MINDEO

FM100 Laser Barcode Scan Engine

User Manual

Version: FM_UM_EN_V1.1.7

Notice

Make sure you carefully read the following information to ensure that your barcode scan engine is able to perform at the level for which it is designed.

1. All software, including firmware, furnished to the user is on a licensed basis.
2. The right is reserved to make changes to any software or product to improve reliability, function, or design.
3. The material in this manual is subject to change without notice.
4. The manufacturer assumes no responsibility for any loss or claims by third parties which may arise from the use of this manual.
5. Do not throw or drop the scan engine or otherwise subject it to strong impact, which can damage the scanner, interrupt program execution, corrupt memory contents, or otherwise interfere with proper operation.
6. Sudden temperature changes can cause condensation to form on the scanner's case. Operating the scan engine while condensation is present can interfere with proper operation. Take care to avoid conditions that cause the formation of condensation. If condensation does form, wait until it dries completely before using the scan engine.

Notes about structure design

1. Read chapter 7-1 carefully to learn about dust-proof, moisture-proof design, grounding design and ESD design.
2. Read chapter 7-3 carefully to learn about the options of exit window material.
3. Read chapter 7-4 carefully to learn about the exit window tilt angle against the engine.

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1 Technical specifications

Input voltage	3.3 V DC (±5%)	
Current	85 mA (operating) / 100 mA (peak)	
Standby current	<250μA	
Laser	650 nm laser diode	
Scan rate	48±4 scans/sec	
Decode capability	UPC-A, UPC-E, EAN-13, EAN-8, ISBN/ISSN, Code 39, Code 39 full ASCII, Code 32, Trioptic Code 39, Interleaved 2 of 5, Industrial 2 of 5, Matrix 2 of 5, Codabar(NW7), Code 128, Code 93, Code 11(USD-8), MSI/Plessey, UK/Plessey, UCC/EAN 128, China Post, GS1 DataBar (formerly RSS) variants	
Indicator interface	To control external Beeper, LED	
Interface supported	UART (TTL3.3V)	
Operating mode	Good-Read off, Continuous	
Dimensions	Height × Width × Depth: 17.5mm×40mm×33.7mm	
Weight	22g (with decoder), 19g (without decoder)	
Cable	Tapered 12-pin Flex Strip (12 x 0.5mm) with decoder; Tapered 8-pin Flex Strip (8 x 0.5mm) without decoder;	
Case material	ABS	
Temperature	Operating: -10° to 50°C (-4° to 122°F); Storage :-40° to 70°C (-40° to 158°F)	
Humidity	5% to 95% (non-condensing)	
Programming method	Manual (scanning special barcode in sequence)	
Program upgrade	Online	
Decoding depth & Min. element width	(1 mil = 0.0254mm) **Long-Range series** 5 mil: 40-110mm 10 mil: 10-280mm 13 mil: 15-315mm 16 mil: 25-385mm 35 mil: 145-630mm	 **High-Density series** 3 mil: 5-50mm 10 mil: 10-85mm 13 mil: 10-150mm 16 mil: 25-165mm 35 mil: 145-295mm
Safety	Laser safety: EN60825-1, Class 1 EMC: EN 55022, EN 55024 Electrical safety: EN 60950-1	

2 Default setting for each barcode

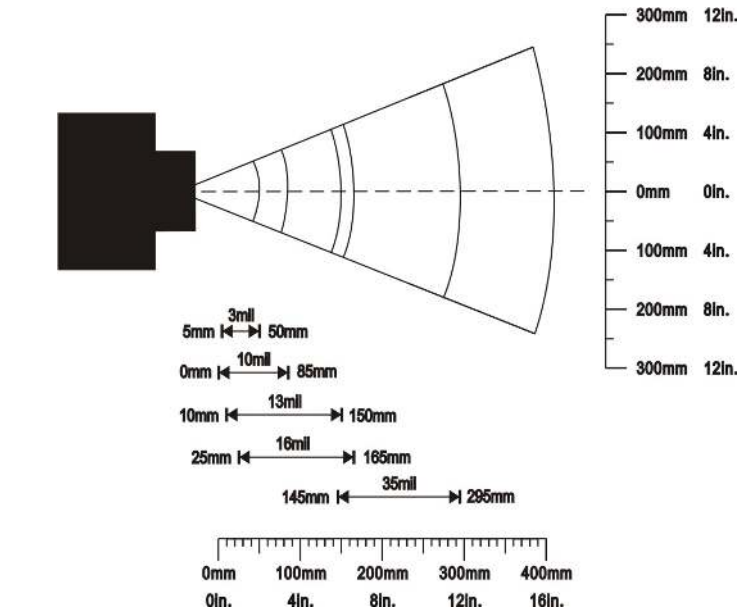
Code type	Read enable	Check digit verification	Check digit transmission	Min. code length	Proprietary code ID	AIM code ID
UPC-A	√	√	√	(12)[2]	A	]Em
UPC-E	√	√	√	(8)[2]	D	]Em
EAN-13	√	√	√	(13)[2]	A	]Em
EAN-8	√	√	√	(8)[2]	C	]Em
ISBN/ISSN[1]	√	√	√	(13)[2]	A	]Em
Code 39	√	-	-	1	M	]Am
Interleaved 2 of 5	√	-	-	6	I	]Im
Industrial 2 of 5	-	-	-	4	H	]Im
Matrix 2 of 5	√	-	-	6	X	]Im
Codabar	√	-	-	4	N	]Fm
Code 128	√	√	-	1	K	]Cm
Code 93	√	√	-	1	L	]Gm
Code 11	-	√	-	4	V	-
MSI/Plessey	-	-	-	4	O	]Mm
UK/Plessey	√	√	-	1	U	]Mm
UCC/EAN 128	√	√	-	1	K	]Cm
China Post	√	-	-	(11)[2]	T	]Im
China Finance	√	-	-	(10)[2]	Y	-
GS1 DataBar	√	-	-	(16)[2]	R	]em
GS1 DataBar Truncated[3]	√	-	-	(16)[2]	R	]em
GS1 DataBar Limited	√	-	-	(16)[2]	R	]em
GS1 DataBar Expanded	√	-	-	1	R	]em

Note: [1]The settings for ISBN/ISSN and EAN-13 must be the same.

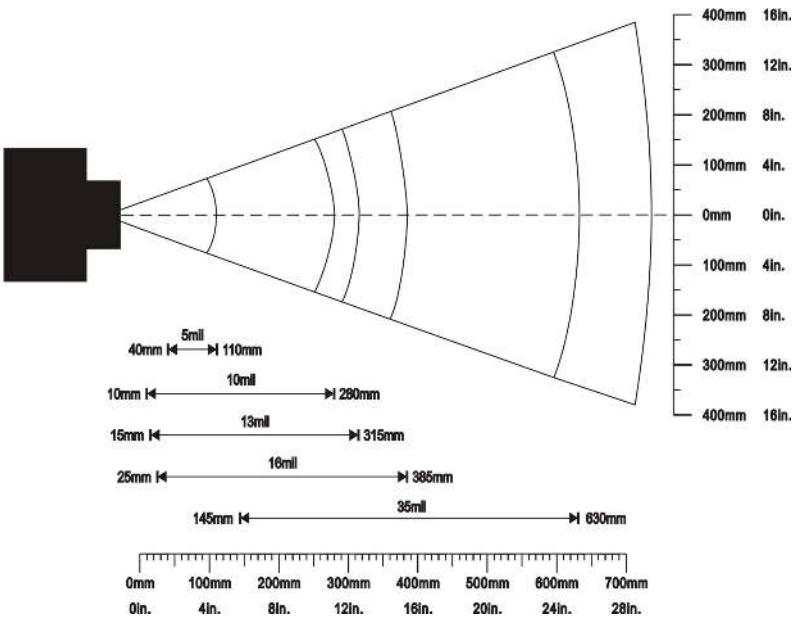
[2] Fixed-length barcodes.

[3]The settings for GS1 DataBar Truncated and GS1 DataBar must be the same.

3 Decode zone

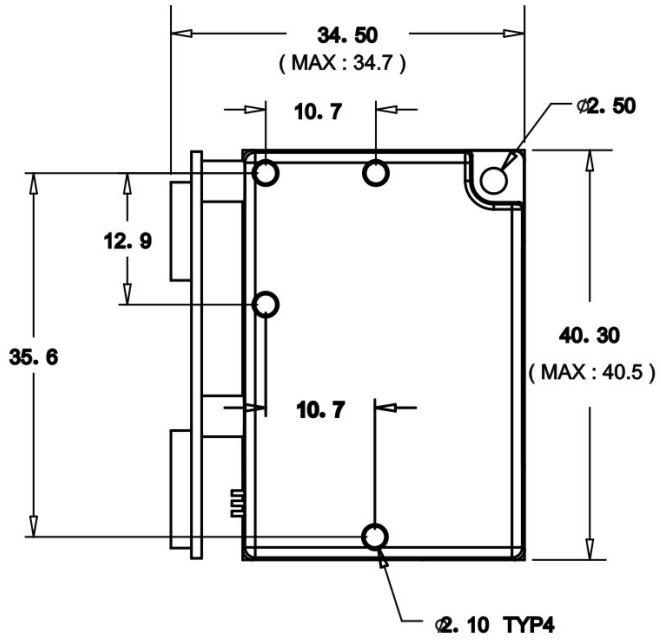


High-density series

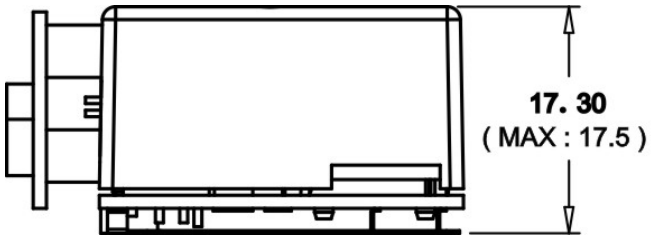


Long-range series

4 Dimensions



Top view (with decoder)



Side view (with decoder)

5 Operation modes

5-1 Operate the engine by TRIG

A pulse input to the pin TRIG triggers the engine to start scanning.

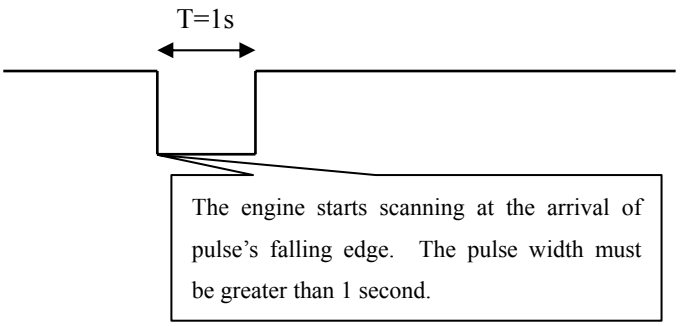


Figure 5-1: A pulse of trigger signal

5-2 Operate the engine by receiving command via UART

UART parameter should be set as below:

(1) Baud rate: 9600 bps;

(2) Data bits: 8 bits;

(3) Stop bit: 1 bit;

(4) Parity check bit: None;

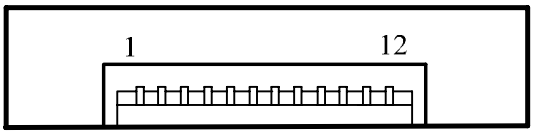
(5) Flow control: None.

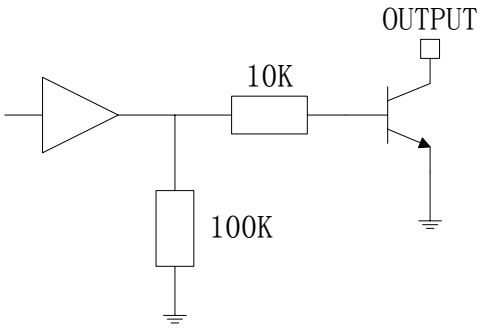
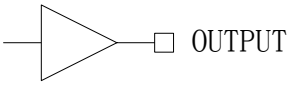
Command name	Command format	Comments
Stop_Scan	0xAA 0x01 0x00 0x55	
Start_GoodReadOff	0xAA 0x02 0x00 0x55	
Start_Continue	0xAA 0x03 0x00 0x55	
Restart	0xAA 0x07 0x00 0x55	

6 PIN assignment

6-1 FM 100-13x (with decoder) 12P connector PIN assignment

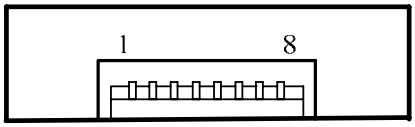
FM 100 provides a low profile ZIF 12-pin connector to connect to a 0.5 mm x 12 position FFC/FPC cable. The pin assignments are as follows:

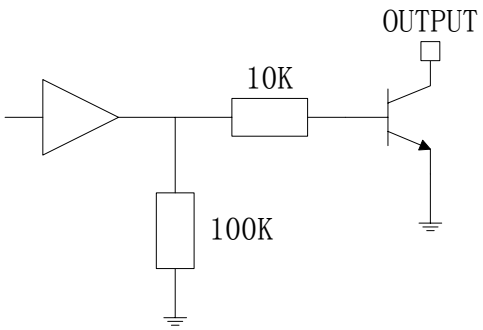
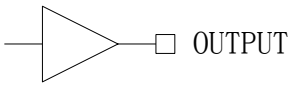


PIN No	Signal Name	Type	Description
1	Flash_DWLD	Input	Flash download. Do not drive high. Pull low for download.
2	VCC	Input	VCC(3.3V)
3	GND	Input	GND
4	RxD	Input	Received Date：Serial input port.
5	TxD	Output	Transmitted Data： Serial output port.
6	CTS	Input	Clear to Send：Serial port handshaking line.
7	RTS	Output	Request to Send：Serial port handshaking line.
8	PWRDWN	Output	Power down ready：When high， the decoder is in low power mode.
9	BPR	Output	Beeper: Low current beeper output.
10	DLED	Output	Decoder LED：Low current decode LED output.
11	WAKE	Input	Wake up: When decoder is in low power mode, pulses this pin low for 200 ns awakens it.
12	TRIG	Input	Trigger: Hardware triggering line，Driving this low pin causes the decoder to start a scan and decode session.
			Beeper output  **Other outputs** 

6-2 FM 100-00x (without decoder) 8P connector PIN assignment

FM 100 provides a low profile ZIF 8-pin connector to connect to a 0.5 mm x 8 position FFC/FPC cable. The pin assignments are as follows:



PIN No	Signal Name	Type	Description
1	GND	Input	GND
2	GND	Input	GND
3	FRAME SIGNAL	Output	Frame signal
4	DATA SIGNAL	Output	Bar code signal
5	PWR_AMP	Input	Amplifiers' power control. Pull up to turn on amplifier and pull low to turn off amplifier.
6	LASER_CTR	Input	Laser control. Pull up to turn on laser and pull down to turn off laser.
7	VCC	Input	Power 3.3V
8	VCC	Input	Power 3.3V
			Beeper output  **Other outputs** 

7 Installation

7-1 Introduction

This chapter provides information for mounting and installing the engine, including physical and electrical considerations and recommended window properties.

- **Grounding**

The engine chassis is connected to GROUND. If you are installing the engine to a hot or powered host, you must isolate the two. The best integration practice is to avoid ground loops wherever possible. There is a potential for creating a ground loop by grounding the engine chassis to the ground of the system in which the engine is being integrated.

If non-magnetic metallic screws are used, shoulder washers must be used to isolate the screws from the host. Non-metallic screws may also be used if mechanical considerations permit.

- **ESD**

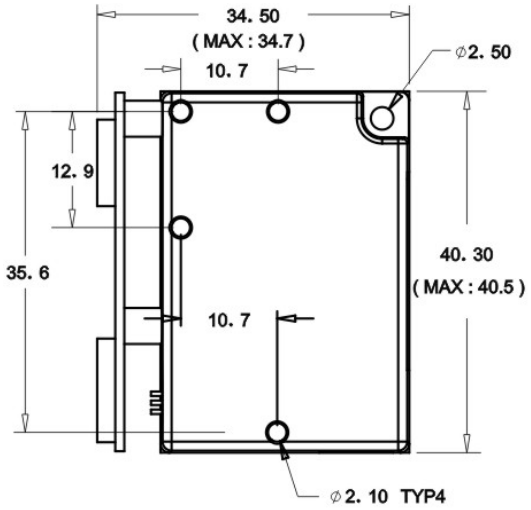
The engine is protected from ESD events that may occur in an ESD-controlled environment. Always exercise care when handling the module. Use grounding wrist straps and handle in a properly grounded work area.

- **Environment**

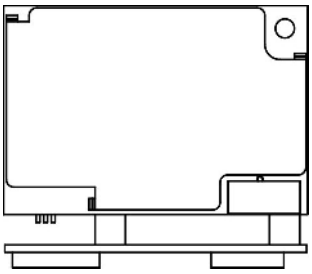
The engine must be sufficiently enclosed to prevent dust particles and moisture from gathering on the mirrors, laser lens, and the photodiode. Dust and other external contaminants will eventually cause degradation in unit performance. The performance of engine is not guaranteed when used in an exposed application.

7-2 Mounting

There are one big mounting-hole (M2.5) and four small mounting-holes (M2.1, at depth of 5mm) on the top of the chassis as shown in Figure 7-1.



Top View



Bottom View

Back View Side View

Figure 7-1 Mounting Diagram

Notes:

1- Chassis is electrically connected to ground and must be isolated from VCC.

2- Mounting screws must be nonmagnetic material. Do not place any magnetic material within 1 inch of the chassis without testing.

3- Dimensions are mm.

7-3 Exit window materials

Many window materials that look perfectly clear to the eye can contain stresses and distortions which affect the laser beam and reduce scan engine performance. Following are the description of three popular exit window materials:

- Poly-methyl Methacrylic (PMMA): Also known as Cell Cast Acrylic, and is relatively soft.
- Allyl Diglycol Carbonate (ADC): Also known as CR-39.
- Chemically tempered float glass

Among these three materials, the chemically tempered float glass is a hard material which provides the most excellent scratch and abrasion resistance. Note that the structure design must be well considered to pass drop test.

7-4 Exit window tilt angle

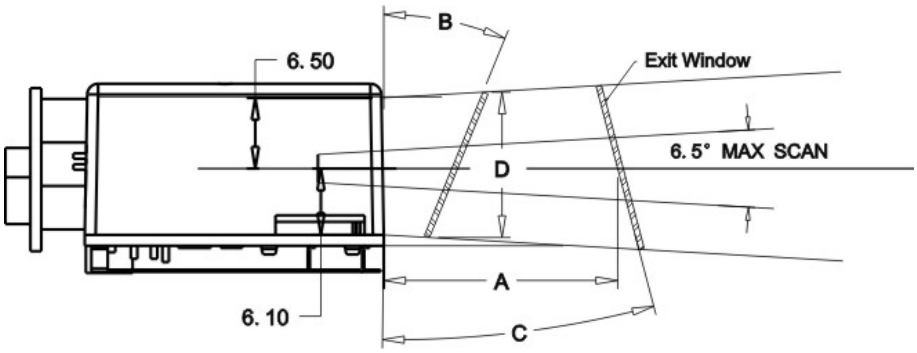


Figure 7-2 Exit Window Tilt Angle

Table 7-1 Exit window distance from engine: 0.14 in - 0.36 in (3.6 mm - 9 mm)

A	0.15/3.8	0.16/4.0	0.18/4.5	0.2/5.0	0.22/5.5	0.24/6.0	0.25/6.35
B	38.5°	37.8°	36.0°	35.0°	34.0°	33.0°	32.5°
C	38.5°	37.8°	36.0°	35.0°	34.0°	33.0°	32.5°

A	0.26/6.5	0.28/7.0	0.31/8.0	0.36/9.0	0.39/10.0	0.48/12.0	0.50/12.7
B	32.5°	30.0°	28.5°	27.0°	25.5°	22.5°	21.5°
C	32.5°	30.0°	28.5°	27.0°	25.5°	22.5°	21.5°

A	0.55/14.0	0.75/19.0	1.00/25.4	1.25/31.8	1.50/38.0	1.75/44.5	2.00/50.8
B	20.0°	16.0°	13.5°	12.0°	10.5°	9.5°	9.0°
C	20.0°	16.0°	13.5°	12.0°	10.5°	9.5°	9.0°

Note:

A: Distance from Scan Engine on center line (in/mm);

B: Minimum Window Positive Tilt (degrees);

C: Minimum Window Negative Tilt (degrees).

7-5 Exit window positioning

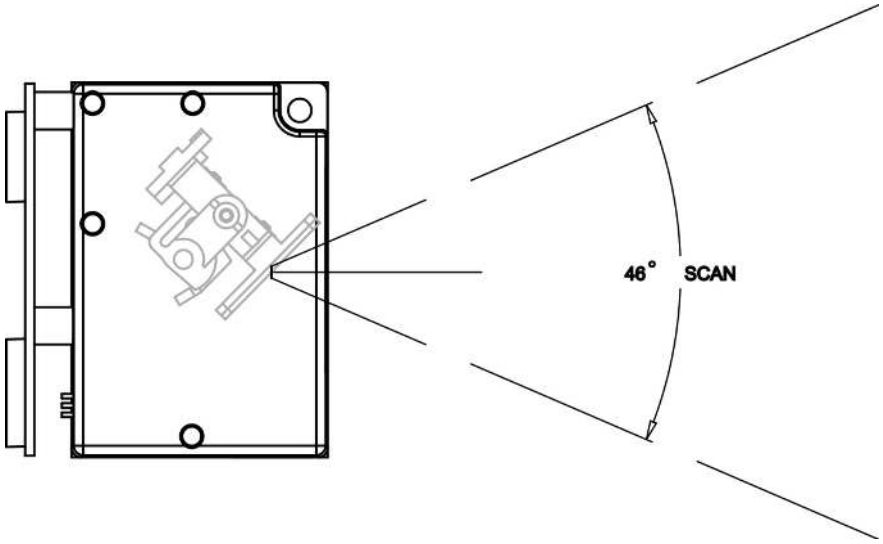


Figure 7-3 Exit Window Positioning

8 Barcode programming instruction

Refer to the next page, the steps of programming are:

a) Scan the **SETUP** bar code on the parameter setting part.

b) Enter the option mode by scanning the **Option bar code**.

c) To the right of the option barcode, the necessary alphanumeric inputs are listed. Scan these alphanumeric entries.

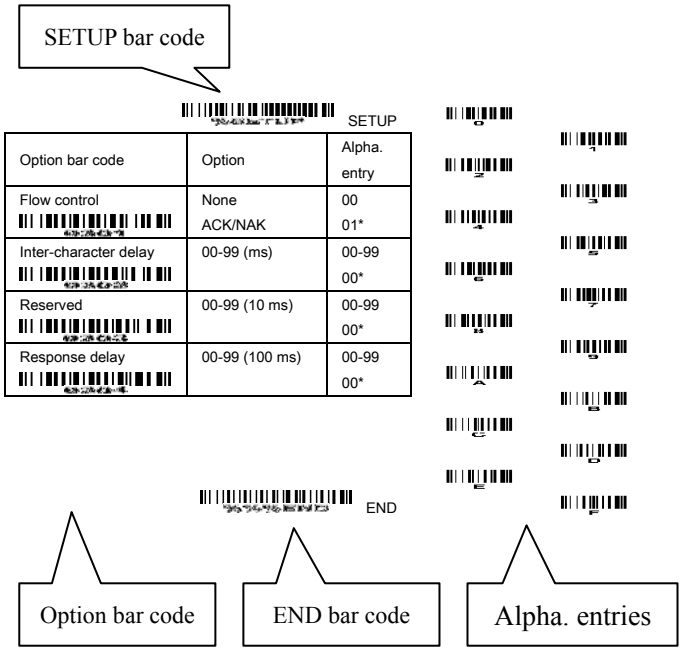
d) Scan the **END** bar code, listed on the lower right hand corner of each parameter setting part.

e) **Notes that only one parameter can be setup at each time.**

h) Throughout the programming bar code menus, the factory default settings are indicated with asterisks (*).

Example: to set Flow control to be None.

Steps: Scan the following barcodes in order.



Option bar code	Option	Alpha. entry
Flow control	None ACK/NAK	00 01*
Inter-character delay	00-99 (ms)	00-99 00*
Reserved	00-99 (10 ms)	00-99 00*
Response delay	00-99 (100 ms)	00-99 00*

Figure 8-1 Set Flow control to be None

8-1 UPC-A

Read: Format

Leading zero	Data digits (11 digits)	Check digit

Check digit verification: The check digit is optional.

Check digit trans.: By setting Enable, check digit will be transmitted.

Code ID setting: Code ID is a one-or-two-character string used to represent the symbol upon a succeeding reading. If you want application to transmit Code ID, you must set Code ID transmission to be enabled. Refer to the chapter of String transmission.

Insertion group selection: Refer to Global insertion group selection of the chapter of Hand-held scan & some global settings.

Supplement digits: The Supplement digits barcode is the supplemental 2 or 5 characters.

Format

Leading zero	Data digits (11 digits)	Check digit	Supplement digits 2 or 5

Truncation/Expansion:

Truncate leading zeros- The leading “0” digits of UPC-A data characters can be truncated when the feature is enabled.

Expand to EAN-13- It extends to 13-digits with a “0” leading digit when the feature is enabled.

%SETUP SETUP

Option bar code	Option	Alpha. entry
Read	Disable	00
	Enable	01*
Check digit verification	Disable	00
	Enable	01*
Check digit trans.	Disable	00
	Enable	01*
Code ID setting	00-FF_{16}	00-FF_{16}
	(ASCII)	<A>*
Insert group selection	00-66	00-66
		00*
Supplement digits	None	00*
	2 digits	01
	5 digits	02
	2 or 5 digits	03
Truncation/Expansion	None	00*
	Truncate leading zeros	01
	Expand to EAN-13	02
Reserved		

%%%END END

8-2 UPC-E

Read: Format

Leading zero	Data digits (6 digits)	Check digits

Check digit verification: The check digit is optional and made as the sum of the numerical value of the data digits.

Check digit trans.: By setting Enable, check digit will be transmitted.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Supplement digits:

Format

Leading zero	Data digits (6 digits)	Check digit	Supplement digits 2 or 5

Truncation/Expansion:

Truncate leading zeros- Refer to Truncation/Expansion of UPC-A.

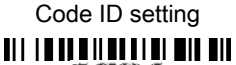
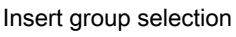
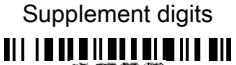
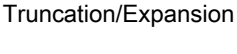
Expand to EAN-13- It extends to 13-digits with “0” digits when the feature is set to be enabled.

Example: Barcode “0123654”,

Output: “0012360000057”.

Expand to UPC-A- It extends to 12-digits when the feature is set to be enabled.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable	00
	Enable	01*
Check digit verification 	Disable	00
	Enable	01*
Check digit trans. 	Disable	00
	Enable	01*
Code ID setting 	00-FF_{16}	00-FF_{16}
	(ASCII)	<D>*
Insert group selection 	00-66	00-66
		00*
Supplement digits 	None	00*
	2 digits	01
	5 digits	02
	2 or 5 digits	03
Truncation/Expansion 	None	00*
	Truncate leading zeros	01
	Expand to EAN-13	02
	Expand to UPC-A	03
Reserved 		

END

8-3 EAN-13

Read:

Format

Data digits (12 digits)	Check digit

Check digit verification: The check digit is optional and made as the sum of the numerical value of the data digits.

Check digit transmission: By setting Enable, check digit will be transmitted.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Supplement digits:

Format

Data digits (12 digits)	Check digit	Supplement digits 2 or 5

ISBN/ISSN: The ISBN (International Standard Book Number) and ISSN (International Standard Serial Number) are two kinds of barcode for books and magazines. The ISBN is 10 digits with leading “978” and the ISSN is 8 digits with leading “977” of the EAN-13 symbology.

Example:

Barcode “9780194315104”, Output: “019431510X”.

Barcode “9771005180004”, Output: “10051805”.

%SETUP SETUP

Option bar code	Option	Alpha. entry
Read	Disable	00
	Enable	01*
Check digit verification	Disable	00
	Enable	01*
Check digit transmission	Disable	00
	Enable	01*
Code ID setting	00-FF_{16}	00-FF_{16}
	(ASCII)	<A>*
Insert group selection	00-66	00-66
		00*
Supplement digits	None	00*
	2 digits	01
	5 digits	02
	2 or 5 digits	03
ISBN/ISSN conversion	Disable	00*
	Enable	01
Reserved		

%%%END END

8-4 EAN-8

Read:

Format

Data digits (7 digits)	Check digit

Check digit verification: The check digit is optional and made as the sum of the numerical value of the data digits.

Check digit trans.: By setting Enable, check digit will be transmitted.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Supplement digits:

Format

Data digits (7 digits)	Check digit	Supplement Digits 2 or 5

Truncation/Expansion: Refer to Truncation/Expansion of UPC-A.

%SETUP SETUP

Option bar code	Option	Alpha. entry
Read	Disable	00
	Enable	01*
Check digit verification	Disable	00
	Enable	01*
Check digit trans.	Disable	00
	Enable	01*
Code ID setting	00-FF_{16}	00-FF_{16}
	(ASCII)	<A>*
Insert group selection	00-66	00-66
		00*
Supplement digits	None	00*
	2 digits	01
	5 digits	02
	2 or 5 digits	03
Truncation/Expansion	None	00*
	Truncate leading zero	01
	Expand to EAN-13	02
Reserved		

%%%END END

8-5 Code 39

Read:

Format

⋆	Data digits (variable)	Check digit (optional)	⋆

Check digit verification: The check digit is optional and made as the sum module 43 of the numerical value of the data digits.

Check digit transmission: By setting Enable, check digit will be transmitted.

Max./Min. code length: Each symbology has own max./min. code length. If both setting of max./min. code length are "00"s, the setting of global max./min. code length is effective. The length is defined as to the actual barcode data length to be sent. Label with length exceeds these limits will be rejected. Make sure that the minimum length setting is no greater than the maximum length setting, or otherwise all the labels of the symbology will not be readable. In particular, you can see the same value for both minimum and maximum reading length to force the fixed length barcode decoded.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Start/End transmission: The start and end characters of Code 39 are "⋆"s. You can transmit all data digits including two "⋆"s.

"⋆" as data character: By setting Enable, "⋆" can be recognized as data character.

Convert Code 39 to Code 32: Code 32 is a variant of Code 39 used by the Italian pharmaceutical industry. Note that Code 39 must be enabled in order for this parameter to function.

Format of Code 32

"A" (optional)	Data digits (8 digits)	Check digit

Code 32 Prefix "A" transmission: By setting Enable, the prefix character "A" can be added to all Code 32 barcodes.

Trioptic Code 39 read: Trioptic Code 39 is a variant of Code 39 used in the marking of magnetic tapes and computer cartridges. Trioptic Code 39 symbols always contain six characters.

Format

$	Data digits (6 digits)	$

Trioptic Code 39 Start/End transmission: The start and end characters of Trioptic Code 39 are "$"s. You can transmit all data digits including two "$"s.

SETUP

Option bar code	Option	Alpha. entry
Read	Disable	00
	Enable	01*
Check digit verification	Disable	00*
	Enable	01
Check digit transmission	Disable	00*
	Enable	01
Max. code length	00-99	00-99
		00*
Min. code length	00-99	00-99
		01*
Code ID setting	00-FF_{16}	00-FF_{16}
	(ASCII)	<M>*
Insert group selection	00-66	00-66
		00*
Format	Standard	00*
	Full ASCII	01
Start/End transmission	Disable	00*
	Enable	01
“★” as data character	Disable	00*
	Enable	01
Convert Code 39 to Code 32	Disable	00*
	Enable	01
Code 32 Prefix “A” transmission	Disable	00*
	Enable	01
Trioptic Code 39 read	Disable	00*
	Enable	01
Trioptic Code 39 Start/End transmission	Disable	00*
	Enable	01

END

8-6 Interleaved 2 of 5

Read:

Format

Data digits (Variable)	Check digit (optional)

Check digit verification: The check digit is made as the sum module 10 of the numerical values of all data digits. There are two optional check digit algorithms: the specified Uniform Symbology Specification (USS) and the Optical Product Code Council (OPCC).

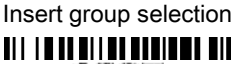
Check digit transmission: By setting Enable, check digit will be transmitted.

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00 01*
Check digit verification 	Disable USS OPCC	00* 01 02
Check digit transmission 	Disable Enable	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 06*
Code ID setting 	00-FF$_{16}$ (ASCII)	00-FF$_{16}$ <I>*
Insert group selection 	00-66	00-66 00*
Reserved 		

END

8-7 Industrial 2 of 5

Read:

Format

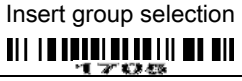
Data digits (variable)

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 00*
Code ID setting 	00-FF_{16} (ASCII)	00-FF_{16} <H>*
Insert group selection 	00-66	00-66 00*
Reserved 		

END

8-8 Matrix 2 of 5

Read:

Format

Data digits (variable)	Check digit (optional)

Check digit verification: The check digit is made as the sum module 10 of the numerical values of all data digits.

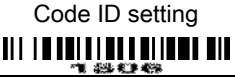
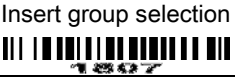
Check digit transmission: By setting Enable, check digit will be transmitted.

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00 01*
Check digit verification 	Disable Enable	00* 01
Check digit transmission 	Disable Enable	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 06*
Code ID setting 	00-FF_{16} (ASCII)	00-FF_{16} <X>*
Insert group selection 	00-44	00-44 00*
Reserved 		

END

8-9 Codabar

Read:

Format

Start	Data digits (variable)	Check digit (optional)	End

Check digit verification: The check digit is made as the sum module 16 of the numerical values of all data digits.

Check digit transmission: By setting Enable, check digit will be transmitted.

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Start/End type: Codabar has four pairs of Start/End pattern; you may select one pair to match your application.

Start/End transmission: Refer to Start/End transmission of Code 39.

Start/End character equality: By setting Enable, the start and end character of a Codabar barcode must be the same.

%SETUP SETUP

Option bar code	Option	Alpha. entry
Read	Disable	00
	Enable	01*
Check digit verification	Disable	00*
	Enable	01
Check digit transmission	Disable	00*
	Enable	01
Max. code length	00-99	00-99
		00*
Min. code length	00-99	00-99
		00*
Code ID setting	00-FF_{16}	00-FF_{16}
	(ASCII)	<N>*
Insert group selection	00-66	00-66
		00*
Start/End type	ABCD/ABCD	00*
	abcd/abcd	01
	ABCD/TN⋆E	02
	abcd/tn⋆e	03
Start/End transmission	Disable	00*
	Enable	01
Start/End character equality	Disable	00*
	Enable	01

%%%END END

8-10 Code 128

Read:

Format

Data digits (variable)	Check digit (optional)

Check digit verification: The check digit is made as the sum module 103 of all data digits.

Check digit transmission: By setting Enable, check digit will be transmitted.

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Truncate leading zeros: The leading “0” digits of Code 128 barcode characters can be truncated when the feature is enabled.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00 01*
Check digit verification 	Disable Enable	00 01*
Check digit transmission 	Disable Reserved	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 01*
Code ID setting 	00-FF_{16} (ASCII)	00-FF_{16} <K>*
Insert group selection 	00-66	00-66 00*
Truncate leading zeros 	Disable All leading “0”s Only the first “0”	00* 01 02

END

8-11 Code 93

Read:

Format

Data digits (variable)	2 check digits (optional)

Check digit verification: The check digit is made as the sum module 47 of the numerical values of all data digits.

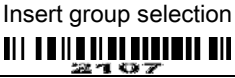
Check digit transmission: By setting Enable, check digit will be transmitted.

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00 01*
Check digit verification 	Disable Enable	00 01*
Check digit transmission 	Disable Enable	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 01*
Code ID setting 	00-FF_{16} (ASCII)	00-FF_{16} <L>*
Insert group selection 	00-66	00-66 00*
Reserved 		

END

8-12 Code 11

Read:

Format

Data digits (variable)	Check digit 1 (optional)	Check digit 2 (optional)

Check digit verification: The check digit is presented as the sum module 11 of all data digits.

Check digit transmission: By setting Enable, check digit 1 and check digit 2 will be transmitted upon your selected check digit verification method.

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00* 01
Check digit verification 	Disable One digit Reserved Reserved	00 01* 02 03
Check digit transmission 	Disable Enable	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 00*
Code ID setting 	$00\text{-}FF_{16}$ (ASCII)	$00\text{-}FF_{16}$ <V>*
Insert group selection 	00-66	00-66 00*
Reserved 		

END

8-13 MSI/Plessey

Read:

Format

Data digits (variable)	Check digit 1 (optional)	Check digit 2 (optional)

Check digit verification: The MSI/Plessey has one or two optional check digits. There are three methods of verifying check digits, i.e. Mod10, Mod10/10 and Mod 11/10. The check digit 1 and check digit 2 will be calculated as the sum module 10 or 11 of the data digits.

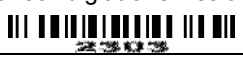
Check digit transmission: By setting Enable, check digit 1 and check digit 2 will be transmitted upon your selected check digit verification method.

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00* 01
Check digit verification 	Disable 1 digit (mod 10) Reserved Reserved	00* 01 02 03
Check digit transmission 	Disable Enable	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 00*
Code ID setting 	00-FF$_{16}$ (ASCII)	00-FF$_{16}$ <O>*
Insert group selection 	00-66	00-66 00*
Reserved 		

END

8-14 UK/Plessey

Read:

Format

Data digits (variable)	2 check digits (optional)

Check digit verification: The UK/Plessey has one or two optional check digits. The check digit 1 and check digit 2 will be calculated as the sum module 10 or 11 of the data digits.

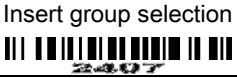
Check digit transmission: By setting Enable, check digit will be transmitted.

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00 01*
Check digit verification 	Disable Enable	00 01*
Check digit transmission 	Disable Enable	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 01*
Code ID setting 	00-FF_{16} (ASCII)	00-FF_{16} <U>*
Insert group selection 	00-66	00-66 00*
Reserved 		

END

8-15 UCC/EAN 128

Read:

Format

Data digits (variable)	Check digit (optional)

Check digit verification: The check digit is made as the sum module 103 of all data digits.

Check digit transmission: By setting Enable, check digit will be transmitted.

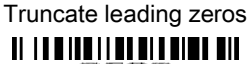
Max. /Min. code length: Refer to Max./Min. code length of Code 39.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Truncate leading zeros: Refer to Truncate leading zeros of Code 128.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00 01*
Check digit verification 	Disable Enable	00 01*
Check digit transmission 	Disable Reserved	00* 01
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 01*
Code ID setting 	$00\text{-}FF_{16}$ (ASCII)	$00\text{-}FF_{16}$ <K>*
Insert group selection 	00-66	00-66 00*
Truncate leading zeros 	Disable All leading “0”s Only the first “0”	00* 01 02

END

8-16 China Post

Read:

Format

11 Data digits

Max. /Min. code length: Refer to Max./Min. code length of Code 39. The code length of China Post is 11.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read	Disable Enable	00 01*
Reserved		
Reserved		
Max. code length	00-99	00-99 11*
Min. code length	00-99	00-99 11*
Code ID setting	00-FF_{16} (ASCII)	00-FF_{16} <T>*
Insert group selection	00-66	00-66 00*
Reserved		

END

8-17 GS1 DataBar (GS1 DataBar Truncated)

GS1 DataBar Truncated is structured and encoded the same as the standard GS1 DataBar format, except its height is reduced to a 13 modules minimum; while GS1 DataBar should have a height greater than or equal to 33 modules.

Read:

Format

16 Data digits

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Conversion:

UCC/EAN 128- Refer to Code ID transmission of String transmission,]Cm will be identified as AIM ID.

UPC-A or EAN-13- Barcode beginning with a single zero as the first digit has the leading “010” stripped and the barcode reported as EAN-13. Barcode beginning with two or more zeros but not six zeros has the leading “0100” stripped and the barcode reported as UPC-A.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00 01*
Code ID setting 	00-FF_{16} (ASCII)	00-FF_{16} <R >*
Insert group selection 	00-66	00-66 00*
Conversion 	None UCC/EAN 128 UPC-A or EAN-13	00* 01 02
Reserved 		

END

8-18 GS1 DataBar Limited

Read:

Format

16 Data digits

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Conversion: Refer to Conversion of GS1 DataBar (GS1 DataBar Truncated).

%SETUP SETUP

Option bar code	Option	Alpha. entry
Read	Disable	00
	Enable	01*
Code ID setting	00-FF_{16}	00-FF_{16}
	(ASCII)	<R >*
Insert group selection	00-66	00-66
		00*
Conversion	None	00*
	UCC/EAN 128	01
	UPC-A or EAN-13	02
Reserved		

%%%END END

8-19 GS1 DataBar Expanded

Read:

Format

Data characters (variable)

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

Conversion:

UCC/EAN 128- Refer to Code ID transmission of String transmission,]Cm will be identified as AIM ID.

SETUP

Option bar code	Option	Alpha. entry
Read 	Disable Enable	00 01*
Max. code length 	00-99	00-99 00*
Min. code length 	00-99	00-99 01*
Code ID setting 	00-FF_{16} (ASCII)	00-FF_{16} <R >*
Insert group selection 	00-66	00-66 00*
Conversion 	None UCC/EAN 128	00* 01
Reserved 		

END

8-20 China Finance

Note: This type of barcode is not Omni-directionally decodable. The encodable character set includes numeric 0 to 9. Among the symbol of 0 to 9, 0 and 2, 4 and 9, 5 and 8, 6 and 7, have the symmetrical pattern; the pattern of 1 and 3 is symmetrical.

Read:

Format

10 Data digits

Max./Min. code length: Refer to Max./Min. code length of Code 39.

Check digit verification: The check digit is made as the sum module 10 of the numerical values of all data digits.

Leading character 5/6/7/8/9 converted to A/B/C/D/E: By setting, leading character 5/6/7/8/9 can be converted to A/B/C/D/E.

Leading character assignment: By setting, only the barcode with the assigned leading character can be output.

Code ID setting: Refer to Code ID setting of UPC-A.

Insertion group selection: Refer to Insertion group selection of UPC-A.

%SETUP SETUP

Option bar code	Option	Alpha. entry
Read	Disable	00
	Enable	01*
Max. code length	00-99	00-99
		10*
Min. code length	00-99	00-99
		10*
Check digit verification	Disable	00*
	Reserved	01
Leading character 5/6/7/8/9 converted to A/B/C/D/E	Disable	00
	Enable	01*
	Only 5 converted to A	02
	Only 6 converted to B	03
	Only 7 converted to C	04
	Only 8 converted to D	05
	Only 9 converted to E	06
Leading character assignment	Disable	00
	Assigned to 0	01*
	Assigned to 5(A)	02
	Assigned to 6(B)	03
	Assigned to 7(C)	04
	Assigned to 8(D)	05
	Assigned to 9(E)	06
	Assigned to 1	07
	Assigned to 2	08
	Assigned to 3	09
	Assigned to 4	10
Code ID setting	00-FF_{16}	00-FF_{16}
	(ASCII)	<Y>*
Insert group selection	00-66	00-66
		00*

%%%END END

%%LLDS

Laser Light Direction Setting: By scanning the barcode above, the decoding direction of the scanner's laser light is from left to right. By scanning the up-side-down barcode above, the decoding direction of the scanner's laser light is from right to left.

8-21 G1-G6 & FN1 substitution string setting

Format of barcode data transmission

Prefix	Code name	Preamble	Code ID	Code length	Code data	Code ID	Postamble	Suffix

Suffix string setting: The <enter > key is represented in different ASCII when it is applied by different OS. For a Windows/DOS OS, <enter> is represented as <CR><LF> (0x0D 0x0A); for an APPLE MAC OS, <enter> is represented as <CR> (0x0D); for a Linux/Unix OS, <enter> is represented as <LF> (0x0A).

Prefix/Suffix string setting: & **Preamble/Postamble string setting:**

They are appended to the data automatically when a barcode is decoded.

Example: Add a symbol of "$" as a prefix for all symbologies.

Steps:

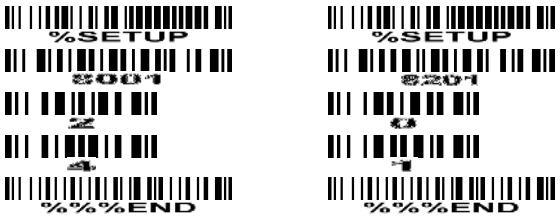
1) Scan SETUP and Prefix string setting barcode.

2) Use the ASCII table to find the value of $→24.

3) Scan 2 and 4 from the barcode on the foldout back page.

4) Scan END barcode.

Scanning steps: Scan the following barcodes in order.



Insert G1/G2/G3/G4 string setting: The scanner offers 4 positions and 4 character strings to insert among the symbol.

Example: Set G1 string to be "AB".

Original code data	"1 2 3 4 5 6"
Output code data	"1 2 A B 3 4 5 6"

Steps:

1) Scan SETUP and Insert G1 string setting barcode "8005".

2) Use the ASCII table to find the value of A→41, B→42.

3) Scan 4, 1 and 4, 2 from the barcode on the foldout back page.

4) Scan END barcode.

5) Refer to the chapter of G1-G4 string position & Code ID position.

6) Refer to the chapter of Hand-held scan & some global settings.

Testing barcode:

FN1 substitution string setting: The FN1 character (0x1D) in an UCC/EAN128 barcode, or a Code 128 barcode, or a GS1 DataBar barcode can be substituted with a defined string.

Truncate leading G5 string setting: By setting, a defined leading character or string can be truncated. Also a single character can be un-defined.

Repeat of a G5 character setting: While G5 is set as a single defined/un-defined character, G5 can also be set to be repeated. This setting is ignored when the truncate number is more than the barcode data characters. The option of "FF" for this setting is not active while the option of Truncate leading G5 string setting is "00".

Example: Truncate all leading zeros for all symbologies.

Original code data	"0 0 0 1 2 3 4 5 6"
Output code data	"1 2 3 4 5 6"

Steps: scan the following data in order.

Testing barcode:

Truncate ending G6 string setting: By setting, a defined ending character or string can be truncated. Also a single character can be un-defined.

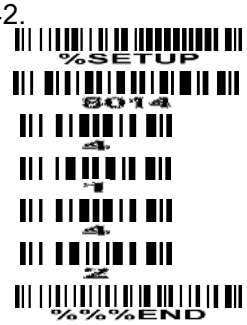
Repeat of a G6 character setting: While G5 is set as a single defined/un-defined character, G6 can also be set to be repeated. This setting is ignored when the truncate number is more than the barcode data characters. The option of "FF" for this setting is not active while the option of Truncate ending G6 string setting is "00".

Single character C1/C2 replacement: By setting, a defined character in the data string can be replaced by another defined character. The C1 and C2 replacement are applied simultaneously.

Example: Replace all the "A" character in a data string to be "B" character.

Original code data	"1 2 3 A 5 A"
Output code data	"1 2 3 B 5 B"

Steps: scan the following barcodes in order. The ASCII value for "A" is 41, and the ASCII value for "B" is 42.



Testing barcode:

%SETUP SETUP

Option bar code	Option	Alpha. entry
Prefix string setting	0-22 characters	00-FF$_{16}$
	None	00*
Suffix string setting	0-22 characters	00-FF$_{16}$
	<ENTER>	0A0D*
Preamble string setting	0-22 characters	00-FF$_{16}$
	None	00*
Postamble string setting	0-22 characters	00-FF$_{16}$
	None	00*
Insert G1 string setting	0-22 characters	00-FF$_{16}$
	None	00*
Insert G2 string setting	0-22 characters	00-FF$_{16}$
	None	00*
Insert G3 string setting	0-22 characters	00-FF$_{16}$
	None	00*
Insert G4 string setting	0-22 characters	00-FF$_{16}$
	None	00*
FN1 substitution string setting	0-4 characters	00-FF$_{16}$
	<SP>	20*
Truncate leading G5 string setting	A un-defined character	00
	1-22 defined characters	01-7F$_{16}$
	<0>	30*
Repeat of a G5 character setting	Once	01*
	Defined times	01-22
	Un-defined times (All)	FF
Truncate ending G6 string setting	A un-defined character	00
	1-22 defined characters	01-7F$_{16}$
	<0>	30*
Repeat of a G6 character setting	Once	01*
	Defined times	01-22
	Un-defined times (All)	FF
Single character C1 replacement	<0000>	0000*
		0000-FFFF $_{16}$
Single character C2 replacement	<0000>	0000*
		0000-FFFF $_{16}$

%%%END END

8-22 G1-G4 string position & Code ID position

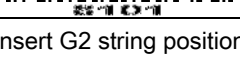
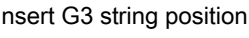
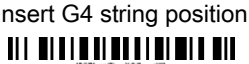
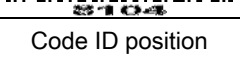
Format of barcode data transmission

Prefix	Code name	Preamble	Code ID	Code length	Code data	Code ID	Postamble	Suffix

Insert G1/G2/G3/G4 string position: The scanner offers 4 positions to insert strings among the symbol. In case of the insertion position is greater than the length of the symbol, the insertion of string is not effective.

Code ID position: It is allowed to select different positions of code ID placement.

SETUP

Option bar code	Option	Alpha. entry
Insert G1 string position 	00-99	00-99 00*
Insert G2 string position 	00-99	00-99 00*
Insert G3 string position 	00-99	00-99 00*
Insert G4 string position 	00-99	00-99 00*
Code ID position 	Before code data After code data	00* 01
Reserved 		
Reserved 		

END

8-23 String transmission

Note: The information in this chapter is closely related to the chapter of String setting.

Format of barcode data transmission

Prefix	Code name	Preamble	Code ID	Code length	Code data	Code ID	Postamble	Suffix

Prefix transmission: By setting Enable, prefix will be appended before the data transmitted.

Suffix transmission: By setting Enable, suffix will be appended after the data is transmitted.

Code name transmission: By setting Enable, code name will be transmitted before code data.

Preamble transmission: By setting Enable, preamble will be appended before the data transmitted.

Postamble transmission: By setting Enable, postamble will be appended after the data is transmitted.

Code ID transmission: Code ID can be transmitted in the format of either Proprietary ID or AIM ID. Refer to the chapter of Default setting for each barcode.

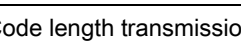
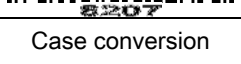
Code length transmission: The length of code data string can be transmitted before the code data when Enable is selected. The length is represented by a number with two digits.

Case conversion: The characters within code data or the whole output string can be set in either upper case or lower case.

FN1 substitution transmission: The scanner supports a FN1 substitution feature for keyboard wedge, USB and RS-232 interface. The replacement string of FN1 can be chosen by user (see chapter of G1-G6 & FN1 substitution string setting).

All-non-printable-character string transmission with string setting: By setting enable, all string settings, e.g. Preamble transmission or Insert G1 string setting, are active for an all-non-printalbe-character string. Here a non-printable character means a character with ASCII value between 0x00 to 0x1F.

SETUP

Option bar code	Option	Alpha. entry
Prefix transmission 	Disable	00*
	Enable	01
Suffix transmission 	Disable	00
	Enable	01*
Code name transmission 	Disable	00*
	Enable	01
Preamble transmission 	Disable	00*
	Enable	01
Postamble transmission 	Disable	00*
	Enable	01
Code ID transmission 	Disable	00*
	Proprietary ID	01
	AIM ID	02
Code length transmission 	Disable	00*
	Enable	01
Case conversion 	Disable	00*
	Upper (data only)	01
	Lower (data only)	02
	Upper (whole string)	03
	Lower (whole string)	04
FN1 substitution transmission 	Disable	00*
	Keyboard wedge/USB	01
	RS-232	02
	Keyboard wedge/USB/RS-232	03
All-non-printable-character string transmission with string setting 	Disable	00*
	Enable	01

END

9 Test Chart

UPC-A

UPC-E

EAN-8

EAN-13

Code 39

Code 32

Code 128

Interleaved 2 of 5

Industrial 2 of 5

Matrix 2 of 5

Code 93

UCC/EAN 128

Code 11

(Default setting: Read disable)

MSI/Plessey

(Default setting: Read disable)

UK/Plessey

ISBN/ISSN

China Post

GS1 DataBar (GS1 DataBar Truncated)

GS1 DataBar Limited

GS1 DataBar Expanded

PDF417

01Az+-=

MicroPDF417

23+-mdo

10 ASCII Table

	for keyboard wedge		for RS-232	
H / L	0	1	0	1
0	Null		NUL	DLE
1	Up	F1	SOH	DC1
2	Down	F2	STX	DC2
3	Left	F3	ETX	DC3
4	Right	F4	EOT	DC4
5	PgUp	F5	ENQ	NAK
6	PgDn	F6	ACK	SYN
7		F7	BEL	ETB
8	Bs	F8	BS	CAN
9	Tab	F9	HT	EM
A		F10	LF	SUB
B	Home	Esc	VT	ESC
C	End	F11	FF	FS
D	Enter	F12	CR	GS
E	Insert	Ctrl+	SO	RS
F	Delete	Alt+	SI	US

Notes: The 2nd and the 3rd columns above are used for keyboard wedge only.

H / L	2	3	4	5	6	7
0	SP	0	@	P	`	p
1	!	1	A	Q	a	q
2	“	2	B	R	b	r
3	#	3	C	S	c	s
4	$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	‘	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	i	y
A	*	:	J	Z	j	z
B	+	;	K	[	k	{
C	,	<	L	\	l	|
D	-	=	M	]	m	}
E	.	>	N	^	n	~
F	/	?	O	_	o	DEL

Example: ASCII “A” = “41”.

11 Barcode representing non-printable character

Notes to make the following barcode:

1. According to different barcode printing software, the method of printing following barcode is different.
2. If using CODESOFT software, firstly read the information through “Help→Index→Code128→Special input syntax”. Also refer to ASCII table. For example, if we wish to make “F1” barcode, select “code128”, then select “CODE A” type, and input “{DOC1}” as data.

Up ↑

Down ↓

Left ←

Right →

Page Up

Page Down

Backspace

Tab

Home

End

Enter

Insert

Delete

F1

F2

F3

F4

F5

F6

F7

F8

F9

F10

Esc

F11

F12

12 Return default parameters & others

WARNING: Default value initialization

If you wish to return the scanner to all the factory default settings, scan the barcode above.

Firmware version list

If you wish to display the firmware version, scan the barcode above.

13 Configuration alphanumeric entry barcode