DATALOGIC

# PowerScan™ M9300




## PM8300 Compatibility

## Product Reference Guide

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## Patents

See www.patents.datalogic.com for patent list.

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# Chapter 1
# Compatibility with PM8300

## Compatibility Mode

In order to use the PM9300 together with PM8300 devices, you must switch the scanner in compatible mode.

When in compatible mode, the Scanner can recognize a subset of PM8300 commands, listed on this Manual.

It is possible to still uses the standard configuration manual or Aladdin in order to configure parameters not present here.

## Changing from Normal to Compatible Mode

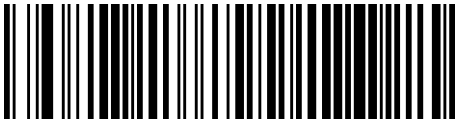
### PM9300 Handheld

1. With the PM9300, read the Compatible Mode bar code.



Compatible Mode

2. Read the restore default command.



Restore Default

3. Follow the procedure described at page 3.




When the PM9300 is in Compatible Mode, some newer features (such as communication speed programming) will not be available.

# Changing from Compatible Mode back to Normal

## PM9300 Handheld

1. With the PM9300, read the following label:



Normal Mode (High Speed)

2. With the PM9300, read the Unlink programing label.

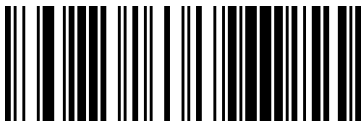


Unlink

3. Now you can link your PM9300 to a BC9xxx in normal mode; the PM9300 will inherit the programmed speed from the BC9xxx.

## BC9xxx Base

1. With a PM9300 in normal mode, read the Unlink programming label below:



Unlink

2. Read the following bar code:



Return to Normal

3. Place the PM9300 on your BC9xxx.

Your BC9xxx will link to the PM9300 and will inherit the reader's programmed speed.

# POWERSCAN™ M8300/BC-80X0 STAND-ALONE SETUP

Follow the procedure below to set the radio address and bind PowerScan™ M8300 to the BC-80X0 cradle.

1. Enter Configuration



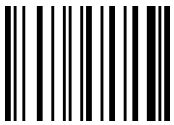
2. Set Date



+

six digits for Day, Month and Year (DDMMYY)

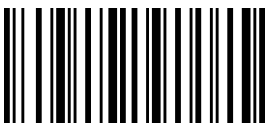
3. Set Time



+

four digits for Hour and Minutes (HHMM)

4. Set Radio Address



+

four digits for the PowerScan™ M8300 Address (from **0000** to**1999**).

**All readers used in the same area must have different addresses.**

5. Exit and Save Configuration

6. Read the **Bind** code to pair the PowerScan™ M8300 to the BC-80X0 cradle. The reader is dedicated to the cradle. Any previously **bound** reader will be excluded.

*To connect several readers to the same cradle see the following paragraph 'Using Multiple M8300 Series Readers with Same Cradle'.*

Bind

The green LED on the PowerScan™ M8300 will blink; the reader is ready to be inserted into the cradle.

7. Firmly insert the reader into the BC-80X0 cradle within 10 seconds, a beep will be emitted, signaling that the BC-80X0 cradle has been paired to the PowerScan™ M8300, and the green LED on the reader will go off.




8. Read the BC-80X0 restore default code:

Restore BC-80X0 Default

Go to INTERFACE SELECTION on page 12.

## Using Multiple M-Series Readers with Same Cradle

If you want to use several M-Series readers with the same BC-80X0 cradle, you must first **Bind** the cradle with one of the readers (see previously described configuration procedure).

Successive readers can be associated with the same cradle by following the configuration procedure substituting the **Bind** command with **Join** (step 7).

7. Join



The green LED on the PowerScan™ M8300 will blink: the reader is ready to be positioned onto the cradle. Complete step 8.

**END of procedure.**



CAUTION

**All readers associated with the same cradle must have different addresses.**

**YOUR READER IS NOW READY TO READ BARCODES.**

To change the defaults see CHANGING DEFAULT SETTINGS on page 14.

## PowerScan™ M8300/STAR-Modem™ in Stand-Alone Mode

To configure a PowerScan™ M8300 reader to communicate with STAR-Modem™ in Stand-alone Mode, follow the procedure on page 3 substituting steps 6 and 7 with those below:

6. STAR-Modem™ Address



Read the code above and the four-digit address of the STAR-Modem™.

7. Exit and Save configuration



**END of procedure.**

**YOUR READER IS NOW READY TO READ BARCODES.**

To change the defaults see CHANGING DEFAULT SETTINGS on page 14.

# POWERSCAN™ M8300/STAR-SYSTEM™ SETUP

The following procedure allows configuring a PowerScan™ M8300 reader to communicate with various STAR-System™ devices such as STARGATE™ RF base stations.

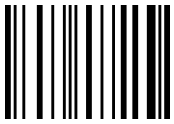
1. Restore PowerScan™ M8300 Default



2. Enter Configuration



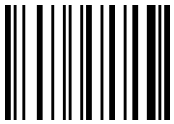
3. Set Date



+

six digits for Day, Month and Year (DDMMYY)

4. Set Time



+

four digits for Hour and Minutes (HHMM)

5. Set the connection according to the length of the codes to be read:

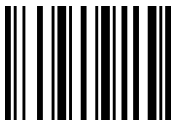


Code Length ≤ 240 Characters



Code Length >240 Characters
(not for systems with BC-8000 as Master)

6. Set Radio Address



+

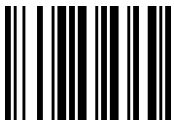
four digits from the Numeric Table in the range 0000–1999.
**All readers must have different addresses.**

7. First STAR-System™ Address



Read the code above and the four-digit address of the First STAR-System™ device in the system.

8. Set Last STAR-System™ Address



Read the code above and the four-digit address of the Last STAR-System™ device in the system.




**Whenever the system is composed of a single base station, the first and last base station addresses (steps 7 and 8) must have the same value.**

9. Exit and Save Configuration



**END of procedure.**

**YOUR READER IS NOW READY TO READ BARCODES.**

To change the defaults see CHANGING DEFAULT SETTINGS on page 14.

# BC-8060 STAR-SYSTEM™ NETWORK SETUP

When the BC-8060 cradle model is used in an RS-485 network, it must be initially configured. To do this using configuration barcodes, follow the procedure below using any PowerScan™ M8300 reader.

1. Set BC-8060 Address

+

four digits for the BC-8060 Address (from 0000 to 1999).

**All cradles used in the network must have different addresses.**

2. Exit and Save configuration.

3. Read the Bind code to pair the PowerScan™ M8300 to the BC-8060 cradle for configuration.

Bind

The green LED on the PowerScan™ M8300 will blink; the reader is ready to be inserted into the cradle.

4. Firmly insert the reader into the BC-8060 cradle within 10 seconds, a beep will be emitted, signaling that the BC-8060 cradle has been paired to the PowerScan™ M8300, and the green LED on the reader will go off.



5. Read the BC-8060 restore default code:

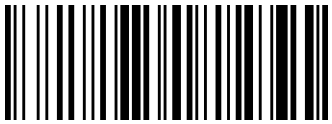


Restore BC-8060 Default

6. Read the desired Enable Network code.



Enable RS-485 Master



Enable RS-485 Slave

**END of procedure.**

For Host Master Network Layouts, the network configuration parameters can be changed through STAR-Link™ software running on the PC. Star-Link™ software can be downloaded for free from the web site: www.datalogic.com.

For BC-8060 Master Network Layouts, the network configuration parameters can be changed either through the Datalogic Aladdin™ configuration software running on the PC or by reading the barcode selections in the Network section of this manual starting on page 31. If using configuration barcodes, it is advised to completely configure the cradles before reconfiguring the PowerScan™ M8300 reader (see following pages).

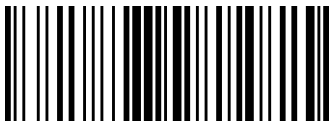



**After completing the BC-8060 cradle configuration and connections in the network, you must reconfigure the PowerScan™ M8300 reader using the STAR-System™ NOTE in POWERSCAN™ M8300/STAR-SYSTEM™ SETUP on page 7.**

# INTERFACE SELECTION

Read the interface selection code for your application.

## RS-232



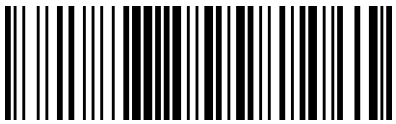
RS-232 = Standard

## POS TERMINALS



POS-TERMINAL = Nixdorf Mode A

## WEDGE



Wedge = IBM AT or PS/2 PCs

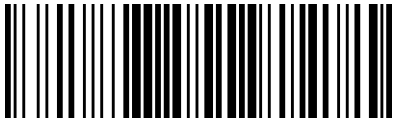


Wedge = PC Notebook

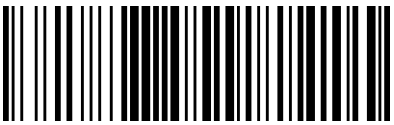
### WEDGE - ALT MODE

The ALT–mode selection allows barcodes sent to the PC to be interpreted correctly independently from the Keyboard Nationality used. You do not need to make a Keyboard Nationality selection.

(default = Num Lock Unchanged). Make sure the Num Lock key on your key–board is ON.



ALT mode = IBM AT



ALT mode = PC Notebook

## USB



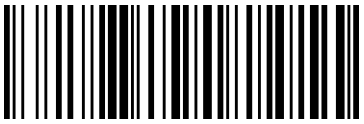
USB = USB-KBD



USB = USB-IBM-Table Top



USB = USB-KBD-ALT-MODE



USB = USB-IBM-Hand Held



USB = USB-COM*

* When configuring USB–COM, the relevant files and drivers must be installed from the USB Device Installation software, which can be downloaded from the web site http://www.datalogic.com.

# CHANGING DEFAULT SETTINGS

Once your reader is setup, you can change the default parameters to meet your application needs. Refer to the preceding paragraphs for initial configuration in order to set the default values and select the interface for your application.

In this manual, the configuration parameters are divided into logical groups making it easy to find the desired function based on its reference group.

The first four groups are for Standard Interface parameter configuration for all PowerScan™ D8330 series readers and PowerScan™ M8300/BC-80X0 Standalone configurations only:

- RS-232
- USB
- WEDGE
- NETWORK PARAMETERS are available only for BC-8060 Network configurations.

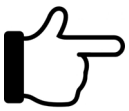
The following parameter groups are common to all interface applications:

- DATA FORMAT parameters regard the messages sent to the Host system for all interfaces except Pen Emulation.
- POWER SAVE manages overall current consumption in the reading device.
- READING PARAMETERS control various operating modes and indicator status functioning.
- DECODING PARAMETERS maintain correct barcode decoding in certain special reading conditions.
- CODE SELECTION parameters allow configuration of a personalized mix of codes, code families and their options.
- ADVANCED FORMATTING PARAMETERS allow code concatenation and advanced formatting of messages towards the Host. It cannot be used with Pen Emulation connections.
- RADIO PARAMETERS (M8300 series only) allow configuration of radio control parameters.
- DISPLAY PARAMETERS (some M8300 series models only) allow configuration of reader display parameters.

# RS-232 PARAMETERS


| |
|---|
| **BAUD RATE** on page 16 |
| **PARITY** on page 17 |
| **STOP BITS** on page 27 |
| **HANDSHAKING CONTROL** on page 18 |
| **INTER-CHARACTER DELAY** on page 18 |


1. Read the Enter Configuration code ONCE, available at the top of each page.
2. Read configuration codes from the desired groups.



= Read the code and follow the procedure given

3. Read the **Exit and Save Configuration** code ONCE, available at the top of each page.

## Baud Rate

Baud Rate = 1200

Baud Rate = 2400

Baud Rate = 4800

DEFAULT

Baud Rate = 9600

Baud Rate = 19,200

Baud Rate = 38,400

## Parity

DEFAULT

Parity = None

Parity = Even

Parity = Odd

## Stop Bits

DEFAULT

Stop Bits = 1 stop bit

Stop Bits = 2 stop bits

## Handshaking Control

DEFAULT



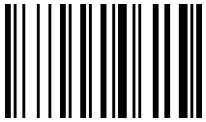
Handshaking Control = RTS



Handshaking Control = hardware (RTS/CTS)



Handshaking Control = software (XON/XOFF)



Handshaking Control = RTS always ON

## Inter-character Delay

Delay between characters transmitted to Host



**Read 2 numbers from the table where:**

00 = DELAY disabled

01 – 99 = DELAY from 1 to 99 milliseconds

DEFAULT

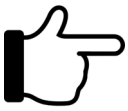
Delay disabled

# USB PARAMETERS


| USB-COM |
| --- |
| HANDSHAKING CONTROL on page 18 |
| USB-KBD |
| KEYBOARD NATIONALITY on page 21 |
| INTER-CODE DELAY on page 22 |
| USB KEYBOARD SPEED on page 23 |


The programming bar codes in this chapter allow modifications to the standard RS-232 and USB-Com interfaces. Reference Appendix C, Standard Defaults for a listing of standard factory settings.

1. Read the **Enter Configuration** code ONCE, available at the top of each page.
2. Read configuration codes from the desired groups.



= Read the code and follow the procedure given

3. Read the **Exit and Save Configuration** code ONCE, available at the top of each page.

# USB-COM

## Handshaking

Handshaking = RTS

DEFAULT

Handshaking = hardware (RTS/CTS)

Handshaking = software (XON/XOFF)

Handshaking = RTS always ON

# USB-KBD

## Keyboard Nationality

**Not Available for USB-KBD-ALT-MODE Interface**

This parameter default value is restored through the Interface Selection code and not Restore Default.

Keyboard nationality = Belgian

Keyboard nationality = Enlish (UK)

Keyboard nationality = French

Keyboard nationality = German

Keyboard nationality = Italian

Keyboard nationality = Spanish

## Keyboard Nationality (continued)

Keyboard nationality = Swedish

DEFAULT

Keyboard nationality = USA

Keyboard nationality = Japanese

The Japanese and is valid only for IBM AT compatible PCs.

## Inter-code Delay

Delay between characters transmitted to Host

**Read 2 numbers from the table where:**
00 = DELAY disabled
01 – 99 = DELAY from 1 to 99 milliseconds

DEFAULT

Delay disabled

## USB Keyboard Speed

DEFAULT

USB Keyboard Speed = Normal

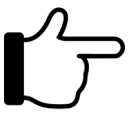
USB Keyboard Speed = Fast

# NOTES

# WEDGE PARAMETERS


| |
|---|
| **KEYBOARD NATIONALITY** on page 26 |
| **CAPS LOCK** on page 27 |
| **CAPS LOCK AUTO-RECOGNITION (IBM AT COMPATIBLE ONLY)** on page 28 |
| **NUM LOCK** on page 28 |
| **INTER-CHARACTER DELAY** on page 29 |
| **INTER-CODE DELAY** on page 29 |
| **CONTROL CHARACTER EMULATION** on page 30 |


1. Read the Enter Configuration code ONCE, available at the top of each page.
2. Read configuration codes from the desired groups.



= Read the code and follow the procedure given

3. Read the **Exit and Save Configuration** code ONCE, available at the top of each page.

## Keyboard Nationality

Keyboard Nationality = Belgian

Keyboard Nationality = English (UK)

Keyboard Nationality = French

Keyboard Nationality = German

Keyboard Nationality = Italian

Keyboard Nationality = Spanish

## Keyboard Nationality (continued)

Keyboard Nationality = Swedish

DEFAULT

Country Mode = English (USA)

Keyboard Nationality = Japanese

The Japanese is valid only for IBM AT compatible PCs.

## Caps Lock

DEFAULT

Caps Lock = OFF

Caps Lock = ON

Select the appropriate code to match your keyboard caps lock status.

**Caps lock manual configuration is ignored when Caps Lock Auto-Recognition is enabled.**

For PC Notebook interface selections, the caps lock status is automatically recognized; therefore this command is not necessary.

## Caps Lock Auto-recognition (IBM AT Compatible Only)

Caps Lock Auto-recognition = Disable

DEFAULT

Caps Lock Auto-recognition = Enable

## Num Lock

Num Lock = toggle num lock

DEFAULT

Num Lock = num lock unchanged

This selection is used together with the Alt Mode interface selection for AT or Notebook PCs.

It changes the way the Alt Mode procedure is executed; therefore it should be set as follows:

- if your keyboard Num Lock is normally on use **num lock unchanged**
- if your keyboard Num Lock is normally off use **toggle num lock**

In this way the device will execute the Alt Mode procedure correctly for your application.

## Inter-character Delay

This option specifies the format in which the reader sends character data. This does not apply when an alternate key encoding keyboard is selected.

Delay between characters transmitted to Host

**Read 2 numbers from the table where:**

00 = DELAY disabled

01 – 99 = DELAY from 1 to 99 milliseconds

DEFAULT

Delay disabled

## Inter-code Delay

This option specifies the setting of the NUMLOCK key in the Keyboard Wedge interface.

Delay between codes transmitted to Host

**Read 2 numbers from the table where:**

00 = DELAY disabled

01 – 99 = DELAY from 1 to 99 milliseconds

DEFAULT

Delay disabled

## Control Character Emulation

Control Character Emulation = Ctrl + Shift + Key

DEFAULT

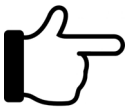
Control Character Emulation = Ctrl + Key

# NETWORK PARAMETERS

## BC-8060 Model Configuration Only


| |
|---|
| **RS-485 NETWORK** on page 32 |
| **NETWORK BAUD RATE** on page 33 |
| **SLAVE ADDRESS RANGE** on page 34 |
| **NETWORK WARNING MESSAGE** on page 34 |
| **RECEPTION WARNING MESSAGE** on page 35 |
| **MASTER CRADLE HEADER** on page 35 |
| **MASTER CRADLE TERMINATOR** on page 37 |


1. Read the Enter Configuration code ONCE, available at the top of each page.
2. Read configuration codes from the desired groups.



= Read the code and follow the procedure given

3. Read the **Exit and Save Configuration** code ONCE, available at the top of each page.

## RS-485 NETWORK

RS-485 Network = disable RS-485 network

DEFAULT

RS-485 Network = enable RS-485 slave

RS-485 Network = enable RS-485 master




**If a BC-8060 cradle is errantly configured as a Slave but not connected to a network, it may not be able to receive further commands from the reader. In this case it can be reconfigured by executing the bind procedure, which returns the cradle to Stand-alone configuration.**

## NETWORK BAUD RATE

Network Baudrate = 9600

Network Baudrate = 19200

Network Baudrate = 38400

DEFAULT

## SLAVE ADDRESS RANGE

Slave Address Range = First Address

Read the code above and the four-digit address of the First Slave device in the system.

Slave Address Range = Last Address

Read the code above and the four-digit address of the Last Slave device in the system.

## NETWORK WARNING MESSAGE

Network Warning Message = not transmitted

DEFAULT

Network Warning Message = transmitted

## RECEPTION WARNING MESSAGE

Reception Warning Message = not transmitted

DEFAULT

Reception Warning Message = transmitted

## MASTER CRADLE HEADER

Master Cradle Header = no header

DEFAULT

Master Cradle Header = one character header

Master Cradle Header = two character header

Master Cradle Header = three character header

## MASTER CRADLE HEADER (continued)

Master Cradle Header = four character header

Master Cradle Header = five character header

Master Cradle Header = six character header

Master Cradle Header = seven character header

Master Cradle Header = eight character header

After selecting one of the desired Header codes, read the character(s) from the HEX table.

Example: Valid characters are in the range: **00–FE**

**Example:**

| | Four character header | | Hex codes | | |
|---|---|---|---|---|---|
| Read | | + | 41 + 42 + 43 + 44 | = | AI |

For more details, see paragraph "Master Header/Terminator Selection" on page 79.

# MASTER CRADLE TERMINATOR

Master Cradle Terminator = no terminator

DEFAULT

Master Cradle Terminator = one character terminator

Master Cradle Terminator = two character terminator

Master Cradle Terminator = three character terminator

Master Cradle Terminator = four character terminator

Master Cradle Terminator = five character terminator

## MASTER CRADLE TERMINATOR (continued)

Master Cradle Terminator = six character terminator

Master Cradle Terminator = seven character terminator

Master Cradle Terminator = eight character terminator

After selecting one of the desired Header codes, read the character(s) from the HEX table.

Example: Valid characters are in the range: **00-FE**

**Example:**

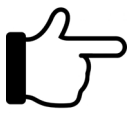
Read [Two character terminator] + Hex codes 0D + 0A

For more details, see paragraph "Master Header/Terminator Selection" on page 79.

# DATA FORMAT


| |
|---|
| **CODE IDENTIFIER** on page 41 |
| **CUSTOM CODE IDENTIFIER** on page 41 |
| **HEADER** on page 42 |
| **TERMINATOR** on page 44 |
| **ADDRESS STAMPING** on page 46 |
| **ADDRESS DELIMITER** on page 46 |
| **RADIO PARAMETERS** on page 47 |


1. Read the Enter Configuration code ONCE, available at the top of each page.
2. Read configuration codes from the desired groups.



= Read the code and follow the procedure given

3. Read the **Exit and Save Configuration** code ONCE, available at the top of each page.

## CODE IDENTIFIER TABLE

| CODE | AIM STANDARD | DATALOGIC STANDARD | CUSTOM |
|---|---|---|---|
| 2/5 interleaved | ] I y | N | |
| 2/5 industrial ] X y P | ] X y | P | |
| 2/5 normal 5 bars | ] S y | O | |
| EAN 8 | ] E 4 | A | |
| EAN 13 | ] E 0 | B | |
| UPC A | ] X y | C | |
| UPC E | ] X y | D | |
| EAN 8 with 2 ADD ON | ] E 5 | J | |
| EAN 8 with 5 ADD ON | ] E 6 | K | |
| EAN 13 with 2 ADD ON | ] E 1 | L | |
| EAN 13 with 5 ADD ON | ] E 2 | M | |
| UPC A with 2 ADD ON | ] X y | F | |
| UPC A with 5 ADD ON | ] X y | G | |
| UPC E with 2 ADD ON | ] X y | H | |
| UPC E with 5 ADD ON | ] X y | I | |
| Code 39 | ] A y | V | |
| Code 39 Full ASCII | | | |
| CODABAR | ] F y | R | |
| ABC CODABAR | ] X y | S | |
| Code 128 | ] C y | T | |
| EAN 128 | ] C y | k | |
| ISBT 128 | ] C4 | f | |
| Code 93 | ] G y | U | |
| CIP/39 | ] X y | Y | |
| CIP/HR | | | |
| Code 32 | ] X y | X | |
| MSI | ] M y | Z | |
| Code 11 | ] H y | b | |
| GS1 DataBar™ Expanded Linear and Stacked | ] e 0 | t | |
| GS1 DataBar Limited | ] e 0 | v | |
| GS1 DataBar 14 Linear and Stacked | ] e 0 | u | |

- AIM standard identifiers are not defined for all codes: the X identifier is assigned to the code for which the standard is not defined. The y value depends on the selected options (check digit tested or not, check digit tx or not, etc.).
- When customizing the Datalogic Standard code identifiers, 1 or 2 identifier characters can be defined for each code type. If only 1 identifier character is required, the second character must be selected as FF (disabled).
- The code identifier can be singly disabled for any code by simply selecting FF as the first identifier character.
- Write in the Custom character identifiers in the table above for your records.

## Code Identifier

Code Identifier = disable

DEFAULT

Code Identifier = Datalogic standard

Code Identifier = AIM standard

Code Identifier = custom

## Custom Code Identifier

define custom code identifier(s)

1. Read the above code. (Code Identifiers default to Datalogic standard, see table on previous page).
2. Select the code type from the code table in Appendix B for the identifier you want to change.
3. You can define 1 or 2 identifier characters for each code type. If only 1 identifier character is required, the second character must be selected as FF (disabled). Read the hexadecimal value corresponding to the character(s) you want to define as identifiers for the code selected in step 2. : valid characters are in the range 00–FD.

Example: To define Code 39 Code Identifier = @

Read define custom code identifier(s) + Code 39 + 40 + FF

## HEADER

Header = no header

Header = one character header

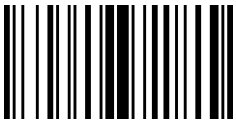
Header = two character header

Header = three character header

Header = four character header

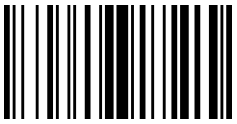
## HEADER (continued)





Header = five character header





Header = six character header





Header = seven character header





Header = eight character header

After selecting one of the desired Header codes, read the character(s) from the HEX table. Valid characters are in the range 00–FE.

**Example:**

| | Four character header | | Hex codes | | Header |
|---|---|---|---|---|---|
| Read |  | + | 41 + 42 + 43 + 44 | = | ABCD |

## TERMINATOR

Terminator = no terminator

Terminator = one character terminator

Terminator = two character terminator

Terminator = three character terminator

Terminator = four character terminator

## TERMINATOR (continued)

Terminator = five character terminator

Terminator = six character terminator

Terminator = seven character terminator

Terminator = eight character terminator

After selecting one of the desired Terminator codes, read the character(s) from the HEX table. Valid characters are in the range 00–FE.

**Example:**

two character terminator + 0D + 0A = Terminator CR LF

Enter Configuration

Exit and Save Configuration

## ADDRESS STAMPING



Address stamping = disable reader address stamping

DEFAULT



Address stamping = enable reader address stamping

## ADDRESS DELIMITER



Address delimiter = disable reader address delimiter

DEFAULT



Address delimiter = enable reader address delimiter and select character

Read 2 HEX characters in the range **00–FE**.

# RADIO PARAMETERS

## BATCH MODE

Batch mode = disable batch

DEFAULT

Batch mode = enable normal batch

Batch mode = enable automatic batch

The following batch management parameters are complete commands and do not require reading the Enter and Exit configuration codes.

Batch mode = start normal batch transmission

Batch mode = delete batch data

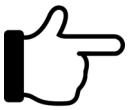
# NOTES

# DISPLAY AND KEYPAD PARAMETERS

## PowerScan™ M8300 Series Display and 3-Key readers only


| |
|---|
| **DATE AND TIME** on page 50 |
| **CONTRAST** on page 50 |
| **FONT SIZE** on page 51 |
| **BACKLIGHT** on page 51 |
| **DISPLAY-OFF TIMEOUT** on page 52 |
| **DISPLAY MODE** on page 52 |


1. Read the Enter Configuration code ONCE, available at the top of each page.
2. Read configuration codes from the desired groups.



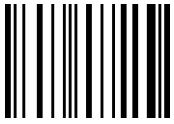
= Read the code and follow the procedure given

3. Read the **Exit and Save Configuration** code ONCE, available at the top of each page.

# DISPLAY PARAMETERS (3-KEY MODEL PARAMETERS)

## DATE AND TIME

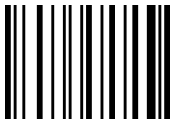




Date and time = set date

Read 6 numbers for DDMMYY





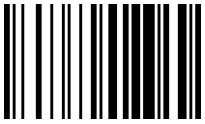
Date and time = set time

Read 4 numbers for HHMM

## CONTRAST



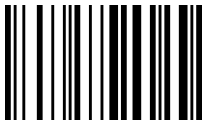
Contrast = lighter



Contrast = darker

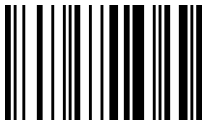
Read the code until the desired contrast is reached.

## FONT SIZE



Font size = small

DEFAULT



Font size = medium



Font size = large

## BACKLIGHT



Backlight = OFF

DEFAULT



Backlight = ON

## DISPLAY-OFF TIMEOUT

timeout

**Read 2 numbers in the range 00–99:**
00=disables display timeout (always on)
01 to 99 = timeout from 1 to 99 seconds.

DEFAULT

display-off after 8 seconds

## DISPLAY MODE

Display mode = normal

DEFAULT

Display mode = local echo

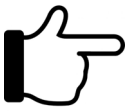
Display mode = clear after decode

# DISPLAY AND KEYPAD PARAMETERS

## POWERSCAN™ M8300-DK 16-KEY READERS ONLY


| |
|---|
| **KEYPAD PARAMETERS** on page 54 |
| **DISPLAY PARAMETERS** on page 59 |
| **DATA FORMAT** on page 63 |
| **OPERATIVE MODE** on page 73 |
| **QTY/CODE MODE** on page 73 |


1. Read the Enter Configuration code ONCE, available at the top of each page.
2. Read configuration codes from the desired groups.



= Read the code and follow the procedure given

3. Read the **Exit and Save Configuration** code ONCE, available at the top of each page.

# KEYPAD PARAMETERS

## 16-KEY KEYPAD PARAMETERS

The software has the capability to disable or enable the 16-key keyboard.

16-key Keypad = disable

DEFAULT

16-key Keypad = enable

## KEY PRESS SOUND

Enable/disable the KEY press sound (*'click'*)

Key Press sound = disable

DEFAULT

Key Press Sound = enable

# FUNCTION KEY PROGRAMMING

There are four function keys, F1, F2, F3, F4, plus the SHIFT key (↑), which can be defined as Function 5. Each of these keys can be programmed to perform a user-assigned function. This is done by associating a function key with an entry in the String Table, which is a database resident on the 16-key PowerScan™. You can select either a predefined command or define your own custom string. See the "String Table" command on page 56 to define customized strings for the String Table. See the "Shift Key Programming" command on page 58 to define the SHIFT key as F5.

Each function key has an associated mnemonic label which shows in the display when active. The default labels are shown in the table below. To program the function key labels, see "Function Key Label" command on page 57.

The following table shows the list of commands and available strings.

| CMD_ID | NAME | FUNCTION | DEFAULT LABEL |
|---|---|---|---|
| 0 | ENTER CMD | (Same as ENTER_KEY) | ↵ |
| 1 | String 1 | Associate with String 1 from the String Table | <first 3 char> |
| 2 | String 2 | Associate with String 2 from the String Table | <first 3 char> |
| 3 | String 3 | Associate with String 3 from the String Table | <first 3 char> |
| 4 | String 4 | Associate with String 4 from the String Table | <first 3 char> |
| 5 | String 5 | Associate with String 5 from the String Table | <first 3 char> |
| 6 | Backlight CMD | Toggle the backlight ON/OFF | Lgt |
| 7 | Clear CMD | Cancel ALL data entered in the edit field | CLR |
| 8 | Backspace CMD | Delete one char per key press from an edit field | ← |
| 9 | Recall Last CMD | If pressed once it recalls from memory the last code sent out; If pressed twice it will attempt to resend the last sent code | Rec |
| A | Show Watch | Display the internal time | Tim |

define function key

1. Read the above code to associate a Function Key or the Shift key (if defined as F5).
2. Specify which Function Key you want to associate (F1 – F4 or Shift F5) by scanning a barcode (1–5) from the hex numeric table in the back of this manual.
3. Select the label command you want to associate from the table on page 55. Scan a barcode from the hex numeric table corresponding to the command ID (0–A).

**Example:** To define Function Key 1= Clear command

| | Define Function Key | | Func Key # | | CMD ID |
|---|---|---|---|---|---|
| Read | | + | 1 | + | 7 |

## STRING TABLE

The Powerscan™ 16-key model allows you to define a String Table, a database with room for five entries, from String1 to String5, which can be recalled using a Function Key. This is done with Function Key Programming, described on page 55.

The string can be a single 'char'. Default = empty strings.

define string

1. Read the above code.
2. Select the string number you want to add by scanning a barcode (1 – 5) from the hex numeric table in the back of this manual.
3. Select the desired string length by scanning a barcode (0 – A) from the hex numeric table.
4. Define the label string by scanning characters or numerals from the hex numeric table.

**Example:** To define String 1 = DATALOGIC

| | Define string | | String # | | Length | | Hex codes | | String text |
|---|---|---|---|---|---|---|---|---|---|
| Read | | + | 2 | + | 9 | + | 44+41+54+41+4C +4F+47+49+43 | = | DATALOGIC |

## FUNCTION KEY LABEL

This item allows the user to change the default mnemonic label associated to each individual function key (F1 – F4). This is done by programming a short acronym string or symbol to be shown in the bottom of the display. The purpose of the label is to serve as an indication of the programmed function of the Function Key below it. To program the Function Keys themselves, see the "Function Key Programming" command on page 55.




**Function key label length is fixed at 4 characters and is not programmable.**

define function key label

1. Read the above code.
2. Specify which Function Key Label you want to change by scanning a barcode (1–4) from the hex numeric table in the back of this manual.
3. Define the label string by scanning 4 characters from the Hex numeric table.

Example: to define Function Key 2 label = D

| | Define function key label | | Function key # | | Hex codes | | Text string |
|---|---|---|---|---|---|---|---|
| Read | | + | 2 | + | 20 + 20 + 44 + 20 | = | space space D space |

## LOWER CASE

This function enables/disables the capability to use the SHIFT key to switch to Lower Case (alphanumeric) mode. When enabled, the indication in the upper right corner of display is 'ab'.

Lower case = disable

DEFAULT

Lower case = enable

## SHIFT KEY PROGRAMMING

The SHIFT key (↑) can be programmed to perform a function different than its standard (which is to toggle from numeric to alpha model). After the Shift Key has been defined as Function 5, refer to the "FUNCTION KEY PROGRAMMING", on page-55.

SHIFT KEY = normal mode

DEFAULT

SHIFT KEY = function 5

## ECHO

This function enables/disables the keypad echo. It works only when the scanner is in simple data input mode (no QTY/CODE).

Echo = Full keypad

DEFAULT

Echo = no echo on Function key

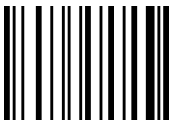
Echo = no echo on any key

# DISPLAY PARAMETERS

## DATE AND TIME

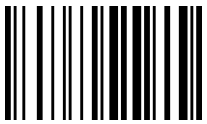


Date and time = set date
Read 6 numbers for DDMMYY

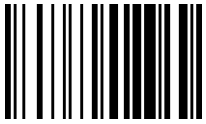


Date and time = set time
Read 4 numbers for HHMM

## CONTRAST



Contrast = lighter



Contrast = darker

## DISPLAY-OFF TIMEOUT



timeout

**Read 2 numbers in the range 00–99:**
00=disables display timeout (always on)
01 to 99 = timeout from 1 to 99 seconds.

DEFAULT — display-off after 8 seconds

DEFAULT — delay disabled

## LAST CODE SHOWN TIMEOUT

After the CODE transmission, the last code read will be shown on the display for a configurable timeout (LAST CODE SHOWN TOUT).

NOTE: Just as in the settings for the standard Powerscan™, the display has an active timeout before going in OFF state. This timeout has a higher priority than the LAST CODE SHOWN TOUT, so the two parameters should be combined to get the desired result.

Last code shown timeout = disable

Last code shown timeout = 1 second

Last code shown timeout = 2 second

DEFAULT

Last code shown timeout = 5 second

Last code shown timeout = 10 second

## LAST CODE SHOWN TIMEOUT (continued)

Last code shown timeout = 25 second

Last code shown timeout = 40 second

Last code shown timeout = 60 second

Last code shown timeout = 80 second

Last code shown timeout = 99 second

## BACKLIGHT

This feature defines the behavior of the 16-key scanner Backlight (both for display and keyboard).

Backlight = all backlighting disabled

DEFAULT

Backlight = display enabled, keyboard disabled

Backlight = display disabled, keyboard enabled (rarely used)

Backlight = display enabled, keyboard enabled

# DATA FORMAT

## Keypad Specific Formatting

## KEYBOARD DATA FORMAT ENABLE/DISABLE

This feature allows you to enable/disable specific formatting for data entered by keyboard and barcode labels read by the scan engine.

Use this command only if you require differentiation in formatting between scanned barcodes and data that is input from the keyboard. Refer to the standard Data Format section for other formatting options.




**If you enable different formatting you must define the desired format, otherwise the default data format will be used.**

Keyboard Data Format = disable (same as code)

DEFAULT

Keyboard Data Format = enable (different format allowed)

## TIME STAMPING MODE

Time **Stamping Mode** can be applied when entering data from either a bar-code, from the keyboard, or both.




**The standard Time Stamp enable/disable and setup are also applicable.**

TIME STAMPING MODE = data from both barcode and keyboard

DEFAULT

TIME STAMPING MODE = data only from barcode

TIME STAMPING MODE = data only from keyboard

## SCANNER DATA HEADER /TERMINATOR

Scanner Data Header/Terminator creates an optional Header and Terminator data format added to a barcode read from the device.




**Keyboard data format enable/disable (on page 63) must be used to enable the Header and Terminator setup, so the two parameters should be combined to get the desired result.**

## HEADER

Header = no header

Header = one character header

Header = two character header

Header = three character header

Header = four character header

## HEADER (continued)

Header = five character header

Header = six character header

Header = seven character header

Header = eight character header

After selecting one of the desired Header codes, read the character(s) from the HEX table. Valid characters are in the range 00–FE.

**Example:**

| | Four character header | | Hex codes | | Header |
|---|---|---|---|---|---|
| Read | | + | 41 + 42 + 43 + 44 | = | ABCD |

See Message Formatting on page 81.

## TERMINATOR

Terminator = no terminator

Terminator = one character terminator

Terminator = two character terminator

Terminator = three character terminator

Terminator = four character terminator

## TERMINATOR (continued)



Terminator = five character terminator



Terminator = six character terminator



Terminator = seven character terminator



Terminator = eight character terminator

After selecting one of the desired Header codes, read the character(s) from the HEX table. Valid characters are in the range 00–FE.

**Example:**

| | Two character terminator | | Hex codes | | Terminator |
|---|---|---|---|---|---|
| Read |  | + | 0D + 0A | = | CR LF |

See Message Formatting on page 81.

## KEYPAD DATA HEADER /TERMINATOR

Keypad Data Header/Terminator creates an optional Header and Terminator data format added to data typed on the keypad.

**Keyboard data format enable/disable must be used to enable the Header and Terminator setup, so the two parameters should be combined to get the desired result.**

### HEADER

Header = no header

Header = one character header

Header = two character header

Header = three character header

Header = four character header

## HEADER (continued)

Header = five character header

Header = six character header

Header = seven character header

Header = eight character header

After selecting one of the desired Header codes, read the character(s) from the HEX table. Valid characters are in the range 00–FE.

**Example:**

| | Four character header | | Hex codes | | Header |
|---|---|---|---|---|---|
| Read | | + | 41 + 42 + 43 + 44 | = | ABCD |

See Message Formatting on page 81.

## TERMINATOR

Terminator = no terminator

DEFAULT

Terminator = one character terminator

Terminator = two character terminator

Terminator = three character terminator

Terminator = four character terminator

## TERMINATOR (continued)



Terminator = five character terminator



Terminator = six character terminator



Terminator = seven character terminator



Terminator = eight character terminator

After selecting one of the desired Header codes, read the character(s) from the HEX table. Valid characters are in the range 00–FE.

**Example:**

| | Two character terminator | | Hex codes | | Terminator |
|---|---|---|---|---|---|
| Read |  | + | 0D + 0A | = | CR LF |

See Message Formatting on page 81.

# OPERATIVE MODE

## MODE SELECTION

This feature allows the PowerScan™ PM8300-DK to operate in one of two basic operative modes:

- SDIM (Simple Data Input Mode) — data entered, either on the keypad or read via barcode, is transmitted the host once the enter key is pressed, following the formatting rules described in the previous paragraph.
- QTY/CODE (Quantity/Code Mode) — Refer to the next section, QTY/CODE MODE PARAMETERS.

Mode Selection = Simple data input mode

DEFAULT

Mode Selection = Quantity / Code mode

## QTY/CODE MODE

When the scanner is in Quantity-Code Mode, the operator is prompted with two data fields named QTY= and CODE= . The normal position of the cursor is in the QTY field; the operator is required to type the quantity on the key-pad, then press the "enter key" to move the cursor to the CODE field. Data in the CODE field can either be entered manually from the keypad or read through the scanner.

The pair quantity and code are then transmitted to the host in a single string with configurable header, terminators and separator. Use the commands in the following sections to define the configuration parameters.

# QTY FIELD

This feature defines the behavior of the scanner if no data is entered in the QTY field so it is left empty. Options are:

- code is transmitted with default QTY ('1')
- code is transmitted alone (without any quantity information)
- code is discarded and an error beep is generated

QTY Field = Transmit code with default QTY (1)

DEFAULT

QTY Field = Transmit code alone
(without any quantity information)

QTY Field = Discard barcode, generate error beep

# QTY/CODE SEND MODE

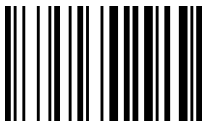
This feature defines the rules that will be used to send a QTY/CODE pair:

0. code is transmitted with QTY field (and its predefined format) preceding CODE field (and its predefined format)
1. code is transmitted with CODE field (and its predefined format) preceding QTY field (and its predefined format)
2. code in CODE field is sent out for the number of times defined in the QTY field (when using this option the maximum number of times is '9999');

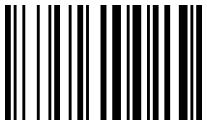


QTY/CODE Send Mode = QTY precedes CODE

DEFAULT



QTY/CODE Send Mode = CODE precedes QTY



QTY/CODE Send Mode = CODE sent out = QTY times

# APPEND CODE

This function defines how a scanned barcode interacts with a pre-edited CODE field, or with a string entered by a pre-programmed FUNC KEY.

Options are:

0. Barcode data overwrites what is written in the CODE field by keyboard and the code is transmitted;
1. Barcode data is appended to any text in the CODE field and the code is transmitted;
2. Barcode data is appended to any text in the CODE field but the code IS NOT transmitted. Data is transmitted when the enter key is pressed;




**Option 2 allows the addition of a footer to the scanned barcode ('just in time formatting').**

Append Code = Overwrite CODE and transmit

DEFAULT

Append Code = Append to CODE and transmit

Append Code = Append to CODE and don't transmit

# Chapter 7
# References

This section contains explanations and examples of selected bar code features.


**NETWORK PARAMETERS** on page 78

**DISPLAY PARAMETERS (SOME M8300 MODELS ONLY)** on page 80

# Network Parameters

## Slave Address Range First /Last

These parameters define the valid addresses for the Slave cradles on the network. Valid values are in the range 0 to 1999. However, the maximum number of cradles in a single network is 16, (including the Master if present). All cradles in the system must have different addresses.

To reduce system boot time, it is recommended to number the Slaves consecutively, while it is not necessary that the Master cradle address is contained in the range. The network addresses correspond to the radio addresses, see par. "BC-8060 STAR-SYSTEM™ NETWORK SETUP", on page-10.

At system power-up, the Master searches for and initializes all the Slaves found in the valid address range. During this phase the yellow LED on the Master cradle blinks. The time to complete the start up procedure varies depending on the complexity of the network but is typically between a few seconds to a few minutes. Start up cannot be interrupted. At the end of this procedure the system will be operative and can collect data from all devices



**CAUTION**

**All Slaves must be powered up either before or together with the Master. Slaves successively powered will not be recognized by the system even if their address is in the specified range.**

## Network Warning Message

The Master cradle can transmit warning messages to the Host regarding some network errors.

/***Slave xxxx not responding****/: when the Master can no longer communicate with the specified Slave previously identified at start up.

/***Frame out of sequence for terminal xxxx****/: if a reader is sending data packets out of sequence. This can happen if there are transmission problems on the network (either connection or communication), or if the reader has correctly transmitted data to a device not on the network (reader configuration error).

The message is sent in the following format:

**"Message" CR LF**

## Reception Warning Message

The Master cradle can transmit warning messages to the Host regarding wrong reception of data. Example:

**/*Two-Ways Out of Sequence!(.....)*/**

This message is transmitted to the Host by the Master cradle when the Master cradle receives a closing string from the Host for a Two-way tx communication, but this was either not open or already closed, therefore the data will be lost.

## Master Header/Terminator Selection

In addition to the standard header/terminator selection, the Master cradle can add its own header/terminator to the entire message sent to the Host.

In the STAR-System™ network headers and terminators for all RF Devices are disabled by default.

The Master header and terminator default values are as follows depending on the interface selection towards the Host:

RS-232: no header, terminator CR-LF

WEDGE: no header, terminator ENTER

## Address Stamping

It is possible to include the reader address in the message sent to the host. The Reader Address Stamping and the Cradle Address Stamping parameters consist of a 4-digit number in the range 0000 to 1999.

For message output format, refer to MESSAGE FORMATTING on page 81.

## Address Delimiter

The Address Delimiter allows a character to be included to separate the reader Address stamping field from the next field in the message. Any character can be included in the hexadecimal range from 00 to FE.

For message output format, refer to MESSAGE FORMATTING on page 81.

# Display Parameters (some M8300 models only)

## Display Mode

The user can control the reader display behavior according to the following selections:

**Normal mode**: When a barcode is read with the reader:

- The code is sent to the Host.
- The reader display is not cleared.Therefore if any previous data was displayed on the reader screen it remains.
- There is no Local Echo to the reader display.

**Clear Display After Decode mode**: When a barcode is read with the reader:

- The code is sent to the Host.
- The reader display is cleared.Therefore if any previous data was displayed on the reader screen it is canceled and the screen remains blank.
- There is no Local Echo of the code to the reader display.

**Local Echo mode**: When a barcode is read with the reader:

- The code is sent to the Host.
- The reader display is cleared.
- The code is also sent to the reader display (Local Echo).
- The cursor is positioned after the last printed character on the reader display.

Host messages sent to the reader are always written to the reader display.

# Chapter 8
# Message Formatting

## Standard Message Formatting

The system always provides scanner to host data communication using the following:

Output Message from PowerScan™ D8330 or standard PowerScan™ M8300 Stand-alone Towards Host

[Header] [Scanner_Addr] [Scanner_Addr_delimiter] ] [Cradle_Addr] [Cradle_Addr_delimiter] [Time stamp] [Ts_delimiter] [Code ID] [Code Length] CODE [Terminator]

[Items in square brackets are optional.]

Output Message from PowerScan™ M8300 STAR-System™Towards Host

[Time stamp] [Ts_delimiter] [Header] [Code ID] [Code Length] CODE [Terminator]

[Items in square brackets are optional.]

For PowerScan™ M8300 models with display, if the RS-232 interface is selected for communication between the Host and the BC-80X0 cradle, then the following additional communications between Host and Scanner can occur:

- The Host can send messages to any scanner associated with that cradle to control the Scanner's display, LEDs and beeper.
- The Scanner can send up to 3 user-defined characters to the Host using the 3 command keys on the Scanner.

# 16-Key DK Message Formatting

The general Data Format shown remains valid for the Powerscan™ M8300 DK with display and 16-key keypad. In addition, it also offers an extended message formatting.

The table below describes conventions and definitions used in the examples on the following page. In both the table and in the examples, formatting items valid only for the 16-key model are shown in *italics*. The prefix C means programmed from the standard Data Format parameters (beginning on page 39) and the prefix S means it is programmed from the 16-key Display and Keypad Parameters (Data Format section beginning on page 39).

| | |
|---|---|
| *[ S Header]* | The optional Header programmed from Display and Keypad Parameters. It is additional to Header programmed from general Data Format.<br>It can be:<br>o *[ Scanner Data Header]*<br>or<br>o *[ Keypad Data Header]*<br>depending on whether data is read from a barcode or typed on the keypad. |
| *[ S Terminator]* | The optional Terminator programmed from Display and Keypad Parameters. It is additional to Terminator programmed from general Data Format.<br>It can be:<br>o *[ Scanner Data Terminator]*<br>or<br>o *[ Keypad Data Terminator]*<br>depending on whether data is read from a barcode or typed on the keypad. |
| [Code ID] | The optional Code ID formatting. It can be programmed:<br>• from General Data Format, represented in the following as<br>[C ID]<br>• from specific Data Format Display and Keypad Parameters, represented in the following as<br>[S ID] |
| [Code len] | The optional Code ID formatting. It can be programmed:<br>• from General Data Format, represented in the following as<br>[C len]<br>• from specific Data Format Display and Keypad Parameters, represented in the following as<br>[S len] |

[C Header] [Scanner_Addr] [Scanner_Addr delimiter] [Cradle_Addr] [Cradle_Addr_ delimiter] [Time Stamp ][Time Stamp Delimiter] *[ S Header]*[Code ID] [Code len] CODE *[S Terminator]*[C Terminator ]

Code ID, Code Length and Code can be different content in the 16-key DK model. These features can be programmed with Scanner Data Header/Terminator on page 65, or Keypad Data Header/Terminator on page 69.

Field code ID and Code length may also be programmed in the DK model:

[C Header] [Scanner Addr] [Scanner Addr delimiter] [Cradle_Addr] [Cradle Addr delimiter] [Time Stamp ][Time Stamp Delimiter] *[ S Header]*[Code ID] [C len] CODE *[S Term]*[C Term ]

[C Header] [Scanner Addr] [Scanner Addr delimiter] [Cradle Addr] [Cradle Addr delimiter] [Time Stamp] [Time Stamp Delimiter] *[ S Header]*[S ID] [S len] CODE *[S Term]*[C Term]

The prefix C means programmed from general Data Format beginning on page 39, and the prefix S means it is programmed from Scanner Code ID and Scanner Code Length in Display and Keypad for 16-keys, on page 53.

NOTE: in case of double formatting for [Code ID] [Ccode len], only one of these is included in message formatting. Specific Data Format *[S ID] [S len]* takes priority over general Data Format.

The code field [CODE] as additional formatting in the 16-key model, when the device is programmed in Qty/Code mode.

# Messages from Host to Reader

The general format to enable the Scanner for a 2 way communication is:

[Scanner_Addr] [Scanner_Addr_delimiter] **MESSAGE** [CR]




**If you have enabled the Scanner Address Stamping or the Scanner Address Delimiter, you must specify them in every message.**

The format for other asynchronous messages is:

[Scanner_Addr] [Scanner_Addr_delimiter] [DC2] MESSAGE [CR]

where DC2 is ASCII 0x12 (^R) character.

- If you have not enabled the Scanner Address Stamping or the Scanner Address Delimiter, you must not specify them. In this case all messages will be implicitly addressed to the 'binded' Scanner of the cradle directly connected to the serial line.
- The Scanner can only receive messages if two-way mode is enabled.
- Messages cannot start with '$+' because they would be interpreted as a configuration command.
- You can send a message to the Scanner only while it is on. This happens when it has sent a message to the host and the radio timeout has not yet expired.
- If you want to control the Scanner's beeper from the host, you will also probably want to disable the good transmission beep that is emitted when the code is received from the cradle.

The message field can store plain text and escape sequences.

- Escape sequences are interpreted as commands.
- Plain text is directly printed on the display. If writing beyond the end of line, the display does not wrap automatically. Extra characters are ignored. Control characters are not interpreted (i.e. LF, FF, etc.).

# Appendix 9
# Hex / Numeric Table



0



1



2



3



4



5



6



7



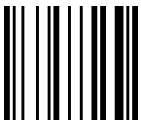
8



9



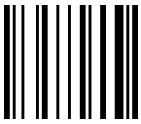
A



B



C



D



E



F

# ASCII Chart

| ASCII Char. | Hex No. | ASCII Char. | Hex No. | ASCII Char. | Hex No. | ASCII Char. | Hex No. |
|---|---|---|---|---|---|---|---|
| NUL | 00 | SP | 20 | @ | 40 | ‘ | 60 |
| SOH | 01 | ! | 21 | A | 41 | a | 61 |
| STX | 02 | ’ | 22 | B | 42 | b | 62 |
| ETX | 03 | # | 23 | C | 43 | c | 63 |
| EOT | 04 | $ | 24 | D | 44 | d | 64 |
| ENQ | 05 | % | 25 | E | 45 | e | 65 |
| ACK | 06 | & | 26 | F | 46 | f | 66 |
| BEL | 07 | ’ | 27 | G | 47 | g | 67 |
| BS | 08 | ( | 28 | H | 48 | h | 68 |
| HT | 09 | ) | 29 | I | 49 | i | 69 |
| LF | 0A | * | 2A | J | 4A | j | 6A |
| VT | 0B | + | 2B | K | 4B | k | 6B |
| FF | 0C | , | 2C | L | 4C | l | 6C |
| CR | 0D | - | 2D | M | 4D | m | 6D |
| SO | 0E | . | 2E | N | 4E | n | 6E |
| SI | 0F | / | 2F | O | 4F | o | 6F |
| DLE | 10 | 0 | 30 | P | 50 | p | 70 |
| DC1 | 11 | 1 | 31 | Q | 51 | q | 71 |
| DC2 | 12 | 2 | 32 | R | 52 | r | 72 |
| DC3 | 13 | 3 | 33 | S | 53 | s | 73 |
| DC4 | 14 | 4 | 34 | T | 54 | t | 74 |
| NAK | 15 | 5 | 35 | U | 55 | u | 75 |
| SYN | 16 | 6 | 36 | V | 56 | v | 76 |
| ETB | 17 | 7 | 37 | W | 57 | w | 77 |
| CAN | 18 | 8 | 38 | X | 58 | x | 78 |
| EM | 19 | 9 | 39 | Y | 59 | y | 79 |
| SUB | 1A | : | 3A | Z | 5A | z | 7A |
| ESC | 1B | ; | 3B | [ | 5B | { | 7B |
| FS | 1C | < | 3C | \ | 5C | \| | 7C |
| GS | 1D | = | 3D | ] | 5D | } | 7D |
| RS | 1E | > | 3E | ^ | 5E | ~ | 7E |
| US | 1F | ? | 3F | _ | 5F | DEL | 7F |

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