Programming Guide Nuscan 2400 / 4100

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About this manual

Introduction

This manual is intended for setting up your barcode scanner to optimize its performance for your particular application. When the required options have been configured, they remain in the scanner, even after power down. The scanner can be set to factory default by reading the default barcode label.

Caution

Service information

Please read this manual first before using any Adesso barcode scanners. If you need more technical support, please contact us via phone or email.

Web Address: www.adesso.com

Email: support@adesso.com

Manual applies to the following models

Revised version

Revised Date	Version	Description
2012.5.3	V1.1	STM
2013.1.1	V2.1	ADESSO_STM_SIM
2.14.5.27	V2.1.1	Modify the prefix/suffix set mode
2.14.6.25	V2.1.2	Modify the prefix/suffix set mode; Replace the barcode; Complement the background of the code; Delete the reservation instruction content. Typesetting

1. Product Specifications

1.1 Technical parameters

Details can be referred to the related product brochures.

1.2 Barcode default parameters

Type	Read	Check	Check Transmission	Start/End Characters Transmission	Min/ Max Length	ID
EAN13 [n]	√	√	√	X	$(13)^2$	A
EAN8 [n]	√	√	√	X	$(8)^2$	B
UPC-A [n]	√	√	√	X	$(12)^2$	C
UPC-E [n]	√	√	√	X	$(8)^2$	D
CODABAR(NW-7)[n]	√	-	√	-	4~70	E
CODE 39 [n]	√	-	√	-	3~50	F
CODE 93 [n]	√	√	√	X	1~80	G
INTERLEAVED 2OF5 [n]	√	-	√	X	4~80	H
STANDARD 2OF5	-	-	√	X	4~80	I
MATRIX 2OF5	-	X	X	X	6~80	J
CODE 128 [n]	√	√	-	X	1~80	K
EAN/UCC 128 [n]	√	√	-	X	1~80	L
CODE 11	-	√	-	X	4~80	M
CHINESE POST	-	X	X	X	6~80	N

Note：
1. “√” means default enable, “-” means default disable, “×” means parameter of this barcode type does not exist;
2. The min/max length of barcode noted with “2” means the length of barcode is fixed length;
3. The type of barcode noted with “n” means support negative barcode decode.

1.3 Interface specifications

All Netum readers can be equipped with USB Keyboard, TTL/RS232 (DB9 female), RS485 (DB9 male), PS2 keyboard or any other customized interfaces. Different product's standard interface is different. So please confirm it before purchase. Other interfaces can be customized according to customer's demand.

1.3.1 Scan module interface CMOS

Pin No.	Name	Type	Description
1	NC	Null	Reserved
2	VCC	DC Power	DC3.3V or DC5V (according to different modules) ±5%
3	GND	Digital	GND
4	Rx	Input	COM input port TTL level
5	Tx	Output	COM output port TTL level
6	NC	Null	Reserved
7	NC	Null	Reserved
8	NC	Null	Reserved
9	BPR	Output	Buzzer good read will be activated and output frequency is 3K for 150ms if decoding successfully. Output low level when idle.
10	LED	Output	LED good read will be activated and output low level if decoding successfully.
11	NC	Null	Reserved
12	TRIG	Input	Trigger scan

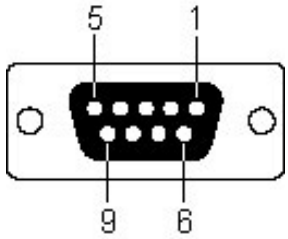
1.3.2 Scan engine interface without decoding

Interface circuit is a ZIP (0.5mm-8p) interface which communicates with outside world. It's the microprocessor that controls the scan engine's work and takes the data to decode.

Pin NO.	Pin Name	Description
1、2	GND	Ground
3	SOS	Scan starting signal: When the laser line reaches the edge, the signal will transform from high to low or from low to high in order to detect the start and finish of a scan.
4	DATA	The width of the DATA signal stands for the width of black and white bars. The output is CMOS level. High level=Bars, Low level=Spaces
5	TRIG	Allowing Trigger scanning signal: TRIG=High: The scan engine will enter a power-saving mode; TRIG=Low: The scan circuit will be activated to the ready state.
6	LASER-EN	Activation signal LASER-EN=High or not connected: The laser will be closed; LASER-EN=Low and TRIG=Low: The scan engine circuit will be activated and ready to scan barcodes. The laser will open.
7	IR-TRIG	Optional, IR trigger pin, only for WSL3000
8	VCC	Power Supply: DC 5V

1.3.3 Standard serial port (DB9)

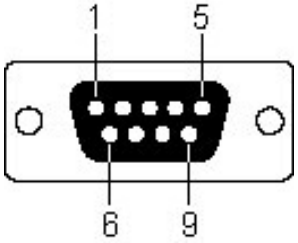
NO.	Function
1	Trigger(optional)
2	Rx
3	Tx
5	GND
9	DC 5V(optional)



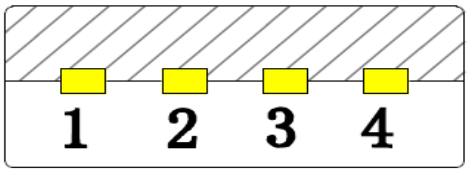
When pin 1 receives low level for 10ms, it means trigger and scan. (optional)

Pin 6 is only used in trigger mode. It will output low level for 100ms if it detects no barcode after trigger. (value added service)

1.3.4 RS485 interface

NO.	Function	
1	Trigger(optional)	
3	A+	
8	B-	
5	GND	
9	DC 5V(optional)	

1.3.5 USB interface

NO.	Function	
1	VCC	
2	D-	
3	D+	
4	GND	

1.3.6 PS2 Keyboard wedge

Omission

2. Command instructions

2.1 Barcode command instructions

A. Command barcodes are printed via Code 128 CODE B barcode set. Command barcode is same as serial port command value（Detail as Chart 2.2-1）.

B. Note with "*" means factory default parameter.

(a) "%SET": Enter setting mode; It will drop out setting mode automatically if it not scans next command barcode in 30s;
(b) Modify parameters command: It can scan one or several command barcodes;
(c) "%END": Save & Exit.

2.2 Serial port command instructions

Table 2.2-1 Serial Port Command Data Format

Length	Message Source	Message target	Reserve	Opcode	Command	Beeper	Check Sum

Table 2.2-2 Serial Port Command Data Analysis

Field	Format	Sub-Field	Description
Length	1 Byte	Length	Command length, excluding Check Sum, maximum value is 0xFF.
Message Source	1 Byte	0x04=Host (PC or industrial computer); 0x31= Decoder (barcode scanner)	Command source
Message target	1 Byte	0x04=Host (PC or industrial computer); 0x31=Decoder (barcode scanner)	Command target address
Reserve	1Byte	Reserved (0x00)	
Opcode	1Byte		Op-code command function table
Command	Variable number of bytes		
Beeper	1 Byte	0x31=Enable 0xFF=Disable	Buzzer status
Check Sum	2 Byte		Message check sum format High byte low byte

Note:

1. Check Sum: Radix complement of command sum, high byte in the beginning and low byte in the end.

Check digit calculation method: Adding up all bytes to get sum before checking (excluding two check digit bytes). Check digit value=Sum reversed as per digit then add one.

Example: Save & Exit (0A 04 31 00 24 25 45 4E 44 FF) adding up to obtain the sum: 02 5E, switch to binary (0000 0010 0101 1110), then reverse (1111 1101 1010 0001), finally add one is check digit (FD A2).

2. When Command uses character in the following data format pack (prefix excluding “0x”) and be sent via serial port command, it should switch character to Hex of ASCII code accordingly.

2.3 Command table

Table 2.3-1 Command table

Name	Opcode	Description	Barcode comman[1]	Serial port comman[2]	Serial port respond[3]
SET	0x24	Enter setting mode	√	X	X
END	0x24	Save & Exit[6]	√	√	√
TRIGGER_SCAN	0x26	Trigger scan	X	√	√+barcode[4]
STOP_SCAN	0x27	Stop scan	√	√	√
FACTORY_DEFAULTS	0x28	Restore factory default	√	√	√
CUSTOM_DEFAULTS	0x29	Restore user default	√	√	√
WR_CUSTOM_DEFAULTS	0x2A	Write user default	√	√	√
READ_REVISION	0x2B	Read product software version	√	√	√+software version[5]
PARAM_MODIFY	0x50	Modify parameter value	√	√	√
OPEN_BEEPER	0x31	Open buzzer	X	√	X
ACK	0x3F	Handshaking	X	√	X

Note：
1. Whether to support the barcode command setting;
2. Whether to support to send command setting via serial port;
3. Whether it is necessary for the scanner to respond when it allowed to answer;
4. Scanner will respond and return the ASCII code of the barcode characters if read successfully;
5. Scanner will respond first and then return the software version when allowed replying;
6. Save settings.

2.4 Quick command (HEX format)

Quick command can be used in the following conditions:
Message Source=0x04 (PC or Industrial Computer);
Message target=0x31 (barcode scanner 0x31);
Beeper=0xFF (Closed).

Table 2.4-1 Host to Scanner

Function	Command(HEX format)
Common command:	
Save & Exit (%END)	0A 04 31 00 24 **25 45 4E 44** FF FD A2
Trigger scan (LT)	08 04 31 00 26 **4C 54** FF FD FE
Stop scan (LS)	08 04 31 00 27 **4C 53** FF FD FE
Restore factory default (DF)	08 04 31 00 28 **44 46** FF FE 12
Restore user default (DC)	08 04 31 00 29 **44 43** FF FE 14
Write user default (WC)	08 04 31 00 2A **57 43** FF FE 00
Read product batch version (RV)	08 04 31 00 2B **52 56** FF FD F1
Modify parameter command:	
Single read (F0000)	0B 04 31 00 50 **46 30 30 30 30** FF FD 6B
Continuous read (F0001)	0B 04 31 00 50 **46 30 30 30 31** FF FD 6A
Disable repeat read (F0100)	0B 04 31 00 50 **46 30 31 30 30** FF FD 6A
Enable repeat read (F0101)	0B 04 31 00 50 **46 30 31 30 31** FF FD 69
Multiple read (F0102)	0B 04 31 00 50 **46 30 31 30 32** FF FD 68
TTL/RS232 output (A0000)	0B 04 31 00 50 **41 30 30 30 30** FF FD 70
USB HID Keyboard output (A0001)	0B 04 31 00 50 **41 30 30 30 31** FF FD 6F
Disable respond (E0000)	0B 04 31 00 50 45 30 30 30 30 FF FD 6C
Enable respond (E0001)	0B 04 31 00 50 45 30 30 30 31 FF FD 6B
Disable transmit NR (G0000)	0B 04 31 00 50 47 30 30 30 30 FF FD 6A
Enable transmit NR (G0001)	0B 04 31 00 50 47 30 30 30 31 FF FD 69
Enable transmit NR (protocol) (G0002)	0B 04 31 00 50 47 30 30 30 32 FF FD 68
Disable read all barcodes (I1000)	0B 04 31 00 50 **49 31 30 30 30** FF FD 67
Enable read all barcodes (I1001)	0B 04 31 00 50 **49 31 30 30 31** FF FD 66

Table 2.4-2 Scanner to Host

Function	Command(HEX format)
Respond if setting succeed	07 31 04 00 01 06 FF FE BE
Respond if setting fail	07 31 04 00 01 15 FF FE AF
Enable transmit NR (protocol)	08 31 04 00 02 4E 52 FF FE 22

3. General command data format

3.1 SET & END

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0A	0x04	0x31	0x00	0x24	%END		

Command:

Enter setting mode	%SET	
Save & Exit	%END	

3.2 Defaults parameter

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x08	0x04	0x31	0x00				

Command:

	Opcode	%SET	
Restore factory default	0x28	DF	
Restore user default	0x29	DC	
Write user default[1]	0x2A	WC	
		%END	
Note: 1. Setting “Write user default” will automatically set with “%**END**”.			

3.3 TRIGGER_SCAN & STOP_SCAN

Data format：

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x08	0x04	0x31	0x00				

Command:

	Opcode	%SET	
Trigger scan	0x26	LT	
Stop scan	0x27	LS	
		%END	

3.4 Version

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x08	0x04	0x31	0x00	0x2B			

Command:

	%**SET**	
Read product batch version	RV	
Read product bootload version	RB	
	%**END**	

3.5 OPEN_BEEPER

Field	Format	Sub-Field	Description

Data format:

Table 3.5-1

Field	Sub-Field	Description
Length	0x0F	Command length, excluding Check Sum
Message Source	0x04	0x04=Host (PC or Industrial Computer)
Message target	0x31	0x31=Decoder (barcode scanner)
Reserve	0x00	Reserved
Opcode	0x31	OPEN_BEEPER
Command	0x2F	Fixed(/)
	Beeper Type	Sound type (0x01~0x03)
	First Frequency	Sound 1 Frequency (0x00~0x08) refer chart 3.5-2
	first_x25ms	Sound 1 time based on 25ms (0x00~0xFF)
	Second Frequency	Sound 2 Frequency (0x00~0x08) refer chart 3.5-2
	second_x25ms	Sound 2 Time based on 25ms (0x00~0xFF)
	Third Frequency	Sound 3 Frequency (0x00~0x08) refer chart 3.5-2
	third_x25ms	Sound 3 time based on 25ms (0x00~0xFF)
	Between Stop Beeper_x25ms	Stop time between each sound of type 2 or 3
Beeper	0xFF	Reserved
Check Sum	2 byte	
Note: Different Command value can produce different sound.		

Table 3.5-2

Value	Frequency
0x00	BEEPER_1350Hz
0x01	BEEPER_1500 Hz
0x02	BEEPER_1700 Hz
0x03	BEEPER_2000 Hz
0x04	BEEPER_2300 Hz
0x05	BEEPER_2500 Hz
0x06	BEEPER_2700 Hz
0x07	BEEPER_3100 Hz
0x08	BEEPER_3500 Hz

Example 1 (hex): ring 3 times

Sound 1 (2500Hz), last for 100ms; sound 2 (1500Hz), last for 100ms; sound 3 (2500Hz), last for 100ms; stop time between each sound is 250ms.
Setting command: 0F 04 31 00 31 2F **03 05 04 01 04 05 04 0A** FF FE 39

Example 2 (hex): ring once

Sound 1 (2500Hz), last for 250ms; sound 2 (1350Hz), last for 0ms; sound 3 (1350Hz), last for 0ms; stop time between each sound is 0ms.
Setting command: 0F 04 31 00 31 2F **01 05 0A 00 00 00 00 00** FF FE 4D
If set to ring once, the frequency of sound 2 and 3 will be invalid; last time and stop time between each sound should be set at 0ms.

3.6 ACK Handshaking

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x07	0x04	0x31	0x00	0x3F	0x2F		

Scanner->Host: handshaking respond (protocol) data format:

Length	Message Source	Message target	Reserve	Opcode	data	beeper	Check Sum
0x0D	0x31	0x04	0x00	0x3F	ND-V201	0xFF	

Example (hex):

Host->Scanner: 07 04 31 00 3F 2F FF FE 57
Scanner->Host: 0D 31 04 00 3F 4E 44 2D 56 32 30 31 FF FC D8

4. Modify parameters command

4.1 Data output mode

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command：

	%SET	
***TTL/RS232**	**A0000**	
***USB HID Keyboard**	**A0001**	
USB virtual com port	A0002	
USB HID communication	A0003	
RS485	A0004	
PS2 Keyboard	A0005	
	%END	

4.2 Keyboard language

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
***US**	**A0100**	
French	A0101	
German	A0102	
Turkish	A0103	
Belgian	A0104	
Brazil	A0105	
	%**END**	

4.3 Buzzer & LED control

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
Disable boot buzzer	B0000	
***Enable boot buzzer**	**B0001**	
Disable good read buzzer	B0100	
***Enable good read buzzer**	**B0101**	
Buzzer volume: low	B0200	
***Buzzer volume: Medium**	**B0201**	
Buzzer volume: high	B0202	
Disable barcode set buzzer	B0300	
***Enable barcode set buzzer**	**B0301**	
	%**END**	

4.4 Serial port setting

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

The baud rate is the rate at which bits are transmitted from the reader to the host, and vice verse. Both the reader and the host should be set to the same baud rate.

The data characters may be transferred in one of the following formats:

A parity bit may be added to every character so that the total number of 1's in the data bits, together with the parity bit, is odd for odd parity or even for even parity.

Command:

	%SET	
2400 baud	C0000	
4800 baud	C0001	
***9600 baud**	**C0002**	
19200 baud	C0003	
38400 baud	C0004	
57600 baud	C0005	
115200 baud	C0006	
7 data bits	C0100	
***8 data bits**	**C0101**	
***1 stop bit**	**C0200**	
2 stop bit	C0201	
***No parity**	**C0300**	

Odd parity	C0301	
Even parity	C0302	
	%**END**	

4.5 Serial port respond

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command：

	%SET	
***Disable respond**	**E0000**	
Enable respond	E0001	
	%END	

Decode respond data format:

Length	Message Source	Message target	Reserve	Opcode	Command	Beeper	Check Sum
0x07	0x31	0x04	0x00	0x01		0xFF	
Note: Command = 0x06 means serial port command setting succeed; Command = 0x15 means serial port command setting fail.							

Example:

Setting succeed: 07 31 04 00 01 **06** FF FE BE
Setting fail: 07 31 04 00 01 **15** FF FE AF

Note: This function only supports TTL/RS232 serial port mode.

4.6 Transmit “No Read” Message

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	Beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
***Disable transmit NR**	**G0000**	
Enable transmit NR	G0001	
Enable transmit NR (protocol)	G0002	
	%**END**	

Decode-> Host: Enable transmit NR (protocol) data format:

Length	Message Source	Message target	Reserve	Opcode	data	beeper	Check Sum
0x08	0x31	0x04	0x00	0x02	NR	0xFF	

Example:

08 31 04 00 02 **4E 52** FF FE 22

Note: This function only supports TTL/RS232 serial port mode.

4.7 Power mode

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	Beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
Regular power consumption	E0100	
Low power consumption	E0101	
	%**END**	

4.8 Trigger mode & read mode

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
***Single read**	**F0000**	
Continuous read	F0001	
Disable repeat read	F0100	
***Enable repeat read**	**F0101**	
Multiple read	F0102	
	%**END**	

Note:

1. Trigger mode:

Single read: When a bar code has been decoded, the reader will be turned off. The reader must be triggered again to read another label. It can be triggered via button, serial port or auto trigger.

Continuous read: The reader will produce as much data as it can decode regardless whether it is the same or not. This mode is mainly used for demonstration and diagnosis.

2. Read mode:

Disable repeat read: Disable continue to read the same barcode.

Enable repeat read: Enable continue to read the same barcode.

Multiple read: The same label can only be decoded again after the label has not been detected for a number of scans. This mode can only be programmed in Continuous read trigger mode.

4.9 Delay for repeating to read the same barcode

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	Beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
***0ms**	**F0200**	
100ms	F02**01**	
200ms	F02**02**	
500ms	F02**05**	
900ms	F02**09**	
1000ms	F02**10**	
1500ms	F02**15**	
2000ms	F02**20**	
9900ms	F02**99**	
	%**END**	
Note: The last two digits of command are decimal number. Minimum is 00 and maximum is 99. Multiple is 100ms.		

4.10 Light delay after triggering the scanner caused by the trigger pin

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	Beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
***0ms**	**F0300**	
100ms	F03**01**	
200ms	F03**02**	
500ms	F03**05**	
900ms	F03**09**	
1000ms	F03**10**	
1500ms	F03**15**	
2000ms	F03**20**	
4000ms	F034**0**	
6000ms	**F0360**	
9900ms	F03**99**	
	%**END**	

Note:
1. The last two digits of command are decimal number. Minimum is 00 and maximum is 99. Multiple is 100ms.
2. When trigger scan waiting time is 0ms with low level signal, it will continuously scan unless decode or high level signal. There will be no overtime under this condition.
3. When trigger scan waiting time is not 0ms, it will start to scan with low level signal. It will automatically time out and stop scanning if not decode in the required waiting time.

4.11 Light delay after triggering the scanner caused by the serial port commands/auto trigger

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
100ms	F04**01**	
200ms	F04**02**	
500ms	F04**05**	
900ms	F04**09**	
1000ms	F04**10**	
1500ms	F04**15**	
2000ms	F04**20**	
***4000ms**	**F0440**	
6000ms	F0460	
9900ms	F04**99**	
	%**END**	

Note:
1. The last two digits of command are decimal number. Minimum is 00 and maximum is 99. Multiple is 100ms.
2. Scanner will scan if receive serial port command or auto trigger. It will stop scanning automatically if decode or time out. It will modify timeout to 6000ms automatically if set at 0ms.

4.12 Laser mode & Swing plate boot mode

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%SET	
***Standard mode**	**F0500**	
High detection mode	F0501	
Low detection mode 1	F0502	
Low detection mode 2	F0503	
***Trigger swing**	**F0600**	
Power swing	F0601	
	%END	

Note:

1. Laser mode: This mode only supports specified laser scan engine.

Standard mode: This mode satisfies the scanning performance described in the product specification.

High detection mode: It broadens the frequency characteristics of analog signal processing and sets the detection range high at the same time. It is the highest detection mode that improves scanning performance of hardly modulated barcodes (meaning modulation of contrast within one barcode).

Low detection mode 1: It lowers the detection range and prevents the scanning performance from degrading by noise. It mainly improves scanning performance of low PCS and low resolution barcodes from the long distance.

Low detection mode 2: It narrows the frequency characteristics of analog signal processing and sets the detection range low at the same time. It is the lowest detection mode that improves blemished or heavily defective barcodes (meaning spots and voids within the barcode).

2. Swing plate boot mode: This mode is used to control working status of laser head swing plate via TRIGGER pin signal.

Trigger swing: Enable swing when trigger scanning barcode (TRIGGER low level). Disable swing when turn off scanning (TRIGGER high level).

Power swing: It will swing continuously as long as the laser head is powered on.（TRIGGER low level).

4.13 Auto trigger

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%**SET**	
Disable	H0000	
***Enable**	**H0001**	
	%**END**	

4.14 Barcode setting

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

1 Byte	3 byte
Barcode ID	Command data

4.14.1 EAN13 & UPC-A

The EAN13 symbology is a fixed length symbology encoding 12 data digits, a check digit and non printable start/stop characters. The following characters are supported: the digits 0 up to 9.

The UPC-A symbology is a fixed length symbology encoding 11 data digits, a check digit and non printable start/stop characters. The following characters are supported: the digits 0 up to 9.

An optional leading zero can be transmitted, which together with the data and the check digit forms a 13 digit field providing compatibility with the EAN13 format.

Command:

	%**SET**	
Disable	IA000	
***Enable**	**IA001**	
Disable Read	IC000	
***Enable Read**	**IC001**	
	%**END**	

4.14.2 EAN8

The EAN8 symbology is a fixed length symbology encoding 7 data digits, a check digit and non printable start/stop characters. The following characters are supported: the digits 0 up to 9.

Command:

	%**SET**	
Disable	IB000	
***Enable**	**IB001**	
	%**END**	

4.14.3 UPC-E

The UPC-E symbology is a fixed length symbology encoding 6 data digits, a check digit and non printable start/stop characters. The following characters are supported: the digits 0 up to 9.

An optional leading digit can be transmitted, which together with the data and the check digit forms a 8 digit field providing compatibility with the EAN8 format.

Command :

	%**SET**	
Disable	ID000	
***Enable**	**ID001**	
Enable UPC-E convert to UPC-A	ID100	
***Disable UPC-E convert to UPC-A**	**ID101**	
	%**END**	

4.14.4 CODABAR (NW-7)

Codabar (NW-7) is a variable length symbology with an optional check digit and printable start/stop characters. The next characters are supported: the digit 0 up to 9; the characters “-”, “$”, “:”, “/”, “.”, “+”; start/stop characters are A, B, C, D.

The checksum is calculated as the sum modulo 16 of the numerical values of all data characters.

Command:

	%**SET**	
Disable	**IE000**	
***Enable**	IE001	
***Not Transmit ST/SP**	**IE100**	
Transmit ST/SP: ABCD	IE101	
Transmit ST/SP: abcd	IE102	
Transmit ST/SP: TN*E	IE103	
***Not Check CD**	**IE200**	
Check CD	IE201	
Not Transmit CD	IE300	
***Transmit CD**	**IE301**	
***Min barcode length**	**IE804**	
***Max barcode length**	**IE970**	
	%**END**	
Note: Min/Max barcode length includes barcode prefix/suffix (ABCD/abcd/TN*E).		

Codabar Min/Max barcode length

	%**SET**	
Min barcode length(5)	IE805	
Min barcode length(6)	IE806	
Min barcode length(7)	IE807	
Min barcode length(8)	IE808	
Min barcode length(10)	IE810	
Min barcode length(12)	IE812	
Min barcode length(14)	IE814	
Min barcode length(16)	IE816	
Max barcode length(10)	IE910	
Max barcode length(12)	IE912	
Max barcode length(14)	IE914	
Max barcode length(16)	IE916	
Max barcode length(18)	IE918	
Max barcode length(20)	IE920	
Max barcode length(22)	IE922	
Max barcode length(24)	IE924	
	%**END**	

4.14.5 CODE 39

Code 39 is a variable length symbology with an optional check digit and printable start/stop characters. The following characters are supported: the digit 0 up to 9; the upper case characters A up to Z; the characters “-”, “$”, “%”, “/”, “.”, “+”, SPACE; start/stop character is “*”.

The checksum is calculated as the sum modulo 43 of the numerical values of the data characters. In full ASCII mode, all 128 ASCII characters are supported. This is done by combining one of the characters “$”, “%”, “+” or “/” with one of the alpha characters (A up to Z).

Command:

	%**SET**	
Disable	IF000	
***Enable**	**IF001**	
***Not Transmit ST/SP**	**IF100**	
Transmit ST/SP: *	IF101	
***Not Check CD**	**IF200**	
Check CD	IF201	
Not Transmit CD	IF300	
***Transmit CD**	**IF301**	
***Disable Full ASCII code39**	**IF400**	
Enable Full ASCII code39	IF401	
***Min barcode length**	**IF803**	
***Max barcode length**	**IF950**	
***Disable Code39 convert to Code32 (Italian Pharmacode)**	**IF500**	
Enable Code39 convert to Code32 (Italian Pharmacode)	IF501	

***Code32 Not Transmit ST: A**	**IF600**	
Code32 Transmit ST: A	IF601	
Code32 Not Transmit CD	IF700	
***Code32 Transmit CD**	**IF701**	
	%**END**	

Code 39 Min/Max barcode length

	%**SET**	
Min barcode length(5)	IF805	
Min barcode length(6)	IF806	
Min barcode length(7)	IF807	
Min barcode length(8)	IF808	
Min barcode length(10)	IF810	
Min barcode length(12)	IF812	
Min barcode length(14)	IF814	
Min barcode length(16)	IF816	
Max barcode length(10)	IF910	
Max barcode length(12)	IF912	
Max barcode length(14)	IF914	
Max barcode length(16)	IF916	
Max barcode length(18)	IF918	
Max barcode length(20)	IF920	
Max barcode length(22)	IF922	
Max barcode length(24)	IF924	
	%**END**	

4.14.6 CODE 93

Code 93 is a variable length symbology with 2 mandatory check digits and non printable start/stop characters. The following characters are supported: the digit 0 up to 9; the upper case characters A up to Z; the characters “-”, “$”, “%”, “/”, “.”, “+”, SPACE; 4 non printable shift characters.

The first check digit (C) is the modulo 47 sum of the weighted data character values. The second check digit (K) is the modulo 47 sum of the weighted data character values including the first check digit (C). The check digits are not transmitted.

The special shift characters are control characters and are not transmitted with the data. If one of these characters is followed by an upper case character “A” up to “Z”, it is transmitted as 1 single character. In case of an invalid combination, the label is rejected. This method enables support for full 128 ASCII characters encodation. The encodation is compatible with the Code 39 “$”, “%”, “/” and “+” characters.

Command:

	%**SET**	
Disable	**IG000**	
***Enable**	**IG001**	
***Not Transmit CD**	**IG100**	
Transmit CD	IG101	
***Min barcode length**	**IG801**	
***Max barcode length**	**IG980**	
	%**END**	

Code 93 Min/Max barcode length

	%**SET**	
Min barcode length(2)	IG802	
Min barcode length(4)	IG804	
Min barcode length(6)	IG806	
Min barcode length(8)	IG808	
Min barcode length(10)	IG810	
Min barcode length(12)	IG812	
Min barcode length(14)	IG814	
Min barcode length(16)	IG816	
Max barcode length(10)	IG910	
Max barcode length(12)	IG912	
Max barcode length(14)	IG914	
Max barcode length(16)	IG916	
Max barcode length(18)	IG918	
Max barcode length(20)	IG920	
Max barcode length(22)	IG922	
Max barcode length(24)	IG924	
	%**END**	

4.14.7 INTERLEAVED 2 OF 5

This symbology encodes a pair of digits in each symbol. The number of digits is therefore always an even number. Information is carried in the bars and spaces. The start and stop pattern are not unique inside the code. It is therefore essential to use the fixed length option to prevent partial reads.

Command:

	%**SET**	
Disable	IH000	
***Enable**	**IH001**	
***Not Check CD**	**IH100**	
Check CD	IH101	
Not Transmit CD	IH200	
***Transmit CD**	**IH201**	
***Min barcode length**	**IH804**	
***Max barcode length**	**IH970**	
	%**END**	

Interleaved 2 of 5 Min/Max barcode length

	%**SET**	
Min barcode length(5)	IH805	
Min barcode length(6)	IH806	
Min barcode length(7)	IH807	
Min barcode length(8)	IH808	
Min barcode length(10)	IH810	
Min barcode length(12)	IH812	
Min barcode length(14)	IH814	
Min barcode length(16)	IH816	
Max barcode length(10)	IH910	
Max barcode length(12)	IH912	
Max barcode length(14)	IH914	
Max barcode length(16)	IH916	
Max barcode length(18)	IH918	
Max barcode length(20)	IH920	
Max barcode length(22)	IH922	
Max barcode length(24)	IH924	
	%**END**	

4.14.8 STANDARD 2 of 5 (Industrial 2 of 5)

This symbology encodes a single digit in each data symbol. Information is carried in the bars and spaces.

Command:

	%**SET**	
***Disable**	**II000**	
Enable	II001	
***Not Check CD**	**II100**	
Check CD	II101	
Not Transmit CD	II200	
***Transmit CD**	**II201**	
***Min barcode length**	**II804**	
***Max barcode length**	**II970**	
	%**END**	

Standard 2 of 5 (Industrial 2 of 5) Min/Max barcode length

	%**SET**	
Min barcode length(5)	II805	
Min barcode length(6)	II806	
Min barcode length(7)	II807	
Min barcode length(8)	II808	
Min barcode length(10)	II810	
Min barcode length(12)	II812	
Min barcode length(14)	II814	
Min barcode length(16)	II816	
Max barcode length(10)	II910	
Max barcode length(12)	II912	
Max barcode length(14)	II914	
Max barcode length(16)	II916	
Max barcode length(18)	II918	
Max barcode length(20)	II920	
Max barcode length(22)	II922	
Max barcode length(24)	II924	
	%**END**	

4.14.9 MATRIX 2 of 5

This symbology encodes 1 digit in each character. The number of digits can therefore be an odd or an even number. Information is carried in the bars and spaces.

Command:

	%SET	
***Disable**	**IJ000**	
Enable	IJ001	
***Min barcode length**	**IJ806**	
***Max barcode length**	**IJ970**	
Min barcode length(8)	IJ808	
Min barcode length(10)	IJ810	
Min barcode length(12)	IJ812	
Min barcode length(14)	IJ814	
Max barcode length(10)	IJ910	
Max barcode length(12)	IJ912	
Max barcode length(14)	IJ914	
Max barcode length(16)	IJ916	
Max barcode length(18)	IJ918	
	%END	

4.14.10 CODE 128 & EAN/UCC 128

Code 128 is a variable length symbology with a mandatory check digit and non printable start/stop characters. The following characters are supported : all 128 ASCII characters; 4 non data function characters; 3 start characters; 4 code set selection characters ; 1 stop character.

The check digit is calculated as the sum modulo 103 of the start character and the weighted values of the data and special characters.

EAN/UCC 128, also kownn as GS1-128, is a variant of the Code 128 symbology. EAN/UCC 128 data starts with the FNC1 character and separates 2 data fields with the FNC1 character.

Command :

	%SET	
Disable	IK000	
***Enable**	**IK001**	
Disable EAN/UCC 128	IL000	
***Enable EAN/UCC 128**	**IL001**	
***Not Transmit CD**	**IK100**	
Transmit CD	IK101	
***Min barcode length**	**IK801**	
***Max barcode length**	**IK980**	
	%END	

Code 128 & EAN/UCC128 Min/Max barcode length

	%**SET**	
Min barcode length(4)	IK804	
Min barcode length(6)	IK806	
Min barcode length(7)	IK807	
Min barcode length(8)	IK808	
Min barcode length(10)	IK810	
Min barcode length(12)	IK812	
Min barcode length(14)	IK814	
Min barcode length(16)	IK816	
Max barcode length(10)	IK910	
Max barcode length(12)	IK912	
Max barcode length(14)	IK914	
Max barcode length(16)	IK916	
Max barcode length(18)	IK918	
Max barcode length(20)	IK920	
Max barcode length(22)	IK922	
Max barcode length(24)	IK924	
	%**END**	

4.14.11 CODE 11

Code 11 is a variable length symbology with 1 or 2 optional check digits and non printable start/stop character. If the data is 10 or less characters, one check digit is used. If the data is more than 10 characters, then 2 check digits are used. The following characters are supported: the digits 0 up to 9; the dash character "-".

The first check digit is the modulo 11 sum of the weighted data character values. The second check digit is the modulo 11 sum of the weighted data character values including the first check digit. The check digits are not transmitted.

Command:

	%**SET**	
***Disable**	**IM000**	
Enable	IM001	
Not Check CD	IM100	
***Check CD(one byte)**	**IM101**	
Check CD(two bytes)	IM102	
Not Transmit CD	IM200	
***Transmit CD**	**IM201**	
***Min barcode length**	**IM804**	
***Max barcode length**	**IM970**	
	%**END**	

Code 11 Min/Max barcode length

	%**SET**	
Min barcode length(5)	IM805	
Min barcode length(6)	IM806	
Min barcode length(7)	IM807	
Min barcode length(8)	IM808	
Min barcode length(10)	IM810	
Min barcode length(12)	IM812	
Min barcode length(14)	IM814	
Min barcode length(16)	IM816	
Max barcode length(10)	IM910	
Max barcode length(12)	IM912	
Max barcode length(14)	IM914	
Max barcode length(16)	IM916	
Max barcode length(18)	IM918	
Max barcode length(20)	IM920	
Max barcode length(22)	IM922	
Max barcode length(24)	IM924	
	%**END**	

4.14.12 CHINESE POST

Command:

	%SET	
***Disable**	**IN000**	
Enable	IN001	
***Min barcode length**	**IN806**	
***Max barcode length**	**IN970**	
Min barcode length(8)	IN808	
Min barcode length(10)	IN810	
Min barcode length(12)	IN812	
Min barcode length(14)	IN814	
Max barcode length(10)	IN910	
Max barcode length(12)	IN912	
Max barcode length(14)	IN914	
Max barcode length(16)	IN916	
Max barcode length(18)	IN918	
	%END	

4.14.13 Set Positive/Negative Barcodes

Usually barcodes are printed black on white, but sometimes white on black. These labels are called positive and negative respectively. In case the “negative barcodes” option has been selected, positive labels may not be decoded anymore or with difficulty. This also applies to menu labels. To enable the reader to read positive labels again, a number of negative menu labels have been included.

Command:

	%SET	
Positive bar codes	**I1100**	
Negative bar codes	I1101	
Positive and negative bar codes	I1102	
	%END	
	%SET	
Positive bar codes	**I1100**	
Negative bar codes	I1101	
Positive and negative bar codes	I1102	
	%END	

4.14.14 All barcodes setting

Command:

	%SET	
Disable All barcodes	I1000	
Enable All barcodes	I1001	
	%END	

4.15 Case control

Command:

	%**SET**	
***No case conversion**	**I1200**	
Convert to upper case	I1201	
Convert to lower case	I1202	
	%**END**	

4.16 Set prefix

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%SET	
***Disable prefix**	**J1000**	
Space	J1001	
AIM + barcode	J1002	
ID + barcode	J1003	
ID + user-defined prefix + barcode	J1006	
User-defined prefix + ID + barcode	J1007	
User-defined prefix + barcode	J1008	
	%END	

Note:
How to set user-defined prefix:
1. Set prefix mode;
2. Enter user-defined prefix mode;
3. Set user-defined prefix code (ASCII code).(Please see 4.18 for further information)

Example: Sets the prefix of the barcode "1234567" to "#Ab9", namely the output barcode is "#Ab91234567".

1. The prefix mode is set to "User-defined prefix + barcode";
2. Enter user-defined prefix mode, then scan the barcode of "#", "A", "b" and "9" successively.

4.17 Set suffix

Data format:

Length	Message Source	Message target	Reserve	Opcode	Command	beeper	Check Sum
0x0B	0x04	0x31	0x00	0x50			

Command:

	%SET	
***Disable suffix**	**J2000**	
0x0D as suffix	J2001	
0x0A as suffix	J2002	
0x0D 0x0A as suffix	J2003	
Tab(0x09) as suffix	J2004	
Tab(0x09) 0x0D as suffix	J2005	
barcode + user-defined suffix	J2006	
barcode + user-defined suffix + 0x0D	J2007	
barcode + user-defined suffix + 0x0A	J2008	
barcode + user-defined suffix + 0x0D 0x0A	J2009	
barcode + user-defined suffix + Tab(0x09)	J200A	
	%END	

Note:
How to set user-defined suffix:
1. Set suffix mode;
2. Enter user-defined suffix mode;
3. Set user-defined suffix code (ASCII code). (Please see 4.18 for further information)

Example: Sets the suffix of the barcode "1234567" to "%B", namely the output barcode is "1234567%B".

1. The suffix mode is set to "barcode + user-defined suffix";
2. Enter user-defined prefix mode, then scan the barcode of "%", "B" successively.

4.18 Customize prefix/suffix

Command:

	%**SET**	
Enter user-defined prefix mode	JA100	
Enter user-defined suffix mode	JA200	
Control character	**Hex**	
^@ (NULL)	00	
^A (SOH)	01	
^B (STX)	02	
^C (ETX)	03	
^D (EOT)	04	
^E (ENQ)	05	
^F (ACK)	06	
^G (BEL)	07	
^H (BS)	08	
^I (HT)	09	
^J (LF)	0A	
^K (VT)	0B	
^L (FF)	0C	
^M (CR)	0D	

^N (SO)	0E	
^O (SI)	0F	
^P (DLE)	10	
^Q (DC1)	11	
^R (DC2)	12	
^S (DC3)	13	
^T (DC4)	14	
^U (NAK)	15	
^V (SYN)	16	
^W (ETB)	17	
^X (CAN)	18	
^Y (EM)	19	
^Z (SUB)	1A	
^[(ESC)	1B	
^\ (FS)	1C	
^] (GS)	1D	
^^ (RS)	1E	
^_ (US)	1F	
SPC	20	

Character	Hex	
!	21	
"	22	
#	23	
$	24	
%	25	
&	26	
'	27	
(	28	
)	29	
*	2A	
+	2B	
,	2C	
-	2D	
.	2E	
/	2F	
0	30	
1	31	
2	32	
3	33	

4	34	
5	35	
6	36	
7	37	
8	38	
9	39	
:	3A	
;	3B	
<	3C	
=	3D	
>	3E	
?	3F	
@	40	
A	41	
B	42	
C	43	
D	44	
E	45	
F	46	
G	47	

H	48	
I	49	
J	4A	
K	4B	
L	4C	
M	4D	
N	4E	
O	4F	
P	50	
Q	51	
R	52	
S	53	
T	54	
U	55	
V	56	
W	57	
X	58	
Y	59	
Z	5A	
[	5B	

\	5C	
]	5D	
^	5E	
_	5F	
`	60	
a	61	
b	62	
c	63	
d	64	
e	65	
f	66	
g	67	
h	68	
i	69	
j	6A	
k	6B	
l	6C	
m	6D	
n	6E	
o	6F	

p	70	
q	71	
r	72	
s	73	
t	74	
u	75	
v	76	
w	77	
x	78	
y	79	
z	7A	
{	7B	
|	7C	
}	7D	
~	7E	
DEL	7F	
Keyboard keys	**Hex**	
F1	80	
F2	81	

F3	82	
F4	83	
F5	84	
F6	85	
F7	86	
F8	87	
F9	88	
F10	89	
F11	8A	
F12	8B	
Backspace	8C	
Tab	8D	
Return (ENTER)	8E	
Enter(Numeric Keypad)	8F	
Esc	90	
Arrow Down	91	
Arrow up	92	
Arrow right	93	
Arrow left	94	
Insert	95	

Home	96	
End	97	
Page up	98	
Page down	99	
Left Shift	9A	
Left Ctrl	9B	
Left Alt	9C	
Left GUI	9D	
Right Shift	9E	
Right Ctrl	9F	
Right Alt	A0	
Right GUI	A1	
Caps Lock	A2	
	%**END**	

Note:
How to customize prefix/suffix:
1. Scan “%SET” label;
2. According to command, scan “Enter user-defined prefix/suffix mode”;
3. Scan the barcode of the character that you need to set;
4. Scan “%END” label.

4.19 Update firmware mode

Command:

	%**SET**	
Update firmware mode	**$down**	
	%**END**	

Note:
1. This feature only supports USB interface. When you don't need to update the firmware, please use caution.
2. When switching to update firmware mode and then repowering the product, it will automatically virtualize the USB keyboard wedge to serial port and allow to update the product's firmware.When the update is complete, it will automatically switch to normal mode. If you give up updating the firmware, you can restore the factory default or reset the interface and also can switch to the normal mode.

Appendixes

Appendix 1: Barcode test card

Appendix 2: ASCII code table

Decimal	Octal	Hexadecimal	Character	Description
0	0	00	NUL	
1	1	01	SOH	start of header
2	2	02	STX	start of text
3	3	03	ETX	end of text
4	4	04	EOT	end of transmission
5	5	05	ENQ	enquiry
6	6	06	ACK	acknowledge
7	7	07	BEL	bell
8	10	08	BS	backspace
9	11	09	HT	horizontal tab
10	12	0A	LF	line feed
11	13	0B	VT	vertical tab
12	14	0C	FF	form feed
13	15	0D	CR	carriage return
14	16	0E	SO	shift out
15	17	0F	SI	shift in
16	20	10	DLE	data link escape
17	21	11	DC1	no assignment, but usually XON
18	22	12	DC2	
19	23	13	DC3	no assignment, but usually XOFF
20	24	14	DC4	
21	25	15	NAK	negative acknowledge
22	26	16	SYN	synchronous idle
23	27	17	ETB	end of transmission block
24	30	18	CAN	cancel
25	31	19	EM	end of medium
26	32	1A	SUB	substitute
27	33	1B	ESC	escape
28	34	1C	FS	file separator
29	35	1D	GS	group separator
30	36	1E	RS	record separator
31	37	1F	US	unit separator
32	40	20	SPC	space
33	41	21	!	
34	42	22	"	
35	43	23	#	

Decimal	Octal	Hexadecimal	Character	Description
36	44	24	$	
37	45	25	%	
38	46	26	&	
39	47	27	'	
40	50	28	(	
41	51	29	)	
42	52	2A	*	
43	53	2B	+	
44	54	2C	,	
45	55	2D	-	
46	56	2E	.	
47	57	2F	/	
48	60	30	0	
49	61	31	1	
50	62	32	2	
51	63	33	3	
52	64	34	4	
53	65	35	5	
54	66	36	6	
55	67	37	7	
56	70	38	8	
57	71	39	9	
58	72	3A	:	
59	73	3B	;	
60	74	3C	<	
61	75	3D	=	
62	76	3E	>	
63	77	3F	?	
64	100	40	@	
65	101	41	A	
66	102	42	B	
67	103	43	C	
68	104	44	D	
69	105	45	E	
70	106	46	F	
71	107	47	G	
72	110	48	H	
73	111	49	I	

Decimal	Octal	Hexadecimal	Character	Description
74	112	4A	J	
75	113	4B	K	
76	114	4C	L	
77	115	4D	M	
78	116	4E	N	
79	117	4F	O	
80	120	50	P	
81	121	51	Q	
82	122	52	R	
83	123	53	S	
84	124	54	T	
85	125	55	U	
86	126	56	V	
87	127	57	W	
88	130	58	X	
89	131	59	Y	
90	132	5A	Z	
91	133	5B	[	
92	134	5C	\	
93	135	5D	]	
94	136	5E	^	
95	137	5F	_	
96	140	60	`	
97	141	61	a	
98	142	62	b	
99	143	63	c	
100	144	64	d	
101	145	65	e	
102	146	66	f	
103	147	67	g	
104	150	68	h	
105	151	69	i	
106	152	6A	j	
107	153	6B	k	
108	154	6C	l	
109	155	6D	m	
110	156	6E	n	
111	157	6F	o	

Decimal	Octal	Hexadecimal	Character	Description
112	160	70	p	
113	161	71	q	
114	162	72	r	
115	163	73	s	
116	164	74	t	
117	165	75	u	
118	166	76	v	
119	167	77	w	
120	170	78	x	
121	171	79	y	
122	172	7A	z	
123	173	7B	{	
124	174	7C	|	
125	175	7D	}	
126	176	7E	~	
127	177	7F	DEL	delete
128	200	80	F1	
129	201	81	F2	
130	202	82	F3	
131	203	83	F4	
132	204	84	F5	
133	205	85	F6	
134	206	86	F7	
135	207	87	F8	
136	210	88	F9	
137	211	89	F10	
138	212	8A	F11	
139	213	8B	F12	
140	214	8C	Backspace	
141	215	8D	Tab	
142	216	8E	Return	
143	217	8F	Enter	
144	220	90	Esc	
145	221	91	Arrow Down	
146	222	92	Arrow up	
147	223	93	Arrow right	
148	224	94	Arrow left	
149	225	95	Insert	

Decimal	Octal	Hexadecimal	Character	Description
150	226	96	Home	
151	227	97	End	
152	230	98	Page up	
153	231	99	Page down	
154	232	9A	Left Shift	
155	233	9B	Left Ctrl	
156	234	9C	Left Alt	
157	235	9D	Left GUI	
158	236	9E	Right Shift	
159	237	9F	Right Ctrl	
160	240	A0	Right Alt	
161	241	A1	Right GUI	
162	242	A2	Caps Lock	

Appendix 3: Example codes

EAN13

UPC-A

EAN8

UPC-E

Default data: 1234565

Codabar

Encoded data: c01235d

Code 93

Code 39(Regular)

Code 39(Full ASCII)

Code 39

Encoded data: *Code 39*

GS1 Databar

(01) 6 5473728 28191 9

Encoded data: 65473728281919