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because we care

Rugged Handheld Laser Scanner

- MS851 -

User's Manual

Version 1.4

Change Log

Date	Change Description	Version
2019/9/3	first published version	1.0
2020/2/3	Update contents	1.1
2020/5/8	Update chapter two (2.3)	1.2
2021/6/15	Update RS232 setting	1.3
2021/12/6	Remove 2.4.3 Beeper Tone and Update 2.4.2 Beeper Volume	1.4

Preface

About This Manual

Thank you for purchasing the unitech product.
This manual explains how to install, operate and maintain our product.

Regulatory Compliance Statements

FCC Warning Statement

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference with radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

–Reorient or relocate the receiving antenna.
–Increase the separation between the equipment and receiver.
–Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

–Consult the dealer or an experienced radio/TV technician for help.

1. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. To maintain compliance with FCC RF exposure requirements, avoid direct contact to the transmitting antenna during transmitting.
3. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.

Operation on the 5.15 - 5.25GHz frequency band is restricted to indoor use only. The FCC requires indoor use for the 5.15-5.25GHz band to reduce the potential for harmful interference to co-channel Mobile Satellite Systems. Therefore, it will only transmit on the 5.25-5.35 GHz, 5.47-5.725 GHz and 5.725 – 5.850 GHz band when associated with an access point (AP).

FCC Label Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

RF Radiation Exposure Statement

For body contact during operation, this device has been tested and meets FCC RF exposure guidelines when used with an accessory that contains no metal and that positions the handset a minimum of 1.5 cm from the body.
Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

Canadian Compliance Statement

This Class B Digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe B respecte les exigences du Reglement

sur le material broilleur du Canada.

European Conformity Statement

unitech Electronics co., Ltd herewith declares that the unitech product is in compliance with the essential requirements and all other provisions of the RED 2014/53/EU directive, the EMC 2014/30/EU directive and the Low Voltage 2014/35/EU directive.
The declaration of conformity is available for download at :
https://portal.unitech.eu/public/Safetyregulatorystatement

CE RF Exposure Compliance

This device meets EU requirements (2014/53/EU) on the limitation of exposure of the general public to electromagnetic fields by way of health protection.
For body-worn operation, this device has been tested and meets the ICNIRP guidelines and the European Standard EN 62209-2, for use with dedicated accessories, SAR is measured with this device at a separation of 0.5 cm to the body, while transmitting at the highest certified output power level in all frequency bands of this device. Use of other accessories which contain metals may not ensure compliance with ICNIRP exposure guidelines.

CE Mark Warning

CE

This equipment complies with the requirements of Directive 2014/53/EU of the European Parliament and Commission from 24 May, 2014 governing Radio and Telecommunications Equipment and mutual recognition of conformity.

RoHS Statement

This device conforms to RoHS (Restriction of Hazardous Substances) European Union regulations that set maximum concentration limits on hazardous materials used in electrical and electronic equipment.

Waste electrical and electronic equipment (WEEE)

unitech has set up a policy and process to meet the EU directive 2002/96/EC and update 2003/108/EC concerning electronic waste disposal.

For more detailed information of the electronic waste disposal of the products you have purchased from unitech directly or via unitech's resellers, you shall either contact your local supplier or visit us at : https://portal.unitech.eu/public/WEEE

Taiwan NCC Warning Statement

低功率電波輻射性電機管理辦法

第十二條：經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條：低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信法規定作業之無線電通信。
低功率射頻電機需忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

注意事項:

1. 使用過度恐傷害視力。
2. 使用30分鐘請休息10分鐘；2歲以下幼兒不看螢幕，2歲以上每天看螢幕不要超過1小時。
3. 減少電磁波影響，請妥適使用。

Laser Information

The unitech product is certified in the U.S. to conform to the requirements of DHHS/CDRH 21CFR Subchapter J and to the requirements of IEC 825-1. Class II and Class 2 products are not considered to be hazardous. The unitech product contains internally a Visible Laser Diode (VLD) whose emissions do not exceed the maximum limits as set forth in the above regulations. The scanner is designed so that there is no human access to harmful laser light during normal operation, user maintenance or prescribed service operations.

The laser safety warning label required by the DHHS/IEC for the unitech product's optional laser scanner module is located on the memory compartment cover, on the back of the unit.

* Laser information only applies to the products with laser components.

CAUTION! Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser light. Use of optical instruments with the scanner, including binoculars, microscopes, and magnifying glasses, with will increase eye damage. This does not include eyeglasses worn by the user.

LED Information

The unitech product contains LED indicator(s) or LED ring whose luminance is not harmful to human eyes during normal operation, user maintenance or prescribed service operations.

*LED information only applies to the products with LED components.

Battery Notice

1. To guarantee optimal performance, it is recommended that rechargeable batteries be replaced every year, or after 500 charging cycles are completed. It is normal for the battery to balloon or expand after one year or 500 cycles. Although it does not cause damage, it cannot be used again and must be disposed of according to the location's safe battery disposal procedures.
2. If a battery performance decreases more than 20%, the battery is at the end of its life cycle. Stop use and ensure the battery is disposed of properly.
3. The length of time that a battery lasts depends on the battery type and how the device is used. Conserve the battery life by doing the following:
   - Avoid fully uncharging the battery because this places additional strain on it. Several partial uncharges with frequent charges are better than a fully uncharged battery. Charging a partially charged battery does not cause harm to the unit.
   - Keep the battery cool. Avoid hot vehicles. For prolonged storage, keep the battery at a 40% charge level.
   - Do not leave the battery uncharged and unused for an extended period of time, the battery will wear out and the longevity of the battery will be at least half of one with frequent charges.
4. Protect battery life by not over or under charging the battery.
5. Please do not leave battery unused for long time without charging it. Despite unitech's safety precautions, the battery pack may begin to change shape. If so, stop using it immediately. Please check to see if you are using a proper power adapter to charge the battery or contact your service provider for service.
6. If you cannot charge the battery after it has been idle for an extended period of time and it begins to heat up, please do not try to charge it. It may not be functional anymore.
7. Please only use the original battery from unitech. Using a third party battery can damage our products. Please note that when such damage occurs, it is not covered by your warranty.

CAUTION!

- RISK OF EXPLOSION IF BATTERY IS REPLACED INCORRECTLY.
  DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.
- 如果更換不正確之電池行事會有爆炸的風險
  請依製造商說明書處理用過之電池
- 如果更换不正确之电池行事会有爆炸的风险
  请依制造商说明书处理用过之电池

Battery charge notice

It is important to consider temperature when the battery pack is charging. Charging is most efficient at normal room temperature or in a slightly cooler environment. It is essential that batteries are charged within the stated range of 0˚C to 40˚C. Charging batteries outside of the specified range could damage the batteries and shorten their life cycle.

CAUTION! Do not charge batteries at a temperature lower than 0˚C. This will and make the batteries unstable and dangerous. Please use a battery temperature detecting device for a charger to ensure a safe charging temperature range.

CAUTION! To ensure the unit working properly, please keep all connectors away from the contaminants staying inside of them such as dust, grease, mud, and water. The negligence may cause the unit with no communication, short circuited, overheated and so on.

CAUTION! If the connector is damaged, please ensure the connector is being fully repaired before use the unit to avoid causing short circuited.

Storage and safety notice

Although charged batteries may be left unused for several months, their capacity may be depleted due to build up of internal resistance. If this happens, they will require recharging prior to use. Batteries may be stored at temperatures between -20°C to 60°C, however they may deplete more rapidly at higher temperatures. It is recommended to store batteries at room temperature.

** The message above only applies to the usage of the removable batteries. For the products with non-removable batteries / without batteries, please refer to the specification of each product.*

Product Operation and Storage Notice

The unitech product has applicable operation and storage temperature conditions. Please follow the limitation of suggested temperature conditions to avoid failure, damage or malfunction.

**For applicable temperature conditions, please refer to the specification of each product.*

Adapter Notice

1. Please do not leave the power adapter in the socket when it is not connected to your unitech product for charging.
2. Please remove the power adapter when the battery is fully recharged.
3. The bundled power adapter that comes with your unitech product is not meant to be used outdoors. An adapter exposed to water or rain, or a very humid environment can cause damage to both the adapter and the product.
4. Please only use the bundled power adapter or same specification of adapter to charge your unitech product. Using the wrong power adapter can damage your unitech product.

** The message above only applies to the product connected to the adapter. For the products without using the adapters, please refer to the specification of each product.*

Hearing Damage Warning

Zx.3 Warning

The warning shall be placed on the equipment, or on the packaging, or in the instruction manual and shall consist of the following:

- the symbol of Figure 1 with a minimum height of 5 mm; and
- the following wording, or similar :

To prevent possible hearing damage, do not listen at high volume levels for long periods.

Figure 1 – Warning label (IEC 60417-6044)

Alternatively, the entire warning may be given through the equipment display during use, when the user is asked to acknowledge activation of the higher level.

Worldwide Support

unitech's professional support team is available to quickly answer questions or assist with technical-related issues. Should an equipment problem occur, please contact the nearest unitech regional service representative.
For complete contact information please visit the Web sites listed below:

Taipei, Taiwan – Headquarters		Europe	
Tel:	+886-2-89121122	**Tel:**	+31-13-4609292
E-mail:	info@hq.ute.com	**E-mail:**	info@eu.ute.com
Address:	5F, No. 136, Lane 235, Baoqiao Road, Xindian District, New Taipei City 231, Taiwan (R.O.C.)	**Address:**	Kapitein Hatterasstraat 19, 5015 BB, Tilburg, the Netherlands
Website:	http://www.ute.com	**Website:**	http://eu.ute.com
China		**Japan**	
Tel:	+86-59-2310-9966	**Tel:**	+81-3-35232766
E-mail:	info@cn.ute.com	**E-mail:**	info@jp.ute.com
Address:	Room401C, 4F, RIHUA International Mansion, Xinfeng 3nd Road, Huoju Hi-tech District, Xiamen, Fujan , China	**Address:**	Kayabacho Nagaoka Building 8F.,1-5-19 Shinkawa, Chuo-Ku, Tokyo, 104-0033, Japan
Website:	http://cn.ute.com	**Website:**	http://jp.ute.com
Asia & Pacific / Middle East		**Latin America**	
Tel:	+886-2-27911556	**Tel:**	+52-55-5171-0528
E-mail:	info@apac.ute.com info@india.ute.com info@mideast.ute.com	**E-mail:**	info@latin.ute.com
Address:	4F., No. 236, ShinHu 2nd Rd., NeiHu Chiu, 114, Taipei,Taiwan	**Address:**	17171 Park Row, Suite 210 Houston, TX 77084USA (Rep.)
Website:	http://apac.ute.com / http://mideast.ute.com	**Website:**	http://latin.ute.com
North America		**Please scan QR Code to visit us :**	
Tel:	+1-714-8926400		
E-mail:	info@us.ute.com / info@can.ute.com		
Address:	6182 Katella Ave, Cypress, CA 90630, USA		
Website:	http://us.ute.com		

Warranty Policy

The items covered under the unitech Limited Warranty are free from defects during normal use.
The warranty period is varied from each country. Please consult with your supplier or unitech local office for actual length of warranty period to your purchased product.

Warranty becomes void if equipment is modified, improperly installed or used, damaged by accident or neglect, or if any parts are improperly installed or replaced by the user.

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Chapter 1 - Overview

1.1 Package

Please make sure the following contents are in the MS851 gift box.
If something is missing or damaged, please contact your unitech representative.

The standard package contents:

- MS851 Rugged Handheld Laser Scanner
- Cable
- Quick Start Guide
- Regulatory Compliance Statements

NOTE: ***The barcode with an asterisk (*) which appears in the following chapters indicates that it is the default option for the corresponding setting.***

1.2 Product Detail

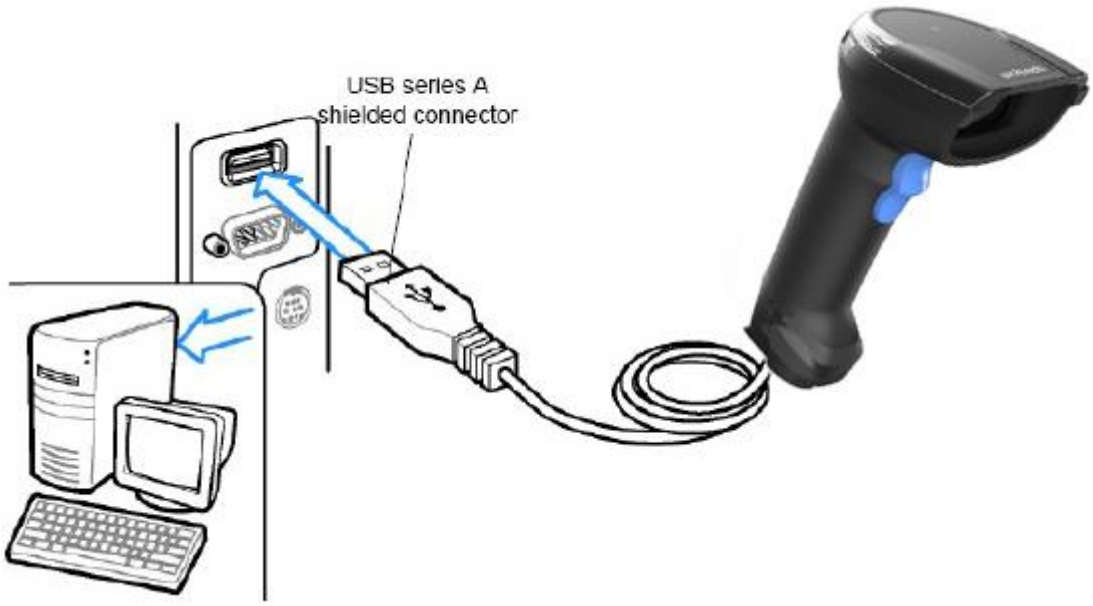
1.3 Specifications

Optical & Performance	
Receiving Device	Laser Engine
Light Source	650 nm visible laser diode
Scan Rate	104 (± 12) scans/sec (bidirectional)
Skew Angle	±40° from normal
Pitch Angle Sensor	±65° from normal
Optical Resolution	4mil (0.1mm)
Printing Contrast Scale	Minimum 20%
Depth of Field (DOF PCS=80%)	Symbology | Density | Near | Far Code 128, 5 mils | 3.55 cm | 17.78 cm Code 39, 5 mils | 3.05 cm | 26.67 cm Code 39, 7.5 mils | 3.04 cm | 41.91 cm Code 128, 10 mils | 3.05 cm | 40.46cm UPC, 13 mils | 4.57 cm | 63.50 cm Code 128, 15 mils | 5.08 cm | 66.04 cm Code 39, 20 mils | 3.56 cm | 116.84 cm Code 39, 55 mils | 8.64 cm | 177.80 cm Code 39, 100 mils | 60.96 cm | 457.20 cm
Communication	
Host Interface supported	USB
Mechanical	
Dimension	87.8mm x 177.7mm x71.6 mm (L x H X W)
Weight	147g without cable
Switch Life	10 million times

Functionality	
Symbologies	Code 39, Full ASCII Code39, Interleave 2 of 5, UPC A/E/E1, MSI, Codabar, Code 11, EAN8/13, Code 93, Code 128, EAN128, Code32, GS1 databar Code, Bookland EAN, Discreate 2 of 5, Chinese 2 of 5, ISBT 128, UCC Coupon Extended Code, Bookland 128
Operation Mode	Trigger mode, Pulse mode, Flash mode, Continuous Mode
Data Formatting	Prefix, Suffix, Code ID, Reformatting Date
Electrical	
Operation Voltage	4 VDC to 5.5 VDC
Current Consumption	Operation mode: <110mA, Standby mode: <20mA
Indicator	Direct decode indicator, good decode LEDs, beeper (adjustable tone/volume)
Environmental	
ESD Protection	Functional after 8K Contact and 15K Air
Mechanical Shock	2M onto concrete (scanner only)
Operating Temperature	-10°C to 50°C (14°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to +158°F)
Relative Humidity	95% non-condensing
IP Rating	IP42
Regulatory Approvals	
CE, FCC, BSMI, VCCI	

1.4 Getting Started

To get started with MS851, please connect USB cable to the USB port of a host PC.



1.5 LED Indicator / Beeper Sequence

Description	Indication	
	Beeper	LED
Trigger Pull	No Sound	No Light
No decode		
Wake up		
Decode	Middle Tone	Green Blink
Power on	Low Tone, Middle Tone, High Tone	No Light
Transmission error	Four Low Tones	No Light
Entry error	Low Tone, High Tone	Green Blink
Defaults set	High Tone, Low Tone, High Tone, Low Tone	Green Blink
Parameter entered		
Number entry expected	High Tone, Low Tone	Green Blink

Chapter 2 – Command Settings

2.1 General setting

2.1.1 Default

Scan below bar code to restore the factory setting.

Default

2.1.2 Display F/W Version

Scan below bar code to display F/W version.

Display F/W Version

2.2 USB Device Type

HID Keyboard*

CDC (SPP)

2.3 Scan Mode

Choose one of the options below to trigger the scan engine. Bar codes and option numbers are on the following page.

•**Scan (Trigger Mode)** - A trigger pull activates the laser and decode processing. The laser remains on and decode processing continues until a trigger release, a valid decode, or the Laser On Timeout is reached.

•**Scan (Pulse Mode)** - A trigger pull activates the laser and decode processing. The laser remains on and decode processing continues until a valid decode or the Laser On Timeout is reached.

•**Continuous** - This trigger mode is used for triggerless operation. The laser is always on and decoding.

•**Blink** - This trigger mode is used for triggerless operation. While blinking, the scan angle is fixed at wide. Scanning range is reduced in this mode.

•**Host** - A host command issues the triggering signal. The scan engine interprets an actual trigger pull as a Level triggering option.

Trigger Mode

Continuous Mode

Host Mode

Pulse Mode

Blink Mode

2.4 Beeps & Volume

2.4.1 Good Read

Good Read Beep Enable*

Good Read Beep Disable

2.4.2 Beeper Volume

Low Volume

Medium Volume *

High Volume

2.5 HID configuration

2.5.1 HID Keyboard Character Delay

1 ms*

5 ms

10 ms

20 ms

50 ms

100 ms

2.5.2 HID Keyboard Block Delay

10 ms*

50 ms

100 ms

500 ms

1 Sec.

3 Sec.

2.5.3 HID Keyboard Case

Auto Trace*

To Lower

To Upper

2.5.4 HID Keyboard Language

US English*

UK English

Swiss

Swedish

French

ALT Mode

Danish

Spanish

Norwegian

Italian

Partial ALT

German

Japanese

2.6 Laser on time

This parameter sets the maximum time decode processing continues during a scan attempt. It is programmable in 0.1 second increments from 0.50 to 9.925.5 seconds.

To set a Laser On Time, scan the bar code below. Next scan two numeric bar codes beginning on *page 79Appendix B* that correspond to the desired on time. Single digit numbers must have a leading zero. For example, to set an on time of 0.5 seconds, scan the bar code below, then scan the "50" and "05" bar codes; to set an on time of 9.5 seconds, scan the bar code below, then scan the "9" and "5" bar codes. To change the selection or cancel an incorrect entry, scan *Cancel on page 79Appendix B*.

Laser On Time
(Default: 3.0 sec.)

2.7 Aim duration

It is programmable in 0.1 second increments from 0.0 to 2.09.9 seconds. No aim pattern is visible when the value is 0.0.

To set an aim duration, scan the bar code below. Next scan two numeric bar codes beginning on *page 79Appendix B* that correspond to the desired aim duration. Single digit numbers must have a leading zero. For example, to set an aim duration of 0.5 seconds, scan the bar code below, then scan the "0" and "5" bar codes. To change the selection or cancel an incorrect entry, scan Cancel on *page 79Appendix B*.

Aim Duration
(Default: 0.0 sec.)

2.8 Time out between same symbol

When in Continuous triggering mode, this parameter sets the minimum time that must elapse before the scan engine decodes a second bar code identical to one just decoded. This reduces the risk of accidently scanning the same symbol twice. It is programmable in 0.1 second increments from 0.0 to 9.9 seconds.

Time-out Between Same Symbol
(Default: 1.0 sec.)

To set a time-out between same symbol, scan the bar code below. Next scan two numeric bar codes beginning on ~~page 79~~*Appendix B* that correspond to the desired time-out. Single digit values must have a leading zero. For example, to set a time-out of 0.5 seconds, scan the bar code below, then scan the "0" and "5" bar codes. To change the selection or cancel an incorrect entry, scan Cancel on ~~page 79~~*Appendix B*.

2.9 Transmit "No Read" message

Enable this option to transmit "NR" if a symbol does not decode during the timeout period or before the trigger is released. Any enabled prefix or suffixes are appended around this message.

Enable No Read
(0x01)

When disabled, and a symbol cannot be decoded, no message is sent to the host.

***Disable No Read**

2.10 Prefix / Suffix

2.10.1 Prefix/Suffix Values

A prefix and/or one or two suffixes can be appended to scan data for use in data editing. To set these values, scan a four-digit number (i.e. four bar codes) that corresponds to ASCII values. See the *Table 2-1* and *Numeric Bar Codes on ~~page 79~~Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*. To set the Prefix/Suffix values via serial commands, see *Setting Prefixes and Suffixes Via Serial Commands*.

✓ ***NOTE*** In order to use Prefix/Suffix values, *Data Transmission Format* must be set.

Scan Prefix

Scan Suffix 1

Scan Suffix 2

Data Format Cancel

2.10.2 Data Terminator Quick Setting

Scan below bar code to terminate data

Enter *

Tab

CR/LF

None

Table 2-1 *Character Equivalents*

Scan Value	Keystroke	Scan Value	Keystroke
1000	CTRL 2	1032	Space
1001	CTRL A	1033	!
1002	CTRL B	1034	‘
1003	CTRL C	1035	#
1004	CTRL D	1036	$
1005	CTRL E	1037	%
1006	CTRL F	1038	&
1007	CTRL G	1039	‘
1008	CTRL H	1040	(
1009	CTRL I	1041	)
1010	CTRL J	1042	*
1011	CTRL K	1043	+
1012	CTRL L	1044	,
1013	CTRL M	1045	-
1014	CTRL N	1046	.
1015	CTRL O	1047	/
1016	CTRL P	1048	0
1017	CTRL Q	1049	1
1018	CTRL R	1050	2
1019	CTRL S	1051	3
1020	CTRL T	1052	4
1021	CTRL U	1053	5
1022	CTRL V	1054	6
1023	CTRL W	1055	7
1024	CTRL X	1056	8
1025	CTRL Y	1057	9
1026	CTRL Z	1058	:
1027	CTRL [	1059	;
1028	CTRL \	1060	<
1029	CTRL]	1061	=
1030	CTRL 6	1062	>
1031	CTRL -	1063	?

Scan Value	Keystroke
1064	@
1065	A
1066	B
1067	C
1068	D
1069	E
1070	F
1071	G
1072	H
1073	I
1074	J
1075	K
1076	L
1077	M
1078	N
1079	O
1080	P
1081	Q
1082	R
1083	S
1084	T
1085	U
1086	V
1087	W
1088	X
1089	Y
1090	Z
1091	[
1092	\
1093	]
1094	^
1095	_
1096	‘

Scan Value	Keystroke
1097	a
1098	b
1099	c
1100	d
1101	e
1102	f
1103	g
1104	h
1105	i
1106	j
1107	k
1108	l
1109	m
1110	n
1111	o
1112	p
1113	q
1114	r
1115	s
1116	t
1117	u
1118	v
1119	w
1120	x
1121	y
1122	z
1123	{
1124	|
1125	}
1126	~
1127	Undefined

2.10.3 Data Transmission Format

To change Data Transmission Format, scan one of the eight bar codes corresponding to the desired format.

*Data As Is

<PREFIX> <DATA >

<DATA> <SUFFIX 1>

<PREFIX> <DATA> <SUFFIX 1>

<DATA> <SUFFIX 2>

<PREFIX> <DATA> <SUFFIX 2>

<DATA> <SUFFIX 1> <SUFFIX 2>

<PREFIX> <DATA> <SUFFIX 1> <SUFFIX 2>

2.11 RS232 Setting

2.11.1 RS232 Baud Rate

Baud rate is the number of bits of data transmitted per second. Scan one of the following bar codes to set the engine's baud rate to match the baud rate setting of the host device. Otherwise, data may not reach the host device or may reach it in distorted form.

9600*

19200

38400

57600

115200

230400

2.11.2 RS232 Data Bits

This parameter allows the engine to interface with devices requiring a 7-bit or 8-bit ASCII protocol.

Data Bits 8 bits*

Data Bits 7 bits

2.11.3 RS232 Stop Bits

The stop bit(s) at the end of each transmitted character marks the end of transmission of one character and prepares the receiving device for the next character in the serial data stream. Scan one of the following bar codes to set the number of stop bits (one or two) based on the number the receiving host can accommodate.

Stop Bits 1 bit *

Stop Bits 2 bits

2.11.4 RS232 Parity Check

A parity check bit is the most significant bit of each ASCII coded character. Scan one of the following bar codes to select the parity type according to host device requirements:

•**Odd** - This sets the parity bit value to 0 or 1, based on data, to ensure that the coded character contains an odd number of 1 bits.

•**Even** - This sets the parity bit value to 0 or 1, based on data, to ensure that the coded character contains an even number of 1 bits.

•**None** - No parity bit is required.

Odd

Even

None*

2.11.5 RS232 CTS/RTS Handshaking

The data interface consists of an RS-232 port designed to operate either with or without the hardware handshaking lines Request to Send (RTS) and Clear to Send (CTS).
The DTR signal is jumpered to the active state.

Options:

- **None** - This disables hardware handshaking and transmits scan data as it becomes available.

•**Standard RTS/CTS** - This sets standard RTS/CTS hardware handshaking and transmits scanned data according to the following sequence:

a. The engine reads the CTS line for activity:

- If the CTS line is de-asserted, the engine asserts the RTS line and waits up to Host Serial Response Timeout for the host to assert CTS, and then transmits data when asserted. If, after the timeout, the CTS line is not asserted, the engine sounds a transmit error and discards the data.
- If CTS is asserted, the engine waits up to Host Serial Response Timeout for the host to de-assert CTS. If after this timeout the CTS line is still asserted, the engine sounds a transmit error and discards the scanned data.

b. The engine de-asserts RTS after sending the last character of data.

c. The host negates CTS. The engine checks for a deasserted CTS upon the next data transmission.

During data transmission, if CTS is deasserted for more than 50 ms between characters, the engine sounds a transmit error and discards the data. The data must be re-scanned.

• **RTS/CTS Option 1** - The engine asserts RTS before transmitting and ignores the state of CTS. The engine de-asserts RTS when transmission completes.

• **RTS/CTS Option 2** - RTS is always high or low (user-programmed logic level). However, the engine waits for the host to assert CTS before transmitting data. If CTS is not asserted within the Host Serial Response Timeout, the engine sounds a transmit error and discards the data. During data transmission, if CTS is deasserted for more than 50 ms between characters, the engine sounds a transmit error and discards the data.

• **RTS/CTS Option 3** - This transmits scanned data according to the following sequence:

a . The engine asserts RTS before data transmission, regardless of the state of CTS.

b. The engine waits up to the Host Serial Response Timeout for the host to assert CTS, and then transmits data when asserted. If, after the timeout, the CTS line is not asserted, the engine sounds a transmit error and discards the data.

c. The engine de-asserts RTS after sending the last character of data.

d. The host negates CTS. The engine checks for a de-asserted CTS upon the next data transmission.

During data transmission, if CTS is deasserted for more than 50 ms between characters, the engine sounds a transmit error and discards the data. The data must be re-scanned.

Off *

On

Chapter 3 – Symbology

3.1 UPC/EAN

3.1.1 UPC-A

To enable or disable UPC-A, scan the appropriate bar code below.

*Enable UPC-A

Disable UPC-A

3.1.2 UPC-E

To enable or disable UPC-E, scan the appropriate bar code below.

*Enable UPC-E

Disable UPC-E

3.1.3 UPC-E1

To enable or disable UPC-E1, scan the appropriate bar code below.

✓ ***NOTE*** UPC-E1 is not a UCC (Uniform Code Council) approved symbology.

Enable UPC-E1

***Disable UPC-E1**

3.1.4 EAN-8

To enable or disable EAN-8, scan the appropriate bar code below.

***Enable EAN-8**

Disable EAN-8

3.1.5 EAN-13

To enable or disable EAN-13, scan the appropriate bar code below.

*Enable EAN-13

Disable EAN-13

3.1.6 Bookland EAN

To enable or disable EAN Bookland, scan the appropriate bar code below.

Enable Bookland EAN

*Disable Bookland EAN

✓ ***NOTE*** If you enable Bookland EAN, select a *Bookland ISBN Format*. Also select either Decode UPC/EAN Supplementals, Autodiscriminate UPC/EAN Supplementals, or Enable 978/979 Supplemental Mode in *Decode UPC/EAN Supplementals*.

3.1.7 Bookland ISBN

If you enabled Bookland EAN using *Enable/Disable Bookland EAN*, select one of the following formats for Bookland data:

- **Bookland ISBN-10** - The scanner reports Bookland data starting with 978 in traditional 10-digit format with the special Bookland check digit for backward-compatibility. Data starting with 979 is not considered Bookland in this mode.
- **Bookland ISBN-13** - The scanner reports Bookland data (starting with either 978 or 979) as EAN-13 in 13-digit format to meet the 2007 ISBN-13 protocol.

***Bookland ISBN-10**

Bookland ISBN-13

✓ ***NOTE*** For Bookland EAN to function properly, first enable Bookland EAN using *Enable/Disable Bookland EAN.*

3.1.8 Decode UPC/EAN Supplementals

Supplementals are bar codes appended according to specific format conventions (e.g., UPC A+2, UPC E+2, EAN 13+2). The following options are available:

- If you select **Ignore UPC/EAN with Supplementals**, and the scanner is presented with a UPC/EAN plus supplemental symbol, the scanner decodes UPC/EAN and ignores the supplemental characters.
- If you select **Decode UPC/EAN with Supplementals**, the scanner only decodes UPC/EAN symbols with supplemental characters, and ignores symbols without supplementals.
- If you select **Autodiscriminate UPC/EAN Supplementals**, the scanner decodes UPC/EAN symbols with supplemental characters immediately. If the symbol does not have a supplemental, the scanner must decode the bar code the number of times set via *Decode UPC/EAN Supplemental Redundancy* before transmitting its data to confirm that there is no supplemental.
- If you select one of the following **Supplemental Mode** options, the scanner immediately transmits EAN-13 bar codes starting with that prefix that have supplemental characters. If the symbol does not have a supplemental, the scanner must decode the bar code the number of times set via *Decode UPC/EAN Supplemental Redundancy* before transmitting its data to confirm that there is no supplemental. The scanner transmits UPC/EAN bar codes that do not have that prefix immediately.
  - **Enable 378/379 Supplemental Mode.**
  - **Enable 978/979 Supplemental Mode.**

✓ ***NOTE*** If you select 978/979 Supplemental Mode and are scanning Bookland EAN bar codes, see *Enable/Disable Bookland EAN* to enable Bookland EAN, and select a format using *Bookland ISBN Format*.

  - **Enable 977 Supplemental Mode.**
  - **Enable 414/419/434/439 Supplemental Mode.**
  - **Enable 491 Supplemental Mode.**
  - **Enable Smart Supplemental Mode** - applies to EAN-13 bar codes starting with any prefix listed previously.

- **Supplemental User-Programmable Type 1** - applies to EAN-13 bar codes starting with a 3-digit user-defined prefix. Set this 3-digit prefix using *User-Programmable Supplementals*.
- **Supplemental User-Programmable Type 1 and 2 -** applies to EAN-13 bar codes starting with either of two 3-digit user-defined prefixes. Set the 3-digit prefixes using *User-Programmable Supplementals***.**
- **Smart Supplemental Plus User-Programmable 1** - applies to EAN-13 bar codes starting with any prefix listed previously or the user-defined prefix set using *User-Programmable Supplementals*.
- **Smart Supplemental Plus User-Programmable 1 and 2 -** applies to EAN-13 bar codes starting with any prefix listed previously or one of the two user-defined prefixes set using *User-Programmable Supplementals*.

✓ ***NOTE*** To minimize the risk of invalid data transmission, select either to decode or ignore supplemental characters.

3.1.8.1 Decode UPC/EAN With Supplementals

Decode UPC/EAN With Supplementals

3.1.8.2 Ignore UPC/EAN With Supplementals*

*Ignore UPC/EAN With Supplementals

3.1.8.3 Auto discriminate UPC/EAN Supplementals

Autodiscriminate UPC/EAN Supplementals

3.1.8.4 Enable 378/379 Supplemental Mode

Enable 378/379 Supplemental Mode

3.1.8.5 Enable 978/979 Supplemental Mode

Enable 978/979 Supplemental Mode

3.1.8.6 Enable 977 Supplemental Mode

Enable 977 Supplemental Mode

3.1.8.7 Enable 414/419/434/439 Supplemental Mode

Enable 414/419/434/439 Supplemental Mode

3.1.8.8 Enable 491 Supplemental Mode

Enable 491 Supplemental Mode

3.1.8.9 Enable Smart Supplemental Mode

Enable Smart Supplemental Mode

3.1.8.10 Supplemental User-Programmable Type 1

Supplemental User-Programmable Type 1

3.1.8.11 Supplemental User-Programmable Type 1 and 2

Supplemental User-Programmable Type 1 and 2

3.1.8.12 Smart Supplemental Plus User-Programmable 1

Smart Supplemental Plus User-Programmable 1

3.1.8.13 Smart Supplemental Plus User-Programmable 1 and 2

Smart Supplemental Plus User-Programmable 1 and 2

3.1.9 User-Programmable Supplementals

If you selected a Supplemental User-Programmable option from *Decode UPC/EAN Supplementals*, select **User-Programmable Supplemental 1** to set the 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning. Select **User-Programmable Supplemental 2** to set a second 3-digit prefix. Then select the 3 digits using the numeric bar codes beginning.

User-Programmable Supplemental 1

User-Programmable Supplemental 2

3.1.10 Decode UPC/EAN Supplemental Redundancy

With *Autodiscriminate UPC/EAN Supplementals* selected, this option adjusts the number of times a symbol without supplementals are decoded before transmission. The range is from 2 to 30 times. Five or above is recommended when decoding a mix of UPC/EAN symbols with and without supplementals, and the autodiscriminate option is selected.

Scan the bar code below to select a decode redundancy value. Next scan two numeric bar codes beginning on ~~*page 79*~~*Appendix B*. Single digit numbers must have a leading zero. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~*page 79*~~*Appendix B*.

Decode UPC/EAN Supplemental Redundancy (Default: 7)

3.1.11 Transmit UPC-A Check Digit

Scan the appropriate bar code below to transmit the symbol with or without the UPC-A check digit.

***Transmit UPC-A Check Digit**

Do Not Transmit UPC-A Check Digit

3.1.12 Transmit UPC-E Check Digit

Scan the appropriate bar code below to transmit the symbol with or without the UPC-E check digit.

*Transmit UPC-E Check Digit

Do Not Transmit UPC-E Check Digit

3.1.13 Transmit UPC-E1 Check Digit

Scan the appropriate bar code below to transmit the symbol with or without the UPC-E1 check digit.

*Transmit UPC-E1 Check Digit

Do Not Transmit UPC-E1 Check Digit

3.1.14 UPC-A Preamble

Preamble characters (Country Code and System Character) can be transmitted as part of a UPC-A symbol.

Select one of the following options for transmitting UPC-A preamble to the host device: transmit system character only, transmit system character and country code ("0" for USA), or transmit no preamble.

No Preamble
(<DATA>)

***System Character**
(<SYSTEM CHARACTER> <DATA>)

System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

3.1.15 UPC-E Preamble

Preamble characters (Country Code and System Character) can be transmitted as part of a UPC-E symbol.

Select one of the following options for transmitting UPC-E preamble to the host device: transmit system character only, transmit system character and country code ("0" for USA), or transmit no preamble.

No Preamble
(<DATA>)

***System Character**
(<SYSTEM CHARACTER> <DATA>)

System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

3.1.16 UPC-E1 Preamble

Preamble characters (Country Code and System Character) can be transmitted as part of a UPC-E1 symbol.
Select one of the following options for transmitting UPC-E1 preamble to the host device: transmit system character only, transmit system character and country code ("0" for USA), or transmit no preamble.

No Preamble
(<DATA>)

***System Character**
(<SYSTEM CHARACTER> <DATA>)

System Character & Country Code
(< COUNTRY CODE> <SYSTEM CHARACTER> <DATA>)

3.1.17 Convert UPC-E to UPC-A

Enable this parameter to convert UPC-E (zero suppressed) decoded data to UPC-A format before transmission. After conversion, data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit).
Scan DO NOT CONVERT UPC-E TO UPC-A to transmit UPC-E (zero suppressed) decoded data.

Convert UPC-E to UPC-A (Enable)

***Do Not Convert UPC-E to UPC-A (Disable)**

3.1.18 Convert UPC-E1 to UPC-A

Enable this parameter to convert UPC-E1 (zero suppressed) decoded data to UPC-A format before transmission. After conversion, data follows UPC-A format and is affected by UPC-A programming selections (e.g., Preamble, Check Digit).
Scan DO NOT CONVERT UPC-E TO UPC-A to transmit UPC-E1 (zero suppressed) decoded data.

Convert UPC-E1 to UPC-A (Enable)

***Do Not Convert UPC-E1 to UPC-A (Disable)**

3.1.19 EAN Zero Extend

When enabled, this parameter adds five leading zeros to decoded EAN-8 symbols to make them compatible in format to EAN-13 symbols.
Disable this parameter to transmit EAN-8 symbols as is.

Enable EAN Zero Extend

***Disable EAN Zero Extend**

3.1.20 UCC Coupon Extended Code

The UCC Coupon Extended Code is an additional bar code adjacent to a UCC Coupon Code. To enable or disable UCC Coupon Extended Code, scan the appropriate bar code below.

Enable UCC Coupon Extended Code

***Disable UCC Coupon Extended Code**

3.2 Code 128

3.2.1 Code 128

To enable or disable Code 128, scan the appropriate bar code below.

Disable Code 128

***Enable Code 128**

3.2.2 GS1-128 (formerly UCC/EAN-128)

To enable or disable GS1-128, scan the appropriate bar code below. (See *Appendix A, Miscellaneous Code Information* for details on *GS1-128 (formerly UCC/EAN-128)*.)

Disable GS1-128

***Enable GS1-128**

GS1-128 (formerly UCC/EAN-128)

GS1-128 is a convention for printing data fields with standard Code 128 bar code symbols. GS1-128 symbols are distinguished by a leading FNC 1 character as the first or second character in the symbol. Other FNC 1 characters are used to delineate fields.

When GS1-128 symbols are read, they are transmitted after special formatting strips off the leading FNC 1 character, and replaces other FNC 1 characters with the ASCII 29 (GS) control character.

When AIM symbology identifiers are transmitted, the modifier character indicates the position of the leading FNC 1 character according to AIM guidelines. For example, **]c1** indicates a GS1-128 symbol with a leading FNC1 character.

Standard Code 128 bar codes which do not have a leading FNC 1 may still be used, but are not encoded according to the GS1-128 convention. Standard Code 128 and GS1-128 may be mixed in an application. The scanner auto discriminates between these symbols, and can enable or disable one or both code types. *Table 3-1* indicates the behavior of the scanner in each of the four possible parameter settings.

Table 3-1 *Reading Standard Code 128 & GS1-128*

Standard Code 128	GS1-128	Effect and Example
Disable	Disable	No Code 128 symbols can be read.
Disable	Enable	Read only symbols with leading FNC 1. Examples: ^{FNC1}ABCD^{FNC1}E are read as ABCD^{29}E A^{FNC1}BCD^{FNC1}E are read as ABCD^{29}E ^{FNC1FNC1}ABCD^{FNC1}E are read as ABCD^{29}E ABCD^{FNC1}E cannot be read ABCDE cannot be read
Enable	Disable	Read only symbols without leading FNC 1. Examples: ^{FNC1}ABCD^{FNC1}E cannot be read A^{FNC1}BCD^{FNC1}E cannot be read ^{FNC1FNC1}ABCD^{FNC1}E cannot be read ABCD^{FNC1}E is read as ABCD^{29}E ABCDE is read as ABCDE
Enable	Enable	Read both types of symbols. Examples: ^{FNC1}ABCD^{FNC1}E are read as ABCD^{29}E A^{FNC1}BCD^{FNC1}E are read as ABCD^{29}E ^{FNC1FNC1}ABCD^{FNC1}E are read as ABCD^{29}E ABCD^{FNC1}E is read as ABCD^{29}E ABCDE is read as ABCDE

3.2.3 ISBT 128

To enable or disable ISBT 128, scan the appropriate bar code below.

Disable ISBT 128

*Enable ISBT 128

3.3 Code 39

3.3.1 Code 39

To enable or disable Code 39, scan the appropriate bar code below.

*Enable Code 39

Disable Code 39

3.3.2 Trioptic Code 39

Trioptic Code 39 is a variant of Code 39 used in marking computer tape cartridges. Trioptic Code 39 symbols always contain six characters.
To enable or disable Trioptic Code 39, scan the appropriate bar code below.

Enable Trioptic Code 39

***Disable Trioptic Code 39**

✓ ***NOTE*** Trioptic Code 39 and Code 39 Full ASCII cannot be enabled simultaneously. If an error beep sounds when enabling Trioptic Code 39, disable Code 39 Full ASCII and try again.

3.3.3 Convert Code 39 to Code 32

Code 32 is a variant of Code 39 used by the Italian pharmaceutical industry. Scan the appropriate bar code below to enable or disable converting Code 39 to Code 32.

✓ ***NOTE*** Code 39 must be enabled in order for this parameter to function.

Enable Convert Code 39 to Code 32

***Disable Convert Code 39 to Code 32**

3.3.4 Code 32 Prefix

Enable this parameter to add the prefix character "A" to all Code 32 bar codes. Convert Code 39 to Code 32 must be enabled for this parameter to function.

Enable Code 32 Prefix

***Disable Code 32 Prefix**

3.3.5 Set Lengths for Code 39

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Lengths for Code 39 may be set for any length, one or two discrete lengths, or lengths within a specific range. If Code 39 Full ASCII is enabled, **Length Within a Range** or **Any Length** are the preferred options.

✓ ***NOTE*** When setting lengths, single digit numbers must always be preceded by a leading zero.

One Discrete Length - This option limits decodes to only those Code 39 symbols containing a selected length. Lengths are selected from the numeric bar codes beginning on *~~page 79~~Appendix B*. For example, to decode only Code 39 symbols with 14 characters, scan **Code 39 - One Discrete Length**, then scan **1** followed by **4**. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*.

Code 39 - One Discrete Length

Two Discrete Lengths - This option limits decodes to only those Code 39 symbols containing either of two selected lengths. Lengths are selected from the numeric bar codes beginning on ~~page 79~~*Appendix B*. For example, to decode only those Code 39 symbols containing either 2 or 14 characters, select **Code 39 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~page 79~~*Appendix B*.

Code 39 - Two Discrete Lengths

Length Within Range - This option limits decodes to only those Code 39 symbols within a specified range. For example, to decode Code 39 symbols containing between 4 and 12 characters, first scan **Code 39 - Length Within Range**. Then scan **0**, **4**, **1,** and **2**. Numeric bar codes begin on ~~page 79~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~page 79~~*Appendix B*.

Code 39 - Length Within Range

Any Length - Scan this option to decode Code 39 symbols containing any number of characters.

Code 39 - Any Length

3.3.6 Code 39 Check Digit Verification

When this feature is enabled, the scan engine checks the integrity of all Code 39 symbols to verify that the data complies with specified check digit algorithm. Only those Code 39 symbols which include a modulo 43 check digit are decoded. Only enable this feature if your Code 39 symbols contain a module 43 check digit.

Verify Code 39 Check Digit

***Do Not Verify Code 39 Check Digit**

3.3.7 Transmit Code 39 Check Digit

Scan this symbol to transmit the check digit with the data.

Transmit Code 39 Check Digit (Enable)

Scan this symbol to transmit data without the check digit.

***Do Not Transmit Code 39 Check Digit (Disable)**

3.3.8 Code 39 Full ASCII

Code 39 Full ASCII is a variant of Code 39 which pairs characters to encode the full ASCII character set. To enable or disable Code 39 Full ASCII, scan the appropriate bar code below.

See *Table 3-2* for the mapping of Code 39 characters to ASCII values.

Enable Code 39 Full ASCII

***Disable Code 39 Full ASCII**

✓ ***NOTE*** Trioptic Code 39 and Code 39 Full ASCII cannot be enabled simultaneously. If you get an error beep when enabling Code 39 Full ASCII, disable Trioptic Code 39 and try again.

Table 3-2 *Character Equivalents*

Scan Value	Full ASCII Code 39 Encode Char.	Scan Value	Full ASCII Code 39 Encode Char.
1000	%U	1031	%E
1001	$A	1032	Space
1002	$B	1033	/A
1003	$C	1034	/B
1004	$D	1035	/C
1005	$E	1036	/D
1006	$F	1037	/E
1007	$G	1038	/F
1008	$H	1039	/G
1009	$I	1040	/H
1010	$J	1041	/I
1011	$K	1042	/J
1012	$L	1043	/K
1013	$M	1044	/L
1014	$N	1045	-
1015	$O	1046	.
1016	$P	1047	/
1017	$Q	1048	0
1018	$R	1049	1
1019	$S	1050	2
1020	$T	1051	3
1021	$U	1052	4
1022	$V	1053	5
1023	$W	1054	6
1024	$X	1055	7
1025	$Y	1056	8
1026	$Z	1057	9
1027	%A	1058	/Z
1028	%B	1059	%F
1029	%C	1060	%G
1030	%D	1061	%H

Scan Value	Full ASCII Code 39 Encode Char.
1062	%I
1063	%J
1064	%V
1065	A
1066	B
1067	C
1068	D
1069	E
1070	F
1071	G
1072	H
1073	I
1074	J
1075	K
1076	L
1077	M
1078	N
1079	O
1080	P
1081	Q
1082	R
1083	S
1084	T
1085	U
1086	V
1087	W
1088	X
1089	Y
1090	Z
1091	%K
1092	%L
1093	%M

Scan Value	Full ASCII Code 39 Encode Char.
1094	%N
1095	%O
1096	%W
1097	+A
1098	+B
1099	+C
1100	+D
1101	+E
1102	+F
1103	+G
1104	+H
1105	+I
1106	+J
1107	+K
1108	+L
1109	+M
1110	+N
1111	+O
1112	+P
1113	+Q
1114	+R
1115	+S
1116	+T
1117	+U
1118	+V
1119	+W
1120	+X
1121	+Y
1122	+Z
1123	%P
1124	%Q
1125	%R

Scan Value	Full ASCII Code 39 Encode Char.
1126	%S
1127	

3.4 Code 93

3.4.1 Code 93

To enable or disable Code 93, scan the appropriate bar code below.

Enable Code 93

***Disable Code 93**

3.4.2 Set Lengths for Code 93

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Lengths for Code 93 may be set for any length, one or two discrete lengths, or lengths within a specific range. To set lengths via serial commands, see *Setting Code Lengths Via Serial Commands*.

One Discrete Length - Select this option to decode only those codes containing a selected length. For example, select **Code 93 One Discrete Length**, then scan **1**, **4**, to limit the decoding to only Code 93 symbols containing 14 characters. Numeric bar codes begin on ~~*page 79*~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~*page 79*~~*Appendix B*.

Code 93 - One Discrete Length

Two Discrete Lengths - Select this option to decode only those codes containing two selected lengths. For example, select **Code 93 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, to limit the decoding to only Code 93 symbols containing 2 or 14 characters. Numeric bar codes begin on ~~page 79~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~page 79~~*Appendix B*.

Code 93 - Two Discrete Lengths

Length Within Range - This option sets the unit to decode a code type within a specified range. For example, to decode Code 93 symbols containing between 4 and 12 characters, first scan **Code 93 Length Within Range**, then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero).

Numeric bar codes begin on ~~page 79~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~page 79~~*Appendix B*.

Code 93 - Length Within Range

Any Length - Scan this option to decode Code 93 symbols containing any number of characters.

Code 93 - Any Length

3.5 Code 11

3.5.1 Code 11

To enable or disable Code 11, scan the appropriate bar code below.

Enable Code 11

***Disable Code 11**

3.5.2 Set Lengths for Code 11

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Set lengths for Code 11 to any length, one or two discrete lengths, or lengths within a specific range.

- **One Discrete Length** - Select this option to decode only Code 11 symbols containing a selected length. Select the length using the numeric bar codes beginning on *~~page 79~~Appendix B*. For example, to decode only Code 11 symbols with 14 characters, scan **Code 11 - One Discrete Length**, then scan **1** followed by **4**. To correct an error or to change the selection, scan *Cancel on ~~page 79~~Appendix B*.
- **Two Discrete Lengths** - Select this option to decode only Code 11 symbols containing either of two selected lengths. Select lengths using the numeric bar codes beginning on *~~page 79~~Appendix B*. For example, to decode only those Code 11 symbols containing either 2 or 14 characters, select **Code 11 - Two Discrete Lengths**, then scan **0**, **2**, **1**, and then **4**. To correct an error or to change the selection, scan *Cancel on ~~page 79~~Appendix B*.

- **Length Within Range** - Select this option to decode a Code 11 symbol with a specific length range. Select lengths using numeric bar codes beginning on ~~page 79~~*Appendix B*. For example, to decode Code 11 symbols containing between 4 and 12 characters, first scan **Code 11 - Length Within Range**. Then scan **0**, **4**, **1,** and **2** (single digit numbers must always be preceded by a leading zero). To correct an error or change the selection, scan *Cancel on* ~~page 79~~*Appendix B*.
- **Any Length** - Scan this option to decode Code 11 symbols containing any number of characters within the scan engine capability.

Code 11 - One Discrete Length

Code 11 - Two Discrete Lengths

Code 11 - Length Within Range

Code 11 - Any Length

3.5.3 Code 11 Check Digit Verification

This feature allows the scan engine to check the integrity of all Code 11 symbols to verify that the data complies with the specified check digit algorithm. This selects the check digit mechanism for the decoded Code 11 bar code. The options are to check for one check digit, check for two check digits, or disable the feature.

To enable this feature, scan the bar code below corresponding to the number of check digits encoded in your Code 11 symbols.

*Disable

One Check Digit

Two Check Digits

3.5.4 Transmit Code 11 Check Digits

This feature selects whether or not to transmit the Code 11 check digit(s).

Transmit Code 11 Check Digit(s) (Enable)

*Do Not Transmit Code 11 Check Digit(s) (Disable)

✓ ***NOTE*** Code 11 Check Digit Verification must be enabled for this parameter to function.

3.6 Interleaved 2 of 5

3.6.1 Interleaved 2 of 5

To enable or disable Interleaved 2 of 5, scan the appropriate bar code below.

*Enable Interleaved 2 of 5

Disable Interleaved 2 of 5

3.6.2 Set Lengths for Interleaved 2 of 5

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Lengths for I 2 of 5 may be set for any length, one or two discrete lengths, or lengths within a specific range. To set lengths via serial commands, see *Setting Code Lengths Via Serial Commands*.

✓ ***NOTE*** When setting lengths, single digit numbers must always be preceded by a leading zero.

One Discrete Length - Select this option to decode only those codes containing a selected length. For example, select **I 2 of 5 One Discrete Length**, then scan **1**, **4**, to decode only I 2 of 5 symbols containing 14 characters. Numeric bar codes begin on ~~*page 79*~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~*page 79*~~*Appendix B*.

I 2 of 5 - One Discrete Length

Two Discrete Lengths - Select this option to decode only those codes containing two selected lengths. For example, select **I 2 of 5 Two Discrete Lengths**, then scan **0**, **6**, **1**, **4**, to decode only I 2 of 5 symbols containing 6 or 14 characters. Numeric bar codes begin on ~~page 79~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~page 79~~*Appendix B*.

I 2 of 5 - Two Discrete Lengths

Length Within Range - Select this option to decode only codes within a specified range. For example, to decode I 2 of 5 symbols containing between 4 and 12 characters, first scan **I 2 of 5 Length Within Range**, then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on ~~page 79~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~page 79~~*Appendix B*.

I 2 of 5 - Length Within Range

Any Length - Scan this option to decode I 2 of 5 symbols containing any number of characters.

✓ ***NOTE*** Selecting this option may lead to misdecodes for I 2 of 5 codes.

I 2 of 5 - Any Length

3.6.3 I 2 of 5 Check Digit Verification

When enabled, this parameter checks the integrity of an I 2 of 5 symbol to ensure it complies with a specified algorithm, either USS (Uniform Symbology Specification), or OPCC (Optical Product Code Council).

*Disable

USS Check Digit

OPCC Check Digit

3.6.4 Transmit I 2 of 5 Check Digit

Scan this symbol to transmit the check digit with the data.

Transmit I 2 of 5 Check Digit (Enable)

Scan this symbol to transmit data without the check digit.

*Do Not Transmit I 2 of 5 Check Digit (Disable)

3.6.5 Convert I 2 of 5 to EAN-13

This parameter converts a 14 character I 2 of 5 code into EAN-13, and transmits to the host as EAN-13. To accomplish this, I 2 of 5 must be enabled, one length must be set to 14, and the code must have a leading zero and a valid EAN-13 check digit.

Convert I 2 of 5 to EAN-13 (Enable)

***Do Not Convert I 2 of 5 to EAN-13 (Disable)**

3.7 Discrete 2 of 5

3.7.1 Discrete 2 of 5

To enable or disable Discrete 2 of 5, scan the appropriate bar code below.

Enable Discrete 2 of 5

***Disable Discrete 2 of 5**

3.7.2 Set Lengths for Discrete 2 of 5

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Lengths for D 2 of 5 may be set for any length, one or two discrete lengths, or lengths within a specific range. To set lengths via serial commands, see *Setting Code Lengths Via Serial Commands*.

One Discrete Length - Select this option to decode only those codes containing a selected length. For example, select **D 2 of 5 One Discrete Length**, then scan **1**, **4**, to decode only D 2 of 5 symbols containing 14 characters. Numeric bar codes begin on *~~page 79~~Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*.

D 2 of 5 - One Discrete Length

Two Discrete Lengths - Select this option to decode only those codes containing two selected lengths. For example, select **D 2 of 5 Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, to decode only D 2 of 5 symbols containing 2 or 14 characters. Numeric bar codes begin on *~~page 79~~Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*.

D 2 of 5 - Two Discrete Lengths

Length Within Range - Select this option to decode codes within a specified range. For example, to decode D 2 of 5 symbols containing between 4 and 12 characters, first scan **D 2 of 5 Length Within Range**, then scan **0**, **4**, **1** and **2** (single digit numbers must be preceded by a leading zero). Numeric bar codes begin on ~~page 79~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~page 79~~*Appendix B*.

D 2 of 5 - Length Within Range

Any Length - Scan this option to decode D 2 of 5 symbols containing any number of characters.

✓ ***NOTE*** Selecting this option may lead to misdecodes for D 2 of 5 codes.

D 2 of 5 - Any Length

3.8 Chinese 2 of 5

3.8.1 Chinese 2 of 5

To enable or disable Chinese 2 of 5, scan the appropriate bar code below.

Enable Chinese 2 of 5

*Disable Chinese 2 of 5

3.9 Codabar

3.9.1 Codabar

To enable or disable Codabar, scan the appropriate bar code below.

Enable Codabar

*Disable Codabar

3.9.2 Set Lengths for Codabar

The length of a code refers to the number of characters (i.e., human readable characters), including check digit(s) the code contains. Lengths for Codabar may be set for any length, one or two discrete lengths, or lengths within a specific range. To set lengths via serial commands, see *Setting Code Lengths Via Serial Commands*.

One Discrete Length - Select this option to decode only those codes containing a selected length. For example, select **Codabar One Discrete Length**, then scan **1**, **4**, to decode only Codabar symbols containing 14 characters. Numeric bar codes begin on *~~page 79~~Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*.

Codabar - One Discrete Length

Two Discrete Lengths - This option sets the unit to decode only those codes containing two selected lengths. For example, select **Codabar Two Discrete Lengths**, then scan **0**, **2**, **1**, **4**, to decode only Codabar symbols containing 6 or 14 characters. Numeric bar codes begin on *~~page 79~~Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*.

Codabar - Two Discrete Lengths

Length Within Range - Select this option to decode a code within a specified range. For example, to decode Codabar symbols containing between 4 and 12 characters, first scan **Codabar Length Within Range**, then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on *~~page 79~~Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*.

Codabar - Length Within Range

Any Length - Scan this option to decode Codabar symbols containing any number of characters.

Codabar - Any Length

3.9.3 CLSI Editing

When enabled, this parameter strips the start and stop characters and inserts a space after the first, fifth, and tenth characters of a 14-character Codabar symbol.

✓ ***NOTE*** Symbol length does not include start and stop characters.

Enable CLSI Editing

***Disable CLSI Editing**

3.9.4 NOTIS Editing

When enabled, this parameter strips the start and stop characters from decoded Codabar symbol.

Enable NOTIS Editing

***Disable NOTIS Editing**

3.10 MSI

3.10.1 MSI

To enable or disable MSI, scan the appropriate bar code below.

Enable MSI

***Disable MSI**

3.10.2 Set Lengths for MSI

The length of a code refers to the number of characters (i.e., human readable characters) the code contains, and includes check digits. Lengths for MSI can be set for any length, one or two discrete lengths, or lengths within a specific range. See *Table 3-2* for ASCII equivalents. To set lengths via serial commands, see *Setting Code Lengths Via Serial Commands*.

One Discrete Length - Select this option to decode only those codes containing a selected length. For example, select **MSI Plessey One Discrete Length**, then scan **1**, **4**, to decode only MSI Plessey symbols containing 14 characters. Numeric bar codes begin on *~~page 79~~Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*.

MSI - One Discrete Length

Two Discrete Lengths - Select this option to decode only those codes containing two selected lengths. For example, select **MSI Plessey Two Discrete Lengths**, then scan **0**, **6**, **1**, **4**, to decode only MSI Plessey symbols containing 6 or 14 characters. Numeric bar codes begin on *~~page 79~~Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on ~~page 79~~Appendix B*.

MSI - Two Discrete Lengths

Length Within Range - Select this option to decode codes within a specified range. For example, to decode MSI symbols containing between 4 and 12 characters, first scan **MSI Length Within Range**, then scan **0**, **4**, **1** and **2** (single digit numbers must always be preceded by a leading zero). Numeric bar codes begin on ~~page 79~~*Appendix B*. To change the selection or cancel an incorrect entry, scan *Cancel on* ~~page 79~~*Appendix B*.

MSI - Length Within Range

Any Length - Scan this option to decode MSI Plessey symbols containing any number of characters.

✓ ***NOTE*** Selecting this option may lead to misdecodes for MSI codes.

MSI - Any Length

3.10.3 MSI Check Digits

These check digits at the end of the bar code verify the integrity of the data. At least one check digit is always required. Check digits are not automatically transmitted with the data.

***One MSI Check Digit**

If two check digits are selected, also select an *MSI Check Digit Algorithm.*

Two MSI Check Digit

3.10.4 Transmit MSI Check Digit

Scan this symbol to transmit the check digit with the data.

Transmit MSI Check Digit (Enable)

Scan this symbol to transmit data without the check digit.

***Do Not Transmit MSI Check Digit (Disable)**

3.10.5 MSI Check Digit Algorithm

When the Two MSI check digits option is selected, an additional verification is required to ensure integrity.

Select one of the following algorithms.

MOD 10/ MOD 11

*MOD 10/ MOD 10

3.11 GS1 DataBar

3.11.1 GS1 DataBar-14

To enable or disable GS1 DataBar-14, scan the appropriate bar code below.

Enable GS1 DataBar-14

*Disable GS1 DataBar-14

3.11.2 GS1 DataBar Limited

To enable or disable GS1 DataBar Limited, scan the appropriate bar code below.

Enable GS1 DataBar Limited

***Disable GS1 DataBar Limited**

3.11.3 GS1 DataBar Expanded

To enable or disable GS1 DataBar Expanded, scan the appropriate bar code below.

Enable GS1 DataBar Expanded

***Disable GS1 DataBar Expanded**

3.11.4 Convert GS1 DataBar to UPC/EAN

This parameter only applies to GS1 DataBar-14 and GS1 DataBar Limited symbols. When this conversion is enabled, GS1 DataBar-14 and GS1 DataBar Limited symbols encoding a single zero as the first digit have the leading '010' stripped and the bar code reported as EAN-13.

Bar codes beginning with two or more zeros but not six zeros have the leading '0100' stripped and the bar code reported as UPC-A. The UPC-A Preamble parameter to transmit the system character and country code applies to converted bar codes. Note that neither the system character nor the check digit can be stripped.

Enable Convert GS1 DataBar to UPC/EAN

***Disable Convert GS1 DataBar to UPC/EAN**

3.12 Transmit Code ID Character

A code ID character identifies the code type of a scanned bar code. This can be useful when decoding more than one code type. The code ID character is inserted between the prefix character (if selected) and the decoded symbol.

Select no code ID character, a Symbol Code ID character, or an AIM Code ID character. The Symbol Code ID characters are listed below; see *Appendix A*, *Miscellaneous Code Information* for *AIM Code Identifiers*.

- A = UPC-A, UPC-E, UPC-E1, EAN-8, EAN-13
- B = Code 39, Code 32
- C = Codabar
- D = Code 128, ISBT 128
- E = Code 93
- F = Interleaved 2 of 5
- G = Discrete 2 of 5
- J = MSI
- K = GS1-DataBar
- L = Bookland EAN
- M = Trioptic Code 39
- N = Coupon Code
- R = GS1 DataBar-14, GS1 DataBar Limited, GS1 DataBar Expanded.

Symbol Code ID Character

Aim Code ID Character

***None**

3.13 Linear Code Type Security Level

The scanner offers four levels of decode security for linear code types (e.g. Code 39, Interleaved 2 of 5). Select higher security levels for decreasing levels of bar code quality. As security levels increase, the scan engine's aggressiveness decreases.

Select the security level appropriate for your bar code quality.

Linear Security Level 1

The following code types must be successfully read twice before being decoded:

Code Type	Length
Codabar	All
MSI	4 or less
D 2 of 5	8 or less
I 2 of 5	8 or less

*Linear Security Level 1

Linear Security Level 2

All code types must be successfully read twice before being decoded.

Linear Security Level 2

Linear Security Level 3

Code types other than the following must be successfully read twice before being decoded. The following codes must be read three times:

Code Type	Length
MSI	4 or less
D 2 of 5	8 or less
I 2 of 5	8 or less

Linear Security Level 3

Linear Security Level 4

All code types must be successfully read three times before being decoded.

Linear Security Level 4

3.14 Bi-directional Redundancy

This parameter is only valid when a *Linear Code Type Security Level* is enabled. When this parameter is enabled, a bar code must be successfully scanned in both directions (forward and reverse) before being decoded.

Enable Bi-directional Redundancy

***Disable Bi-directional Redundancy**

Appendix A –Miscellaneous Code Information

AIM Code Identifiers

Each AIM Code Identifier contains the three-character string **]cm** where:

] = Flag Character (ASCII 93)

c = Code Character (see *Table A-2*)

m = Modifier Character (see *Table A-3*).

Table A-1 *Code Characters*

Code Character	Code Type
A	Code 39, Code 39 Full ASCII, Code 32
C	Code 128, ISBT 128, GS1-128, Coupon (Code 128 portion)
E	UPC/EAN, Coupon (UPC portion)
F	Codabar
G	Code 93
H	Code 11
I	Interleaved 2 of 5
M	MSI
S	Discrete 2 of 5, IATA 2 of 5
X	Code 39 Trioptic, Bookland EAN
e	GS1 DataBar

The modifier character is the sum of the applicable option values based on the following table.

Table A-2 *Modifier Characters*

Code Type	Option Value	Option
Code 39		
	0	No Check character or Full ASCII processing.
	1	Reader has checked one check character.
	3	Reader has checked and stripped check character.
	4	Reader has performed Full ASCII character conversion.
	5	Reader has performed Full ASCII character conversion and checked one check character.
	7	Reader has performed Full ASCII character conversion and checked and stripped check character.
	Example: A Full ASCII bar code with check character W, **A+I+MI+DW**, is transmitted as **]A7**AimId where 7 = (3+4).	
Trioptic Code 39		
	0	No option specified at this time. Always transmit 0.
	Example: A trioptic bar code 412356 is transmitted as **]X0**412356	
Code 128		
	0	Standard data packet, No Function code 1 in first symbol position.
	1	Function code 1 in first symbol character position.
	2	Function code 1 in second symbol character position.
	Example: A Code (EAN) 128 bar code with Function 1 character in the first position, **FNC1** Aim Id is transmitted as **]C1**AimId	
I 2 of 5		
	0	No check digit processing.
	1	Reader has validated check digit.
	3	Reader has validated and stripped check digit.
	Example: An I 2 of 5 bar code without check digit, 4123, is transmitted as **]I0**4123	

Code Type	Option Value	Option
Codabar		
	0	No check digit processing.
	1	Reader has checked check digit.
	Example: A Codabar bar code without check digit, 4123, is transmitted as **]F0**4123	
Code 93		
	0	No options specified at this time. Always transmit 0.
	Example: A Code 93 bar code 012345678905 is transmitted as **]G0**012345678905	
MSI		
	0	Mod 10 check digit checked and transmitted.
	1	Mod 10 check digit checked but not transmitted.
	Example: An MSI bar code 4123, with a single check digit checked, is transmitted as **]M0**4123	
D 2 of 5		
	0	No options specified at this time. Always transmit 0.
	Example: A D 2 of 5 bar code 4123, is transmitted as **]S0**4123	
UPC/EAN		
	0	Standard packet in full EAN country code format, which is 13 digits for UPC-A, UPC-E, and EAN-13 (not including supplemental data).
	1	Two digit supplement data only.
	2	Five digit supplement data only.
	3	Combined data packet comprising 13 digits from a UPC-A, UPC-E, or EAN-13 symbol and 2 or 5 digits from a supplemental symbol.
	4	EAN-8 data packet.
	Example: A UPC-A bar code 012345678905 is transmitted as **]E0**0012345678905	
Bookland EAN		
	0	No options specified at this time. Always transmit 0.
	Example: A Bookland EAN bar code 123456789X is transmitted as **]X0**123456789X	

According to AIM standards, a UPC with supplemental bar code is transmitted in the following format:

]E0 (UPC chars) (terminator) **]E2** (supplemental) (terminator)

In the scanner, however, the format is changed to:

]E0 (UPC chars) **]E2** (supplemental)

Therefore, a UPC with two supplemental characters, 01234567890510, is transmitted to the host as a 21-character string, **]E0**0012345678905**]E1**10.

Setting Code Lengths Via Serial Commands

There are two lengths (L1 and L2) for each variable length code type. Depending on the selected option, the scan engine decodes:

- One discrete length bar code
- Two discrete length bar codes
- Bar codes within a range of lengths within the scan engine capability
- Any length of bar codes within the scan engine capability.

Table A-3 lists the requirements for each option.

Table A-3 *Setting Variable Code Lengths*

Code Length Option	L1 value	L2 value
One discrete length is decoded.	Discrete length to decode	0x00
Two discrete lengths is decoded.	Higher length value	Lower length value
Lengths within a range are decoded within the scan engine capability.	Lower length value	Higher length value
Any length bar code is decoded within the scan engine capability.	0x00	0x00

Appendix B –Numeric Bar Codes

For parameters requiring specific numeric values, scan the appropriately numbered bar code(s).

0

1

2

3

4

5

6

7

8

9

Cancel

To change the selection or cancel an incorrect entry, scan the bar code below.

Cancel