTH bar code.
5. Set the first fixed label length by scanning the applicable digits on page 128. Return to this page.



NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

If you need to set a second fixed length, continue with step six. If you do not need a second fixed length skip to step nine.

6. Scan the SET SECOND FIXED LENGTH bar code.
7. Set the second fixed label length by scanning the applicable digits on page 128.
8. Return to this page and go to step ten.



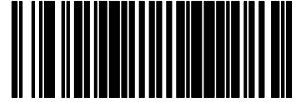
NOTE

If you are setting a label length less than ten, you must scan a zero digit first and then the length digit (e.g., 04, 06, 08).

9. Scan the NO SECOND FIXED LENGTH bar code.
10. Scan the END bar code on page 127.

Fixed Length

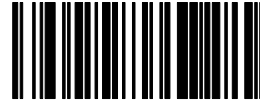
SET -----



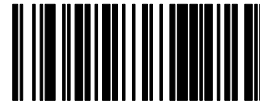
Enable Fixed Length
Format -----



Set First Fixed Length -----



Set Second Fixed Length -----



No Second Fixed
Length -----



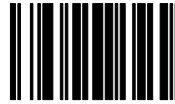
END -----



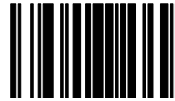
Digits



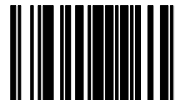
0



1



2



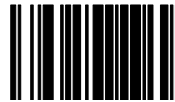
3



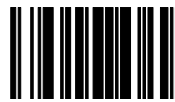
4



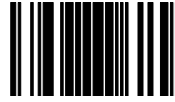
5



6



7




8

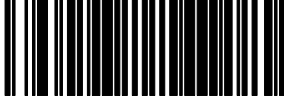
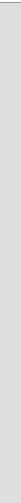
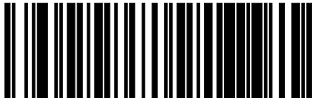


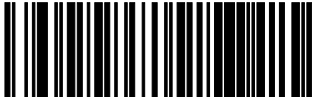
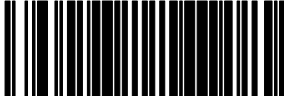


9



Read Verification Scan the bar codes below to set the number of reads desired to verify MSI/Plessey symbologies.

 <p>NOTE</p>	<p>The more times the scanner is required to read and compare the bar codes data, the longer the scanner will take to validate and transmit a label.</p>
--	--

	SET -----	
	Set to One read -----	
	Set to Two reads -----	
	Set to Three reads -----	
	Set to Four reads -----	
	END -----	

General Features

The following section contains the general features that are common to all interfaces. These features allow modification of the scanner's behavior to accommodate user preferences.

- Green LED Lamp Idle State
- Beeper Settings
- Marker Beam Settings
- AutoSense[®] Stand Mode
- Low Power Mode
- Low Power Shut-down Delay
- Half-Angle
- Multiple Read Mode

Programming the General Features

Use the special bar codes on the following pages to configure the features common to all interfaces.

Green LED Lamp Idle State When the scanner is idle, its green LED lamp can be programmed to indicate this in one of two ways:


- LED lamp is OFF when the scanner is idle.
- LED lamp is ON when the scanner is idle.



Beeper Settings

These labels provide options for the scanner's audible 'beep' signal. Reference *LED and Beeper Indicators* on page 11 for more information about beeper behavior.

Audible Signal - enables/disables the beep upon completion of a good read.

 <p>NOTE</p>	<p>It is strongly recommended that this feature remain enabled, as the good read beep provides the best scanning status feedback to the user. Error tones are always enabled and cannot be disabled.</p>
--	--

Power-up Beep - enables/disables the audible tone at power-up.

Beeper Volume - allows setting of the beeper to three different volume settings. The greatest volume occurs with frequency set high and volume set to 3.

Good Read Beeper Frequency - adjusts the pitch of the beeper to low, medium, or high.

Good Read Beep Duration - can be adjusted to SHORT (100msec), MEDIUM (250msec), or LONG (500msec) durations.

When to Beep - may be programmed to announce a 'good read' upon completion of one of the following events:

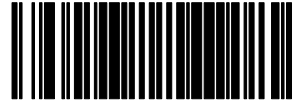
- Decode of a bar code label.
- Transmission of data from the scanner to the host.
- CTS activation at the host terminal (RS-232 interface models ONLY).

Configuring the Beeper Options

Scan these bar codes to set the beeper options.

1. Scan the SET bar code.
2. Scan the bar code(s) for option(s) desired.
3. Scan the END bar code on page 133.

SET -----



Beeper Signal



Beeper OFF -----



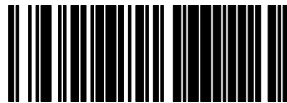
Beeper ON -----



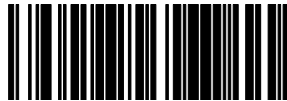
Power-up Beeper



Enable -----



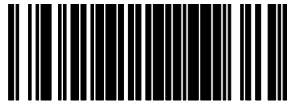
Disable -----



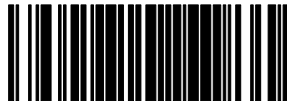
Beeper Volume



Volume 1 -----




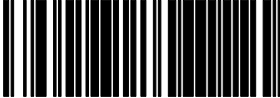


Volume 2 -----




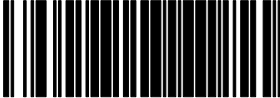
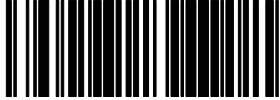
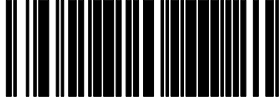
Volume 3 -----




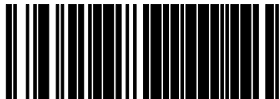
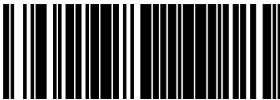

Good Read Beep Frequency

	Low	-----	
	Medium	-----	
	High	-----	

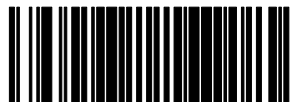
Good read Beep Duration

	Short	-----	
	Medium	-----	
	Long	-----	

When to Beep

	After Decode	-----	
	After Transmission to Host	-----	
	After CTS Activation (RS-232 ONLY)	-----	

END -----



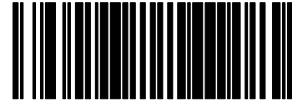
**Marker Beam
Settings**

The Marker Beam feature provides the user with a spotter beam for improved aiming at distant bar code labels and/or in extremely bright environments. A Marker Beam can also be useful when scanning through showcase glass or bar code menus containing bar codes printed with little space between them.

To enable the Marker Beam:

1. Scan the SET bar code.
2. Scan the ENABLE MARKER BEAM bar code.
3. Scan the desired time duration setting for the Marker Beam to be illuminated.
4. Scan the END bar code on page 135.

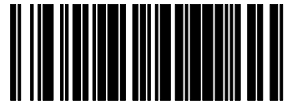
SET -----



Marker Beam Enable/Disable



Marker Beam Enabled -----



Marker Beam Disabled -----



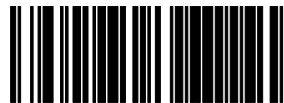
Marker Beam Duration



0 Seconds -----



0.2 Seconds -----



0.3 Seconds -----





0.4 Seconds



0.5 Seconds



0.6 Seconds



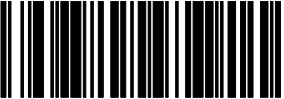
0.8 Seconds



1 Seconds



1.2 Seconds



1.5 Seconds



END -----



**AutoSense®
Stand Mode**

AutoSense® Stand Mode must be enabled when the scanner is used with its stand accessory. This feature allows "hands-free" operation of the scanner when placed in the stand.

Scan these bar codes to set the AutoSense® option.

1. Scan the SET bar code.
2. Scan the bar code to enable/disable the option.
3. Scan the END bar code.



Low Power Mode

When enabled, Low Power Mode causes the scanner to powerdown completely between trigger pulls. This results in very low idle current, lowering the energy needs of the scanner. It does, however, require the scanner's microcontroller to reboot with every trigger pull. This will introduce a very small delay in scanning when this mode is enabled. Therefore, it is recommended that this mode only be used when the scanner is connected to a battery powered terminal.

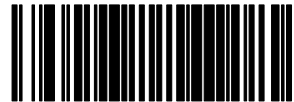


NOTE

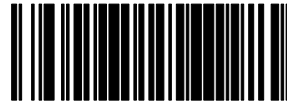
The state of this feature is not affected by the RETURN TO FACTORY DEFAULTS programming bar code. It must be manually enabled or disabled using the programming bar codes below.

Scan these labels to enable and set the Low Power Mode.

SET -----



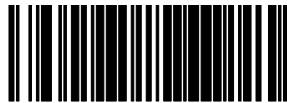
Enable Step #1 -----



Enable Step #2 -----



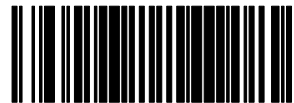
Disable Step #1 -----



Disable Step #2 -----



END -----



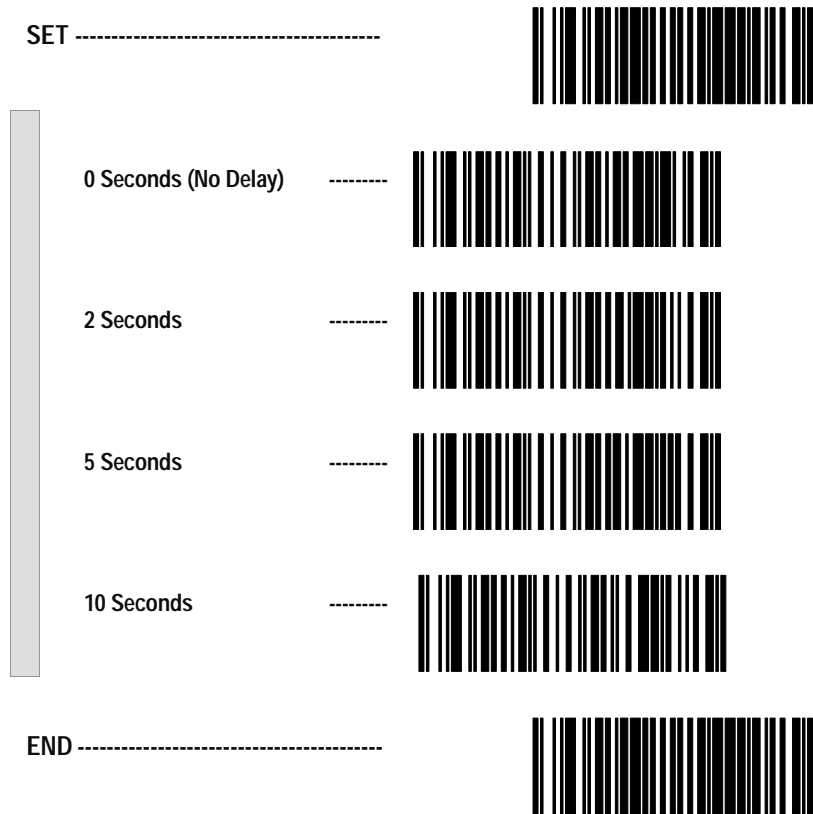
**Low Power
Shut-down
Delay**

This feature allows for quick successive reads in the Low Power Mode. Low Power Shut-down Delay (LPSD) is the amount of delay after the trigger is released before the scanner transitions into shut-down. The programming bar codes below provide for transition times of 0 (no delay), 2, 5, or 10 seconds delay.

For other LPSD settings contact your sales or service representative.

Scan these bar codes to set the LPSD option.

1. Scan the SET bar code.
2. Scan the bar code for delay desired.
3. Scan the END bar code.



Half-Angle When enabled, the Half-Angle feature causes the scanner to scan with a scan angle that is approximately half the standard setting. Disabling the feature returns the scanner to the standard scan width.

Scan these bar codes to set the Half Angle options.

1. Scan the SET bar code.
2. Scan the bar code to enable/disable the option.
3. Scan the END bar code.



Multiple Read Mode When enabled, Multiple Read Mode allows the reading of multiple labels with one trigger pull.



NOTE

For hands-free scanning use the AutoSense[®] feature described on page 136.

Scan these bar codes to set the Multiple Read Mode options.

1. Scan the SET bar code.
2. Scan the bar code to enable/disable the option.
3. Scan the END bar code.

SET -----



Enable -----



Disable -----



END -----



NOTES

Appendix A: Additional Information

RS-232 Host Commands

The RS-232 interface will accept commands from the host. Available commands are:

- Disable Scanner
- Enable Scanner
- Reset Scanner
- Beep Good Read Tone
- Force Good Read
- Xon
- Xoff

Disable Scanner (ASCII 'D') - places the scanner in an operational mode in which the scanner does not accept bar code data input from the scan optics. NOTE: The scanner will complete any message transmission in progress to the host.

Enable Scanner (ASCII 'E') - places the scanner in an operational mode in which the scanner will accept label data input from the scan optics.

Reset Scanner (ASCII 'R') - performs a scanner reset operation. Any bar code data the scanner may be holding in buffers is discarded. NOTE: After reset is executed, additional host commands may be ignored for 30 seconds.

Beep Good Read Tone (ASCII 'B') - causes the beeper to sound one 'good read' tone if the beeper is enabled (see the section in this manual titled, "General Features" for more information about setting the scanner's beeper functions).

Force Good Read Tone (Hex '01') - causes the beeper to sound one 'good read' tone even if the beeper is configured as disabled.

Xoff (Hex '11') - suspends current data transmission from the scanner to the host or prevents future data transmissions from occurring.

Xon (Hex '13') - permits resumption of data transmission from the scanner to the host that was previously suspended via the Xoff command.

Need More Information?

If you require more information about using your host system to change the scanner's programmable features or detailed instructions about creating multifunction labels, contact your local dealer or distributor or call (in the U.S. or Canada) PSC Technical Support at 1-800-547-2507. You can also obtain more information about PSC at www.pscnet.com.

Appendix B: Sample Bar Codes

Code 39



Code 128



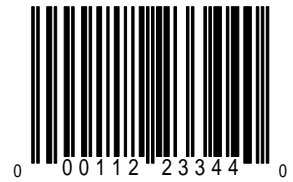
Interleaved
2 of 5



Codabar



UPC-A



UPC-A w/2 digit
Add-ons



**UPC-A w/5 digit
Add-ons**



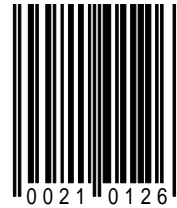
UPC-E



EAN-13



EAN-8



Code 93



Standard 2 of 5

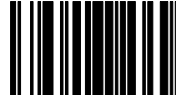


MSI/Plessey

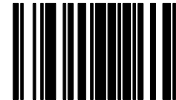
Appendix C: Keypad

Some of the features in this manual require selection of numerals and letters from the set below. Carefully read the instructions for such features, then scan these bar codes as directed.

1



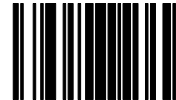
2



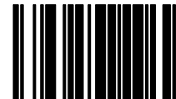
3



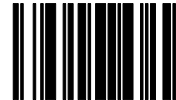
4



5



6



7



8



9



0



A



B



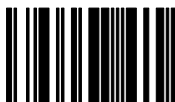
C



D



E



F



ASCII Character Set

The table on this page shows a set of ASCII characters and their corresponding Hex Values. The Hex Values in this table are needed for setting symbology specific label identifiers, as well as enabling custom prefix and suffix characters.

ASCII Char.	Hex Value	ASCII Char.	Hex Value	ASCII Char.	Hex Value	ASCII Char.	Hex Value
nul	00	sp	20	@	40	'	60
soh	01	!	21	A	41	a	61
stx	02	"	22	B	42	b	62
etx	03	#	23	C	43	c	63
eot	04	\$	24	D	44	d	64
enq	05	%	25	E	45	e	65
ack	06	&	26	F	46	f	66
bel	07	'	27	G	47	g	67
bs	08	(	28	H	48	h	68
ht	09	)	29	I	49	i	69
lf	0A	*	2A	J	4A	j	6A
vt	0B	+	2B	K	4B	k	6B
ff	0C	,	2C	L	4C	l	6C
cr	0D	-	2D	M	4D	m	6D
so	0E	.	2E	N	4E	n	6E
si	0F	/	2F	O	4F	o	6F
dle	10	0	30	P	50	p	70
dc1	11	1	31	Q	51	q	71
dc2	12	2	32	R	52	r	72
dc3	13	3	33	S	53	s	73
dc4	14	4	34	T	54	t	74
nak	15	5	35	U	55	u	75
syn	16	6	36	V	56	v	76
etb	17	7	37	W	57	w	77
can	18	8	38	X	58	x	78
em	19	9	39	Y	59	y	79
sub	1A	:	3A	Z	5A	z	7A
esc	1B	;	3B	[	5B	{	7B
fs	1C	,	3C	<	5C	|	7C
gs	1D	=	3D	]	5D	}	7D
rs	1E	>	3E	^	5E	~	7E
us	1F	?	3F	_	5F	del	7F

Asia Pacific

PSC Hong Kong
Hong Kong
Telephone: [852]-2-584-6210
Fax: [852]-2-521-0291

Australia

PSC Asia Pacific Pty Ltd.
North Ryde, Australia
Telephone: [61] 0 (2) 9878 8999
Fax: [61] 0 (2) 9878 8688

France

PSC Sarl
LES ULIS Cedex, France
Telephone: [33].01.64.86.71.00
Fax: [33].01.64 46.72.44

Germany

PSC GmbH
Darmstadt, Germany
Telephone: + 49 (0) 61 51/93
58-0
Fax: + 49 (0) 61 51/93 58 58

Corporate Headquarters

675 Basket Road
Webster, NY 14580-9787
Telephone: (716) 265-1600
Fax: (716) 265-6400

Italy

PSC S.r.l.
Vimercate (MI), Italy
Telephone: [39] (0) 39/62903.1
Fax: [39] (0) 39/685496

Japan

PSC Japan K.K.
Shinagawa-ku, Tokyo, Japan
Telephone: 81 (0)3 3491 6761
Fax: 81 (0)3 3491 6656

Latin America

PSC S.A., INC.
Miami, Florida, USA
Telephone: (305) 539-0111
Fax: (305) 539-0206

United Kingdom

PSC Bar Code Ltd.
Watford, England
Telephone: 44 (0) 1923 809500
Fax: 44 (0) 1923 809 505



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