Advanced
Mobile
Electronics

User Product Manual of AMBER-EM0x

Version 1.1. 2, August 2019

Please read through the manual carefully before using the product and operate it according to the manual. It is advised that you should keep this manual for future reference.

All pictures in this manual are for reference only and actual product may differ. Regarding to the product modification and update. Reserves the right to make changes to any software or hardware to improve reliability, function, or design at any time without notice. The information contained herein is subject to change without prior notice.

Revision History

Version	Date	Modified Content
V1.0.0	2018.12	First draft
V1.1.0	2019.06	1. Modify programming barcode format 2. Added serial command set
V1.1.1	2019.07	1. Added sleep function 2. Added a new support code system (MSI, RSS-Limited, RSS-Expanded)
V1.1.2	2019.08	Default scan model from Manul mode- Edge Trigger change to Manul mode- Level Trigger

Part I Product Description

Chapter 1 Module Settings

☞ The AMBER-EM0X is a highly integrated, high-performance, video 2D bar code imaging module

☞The AMBER-EM0X module is compact in size, making it flexible for a wide range of devices.

☞With advanced image recognition algorithms, the AMBER-EM0X can easily scan all types of 1D barcodes and 2D barcodes.

☞ The AMBER-EM0X has strong reading ability and is adaptable to a variety of demanding and complex environments. For example, in a variety of illumination environments, it performs excellently in reading code within the large temperature and humidity range.

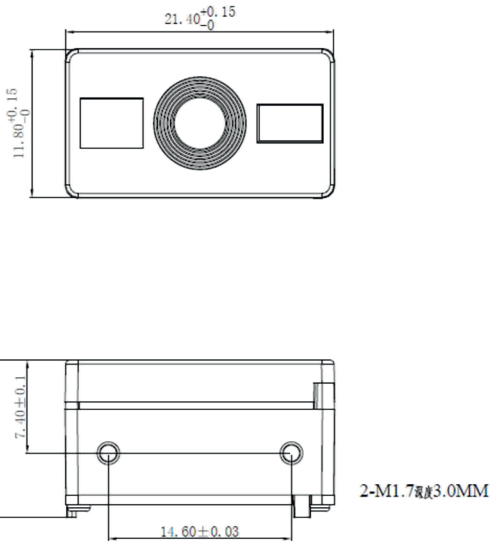
Chapter 2 Module Parameters

Scaning Code	Image Sensor		640 (Horizontal) X 480 (Vertical) CMOS
	Light Source		White light
	Horizontal View Angle		31°
	Symbologies	2D	QR Code、PDF417、DataMatrix（ECC200）
		1D	EAN-13,EAN-8,UPC-A,UPC-E0,UPC-E1,Code128,Code39,Code93,CodaBar,Interleaved 2 of 5,Industrial 25,Matrix 2 of 5,Code11, MSI,RSS-14, RSS-Limited, RSS-Expanded
	Depth of Field	EAN-13	4.0~20.0cm （13mil）
		Code128	4.5 ~ 25.0cm （15mil ）
		QR Code	4.0 ~ 18cm （15mil)
	Scan Angle		Roll:360°, Pitch:±60°, Skew:±60°
	Resolution	1D	⩾5mil
		2D	⩾ 10mil
	Symbol Contrast		≥25%
Physical parameter	Weight		< 7g
	Dimensions		21.4mm x 12.5mm x 11.8mm
	Interface		TTL-232 / USB 2.0 Full Speed
	Voltage		DC +3.3V±5%
	Current	Operating	120mA

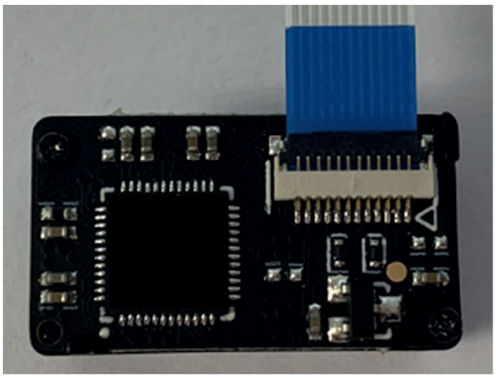
	@DC 3.3V	Sleep	500 μA
Environmental parameters	Operating Temperature		-20℃ ~ 60℃
	Storage Temperature		-40℃ ~ 70℃
	Working Humidity		5% RH~95% RH (Non-condensing)
Reliability	Anti-mechanical shock	Shock	5~200Hz, 10Grms, 3axes, 1.5Hr
		Fall	It can withstand falling from as high as 1.2 meters to the concrete floor.
	Heat Shock Resistance	Lowest Temperature	-20 °C (-4 °F)
		Maximum Temperature	60 °C (140 °F)
		Cycles	High Temperature: 30 minutes Low Temperature: 30 minutes
		Period	24

Module Size Chart

(unit: mm)



Chapter 3 Interface Description



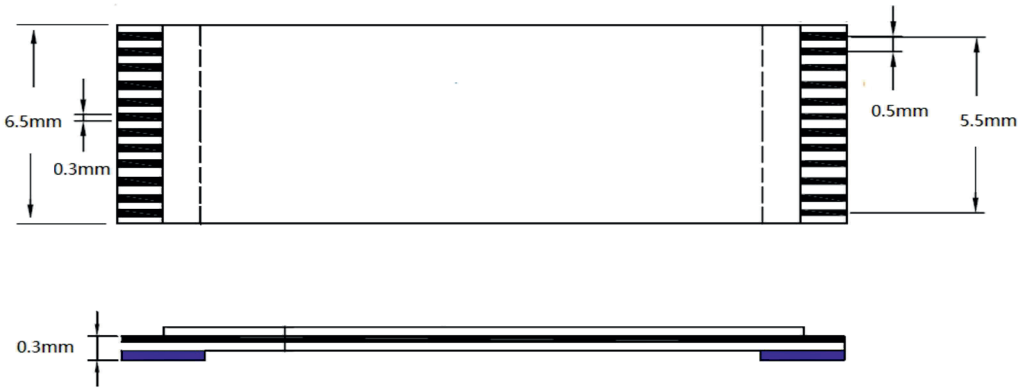
PIN 12 PIN 1

The 12PIN interface definitions and signal descriptions for the AMBER-EM0X are listed as follows.

PIN	Input/Output	Definition	Description
PIN1	-	TEST1	Internal test pin Not Connect
PIN2	Power Supply	VCC	Input +3.3V
PIN3	Ground	GND	-
PIN4	Input	RX	TTL level 232 send receive data
PIN5	Output	TTL level 232 send receive data	TTL level 232 send data
PIN6	Input	D-	USB DN signal
PIN7	Output	D+	USB DP signal
PIN8	Ground	GND	-
PIN9	Output	BEEP	PWM controlled AC signal used to drive an external magnetic beeper Idle Low
PIN10	Output	DLED	Prompt light for successful decoding

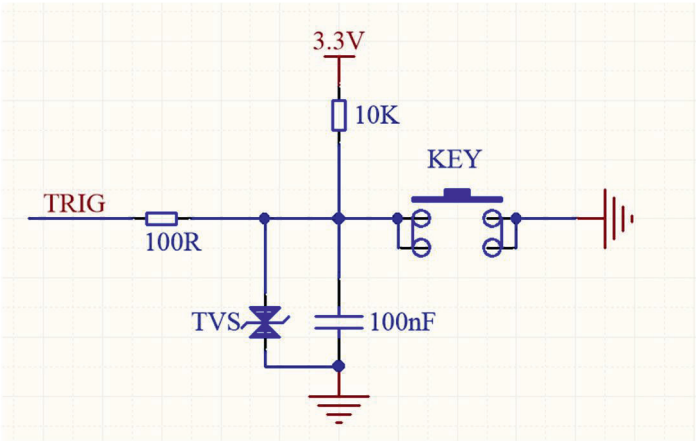
			Idle Low
PIN11	-	TEST2	Internal Test Pin Not Connect.
PIN12	Input	TRIG	The signal to Trigger the module Active low

The AMBER-EM0X requires a 12-pin FFC cable to be connected to the peripherals.

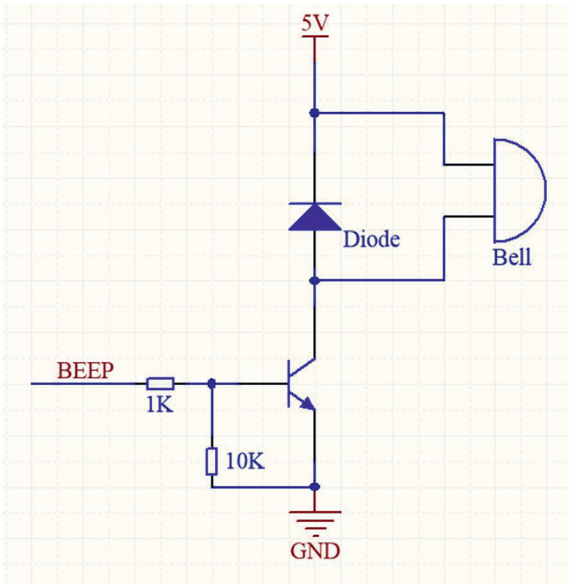


The power supply, TTL level, USB and other pins of the AMBER-EM0X module are directly connected to external circuits. The trigger pin and buzzer pin require a drive circuit. Please refer to the following circuit design:

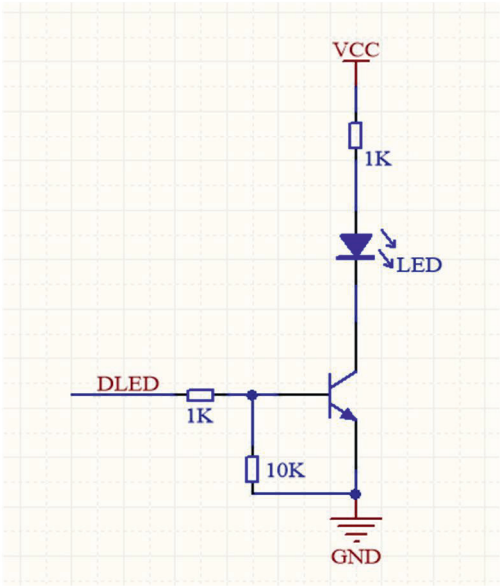
☞ Drive Circuit of Trigger Pin (TRIG):



☞ Drive Circuit of Passive Buzzer:



☞ Drive Circuit of DLED Pin:



The BEEP and DLED pins will give out a high pulse after successful decoding.

Note: When a good read occurs, the Beep pin produces a high level output for about 60ms and the DLED pin produces a high level output for about 100ms

Chapter 4 Requirements for Use

Environmental requirements

Working Temperature		-20℃ ~ 60℃
Storage Temperature		-40℃ ~ 70℃
Working Humidity		5%RH~95%RH（Not Coagulated）

ESD

Always exercise care when handling the engine outside its package. Be sure grounding wrist straps and properly grounded work areas are used.

Thermal Considerations

Electronic components in the AMBER-EM0X will generate heat during the course of their operation. Operating the AMBER-EM0X continuously for an extended period may cause temperatures to rise.

The following precautions should be taken into consideration when integrating the AMBER-EM0X.

☞ Reserve sufficient space for good air circulation in the design.

☞ Avoid wrapping the AMBER-EM0X with thermal insulation materials such as rubber.

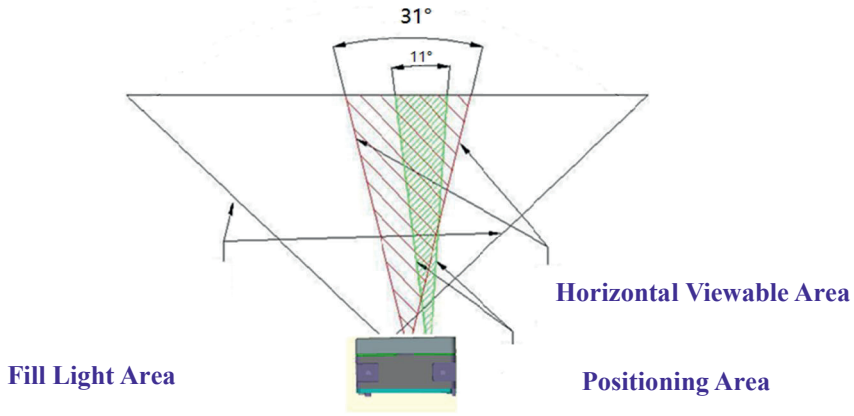
Ripple Noise

Image sensor and decoder chip are directly fed by the input power of AMBER-EM0X. To ensure the image quality, a power supply with low ripple noise is needed..

Acceptable ripple range (peak-to-peak) : ≤50mV.

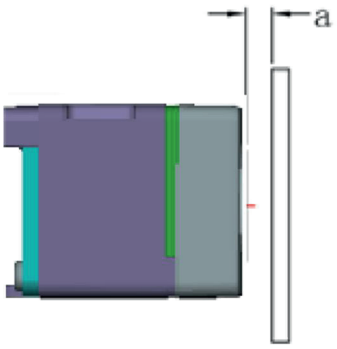
Optics

☞ Distribution of Reading Area



☞ Window placement

The window should be positioned properly and mounted close to the front of the engine (parallel) to let the illumination and aiming beams pass through as much as possible and no reflections back into the engine (reflections can degrade the reading performance).In order to reach better reading performance, the distance from the front of the engine housing to the nearest surface of the window should not exceed a (a =0.6mm) and the thickness of window should not exceed 2mm. The gap between the front of the module and the near end of the window is for protecting the module and window from external impact if falling.



If the window is required to be in a tilted position, the above distance requirements should be met and tilt angle should ensure no reflections back into the lens.

☞Scratch Resistance and Coating

Since the module uses image acquisition to recognize, the window material and color selection should prefer index material of high light transmittance, low blur, and uniform refraction. At the same time, the scratches on the window will reduce the recognizing performance. It is suggested to use abrasion resistant window material or coating.

Chapter 5 Development Tools

The AMBER-EM0X has development tools to support application development to meet rapid assessment and development needs.

DECODE_EVB

The DECODE_EVB is provided to help users to test and evaluate the AMBER-EM0X, which contains beeper & beeper driver circuit, LED & LED driver circuit, TTL-232 to RS-232 converter,rigger & reset button,etc. The module can be connected to the DECODE_EVB via a 12-pin FFC cable type 1 (contacts on the same side). And USB connection or RS-232 connection can be used when connecting the DECODE_EVB to a host device.

Part II Configuration Instructions for Serial Port Commands

Chapter 1 Serial Commands

The user can transmit the serial port command to configure the scanning module through the host. To ensure normal communication, you need to set communication parameters (including baud rate, parity check, Data Bit and stop bit) to match the host device.

The default serial communication parameters of the scanning module are as follows:

Parameter	Default parameter value
Baud Rate	9600bps
Parity Type	None
Data Bits	8
Stop Bits	1
Hardware Flow Control	None

1.1 Operation of Reading Flag

The read device flag command is used to read the contents of 1 to 256 contiguous registers in the engine

Syntax:

Send:{Head1} {Types} {Lens} {Address} {Datas} {CRC}

Head1 ： 0x7E 0x00 (2 bytes)

Types ： 0x07 (1 byte)

Lens ： 0x01 (1 byte)

Address : 0x0000~0x00FF（2 bytes）, starting register address.

Datas ： 0x00~0xFF（1 byte）, number of registers to be read. When Datas=0x00, 256 contiguous registers are to be read.

CRC ： CRC-CCITT checksum (2 bytes)

Computation sequence: Types+ Lens+Address+Datas;

Polynomial: X16+X12+X5+1(0x1021), initial value: 0x0000.

The following C language program is provided for reference

Note: If you do not need the CRC check function, you can choose no CRC check, that is, fill in 0xAB 0xCD without checking at the CRC byte.

Reply:{Head2} {Types} {Lens} {Datas} {CRC}

1) Success message

Head2 : 0x02 0x00

Types : 0x00(success)

Lens : Byte count of Datas returned. If Lens=0x00, that means values of 256 contiguous registers are returned.

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

CRC : CRC-CCITT checksum.

Computation sequence: Types+ Lens+Address+Datas;

Polynomial: X16+X12+X5+1(0x1021), initial value: 0x0000.

The following C language program is provided for reference

2) CRC check error message

No response command

3) Invalid Command response

No response command

Example:

Scan an address with the address 0x000A in flag bits

1) Scan successfully and return the data of 0x3E

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

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

2) CRC check error message

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

Receive: None

3) When the transmitted instruction between two bytes exceeds 400ms, it will be treated as an invalid command.

Send : 0x7E 0x00 0x07 0x01 0x00 0x0A 0x01

Receive: None

1.2 Operation of Writing Flag

The read device flag command is used to read the contents of 1 to 256 contiguous registers in the engine

The contents of the write flag operation modification will be lost after power off. If they need to be saved after power failure, the flag bit needs to be saved in the internal flash.

Syntax:

Send:{Head1} {Types} {Lens} {Address} {Datas} {CRC}

Head1 : 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 flag bits. When configuring multiple flag bits, the data field must be filled from lowest to highest.

CRC : CRC-CCITT checksum.

Computation sequence: Types+ Lens+Address+Datas;

polynomial: X16+X12+X5+1(0x1021), initial value: 0x0000.

The following C language program is provided for reference.

Note: If you do not need the CRC check function, you can choose no CRC check, that is, fill in 0xAB 0xCD without checking at the CRC byte.

Reply: {Head2} {Types} {Lens} {Datas} {CRC}

1) Success message:

Head2 ： 0x02 0x00

Types ： 0x00 (Success)

Lens ： 0x01

Datas ： 0x00

CRC ： CRC-CCITT checksum(0x33 0x31)..

2) CRC check error message

No response command

3) Invalid Command response

No response command

Example:

Write 0x3E in the flag bit of address 0x000A

1) Write successful

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

Receive: 0x02 0x00 0x00 0x01 0x00 0x33 0x31

2) CRC check error message

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

Receive: None

3) When the length of the sent instruction is insufficient or the waiting time exceeds 400ms after transmitting 0x7e 0x00, it shall be treated as an invalid command.

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

Receive: None

1.3 Flags Saved to Internal Flash Instructions

To save the device flag list to internal Flash, it is needed to transmit a save command.

Note: The device cannot save a single flag bit configuration separately and must maintain the entire list at the same time.

Syntax:

Send: {Head1} {Types} {Lens} {Address} {Datas} {CRC}

Head1 : 0x7E 0x00

Types : 0x09

Lens : 0x01

Address : 0x0000

Datas : 0x00

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

Reply: {Head2} {Types} {Lens} {Datas} {CRC}

1) Success message:

Head2 : 0x02 0x00

Types : 0x00 (Success)

Lens : 0x01

Datas : 0x00

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

2) CRC check error message

No response command

3) Invalid Command response

No response command

1.4 Flags Restored to Factory Settings

To restore the contents of the device flag to the factory settings and save to Flash, you need to transmit a reset command.

Syntax:

Send: {Head1} {Types} {Lens} {Address} {Datas} {CRC}

Head1 : 0x7E 0x00

Types : 0x09

Lens : 0x01

Address : 0x0000

Datas : 0xFF

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

Reply: {Head2} {Types} {Lens} {Datas} {CRC}

1) Success message:

Head2 : 0x02 0x00

Types : 0x00 (Success)

Lens : 0x01

Datas : 0x00

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

2) CRC check error message

No response command

3) Invalid Command response

No response command

Chapter 2 Flags

This chapter specifies the information related to the serial port configuration. Refer to Table 1-1 for details.

Flag	0x0000
Data Bit	Function
Bit7	1: Good Read LED ON 0: Good Read LED OFF
Bit6	1: Mute OFF 0: Mute ON
Bit5-4	00: Positioning Light - always OFF 01: Positioning Light - ON when Photographing 10/11: Positioning Light - always ON
Bit3-2	00: Fill Light - always OFF 01: Fill Light - ON when Photographing 10/11: Fill Light - always ON
Bit1-0	00: Manual Mode 01: Command Trigger Mode 10: Continuous Mode 11: Sense Mode
Flag	0x0002
Data Bit	Function
Bit7-1	Reserved
Bit0	The command mode trigger flag is automatically cleared after the scan ends. 1: Trigger 0: Not Trigger
Flag	0x0003

Data Bit	Function
Bit7-2	HID Query Cycle. Period = (Reg0x0003[7:2]+1) ms
Bit1	1: Exit Setup 0: Enter Setup
Bit0	1: Transmit Programming Barcode Data 0: Do Not Transmit Programming Barcode Data
Flag	0x0004
Data Bit	Function
Bit7-0	Image Stabilization Timeout 0x00-0xFF：0ms-25500ms
Flag	0x0005
Data Bit	Function
Bit7-0	Timeout between Decodes 0x00-0xFF: 0ms-25500ms
Flag	0x0006
Data Bit	Function
Bit7-0	Decode Session Timeout 0x00-0xFF: 100ms-25500ms (0x00 represents infinite)
Flag	0x0007
Data Bit	Function
Bit7	Automatic Deep Sleep Function 1: Enter 0: Exit
Bit6-0	Deep Sleep Timeout (high Bit14-8) Unit 100ms
Flag	0x0008
Data Bit	Function
Bit7-0	Deep Sleep Timeout (low Bit7-0)

	Unit 100ms
Flag	0x0009
Data Bit	Function
Bit7-2	Timeout Before HID Release Timeout = (Reg0x0009[7:2]) ms
Bit1-0	Image Flip 00: Image Mirror Flip_ OFF 01: Image Mirror Flip _ ON 10/11: Reserved
Flag	0x000B
Data Bit	Function
Bit7-0	Timeout of Good Read Beep 0x00-0xFF : 0-255ms
Flag	0x000C
Data Bit	Function
Bit7-2	Timeout After HID Release.Timeout = (Reg0x000C[7:2]) ms
Bit1	CapsLock Switch. 0: OFF 1: ON
Bit0	Default level in active buzzer mode 0: Buzzer idle mode with high level, and busy mode with low level 1: Buzzer idle mode with low level, and busy mode with high level
Flag	0x000D
Data Bit	Function
Bit7	Reserved
Bit6	Virtual Keyboard Enable 0: Disable 1: Enable
Bit5-4	Reserved

Bit3-2	Encoding format of Output data 00: GBK 01: UNICODE 10: Original Data 11: UTF8
Bit1-0	00: TTL-232 Serial Output 01: USB -HID 10: Serial & HID Simultaneous Output 11: Virtual Serial Port of USB
Flag	0x000E
Data Bit	Function
Bit7-4	Sleep Timeout. Timeout = (Reg0x000E[7:4]*500)ms
Bit3	Reserved
Bit2	1: Good Read Beep - ON 0: Good Read Beep - OFF
Bit1	1: Setup Beep - OFF 0: Setup Beep - ON
Bit0	1: Enable serial port analog HID protocol 0: Disable serial port analog HID protocol
Flag	0x000F
Data Bit	Function
Bit7-0	Parameter 1 of Sensitivity Adjustment 0x00-0xFF: The higher the value is, the lower the sensitivity is
Flag	0x0010
Data Bit	Function
Bit7-0	Parameter 2 of Sensitivity Adjustment 0x00-0xFF: The higher the value is, the lower the sensitivity is
Flag	0x0013
Data Bit	Function
Bit7	Timeout between Decodes (Same Barcode) Setting

	0: OFF 1: ON
Bit6-0	Timeout (unit: 100ms) 0x00: Infinite Time 0x01-0x7F: 0.1-12700ms;
Flag	0x0014
Data Bit	Function
Bit7-0	Information Output Reservation Perioed (unit: 10ms) 0x00-0xFF: 0-2550ms
Flag	0x002B，0x002A
Data Bit	Function
Bit15	Reserved
Bit14-13	Parity mode: 0: NONE 1: ODD Parity 2: EVEN Parity
Bit12-0	0x09C4: Serial port baud rate is 1200 bps 0x0271: Serial port baud rate is 4800 bps 0x0139: Serial port baud rate is 9600 bps 0x00D0: Serial port baud rate is 14400 bps 0x009C: Serial port baud rate is 19200 bps 0x004E: Serial port baud rate is 38400 bps 0x0034: Serial port baud rate is 57600 bps 0x001A: Serial port baud rate is 115200bps Example: 9600 baud rate: 0x002A = 0x39, 0x002B = 0x01
Flag	0x002C
Data Bit	Function
Bit7-4	Reserved
Bit3	Reserved

Bit2-1	Global Settings 00: Disable All Symbologies; 01: Enable All Symbologies; 10/11: Enable Default Symbologies
Bit0	Reserved
Flag	0x002E
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable EAN13 code 0: Disable EAN13 1: Enable EAN13
Flag	0x002F
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable EAN8 0: Disable EAN8 1: Enable EAN8
Flag	0x0030
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable UPC-A 0: Disable UPC-A 1: Enable UPC-A
Flag	0x0031
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable UPC-E0

	0: Disable UPC-E0 1: Enable UPC-E0 .
Flag	0x0032
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable UPC-E1 0: Disable UPC-E1 1: Enable UPC-E1 .
Flag	0x0033
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable Code128 0: Disable Code128 1: Enable Code128 .
Flag	0x0034
Data Bit	Function
Bit7-0	Set the Minimum Length for Code128 0x00-0xFF：0-255Byte
Flag	0x0035
Data Bit	Function
Bit7-0	Set the Maximum Length for Code128 0x00-0xFF: 0-255Byte
Flag	0x0036
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable Code39 0: Disable Code39 1: Enable Code39.

Flag	0x0037
Data Bit	Function
Bit7-0	Set the Minimum Length for Code39 0x00-0xFF: 0-255Byte
Flag	0x0038
Data Bit	Function
Bit7-0	Set the Maximum Length for Code39 0x00-0xFF: 0-255Byte
Flag	0x0039
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable Code93 0: Disable Code93 1: Enable Code93 .
Flag	0x003A
Data Bit	Function
Bit7-0	Set the Minimum Length for Code93 0x00-0xFF: 0-255Byte
Flag	0x003B
Data Bit	Function
Bit7-0	Set the Maximum Length for Code93 0x00-0xFF: 0-255Byte
Flag	0x003C
Data Bit	Function
Bit7-2	Reserved

Bit1	CodaBar Transmit Start/Stop Character 0: Disable Output of CodaBar Start/Stop Character 1: Output of CodaBar Start/Stop Character
Bit0	Enable/Disable Codabar 0: Disable CodaBar 1: Enable CodaBar
Flag	0x003D
Data Bit	Function
Bit7-0	Set the Minimum Length for CodaBar 0x00-0xFF: 0-255Byte
Flag	0x003E
Data Bit	Function
Bit7-0	Set the Maximum Length for CodaBar 0x00-0xFF: 0-255Byte
Flag	0x003F
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable QR 0: Disable QR 1: Enable QR
Flag	0x0040
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable Interleaved 2 of 5 0: Disable Interleaved 2 of 5 1: Enable Interleaved 2 of 5
Flag	0x0041

Data Bit	Function
Bit7-0	Set the Minimum Length for Interleaved 2 of 5 0x00-0xFF: 0-255Byte
Flag	0x0042
Data Bit	Function
Bit7-0	Set the Maximum Length for Interleaved 2 of 5 0x00-0xFF: 0-255Byte
Flag	0x0043
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable Industrial 25 0: Disable Industrial 25 1: Enable Industrial 25
Flag	0x0044
Data Bit	Function
Bit7-0	Set the Minimum Length for Industrial 25 0x00-0xFF: 0-255Byte
Flag	0x0045
Data Bit	Function
Bit7-0	Set the Maximum Length for Industrial 25 0x00-0xFF：0-255Byte
Flag	0x0046
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable Matrix 2 of 5

	0: Disable Matrix 2 of 5 1: Enable Matrix 2 of 5.
Flag	0x0047
Data Bit	Function
Bit7-0	Set the Minimum Length for Matrix 2 of 5 0x00-0xFF: 0-255Byte
Flag	0x0048
Data Bit	Function
Bit7-0	Set the Maximum Length for Matrix 2 of 5 0x00-0xFF: 0-255Byte
Flag	0x0049
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable Code11 0: Disable Code11 1: Enable Code11
Flag	0x004A
Data Bit	Function
Bit7-0	Set the Minimum Length for Code11 0x00-0xFF: 0-255Byte
Flag	0x004B
Data Bit	Function
Bit7-0	Set the Maximum Length for Code11 0x00-0xFF: 0-255Byte
Flag	0x004C
Data Bit	Function

Bit7-1	Reserved
Bit0	Enable/Disable MSI 0: Disable MSI 1: Enable MSI
Flag	0x004D
Data Bit	Function
Bit7-0	Set the Minimum Length for MSI 0x00-0xFF : 0-255Byte
Flag	0x004E
Data Bit	Function
Bit7-0	Set the Maximum Length for MSI 0x00-0xFF : 0-255Byte
Flag	0x004F
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable RSS-14 0: Disable RSS-14 1: Enable RSS-14
Flag	0x0050
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable RSS-Limited 0: Disable RSS-Limited 1: Enable RSS-Limited
Flag	0x0051
Data Bit	Function
Bit7-1	Reserved

Bit0	Enable/Disable RSS-Expanded 0: Disable RSS-Expanded 1: Enable RSS-Expanded
Flag	0x0052
Data Bit	Function
Bit7-0	Set the Minimum Length for RSS-Expanded 0x00-0xFF : 0-255Byte
Flag	0x0053
Data Bit	Function
Bit7-0	Set the Maximum Length for RSS-Expanded 0x00-0xFF : 0-255Byte
Flag	0x0054
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable DM 0: Disable DM 1: Enable DM
Flag	0x0055
Data Bit	Function
Bit7-1	Reserved
Bit0	Enable/Disable PDF417 0: Disable PDF417 1: Enable PDF417
Flag	0x0060
Data Bit	Function
Bit7	Serial Port / Virtual Serial Port Output with Protocol 0: Raw Data 1: With Protocol

Bit6-5	Tail Type 00: CR (0x0D) 01: CRLF (0x0D ,0x0A) 10: TAB (0x09) 11: None
Bit4	1: Enable Transmitting RF Information 0: Disable Transmitting RF Information
Bit3	1: Enable Prefix 0: Disable Prefix
Bit2	1: Enable Code ID 0: Disable Code ID
Bit1	1: Enable Suffixes 0: Disable Suffixes
Bit0	1: Enable Tail 0: Disable Tail
Flag	0x0061
Data Bit	Function
Bit7-0	Different Country Keyboard Settings 00: U.S. 01: Czech Republic 02: France 03: Germany 04: Hungary 05: Italy 06: Japan 07: Spain 08: Turkey Q 09: Turkey F
Flag	0x0062
Data Bit	Function
Bit7-4	Prefix Character Length 0x00-0x0F: the Length of Prefix Character
Bit3-0	Suffix Character Length 0x00-0x0F: the Length of suffix character
Flag	0x0063 – 0x0071
Data Bit	Function
Bit7-0	Prefix 0x00-0xFF: Prefix Character Value, Up to 15Byte

Flag	0x0072 - 0x0080
Data Bit	Function
Bit7-0	Suffix 0x00-0xFF: AuffixCharacter Value, Up to 15Byte
Flag	0x0081
Data Bit	Function
Bit7-4	Reserved
Bit3-0	RF Information Length 0x00-0x0F: the Length of RF Information
Flag	0x0082– 0x0090
Data Bit	Function
Bit7-0	RF information 0x00-0xFF: RF Information Characters, Up to 15Byte
Flag	0x0091 – 0x00A4
Data Bit	Function
Bit7-0	Set Code ID Character 0x41-0x5a & 0x61-0x7a (A-Z, a-z): Code ID characters for each code system (see Appendix E for details)
Flag	0x00B0
Data Bit	Function
Bit7-2	Reserved
Bit1-0	Data character interception settings 00: Transmit all Data 01: Transmit the Start Data 10: Transmit the END Data 11: Transmit the Center Data

Flag	0x00B1
Data Bit	Function
Bit7-0	Modify the Length for Start Data 0x00-0xFF: 0-255 characters
Flag	0x00B2
Data Bit	Function
Bit7-0	Modify the Length for End Data 0x00-0xFF: 0-255 characters
Flag	0x00D9 (Write-Only Flag)
Data Bit	Function
Bit7-0	Function Flag 0x50: Restore Factory Defaults 0x55: Restore Custom Defaults 0x56: Save as Custom Defaults 0xA0:Sleep ,Device can be waken up through serial port interrupt, and the serial port command is valid (this function is valid only for manual mode) 0xA5: Deep sleep, Device can be waken up through serial port interrupt, and the serial port command is invalid (this function is valid only for manual mode) 0x00: Device can be waken up by writing 0 (this function is valid only for manual mode)
Flag	0x00E5 (Read-Only Flag)
Data Bit	Function
Bit7-0	0x01： AMBER-EM0X
Flag	0x00E1 (Read-Only Flag)
Data Bit	Function

Bit7-0	Hardware Version 0x64：V1.00 0x6E：V1.10 0x78：V1.20 0x82：V1.30 0x8C：V1.40 .....
Flag	0x00E2 (Read-Only Flag)
Data Bit	Function
Bit7-0	Software Version 0x64：V1.00 0x6E：V1.10 0x78：V1.20 0x82：V1.30 0x8C：V1.40 .....
Flag	0x00E3 (Read-Only Flag)
Data Bit	Function
Bit7-0	Software Year (Add 2000 to the value to present the year) 0x12：2018 0x13：2019 .....
Flag	0x00E4 (Read-Only Flag)

Data Bit	Function
Bit7-0	Software Month (This value represents Month X) 0x09：Sep. 0x0A：Oct. 0x0B：Nov. .....
Flag	0x00E5 (Read-Only Flag)
Data Bit	Function
Bit7-0	Software Date (This value represents Date) 0x0A：10th 0x0B：11st .....

Part III Configuration Instructions for Programming Barcode

Chapter 1 Operation Settings

The factory default settings of the AMBER-EM0X are designed to meet the direct use of users in most cases. You can also set the parameters by setting the code according to the actual use.

1.1 Use of Programming Barcode

Scan "enter programming barcode" to configure the module function (set code function). After booting the function, the parameter can be modified by reading one or more programming barcodes. After recognizing "exit programming barcode”, the scanning module will exit the setting mode.

****Enter Setup**

Exit Setup

Enable and disable the output of set code content.

Transmit Programming Barcode Data

****Do Not Transmit Programming Barcode Data**

Note: The optionmarked with (**) in the programming barcode indicates the default function or parameter

1.2 Restore Factory Defaults

After reading this programming barcode, the current parameter setting will be lost and the factory default value will be restored. Factory default parameters and functions can be found in Appendix C.

Restore Factory Defaults

Note: Please use the "Restore Factory Defaults" function with caution.

1.3 User Default Settings

In addition to the factory reset, users can save frequently used settings as user defaults. By reading "**Save as Custom Defaults**", you can save the current device configuration as user default information so that you can make quick settings when needed.

The default settings saved by the user can be restored by reading "**Restore Custom Defaults**".

Save as Custom Defaults

Restore Custom Defaults

Chapter 2 Communication Interface

The AMBER-EM0X scanning module provides a TTL-232 serial communication interface and a USB interface (optional function) for communication with the host. The reading data can be received through the communication interface.

2.1 Selection of Communication Mode

The USB-HID mode is default for communication. Users can switch between communication port output modes by reading code settings (TTL-232 Serial Port Mode / Virtual Serial Port / USB-HID Mode). When USB output and serial port output are needed at the same time, you can select the HID & TTL Simultaneous Output Mode by reading the programming barcode. When users switch communication mode, it is necessary to wait for the device initialization to complete before performing related operations.

Note: When the module is set as USB Virtual Serial Port and communicates with the host through this port, the corresponding driver needs to be installed in the host.

2.1.1 Output Mode of Communication Port

Scan the following programming barcode to set the communication output mode.

TTL-232 Serial Port Mode

****USB-HID Mode**

USB Virtual Serial Port Mode

HID & TTL Simultaneous Mode

2. 2 Serial Communication Interface

The serial communication interface is a common way to connect the scanning module to the host device. When the

serial communication interface in running, the communication module must be completely matched with the host device to ensure smooth communication and correct content.

The serial communication interface provided by the scanning module are TTL -level signals. TTL-232 can be used for most application architectures.For those requiring RS-232, an external conversion circuit is needed.

The default serial communication parameters of the scanning module are as follows. When they are inconsistent with the host device, they can be modified by reading the programming barcode.

Default communication parameters of TTL-232:

Parameter	Default
Serial Communication Type	TTL-232
Baud Rate	9600
Parity Type	None
Data Bits	8
Stop Bits	1

2.2.1 Baud Rate

The Baud Rate is in bps: bits per second. You can scan the following programming barcodes to select configuration parameters.

1200bps

4800bps

****9600bps**

14400bps

19200bps

38400bps

57600bps

115200bps

2.2.2 Parity Methods

There are 3 alternative parity methods, as follows:

****None**

ODD Parity

Even Parity

2.3 Configuration of USB-HID Interface Related Parameter

2.3.1 Access Cycle of PC to HID Device

You can modify the access period of PC to HID device by reading the following programming barcode. The period ranges from 1ms to 64ms.

****1ms**

3ms

5ms

10ms

2.3.2 Timeout Before HID Release

After reading the following programming barcode, you can modify the timeout before the HID is released (that is, the timeout from valid message to release message). The timeout is from 1ms to 63ms.

****1ms**

2ms

5ms

10ms

2.3.3 Timeout After HID Release

After reading the following programming barcode, you can modify the timeout after the HID is released (that is, the timeout from the release of the message to the next valid message). The timeout is from 1ms to 63ms.

**1ms

2ms

5ms

10ms

2.3.4 CapsLock Status Settings

** CapsLock-Off

CapsLock-On

2.3.5 HID Leading Key Output

Users can scan the following programming barcode to enable HID to output a preamble message before outputting each piece of data, which is convenient for client as to software development and positioning. The key value is Ctrl+Shift+r.

** Disable HID Leading Key Output

Enable HID Leading Key Output

Chapter 3 Scanning Module

3.1 Manual Mode

Manual mode is a default scanning module. In manual mode, press the trigger button, the scanning module starts shooting and reading. In the limited duration of "Decode Session Timeout". After successful reading, the scanning module will output the scanned content through the communication interface and stop reading, if you need to one more reading, you need to re-trigger the button. If the reading exceeds the length of a single reading in time duration, the shooting and reading will be stopped.

Manual Mode

3.1.1 Trigger Conditions

The trigger condition can be selected in the manual mode. The trigger condition defaults to edge triggering and level triggering.

☞Edge triggering refers to the detection of the level pulse of the trigger signal, that is, start reading, and the reading is ended when the reading is successful or the decode session timeout condition is reached.

☞ The Level Trigger condition refers to the level at which the trigger signal needs to be held during the start of reading to the end of reading. When the trigger level is cancelled, the reading is successful, or the reading is longer than the single reading duration, the reading is ended.

Edge Trigger

****Level Trigger**

3.1.2 Decode Session Timeout

Decode Session Timeout is the time allowed to conduct the longest reading after the reading is triggered. When the time is exceeded, it will exit the reading state. The range is from 100ms to 25500ms. Scan the following programming barcode to set the Decode Session Timeout.

1000ms

3000ms

****5000ms**

Infinite

3.1.3 Deep Sleep Mode

In this mode, the scanning module automatically enters the deep sleep mode after a certain period of out of operation, which can be set by the following programming barcode.

Deep Sleep Mode-ON

**** Deep Sleep Mode - OFF**

After booting the Deep Sleep Mode, you can wake it up by pressing the button to exit Deep Sleep Mode.

Note: Deep Sleep Function only works in Manual Mode

3.1.4 Sleep Timeout

When deep sleep mode is off, you can also set the idle duration for a sleep by reading the following programming barcode.

Note: The sleep function only works in manual mode.

Sleep Timeout-0ms

****Sleep Timeout-500ms**

Sleep Timeout-3000ms

Sleep Timeout-5000ms

3.2 Command Trigger Mode

In the command trigger mode, the scanning module starts shooting and reading after receiving the trigger signal command sent by the host (that is, the bit 0 of the flag bit 0x0002 is written to "1"); within the limited time range of "decode session timeout" If the reading is successful, the scanning module will output the scan content through the communication interface and stop reading. If a new reading is to be booted, the trigger command needs to be resent. If the reading exceeds the length of a single reading in time duration, the reading will be stopped.

Command Trigger Mode

Note: In the command trigger mode, the serial command of the trigger signal is: 7E 00 08 01 00 02 01 AB CD; After receiving the scan commands, the serial port returns the write success command: 02 00 00 01 00 33 31, the scanning module is booted.

3.2.1 Decode Session Timeout

For the single reading duration setting, please refer to 3.1.2 Decode Session Timeout Code to set.

3.3 Continuous Mode

Continuous Mode is a way for the scanning module to continuously capture, scan and output information.

In this mode, it is defaulted to go into the 1000ms reading timeout after successful reading.

In Continuous Mode, you can use the trigger level control to pause continuous reading or continue reading continuously. In continuous reading, it is necessary to maintain the trigger level of 50ms or more and then cancel it, so that the reading will be suspended. When the reading state is suspended, the trigger level of 50ms or more is also maintained and then canceled, and the reading is continued.

Continuous Mode

3.3.1 *Timeout Between Decodes*

It refers to the timeout between the next reading and the current successful reading. No acquisition is performed during this timeout. Scan the following programming barcode to set timeout between decodes. The setting is from 0ms to 25500ms, and the default duration is 1000ms.

No Timeout

500ms

****1000ms**

3000ms

5000ms

3.3.2 **Ti**meout between Decodes (Same Barcode)

In order to avoid the same barcode being continuously scanned for multiple times in continuous mode, Timeout between Decodes (Same Barcode) is required for scanning module in this mode before enabling the same barcode. Timeout between Decodes (Same Barcode) means that the same barcode will not be read if it has been scanned within the set timeout. It can only be read and output beyong the timeout. By default, Timeout between Decodes (Same Barcode) is turned off.

ON

**** OFF**

Scan the following programming barcode to set Timeout between Decodes (Same Barcode). Setting range: 0ms~12700ms.

☞Note: The delay time setting can be set only after the "Timeout between Decodes (Same Barcode)" is turned on.

Infinite Delay

500ms

1000ms

3000ms

5000ms

3.3.3 Decode Session Timeout

For the decode session timeout, please refer to the programming barcode of Section 3.1.2 Decode Session Timeout.

3.4 Sense Mode

Sense Mode refers to a working mode in which the scanning module conducts reading by sensing the change in brightness of the surrounding environment. When the scene changes, the scanning module begins to scan. After successful reading and outputing information or the Decode Session Timeout,the scanning module needs to be separated for a certain period(can be set) to re-enter the monitoring state. If the following conditions do not occur, the scanning module will cycle in the above manner: the barcode is not scanned within a Decode Session Timeout, and the scanning module will automatically pause the reading and enter the monitoring state. In the sensing scanning module, the scanning module can also boot reading by pressing the trigger button, and continue to monitor the brightness of the surrounding environment after the reading succeeds in outputting the information or releasing the trigger button.

Sense Mode

3.4.1 Decode Session Timeout

For the setting of decode session timeout, please refer to the programming barcode in Section 3.1.2 Decode Session Timeout to set.

3.4.2 Timeout between Decodes

For the setting of the timeout between decodes, please refer to the programming barcode in Section 3.2.1 Timeout between Decodes to set.

3.4.3 Timeout between Decodes (Same Barcode)

For setting Timeout between Decodes (Same Barcode), please refer to the programming barcode in

3.4.4 Sensitivity

Sensitivity refers to the degree of changes in the scene detected in the inductive scanning module. When the scanning module meets the requirements in telling the degree of scene changes, it will switch from the monitoring state to the reading state.

Low Sensitivity

****Medium Sensitivity**

High Sensitivity

Enhanced Sensitivity

3.4.5 Image Stabilization Timeout

Image Stabilization Timeout refers to the period for which the scanning module that detects the scene change needs to wait for the image to stabilize before reading the code in the inductive scanning module. The settting range of image stabilization timeout is 0~25500 ms, and the step size is 100ms. The default image stabilization timeout is 400ms.

****400ms**

0ms

100ms

1000ms

2000ms

Chapter 4 Filling Light and Positioning

4.1 Fill Light

There is a set of LEDs on the scanning module that are specially equipped for shooting, providing auxiliary fill light, illuminating the light beams on the reading targets, improving the adaptability of recognizing performance and weak ambient light. You can set it according to the actual use:

☛**Fill Light - ON when Photographing**: The fill light lights up while shooting and goes out if there is no shooting.

☛**Fill Light - always ON**: The fill light continues to glow after the scanning module is turned on.

☛**Fill Light - always OFF** : the fill light does not light up in any cases.

****Fill Light - ON when Photographing**

Fill Light - always ON

Fill Light - always OFF

4.2 Positioning

The scanning module has an auxiliary device for positioning, which projects a pointing line during shooting to remind users of reading the center of the scene image captured by the module.

☛ **Positioning Light - ON when Photographing** : the positioning light is lit up during shooting and goes out when there is no shooting.

☛ **Positioning Light - always ON**: the positioning light continues to illuminate after the scanning module is turned on.

☛ **Positioning Light - always OFF** : the positioning light does not illuminate in any cases.

****Positioning Light - ON when Photographing**

Positioning Light - always ON

Positioning Light - always OFF

Chapter 5 Beep & LED Notifications

5.1 Buzzer Master Switch

Scan the following programming barcode to turn on /off all of the beep sounds.

Mute _ ON

****Mute _ OFF**

5.2 Buzzer Settings

5.2.1 Passive Buzzer

Scan the following programming barcode to set the buzzer to passive and set the drive frequency of the passive buzzer.

****Passive Buzzer**

Passive_Low Frequency

****Passive_Intermediate Frequency**

Passive_High Frequency

5.2.2 Active Buzze

Scan the following programming barcodes to set the buzzer as active one and set the active buzzer's operating level. Scan "High Level", the buzzer is set to active low when idle, and active high level when working; scan "Low Level", the buzzer is set to active high when idle, and active low level when working.

Active Buzzer

****High Level** **Low Level**

5.3 Good Read Beep for Programming Barcode

Scan the following programming barcodes to enable/disable the programming barcode beep

Beep for Programming Barcode_ON **Beep for Programming Barcode _OFF** ******

5.4 Startup Beep

When the scanning module is on after power on, the scanning module can output or turn off the startup beep according to the setting requirements.

**** Startup Beep_ON** **Startup Beep_OFF**

5.5 Good Read LED/Beep

After the scanning module is successfully scan the codes, BEEP and DLED prompt signals are output through the 12pin external interface by default, and the external passive buzzer and LED are used for prompting. These signals can be turned off if the user requires to do so.

**** Good Read LED_ON**

Good Read LED_OFF

****Good Read Beep_ON**

Good Read Beep_OFF

The user can set the timeout of Good Read Beep, by reading the following programming barcodes.

30ms

****60ms**

90ms

120ms

5.6 Data Output Encoding Format

Users can set the output format of the scanning module through the following programming barcodes, so that the host can output Chinese data according to the specified encoding format.

☞ Note:

GBK format is used for Text., UNICODE format is used for Word and input box of common chat tool.

The Original Data output is used to encrypt the serial output of the data.

****GBK**

UTF8

Original Data

UNICODE

5.7 Different Country Keyboard Settings

In order to apply it in different countries, the device can be set as the corresponding "keyboard" of each country by the following programming barcodes.

****US**

Czech

French

Germany

Hungary

Italy

Japan

Spain

Turkey Q

Turkey F

5.8 Virtual Keyboard Enable

In order to apply it in more regional application environments, the standard/virtual keyboard output settings can be made by reading the following programming barcodes. But that will cause a certain loss in output efficiency. Note that when using a virtual keyboard, you must ensure that the keypad number keys are enabled.

****Standard Keyboard**

Virtual Keyboard

In order to apply it in different application scenarios, the virtual keyboard has two different output modes for control characters smaller than 0x20, and the user can switch them by reading the following programming barcodes.

**Ctrl Mode Alt Mode

5.9 Image Mirroring Mode

When there is mirror flip in image, you can boot the mirror flip mode by reading the following programming barcodes.

Image Mirror Flip _ ON

** Image Mirror Flip_ OFF

Note: In the mirror flip mode, only the barcode of the mirror flip can be recognized. Please exit the mirror flip mode first before identifying the normal barcode or programming barcode.

5.10 Reverse Scanning Module

In some special application scenarios, special barcodes for black and white inversion need to be enabled. The user can enable/disable the reading function of inverse video code by reading the following programming barcodes.

**Video Reverse OFF

Video Reverse ON

Chapter 6 Prefix & Suffix

In practical applications, in order to facilitate data differentiation processing, sometimes it is necessary for the read data to be edited before being output.

Prefix & Suffix include:

- Prefix
- Suffix
- Decode data segment interception
- Code ID
- Decoding failure feature output information (RF Information)
- Tails

Processed output data format:

【Prefix】【Code ID】【Data】【Suffix】【Tail】

6.1 Prefix

Prefix is a string of strings defined by the user before the data is decoded. The user can add and modify the prefixes by reading the following programming barcodes.

Enable Prefixes ****Disable Prefixes**

Scan the following programming barcode, with the programming barcode of "Digit Barcodes

" and the programming barcode of "save", the user can modify the prefixes.

Modify Prefix

☞ Note: A prefix has 15 characters at most and two hexadecimal values is for a prefix character. Refer to Appendix F for the hexadecimal conversion table of character values.

6.2 Suffix

Suffix is a string of strings defined by the user before the data is decoded. The user can add and modify the prefixes by reading the following programming barcodes.

Enable Sufixes ****Disable Sufixes**

Scan the following programming barcode, with the programming barcode of "Digit Barcodes" and the programming barcode of "save", the user can modify the suffixes.

Modify Suffix

☞ Note: A suffix has 15 characters at most and two hexadecimal values is for a prefix character. Refer to Appendix F for the hexadecimal conversion table of character values.

6.3 Code ID

6.3.1 Custom Code ID

Code ID uses one character. Users can customize Code ID by reading the following programming barcodes to identify different barcode types.

Enable Code ID

**** Disable Code ID**

Scan the following programming barcode to restore the default value of Code ID of the barcode. The default list can be found in Appendix E.

Restore Default Code ID

6.3.2 Modify Code ID

Users can modify the Code ID corresponding to each barcode by reading the following programming barcodes.

Modify EAN13 Code ID

Modify EAN8 Code ID

Modify UPC-A Code ID

Modify UPC-E0 Code ID

Modify UPC-E1 Code ID

Modify Code 128 Code ID

Modify Code 39 Code ID

Modify Code 93 Code ID

Modify Codabar Code ID

Modify Interleaved 2 of 5 Code ID

Modify Industrial 25 Code ID

Modify Matrix 2 of 5 Code ID

Modify Code11 Code ID

Modify MSI Code ID

Modify RSS Code ID

Modify RSS-Limited Code ID

Modify RSS-Expanded Code ID

Modify QR Code Code ID

Modify Data Matrix Code ID

Modify PDF417 Code ID

6.4 Tail

Tail OFF

****CR Tail (0x0D)**

TAB Tail (0x09)

CRLF Tail (0x0D 0x0A)

6.5 Data Character

6.5.1 Date Character Interception

This function is used in scenarios where the user needs to output partial decoded information.

The decoding information Data consists of three parts:

【Start】【Center】【End】

The user can select some of the information that needs to be output by reading the following programming barcodes.

**** Transmit all Data**

Transmit the Start Data

Transmit the END Data

Transmit the Center Data

6.5.2 Modify the Length for Data

The user can modify the length of the Start Data and the length of the End Data by reading the following programming barcodes, combined with the programming barcodes of "Digit Barcodes" and "Save" . Both the Start and End segments have up to 255 characters, and both are represented by a hexadecimal character for their length. The characters which are corresponding to the hexadecimal conversion table can be found in Appendix F.

Modify the Length for Start Data

Modify the Length for End Data

6.6 RF Information

The Scan Fail (RF) information is the output information after the scanning module fails to scan the codes, so that the user or the program can adjust or operate after detecting the information. Users are free to define RF information.

Scan the following programming barcode to enable/disable RF transmitting.

Enable Transmitting RF Information

**** Disable Transmitting RF Information**

Scan the following programming barcode, combined with the programming barcode of "Digit Barcodes" and "save", you can modify the RF information by yourself, and two hexadecimal values is for a prefix character, there are 15 characters at most. Refer to Appendix F for the character-to-hexadecimal conversion table.

Modify RF Information

☞Note: When an odd number of hexadecimal values are input, if it is failed to set the last bit, only the first few characters are output.

6.7 Output Protocol

The user can decode the output format of result by reading the following programming barcodes to modify the virtual serial port/serial port mode.

The format of the decoding result with the protocol output is: <03><length><decoded data>

****Raw Data** **With Protocol**

Chapter 7 Quick Operation

7.1 Fast POS Mode

POS Mode features:

- Scan mode: Command Trigger Mode
- Communication port: Serial Port
- Startup Beep OFF
- Tail OFF

Users can quickly configure the reading device to work in POS Mode by reading the following programming barcode.

Fast POS Mode

7.2 Serial Port & Full Codes On Mode

In order to facilitate the quick configuration and switch to the serial port and full codes open mode during the secondary development process, you can realize the quick configuration function by reading the following programming barcodes.

Serial Port & Full Codes ON

Chapter 8 Symbologies

8.1 Global Shortcuts

8.1.1 Global Operations

The user can globally enable/Disable and enable the default reading type for all supported code systems by reading the following programming barcodes. After reading all types of code systems, only the programming barcode is enabled.

Enable All Symbologies

Disable All Symbologies

**** Enable Default Symbologies**

8.1.2 Product Barcode Check Digit Output Enable

The user can enable/disable the commodity barcode check digit output by reading the following programming barcode (commodity barcode includes: EAN13/EAN8/UPC-A/UPC-E0/UPC-E1).

**Enable Transmit Check Digit

Disable Transmit Check Digit

8.2 1D Symbologies

8.2.1 EAN 13

1. Enable or Disable EAN13

The user can enable and disable the EAN13 barcode reading function by reading the following programming barcodes.

**Enable EAN13

Disable EAN13

2. Enable or Disable Add-On Code

The user can enable and disable the forced output function of EAN13 add-on code by reading the following programming barcodes.

EAN13 Add-On Code Required

** EAN13 Add-On Code Not Required

The user can enable and disable the configuration of the EAN13 add-on code by reading the following programming barcodes.

Enable EAN13-2 Digit Add-On Code **** Disable EAN13-2 Digit Add-On Code**

Enable EAN13-5 Digit Add-On Code **** Disable EAN13-5 Digit Add-On Code**

8.2.2 EAN 8

1. Enable or Disable EAN8

The user can enable and disable the EAN8 barcode reading function by reading the following programming barcodes.

Disable EAN8 ****Enable EAN8**

2. Enable or Disable Add-On Code

The user can enable and disable the forced output function of EAN8 add-on code by reading the following programming barcodes.

EAN8 Add-On Code Required **** EAN8 Add-On Code Not Required**

The user can enable and disable the configuration of the EAN8 add-on code by reading the following programming barcodes.

Enable EAN8-2 Digit Add-On Code **** Disable EAN8-2 Digit Add-On Code**

Enable EAN8-5 Digit Add-On Code

**** Disable EAN8-5 Digit Add-On Code**

8.2.3 UPC-A

1. Enable or Disable UPC-A

The user can scan and disable the UPC-A barcode reading function by reading the following programming barcodes.

****Enable UPC-A**

Disable UPC-A

2. Enable or Disable Add-On Code

The user can enable and disable the forced output function of UPC-A add-on code by reading the following programming barcodes.

UPC-A Add-On Code Required

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

The user can enable and disable the configuration of the UPC-A add-on code by reading the following programming barcodes.

Enable UPC-A-2 Digit Add-On Code

**** Disable UPC-A-2 Digit Add-On Code**

Enable UPC-A-5 Digit Add-On Code

**** Disable UPC-A-5 Digit Add-On Code**

1. Enable Conversion from UPC-A to EAN13

The user can enable/disable the conversion of UPC-A to EAN13 by reading the following programming barcodes.

Enable UPC-A to EAN13

**** Disable UPC-A to EAN13**

8.2.4 UPC-E0

1. Enable or Disable UPC-E0

The user can scan and disable the UPC-E0 barcode reading function by reading the following programming barcodes.

****Enable UPC-E0**

Disable UPC-E0

2. Enable or Disable Add-On Code

The user can enable and disable the forced output function of UPC-E0 add-on code by reading the following programming barcodes.

UPC-E0 Add-On Code Required

**** UPC-E0 Add-On Code Not Required**

The user can enable and disable the configuration of the UPC-E0 add-on code by reading the following programming barcodes.

Enable UPC-E0-2 Digit Add-On Code

**** Disable UPC-E0-2 Digit Add-On Code**

Enable UPC-E0-5 Digit Add-On Code

**** Disable UPC-E0-5 Digit Add-On Code**

8.2.5 UPC-E1

1. Enable or Disable UPC-E1

The user can enable and disable the UPC-E1 barcode reading function by reading the following programming barcodes.

****Enable UPC-E1**

Disable UPC-E1

2. Enable or Disable Add-On Code

The user can enable and disable the forced output function of UPC-E1 add-on code by reading the following programming barcodes.

UPC-E1 Add-On Code Required

**** UPC-E1 Add-On Code Not Required**

The user can enable and disable the configuration of the UPC-E1 add-on code by reading the following programming barcodes.

Enable UPC-E1-2 Digit Add-On Code

**** Disable UPC-E1-2 Digit Add-On Code**

Enable UPC-E1-5 Digit Add-On Code

**** Disable UPC-E1-5 Digit Add-On Code**

8.2.6 Code128

1. Enable or Disable Code128

The user can enable and disable the Code128 barcode reading function by reading the following programming barcodes.

****Enable Code128**

Disable Code128

2. Set Length Range for Code128

Users can set the minimum and maximum length of Code128 by reading the following programming barcodes.

Set the Minimum Length for Code128 to 0

****Set the Minimum Length for Code128 to 4**

**Set the Maximum Length for Code128 to 32 Set the Maximum Length for Code128 to 255

8.2.7 Code39

1. Enable or Disable Code39

The user can enable and disable the Code39 barcode reading function by reading the following programming barcodes.

**Enable Code39

Disable Code39

2. Set Length Range for Code39

Users can set the minimum and maximum length of Code39 by reading the following programming barcodes

Set the Minimum Length for Code39 to 0

**Set the Minimum Length for Code39 to 4

**Set the Maximum Length for Code39 to 32

Set the Maximum Length for Code39 to 255

3. Transmit Start/Stop Character

The user can set the output of Code39 Start/Stop Character by reading the following programming barcodes.

Output of Code39 Start Character

**Disable Output of Code39 Stop Character

Output of Code39 Stop Character

****Disable Output of Code39 Stop Character**

4. Code32 Mode

Users can choose whether Code39 supports Code32 mode by reading the following programming barcodes.

Support Code32 Mode

** Disable Support Code32 Mode**

5. FullAsc Mode

Users can choose whether Code39 supports FullAsc mode by reading the following programming barcodes.

Support FullAsc Mode

****Disable Support FullAsc Mode**

8.2.8 Code93

1. Enable or Disable Code93

The user can enable and disable the Code93 barcode reading function by reading the following programming barcodes.

****Enable Code93**

Disable Code93

2. Set Length Range for Code39

Users can set the minimum and maximum length of Code93 by reading the following programming barcodes.

Set the Minimum Length for Code93 to 0

****Set the Minimum Length for Code93 to 4**

****Set the Maximum Length for Code93 to 32**

Set the Maximum Length for Code93 to 255

8.2.9 CodaBar

1. Enable or Disable CodaBar

The user can enable and disable the CodaBar barcode reading function by reading the following programming barcodes.

****Enable CodaBar**

Disable CodaBar

2. Set Length Range for CodaBar

Users can set the minimum and maximum length of CodaBar by reading the following programming barcodes.

Set the Minimum Length for CodaBar to 0

****Set the Minimum Length for CodaBar to 4**

**Set the Maximum Length for CodaBar to 32

Set the Maximum Length for CodaBar to 255

3. Transmit Start/Stop Character

The user can set the output of CodaBar Start/Stop Character by reading the following programming barcodes.

Output of CodaBar Start/Stop Character

****Disable Output of CodaBar Start/Stop Character**

8.2.10 Interleaved 2 of 5

1. Enable or Disable Interleaved 2 of 5

The user can enable and disable the Interleaved 2 of 5 barcode reading function by reading the following programming barcodes.

Enable Interleaved 2 of 5

****Disable Interleaved 2 of 5**

2. Set Length Range for Interleaved 2 of 5

Users can set the minimum and maximum length of Interleaved 2 of 5 by reading the following programming barcodes.

Set the Minimum Length to 0

****Set the Minimum Length to 4**

**Set the Maximum Length to 32

Set the Maximum Length to 255

8.2.11 Industrial 25

1. Enable or Disable Industrial 25

The user can enable and disable the Industrial 25 barcode reading function by reading the following programming barcodes.

Enable Industrial 25

**Disable Industrial 25

2. Set Length Range for Industrial 25

Users can set the minimum and maximum length of Industrial 25 by reading the following programming barcodes

Set the Minimum Length to 0

**Set the Minimum Length to 4

**Set the Maximum Length to 32

Set the Maximum Length to 255

8.2.12 Matrix 2 of 5

1. Enable or Disable Matrix 2 of 5

The user can enable and disable the Matrix 2 of 5 barcode reading function by reading the following programming

barcodes.

Enable Matrix 2 of 5

**** Disable Matrix 2 of 5**

2. Set Length Range for Matrix 2 of 5

Users can set the minimum and maximum length of Matrix 2 of 5 by reading the following programming barcodes.

Set the Minimum Length to 0

****Set the Minimum Length to 4**

Set the Maximum Length to 255

****Set the Maximum Length to 32**

3. Setting of Check Format

The user can set the Matrix 2 of 5 check format by reading the following programming barcodes.

Mod 10

****None**

8.2.13 Code11

1. Enable or Disable Code11

The user can enable and disable the Code11 barcode reading function by reading the following programming

barcodes.

Enable Code11

****Disable Code11**

2. Set Length Range for Code11

Users can set the minimum and maximum length of Code11 by reading the following programming barcodes.

Set the Minimum Length for Code11 to 0

****Set the Minimum Length for Code11 to 4**

****Set the Maximum Length for Code11 to 32**

Set the Maximum Length for Code11 to 255

3. Setting of Check Format

The user can set the check format of Code11 by reading the following programming barcode.

****Check Code11-1bit**

Check Code11-2bit

8.2.14 MSI

1. Enable or Disable MSI

Enable MSI

****Disable MSI**

2. Set Length Range for MSI

Users can set the minimum and maximum length of MSI by reading the following programming barcodes.

Set the Minimum Length for MSI to 0

****Set the Minimum Length for MSI to 4**

****Set the Maximum Length for MSI to 32**

Set the Maximum Length for MSI to 255

8.2.15 RSS-14

1. Enable or Disable RSS-14

The user can enable and disable the RSS-14 barcode reading function by reading the following programming barcodes.

Enable RSS-14

****Disable RSS-14**

8.2.16 RSS-Limited

1. Enable or Disable RSS-Limited

The user can enable and disable the RSS-Limited barcode reading function by reading the following programming barcodes.

Enable RSS-Limited

****Disable RSS-Limited**

8.2.17 RSS-Expanded

1. Enable or Disable RSS-Expanded

The user can enable and disable the RSS-Expanded barcode reading function by reading the following programming barcodes.

Enable RSS-Expanded

**** Disable RSS-Expanded**

2. Set Length Range for Code11

Set the Minimum Length to 0

****Set the Minimum Length to 4**

****Set the Maximum Length to 32**

Set the Maximum Length to 255

8.3 Operation of 2D Symbologies

8.3.1 QR Code

The user can enable and disable the QR Code barcode reading function by reading the following programming barcodes.

**Enable QR

Disable QR

8.3.2 Data Matrix (DM)

The user can enable and disable the Data Matrix reading function by reading the following programming barcodes.

**Enable DM

Disable DM

The user can enable and disable simultaneous multiple DM code reading function by reading the following programming barcodes.

Enable Multiple DM

**Disable Multiple DM

8.3.3 PDF417

The user can enable and disable the PDF417 barcode reading function by reading the following programming barcodes.

**Enable PDF417

Disable PDF417

Chapter 9 Save and Cancel

9.1 Save

After reading the “Digit Barcodes”, you need to read the programming barcode of "Save" to save the data.

Save

9.2 Cancel

When an error occurs in the scanned data, the following programming barcode can be scanned to cancel the current setting, also one bit of data which is previous scanned, and a string of data which is previous scanned.

Cancel All Digits

Cancel the Last Digit

Cancel Current Setting

☞ Note: Cancelling the current setting means cancelling all the Digit Barcodes that were scan, and reset shall be conducted after canceling.

Appendix

Appendix A: Digit Barcodes

0 ～ 9

0

1

2

3

4

5

6

7

8

9

A～F

A

B

C

D

E

F

Appendix B: Example of Parameter Settings

◆ Example 1: Modify the prefix to DATA

1. Query the character table to obtain the hexadecimal values corresponding to the four characters of "DATA": "44", "41", "54", "41"

2. Scan "Enter Setup"; (If it has been enabled, you can skip this step)

3. Scan the programming barcode of "Modify Prefix"

4. Scan the Digit Barcodess of "4" "4" "4" "1" "5" "4" "4" "1"

5. Scan the programming barcode of "Save"

◆ Example 2: Modify the suffix to DATA

1. Query the character table to obtain the hexadecimal values corresponding to the four characters of "DATA": "44", "41", "54", "41"

2. Read "Enter Setup"; (If it has been enabled, you can skip this step)

3. Read the the programming barcode of "Modify Suffix" programming barcode

4. Read the Digit Barcodess of "4" "4" "4" "1" "5" "4" "4" "1"

5. Read the programming barcode of "Save"

◆ Example 3: Modify EAN13 Code ID to "A"

1. Query the character table to obtain the hexadecimal value corresponding to the "A" character: "41"
2. Read "Enter Setup"; (If it has been enabled, you can skip this step)
3. Read the the programming barcode of "Modify EAN13 Code ID"
4. Read the Digit Barcodess of "4" "1" one by one.
5. Read the the programming barcode of "Save"

◆ Example 4:

[Transmit the Start Data] If the decoding information is "1234567890ABC", the first 10 bytes "1234567890" shall be output.

1. Query the character table to obtain the hexadecimal value corresponding to the "10" character: "0A"
2. Read "Enter Setup"; (If it has been enabled, you can skip this step)
3. Read the programming barcode of " Modify the Length for Start Data"
4. Read the Digit Barcodess of "0" "A" in turn.
5. Read the programming barcode of "Save"
6. Read the programming barcode of "Transmit the Start Data "

◆ Example 5:

[Transmit the End Data] If the decoding information is "1234567890ABC", the first 10 bytes "1234567890" shall be output.

1. Query the character table to obtain the hexadecimal value corresponding to the "10" character: "0A"

2. Read "Enter Setup"; (If it has been enabled, you can skip this step)

3. Read the programming barcode of " Modify the Length for End Data"

4. Read the Digit Barcodess of "0" "A" in turn.

5. Read the programming barcode of "Save"

6. Read the programming barcode of "Transmit the End Data"

◆ Example 6:

[Transmit the Center Data] If the decoding information is "1234567890ABC1234567890", the middle 3 bytes "ABC" shall be output.

1. Query the character table to obtain the hexadecimal value corresponding to the "10" character: "0A"

2. Read "Enter Setup"; (If it has been enabled, you can skip this step)

3. Read the programming barcode of "Modify the Length for End Data"

4. Read the Digit Barcodess of "0" "A" in turn.

5. Read the programming barcode of "Save"

6. Read the programming barcode of "Modify the Length for Start Data"

7. Read the Digit Barcodess of "0" "A" in sequence.

8. Read the programming barcode of "Save"

9. Read the programming barcode of ″Transmit the Center Data″

◆ Example7: Modify the RF information to "FAIL"

1. Query the character table to obtain the hexadecimal value corresponding to the "FAIL" character: "46" "41" "49" "4C"

2. Read "Enter Setup"; (If it has been enabled, you can skip this step)

3. Read the programming barcode of "Modify RF Information"

4. Read the Digit Barcodess of "4" "A", "4", "1", "4", "9", "4", "C" in turns

5. Read the programming barcode of "Save"

Appendix C: Default Settings Table

Parameter		Default Setting	Remarks
Programming Barcode			
Function of Programming Barcode		Enter	
Communication Settings			
Communication Mode		USB-HID	
TTL-232	Serial Port Baud Rate	9600bps	
	Serial Parity Bits	None	
	Serial Data Bits	8	
	Serial Port Stop	1	
	Hardware Flow Control	None	
USB-HID	PC to HID Device Access Cycle	1ms	Range:1～64ms
	Timeout Before HID Release	1ms	Range:1～63ms
	Timeout After HID Release	1ms	Range:1～63ms
	CapsLock Status	OFF	
	HID Leading Key Output	Disable	
Scanning Module Parameter			
Default Scanning Module		Manual Mode	
Manual Mode	Trigger Mode	Level Trigger	
	Decode Session Timeout	5000ms	Range: 100ms ～ 25500ms, Step length 100ms, 0: means Infinite

	Deep Sleep	Exit	Deep Sleep Timeout: 0～3276700ms Step Size: 100ms
	Sleep	Enter	Sleep Timeout: 0～7500ms Default: 500ms
Command Trigger Mode	Triggering Conditions	Instruction Trigger	7E 00 08 01 00 02 01 AB CD
	Decode Session Timeout	5000ms	Range: 100ms ～ 25500ms Step size 100ms 0x00: Infinite
Continuous Mode	Timeout between Decodes	1000ms	Range: 0 ～ 25500ms Step size 100ms
	Timeout between Decodes (Same Barcode)	OFF	Delay time range: 100ms ～ 25500ms Step size 100ms 0x00: Infinite
	Decode Session Timeout	5000ms	范围：100ms～25500ms 步长100ms 0x00：无限长 Range: 100ms ～ 25500ms Step size 100ms 0x00: Infinite
Sense Mode	Decode Session Timeout	5000ms	Range: 100 ～ 25500ms Step size 100ms 0x00: infinite
	Timeout between Decodes	1000ms	Range: 0 ～ 25500ms Step size 100ms

	Timeout between Decodes (Same Barcode)	OFF	Delay time range: 100ms ～ 25500ms Step size 100ms 0x00: infinite
	Sensitivity	Medium Sensitivity	Sensitivity parameter 1/2:00-FF The more the parameter is, the less the sensitivity is
General Settings			
Fill Light / Positioning	Positioning Light	ON when Photographing	
	Fill Light	ON when Photographing	
Buzzer	Buzzer Setting	Passive Buzzer	
	Passive Buzzer	Intermediate Frequency	
	Active buzzer	High level	Active high when working, Active low when idle
	Mute	OFF	
Setup Beep		ON	
Good Read Beep		ON	
Timeout of Good Read Beep		60ms	Range:0-255ms
Good Read LED		ON	
Good Read Beep of Programming Barcode		ON	
Data Output Encoding Format		GBK	
Keyboard		US.	
Virtual/Standard Keyboard		Standard	
Image Mirror Flip		Disable	

Serial Port Analog HID Protocol	Disable	
Data Editing		
Prefix	Disable	
Suffix	Disable	
Code ID	Disable	
Tail	CR（0x0D）	
Date Character Interception	Transmit all Data	
RF Information	Disable	
Output Protocol	Raw Data	
Code Setting		
Inverse Video	Disable	
Image Mirror Flip	Disable	
Product Barcode Check Digit	Enable	EAN13/EAN8/UPC-A/UPC-E0/UPC-E1
EAN-13		
Read	Enable	
Add-On Code	Not Required	
2 Digit Add-On Code	Disable	
5 Digit Add-On Code	Disable	
EAN-8		
Read	Enable	
Add-On Code	Not Required	
2 Digit Add-On Code	Disable	
5 Digit Add-On Code	Disable	
UPC-A		

Read	Enable	
Add-On Code	Not Required	
2 Digit Add-On Code	Disable	
5 Digit Add-On Code	Disable	
UPC-A to EAN13	Disable	
UPC-E0		
Read	Enable	
Add-On Code	Not Required	
2 Digit Add-On Code	Disable	
5 Digit Add-On Code	Disable	
UPC-E1		
Read	Enable	
Add-On Code	Not Required	
2 Digit Add-On Code	Disable	
5 Digit Add-On Code	Disable	
Code128		
Read	Enable	
Set the Minimum Length	4	
Set the Maximum Length	32	
Code 39		
Read	Enable	
Set the Minimum Length	4	
Set the Maximum Length	32	
Start Character	Disable	

Stop Character	Disable	
Code32	Disable	
FullAsc Mode	Disable	
Code 93		
Read	Enable	
Set the Minimum Length	4	
Set the Maximum Length	32	
CodaBar		
Read	Enable	
Set the Minimum Length	4	
Set the Maximum Length	32	
Start /Stop Character	Disable	
Interleaved 2 of 5		
Read	Disable	
Set the Minimum Length	4	
Set the Maximum Length	32	
Industrial 25		
Read	Disable	
Set the Minimum Length	4	
Set the Maximum Length	32	
Matrix 2 of 5		
Read	Disable	
Set the Minimum Length	4	
Set the Maximum Length	32	

Check Format	None	
Code11		
Read	Disable	
Set the Minimum Length	4	
Set the Maximum Length	32	
Check Format	1bit	
MSI		
Read	Disable	
Set the Minimum Length	4	
Set the Maximum Length	32	
RSS-14		
Read	Disable	
RSS-Limited		
Read	Disable	
RSS-Expanded		
Read	Disable	
Set the Minimum Length	4	
Set the Maximum Length	32	
QR Code		
Read	Enable	
PDF417		
Read	Enable	
Data Matrix		
Read	Enable	

Multiple DM	Disable	

Appendix D: Common Serial Commands

Function	Serial Command	Return Command
Set the baud rate to 9600	7E 00 08 02 00 2A 39 01 A7 EA	02 00 00 02 39 01 C1 4C
Save settings to internal Flash	7E 00 09 01 00 00 00 DE C8	02 00 00 01 00 33 31
Query baud rate	7E 00 07 01 00 2A 02 D8 0F	02 00 00 02 39 01 C1 4C
Reset	7E 00 09 01 00 00 FF C0 38	02 00 00 01 00 33 31
Command trigger mode trigger command	7E 00 08 01 00 02 01 AB CD	02 00 00 01 00 33 31

Appendix E: Code ID List

Barcode Type	Corresponding Tharacter	Flag Bit Address
EAN-13	d	0x91
EAN-8	d	0x92
UPC-A	c	0x93
UPC-E0	c	0x94
UPC-E1	c	0x95
Code 128	j	0x96
Code 39	b	0x97
Code 93	i	0x98
Codabar	a	0x99
Interleaved 2 of 5	e	0x9A
Industrial 2 of 5	D	0x9B
Matrix 2 of 5	v	0x9C

Code 11	H	0x9D
GS1 Databar(RSS-14)	R	0x9F
QR Code	Q	0xA2
Data Matrix	u	0xA3
PDF 417	r	0xA4

Appendix F: ASCII Table

Hexadecimal	Decimal	Character
00	0	NUL
01	1	SOH
02	2	STX
03	3	ETX
04	4	EOT
05	5	ENQ
06	6	ACK
07	7	BEL
08	8	BS
09	9	HT
0a	10	LF
0b	11	VT
0c	12	FF
0d	13	CR
0e	14	SO
0f	15	SI
10	16	DLE
11	17	DC1
12	18	DC2
13	19	DC3

14	20	DC4
15	21	NAK
16	22	SYN
17	23	ETB
18	24	CAN
Hexadecimal	Decimal	Character
19	25	EM
1a	26	SUB
1b	27	ESC
1c	28	FS
1d	29	GS
1e	30	RS
1f	31	US
20	32	SP
21	33	!
22	34	"
23	35	#
24	36	$
25	37	%
26	38	&
27	39	`
28	40	(
29	41	)
2a	42	*
2b	43	+
2c	44	,
2d	45	-
2e	46	.
2f	47	/

30	48	0
31	49	1
32	50	2
33	51	3
Hexadecimal	Decimal	Character
34	52	4
35	53	5
36	54	6
37	55	7
38	56	8
39	57	9
3a	58	:
3b	59	;
3c	60	<
3d	61	=
3e	62	>
3f	63	?
40	64	@
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
Hexadecimal	Decimal	Character
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	[
5c	92	\
5d	93	]
5e	94	^
5f	95	_
60	96	'
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
Hexadecimal	Decimal	Character
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	{
7c	124	|
7d	125	}
7e	126	~
7f	127	DEL