



NLS-HR21

Hand-held Barcode Scanner

User Guide

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Table of Contents

Revision History	- 3 -
Chapter 1 Getting Started.....	1
Introduction.....	1
About This Guide	1
Unpacking	1
HR21 Scanner.....	2
Data Port	3
Connecting the Scanner to a Host Device.....	4
Using USB Cable	5
Using RS-232 Cable	5
Removing Communication Cable	6
Power On, Sleep, Power Off, Reboot	6
Maintenance.....	7
Dimensions (unit: mm)	8
Left View	8
Front View.....	8
Top View.....	8
Scanning Instructions.....	9
Configuring the HR21	10
Barcode Programming.....	10
Command Programming.....	10
Read Register.....	11
Write Register	14
Save Register Data in EEPROM.....	18
Relationship between Programming Command and Serial Command	20
Registers.....	22
Programming Barcode Data	35
Factory Defaults	35
Chapter 2 Communication Interfaces	36
RS-232 Interface	36
Baud Rate	37
USB Interface.....	38
USB HID-KBW	38
Standard Keyboard.....	38

Emulate ALT+Keypad	39
Function Key Mapping	39
ASCII Function Key Mapping Table	40
USB Country Keyboard Types	41
Beep on Unknown Character	44
Inter-Keystroke Delay	44
Caps Lock	45
Convert Case	46
Emulate Numeric Keypad	47
USB COM Port Emulation	48
USB DATAPIPE	48
HID-POS	49
Access the Scanner with Your Program	49
Acquire Scanned Data	50
Send Data to the Scanner	50
VID/PID	50
Chapter 3 Scan Mode	51
Manual Mode	51
Continuous Mode	52
Decode Session Timeout	52
Timeout between Decodes	53
Sense Mode	54
Decode Session Timeout	54
Timeout between Decodes	55
Image Stabilization Timeout	55
Sensitivity	56
Command Trigger Mode	57
Decode Session Timeout	57
Chapter 4 Illumination & Aiming	58
Illumination	58
Aiming	59
Chapter 5 Notification	60
Mute Mode	60
Good Read Beep	60
Good Read Beep Frequency	61
Good Read Beep Duration	61

Good Read LED	62
Decode Result Notification.....	62
Chapter 6 Prefix & Suffix	63
AIM ID Prefix	63
CODE ID Prefix	64
Terminating Character Suffix.....	65
Chapter 7 Symbolologies	66
Global Settings	66
Enable/Disable All Symbolologies	66
Enable/Disable 1D Symbolologies	66
Enable/Disable 2D Symbolologies	66
Video Reverse	67
1D Symbolologies	68
Code 128	68
Restore Factory Defaults.....	68
Enable/Disable Code 128.....	68
UCC/EAN-128 (GS1-128).....	69
Restore Factory Defaults.....	69
Enable/Disable UCC/EAN-128.....	69
AIM 128.....	70
Restore Factory Defaults.....	70
Enable/Disable AIM 128	70
EAN-8.....	71
Restore Factory Defaults.....	71
Enable/Disable EAN-8.....	71
Transmit Check Character.....	71
Add-On Code.....	72
Add-On Code Required	73
EAN-8 Extension	73
EAN-13.....	74
Restore Factory Defaults.....	74
Enable/Disable EAN-13.....	74
Transmit Check Character.....	74
Add-On Code.....	75
Add-On Code Required	76
ISSN.....	77
Restore Factory Defaults.....	77

Enable/Disable ISSN	77
ISBN.....	78
Restore Factory Defaults.....	78
Enable/Disable ISBN	78
Set ISBN Format	78
UPC-E.....	79
Restore Factory Defaults.....	79
Enable/Disable UPC-E	79
Transmit Check Character.....	79
Add-On Code.....	80
Add-On Code Required	81
Transmit System Character.....	81
UPC-E Extension.....	81
UPC-A.....	82
Restore Factory Defaults.....	82
Enable/Disable UPC-A	82
Transmit Check Character.....	82
Add-On Code.....	83
Add-On Code Required	84
Transmit Preamble Character	84
Interleaved 2 of 5	85
Restore Factory Defaults.....	85
Enable/Disable Interleaved 2 of 5	85
Check Character Verification.....	86
Transmit Appended "0"	87
ITF-6.....	88
ITF-14.....	89
Matrix 2 of 5	90
Restore Factory Defaults.....	90
Enable/Disable Matrix 2 of 5	90
Check Character Verification.....	91
Industrial 25	92
Restore Factory Defaults.....	92
Enable/Disable Industrial 25.....	92
Check Character Verification.....	93
Standard 25	94
Restore Factory Defaults.....	94
Enable/Disable Standard 25.....	94

Check Character Verification.....	95
Code 39.....	96
Restore Factory Defaults.....	96
Enable/Disable Code 39.....	96
Transmit Start/Stop Character.....	96
Check Character Verification.....	97
Enable/Disable Code 39 Full ASCII	97
Codabar	98
Restore Factory Defaults.....	98
Enable/Disable Codabar	98
Check Character Verification.....	99
Transmit Start/Stop Character.....	99
Start/Stop Character Format	100
Code 93.....	101
Restore Factory Defaults.....	101
Enable/Disable Code 93.....	101
Check Character Verification.....	102
Code 11.....	103
Restore Factory Defaults.....	103
Enable/Disable Code 11	103
Check Character Verification.....	104
Plessey.....	105
Restore Factory Defaults.....	105
Enable/Disable Plessey.....	105
Check Character Verification.....	106
MSI-Plessey	107
Restore Factory Defaults.....	107
Enable/Disable MSI-Plessey	107
Check Character Verification.....	108
RSS-14.....	109
Restore Factory Defaults.....	109
Enable/Disable RSS-14.....	109
Transmit Application Identifier “01”	109
RSS-Limited	110
Restore Factory Defaults.....	110
Enable/Disable RSS-Limited	110
Transmit Application Identifier “01”	110
RSS-Expand	111

Restore Factory Defaults.....	111
Enable/Disable RSS-Expand	111
2D Symbolologies	112
PDF417	112
Restore Factory Defaults.....	112
Enable/Disable PDF417	112
Data Matrix.....	113
Restore Factory Defaults.....	113
Enable/Disable Data Matrix.....	113
Rectangular Barcodes	113
Mirror Images.....	114
QR Code	115
Restore Factory Defaults.....	115
Enable/Disable QR Code	115
Micro QR.....	115
Mirrored Micro QR	115
Chinese Sensible Code	116
Restore Factory Defaults.....	116
Enable/Disable Chinese Sensible Code	116
Chapter 8 Safety Information	117
Electrical Safety	117
Photobiological Safety	117
Electromagnetic Compatibility (EMC)	117
Others.....	117
Appendix	118
Appendix A: Factory Defaults Table	118
Appendix B: AIM ID Table	124
Appendix C: Code ID Table.....	127
Appendix D: ASCII Table.....	128
Appendix E: Parameter Programming Examples	132
Program the Decode Session Timeout.....	132
Program the Timeout between Decodes	132
Program the Image Stabilization Timeout	132
Program the Sensitivity Level	132
Appendix F: Digit Barcodes	133
Appendix G: Save/Cancel Barcodes	136
Appendix H: Frequently-Used Serial Commands.....	137

Chapter 1 Getting Started

Introduction

The HR21 hand-held barcode scanner (hereinafter referred to as “**HR21 scanner**” or “**the scanner**”), armed with the world-leading Newland patented **UIMG**, a computerized image recognition system-on-chip, bring about a new era of 2D barcode scanner.

The HR21’s 2D barcode decoder chip ingeniously blends **UIMG** technology and advanced chip design & manufacturing, which significantly simplifies application design and delivers superior performance and solid reliability with low power consumption.

The HR21 supports all mainstream 1D and standard 2D barcode symbologies (e.g., PDF417, QR Code, Data Matrix and Chinese Sensible Code) as well as GS1-DataBar™(RSS) (Limited/Stacked/Expanded versions). It can read barcodes on virtually any medium - paper, plastic card, mobile phones and LCD displays.

About This Guide

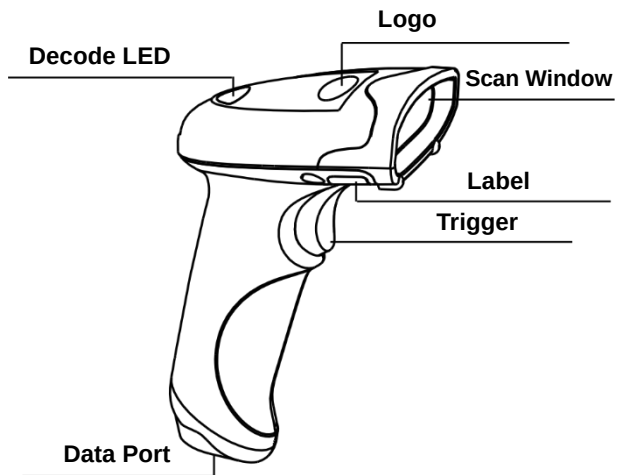
This guide provides programming instructions for the HR21. Users can configure the HR21 by scanning the programming barcodes included in this manual.

The HR21 has been properly configured for most applications and can be put into use without further configuration. Users may check **Appendix A: Factory Defaults Table** for reference. Throughout the manual, asterisks (**) indicate factory default values.

Unpacking

Open the package and take out the scanner and its accessories. Check to make sure everything on the packing list is present and intact. If any contents are damaged or missing, please keep the original package and contact your dealer immediately for after-sales service.

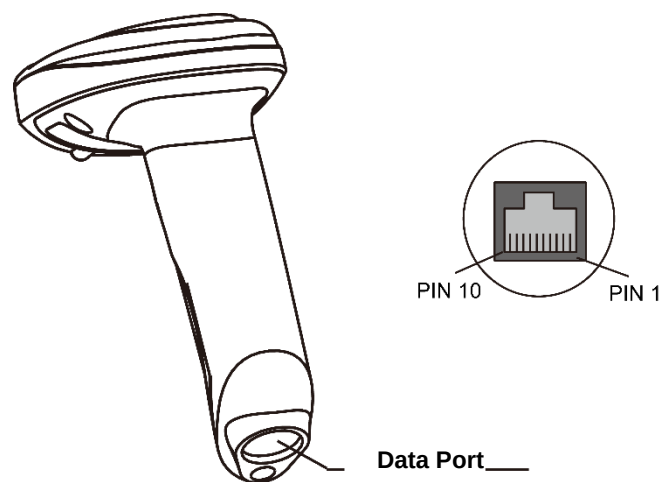
HR21 Scanner



Decode LED:

Green: Barcode is decoded successfully.

Data Port



PIN	Signal	Type	Function
1	NC	-	Not connected
2	NC	-	Not connected
3	VCC	P	Power+ (DC5V)
4	TXD	O	RS-232 output
5	RXD	I	RS-232 input
6	NC	-	Not connected
7	NC	-	Not connected
8	GND	P	Ground
9	D-	I/O	USB signal
10	D+	I/O	

Connecting the Scanner to a Host Device

The scanner must be connected to a host device in actual application, such as PC, POS or any intelligent terminal with USB or RS-232 port, using a communication cable (USB or RS-232 cable).

USB

USB port on the Host



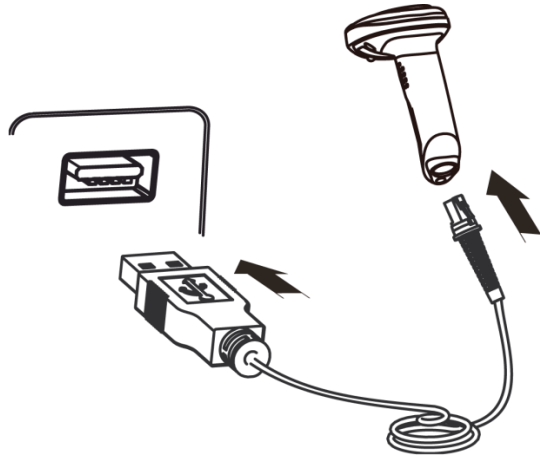
RS-232

RS-232 port on the Host



Note: Please check the port on the host and purchase the cable accordingly.

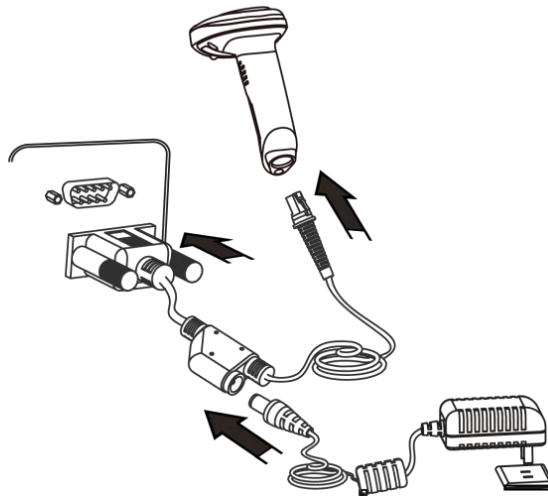
Using USB Cable



Connect the scanner to a Host through a USB cable with RJ45 and USB connectors:

1. Plug the RJ45 connector into the data port on the scanner.
2. Plug the USB connector into the USB port on the Host.

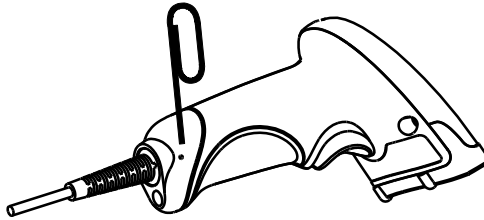
Using RS-232 Cable



Connect the scanner to a Host through an RS-232 cable with RJ45, RS-232 and power connectors:

1. Plug the RJ45 connector into the data port on the scanner.
 2. Plug the RS-232 connector into the RS-232 port on the Host.
 3. Connect the supplied power adaptor to the power connector of the RS-232 cable.
-

Removing Communication Cable



Get an appropriate needle or a straightened paper clip and then follow the steps below:

1. Disconnect the power adaptor from mains if there is one.
2. Insert the needle into the hole.
3. Pull out the cable slowly from the scanner while pressing the needle in.
4. Remove the needle.
5. Disconnect the cable from the host device.

Power On, Sleep, Power Off, Reboot

Power on the scanner

Connect the scanner to a host device. Then the scanner will be turned on and automatically enter the sleep state.

Enter the sleep mode

If no operation is performed on the device for some time, the device will automatically enter the sleep state.

Power off the scanner

Remove the communication cable from the scanner; or remove the communication cable from the host device; or disconnect the power adaptor from mains.

Reboot the scanner

If the scanner stops responding to input or runs abnormally, turn off the scanner and then turn it back on.

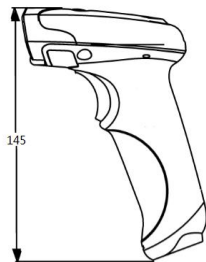
Maintenance

- ✧ The scan window should be kept clean.
- ✧ Do not scratch the scan window.
- ✧ Use soft brush to remove the stain from the scan window.
- ✧ Use the soft cloth to clean the window, such as eyeglass cleaning cloth.
- ✧ Do not spray any liquid on the scan window.
- ✧ Do not use any detergent to clean other parts of the device except for water.

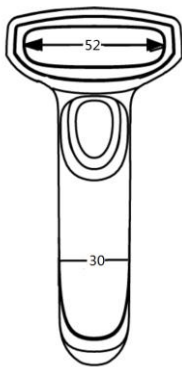
Note: The warranty DOES NOT cover damages caused by inappropriate care and maintenance.

Dimensions (unit: mm)

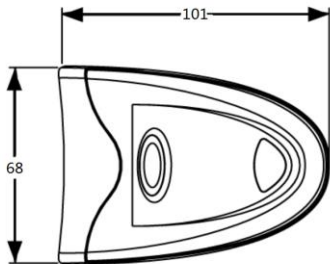
Left View



Front View



Top View

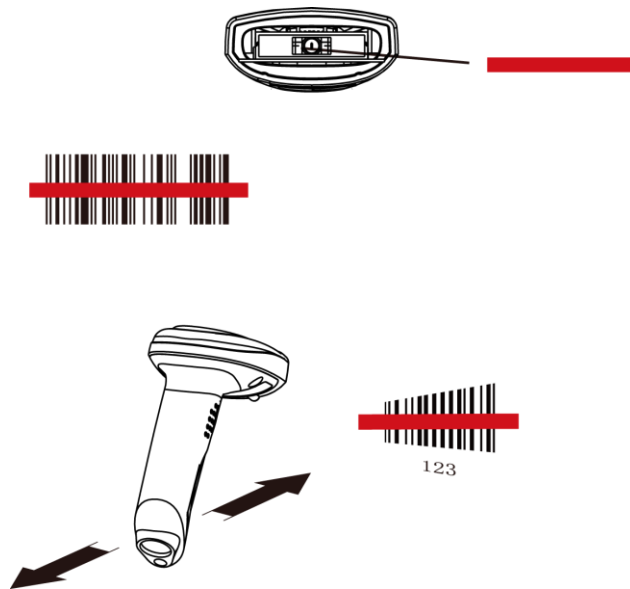


Scanning Instructions

When the scanner is in the Manual scan mode, you can follow the steps below to scan a barcode:

1. Press and hold the Trigger. Then the scanner will project a red aiming beam.
2. Aim the red beam across the center of barcode, as shown below.
3. Release the Trigger when the red beam goes off. If the barcode is decoded successfully, the scanner will emit a good read beep and the decoded data will be sent to the Host.

Note: For barcodes of the same batch, the scanner keeps a very high success ratio in certain distance which is regarded as the optimal scanning distance.



Configuring the HR21

There are two ways to configure the scanner: barcode programming and command programming.

Barcode Programming

The scanner can be configured by scanning programming barcodes. All user programmable features/options are described along with their programming barcodes/commands in the following sections.



Command Programming

Besides the barcode programming method, the scanner can also be configured by serial commands sent from the host device. Note that communication parameters on the scanner and the host must match so that two devices can communicate with each other. The default settings of the scanner are 9600bps, no parity check, 8 data bits, 1 stop bit, and no flow control. The scanner uses 8-bit registers.

Read Register

The read command is used to read the contents of 1 to 256 contiguous registers in the scanner.

Syntax: {Prefix1} {Types} {Lens} {Address} {Datas} {FCS}

Prefix1 : 0x7E 0x00

Types : 0x07

Lens : 0x01

Address: 0x0000~0x00FF, starting register address.

Datas : 0x00~0xFF, number of registers to be read. When Datas=0x00, 256 contiguous registers are to be read.

FCS : CRC-CCITT checksum, 2 bytes.

Computation sequence: Types+ Lens+Address+Datas;

polynomial: $X^{16}+X^{12}+X^5+1$ (0x1021), initial value: 0x0000.

The following C language program is provided for reference.

```
unsigned int crc_cal_by_bit(unsigned char* ptr, unsigned int len)
{
    unsigned int crc = 0;
    while(len-- != 0)
    {
        for(unsigned char i = 0x80; i != 0; i /= 2)
        {
            crc *= 2;
            if((crc&0x10000) != 0)
                crc ^= 0x11021;
            if((*ptr&i) != 0)
                crc ^= 0x1021;
        }
        ptr++;
    }
    return crc;
}
```

Reply: {Prefix2} {Types} {Lens} {Datas} {FCS}

1) Success message:

Prefix2 : 0x02 0x00

Types : 0x00 (success)

Lens : The number of data returned. If Lens=0x00, that means values of 256 contiguous registers are returned.

Datas : 0x00~0xFF, data that are returned.

FCS : CRC-CCITT checksum.

2) CRC check failure message:

Prefix2 : 0x02 0x00

Types : 0x01 (CRC check failure)

Lens : 0x01

Datas : 0x00

FCS : CRC-CCITT checksum (0x04 0x01)

3) Invalid command message:

Prefix2 : 0x02 0x00

Types : 0x03 (invalid command)

Lens : 0x01

Datas : 0x00

FCS : CRC-CCITT checksum (0x6A 0x61)

Example:

Read the content (0x3E) of register 0x000A

1) Read operation succeeds:

Enter: 0x7E 0x00 0x07 0x01 0x00 0x0A 0x01 0xEE 0x8A

Response: 0x02 0x00 0x00 0x01 0x3E 0xE4 0xAC

2) CRC check fails:

Enter: 0x7E 0x00 0x07 0x01 0x00 0x0A 0x01 0x11 0x22

Response: 0x02 0x00 0x01 0x01 0x00 0x04 0x01

3) Situations that may cause the scanner to respond with an invalid command message: Command sent is shorter than the required length, or the third byte is not sent out within 400ms after the first two bytes "0x7e 0x00" are sent

Enter: 0x7E 0x00 0x07 0x01 0x00 0x0A 0x01

Response: 0x02 0x00 0x03 0x01 0x00 0x6A 0x61

Write Register

The write command is used to write contiguous registers (1 to 256 registers) in the scanner.

Syntax: {Prefix1} {Types} {Lens} {Address} {Datas} {FCS}

Prefix1 : 0x7E 0x00 (2 bytes)

Types : 0x08 (1 byte)

Lens : 0x00~0xFF (1 byte), byte count, i.e. number of registers written. When Lens=0x00, 256 contiguous registers are to be written.

Address : 0x0000~0xFFFF (2 bytes), starting register address.

Datas : 0x00~0xFF (1~256 bytes), data to be written into the register(s)

FCS : CRC-CCITT checksum, 2 bytes.

Computation sequence: Types+ Lens+Address+Datas; polynomial: $X^{16}+X^{12}+X^5+1$ (0x1021), initial value: 0x0000.

The following C language program is provided for reference.

```
unsigned int crc_cal_by_bit(unsigned char* ptr, unsigned int len)
{
    unsigned int crc = 0;
    while(len-- != 0)
    {
        for(unsigned char i = 0x80; i != 0; i /= 2)
        {
            crc *= 2;
            if((crc&0x10000) != 0)
                crc ^= 0x11021;
            if((*ptr&i) != 0)
                crc ^= 0x1021;
        }
        ptr++;
    }
    return crc;
}
```

Response: {Prefix2} {Types} {Lens} {Datas} {FCS}

1) Success message:

Prefix2 : 0x02 0x00

Types : 0x00 (success)

Lens : 0x01

Datas : 0x00

FCS : CRC-CCITT checksum (0x33 0x31)

2) CRC check failure message:

Prefix2 : 0x02 0x00

Types : 0x01 (CRC check failure)

Lens : 0x01

Datas : 0x00

FCS : CRC-CCITT checksum (0x04 0x01)

3) Invalid command message:

Prefix2 : 0x02 0x00

Types : 0x03 (invalid command)

Lens : 0x01

Datas : 0x00

FCS : CRC-CCITT checksum (0x6A 0x61)

Example:

Write 0x3E into register 0x000A

1) Write operation succeeds:

Enter: 0x7E 0x00 0x08 0x01 0x00 0x0A 0x3E 0x4C 0xCF

Response: 0x02 0x00 0x00 0x01 0x00 0x33 0x31

2) CRC check fails:

Enter: 0x7E 0x00 0x08 0x01 0x00 0x0A 0x3E 0x11 0x22

Response: 0x02 0x00 0x01 0x01 0x00 0x04 0x01

3) Situations that may cause the scanner to respond with an invalid command message: Command sent is shorter than the required length, or the third byte is not sent out within 400ms after the first two bytes "0x7e 0x00" are sent

Enter: 0x7E 0x00 0x08 0x01 0x00 0x0A 0x3E

Response: 0x02 0x00 0x03 0x01 0x00 0x6A 0x61

Save Register Data in EEPROM

The save command is used to save register data into an external EEPROM.

Syntax: {Prefix1} {Types} {Lens} {Address} {Datas} {FCS}

Prefix1 : 0x7E 0x00

Types : 0x09

Lens : 0x01

Address: 0x0000

Datas : 0x00

FCS : CRC-CCITT checksum (0xDE 0xC8)

Response: {Prefix2} {Types} {Lens} {Datas} {FCS}

1) Success message:

Prefix2 : 0x02 0x00

Types : 0x00 (success)

Lens : 0x01

Datas : 0x00

FCS : CRC-CCITT checksum (0x33 0x31)

2) CRC check failure message:

Prefix2 : 0x02 0x00

Types : 0x01 (CRC check failure)

Lens : 0x01

Datas : 0x00

FCS : CRC-CCITT checksum (0x04 0x01)

3) Invalid command message:

Prefix2 : 0x02 0x00

Types : 0x03 (invalid command)

Lens : 0x01

Datas : 0x00

FCS : CRC-CCITT checksum (0x6A 0x61)

Relationship between Programming Command and Serial Command

1. Program general parameter with serial command

A programming command (i.e. the characters under programming barcode) contains 7 characters. The function of each character is described in the table below.

1st Char	2nd Char ~3rd Char	4th Char~5th Char	6th Char~7th Char	Remark
CMD	BITPOSITION	ADDR	DATA	
"W"	"00"~"FF"	"00"~"FF"	"00"~"FF"	Write a value (DATA) to the specified bits (BITPOSITION) of the register (ADDR).

Note:1. **CMD**: Command type.

2. **ADDR**: Address of register to be written.

3. **BITPOSITION**: Bit(s) the value is written to. For example, if only bit 3 is to be written, the BITPOSITION should be "08"; if all bits are to be written, the BITPOSITION should be "FF".

4. **DATA**: Value written to the BITPOSITION.

The **ADDR** and **DATA** in programming command correspond to **Address** and **Datas** in serial command, respectively:

1) If BITPOSITION="FF", the values of ADDR and DATA can be used directly in the write command.

e.g., programming command: WFFD9D8 (write value 0xD8 to register 0x00D9)

Enter: 0x7E 0x00 0x08 0x01 0x00 0xD9 0xD8 0x91 0x53

Respose: 0x02 0x00 0x00 0x01 0x00 0x33 0x31

2) If BITPOSITION≠"FF", users need to read the register content, calculate the value (Datas) and then write the value into the register, as shown in the following example.

e.g., programming command: W030002 (write value 0x02 to bit1and bit0 of register 0x0000)

Step 1: Read the content of register 0x0000.

Enter: 0x7E 0x00 0x07 0x01 0x00 0x00 0x01 0x01 0x41

Response: 0x02 0x00 0x00 0x01 0xD4 0xB8 0xC8

Step 2: Calculate the value written to the register.

$$\text{Datas} = (0xD4 \& (! 0x03)) + 0x02 = 0xD6$$

Step 3: Write the value into the register.

Enter: 0x7E 0x00 0x08 0x01 0x00 0x00 0xD6 0xDF 0x22

Response: 0x02 0x00 0x00 0x01 0x00 0x33 0x31

2. Program special parameter with serial command

The serial commands used for programming the following parameters are practically irrelevant to their programming commands.

Feature	Serial Command
Program the sensitivity level	0x7E 0x00 0x08 0x01 0x00 0x03 0xTT 0xSS 0xSS
Program the image stabilization timeout	0x7E 0x00 0x08 0x01 0x00 0x04 0xTT 0xSS 0xSS
Program the timeout between decodes	0x7E 0x00 0x08 0x01 0x00 0x05 0xTT 0xSS 0xSS
Program the decode session timeout	0x7E 0x00 0x08 0x01 0x00 0x06 0xTT 0xSS 0xSS

Note: Red: Address of register.

Blue: Value written to register. For example, to set the sensitivity level to 10, 0xTT should be 0x0A.

Pink: CRC checksum calculated.

3. Save register data in EEPROM

Scanning a programming barcode can change register value and save register data in EEPROM as well. As for command programming, it requires a write command and a save command to perform these two tasks. To save register data in an external EEPROM, users need to send the save command to the scanner.

Enter: 0x7E 0x00 0x09 0x01 0x00 0x00 0x00 0xDE 0xC8

Response: 0x02 0x00 0x00 0x01 0x00 0x33 0x31

Registers

Register	0x0000			
Bit	Feature			
Bit 7	1: Good read LED on		0: Good read LED off	
Bit 6	1: Disable the mute mode		0: Enable the mute mode	
Bit 5-4	Aiming: 00: OFF 01: Normal 10/11: Always ON			
Bit 3-2	Illumination: 00: OFF 01: Normal 10: Always ON			
Bit 1-0	Scan Mode: 00: Manual Mode 01: Command Trigger Mode 10: Continuous Mode 11: Sense Mode			
Register	0x0002			
Bit	Feature			
Bit 7	1: Enable CODE ID prefix for all symbologies		0: Disable CODE ID prefix for all symbologies	
Bit 6	1: Enable decode result notification		0: Disable decode result notification	
Bit 5	Reserved			
Bit 4	1: Video reverse ON		0: Video reverse OFF	
Bit 3-0	Reserved			
Register	0x0004			
Bit	Feature			
Bit 7-0	Image Stabilization Timeout: 0x00-0xFF: 0.0-25.5s			
Register	0x0005			
Bit	Feature			
Bit 7-0	Timeout between Decodes: 0x00-0xFF: 0.0-25.5s			
Register	0x0006			
Bit	Feature			
Bit 7-0	Decode Session Timeout: 0x00-0xFF: 0.0-25.5s			

Register	<i>0x0009</i>	
Bit	Feature	
Bit 7-0	Good Read Beep Frequency 0xDA: Low 0x4B: Medium 0x25: High	
Register	<i>0x000A</i>	
Bit	Feature	
Bit 7-0	Good Read Beep Duration 0x1F: 40ms 0x3E: 80ms 0x5D: 120ms	
Register	<i>0x000C</i>	
Bit	Feature	
Bit 7-4	Reserved	
Bit 3	1: Enable Data Matrix	0: Disable Data Matrix
Bit 2	1: Enable 1D symbologies	0: Disable 1D symbologies
Bit 1	1: Enable AIM ID prefix for PDF417	0: Disable AIM ID prefix for PDF417
Bit 0	1: Enable PDF417	0: Disable PDF417
Register	<i>0x000D</i>	
Bit	Feature	
Bit 7	1: Enable QR Code	0: Disable QR Code
Bit 6-2	Reserved	
Bit 1-0	00: USB DATAPIPE 10: USB COM Port Emulation	01: USB HID-KBW 11: USB HID-POS
Register	<i>0x000E</i>	
Bit	Feature	
Bit 7-4	Reserved	
Bit 3	1: Beep on unknown character	0: Do not beep on unknown character
Bit 2	1: Good read beep on	0: Good read beep off
Bit 1-0	Reserved	

Register	0x0010
Bit	Feature
Bit 7-5	Reserved
Bit 4-3	00: Disable AIM ID prefix for 1D symbologies 01: Allow to enable/disable AIM ID prefix for individual 1D symbology 10/11: Enable AIM ID prefix for 1D symbologies
Bit 2-0	Reserved
Register	0x0011
Bit	Feature
Bit 7	1: Enable AIM ID prefix for ISSN 0: Disable AIM ID prefix for ISSN Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 6	1: Enable ISSN 0: Disable ISSN
Bit 5-3	EAN-13 add-on code: 000/001: Only decode EAN-13 barcodes without 2-digit/5-digit add-on code 010: Decode a mix of EAN-13 barcodes with and without 2-digit add-on code 011: Only decode EAN-13 barcodes with 2-digit add-on code 100: Decode a mix of EAN-13 barcodes with and without 5-digit add-on code 101: Only decode EAN-13 barcodes with 5-digit add-on code 110: Decode a mix of EAN-13 barcodes with and without 2-digit/5-digit add-on code 111: Only decode EAN-13 barcodes with 2-digit/5-digit add-on code
Bit 2	1: Transmit EAN-13 check character 0: Do not transmit EAN-13 check character
Bit 1	1: Enable AIM ID prefix for EAN-13 0: Disable AIM ID prefix for EAN-13 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable EAN-13 0: Disable EAN-13
Register	0x0012
Bit	Feature
Bit 7	Reserved
Bit 6	1: Transmit Code 93 check character 0: Do not transmit Code 93 check character Note: Code 93 check character verification must be enabled for this parameter to function.
Bit 5	1: Enable Code 93 check character 0: Disable Code 93 check character
Bit 4	1: Enable AIM ID prefix for Code 93 0: Disable AIM ID prefix for Code 93 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 3	1: Enable Code 93 0: Disable Code 93
Bit 2	ISBN Format 1: ISBN-10 0: ISBN-13
Bit 1	1: Enable AIM ID prefix for ISBN 0: Disable AIM ID prefix for ISBN Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable ISBN 0: Disable ISBN

Register	0x0013
Bit	Feature
Bit 7	Reserved
Bit 6	1: Enable EAN-8 zero extend 0: Disable EAN-8 zero extend
Bit 5-3	EAN-8 add-on code: 000/001: Only decode EAN-8 barcodes without 2-digit/5-digit add-on code 010: Decode a mix of EAN-8 barcodes with and without 2-digit add-on code 011: Only decode EAN-8 barcodes with 2-digit add-on code 100: Decode a mix of EAN-8 barcodes with and without 5-digit add-on code 101: Only decode EAN-8 barcodes with 5-digit add-on code 110: Decode a mix of EAN-8 barcodes with and without 2-digit/5-digit add-on code 111: Only decode EAN-8 barcodes with 2-digit/5-digit add-on code
Bit 2	1: Transmit EAN-8 check character 0: Do not transmit EAN-8 check character
Bit 1	1: Enable AIM ID prefix for EAN-8 0: Disable AIM ID prefix for EAN-8 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable EAN-8 0: Disable EAN-8
Register	0x0014
Bit	Feature
Bit 7	Reserved
Bit 6-4	UPC-A add-on code: 000/001: Only decode UPC-A barcodes without 2-digit/5-digit add-on code 010: Decode a mix of UPC-A barcodes with and without 2-digit add-on code 011: Only decode UPC-A barcodes with 2-digit add-on code 100: Decode a mix of UPC-A barcodes with and without 5-digit add-on code 101: Only decode UPC-A barcodes with 5-digit add-on code 110: Decode a mix of UPC-A barcodes with and without 2-digit/5-digit add-on code 111: Only decode UPC-A barcodes with 2-digit/5-digit add-on code
Bit 3	Transmit UPC-A preamble character 1: System character & country code 0: System character
Bit 2	1: Transmit UPC-A check character 0: Do not transmit UPC-A check character
Bit 1	1: Enable AIM ID prefix for UPC-A 0: Disable AIM ID prefix for UPC-A Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable UPC-A 0: Disable UPC-A

Register	0x0015
Bit	Feature
Bit 7	1: Enable UPC-E extend 0: Disable UPC-E extend
Bit 6-4	UPC-E add-on code: 000/001: Only decode UPC-E barcodes without 2-digit/5-digit add-on code 010: Decode a mix of UPC-E barcodes with and without 2-digit add-on code 011: Only decode UPC-E barcodes with 2-digit add-on code 100: Decode a mix of UPC-E barcodes with and without 5-digit add-on code 101: Only decode UPC-E barcodes with 5-digit add-on code 110: Decode a mix of UPC-E barcodes with and without 2-digit/5-digit add-on code 111: Only decode UPC-E barcodes with 2-digit/5-digit add-on code
Bit 3	1: Transmit UPC-E system character 0: Do not transmit UPC-E system character
Bit 2	1: Transmit UPC-E check character 0: Do not transmit UPC-E check character
Bit 1	1: Enable AIM ID prefix for UPC-E 0: Disable AIM ID prefix for UPC-E Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable UPC-E 0: Disable UPC-E
Register	0x0016
Bit	Feature
Bit 7	1: Transmit AIM 128 check character in the format of "~nnn" (nnn: ASCII decimal value of check character) 0: Do not transmit AIM 128 check character
Bit 6	1: FNC1 character in AIM 128 transmitted as "~" (ASCII value: 126) 0: FNC1 character in AIM 128 transmitted as GS (ASCII value: 29)
Bit 5	1: Enable AIM ID prefix for AIM 128 0: Disable AIM ID prefix for AIM 128 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 4	1: Enable AIM 128 0: Disable AIM 128
Bit 3	1: Transmit Code 128 check character in the format of "~nnn" (nnn: ASCII decimal value of check character) 0: Do not transmit Code 128 check character
Bit 2	1: FNC1 character in Code 128 transmitted as "~" (ASCII value: 126) 0: FNC1 character in Code 128 transmitted as GS (ASCII value: 29)
Bit 1	1: Enable AIM ID prefix for Code 128 0: Disable AIM ID prefix for Code 128 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable Code 128 0: Disable Code 128

Register	0x0017
Bit	Feature
Bit 7	Reserved
Bit 6	1: Transmit programming barcode data (FNC3 Code 128) 0: Do not transmit programming barcode data (FNC3 Code 128)
Bit 5	1: Enable AIM ID prefix for FNC3 Code 128 0: Disable AIM ID prefix for FNC3 Code 128 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 4	1: Enable FNC3 Code 128 0: Disable FNC3 Code 128
Bit 3	1: Transmit UCC/EAN-128 check character in the format of "~nnn" (nnn: ASCII decimal value of check character) 0: Do not transmit UCC/EAN-128 check character
Bit 2	1: FNC1 character in UCC/EAN-128 transmitted as "~" (ASCII value: 126) 0: FNC1 character in UCC/EAN-128 transmitted as GS (ASCII value: 29)
Bit 1	1: Enable AIM ID prefix for UCC/EAN-128 0: Disable AIM ID prefix for UCC/EAN-128 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable UCC/EAN-128 0: Disable UCC/EAN-128
Register	0x0018
Bit	Feature
Bit 7	1: Transmit ITF-14 check character 0: Do not transmit ITF-14 check character
Bit 6	1: Enable AIM ID prefix for ITF-14 0: Disable AIM ID prefix for ITF-14 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 5	1: Enable ITF-14 0: Disable ITF-14
Bit 4	1: Transmit appended "0" of Interleaved 2 of 5 0: Do not transmit appended "0" of Interleaved 2 of 5
Bit 3	1: Transmit Interleaved 2 of 5 check character 0: Do not transmit Interleaved 2 of 5 check character Note: Interleaved 2 of 5 check character must be enabled for this parameter to function.
Bit 2	1: Enable Interleaved 2 of 5 check character 0: Disable Interleaved 2 of 5 check character
Bit 1	1: Enable AIM ID prefix for Interleaved 2 of 5 0: Disable AIM ID prefix for Interleaved 2 of 5 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable Interleaved 2 of 5 0: Disable Interleaved 2 of 5

Register	0x0019
Bit	Feature
Bit 7	Reserved
Bit 6	1: Transmit Industrial 2 of 5 check character 0: Do not transmit Industrial 2 of 5 check character Note: Industrial 2 of 5 check character must be enabled for this parameter to function.
Bit 5	1: Enable Industrial 2 of 5 check character 0: Disable Industrial 2 of 5 check character
Bit 4	1: Enable AIM ID prefix for Industrial 2 of 5 0: Disable AIM ID prefix for Industrial 2 of 5 Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 3	1: Enable Industrial 2 of 5 0: Disable Industrial 2 of 5
Bit 2	1: Transmit ITF-6 check character 0: Do not transmit ITF-6 check character
Bit 1	1: Enable AIM ID prefix for ITF-6 0: Disable AIM ID prefix for ITF-6 Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 0	1: Enable ITF-6 0: Disable ITF-6
Register	0x001A
Bit	Feature
Bit 7	1: Transmit Standard 2 of 5 check character 0: Do not transmit Standard 2 of 5 check character Note: Standard 2 of 5 check character must be enabled for this parameter to function.
Bit 6	1: Enable Standard 2 of 5 check character 0: Disable Standard 2 of 5 check character
Bit 5	1: Enable AIM ID prefix for Standard 2 of 5 0: Disable AIM ID prefix for Standard 2 of 5 Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 4	1: Enable Standard 2 of 5 0: Disable Standard 2 of 5
Bit 3	1: Transmit Matrix 2 of 5 check character 0: Do not transmit Matrix 2 of 5 check character Note: Matrix 2 of 5 check character must be enabled for this parameter to function.
Bit 2	1: Enable Matrix 2 of 5 check character 0: Disable Matrix 2 of 5 check character
Bit 1	1: Enable AIM ID prefix for Matrix 2 of 5 0: Disable AIM ID prefix for Matrix 2 of 5 Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 0	1: Enable Matrix 2 of 5 0: Disable Matrix 2 of 5

Register	<i>0x001B</i>
Bit	Feature
Bit 7	1: Enable AIM ID prefix for RSS-Expand 0: Disable AIM ID prefix for RSS-Expand Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 6	1: Enable RSS-Expand 0: Disable RSS-Expand
Bit 5	1: Transmit RSS-Limited application identifier 0: Do not transmit RSS-Limited application identifier
Bit 4	1: Enable AIM ID prefix for RSS-Limited 0: Disable AIM ID prefix for RSS-Limited Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 3	1: Enable RSS-Limited 0: Disable RSS-Limited
Bit 2	1: Transmit RSS-14 application identifier 0: Do not transmit RSS-14 application identifier
Bit 1	1: Enable AIM ID prefix for RSS-14 0: Disable AIM ID prefix for RSS-14 Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 0	1: Enable RSS-14 0: Disable RSS-14
Register	<i>0x001C</i>
Bit	Feature
Bit 7-6	Reserved
Bit 5	1: Enable Code 39 Full ASCII 0: Disable Code 39 Full ASCII
Bit 4	1: Transmit Code 39 check character 0: Do not transmit Code 39 check character Note: Code 39 check character must be enabled for this parameter to function.
Bit 3	1: Enable Code 39 check character 0: Disable Code 39 check character
Bit 2	1: Transmit Code 39 start/stop characters 0: Do not transmit Code 39 start/stop characters
Bit 1	1: Enable AIM ID prefix for Code 39 0: Disable AIM ID prefix for Code 39 Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 0	1: Enable Code 39 0: Disable Code 39

Register	<i>0x001D</i>
Bit	Feature
Bit 7-6	Reserved
Bit 5	1: Transmit Code 11 check character 0: Do not transmit Code 11 check character Note: Code 11 check character verification must be enabled for this parameter to function.
Bit 4-2	Code 11 Check Character Verification: 000: Disable 001: One check character, MOD11 010: Two check characters, MOD11/MOD11 011: Two check characters, MOD11/MOD9 100: One check character, MOD11 (Len <= 11); two check characters, MOD11/MOD11 (Len > 11) 101: One check character, MOD11 (Len <= 11); two check characters, MOD11/MOD9 (Len > 11)
Bit 1	1: Enable AIM ID prefix for Code 11 0: Disable AIM ID prefix for Code 11 Note: Bit4 and Bit3 of register 0x0010 must be set to "01" in order for this parameter to function.
Bit 0	1: Enable Code 11 0: Disable Code 11
Register	<i>0x001E</i>
Bit	Feature
Bit 7-6	Reserved
Bit 5	1: Transmit Codabar check character 0: Do not transmit Codabar check character Note: Codabar check character must be enabled for this parameter to function.
Bit 4	1: Enable Codabar check character 0: Disable Codabar check character
Bit 3-2	Codabar Start/Stop Character Format: 00: ABCD/ABCD 01: ABCD/TN*E 10: abcd/abcd 11: abcd/tn*e
Bit 1	1: Transmit Codabar start/stop characters 0: Do not transmit Codabar start/stop characters
Bit 0	1: Enable Codabar 0: Disable Codabar

Register	<i>0x001F</i>
Bit	Feature
Bit 7	Reserved
Bit 6	1: Transmit MSI-Plessey check character 0: Do not transmit MSI-Plessey check character Note: MSI-Plessey check character verification must be enabled for this parameter to function.
Bit 5-4	MSI-Plessey Check Character Verification: 00: Disable 01: One check character, MOD10 10: Two check characters, MOD10/MOD10 11: Two check characters, MOD10/MOD11
Bit 3	1: Enable MSI-Plessey 0: Disable MSI-Plessey
Bit 2	1: Transmit Plessey check character 0: Do not transmit Plessey check character Note: Plessey check character must be enabled for this parameter to function.
Bit 1	1: Enable Plessey check character 0: Disable Plessey check character
Bit 0	1: Enable Plessey 0: Disable Plessey
Register	<i>0x0020</i>
Bit	Feature
Bit 7-3	Reserved
Bit 2	1: Enable AIM ID prefix for MSI-Plessey 0: Disable AIM ID prefix for MSI-Plessey Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 1	1: Enable AIM ID prefix for Plessey 0: Disable AIM ID prefix for Plessey Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.
Bit 0	1: Enable AIM ID prefix for Codabar 0: Disable AIM ID prefix for Codabar Note: Bit4 and Bit3 of register 0x0010 must be set to “01” in order for this parameter to function.

Register	<i>0x002B, 0x2A</i>
Bit	Feature
Bit 15-13	Reserved
Bit 12-0	0x09C4: Baud rate 1200 0x04E2: Baud rate 2400 0x0271: Baud rate 4800 0x0139: Baud rate 9600 0x00D0: Baud rate 14400 0x009C: Baud rate 19200 0x004E: Baud rate 38400 0x0034: Baud rate 57600 0x001A: Baud rate 115200
Register	<i>0x004A</i>
Bit	Feature
Bit 7-4	Reserved
Bit 3-2	00: Decode unmirrored Data Matrix only 01: Decode mirrored Data Matrix only 10/11: Decode both
Bit 1	1: Decode Data Matrix starting with the character whose ASCII value is 129 0: Do not decode Data Matrix starting with the character whose ASCII value is 129
Bit 0	Reserved
Register	<i>0x004B</i>
Bit	Feature
Bit 7	Reserved
Bit 6	1: Enable AIM ID prefix for Data Matrix 0: Disable AIM ID prefix for Data Matrix
Bit 5-2	Reserved
Bit 1-0	11: Decode rectangular Data Matrix 00: Do not decode rectangular Data Matrix

Register	0x0060		
Bit	Feature		
Bit 7	Reserved		
Bit 6-5	Terminating Character Suffix: 00/11: CR (0x0D) 01: CRLF (0x0D,0x0A) 10: TAB (0x09)		
Bit 4	Reserved		
Bit 3	1: Caps Lock ON 0: Caps Lock OFF		
Bit 2-1	00: Standard Keyboard 01: Emulate ALT+Keypad 10/11: Function Key Mapping		
Bit 0	1: Enable terminating character suffix 0: Disable terminating character suffix		
Register	0x006B		
Bit	Feature		
Bit 7-0	USB country keyboard types 00: U.S. 01: Belgium 02: Brazil 03: Canada 04: Czech 05: Denmark 06: Finland 07: France 08: Germany, Austria 09: Greece 0A: Hungary 0B: Israel 0C: Italy 0D: Latin America, South America 0E: Netherland 0F: Norway 10: Poland 11: Portugal 12: Romania 13: Russia 15: Slovakia 16: Spain 17: Sweden 18: Switzerland 19: Turkey1 1A: Turkey2 1B: UK 1C: Japan		
Register	0x006F		
Bit	Feature		
Bit 7-6	Inter-keystroke delay 00: No delay 01: Short delay (5ms) 10: Medium delay (10ms) 11: Long delay (15ms)		
Bit 5-4	Convert case 00: No case conversion 10: Convert All to Upper Case 11: Convert All to Lower Case		
Bit 3	Reserved		
Bit 2	1: Emulate numeric keypad 0: Do not emulate numeric keypad		
Bit 1-0	Reserved		

Register	0x008A	
Bit	Feature	
Bit 7-1	Reserved	
Bit 0	1: Visible Code ID (original+0x40)	0: Original Code ID
Register	0x0099	
Bit	Feature	
Bit 7-4	Reserved	
Bit 3	1: Decode mirrored Micro QR	0: Do not decode mirrored Micro QR
Bit 2	1: Enable Micro QR	0: Disable Micro QR
Bit 1	1: Enable AIM ID prefix for QR	0: Disable AIM ID prefix for QR
Bit 0	Reserved	
Register	0x00C0	
Bit	Feature	
Bit 7-5	Reserved	
Bit 4	1: Enable AIM ID prefix for Chinese Sensible Code 0: Disable AIM ID prefix for Chinese Sensible Code	
Bit 3-1	Reserved	
Bit 0	1: Enable Chinese Sensible Code	0: Disable Chinese Sensible Code

Programming Barcode Data

Programming barcode data (e.g. WFFD980) can be transmitted to the Host. To enable this feature, scan the barcode below. After the feature is enabled, programming barcodes will be handled as non-programming barcodes and they cannot be used to configure the scan scanner. The barcode data will be sent to the Host when a programming barcode is scanned and decoded. By default, the scanner does not transmit programming barcode data.

After the scanner is powered down and re-energized, this feature will be automatically disabled (i.e. the scanner does not transmit programming barcode data) and the ability of programming barcodes to configure the scanner will be restored.



Transmit Programming Barcode Data

Factory Defaults

Scanning the following barcode can restore the scanner to the factory defaults. See **Appendix A: Factory Defaults Table** for more information.

Note: Use this feature with discretion.



Restore All Factory Defaults

Chapter 2 Communication Interfaces

The HR21 provides an RS-232 interface and a USB interface to communicate with the host device. The host device can receive scanned data and send commands to control the scanner or to access/alter the configuration information of the scanner via the RS-232 or USB interface.

RS-232 Interface

Serial communication interface is usually used to connect the scanner to a host device (like PC, POS). When the HR21 is connected to a host device through its RS-232 interface, serial communication is enabled by default. However, you need to set communication parameters (including baud rate, parity check, data bit and stop bit) to match the host device so that the two devices can communicate with each other.

Default serial communication parameters are listed below, among which only baud rate can be altered.

Parameter	Factory Default
Serial Communication	Standard RS-232
Baud Rate	9600
Parity Check	None
Number of Data Bits	8
Number of Stop Bits	1
Hardware Flow Control	None

Baud Rate

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



USB Interface

When the HR21 is connected to a host device through its USB interface, **USB COM Port Emulation** is enabled by default. User can switch between **USB DATAPIPE**, **USB HID-KBW**, **USB COM Port Emulation** and **HID-POS**, upon actual need.

USB HID-KBW

When the scanner is connected to the Host via a USB connection, you can enable the **USB HID-KBW** feature by scanning the barcode below. Then the scanner's transmission will be simulated as USB keyboard input. The Host receives keystrokes on the virtual keyboard. It works on a Plug and Play basis and no driver is required.



Standard Keyboard

When the USB HID-KBW feature is enabled, the scanner selects **Standard Keyboard** by default. Besides that, the other two options are provided: **Emulate ALT+Keypad** and **Function Key Mapping**.



Emulate ALT+Keypad

When **Emulate ALT+Keypad** is enabled, any ASCII character (0x00 - 0xFF) is sent over the numeric keypad no matter which keyboard type is selected. Since sending a character involves multiple keystroke emulations, this method appears less efficient.

1. ALT Make
2. Enter the number corresponding to the ASCII character on the keypad.
3. ALT Break



W066004

Emulate ALT+Keypad

Note: It is recommended to turn on the Num Lock light on the host when using this feature.

Function Key Mapping

When **Function Key Mapping** is enabled, function character (0x00 - 0x1F) are sent as ASCII sequences over the numeric keypad.

1. CTRL Make
2. Press function key (Refer to the **ASCII Function Key Mapping Table** on the following page)
3. CTRL Break



W066002

Function Key Mapping

ASCII Function Key Mapping Table

ASCII Value (HEX)	Function Key	ASCII Value (HEX)	Function Key
00	2	10	P
01	A	11	Q
02	B	12	R
03	C	13	S
04	D	14	T
05	E	15	U
06	F	16	V
07	G	17	W
08	H	18	X
09	I	19	Y
0A	J	1A	Z
0B	K	1B	[
0C	L	1C	\
0D	M	1D	]
0E	N	1E	6
0F	O	1F	.

USB Country Keyboard Types

Keyboard layouts vary from country to country. All supported keyboard types are listed below. The default setting is US keyboard.



WFF6B00

**** U.S.**



WFF6B01

Belgium



WFF6B02

Brazil



WFF6B03

Canada



WFF6B04

Czech



WFF6B05

Denmark



WFF6B06

Finland



WFF6B07

France



WFF6B08

Germany, Austria



WFF6B09

Greece



WFF6B0A

Hungary



WFF6B0B

Israel



WFF6B0C

Italy



WFF6B0D

Latin America, South America



WFF6B0E

Netherland



WFF6B0F

Norway



WFF6B10

Poland



WFF6B11

Portugal



WFF6B12

Romania



WFF6B13

Russia



WFF6B15

Slovakia



WFF6B16

Spain



WFF6B17

Sweden



WFF6B18

Switzerland



WFF6B19

Turkey 1



WFF6B1A

Turkey 2



WFF6B1B

27 - UK



WFF6B1C

28 - Japan

Beep on Unknown Character

Due to the differences in keyboard layouts, some characters contained in barcode data may be unavailable on the selected keyboard. As a result, the scanner fails to transmit the unknown characters.

Scan the appropriate barcode below to enable or disable the emission of beep when an unknown character is detected.



W080E08

**** Beep on Unknown Character**



W080E00

Do Not Beep on Unknown Character

Inter-Keystroke Delay

This parameter specifies the delay between emulated keystrokes.



WC06F00

**** No Delay**



WC06F40

Short Delay (5ms)



WC06F80

Medium Delay (10ms)



WC06FC0

Long Delay (15ms)

Caps Lock

The **Caps Lock ON** option can invert upper and lower case characters contained in barcode data. This inversion occurs regardless of the state of Caps Lock key on the Host's keyboard.



**** Caps Lock OFF**



Caps Lock ON

Note: Emulate ALT+Keypad ON/ Convert All to Upper Case/ Convert All to Lower Case prevails over Caps Lock ON.

Example: When the **Caps Lock ON** is selected, barcode data “AbC” is transmitted as “aBc”.

Convert Case

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



W306F00

**** No Case Conversion**



W306F30

Convert All to Lower Case



W306F20

Convert All to Upper Case

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

Emulate Numeric Keypad

When this feature is disabled, sending barcode data is emulated as keystroke(s) on main keyboard.

To enable this feature, scan the **Emulate Numeric Keypad** barcode. Sending a number (0-9) is emulated as keystroke on numeric keypad, whereas sending other character like “+”, “_”, “*”, “/” and “.” is still emulated as keystroke on main keyboard. However, this feature is influenced by the state of the Num Lock key on the host: if the Num Lock light on the host is ON, numbers are sent over numeric keypad, if it is OFF, numbers are sent over main keyboard.



W046F04

Emulate Numeric Keypad



W046F00

**** Do Not Emulate Numeric Keypad**

Note: Make sure the Num Lock light of the Host is turned ON when using this feature.

Emulate ALT+Keypad ON prevails over **Emulate Numeric Keypad**.

USB COM Port Emulation

If you connect the scanner to the Host via a USB connection, the USB COM Port Emulation feature allows the Host to receive data in the way as a serial port does. However, you need to set communication parameters on the scanner to match the Host requirements. A driver is required for this feature.



W030D02

**** USB COM Port Emulation**

USB DATAPIPE

A driver is required when using this protocol to communicate with the scanner.



W030D00

USB DATAPIPE

HID-POS

The HID-POS interface is recommended for new application programs. It can send up to 56 characters in a single USB report and appears more efficient than USB HID-KBW.

Features:

- ✧ HID based, no custom driver required.
- ✧ Way more efficient in communication than USB HID-KBW and traditional RS-232 interface.

Note: HID-POS does not require a custom driver. However, a HID interface on Windows 98 does. All HID interfaces employ standard driver provided by the operating system. Use defaults when installing the driver.



W030D03

USB HID-POS

Access the Scanner with Your Program

1. Use CreateFile to access the scanner as a HID device.
2. Use ReadFile to deliver the scanned data to the application program.
3. Use WriteFile to send data to the scanner.

For detailed information about USB and HID interfaces, go to www.USB.org.

Acquire Scanned Data

After a barcode is decoded, the scanner sends an input report as below:

	Bit							
Byte	7	6	5	4	3	2	1	0
0	Report ID = 0x02							
1	Barcode Length							
2-57	Decoded Data (1-56)							
58-60	AIM ID							
61-62	Reserved							
63	-	-	-	-	-	-	-	Decoded Data Continued

Send Data to the Scanner

This output report is used to send data to the device. All programming commands can be used.

	Bit							
Byte	7	6	5	4	3	2	1	0
0	Report ID = 0x04							
1	Length of output data							
2-63	Output data (1-62)							

VID/PID

USB uses VID (Vendor ID) and PID (Product ID) to identify and locate a device. The VID is assigned by USB Implementers Forum. Newland's vendor ID is 1EAB (Hex). A range of PIDs are used for each Newland product family. Every PID contains a base number and interface type (keyboard, COM port, etc.).

Product	Interface	PID (Hex)	PID (Dec)
HR21	USB DATAPIPE	8301	33537
	USB HID-KBW	8303	33539
	USB COM Port Emulation	8306	33542
	HID-POS	8310	33552

Chapter 3 Scan Mode

Manual Mode

Manual Mode (default): A trigger pull activates a decode session. The decode session continues until the barcode is decoded or the trigger is released.



**** Manual Mode**

Continuous Mode

Continuous Mode: The scanner automatically activates a decode session. The decode session continues until the barcode is decoded or the decode session timeout expires. When a decode session is completed, the scanner waits until the timeout between decodes expires and then starts next session. The scanner continues to work in this pattern if the following situation does not happen: no barcode is presented to the scanner or passed in front of it in a decode session, the scanner will automatically suspend barcode reading. Pressing the trigger can suspend/resume barcode reading.



W030002

Continuous Mode

Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 5.0s. If the parameter is set to 0, the timeout is infinite. To learn how to program this parameter, see ***Appendix E: Parameter Programming Examples***.



M00031D

Decode Session Timeout

Timeout between Decodes

This parameter sets the timeout between decode sessions. When a decode session ends, next session will not happen until the timeout between decodes expires. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 1.0s. To learn how to program this parameter, see ***Appendix E: Parameter Programming Examples***.



M00031C

Timeout between Decodes

Sense Mode

Sense Mode: The scanner waits for the image stabilization timeout to expire before activating a decode session every time it detects a change in ambient illumination. Decode session continues until the barcode is decoded or the decode session timeout expires. After a decode session ends, the scanner waits for the timeout between decodes to expire before beginning to monitor ambient illumination. If no barcode is presented to the scanner or passed in front of it in a decode session, the scanner will automatically suspend barcode reading and start to monitor ambient illumination.

In the Sense mode, a trigger pull can also activate a decode session. The decode session continues until the barcode is decoded or the trigger is released. When the session ends, the scanner will continue to monitor ambient illumination.



W030003

Sense Mode

Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 5.0s. If the parameter is set to 0, the timeout is infinite. To learn how to program this parameter, see **Appendix E: Parameter Programming Examples**.



M00031D

Decode Session Timeout

Timeout between Decodes

After a decode session ends, the scanner waits for the timeout between decodes to expire before beginning to monitor ambient illumination. This parameter is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 1.0s. To learn how to program this parameter, see ***Appendix E: Parameter Programming Examples***.



Timeout between Decodes

Image Stabilization Timeout

This parameter defines the amount of time that the scanner waits for the image to stabilize to a point that it can be decoded with more accuracy. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 0.4s. To learn how to program this parameter, see ***Appendix E: Parameter Programming Examples***.



Image Stabilization Timeout

Sensitivity

Sensitivity specifies the degree of acuteness of the scanner's response to changes in ambient illumination. The higher the sensitivity, the lower requirement in illumination change to trigger the scanner. You can select an appropriate degree of sensitivity that fits the ambient environment.



WFF0308

High Sensitivity



WFF0320

** Medium Sensitivity



WFF0340

Low Sensitivity

Sensitivity levels range from 0 to 255. The smaller the number, the higher the sensitivity.

Users can select a desired sensitivity level that helps achieve greater efficiency. To learn how to program this parameter, see ***Appendix E: Parameter Programming Examples***.



M00031A

Custom Sensitivity

Command Trigger Mode

Command Trigger Mode: A decode session is activated by a host command (i.e. set the bit0 of register 0x0002 to “1”). The decode session continues until the barcode is decoded or the decode session timeout expires.



Command Trigger Mode

Decode Session Timeout

This parameter sets the maximum time decode session continues during a scan attempt. It is programmable in 0.1s increments from 0.1s to 25.5s. The default timeout is 5.0s. If the parameter is set to 0, the timeout is infinite. To learn how to program this parameter, see **Appendix E: Parameter Programming Examples**.



Decode Session Timeout

Chapter 4 Illumination & Aiming

Illumination

A couple of illumination options are provided to improve the lighting conditions during every image capture:

Normal (default): Illumination LED is turned on during image capture.

Always ON: Illumination LED keeps ON after the scanner is powered on.

OFF: Illumination LED is OFF all the time.



**** Normal**



OFF



Always ON

Aiming

When scanning/capturing image, the scanner projects an aiming beam which allows positioning the target barcode within its field of view and thus makes decoding easier.

Normal (default): The scanner projects an aiming beam only during barcode scanning/capture.

Always ON: Aiming beam is constantly ON after the scanner is powered on.

OFF: Aiming beam is OFF all the time.



W300010

**** Normal**



W300000

OFF



W300030

Always ON

Chapter 5 Notification

Mute Mode

Scanning the **Enable Mute Mode** can turn off all notification beeps.



W400000

Enable Mute Mode



W400040

****Disable Mute Mode**

Good Read Beep



W040E04

**** Good Read Beep On**



W040E00

Good Read Beep Off

Good Read Beep Frequency



WFF09DA

Low



WFF094B

** Medium



WFF0925

High

Good Read Beep Duration



WFF0A1F

40ms



WFF0A3E

** 80ms



WFF0A5D

120ms

Good Read LED



W800080

**** Good Read LED On**



W800000

Good Read LED Off

Decode Result Notification

If enabled, when a bad read occurs, “F” will be transmitted; when a good read occurs, “S” will be appended to the barcode data as the most left character.

Note: This feature is NOT available in USB DATAPIPE mode.



W400240

Enable Decode Result Notification



W400200

**** Disable Decode Result Notification**

Chapter 6 Prefix & Suffix

In many applications, barcode data needs to be edited and distinguished from one another.

Usually AIM ID and Code ID can be used as identifiers, but in some special cases terminating character suffix like Carriage Return or Line Feed can also be the alternative.

The scanner can be configured to transmit barcode data in the following format:

["F"/ "S"] + [Code ID] + [AIM ID] + [DATA] + [terminating character]

Note: [DATA] must be transmitted while user can decide whether to transmit any of the rest parts.

["F"/ "S"]: decode result notification.

AIM ID Prefix

AIM (Automatic Identification Manufacturers) IDs define symbology identifiers and data carrier identifiers. For the details, see *Appendix B: AIM ID Table*. If AIM ID prefix is enabled, the scanner will add the symbology identifier before the scanned data after decoding.



WFFD9C0

Enable AIM ID Prefix



WFFD9C1

** Disable AIM ID Prefix

CODE ID Prefix

Code ID can also be used to identify barcode type. For more information, refer to *Appendix C: Code ID Table*.



Enable CODE ID Prefix



** Disable CODE ID Prefix

You can choose to transmit original CODE ID or visible CODE ID by scanning the appropriate barcode below.



** Original CODE ID



Visible CODE ID

Terminating Character Suffix

A terminating character such as carriage return (CR) or carriage return/line feed pair (CRLF) or horizontal tab (TAB) can be used to mark the end of data.



W616000

Disable Terminating Character Suffix



W616001

Append CR



W616021

**** Append CRLF**



W616041

Append TAB

Chapter 7 Symbologies

Global Settings

Enable/Disable All Symbologies

If all symbologies are disabled, the scanner can only identify programming barcodes.



WFFD981

Enable All Symbologies



WFFD982

Disable All Symbologies

Enable/Disable 1D Symbologies



WFFD983

Enable 1D Symbologies



WFFD984

Disable 1D Symbologies

Enable/Disable 2D Symbologies



WFFD985

Enable 2D Symbologies



WFFD986

Disable 2D Symbologies

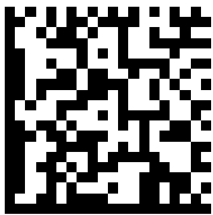
Video Reverse

The **Video Reverse** feature only applies to 2D barcodes.

Regular barcode: Dark image on a bright background.

Inverse barcode: Bright image on a dark background.

The examples of regular barcode and inverse barcode are shown below.



Regular Barcode



Inverse Barcode

Video Reverse is used to allow the scanner to read barcodes that are inverted.

Video Reverse ON: Read both regular barcodes and inverse barcodes.

Video Reverse OFF (default): Read regular barcodes only.

The scanner shows a slight decrease in scanning speed when Video Reverse is ON.



Video Reverse ON



**** Video Reverse OFF**

1D Symbologies

Code 128

Restore Factory Defaults



WFFD990

Restore the Factory Defaults of Code 128

Enable/Disable Code 128



W011601

** Enable Code 128



W011600

Disable Code 128

UCC/EAN-128 (GS1-128)

Restore Factory Defaults



Restore the Factory Defaults of UCC/EAN-128

Enable/Disable UCC/EAN-128



** Enable UCC/EAN-128



Disable UCC/EAN-128

AIM 128

Restore Factory Defaults



WFFD992

Restore the Factory Defaults of AIM 128

Enable/Disable AIM 128



W101610

** Enable AIM 128



W101600

Disable AIM 128

EAN-8

Restore Factory Defaults



Restore the Factory Defaults of EAN-8

Enable/Disable EAN-8



** Enable EAN-8



Disable EAN-8

Transmit Check Character

EAN-8 is 8 digits in length with the last one as its check character used to verify the integrity of the data.



** Transmit EAN-8 Check Character



Do Not Transmit EAN-8 Check Character

Add-On Code

An EAN-8 barcode can be augmented with a two-digit or five-digit add-on code to form a new one. In the examples below, the part surrounded by blue dotted line is an EAN-8 barcode while the part circled by red dotted line is add-on code.



Enable 2-Digit Add-On Code



** Disable 2-Digit Add-On Code



Enable 5-Digit Add-On Code



** Disable 5-Digit Add-On Code

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The scanner decodes a mix of EAN-8 barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The scanner decodes EAN-8 and ignores the add-on code when presented with an EAN-8 plus add-on barcode. It can also decode EAN-8 barcodes without add-on codes.

Add-On Code Required

When **EAN-8 Add-On Code Required** is selected, the scanner will only read EAN-8 barcodes that contain add-on codes.



W081308

EAN-8 Add-On Code Required



W081300

**** EAN-8 Add-On Code Not Required**

EAN-8 Extension

Disable EAN-8 Zero Extend: Transmit EAN-8 barcodes as is.

Enable EAN-8 Zero Extend: Add five leading zeros to decoded EAN-8 barcodes to extend to 13 digits.



W401340

Enable EAN-8 Zero Extend



W401300

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

EAN-13

Restore Factory Defaults



WFFD995

Restore the Factory Defaults of EAN-13

Enable/Disable EAN-13



W011101

** Enable EAN-13



W011100

Disable EAN-13

Transmit Check Character

EAN-13 is 13 digits in length with the last one as its check character used to verify the integrity of the data.



W041104

** Transmit EAN-13 Check Character



W041100

Do Not Transmit EAN-13 Check Character

Add-On Code

An EAN-13 barcode can be augmented with a two-digit or five-digit add-on code to form a new one. In the examples below, the part surrounded by blue dotted line is an EAN-13 barcode while the part circled by red dotted line is add-on code.



Enable 2-Digit Add-On Code



** Disable 2-Digit Add-On Code



Enable 5-Digit Add-On Code



** Disable 5-Digit Add-On Code

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The scanner decodes a mix of EAN-13 barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The scanner decodes EAN-13 and ignores the add-on code when presented with an EAN-13 plus add-on barcode. It can also decode EAN-13 barcodes without add-on codes.

Add-On Code Required

When **EAN-13 Add-On Code Required** is selected, the scanner will only read EAN-13 barcodes that contain add-on codes.



W081108

EAN-13 Add-On Code Required



W081100

**** EAN-13 Add-On Code Not Required**

ISSN

Restore Factory Defaults



WFFD996

Restore the Factory Defaults of ISSN

Enable/Disable ISSN



W401140

Enable ISSN



W401100

** Disable ISSN

ISBN

Restore Factory Defaults



WFFD997

Restore the Factory Defaults of ISBN

Enable/Disable ISBN



W011201

** Enable ISBN



W011200

Disable ISBN

Set ISBN Format



W041200

** ISBN-13



W041204

ISBN-10

UPC-E

Restore Factory Defaults



WFFD998

Restore the Factory Defaults of UPC-E

Enable/Disable UPC-E



W011501

** Enable UPC-E



W011500

Disable UPC-E

Transmit Check Character

UPC-E is 8 digits in length with the last one as its check character used to verify the integrity of the data.



W041504

** Transmit UPC-E Check Character



W041500

Do Not Transmit UPC-E Check Character

Add-On Code

A UPC-E barcode can be augmented with a two-digit or five-digit add-on code to form a new one. In the examples below, the part surrounded by blue dotted line is a UPC-E barcode while the part circled by red dotted line is add-on code.



Enable 2-Digit Add-On Code



** Disable 2-Digit Add-On Code



Enable 5-Digit Add-On Code



** Disable 5-Digit Add-On Code

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The scanner decodes a mix of UPC-E barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The scanner decodes UPC-E and ignores the add-on code when presented with a UPC-E plus add-on barcode. It can also decode UPC-E barcodes without add-on codes.

Add-On Code Required

When **UPC-E Add-On Code Required** is selected, the scanner will only read UPC-E barcodes that contain add-on codes.



W101510

UPC-E Add-On Code Required



W101500

**** UPC-E Add-On Code Not Required**

Transmit System Character

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



W081508

Transmit System Character “0”



W081500

**** Do Not Transmit System Character “0”**

UPC-E Extension

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

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



W801580

Enable UPC-E Extend



W801500

****Disable UPC-E Extend**

UPC-A

Restore Factory Defaults



Restore the Factory Defaults of UPC-A

Enable/Disable UPC-A



** Enable UPC-A



Disable UPC-A

Transmit Check Character

UPC-A is 13 digits in length with the last one as its check character used to verify the integrity of the data.



** Transmit UPC-A Check Character



Do Not Transmit UPC-A Check Character

Add-On Code

A UPC-A barcode can be augmented with a two-digit or five-digit add-on code to form a new one. In the examples below, the part surrounded by blue dotted line is a UPC-A barcode while the part circled by red dotted line is add-on code.



Enable 2-Digit Add-On Code



** Disable 2-Digit Add-On Code



Enable 5-Digit Add-On Code



** Disable 5-Digit Add-On Code

Enable 2-Digit Add-On Code/ Enable 5-Digit Add-On Code: The scanner decodes a mix of UPC-A barcodes with and without 2-digit/5-digit add-on codes.

Disable 2-Digit Add-On Code/ Disable 5-Digit Add-On Code: The scanner decodes UPC-A and ignores the add-on code when presented with a UPC-A plus add-on barcode. It can also decode UPC-A barcodes without add-on codes.

Add-On Code Required

When **UPC-A Add-On Code Required** is selected, the scanner will only read UPC-A barcodes that contain add-on codes.



W101410

UPC-A Add-On Code Required



W101400

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

Transmit Preamble Character

Preamble characters (Country Code and System Character) can be transmitted as part of a UPC-A barcode. Select one of the following options for transmitting UPC-A preamble to the host device: transmit system character only or transmit system character and country code ("0" for USA).



W081408

System Character & Country Code



W081400

**** System Character**

Interleaved 2 of 5

Restore Factory Defaults



Restore the Factory Defaults of Interleaved 2 of 5

Enable/Disable Interleaved 2 of 5



** Enable Interleaved 2 of 5



Disable Interleaved 2 of 5

Check Character Verification

A check character is optional for Interleaved 2 of 5 and can be added as the last character. It is a calculated value used to verify the integrity of the data.

Disable: The scanner transmits Interleaved 2 of 5 barcodes as is.

Do Not Transmit Check Character After Verification: The scanner checks the integrity of all Interleaved 2 of 5 barcodes to verify that the data complies with the check character algorithm. Barcodes passing the check will be transmitted except the last digit, whereas those failing it will not be transmitted.

Transmit Check Character After Verification: The scanner checks the integrity of all Interleaved 2 of 5 barcodes to verify that the data complies with the check character algorithm. Barcodes passing the check will be transmitted, whereas those failing it will not be transmitted.



W0C1800

**** Disable**



W0C1804

Do Not Transmit Check Character After Verification



W0C180C

Transmit Check Character After Verification

Transmit Appended “0”

If an Interleaved 2 of 5 barcode contains an odd number of characters, a leading zero must be appended to the barcode. Scan the appropriate barcode to choose whether to transmit the appended “0”.



**** Transmit Appended “0”**



Do Not Transmit Appended “0”

ITF-6

ITF-6 is a special kind of Interleaved 2 of 5 with a length of 6 characters and the last character as the check character.



Restore the Factory Defaults of ITF-6



**** Disable ITF-6**



Enable ITF-6 But Do Not Transmit Check Character



Enable ITF-6 and Transmit Check Character

Note: It is advisable not to enable ITF-6 and Interleaved 2 of 5 at the same time.

ITF-14

ITF-14 is a special kind of Interleaved 2 of 5 with a length of 14 characters and the last character as the check character.



WFFD99C

Restore the Factory Defaults of ITF-14



W201800

Disable ITF-14



WA01820

Enable ITF-14 But Do Not Transmit Check Character



WA018A0

** Enable ITF-14 and Transmit Check Character

Note: It is advisable not to enable ITF-14 and Interleaved 2 of 5 at the same time.

Matrix 2 of 5

Restore Factory Defaults



WFFD99F

Restore the Factory Defaults of Matrix 2 of 5

Enable/Disable Matrix 2 of 5



W011A01

** Enable Matrix 2 of 5



W011A00

Disable Matrix 2 of 5

Check Character Verification



W041A00

**** Disable**



W0C1A04

Do Not Transmit Check Character After Verification



W0C1A0C

Transmit Check Character After Verification

Industrial 25

Restore Factory Defaults



WFFD9A0

Restore the Factory Defaults of Industrial 25

Enable/Disable Industrial 25



W081908

**** Enable Industrial 25**



W081900

Disable Industrial 25

Check Character Verification



W201900

**** Disable**



W601920

Do Not Transmit Check Character After Verification



W601960

Transmit Check Character After Verification

Standard 25

Restore Factory Defaults



WFFD9A1

Restore the Factory Defaults of Standard 25

Enable/Disable Standard 25



W101A10

**** Enable Standard 25**



W101A00

Disable Standard 25

Check Character Verification



W401A00

**** Disable**



WC01A40

Do Not Transmit Check Character After Verification



WC01AC0

Transmit Check Character After Verification

Code 39

Restore Factory Defaults



WFFD9A2

Restore the Factory Defaults of Code 39

Enable/Disable Code 39



W011C01

** Enable Code 39



W011C00

Disable Code 39

Transmit Start/Stop Character



W041C04

Transmit Start/Stop Character



W041C00

** Do Not Transmit Start/Stop Character

Check Character Verification



W081C00

**** Disable**



W181C08

Do Not Transmit Check Character After Verification



W181C18

Transmit Check Character After Verification

Enable/Disable Code 39 Full ASCII

The scanner can be configured to identify all ASCII characters by scanning the appropriate barcode below.



W201C20

Enable Code 39 Full ASCII



W201C00

**** Disable Code 39 Full ASCII**

Codabar

Restore Factory Defaults



WFFD9A3

Restore the Factory Defaults of Codabar

Enable/Disable Codabar



W011E01

** Enable Codabar



W011E00

Disable Codabar

Check Character Verification



W101E00

**** Disable**



W301E10

Do Not Transmit Check Character After Verification



W301E30

Transmit Check Character After Verification

Transmit Start/Stop Character



W021E02

**** Transmit Start/Stop Character**



W021E00

Do Not Transmit Start/Stop Character

Start/Stop Character Format



W0C1E00

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



W0C1E04

ABCD/TN*E as the Start/Stop Character



W0C1E08

abcd/abcd as the Start/Stop Character



W0C1E0C

abcd/tn*e as the Start/Stop Character

Code 93

Restore Factory Defaults



WFFD9A4

Restore the Factory Defaults of Code 93

Enable/Disable Code 93



W081208

** Enable Code 93



W081200

Disable Code 93

Check Character Verification



W201200

Disable



W601220

**** Do Not Transmit Check Character After Verification**



W601260

Transmit Check Character After Verification

Code 11

Restore Factory Defaults



WFFD9A5

Restore the Factory Defaults of Code 11

Enable/Disable Code 11



W011D01

** Enable Code 11



W011D00

Disable Code 11

Check Character Verification



W1C1D00

Disable



W1C1D04

** One Check Character, MOD11



W1C1D08

Two Check Characters, MOD11/MOD11



W1C1D0C

Two Check Characters, MOD11/MOD9



W1C1D10

One Check Character, MOD11 (Len <= 11)
Two Check Characters, MOD11/MOD11 (Len > 11)



W1C1D14

One Check Character, MOD11 (Len <= 11)
Two Check Characters, MOD11/MOD9 (Len > 11)



W201D20

** Transmit Check Character



W201D00

Do Not Transmit Check Character

Plessey

Restore Factory Defaults



WFFD9A6

Restore the Factory Defaults of Plessey

Enable/Disable Plessey



W011F01

** Enable Plessey



W011F00

Disable Plessey

Check Character Verification



W021F00

Disable



W061F02

**** Do Not Transmit Check Character After Verification**



W061F06

Transmit Check Character After Verification

MSI-Plessey

Restore Factory Defaults



WFFD9A7

Restore the Factory Defaults of MSI-Plessey

Enable/Disable MSI-Plessey



W081F08

** Enable MSI-Plessey



W081F00

Disable MSI-Plessey

Check Character Verification



W301F00

Disable



W301F10

** One Check Character, MOD10



W301F20

Two Check Characters, MOD10/MOD10



W301F30

Two Check Characters, MOD10/MOD11



W401F40

** Transmit Check Character



W401F00

Do Not Transmit Check Character

RSS-14

Restore Factory Defaults



WFFD9A8

Restore the Factory Defaults of RSS-14

Enable/Disable RSS-14



W011B01

**** Enable RSS-14**



W011B00

Disable RSS-14

Transmit Application Identifier “01”



W041B04

**** Transmit Application Identifier “01”**



W041B00

Do Not Transmit Application Identifier “01”

RSS-Limited

Restore Factory Defaults



WFFD9A9

Restore the Factory Defaults of RSS-Limited

Enable/Disable RSS-Limited



W081B08

**** Enable RSS-Limited**



W081B00

Disable RSS-Limited

Transmit Application Identifier “01”



W201B20

**** Transmit Application Identifier “01”**



W201B00

Do Not Transmit Application Identifier “01”

RSS-Expand

Restore Factory Defaults



WFFD9AA

Restore the Factory Defaults of RSS-Expand

Enable/Disable RSS-Expand



W401B40

**** Enable RSS-Expand**



W401B00

Disable RSS-Expand

2D Symbolologies

PDF417

Restore Factory Defaults



Restore the Factory Defaults of PDF417

Enable/Disable PDF417



** Enable PDF417



Disable PDF417

Data Matrix

Restore Factory Defaults



Restore the Factory Defaults of Data Matrix

Enable/Disable Data Matrix



** Enable Data Matrix



Disable Data Matrix

Rectangular Barcodes



** Decode Rectangular Barcodes



Do Not Decode Rectangular Barcodes

Mirror Images



W0C4A00

**** Decode Unmirrored DM Only**



W0C4A04

Decode Mirrored DM Only



W0C4A0C

Decode Both

QR Code

Restore Factory Defaults



WFFD9B2

Restore the Factory Defaults of QR Code

Enable/Disable QR Code



W800D80

** Enable QR Code



W800D00

Disable QR Code

Micro QR



W049904

** Enable Micro QR



W049900

Disable Micro QR

Mirrored Micro QR



W089908

Decode Mirrored Micro QR



W089900

** Do Not Decode Mirrored Micro QR

Chinese Sensible Code

Restore Factory Defaults



WFFD9B3

Restore the Factory Defaults of Chinese Sensible Code

Enable/Disable Chinese Sensible Code



W01C001

**** Enable Chinese Sensible Code**



W01C000

Disable Chinese Sensible Code

Chapter 8 Safety Information

Electrical Safety

1. Use only the supplied power adapter. Otherwise there is a risk of damage to the scanner.
2. To avoid risk of electric shock, do not attempt to disassemble or modify the supplied power adapter yourself.
3. Use only a dry soft cloth to clean the scanner and power adapter. Cleaning them with wet cloth may cause electric shock or damage to the devices.
4. If there is unusual odor, overheating or smoke when using the scanner, immediately cut off the power and disconnect the power adapter, and contact your dealer or Newland customer service center. Continued use in this case may result in fire or electric shock.
5. Keep the scanner and its accessories away from fire and heat sources. Keep them from moisture.

Photobiological Safety

The scanner complies with the requirements of IEC 62471. The scanner has no lasers. It uses LEDs to produce illumination and aiming beams. The LEDs are bright, but testing has been done to demonstrate that the scanner is safe for its intended application under normal usage conditions. However, the user should avoid looking into the beam.

Electromagnetic Compatibility (EMC)

The scanner meets the requirements of EN 55032:2015 and EN 55024:2010.

Note: The scanner contains ESD (Electrostatic Discharge) sensitive components and circuits. Static control precautions are required when using this device. Device damage may result if ESD control procedures are not followed. Any ESD-related malfunctions should be reported to the technical support.

Others

1. Do not attempt to disassemble or retrofit the scanner yourself. Unauthorized disassembly or retrofit will void the warranty.
2. If any malfunction occurs while using the scanner, immediately cut off the power and contact your dealer or Newland customer service center.

Appendix

Appendix A: Factory Defaults Table

Parameter		Factory Default	Remark
Programming Barcode			
Barcode Programming		Enabled	
Programming Barcode Data		Do not send	If Send Programming Barcode Data is enabled, barcode programming will be disabled.
Communication Interfaces			
TTL-232 Interface	Baud Rate	9600	
	Parity Check	None	
	Number of Data Bits	8	
	Number of Stop Bits	1	
	Hardware Flow Control	None	
USB Interface		USB COM Port Emulation	Other options: USB HID-KBW, USB DATAPIPE, HID-POS.
USB HID-KBW	Input Mode	Standard Keyboard	
	USB Country Keyboard Type	U.S.	
	Beep on Unknown Character	Enabled	
	Inter-Keystroke Delay	No delay	
	Caps Lock	Disabled	
	Convert Case	No conversion	
	Emulate Numeric Keypad	Disabled	
Scan Mode			
Scan Mode		Manual mode	Other options: Continuous Mode, Sense Mode, Command Trigger Mode.

Parameter		Factory Default	Remark
Continuous Mode	Decode Session Timeout	3.0s	0.1-25.5s; 0: infinite.
	Timeout between Decodes	1.0s	0-25.5s
Sense Mode	Decode Session Timeout	3.0s	0.1-25.5s; 0: infinite.
	Timeout between Decodes	1.0s	0-25.5s
	Image Stabilization Timeout	0.4s	0-25.5s
	Sensitivity	Medium	
Command Trigger Mode	Decode Session Timeout	3.0s	0.1-25.5s; 0: infinite.
Illumination & Aiming			
Illumination		Normal	Turn on when scanning barcode
Aiming		Normal	Turn on when scanning barcode
Notification			
Mute Mode		Disabled	
Good Read Beep	Beep on Good Read	Enabled	
	Beep Frequency	Medium	
	Beep Duration	80ms	Other options: 40ms, 120ms.
Good Read LED		Enabled	
Decode Result Notification		Disabled	"S": Good read; "F": No read. NOT applicable to USB DATAPIPE.
Data Formatting			
AIM ID Prefix		Disabled	
Code ID Prefix		Disabled	
Code ID Type		Original Code ID	
Terminating Character Suffix		CRLF	Options: Disabled, CR, TAB.

Parameter	Factory Default	Remark
Symbologies		
Video Reverse	Disabled	Applicable to all symbologies.
Code 128		
Code 128	Enabled	
UCC/EAN-128 (GS1-128)		
UCC/EAN-128	Enabled	
AIM 128		
AIM 128	Enabled	
EAN-8		
EAN-8	Enabled	
Check Character	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
Extend to EAN-13	Disabled	
EAN-13		
EAN-13	Enabled	
Check Character	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
ISSN		
ISSN	Disabled	
ISBN		
ISBN	Enabled	
ISBN Format	ISBN-13	

Parameter	Factory Default	Remark
UPC-E		
UPC-E	Enabled	
Check Character	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
Extend to UPC-A	Disabled	
System Character "0"	Do not transmit	
UPC-A		
UPC-A	Enabled	
Check Character	Transmit	
2-Digit Add-On Code	Disabled	
5-Digit Add-On Code	Disabled	
Add-On Code	Not required	
System Character	Transmit	
Country Code	Do not transmit	
Interleaved 2 of 5		
Interleaved 2 of 5	Enabled	
Check Character Verification	Disabled	
Check Character	Do not transmit	
Appended "0"	Transmit	For Interleaved 2 of 5 barcodes that contain an odd number of characters
ITF-6		
ITF-6	Disabled	
Check Character	Do not transmit	
ITF-14		
ITF-14	Enabled	
Check Character	Transmit	
Matrix 2 of 5		
Matrix 2 of 5	Enabled	
Check Character Verification	Disabled	
Check Character	Do not transmit	

Parameter	Factory Default	Remark
Industrial 25		
Industrial 25	Enabled	
Check Character Verification	Disabled	
Check Character	Do not transmit	
Standard 25		
Standard 25	Enabled	
Check Character Verification	Disabled	
Check Character	Do not transmit	
Code 39		
Code 39	Enabled	
Check Character Verification	Disabled	
Check Character	Do not transmit	
Start/Stop Character	Do not transmit	
Code 39 Full ASCII	Disabled	
Codabar		
Codabar	Enabled	
Check Character Verification	Disabled	
Check Character	Do not transmit	
Start/Stop Character	Transmit	
Start/Stop Character Format	ABCD/ABCD	
Code 93		
Code 93	Enabled	
Check Character Verification	Enabled	
Check Character	Do not transmit	
Code 11		
Code 11	Enabled	
Check Character Verification	One check character, MOD11	
Check Character	Transmit	

Parameter	Factory Default	Remark
Plessey		
Plessey	Enabled	
Check Character Verification	Enabled	
Check Character	Do not transmit	
MSI-Plessey		
MSI-Plessey	Enabled	
Check Character Verification	One check character, MOD10	
Check Character	Transmit	
RSS-14		
RSS-14	Enabled	
AI (Application Identifier)	Transmit	
RSS-Limited		
RSS-Limited	Enabled	
AI (Application Identifier)	Transmit	
RSS-Expand		
RSS-Expand	Enabled	
PDF417		
PDF417	Enabled	
Data Matrix		
Data Matrix	Enabled	
Rectangular Barcodes	Decode	
Mirror Images	Decode unmirrored DM only	
QR Code		
QR Code	Enabled	
Micro QR	Enabled	
Mirrored Micro QR	Do not decode	
Chinese Sensible Code		
Chinese Sensible Code	Enabled	

Appendix B: AIM ID Table

Symbology	AIM ID	Remark
Code 128	]C0	Standard Code 128
UCC/EAN 128 (GS1-128)	]C1	FNC1 is the character right after the start character
AIM 128	]C2	FNC1 is the 2nd character after the start character
EAN-8	]E4	Standard EAN-8
	]E4....]E1...	EAN-8 + 2-Digit Add-On Code
	]E4....]E2...	EAN-8 + 5-Digit Add-On Code
EAN-13	]E0	Standard EAN-13
	]E3	EAN-13 + 2/5-Digit Add-On Code
ISSN	]X5	Standard ISSN
ISBN	]X4	Standard ISBN
UPC-E	]E0	Standard UPC-E
	]E3	UPC-E + 2/5-Digit Add-On Code
UPC-A	]E0	Standard UPC-A
	]E3	UPC-A + 2/5-Digit Add-On Code
Interleaved 2 of 5	]I0	No check character verification
	]I1	Transmit check character after verification
	]I3	Do not transmit check character after verification
ITF-6	]I1	Transmit check character
	]I3	Do not transmit check character
ITF-14	]I1	Transmit check character
	]I3	Do not transmit check character
Matrix 2 of 5	]X1	No check character verification
	]X2	Transmit check character after verification
	]X3	Do not transmit check character after verification
Industrial 25	]S0	Not specified
Standard 25	]R0	No check character verification
	]R8	One check character, MOD 7; do not transmit check character
	]R9	One check character, MOD 7; transmit check character
Code 39	]A0	Transmit barcodes as is; Full ASCII disabled; no check character verification

Symbology	AIM ID	Remark
	]A1	One check character, MOD 43; transmit check character
	]A3	One check character, MOD 43; do not transmit check character
	]A4	Full ASCII enabled; no check character verification
	]A5	Full ASCII enabled; MOD43; transmit check character
	]A7	Full ASCII enabled; MOD43; do not transmit check character
Codabar	]F0	Standard Codabar
	]F2	Transmit check character after verification
	]F4	Do not transmit check character after verification
Code 93	]G0	Not specified
Code 11	]H0	One check character, MOD11; transmit check character
	]H1	Two check characters, MOD11/MOD11; transmit check character
	]H3	Do not transmit check character after verification
	]H8	Two check characters, MOD11/MOD9; transmit check character
	]H9	No check character verification
Plessey	]P0	Not specified
MSI Plessey	]M0	One check character, MOD10; transmit check character
	]M1	One check character, MOD10; do not transmit check character
	]M7	Two check characters, MOD10 /MOD11; do not transmit check character
	]M8	Two check characters, MOD10 /MOD11; transmit check character
	]M9	No check character verification
RSS-14 RSS-Limited RSS-Expand	]e0	
PDF417	]L0	Comply with 1994 PDF417 specifications
Data Matrix	]d0	ECC 000 - 140
	]d1	ECC 200
	]d2	ECC 200; FNC1 is the 1st or 5th character after the start character
	]d3	ECC 200; FNC1 is the 2nd or 6th character after the start character
	]d4	ECC 200, ECI protocol supported
	]d5	ECC 200; FNC1 is the 1st or 5th character after the start character; ECI supported
	]d6	ECC 200; FNC1 is the 2nd or 6th character after the start character;

Symbology	AIM ID	Remark
		ECI supported
QR Code	]Q0	QR1 (comply with AIM ISS 97-001 specifications)
	]Q1	QR2 (2005 symbol), ECI protocol not supported
	]Q2	QR2 (2005 symbol), ECI protocol supported
	]Q3	QR2 (2005 symbol), ECI protocol not supported; FNC1 is the character right after the start character
	]Q4	QR2 (2005 symbol), ECI protocol supported; FNC1 is the character right after the start character
	]Q5	QR2 (2005 symbol), ECI protocol not supported; FNC1 is the 2nd character right after the start character
	]Q6	QR2 (2005 symbol), ECI protocol supported; FNC1 is the 2nd character right after the start character
Chinese Sensible Code	]h0	ECI protocol not supported
	]h1	ECI protocol supported

Reference: ISO/IEC 15424:2008 Information technology – Automatic identification and data capture techniques – Data Carrier Identifiers (including Symbology Identifiers)

Appendix C: Code ID Table

Symbology	Original Code ID	Visible Code ID
Code 128 FNC3	1	A(0x41)
Code 128	2	B(0x42)
UCC/EAN 128	3	C(0x43)
EAN-8	4	D(0x44)
EAN-13	5	E(0x45)
UPC-E	6	F(0x46)
UPC-A	7	G(0x47)
Interleaved 2 of 5	8	H(0x48)
ITF-14	9	I(0x49)
ITF-6	10	J(0x4A)
Code 39	13	M(0x4D)
Codabar	15	O(0x4F)
Standard 25	16	P(0x50)
Code 93	17	Q(0x51)
AIM 128	21	U(0x55)
MSI Plessey	22	V(0x56)
ISBN	23	W(0x57)
Industrial 25	24	X(0x58)
Matrix 2 of 5	25	Y(0x59)
RSS-14	26	Z(0x5A)
RSS Limited	27	[(0x5B)
RSS Expand	28	\(0x5C)
Code 11	29	] (0x5D)
Plessey	30	^(0x5E)
ISSN	31	_(0x5F)
PDF417	32	`(0x60)
QR	33	a(0x61)
Data Matrix	35	c(0x63)
Chinese Sensible Code	39	g(0x67)

Appendix D: ASCII Table

Hex	Dec	Char
00	0	NUL (Null char.)
01	1	SOH (Start of Header)
02	2	STX (Start of Text)
03	3	ETX (End of Text)
04	4	EOT (End of Transmission)
05	5	ENQ (Enquiry)
06	6	ACK (Acknowledgment)
07	7	BEL (Bell)
08	8	BS (Backspace)
09	9	HT (Horizontal Tab)
0a	10	LF (Line Feed)
0b	11	VT (Vertical Tab)
0c	12	FF (Form Feed)
0d	13	CR (Carriage Return)
0e	14	SO (Shift Out)
0f	15	SI (Shift In)
10	16	DLE (Data Link Escape)
11	17	DC1 (XON) (Device Control 1)
12	18	DC2 (Device Control 2)
13	19	DC3 (XOFF) (Device Control 3)
14	20	DC4 (Device Control 4)
15	21	NAK (Negative Acknowledgment)
16	22	SYN (Synchronous Idle)
17	23	ETB (End of Trans. Block)
18	24	CAN (Cancel)
19	25	EM (End of Medium)
1a	26	SUB (Substitute)
1b	27	ESC (Escape)
1c	28	FS (File Separator)
1d	29	GS (Group Separator)

Hex	Dec	Char	
1e	30	RS	(Request to Send)
1f	31	US	(Unit Separator)
20	32	SP	(Space)
21	33	!	(Exclamation Mark)
22	34	"	(Double Quote)
23	35	#	(Number Sign)
24	36	\$	(Dollar Sign)
25	37	%	(Percent)
26	38	&	(Ampersand)
27	39	`	(Single Quote)
28	40	(	(Left / Opening Parenthesis)
29	41	)	(Right / Closing Parenthesis)
2a	42	*	(Asterisk)
2b	43	+	(Plus)
2c	44	,	(Comma)
2d	45	-	(Minus / Dash)
2e	46	.	(Dot)
2f	47	/	(Forward Slash)
30	48	0	
31	49	1	
32	50	2	
33	51	3	
34	52	4	
35	53	5	
36	54	6	
37	55	7	
38	56	8	
39	57	9	
3a	58	:	(Colon)
3b	59	;	(Semi-colon)
3c	60	<	(Less Than)
3d	61	=	(Equal Sign)

Hex	Dec	Char
3e	62	> (Greater Than)
3f	63	? (Question Mark)
40	64	@ (AT Symbol)
41	65	A
42	66	B
43	67	C
44	68	D
45	69	E
46	70	F
47	71	G
48	72	H
49	73	I
4a	74	J
4b	75	K
4c	76	L
4d	77	M
4e	78	N
4f	79	O
50	80	P
51	81	Q
52	82	R
53	83	S
54	84	T
55	85	U
56	86	V
57	87	W
58	88	X
59	89	Y
5a	90	Z
5b	91	[(Left / Opening Bracket)
5c	92	\ (Back Slash)
5d	93	] (Right / Closing Bracket)

Hex	Dec	Char
5e	94	^ (Caret / Circumflex)
5f	95	_ (Underscore)
60	96	' (Grave Accent)
61	97	a
62	98	b
63	99	c
64	100	d
65	101	e
66	102	f
67	103	g
68	104	h
69	105	i
6a	106	j
6b	107	k
6c	108	l
6d	109	m
6e	110	n
6f	111	o
70	112	p
71	113	q
72	114	r
73	115	s
74	116	t
75	117	u
76	118	v
77	119	w
78	120	x
79	121	y
7a	122	z
7b	123	{ (Left/ Opening Brace)
7c	124	(Vertical Bar)
7d	125	} (Right/Closing Brace)
7e	126	~ (Tilde)
7f	127	DEL (Delete)

Appendix E: Parameter Programming Examples

The following examples show you how to program parameters by scanning programming barcodes.

Program the Decode Session Timeout

Example: Set the decode session timeout to 5.0s

1. Scan the **Decode Session Timeout** barcode.
2. Scan the numeric barcodes “5” and “0”.
3. Scan the **Save** barcode.

Program the Timeout between Decodes

Example: Set the timeout between decodes to 5.0s

1. Scan the **Timeout between Decodes** barcode.
2. Scan the numeric barcodes “5” and “0”.
3. Scan the **Save** barcode.

Program the Image Stabilization Timeout

Example: Set the image stabilization timeout to 5.0s

1. Scan the **Image Stabilization Timeout** barcode.
2. Scan the numeric barcodes “5” and “0”.
3. Scan the **Save** barcode.

Program the Sensitivity Level

Example: Set the sensitivity level to 5

1. Scan the **Custom Sensitivity** barcode.
2. Scan the numeric barcode “5”.
3. Scan the **Save** barcode.

Appendix F: Digit Barcodes

0 ~ 5



D 0 0 0 0 0 0

0



D 0 0 0 0 0 1

1



D 0 0 0 0 0 2

2



D 0 0 0 0 0 3

3



D 0 0 0 0 0 4

4



D 0 0 0 0 0 5

5

6~ 9



6



7



8



9

A ~ F



D 0 0 0 0 0 0 A

A



D 0 0 0 0 0 0 B

B



D 0 0 0 0 0 0 C

C



D 0 0 0 0 0 0 D

D



D 0 0 0 0 0 0 E

E



D 0 0 0 0 0 0 F

F

Appendix G: Save/Cancel Barcodes

After reading numeric barcode(s), you need to scan the **Save** barcode to save the data. If you scan the wrong digit(s), you can either scan the **Cancel the Last Digit** barcode and then the correct digit, or scan the **Cancel All Digits** barcode and then the digits you want.

For instance, after reading the **Decode Session Timeout** barcode and numeric barcodes “1”, “2” and “3”, you scan:

- ✧ **Cancel the Last Digit:** The last digit “3” will be removed.
- ✧ **Cancel All Digits:** All digits “123” will be removed.



D 0 0 0 0 0 1 2

Save



D 0 0 0 0 0 1 0

Cancel the Last Digit



D 0 0 0 0 0 1 1

Cancel All Digits

Appendix H: Frequently-Used Serial Commands

Feature	Serial Command
Set baud rate to 9600	7E 00 08 01 00 D9 D3 20 38
Set baud rate to 115200	7E 00 08 01 00 D9 D8 91 53
Save register data in EEPROM	7E 00 09 01 00 00 DE C8
Query the baud rate	7E 00 07 01 00 2A 02 D8 0F

After receiving the Query Baud Rate serial command, the scanner may respond with one of the following messages.

Message	Baud Rate
02 00 00 02 C4 09 SS SS	1200
02 00 00 02 E2 04 SS SS	2400
02 00 00 02 71 02 SS SS	4800
02 00 00 02 39 01 SS SS	9600
02 00 00 02 D0 00 SS SS	14400
02 00 00 02 9C 00 SS SS	19200
02 00 00 02 4E 00 SS SS	38400
02 00 00 02 34 00 SS SS	57600
02 00 00 02 1A 00 SS SS	115200

Note: SS SS: CRC-CCITT checksum.



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