RF Scanners

LZ360RF, LZ404RF, 520-RF & B700 Base Station

Worth Data®

LZ360-RF & LZ404-RF 1D Cordless Bar Code Scanners

520-RF 2D Cordless Bar Code Scanners

B700 USB Base Station

WORTH
data

www.worthdata.com

Owner's Manual

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to The following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada RSS standard exempts de licence (s). Son utilisation est soumise à Les deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doit accepter Toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

This device complies with Health Canada's Safety Code 6 / IC RSS-210. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at: http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guidelignes_ direct-eng.php

Cet appareil est conforme avec Santé Canada Code de sécurité 6 / IC RSS-210. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues: http://www.hc-sc.gc.ca/ewhsemt/ pubs/radiation/radio_guide-lignes_direct-eng.php

This device has been tested to comply with the requirements set out in the Council Directive on the approximation of the laws of the Member States relating to Electromagnetic Compatibility Directive (2004/108/EC) with applicable standards listed below:

> EN 55022:2006+A1:2007, Class A
> EN 55024:1998+A1:2001+A2:2003
> EN 61000-3-2:2006+A2:2009
> EN 61000-3-3:2008

The LZ360RF, LZ404RF and 520-RF models of this product have a laser scanner integrated with the scanner as single unit. The laser used is a Class II Laser Product and has a 1.2 Milliwatt Output. To operate the laser scanner, aim the top of the case at a bar code, and press the trigger on the scanner. The light source will turn off, once a successful scan has occurred or 2.5 seconds has elapsed, whichever is first. Do not look directly into the laser light source with the trigger depressed; avoid direct eye contact with the laser light source.

PROPOSITION 65 WARNING: This product, its packaging, and/or components may contain chemicals known to the state of California to cause cancer or birth defects or other reproductive harm

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Introduction

Worth Data RF Lasers have the following features:

1) A range of up to 500 feet (line-of-sight) with collision detection and retry logic built in. Indoor range will vary depending on wall construction type, number of walls and other obstructions between the RF Laser and USB Base Station receiver.

2) Up to ten 1D RF Lasers can communicate with one USB Base Station receiver. One 2D RF Laser can communicate with one USB Base Station receiver. You cannot mix 1D and 2D RF Lasers on a single USB Base Station receiver.

3) The USB Base Station receiver will enumerate as a keyboard so all scanned data will be input to the PC as keyboard data. The USB Base Station receiver will work on any computer that supports a USB keyboard (PC, Mac, Linux, etc.).

4) The USB Base Station receiver can optionally be configured to enumerate as a serial device (COM port) using USB-CDC.

5) The RF Laser operates in the 2400 MHz band similar to WiFi and Bluetooth devices but on narrower channels to avoid interference.

6) The RF Laser can read and discriminate between Code 39, Full ASCII Code 39, Interleaved 2 of 5, Codabar, Code 128, EAN-13, EAN-8, UPC-E, UPC-E1, UPC-A, MSI, LabelCode4, LabelCode5, Code 93 and Plessey.

7) The RF Laser has a rechargeable lithium ion battery. The battery is recharged with the included 5v power supply. Recharge time on fully a discharged battery is about 3 hours.

Installation

Components of RF Laser Readers

In the event the shipping box shows damage on arrival, please note the damage on the carrier's receipt log.

The standard contents of your reader shipment are the following:

1. One or more RF Laser scanners.

2. USB Base Station receiver.

3. A Worth Data regulated 5V power supply to charge the RF Laser Scanner. **TO PREVENT DAMAGING THE RF LASER, DO NOT USE ANY OTHER BRAND OF POWER SUPPLY.**

4. A CD with the user's manual and setup sheet pdf files.

RF Laser Battery Charging

Before using the RF Laser it is a good idea to fully charge the battery. Simply plug the Worth Data charger into the base of the RF Laser handle. The red LED should turn on to indicate that the battery is being charged. If the red LED does not light then either the battery is already fully charged or the battery or charger is defective. It takes about 3 hours to fully charge the battery. The 1D RF Laser will read about 30,000 bar codes per charge and the 2D RF Laser will read about 15,000 bar codes per charge.

If you pull the trigger and the LED is RED instead of YELLOW during scanning then the battery is below 10% and will need to be charged soon.

USB Base Station Receiver Installation

You can plug the USB Base Station receiver into any USB port on your computer. The USB Base Station will automatically be sensed and the driver installation will begin. Windows can usually find the necessary driver on the hard drive under */Windows/System 32/Drivers*; occasionally you will have to insert the original Windows CD. The Mac always finds the driver. In either case, the driver used is the standard USB keyboard driver. No special drivers are required. The LED on the USB Base Station will turn red during enumeration then turn green after successful USB-HID keyboard enumeration.

You can toggle the USB Base Station enumeration between USB-HID (keyboard) and USB-CDC (com port) by pressing and holding the button on the USB Base Station for 6 seconds. After about 2 seconds the LED will blink red 3 times. Continue to hold the button down until the LED blinks green 3 times then release the button. Your computer should report "New hardware found" and ask for a driver. An INF file is included on the supplied driver CD that will install the necessary drivers. The LED on the USB Base Station will turn red during enumeration then turn yellow after successful USB-CDC enumeration.

The interface type (keyboard or com port) is stored in the USB Base Station receiver so if you unplug the receiver or power cycle your computer the receiver will maintain the interface type.

USB-CDC operation is supported under Windows XP, Vista and 7 for both 32-bit and 64-bit versions.

If you mistakenly abort your driver installation, see the **Trouble Shooting Section** of this manual.

Pairing

The default state of the RF Laser is un-paired. You must pair the RF Laser to the USB Base Station receiver that you wish it to communicate with. You can pair the RF Laser with any USB Base Station receiver but it can only be paired with one at a time. Briefly press the button on the USB Base Station receiver until you see the LED blink 3 times then release the button. This will put the receiver into pairing mode for 60 seconds. Scan the "PAIR" bar code with the RF Laser that you wish to pair with the receiver. The LED on the RF Laser will turn blue while it is pairing with the receiver. Once paired, the RF Laser will beep and the LED will turn off. If pairing fails the RF Laser will beep and the LED will blink 5 times then turn off. The RF Laser will remain paired to the paired receiver until it is paired with a different receiver. Scanning **Start Setup**, **Reset**, **End Setup** will not reset the pairing. You can pair up to ten 1D RF Lasers with one 1D USB Base Station receiver.

The RF Laser can be programmed with an ID preamble if your application needs to know which RF Laser the data is from. For example, you can set the preamble to "shipping" or "receiving" or just "5" to identify incoming data. On the Setup Menu first scan **Start Setup** then **Preamble** then up to 15 characters from the full ASCII chart then **SET** followed by **End Setup**. Refer to page 57 for information on how to setup the 2D RF Laser preamble.

It is best to pair the 2D RF Laser and the Base before changing the setup of the 2D RF Laser scanner. Some settings that modify the contents of the scanned bar code (like preamble, postamble, substitution, etc.) can cause the 2D RF Laser to no longer pair with the Base. It won't affect the existing pairing but it might not allow the 2D RF Laser to pair with a different Base until it is reset to factory default settings.

RF Laser Status

The status of the scanner can be displayed on the multicolor LED by either scanning the **Status** bar code on the setup sheet or by holding down the trigger for 10 seconds when no data is stored in the scanner.

The LED will blink red to indicate the status of the battery, one blink for each 10% of current battery capacity. If the battery is currently at 40% capacity then the LED will blink 4 times.

This is a handy way to determine the status of a scanner without using the Setup Menu.

If you would like a complete status report for all setup parameters you must first pair the RF Laser with a USB Base Station receiver then scan the **Transmit Setup** barcode from the Setup Menu. The RF Laser will transmit all the setup parameters to the paired receiver which will output them to the connected computer.

When the battery is below 10% the LED will turn RED instead of YELLOW while scanning to alert the user that the battery will need to be charged soon.

Range Test

Scanning the **Range Test** bar code on the setup sheet will put the RF Laser into Range Test mode. In this mode, the RF Laser will continuously transmit test packets to the USB Base Station receiver which will echo them back. The RF Laser generates a high pitched tone when it transmits the test packet and a low pitched tone when it receives the confirmation. You can put the RF Laser into this mode and test the range of the RF Laser system to see if you have good coverage. If not, try moving the USB Base Station receiver to a different location or using a USB dock to elevate the USB Base Station receiver.

Operational Modes

Normal Operation

When you scan, you will get one high pitched beep when you get a successful decode. The data is then transmitted to the USB Base Station receiver (as it is being transmitted, the LED turns blue). When the Laser receives the acknowledgement from the Base Station that the data has been received, the RF Laser emits a lower pitched beep and turns on a green LED.

If the transmitted data fails to be acknowledged,

1) Further scanning is prohibited. You can't scan again until the data reaches the base or you clear the scanner.

2) The laser will retransmit three times, (the yellow LED will indicate retransmissions) each time the trigger is pulled.

3) If the transmission fails three times, the RF Laser will emit a distinct 8 beep pattern and turn off. The scanned data is saved in the memory of the RF Laser until it is successfully transmitted to the Base or deleted by the user. Check out the Base Station or move closer.

4) You can clear the pending data transmission by holding down the trigger on the RF Laser Scanner for 10 seconds. After 10 seconds, the data from the last scan will be deleted and the RF Laser Scanner will be able to scan bar codes again.

Power Modes

The 1D RF Laser goes into a low-power standby mode when the trigger is released. In this mode, all the components of the scanner are powered but in standby to provide a snappy response when the trigger is pulled. A fully charged battery will last approximately three weeks in this mode if it is not charged sooner. If you wish to completely power-down the 1D RF Laser then scan the bar code below. Any trigger pull after scanning the below bar code will wake up the scanner and put it into standby mode. When waking up from the power down state, there is a delay of about 2 seconds for RF transmission. Only the first scan is delayed.

The 2D RF Laser will automatically power down after sitting idle for 15 minutes. Any trigger pull will wake up the scanner and put it into standby mode. When waking up from the power down state, there is a delay of about 2 seconds for scanning and about 2 seconds for RF transmission. Only the first scan is delayed.

Power-down does not affect pairing or stored setup parameters.

1D Setup Mode

Note: If you are using the 2D 520-RF then refer to the 2D setup chart starting on page 21.

On the included CD-ROM you will find the *RF Laser Setup Menu* sheet. This simple menu lets you easily configure the RF Laser Reader to work with almost any computer system, and to tailor its bar code reading and data format characteristics.

Be sure to read the scanning instructions on the next page. To read *Setup Menu* bar codes and configure your reader, you must know the right way to scan bar codes.

These are the RF Laser Reader's default settings and are shipped configured to these settings; they can be reset to them at any time by scanning the **Start Setup** and **Reset** codes on the *RF Laser Setup Menu*.

Code 39	UPC\EAN
• Enabled	• Enabled
• Check digit disabled	• UPC supplements disabled
• Accumulate Mode enabled	• UPC-E Compressed / NSC of 0
• Caps Lock Off	• UPC-A NSC and EAN-13 1st 2 characters
• Start/stop characters not transmitted	and check digits transmitted
2 of 5 Code	• UPC-E NSC and EAN-8 1st 2 characters
• Disabled	& check digits not transmitted
• **I 2 of 5 Code** Disabled	**General configuration settings**
• 6-digit code length	
• Check digit disabled	
Code 128	• CR for Terminator Character
• Enabled	• Data Transmission Timing of None
• UCC/EAN-128 options disabled	
Codabar	• No preamble or postamble
• Disabled	
• CLSI Format disabled	
• Start/stop characters not transmitted	
MSI/Plessey	
• Disabled	
• Check digit(s) not transmitted	
Code 93	
• Disabled	
• Full ASCII disabled	

If you need to change any of the default settings, or would like to learn more about the Wireless scanner options, the next several pages will explain, step by step, how to set them.

Laser Scanning Instructions

Using a laser scanner is basically as simple and intuitive as "point and shoot" at a distance of 0-24", depending on the density of the bar code.

Basically, the laser scanner's beams must cross every bar and space on the bar code, without touching any other bar codes, as shown in the first example below. You'll need to hold the scanner further away to produce a wider beam for large bar codes, and closer for bar codes with bars very close together.

Even though momentary exposure to a laser's low-power, visible-light is not known to be harmful, **you should not aim the beam into anyone's eyes**.

The important thing to remember about using a laser with the RF Laser Reader Setup Menu is that you need to make sure the scanner's beam covers only one bar code at a time. The laser scanner's beam is wide enough, and the configuration bar codes close together enough that you will need to use your fingers or a few pieces of note paper to "block off" bar codes adjacent to whatever configuration bar code you need to read.

For example, to read this "5" bar code on the Setup Menu, you would need to cover any adjacent bar codes with paper or a finger first, as shown.

Using The 1D RF Laser Setup Menu

Note: If you are using the 2D 520-RF then refer to the 2D setup chart starting on page 24.

1. To configure your reader using the **RF Laser Setup Menu**, you must first scan the **Start Setup** code at the top left corner. **Do this now**. You'll hear two beeps. During Setup, nothing will be transmitted to your computer; the *Reader Setup Menu* codes are strictly for configuring the reader. If you did not hear two beeps, try scanning the code again, until you hear the two beeps. If you've never scanned bar codes before, read the scanning instructions on *page 6* before continuing. The scanner LED will turn green when in setup mode.

2. Next, choose the setting you want to change an option for and scan its code. You will hear 2 beeps each time you read a setup barcode.

3. Then, choose the option you want to change, from the list next to the setting bar code you just scanned. Using the "*Barpad Table*" on the right side of the Reader Setup Menu, scan the number or letter associated with the option you have selected to change. Some settings (like Preamble and Postamble) require the **SET** barcode to terminate a string entry but most are single character.

4. Now scan **End Setup** (at the top-right corner of the Reader Setup Menu to complete the setup. You'll hear three beeps.

The next several pages will show you all of the various Wireless Reader options. Default settings are shown in **bold** in this manual and marked with an * on the *Reader Setup Menu*.

Note: If you are using the 2D 520-RF then refer to the 2D setup chart starting on page 24.

Code 3 of 9 (Code 39)

Enable Code 39	**0**
Disable Code 39	1
Enable Full ASCII Code 39	**2**
Disable Full ASCII Code 39	3
Enable Code 39 Accumulate Mode	**4**
Disable Code 39 Accumulate Mode	5
Enable Start/stop character transmission	6
Disable Start/Stop character transmission	**7**
Enable Mod 43 Check Digit	8
Disable Mod 43 Check Digit	**9**
Enable Check Digit Transmission	A
Disable Check Digit Transmission	**B**
Caps Lock ON	C
Caps Lock OFF	**D**

See *page 20* for information about **Accumulate Mode** (this setting also controls Code 93 and Code 128).

Enabling Start/Stop character transmission means that the RF Laser Reader will transmit the ***** Start/Stop characters to your computer along with the data. For example, data of 1234 would be transmitted as ***1234***.

Enabling the Mod 43 Check Digit requires the units position of your data to match the calculation for the check digit explained in *Appendix C*.

If you've enabled the check digit, enabling Check Digit transmission causes the reader to transmit it to your computer along with the bar code data.

"Caps Lock ON" means that for all codes lower case letters read as data will be transmitted as upper case, and upper case as lower. Numbers, punctuation & control characters are not affected. This applies to Code 128 and Code 93 also.

"Caps Lock OFF" means that letters will be transmitted exactly as read.

Note: If you are using the 2D 520-RF then refer to the 2D setup chart starting on page 24.

UPC/EAN

Enable UPC/EAN	**0**
Disable UPC/EAN	1
Enable UPC/EAN Supplements	2
Disable UPC/EAN Supplements	**3**
Enable transmission of UPC-A NSC and EAN-13 1st 2	**4**
Disable transmission of UPC-A NSC and EAN-13 1st 1 digits	5
Enable transmission of UPC-A and EAN–13 Check Digit	**6**
Disable transmission of UPC-A and EAN-13 Check Digit	7
Enable transmission of UPC-E NSC and EAN-8 1st Digit	8
Disable transmission of UPC-E NSC and EAN-8 1st Digit	**9**
Enable transmission of UPC-E and EAN-8 Check Digit	A
Disable transmission of UPC-E and EAN-8 check Digit	**B**
UPC-E Compressed	**C**
UPC=E Expanded	D
EAN-8 observes 9 & A above	**E**
EAN-8 is forced to transmit 8 digits	F

Enabling supplements allows you to read 2 and 5-digit supplemental codes used with magazines and paperbacks. **This disallows right-to-left reading** of UPC codes, to assure that the supplement doesn't get skipped.

Use setting **2** to enable reading of the 2 and 5 digit **UPC/EAN supplements** commonly found on magazines and paperback books. Use this setting to force left to right reading of UPC codes, assuring that the supplement code is not missed. This This setting also allows for reading of the *UCC/EAN 128 Extended Coupon Code.* The *Extended Coupon Code* consists of a UPC code with a NSC of 5 or and EAN code with a country code of 99 along with a C0de 128 supplemental code to the right. This setting allows you to read the Code 128 supplement with the UPC/EAN, providing the UPC has a NSC of 5 or the EAN code has a country code of 99. Without the correct NSC or country code, the Code 128 portion will be ignored; UPC code with an NSC of 5 or EAN codes with country code of 99 will not be read unless there is a readable Code 128 supplemental code read also.

UPC-E Compressed Format transmits UPC-E codes as is; **Expanded Format** adds zeros to make them the same length as UPC-A.

UPC-E can be used in either normal UPC-E format (implicit NSC of 0) or UPC-E1 format (NSC of 1). **UPC-E1 is enabled** by scanning 2 of 5 Code and **8** (9 disables UPC-E1). It is very easy to partially read EAN-13 as UPC-E1, so **don't enable UPC-E1 if reading EAN-13.**

If you wish **to transmit UPC-A data in EAN-13 format**, (an added leading 0 for the USA's country code), scan **Terminator Character** and **F**. Scanning **E**, the default, sets UPC back to no country code transmitted.

ISBN, International Standard Book Numbering, bar codes are EAN-13 codes with a 5 digit supplement. If the first three digits are the "Bookland" country codes of 978 for books or 977 for periodicals, then you can enable transmission of EAN-13 bar codes in the ISBN format. Suppose you scan an EAN-13 with 5-digit supplement which is a bar code of 978055337062153495. It would be transmitted in ISBN format as 0553370626 (as of Jan.1, 2006, the correct ISBN format is the EAN-13 bar code with the 5 digit supplement). 055337062 are the first nine digits of the ISBN format, and 6 is the newly calculated Mod-11 check digit.

To enable the transmission of the ISBN format, scan **Terminator Character** and **D**. Scanning **C,** the default, disables conversion to ISBN format back to regular EAN-13 format.

Note: If you are using the 2D 520-RF then refer to the 2D setup chart starting on page 24.

Code 128

Disable Code 128	**0**
Enable Code 128	1
Disable UCC/EAN-128	**2**
Enable UCC/EAN-128	3
Enable Storage Tek Tape Label Code	C
Disable Storage Tek Tape Label Code	**D**
Bar Code IDs transmitted	E
Bar Code IDs not transmitted	**F**

To enable a Bar Code ID character to be transmitted at the beginning of each bar code read, scan **E. The ID's are as follows:**

Codabar	a	I2of5	e	93	i	Plessey	x
Code 39	b	2of5	f	UPC-E0	n	LabelCode4	y
UPC-A	c	128	g	UPC-E1	o	LabelCode5	z
EAN-13	d	MSI	j	EAN-8	p	STK	s

To disable bar code ID characters, scan F.

MSI and Plessey

Disable MSI	**0**
Enable MSI with 1 Mod 10 check digit	1
Enable MSI with 2 Mod 10 check digits	2
Enable MSI with 1 Mod 11 and 1 Mod 10 check digit	3
Transmit No Check Digits	**4**
Transmit 1 Check digit	5
Transmit 2 Check digits	6
Enable Plessey (mutually exclusive with MSI)	7
Enable LabelCode5	8
Enable LabelCode4	9

Codabar

Enable Codabar	**0**
Disable Codabar	1
Enable CLSI Codabar	**2**
Disable CLSI Codaber	3
Enable Start/Stop Character Transmission	4
Disable Start/Stop Character Transmission	**5**

CLSI format is a form of Codabar often used by libraries.

Enabling Start/Stop character transmission means that the RF Laser will transmit start/stop characters to your computer along with data. If you're varying start/stop characters with different label types, you'll want to enable transmission.

Note: If you are using the 2D 520-RF then refer to the 2D setup chart starting on page 24.

2 of 5 Code

Enable Interleaved 2 of 5	**0**
Disable Interleaved 2 of 5	1
Enable Interleaved 2 of 5 Check Digit	2
Disable Interleaved 2 of 5 Check Digit	**3**
Enable Check Digit Transmission	4
Disable Check Digit Transmission	**5**
Enable Standard 2 of 5	6
Disable Standard 2 of 5	**7**

Enabling the Check Digit requires the data's unit's position to match the calculation for the check digit. *If you've enabled the check digit*, enabling Check Digit transmission causes the reader to transmit it to your computer along with the bar code data.

2 of 5 Data Length

2 of 5 Code is so susceptible to interpreting partial scans as valid reads that the Radio/Freedom Reader uses fixed-length data as a safeguard. **To choose a data length**, scan it as a two-digit number using the Barpad Table. For example, to select 8-digit data length, you would scan a 0 and then an 8. **Because Interleaved 2 of 5 is required to be an even number of digits in length**, you must use an even number. If you're unsure of your bar code length, **temporarily** set the length to **00**, read a bar code, and count its digits and then set it to the actual length. **DO NOT PERMANENTLY SET THE *2 of 5 LENGTH* TO *00* or you will get misreads!**

Code 93

Enable Code 93	0
Disable Code 93	1
Enable Full ASCII Code 93	2
Disable Full ASCII Code 93	**3**

Note: If you are using the 2D 520-RF then refer to the 2D setup chart starting on page 24.

Terminator characters

Enter (carriage return)	**0**
None	1
HT	2
CR/LF	3

Depending on your application, you may wish your Wireless Reader to transmit bar code data to your computer with an **Enter** (carriage return), a **Tab** at the end, or with no extra terminating character at all.

If you need a terminator character other than **CR** or **HT** or **CR/LF**, you can get it by specifying **None** here and then selecting your desired terminator character(s) specified in the **Postamble**.

Preamble

A "Preamble" is a user-specified data string transmitted at the beginning of each bar code. For example, if you specify the preamble **@@** and read data of **123456**, "**@@123456**" would be transmitted to your computer. The Preamble applies to the scanner, not the base station because there may be multiple scanners per base.

The default is no preamble. To select a preamble, scan up to 15 characters from the "FULL ASCII MENU" on the back of the *Reader Setup Menu*, and then scan **SET** when you're done. To return to the no preamble setting, scan **Clear** here instead of scanning **SET** or any characters from the FULL ASCII MENU.
You can **trim 1-15 leading characters** from bar code codes by scanning a ~ (tilde -- ASCII 126) followed by a single digit, 1 through F, as part of the Preamble. (Bar codes that are shorter than the amount-to-trim are transmitted with no trimming.) Consider the examples in the following table to understand how trimming works:

Bar Code Data	Preamble	Data Transmitted
123	**XYZ**	**XYZ123**
12345678	**~3XYZ**	**XYZ45678**
12345678	**~9**	**12345678**
12345	**~A**	**12345**
123456	**~5**	**6**

You can also trim selectively by bar code type. For example, you can trim 2 characters from Code 39 and a different amount from other bar code outputs. This is done by using the bar code ID character in conjunction with the tilde (~). A preamble of ~b2~c1 says trim 2 characters from the front of Code 39 output and trim 1 character from the front of UPC-A. Refer to the Code 128 parameter on page 13 for a list of the ID character associated with each bar code type.

A final use of the Preamble/Postamble is to enter a minimum/maximum length check for bar code data read. Use the Preamble or Postamble by entering |*nnmm* where "|" is ASCII 124, "*nn*" is the two digit minimum to be read and "*mm*" is the two digit maximum to be read.

Note: If you are using the 2D 520-RF then refer to the 2D setup chart starting on page 24.

Postamble

"Postamble" refers to a user-specified data string transmitted at the end of each bar code. For instance, if you specify the postamble **@@** and read data of **123456**, "**123456@@**" would be transmitted to your computer.

The default is no postamble. To select a postamble, scan up to 15 characters from the "FULL ASCII MENU" on the back of the *Reader Setup Menu*, and then scan **SET** when you're done. To return to the no postamble setting, scan **CLEAR** here instead of scanning **SET** or any characters from the FULL ASCII MENU.

You can **trim 1-15 trailing characters** from bar code codes by scanning a ~ (tilde -- ASCII 126) followed by a single hex digit, **1** through **F**. (Bar codes which are shorter than the amount-to-trim are transmitted without trimming.) Consider the examples in the following table to understand the options of the Postamble:

Bar Code Data	Postamble	Data Transmitted
123	**XYZ**	**123XYZ**
12345678	**~3XYZ**	**12345XYZ**
12345678	**~9**	**12345678**
12345	**~A**	**12345**
123456	**~5**	**1**

Bar codes that are shorter than the sum of the Postamble trimming and Preamble trimming will be transmitted without trimming. Selective trimming and min/max bar code data is also supported through Postamble specifications, (See **Preamble** above for complete details).

Characters

This setup option allows you to output ASCII characters different from the ones scanned.

For example: Suppose you want to output a hex 92 character every time you scan a 1 (hex 31); you want to remap hex 31 to hex 92, (If you're using 8 data bits, output of 80-F8 codes is possible.)

  1) Scan the **Start Setup** Bar Code
  2) Scan the **Characters** Bar Code on the Setup Sheet.
  3) Scan **3 1** and **9 2** to output hex 92 when reading a "1".
  4) Scan up to 7 other pairs of character reassignments.
  5) Scan **Set** when complete.
  6) Scan **End Setup** to exit setup mode.

Hex values for each character code are shown on the ***Full ASCII Menu***. The equivalent decimal values are also shown for each character.

You can also eliminate characters by reassigning hex codes to FF. For example, to strip all $ (dollar sign) characters from transmission, you would follow the above instructions and scan **2 4 F F** in step 3.

Reset

Once you are in the Setup Mode, don't scan **Reset** unless you're sure you want to restore the RF Laser to its default settings (as described on *page 5*), erasing all changes you've made.

DIFFICULT CODE SETUP OPTIONS (does not apply to 2D RF Laser)

Aiming Laser Dot: (LZ404-RF only) Sometimes it is difficult to see the laser beam and know you are on the bar code, especially if you are attempting to read outdoors in direct sunlight. The laser can be output as a bright dot for a few seconds, allowing the user to place the dot in the middle of the bar code; then the laser beam starts sweeping for the read. As shipped, the laser beam never forms an aiming dot, but you can program a number of seconds that you wish the aiming dot to appear before the beam scans using the following setting:

> Scan **Start Setup**
> Scan **Aiming Dot Duration**
> Scan **1** to select a 1 second aiming dot, or
>   **2** to select a 2 second aiming dot, or
>   **3** to select a 3 second aiming dot, or
>   **4** to select a 4 second aiming dot, or
>   **5** to select a 5 second aiming dot, or
>   **0**, the default, to eliminate an aiming dot.
> Scan **End Setup**

4-second beam: Another option with problem reading conditions is to increase the length of the time the scanner attempts to read, from the default 2-second beam to a 4-second beam. To select the 4-second beam:

> Scan **Start Setup**
> Scan **4-Second Beam**
> Scan **1** to select the 4-second beam
> Scan **End Setup**

To return to the default 2-second beam, scan **0** instead of **1**.

Automobile VIN READING*:*
There is special support for reading automobile Vehicle Identification Numbers, VIN, remotely from the computer. (CCDs will not read through a windshield, only laser scanners.) You may want to use the aiming dot above too.

"Difficult Code 39 Reading": This feature facilitates reading of the VIN number on automobiles, which is often a difficult-to-read bar code, especially reading through a windshield. VIN numbers are long, often weathered, often dirty, and challenging to read.

To enable the more aggressive Code 39 algorithms necessary to read windshield VINs:

> Scan **Start Setup**
> Scan **Difficult Code 39 Reading**
> Scan **1** for windshield reading
> Scan **End Setup**

To return to the default Code 39 decode algorithms, scan **0** instead of **1.**

"Double-scan checking": When reading a VIN, you will also want to disable double scan checking. The reader's default is to not output or beep until it has two successive identical decodes. This is an acceptable safeguard with most codes, but with VIN numbers read through a windshield, you will have to deactivate double scan checking to get timely reads.

> Scan **Start Setup**
> Scan **Double Decode**
> Scan **0** to disable double decode
> Scan **End Setup**

To enable double scan checking, scan **1** instead of **0**.

Accumulate Mode (1D only)

Accumulate Mode is an option (which can be enabled or disabled using the Reader Setup Menu's Code 39 section) allowing the reader to accumulate multiple bar codes in its buffer, then transmit them to the computer as if they had been a single bar code. This is useful for entering quantities and other variable data.

It works with Code 39 only, and can't be used with a check digit. When the reader reads a bar code with a leading space, it beeps and buffers the data without transmission. It continues to read and buffer bar codes (up to 40 characters) until it reads a bar code without a leading space. Then the entire buffer (including that last code) is transmitted as one long bar code. A bar code of a double minus (--) sign clears the buffer. Scanning a backspace code ($H) backspaces in Full ASCII mode. A handy code for **Enter** (as seen on the "Barpad" below) is a Start/Stop only. (No data.) The code to use for testing the transmission link between the RF Laser Scanner and the RF Base Station is the CLEAR BUFFER code (the same bar code as titled Link Test on the Setup Menu. It will cause beeps to be heard, but no data will be transmitted to the computer -- testing blind with no computer consequence.

This numeric "Barpad" illustrates Accumulate Mode. Scan **5, 3, 8,** and **Enter**. The reader transmits a single message of **538.**
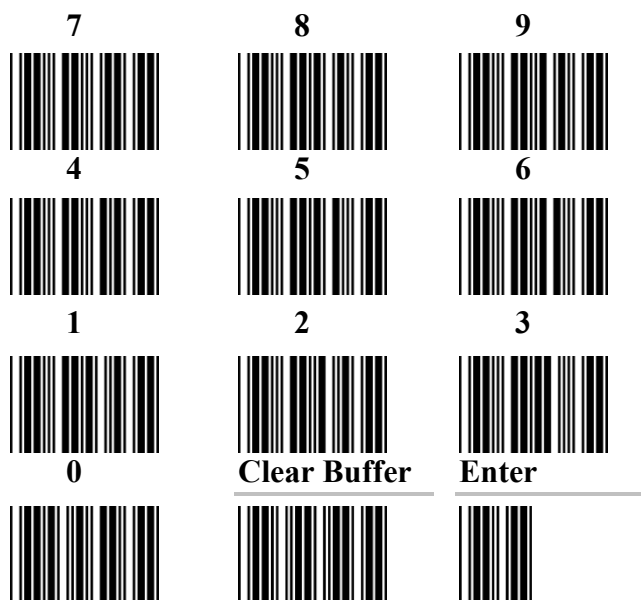
Function/Control Key Support

The RF Laser can also transmit key sequences for function, control, alt (command and option keys on Macs), cursor and shift keys, for ease of use with the many software packages using these keys for menus or commands. You can include these codes in other bar codes, or you can scan these "keystrokes" into your Preamble or Postamble in order to add them to every scan from your reader. You must have Full ASCII Code 39 enabled on your reader (this is the default setting). Scan the corresponding bar code (or pairs of codes for Pg Up, Pg Dn, Home, etc) from the Full ASCII menu to emulate the chosen key.

PC Key	Full ASCII Menu Bar Code
F1	SOH (f1)
F2	STX (f2)
F3	ETX (f3)
F4	EOT (f4)
F5	ENQ (f5)
F6	ACK (f6)
F7	BEL (f7)
F8	SO (f8)
Numpad 5*	Null 5
Enter	CR
F9	SI (f9)
F10	DLE (f10)
Del	Null .
Insert	Null 0
Left Arrow*	Null 4
Rt Arrow*	Null 6
Dn Arrow*	Null 2
Up Arrow*	Null 8
Pg Up*	Null 9
Pg Dn*	Null 3
Home*	Null 7
End*	Null 1
Shift ON	EM (Shift ON)
Shift OFF	SUB (Shift OFF)
Control On	FS (Ctrl ON)
Control Off	GS (Ctrl OFF)
Alt On	RS (Alt ON)
Alt Off	US (Alt OFF)

* refers to the keys on the Number pad on the far right side of a PC keyboard. To emulate any of the keys above, scan the appropriate bar code from the FULL ASCII MENU. For example, to emulate the f5 key, scan the ENQ bar code.
 Simply scan the correct bar code(s) from the FULL ASCII MENU. For example, if the WDP reads the bar code SOH (ASCII 001 -- a control-A) from the FULL ASCII MENU, it will transmit an F1 key.

Shift, Ctrl and Alt keys require three sequences:
1) The ON code generated when the Shift, Ctrl or Alt key is pressed.
2) The other key to be used in conjunction with the Shift, Ctrl or Alt key.
3) OFF code generated when the Shift, Ctrl or Alt key is released.

(For example, to create a Control C bar code: use Control ON, C, and Control OFF. To put Control C in a Preamble or Postamble, scan from the Full ASCII Menu: Control ON, C, and Control OFF).

Function keys F11 and F12
Function keys F11 and F12 require two bar codes to be scanned to make these functions keys. The F11 key is created by combining the Null and SOH. The F12 key is created by combining the Null and the STX.

Windows Key
The Windows key on a Windows keyboard is transmitted by scanning 4 bar codes - NULL and C for Windows On (pressing down) and NULL and D for Windows Off (releasing the key).

Command and Option Keys on Mac USB Keyboards
When you have a WDP Reader attached to a Macintosh Computer's USB port, to emulate the Command key, use the Windows key ON/OFF bar codes NULL, C (Command ON) and NULL, D (Command OFF) For the Option Key ON/OFF use RS (Option On) and US (Option Off).

Transmitting any ASCII character using its 3-digit ASCII code
You can also transmit any ASCII character from 000 to 255 by emulating the PC technique of typing a character's ASCII number on the numeric pad while holding down the Alt key. For example, to transmit ASCII 250, you would scan the bar codes for:

Keystroke	Full ASCII Menu Bar Code
Alt ON	RS
Ins (0 on the numeric pad)	DC2
Down Arrow (2 on the numeric pad)	NAK
Numpad 5	LF
Ins (0 on the numeric pad	DC2
Alt OFF	US

Troubleshooting

All Models Troubleshooting

The beam won't stay on, or **I just get a narrow beam when I pull the trigger,** or **the scanner won't turn on when I pull the trigger** or **the red LED flashes when I pull the trigger.**

☐ All of the above problems are an indication that your BATTERY IS TOO LOW. With any of the above symptoms, recharge the battery in the RF Laser before assuming you have some other kind of problem.

The reader won't beep when reading bar codes

☐ Recheck all the connections. Get close to the Base Station. Try reading the *Link Test* bar code, following the steps for scanning on page 6.

☐ If you hear two beeps, but see nothing on the screen, try scanning **End Setup**.

☐ Reread the configuration section and make sure you properly enabled the bar code types you're trying to read.

Extra characters at the beginning or end of your bar code data

☐ Clear the Preamble and Postamble.

Poor read rate

☐ Get close to the Base Station and try reading the test label (following the scanning instructions on *page 6*) as an example of a known good bar code. Examine your bar codes to make sure they have dark bars, clearly defined bars and white spaces, and a "quiet zone" of at least 1/4 inch to the left and right. If the bars are gray, or so dark that they "bleed" into the white spaces, the person or organization printing them will need to adjust the printer or get a new ribbon or toner cartridge for it.

I get six beeps when the RF Laser powers up.

☐ The unit needs repair. Call for an RMA.

The Orange light stays on the RF Laser Scanner

☐ You are in Setup Mode. Scan End Setup on the Wireless Setup Menu.

You need more range

☐ If you need more range consider using a USB Dock to allow the USB Base Station receiver to be positioned with better line-of –sight to the RF Laser.

USB Trouble Shooting

The Base Station's light flashes in Red cycles when the USB cable is connected.

☐ The Base Station cannot enumerate. The driver is probably not installed correctly.

Occasionally the user will be unaware that he aborted his driver installation. Once the process has started, it should finish successfully. If it doesn't, you will not see any data on the screen when scanning.

To resolve a driver installation problem follow the applicable instructions below:

Windows XP:

1. Go to the *Start* menu.
2. Select *Control Panel*.
3. Switch to "*Classic View*" if in "*Category View*"
4. Select "*System*".
5. Select "*Hardware*" tab.
6. Select "*Device Manager*"
7. Double Click on the" *Human Interface Devices*"
8. Locate the USB Human Interface Device with a "!" in the icon.
9. Click on *Update Driver*
10. Follow instructions. If XP fails to find the driver on the computer's hard disk, you may have to insert and point to the original Windows XP CD to complete the installation.
11. Click "*Finish*"

Win98/ME:

1. Go to the "*Start*" menu.
2. Go to "*Settings*".
3. Select "*Control Panel*".
4. Go to "*System*".
5. Click on the "*Device Manager*" tab.
6. Double Click on the "*USB Human Interface Devices*" (it may be titled *TriCoder HID Keyboard* instead).
7. Now click on the "*Reinstall Driver*" button.
8. Follow directions. If the installer cannot find the right driver file on your hard disk, you may have to insert the original Windows 98 CD and point to it to complete the installation.
9. Click "*Finish*".

Win2000:

1. Log on as *Administrator* and open the "*Administrative Tools*" folder in your *Control Panel*.
2. Run the "*Computer Management*" utility.
3. Select the "*Tree*" tab on the left panel
4. Find the "*Device Manager*" entry under "*System Tools*" and click on it. The right panel will display current devices.
5. Problem devices will be identified with an "**!**" icon. Find either the "*HID Keyboard Device*" under Keyboards or the "*USB Human Interface Device*" under Human Interface Devices and double-click on one of those entries.
6. Now select the "*Driver*" tab at the top of the window and click on the "*Update Driver*" button. Follow the prompts to re-install the HID driver.

Worth Data 520-RF Bar Code Scanner Setup Guide

1D Codes:

Code Type	Enabled by Default	Additional Setup Info
UPC	yes	page 25
EAN	yes	page 26
EAN-13	yes	page 26
EAN-8	yes	page 26
Code 39	yes	page 28
Codabar	yes	page 29
Code 128	yes	page 31
Code 93	yes	page 32
Code 11	no	page 33
Industrial 2 of 5	yes	page 34
Interleaved 2 of 5	yes	page 34
S-Code	yes	page 34
Matrix 2 of 5	no	page 34
Chinese Post Matrix 2 of 5	no	page 34
MSI/Plessey	yes	page 35
UK/Plessey	yes	page 36
POSTNET	no	page 37
Intelligent Mail Bar Code	no	page 38
GS1 DataBar	yes	page 39
Korean Postal Authority	no	page 40
IATA	yes	page 41
Tri-Optic	yes	page 42
Telepen	yes	page 43
JPN (Customer Bar Code)	no	page 44

2D codes:

Code Type	Enabled by Default	Additional Setup Info
PDF417	yes	page 45
Micro PDF417	yes	page 46
Maxi Code	yes	page 47
QR Code	yes	page 48
Micro QR	yes	page 49
Aztec Code	yes	page 50
Aztec Runes	no	page 51
Data Matrix (ECC 200)	yes	page 52
Data Matrix (ECC 000-140)	no	page 52
Codablock F	no	page 53
Chinese Sensible Code	no	page 54
All Codes	no	page 55

Other Options:

Item	Setup Info
Number of Characters	page 56
Composite Codes	page 57
String Options (preamble, postamble)	page 58
String Options (prefix, suffix)	page 59
String Options (code identification)	page 62
Collective Reading	page 64
Read Mode	page 66
Imager Settings	page 70

Warning: These setup codes are for the LZ520-2DRF only. Do not use these codes to setup the 2D scanner on a 2D integrated Terminal or TriCoder. Use the internal menu to configure those units.

Note: Use caution when reading setup codes such that unwanted codes are not read.

Set to factory default:

To set the scanner to factory defaults, scan the code below.

Reset All 2D Settings to Default

UPC

UPC-A Settings:

UPC-A leading zero check digit transmission	UPC-A, no leading zero, transmit check digit	default	
	UPC-A, no leading zero, not transmit check digit		
	UPC-A, leading zero, transmit check digit		
	UPC-A, leading zero, not transmit check digit		

UPC-E Settings:

UPC-E leading zero check digit transmission	UPC-E, no leading zero, transmit check digit	default	
	UPC-E, no leading zero, not transmit check digit		
	UPC-E, leading zero, transmit check digit		
	UPC-E, leading zero, not transmit check digit		
UPC-A,E conversion	transmit UPC-E	default	
	transmit as UPC-A		
UPC-E1 conversion	disable UPC-E1	default	
	enable UPC-E1		

UPC Supplement Settings:

UPC Symbologies	Exclusive	Enable	Disable
UPC without supplement (default enable)			
UPC with 2-digit supplement			
UPC with 5-digit supplement			

note: setting any symbology to exclusive will disable all other symbologies

EAN

EAN Settings:

EAN-13 and EAN-8 Check Digit Transmission	not transmit EAN-13 check digit		
	transmit EAN-13 check digit	default	
	not transmit EAN-8 check digit		
	transmit EAN-8 check digit	default	

EAN-13 and EAN-8 ISBN Conversion	disable ISBN conversion	default	
	enable ISBN conversion		
	enable ISBN if possible		

EAN-13 and EAN-8 ISSN Conversion	disable ISSN conversion	default	
	enable ISSN conversion		
	enable ISSN if possible		

EAN-13 and EAN-8 ISMN Conversion	disable ISMN conversion	default	
	enable ISMN conversion		
	enable ISMN if possible		

EAN-13 Forced Add-On 1	enable EAN forced add-on when EAN13 starts with 378 / 379 / 529		
	disable EAN forced add-on when EAN13 starts with 378 / 379 / 529	default	

EAN-13 Forced Add-On 2	enable EAN forced add-on when EAN13 starts with 434 / 439 / 414 / 419 / 977 / 978		
	disable EAN forced add-on when EAN13 starts with 434 / 439 / 414 / 419 / 977 / 978	default	

EAN Supplement Settings:

EAN Symbologies	Exclusive	Enable	Disable
EAN no supplement (default enable)	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖
EAN with 2-digit supplement	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖
EAN with 5-digit supplement	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖

note: setting any symbology to exclusive will disable all other symbologies

EAN-13 Supplement Settings:

EAN Symbologies	Exclusive	Enable	Disable
EAN-13 no supplement (default enable)	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	N/A
EAN-13 with 2-digit supplement	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	N/A
EAN-13 with 5-digit supplement	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	N/A

note: setting any symbology to exclusive will disable all other symbologies

EAN-8 Supplement Settings:

EAN Symbologies	Exclusive	Enable	Disable
EAN-8 no supplement (default enable)	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	N/A
EAN-8 with 2-digit supplement	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	N/A
EAN-8 with 5-digit supplement	‖‖‖‖‖‖‖	‖‖‖‖‖‖‖	N/A

note: setting any symbology to exclusive will disable all other symbologies

Code 39

Code 39 Settings:

Code 39	Exclusive	Enable	Disable
Code 39 Enable/Disable (default enable)	‖‖‖‖	‖‖‖‖	‖‖‖‖

note: setting any symbology to exclusive will disable all other symbologies

Full ASCII Conversion	normal code 39	default	‖‖‖‖
	full ASCII code 39		‖‖‖‖
	full ASCII code 39 if possible		‖‖‖‖

Code 39 and It Pharmaceutical Check Digit (CD)	not check CD	default	‖‖‖‖
	check CD		‖‖‖‖
	not transmit CD		‖‖‖‖
	transmit CD	default	‖‖‖‖

Code 39 and It Pharmaceutical Misc Settings	not transmit start/stop	default	‖‖‖‖
	transmit start/stop		‖‖‖‖
	minimum data = three characters		‖‖‖‖
	minimum data = one character	default	‖‖‖‖
	disable concatenation	default	‖‖‖‖
	enable concatenation		‖‖‖‖

Italian Pharmaceutical Options	Enable	Disable
Italian Pharmaceutical Only (default disable)	‖‖‖‖	‖‖‖‖
Italian Pharmaceutical if Possible (default disable)	‖‖‖‖	‖‖‖‖
Leading A Transmission (default disable)	‖‖‖‖	‖‖‖‖

Codabar

Codabar Settings:

Codabar	Exclusive	Enable	Disable
Codabar Enable/Disable (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

Codabar ABC, CX Conversion	enable only Codabar normal mode	default	
	enable only ABC code		
	enable only CX code		
	enable Codabar / ABC and CX		

Codabar Check Digit (CD)	not check CD	default	
	check CD		
	not transmit CD		
	transmit CD	default	

Codabar Start / Stop	not transmit start / stop	default	
	start / stop = ABCD / ABCD		
	start / stop = abcd / abcd		
	start / stop = ABCD / TN*E		
	start / stop = abcd / tn*e		
	start = <DC1><DC2><DC3><DC4> stop = <DC1><DC2><DC3><DC4>		

Codabar Settings Continued:

Codabar Minimum Digit	minimum data = one character		|||||| |||| || ||||
	minimum data = three characters		|||||| |||| || ||||
	minimum data = five characters	default	|||||| |||| ||| ||||

Codabar Space Insertion	disable space insertion	default	|||||| ||| || ||||
	enable space insertion		|||||| ||| || ||||

Codabar Inter-Character Gap Check	disable inter-character gap check		|||||| ||| || ||||
	enable inter-character gap check	default	|||||| ||| || ||||

Code 128

Code 128 Settings:

Codabar	Exclusive	Enable	Disable
Code 128 Enable/Disable (default enable)	‖‖‖‖‖‖	‖‖‖‖‖‖	‖‖‖‖‖‖

note: setting any symbology to exclusive will disable all other symbologies

Code 128 and GS1-128 (EAN-128) EAN-128 Conversion	disable GS1-128	default	‖‖‖‖‖‖
	enable GS1-128 only		‖‖‖‖‖‖
	enable EAN-128 if possible		‖‖‖‖‖‖

Code 128 and GS1-128 (EAN-128) Concatenation	disable concatenation (FNC2 message append)	default	‖‖‖‖‖‖
	enable concatenation (FNC2 message append)		‖‖‖‖‖‖

Code 93

Start Setup	End Setup
‖‖‖‖‖‖‖‖‖	‖‖‖‖‖‖‖‖‖

Code 93 Settings:

Symbology	Exclusive	Enable	Disable
Code 93 (default enable)	‖‖‖‖‖‖‖‖	‖‖‖‖‖‖‖‖	‖‖‖‖‖‖‖‖

note: setting any symbology to exclusive will disable all other symbologies

Code 93 Check Digit (CD)	not transmit CD	default	‖‖‖‖‖‖‖‖
	transmit CD		‖‖‖‖‖‖‖‖

Code 11

Code 11 Settings:

Symbology	Exclusive	Enable	Disable
Code 11 (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

Code 11 Check Digit (CD)	not check CD		
	check 1 CD		
	check 2 CD		
	check auto 1 or 2 CD	default	
	not transmit CD	default	
	transmit CD		

2 of 5 and S-Code

Start Setup

End Setup

2 of 5 and S-Code Settings:

Symbology	Exclusive	Enable	Disable
Industrial 2 of 5 (default enable)			
Interleaved 2 of 5 (default enable)			
S-Code (default enable)			N/A
Matrix 2 of 5 (default disable)			N/A
Chinese Post Matrix 2 of 5 (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

2 of 5 and S-Code Check Digit (CD)	not check CD	default	
	check CD		
	not transmit CD		
	transmit CD	default	

2 of 5 and S-Code Space Check	disable space check for Industrial 2 of 5		
	enable space check for Industrial 2 of 5	default	

S-Code Conversion	not transmit S-Code as Interleaved 2 of 5	default	
	transmit S-Code as Interleaved 2 of 5		

2 of 5 and S-Code Minimum Digit	minimum data = one character		
	minimum data = three characters		
	minimum data = five characters	default	

MSI / Plessey

Start Setup

‖‖‖‖‖‖‖‖‖‖‖‖

End Setup

‖‖‖‖‖‖‖‖‖‖‖‖

MSI / Plessey Settings:

Symbology	Exclusive	Enable	Disable
MSI / Plessey (default enable)	‖‖‖‖‖‖‖‖	‖‖‖‖‖‖‖‖	‖‖‖‖‖‖‖‖

note: setting any symbology to exclusive will disable all other symbologies

MSI / Plessey Check Digit (CD)	not check CD		‖‖‖‖‖‖‖‖
	check 1 CD = mod 10	default	‖‖‖‖‖‖‖‖
	check 2 CD = mod 10/mod 10		‖‖‖‖‖‖‖‖
	check 2 CD = mod 10/mod 11		‖‖‖‖‖‖‖‖
	check 2 CD = mod 11/mod 10		‖‖‖‖‖‖‖‖
	check 2 CD = mod 11/mod 11		‖‖‖‖‖‖‖‖

MSI / Plessey Check Digit (CD) Transmission	not transmit CD		‖‖‖‖‖‖‖‖
	transmit CD 1	default	‖‖‖‖‖‖‖‖
	transmit CD 1 and CD 2		‖‖‖‖‖‖‖‖

UK / Plessey

<table>
<tr><td style="text-align:center">Start Setup</td><td style="text-align:center">End Setup</td></tr>
</table>

UK / Plessey Settings:

Symbology	Exclusive	Enable	Disable
UK / Plessey (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

UK / Plessey Check Digit (CD)	not transmit CD		
	transmit CD	default	

UK / Plessey Space Insertion	disable space insertion	default	
	enable space insertion		

UK / Plessey X Conversion	disable A -> X conversion	default	
	enable A -> X conversion		

POSTNET

Start Setup

||||||||||||||||||||

End Setup

||||||||||||||||||||

POSTNET Settings:

Symbology	Exclusive	Enable	Disable
POSTNET (default disable)	|||||||||||||	|||||||||||||	|||||||||||||

note: setting any symbology to exclusive will disable all other symbologies

Intelligent Mail Bar Code

Start Setup

End Setup

Intelligent Mail Bar Code Settings:

Symbology	Exclusive	Enable	Disable
IMBC (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

GS1 DataBar

Start Setup

End Setup

GS1 DataBar Settings:

Symbology	Exclusive	Enable	Disable
GS1 DataBar Omnidirectional Truncated Stacked Stacked Omnidirectional (default enable)			
GS1 DataBar Limited (default enable)			
GS1 DataBar Expanded Expanded Stacked (default enable)			
GS1 DataBar All Above Types (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

GS1 DataBar Check Digit (CD)	not transmit CD		
	transmit CD	default	

GS1 DataBar AI Transmission	not transmit application identifier		
	transmit application identifier	default	

Korean Postal Authority

Start Setup

End Setup

Korean Postal Authority Code Settings:

Symbology	Exclusive	Enable	Disable
Korean Postal Authority (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

Korean Postal Authority Check Digit (CD)	not transmit CD	default	
	transmit CD		

Korean Postal Authority Dash	not transmit dash		
	transmit dash	default	

Korean Postal Authority Upside Down Reading	upside down reading enabled		
	upside down reading disabled	default	

IATA

‖‖‖‖‖‖‖‖‖‖‖‖

‖‖‖‖‖‖‖‖‖‖‖‖

IATA Settings:

Symbology	Exclusive	Enable	Disable
IATA (default enable)	‖‖‖‖‖‖‖‖‖	‖‖‖‖‖‖‖‖‖	‖‖‖‖‖‖‖‖‖

note: setting any symbology to exclusive will disable all other symbologies

IATA Check Digit (CD)	not check CD	default	‖‖‖‖‖‖‖‖‖
	check FC / SN only		‖‖‖‖‖‖‖‖‖
	check FC / CPN / SN		‖‖‖‖‖‖‖‖‖
	check FC / CPN / AC / SN		‖‖‖‖‖‖‖‖‖

IATA Check Digit (CD) Transmission	not transmit CD		‖‖‖‖‖‖‖‖‖
	transmit CD	default	‖‖‖‖‖‖‖‖‖

Tri-Optic

Start Setup	**End Setup**

Tri-Optic Settings:

Symbology	Exclusive	Enable	Disable
Tri-Optic (default enable)			N/A

note: setting any symbology to exclusive will disable all other symbologies

Telepen

Telepen Settings:

Symbology	Exclusive	Enable	Disable
Telepen (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

Telepen Conversion Output Mode	numeric mode	default	
	ASCII mode		

JPN (Customer Bar Code)

Start Setup

End Setup

JPN Settings:

Symbology	Exclusive	Enable	Disable
JPN (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

PDF417

Start Setup

||||||||||||||||||||||||

End Setup

||||||||||||||||||||||||

PDF417 Settings:

Symbology	Exclusive	Enable	Disable
PDF417 (default enable)	||||||||||||||	||||||||||||||	||||||||||||||

note: setting any symbology to exclusive will disable all other symbologies

Micro PDF417

Start Setup

End Setup

Micro PDF417 Settings:

Symbology	Exclusive	Enable	Disable
Micro PDF417 (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

Maxi Code

Start Setup

End Setup

Maxi Code Settings:

Symbology	Exclusive	Enable	Disable
Maxi Code (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

QR Code

Start Setup

End Setup

QR Code Settings:

Symbology	Exclusive	Enable	Disable
QR Code (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

Micro QR

Start Setup

End Setup

Micro QR Settings:

Symbology	Exclusive	Enable	Disable
Micro QR (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

Aztec Code

Aztec Code Settings:

Symbology	Exclusive	Enable	Disable
Aztec Code (default enable)			

note: setting any symbology to exclusive will disable all other symbologies

Aztec Runes

Start Setup

End Setup

Aztec Runes Settings:

Symbology	Exclusive	Enable	Disable
Aztec Runes (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

Data Matrix

Start Setup	End Setup

Data Matrix Settings:

Symbology	Exclusive	Enable	Disable
Data Matrix (ECC 200) (default enable)			
Data Matrix (ECC 000-140) (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

Codablock F

Start Setup

End Setup

Codablock F Settings:

Symbology	Exclusive	Enable	Disable
Codablock F (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

Chinese Sensible Code

Start Setup	End Setup

Chinese Sensible Code Settings:

Symbology	Exclusive	Enable	Disable
Chinese Sensible Code (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

All Codes

Start Setup

End Setup

All Codes Settings:

Symbology	Exclusive	Enable	Disable
All 1D Codes (default disable)			
All 2D Codes (default disable)			
All 1D and 2D Codes (default disable)			

note: setting any symbology to exclusive will disable all other symbologies

Use this setting if you're having trouble reading a bar code with the default settings and you don't know what type of code you are trying to read. It's also a quick way to turn On or Off all 1D or 2D code symbologies.

Number of Characters

Number of Characters Settings:

If you are going to read bar codes of a known length, it is recommended to set the scanner for a fixed number of characters. The scanner uses this to verify that labels read are of the correct length and reject labels that do not have the specified length. The advantage of setting a fixed length is that it provides protection against short scans of labels, such as Interleaved 2of 5, which do not provide sufficient security against partial scans. The length check is done on the label data and is not affected by options such as (not) transmit start/stop character or check digit. Setting the number or characters does not affect fixed length codes, such as EAN-13. It is also possible to set the minimum and maximum number of characters allowed. The character length settings can be global (applying to all enabled codes) or individual (applying only to selected code types).

Character Length Settings:

Global Setting for Fixed Length	fixed length OFF for all variable length codes	default	
	fixed length ON for all enabled variable length codes		

Individual Setting for Length	fixed length ON for selected variable length code(s)	
	set minimum length for selected variable length code(s)	
	set maximum length for selected variable length codes	

Fixed Length Example Programming Sequence:

1)   Scan "Start Setup"
2)   Scan "Fixed Length ON" (global or individual)
3)   Scan a bar code of the desired length
4)   Scan another bar code of a second desired length (optional)
5)   Scan "End Setup"

If you scan "global" fixed length then all enabled codes will be affected. If you scan "individual" fixed length then only the symbology scanned in step 3 and/or 4 is affected.

Note: The maximum number of characters that can be set is 8000.

Composite Codes

Composite Codes Settings:

Link Flag	not ignore link flag for RSS/EAN-128 and EAN/UPC	default	
	ignore link flag for RSS/EAN-128 and EAN/UPC		

RSS / EAN-128 Composite	disable RSS/EAN-128 composite	default	
	enable RSS/EAN-128 composite		

EAN / UPC Composite	disable EAN/UPC composite	default	
	enable EAN/UPC composite		

Composite Component	enable 1D composite only		
	enable 2D composite only		
	enable 1D and 2D composites	default	

Outputs for Composite Code Setting:

Composite Setting			Output		
Enable/Disable	Link Flag	Composite Component	1D+2D	1D	2D
Enable	not ignore	N/A	o	x	x
	ignore	1D composite only	o	#	x
		2D composite only	o	x	#
		1D and 2D composite	o	#	#
Disable	N/A	1D composite only	x	o	x
		2D composite only	x	x	o
		1D and 2D composite	x	o	o

o : Priority output

: Output when data cannot be output with o

x : Not output

String Options

Case Conversion Settings:

Case Conversion	no case conversion (AbCd -> AbCd)	default	
	convert to upper case (AbCd -> ABCD)		
	convert to lower case (AbCd -> abcd)		
	exchange case (AbCd -> aBcD)		

Output Format Settings:

The following additional characters can be included in each code that is scanned:

1)   Preamble / Postamble (up to 8 digits)
Specified strings can be added in front and at the end of the data for all codes.

2)   Prefix / Suffix (up to 4 digits)
Specified strings can be added in front and at the end of the data for a specific symbology.
By default, the prefix is empty and the suffix is a CR character.

3)   Code Identification / Code Length
Code Identification and Code Length can be included in a prefix and/or a suffix.

Output Format:

Preamble (max 8 digits)	Prefix for each code (max 4 digits)	Data	Suffix for each code (max 4 digits)	Postamble (max 8 digits)

Preamble and Postamble	preamble command	
	postamble command	

Preamble / Postamble Example Programming Sequence:

1)   Scan "Start Setup"
2)   Scan "Preamble Command" or "Postamble Command"
3)   Scan up to 8 ASCII values from the ASCII Value Table
4)   Scan "End Setup"

Prefix / Suffix Commands:

Symbology	Prefix Command	Suffix Command
All Codes		
UPC-A		
UPC-A add-on		
UPC-E		
UPC-E add-on		
EAN-13		
EAN-13 add-on		
EAN-8		
EAN-8 add-on		
Code 39		
Tri-optic		
Codabar		
Industrial 2 of 5		
Interleaved 2 of 5		
S-code		
Matrix 2 of 5		
IATA		
MSI/Plessey		
Telepen		
UK/Plessey		
Code 128		
GS1-128		
Code 11		
Intelligent Mail Bar Code		

Prefix / Suffix Commands Continued:

Symbology	Prefix Command	Suffix Command
POSTNET		
GS1 DataBar		
Composite code		
Codablock-F		
Data Matrix		
Aztec		
Chinese Sensible Code		
QR Code		
Maxicode		
PDF417		
MicroPDF417		
Clear Prefix / Suffix		

Prefix / Suffix Example Programming Sequence:

        1) Scan "Start Setup"
2) Scan "Prefix Command" or "Suffix Command" for the desired symbology
3) Scan up to 4 ASCII values from the Prefix / Suffix ASCII Value Table
4) Scan "End Setup"

Prefix / Suffix ASCII Value Table:

ASCII	Command	ASCII	Command	ASCII	Command	ASCII	Command
<SP>		A		a		(NULL)	
!		B		b		(SOH)	
"		C		c		(STX)	
#		D		d		(ETX)	
$		E		e		(EOT)	
%		F		f		(ENQ)	
&		G		g		(ACK)	
'		H		h		(BEL)	
(		I		i		(BS)	
)		J		j		(HT)	
*		K		k		(LF)	
+		L		l		(VT)	
,		M		m		(FF)	
-		N		n		(CR)	
.		O		o		(SO)	
/		P		p		(SI)	
:		Q		q		(DLE)	
;		R		r		(DC1)	
<		S		s		(DC2)	
=		T		t		(DC3)	
>		U		u		(DC4)	
?		V		v		(NAK)	
@		W		w		(SYN)	
[		X		x		(ETB)	
\		Y		y		(CAN)	
]		Z		z		(EM)	

Prefix / Suffix ASCII Value Table Continued:

ASCII	Command	ASCII	Command	ASCII	Command	ASCII	Command
^	‖‖‖‖‖‖‖	0	‖‖‖‖‖‖‖			(SUB)	‖‖‖‖‖‖‖
_	‖‖‖‖‖‖‖	1	‖‖‖‖‖‖‖			(ESC)	‖‖‖‖‖‖‖
`	‖‖‖‖‖‖‖	2	‖‖‖‖‖‖‖			(FS)	‖‖‖‖‖‖‖
{	‖‖‖‖‖‖‖	3	‖‖‖‖‖‖‖			(GS)	‖‖‖‖‖‖‖
|	‖‖‖‖‖‖‖	4	‖‖‖‖‖‖‖			(RS)	‖‖‖‖‖‖‖
}	‖‖‖‖‖‖‖	5	‖‖‖‖‖‖‖			(US)	‖‖‖‖‖‖‖
~	‖‖‖‖‖‖‖	6	‖‖‖‖‖‖‖			DEL	‖‖‖‖‖‖‖
		7	‖‖‖‖‖‖‖				
		8	‖‖‖‖‖‖‖				
		9	‖‖‖‖‖‖‖				

Code Identification / Length Settings:

Code Identification	code identification using Worth Data Code ID	‖‖‖‖‖‖‖
	code identification using AIM/ISO/IEC 15424 ID	‖‖‖‖‖‖‖
Code Length	code length (1D/2D : 2/6 digit)	‖‖‖‖‖‖‖
	code length (1D/2D : 6/6 digit)	‖‖‖‖‖‖‖

Code Identification and Code Length can be included in a prefix and/or suffix. The code length will be the number of characters that is configured above. The code identification and code length can be put at any position in the prefix/suffix string. These direct input characters count as 1 entry of the 4 permissible entries for a prefix and suffix.

The code length is transmitted as 2 digits, excluding prefix and suffix characters. For 2D codes the code length is transmitted as 6 digits. It is also possible to send the length as 6 digits for both 1D and 2D codes.

Worth Data Code ID Prefix / Suffix Values:

Code	Code ID	Code	Code ID
UPC-A	C	MSI/Plessey	Z
UPC-A +2	F	Telepen	d
UPC-A +5	G	UK/Plessey	a
UPC-E	D	Code 128	T
UPC-E +2	H	GS1-128	T
UPC-E +5	I	Code 93	U
EAN-13	B	Code 11	b
EAN-13 +2	L	Korean Postal Authority	c
EAN-13 +5	M	Intelligent Mail Bar Code	0
EAN-8	A	POSTNET	3
EAN-8 +2	J	GS1 DataBar	y
EAN-8 +5	K	Composite Code-A	m
Code 39	V	Composite Code-B	n
Code 39 Full ASCII	W	Composite Code-C	l
Italian Pharmaceutical	Y	Codablock-F	E
Codabar	R	DataMatrix	t
Codabar ABC	S	Aztec	o
Codabar CX	f	Aztec Runes	o
Industrial 2 of 5	O	Chinese Sensible Code	e
Interleaved 2 of 5	N	QR Code	u
S-Code	g	Micro QR Code	j
Matrix 2 of 5	Q	Maxi Code	v
Chinese Post	w	PDF417	r
IATA	P	Micro PDF417	s

Collective Reading

Start Setup	End Setup

Collective Reading Settings:

It is possible to not output data unless the specified number of codes is read. That means that the scanner does not read codes other than the specified number. Use this setting to read a group of labels all at once.

Multiple Label Read	multiple label = 1	default	|||||||||||||||||
	multiple label = 2		|||||||||||||||||
	multiple label = 3		|||||||||||||||||
	multiple label = 4		|||||||||||||||||
	multiple label = 5		|||||||||||||||||
	multiple label = 6		|||||||||||||||||
	multiple label = 7		|||||||||||||||||
	multiple label = 8		|||||||||||||||||
	multiple label = 9		|||||||||||||||||
	multiple label = 10		|||||||||||||||||

Multiple Label Read (right and left)	left to right	default	|||||||||||||||||
	right to left		|||||||||||||||||

Multiple Label Read (top and bottom)	top to bottom	default	|||||||||||||||||
	bottom to top		|||||||||||||||||

Multiple Label Read (output priority)	output priority vertical	default	|||||||||||||||||
	output priority horizontal		|||||||||||||||||

Collective Reading Settings Continued:

Same Label Read	disable same label read during multiple read	default	
	enable same label read during multiple read		

Sorting Labels	enable sorting decoded labels	default	
	disable sorting decoded labels		

Buffered Mode	buffered mode (one image)	default	
	buffered mode (multiple images)		
	non-buffered mode		

Read Mode

Read Mode Settings:

Read Mode	single read	default	
	multiple read (see below)		
	continuous read (used mainly for demonstration)		

In multiple read mode, when a bar code has been decoded, the decoded data will be output and the scan engine will keep on reading. When the bar code that has just been output is read again, it will not be output. However, when the scanner cannot decode any labels for some configurable time, it will forget the previous scan and then the same label can be read again.

Multiple Read Reset Time	multiple read reset time = 1 frame		
	multiple read reset time = 2 frames		
	multiple read reset time = 3 frames		
	multiple read reset time = 4 frames		
	multiple read reset time = 5 frames		
	multiple read reset time = 6 frames	default	
	multiple read reset time = 7 frames		
	multiple read reset time = indefinitely		

Enable/Disable Trigger	enable trigger	default	
	disable trigger (continuous read)		

Read Mode Settings Continued:

Auto Trigger (Stand Mode)	enable auto trigger		‖‖‖‖‖‖‖‖‖‖
	disable auto trigger	default	‖‖‖‖‖‖‖‖‖‖

Auto Trigger Synchronization	disable auto trigger synchronization		‖‖‖‖‖‖‖‖‖‖
	enable auto trigger synchronization	default	‖‖‖‖‖‖‖‖‖‖

note: when the auto trigger is synchronized with the trigger switch, the read time configured for normal reading will be used for auto trigger read time.

Auto Trigger Read Time	read time 1 second	default	‖‖‖‖‖‖‖‖‖‖
	read time 2 seconds		‖‖‖‖‖‖‖‖‖‖
	read time 3 seconds		‖‖‖‖‖‖‖‖‖‖
	read time 4 seconds		‖‖‖‖‖‖‖‖‖‖
	read time 5 seconds		‖‖‖‖‖‖‖‖‖‖
	read time 6 seconds		‖‖‖‖‖‖‖‖‖‖
	read time 7 seconds		‖‖‖‖‖‖‖‖‖‖
	read time 8 seconds		‖‖‖‖‖‖‖‖‖‖
	read time 9 seconds		‖‖‖‖‖‖‖‖‖‖
	read time * 10		‖‖‖‖‖‖‖‖‖‖
	read time indefinitely		‖‖‖‖‖‖‖‖‖‖

Auto Trigger Conditions	auto trigger = sensitive	default	‖‖‖‖‖‖‖‖‖‖
	auto trigger = normal		‖‖‖‖‖‖‖‖‖‖
	auto trigger = insensitive		‖‖‖‖‖‖‖‖‖‖

Read Mode Settings Continued:

Normal Read Time	read time 0 second		
	read time 1 second		
	read time 2 seconds	default	
	read time 3 seconds		
	read time 4 seconds		
	read time 5 seconds		
	read time 6 seconds		
	read time 7 seconds		
	read time 8 seconds		
	read time 9 seconds		
	read time * 10		
	read time indefinitely		

Redundancy	read 1 time, redundancy = 0		
	read 2 time, redundancy = 1	default	
	read 3 time, redundancy = 2		
	read 4 time, redundancy = 3		
	read 5 time, redundancy = 4		
	read 6 time, redundancy = 5		
	read 7 time, redundancy = 6		
	read 8 time, redundancy = 7		
	read 9 time, redundancy = 8		

Redundancy is the number of times that the label has to be scanned in addition to the first scan.

Positive and Negative Codes	positive bar codes (black on white)	default	
	negative bar codes (white on black)		
	positive and negative bar codes		

Read Mode Settings Continued:

Add-on Delay Timer	disable add-on wait more	default	‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	add-on wait mode = 0.25 seconds		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	add-on wait mode = 0.50 seconds		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	add-on wait mode = 0.75 seconds		‖‖‖ ‖‖‖‖ ‖‖ ‖‖

Since WPC-type codes (UPC, EAN) with add-on (supplements) have a high probability of unsuccessful decoding, the scanner repeats decoding the add-on code during the specified period of time. It is effective to read the add-on parts, but it will also cause a reduced response when a code without an add-on is read.

Margin Check (Quiet Zone)	no margin check		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	margin check 1/7 normal		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	margin check 2/7 normal		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	margin check 3/7 normal		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	margin check 4/7 normal		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	margin check 5/7 normal		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	margin check 6/7 normal		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	margin check normal	default	‖‖‖ ‖‖‖‖ ‖‖ ‖‖

Power Saving	disable power saving (USB I/F default)	default	‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 0 seconds (RS-232 I/F default)	default	‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 1 second		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 2 seconds		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 5 seconds		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 10 seconds		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 30 seconds		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 10 minutes		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 30 minutes		‖‖‖ ‖‖‖‖ ‖‖ ‖‖
	power saving after 60 minutes		‖‖‖ ‖‖‖‖ ‖‖ ‖‖

Imager Settings:

Illumination Mode	disable LED illumination		‖‖‖‖‖‖‖‖‖
	enable LED illumination	default	‖‖‖‖‖‖‖‖‖
	LED illumination alternating		‖‖‖‖‖‖‖‖‖

Aiming On/Off	disable laser aiming and LED illumination		‖‖‖‖‖‖‖‖‖
	enable laser aiming	default	‖‖‖‖‖‖‖‖‖
	disable laser aiming		‖‖‖‖‖‖‖‖‖

Central Reading	enable central reading (read only a code that the laser aims at)		‖‖‖‖‖‖‖‖‖
	disable central reading (read the entire image)	default	‖‖‖‖‖‖‖‖‖

1D Code Decode Mode	careful mode (good for hard to read codes)		‖‖‖‖‖‖‖‖‖
	standard mode	default	‖‖‖‖‖‖‖‖‖
	semi-quick mode		‖‖‖‖‖‖‖‖‖
	quick mode (good for easy to read codes)		‖‖‖‖‖‖‖‖‖

LCD Display Scanning	disable scanning from LCD display	default	‖‖‖‖‖‖‖‖‖
	enable scanning from LCD display		‖‖‖‖‖‖‖‖‖

Auto Focus Mode	AF system = laser and contrast	default	‖‖‖‖‖‖‖‖‖
	AF system = contrast only		‖‖‖‖‖‖‖‖‖
	AF system = laser only		‖‖‖‖‖‖‖‖‖

Note: Normally laser ranging is used for reading labels. In case it cannot be used in a brightly-lit environment, the contrast method is used. When "contrast only" is configured, the reading speed will be slower.

Fixed Focus Mode	short range = 90mm		‖‖‖‖‖‖‖‖‖
	medium range = 163mm		‖‖‖‖‖‖‖‖‖
	long range = 880mm		‖‖‖‖‖‖‖‖‖