Universal menu book
…for bar code readers

CAUTION: This menu book may be revised or withdrawn at any time without prior notice.

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By opening the package of this reader you agree to become bound by the liability and warranty conditions as described below.

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CONTENTS

INTRODUCTION

This menu book is intended for setting up your bar code reader to optimize its performance for your particular application. When the required options have been configured, they remain in the reader, even after power down. The reader can be returned to factory default by reading the default label.

Configuring via the menu book:
To configure the required options proceed as follows:

- Scan the SET label

- Scan the required option(s)

- Scan the END label

After scanning the END label, the new settings are stored in non volatile memory.

Recommended steps to follow:

Note: Ensure that the power is disconnected from your equipment before you connect the reader. After connecting the power can be applied to the equipment and the reader.
  * You are now ready to start the configuration of your reader.

  1 Use chapter 1 to set the correct default for your reader.
  * The reader is now in factory default.

  2 Use chapter 2 to optimize the interface.
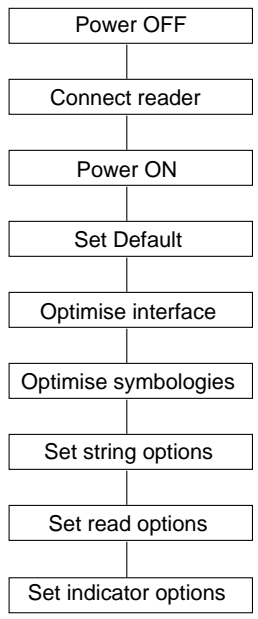 * The reader is now able to read bar codes and transmit the data.

  3 Use chapter 3 to optimize the reader for the type of bar codes you use. Set the readable codes first and then the options for each of these codes.
  * The reader is now able to read the codes you selected, validate the data using length and check digit and transmit that part of the data you specified.

Introduction

4 Use chapter 4 to select the string options for your application. These include transmission of code length, conversion of upper and lower case and setting a prefix and suffix.
* The reader can now read and transmit the data in the required format.

5 Use chapter 5 to select the read options to your preference. These options affect the read mode, read time, trigger and redundancy.

6 Use chapter 6 to select the indicator options you prefer. These options affect the operation of the buzzer and good read LED.
* The reader will now operate to your personal preference.

| Power OFF |
| Connect reader |
| Power ON |
| Set Default |
| Optimise interface |
| Optimise symbologies |
| Set string options |
| Set read options |
| Set indicator options |

Menu labels:

The reader must be set by reading the bar code labels in the menu table. The layout of the table is explained below:

MENU TABLE:

Default setting — Section number — Section title

Enter the program mode
Command for RS232
Bar code command to disable the buzzer

6.1 Buzzer settings (1)

	SET	
Enable software buzzer		**W8**
Enable hardware buzzer		W9
Disable buzzer		W0
Single tone buzzer		W1
High-low buzzer		**W2**
Low-high buzzer		W3
Buzzer duration 50 msec.		W7
Buzzer duration 100 msec.		W4
Buzzer duration 200 msec.		**W5**
Buzzer duration 400 msec.		W6
	END	

6 — Number of chapter

Indicator options — Title of chapter

Grouping

Name of parameter

Completion of program mode and save settings

Configuring via RS232:

In the last column of the menu pages the command is printed, e.g. **UØ**. These commands can be sent to readers with an RS232 interface. To configure via the RS232 port proceed as follows:

• Transmit <ESC><Command string><CR>

<ESC> is the ASCII escape character (Hex 1B).
<Command string> is the ASCII command with its parameters as would be scanned from the menu book, i.e. <ESC>**M41B**<CR> configures the ASCII control code <STX> as the prefix for Code 39.
<CR> is the ASCII CR character (Hex ØD).

These options are immediately active, but the command **Z2** must be sent to store the settings to non volatile memory.

The following commands may be used to:
Command **B**   sound a good read beep
Command **E**   sound an error beep
Command **L**   switch on the good read LED
Command **Y**   de-trigger the reader
Command **Z**   trigger the reader

The characters transmitted must be separated by an intercharacter delay to allow the reader to process each character received and to execute the command string.

1 DEFAULTS

This option allows you to undo all previously programmed options and bring the reader's configuration back to factory default settings.

These **factory default settings** are printed in **bold**.

Note that differences may occur depending on the type of interface as will be mentioned in the text.

Select only the correct default settings corresponding to your hardware "defaults" label.

The interfaces supported depend on the reader model and software release.
Please consult your sales office for not listed interfaces.

1.1 Linker, RS232, PC wedge

	SET	||||| ||| || |||
Linker	||||| ||| || |||	U3
RS232	||||| ||| || |||	U2
Serial TTL	||||| ||| || |||	SS
RS232 wedge	||||| ||| || |||	U5
XT wedge	||||| ||| || |||	UA
AT wedge	||||| ||| || |||	UB
PS2 wedge	||||| ||| || |||	UC
HP Vectra wedge	||||| ||| || |||	UD
Macintosh wedge	||||| ||| || |||	UM
	||||| ||| || |||	ST
USB	||||| ||| || |||	SU
	END	||||| ||| || |||

1.2 Terminal wedge (1)

	SET	||||| barcode
ADI DT 1496	||||| barcode	RH
Alcatel 14430123	||||| barcode	RI
Bull Questar 210	||||| barcode	UX
Bull Questar 420	||||| barcode	UT
Canon Canofile 250	||||| barcode	QJ
Daewoo XT230	||||| barcode	QK
Datapoint 7350	||||| barcode	QL
DEC VT 220	||||| barcode	UØ
DEC VT 320	||||| barcode	QM
DEC VT 420	||||| barcode	QN
DEC VT 510	||||| barcode	QO
	END	||||| barcode

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1.2 Terminal wedge (2)

	SET	||||| barcode
DSI 3876, 3877, 3878	||||| barcode	QP
Facit M5520	||||| barcode	QQ
Falco infinity	||||| barcode	UI
HP 700/60	||||| barcode	QE
HP 700/92	||||| barcode	UR
HP 2392A	||||| barcode	QG
IBM 3151/3152	||||| barcode	UN
IBM 3179/3180	||||| barcode	UG
IBM 319x	||||| barcode	U6
IBM 347x	||||| barcode	UP
IBM 348x	||||| barcode	UF
	END	||||| barcode

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Defaults

1.2 Terminal wedge (3)

	SET	
Idea 3270		QR
Link Technology MC 70		UE
Memorex Telex 196		QS
Memorex Telex 1471, 1472		UH
Memorex Telex 2178		UV
Nokia A 320 B		UU
Qume QVT 61		VN
Siemens Nixdorf 9758		UW
Siemens Nixdorf 97801		QT
Siemens Nixdorf 97808		QU
Sun Sparc ipx		U7
	END	

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1.2 Terminal wedge (4)

	SET	
Televideo 935		UZ
Unisys B20		U4
Versal UTS20		QV
Wyse 30		US
Wyse 30+		U9
Wyse 55		QW
Wyse 60		UJ
Wyse 85		QX
Wyse 120		UK
Wyse 160		UL
Wyse 160ES		QI
	END	

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1.2 Terminal wedge (5)

	SET	
	SET	‖‖‖‖‖‖‖‖
Wyse 185	‖‖‖‖‖‖‖‖	UY
Wyse 285	‖‖‖‖‖‖‖‖	QY
Wyse 370	‖‖‖‖‖‖‖‖	UE
Link MAX700	‖‖‖‖‖‖‖‖	QZ
Visa MP200/60	‖‖‖‖‖‖‖‖	SA
Unisys UVT1224	‖‖‖‖‖‖‖‖	SB
	‖‖‖‖‖‖‖‖	SC
	‖‖‖‖‖‖‖‖	SD
	‖‖‖‖‖‖‖‖	SE
	‖‖‖‖‖‖‖‖	SF
	‖‖‖‖‖‖‖‖	SG
	END	‖‖‖‖‖‖‖‖

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1.2 Terminal wedge (6)

	SET	
	SET	‖‖‖‖‖‖‖‖
	‖‖‖‖‖‖‖‖	SH
	‖‖‖‖‖‖‖‖	SI
	‖‖‖‖‖‖‖‖	SJ
	‖‖‖‖‖‖‖‖	SK
	‖‖‖‖‖‖‖‖	SL
	‖‖‖‖‖‖‖‖	SM
	‖‖‖‖‖‖‖‖	SN
	‖‖‖‖‖‖‖‖	SO
	‖‖‖‖‖‖‖‖	SP
	‖‖‖‖‖‖‖‖	SQ
	‖‖‖‖‖‖‖‖	SR
	END	‖‖‖‖‖‖‖‖

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1.3 Cash registers

	SET	
	SET	‖‖‖‖‖‖‖‖
OCIA Casio	‖‖‖‖‖‖‖‖	IL
OCIA Certec	‖‖‖‖‖‖‖‖	II
OCIA NCR	‖‖‖‖‖‖‖‖	IG
OCIA Nixdorf	‖‖‖‖‖‖‖‖	IH
OCIA OKI	‖‖‖‖‖‖‖‖	IF
OCIA TEC	‖‖‖‖‖‖‖‖	IJ
IBM 4683-1520 emulation	‖‖‖‖‖‖‖‖	QC
IBM 4683-4500 emulation	‖‖‖‖‖‖‖‖	QB
	‖‖‖‖‖‖‖‖	IM
	‖‖‖‖‖‖‖‖	IN
	END	‖‖‖‖‖‖‖‖

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1.4 Network

	SET	
	SET	‖‖‖‖‖‖‖‖
OSE Net Full duplex	‖‖‖‖‖‖‖‖	GU
OSE Net Half duplex	‖‖‖‖‖‖‖‖	GV
	END	‖‖‖‖‖‖‖‖

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2 INTERFACE

This chapter describes the programmable transmission options for your reader. Some options may not be relevant to the type of reader you have. An attempt to program the reader for such options does not affect its operation and usually results in the reader producing an error tone, indicating you tried to make an illegal programming entry.

2.1 Linker options

This paragraph describes the options which are specific for readers with a linker (wand emulation) interface.

High speed:
  This option can be used with most decoders to transmit the data.

Low speed:
  This option is used for some older decoders which are not able to process the received data at high speed.

Transmit as Code as is:
  The reader will transmit the label in the same symbology as it was decoded.

Transmit as Code 39 full ASCII:
  The reader will transmit the label as if it were a Code 39 full ASCII label, thus supporting all 128 ASCII characters.

Transmit as Code 39 if possible:
  The reader will transmit the label as if it were a Code 39 label. If any character of the label read is not within the Code 39 specifications, the label will not be transmitted at all.

Transmit as Code 39 skip mode:
  The reader will transmit the label as if it were a Code 39 label. If any character of the label read is not within the Code 39 specifications, this character will not be transmitted.

Transmit as Code 39 replace mode:
  The reader will transmit the label as if it were a Code 39 label. If any character of the label read is not within the Code 39 specifications, this character will be transmitted as a space.

Output black high:
  Black will be transmitted as a high logical level (+5V) and spaces as low (0V).

Output black low:
  Black will be transmitted as a low logical level (0V) and spaces as high (+5V).

Pen touch enabled:
   The TTL signal represents "black" when the wand is
   not in action.

Pen touch disabled:
   The TTL signal represents "white" when the wand is
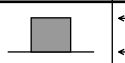   not in action.

	Pen touch enabled	Pen touch disabled	
Output black high			← black / +5V ← white / 0V
Output black low			← white / +5V ← black / 0V

fig.2.1; Linker output signal.

2.1 Linker options

	SET	
High speed		**C4**
Low speed		C5
Transmit as: Code as is		**C6**
Transmit as: Code 39 full ASCII		CC
Transmit as: Code 39 if possible		C7
Transmit as: Code 39 skip mode		C8
Transmit as: Code 39 replace mode		C9
Output black high		**P7**
Output black low		P8
Pen touch disabled		P9
Pen touch enabled		**PA**
	END	

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Interface

2.2 RS232 options

This paragraph describes the specific options for a reader with an RS232 interface.

Bar code readers with an RS232 interface are normally supplied with either a DB25 or DB9 female connector. Both connectors are fitted with an external power connector. The following terminations apply:

fig. 2.2; DB25 Female connector with cross connection.
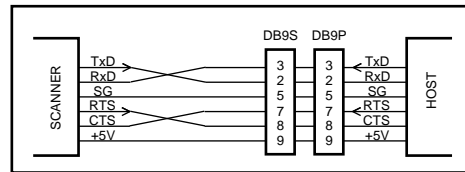
fig. 2.3; DB9 Female connector with cross connection.

Other connectors and/or connections are available by special order.

Pin functions as seen from the bar code reader.

FG   Frame Ground: This is normally connected to the "chassis ground" at the host computer. In the RS232 specification the use of FG is optional.

TxD   Transmitted Data: Transmits data from the reader to the host. This connection is mandatory.

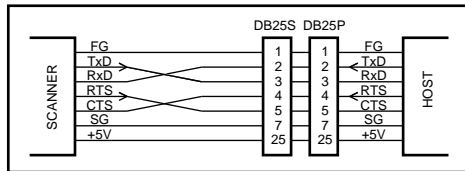RxD   Received Data: Receives data from the host to the reader. This connection is required if you want to send commands to the bar code reader or if software handshaking or acknowledgement control (see section 2.2.3) is used.

RTS   Request To Send: A general purpose output to the host, used for hardware flow control. This connection is optional.

CTS   Clear To Send: A general purpose input to the bar code reader, used for hardware flow control. This connection is optional.

SG   Signal Ground: Reference point for power supply and interface signals. This connection is mandatory.

+5V   5 Volt power supply to the reader. This pin is disconnected when the external power connector is in use.

2.2.1 Baud rate settings

The baud rate is the rate at which bits are transmitted from the reader to the host, and vice versa. Both the reader and the host should be set to the same baud rate.

2.2.1   Baud rate settings

	SET	
150 baud		KØ
300 baud		K1
600 baud		K2
1200 baud		K3
2400 baud		K4
4800 baud		K5
9600 baud		**K6**
19200 baud		K7
38400 baud		K8
		K9
		KZ
	END	

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Interface

2.2.2 Data, parity and stop bits

The data characters may be transferred in one of the following formats:

(1)	START	7 Bit Data		STOP
(2)	START	7 Bit Data		2 STOP
(3)	START	7 Bit Data	PARITY	STOP
(4)	START	7 Bit Data	PARITY	2 STOP
(5)	START	8 Bit Data		STOP
(6)	START	8 Bit Data		2 STOP
(7)	START	8 Bit Data	PARITY	STOP
(8)	START	8 Bit Data	PARITY	2 STOP
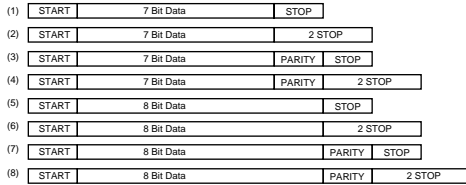
fig.2.4; Character transfer format.

A parity bit may be added to every character so that the total number of 1's in the data bits, together with the parity bit, is odd for odd parity or even for even parity.

2.2.2   Data, parity, stop bits

	SET	
7 data bits		LØ
8 data bits		**L1**
No parity		**L2**
Even parity		L3
Odd parity		L4
1 stop bit		**L5**
2 stop bits		L6
	END	

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Interface

2.2.3 Handshaking

Data flow control is available using either hardware (Modem, Busy/Ready) or software (XON/XOFF). In addition, an optional acknowledgement control is available (ACK/NAK with or without error response). Flow control may be combined with acknowlegement control.
The RS232 voltage levels employed by the reader for transmission are either -10V (OFF) or +10V (ON),

1. No handshake:
Does not employ any handshaking: data is transmitted regardless of the control signals. This option will undo any handshake and flow control options selected.

2. Busy/ready:
The reader's RTS is ON as soon as the power is supplied to the reader and will stay ON while the reader can receive data from the host. The host will keep the reader's CTS ON while it is ready to receive data from the reader. While CTS is ON the reader is able to transmit data. The reader will abort transmission with an error indication of the buzzer when the CTS is not ON within a certain configurable period.
The reader may drop RTS to OFF during transmission if it can not receive data simulaneously.
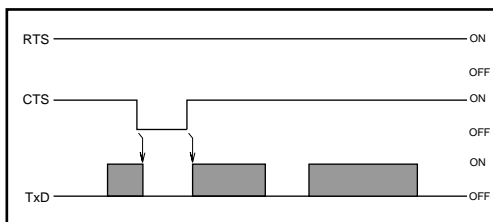See Figure 2.5.

fig. 2.5; Busy/ready protocol

3. Modem mode:
The reader's RTS is OFF as soon as power is supplied to the reader. The reader will turn RTS ON when it wants to transmit data to the host. The host should respond by putting CTS ON when it is ready to receive data. While CTS is ON the reader is allowed to transmit data. When all data has been transmitted, the reader will turn RTS OFF. In response, the host should turn OFF the reader's CTS. If, while RTS is ON, the CTS line is not ON for a certain configurable period, the reader will terminate the transmission with an error indication of the buzzer.
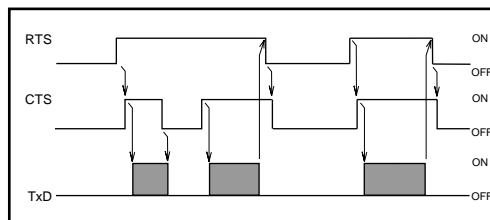See Figure 2.6.

fig. 2.6; Modem protocol

4. XON/XOFF:

The reader sends data until an XOFF (ASCII DC3, Hex 13) character is received from the host. Only when the reader receives an XON (ASCII DC1, Hex 11) character, the reader continues to send its data.

5. ACK/NAK:

After data has been transmitted, the reader expects to receive one of the following responses from the host:

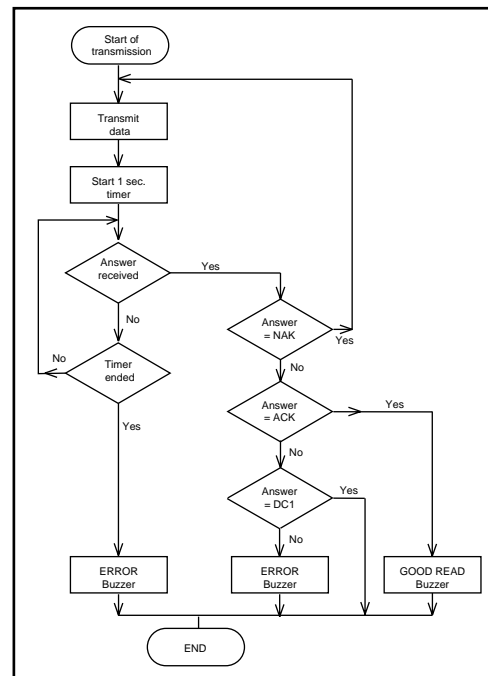| Response:	ASCII	Action:
"ACK"	Hex Ø6	The reader completes transmission with the good-read buzzer.
"NAK"	Hex 15	The reader sends the data again.
"DC1"	Hex 11	The reader completes transmission without a good-read or error buzzer.
"None"		If there is no response within one second then the reader terminates transmission with an error buzzer.

See figure 2.7.

fig.2.7; ACK/NAK protocol

6. ACK/NAK/NO RESPONSE:
The difference from the ACK/NAK mode is that when no response from the host is received within 100 ms, the reader assumes that the data has been received correctly by the host.

Response: ASCII   Action:
   "ACK"   Hex Ø6   The reader completes transmission with the good-read buzzer.
   "NAK"   Hex 15   The reader sends the data again.
   "DC1"   Hex 11   The reader completes transmission without a good-read or error buzzer.
   "None"   If there is no response within 100 ms then the reader terminates transmission with a good read buzzer.
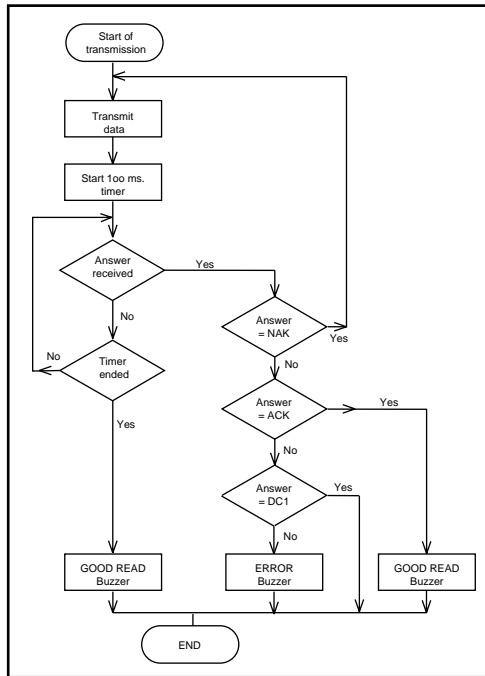
See figure 2.8.

fig. 2.8; ACK/NAK/NO RESPONSE

2.2.3 Handshaking

	SET	
		‖‖‖‖‖‖‖‖
No handshake	‖‖‖‖‖‖‖	**PØ**
Busy/ready	‖‖‖‖‖‖‖	P1
Modem	‖‖‖‖‖‖‖	P2
XON/XOFF	‖‖‖‖‖‖‖	ZG
ACK/NAK	‖‖‖‖‖‖‖	P3
ACK/NAK/ NO RESPONSE	‖‖‖‖‖‖‖	P4
Flow Control Time out indefinitely	‖‖‖‖‖‖‖	**IØ**
Flow control Time out 100 ms	‖‖‖‖‖‖‖	I1
Flow control Time out 200 ms	‖‖‖‖‖‖‖	I2
Flow control Time out 400 ms	‖‖‖‖‖‖‖	I3
	‖‖‖‖‖‖‖	ID
	END	‖‖‖‖‖‖‖

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Interface

2.2.4 Intercharacter delay for RS232

The intercharacter delay introduces a configurable
time delay after each character transmitted.
This may be used if the connected computer or
terminal does not support flow control and is not
capable of handling the received data.

2.2.4   Interchar. delay for RS232

	SET	||||| ||| |||| |||
No delay	||||| ||| || |||	**KA**
20 ms delay	||||| ||| || |||	KB
50 ms delay	||||| ||| ||| |||	KC
100 ms delay	||||| ||| || |||	KD
	||||| |||| || |||	OP
	||||| ||| || |||	OQ
	||||| |||| || |||	OR
	||||| |||| || |||	OS
	||||| |||| || |||	OT
	||||| || || |||	OU
	||||| || ||| |||	OV
	END	||||| ||| ||| ||||

2.3 RS232 wedge options

This paragraph summarises the most important labels for use with the RS232 wedge. Note that the settings should match those on the terminal.

Use the following steps:
- Select baud rate from section 2.2.1
- Select data, parity and stop bits from section 2.2.2
- Select handshake options from section 2.2.3
- Select an inter character delay from section 2.2.4
- Select an echo mode

Remote echo
  In this mode the reader sends data to the host which echoes all data to the terminal, whereafter the data is displayed on the terminal.
  This option is used if the terminal is configured for remote echo.

Local echo
  In this mode the reader sends data to both the host and the terminal.
  This option is used if the terminal is configured for local echo.

Force XON to host and terminal
  This is a maintenance function which forces the reader to transmit a single XON (ASCII DC1, Hex 17) character to the terminal and the host. It may be used if the terminal or host does not respond after the terminal or reader has been powered down.

2.3 RS232 wedge options

	SET	‖‖‖‖‖‖‖‖‖
Remote echo	‖‖‖‖‖‖‖‖‖	**ZE**
Local echo	‖‖‖‖‖‖‖‖‖	ZF
Force XON to host and terminal	‖‖‖‖‖‖‖‖‖	ZH
	END	‖‖‖‖‖‖‖‖‖

2.4 Keyboard wedge options

This paragraph describes the options which are relevant to scanners with a wedge interface. The following parameters can be configured:

- Keyboard layout
- Keyboard language
- Special options
- Intercharacter delay

Because these options are interdependent, it is important to perform the configuration in the sequence given.

Please consult your sales office for keyboard layouts and language currently supported.

2.4.1 Keyboard layouts

Terminal manufacturers offer a selection of different keyboard layouts. These keyboards differ in the number of available keys and/or their position. Select the same keyboard layout that has been selected on your terminal.

For PC wedges, the correct keyboard layout is selected by default.
The same applies to terminal wedges which support only a single keyboard layout.

The 'without keyboard' option is only supported for PC/AT wedges.

2.4.1 Keyboard layout (1)

	SET	||||||||
PC	||||||||	KU
ASCII	||||||||	KS
ANSI	||||||||	KT
VT220	||||||||	KR
88 keys	||||||||	KW
102/103 keys	||||||||	KX
122 keys	||||||||	KY
	||||||||	KN
	||||||||	KO
	||||||||	KP
	||||||||	KQ
	END	||||||||

2.4.1 Keyboard layout (2)

	SET	
Wyse Keyboard ANSI 101 keys		IV
Wyse Keyboard ANSI 105 keys		IU
Wyse Keyboard ANSI 107 keys		IT
Wyse Keyboard ANSI 108 keys		IS
Wyse Keyboard ASCII 83 keys		IX
Wyse Keyboard ASCII 101 keys		IW
Wyse Keyboard EPC 102 keys		IZ
Wyse Keyboard IEPC 103 keys		IY
		IO
		IP
		IQ
	END	

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2.4.1 Keyboard layout (3)

	SET	
With keyboard		**KM**
Without keyboard		KL
	END	

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2.4.2 Keyboard language

Keyboards are also different depending on country or language. Examples are the QWERTY and AZERTY keyboards. Select the same language that has been selected on your PC or terminal.

The languages supported depend on the reader model and software release. Please consult your sales office for the languages currently supported.

2.4.2 Keyboard language (1)

	SET	||||| ||| |||
US	||||| ||| |||	**KE**
UK	||||| ||| |||	KV
German	||||| ||| |||	KG
French	||||| ||| |||	KI
Italian	||||| ||| |||	OW
Spanish	||||| ||| |||	KJ
Portuguese	||||| ||| |||	PH
Swiss (French)	||||| ||| |||	PL
Swiss (German)	||||| ||| |||	PK
Dutch	||||| ||| |||	PI
	||||| ||| |||	P5
	END	||||| ||| |||

2.4.2 Keyboard language (2)

	SET	
Belgian		PJ
Belgian (French)		QF
Swedish		PD
Finnish		PG
Danish		KK
Norwegian		PE
Japanese		PM
		WE
		WF
		WH
		WI
	END	

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2.4.2 Keyboard language (3)

	SET	
		RO
		RP
		RQ
		RR
		RS
		RT
		RU
		RV
		VT
		VU
		VV
	END	

U47

2.4.3 Special options

This section contains some specialised keyboard options.

Do not use numpad: The reader wil emulate the numerical keys on the alpha keypad when transmitting numerical data.

Use numpad: The reader will emulate the numerical keypad when transmitting numerical data. The NUMLOCK should always be ON when this option has been selected.

No CAPSLOCK mode: This options cancels the CAPSLOCK mode.

CAPSLOCK mode: This option ensures that data is displayed correctly when the keyboard is normally in CAPSLOCK mode. The keyboard is returned in the CAPSLOCK mode after transmission.

No Japanese options: This option cancels the Hiragana, Katakana and Japanese CAPSLOCK options.

Japanese Hiragana mode: This option ensures that data is displayed correctly when the keyboard is normally in the Hiragana mode. The keyboard is returned in the Hiragana mode after transmission.

Japanese Katakana mode: This option ensures that data is displayed correctly when the keyboard is normally in the Katakana mode. The keyboard is returned in the Katakana mode after transmission.

Japanese CAPSLOCK mode: This option ensures that data is displayed correctly when the keyboard is normally in the CAPSLOCK mode. The keyboard is returned in the CAPSLOCK mode after transmission.

DOS ALT mode: This option works only with PC's using the DOS operating system and running 'well behaved' DOS applications. The reader transmits each character as its 3-digit decimal ASCII value, using the numeric keypad, in combination with the ALT key.
For example, the character 'A' is transmitted as:
<make ALT key>065<release ALT key>
The advantage of this mode is that it is language independent. The disadvantages are that it only works with well behaved DOS applications and transmission is slower.

2.4.3 Special options

	SET	||||||
Do not use numpad	||||||	**RN**
Use numpad	||||||	RM
No CAPSLOCK mode	||||||	**5Q**
CAPSLOCK mode	||||||	8A
No Japanese options	||||||	**5Q**
Japanese Hiragana mode	||||||	RJ
Japanese Katakana mode	||||||	RK
Japanese CAPSLOCK mode	||||||	RL
DOS ALT mode	||||||	KF
	END	||||||

2.4.4 Intercharacter delay for wedges

The intercharacter delay can be used to adapt the reader's data transmission speed to the system.
If the transmission speed is too high, the system may not be able to receive all characters.
Adjust the inter character delay until the data is received correctly.

The default value as well as the actual delay time depend on the terminal type and language selected.

2.4.4 Interchar. delay for wedges

	SET	||||| ||| |||
No delay	||||| ||| |||	LA
Delay = 1	||||| ||| |||	LB
Delay = 2	||||| ||| |||	LC
Delay = 3	||||| ||| |||	LD
Delay = 4	||||| ||| |||	LE
Delay = 5	||||| ||| |||	LF
Delay = 6	||||| ||| |||	LG
Delay = 7	||||| ||| |||	LH
Delay = 8	||||| ||| |||	LI
Delay = 9	||||| ||| |||	LJ
Delay = 10	||||| ||| |||	LK
	END	||||| ||| |||

2

Interface

2.5 OCIA and IBM 4683 options

This paragraph describes the options relevant to readers which support the OCIA interface or the IBM4683 interface.

Accept IBM 4683 mode commands:
  The reader will accept commands from the host.

Ignore IBM 4683 mode commands:
  The reader will ignore commands from the host and will always stay in a scanning mode.

Transmit as is:
  The reader will transmit the label in the same symbology as it was decoded.

Transmit as:
  EAN-8 or EAN-13 may be selected for those cash registers which do not support other symbologies such as Interleaved 2of5 . If both options are enabled, the reader will transmit in the EAN-8 format if possible or else as EAN-13. Leading zero's will be added if required. The reader will make an error sound if the data can not be transmitted as either EAN-8 or EAN-13.

2.5 OCIA and IBM 4683 options

	SET	
Accept IBM 4683 mode commands		ZJ
Ignore IBM 4683 mode commands		ZI
Transmit as is		CU
Transmit as EAN-8		CV
Transmit as EAN-13		CW
Short format		**CR**
Full format 8 bit		CS
Full format 9 bit		CT
Disable suffix BBC		**CX**
Enable suffix BBC		CY
	END	

Interface

2.6 Network options

This paragraph describes the options relevant to readers with a network interface such as OSENET.

Set Station address:
The station address is a number which identifies each reader in a network.
On each reader in the network, you have to set a different station address.

Example:
  To set the station address to 3, read the labels
  <SET>
      <SET Station Address>
      <3>
  <END>

  To set the station address to 120, read the labels
  <SET>
      <SET Station Address>
      <1>
      <2>
      <0>
  <END>

Valid station addresses for OSENET are 1 up to 126.

2.6 Network options

	SET	
Set station addresses		VP
0		QØ
1		Q1
2		Q2
3		Q3
4		Q4
5		Q5
6		Q6
7		Q7
8		Q8
9		Q9
	END	

2

Interface

3 CODE OPTIONS

The menu options in this chapter are intended to select:
- -which bar code types can be read
- -The permissible length of the bar codes to be read
- -Bar code specific options

In short: the decoding characteristics of the reader can be adjusted.

3.1 Setting of readable codes

These options do not influence the reading of the menu labels.
The required bar code types can be selected by enabling a single readable code only and enabling readable codes

It is strongly recommended to select only the required codes.

Advantages of selecting only the required codes are:
- - Faster reading.
- - No accidental scanning of unwanted bar codes.
- - Reduced probability of reading errors which can not be prevented completely, because of the limited security of some bar code types.

Some bar codes are translations or special variants of other bar code types. The following table lists their relationships.

Code type:	Belongs to:
ISBN Bookland	EAN-13
Code 39 Full ASCII	Code 39
Italian Pharmaceutical	Code 39
ABC Code	Codabar
CX Code	Codabar
EAN128	Code 128

table 3.1; Bar code type relationships

Example:
To read Italian Pharmaceutical type bar codes,
  Enable Code 39,
  Select the option 'Italian Pharmaceutical' from the 'Options for Code 39'

3.1.1 Enabling a single readable code:

With this option you can set the reader to read a single bar code type only. If you select 'Code 39 only', no other codes will be read.

Example:
If you want to read Code 39 only, you read the option 'Code 39 only'.

```
      SET
       |
  Code 39 only
       |
      END
```
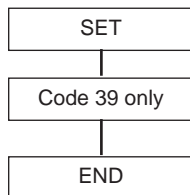
fig.3.1; Enabling a single readable code

Example:
If you want to read one of the special bar codes as listed in table 3.1, e.g. EAN128 only, you read the option 'Code 128 only' followed by 'Enable EAN128 only' from the 'Options for Code 128'.

```
      SET
       |
  Code 128 only
       |
  Enable EAN128
      only
       |
      END
```
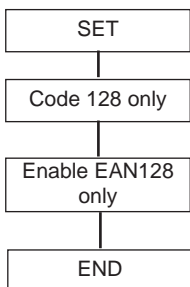
fig.3.2; Enabling EAN128 only

	SET	
All codes excl. add-on		**AØ**
Only all UPC and EAN codes		JØ
UPC only		J1
UPC + 2 only		J2
UPC + 5 only		J3
EAN only		J4
EAN + 2 only		J5
EAN + 5 only		J6
		JA
		JB
		JC
	END	

3 Code options

3.1.1 Enabling a single read. code (2)

	SET	
	SET ▐█▊▌█▐▊█▌▌█▐█	
Code 39 only	▐█▊▌█▐▊█▌▌█▐█	A2
Codabar only	▐█▊▌█▐▊█▌▌█▐█	A3
Industrial 2of5 only	▐█▊▌█▐▊█▌▌█▐█	J7
Interleaved 2of5 only	▐█▊▌█▐▊█▌▌█▐█	J8
S Code only	▐█▊▌█▐▊█▌▌█▐█	RA
Matrix 2of5 only	▐█▊▌█▐▊█▌▌█▐█	AB
IATA only	▐█▊▌█▐▊█▌▌█▐█	A4
Code 93 only	▐█▊▌█▐▊█▌▌█▐█	A5
Code 128 only	▐█▊▌█▐▊█▌▌█▐█	A6
MSI/Plessey	▐█▊▌█▐▊█▌▌█▐█	A7
Telepen only	▐█▊▌█▐▊█▌▌█▐█	A9
	END ▐█▊▌█▐▊█▌▌█▐█	

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3.1.1 Enabling a single read. code (3)

	SET	
	SET ▐█▊▌█▐▊█▌▌█▐█	
UK/Plessey only	▐█▊▌█▐▊█▌▌█▐█	A1
Laetus only	▐█▊▌█▐▊█▌▌█▐█	JD
Chinese post matrix 2of5 only	▐█▊▌█▐▊█▌▌█▐█	JE
	▐█▊▌█▐▊█▌▌█▐█	J9
	▐█▊▌█▐▊█▌▌█▐█	JG
	▐█▊▌█▐▊█▌▌█▐█	JH
	▐█▊▌█▐▊█▌▌█▐█	JI
	▐█▊▌█▐▊█▌▌█▐█	JJ
	▐█▊▌█▐▊█▌▌█▐█	JK
	▐█▊▌█▐▊█▌▌█▐█	JL
	END ▐█▊▌█▐▊█▌▌█▐█	

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3.1.2 Enabling of readable codes

With this option you can set the reader to read a number of bar code types or simply enable additional bar code types.

Example:
If you only want to read Code 39 and Code 128, you read 'Code 39 only' and 'enable Code 128'.

Alternatively you can read 'Disable All', 'Enable Code 39' and 'Enable Code 128'. Note that the option 'Disable All' is a new option which is available from software 5.0.
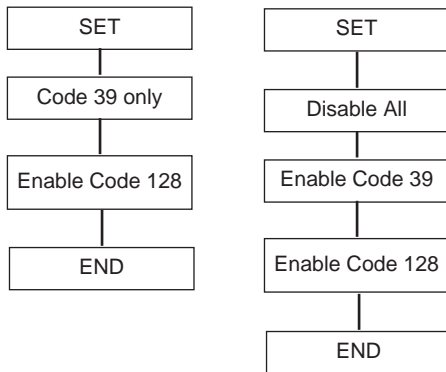
fig.3.3; Enabling readable codes.

Example:
If you want to enable Codabar in addition to what you already have configured, you read 'Enable Codabar'.
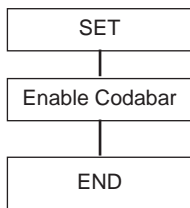
fig.3.4; Enabling an additional readable code.

3.1.2 Enabling of readable codes (1)

	SET	▐▌▐▐▌▐▐▌▐▌
All codes excl. add-on	▐▌▐▌▐▐▌▐▌	**AØ**
Enable UPC	▐▌▐▌▐▐▌▐▌	**R1**
Enable UPC + 2	▐▌▐▌▐▐▌▐▌	R2
Enable UPC + 5	▐▌▐▌▐▐▌▐▌	R3
Enable EAN	▐▌▐▌▐▐▌▐▌	**R4**
Enable EAN + 2	▐▌▐▌▐▐▌▐▌	R5
Enable EAN + 5	▐▌▐▌▐▐▌▐▌	R6
	▐▌▐▌▐▐▌▐▌	JQ
	▐▌▐▌▐▐▌▐▌	JO
	▐▌▐▌▐▐▌▐▌	JP
Disable all	▐▌▐▌▐▐▌▐▌	BØ
	END	▐▌▐▌▐▐▌▐▌

3.1.2 Enabling readable codes (2)

	SET	|||||
Enable Code 39	|||||	**B2**
Enable Codabar	|||||	**B3**
Enable Industrial 2of5	|||||	**R7**
Enable Interleaved 2of5	|||||	**R8**
Enable S Code	|||||	**R9**
Enable Matrix 2of5	|||||	BB
Enable IATA	|||||	**B4**
Enable Code 93	|||||	**B5**
Enable Code 128	|||||	**B6**
Enable MSI/ Plessey	|||||	**B7**
Enable Telepen	|||||	**B9**
	END	|||||

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3.1.2 Enabling readable codes (3)

	SET	|||||
Enable UK/Plessey	|||||	**B1**
Enable Laetus	|||||	**JZ**
Enable Chinese post matrix 2of5	|||||	JS
	|||||	JT
	|||||	JU
	|||||	JV
	|||||	JW
	|||||	JX
	|||||	JY
	END	|||||

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3.2 Setting the number of characters

If you are going to read bar codes of known length, it is advisable to set the reader for a fixed number of characters. This can be done for up to two lengths. The reader uses this to verify that labels read are of the correct length, rejecting any labels which do not have the specified length.

The advantage of setting a fixed length, is that it provides protection against short scans of labels, such as Interleaved 2of5, which do not provide sufficient security against partial scan. The length checking done on the label data and is not affected by options such as (not) transmit start/stop character or check digit.

The following options are available:
- Fixed length OFF all codes
  This option cancels the fixed length checking.
- Fixed length ON all codes
  This option enables the fixed length checking. Two fixed lengths are programmed which will affect all variable length codes. This is done by reading the following labels:

  <SET>
  <Fixed length ON - all codes>
  a bar code with the required length
  a second bar code with the required length (this may be the same one as the first one)

<END>
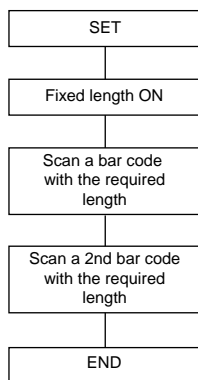
fig.3.5; Setting fixed length.

It is also possible to configure up to 3 fixed lengths, 3 minimum and 3 maximum lengths for selected symbologies, by reading the respective option together with up to 3 bar code labels.
The different functions may be combined and will be used as follows:
1) If a label is checked for fixed length, it will not be checked for minimum or maximum length.
2) If a label is not checked for fixed length it will be checked for both minimum and maximum length.

By reading an option followed by the 'END' label, the function is disabled or the values for that option are reset to their default. The default values are:

fixed:	disabled, thus no fixed length checking
minimum:	according to table 3.2 (The minimum length of the 2of5 bar code types can not be changed independent.)
maximum:	disabled, thus no maximum length checking.(The maximum length is reader dependent)

Bar code type	Minimum length
Code 39	1
Codabar	5
Industrial 2of5	5
Interleaved 2of5	6
S Code	5
Matrix 2of5	5
IATA	5
Code 93	1
Code 128	1
MSI/Plessey	3
Telepen	1
UK/Plessey	2

table 3.2; Defaults for minimum length.

- Fixed length ON for selected codes:
  This option enables fixed length checking for different bar code types. Up to 3 fixed lengths can be programmed which will only affect the bar code types read. This is done by reading the following labels:

  <SET>
  <Fixed length ON for selected codes>
  Scan up to 3 bar codes of the required type and length
  <END>

Example:
The 2 examples shown in figure 3.6 have the following results:

In the first example only Code 39 labels will be checked for a length of 6 characters. Any other bar code type will not be checked for fixed length.

In the second example Code 39 labels will be checked for a length of 6 characters and Interleaved 2of5 labels for a length of 12 characters. This implies that also Industrial 2of5, Matrix 2of5 and S Code are checked for a fixed length of 12 characters. Any other bar code type will not be checked for fixed length.
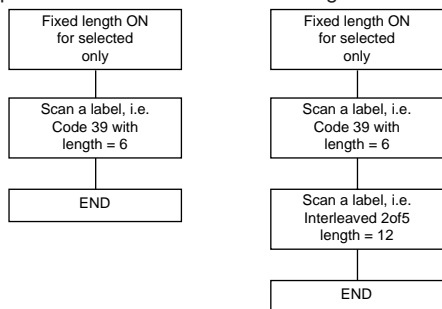
fig.3.6; Setting fixed length for selected codes only.

- Minimum length for selected codes:
    This options modifies the default minimum length table for up to three different bar code types. This is done by reading the following labels:
    <SET>
        <Minimum length for selected codes>
        Scan up to 3 bar codes of the required type and length
    <END>

Example:
The two examples shown in figure 3.7 have the following result:

In the first example only Code 39 labels will be checked for a minimum length of 2 characters. All other bar code types will be checked for a minimum length as per table 3.2.

In the second example Code 39 labels will be checked for a minimum length of 2 characters and Interleaved 2of5 labels for a minimum length of 4 characters.

This implies that also Industrial 2of5, Matrix 2of5 and S Code are checked for a minimum length of 4 characters. All other bar code types will be checked for a minimum length as per table 3.2.
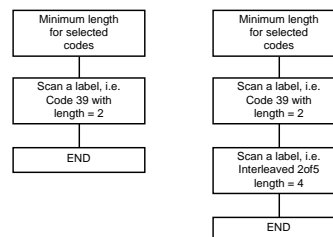
fig.3,7; Modifying minimum length for selected codes.

- Maximum length for selected codes:
    This option enables the maximum length checking for up to three different bar code types. This is done by reading the following labels:
    <SET>
        <Maximum length for selected codes>
        Scan up to 3 bar codes of the required type and length
    <END>

Example:
The two following examples shown in figure 3.8 have the following result:
In the first example only Code 39 labels will be checked for a maximum length of 12 characters. Any other bar code types will not be checked for a maximum length.
In the second example Code 39 labels will be checked for a maximum length of 12 characters and Interleaved 2of5 labels for a maximum length of 14 characters. This implies that also Industrial 2of5, Matrix 2of5 and S Code are checked for a maximum length of 14 characters. Any other bar code types will not be checked for a maximum length.
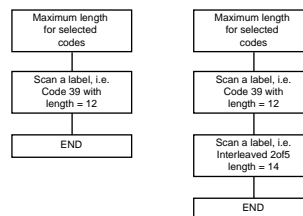
fig.3.8; Modifying maximum length for selected codes.

3.2 Setting of number of characters

	SET	|||||||||||||
Fixed length OFF all codes	||||||||||||||	HØ
Fixed length ON all codes	||||||||||||||	H1
Fixed length ON for selected codes	||||||||||||||	HK
Minimum length for selected codes	||||||||||||||	HL
Maximum length for selected codes	||||||||||||||	HM
	END	|||||||||||||

3.3 Setting code specific options

Code specific options may be configured affecting:

* Enabling and disabling code variants and translations, such as EAN-128, as were listed in table 3.1.
* Data verification such as by means of a check digit calculation. A check digit has a value that can be calculated from the other data characters and is usually the last data character in a bar code.
* Pre-editing of the data string such as removing the check-digit and/or start/stop characters.

The more common options are described here:

Check CD:
    This option enables the check digit calculation.
    If the calculated check digit does not correspond to the check digit in the bar code, then the bar code is ignored. The use of a check digit greatly improves the security of a bar code.

Not check CD:
    This option disables the check digit calculation.
    This option is required when the bar codes do not contain a check digit or contain an invalid check digit.

Transmit CD:
    This option enables the transmission of the check digit together with the data characters.
    If the check digit calculation is disabled, the reader can not differentiate anymore between a (valid) check digit and a data character. It will therefore transmit all data characters of the label, including what could constitute a check digit.

Not transmit CD:
    This option disables the transmission of the check digit.
    If the check digit calculation is disabled, the reader can not differentiate between a (valid) check digit and a data character. It will therefore transmit all data characters of the label, excluding the character that could constitute the check digit for the type of bar code.

Transmit ST/SP:
    This option enables the transmission of the start and stop characters of a bar code.

Not transmit ST/SP:
   This option disables the transmission of the start
   and stop characters of a bar code.

Figure 3.9 summarizes the effect of the transmit
options for a Code 39 label with:
   -start and stop characters '*'
   -data characters '1 2 3 4 5 6'
   -or data characters '1 2 3 4 5' and check digit '6'

Note that because '6' is, according to the Code 39
specifications, not a valid check digit for this label. The
check digit calculation must therefore be disabled in
order for the label to be accepted.

	Transmit CD	Not transmit CD
Transmit ST/SP	* 1 2 3 4 5 6 *	* 1 2 3 4 5 *
Not transmit ST/SP	1 2 3 4 5 6	1 2 3 4 5

fig.3.9; Effect of transmit options.

3.3.1 Options for UPC-A:

The UPC-A symbology is a fixed length symbology encoding 11 data digits, a check digit and non printable start/stop characters.
The following characters are supported:
        the digits 0 upto 9

An optional leading zero can be transmitted, which together with the data and the check digit forms a 13 digit field providing compatibility with the EAN-13 format.

String format:

Leading zero	Data (11 digits)	check digit

UPC-A add-on 2/add-on 5
The UPC-A symbology as described above can be succeeded by an additional 2 or 5 digit UPC-A code.

String format:

Leading zero	Data (11 digits)	check digit	add-on 2 or 5

Options for UPC-A
        -Disable transmission of the leading zero
        -Disable transmission of the check digit

3.3.1 Options for UPC-A

	SET	||||| |||| |||
UPC-A, no leading zero, transmit CD	||||||| ||| ||| |||	**E3**
UPC-A, no leading zero, not transmit CD	||||||| ||| ||| |||	E5
UPC-A, leading zero, transmit CD	||||||| ||| ||| |||	E2
UPC-A, leading zero, not transmit CD	||||||| ||| ||| |||	E4
	END	|||| |||| ||| ||||

3 Code options

3.3.2 Options for UPC-E:
The UPC-E symbology is a fixed length symbology encoding 6 data digits, a check digit and non printable start/stop characters.
The following characters are supported:
> the digits 0 upto 9

An optional leading zero can be transmitted, which together with the data and the check digit forms an 8 digit field providing a compatibility with the EAN-8 format.

String format:

Leading zero	Data (6 digits)	check digit

UPC-E add-on 2/add-on 5
The UPC-E symbology as described above can be succeeded by an additional 2 or 5 digit UPC-E code.

String format:

Leading zero	Data (6 digits)	check digit	add-on 2 or 5

Options for UPC-E
> -Enable transmission of the leading zero
> -Disable transmission of the check digit
> -Transmit UPC-E as UPC-A

Transmit UPC-E as UPC-A:
  If this option is enabled, a UPC-E label is transmitted in the UPC-A format.

3.3.2 Options for UPC-E

	SET	
UPC-E, no leading zero, transmit CD		**E7**
UPC-E, no leading zero, not transmit CD		E9
UPC-E, leading zero, transmit CD		E6
UPC-E, leading zero, not transmit CD		E8
Transmit UPC-E as is		**6Q**
Transmit UPC-E as UPC-A		6P
	END	

3.3.3 Options for EAN-13 and EAN-8

EAN-13:
The EAN-13 symbology is a fixed length symbology encoding 12 data digits, a check digit and non printable start/stop characters.
The following characters are supported:
        the digits 0 upto 9

The data may be translated into ISBN or ISSN format.

String format:

Data (12 digits)	check digit

EAN-13 add-on 2/add-on 5
The EAN-13 symbology as described above can be succeeded by an additional 2 or 5 digit code.

String format:

Data (12 digits)	check digit	add-on 2 or 5

EAN-8:
The EAN-8 symbology is a fixed length symbology encoding 7 data digits, a check digit and non printable start/stop characters.
The following characters are supported:
        the digits 0 upto 9

String format:

Data (7 digits)	check digit

EAN-8 add-on 2/add-on 5
The EAN-8 symbology as described above can be succeeded by an additional 2 or 5 digit code.

String format:

Data (7 digits)	check digit	add-on 2 or 5

Options for EAN
        -Disable transmission of the check digit
        -Enable ISBN or ISSN translation
Enable ISBN or ISSN translation:
  If this option is enabled, an EAN-13 label is verified for the correct format and transmitted as a 10 digit ISBN number or 8 digit ISSN number.

3.3.3 Options for EAN-13 and EAN-8

	SET	
EAN-13 transmit CD		**6K**
EAN-13 not transmit CD		6J
EAN-8 transmit CD		**6I**
EAN-8 not transmit CD		6H
Disable ISBN translation		**IB**
Enable ISBN translation		IA
Enable ISBN if possible		IK
Disable ISSN translation		HN
Enable ISSN translation		HO
Enable ISSN if possible		4V
	END	

3 Code options

3.3.4 Options for Code 39 and It. Pharm.

Code 39 is a variable length symbology with an optional check digit and printable start/stop characters. The following characters are supported:

        * the digits 0 upto 9
        * the capitals A upto Z
        * the characters - $ / + % SPACE
        * start/stop character is *

The checksum is calculated as the sum modulo 43 of the numerical value of the data characters.

In full ASCII mode, all 128 ASCII characters are supported. This is done by combining one of the characters +, %, $ or / with one of the alpha characters (A upto Z).

String format:

start char.	data (0 or more characters)	check digit	stop char.

Italian Pharmaceutical:
In this mode the Code 39 data is translated to the Italian pharmaceutical format. This format has a fixed length containing 8 numeric data values followed by a single mandatory check digit.

An optional leading 'A' can be transmitted.

String format:

start char.	leading A	data (8 digits)	check digit	stop char.

Options for Code 39:
      -Enable full ASCII conversion
      -Enable Italian Pharmaceutical conversion
      -Enable check digit
      -Disable transmission of the check digit
      -Enable transmission of start/stop
      -Enable leading A for Italian Pharmaceutical
      -Selection of the minimum number of data
       characters

Normal Code 39:
    In this mode the decoded data characters are transmitted without further translation.

Full ASCII Code 39:
    In this mode the decoded data characters are translated to full ASCII Code 39.

Full ASCII Code 39 if possible:
    In this mode the decoded data characters are translated to full ASCII Code 39. Invalid combinations are not translated and are transmitted as is.

Italian Pharmaceutical only:
    In this mode the decoded data characters are translated to the Italian Pharmaceutical format. If the data does not comply with the Italian Pharmaceutical format, the label is rejected.

Italian Pharmaceutical if possible:
    In this mode the decoded data characters are translated to the Italian Pharmaceutical format. If the data does not comply with the Italian Pharmaceutical format, then the data is transmitted as Normal or full ASCII Code 39.

Concatenation:
    If a Code 39 bar code contains a leading space, the data is stored into the reader's buffer without the leading space. As soon as a Code 39 bar code is read without a leading space, the data is appended to the reader's buffer and the entire buffer is transmitted and cleared for new data. In case a non Code 39 bar code is read, the data in the non-Code 39 bar code is transmitted and the buffer is cleared. The buffer size is reader dependent.

3.3.4 Options for Code 39 and It.Pharm.(1)

	SET	|||||||||||
Normal Code 39	|||||||||||	**D5**
Full ASCII Code 39	|||||||||||	D4
Full ASCII Code 39 if possible	|||||||||||	+K
It. Pharmaceutical only	|||||||||||	D6
It. Pharmaceutical if possible	|||||||||||	D7
Not check CD	|||||||||||	**C1**
Check CD	|||||||||||	CØ
Transmit CD	|||||||||||	**D9**
Not transmit CD	|||||||||||	D8
Not transmit ST/SP	|||||||||||	**D1**
Transmit ST/SP	|||||||||||	DØ
	END	|||||||||||

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3.3.4 Options for Code39 and It.Pharm. (2)

	SET	|||||||||||
Not transm. Id. A for It. Pharm. Code	|||||||||||	DA
Transmit leading A for It. Pharm. Code	|||||||||||	DB
	|||||||||||	MM
	|||||||||||	MN
Minimum 3 digits	|||||||||||	8D
Minimum 1 digit	|||||||||||	8E
Disable concatenation	|||||||||||	**+M**
Enable concatenation	|||||||||||	+L
	END	|||||||||||

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3.3.5 Options for Codabar

Codabar (NW7) is a variable length symbology with an optional check digit and printable start/stop characters. The next characters are supported:

> The digits 0 upto 9
> the characters - $: / . +
> start/stop characters are A, B, C or D

The checksum is calculated as the sum modulo 16 of the numerical values of all data characters.

String format:

start char.	data (1 or more characters)	check digit	stop char.

ABC-Code:
The ABC code is an acronym for American Blood Commission. This code consists of two bar codes which are decoded in one read cycle. The code is concatenated when the stop character of the first bar code and the start character of the second bar code is a D. These two D's are not transmitted.

String format:

start char.	data (1 or more char.)	check digit	data (1 or more char.)	check digit	stop char.

CX-Code:
The CX-Code consists of two bar codes which are decoded in one read cycle. The code is concatenated when the stop character of the first bar code is a C, and the start character of the second bar code is a B. The B and C characters are not transmitted.

String format:

start char.	data (1 or more char.)	check digit	data (1 or more char.)	check digit	stop char.

Options for Codabar:
- Enable ABC code concatenation.
- Enable CX code concatenation.
- Enable check digit check.
- Disable transmission of the check digit.
- Disable transmission of start/stop.
- Selection of start/stop character translation.
- Selection of minimum number of data characters.
- Enable library space (CLSI) insertion.

Space insertion:
> This option inserts spaces in position 2, 7, 13, of the data string for use in library systems.

ST/SP translation:
> This option enables the translation and transmission of the start and stop characters. Thus if the option ST/SP: abcd/tn*e is chosen, the start character is converted to lower case, e.g. from A, B, C or D to a, b, c, or d respectively and the stop character is converted from A, B, C or D to t, n, *, or e respectively. Figure 3.10 shows the resulting format for these options with a Codabar label using A and B as start and stop characters and 1 2 3 4 5 6 as data characters.

1 2 3 4 5 6	Not transmit ST/SP
A 1 2 3 4 5 6 B	ST/SP: ABCD/ABCD
a 1 2 3 4 5 6 b	ST/SP: abcd/abcd
A 1 2 3 4 5 6 N	ST/SP: ABCD/TN*E
a 1 2 3 4 5 6 n	ST/SP: abcd/tn*e

fig.3.10; Effect of start stop selection.

Minimum data characters:
> Codabar labels are checked for a minimum of 1, 3 or 5 characters are set by the user. If the number of characters in the label is shorter than the number set, the label will be rejected. If the fixed length option is used for Codabar type labels then such labels will additionally be checked for fixed length. This option will no longer be supported in future software releases.

Intercharacter gap check:
> This option enables the reading of Codabar labels with a large or irregular gap between characters.

3.3.5 Options for Codabar (1)

	SET	
		‖‖‖‖‖‖‖‖
Enable only Codabar normal mode	‖‖‖‖‖‖‖‖	**HA**
Enable only ABC code	‖‖‖‖‖‖‖‖	H4
Enable only CX code	‖‖‖‖‖‖‖‖	H5
Enable Codabar, ABC and CX	‖‖‖‖‖‖‖‖	H3
Not check CD	‖‖‖‖‖‖‖‖	**H7**
Check CD	‖‖‖‖‖‖‖‖	H6
Transmit CD	‖‖‖‖‖‖‖‖	**H8**
Not transmit CD	‖‖‖‖‖‖‖‖	H9
Disable space insertion	‖‖‖‖‖‖‖‖	**HE**
Enable space insertion	‖‖‖‖‖‖‖‖	HD
	‖‖‖‖‖‖‖‖	FM
	END	‖‖‖‖‖‖‖‖

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3.3.5 Options for Codabar (2)

	SET	
		‖‖‖‖‖‖‖‖
Not transmit ST/SP	‖‖‖‖‖‖‖‖	**FØ**
ST/SP: ABCD/ABCD	‖‖‖‖‖‖‖‖	F3
ST/SP: abcd/abcd	‖‖‖‖‖‖‖‖	F4
ST/SP: ABCD/TN*E	‖‖‖‖‖‖‖‖	F1
ST/SP: abcd/tn*e	‖‖‖‖‖‖‖‖	F2
Minimum data one character	‖‖‖‖‖‖‖‖	HC
Minimum data three characters	‖‖‖‖‖‖‖‖	HB
Minimum data five characters	‖‖‖‖‖‖‖‖	**HF**
Enable interchar. gap check	‖‖‖‖‖‖‖‖	**HH**
Disable interchar. gap check	‖‖‖‖‖‖‖‖	HI
	‖‖‖‖‖‖‖‖	HJ
	END	‖‖‖‖‖‖‖‖

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3.3.6 Options for 2of5, S Code and Matrix 2of5

Code 2of5 is a variable length symbology with an optional check digit and non printable start and stop characters.
The following characters are supported:
The digits 0 upto 9

The checksum is calculated as the sum modulo 10 of the numerical values of all the data characters.

The following 2of5 codes are supported:

Industrial 2of5
This symbology encodes a single digit in each data symbol. Information is carried in the bars only.

Interleaved 2of5
This symbology encodes a pair of digits in each symbol, the number of digits are therefore always an even number. Information is carried in the bars and spaces.
The start and stop pattern is not unique inside the code. It is therefore essential to use the fixed length option to prevent partial reads.

S Code
This symbology encodes like Interleaved 2of5 but encodes the last data character as Industrial 2of5. The number of data digits is therefore always an odd number.
Information is carried in the bars and the spaces.
The start and stop pattern is not unique inside the code. It is therefore essential to use the fixed length option to prevent partial reads.

Matrix 2of5
This symbology encodes 1 digit in each character, the number of digits can therefore be an odd or an even number.
Information is carried in the bars and spaces.

String format
Industrial, Interleaved 2of5, S Code or Matrix 2of5:

leading zero	data (1 or more digits)	check digit

Options for code 2of5:
-Disable transmission of the check digit
-Enable check digit check
-Selection of the minimum number of data characters
-Disable space check for industrial 2of5
-Transmit S Code as Interleaved 2of5

Minimum data characters:
Code 2of5 are checked for a minimum of 1, 3 or 5 characters as set by the user. If the number of characters in the label is less the the number set, the label will be rejected. If the fixed length option is used for a Code 2of5 type label, than such label will additionally be checked for fixed length. This option will no longer be supported in future software releases.

Space check:
This option enables the reading of Industrial 2of5 labels with a large or irregular spacing.

Transmit S Code as Interleaved 2of5:
This option enables to transmit S Code as Interleaved 2of5 by adding a leading zero.

3.3.6 Options for Code 2of5

	SET	|||||| ||| ||| ||||
Transmit CD	|||||| ||| ||| |||	**EØ**
Not transmit CD	|||||| ||| ||| |||	E1
Check CD	|||||| ||| ||| |||	G1
Not check CD	|||||| ||| ||| |||	**GØ**
Minimum data one character	|||||| ||| ||| |||	GE
Minimum data three character	|||||| ||| ||| |||	GF
Minimum data five character	|||||| ||| ||| |||	**GI**
Enable space check for Industrial 2of5	|||||| ||| ||| |||	**GJ**
Disable space check for Industrial 2of5	|||||| ||| ||| |||	GK
Not transmit S Code as Interleaved 2of5	|||||| ||| ||| |||	**GH**
Transmit S Code as Interleaved 2of5	|||||| ||| ||| |||	GG
	END	|||||| ||| ||| ||||

3.3.7 Options for IATA

The IATA code is a variable length symbology with an optional check digit and non printable start/stop characters.
The following characters are supported:
The digits 0 upto 9

The checksum is calculated as the modulo seven of the data string. IATA is acronym for International Air Transport Association.

String format:
A possible format of IATA is the following:

CPN	Airline code	form code	SN	Check digit

CPN	coupon	1 digit
AC	airline code	3 digits
FC	form code	2 digits
SN	serial number	8 digits
CD	check digit	1 digit
	total	15 digits

Options for IATA:
-Enable check digit check
-Selection of the check digit calculation
-Disable transmission of the check digit

Check digit calculation:
If the check digit calculation is required, then the appropriate calculation method must be selected.

3.3.7 Options for IATA

	SET	
	SET	
Not check CD		**4H**
Check S/N only		4I
Check CPN, S/N		4J
Check CPN, airline and S/N		4K
Transmit CD		**4L**
Not transmit CD		4M
	END	

3

Code options

3.3.8 Options for MSI/Plessey

MSI Plessey is a variable length symbology with one or two optional check digit calculations CD1 and CD2 and non printable start/stop characters.
The following characters are supported:
The digits 0 upto 9

The checksum is calculated as the sum modulo 10 or 11 of the data characters. The checksum CD2 is calculated as the sum modulo 10 or 11 of the data characters and CD1.

String format:

data (1 upto 13 digits)	CD1	CD2

Options for MSI/Plessey:
-Disable check digit check
-Selection of the check digit calculation
-Selection of the number of check digits to be transmitted

Check digit:
If the check digit calculation is required, then the appropriate calculation method must be selected.

Not transmit CD:
The character positions CD1 and CD2 are not transmitted.

Transmit CD1:
The character position CD2 is not transmitted.

Transmit CD1 and CD2:
All characters in the label are transmitted.

3.3.8 Options for MSI/Plessey

	SET	
Not check CD		4A
Check 1 CD = MOD 10		**4B**
Check 2 CD's = MOD 10/MOD 10		4C
Check 2 CD's = MOD 10/MOD 11		4D
Check 2 CD's = MOD 11/MOD 10		4R
Not transmit CD		4G
Transmit CD1		**4E**
Transmit CD1 and CD2		4F
		4S
	END	

3.3.9 Options for Telepen

Telepen is a variable length symbology with a check digit and non printable start/stop characters.
The following characters are supported:

In numeric mode, the digits 00 upto 99
In full ASCII mode, all 128 ASCII characters

The check digit calculation is derived from the sum of all data characters modulo 127. The check digit can not be transmitted.

String format:

data
(1 upto 32 characters)

Options for Telepen:
-Selection of ASCII mode

3.3.9 Options for Telepen

	SET	
Numeric mode		**D2**
ASCII mode		D3
		DC
		DD
		DE
		DF
		DG
		DH
		DI
		DJ
		DK
	END	

3 Code options

3.3.10 Options for UK/Plessey

UK Plessey is a variable length symbology with a mandatory checksum and non printable start/stop characters.
The following characters are supported:
> the digits 0 upto 9
> the characters A upto F

The checksum contains 2 digits and is calculated from the numerical values of all the data digits.

String format:

data (5 upto 20 characters)	check digits

Options for UK Plessey:
> -Disable transmission of the check digits
> -Enable library space (CLSI) insertion

Space insertion:
> This option inserts spaces in position 2, 5, 11, 14 of the data string for use in library systems.

3.3.10 Options for UK/Plessey

	SET	
Transmit CD's		**4N**
Not transmit CD's		4O
Disable space insertion		DO
Enable space insertion		DN
		DP
		DQ
		DL
		DM
		DR
		DS
		DT
	END	

3.3.11 Options for Code 128 and EAN 128

Code 128 is a variable length symbology with a mandatory check digit and non printable start/stop characters.
The following characters are supported:
- all 128 ASCII characters
- 4 non data function characters   - 3 start characters
- 4 code set selection characters   - 1 stop character

The check sum is calculated as the sum modulo 103 of the start character and the weighted values of the data and special characters.

String format: | Data (1 or more characters) |

EAN 128. In this mode the Code128 data is translated to the EAN 128 format. EAN 128 data starts with the FNC1 character and separates 2 data fields with the FNC1 character.
The first FNC1 character is translated to]C1, and the second FNC1 character is translated to an ASCII GS (hex 1D) character.

String format: |]C1 | Data characters | <GS> | Data characters |

Options for EAN 128: Enable EAN128 conversion

Enable EAN 128 only:
    In this mode the decoded data characters are translated to the EAN 128 format. If the data does not comply with the EAN 128 format, then the label is rejected.

Enable EAN 128 if possible:
    In this mode the decoded data characters are translated to the EAN 128 format. If the data does not comply with the EAN 128 format, then the label is transmitted as Code 128.

FNC2 Concatenation:
    If a Code 128 bar code contains a leading FNC2 character, the data is stored into the reader's buffer. As soon as a Code 128 bar code is read without a leading FNC2 character, the data is appended to the reader's buffer and the entire buffer is transmitted and cleared for new data. In case a non Code 128 bar code is read, the data in the non-Code 128 bar code is transmitted and the buffer is cleared. The buffer size is reader dependent.

3.3.11 Options for Code128, EAN128

	SET	|||‖‖‖|||
Disable EAN 128	‖‖‖|||‖|‖	**OF**
Enable EAN 128 only	‖‖‖|||‖|‖	JF
Enable EAN 128 if possible	‖‖‖||‖|‖	OG
Disable FNC2 concatenation	‖‖‖||‖|‖	**MP**
Enable FNC2 concatenation	‖‖‖||‖|‖	MO
	END	|‖|‖‖|‖‖|||

3 Code options

4 STRING OPTIONS

This chapter describes the alterations which can be made to the format of the transmitted data string.

Options available are:
    Case conversion
    Transmission of a code identifier
    Transmission of the code length
    Transmission of a prefix
    Transmission of a suffix

From software version 5.0 the prefix and/or suffix may include a code identifier and/or the code length.

Software releases prior to version 5.0 support only code length in a fixed position of the string. The labels for these readers have been included in the compatibility section.

The string is transmitted as follows:

prefix	bar code data	suffix

Where bar code data has the format as described in chapter 3.

4.1 Case conversion

The bar code data may be converted to either lower or upper case or the case may be exchanged. These options may be used if the user of a wedge has a preference to leave for instance the CAPSLOCK ON or if the host requires upper case characters only.

Test string	AbCd
No case conversion	AbCd
Convert to upper case	ABCD
Convert to lower case	abcd
Exchange case	aBcD

Table 4.1; Test string.

4.1 Case conversion

	SET	
No case conversion		**YZ**
Convert to upper case		YW
Convert to lower case		YX
Exchange case		YY
	END	

4.2 Set prefix and suffix

A prefix and suffix of maximum 4 direct input entries each may be included in front and at the end of the string respectively.

Bar code readers with an RS232 interface may be programmed with all 128 ASCII characters. Keyboard wedges may additionally be programmed with the special keys supported by the keyboard, e.g. function keys.

The prefix and suffix for the linker interface are not configurable.
The default prefix and suffix for the OCIA and IBM4683 interface are dependent on interface type and symbology but can be reconfigured.

Default settings are:

	Prefix	Suffix
RS232	None	^M (CR)
Wedge	None	RETURN

How to set a prefix or a suffix?

To configure a prefix for example for Code-39 as C39: scan the following labels:
```
<SET>
            <Set prefix Code 39>    page 109
            <C>                     page 122
            <3>                     page 121
            <9>                     page 121
            < : >                   page 119
<END>
```

Bar code readers which do not support a different prefix or suffix for each symbology have to make use of <ALL>.

How to clear a prefix or suffix

To clear the suffix for example for Code 128 scan the following labels:
```
<SET>
            <Set suffix Code 128> page112
<END>
```

How to set a suffix for all symbologies

To configure for example the suffix <CR> for all symbologies scan the following labels:
```
<SET>
            <Set suffix ALL>        page111
            <^M (CR)>               page129
<END>
```

Note that this last example is for an RS232 interface. For a wedge interface a ^M (CR) results in the key combination <CTRL>M.

If the direct input key <RETURN> from page 115 is selected then the result is a <carriage return> or <Enter> key.
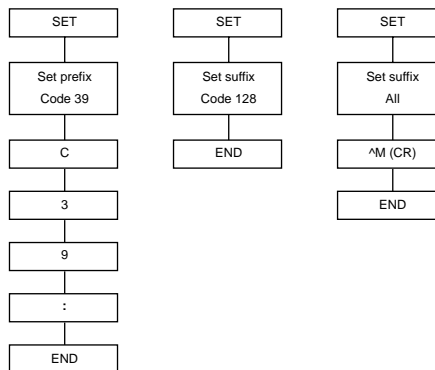
fig.4.1; Setting prefix, suffix

Preamble and postamble

A preamble is transmitted before the prefix and can contain upto 8 direct input characters.
A postamble is transmitted after the suffix and can contain upto 8 direct input characters.
A preamble and postamble will be transmitted for all symbologies. By default, the preamble and post-amble is empty.

A code identification and the code length may be included as a prefix or suffix. The direct input 'code identifier' provides a quick method of programming in addition to programming a separate prefix or suffix for each bar code type.

These direct input characters count as 1 entry of the 4 permissible entries for a prefix or suffix. The code length is transmitted as 2 digits, representing the decimal number of data characters transmitted, excluding prefix and suffix characters.

UPC-A	C	Code 39	V
UPC-A + 2	F	Code 39 full ASCII	W
UPC-A + 5	G	It.Pharmaceutical	Y
UPC-E	D	Codabar	R
UPC-E + 2	H	Codabar ABC	S
UPC-E + 5	I	Codabar CX	f
EAN-8	A	Industrial 2of5	O
EAN-8 + 2	J	Interleaved 2of5	N
EAN-8 + 5	K	S Code	g
		Matrix 2of5	Q
EAN-13	B	IATA	P
EAN-13 + 2	L	Code 93	U
EAN-13 + 5	M	Code 128	T
		EAN 128	T
		MSI/Plessey	Z
		Telepen	d
		UK/Plessey	a

Table 4.2; Code identifiers.

Example:
If you want to configure the prefix
    <code identifier>:<code length>:
scan the following labels:

    <SET>
        <Set prefix all>
        <Code identification>
        <:>
        <Code length>
        <:>
    <END>

If you want to use the code identifiers, but need another code identifier for Code 39, you scan the following labels:

<SET>
    <Set prefix all>
    <Code identification>
    <:>
    <Set prefix Code 39>
    <$>
    <:>
<END>
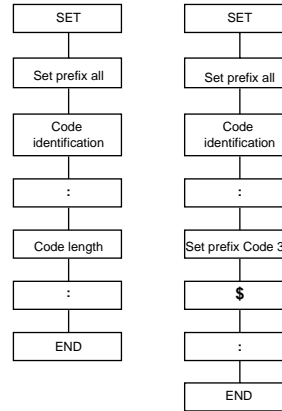
fig.4.2; Setting prefix.

4.2 Set prefix (1)

	SET	
All Codes		RY
UPC-A		N1
UPC-A + add-on		MØ
UPC-E		N2
UPC-E + add-on		M1
EAN-13		N3
EAN-13 + add-on		M2
EAN-8		N4
EAN-8 + add-on		M3
		MC
		MD
	END	

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4.2 Set prefix (2)

	SET	
Code 39		M4
Codabar		M5
Industrial 2of5		M6
Interleaved 2of5		M7
S Code		MB
Matrix 2of5		GL
IATA		I8
Code 93		M8
Code 128		M9
MSI/Plessey		NØ
Telepen		L8
	END	

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4.2 Set prefix (3)

	SET	
UK/Plessey		MA
Clear all prefixes		MG
Preamble		MZ
		MH
		MI
		MJ
		MK
		ML
		OC
		OD
		OE
	END	

U110

4.2 Set suffix (1)

	SET	
All Codes		RZ
UPC-A		N6
UPC-A + add-on		OØ
UPC-E		N7
UPC-E + add-on		O1
EAN-13		N8
EAN-13 + add-on		O2
EAN-8		N9
EAN-8 + add-on		O3
		PN
		PO
	END	

U111

4.2 Set suffix (2)

	SET	
Code 39		O4
Codabar		O5
Industrial 2of5		O6
Interleaved 2of5		O7
S Code		OB
Matrix 2of5		GM
IATA		I9
Code 93		O8
Code 128		O9
MSI/Plessey		N5
Telepen		L9
	END	

U112

4.2 Set suffix (3)

	SET	
UK/Plessey		OA
Clear all suffixes		PR
Postamble		PS
		PT
		PU
		PV
		PW
		PX
		PY
		PZ
		PQ
	END	

U113

4.3 Direct input keyboard keys (1)

	SET	
	SET	(barcode)
F1	(barcode)	8J
F2	(barcode)	8K
F3	(barcode)	8L
F4	(barcode)	8M
F5	(barcode)	8N
F6	(barcode)	8O
F7	(barcode)	8P
F8	(barcode)	8Q
F9	(barcode)	8R
F10	(barcode)	8S
F11	(barcode)	8T
	END	(barcode)

U114

4.3 Direct input keyboard keys (2)

	SET	
	SET	(barcode)
F12	(barcode)	8U
Backspace	(barcode)	9X
TAB	(barcode)	7H
RETURN	(barcode)	**7I**
Enter (Numeric pad)	(barcode)	7Q
Enter make (alpha pad)	(barcode)	7R
Enter make and break (alpha pad)	(barcode)	7S
ESC	(barcode)	7J
Arrow down	(barcode)	7K
Arrow up	(barcode)	7L
	(barcode)	9R
	END	(barcode)

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String options

4.3 Direct input keyboard keys (3)

	SET	
Arrow right		7M
Arrow left		7N
<DEL>		7T
<INSERT>		VQ
<HOME>		VR
<END>		VS
Page up		7O
Page down		7P
Left <Shift>		7U
Left <Ctrl>		7W
Left <Alt>		7Y
	END	

U116

4.3 Direct input keyboard keys (4)

	SET	
Right <Shift>		7V
Right <Ctrl>		7X
Right <Alt>		7Z
CAPSLOCK		9S
	END	

U117

4.3 Direct input character misc. (1)

	SET	
<SPACE>		5A
!		5B
"		5C
#		5D
$		5E
%		5F
&		5G
'		5H
(		5I
)		5J
*		5K
	END	

U118

4.3 Direct input character misc. (2)

	SET	
+		5L
,		5M
-		5N
.		5O
/		5P
:		6A
;		6B
<		6C
=		6D
>		6E
?		6F
	END	

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4.3 Direct input character misc. (3)

	SET		
@		6G
[		7A
\		7B
]		7C
^		7D
_		7E
`		7F
{		9T
|		9U
}		9V
~		9W
	END	

U120

4.3 Direct input numeric

	SET		
0		QØ
1		Q1
2		Q2
3		Q3
4		Q4
5		Q5
6		Q6
7		Q7
8		Q8
9		Q9
	END	

U121

4.3 Direct input character (1)

	SET		
A		ØA
B		ØB
C		ØC
D		ØD
E		ØE
F		ØF
G		ØG
H		ØH
I		ØI
	END	

U122

4.3 Direct input character (2)

	SET		
J		ØJ
K		ØK
L		ØL
M		ØM
N		ØN
O		ØO
P		ØP
Q		ØQ
R		ØR
	END	

U123

4.3 Direct input character (3)

	SET		
S		ØS
T		ØT
U		ØU
V		ØV
W		ØW
X		ØX
Y		ØY
Z		ØZ
	END	

U124

4.3 Direct input lower case character (1)

	SET		
a		$A
b		$B
c		$C
d		$D
e		$E
f		$F
g		$G
h		$H
i		$I
	END	

U125

4.3 Direct input lower case character (2)

	SET		
j		$J
k		$K
l		$L
m		$M
n		$N
o		$O
p		$P
q		$Q
r		$R
	END	

U126

4.3 Direct input lower case character (3)

	SET		
s		$S
t		$T
u		$U
v		$V
w		$W
x		$X
y		$Y
z		$Z
	END	

U127

4.3 Direct input control character (1)

	SET	
^@(NULL)		9G
^A(SOH)		1A
^B(STX)		1B
^C(ETX)		1C
^D(EOT)		1D
^E(ENQ)		1E
^F(ACK)		1F
^G(BEL)		1G
^H(BS)		1H
^I(HT)		1I
	END	

U128

4.3 Direct input control character (2)

	SET	
^J(LF)		1J
^K(VT)		1K
^L(FF)		1L
^M(CR)		1M
^N(SO)		1N
^O(SI)		1O
^P(DLE)		1P
^Q(DC1)		1Q
^R(DC2)		1R
	END	

U129

4.3 Direct input control character (3)

	SET		
^S(DC3)		1S
^T(DC4)		1T
^U(NAK)		1U
^V(SYN)		1V
^W(ETB)		1W
^X(CAN)		1X
^Y(EM)		1Y
^Z(SUB)		1Z
	END	

U130

4.3 Direct input control character (4)

	SET		
^[(ESC)		9A
^\(FS)		9B
^](GS)		9C
^^(RS)		9D
^_(US)		9E
DEL(ASCII 127)		9F
	END	

U131

4.3 Direct input code id/length

	SET	
Code identification		$2
Code length		$3
	END	

U132

4 String options

5 READ OPTIONS

This chapter allows to set the read mode, trigger type and redundancy.

5.1 Read mode options

The following read modes are available:

Single read:
    When a bar code has been decoded, the reader will be turned OFF. The reader must be triggered again to read another label. This option and 'Disable trigger' can not be programmed at the same time.

Multiple read:
    When a bar code has been decoded, the reader will stay ON for a time as set by 'Read time options' or indefinitely if the trigger switch has been disabled. The same label can only be decoded again after the label has not been detected for a number of scans.

Continuous read:
    The reader will produce as much data as it can decode regardless whether it is the same or not. This mode is mainly used for demonstration and diagnosis.

Disable trigger:
    This is applicable to readers which have a trigger switch. When this option is selected, the reader will stay ON all the time.
    Note: Selecting this option for a laser reader means that the laser diode is ON continuously, which may reduce the lifetime of this component. Also local legislation may require that the trigger switch is always enabled. Therefore it is recommended not to disable the trigger switch for laser readers.

Add-on wait mode:
    Used if UPC/EAN with add-on is enabled. The reader searches within the selected time for a valid add-on code. If a valid add-on code is found, the reader transmits the data immediately. If nothing is found behind the code, the scanner will transmit the data without add-on. If something is found behind the code, the reader ignored the code in case it is not a valid add-on.

U134

5.1 Read mode options

	SET	||||||||||||||
Single read	||||||||||	SØ
Multiple read	||||||||||	**S1**
Continuous read	||||||||||	S2
Disable trigger	||||||||||	S7
Enable trigger	||||||||||	S8
Add-on wait mode disabled	||||||||||	XA
Add-on wait mode 0.25 sec.	||||||||||	XB
Add-on wait mode 0.50 sec.	||||||||||	**XC**
Add-on wait mode 0.70 sec.	||||||||||	XD
	END	||||||||||||||

5

Read options

U135

5.1.1   Multiple read reset time

This option can be used in conjunction with multiple read mode. It sets the time the reader should be pointed away from the label, before it can decode the same label again.

5.1.1 Multiple read reset time

	SET	
50 ms		AH
100 ms		AI
200 ms		AJ
300 ms		AK
400 ms		AL
500 ms		**AM**
600 ms		AN
	END	

U136   U137

5.1.2   Quiet zone options

With this option the reader can decode bar codes that
have smaller start and/or end margins than specified
for the symbology. Be careful when using this option.
It may increase the possibility of partial reads and
ghost reads. Do not use smaller margin checks then
necessary. If possible replace the bar code labels by
ones that have correct start and end margins.

5.1.2 Quiet zone options

	SET	||||| ||| |||||
No margin check	||||| ||||| || |||	YN
Margin check 1/7 nominal	||||| ||||| || |||	YO
Margin check 2/7 nominal	||||| ||||| || |||	YP
Margin check 3/7 nominal	||||| ||||| || |||	YQ
Margin check 4/7 nominal	||||| ||||| || |||	YR
Margin check 5/7 nominal	||||| ||||| || |||	YS
Margin check 6/7 nominal	||||| ||||| || |||	YT
Margin check normal	||||| ||| ||| |||	**YU**
	END	||||| ||||| |||||

5.1.3   Auto trigger options

These options are used to activate the auto trigger
option of the reader. This is only supported for reader
equipped with the auto trigger option.

Disable auto trigger:
    The auto trigger function is not activated.

Enable auto trigger dark > bright:
    The reader will be triggered if it moves from a dark
    to bright surface.

Enable auto trigger bright > dark:
    The reader will be triggered if it moves from a
    bright to dark surface.

Enable auto trigger dark > bright < dark:
    The reader will be triggered if it detects changes in
    brightness.

Sensitivity:
    Read this label followed by maximum three direct
    input numeric characters in chapter 4.3. The
    minimum sensitivity is 24 and the maximum
    sensitivity is 114. the sensitivity can be adjusted in
    steps of 6. If a value is selected lower then the
    minimum value, the minimum value will be used. If
    a value is selected higher then the maximum
    value, the maximum value will be used. If a value
    is selected between 24 and 114, the values closest
    to a multiple of 6 is used The default sensitivity is
    60.

5.1.3 Auto trigger options

	SET	||||||| |||||
Disable auto trigger	|||||| ||| ||||	**+F**
Enable auto trigger dark > bright	|||||| || ||| |||	+G
Enable auto trigger bright > dark	|||||| ||| ||||	+H
Enable auto trigger dark > bright < dark	|||||| ||| ||||	+I
Sensivity	|||||| ||| ||||	+J
	END	||||| |||| ||||

5.2 Read time options

The length of the period that the reader is ON after the trigger switch is pressed, or (in multiple or continuous read mode) after a label has been read.
Selecting a read time of 0 means that the reader will stay ON as long as the trigger switch is being pressed.
Selecting a read time for readers without a trigger switch, or when the trigger switch is disabled, does not have any effect.

5.2 Read time options

	SET	
0 seconds		YØ
1 second		Y1
2 seconds		**Y2**
3 seconds		Y3
4 seconds		Y4
5 seconds		Y5
6 seconds		Y6
7 seconds		Y7
8 seconds		Y8
Read time x 10		YL
Indefinitely		YM
	END	

5.3 Power control

For CCD readers without a trigger switch the LED's may be pulsed to reduce power consumption. If this option is selected the LED's will flash until the reader is reading a bar code. The LED's will remain ON as long as the reader detects a bar code.

For some CCD readers the LED's may be placed in a low power mode to reduce power consumption. If this option is selected the LED's will emit less light which will reduce the depth of field.

For some RS232 readers the RS232 interface may be placed in a stand by mode to reduce power consumption. If this option is selected, the RS232 outputs from the reader are in a high impedance state when the reader is not transmitting. The reader can not receive RS232 commands when this option is selected.

5.4 Redundancy options

This is the number of times that a label must be correctly decoded before it is transmitted. Selecting a higher redundancy count makes reading slower, but it reduces the probability of reading errors, especially when labels of poor definition are used.

5.3 Power control / 5.4 Redundancy

	SET	|||||| |||| |||||
LED's continuous	|||||||| ||| |||	**S5**
LED's pulsed	|||||| ||| ||| ||	S6
LED's low power disabled	|||| |||| ||| |||	**VX**
LED's low power enabled	|||| |||| ||||| ||	VW
RS232 low power stand by disabled	|||||| ||| |||		**S4**
RS232 low power stand by enabled	||||||| ||| ||| ||	S3
No redundancy	|||| |||| ||| |||	XØ
Two times redundant	|||| |||||| |||	**X1**
Three times redundant	|||| |||||| |||	X2
Four times redundant	|||| |||||| |||	X3
	END	|||| ||||| ||||||

5.5 Positive and negative bar codes

Usually bar codes are printed black on white, but sometimes white on black. These labels are called positive and negative respectively. In case the 'negative bar codes' option has been selected, positive labels may not be decoded anymore or with difficulty. This also applies to menu labels. To enable the reader to read positive labels again, a number of negative menu labels have been included.

5.5 Pos. and neg. bar codes

	SET	
Positive bar codes		**V2**
Negative bar codes		V3
Positive and negative bar codes		V4
Positive bar codes		**V2**
Positive and negative bar codes		V4
SET END		ZZ
	END	

5 Read options

5.6 Resolution and density

The following options optimise the reader for different label qualities. The specific options supported are dependent on the reader hardware. Experiment with these options to get optimum reading performance.

Filter:
>   The option 'filter ON' improves the reading of low density labels and labels with reduced printing quality.

Scan rate:
>   The option 'scan rate LOW' improves the reading of high density labels together with a reduced power consumption.

Digitiser:
>   The option 'high density' improves the reading of labels at a near distance and reading high density labels.

5.6 Resolution and density options (1)

	SET	|||||||||||
Filter ON	||||||||||||	X4
Filter OFF	||||||||||||	X5
Filter alternating ON/OFF	||||||||||||	X6
Scan rate high	||||||||||||	TJ
Scan rate low	||||||||||||	TK
Scan rate alternating high/low	||||||||||||	TL
Digitiser normal	||||||||||||	TM
Digitiser high density	||||||||||||	TN
Digitiser alternating normal/high	||||||||||||	TO
	END	|||||||||||

5 Read options

Gain:
The option 'gain HIGH' improves the reading of low contrast labels and high density labels.

Density	High	Low
Filter	OFF	ON
Scan rate	Low	High
Digitiser	High density	Normal
Gain	High	Normal

Contrast	Low	Normal
Gain	High	Normal

Table 5.1; Label quality.

Examples:

High density ||||||||||||||

Low density ||||||||||||||

Low contrast ||||||||||||||

Normal contrast ||||||||||||||

5.6 Resolution and density options (2)

	SET	|||||||||||||
Gain normal	|||||||||||||	TP
Gain high	|||||||||||||	TQ
Gain alternating	|||||||||||||	TR
	END	|||||||||||||

6 INDICATOR OPTIONS

This chapter describes the options for the Buzzer and Good Read LED.

6.1 Buzzer settings

These options determine the buzzer type, tone, duration and loudness. By default, the buzzer is disabled for Linker type readers.

Buzzer type:
The buzzer may be disabled or enabled as either a hardware or software buzzer.
Not all readers support both a hardware and software buzzer.

Buzzer tone:
If a software buzzer is used, the buzzer tone may be selected as shown in the table below:\

Buzzer	Frequency	Duration
Single tone	3 KHz	100%
High - low	3 KHz - 2.5 KHz	50% - 50%
Low - high	3 KHz - 4 KHz	50% - 50%

Table 6.1; Buzzer settings.

Buzzer duration and loudness:
If a software buzzer is used, a buzzer duration of 50, 100, 200 or 400 msec. may be selected. The loudness can be adjusted in four different steps.

6.1 Buzzer settings (1)

	SET	||||||
Enable software buzzer	||||||	**W8**
Enable hardware buzzer	||||||	W9
Disable buzzer	||||||	WØ
Single tone buzzer	||||||	W1
High - low buzzer	||||||	**W2**
Low - high buzzer	||||||	W3
Buzzer duration 50 msec.	||||||	W7
Buzzer duration 100 msec.	||||||	W4
Buzzer duration 200 msec.	||||||	**W5**
Buzzer duration 400 msec.	||||||	W6
	END	||||||

Buzzer before transmission :
  The good read buzzer will be activated after
  decoding the bar code, but before transmission.
  During the transmission the buzzer sequence
  will be completed.

Buzzer After transmission:
  The good read buzzer will be activated after
  transmission.

Enable startup buzzer:
  When this options is selected, the reader will
  generate a single good read buzzer to indicate
  the reader is ready after the reader is supplied
  with power.

Disable startup buzzer:
  When this options is selected, the reader will not
  sound the buzzer after the reader is supplied with
  power.

6.1 Buzzer settings (2)

	SET	|||||| ||||| ||||| |||
Buzzer loudness: Maximum	||||||| ||| ||| |||	**TØ**
Buzzer loudness: Loud	||||||| ||| ||| |||	T1
Buzzer loudness: Normal	||||||| ||| ||| |||	T2
Buzzer loudness: Minimum	||||||| ||| ||| |||	T3
Buzzer before transmission	||||| |||| ||| |||	**VY**
Buzzer after transmission	||||| |||| ||| |||	VZ
Disable startup buzzer	||||| |||| ||| |||	GD
Enable startup buzzer	||||| |||| ||| |||	GC
	END	|||||| ||||| ||||| |||

6.2 Good read LED

The Good Read LED can be disabled or set for several durations.

6.2 Good read LED

	SET	|||| |||| ||||| |||
Disable indicator	||||||| ||| ||| |||	T4
Indicator duration: 0.2 s	|||||| ||| ||| |||	**T5**
Indicator duration: 0.4 s	|||||| ||| ||| |||	T6
Indicator duration: 0.8 s	|||||| ||| ||| |||	T7
	END	|||| |||| ||| ||||

7 MISCELLANEOUS

The options on this page are primarily intended for diagnostic purposes.
The following options are available:

Transmit software version:
   The software version is transmitted.

Transmit settings:
   The reader settings are transmitted as a string of hexadecimal numbers.

Transmit ASCII printable string:
   The printable ASCII characters Hex 20 upto Hex 7F are transmitted.

Transmit ASCII control string:
   The non printable ASCII control characters Hex 00 upto Hex 1F are transmitted.

Disable configuring via RS232:
   The reader ignores all configuration commands from the RS232 port. The trigger and buzzer commands are still accepted.

Enable configuring via RS232:
   The reader accepts all configuration commands from the RS232 port.

Disable trigger via RS232:
   The reader ignores the trigger command, <Z> (Hex 5A), via the RS232 port.

Enable trigger via RS232:
   The reader accepts the trigger command via the RS232 port.

Disable buzzer via RS232:
   The reader ignores the buzzer command via the RS232 port.

Enable buzzer via RS232:
   The reader accepts the buzzer command, <B> (Hex 42) for the good read buzzer and <E> (Hex 45) for the error buzzer, via the RS232 port.

7 Miscellaneous

	SET	
Transmit software version		Z1
Transmit settings		Z3
Transmit ASCII printable string		ZA
Transmit ASCII control string		YV
Disable configuring via RS232		TS
Enable configuring via RS232		**TT**
Disable trigger via RS232		8B
Enable trigger via RS232		**8C**
Disable buzzer via RS232		WB
Enable buzzer via RS232		**WA**
	END	

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Miscellaneous

Disable Good read LED via RS232:
    The reader ignores the good read LED command
    via the RS232 port.
Enable Good read LED via RS232:
    The reader accepts the good read LED command,
    <L>(Hex 4C), via the RS232 port.

Disable ACK/NAK for RS232 commands:
    The reader does not transmit <ACK> nor <NAK>
    when a command is received.
Enable ACK/NAK for RS232 commands:
    The reader transmits an <ACK> (Hex 06) after
    each valid RS232 command and a <NAK>
    (Hex 15) after each invalid RS232 command.

Error message - No label:
    Following this menu label a maximum of 4 direct
    input characters may be read. These characters
    will be transmitted if during the read time of the
    reader no label was detected. This function is only
    available on readers where the trigger is enabled.
    If no direct input character is read following the
    command, the error message is disabled.The
    function may be combined with 'Error message -
    No decode'.

Error message - No decode:
    Following this menu label a maximum of 4 direct
    input characters may be read. These characters
    will be transmitted if during the read time of the
    reader a label was detected, but nothing could be
    decoded. This function is only available on readers
    where the trigger is enabled. If no direct input
    character is read following the command, the error
    message is disabled.The function may be
    combined with 'Error message - No label'.
Example:
The following two examples will set the messages
'NL<CR>' and 'ND<CR>' for No label and No decode
respectively. The two examples may both be active at
the same time.
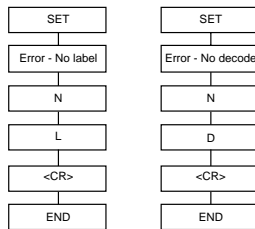
Fig.7.1; Setting error messages.

7 Miscellaneous (2)

	SET	
Disable good read LED via RS232		TY
Enable good read LED via RS232		**TZ**
Disable ACK/NAK for RS232 comm.		**WD**
Enable ACK/NAK for RS232 comm.		WC
Error message No label		TH
Error message No decode		TI
		TG
	END	

7

Miscellaneous

DMC program commands :
These options are only supported on readers which supports DMC programming language, and if DMC interpreter and DMC application are installed on the reader.

Start DMC program :
    This command starts the DMC program with the first instruction defined. The contents of numeric and string registers will be cleared, but records which are previously downloaded to the reader will be kept.

Stop DMC program:
    This command stops the DMC program and returns to the normal reader mode.

	SET	|||||| ||| |||||
Start DMC program	|||||| ||| |||| |||	//
Stop DMC program	|||||| ||| |||| |||	/$
	END	||||| |||| ||| |||

8 COMPATIBILITY

This section contains menu labels which are used in readers which do not support direct input configuration of prefixes and suffixes. These labels are not valid for readers supporting direct input configuring of prefixes and suffixes.

8 Special prefix and suffix (1)

	SET	
Suffix none		NA
Suffix CR		NB
Suffix LF		NC
Suffix CR/LF		ND
Suffix F1		NG
Suffix F2		NH
Suffix F3		NI
Suffix F4		NJ
Suffix F5		NK
Suffix F6		NL
Suffix F7		NM
	END	

8 Special prefix and suffix (2)

	SET	
Suffix F8		NN
Suffix F9		NO
Suffix F10		NP
Suffix F11		OH
Suffix F12		OI
Suffix ENTER numeric		ON
Suffix ENTER make		OJ
Suffix ENTER make & break		OK
Prefix NONE		NE
Prefix TAB		NF
Prefix F1		NQ
	END	

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8 Special prefix and suffix (3)

	SET	
Prefix F2		NR
Prefix F3		NS
Prefix F4		NT
Prefix F5		NU
Prefix F6		NV
Prefix F7		NW
Prefix F8		NX
Prefix F9		NY
Prefix F10		NZ
Prefix F11		OL
Prefix F12		OM
	END	

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8 Compatibility

8 Transmit code length (1)

	SET	
	SET	‖‖‖‖‖‖‖
UPC-A	‖‖‖‖‖‖‖	3A
UPC-A + add-on	‖‖‖‖‖‖‖	3B
UPC-E	‖‖‖‖‖‖‖	3C
UPC-E + add-on	‖‖‖‖‖‖‖	3D
EAN-13	‖‖‖‖‖‖‖	3E
EAN-13 + add-on	‖‖‖‖‖‖‖	3F
EAN-8	‖‖‖‖‖‖‖	3G
EAN-8 + add-on	‖‖‖‖‖‖‖	3H
	‖‖‖‖‖‖‖	3U
	‖‖‖‖‖‖‖	3V
	‖‖‖‖‖‖‖	3W
	END	‖‖‖‖‖‖‖

U168

8 Transmit code length (2)

	SET	
	SET	‖‖‖‖‖‖‖
Code 39	‖‖‖‖‖‖‖	3I
Codabar	‖‖‖‖‖‖‖	3J
Industrial 2of5	‖‖‖‖‖‖‖	3K
Interleaved 2of5	‖‖‖‖‖‖‖	3L
Code 93	‖‖‖‖‖‖‖	3M
Code 128	‖‖‖‖‖‖‖	3N
MSI/Plessey	‖‖‖‖‖‖‖	3O
Nixdorf Code	‖‖‖‖‖‖‖	3Q
Telepen	‖‖‖‖‖‖‖	3P
IATA	‖‖‖‖‖‖‖	3S
	‖‖‖‖‖‖‖	3X
	END	‖‖‖‖‖‖‖

U169

8 Transmit Code length (3)

	SET	‖‖‖‖‖‖‖
UK/Plessey	‖‖‖‖‖‖‖	3R
S Code	‖‖‖‖‖‖‖	3T
	END	‖‖‖‖‖‖‖

U170

8 Not transmit Code length (1)

	SET	‖‖‖‖‖‖‖
UPC-A	‖‖‖‖‖‖‖	**2A**
UPC-A + add-on	‖‖‖‖‖‖‖	**2B**
UPC-E	‖‖‖‖‖‖‖	**2C**
UPC-E + add-on	‖‖‖‖‖‖‖	**2D**
EAN-13	‖‖‖‖‖‖‖	**2E**
EAN-13 + add-on	‖‖‖‖‖‖‖	**2F**
EAN-8	‖‖‖‖‖‖‖	**2G**
EAN-8 + add-on	‖‖‖‖‖‖‖	**2H**
	END	‖‖‖‖‖‖‖

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8 Not transmit Code length (2)

	SET	
Code 39		2I
Codabar		2J
Industrial 2of5		2K
Interleaved 2of5		2L
Code 93		2M
Code 128		2N
MSI/Plessey		2O
Nixdorf Code		2Q
Telepen		2P
IATA		2S
	END	

U172

8 Not transmit Code length (3)

	SET	
UK/Plessey		2R
S Code		2T

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8 Languages

	SET	‖‖‖‖ ‖‖‖ ‖‖‖ ‖‖
French (numpad emulation)	‖‖‖‖‖ ‖‖‖ ‖‖ ‖‖	KH
French (without numpad emulation)	‖‖‖‖‖ ‖‖ ‖‖ ‖‖	KI
	END	‖‖‖‖ ‖‖‖‖ ‖‖‖ ‖‖

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APPENDIX A

A   Trouble shooting

This diagram can be of help if your reader does
not operate as expected. If any problem is not
covered or solved with this diagram you need
to contact your dealer.
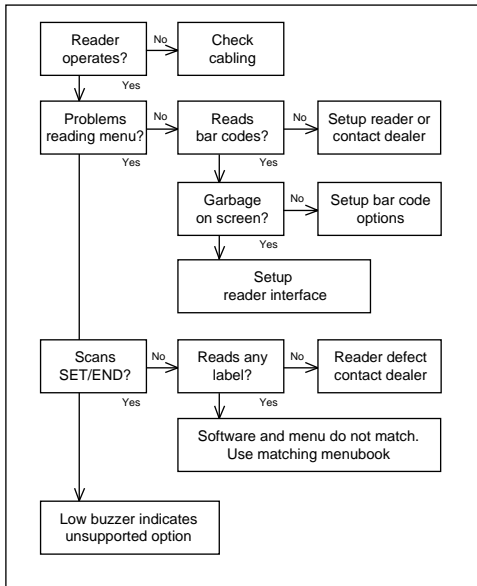
fig. A; Trouble shooting diagram.

Whether the reader operates or not can be
checked in the following way:
1. It should beep after the power has been
   switched ON.
2. It should either react on a trigger(if any) or
   it should emit light at the scan side of the
   reader (LED's).

Appendix

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B   Glossery of terms

Bar: The dark element of a printed symbol.

Bar code: An array of parallel rectangular bars and spaces which together represent data elements of characters in a particular symbology. The bars and spaces are arranged in a predetermined pattern, following unambiguous rules defined by the symbology.

Bar code density: The number of bar code characters which can be represented in a linear unit of measure. Bar code density is often expressed in characters per inch.

Bar code label: A label that carries a bar code and, optionally, other human-readable information; it can be affixed to an article.

Bar code reader: A device used to scan and decode a bar code symbol.

Bar width: The thickness of a bar measured from the edge closest to the symbol start character to the trailing edge of the same bar.

Baudrate: The rate at which data is transferred over a serial interface, expressed in bits per second.

CCD scanner: A scanning device which uses the CCD technology. CCD is an acronym for **C**harge **C**oupled **D**evice. Light from a lightsource within the CCD scanner is reflected by a bar code label and falls on an array of light sensitive elements in the scanner, the CCD. Whether the light is reflected depends on black or white parts of the bar code. The presence (or absence) of reflected light determines the presence (or absence) of electrical charge (electrons) in the distinct elements. The result is an electrical image of the bar code which can be used for further processing.

Character: A single group of bars and spaces which represent an individual number, letter or punctuation mark. It is usually composed of six, seven or eight bits.

Check digit: A character included within a symbol whose value is based, mathematically, on other characters within the symbol. It is used to perform a mathematical check to ensure the accuracy of the read.

Data: Digital information.

Default: A standard option or parameter setting. Default settings are present in the memory of a device. If no other value or option is chosen within a program (or bar code menu), the default settings are automatically chosen.

Disable: To disable an option means, making it impossible for this option to get active.

Emulation: The imitation of all or part of one device by another so that the mimicking device can accept the same data and perform the same functions as the actual device.

Enable: To enable an option means, to activate it.

Fixed length: Relates to a symbol in which the data elements must be of specific length.

Format: A message or data structure that allows identification of control and data parts by their position within a frame.

Handshaking: The initial exchange between two data communication systems prior to and during data transmission. The first unit sends a signal, then waits for an appropriate signal in response. A handshake method (such as XON/XOFF), parity setting, number of data bits, and number of stop bits.

Intensity: The amount of radiant or luminous flux per unit solid angle that is diverging from a light source.

Inter character delay: The time between transmitting two characters.

Interface: Allows devices to communicate with each other. Used most often to refer to

B

Appendix

the design of hardware and software which allows connection of network components and transfer of information.

Keyboard wedge: This device permits you to connect a bar code reader between the computer and it's keyboard by way of an Y-cable. The computer "suggests" that the scanned data is keyboard entered. Normal software can still be used.

Laser scanner: A scanning device which utilises a laser diode for it's source of illumination. Laser is an acronym for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation. A physical process which after focussing leads a light beam with special properties. A laser beam can be very powerful. For bar code scanning a low energy, safe laser beam is used. Opticon's laser scanners are Class 1 (Highest security).

Linker: Some bar code equipments only support a wand as scanning device. If a different scanning technique like laser or CCD is required, the linker or "wand emulator" can be a solution. This device allows a CCD or laser reader to be connected to the wand input of a decoder.

Modem (MOdulator/DEModulator): A hardware device that sends data via telephone lines from one computer to another or to a network resource, such as a file server.

Parity: A method of checking for errors in transmitted data. The eight bits of each transmitted character are added, and the total must always be an odd number for odd parity and an even number for even parity. If the total is wrong, the communications software detects that an error has occured during transmission and may request that the data is retransmitted.

Prefix: One or more characters which accompany transported data. A prefix is put in front of the data and is part of the frame.

Protocol: Usually, a specified method for determining how and when to format and send data. A serial (asynchronous) transmission protocol might include the baudrate, handshake method (XON/XOFF, etc.), parity setting, number of data bits (character length), and number of stop bits.

Resolution: In optics, sharpness; the ability of a scanner to read the narrow bars in bar codes.

Scanner: A device that examines a spatial pattern, one part after another, and generates analog or digital signals corresponding to the pattern. The scanner converts bar code symbols to electrical signals for input to a bar code reader decoder for processing and subsequent output through a data communications interface.

Scan rate: The number of scans (the attempts to recognise a bar code symbol optically) per time unit.

Start bit: A control bit used to indicate the start of a group of data bits being sent in asynchronous transmission.

Stop bit: A control bit used to indicate the end of a group of data bits being sent in asynchronous transmission.

Suffix: One or more characters which accompany transported data. A suffix is put at the end of the data and is part of the frame.

Symbology: A set of rules specifying the way in which data may be represented.

Wand: A handheld scanning device which has to be moved from one side of a bar code label to the other. The scanner should remain in contact with the surface of the label uninterruptedly.

B

Appendix

APPENDIX C

Example bar codes:

UPC A

0 071589 812308

EAN 13
(ISBN)

9 780123 456786 >
(0123456789)

EAN 13 ADDON 5

12345

7 376221 357463

Code 39
(Code 39 FULL ASCII)

C+O+D+E 39
(Code 39)

Code 39
(Italian Pharmaceutical)

V2GZD9
(908557705)

Codabar ABC-code

01234   56789
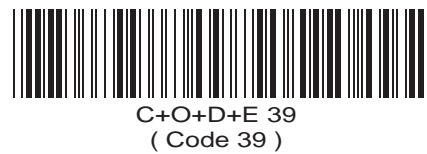
Industrial 2of5 (without CD)

0123456789

Interleaved 2of5 (with CD)
with bearer bars

0123456784

Telepen ASCII
(Telepen numeric)

Telepen
(57748174857483)

Code 128 Code C
(EAN 128)

0123456789
( ]C10123456789)

Notes:

U182   U183

Notes:

U184