Barcode Scanning Made Easy

Wasp
BARCODE TECHNOLOGIES



CCD Scanner

Programming Guide

CCD Scanner Programming Guide



Please Read

Note: The Wasp® WCS3900 Series Scanners are ready to scan the most popular barcodes out of the box. **This manual should only be used to make changes in the configuration of the scanner for specific applications.** These scanners do not require software or drivers to operate. The scanner enters data as keyboard data. Please review this manual before scanning any of the programming barcodes in this manual.



Tech Tip

If you are unsure of the scanner configuration or have scanned the incorrect codes, please scan the default barcode on page 7. This will reset the scanner to its factory settings.

Check Version



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Introduction

Barcoding is the most common Automated Data Collection (ADC) technology providing timely, error-free information that can be used to increase productivity, accuracy, and efficiency in the workplace. Virtually every type of industry is using barcodes to replace keyboard data entry. Studies have shown that a proficient data entry operator will make one error for every 300 characters that are manually entered. The error rate using barcodes is almost negligible and can be error-free using barcode symbologies with the check digit enabled.

The Wasp Charged Coupled Device (CCD) technology is a technique whereby a barcode is photographed, digitized, and electronically sampled by built-in photodetectors. The detectors process the measurement of every bar and space using the number of adjacent photodetectors which contrast a black mark and a white space. Wasp WCS3900 Series Scanners are extremely rugged since they have no moving parts. WCS3900 Series Scanners plug into your PC's USB or PS/2 port. As you scan a barcode, the barcode value is automatically displayed in your application (eg. an Excel cell, inventory application, etc.) where the blinking curser is, just as if it had been typed on the keyboard.

Of all the hand held barcode scanning devices on the market, the CCD reader is the easiest to use and most cost effective for the typical business user. To activate the scanner, the user simply points the scanning aperture towards the barcode, pulls the trigger, and aims the red LED beam across the barcode. This scanner will work at a range of contact up to 1.5" away from the barcode.

Barcode Symbologies

Barcodes are symbols consisting of a series of bars and spaces which can be applied to packages, cartons, bottles, and other commercial products. The bars and spaces in each symbol are grouped in such a way to represent a specific ASCII character or function. The interpretation of these groups is based on a particular set of rules called symbologies. Various symbologies have been developed for particular applications. Some examples are shipping and receiving, manufacturing, retail, healthcare, transportation, document processing and tracking, and libraries.

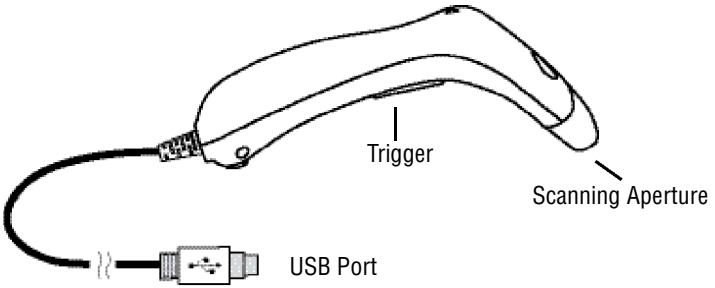
The resolution of a barcode is dependent on the narrowest element of a barcode (X dimension), and can vary from high density (nominally less than 0.009 in./0.23 mm), medium density (between 0.009 in./0.23 mm and 0.020 in./0.50 mm), and low density (greater than 0.020 in./0.50 mm). Medium and low densities are the most common since these are the easiest to read (scan) with nearly all scanning devices. The scanner can read barcodes with X-dimensions as low as 5 mils (0.005 in/0.13mm).

WCS3900 Series Scanners can read the most popular barcode symbologies including Code 39, Code 93, Code 128, Interleaved 2 of 5, UPC-A, UPC-E, EAN/JAN-8, EAN/JAN-13, Codabar, and MSI/Plessey.

Please see test chart on pages 29-31.

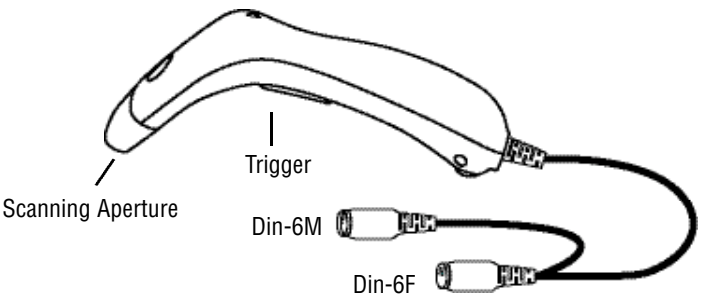
Installation

WCS3900 USB Scanner



1. Insert the USB cable directly into your PC's USB port.

WCS3900 PS2 Scanner



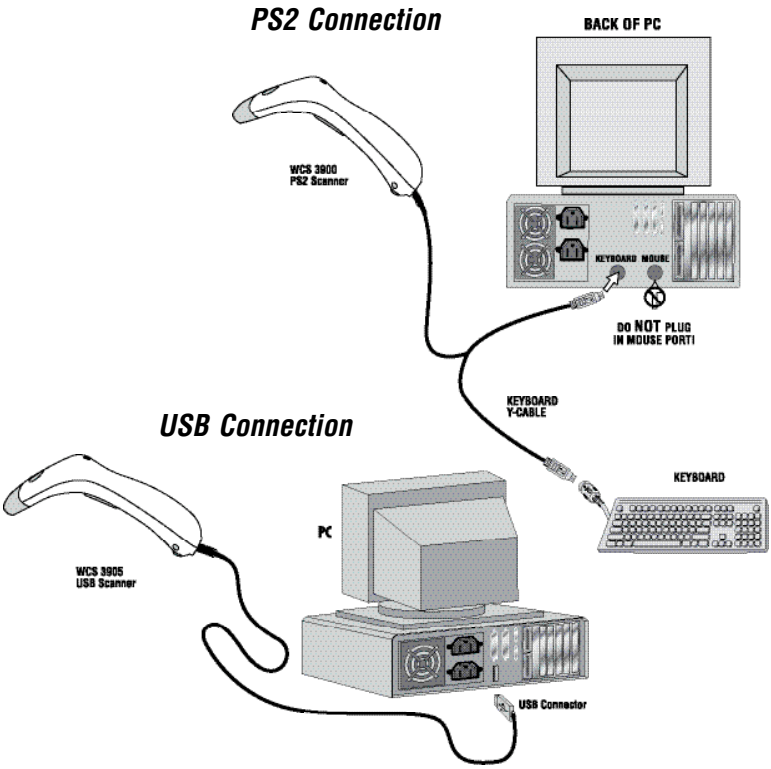
1. Turn off your computer.
2. Unplug your PC keyboard cable and plug the male end (Din 6) of the WCS3900 Scanner directly into your PC keyboard port. Plug your keyboard cable into the other end (female Din 6) of the the scanner.
3. Turn your computer on.

Quick Start

Your Wasp WCS3900 Series Scanners are ready for use. The default settings of the scanners have been pre-programmed for the most common barcode configurations. Use the “Setup & Configuration” sections only to customize the scanners settings. Please review the “Enable Barcode Symbologies” configuration beginning on page 14 to see the list of barcodes symbologies which are enabled by default.

Tip:

- Use the pre-printed "Barcode Test Symbols" in Appendix A on pages 29-31 as a test chart to practice scanning.



Setup & Configuration

In order to configure Wasp WCS3900 Series Scanners, you must familiarize yourself with the setup procedures on the following pages. The default settings of the scanners are identified on each page and clearly marked using an asterisk (*). **The default settings have been programmed for the most common barcode configurations. Use the setup & configuration barcodes only to customize the WCS3900 Series Scanner settings.** If you need to configure the Scanner, the default settings will be overwritten. All the programmed settings are stored permanently in non-volatile memory; therefore, your configuration will be maintained even if the keyboard power to the WCS3900 Series Scanners are removed by turning off your PC.

In order to configure Wasp WCS3900 Series Scanners, two basic steps need to be followed:

(1) Locate the group that contains the options to be changed.
(2) Scan the barcode representing the option to be changed.
The scanner will sound two beeps.

To change Minimum/Maximum Length:

(1) Scan the Minimum or Maximum Length barcode on page 15.
(2) Scan a 2 digit value from the ASCII table on pages 31-34
(3) Scan the Minimum or Maximum Length barcode again.

Example: To have a minimum length barcode of 1, you must scan a 0 then 1, then scan the minimum barcode again. To have a maximum length barcode of 10, you must scan a 1 then 0, then scan the maximum barcode again.

Factory Default

Use the Factory Default barcode to reset the scanner to the Default settings.



FactoryDefault

Continuous Mode

Scan this continuous scan mode barcode to enable continuous scanning. This feature allows the scanner to be used with a stand for hands free scanning. The trigger is functionless in this mode. To turn this mode off scan the default barcode above.



Continuous Scan Mode Enable

Keyboard Connection

The Keyboard Connection is used to program the Wasp WCS3900 Series scanner for the type of host computer.



PC (USB or PS/2) *



Notebook

*Default

Chapter 5 BEEP AND DELAY

The 'Beep and Delay' configuration supports the general control options for the WCS3900 Series Scanners. These options include the volume, intercharacter delay, and interblock delay.

Interblock delay is the minimum time interval between two adjacent scans. If the processing speed of your host device is slower than your scanning speed, a longer interblock delay may ensure the data integrity.

Intercharacter delay is the time period that the scanner will wait before transmitting the next character. If data sent by the scanner has incorrect or missing characters, a longer intercharacter delay may solve the problem. The intercharacter delay should be changed only if the transfer rate cannot be maintained between the scanner and the keyboard buffer of the computer.

Note: The default for the intercharacter delay is set to '140us' and is the most common configuration; however, your PC may be different. When you scan a barcode, if stray or scrambled characters appear, increase the intercharacter delay to slow down the transfer rate.

Beep Settings



Beep Off



Beep Hi



Beep Medium *



Beep Low to High



Beep High to Low



Beep Low

*Default

Interblock Delay



0ms *



10ms



50ms



100ms



200ms



500ms

Intercharacter Delay



140us *



500us



1ms



4ms



16ms

*Default

- Caps Lock Auto (For PC XT/AT only):
  In Auto mode, the scanner will keep track of the Caps Lock status automatically. For some PCs, the scanning performance may be compromised because of the auto tracing. If the scanning performance is poor (or cannot scan) or the scanner cannot output the upper/lower case characters correctly, try to select one of the next two choices instead of auto tracing.
- Caps Lock Off:
  When the keyboard is in the unshifted state (Caps Lock is not pressed), select “Lower Case.”
- Caps Lock On:
  When the keyboard is in the shifted state (Caps Lock is on), select “Upper Case.”



Caps Lock On



Caps Lock Off *



Caps Lock Auto

*Default

The 'Keyboard Language' setting controls the key codes for your keyboard's language.



U.S. *



German



French



Spanish



Italian

*Default

The 'Preamble/Postamble' configuration is used to add a prefix or suffix set of characters to the barcode value. Up to 8 characters may be added for each option separately. Preamble and postamble characters can function concurrently, but need to be configured separately.
To add preamble or postamble characters, follow the steps below:

1) Scan the 'Clear Pre/Postamble' barcode on this page.
2) Scan the 'Preamble' or 'Postamble' barcode.
3) Use Appendix B on pages 32-35 to locate the characters you want to add as preamble or postamble characters. Make sure that you scan the barcode associated with each letter before preceding to the next character. For example, to add the letter "A," scan the barcode corresponding to the letter "A" on page 34. The letter "A" will always appear in your data as prefix or suffix to the barcode value.
4) Scan the corresponding 'Pre/Postamble' barcode on this page to exit this setting.



Clear Pre/Postamble



Preamble



Postamble

Terminator

The 'Terminator' option is used to specify the end-of-text message and is primarily used to denote the end of the barcode value.



CR *



Tab



None



Space



LF



ESC



CR + LF

Code ID

The 'Code ID' option sends a specific value when a particular barcode symbology is scanned. For example, if 'Code ID' is enabled and Code 39 is scanned, an "M" will appear in the data stream in front of the barcode value.



Code ID On



Code ID Off *

O - MSI/Plessey	T - EAN 128
S - EAN 8	K - Code 128
E - UPC E	N - Codabar
A - UPC A	D - Full ASCII Code 39
F - EAN 13	M - Std. Code 39
L - Code 93	I - Interleaved 2 of 5

*Default

Enable	*Disable*
 Enable All	 Disable All
 MSI Plessey	 MSI Plessey *
 Interleaved 2 of 5 *	 Interleaved 2 of 5
 Code 128 *	 Code 128
 Codabar *	 Codabar
 Code 39 *	 Code 39

*Default

Enable	*Disable*
	
UPC A *	UPC A
	
UPC E *	UPC E
	
EAN 8 *	EAN 8
	
EAN 13 *	EAN 13
	
Code 93	Code 93 *

*Default

Code 39 is variable length and is the most frequently used symbology in industrial barcode systems today. It is extensively used within the Department of Defense (DOD). The principal feature is to encode messages using the full alphanumeric character set. Standard Code 39 contains only 43 characters (0-9, A-Z, $, /, %, +, -, ., SPACE) and can be extended to a 128 character symbology (full ASCII) by combining one of the special characters (S, /, %, +) with a letter (A-Z) to form the characters that are not present in the standard Code 39 symbology.

See page 6 for information on setting the minimum and maximum lengths.



Enable Code 39 *



Disable Code 39



Enable Code 39 Full ASCII *



Disable Code 39 Full ASCII



Check Digit Do Not Calculate *



Check Digit Calculate And Send



Check Digit Calculate But Do Not Send *



Minimum Length (1 *)



Maximum Length (48 *)

*Default

Interleaved 2 of 5 is a variable length, even numbered, numeric barcode. It is typically used in industrial and master carton labeling and also in the automobile industry. The symbology uses bars to represent the first digit of a pair and the interleaved (white) spaces to represent the second digit of a character pair.

See page 6 for information on setting the minimum and maximum lengths.



Enable Interleaved 2 of 5 *



Disable Interleaved 2 of 5



Check Digit Do Not Calculate *



Check Digit Calculate And Send



Check Digit Calculate But Do Not Send



Minimum Length (6 *)



Maximum Length (48 *)

Code 93 encodes the full 128 ASCII character set using 9 modules arranged into 3 bars with adjacent spaces. Two of the characters are check characters. Code 93 is similar to Code 39 but encodes more characters per inch.



Enable Code 93



Disable Code 93 *



Minimum Length (6 *)



Maximum Length (48 *)

*Default

Code 128 is the most flexible of all the common linear symbologies. It supports alpha and numeric characters easily, has the highest number of characters per inch, and is variable length.

See page 6 for information on setting the minimum and maximum lengths.



Enable Code 128 *



Minimum Length (5 *)



Disable Code 128



Maximum Length (48 *)



UCC/EAN 128 Enable *



UCC/EAN 128 Disable



UCC/EAN 128 Code ID Enable



UCC/EAN 128 Code ID Disable *



Function 1 Character Send



Function 1 Character Do Not Send *



Define UCC/EAN 128 Group Separator

To Define UCC/EAN 128 Group Separator:

1. Scan Define UCC/EAN 128 Group Separator
2. Scan ASCII code from pages 31-34
3. Scan Define UCC/EAN 128 Group Separator

Note: Default Group Separator is GS

*Default

MSI Plessey is a variable length numeric symbology and is primarily used in marking retail shelves. Each character consists of four bars with intervening spaces for each encoded digit, one or two symbol check digits, and a reverse start code.

See page 6 for information on setting the minimum and maximum lengths.



Enable



Disable *



Check Digit Verify And Send *



Check Digit Verify And Do Not Send



Check Digit Double MOD 10



Check Digit Double 11 Plus MOD 10



Check Digit Single MOD 10



Minimum Length (6 *)



Maximum Length (48 *)

*Default

Codabar is a variable length symbology capable of encoding six special alphanumeric characters, capital letters A through D, T, N, *, E, and all numeric digits. Codabar is one of the oldest barcode symbologies and is still used in some library applications. It should not be considered for new applications except under unusual circumstances.

See page 6 for information on setting the minimum and maximum lengths.



Codabar Enable *



Codabar Disable



Send Start/Stop *



Do Not Send Start/Stop



Check Digit Do Not Verify *



Check Digit Verify And Send



Check Digit Verify And Do Not Send



Minimum Length (6 *)



Maximum Length (48 *)

*Default

UPC-A (Universal Product Code-A) is fixed length and is the most common UPC barcode for retail product labeling. It is seen in most grocery stores across the United States. The symbology encodes a 12-digit number. The first six digits are assigned from the Uniform Code Council (UCC). The next five digits are assigned by the manufacturer, and the final digit is a modulo 10 check digit. The nominal height for the UPC-A barcode is one inch. The reduced size is 80% of the nominal size.



UPC-A Enable *



UPC-A Disable



Send Leading Digit *



Do Not Send Leading Digit



Send Check Digit *



Do Not Send Check Digit

*Default

This option enables the two and five digit supplements for the UPC and EAN/JAN barcode symbologies.



5 Digit Supplement Enable



5 Digit Supplement Disable *



2 Digit Supplement Enable



2 Digit Supplement Disable *



Transmit if Present



Must Be Present *

This option expands the UPC-A barcode to EAN-13.

PostScript Picture (UPCtoEAN13_on.eps)

UPC-A to EAN-13 Enable

PostScript Picture (UPCtoEAN13_off.eps)

UPC-A to EAN-13 Disable *

*Default

UPC-E (Universal Product Code-E) is fixed length and is a compressed six digit code used for marking small packages, including magazines and paperback books. UPC-E symbols are UPC-A symbols that have been zero suppressed (i.e. consecutive zeros are not included in the symbol). The printed value of the UPC-E code is a twelve digit code. The nominal height for the UPC-E barcode is one inch. The reduced size is 80% of the nominal size.



UPC-E Enable *



UPC-E Disable



Send Leading Digit *



Do Not Send Leading Digit



Send Check Digit *



Do Not Send Check Digit



Expand to UPC-A On



Expand to UPC-A Off *

*Default

This option enables the two and five digit supplements for the UPC and EAN/JAN barcode symbologies.



5 Digit Supplement Enable



5 Digit Supplement Disable *



2 Digit Supplement Enable



2 Digit Supplement Disable *



Transmit if Present



Must Be Present *

*Default

The EAN/JAN-8 is fixed length and is similar to the UPC-E code, but includes two more digits for the country code. The nominal height for the EAN/JAN-8 barcode is one inch. The reduced size is 80% of the nominal size.



EAN-8 Enable *



EAN-8 Disable



Send Leading Digit *



Do Not Send Leading Digit



Send Check Digit *



Do Not Send Check Digit

*Default

This option enables the two and five digit supplements for the UPC and EAN/JAN barcode symbologies.



5 Digit Supplement Enable



5 Digit Supplement Disable *



2 Digit Supplement Enable



2 Digit Supplement Disable *



Transmit if Present



Must Be Present *

*Default

The EAN/JAN-13 (European Article Number/Japanese Article Number) is fixed length and is similar to the UPC-A symbology, but encodes a 13th digit. The nominal height for the EAN/JAN-8 barcode is one inch. The reduced size is 80% of the nominal size.



EAN-13 Enable *



EAN-13 Disable



Send Leading Digit *



Do Not Send Leading Digit



Send Check Digit *



Do Not Send Check Digit



ISBN Enable



ISBN Disable *



ISSN Enable



ISSN Disable *

*Default

This option enables the two and five digit supplements for the UPC and EAN/JAN barcode symbologies.



5 Digit Supplement Enable



5 Digit Supplement Disable *



2 Digit Supplement Enable



2 Digit Supplement Disable *



Transmit if Present



Must Be Present *

*Default

Note: Make sure that the appropriate barcode symbology is configured properly and enabled before trying to scan. Use the 'Barcode Symbologies' configuration beginning on page 14 to enable specific symbologies.

Code 39*



Code 93



Interleaved 2 of 5 *



Codabar *



Code 128*



MSI/Plessey



*Default

UPC-A*



UPC-A
w/5 digit supplement



UPC-A
w/2 digit supplement



UPC-E*



UPC-E
w/5 digit supplement



UPC-E
w/2 digit supplement



*Default

EAN/JAN-13*



EAN/JAN-13
w/5 digit supplement



EAN/JAN-13
w/2 digit supplement



EAN/JAN-8*



EAN/JAN-8
w/5 digit supplement



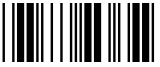
EAN/JAN-8
w/2 digit supplement



*Default

Appendix B ASCII TABLE

Use this ASCII Table to add preamble and postamble characters to your barcode value. Please refer to the appropriate configuration section for the number of characters that can be configured.

 NUL	 LF	 DC4
 SOH	 VT	 NAK
 STX	 FF	 SYN
 ETX	 CR	 ETB
 EOT	 SO	 CAN
 ENQ	 SI	 EM
 ACK	 DLE	 SUB
 BEL	 DC1	 ESC
 BS	 DC2	 FS
 HT	 DC3	 GS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F10


Cursor Right


F2


F11


Cursor Up


F3


F12


Cursor Left


F4


Tab


Cursor Down


F5


Back Tab


Page Up


F6


Esc


Page Down


F7


End


Ins


F8


Home


Enter


F9


Back Space


Del

MODEL	WCS3900
OPTICAL	
Scanning Width	3.00" (76mm)
Depth of Field	contact to 5mm (approx 1.5")
Scan Rate	45 scans / second
Decode Rate	100 scans / second
ELECTRICAL	
Light Source	660 nm red visible LED
Sensor	2088 linear imager
Operating Voltage	+5 VDC ± 5%
Current Consumption	Decoded: Standby <30 mA/ Working <95 mA
Output	USB or PS/2
MECHANICAL	
Dimensions	L7.40" x W3.62" x H1.06"
Weight	125 g (without cable)
Cable	6 ft
Housing	ABS
ENVIRONMENTAL	
Operating Temperature	0˚C to 50˚C
Storage Temperature	-20˚C to 60˚C
Relative Humidity	20% to 80% non-condensing
Safety Certification	Conforms FCC Class A and CE requirements

Warranty Information

Wasp Barcode Technologies products are warranted against defects in workmanship and materials for a period of one year from the date of shipment, provided that the product remains unmodified and is operated under normal and proper conditions.

This warranty is limited to repair or replacement at Wasp Barcode Technologies option, with reasonable promptness after being notified. These provisions do not prolong the original warranty term for any product which has been repaired or replaced by Wasp Barcode Technologies.

This warranty applies to the original owner and does not extend to any product which has been subject to misuse, neglect, accidental damage, unauthorized repair, or tampering.

No other express warranty is given. The replacement or repair of a product is your exclusive remedy. Any other implied warranty of merchantability or fitness is limited to the duration of this written warranty. Some states, provinces, and countries do not allow limits on how long an implied warranty lasts, so the above limitation may not apply to you.

In no event shall Wasp Barcode Technologies be liable for consequential damages. Some states, provinces, and countries do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

Q: How do I configure the scanner for a notebook (or laptop) computer?
A: Scan the “Notebook” barcode on page 7.

Q: How do I change the terminator to a Tab?
A: Scan the “Tab” barcode on page 13.

Q: How do I remove the terminator?
A: Scan the “None” barcode on page 13.

Q: How do I enable the Full ASCII character set for the Code 39 barcode symbology?
A: Scan the following “Enable Code 39 Full ASCII” barcode on page 14.

Product Support

If you experience any problems with the Wasp WCS3900 Series Scanners that you are unable to resolve, call for technical assistance at (214) 547-4100 ext 2, Monday through Friday, 8:00 AM - 5:00 PM Central Standard Time. Visit www.waspbarcode.com/support anytime.

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