unitech
because we care

# Bluetooth 2D Imager Barcode Scanner

## - MS852B Plus -


## User's Manual

Version 1.1

# Change Log

| Date | Change Description | Version |
|---|---|---|
| 2020/4/17 | first published version | 1.0 |
| 2020/07/22 | Add OCR setting on chapter 3 | 1.1 |
| | | |

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

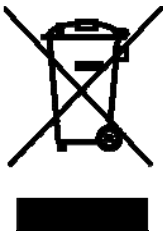
CE

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<br>info@india.ute.com<br>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.

# Table of Contents

# Chapter 1 - Overview

## 1.1 Package

Please make sure the following contents are in the MS852B Plus gift box. If something is missing or damaged, please contact your unitech representative.

### The package contents (without cradle):

- MS852B Plus Scanner with Battery
- USB Type C Charging Cable
- Quick Start Guide
- Regulatory Compliance Statements

***Note: Charging with USB type C Cable***

### The package contents (with cradle):

- MS852B Plus Scanner with Battery
- Interface Cable (USB cable or RS232 cable + Power Adapter)
- Charging Cradle
- Quick Start Guide
- Regulatory Compliance Statements

***Note: Charging with cradle***

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

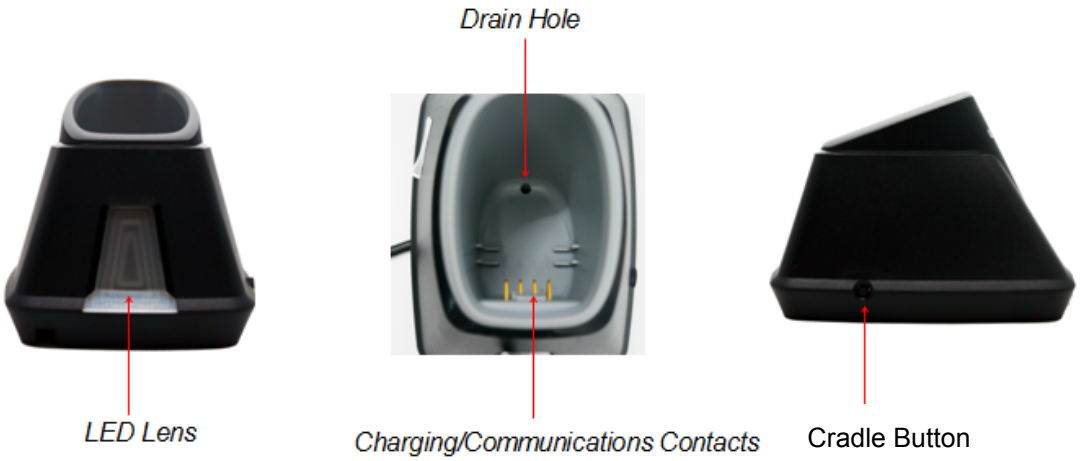
# 1.2 Product Detail

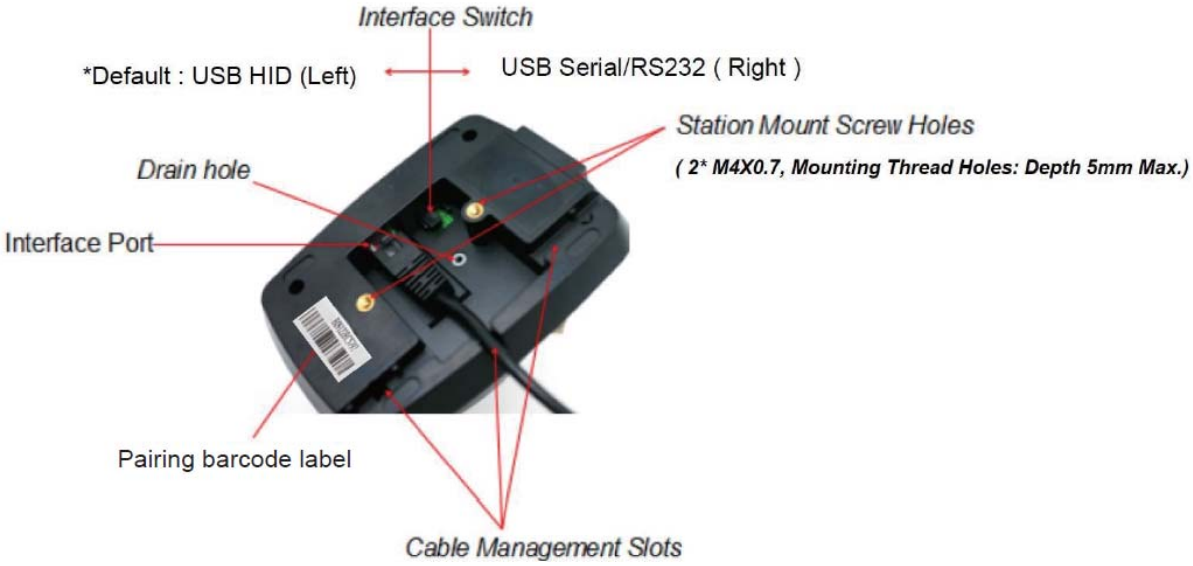
- Scanner details



## ■ Cradle details



# 1.3 Specifications

| Optical & Performance | |
|---|---|
| 1D or 2D | 2D |
| Sensor | 1280 X 800 global shutter |
| Aiming Element | Red laser |
| Illumination | White LED (exempt risk group) |
| Imager Field of View | 100,000 Lux (Sunlight) |
| Skew Angle | ± 60° |
| Pitch Angle Sensor | ± 60° |
| Roll Angle | 0 - 360° |
| Optical Resolution | 1D 3mil/ 0.075mm |
| Printing Contrast Scale | Minimum 20% |
| Depth of Field (DOF PCS=80%) | SYMBOLOGY / X-DIM TYPICAL RANGE* Near Far13 mil UPC 1.34 in / 3.4 cm 22.5 in / 57.3 cm5 mil Code 39 2.76 in / 7 cm 11.85 in / 30.1 cm10 mil Code 39 1.14 in / 2.9 cm 20.3 in / 51.7 cm20 mil Code 39 1.38 in / 3.5 cm 31.5 in / 80 cm15 mil Code 128 1.34 in / 3.4 cm 25.6 in / 65 cm10 mil DM 2.84 in / 7.2 cm 11.7 in / 29.7 cm6,7 mil PDF417 3.3 in / 8.4 cm 9.6 in / 24.4 cm15 mil QR Code 1.3 in / 3.3 cm 15.35 in / 39 cm |
| **Communication** | |
| Host Interface supported | USB / RS232 |
| Radio | Bluetooth LE® V4.2<br>Bluetooth® 2.1+EDR, Class1<br>Dual mode |
| Wireless Coverage | 100m ( line of sight) |
| Interface/ Profile | BT HID & SPP |

| | |
|---|---|
| **Mechanical** | |
| Scanner Dimension | 87.8 mm x 177.7 mm x71.6 mm (L x H X W) |
| Cradle Dimension | 120.6 mm x 86.0 mm x 88.7 mm (L x H X W) |
| Weight | 213g (without cradle) |
| Trigger Switch Life | 10 million times |
| **Functionality** | |
| Symbologies | **1D:** Codabar, Code 11, Code 128, Code 2 of 5, Code 39, Code 93 and 93i, EAN/JAN-13, EAN/JAN 8, IATA Code 2 of 5, Interleaved 2 of 5, Matrix 2 of 5, MSI, GS1 Databar, UPC-A, UPC E, UPC-A/EAN-13 with Extended Coupon Code, Coupon GS1 Code 32(PARAF)<br><br>**2D:**<br>EAN-UCC Emulation, GS1 Data Bar, TLC392D Stacked: Codablock A, Codablock F, PDF417, MicroPDF4172D Matrix: Aztec Code, Data Matrix, MaxiCode, QR Code, Chinese Sensible (Han Xin), Grid Matrix, Dot CodePostal: Australian Post, British Post, Canadian Post, China Post, Japanese Post, Korea Post, Netherlands Post, Planet Code, Postnet<br><br>**OCR Barcodes:** Support OCR barcodes |
| **Electrical** | |
| Indicator | LED & Beeper & Vibrator |
| Battery Type | Rechargeable and replaceable battery pack |
| Battery Capacity | 2850mAh |
| Battery Charging time | <6.5 hours |
| Operating Time | >25 hours **(Based on 1 scan/5 seconds)** |
| **Environmental** | |
| ESD Protection | Functional after 8K Contact and 15K Air |
| Mechanical Shock | 2.1M 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, NCC, TELEC, BQB | |

# 1.4 Getting Started

**Scanner Turn on** : Long press the trigger key for 2 seconds until you hear a long beep sound.

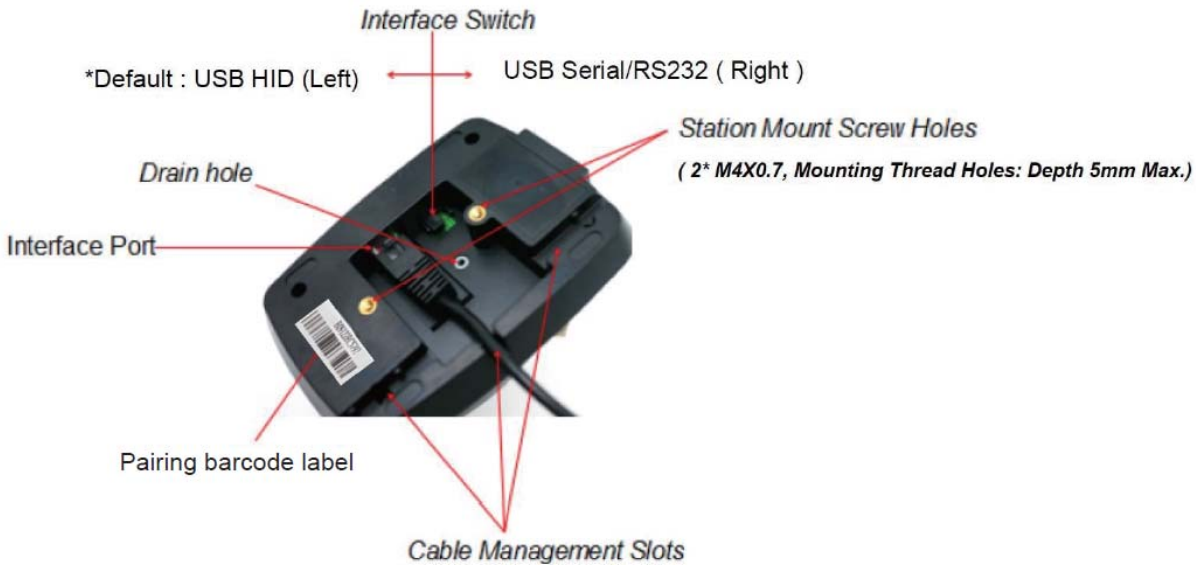
**Scanner Turn off** : Long press the trigger key for about 7 seconds until you hear a short beep sound.

## ■ How to pair the scanner with the cradle

1. Firstly, select the interface you want to communicate with your PC, for USB/RS232 cable connection, please switch the interface switch to the left/right side as below figure and then connect the cradle and the PC via the interface cable.

2. Long press trigger key for 2 seconds to turn on the scanner. And then put the scanner on the cradle to start the BT pairing automatically.

3. When the pairing is completed, both the scanner LED and the cradle LED will show solid blue light.



## The definition of Cradle Button Operation

- Long press 2 seconds to un-pair with the scanner.
- Long press 5 seconds to do reset default to the cradle.
- Press the button to find the paired scanner.
- Press & power on (plug in USB cable): Enter bootloader mode for FW update.

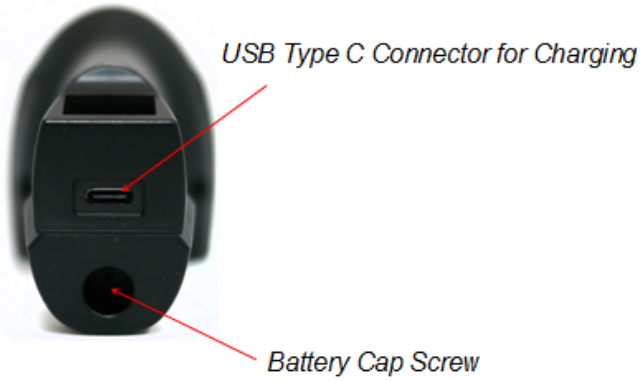
Cradle Button

# 1.5 Battery Charging

Before you use the MS852B Plus for the first time, we strongly recommend charging the battery. It takes approximately 5 hours to fully charge the battery. To charge the scanner with / without a cradle, please follow the instructions below. Please only use the USB type C cable which came with the package.

## ■ Charging through USB type C cable

To charge MS852B Plus, please connect scanner with host PC through USB type C cable.




## ■ Charging with the cradle

Please charge your scanner with the cradle.

# 1.6 How to Replace Battery

Please follow the below instruction to replace the scanner battery.

*1. Loosen the screw*

*2. Remove the battery cap*

*3. Take out the battery*

# 1.7 LED / Beeper Indicator

## ■ Scanner LED indicator

| Description | Indication |
|---|---|
| Battery charging | Solid Red Light<br>**(LED is in the center of top housing)** |
| Battery Low < 10% | Red LED blinking every 2 seconds<br>**(LED is in the center of top housing)** |
| Battery Low < 5% | Red LED blinking fast with all other LED indicators disabled<br>**(LED is in the center of top housing)** |
| System Warning /Error | Red LED toggling every second for 5 seconds or until trigger key pressed |
| BT is paired and disconnected to the host | Solid Green Light |
| Scanner in Auto Presentation Mode | Green LED blinking every 2 seconds |
| System busy with data scanning disabled | Green LED toggling every second |
| BT is connected to the host / cradle & ready to send data. | Solid Blue Light |
| Good read | Green LED flashing once |
| BT in pairing mode | Blue LED toggling every second |
| BT is connected to the host / cradle but its signal is too weak to send data Blue LED blinking fast | Blue LED blinking fast |
| In scanner Firmware Update Mode | White LED |

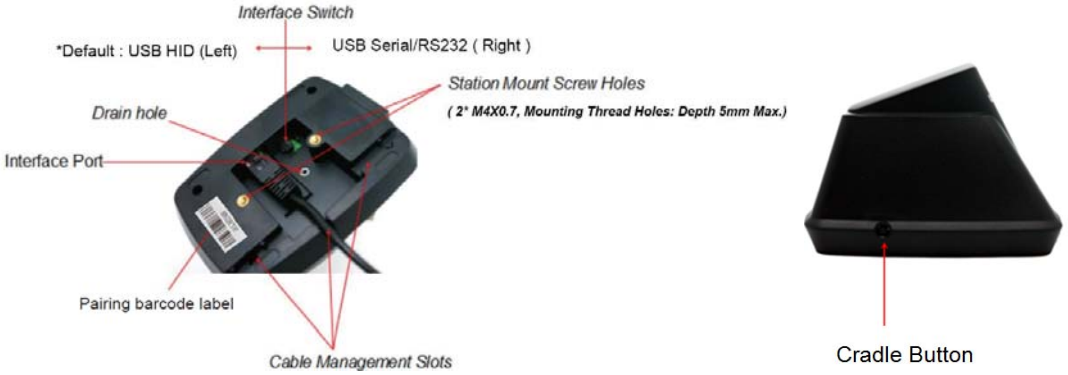
## ■ Cradle LED indicator

| Description | Indication |
|---|---|
| Power is on but host is not connected | Solid Red Light |
| Host is connected, BT is paired and disconnected | Solid Green Light |
| System busy with data sending/receiving disabled | Green LED toggling every second |
| Host is connected, BT is connected and cradle is ready to send/receive data | Solid Blue Light |
| BT in pairing mode | Blue LED toggling every second |
| In cradle Firmware Update Mode | White Light on |
| In scanner Firmware Update Mode | White LED toggling every second |

## ■ Scanner Beeper indicator

| Beeper Description | Indication |
|---|---|
| Scanner in Auto Operation Mode | Power On with 1 Beep |
| Scanner in Wedge Operation Mode | Power On with 2 Beeps |
| Scanner in Batch Operation Mode | Power On with 3 Beeps |
| Auto Power Off Alarm | 3 short beeps at 15 seconds before power off |
| Power Off | Short beep |
| Good Read with BT Connected | Beep with medium sound |
| Good Read with BT Disconnected | Beep with short medium-high sound |
| BT Connection | Beep with low-medium-high sound |

# 1.8 Firmware Update Procedure




## How to update cradle firmware

***Note: Tera Term (alternatively TeraTerm) is an open-source, free, software implemented, terminal emulator which can be downloaded from internet. The different version of Tera Term might not be executed firmware update properly. If you encounter this problem, please use Tera Term V4.72 for firmware update.***

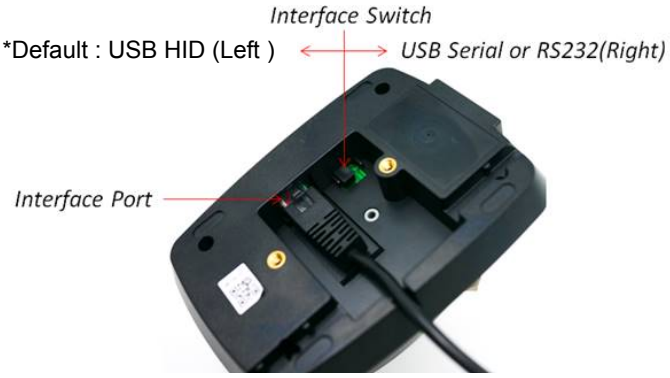
1. Switch Cradle interface to the USB serial interface (away from RJ45 port)
2. Press down the cradle button while plug-in the USB cable into the computer
3. Cradle LED flashing white color when entering cradle firmware update mode.
4. Open Tera Term and select Com port
5. The Tera Term screen pops up of ccccc strings and ready to update firmware
6. Select from Tera Term menu: Transfer→ Y modem-→ Send
7. Select the Firmware to be updated to the cradle -> Confirm to perform the update
8. The Tera Term screen pops out of ccccc strings → must see Cradle LED flashing blue color→ Success

# How to update the scanner firmware

***Note: Before going to update the scanner firmware, please un-pair your scanner with the cradle first.***

1. Switch Cradle interface to the USB serial interface (away from RJ45 port),
2. Connect the cradle to the computer and wait till LED flashing blue color and then open the **Tera Term** and select the Com port to establish the connection.
3. No need to power on the scanner and insert into the cradle.
4. Press down" **Spacebar**" on the computer first while press down the scanner trigger key→ You will hear a Bi sound means scanner enters into the bootloader mode (scanner flashing white LED)
5. The **Tera Term** screen pops out of ccccc of strings.
6. Select from **Tera term** menu: **Transfer→ Y modem-→ Send**
7. Select the firmware to be updated to the scanner -> Confirm to perform the update
8. The screen pops out of words and you will hear a Bi sound → wait till white LED turn off→ Success

## How to check cradle firmware




1. Switch to USB HID interface (close to RJ45 port) and connect cradle to the computer and open word or note -> open Microsoft Word or note pad.
2. Press and hold the cradle button until seeing "**factory default** " shown on the Screen.

## How to check scanner firmware

Please scan "Send Info" barcode below for setting.

Send Info

# 1.9 Auto Presentation Mode

During the auto presentation mode, scanner will be performing this mode automatically when scanner is on the cradle.
The scanner will switch to manual trigger mode when the scanner is removed from the cradle.

To enable auto presentation mode :
Scan the barcode below "enable"

Disable*

Enable

# Chapter 2 – Command Settings

## 2.1 Scanner Type

***Note:***

- ***These settings are for cradleless mode only when the scanner connects to the host directly not through cradle.***
- ***To switch the different scanner type, please do un-pair first and then select the scanner type and redo Bluetooth connection.***

BT Keyboard

BLE Keyboard

BT SPP

## 2.2 Operation Mode

Auto*

Wedge

Batch

# 2.3 System Reset & Info

Factory Default

(Reset setting and **Clean** Bluetooth Link-key information)

Reset Setting

(Reset setting but **Keep** Bluetooth Link-key information)

Send Info

# 2.4 Data & Memory

Note: To erase buffer, scan 'Enter Auto Buffer Erase' and then scan 'Erase'.
To erase batch file, scan 'Enter Batch File' and then scan 'Erase'.

Send Batch

Free Buffer / Drive Space

Erase

Enter Auto Buffer Erase

Enter Batch File Erase

Erase Last Data Entry

# 2.5 BT SPP Setting

Note: Data ACK/NAK is applied to Auto Operation Mode only.

Enable Auto Connection*

Disable Auto Connection

Disable Data ACK/NAK*

Enable Data ACK/NAK

## 2.6 Bluetooth

Note: If 'Higher Level RF Signal Checking' is selected, BLE communication will become more reliable but the distance will be shorter.

BT/BLE Un-Pair / Pair

Enable Cradle Auto Pair*

Normal Level RF Signal Checking*

Higher Level RF Signal Checking

Disable Cradle Auto Pair

## 2.7 Data Terminator

CR*

CRLF

LF

None/ Null

TAB

# 2.8 Auto Power Off After Idle

15 Minutes *

5 Minutes

30 Minutes

2 Hours

4 Hours

6 Hours

1 Hour

Disable

## 2.9 Beeper Control

Medium Volume*

High Volume

Low Volume

Mute

## 2.10 Good Read Indicator

Beeper *

Vibrator

None

Beeper & Vibrator

## 2.11 Connection Indicator

None

Beeper *

Vibrator

Beeper & Vibrator

## 2.12 System Setting Indicator

None

Beeper *

Vibrator

Beeper & Vibrator

## 2.13 System Warning/Error Indicator

None

Beeper *

Vibrator

Beeper & Vibrator

## 2.14 Power On Indicator

None

Beeper *

Vibrator

Beeper & Vibrator

# 2.15 Power Off Alarm & Power Off Indicator

None

Beeper *

Vibrator

Beeper & Vibrator

## 2.16 Vibrator Control

Enable Vibrator*

Disable Vibrator

## 2.17 Data Sending Inter Block Delay

10 ms*

50 ms

100 ms

500 ms

1 Sec.

3 Sec.

## 2.18 HID Keyboard Character Delay

1 ms*

5 ms

10 ms

20 ms

50 ms

100 ms

## 2.19 HID Keyboard Case

Auto Trace*

To Upper

To Lower

# 2.20 HID Keyboard Language

German

Japanese

Danish

Spanish

US English*

UK English

Swiss

Swedish

French

ALT Mode

Belgian

Norwegian

Italian

# 2.21 Save Buffer When Power Off

Don't Save*

Save

# 2.22 Control Character in Bar Code

Note: Partial Send only sends characters BS (0x08), TAB (0x09), CR (0x0D) and ESC (0x1B).

Partial Send *

Send

Don't Send

## 2.23 End of Batch Sending Message

Note: If 'Send' is selected, the scanner will send message "# End of File Total=Number CS=0xHHHH #" before the end of batch file sending. Number is total entries in decimal format and 0xHHHH is 32-bit checksum in hex format.

Send

Don't Send *

## 2.24 Setting Bar Codes Enable /Disable

Enable *

Disable

## 2.25 Scan mode

Before starting scan mode, please make sure you disable the auto sensing mode. Scan the bar code below to disable the auto sensing mode

Disable Auto Sensing (Trigger Mode)

## 2.25.1 Scan Mode

Manual Trigger-Normal*

Normal mode offers good scan speed and the longest working ranges (depth of field).

Presentation Mode

Presentation Mode uses ambient light and scan engine illumination to detect bar codes. When in Presentation Mode, the LEDs remain dim until a bar code is presented to the scan engine, then the aimer turns on and the LEDs turn up to read the code. If the light level in the room is not high enough, Presentation Mode may not work properly. Scan the following bar code to program your scan engine for Presentation Mode.

## 2.25.2 Aimer Mode

This feature allows you to turn the aimer on and off. When the Interlaced bar code is scanned, the aimer is interlaced with the illumination LEDs.

Default = Interlaced.

Aimer Mode*

Off

### 2.25.3 Mobile Phone Read Mode

When this mode is selected, your scan engine is optimized to read bar codes from mobile phone or other LED displays. However, the speed of scanning printed bar codes may be slightly lower when this mode is enabled.
You can enable Mobile Phone Reading for either a hand held device, or for a hands-free (presentation) application.

Hand Held Scanning - Mobile Phone

Streaming Presentation - Mobile Phone

## 2.26 Suffix Selection

### 2.26.1 Add CR Suffix All Symbologies

Scan the following bar code if you wish to add a carriage return suffix to all symbologies at once.

Add CR Suffix All Symbologies

## 2.26.2 Suffix Selections

Add Suffix

Clear All Suffixes

# 2.27 Aimer Delay

The aimer delay allows a delay time for the operator to aim the scan engine before the picture is taken. Use these codes to set the time between when the trigger is pulled and when the picture is taken. During the delay time, the aiming light will appear, but the LEDs won't turn on until the delay time is over. Default = Off.

**200 milliseconds**

**Off (no delay)***

**400 milliseconds**

### 2.27.1 User-Specified Aimer Delay

If you want to set your own length for the duration of the delay, scan the bar code below, then set the time-out by scanning digits (0 - 4,000 ms) from the Programming Chart inside the back cover of this manual, then scan Save.

**Delay Duration**

## 2.28 Aimer Mode

This feature allows you to turn the aimer on and off. When the Interlaced bar code is scanned, the aimer is interlaced with the illumination LEDs.
Default = Interlaced.

**Off**

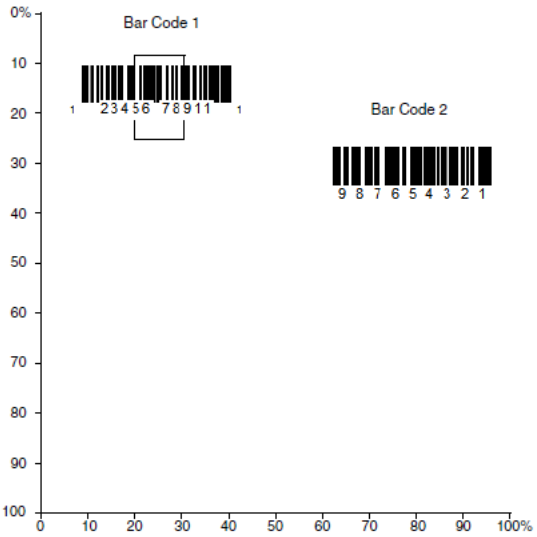
**Interlaced ***

# 2.29 Centering

Use Centering to narrow the scan engine's field of view to make sure that when the scanner is hand-held, it reads only those bar codes intended by the user. For instance, if multiple codes are placed closely together, centering will insure that only the desired codes are read. (Centering can be used in conjunction with Aimer Delay for the most error-free operation in applications where multiple codes are spaced closely together. Using the Aimer Delay and Centering features, the scanner can emulate the operation of older systems, such as linear laser bar code scanners.)If a bar code is not touched by a predefined window, it will not be decoded or output by the scan engine. If centering is turned on by scanning Centering On, the scan engine only reads codes that pass through the centering window you specify using the Top of Centering Window and Bottom of Centering Window bar codes.

In the example below, the white box is the centering window. The centering window has been set to 8% top and 25% bottom. Since Bar Code 1 passes through the centering window, it will be read. Bar Code 2 does not pass through the centering window, so it will not be read.




A bar code needs only to be touched by the centering window in order to be read. It does not need to pass completely through the centering window. Scan Centering On, then scan one of the following bar codes to change the top and bottom of the centering window. Then scan the percent you want to shift the centering window using digits on the inside back cover of this manual. Scan Save. Default Centering = 40% for Top, 60% for Bottom.

**Centering On**

**Top of Centering Window**

**Bottom of Centering Window**

**Centering Off ***

# 2.30 Video Reverse

Video Reverse is used to allow the scan engine to read bar codes that are inverted. The Video Reverse Off bar code below is an example of this type of bar code. Scan Video Reverse Only to read only inverted bar codes. Scan Video Reverse and Standard Bar Codes to read both types of codes.

*Note: After scanning Video Reverse Only, menu bar codes cannot be read. You must scan Video Reverse Off or Video Reverse and Standard Bar Codes in order to read menu bar codes.*

*Note: Images downloaded from the unit are not reversed. This is a setting for decoding only.*

**Video Reverse Only**

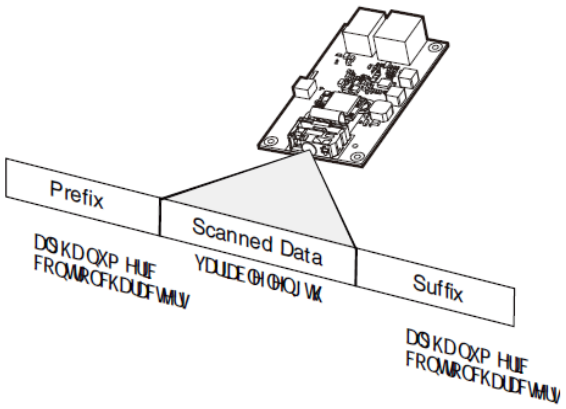
**Video Reverse and Standard Bar Codes**

**Video Reverse Off***

# 2.31 Data Editing

## 2.31.1 Prefix / Suffix Overview

When a bar code is scanned, additional information is sent to the host computer along with the bar code data. This group of bar code data and additional, user-defined data is called a "message string." The selections in this section are used to build the user-defined data into the message string. Prefix and Suffix characters are data characters that can be sent before and after scanned data. You can specify if they should be sent with all symbologies, or only with specific symbologies. The following illustration shows the breakdown of a message string:



### 2.31.1.1 Points to keep in mind

• It is not necessary to build a message string. The selections in this chapter are only used if you wish to alter the default settings.
Default prefix = None. Default suffix = None.

• A prefix or suffix may be added or cleared from one symbology or all symbologies.

• You can add any prefix or suffix from the ASCII Conversion Chart, plus Code I.D. and AIM I.D.

• You can string together several entries for several symbologies at one time.

• Enter prefixes and suffixes in the order in which you want them to appear on the output.

• When setting up for specific symbologies (as opposed to all symbologies), the specific symbology ID value counts as an added prefix or suffix character.

• The maximum size of a prefix or suffix configuration is 200 characters, which includes header information.

### 2.31.1.2 To Add a Prefix

Step 1. Scan the Add Prefix symbol
(please see the barcodes below).

Step 2. Determine the 2 digit Hex value from the Symbology Chart (included in the Symbology Charts) for the symbology to which you want to apply the prefix or suffix. For example, for Code 128, Code ID is "j" and Hex ID is "6A".

Step 3. Scan the 2 hex digits from the Programming Chart or scan 9, 9 for all symbologies.

Step 4. Determine the hex value from the ASCII Conversion Chart for the prefix you wish to enter.

Note: To add the Code I.D., scan 5, C, 8, 0.To add AIM I.D., scan 5, C, 8, 1. To add a backslash (\), scan 5, C, 5, C.To add a backslash (\), you must scan 5C twice – once to create the leading backslash and then to create the backslash itself.

Step 5.Scan the 2 digit hex value from the Programming Chart.

Step 6.Repeat Steps 4 and 5 for every prefix character.

Step 7.Scan Save to exit and save, or scan Discard to exit without saving.

Repeat Steps 1-6 to add a prefix for another symbology.

Example: Add a Tab Prefix to All Symbologies

Step 1.Scan Add Prefix.

Step 2.Scan 9, 9 from the Programming Chart to apply this prefix to all symbologies.

Step 3.Scan 0, 9 from the Programming Chart. This corresponds with the hex value for a horizontal tab, shown in the ASCII Conversion Chart (Code Page 1252).

Scan Save, or scan Discard to exit without saving.

### 2.31.1.3 To Add a Suffix

Step 1. Scan the Add Suffix symbol (please see the barcodes below).

Step 2. Determine the 2 digit Hex value from the Symbology Chart (included in the Symbology Charts) for the symbology to which you want to apply the prefix or suffix. For example, for Code 128, Code ID is "j" and Hex ID is "6A".

Step 3. Scan the 2 hex digits from the Programming Chart or scan 9, 9 for all symbologies.

Step 4. Determine the hex value from the ASCII Conversion Chart for the prefix or suffix you wish to enter.

Note: To add the Code I.D., scan 5, C, 8, 0.To add AIM I.D., scan 5, C, 8, 1. To add a backslash (\), scan 5, C. To add a backslash (\), once to create the leading backslash and then to create the backslash itself.

Step 5.Scan the 2 digit hex value from the Programming Chart.

Step 6.Repeat Steps 4 and 5 for every suffix character.

Step 7.Scan Save to exit and save, or scan Discard to exit without saving.

Repeat Steps 1-6 to add a suffix for another symbology.

Example: Add a Tab Suffix to All Symbologies

Step 1.Scan Add Suffix.

Step 2.Scan 9, 9 from the Programming Chart to apply this suffix to all symbologies.

Step 3.Scan 0, 9 from the Programming Chart. This corresponds with the hex value for a horizontal tab, shown in the ASCII Conversion Chart (Code Page 1252).

Scan Save, or scan Discard to exit without saving.

### 2.31.1.4 To Clear One or All Prefixes or Suffixes

You can clear a single prefix or suffix, or clear all prefixes/suffixes for a symbology. If you have been entering prefixes and suffixes for single symbologies, you can use Clear One Prefix (Suffix) to delete a specific character from a symbology. When you Clear All Prefixes (Suffixes), all the prefixes or suffixes for a symbology are deleted.

Step 1.Scan the Clear One Prefix or Clear One Suffix symbol.

Step 2.Determine the 2 digit Hex value from the Symbology Chart (included in the Symbology Charts) for the symbology from which you want to clear the prefix or suffix.

Step 3.Scan the 2 digit hex value from the Programming Chart or scan 9, 9 for all symbologies.

Step 4.Scan the Clear One Prefix or Clear One Suffix symbol.

Your change is automatically saved.

### 2.31.1.5 To Add a Carriage Return Suffix to All Symbologies

Scan the following bar code if you wish to add a carriage return suffix to all symbologies at once. This action first clears all current suffixes, then programs a carriage return suffix for all symbologies.

Add CR SuffixAll Symbologies

## 2.31.2 Prefix Selections

Add Prefix

Clear One Prefix

Clear All Prefixes

## 2.31.3 Suffix Selections

Add Suffix

Clear One Suffix

Clear All Suffixes

## 2.31.4 Function Code Transmit

When this selection is enabled and function codes are contained within the scanned data, the scan engine transmits the function code to the terminal. Charts of these function codes are provided in Supported Interface Keys starting. When the scanner is in keyboard wedge mode, the scan code is converted to a key code before it is transmitted. Default = Enable.

Enable*

Disable

# 2.32 Data Formatting

## 2.32.1 Data Format Editor Introduction

You may use the Data Format Editor to change the scan engine's output. For example, you can use the Data Format Editor to insert characters at certain points in bar code data as it is scanned. The selections in the following pages are used only if you wish to alter the output. Default Data Format setting = None. Normally, when you scan a bar code, it is output automatically. However, when you create a format, you must use a "send" command within the format program to output data.

Multiple formats may be programmed into the scan engine. They are stacked in the order in which they are entered. However, the following list presents the order in which formats are applied:

1. Specific Terminal ID, Actual Code ID, Actual Length
2. Specific Terminal ID, Actual Code ID, Universal Length
3. Specific Terminal ID, Universal Code ID, Actual Length
4. Specific Terminal ID, Universal Code ID, Universal Length
5. Universal Terminal ID, Actual Code ID, Actual Length
6. Universal Terminal ID, Actual Code ID, Universal Length
7. Universal Terminal ID, Universal Code ID, Actual Length
8. Universal Terminal ID, Universal Code ID, Universal Length

The maximum size of a data format configuration is 2000 bytes, which includes header information. If a bar code is read that fails the first data format, the next data format, if there is one, will be used on the bar code data. If there is no other data format, the raw data is output. If you have changed data format settings, and wish to clear all formats and return to the factory defaults, scan the Default Data Format code below.

Default Data Format*

## 2.32.2 Add a Data Format

Step 1.Scan the Enter Data Format symbol.

Step 2.Select Primary/Alternate FormatDetermine if this will be your primary data format, or one of 3 alternate formats. This allows you to save a total of 4 different data formats. To program your primary format, scan 0 using the Programming Chart inside the back cover of this manual. If you are programming an alternate format, scan 1, 2, or 3, depending on which alternate format you are programming. (See "Primary/Alternate Data Formats" for further information.)

Step 3.Terminal TypeRefer to Terminal ID Table and locate the Terminal ID number for your PC. Scan three numeric bar codes on the inside back cover to program the scan engine for your terminal ID (you must enter 3 digits). For example, scan 0 0 3 for an AT wedge.
Note:099 indicates all terminal types.

Step 4. Code I.D.In the Symbology Charts, beginning on page A-1, find the symbology to which you want to apply the data format. Locate the Hex value for that symbology and scan the 2 digit hex value from the Programming Chart.
If you wish to create a data format for all symbologies, with the exception of some specific symbologies, refer to B8. If you are creating a data format for Batch Mode Quantity, use 35 for the Code I.D.
Note:99 indicates all symbologies.

Step 5.LengthSpecify what length (up to 9999 characters) of data will be acceptable for this symbology. Scan the four digit data length from the Programming Chart. For example, 50 characters is entered as 0050.
Note:9999 indicates all lengths.

Step 6.Editor CommandsRefer to Data Format Editor Commands. Scan the symbols that represent the command you want to enter. 94 alphanumeric characters may be entered for each symbology data format.

Step 7.Scan Save to save your data format, or Discard to exit without saving your changes.

Enter Data Format

Save

Discard

## 2.32.3 Other Programming Selections

**Clear One Data Format**

This deletes one data format for one symbology. If you are clearing the primary format, scan 0 from the Programming Chart inside the back cover of this manual. If you are clearing an alternate format, scan 1, 2, or 3, depending on the format you are clearing. Scan the Terminal Type and Code I.D. (see Symbology Charts), and the bar code data length for the specific data format that you want to delete. All other formats remain unaffected.

**Clear all Data Formats** This clears all data formats.

**Save** to exit and save your data format changes.

**Discard** to exit without saving any data format changes.

Clear One Data Format

Clear All Data Formats

Save

Discard

## *Terminal ID Table*

| Terminal | Model(s) | Terminal ID |
|---|---|---|
| USB | PC keyboard (HID) | 124 |
| | Mac Keyboard | 125 |
| | PC Keyboard (Japanese) | 134 |
| | Serial (COM driver required) | 130 |
| | HID POS | 131 |
| | USB SurePOS Handheld | 128 |
| | USB SurePOS Tabletop | 129 |
| Serial | RS232 TTL | 000 |
| | RS232 True | 000 |
| | RS485 (IBM-HHBCR 1+2, 46xx) | 051 |
| Keyboard | PS2 compatibles | 003 |
| | AT compatibles | 002 |

## 2.32.4 Data Format Editor Commands

When working with the Data Format Editor, a virtual cursor is moved along your input data string. The following commands are used to both move this cursor to different positions, and to select, replace, and insert data into the final output.

### 2.32.4.1 Send Commands

- **Send all characters**

F1 Include in the output message all of the characters from the input message, starting from current cursor position, followed by an insert character. Syntax = F1xx where xx stands for the insert character's hex value for its ASCII code. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

- **Send a number of characters**

F2 Include in the output message a number of characters followed by an insert character. Start from the current cursor position and continue for "nn" characters or through the last character in the input message, followed by character "xx." Syntax = F2nnxx where nn stands for the numeric value (00-99) for the number of characters, and xx stands for the insert character's hex value for its ASCII code. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

**F2 Example: Send a number of characters**


Send the first 10 characters from the bar code above, followed by a carriage return. Command string: F2100D
F2 is the "Send a number of characters" command
10 is the number of characters to send
0D is the hex value for a CR
The data is output as: 1234567890

**F2 and F1 Example: Split characters into 2 lines**

Send the first 10 characters from the bar code above, followed by a carriage return, followed by the rest of the characters.

Command string: F2100DF10D

F2 is the "Send a number of characters" command

10 is the number of characters to send for the first line

0D is the hex value for a CR

F1 is the "Send all characters" command

0D is the hex value for a CR

The data is output as:

**1234567890**

**ABCDEFGHIJ**

**<CR>**

- **Send all characters up to a particular character**

F3 Include in the output message all characters from the input message, starting with the character at the current cursor position and continuing to, but not including, the search character "ss," followed by an insert character. The cursor is moved forward to the "ss" character. Syntax = F3ssxx where ss stands for the search character's hex value for its ASCII code, and xx stands for the insert character's hex value for its ASCII code. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

**F3 Example: Send all characters up to a particular character**


Using the bar code above, send all characters up to but not including "D," followed by a carriage return.

Command string: F3440D

F3 is the "Send all characters up to a particular character" command

44 is the hex value for a 'D"

0D is the hex value for a CR
The data is output as:
**1234567890ABC**
**<CR>**

- **Send all characters up to a string**

B9 Include in the output message all characters from the input message, starting with the character at the current cursor position and continuing to, but not including, the search string "s...s." The cursor is moved forward to the beginning of the "s...s" string. Syntax = B9nnnns...s where nnnn stands for the length of the string, and s...s stands for the string to be matched. The string is made up of hex values for the characters in the string. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

**B9 Example: Send all characters up to a defined string**


Using the bar code above, send all characters up to but not including "AB."
Command string: **B900024142**
B9 is the "Send all characters up to a string" command
0002 is the length of the string (2 characters)
41 is the hex value for A
42 is the hex value for B
The data is output as: 1234567890

■ **Send all characters up to a string**

E9 Include in the output message all but the last "nn" characters, starting from the current cursor position. The cursor is moved forward to one position past the last input message character included. Syntax = E9nn where nn stands for the numeric value (00-99) for the number of characters that will not be sent at the end of the message.

■ **Insert a character multiple times**

F4 Send "xx" character "nn" times in the output message, leaving the cursor in the current position. Syntax = F4xxnn where xx stands for the insert character's hex value for its ASCII code, and nn is the numeric value (00-99) for the number of times it should be sent. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

**E9 and F4 Example: Send all but the last characters, followed by 2 tabs**


Send all characters except for the last 8 from the bar code above, followed by 2 tabs.

Command string: E908F40902

E9 is the "Send all but the last characters" command

08 is the number of characters at the end to ignore

F4 is the "Insert a character multiple times" command

09 is the hex value for a horizontal tab

02 is the number of times the tab character is sent

The data is output as: **1234567890AB <tab><tab>**

■ **Insert a string**

BASend "ss" string of "nn" length in the output message, leaving the cursor in the current position. Syntax = BAnnnns...s where nnnn stands for the length of the string, and s...s stands for the string. The string is made up of hex values for the characters in the string. Refer to the ASCII Conversion Chart (Code Page 1252), beginning on page A-3 for decimal, hex and character codes.

**B9 and BA Example: Look for the string "AB" and insert 2 asterisks (**)**


Using the bar code above, send all characters up to but not including "AB." Insert 2 asterisks at that point, and send the rest of the data with a carriage return after.
Command string: B900024142BA00022A2AF10D
B9 is the "Send all characters up to a string" command
0002 is the length of the string (2 characters)
41 is the hex value for A
42 is the hex value for B
BA is the "Insert a string" command
0002 is the length of the string to be added (2 characters)
2A is the hex value for an asterisk (*)
2A is the hex value for an asterisk (*)
F1 is the "Send all characters" command
0D is the hex value for a CR
The data is output as:
**1234567890**ABCDEFGHIJ**
**<CR>**

■ **Insert symbology name**

B3 Insert the name of the bar code's symbology in the output message, without moving the cursor. Only symbologies with a Honeywell ID are included (see Symbology Charts). Refer to the ASCII Conversion Chart (Code Page 1252), for decimal, hex and character codes**.**

■ **Insert bar code length**

B4 Insert the bar code's length in the output message, without moving the cursor. The length is expressed as a numeric string and does not include leading zeroes.

**B3 and B4 Example: Insert the symbology name and length**


Send the symbology name and length before the bar code data from the bar code above. Break up these insertions with spaces. End with a carriage return.
Command string: B3F42001B4F42001F10D
B3 is the "Insert symbology name" command
F4 is the "Insert a character multiple times" command
20 is the hex value for a space
01 is the number of times the space character is sent
B4 is the "Insert bar code length" command
F4 is the "Insert a character multiple times" command
20 is the hex value for a space
01 is the number of times the space character is sent
F1 is the "Send all characters" command
0D is the hex value for a CR
The data is output as:
**Code128 20 1234567890ABCDEFGHIJ**
**<CR>**

■ **Insert key strokes**

B5 Insert a key stroke or combination of key strokes. Key strokes are dependent on your keyboard. Any key can be inserted, including arrows and functions. Syntax = B5xxssnn where xx is the number of keys pressed (without key modifiers), ss is the key modifier from the table below, and nn is the key number from the Unicode Key Maps.

| Key Modifiers | |
|---|---|
| No Key Modifier | 00 |
| Shift Left | 01 |
| Shift Right | 02 |
| Alt Left | 04 |
| Alt Right | 08 |
| Control Left | 10 |
| Control Right | 20 |

For example, B501021F inserts an "A" on a 104 key, U.S. style keyboard. B5 = the command, 01 = number of keys pressed (without the key modifier), 02 is the key modifier for Shift Right, and 1F is the "a" key. If a lower case "a" were to be inserted, B501001F would be entered.

If there are three keystrokes, the syntax would change from B5xxssnn for one keystroke to B5xxssnnssnnssnn. An example that would insert "abc" is as follows: B503001F00320030F833.

Note: Key modifiers can be added together when needed. Example: Control Left+Shift Left = 11.

## 2.32.4.2 Move Commands

■ **Move the cursor forward a number of characters**

F5 Move the cursor ahead "nn" characters from current cursor position. Syntax = F5nn where nn is the numeric value (00-99) for the number of characters the cursor should be moved ahead.

**F5 Example: Move the cursor forward and send the data**


Move the cursor forward 3 characters, then send the rest of the bar code data from the bar code above. End with a carriage return.
Command string: F503F10D
F5 is the "Move the cursor forward a number of characters" command
03 is the number of characters to move the cursor
F1 is the "Send all characters" command
0D is the hex value for a CR
The data is output as:
**4567890ABCDEFGHIJ**
**<CR>**

■ **Move the cursor backward a number of characters**

F6 Move the cursor back "nn" characters from current cursor position. Syntax = F6nn where nn is the numeric value (00-99) for the number of characters the cursor should be moved back.

■ **Move the cursor to the beginning**

F7 Move the cursor to the first character in the input message. Syntax = F7.

**FE and F7 Example: Manipulate bar codes that begin with a 1**


Search for bar codes that begin with a 1. If a bar code matches, move the cursor back to the beginning of the data and send 6 characters followed by a carriage return. Using the bar code above:

Command string: FE31F7F2060D

FE is the "Compare characters" command

31 is the hex value for 1

F7 is the "Move the cursor to the beginning" command

F2 is the "Send a number of characters" command

06 is the number of characters to send

0D is the hex value for a CR

The data is output as:

**123456**

**<CR>**

■ **Move the cursor to the end**

EA Move the cursor to the last character in the input message. Syntax = EA.

## 2.32.4.3 Search Commands

■ **Search forward for a character**

F8 Search the input message forward for "xx" character from the current cursor position, leaving the cursor pointing to the "xx" character. Syntax = F8xx where xx stands for the search character's hex value for its ASCII code. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

**F8 Example: Send bar code data that starts after a particular character**


Search for the letter "D" in bar codes and send all the data that follows, including the "D." Using the bar code above:
Command string: F844F10D
F8 is the "Search forward for a character" command
44 is the hex value for "D"
F1 is the "Send all characters" command
0D is the hex value for a CR
The data is output as:
**DEFGHIJ**
**<CR>**

■ **Search backward for a character**

F9 Search the input message backward for "xx" character from the current cursor position, leaving the cursor pointing to the "xx" character. Syntax = F9xx where xx stands for the search character's hex value for its ASCII code. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

■ **Search forward for a string**

B0Search forward for "s" string from the current cursor position, leaving cursor pointing to "s" string. Syntax = B0nnnnS where nnnn is the string length (up to 9999), and S consists of the ASCII hex value of each character in the match string. For example, B0000454657374 will search forward for the first occurrence of the 4 character string "Test." Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

**B0 Example: Send bar code data that starts after a string of characters**


Search for the letters "FGH" in bar codes and send all the data that follows, including "FGH." Using the bar code above:

Command string: B00003464748F10D

B0 is the "Search forward for a string" command

0003 is the string length (3 characters)

46 is the hex value for "F"

47 is the hex value for "G"

48 is the hex value for "H"

F1 is the "Send all characters" command

0D is the hex value for a CR

The data is output as:

**FGHIJ**

**<CR>**

■ **Search backward for a string**

B1 Search backward for "s" string from the current cursor position, leaving cursor pointing to "s" string. Syntax = B1nnnnS where nnnn is the string length (up to 9999), and S consists of the ASCII hex value of each character in the match string. For example, B1000454657374 will search backward for the first occurrence of the 4 character string "Test." Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

■ **Search forward for a non-matching character**

E6 Search the input message forward for the first non-"xx" character from the current cursor position, leaving the cursor pointing to the non-"xx" character. Syntax = E6xx where xx stands for the search character's hex value for its ASCII code. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

**E6 Example: Remove zeroes at the beginning of bar code data**


This example shows a bar code that has been zero filled. You may want to ignore the zeroes and send all the data that follows.

E6 searches forward for the first character that is not zero, then sends all the data after, followed by a carriage return. Using the bar code above:

Command string: E630F10DE6 is the "Search forward for a non-matching character" command

30 is the hex value for 0

F1 is the "Send all characters" command

0D is the hex value for a CR

The data is output as:

**37692**

**<CR>**

■ **Search backward for a non-matching character**

E7 Search the input message backward for the first non-"xx" character from the current cursor position, leaving the cursor pointing to the non-"xx" character. Syntax = E7xx where xx stands for the search character's hex value for its ASCII code. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

## 2.32.5 Miscellaneous Commands

■ **Suppress characters**

FB Suppress all occurrences of up to 15 different characters, starting at the current cursor position, as the cursor is advanced by other commands. When the FC command is encountered, the suppress function is terminated. The cursor is not moved by the FB command. Syntax = FBnnxxyy . .zz where nn is a count of the number of suppressed characters in the list, and xxyy .. zz is the list of characters to be suppressed.

**FB Example: Remove spaces in bar code data**


This example shows a bar code that has spaces in the data. You may want to remove the spaces before sending the data. Using the bar code above:
Command string: FB0120F10D
FB is the "Suppress characters" command
01 is the number of character types to be suppressed
20 is the hex value for a space
F1 is the "Send all characters" command
0D is the hex value for a CR
The data is output as:
**34567890**
**<CR>**

■ **Stop suppressing characters**

FC Disables suppress filter and clear all suppressed characters. Syntax = FC.

■ **Replace characters**

E4 Replaces up to 15 characters in the output message, without moving the cursor. Replacement continues until the E5 command is encountered. Syntax = E4nnxx1xx2yy1yy2...zz1zz2 where nn is the total count of the number of characters in the list (characters to be replaced plus replacement characters); xx1 defines characters to be replaced and xx2 defines replacement characters, continuing through zz1 and zz2.

**E4 Example: Replace zeroes with CRs in bar code data**


If the bar code has characters that the host application does not want included, you can use the E4 command to replace those characters with something else. In this example, you will replace the zeroes in the bar code above with carriage returns.

Command string: E402300DF10D

E4 is the "Replace characters" command

02 is the total count of characters to be replaced, plus the replacement characters (0 is replaced by CR, so total characters = 2)

30 is the hex value for 0

0D is the hex value for a CR (the character that will replace the 0)

F1 is the "Send all characters" command

0D is the hex value for a CR

The data is output as:

**12345678ABC**

**<CR>**

■ **Stop replacing characters**

E5 Terminates character replacement. Syntax = E5.

■ **Compare characters**

FE Compare the character in the current cursor position to the character "xx." If characters are equal, move the cursor forward one position. Syntax = FExx where xx stands for the comparison character's hex value for its ASCII code. Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

■ **Compare characters**

B2 Compare the string in the input message to the string "s." If the strings are equal, move the cursor forward past the end of the string. Syntax = B2nnnnS where nnnn is the string length (up to 9999), and S consists of the ASCII hex value of each character in the match string. For example, B2000454657374 will compare the string at the current cursor position with the 4 character string "Test." Refer to the ASCII Conversion Chart (Code Page 1252) for decimal, hex and character codes.

■ **Check for a number**

EC Check to make sure there is an ASCII number at the current cursor position.

The format is aborted if the character is not numeric.

**EC Example: Only output the data if the bar code begins with a number**

If you want only data from bar codes that begin with a number, you can use EC to check for the number.

Command string: ECF10D

EC is the "Check for a number" command

F1 is the "Send all characters" command

0D is the hex value for a CR

If this bar code is read 

, the next data format, if there is one, will be used on the data. If there is no other format, the format fails and the raw data is output as AB1234. If this bar code is read: 

the data is output as:

1234AB

<CR>

■ **Check for non-numeric character**

ED Check to make sure there is a non-numeric ASCII character at the current cursor position. The format is aborted if the character is numeric.

**ED Example: Only output the data if the bar code begins with a letter**

If you want only data from bar codes that begin with a letter, you can use ED to check for the letter.

Command string: EDF10D

ED is the "Check for a non-numeric character" command

F1 is the "Send all characters" command

0D is the hex value for a CR

If this bar code is read 

, the next data format, if there is one, will be used on the data. If there is no other format, the format fails and the raw data is output as AB1234. If this bar code is read: 

the data is output as:

AB1234

<CR>

■ **Insert a delay**

EF Inserts a delay of up to 49,995 milliseconds (in multiples of 5), starting from the current cursor position. Syntax = EFnnnn where nnnn stands for the delay in 5ms increments, up to 9999. This command can only be used with keyboard emulation.a

■ **Discard Data**

B8 Discards types of data. For example, you may want to discard Code 128 bar codes that begin with the letter A. In step 4, select 6A (for Code 128), and in step 5, select 9999 (for all lengths). Enter FE41B8 to compare and discard Code 128 bar codes that begin with the letter A. Syntax = B8.

Note: The B8 command must be entered after all other commands. The Data Format must be Required in order for the B8 command to work. If Data Format is On, but Not Required, bar code data that meets the B8 format is scanned and output as usual. Because the data format needs to be On and Required for the B8 command, you must input data formats for all bar codes you wish to discard as well as all bar codes you wish to output. Other data format settings impact the B8 command. If Data Format Non-Match Error Tone is On, the scan engine emits an error tone. If Data format Non-Match Error Tone is Off, the code is disabled for reading and no tone is sounded.

## 2.32.6 Data Formatter

When Data Formatter is turned Off, the bar code data is output to the host as read, including prefixes and suffixes.

**Data Formatter Off**

You may wish to require the data to conform to a data format you have created and saved. The following settings can be applied to your data format:

**Data Formatter On, Not Required, Keep Prefix/Suffix**

Scanned data is modified according to your data format, and prefixes and suffixes are transmitted.

**Data Formatter On, Not Required, Drop Prefix/Suffix**

Scanned data is modified according to your data format. If a data format is found for a particular symbol, those prefixes and suffixes are not transmitted. If a data format is not found for that symbol, the prefixes and suffixes are transmitted.

**Data Format Required, Keep Prefix/Suffix**

Scanned data is modified according to your data format, and prefixes and suffixes are transmitted. Any data that does not match your data format requirements generates an error tone and the data in that bar code is not transmitted. If you wish to process this type of bar code without generating an error tone, see Data Format Non-Match Error Tone.

**Data Format Required, Drop Prefix/Suffix**

Scanned data is modified according to your data format. If a data format is found for a particular symbol, those prefixes and suffixes are not transmitted. Any data that does not match your data format requirements generates an error tone. If you wish to process this type of bar code without generating an error tone, see Data Format Non-Match Error Tone.

Choose one of the following options. Default = Data Formatter On, Not Required, Keep Prefix/Suffix.

Data Formatter On, Not Required, Keep Prefix/Suffix *

Data Format Required, Keep Prefix/Suffix

Data Formatter On, Not Required, Drop Prefix/Suffix

Data Format Required, Drop Prefix/Suffix

## 2.32.7 Data Format Non-Match Error Tone

When a bar code is encountered that doesn't match your required data format, the scan engine normally generates an error tone. However, you may want to continue scanning bar codes without hearing the error tone. If you scan the Data Format Non-Match Error Tone Off bar code, data that doesn't conform to your data format is not transmitted, and no error tone will sound. If you wish to hear the error tone when a non-matching bar code is found, scan the Data Format Non-Match Error Tone On bar code. Default = Data Format Non-Match Error Tone On.

Data Format Non-Match Error Tone On *

Data Format Non-Match Error Tone Off

## 2.32.8 Primary/Alternate Data Formats

You can save up to four data formats, and switch between these formats. Your primary data format is saved under 0. Your other three formats are saved under 1, 2, and 3. To set your device to use one of these formats, scan one of the bar codes below.

Primary Data Format

Data Format 2

Data Format 1

Data Format 3

## 2.32.9 Single Scan Data Format Change

You can also switch between data formats for a single scan. The next bar code is scanned using an alternate data format, then reverts to the format you have selected above (either Primary, 1, 2, or 3). For example, you may have set your device to the data format you saved as Data Format 3. You can switch to Data Format 1 for a single trigger pull by scanning the Single Scan-Data Format 1 bar code below. The next bar code that is scanned uses Data Format 1, then reverts back to Data Format 3.

Single Scan-Primary Data Format

Single Scan-Data Format 1

Single Scan-Data Format 2

Single Scan-Data Format 3

# Chapter 3 – Symbology

## 3.1 Message Length Description

You are able to set the valid reading length of some of the bar code symbologies. You may wish to set the same value for mini-mum and maximum length to force the scanner to read fixed length bar code data. This helps reduce the chances of a misread.

**EXAMPLE**: Decode only those bar codes with a count of 9-20 characters.
Min.length = 09 Max. length = 20

**EXAMPLE**: Decode only those bar codes with a count of 15 characters.
Min. length = 15 Max. length = 15

For a value other than the minimum and maximum message length defaults, scan the bar codes included in the explanation of the symbology, then scan the digit value of the message length and Save bar codes on the Programming Chart. The minimum and maximum lengths and the defaults are included with the respective symbologies.

# 3.2 1D

## 3.2.1 Codabar

Codabar On*

Default All Codabar Settings

Codabar Off

### 3.2.1.1 Codabar Start / Stop Characters

Start/Stop characters identify the leading and trailing ends of the bar code. You may either transmit, or not transmit Start/Stop characters.
Default = Don't Transmit.

Transmit

Don't Transmit*

### 3.2.1.2 Codabar Check Characters

Codabar check characters are created using different "modulos." You can program the scanner to read only Codabar bar codes with Modulo 16 check characters. Default = No Check Character.

**No Check Character** indicates that the scanner reads and transmits bar code data with or without a check character.

When Check Character is set to **Validate and Transmit**, the scanner will only read Codabar bar codes printed with a check character, and will transmit this character at the end of the scanned data.

When Check Character is set to **Validate, but Don't Transmit**, the unit will only read Codabar bar codes printed with a check character, but will not transmit the check character with the scanned data.

No Check Character*

Validate Modulo 16, but Don't Transmit

Validate Modulo 16 and Transmit

### 3.2.1.3 Codabar Concatenation

Codabar supports symbol concatenation. When you enable concatenation, the scanner looks for a Codabar symbol having a "D" start character, adjacent to a symbol having a "D" stop character. In this case the two messages are concatenated into one with the "D" characters omitted.


Select Require to prevent the scanner from decoding a single "D" Codabar symbol without its companion. This selection has no effect on Codabar symbols without Stop/Start D characters.

On

Off*

Require

### 3.2.1.4 Codabar Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information.

Minimum and Maximum lengths = 2-60.

Minimum Default = 4, Maximum Default = 60.

Minimum Message Length

Maximum Message Length

## 3.2.2 Code 39

Code 39 On*

Default All Code 39 Settings

Code 39 Off

### 3.2.2.1 Code 39 Start / Stop Characters

Start/Stop characters identify the leading and trailing ends of the bar code. You may either transmit, or not transmit Start/ Stop characters.
Default = Don't Transmit.

Transmit

Don't Transmit*

### 3.2.2.2 Code 39 Check Characters

**No Check Character** indicates that the scanner reads and transmits bar code data with or without a check character.
When Check Character is set to **Validate, but Don't Transmit**, the unit only reads Code 39 bar codes printed with a check character, but will not transmit the check character with the scanned data.
When Check Character is set to **Validate and Transmit,** the scanner only reads Code 39 bar codes printed with a check character, and will transmit this character at the end of the scanned data. Default = No Check Character.

No Check Character*

Validate , but Don't Transmit

Validate and Transmit

### 3.2.2.3 Code 39 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information.
Minimum and Maximum lengths = 0-48.
Minimum Default = 0, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

### 3.2.2.4 Code 39 Append

This function allows the scanner to append the data from several Code 39 bar codes together before transmitting them to the host computer. When the scanner encounters a Code 39 bar code with the append trigger character(s), it buffers Code 39 bar codes until it reads a Code 39 bar code that does not have the append trigger. The data is then transmitted in the order in which the bar codes were read (FIFO). Default = Off.

Off *

On

### 3.2.2.5 Code 32 Pharmaceutical (PARAF)

Code 32 Pharmaceutical is a form of the Code 39 symbology used by Italian pharmacies. This symbology is also known as PARAF.

*Note: Trioptic Code must be turned off while scanning Code 32 Pharmaceutical codes.*

Off *

On

## 3.2.2.6 Full ASCII

Full ASCII Code 39 decoding is enabled, certain character pairs within the bar code symbol will be interpreted as a single character.
For example: $V will be decoded as the ASCII character SYN, and /C will be decoded as the ASCII character #. Default = Off.

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NUL | %U | DLE | $P | SP | SPACE | 0 | 0 | @ | %V | P | P | ‘ | %W | p | +P |
| SOH | $A | DC1 | $Q | ! | /A | 1 | 1 | A | A | Q | Q | a | +A | q | +Q |
| STX | $B | DC2 | $R | “ | /B | 2 | 2 | B | B | R | R | b | +B | r | +R |
| ETX | $C | DC3 | $S | # | /C | 3 | 3 | C | C | S | S | c | +C | s | +S |
| EOT | $D | DC4 | $T | $ | /D | 4 | 4 | D | D | T | T | d | +D | t | +T |
| ENQ | $E | NAK | $U | % | /E | 5 | 5 | E | E | U | U | e | +E | u | +U |
| ACK | $F | SYN | $V | & | /F | 6 | 6 | F | F | V | V | f | +F | v | +V |
| BEL | $G | ETB | $W | ‘ | /G | 7 | 7 | G | G | W | W | g | +G | w | +W |
| BS | $H | CAN | $X | ( | /H | 8 | 8 | H | H | X | X | h | +H | x | +X |
| HT | $I | EM | $Y | ) | /I | 9 | 9 | I | I | Y | Y | i | +I | y | +Y |
| LF | $J | SUB | $Z | * | /J | : | /Z | J | J | Z | Z | j | +J | z | +Z |
| VT | $K | ESC | %A | + | /K | ; | %F | K | K | [ | %K | k | +K | { | %P |
| FF | $L | FS | %B | , | /L | < | %G | L | L | \ | %L | l | +L | \| | %Q |
| CR | $M | GS | %C | - | - | = | %H | M | M | ] | %M | m | +M | } | %R |
| SO | $N | RS | %D | . | . | > | %I | N | N | ^ | %N | n | +N | ~ | %S |
| SI | $O | US | %E | / | /O | ? | %J | O | O | _ | %O | o | +O | DEL | %T |

Character pairs /M and /N decode as a minus sign and period respectively.
Character pairs /P through /Y decode as 0 through 9.

Full ASCII Off *

Full ASCII On

### 3.2.2.7 Code 39 Code Page

Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the bar codes were created (see ISO 2022/ISO 646 Character Replacements), and scan the value and the Save bar code from the Programming Chart. The data characters should then appear properly.

Code 39 Code Page

## 3.2.3 Interleaved 2 of 5

Interleaved 2 of 5 On*

Default All Interleaved 2 of 5 Settings

Interleaved 2 of 5 Off

### 3.2.3.1 Check digit

No Check Digit indicates that the scanner reads and transmits bar code data with or without a check digit. When Check Digit is set to Validate, but Don't Transmit, the unit only reads Interleaved 2 of 5 bar codes printed with a check digit, but will not transmit the check digit with the scanned data. When Check Digit is set to Validate and Transmit, the scanner only reads Interleaved 2 of 5 bar codes printed with a check digit, and will transmit this digit at the end of the scanned data. Default = No Check Digit.

No Check Digit*

Validate , but Don't Transmit

Validate and Transmit

### 3.2.3.2 Interleaved 2 of 5 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information.
Minimum and Maximum lengths = 2-80.
Minimum Default = 4, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

## 3.2.4 Code 93

Code 93 On*

Default All Code 93 Settings

Code 93 Off

### 3.2.4.1 Code 93 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 0-80. Minimum Default = 0, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

### 3.2.4.2 Code 93 Append

This function allows the scanner to append the data from several Code 93 bar codes together before transmitting them to the host computer. When this function is enabled, the scanner stores those Code 93 bar codes that start with a space (excluding the start and stop symbols), and does not immediately transmit the data. The scanner stores the data in the order in which the bar codes are read, deleting the first space from each. The scanner transmits the appended data when it reads a Code 93 bar code that starts with a character other than a space. Default = Off.

Off *

On

### 3.2.4.3 Code 93 Code Page

Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the bar codes were created (see ISO 2022/ISO 646 Character Replacements), and scan the value and the Save bar code from the Programming Chart. The data characters should then appear properly.

Code 93 Code Page

## 3.2.5 Straight 2 of 5 Industrial (three-bar start/stop)

Straight 2 of 5
Industrial On

Default All Straight 2 of 5
Industrial Settings

Straight 2 of 5
Industrial Off*

### 3.2.5.1 Straight 2 of 5 Industrial Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-48. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

## 3.2.6 Straight 2 of 5 IATA (two-bar start/stop)

Straight 2 of 5 IATA
Industrial On

Default All Straight 2 of 5
IATA Industrial Settings

Straight 2 of 5 IATA
Industrial Off*

### 3.2.6.1 Straight 2 of 5 IATA Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-48. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

## 3.2.7 Matrix 2 of 5

Matrix 2 of 5 On

Default All Matrix 2 of 5 Settings

Matrix 2 of 5 Off*

### 3.2.7.1 Matrix 2 of 5 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-80. Minimum Default = 4, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

## 3.2.8 Code 11

Code 11 On

Default All Code 11 Settings

Code 11 Off*

### 3.2.8.1 Check Digits Required

This option sets whether 1 or 2 check digits are required with Code 11 bar codes. Default = Two Check Digits.

One Check Digit

Two Check Digits*

### 3.2.8.2 Code 11 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-80. Minimum Default = 4, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

## 3.2.9 Code 128

Note: Disable Code 128 might cause setting barcode cannot be recognized resulted in setting unperformable.

Code 128 On*

Default All Code 128 Settings

Code 128 Off

### 3.2.9.1 ISBT 128 Concatenation

In 1994 the International Society of Blood Transfusion (ISBT) ratified a standard for communicating critical blood information in a uniform manner. The use of ISBT formats requires a paid license. The ISBT 128 Application Specification describes 1) the critical data elements for labeling blood products, 2) the current recommendation to use Code 128 due to its high degree of security and its space-efficient design, 3) a variation of Code 128 that supports concatenation of neigh-boring symbols, and 4) the standard layout for bar codes on a blood product label. Use the bar codes below to turn concatenation on or off. Default =Off.

On

Off*

### 3.2.9.2 Code 128 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 0-80. Minimum Default = 0, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

### 3.2.9.3 Code 128 Append

This function allows the scanner to append the data from several Code 128 bar codes together before transmitting them to the host computer. When the scanner encounters a Code 128 bar code with the append trigger character(s), it buffers Code 128 bar codes until it reads a Code 128 bar code that does not have the append trigger. The data is then transmitted in the order in which the bar codes were read (FIFO). Default = On.

On*

Off

### 3.2.9.4 Code 128 Code Page

Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the bar codes were created (see ISO 2022/ISO 646 Character Replacements), and scan the value and the Save bar code from the Programming Chart. The data characters should then appear properly.

Code 128 Code Page

## 3.2.10 UPC-A

Code UPC-A On*

Default All UPC-A Settings

Code UPC-A Off

*Note: To convert UPC-A bar codes to EAN-13, see Convert UPC-A to EAN-13..*

### 3.2.10.1 UPC-A Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data or not. Default = On.

On*

Off

### 3.2.10.2 UPC-A Number System

The numeric system digit of a U.P.C. symbol is normally transmitted at the beginning of the scanned data, but the unit can be programmed so it will not transmit it. Default = On.

On*

Off

### 3.2.10.3 UPC-A Addenda

This selection adds 2 or 5 digits to the end of all scanned UPC-A data. Default = Off for both 2 Digit and 5 Digit Addenda.

2 Digit Addenda Off*

2 Digit Addenda On

5 Digit Addenda Off*

5 Digit Addenda On

### 3.2.10.4 UPC-A Addenda Required

When Required is scanned, the scanner will only read UPC-A bar codes that have addenda. You must then turn on a 2 or 5 digit addenda. Default = Not Required.

Not Required*

Required

### 3.2.10.5 Addenda Timeout

You can set a time during which the scanner looks for an addenda. If an addenda is not found within this time period, the data can be either transmitted or discarded, based on the setting you are using for UPC-A Addenda Required. Set the length (in milliseconds) for this timeout by scanning the bar code below, then setting the timeout (from 0-500 milliseconds) by scanning digits from the Programming Chart, then scanning Save. Default = 100.

Addenda Timeout

### 3.2.10.6 UPC-A Addenda Separator

When this feature is on, there is a space between the data from the bar code and the data from the addenda. When turned off, there is no space. Default = On.

On *

Off

## 3.2.10.7 UPC-A/EAN-13 with Extended Coupon Code

Use the following codes to enable or disable UPC-A and EAN-13 with Extended Coupon Code. When left on the default setting (Off), the scanner treats Coupon Codes and Extended Coupon Codes as single bar codes. If you scan the Allow Concatenation code, when the scanner sees the coupon code and the extended coupon code in a single scan, it transmits both as one symbology. Otherwise, it transmits the first coupon code it reads. If you scan the Require Concatenation code, the scanner must see and read the coupon code and extended coupon code in a single read to transmit the data. No data is output unless both codes are read. Default = Off.

Off*

Allow Concatenation

Require Concatenation

## 3.2.10.8 Coupon GS1 DataBar Output

If you scan coupons that have both UPC and GS1 DataBar codes, you may wish to scan and output only the data from the GS1 DataBar code. Scan the GS1 Output On code below to scan and output only the GS1 DataBar code data. Default = GS1 Out-put Off.

GS1 Output Off *

GS1 Output On

## 3.2.11 UPC-E0

Most U.P.C. bar codes lead with the 0 number system. To read these codes, use the UPC-E0 On selection. If you need to read codes that lead with the 1 number system, use UPC-E1. Default = On.

Code UPC-A On*

Default All UPC-E Settings

Code UPC-A Off

### 3.2.11.1 UPC-E0 Expand

UPC-E Expand expands the UPC-E code to the 12 digit, UPC-A format. Default = Off.

Off *

On

### 3.2.11.2 UPC-E0 Addenda Required

When Required is scanned, the scanner will only read UPC-E bar codes that have addenda. Default = Not Required.

Not Required *

Required

### 3.2.11.3 UPC-E0 Addenda Separator

When this feature is On, there is a space between the data from the bar code and the data from the addenda. When turned Off, there is no space.
Default = On.

On*

Off

### 3.2.11.4 UPC-E0 Check Digit

Check Digit specifies whether the check digit should be transmitted at the end of the scanned data or not. Default = On.

On*

Off

### 3.2.11.5 UPC-E0 Leading Zero

This feature allows the transmission of a leading zero (0) at the beginning of scanned data. To prevent transmission, scan Off. Default = On.

On*

Off

### 3.2.11.6 UPC-E0 Addenda

This selection adds 2 or 5 digits to the end of all scanned UPC-E data. Default = Off for both 2 Digit and 5 Digit Addenda.

2 Digit Addenda Off*

2 Digit Addenda On

5 Digit Addenda Off*

5 Digit Addenda On

## 3.2.12 UPC-E1

Most U.P.C. bar codes lead with the 0 number system. For these codes, use UPC-E0. If you need to read codes that lead with the 1 number system, use the UPC-E1 On selection. Default = Off.

Off*

On

## 3.2.13 EAN/JAN-13

EAN/JAN-13 On*

Default All EAN/JAN Settings

EAN/JAN-13 Off

### 3.2.13.1 Convert UPC-A to EAN-13

When UPC-A Converted to EAN-13 is selected, UPC-A bar codes are converted to 13 digit EAN-13 codes by adding a zero to the front. When Do not Convert UPC-A is selected, UPC-A codes are read as UPC-A.

Do not Convert UPC-A*

UPC-A Converted to EAN-13

### 3.2.13.2 EAN/JAN-13 Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data or not. Default = On.

On*

Off

### 3.2.13.3 EAN/JAN-13 Addenda

This selection adds 2 or 5 digits to the end of all scanned EAN/JAN-13 data. Default = Off for both 2 Digit and 5 Digit Addenda.

2 Digit Addenda Off*

2 Digit Addenda On

5 Digit Addenda Off*

5 Digit Addenda On

### 3.2.13.4 EAN/JAN-13 Addenda Required

When Required is scanned, the scanner will only read EAN/JAN-13 bar codes that have addenda. Default = Not Required.

Not Required*

Required

### 3.2.13.5 EAN/JAN-13 Addenda Separator

When this feature is **On**, there is a space between the data from the bar code and the data from the addenda. When turned **Off**, there is no space. Default = On.

*Note: If you want to enable or disable EAN13 with Extended Coupon Code, refer to UPC-A/EAN-13 with Extended Coupon Code.*

On*

Off

### 3.2.13.6 ISBN Translate

When On is scanned, EAN-13 Bookland symbols are translated into their equivalent ISBN number format. Default = Off.

On

Off *

## 3.2.14 EAN/JAN-8

EAN/JAN-8 On*

EAN/JAN-8 Off

Default All EAN/JAN-8 Settings

### 3.2.14.1 EAN/JAN-8 Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data or not. Default = On.

On*

Off

## 3.2.14.2 EAN/JAN-8 Addenda

This selection adds 2 or 5 digits to the end of all scanned EAN/JAN-8 data. Default = Off for both 2 Digit and 5 Digit Addenda.

2 Digit Addenda Off*

2 Digit Addenda On

5 Digit Addenda Off*

5 Digit Addenda On

## 3.2.14.3 EAN/JAN-8 Addenda Required

When Required is scanned, the scanner will only read EAN/JAN-8 bar codes that have addenda. Default = Not Required.

Not Required*

Required

### 3.2.14.4 EAN/JAN-8 Addenda Separator

When this feature is On, there is a space between the data from the bar code and the data from the addenda. When turned Off, there is no space.
Default = On.

On*

Off

## 3.2.15 MSI

MSI On

MSI Off *

Default All MSI Settings

### 3.2.15.1 MSI Check Character

Different types of check characters are used with MSI bar codes. You can program the scanner to read MSI bar codes with Type 10 check characters. Default = Validate Type 10, but Don't Transmit. When Check Character is set to Validate Type 10/11 and Transmit, the scanner will only read MSI bar codes printed with the specified type check character(s), and will transmit the character(s) at the end of the scanned data. When Check Character is set to Validate Type 10/11, but Don't Transmit, the unit will only read MSI bar codes printed with the specified type check character(s), but will not transmit the check character(s) with the scanned data.

Validate Type 10, but Don't Transmit*

Validate Type 10 and Transmit

Validate 2 Type 10 Characters, but Don't Transmit

Validate 2 Type 10 Characters and Transmit

Validate Type 10 then Type 11 Character, but Don't Transmit

Validate Type 10 then Type 11 Character and Transmit

Disable MSI Check Characters

### 3.2.15.2 MSI Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 4-48. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

## 3.2.16 NEC 2 of 5

NEC 2 of 5 On

NEC 2 of 5 Off *

Default All NEC 2 of 5 Settings

### 3.2.16.1 Check Digit

No Check Digit indicates that the scanner reads and transmits bar code data with or without a check digit. When Check Digit is set to Validate, but Don't Transmit, the unit only reads NEC 2 of 5 bar codes printed with a check digit, but will not transmit the check digit with the scanned data. When Check Digit is set to Validate and Transmit, the scanner only reads NEC 2 of 5 bar codes printed with a check digit, and will transmit this digit at the end of the scanned data. Default = No Check Digit.

No Check Digit*

Validate and Transmit

Validate, but Don't Transmit

### 3.2.16.2 NEC 2 of 5 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 2-80 Minimum Default = 4, Maximum Default = 80

Minimum Message Length

Maximum Message Length

## 3.2.17 GS1-128

GS1-128 On

Default All GS1-128 Settings

GS1-128 Off *

### 3.2.17.1 GS1-128 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-80 Minimum Default = 1, Maximum Default = 80

Minimum Message Length

Maximum Message Length

## 3.2.18 Telepen

Telepen On

Telepen Off *

Default All Telepen Settings

### 3.2.18.1 Telepen Output

Using AIM Telepen Output, the scanner reads symbols with start/stop pattern 1 and decodes them as standard full ASCII (start/stop pattern 1). When Original Telepen Output is selected, the scanner reads symbols with start/stop pattern 1 and decodes them as compressed numeric with optional full ASCII (start/stop pattern 2). Default = AIM Telepen Output.

AIM Telepen Output *

Original Telepen Output

### 3.2.18.2 Telepen Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-60 Minimum Default = 1, Maximum Default = 60

Minimum Message Length

Maximum Message Length

# 3.3 2D

## 3.3.1 GS1 DataBar Omnidirectional

GS1 DataBar Omnidirectional On*

GS1 DataBar Omnidirectional Off

Default All GS1 DataBar Omnidirectional Settings

## 3.3.2 GS1 DataBar Limited

GS1 DataBar Limited On*

GS1 DataBar Limited Off

Default All GS1 DataBar Limited Settings

## 3.3.3 GS1 DataBar Expanded

GS1 DataBar Expanded On*

GS1 DataBar Expanded Off

Default All GS1 DataBar Expanded Settings

### 3.3.3.1 GS1 DataBar Expanded Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 4-74. Minimum Default = 4, Maximum Default = 74.

Minimum Message Length

Maximum Message Length

## 3.3.4 PDF 417

PDF 417 On*

PDF 417 Off

Default All PDF 417 Settings

### 3.3.4.1 PDF417 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-2750. Minimum Default = 1, Maximum Default = 2750.

Minimum Message Length

Maximum Message Length

## 3.3.5 MacroPDF417

MacroPDF417 is an implementation of PDF417 capable of encoding very large amounts of data into multiple PDF417 bar codes. When this selection is enabled, these multiple bar codes are assembled into a single data string. Default = On.

On *

Off

## 3.3.6 MicroPDF417

MicroPDF417 On

MicroPDF417 Off *

Default All MicroPDF417 Settings

### 3.3.6.1 MicroPDF417 Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-366. Minimum Default = 1, Maximum Default = 366.

Minimum Message Length

Maximum Message Length

## 3.3.7 GS1 Composite Codes

Linear codes are combined with a unique 2D composite component to form a new class called GS1 Composite symbology. GS1 Composite symbologies allow for the co-existence of symbologies already in use. Default = Off.

On

Off *

### 3.3.7.1 UPC/EAN Version

Scan the UPC/EAN Version On bar code to decode GS1 Composite symbols that have a U.P.C. or an EAN linear compo-nent. (This does not affect GS1 Composite symbols with a GS1-128 or GS1 linear component.)
Default = UPC/EAN Ver-sion Off.
Note: If you scan coupons that have both UPC and GS1 DataBar codes, you may wish to scan and output only the data from the GS1 DataBar code. See Coupon GS1 DataBar Output for further information.

On

Off *

### 3.3.7.2 GS1 Composite Code Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-2435. Minimum Default = 1, Maximum Default =2435.

Minimum Message Length

Maximum Message Length

### 3.3.7.3 GS1 Emulation

The scanner can automatically format the output from any GS1 data carrier to emulate what would be encoded in an equivalent GS1-128 or GS1 DataBar symbol. GS1 data carriers include UPC-A and UPC-E, EAN-13 and EAN-8, ITF-14, GS1-128, and GS1-128 DataBar and GS1 Composites. (Any application that accepts GS1 data can be simplified since it only needs to recognize one data carrier type.)

If GS1-128 Emulation is scanned, all retail codes (U.P.C., UPC-E, EAN8, EAN13) are expanded out to 16 digits. If the AIM ID is enabled, the value will be the GS1-128 AIM ID, ]C1.
If GS1 DataBar Emulation is scanned, all retail codes (U.P.C., UPC-E, EAN8, EAN13) are expanded out to 16 digits. If the AIM ID is enabled, the value will be the GS1-DataBar AIM ID, ]em.
If GS1 Code Expansion Off is scanned, retail code expansion is disabled, and UPC-E expansion is controlled by the UPC-E0 Expand setting.
If the AIM ID is enabled, the value will be the GS1-128 AIM ID, ]C1.
If EAN8 to EAN13 Conversion is scanned, all EAN8 bar codes are converted to EAN13 format. Default = GS1 Emulation Off.

GS1-128 Emulation

GS1 Emulation Off *

GS1 Code Expansion Off

GS1 DataBar Emulation

EAN8 to EAN13 Conversion

## 3.3.8 TCIF Linked Code 39 (TLC39)

This code is a composite code since it has a Code 39 linear component and a MicroPDF417 stacked code component. All bar code readers are capable of reading the Code 39 linear component. The MicroPDF417 component can only be decoded if TLC39 On is selected. The linear component may be decoded as Code 39 even if TLC39 is off. Default = Off.

On

Off *

## 3.3.9 QR Code

QR Code On*

Default All QR Code Settings

QR Code Off

### 3.3.9.1 QR Code Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-7089. Minimum Default = 1, Maximum Default = 7089.

Minimum Message Length

Maximum Message Length

### 3.3.9.2 QR Code Append

This function allows the scanner to append the data from several QR Code bar codes together before transmitting them to the host computer. When the scanner encounters an QR Code bar code with the append trigger character(s), it buffers the number of QR Code bar codes determined by information encoded in those bar codes. Once the proper number of codes is reached, the data is output in the order specified in the bar codes. Default = On.

On*

Off

### 3.3.9.3 QR Code Page

QR Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the bar codes were created (see ISO 2022/ISO 646 Character Replacements ), and scan the value and the Save bar code from the Programming Chart. The data characters should then appear properly.

QR Code Page

## 3.3.10 Data Matrix

Data Matrix On*

Default All Data Matrix Settings

Data Matrix Off

### 3.3.10.1 Data Matrix Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-3116. Minimum Default = 1, Maximum Default = 3116.

Minimum Message Length

Maximum Message Length

### 3.3.10.2 Data Matrix Append

This function allows the scanner to append the data from several Data Matrix bar codes together before transmitting them to the host computer. When the scanner encounters an Data Matrix bar code with the append trigger character(s), it buffers the number of Data Matrix bar codes determined by information encoded in those bar codes. Once the proper number of codes is reached, the data is output in the order specified in the bar codes. Default = On.

On*

Off

### 3.3.10.3 Data Matrix Code Page

Data Matrix Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the bar codes were created (see ISO 2022/ISO 646 Character Replacements ), and scan the value and the Save bar code from the Programming Chart. The data characters should then appear properly.

Data Matrix Code Page

## 3.3.11 MaxiCode

MaxiCode On

MaxiCode Off*

Default All MaxiCode Settings

### 3.3.11.1 MaxiCode Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-150. Minimum Default = 1, Maximum Default = 150..

Minimum Message Length

Maximum Message Length

## 3.3.12 Chinese Sensible (Han Xin) Code

Han Xin On

Han Xin Off*

Default All Han Xin Settings

### 3.3.12.1 Han Xin Code Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-7833. Minimum Default = 1, Maximum Default = 7833.

Minimum Message Length

Maximum Message Length

## 3.3.13 Postal Codes - 2D

The following lists the possible 2D postal codes, and 2D postal code combinations that are allowed. Only one 2D postal code selection can be active at a time. If you scan a second 2D postal code selection, the first selection is overwritten. Default = 2D Postal Codes Off.

2D Postal Codes Off *

### 3.3.13.1 Single 2D Postal Codes

**Australian Post On**

**British Post On**

**Canadian Post On**

**Intelligent Mail Bar Code On**

**Japanese Post On**

**KIX Post On**

**Planet Code On**

**Postal-4i On**

**Postnet On**

**Postnet with B and B' Fields On**

**InfoMail On**

## 3.3.13.2 Combination 2D Postal Codes

**InfoMail and British Post On**

**Postal-4i and Postnet with B and B' Fields On**

**Postnet and Postal-4i On**

**Planet Code and Postal-4i On**

**Postal-4i and Intelligent Mail Bar Code On**

**Planet Code, Postnet, and Postal-4i On**

**Planet Code and Postnet On**

**Planet Code, Postal-4i, and Intelligent Mail Bar Code On**

**Intelligent Mail Bar Code and Postnet with B and B' Fields On**

**Planet Code, Postal-4i, and Postnet with B and B' Fields On**

**Postnet and Intelligent Mail Bar Code On**

**Postal-4i, Intelligent Mail Bar Code, and Postnet with B and B' Fields On**

**Planet Code and Postnet with B and B' Fields On**

**Planet Code, Postal-4i, Intelligent Mail Bar Code, and Postnet with B and B' Fields On**

**Planet Code and Intelligent Mail Bar Code On**

**Planet Code, Postal-4i, Intelligent Mail Bar Code, and Postnet On**

**Planet Code, Postnet, and Intelligent Mail Bar Code On**

**Postnet, Postal-4i, and Intelligent Mail Bar Code On**

**Planet Code, Intelligent Mail Bar Code, and Postnet with B and B' Fields On**

### 3.3.13.3 Planet Code Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of Planet Code data. Default = Don't Transmit.

Transmit Check Digit

Don't Transmit Check Digit*

### 3.3.13.4 Postnet Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of Postnet data. Default = Don't Transmit.

Transmit Check Digit

Don't Transmit Check Digit *

## 3.3.13.5 Australian Post Interpretation

This option controls what interpretation is applied to customer fields in Australian 4-State symbols. Bar Output lists the bar patterns in "0123" format. Numeric N Table causes that field to be interpreted as numeric data using the N Table. Alphanumeric C Table causes the field to be interpreted as alphanumeric data using the C Table. Refer to the Australian Post Specification Tables. Combination C and N Tables causes the field to be interpreted using either the C or N Tables.

Bar Output *

Numeric N Table

Alphanumeric C Table

Combination C and N Tables

## 3.3.14 Postal Codes – Linear

### China Post (Hong Kong 2 of 5)

China Post (Hong Kong 2 of 5) On

Default All China Post (Hong Kong 2 of 5) Settings

China Post (Hong Kong 2 of 5) Off*

#### 3.3.14.1 China Post (Hong Kong 2 of 5) Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 2-80. Minimum Default = 4, Maximum Default = 80.

Minimum Message Length

Maximum Message Length

## 3.3.15 Trioptic Code

Note: If you are going to scan Code 32 Pharmaceutical codes, Trioptic Code must be off. Trioptic Code is used for labeling magnetic storage media.

On

Off *

## 3.3.16 Codablock A

Codablock A On

Codablock A Off*

Default All Codablock A Settings

### 3.3.16.1 Codablock A Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-600. Minimum Default = 1, Maximum Default = 600.

Minimum Message Length

Maximum Message Length

## 3.3.17 Codablock F

Codablock F On

Codablock F Off*

Default All Codablock F Settings

### 3.3.17.1 Codablock F Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-2048. Minimum Default = 1, Maximum Default = 2048.

Minimum Message Length

Maximum Message Length

### 3.3.17.2 Label Code

The standard Label Code is used in libraries. Default = Off.

On

Off *

## 3.3.18 Aztec Code

Aztec Code On*

Aztec Code Off

Default All Aztec Code Settings

### 3.3.18.1 Aztec Code Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-3832. Minimum Default = 1, Maximum Default = 3832.

Minimum Message Length

Maximum Message Length

## 3.3.18.2 Aztec Append

This function allows the scanner to append the data from several Aztec bar codes together before transmitting them to the host computer. When the scanner encounters an Aztec bar code with the append trigger character(s), it buffers the number of Aztec bar codes determined by information encoded in those bar codes. Once the proper number of codes is reached, the data is output in the order specified in the bar codes. Default = On.

On *

Off

## 3.3.18.3 Aztec Code Page

Aztec Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host program is expecting. If this is the case, scan the bar code below, select the code page with which the barcodes were created (see ISO 2022/ISO 646 Character Replacements), and scan the value and the Save bar code from the Programming Chart.
The data characters should then appear properly.

Aztec Code Page

# 3.3.19 Chinese Sensible (Han Xin) Code

Han Xin On

Default All Han Xin Settings

Han Xin Off *

## 3.3.19.1 Han Xin Code Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 1-7833. Minimum Default = 1, Maximum Default = 7833.

Minimum Message Length

Maximum Message Length

## 3.3.20 Korea Post

Korea Post On

Korea Post Off *

Default All Korea Post Settings

### 3.3.20.1 Korea Post Message Length

Scan the bar codes below to change the message length. Refer to Message Length Description for additional information. Minimum and Maximum lengths = 2-80. Minimum Default = 4, Maximum Default = 48.

Minimum Message Length

Maximum Message Length

### 3.3.20.2 Korea Post Check Digit

This selection allows you to specify whether the check digit should be transmitted at the end of the scanned data. Default = Don't Transmit.

Transmit Check Digit

Don't Transmit Check Digit *

## 3.3.21 Dotcode

Dotcode On

# 3.4 OCR Setting

## 3.4.1 OCR Defaults

Scan the following bar code to reset all OCR selections to their custom or factor default settings.

Default all OCR settings

## 3.4.2 Enabling OCR Reading

Scan one of the following bar codes to program your scanner to read OCR in either **Normal Video** (black characters on a white background) **Reverse Video** (white characters on a black background) or **Both Normal and Reverse Video**. Scan the **OCR Off** bar code to disable OCR reading.

Note: Once OCR reading is enabled, you must select a Pre-Defined Template, or create a Custom OCR Template, in order to read OCR characters.

OCR Normal Video

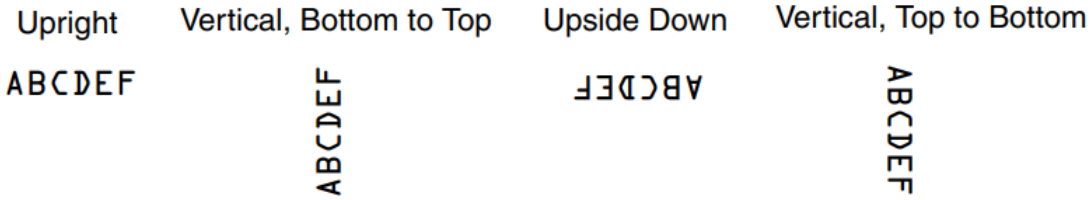
OCR Reverse Video

OCR Both Normal and Reverse Video

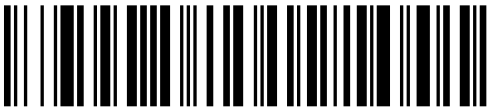
OCR Off

## 3.4.3 Working Orientation

OCR characters are direction-sensitive. For example, OCR can misread when scanned sideways or upside down. Use the working orientation settings if your OCR characters will not usually be presented upright to the scanner. If the OCR string is not in the selected orientation, it will not be read. Orientation examples:




Upright *



Upside Down

Vertical, Bottom to Top

Vertical, Top to Bottom

# 3.4.4 Pre-Defined OCR Templates

## 3.4.4.1 Passport Template

The passport template may be used to read passports, visas, and official travel documents based on the ICAO standard. This template reads both OCR-A and OCR-B fonts. Passports and Format-A visas each consist of two rows of 44 OCR-B characters.
Format-B visas and TD-2 travel documents each have two rows of 36 OCR-B characters, while TD-1 travel documents employ three rows of 30 OCR-B characters.

**Example: Passport OCR-B text**

```
P<UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<<<<<<<<<<<
L898902C<3UT06908061F9406236ZE184226B<<<<<14
```

**Example: Format-A Visa OCR-B text**

```
V<UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<<<<<<<<<<<
L898902C<3UT06908061F9406236ZE184226B<<<<<<<
```

**Example: Format-B Visa OCR-B text**

```
V<UTOERIKSSON<<ANNA<MARIA<<<<<<<<<<<
L898902C<3UT06908061F9406236ZE184226
```

**Example: TD-1 travel document OCR-B text**

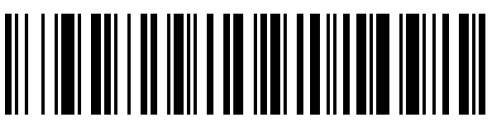
```
I<UTOD231458907<<<<<<<<<<<<<<<
3407127M9507122UTO<<<<<<<<<<<2
STEVENSON<<PETER<JOHN<<<<<<<<<
```

**Example: TD-2 travel document OCR-B text**

```
I<UTOSTEVENSON<<PETER<<<<<<<<<<<<<<<
D231458907UTO3407127M9507122<<<<<<<2
```

Scan the following bar code to enable the Passport Template

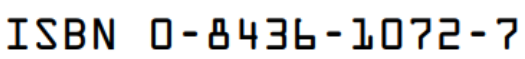
Enable Passport Template



### 3.4.4.2 ISBN Template

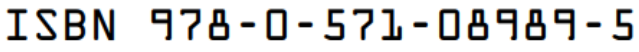
The ISBN Template is used to read an International Standard Book Number (ISBN) in either OCR-A or OCR-B font.

Example: 13 Character ISBN format in OCR-A text




This format consists of the 4 letter ISBN followed by 13 characters which include hyphens. The last digit is a Mod 11 checksum of 10 numbers (0-9)，or an "X." AII ISBN results are checked for a valid checksum.

Example: 17 Character ISBN format in OCR-A text




This format differs from the 13 character format in that the checksum is a Mod 10 checksum of 10 numbers (0-9) only.

Scan the following bar code to enable the ISBN Template.

You can enable multiple Pre-Defined OCR templates along with the ISBN template. See Multiple Pre-Defined OCR Templates.

### 3.4.4.3 Price Field Template

The Price Field is used in a number of applications including book pricing. The Price Field Template reads both OCR-A and OCR-B fonts. The format is as follows:

C1234 P5678E

The field begins with a 'C' and ends with an 'E.' The first part of the Price Field is a 'C' followed by four numeric digits. The second half begins with a currency character. The above example shows the letter 'P' but the Price Field template allows the following additional characters:

$€£¥

Following the currency character, a numeric grouping of 3,4,5,or 6 digits is followed by a terminating letter 'E.' The template reads both OCR-A and OCR-B fonts. The following examples can also be read when the Price Field Template is enabled:

C6712 $801E
C0217 €4399E
C0823 ¥31559E
C0331 £706213E

Scan the following bar code to enable the Price Field Template.

You can enable multiple Pre-Defined OCR templates along with the Price Field template. See Multiple Pre-Defined OCR Templates.

### 3.4.4.4 MICR E-13B Template

MICR E-13B consists of 14 characters: the numbers 0-9 and 4 control characters. The 4 control characters are known as TOAD (Transit, On Us，Amount and Dash) and are output in the following manner:

| MICR Char. | Function | ASCII Char. | Decimal | Hex |
|---|---|---|---|---|
| ⑆ | Transit | A | 65 | 0x41 |
| ⑇ | Amount | B | 66 | 0x42 |
| ⑈ | On Us | C | 67 | 0x43 |
| ⑉ | Dash | D | 68 | 0x44 |

MICR E-13B is used in financial applications, such as checks, to encode bank account numbers, bank routing numbers, check numbers, and other information on a single row. There are standard guidelines that address how data must be represented on checks and other financial documents, but there is a great deal of flexibility left to the discretion of the document designer.

The MICR E-13B Template reads any MICR string whose length is between 4 and 40 characters. Only one consecutive space is allowed in a template,. Since there are many checks produced where the MICR line contains fields separated by more than one space，these fields will be read and output as individual MICR strings. There is a broad range of strings that produce MICR output, so you should check for partial reads of MICR text where only part of the targeted MICR string is actually in the image presented to the scanner. The following examples can be read when the MICR E-13B Template is enabled:

⑆12345678⑆

⑈0123⑈ ⑆12345678⑆ 1934124541⑈

⑈9876⑈ ⑆56812397?⑆ 67891788⑈70

Note that in the third example, there will be 2 separate output results because of the 4 space gap between the first and second fields.
Scan the following bar code to enable the MICR E-13B Template.

You can enable multiple Pre-Defined OCR templates along with the MICR E-13B template. See Multiple Pre-Defined OCR Templates.
One of the standard fields within MICR E13-B is the routing field. It begins with the Transit symbol (A) and is followed by 9 numeric digits and a terminating Transit symbol. In some checks, the routing field is separated on each end by at least one space and can be read as a standalone field.
This would be done by creating the following template (see Custom OCR Templates):

```
14x415149x410
```

If the routing field is part of a longer field (i.e., there is no space between either the leading or trailing transit character and other MICR data), then a custom template must be created to read those documents.

### 3.4.4.3 Multiple Pre-Defined OCR Template

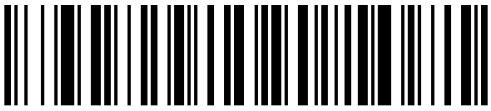
You can enable combinations of Pre-Defined OCR Templates by scanning one of the following bar codes.

Enable ISBN and Price Field Templates

Enable ISBN, Custom, and Price Field Templates

Enable ISBN, Price Field, and MICR-E13B Templates

Enable Price Field and Custom Templates



Enable Price Field, Custom, and MICR-E13B Templates

Enable ISBN and Custom Templates

Enable ISBN, and MICR-E13B Templates

Enable ISBN, Custom, and MICR-E13B Templates

Enable ISBN, Custom, Price Field and MICR-E13B Templates

Enable Price Field and MICR-E13B Templates

Enable MICR-E13B and Custom Templates

### 3.4.4.4 Custom OCR Template

You can create a custom template, or character string that defines the length and content of OCR strings that will be read with your scanner. The templates define the OCR font as well as the layout of the text in a row and column format. Each row can have up to 50 characters, with up to 18 rows in a template, with a maximum of 320 characters. Within each character position, the allowable characters can be specified either through explicit ASCII values, groups of ASCII values, wildcard characters, or combinations of these types. To achieve better OCR results, limit each character position's values to the specific expected values in your application.

#### *Spaces*

Internal gaps longer than one space are not allowed in a template. For example, the OCR text

ONE SPACE

is valid because there is only one space between the E and S in the text. However, the following text is illegal given the two spaces between the O and S:

TWO SPACES

An arbitrary number of spaces at the beginning and end of a line are acceptable. These spaces must be included in the template with the ASCII value of a space (32 decimal, 0x20 hex), and not be included as part of a group or wildcard character.

#### *Character Size*

The ideal height of an OCR character after sampling is about 20 pixels, but characters up to 50 pixels in height can be read. If OCR characters are consistently above 40 pixels in height, downsampling the image by a factor of 2 will achieve better results in both speed and decode rates.

#### *Euro, Pound, and Yen Currency Characters*

7 bit ASCII values are used in the OCR template strings. However, there are no 7 bit ASCII representations for the euro, pound, or yen currency characters. 8 bit codes for these characters are:

| Currency | Decimal | Hex |
|---|---|---|
| Euro | 128 | 0x80 |
| Pound | 163 | 0xA3 |
| Yen | 165 | 0xA5 |

The hex character is output. For example, the euro output is [0XA3]. Refer to the ASCII Conversion Chart.

### 3.4.4.5 Creating a Custom OCR Template

Custom OCR Templates are strings made up of various control codes along with standard ASCII values.

- Control Codes Chart

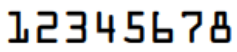
| Control Code | Value | Argument |
|---|---|---|
| End of Template | 0 | |
| New Template | 1 | Font:<br>1 - OCR-A<br>2 - OCR-B<br>3 - Both A & B<br>4 - MICR<br>5 - Semi |
| New Line | 2 | |
| Define Group Start | 3 | ID [001-255] |
| Define Group End | 4 | |
| Wildcard: Numeric | 5 | [0-9] |
| Wildcard: Alpha | 6 | [A-Z uppercase] |
| Wildcard: Alphanumeric | 7 | [0-9] [A-Z uppercase] |
| Wildcard: Any (including space) | 8 | |
| Defined Group | A | ID [001-255] |
| In Line Group Start | B | |
| In Line Group End | C | |
| Checksum | D | Weights, Type, MOD |
| Fixed Character Repeat | E | [01-50] |
| Variable Character Repeat | F | Range Low [01-50]<br>Range High [01-50] |
| ASCII Hex Value | x## | 2 digits |

Note: In all following examples, spaces are used in template strings for readability only.

### 3.4.4.6 New Template

All OCR templates begin with the **New Template** control code. The value immediately following this control code indicates the font(s) for which this template is designed.

**Example:** You need to read 8 numeric digits in either OCR-A or OCR-B:



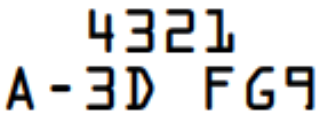
The string would be : 1 3 5 5 5 5 5 5 5 0
The breakdown:

| Control Code | Description |
|---|---|
| 1 | New Template Code |
| 3 | Both OCR-A and OCR-B font |
| 5 | Wildcard: Numeric - 8 times |
| 5 | |
| 5 | |
| 5 | |
| 5 | |
| 5 | |
| 5 | |
| 5 | |
| 0 | End of Template |

A template may contain multiple distinct templates all within the same string. Begin each template with a **New Template** control code.

## 3.4.5 Multiple Lines

A new line within a multiple line template is indicated by the New Line control code. **Example**: You need to read 2 lines of OCR-A characters. The first line has four numeric digits and the second line has eight alphanumeric characters and spaces:

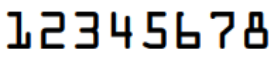



The string would be : 1 1 5 5 5 5 2 8 8 8 8 8 8 8 0
The breakdown:

| Control Code | Description |
|---|---|
| 1 | New Template Code |
| 1 | OCR-A font |
| 5 | Wildcard: Numeric - 4 times |
| 5 | |
| 5 | |
| 5 | |
| 2 | New Line |
| 8 | Wildcard: Any (including space) - 8 times |
| 8 | |
| 8 | |
| 8 | |
| 8 | |
| 8 | |
| 8 | |
| 8 | |
| 0 | End of Template |

## 3.4.6 Repeating Characters

To simplify the creation of user templates, the **Fixed Character Repeat** control code may be used to repeat a character a specified number of times. Any specific ASCII value, wildcard, or group can be repeated.
Because each OCR line limited to a maximum of 50 characters, you can shorten your string by using a fixed character repeat.
Example : Using the example for New Template, you need to read 8 numeric digits in either OCR-A or OCR-B :




The string without repeating characters was : 1 3 5 5 5 5 5 5 5 0
Using Repeating Characters, it would be: 1 3 5 E 0 8 0
The breakdown:

| Control Code | Description |
|---|---|
| 1 | New Template Code |
| 3 | Both OCR-A and OCR-B font |
| 5 | Wildcard: Numeric |
| E | Fixed Character Repeat - 8 times |
| 0 | |
| 8 | |
| 0 | End of Template |

## 3.4.7 Variable Characters Repeat

The Variable Characters Repeat control code may be used to repeat a count for a character a variable number of times. Any specific ASCII value, wildcard, or group can be repeated.

The control code requires 4 bytes that give the minimum and maximum number of times (2 bytes each) that the character may appear in the template. Because each OCR line is limited to a maximum of 50 characters, you can shorten your string by using a variable character repeat. The minimum and maximum counts must be in the range from 1 to 50, with the minimum count less than or equal to the maximum count.

Example: You need to read OCR-B characters that may contain 5, 6, or 7 numeric digits. The string, without repeating variable characters, would be :

1 2 5 5 5 5 5 1 2 5 5 5 5 5 1 2 5 5 5 5 5 0

Using repeating variable characters, the template would be: 1 2 5 F 0 5 0 7 0

The breakdown:

| Control Code | Description |
|---|---|
| 1 | New Template Code |
| 2 | OCR-B font |
| 5 | Wildcard: Numeric |
| F | Variable Character Repeat - 5 min, 7 max |
| 05 | |
| 07 | |
| 0 | End of Template |

## 3.4.8 Groups

In a given character position, you must specify which values a text character may take. To reduce the overall size of templates, you may define common groups of ASCII characters and then use the defined group control character rather than repeating the same sequence over and over.
Groups can be made up of individual ASCII values or wildcard values or wildcard values. The wildcard values are Control Codes Numeric (5), Alpha (6), Alphanumeric (7), and Any (8).

To define a group, specify the Defined group control code followed by an ID from 1 to 255. (Up to 255 groups may be defined in a single template.)
Use the group ID to use the group in any template you build.
Note: Groups may not be nested.

Example: You need to read a 3 numeric digits, then either A, B, C, or another numeric digit. The string would be:
1 2 3 0 0 1 x 4 1 x 4 2 x 4 3 5 4 5 5 5 A 0 0 1 0

Note: Spaces are used in this example only for ease of readability.
The breakdown : (dark box indicates group definition)

| Control Code | Description |
|---|---|
| 1 | New Template Code |
| 2 | Both OCR-A and OCR-B font |
| 3 | Defined Group |
| 001 | Group ID |
| x41 | ASCII hex value for A |
| x42 | ASCII hex value for B |
| x43 | ASCII hex value for C |
| 5 | Numeric Digit |
| 4 | Define Group End |
| 5 | 3 Numeric Digits |
| 5 | |
| 5 | |
| A001 | Defined Group, ID 001 |
| 0 | End of Template |

See the ASCII Conversion Chart for character to hex conversions.

### 3.4.8.1 In Line Group

The **In Line Group** defines a one time instance of a group that occupies one character position in the template. Use this for unique groups of characters that occur only once.

## 3.4.9 Checksums and Weighting

A checksum reduces the probability of misreads. There are two types of checksums: row and block. For additional checksum protection, there are four different weighting schemes: 1, 12, 13 and 137. The checksum calculation is based on modulo arithmetic. The modulo factor may vary from 6 to 36.
The byte immediately following the Checksum control code (D) defines the type of checksum that will be used :

| Checksum Table | |
|---|---|
| **Bit Position(s)** | **Meaning** |
| 7,6: Weight Scheme | 00: Weight Scheme: 1 |
| | 01: Weight Scheme: 12 |
| | 10: Weight Scheme: 13 |
| | 11: Weight Scheme: 137 |
| 5: Checksum Type | 0: Row |
| | 1: Block |
| 4-0: Modulo Value | Checksum Modulo - 5 |

Row Checksums (0) perform a checksum calculation on all characters preceding them up to the first character on the same row. Block Checksums (1) perform a checksum calculation on all characters up to the very first character in the template; they span multiple rows. The 5bit Modulo Value stores the Checksum Modulo – 5. The stored number can range from 1, which is a Chceksum Modulo value of 6, to 31, which describes a Checksum Modulo of 36. A Modulo value of 0 (checksum Modulo of 5) is illegal. The characters within a checksum field have a numerical value that is used in the checksum

calculation. Digits are converted to their numerical value (0-9), while uppercase letters range from 10 for an "A" to 36 for a "Z." All punctuation characters have a value of 0 for checksum purposes. However, they do count as a spot for determining the weight values used in calculating the checksum.

## 3.4.10 Weight Scheme

The Weight Scheme defines how the values described above can be changed based on the their character position. The default weight scheme is 1. This means that the checksum is based only on the character value and is not dependent on its position. The other weight schemes multiply the character value by a repetitive weight value that helps in identifying characters that have had their column locations switched. The 4 weight schemes are:

| Weight Scheme Table | |
|---|---|
| **Weight Scheme** | **Multiplier Values** |
| 1 | 1 1 1 1 1 ... |
| 12 | 1 2 1 2 1 2 ... |
| 13 | 1 3 1 3 1 3 ... |
| 137 | 1 3 7 1 3 7 1 3 7 ... |

The checksum character always starts with a weight of 1. As you move to the left of the checksum, the weight value is updated to the next member of the sequence. The sequences repeat until the first character in a row of a Row type checksum, and to the first character in the template for a Block type checksum. The resulting sum is then divided by the Checksum Modulo number of the checksum. The remainder of this division should be zero for a valid checksum.

## 3.4.11 Checksum Example

ABCD6
EFG5Y

The two lines of OCR-B text above both contain a row checksum. In addition, the last character of row 2 is a block checksum. The 2 row checksums are mod 10 with a 13 weight (133 decimal, 0x85 hex), while the block checksum is a mod 36 with a 137 weight (255 decimal, 0Xff hex). The following template will read this text :

1266666**D85**2666**D85DFF**0

Note: Bold text shows the row and block checksum notations.
The breakdown of the row checksum:

| D85 | Description |
|---|---|
| 1 | Weight Scheme: 13 |
| 0 | |
| 0 | Checksum Type: Row |
| 0 | Translation of the sum to binary code |
| 0 | |
| 1 | |
| 0 | |
| 0 | |

The breakdown of the block checksum :

| DFF | Description |
|---|---|
| 1 | Weight Scheme: 137 |
| 1 | |
| 1 | Checksum Type: Block |
| 1 | Translation of the sum to binary code |
| 1 | |
| 1 | |
| 1 | |
| 1 | |

The top line checksum is the 6 at the end of the line. While this example show the checksum at the end of the line, it may appear anywhere on the line and then protects all the characters to its left. The following sum is generated to verify a proper checksum on line 1:

6 D C B A

(1x6) + (3x13) + (1x12) + (3x11) + (1x10) = 100

Note that the 13 weight scheme starts with a 1 on the checksum digit, and then alternates between a 1 and 3 for all digits to the left of the checksum, up to the first character on the line. The numerical values of the alphabetic characters range from 10 for an A to a 35 for a Z. The sum of 100 is a multiple of 10, so the mod 10 checksum here has passed. On line 2, the row checksum is the 5 following the G. Verify its line by generating its sum:

5 G F E

(1x5) + (3x16) + (1x15) + (3x14) = 110

Again, a value is obtained that is a multiple of 10, validating this row checksum. The X at the end of the line is a mod 36 block checksum with 137 weighting. It protects all the characters in the template, including the first line. Calculating its sum working backwards from the block checksum and using the 137 weighting scheme:

Y 5 G F E 6 D C B A

(1x34) + (3x5) + (7x16) + (1x15) + (3x14) + (7x6) + (1x13) + (3x12) + (7x11) + (1x10) = 396

The resulting sum is a multiple of 36, so the block checksum has been validated.

## 3.4.12 OCR Programming Codes

We recommend that you enter OCR Templates using serial commands. However, you can also enter them by scanning the **Enter OCR Template** bar code, followed by the **OCR Programming Codes**, followed by a **Menu Save** code. To discard your template, scan **Discard OCR Template**.

**Enter OCR Template**

0

1

2

3

4

5

6

7

8

9

A- Define Group

B-In Line Group Start

C-In Line Group End

D-Checksum

E- Fixed Character Repeat

F-Variable Character Repeat

x-ASCII Hex Value

Save OCR Template

Discard OCR Template

# 3.4.13 ASCII Conversion Chart

| Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 00 | NUL | 32 | 20 | | 64 | 40 | @ | 96 | 60 | ‘ |
| 1 | 01 | SOH | 33 | 21 | ! | 65 | 41 | A | 97 | 61 | a |
| 2 | 02 | STX | 34 | 22 | “ | 66 | 42 | B | 98 | 62 | b |
| 3 | 03 | ETX | 35 | 23 | # | 67 | 43 | C | 99 | 63 | c |
| 4 | 04 | EOT | 36 | 24 | $ | 68 | 44 | D | 100 | 64 | d |
| 5 | 05 | ENQ | 37 | 25 | % | 69 | 45 | E | 101 | 65 | e |
| 6 | 06 | ACK | 38 | 26 | & | 70 | 46 | F | 102 | 66 | f |
| 7 | 07 | BEL | 39 | 27 | ‘ | 71 | 47 | G | 103 | 67 | g |
| 8 | 08 | BS | 40 | 28 | ( | 72 | 48 | H | 104 | 68 | h |
| 9 | 09 | HT | 41 | 29 | ) | 73 | 49 | I | 105 | 69 | i |
| 10 | 0A | LF | 42 | 2A | * | 74 | 4A | J | 106 | 6A | j |
| 11 | 0B | VT | 43 | 2B | + | 75 | 4B | K | 107 | 6B | k |
| 12 | 0C | FF | 44 | 2C | , | 76 | 4C | L | 108 | 6C | l |
| 13 | 0D | CR | 45 | 2D | - | 77 | 4D | M | 109 | 6D | m |
| 14 | 0E | SO | 46 | 2E | . | 78 | 4E | N | 110 | 6E | n |
| 15 | 0F | SI | 47 | 2F | / | 79 | 4F | O | 111 | 6F | o |
| 16 | 10 | DLE | 48 | 30 | 0 | 80 | 50 | P | 112 | 70 | p |
| 17 | 11 | DC1 | 49 | 31 | 1 | 81 | 51 | Q | 113 | 71 | q |
| 18 | 12 | DC2 | 50 | 32 | 2 | 82 | 52 | R | 114 | 72 | r |
| 19 | 13 | DC3 | 51 | 33 | 3 | 83 | 53 | S | 115 | 73 | s |
| 20 | 14 | DC4 | 52 | 34 | 4 | 84 | 54 | T | 116 | 74 | t |
| 21 | 15 | NAK | 53 | 35 | 5 | 85 | 55 | U | 117 | 75 | u |
| 22 | 16 | SYN | 54 | 36 | 6 | 86 | 56 | V | 118 | 76 | v |
| 23 | 17 | ETB | 55 | 37 | 7 | 87 | 57 | W | 119 | 77 | w |
| 24 | 18 | CAN | 56 | 38 | 8 | 88 | 58 | X | 120 | 78 | x |
| 25 | 19 | EM | 57 | 39 | 9 | 89 | 59 | Y | 121 | 79 | y |
| 26 | 1A | SUB | 58 | 3A | : | 90 | 5A | Z | 122 | 7A | z |
| 27 | 1B | ESC | 59 | 3B | ; | 91 | 5B | [ | 123 | 7B | { |
| 28 | 1C | FS | 60 | 3C | < | 92 | 5C | \ | 124 | 7C | \| |
| 29 | 1D | GS | 61 | 3D | = | 93 | 5D | ] | 125 | 7D | } |
| 30 | 1E | RS | 62 | 3E | > | 94 | 5E | ^ | 126 | 7E | ~ |
| 31 | 1F | US | 63 | 3F | ? | 95 | 5F | _ | 127 | 7F | |

| Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char | Dec | Hex | Char |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 128 | 80 | € | 160 | A0 | | 192 | C0 | À | 224 | E0 | à |
| 129 | 81 | □ | 161 | A1 | ¡ | 193 | C1 | Á | 225 | E1 | á |
| 130 | 82 | ‚ | 162 | A2 | ¢ | 194 | C2 | Â | 226 | E2 | â |
| 131 | 83 | *ƒ* | 163 | A3 | £ | 195 | C3 | Ã | 227 | E3 | ã |
| 132 | 84 | „ | 164 | A4 | ¤ | 196 | C4 | Ä | 228 | E4 | ä |
| 133 | 85 | … | 165 | A5 | ¥ | 197 | C5 | Å | 229 | E5 | å |
| 134 | 86 | † | 166 | A6 | ¦ | 198 | C6 | Æ | 230 | E6 | æ |
| 135 | 87 | ‡ | 167 | A7 | § | 199 | C7 | Ç | 231 | E7 | ç |
| 136 | 88 | ˆ | 168 | A8 | ¨ | 200 | C8 | È | 232 | E8 | è |
| 137 | 89 | ‰ | 169 | A9 | © | 201 | C9 | É | 233 | E9 | é |
| 138 | 8A | Š | 170 | AA | ª | 202 | CA | Ê | 234 | EA | ê |
| 139 | 8B | ‹ | 171 | AB | « | 203 | CB | Ë | 235 | EB | ë |
| 140 | 8C | Œ | 172 | AC | ¬ | 204 | CC | Ì | 236 | EC | ì |
| 141 | 8D | □ | 173 | AD | - | 205 | CD | Í | 237 | ED | í |
| 142 | 8E | Ž | 174 | AE | ® | 206 | CE | Î | 238 | EE | î |
| 143 | 8F | □ | 175 | AF | ¯ | 207 | CF | Ï | 239 | EF | ï |
| 144 | 90 | □ | 176 | B0 | ° | 208 | D0 | Ð | 240 | F0 | ð |
| 145 | 91 | ‘ | 177 | B1 | ± | 209 | D1 | Ñ | 241 | F1 | ñ |
| 146 | 92 | ’ | 178 | B2 | ² | 210 | D2 | Ò | 242 | F2 | ò |
| 147 | 93 | “ | 179 | B3 | ³ | 211 | D3 | Ó | 243 | F3 | ó |
| 148 | 94 | ” | 180 | B4 | ´ | 212 | D4 | Ô | 244 | F4 | ô |
| 149 | 95 | • | 181 | B5 | µ | 213 | D5 | Õ | 245 | F5 | õ |
| 150 | 96 | – | 182 | B6 | ¶ | 214 | D6 | Ö | 246 | F6 | ö |
| 151 | 97 | — | 183 | B7 | · | 215 | D7 | × | 247 | F7 | ÷ |
| 152 | 98 | ˜ | 184 | B8 | ¸ | 216 | D8 | Ø | 248 | F8 | ø |
| 153 | 99 | ™ | 185 | B9 | ¹ | 217 | D9 | Ù | 249 | F9 | ù |
| 154 | 9A | š | 186 | BA | º | 218 | DA | Ú | 250 | FA | ú |
| 155 | 9B | › | 187 | BB | » | 219 | DB | Û | 251 | FB | û |
| 156 | 9C | œ | 188 | BC | ¼ | 220 | DC | Ü | 252 | FC | ü |
| 157 | 9D | □ | 189 | BD | ½ | 221 | DD | Ý | 253 | FD | ý |
| 158 | 9E | ž | 190 | BE | ¾ | 222 | DE | Þ | 254 | FE | þ |
| 159 | 9F | Ÿ | 191 | BF | ¿ | 223 | DF | ß | 255 | FF | ÿ |

# Appendix A – Symbology Charts

"m" represents the AIM modifier character. Refer to International Technical Specification, Symbology Identifiers, for AIM modifier character details. Prefix/Suffix entries for specific symbologies override the universal (All Symbologies, 99) entry. Refer to Data Editing and Data Formatting for information about using Code ID and AIM ID.

## Linear Symbologies

| | AIM | | Honeywell | |
|---|---|---|---|---|
| **Symbology** | **ID** | **Possible modifiers (*m*)** | **ID** | **Hex** |
| *All Symbologies* | | | | 99 |
| Codabar | ]F*m* | 0-1 | a | 61 |
| Code 11 | ]H3 | | h | 68 |
| Code 128 | ]C*m* | 0, 1, 2, 4 | j | 6A |
| Code 32 Pharmaceutical (PARAF) | ]X0 | | < | 3C |
| Code 39 (supports Full ASCII mode) | ]A*m* | 0, 1, 3, 4, 5, 7 | b | 62 |
| TCIF Linked Code 39 (TLC39) | ]L2 | | T | 54 |
| Code 93 and 93i | ]G*m* | 0-9, A-Z, | i | 69 |
| EAN | ]E*m* | 0, 1, 3, 4 | d | 64 |
| EAN-13 (including Bookland EAN) | ]E0 | | d | 64 |
| EAN-13 with Add-On | ]E3 | | d | 64 |
| EAN-13 with Extended Coupon Code | ]E3 | | d | 64 |
| EAN-8 | ]E4 | | D | 44 |
| EAN-8 with Add-On | ]E3 | | D | 44 |
| GS1 | | | | |
| GS1 DataBar | ]e*m* | 0 | y | 79 |
| GS1 DataBar Limited | ]e*m* | | { | 7B |
| GS1 DataBar Expanded | ]e*m* | | } | 7D |
| GS1-128 | ]C1 | | I | 49 |
| 2 of 5 | | | | |
| China Post (Hong Kong 2 of 5) | ]X0 | | Q | 51 |
| Interleaved 2 of 5 | ]I*m* | 0, 1, 3 | e | 65 |
| Matrix 2 of 5 | ]X0 | | m | 6D |
| NEC 2 of 5 | ]X0 | | Y | 59 |

| | | | | |
|---|---|---|---|---|
| Straight 2 of 5 IATA | ]R*m* | 0, 1, 3 | f | 66 |
| Straight 2 of 5 Industrial | ]S0 | | f | 66 |
| MSI | ]M*m* | 0, 1 | g | 67 |
| Telepen | ]B*m* | | t | 74 |
| UPC | | 0, 1, 2, 3, 8, 9, A, B, C | | |

| | AIM | | Honeywell | |
|---|---|---|---|---|
| **Symbology** | **ID** | **Possible modifiers (*m*)** | **ID** | **Hex** |
| UPC-A | ]E0 | | c | 63 |
| UPC-A with Add-On | ]E3 | | c | 63 |
| UPC-A with Extended Coupon Code | ]E3 | | c | 63 |
| UPC-E | ]E0 | | E | 45 |
| UPC-E with Add-On | ]E3 | | E | 45 |
| UPC-E1 | ]X0 | | E | 45 |

| | | | | |
|---|---|---|---|---|
| Add Honeywell Code ID | | | | 5C80 |
| Add AIM Code ID | | | | 5C81 |
| Add Backslash | | | | 5C5C |
| Batch mode quantity | | | 5 | 35 |

## 2D Symbologies

| Symbology | AIM | | Honeywell | |
|---|---|---|---|---|
| | ID | Possible modifiers (*m*) | ID | Hex |
| *All Symbologies* | | | | 99 |
| Aztec Code | ]z*m* | 0-9, A-C | z | 7A |
| Chinese Sensible Code (Han Xin Code) | ]X0 | | H | 48 |
| Codablock A | ]O6 | 0, 1, 4, 5, 6 | V | 56 |
| Codablock F | ]O*m* | 0, 1, 4, 5, 6 | q | 71 |
| Code 49 | ]T*m* | 0, 1, 2, 4 | l | 6C |
| Data Matrix | ]d*m* | 0-6 | w | 77 |
| GS1 | ]e*m* | 0-3 | | |
| GS1 Composite | ]e*m* | 0-3 | y | 79 |
| GS1 DataBar Omnidirectional | ]e*m* | | y | 79 |
| MaxiCode | ]U*m* | 0-3 | x | 78 |
| PDF417 | ]L*m* | 0-2 | r | 72 |
| MicroPDF417 | ]L*m* | 3-5 | R | 52 |
| QR Code | ]Q*m* | 0-6 | s | 73 |
| Micro QR Code | ]Q*m* | | s | 73 |

## Postal Symbologies

| Symbology | AIM | | Honeywell | |
|---|---|---|---|---|
| | ID | Possible modifiers (*m*) | ID | Hex |
| *All Symbologies* | | | | 99 |
| Australian Post | ]X0 | | A | 41 |
| British Post | ]X0 | | B | 42 |
| Canadian Post | ]X0 | | C | 43 |
| China Post | ]X0 | | Q | 51 |
| InfoMail | ]X0 | | , | 2c |
| Intelligent Mail Bar Code | ]X0 | | M | 4D |
| Japanese Post | ]X0 | | J | 4A |
| KIX (Netherlands) Post | ]X0 | | K | 4B |
| Korea Post | ]X0 | | ? | 3F |
| Planet Code | ]X0 | | L | 4C |
| Postal-4i | ]X0 | | N | 4E |
| Postnet | ]X0 | | P | 50 |

## ASCII Conversion Chart (Code Page 1252)

In keyboard applications, ASCII Control Characters can be represented in 3 different ways, as shown below. The CTRL+X function is OS and application dependent. The following table lists some commonly used Microsoft functionality. This table applies to U.S. style keyboards. Certain characters may differ depending on your Country Code/PC regional settings.

| Non-printable ASCII control | | | Keyboard Control + ASCII (CTRL+X) Mode | | |
|---|---|---|---|---|---|
| | | | | Windows Mode Control + X Mode On (KBDCAS2) | |
| DEC | HEX | Char | Control + X Mode Off (KBDCAS0) | CTRL + X | CTRL + X function |
| 0 | 00 | NUL | Reserved | CTRL+ @ | |
| 1 | 01 | SOH | NP Enter | CTRL+ A | Select all |
| 2 | 02 | STX | Caps Lock | CTRL+ B | Bold |
| 3 | 03 | ETX | ALT Make | CTRL+ C | Copy |
| 4 | 04 | EOT | ALT Break | CTRL+ D | Bookmark |
| 5 | 05 | ENQ | CTRL Make | CTRL+ E | Center |
| 6 | 06 | ACK | CTRL Break | CTRL+ F | Find |
| 7 | 07 | BEL | Enter / Ret | CTRL+ G | |
| 8 | 08 | BS | *(Apple Make)* | CTRL+ H | History |
| 9 | 09 | HT | Tab | CTRL+ I | Italic |
| 10 | 0A | LF | *(Apple Break)* | CTRL+ J | Justify |
| 11 | 0B | VT | Tab | CTRL+ K | hyperlink |
| 12 | 0C | FF | Delete | CTRL+ L | list, left align |
| 13 | 0D | CR | Enter / Ret | CTRL+ M | |
| 14 | 0E | SO | Insert | CTRL+ N | New |
| 15 | 0F | SI | ESC | CTRL+ O | Open |
| 16 | 10 | DLE | F11 | CTRL+ P | Print |
| 17 | 11 | DC1 | Home | CTRL+ Q | Quit |
| 18 | 12 | DC2 | PrtScn | CTRL+ R | |

| Non-printable ASCII control | | | Keyboard Control + ASCII (CTRL+X) Mode | | |
|---|---|---|---|---|---|
| | | | | Windows Mode Control + X Mode On (KBDCAS2) | |
| DEC | HEX | Char | Control + X Mode Off (KBDCAS0) | CTRL + X | CTRL + X function |
| 19 | 13 | DC3 | Backspace | CTRL+ S | Save |
| 20 | 14 | DC4 | Back Tab | CTRL+ T | |
| 21 | 15 | NAK | F12 | CTRL+ U | |
| 22 | 16 | SYN | F1 | CTRL+ V | Paste |
| 23 | 17 | ETB | F2 | CTRL+ W | |
| 24 | 18 | CAN | F3 | CTRL+ X | |
| 25 | 19 | EM | F4 | CTRL+ Y | |
| 26 | 1A | SUB | F5 | CTRL+ Z | |
| 27 | 1B | ESC | F6 | CTRL+ [ | |
| 28 | 1C | FS | F7 | CTRL+ \ | |
| 29 | 1D | GS | F8 | CTRL+ ] | |
| 30 | 1E | RS | F9 | CTRL+ ^ | |
| 31 | 1F | US | F10 | CTRL+ - | |
| 127 | 7F | ⌂ | NP Enter | | |

### ISO 2022/ISO 646 Character Replacements

Code pages define the mapping of character codes to characters. If the data received does not display with the proper characters, it may be because the bar code being scanned was created using a code page that is different from the one the host pro-gram is expecting. If this is the case, select the code page with which the bar codes were created. The data characters should then appear properly.

| Code Page Selection Method/Country | Standard | Keyboard Country | Honeywell Code Page |
|---|---|---|---|
| Great Britain (UK) | ISO /IEC 646-04 | 7 | 87 |
| France | ISO /IEC 646-69 | 3 | 83 |
| Germany | ISO/IEC646-21 | 4 | 84 |
| Switzerland | ISO /IEC 646-CH | 6 | 86 |
| Sweden / Finland (extended Annex C) | ISO/IEC 646-11 | 2 | 82 |
| Denmark | ISO/IEC 646-08 | 8 | 88 |
| Norway | ISO/IEC 646-60 | 9 | 94 |
| Italy | ISO/IEC 646-15 | 5 | 85 |
| Portugal | ISO/IEC 646-16 | 13 | 92 |
| Spain | ISO/IEC 646-17 | 10 | 90 |
| Spain | ISO/IEC 646-85 | 51 | 91 |

| Dec | | | 35 | 36 | 64 | 91 | 92 | 93 | 94 | 96 | 123 | 124 | 125 | 126 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hex | | | 23 | 24 | 40 | 5B | 5C | 5D | 5E | 60 | 7B | 7C | 7D | 7E |
| US | 0 | 1 | # | $ | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| CA | 54 | 95 | # | $ | à | â | ç | ê | î | ô | é | ù | è | û |
| CA | 18 | 96 | # | $ | à | â | ç | ê | É | ô | é | ù | è | û |
| JP | 28 | 98 | # | $ | @ | [ | ¥ | ] | ^ | ` | { | \| | } | □ |
| CN | 92 | 99 | # | ¥ | @ | [ | \ | ] | ^ | ` | { | \| | } | □ |
| GB | 7 | 87 | £ | $ | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| FR | 3 | 83 | £ | $ | à | ° | ç | § | ^ | µ | é | ù | è | ¨ |
| DE | 4 | 84 | # | $ | § | Ä | Ö | Ü | ^ | ` | ä | ö | ü | ß |
| CH | 6 | 86 | ù | $ | à | é | ç | ê | î | ô | ä | ö | ü | û |
| SE/FI | 2 | 82 | # | ¤ | É | Ä | Ö | Å | Ü | é | ä | ö | å | ü |
| DK | 8 | 88 | # | $ | @ | Æ | Ø | Å | ^ | ` | æ | ø | å | ~ |
| NO | 9 | 94 | # | $ | @ | Æ | Ø | Å | ^ | ` | æ | ø | å | ¨ |
| IE | 73 | 97 | £ | $ | Ó | É | Í | Ú | Á | ó | é | í | ú | á |
| IT | 5 | 85 | £ | $ | § | ° | ç | é | ^ | ù | à | ò | è | ì |
| PT | 13 | 92 | # | $ | § | Ã | Ç | Õ | ^ | ` | ã | ç | õ | ° |
| ES | 10 | 90 | # | $ | § | ¡ | Ñ | ¿ | ^ | ` | ° | ñ | ç | ~ |
| ES | 51 | 91 | # | $ | · | ¡ | Ñ | Ç | ¿ | ` | ´ | ñ | ç | ¨ |
| COUNTRY | Country Keyboard | Honeywell CodePage | **ISO / IEC 646 National Character Replacements** | | | | | | | | | | | |

## Lower ASCII Reference Table

Note: Windows code page 1252 and lower ASCII user the same characters.

| Printable Characters | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DEC | HEX | Character | DEC | HEX | Character | DEC | HEX | Character |
| 32 | 20 | <SPACE> | 64 | 40 | @ | 96 | 60 | ` |
| 33 | 21 | ! | 65 | 41 | A | 97 | 61 | a |
| 34 | 22 | " | 66 | 42 | B | 98 | 62 | b |
| 35 | 23 | # | 67 | 43 | C | 99 | 63 | c |
| 36 | 24 | $ | 68 | 44 | D | 100 | 64 | d |
| 37 | 25 | % | 69 | 45 | E | 101 | 65 | e |
| 38 | 26 | & | 70 | 46 | F | 102 | 66 | f |
| 39 | 27 | ' | 71 | 47 | G | 103 | 67 | g |
| 40 | 28 | ( | 72 | 48 | H | 104 | 68 | h |
| 41 | 29 | ) | 73 | 49 | I | 105 | 69 | i |
| 42 | 2A | * | 74 | 4A | J | 106 | 6A | j |
| 43 | 2B | + | 75 | 4B | K | 107 | 6B | k |
| 44 | 2C | , | 76 | 4C | L | 108 | 6C | l |
| 45 | 2D | - | 77 | 4D | M | 109 | 6D | m |
| 46 | 2E | . | 78 | 4E | N | 110 | 6E | n |
| 47 | 2F | / | 79 | 4F | O | 111 | 6F | o |
| 48 | 30 | 0 | 80 | 50 | P | 112 | 70 | p |
| 49 | 31 | 1 | 81 | 51 | Q | 113 | 71 | q |
| 50 | 32 | 2 | 82 | 52 | R | 114 | 72 | r |
| 51 | 33 | 3 | 83 | 53 | S | 115 | 73 | s |
| 52 | 34 | 4 | 84 | 54 | T | 116 | 74 | t |
| 53 | 35 | 5 | 85 | 55 | U | 117 | 75 | u |
| 54 | 36 | 6 | 86 | 56 | V | 118 | 76 | v |
| 55 | 37 | 7 | 87 | 57 | W | 119 | 77 | w |
| 56 | 38 | 8 | 88 | 58 | X | 120 | 78 | x |
| 57 | 39 | 9 | 89 | 59 | Y | 121 | 79 | y |
| 58 | 3A | : | 90 | 5A | Z | 122 | 7A | z |

| Printable Characters (Continued) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| DEC | HEX | Character | DEC | HEX | Character | DEC | HEX | Character |
| 59 | 3B | ; | 91 | 5B | [ | 123 | 7B | { |
| 60 | 3C | < | 92 | 5C | \ | 124 | 7C | \| |
| 61 | 3D | = | 93 | 5D | ] | 125 | 7D | } |
| 62 | 3E | > | 94 | 5E | ^ | 126 | 7E | ~ |
| 63 | 3F | ? | 95 | 5F | _ | 127 | 7F | ⌂ |

| Extended ASCII Characters | | | | | |
|---|---|---|---|---|---|
| DEC | HEX | CP 1252 | ASCII | Alternate Extended | PS2 Scan Code |
| 128 | 80 | € | Ç | up arrow ↑ | 0x48 |
| 129 | 81 | | ü | down arrow ↓ | 0x50 |
| 130 | 82 | ‚ | é | right arrow → | 0x4B |
| 131 | 83 | ƒ | â | left arrow ← | 0x4D |
| 132 | 84 | „ | ä | Insert | 0x52 |
| 133 | 85 | … | à | Delete | 0x53 |
| 134 | 86 | † | å | Home | 0x47 |
| 135 | 87 | ‡ | ç | End | 0x4F |
| 136 | 88 | ˆ | ê | Page Up | 0x49 |
| 137 | 89 | ‰ | ë | Page Down | 0x51 |
| 138 | 8A | Š | è | Right ALT | 0x38 |
| 139 | 8B | ‹ | ï | Right CTRL | 0x1D |
| 140 | 8C | Œ | î | Reserved | n/a |
| 141 | 8D | | ì | Reserved | n/a |
| 142 | 8E | Ž | Ä | Numeric Keypad Enter | 0x1C |
| 143 | 8F | | Å | Numeric Keypad / | 0x35 |
| 144 | 90 | | É | F1 | 0x3B |
| 145 | 91 | ‘ | æ | F2 | 0x3C |
| 146 | 92 | ’ | Æ | F3 | 0x3D |
| 147 | 93 | “ | ô | F4 | 0x3E |
| 148 | 94 | ” | ö | F5 | 0x3F |
| 149 | 95 | • | ò | F6 | 0x40 |
| 150 | 96 | – | û | F7 | 0x41 |
| 151 | 97 | — | ù | F8 | 0x42 |
| 152 | 98 | ˜ | ÿ | F9 | 0x43 |
| 153 | 99 | ™ | Ö | F10 | 0x44 |
| 154 | 9A | š | Ü | F11 | 0x57 |
| 155 | 9B | › | ¢ | F12 | 0x58 |
| 156 | 9C | œ | £ | Numeric Keypad + | 0x4E |

| | | | | | |
|---|---|---|---|---|---|
| 157 | 9D | | ¥ | Numeric Keypad - | 0x4A |
| 158 | 9E | ž | Pts | Numeric Keypad * | 0x37 |
| 159 | 9F | Ÿ | ƒ | Caps Lock | 0x3A |
| 160 | A0 | | á | Num Lock | 0x45 |
| 161 | A1 | ¡ | í | Left Alt | 0x38 |
| 162 | A2 | ¢ | ó | Left Ctrl | 0x1D |
| 163 | A3 | £ | ú | Left Shift | 0x2A |
| 164 | A4 | ¤ | ñ | Right Shift | 0x36 |
| 165 | A5 | ¥ | Ñ | Print Screen | n/a |
| 166 | A6 | ¦ | ª | Tab | 0x0F |
| 167 | A7 | § | º | Shift Tab | 0x8F |
| 168 | A8 | ¨ | ¿ | Enter | 0x1C |
| 169 | A9 | © | ⌐ | Esc | 0x01 |
| 170 | AA | ª | ¬ | Alt Make | 0x36 |

| Extended ASCII Characters (Continued) | | | | | |
|---|---|---|---|---|---|
| DEC | HEX | CP 1252 | ASCII | Alternate Extended | PS2 Scan Code |
| 171 | AB | « | ½ | Alt Break | 0xB6 |
| 172 | AC | ¬ | ¼ | Control Make | 0x1D |
| 173 | AD | | ¡ | Control Break | 0x9D |
| 174 | AE | ® | « | Alt Sequence with 1 Character | 0x36 |
| 175 | AF | ¯ | » | Ctrl Sequence with 1 Character | 0x1D |
| 176 | B0 | ° | ░ | | |
| 177 | B1 | ± | ▒ | | |
| 178 | B2 | ² | ▓ | | |
| 179 | B3 | ³ | │ | | |
| 180 | B4 | ´ | ┤ | | |
| 181 | B5 | µ | ╡ | | |
| 182 | B6 | ¶ | ╢ | | |
| 183 | B7 | · | ╖ | | |
| 184 | B8 | ¸ | ╕ | | |
| 185 | B9 | ¹ | ╣ | | |
| 186 | BA | º | ║ | | |
| 187 | BB | » | ╗ | | |
| 188 | BC | ¼ | ╝ | | |
| 189 | BD | ½ | ╜ | | |
| 190 | BE | ¾ | ╛ | | |
| 191 | BF | ¿ | ┐ | | |
| 192 | C0 | À | └ | | |
| 193 | C1 | Á | ┴ | | |
| 194 | C2 | Â | ┬ | | |
| 195 | C3 | Ã | ├ | | |
| 196 | C4 | Ä | ─ | | |
| 197 | C5 | Å | í | | |
| 198 | C6 | Æ | ╞ | | |
| 199 | C7 | Ç | ╟ | | |
| 200 | C8 | È | ╚ | | |
| 201 | C9 | É | ╔ | | |
| 202 | CA | Ê | ╩ | | |
| 203 | CB | Ë | ╦ | | |
| 204 | CC | Ì | ╠ | | |
| 205 | CD | Í | ═ | | |

| | | | | | |
|---|---|---|---|---|---|
| 206 | CE | Î | ╬ | | |
| 207 | CF | Ï | ╧ | | |
| 208 | D0 | Ð | ╨ | | |
| 209 | D1 | Ñ | ╤ | | |
| 210 | D2 | Ò | ╥ | | |
| 211 | D3 | Ó | ╙ | | |
| 212 | D4 | Ô | ╘ | | |
| 213 | D5 | Õ | ╒ | | |
| 214 | D6 | Ö | ╓ | | |
| 215 | D7 | × | ╫ | | |
| 216 | D8 | Ø | ╪ | | |
| 217 | D9 | Ù | ┘ | | |
| 218 | DA | Ú | ┌ | | |
| 219 | DB | Û | █ | | |
| 220 | DC | Ü | ▄ | | |
| 221 | DD | Ý | ▌ | | |
| 222 | DE | Þ | ▐ | | |

| Extended ASCII Characters (Continued) | | | | | |
|---|---|---|---|---|---|
| DEC | HEX | CP 1252 | ASCII | Alternate Extended | PS2 Scan Code |
| 223 | DF | ß | ■ | | |
| 224 | E0 | à | α | | |
| 225 | E1 | á | ß | | |
| 226 | E2 | â | Γ | | |
| 227 | E3 | ã | π | | |
| 228 | E4 | ä | Σ | | |
| 229 | E5 | å | σ | | |
| 230 | E6 | æ | µ | | |
| 231 | E7 | ç | τ | | |
| 232 | E8 | è | Φ | | |
| 233 | E9 | é | Θ | | |
| 234 | EA | ê | Ω | | |
| 235 | EB | ë | δ | | |
| 236 | EC | ì | ∞ | | |
| 237 | ED | í | φ | | |
| 238 | EE | î | ε | | |
| 239 | EF | ï | ∩ | | |
| 240 | F0 | ð | ≡ | | |
| 241 | F1 | ñ | ± | | |
| 242 | F2 | ò | ≥ | | |
| 243 | F3 | ó | ≤ | | |
| 244 | F4 | ô | ⌠ | | |
| 245 | F5 | õ | ⌡ | | |
| 246 | F6 | ö | ÷ | | |
| 247 | F7 | ÷ | ≈ | | |
| 248 | F8 | ø | ° | | |
| 249 | F9 | ù | ∙ | | |
| 250 | FA | ú | · | | |
| 251 | FB | û | √ | | |
| 252 | FC | ü | ⁿ | | |
| 253 | FD | ý | ² | | |
| 254 | FE | þ | ■ | | |
| 255 | FF | ÿ | | | |

# Appendix B – Programming Chart

0

1

2

3

4

5

6

7

8

9

A

B

C

D

E

F

Save

Reset

Discard

Note: If you make an error while scanning the letters or digits (before scanning Save), scan Discard, scan the correct letters or digits, and **Save** again.