HAND-HELD DEVICES

Software Configuration Manual

DATALOGIC DL
Bar Code & More

HAND-HELD DEVICES

SOFTWARE CONFIGURATION MANUAL

This manual refers to
software version 4.00

(Rev. A)

CONTENTS

HOW TO USE THIS MANUAL

All HHD products are supplied with their own Quick Reference Manual which provides connection diagrams, reading diagrams, basic application parameter settings, default values, and specific technical features.

Use your device's Quick Reference Manual for initial configuration in order to set the default values and select the interface for your application.

If you wish to change the default settings, this manual provides complete configuration of your Hand-Held Device in an easy way.

- **To configure your device:**

  1) Open the folded page in <u>Appendix C</u> with the hex-numeric table and keep it open during the device configuration.

  2) Read the **Enter Configuration** code <u>ONCE</u>, available at the top of each page in chapter 2.

  3) Modify the desired parameters in one or more sections following the procedures given for each group.

  4) Read the **Exit and Save Configuration** code <u>ONCE</u>, available at the top of each page in chapter 2.

Reference notes describing the operation of the more complex parameters are given in chapter 3.

An alternative configuration method is provided in Appendix A using the RS232 interface. This method is particularly useful when many devices need to be configured with the same settings. Batch files containing the desired parameter settings can be prepared to configure devices quickly and easily.

Device configuration can also be performed using the **WinSET** Windows-based utility program available from your local Datalogic distributor. This method provides direct RS232 interface configuration as well as configuration barcode printing.

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1   INTRODUCTION

This manual provides all the necessary information for complete software configuration of various Datalogic families of **H**and-**H**eld **D**evices including CCD guns and readers, laser scanners, and decoders.

These HHD products contain a built-in decoder and multi-standard interface.

They are designed for use in a wide variety of applications and environments including **commercial**, **office automation**, **retail**, and **industrial** applications where large quantities of information need to be collected rapidly, easily and reliably.

These families of HHD products have common status indicator functions which are described in the next paragraph.

1.1 STATUS INDICATORS

The HHD readers have two indicators, LED and beeper. They signal several operating conditions which are described in the tables below.

POWER UP

Beeper	Meaning
L L L L	Parameters loaded correctly
H H H H long tones	Parameter loading error, reading or writing error in the non volatile memory
H L H L	Hardware error in EEPROM

CONFIGURATION

Beeper	Meaning
H H H H	correct entry or exit from Configuration mode
L	good read of a command
L L L	command read error

DATA ENTRY

LED	Beeper	Meaning
ON	one beep°	correct read of a code in normal mode
OFF		ready to read a code
	H L H L	output interface not selected or reader type not selected (see the Quick Reference Manual)
	H L long tones	tx buffer full

H = high tone   **L** = low tone

° (user configurable)

2   CONFIGURATION

Use your device's Quick Reference Manual 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 three groups are for Standard Interface parameter configuration:

- **RS232**

- **WEDGE**

- **PEN EMULATION**

If you are using a device that supports an interface selection other than the ones listed above, refer to the Quick Reference manual of the device for specific interface configuration parameters.

The following groups apply to all HHD products:

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.

RS232 PARAMETERS

PARAMETERS
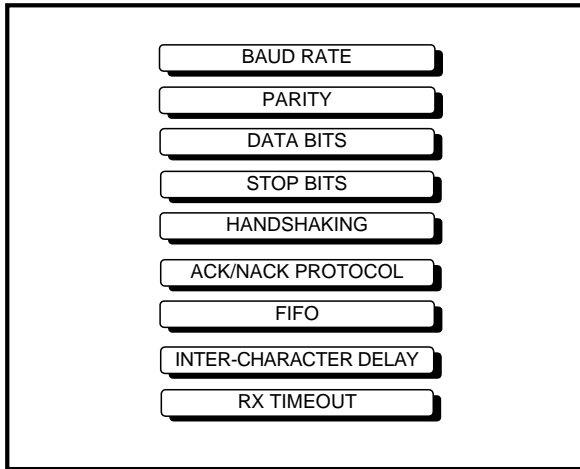
BAUD RATE
PARITY
DATA BITS
STOP BITS
HANDSHAKING
ACK/NACK PROTOCOL
FIFO
INTER-CHARACTER DELAY
RX TIMEOUT

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.

RS232

BAUD RATE

150 baud
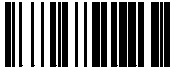
2400 baud

300 baud

4800 baud

600 baud

9600 baud

1200 baud

19200 baud

RS232

PARITY

even parity

odd parity

DATA BITS

7 bits

8 bits

9 bits

RS232
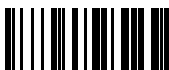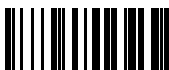
STOP BITS

1 stop bit

2 stop bits

HANDSHAKING

disable

hardware (RTS/CTS)

software (XON/XOFF)

See par. 3.1.1 for details.

RS232

ACK/NACK PROTOCOL

enable

disable

See par. 3.1.2 for details.

FIFO

enable

disable

See par. 3.1.3 for details.

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

RX TIMEOUT

timeout control in reception from Host

Read 2 numbers from the table where:

00 =   TIMEOUT disabled
01-99 =   TIMEOUT from **.1** to **9.9** seconds

See par. 3.1.4 for details.

WEDGE PARAMETERS

PARAMETERS
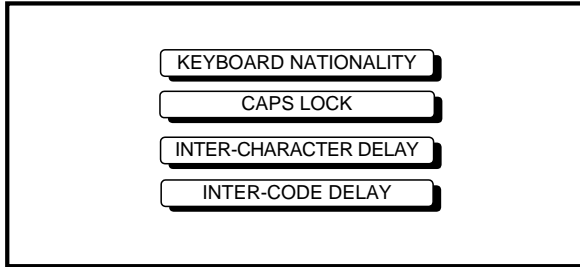
```
KEYBOARD NATIONALITY
CAPS LOCK
INTER-CHARACTER DELAY
INTER-CODE DELAY
```

1. Read the **Enter Configuration** code <u>ONCE</u>, available at the top of each page.

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☞ = Read the code and follow the procedure given

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

WEDGE

KEYBOARD NATIONALITY

English

French

German

Italian

Swedish

USA

Spanish

Belgian

WEDGE

CAPS LOCK

caps lock OFF

‖‖‖‖‖‖‖‖‖

caps lock ON

‖‖‖‖‖‖‖‖‖

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

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

INTER-CHARACTER DELAY

delay between characters transmitted to Host

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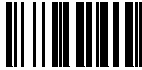
Read 2 numbers from the table where:

00 =	DELAY disabled
01-99 =	DELAY from **1** to **99** milliseconds

INTER-CODE DELAY

delay between codes transmitted to Host

‖‖‖‖‖‖‖

Read 2 numbers from the table where:

00 =	DELAY disabled
01-99 =	DELAY from **1** to **99** seconds

PEN EMULATION

PARAMETERS
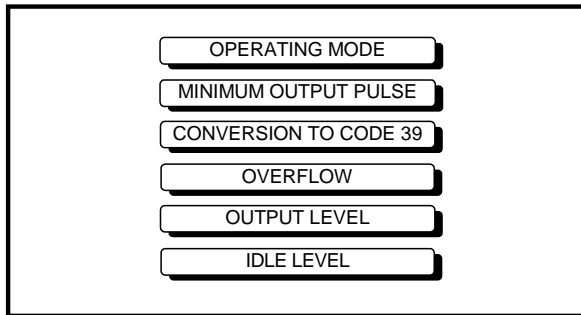
```
┌─────────────────────────────────────────┐
│         ┌──────────────────────┐         │
│         │   OPERATING MODE      │         │
│         └──────────────────────┘         │
│        ┌──────────────────────┐          │
│        │ MINIMUM OUTPUT PULSE  │          │
│        └──────────────────────┘          │
│       ┌──────────────────────┐           │
│       │ CONVERSION TO CODE 39 │           │
│       └──────────────────────┘           │
│         ┌──────────────────────┐         │
│         │      OVERFLOW         │         │
│         └──────────────────────┘         │
│         ┌──────────────────────┐         │
│         │    OUTPUT LEVEL       │         │
│         └──────────────────────┘         │
│         ┌──────────────────────┐         │
│         │      IDLE LEVEL       │         │
│         └──────────────────────┘         │
└─────────────────────────────────────────┘
```

1. Read the **Enter Configuration** code ONCE, available at the top of each page.

2. Read configuration codes from the desired groups.

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

PEN EMULATION

The operating mode parameters are complete commands and do not require reading the Enter and Exit configuration codes.

OPERATING MODE

interpret mode

||| || ||||| |||

Interprets commands without sending
them to the decoder.

transparent mode

||| || ||||| |||

Sends commands to the decoder without
interpreting them.

PEN EMULATION

MINIMUM OUTPUT PULSE

high resolution code
emulation

200 µs

400 µs

600 µs

800 µs

1 ms

1.2 ms

low resolution code
emulation

See par. 3.2.1 for details.

PEN EMULATION

CONVERSION TO CODE 39

disable

Transmits all codes in their original
format.

enable

Converts all codes read into Code 39
format.

OVERFLOW

narrow

medium

wide

See par. 3.2.2 for details.

OUTPUT LEVEL

normal
(white = logic level 0)

inverted
(white = logic level 1)

See par. 3.2.3 for details.

IDLE LEVEL

normal
(black level)

inverted
(white level)

See par. 3.2.3 for details.

DATA FORMAT

NOT FOR PEN INTERFACES

PARAMETERS
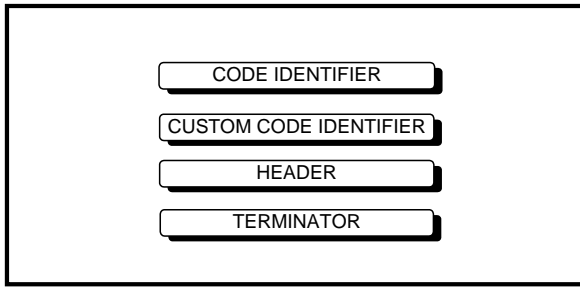
CODE IDENTIFIER

CUSTOM CODE IDENTIFIER

HEADER

TERMINATOR

1. Read the **Enter Configuration** code ONCE, available at the top of each page.

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☞ = Read the code and follow the procedure given

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

DATA FORMAT

CODE IDENTIFIER TABLE			
CODE	**AIM STANDARD**	**DATALOGIC STANDARD**	**Custom**
2/5 interleaved	] I *y*	N	
2/5 industrial	] X *y*	P	
2/5 normal 5 bars	] S *y*	O	
2/5 matrix 3 bars	] X *y*	Q	
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	] A *y*	W	
CODABAR	] F *y*	R	
ABC CODABAR	] X *y*	S	
Code 128	] C 0	T	
EAN 128	] C 1	k	
Code 93	] G *y*	U	
CIP/39	] X *y*	Y	
CIP/HR	] X *y*	e	
Code 32	] X *y*	X	

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.

DATA FORMAT

CODE IDENTIFIER

disable

Datalogic standard

AIM standard

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 hexidecimal 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 **00-7F**.

EXAMPLE: To define Code 39 Code Identifier = **@**

define custom code identifier(s)

Read   + **Code 39** + **40** + **FF**

DATA FORMAT

HEADER

no header

one character header

two character header

three character header

four character header

TERMINATOR

no terminator

one character terminator

two character terminator

three character terminator

four character terminator

After selecting the desired Header/Terminator code, read the character(s) from the HEX table.

four character header

EXAMPLE: + **41** + **42** + **43** + **44** = Header **ABCD**

For more details about default values, see par. 3.3.1.

For Terminals see also table in par. 3.3.1, Extended Keyboard To Hex Conversion Table.

POWER SAVE

PARAMETERS
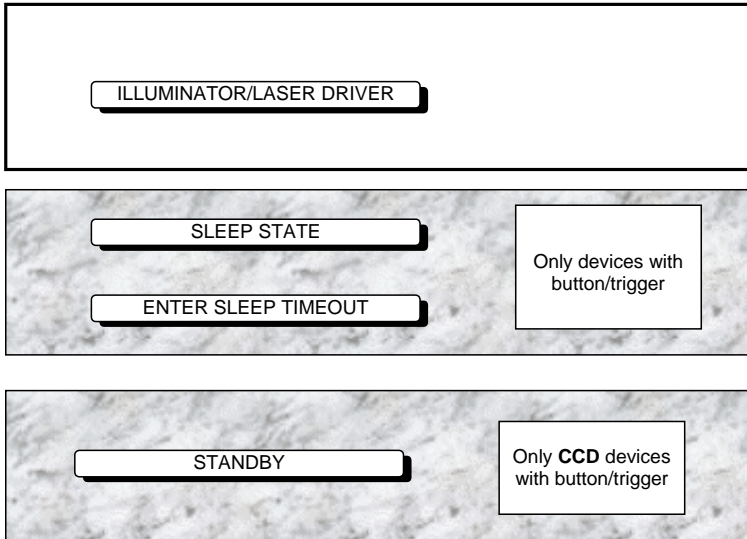
```
┌─────────────────────────────────────────────────────┐
│                                                     │
│                                                     │
│     ▐ ILLUMINATOR/LASER DRIVER ▌                    │
│                                                     │
│                                                     │
└─────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────┬───────────────────┐
│                                 │                   │
│     ▐      SLEEP STATE     ▌     │   Only devices    │
│                                 │   with            │
│                                 │   button/trigger  │
│     ▐ ENTER SLEEP TIMEOUT ▌     │                   │
│                                 │                   │
└─────────────────────────────────┴───────────────────┘
```

```
┌─────────────────────────────────┬───────────────────┐
│                                 │   Only CCD devices│
│     ▐        STANDBY       ▌     │   with button/    │
│                                 │   trigger         │
└─────────────────────────────────┴───────────────────┘
```

1. Read the **Enter Configuration** code <u>ONCE</u>, 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 <u>ONCE</u>, available at the top of each page.

POWER SAVE

ILLUMINATOR/LASER DRIVER

no change before beep

off before beep

See par. 3.4.1 for details.

ONLY devices with button/trigger

SLEEP STATE

enable

disable

See par. 3.4.2 for details.

POWER SAVE

ONLY devices with button/trigger

ENTER SLEEP TIMEOUT

enter sleep timeout

☞

Read 2 numbers in the range 00-99:

00 = Enter Sleep state immediately

01-99 = corresponds to a max. 9.9 sec. delay before entering the Sleep state.

See par. 3.4.3 for details.

STANDBY

ONLY CCD devices with button/trigger

enable

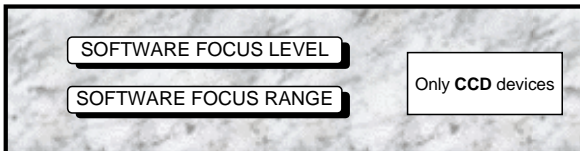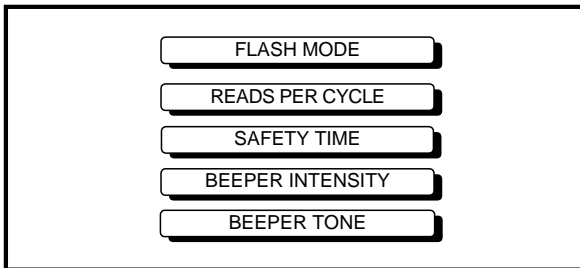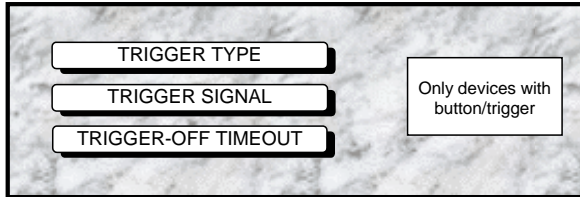optimize for low power consumption

disable

optimize for reading speed

See par. 3.4.4 for details.

READING PARAMETERS

PARAMETERS

```
┌─────────────────────────────────────────────────┐
│  ┌──────────────────────────┐                    │
│  │      TRIGGER TYPE         │   ┌─────────────┐  │
│  ├──────────────────────────┤   │ Only devices│  │
│  │     TRIGGER SIGNAL        │   │with         │  │
│  ├──────────────────────────┤   │button/trigger│ │
│  │   TRIGGER-OFF TIMEOUT     │   └─────────────┘  │
│  └──────────────────────────┘                    │
└─────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────┐
│          ┌──────────────────────────┐            │
│          │        FLASH MODE         │           │
│          ├──────────────────────────┤            │
│          │     READS PER CYCLE       │           │
│          ├──────────────────────────┤            │
│          │       SAFETY TIME         │           │
│          ├──────────────────────────┤            │
│          │    BEEPER INTENSITY       │           │
│          ├──────────────────────────┤            │
│          │       BEEPER TONE         │           │
│          └──────────────────────────┘            │
└─────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────┐
│  ┌──────────────────────────┐                    │
│  │   SOFTWARE FOCUS LEVEL    │   ┌─────────────┐  │
│  ├──────────────────────────┤   │ Only CCD     │  │
│  │   SOFTWARE FOCUS RANGE    │   │ devices      │  │
│  └──────────────────────────┘   └─────────────┘  │
└─────────────────────────────────────────────────┘
```

1. Read the **Enter Configuration** code <u>ONCE</u>, 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 <u>ONCE</u>, available at the top of each page.

READING PARAMETERS

ONLY devices with button/trigger

TRIGGER TYPE

hardware trigger

Restores Trigger mode

software trigger

Enables "FLASH" MODE
for trigger version

ONLY devices with button/trigger

TRIGGER SIGNAL

trigger active level

trigger active pulse

See par. 3.5.1 for details.

ONLY devices with button/trigger

TRIGGER-OFF TIMEOUT

trigger-off timeout

Read 2 numbers in the range 00-99:

00 = disables the trigger-off timeout
01-99 = corresponds to a max. 99 sec. delay after the trigger press to allow the reader to turn off automatically.

See par. 3.5.2 for details.

READING PARAMETERS

FLASH MODE

"FLASH" ON duration

☞

"FLASH" OFF duration

☞

Read 2 numbers in the range 01-99:

01 to 99 = from .1 to 9.9 seconds.

READS PER CYCLE

one read per cycle

multiple reads per cycle

See par. 3.5.3 for details.

SAFETY TIME

safety time

☞

Limits <u>same</u> code consecutive reading.

Read 2 numbers in the range 00-99:

00 = no same code consecutive reading until reader is removed (no decoding) for at least 400 ms.

01 to 99 = timeout from .1 to 9.9 seconds before a consecutive read on same code.

See par. 3.5.4 for details.

READING PARAMETERS

BEEPER INTENSITY

beeper off

BEEPER TONE

tone 1

low intensity

tone 2

medium intensity

tone 3

high intensity

tone 4

READING PARAMETERS

SOFTWARE FOCUS LEVEL

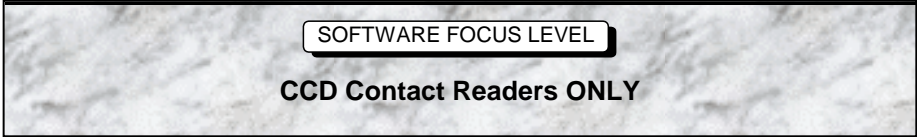**CCD Contact Readers ONLY**

factory focus level

high
resolution
codes

high resolution

med-high resolution

med-low resolution

low resolution

poor
quality
codes

---

1) The factory focus level is sufficient for almost all reading cases.

2) Reading time may be improved in your application by setting a fixed focus level. For example in cases where labels are of poor quality or are produced by a pin printer, select low resolution.

READING PARAMETERS

SOFTWARE FOCUS RANGE
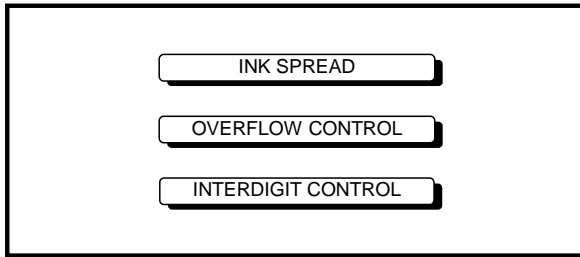
CCD Long Range Readers ONLY

factory focus range

long range only

1) The factory focus range is sufficient for almost all reading cases.

2) Reading time may be improved in your application by setting long range only. This selection also eliminates the "double blinking effect".

DECODING PARAMETERS

PARAMETERS

> INK SPREAD
>
> OVERFLOW CONTROL
>
> INTERDIGIT CONTROL

CAUTION
Before changing these parameter values
read the descriptions in par. 3.6.

---

1. Read the **Enter Configuration** code <u>ONCE</u>, available at the top of each page.

2. Read configuration codes from the desired groups.

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

DECODING PARAMETERS

INK-SPREAD

disable

enable

See par. 3.6.1 for details.

OVERFLOW CONTROL

disable

enable

See par. 3.6.2 for details.

DECODING PARAMETERS

INTERDIGIT CONTROL

disable

||||||||||||||||||

enable

||||||||||||||||

See par. 3.6.3 for details.

CODE SELECTION

PARAMETERS
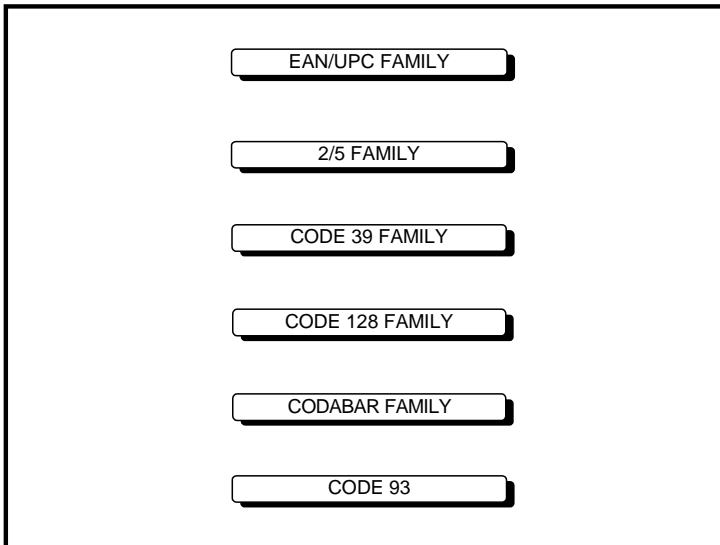
EAN/UPC FAMILY
2/5 FAMILY
CODE 39 FAMILY
CODE 128 FAMILY
CODABAR FAMILY
CODE 93

1. Read the **Enter Configuration** code ONCE, available at the top of each page.

2. Read configuration codes from the desired groups.

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

DISABLES ALL CODE FAMILIES

‖‖‖‖‖‖‖‖‖

NOTE

The reader allows up to 5 code selections. This does not limit the number of CODES enabled to 5, as it depends on the code family:

SINGLE SELECTION =

- **ONE** combination code from the EAN family
- **ONE** code from the 2/5 family
- **ONE or MORE** codes from the Code 128 family
- **ONE or MORE** codes from the Code 39 family
- **ONE or MORE** codes from the Codabar family

Example

5 code selections:

1. **2/5 Interleaved**
2. **2/5 Industrial**
3. Code 128 + EAN 128
4. Code 39 Full ASCII + Code 32
5. **UPC A/UPC E**

In this section all SINGLE code selections are underlined and in bold.

CODE SELECTION

EAN/UPC FAMILY

disables the family

① Read the desired family code

Note:
Since the EAN/UPC without ADD ON code selection is enabled by default, to correctly enable another selection, first disable the family.

EAN 8/EAN 13/UPC A/UPC E with and without ADD ON

WITHOUT ADD ON

EAN 8/EAN 13/UPC A/UPC E

EAN 8/EAN 13

UPC A/UPC E

CODE SELECTION

WITH ADD ON 2 AND 5

EAN 8/EAN 13/UPC A/UPC E

EAN 8/EAN 13

UPC A/UPC E

WITH ADD ON 5 ONLY

EAN 8/EAN 13

UPC A/UPC E

WITH ADD ON 2 ONLY

EAN 8/EAN 13

UPC A/UPC E

CODE SELECTION

EAN/UPC CHECK DIGIT TX SELECTIONS

For each code type in this family you can choose to transmit the check digit or not

**CHECK DIGIT
TRANSMISSION**

EAN 8

**NO CHECK DIGIT
TRANSMISSION**

EAN 8

EAN 13

EAN 13

UPC A

UPC A

UPC E

UPC E

CODE SELECTION

CONVERSION OPTIONS

UPC E to UPC A conversion

UPC E to EAN 13 conversion

UPC A to EAN 13 conversion

EAN 8 to EAN 13 conversion

CODE SELECTION

‖‖‖‖‖‖‖‖

‖‖‖‖‖‖‖‖

2/5 FAMILY

disables the family

‖‖‖‖‖‖‖‖‖

① Read the desired family code

② Read a check digit selection

Interleaved 2/5

☞ ‖‖‖‖‖‖‖‖‖

CHECK DIGIT TABLE

no check digit control

‖‖‖‖‖‖‖‖

Normal 2/5 (5 Bars)

☞ ‖‖‖‖‖‖‖‖‖

check digit control
and transmission

‖‖‖‖‖‖‖‖

Industrial 2/5 (IATA)

☞ ‖‖‖‖‖‖‖‖‖

check digit control
without transmission

‖‖‖‖‖‖‖‖

Matrix 2/5 (3 Bars)

☞ ‖‖‖‖‖‖‖‖‖

③ Read **4** numbers for the code length where:

    First 2 digits = minimum code length.

    Second 2 digits = maximum code length.

The pharmaceutical code below is part of the 2/5 family but has no check digit nor code length selections.

Code CIP/HR

‖‖‖‖‖‖‖‖

French pharmaceutical code

The maximum code length is 55 characters.
The minimum code length must always be less than or equal to the maximum.

Examples:

0155 = variable from 1 to 55 digits in the code.

1010 = 10 digit code length only.

CODE SELECTION

CODE 39 FAMILY

disables the family

① Read the desired family code

② Read a check digit selection

CHECK DIGIT TABLE

no check digit control

Standard Code 39

check digit control
and transmission

Full ASCII Code 39

check digit control
without transmission

The pharmaceutical codes below are part of the Code 39 family but have no check digit selections.

Code CIP39

French pharmaceutical code

Code 32

Italian pharmaceutical code

CODE LENGTH (optional)

The code length selection is valid for the entire Code 39 family

Read the code + **4** numbers for the code length where:

set code length

First 2 digits = minimum code length.

Second 2 digits = maximum code length.

The maximum code length is 32 characters. The minimum code length must always be less than or equal to the maximum.

Examples: **0132** = variable from 1 to 32 digits in the code.   **1010** = 10 digit code length only.

CODE SELECTION

CODE 128 FAMILY

disables the family

① Read the desired family code

Code 128

control without transmission
of check digit

EAN 128

control without transmission
of check digit

CODE 93

disables the code

<u>Code 93</u>

control without transmission
of check digit

CODE SELECTION

CODABAR FAMILY

disables the family

① Read the desired equality control code   ② Read a start/stop transmission selection
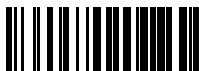
Standard Codabar

👉

no start/stop character equality control

START/STOP CHARACTER TRANSMISSION

no transmission

Standard Codabar

👉

start/stop character equality control

transmission

The Codabar ABC code below uses a fixed start/stop character transmission selection.

Codabar ABC

no start/stop character equality control but transmission.

CODE LENGTH (optional)

The code length selection is valid for the entire Codabar family

Read the code + **4** numbers for the code length where:

First 2 digits = minimum code length.

Second 2 digits = maximum code length.

set code length

The maximum code length is 44 characters. The minimum code length must always be less than or equal to the maximum.

Examples: **0144** = variable from 1 to 44 digits in the code.   **1010** = 10 digit code length only.

CODE SELECTION

START/STOP CHARACTER CASE

The start/stop character case selections below are valid for the entire Codabar family:

lower case start/stop characters

upper case start/stop characters

3   REFERENCES

3.1   RS232 PARAMETERS

3.1.1   Handshaking

Hardware handshaking: (RTS/CTS)

The RTS line is activated by the decoder before transmitting a character. Transmission is possible only if the CTS line (controlled by the Host) is active.

RTS/CTS handshaking
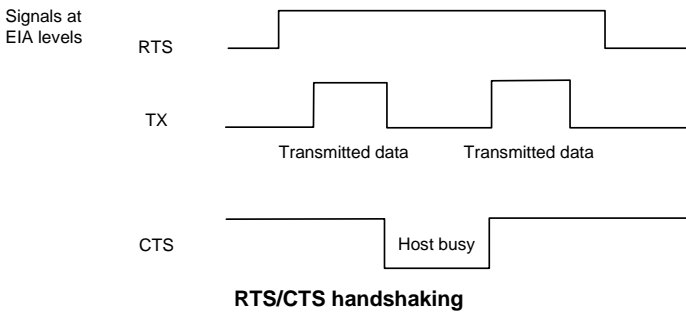
Software handshaking: (XON/XOFF)

During transmission, if the Host sends the XOFF character (13 Hex), the decoder interrupts the transmission with a maximum delay of one character and only resumes when the XON character (11 Hex) is received.

XON/XOFF handshaking
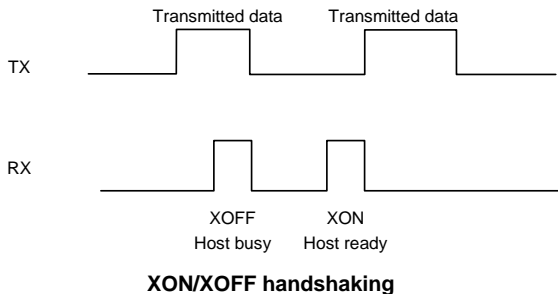
3.1.2 ACK/NACK Protocol

This parameter sets a transmission protocol in which the Host responds to the reader after every code transmitted. The Host sends an ACK character (06 HEX) in the case of good reception or the NACK character (15 HEX) requesting re-transmission, in the case of bad reception.

Selection of the ACK/NACK protocol automatically disables FIFO buffering see par. 3.1.3.

3.1.3 FIFO

This parameter determines whether data (barcodes) are buffered on a First In First Out basis allowing faster data collection in certain cases for example when using slow baud rates and/or HW handshaking.

If the FIFO buffering is enabled, codes are collected and sent out on the serial line in the order of acquisition. Up to 185 characters can be collected (buffer full), after which the reader signals an error and discards any further codes until the transmission is restored.

If the FIFO buffering is disabled, each code must be transmitted before another one can be read.

Selection of FIFO buffering automatically disables ACK/NACK protocol see par. 3.1.2, and Sleep state see par. 3.4.2.

3.1.4 RX Timeout

When the RS232 interface is selected, the Host can be used to configure the device by sending it command strings (see appendix A).

This parameter can be used to automatically end data reception from the Host after the specified period of time.

If no character is received from the Host, after the timeout expires, any incomplete string (any string not terminated by <CR>) is flushed from the device buffer.

3.2   PEN PARAMETERS

3.2.1 Minimum Output Pulse

This parameter sets the duration of the output pulse corresponding to the narrowest element in the barcode. In this way the code resolution is controlled by the signal sent to the decoder, independently of the physical resolution of the code read.

The shortest pulse (200 µs) corresponds to a high resolution code emulation and therefore a shorter transfer speed to the decoder (for decoders able to work on high resolution codes). Likewise, longer pulses correspond to low resolution code emulation and therefore a longer transfer time to the decoder.

3.2.2 Overflow

This parameter generates a white space before the first bar and after the last bar of the code. The selections are as follows:

narrow   = space 10 times the minimum output pulse.
medium = space 20 times the minimum output pulse.
wide   = space 30 times the minimum output pulse.

3.2.3 Output and Idle Levels

The following state diagrams describe the different output and idle level combinations for Pen emulation:

OUTPUT: Normal
IDLE: Normal

OUTPUT: Normal
IDLE: Inverted

OUTPUT: Inverted
IDLE: Normal

OUTPUT: Inverted
IDLE: Inverted
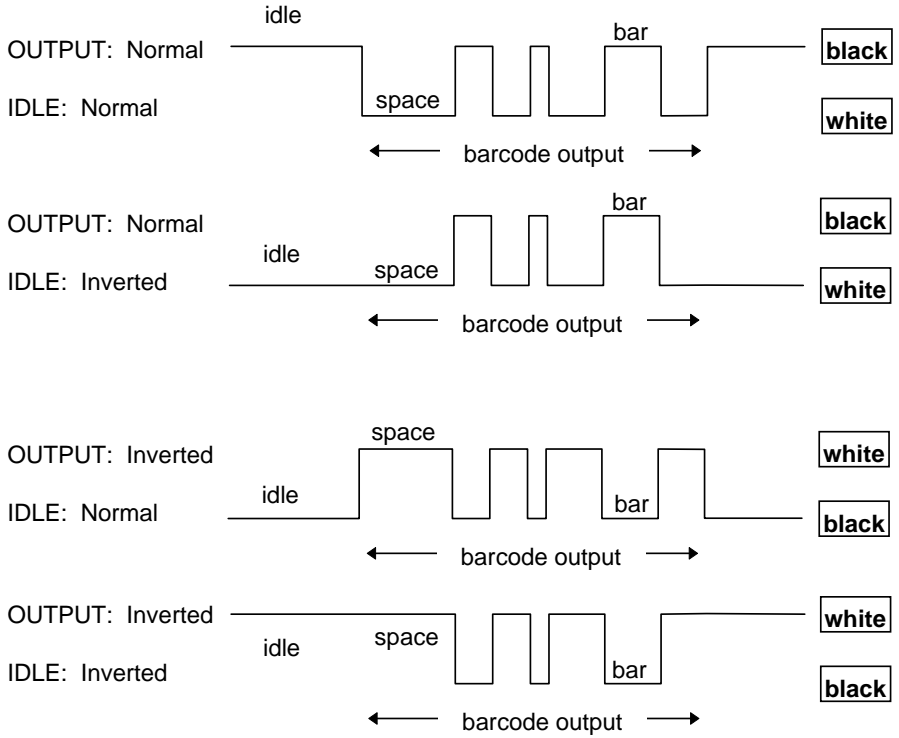
Output and Idle Levels

3.3   DATA FORMAT

3.3.1   Header/Terminator Selection

The header/terminator selection is not effected by the reading of the restore default code. In fact, header and terminator default values depend on the interface selection:

RS232:   no header, terminator CR-LF

WEDGE: no header, terminator ENTER

These default values are always restored through the reading of RS232 or WEDGE interface selection code, see the relative Quick Reference Manual.

For the WEDGE interface, the following extended keyboard values can also be configured:

EXTENDED KEYBOARD TO HEX CONVERSION TABLE			
	IBM AT IBM 3153	**IBM XT**	**IBM 31xx, 32xx, 34xx, 37xx**
HEX	KEY	KEY	KEY
83	ENTER	ENTER	FIELD EXIT
84	TAB	TAB	TAB
85	F1	F1	F1
86	F2	F2	F2
87	F3	F3	F3
88	F4	F4	F4
89	F5	F5	F5
8A	F6	F6	F6
8B	F7	F7	F7
8C	F8	F8	F8
8D	F9	F9	F9
8E	F10	F10	F10
8F	F11	ESC	F11
90	F12	BACKSPACE	F12
91	HOME	HOME	ENTER
92	END	END	RESET
93	PG UP	PG UP	INSERT
94	PG DOWN	PG DOWN	DELETE
95	↑	↑	FIELD -
96	↓	↓	FIELD +
97	←	←	ENTER (Paddle)
98	→	→	PRINT
99	ESC	ESC	
9A	CTRL (Right)	CTRL (Right)	

3.4 POWER SAVE

3.4.1 Illuminator/Laser driver

To reduce maximum power consumption, this command assures that the **Illuminator** (for CCD devices), and the **beeper** are not on simultaneously.

For scanners the **Laser** and the **beeper** are not on simultaneously.

3.4.2 Sleep state *(only devices with button/trigger)*

This mode allows the µP in the reader to enter a "Sleep" state for minimum power consumption. This command is only valid for readers with button/trigger when hardware trigger type is selected.

Before entering Sleep mode, the following are verified:

- no commands coming from Host
- no data being transmitted to Host
- Enter Sleep Timeout ended (see par. 3.4.3)

To exit Sleep mode press the trigger.

Enabling the Sleep state automatically enables Standby mode for CCD devices, see par. 3.4.4, and disables FIFO, see par. 3.1.3.

3.4.3 Enter sleep timeout

For readers that have the Sleep state enabled, this timeout determines when the reader will enter this state.

3.4.4 Standby *(only CCD devices with button/trigger)*

If this command is enabled, part of the CCD circuitry shuts down (Standby), in order to optimize low power consumption when not reading. When the trigger is pressed this circuitry powers up. This mode causes a minor delay before the reader is ready, ranging from a few milliseconds to a few tenths of a second (depending on the reader).

Disabling Standby mode automatically disables the Sleep state, see par. 3.4.2.

3.5   READING PARAMETERS

3.5.1 Trigger signal

Trigger signal is useful to determine the modality of the reader ON state for readers with trigger when hardware trigger is selected:

- trigger level: the reader goes ON when the trigger is pressed and goes OFF when it is released
- trigger pulse: the reader goes ON at the first trigger press and goes OFF only at a second press

3.5.2 Trigger-Off Timeout

The timeout is useful for readers with trigger when hardware trigger type is selected.

When timeout is selected, the reader which isn't decoding turns OFF automatically after the desired period of time.

3.5.3 Reads per Cycle

In general, a **reading cycle** corresponds to the ON + OFF times of a device. The resulting effects of this parameter on code reading depend on other related configuration conditions. Here are the definitions of ON and OFF times.

- For readers which operate in FLASH MODE (either readers without button/trigger, or readers with trigger using the *software trigger* parameter), a reading cycle corresponds to the *flash on* + *flash off* times. Code reading takes place during the *flash on* time.

- For readers with button/trigger and using the *hardware trigger* parameter, a reading cycle corresponds to a trigger press (ON) + one of the following OFF conditions:

> trigger release (for *trigger active level*)
>
> a second trigger press (for *trigger active pulse*)
>
> *trigger-off timeout* (see par. 3.5.2).

When **one read per cycle** is selected, the device decodes only one code during the ON period and immediately turns OFF the reader. It is only possible to read another code when the next ON time occurs.

In **multiple reads per cycle**, the device decodes a code during the ON period. The *flash on* or the *trigger-off timeout* period is immediately reset after each read and therefore extended. If another code is decoded before the reset *flash on* or *timeout* period expires, the *flash on* or *timeout* is again reset and the effect is that the device remains ON, decoding codes until the *flash on* or *timeout* period expires.

The Safety Time parameter should be used in this case to avoid unwanted multiple reading of the same code, see par. 3.5.4.

3.5.4 Safety Time

Safety time prevents the device from immediately decoding the same code more than once. Same code consecutive reading can be disabled requiring the reader to be removed from the code (no decoding) for at least 400 ms, or a timeout can be set up to 9.9 seconds before the decoder will accept the same code. Reading is immediate if the code changes.

3.6 DECODING PARAMETERS

CAUTION

These parameters are intended to enhance the decoding capability of the reader for particular applications. Used incorrectly, they can degrade the reading performance or increase the possibility of a decoding error.

3.6.1 Ink-spread

The ink-spread parameter allows the decoding of codes which are not perfectly printed because the page texture tends to absorb the ink.

3.6.2 Overflow control

The overflow control parameter can be disabled when decoding codes printed on small surfaces, which don't allow the use of an overflow space.

This command does not effect code families 2/5, Code 128 and Code 93.

3.6.3 Interdigit control

The interdigit control parameter verifies the interdigit spacing for code families Code 39 and Codabar.

3.7 CONFIGURATION EDITING COMMANDS

The barcode reading configuration method described in each section of chapter 2 of this manual is the most common way to configure your device.

However, additional editing commands are available and are described in this paragraph.

Command	Description
$+	Enter configuration environment
$%	Backspace - cancel an incomplete configuration sequence without exiting configuration environment
$/	Cancel all modifications without exiting configuration environment
$-	Exit and Save configuration in EEPROM

The Exit and Save command **$-** can be replaced by **$)** which exits saving the configuration only to RAM (without saving in EEPROM). The new configuration is valid as long as the decoder remains powered.

In this case, the following commands save in EEPROM, either the modified configuration in RAM, or the previously saved EEPROM configuration; then exit the configuration environment.

Command	Description
‖‖‖‖‖‖‖‖‖ **$)**	End of modifications (Exit saving to RAM without saving in EEPROM)
‖‖‖‖‖‖‖‖‖‖ **$+$(**	Save current configuration in RAM to EEPROM
‖‖‖‖‖‖‖‖‖‖ **$+$.**	Restore last configuration saved in EEPROM

The following two commands carry out their specific function and then exit the configuration environment.

Command	Description
‖‖‖‖‖‖‖‖‖‖ **$+$***	Restore system default configuration (see the relative Quick Reference Manual for default settings)
‖‖‖‖‖‖‖‖‖‖ **$+$!**	Transmit the Software release

4 TROUBLESHOOTING

If your device does not work properly after configuration, read the code corresponding to your device type and then follow the regular programming procedure in the Quick Reference manual.

CCD Contact Readers

||||||||||||||||||||||||||

CCD Long Range Readers

||||||||||||||||||||||||||

Laser Scanners

||||||||||||||||||||||||||

APPENDIX A   HOST CONFIGURATION STRINGS

In this section we provide a description of how to modify the device configuration using serial strings sent from the Host.

This method requires the RS232 interface.

The device configuration can be changed by receiving commands from the Host through the serial interface. When this method is used, the programming sequence format is the following:

$+	*Command*	**$-**	**CR**

→ Carriage return character (0D Hex.)

→ Exit and Save configuration

→ Character sequence in following tables

→ Enter configuration environment

Example:

Multiple command programming sequence:

$+	**BG1**	**BH0**	**AC410132**	**$-**	**CR**

→ Carriage return character (0D Hex.)

→ Exit and save new configuration

→ Matrix 2/5 3 bars: no check digit,
variable length code from 1 to 32 characters

→ Beeper tone 1

→ Beeper low intensity

→ Enter configuration environment

Each configuration parameter setting removes the condition previously active for that parameter.

NOTE

The device buffer can contain a maximum of 60 characters. If your programming string goes over this value, you must split it into separate groups and send each group after a delay of at least 3 seconds to give the reader time to empty the buffer and interpret the commands.

SERIAL CONFIGURATION STRINGS

ENTER/EXIT CONFIGURATION COMMANDS	
DESCRIPTION	**STRING**
Enter Configuration	**$+**
Exit and Save Configuration	**$-**
Restore Default	**$***
Transmit Software Release (not for PEN emulation)	**$!**

INTERFACE SELECTION		
DESCRIPTION		**STRING**
RS232 interface		**CP0**
WEDGE	for IBM AT	**CP500**
	for IBM Terminals: 31xx, 32xx, 34xx, 37xx; make-break keyboard	**CP501**
	for IBM Terminals: 31xx, 32xx, 34xx, 37xx; make only keyboard	**CP502**
	for IBM XT	**CP503**
	for IBM Terminal 3153	**CP504**
	for IBM PC Notebook * only if selectable from Quick Reference	**CP505**
	for IBM SURE1	**CP506**
PEN emulation interface		**CP6**

RS232		
DESCRIPTION		**STRING**
Baud rate	150	**CD0**
	300	**CD1**
	600	**CD2**
	1200	**CD3**
	2400	**CD4**
	4800	**CD5**
	9600	**CD6**
	19200	**CD7**
Parity	none	**CC0**
	even	**CC1**
	odd	**CC2**
Data bits	7	**CA0**
	8	**CA1**
	9	**CA2**
Stop bits	1	**CB0**
	2	**CB1**
Handshaking	disable	**CE0**
	RTS/CTS	**CE1**
	XON/XOFF	**CE2**

RS232 (continued)		
ACK/NACK Protocol	disable	**CF0**
	enable	**CF3**
FIFO:	disable	**EC0**
	enable	**EC1**
Inter-character delay *(ms)*		**CK00 - CK99**
RX Timeout *(100 ms)*		**CL00 - CL99**

WEDGE		
DESCRIPTION		**STRING**
Keyboard Type for	typewriter	**FK0**
IBM Terminals 31xx, 32xx, 34xx, 37xx	advanced	**FK1**
Keyboard nationality	Belgian	**FJ7**
	English	**FJ4**
	French	**FJ2**
	German	**FJ3**
	Italian	**FJ1**
	Spanish	**FJ6**
	Swedish	**FJ5**
	USA	**FJ0**
Caps Lock	caps Lock ON	**FE1**
	caps Lock OFF	**FE0**
Delays	inter-character *(ms)*	**CK00 - CK99**
	inter-code *(s)*	**FG00 - FG99**

PEN		
DESCRIPTION		**STRING**
Operating mode	interpret (does not require **$+** or **$-**)	**$]**
	transparent (does not require **$+** or **$-**)	**$[**
Minimum output pulse	200µs	**DG0**
	400µs	**DG1**
	600µs	**DG2**
	800µs	**DG3**
	1 ms	**DG4**
	1.2 ms	**DG5**
Conversion to Code 39	disable	**DA0**
	enable	**DA1**
Output level	normal	**DD0**
	inverted	**DD1**
Idle level	normal	**DE0**
	inverted	**DE1**
Overflow	narrow overflow	**DH0**
	medium overflow	**DH1**
	wide overflow	**DH2**

DATA FORMAT		
NOT FOR PEN EMULATION INTERFACES		
DESCRIPTION		**STRING**
Code Identifier	disable	**EB0**
	Datalogic standard	**EB1**
	AIM standard	**EB2**
	Custom	**EB3**
Custom Code Identifier		**EH*abc***
Headers	no header	**EA00**
	one character	**EA01*x***
	two characters	**EA02*xx***
	three characters	**EA03*xxx***
	four characters	**EA04*xxxx***
Terminators	no terminator	**EA10**
	one character	**EA11*x***
	two characters	**EA12*xx***
	three characters	**EA13*xxx***
	four characters	**EA14*xxxx***

a = ASCII character.
b, c, x = HEX values representing an ASCII character.

a = ASCII character of the DATALOGIC STANDARD Code Identifier from the table in the Data Format group.

b = Hex value of the first Custom Code Identifier character from **00** to **7F**;
   FF = disable Code Identifier

c = Hex value of the second Custom Code Identifier character from **00** to **7F**;
   FF = disable second character of Custom Code Identifier

x =   for RS232: Hex value from **00** to **7F**
x =   for WEDGE: Hex value from **00** to **99**

POWER SAVE		
DESCRIPTION		**STRING**
Illuminator/Laser Driver	no change before beep	**BN0**
	off before beep	**BN1**
Sleep State	disable	**BQ0**
(**Only CCD devices with button/trigger**)	enable	**BQ1**
Enter Sleep Timeout *(100 ms)*		**BR00-99**
(**Only CCD devices with button/trigger**)		
Standby	enable	**BM0**
(**Only CCD devices with button/trigger**)	disable	**BM1**

READING PARAMETERS		
DESCRIPTION		**STRING**
Trigger Type	hardware	**BK1**
(**Only devices with button/trigger**)	software	**BK0**
Trigger Signal	level	**BA0**
(**Only devices with button/trigger**)	pulse	**BA1**
Trigger-off Timeout *(s)* (**Only devices with button/trigger**)		**BD00 - BD99**
FLASH ON *(100 ms)*		**BB001 - BB099**
FLASH OFF *(100 ms)*		**BB101 - BB199**
Reads per Cycle	one read	**BC0**
	multiple reads	**BC1**
Safety Time *(100 ms)*		**BE00 - BE99**
Beeper Intensity	beeper off	**BG0**
	low intensity	**BG1**
	medium intensity	**BG2**
	high intensity	**BG3**
Beeper Tone	tone 1	**BH0**
	tone 2	**BH1**
	tone 3	**BH2**
	tone 4	**BH3**
Software Focus level	factory focus level	**BL0**
(**CCD Contact Readers ONLY**)	high resolution codes	**BL1**
	med-high resolution codes	**BL2**
	med-low resolution codes	**BL3**
	low resolution codes	**BL4**
Software Focus range	factory focus range	**BS0**
(**CCD Long Range Readers ONLY**)	long range only	**BS1**

DECODING PARAMETERS		
DESCRIPTION		**STRING**
Ink-spread	disable	**AX0**
	enable	**AX1**
Overflow control	disable	**AW1**
	enable	**AW0**
Interdigit control	disable	**AV0**
	enable	**AV1**

CODE SELECTION			
DESCRIPTION			**STRING**
DISABLE ALL FAMILY CODES			**AZ0**
EAN/UPC	disable EAN/UPC family		**AA0**
	EAN 8/EAN 13/UPC A/UPC E	without ADD ON	**AA1**
		with ADD ON	**AA5**
		with and without ADD ON	**AA8**
	EAN 8/EAN 13	without ADD ON	**AA3**
		with ADD ON 2 ONLY	**AAK**
		with ADD ON 5 ONLY	**AAL**
		with ADD ON 2 AND 5	**AA6**
	UPC A/UPC E	without ADD ON	**AA4**
		with ADD ON 2 ONLY	**AAM**
		with ADD ON 5 ONLY	**AAN**
		with ADD ON 2 AND 5	**AA7**
	EAN 8 check digit transmission	disable	**AAG0**
		enable	**AAG1**
	EAN 13 check digit transmission	disable	**AAH0**
		enable	**AAH1**
	UPC A check digit transmission	disable	**AAI0**
		enable	**AAI1**
	UPC E check digit transmission	disable	**AAJ0**
		enable	**AAJ1**
	conversions	UPC E to UPC A	**AAA**
		UPC E to EAN 13	**AAB**
		UPC A to EAN 13	**AAC**
		EAN 8 to EAN 13	**AAD**
Code 39	disable Code 39 family		**AB0**
	Standard	no check digit control	**AB11**
		check digit control and transmission	**AB12**
		check digit control without transmission	**AB13**
	Full ASCII	no check digit control	**AB21**
		check digit control and transmission	**AB22**
		check digit control without transmission	**AB23**
	CIP 39		**AB3**
	Code 32		**AB4**
	code length		**AB*xxxx**

xxxx = ASCII numbers that define the code length where:

- First 2 digits = minimum acceptable code length.
- Second 2 digits = maximum acceptable code length.

The minimum code length must always be less than or equal to the maximum.

Examples:

0132 = variable length from 1 to 32 digits in the code.

1010 = 10 digit code length only.

The maximum code lengths are:	
Code 39	32 characters
Codabar	44 characters
2/5	55 characters

CODE SELECTION (continued)			
DESCRIPTION			**STRING**
2/5	disable Code 2/5 family		**AC0**
	Interleaved 2/5	no check digit control	**AC11*xxxx***
		check digit control and transmission	**AC12*xxxx***
		check digit control without transmission	**AC13*xxxx***
	Normal 2/5 5 bars	no check digit control	**AC21*xxxx***
		check digit control and transmission	**AC22*xxxx***
		check digit control without transmission	**AC23*xxxx***
	Industrial 2/5 (IATA)	no check digit control	**AC31*xxxx***
		check digit control and transmission	**AC32*xxxx***
		check digit control without transmission	**AC33*xxxx***
	Matrix 2/5 3 bars	no check digit control	**AC41*xxxx***
		check digit control and transmission	**AC42*xxxx***
		check digit control without transmission	**AC43*xxxx***
	CIP/HR		**AC5**
Codabar	disable Codabar family		**AD0**
	Standard	no start/stop character equality control nor transmission	**AD111**
		no start/stop character equality control but transmission	**AD112**
		start/stop character equality control but no transmission	**AD121**
		start/stop character equality control and transmission	**AD122**
	ABC CODABAR	no start/stop character equality control but transmission	**AD212**
	code length		**AD**xxxx***
	start/stop character case	lower case	**ADA0**
		upper case	**ADA1**
Code 128	disable Code 128 family		**AI0**
	enable Code 128 - control without transmission of check digit		**AI11**
	enable EAN 128 - control without transmission of check digit		**AI21**
Code 93	disable Code 93 family		**AK0**
	enable Code 93 - control without transmission of check digit		**AK1**

xxxx = ASCII numbers that define the code length where:

- First 2 digits = minimum acceptable code length.
- Second 2 digits = maximum acceptable code length.

The minimum code length must always be less than or equal to the maximum.

Examples:

0132 = variable length from 1 to 32 digits in the code.

1010 = 10 digit code length only.

```
The maximum code lengths are:

  Code 39      32 characters
  Codabar      44 characters
  2/5          55 characters
```

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APPENDIX B   CODE IDENTIFIER TABLE

2/5 Interleaved

2/5 Industrial

2/5 normal 5 bars

2/5 matrix 3 bars

EAN 8

EAN 13

UPC A

UPC E

EAN 8 with 2 ADD ON

EAN 8 with 5 ADD ON

EAN 13 with 2 ADD ON

EAN 13 with 5 ADD ON

UPC A with 2 ADD ON

UPC A with 5 ADD ON

UPC E with 2 ADD ON

UPC E with 5 ADD ON

Code 39

Code 39 Full ASCII

CODABAR

ABC CODABAR

Code 128

EAN 128

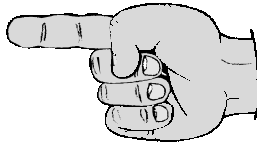**Code 93**

CIP/39

CIP/HR

Code 32

APPENDIX C   HEX AND NUMERIC TABLES

OPEN THIS PAGE TO READ THE DESIRED

HEX AND NUMERIC SELECTIONS

HEX TABLE

CHARACTER TO HEX CONVERSION TABLE					
char	hex	char	hex	char	hex
NUL	00	*	2A	U	55
SOH	01	+	2B	V	56
STX	02	,	2C	W	57
ETX	03	-	2D	X	58
EOT	04	.	2E	Y	59
ENQ	05	/	2F	Z	5A
ACK	06	0	30	[	5B
BEL	07	1	31	\	5C
BS	08	2	32	]	5D
HT	09	3	33	^	5E
LF	0A	4	34	_	5F
VT	0B	5	35	`	60
FF	0C	6	36	a	61
CR	0D	7	37	b	62
SO	0E	8	38	c	63
SI	0F	9	39	d	64
DLE	10	:	3A	e	65
DC1	11	;	3B	f	66
DC2	12	<	3C	g	67
DC3	13	=	3D	h	68
DC4	14	>	3E	i	69
NAK	15	?	3F	j	6A
SYN	16	@	40	k	6B
ETB	17	A	41	l	6C
CAN	18	B	42	m	6D
EM	19	C	43	n	6E
SUB	1A	D	44	o	6F
ESC	1B	E	45	p	70
FS	1C	F	46	q	71
GS	1D	G	47	r	72
RS	1E	H	48	s	73
US	1F	I	49	t	74
SPACE	20	J	4A	u	75
!	21	K	4B	v	76
"	22	L	4C	w	77
#	23	M	4D	x	78
$	24	N	4E	y	79
%	25	O	4F	z	7A
&	26	P	50	{	7B
'	27	Q	51	|	7C
(	28	R	52	}	7D
)	29	S	53	~	7E
		T	54	DEL	7F

0

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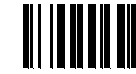
A

B

C

D

E

F

Backspace

Cancels an incomplete configuration sequence

SW 4.00