



Lynx™

Instruction Manual

DATALOGIC

Lynx™

INSTRUCTION MANUAL



DATALOGIC

DATALOGIC S.p.A.
Via Candini 2
40012 - Lippo di Calderara di Reno
Bologna - Italy

Lynx™

Ed.: 12/2004

This manual refers to software version 2.10 and later.

ALL RIGHTS RESERVED

Datalogic reserves the right to make modifications and improvements without prior notification.

Datalogic shall not be liable for technical or editorial errors or omissions contained herein, nor for incidental or consequential damages resulting from the use of this material.

Product names mentioned herein are for identification purposes only and may be trademarks and or registered trademarks of their respective companies.

© Datalogic S.p.A. 2001 – 2004

820001471 (Rev. A)

CONTENTS

	HOW TO USE THIS MANUAL	ix
	SERVICES, SUPPORT AND WARRANTY	x
	COMPLIANCE	xi
	FCC	xi
	Laser Safety	xii
	LED Illuminator	xii
	Aiming System	xiii
	Power Supply	xvi
	Patents	xvi
1	GETTING STARTED	1
1.1	Description	1
1.2	Package Contents	1
1.3	System Connections	2
1.3.1	RS232 Connection	2
1.3.2	Wedge	3
1.3.3	USB Connection	4
1.4	Operating the Reader	5
1.4.1	Aiming System	5
1.4.2	Normal Operation	6
1.4.3	Image Capturing	7
	Basic Configuration Parameters	7
	Advanced Configuration Parameters	7
1.4.4	Autoscanning	9
	Normal Mode	9
	Pattern Mode	9
1.4.5	Camera Control	10
1.5	Defining Data Formatting	11
1.5.1	Concatenation	12
	One Code Per Scan	12
	All Codes Per Scan	12
1.6	Indicators	13
1.6.1	LED Indicators	13
1.6.2	Beeper	13
2	CONFIGURATION USING BARCODE SYMBOLS	14
2.1	Default Settings	15
2.2	Configuration Editing Commands	19
2.2.1	Enter and Exit Commands	19

2.2.2	Other Editing Commands.....	19
2.3	Interface Selection	20
2.4	RS232 Interface	21
	Baud Rate	21
	Parity.....	22
	Data Bits	22
	Stop Bits.....	22
	ACK/NACK Protocol	22
	Handshake.....	23
	FIFO.....	23
	Intercharacter Delay.....	23
	Intercode Delay.....	23
2.5	USB	24
2.5.1	USB COM Emulation	24
	Handshake.....	24
	Ack/Nack Protocol.....	24
	FIFO.....	24
	Intercharacter Delay.....	25
	Intercode Delay.....	25
2.5.2	USB Keyboard Emulation	25
	Intercharacter Delay.....	25
	Intercode Delay.....	25
	Keyboard Nationality.....	26
2.6	Wedge Interface.....	27
	Caps Lock.....	27
	Caps Lock Auto-Recognition.....	27
	Num Lock.....	27
	Intercharacter Delay.....	27
	Intercode Delay.....	27
	Keyboard Nationality	28
	Keyboard Setting.....	29
	Extended Header/Terminator Keys	32
	Set Custom Extended Header/Terminator Keys	33
2.7	Data Format	36
	Data Format Default.....	36
2.7.1	Symbology Independent Parameters	36
	Code Identifier.....	36
	Code Length	36
	Set Headers.....	37
	Headers	37
	Set Terminators	37
	Terminators.....	37
2.7.2	Symbology Dependent Parameters	38
	Custom Code Identifier	38
	Symbology Specific Format	38
	Symbology Headers.....	39

	Headers	39
	Symbology Terminators	39
	Terminators.....	40
	Symbology Character Substitution	40
	Character Substitution.....	40
	Symbology Character Deletion.....	41
	Character Deletion	41
	Symbology Specific Format Default	41
2.7.3	Concatenation.....	42
	Define Concatenation.....	42
	Concatenation Enable/Disable	42
	Concatenation Options.....	42
	First Concatenated Code Length	42
	Second Concatenated Code Length	42
	Third Concatenated Code Length	43
	Fourth Concatenated Code Length	43
	Concatenation with Intercode Delay.....	43
	Concatenation Failure Transmission.....	43
	Concatenation Timeout.....	44
	Transmission After Timeout	44
	Concatenation Result Code ID.....	45
2.8	Camera Control.....	46
	Exposure Mode.....	46
	Camera Calibration	46
2.9	Power Save.....	47
	Illumination System Power	47
2.10	Code Selection.....	48
2.10.1	Linear Symbologies.....	48
	UPC/EAN/JAN Family.....	48
	Code 39 Family.....	49
	Code 32 Family.....	50
	Interleaved 2 of 5 Family.....	51
	Codabar Family.....	52
	Code 128 Family.....	53
	Code 93 Family.....	54
2.10.2	2D Symbologies.....	56
	PDF417.....	56
	DataMatrix Family	56
	QR Family	57
	Postal Codes Family	57
2.11	Reading Parameters	59
	Trigger Mode.....	59
	Trigger Type.....	59
	Flash Mode	59
	Beeper Tone	60
	Beeper Volume	60

	Beeper Duration.....	60
	Read per Cycle.....	61
	Scan Timeout.....	61
2.11.1	User Defined Beeper.....	61
	User Defined Beeper Tone.....	61
	User Defined Beeper Volume.....	62
	User Defined Beeper Duration.....	62
	Test User Defined Beeper.....	62
2.11.2	Code Ordering and Selection.....	63
	Code per Scan.....	63
	Central Code Transmission.....	63
	Order By Code Length.....	63
	Order By Code Symbology.....	64
2.11.3	Autoscan.....	64
	Autoscan Mode.....	64
	Autoscan Aiming System.....	64
	Autoscan Hardware Trigger.....	65
	Autoscan Illumination System.....	65
	Safety Time.....	65
	Safety Time Duration.....	65
2.12	Capture Image.....	66
2.13	Advanced Image Capture.....	67
2.13.1	Image Preset 1.....	67
	Image Format – preset 1.....	67
	Resolution – preset 1.....	67
	JPEG Quality Factor – preset 1.....	67
	Window Dimensions – preset 1.....	68
	Brightness – preset 1.....	69
	Contrast – preset 1.....	69
	Zoom – preset 1.....	70
	Color Depth – preset 1.....	71
2.13.2	Image Preset 2.....	72
	Image Format – preset 2.....	72
	Resolution – preset 2.....	72
	JPEG Quality Factor – preset 2.....	72
	Window Dimensions – preset 2.....	73
	Brightness – preset 2.....	74
	Contrast – preset 2.....	74
	Zoom – preset 2.....	75
	Color Depth – preset 2.....	76
2.13.3	Image Preset 3.....	77
	Image Format – preset 3.....	77
	Resolution – preset 3.....	77
	JPEG Quality Factor – preset 3.....	77
	Window Dimensions – preset 3.....	78
	Brightness – preset 3.....	79

	Contrast – preset 3	79
	Zoom – preset 3.....	80
	Color Depth – preset 3	81
2.13.4	Image Preset 4.....	82
	Image Format – preset 4.....	82
	Resolution – preset 4	82
	JPEG Quality Factor – preset 4	82
	Window Dimensions – preset 4.....	83
	Brightness – preset 4	84
	Contrast – preset 4	84
	Zoom – preset 4.....	85
	Color Depth – preset 4	86
2.14	Advanced Data Format	87
2.14.1	Format Definition.....	88
	Method 1 - Extracting Information from Barcode.....	89
	Method 2 - Manipulating the Barcode Data	94
2.14.2	Match Conditions	105
2.14.3	Format Enable/Disable.....	107
2.14.4	Mismatch Result	108
3	TEST BARCODE SYMBOLS	109
4	TROUBLESHOOTING & MAINTENANCE.....	112
4.1	Cable Connections.....	112
4.2	Maintenance	112
5	TECHNICAL FEATURES	113
A	PROGRAMMING FOR EXPERT USERS.....	117
	Function Description	117
B	CODE IDENTIFIER TABLE.....	122
C	HEX AND NUMERIC TABLE	124

GENERAL VIEW

LYNX™

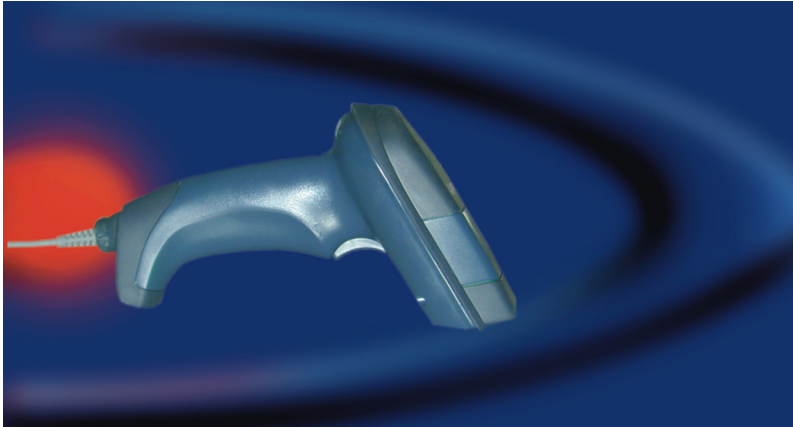


Figure A

1. Aiming System ON/
Wrong Read LED
(red)

2. Good Read LED
(green)

HOW TO USE THIS MANUAL

CONNECTIONS

To make system connections see par. 1.3.

CONFIGURATION

You can configure the LYNX™ reader in the following ways:

- **reading the programming barcode symbols in this manual**
configuration commands and their relative arguments are read individually using the symbols in this manual. See chapter 2, Appendix B and Appendix C.
- **using the Lynx™ Configuration Tools software utility**
programming the reader is accomplished by selecting configuration commands or printing them through a user-friendly graphical interface running on the PC. These commands are sent to the reader over the current communication interface; or they can be printed to be read. *Install the Datalogic VisualSetup program from the CD-ROM provided.*

DESCRIPTIONS

- For information on how to use the device read chapter 1.
- Explanations for some of the more complex barcode reading parameters are given next to the relative parameter in chapter 2.

SERVICES, SUPPORT AND WARRANTY

Datalogic provides several services as well as technical support through its website. Log on to www.datalogic.com/services and click on the [links](#) indicated for further information including:

- **Datalogic Services - Warranty Extensions and Maintenance Agreements**
- **Downloads - Software Downloads, Manuals and Catalogues**
- **Contact Us - Listing of Datalogic Subsidiaries and Quality Partners**
- **Authorised Repair Centres**

COMPLIANCE

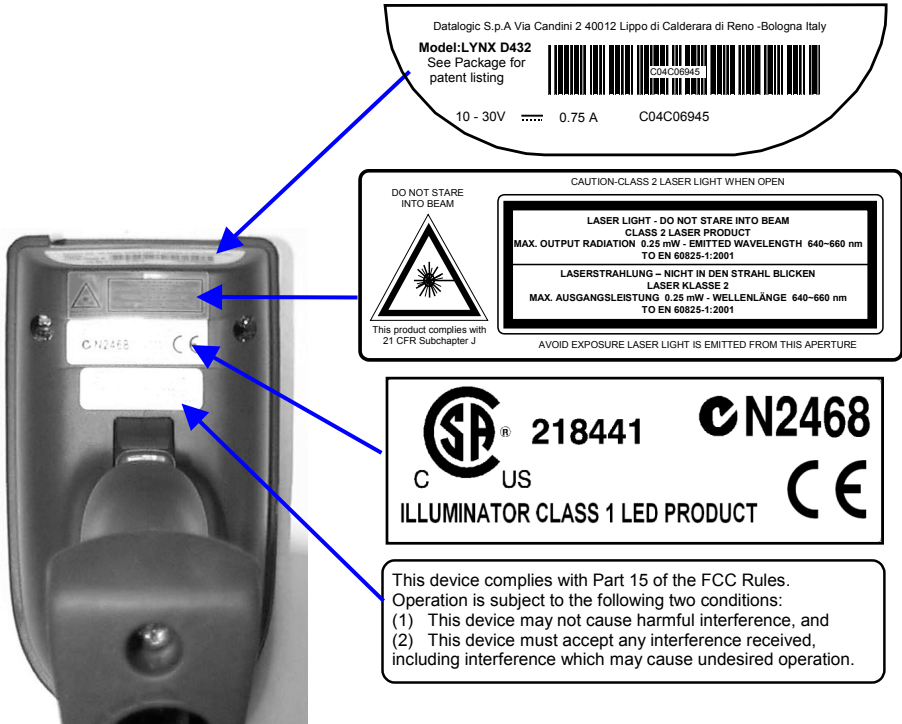


Figure B - LYNX™ Reader Product Labels

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference which may cause undesired operation.

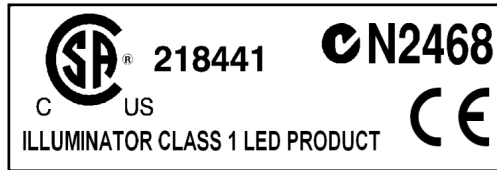
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

LASER SAFETY

The LYNX™ hand-held reader is a Class 1 LED product regarding its Illuminator and a Class 2 laser product regarding its Aiming System.

LED Illuminator

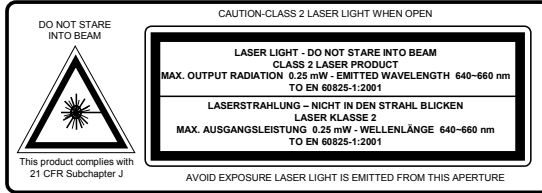
The use of an illuminator in the LYNX™ hand-held reader is a Class 1 LED product:



ILLUMINATORE LED CLASSE 1
AUSLEUCHTER LED KLASSE 1
ILLUMINATEUR A LED DE CLASSE 1
ILUMINADOR LED DE CLASE 1

Aiming System

The Lynx aiming system meets the requirements for laser safety.



I	D	F	E
LA LUCE LASER È VISIBILE ALL'OCCHIO UMANO E VIENE EMESSA DALLA FINESTRA INDICATA NELLA FIGURA.	DIE LASER-STRABLUNG IST FÜR DAS MENSCHLICHE AUGE SICHTBAR UND WIRD AM STRAHLAUS-TRITTSFENSTER AUSGESENDET (SIEHE BILD)	LE RAYON LASER EST VISIBLE À L'OEIL MU ET IL EST ÉMIS PAR LA FENÊTRE DÉSIGNÉE SUR L'ILLUSTRATION DANS LA FIGURE	A LUZ LÁSER ES VISIBLE AL OJO HUMANO Y ES EMITIDA POR LA VENTANA INDICADA EN LA FIGURA.
LUCE LASER NON FISSARE IL FASCIO APPARECCHIO LASER DI CLASSE 2 MASSIMA POTENZA D'USCITA: LUNGHEZZA D'ONDA EMESSA: CONFORME A EN 60825-1 (2001)	LASERSTRAHLUNG NICHT IN DEN STRAHL BLICKEN PRODUKT DER LASERKLASSE 2 MAXIMALE AUSGANGSLEISTUNG: WELLENLÄGE: ENTSPR. EN 60825-1 (2001)	RAYON LASER EVITER DE REGARDER LE RAYON APPAREIL LASER DE CLASSE 2 PUISSANCE DE SORTIE: LONGUER D'ONDE EMISE: CONFORME A EN 60825-1 (2001)	RAYO LÁSER NO MIRAR FIJO EL RAYO APARATO LÁSER DE CLASE 2 MÁXIMA POTENCIA DE SALIDA: LONGITUD DE ONDA EMITIDA: CONFORME A EN 60825-1 (2001)

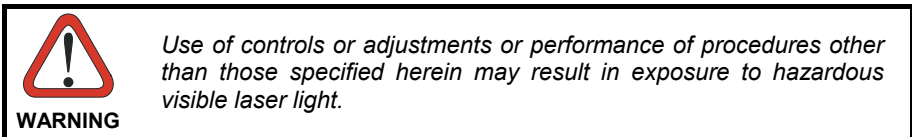
ENGLISH

The following information is provided to comply with the rules imposed by international authorities and refers to the correct use of your terminal.

STANDARD LASER SAFETY REGULATIONS

This product conforms to the applicable requirements of both CDRH 21 CFR 1040 and EN 60825-1 at the date of manufacture.

For installation, use and maintenance, it is not necessary to open the device.



The product utilizes a low-power laser diode. Although staring directly at the laser beam momentarily causes no known biological damage, avoid staring at the beam as one would with any very strong light source, such as the sun. Avoid that the laser beam hits the eye of an observer, even through reflective surfaces such as mirrors, etc.

ITALIANO

Le seguenti informazioni vengono fornite dietro direttive delle autorità internazionali e si riferiscono all'uso corretto del terminale.

NORMATIVE STANDARD PER LA SICUREZZA LASER

Questo prodotto risulta conforme alle normative vigenti sulla sicurezza laser alla data di produzione: CDRH 21 CFR 1040 e EN 60825-1.

Non si rende mai necessario aprire l'apparato per motivi di installazione, utilizzo o manutenzione.



ATTENZIONE

L'utilizzo di procedure o regolazioni differenti da quelle descritte nella documentazione può provocare un'esposizione pericolosa a luce laser visibile.

Il prodotto utilizza un diodo laser a bassa potenza. Sebbene non siano noti danni riportati dall'occhio umano in seguito ad una esposizione di breve durata, evitare di fissare il raggio laser così come si eviterebbe qualsiasi altra sorgente di luminosità intensa, ad esempio il sole. Evitare inoltre di dirigere il raggio laser negli occhi di un osservatore, anche attraverso superfici riflettenti come gli specchi.

DEUTSCH

Die folgenden Informationen stimmen mit den Sicherheitshinweisen überein, die von internationalen Behörden auferlegt wurden, und sie beziehen sich auf den korrekten Gebrauch vom Terminal.

NORM FÜR DIE LASERSICHERHEIT

Dies Produkt entspricht am Tag der Herstellung den gültigen EN 60825-1 und CDRH 21 CFR 1040 Normen für die Lasersicherheit.

Es ist nicht notwendig, das Gerät wegen Betrieb oder Installations-, und Wartungsarbeiten zu öffnen.



ACHTUNG

Jegliche Änderungen am Gerät sowie Vorgehensweisen, die nicht in dieser Betriebsanleitung beschrieben werden, können ein gefährliches Laserlicht verursachen.

Der Produkt benutzt eine Laserdiode. Obwohl zur Zeit keine Augenschäden von kurzen Einstrahlungen bekannt sind, sollten Sie es vermeiden für längere Zeit in den

Laserstrahl zu schauen, genauso wenig wie in starke Lichtquellen (z.B. die Sonne). Vermeiden Sie es, den Laserstrahl weder gegen die Augen eines Beobachters, noch gegen reflektierende Oberflächen zu richten.

FRANÇAIS

Les informations suivantes sont fournies selon les règles fixées par les autorités internationales et se réfèrent à une correcte utilisation du terminal.

NORMES DE SECURITE LASER

Ce produit est conforme aux normes de sécurité laser en vigueur à sa date de fabrication: CDRH 21 CFR 1040 et EN 60825-1.

Il n'est pas nécessaire d'ouvrir l'appareil pour l'installation, l'utilisation ou l'entretien.



ATTENTION

L'utilisation de procédures ou réglages différents de ceux donnés ici peut entraîner une dangereuse exposition à lumière laser visible.

Le produit utilise une diode laser. Aucun dommage aux yeux humains n'a été constaté à la suite d'une exposition au rayon laser. Eviter de regarder fixement le rayon, comme toute autre source lumineuse intense telle que le soleil. Eviter aussi de diriger le rayon vers les yeux d'un observateur, même à travers des surfaces réfléchissantes (miroirs, par exemple).

ESPAÑOL

Las informaciones siguientes son presentadas en conformidad con las disposiciones de las autoridades internacionales y se refieren al uso correcto del terminal.

NORMATIVAS ESTÁNDAR PARA LA SEGURIDAD LÁSER

Este aparato resulta conforme a las normativas vigentes de seguridad láser a la fecha de producción: CDRH 21 CFR 1040 y EN 60825-1.

No es necesario abrir el aparato para la instalación, la utilización o la manutención.



ATENCIÓN

La utilización de procedimientos o regulaciones diferentes de aquellas descritas en la documentación puede causar una exposición peligrosa a la luz láser visible.

El aparato utiliza un diodo láser a baja potencia. No son notorios daños a los ojos humanos a consecuencia de una exposición de corta duración. Eviten de mirar fijo el rayo láser así como evitarían cualquiera otra fuente de luminosidad intensa, por ejemplo el sol. Además, eviten de dirigir el rayo láser hacia los ojos de un observador, también a través de superficies reflectantes como los espejos.



CAUTION

The LYNX™ Hand-Held Reader is not user-serviceable. Opening the case of the unit can cause internal damage and will void the warranty.

POWER SUPPLY

This device is intended to be supplied by a UL Listed or CSA Certified Power Unit marked "Class 2" or "LPS" output rated 10-30 V, minimum 0.75 A which supplies power directly to the scanner via the jack connector on the cable.

PATENTS

This product is covered by one or more of the following patents:

U.S. patents: 6,442,180 B1; 6,478,226 B2; and 6,512,218 B1

Additional patents pending.

1 GETTING STARTED

1.1 DESCRIPTION

The LYNX™ Hand-Held Reader packs a lot of performance into an attractive, rugged, hand-held device. It operates in commercial and industrial environments as well as the front office.

Omnidirectional Operating To read a symbol or capture an image, you simply aim the reader and pull the trigger. Since the orientation of the symbol is not important, the LYNX™ reader is a powerful, omnidirectional device.

Decoding And Imaging Thanks to powerful algorithms, Lynx™ reliably decodes all major 1D (linear) barcodes, 2D stacked codes (such as PDF417), 2D matrix symbols (such as DataMatrix), postal codes (such as POSTNET, PLANET). The data stream — acquired from decoding a symbol — is rapidly sent to the host. The reader is immediately available to read another symbol.

Lynx™ can also function as a camera by capturing images of labels, signatures, and other items. (see par. 1.4.3 for further details).

FLASH MEMORY Flash technology allows to upgrade the LYNX™ reader as new symbologies are supported or as improved decoding algorithms become available.

1.2 PACKAGE CONTENTS

The following parts are included in the LYNX™ package contents:

- LYNX™ Hand-Held Reader
- CD-ROM containing the Lynx™ Configuration Tools software
- LYNX™ Instruction Manual

You may want to save your packing material in case you need to ship the reader at some later time.

1.3 SYSTEM CONNECTIONS

1.3.1 RS232 Connection

The LYNX™ Reader requires the RS232 interface cable and the AC/DC power adapter to be connected.

To install your reader to your host system, follow these instructions (see Figure 1 below).

1. Insert the cable into the bottom of the handle of the LYNX™ reader.
2. Connect the RS232 interface cable to the proper port on the host terminal.
3. Connect the power cord to the RS232 interface cable.
4. Connect the AC/DC power adapter at the wall outlet.
5. Power up your PC.

RS232 is the default interface set at the factory.

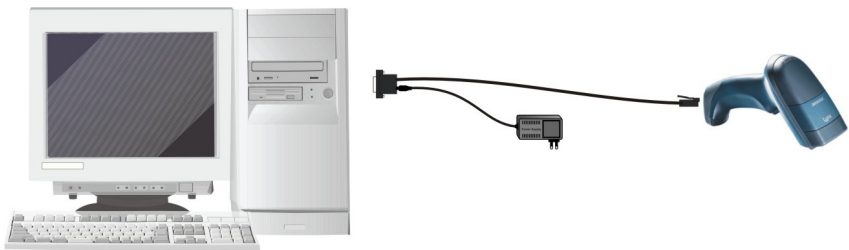


Figure 1 - RS232 Connection

1.3.2 Wedge

The LYNX™ Reader requires the Wedge interface cable and the AC/DC power adapter to be connected.

To install your reader to your host system, follow these instructions (see Figure 2 below).

1. Insert the cable into the bottom of the handle of the LYNX™ reader;
2. Connect the cable to the power cord;
3. Connect the AC/DC power adapter at the wall outlet;
4. Once the reader is powered and **BEFORE CONNECTING THE CABLE TO THE PC AND KEYBOARD**, read the Wedge IBM AT interface code in par. 2.3 of this manual.
5. Connect the WEDGE interface cable between the keyboard and the host terminal.
6. Power up your PC.



Figure 2 - Wedge Connection



CAUTION

When not using the Lynx™ reader remember to disconnect the Wedge interface from the PC before disconnecting the power cord.



NOTE

While using the Lynx™ it is always necessary to use cables adopting an external power supply.

1.3.3 USB Connection

The LYNX™ Reader requires the USB interface cable and the AC/DC power adapter to be connected.

To install your reader to your host system, follow these instructions (see Figure 3 below).

1. Insert the cable into the bottom of the handle of the LYNX™ reader.
2. Connect the power cord to the USB interface cable.
3. Connect the AC/DC power adapter at the wall outlet.
4. Once the reader is powered and BEFORE CONNECTING THE CABLE TO THE PC, read the correct USB interface code for your application in par. 2.3 of this manual.
5. Power up your PC and connect the USB interface cable to a free USB port. The PC automatically recognizes the device and asks to install the device driver.
6. Install the USB driver on your PC (the first time only) to complete the connection.
 - For USB Bulk the relevant files and drivers must be installed from the CD-ROM. See the “DLBulkUSB User Guide” file provided on the CD-ROM for more information.
 - For USB COM the relevant files and drivers must be installed from the USB Device Installation software which can be downloaded from the web page <http://www.datalogic.com/services/support>.
 - For USB Keyboard and for USB Generic HID the correct USB driver is included in the Host Operating System and will either be loaded automatically or will be suggested by the O.S. and should therefore be selected from the dialog box.



Figure 3 – USB connection

**NOTE**

The Lynx™ reader is a USB self-powered device.

**NOTE**

If you need to change the USB device interface, after having reconfigured the reader, you have to disconnect and reconnect the cable to the PC.

1.4 OPERATING THE READER

1.4.1 Aiming System

The LYNX™ reader uses an intelligent aiming system similar to those on cameras. The aiming system creates a field of view where the code is to be positioned:

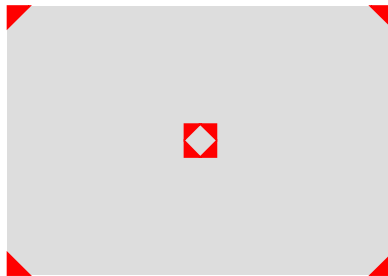
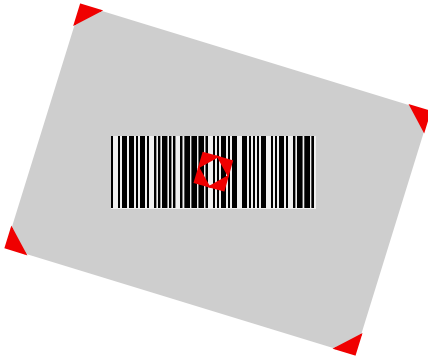


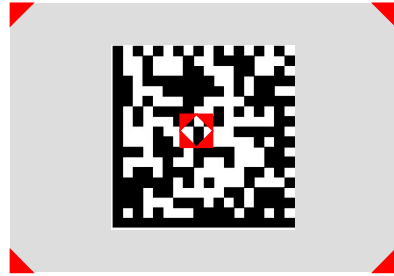
Figure 4 - Aiming System

When you pull the trigger completely a red beam illuminates the code. If the aiming system is centered and the entire symbology is within the aiming system, you will get a good read. The field of view changes size as you move the reader closer or farther away from the code.

Linear barcode



2D Matrix symbol

**Figure 5 - Relative Size and Location of Aiming System Pattern**

The field of view created by the aiming system will be smaller when the Lynx™ is closer to the code and larger when it is farther from the code. Symbologies with smaller bars or elements (mil size) should be read closer to the unit. Symbologies with larger bars or elements (mil size) should be read farther from the unit. (See chapter 5 for further details).

1.4.2 Normal Operation

Lynx™ normally functions by capturing and decoding codes.

Point the reader at the target and pull the trigger partially to enable the aiming system. Then, pull it completely to capture and decode the image. The reader will repeatedly flash until the symbol is decoded or timeout is reached. In between the flashes of the reader, the aiming system keeps on showing the field of view on the target (see Figure 5).

As you are reading code symbols, adjust the distance at which you are holding the reader.

**NOTE**

The LYNX™ hand-held reader aiming system is designed for general reading and decoding of 1D and 2D symbols. Some variation in reading distance will occur due to narrow bar width and other factors.

1.4.3 Image Capturing

Lynx™ can also function as a camera by capturing images of labels, signatures, and other items.

In order to capture an image, the user should read a Capture Image code (see par 2.12), then point at the image subject and pull the trigger. This way, the image will be captured and sent to the host PC. Lynx™ then returns to normal operation. To capture another image you must read another Capture Image Code of the same or a different Preset Configuration.

You can use the aiming system to position the reader from the object (ensure the reader is about centered over the target). Adjust the distance at which you are holding the reader (see Figure 5).

If the RS232 interface has been selected, the image will be transferred to the host PC via XMODEM_1K protocol.



NOTE

Image capturing is not available in Wedge and USB Keyboard Emulation interfaces and is not compatible with Autoscanning nor when the Software trigger type is selected.

Up to four different and independent Image Presets can be defined (see par. 2.13). For each Image Preset you may set up to three Basic Configuration Parameters, and up to five Advanced Configuration Parameters. Therefore an image is processed before being sent to the Host, according to a preset group of parameters.

Basic Configuration Parameters

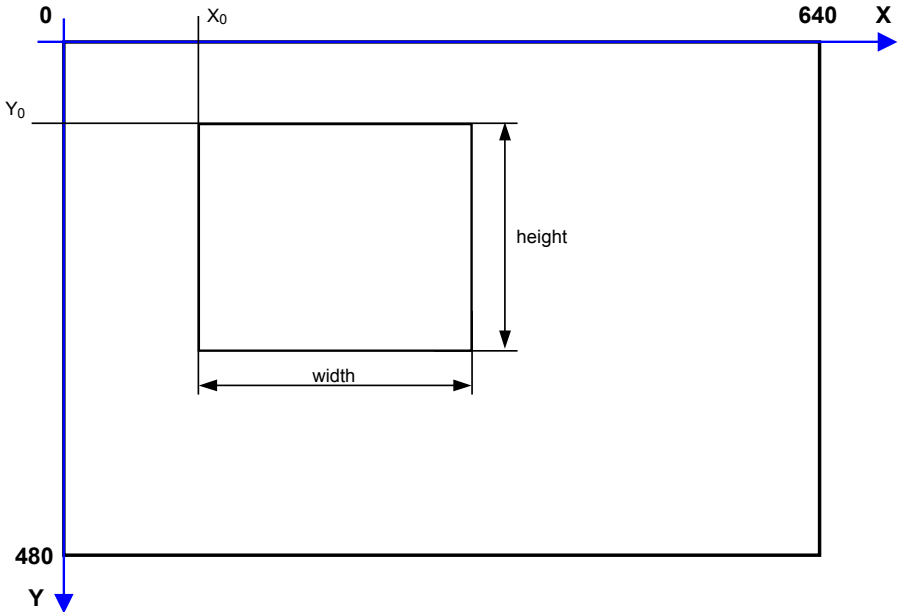
The Image file formats supported are: BMP, TIFF, JPEG (default).

Two resolution options are available: VGA Resolution (640 x 480 pixels) (default), and CIF Resolution (320 x 240 pixels). The lower resolution setting yields smaller file sizes, so the transfer time decreases.

For JPEG images it is possible to define the Image Quality level to address tradeoff between image file size and quality.

Advanced Configuration Parameters

An image portion (Window), instead of an entire image, can be captured. This parameter is generally used for particular fixed reading position applications.



An Image Window may either be as large as the image itself or smaller (10 x 10 pixels minimum), and is defined by its origin (the coordinate X_0 , Y_0), its width (number of pixels along the X Axis) and its height (number of pixels along the Y Axis).

By default, for all Image Presets, the window has its origin coordinates equal to zero, its width equal to 640 pixels and its height to 480 pixels.

It is possible to perform Zooming of the image. The zoom range varies from 20% up to 200% in steps of 20%, so ten different settings are available. Default is 100% (no zoom).

In addition to Windowing and Zoom you can adjust Brightness and Contrast levels.

Brightness Adjustment is available in the range from -100% up to 100%, in steps of 1%. Positive values shift the luminance up so that the image will result brighter. Default value is 0%, meaning that no brightness adjustment is performed.

The same range of values (-100% up to 100%, in steps of 1%) is available for Contrast Adjustment. Positive values will increase the contrast, so that dark and bright objects inside the image will be better distinguishable. Default value is 0%, which means that no contrast adjustment is performed.

You can set the Image Color Depth by selecting 256 gray levels (default), 16 gray levels, or 2 gray levels. Higher color depths yield larger image files. This option is ignored if the JPEG format is selected,(256 gray levels only).

1.4.4 Autoscanning

Normal Mode

Lynx™ provides an **autoscan** command (see par. 2.11.3), which when enabled, causes the reader to scan continuously and to monitor the central zone of its reading area. In this way, Lynx™ is ready to capture any image (containing a potential code) positioned on a uniform background.

The aiming system can be enabled to indicate the reading area of the potential code to be captured. The illumination system can also be enabled when the ambient light conditions are not sufficient to autodetect the potential code to be captured; furthermore, the illumination system increases in intensity for an instant when capturing and decoding an image. A safety time may be defined to prevent Lynx™ from reading the same code repeatedly.

If the decoding is completed successfully, the reader starts monitoring the reading area again. In case of decoding failure, Lynx™ keeps on decoding until a potential code is present in the central zone of the reading area.

Pattern Mode

The Autoscan pattern mode is particularly advised when reading barcodes positioned on a non-uniform background. In these cases Lynx™ may perceive some elements of the background as barcodes and start the decoding. To avoid this undesired effect, the Autoscan Pattern Code is placed in the Lynx™ reading area which prevents decoding. Using this code as the background, code reading takes place normally by presenting desired codes to be read over the Pattern Code. Between each code read, the Pattern Code must be represented to Lynx™.

The Pattern Code can be printed from the file of the manual (Appendix C) available on the CD-ROM.

In case of low ambient light conditions, Lynx™ automatically activates the illumination system. If desired, the illumination system can be enabled so that it is always active.

1.4.5 Camera Control

Exposure and Calibration

Two different control modes are available for managing the camera: automatic mode and fixed mode.

The automatic mode provides three different options to get the best tuning of the image to be captured:

- Automatic based on entire image: camera control mode based on the analysis of the whole image. This mode works well in most standard applications. It is the default setting.
- Automatic based on central image: camera control mode based on the analysis of a restricted area positioned in the central zone of the image. This mode is suggested when reading small codes positioned in a dark and extensive background.
- Automatic for highly reflective surfaces: camera control mode allowing to read codes on highly reflective surfaces. This mode is suggested, for example, when reading codes positioned on plastic or metal surfaces.

The fixed mode is particularly suggested for expert users. It requires a camera calibration to adjust the acquisition parameters to the ambient light conditions. The defined values will always be used when working with a fixed exposure.

These values are permanently saved in the reader memory.

Refer to par. 2.8 for configuration barcodes.

Aiming System Calibration

The factory-defined Lynx™ aiming system is already correctly and precisely calibrated to the Lynx™ focus distance and therefore works for the most typical applications. However, it is possible to modify the aiming system precision for the following condition:

when a fixed reading distance different from the Lynx™ focus distance is used. The Lynx™ focus distance is 115 mm for Lynx™ D432, and 65 mm for Lynx™ D432E.

Refer to the VisualSetup software program for performing the aiming system calibration.

1.5 DEFINING DATA FORMATTING

The string of a decoded code to be sent to the host may be formatted as follows:

- defining simple **data formatting** (see par. 2.7);
- defining **advanced data formatting** giving complete flexibility in changing the format of data (see par. 2.14).

When both simple and advanced data formatting are selected the info is processed in the following order:

1. the string of the decoded code is processed according to the advanced formatting rules;
2. the resulting string is processed according to the selection type rules of the simple data formatting;
3. character substitution is performed on the resulting string;
4. character deletion is performed on the resulting string;
5. code concatenation is performed;
6. code ID is attached to the resulting string;
7. global headers and terminators are attached to the resulting string;

The codes to be sent to the host may also be selected or ordered depending on the following two conditions:

- **one code per scan**: Lynx™ sends the code being closest to the image center. If the "Central Code Transmission" command is enabled, only the code containing the image center will be transmitted (see par. 2.11.2);
- **all codes per scan**: the codes to be sent to the host may be ordered either by length or by symbology starting from the code being closest to the image center (see par. 2.11.2). When enabling both these criteria, codes belonging to the same symbology are sent to the host depending on their length.

1.5.1 Concatenation

It is possible to concatenate up to 4 different codes, set their length and enable the intercode delay between them (the intercode delay is set in the specific interface parameters, see pars. 2.4, 2.5, and 2.6). When enabling the delay (see par. 2.7.3) one or more global headers and terminators are added to the decoded data. The concatenation procedure may occur in different ways depending on the number of codes to be decoded per image:

One Code Per Scan

- If the code resulting from the single decoding of an image belongs to one of the code families to be concatenated, it is saved to the Lynx™ memory waiting for other codes to complete the concatenation.
- If the code belongs to the same family of a code previously saved, it overwrites the old one.
- If the code resulting from the decoding does not belong to one of the code families to be concatenated, it causes the concatenation failure and clears the temporary memory. If the "Concatenation Failure Transmission" command is set to "Tx codes causing failure" (see par. 2.7.3), this code will be sent in the output message.

All Codes Per Scan

- All codes resulting from the decoding of an image and belonging to one of the families to be concatenated are saved to the Lynx™ memory waiting for other codes to complete the concatenation.
- If one or more codes resulting from the decoding belong to the same family of codes previously saved, they overwrite the old ones.
- When the image contains no code to be concatenated, the concatenation fails and the reader temporary memory is cleared. If the "Concatenation Failure Transmission" command is set to "Tx codes causing failure" (see par. 2.7.3), the codes causing the concatenation failure will be sent in the output message.

1.6 INDICATORS

1.6.1 LED Indicators

The following LED indicators signal the reader functions.

LED	Behavior	
	Reader Power On	Normal Functioning
Red (Figure A, 1)	lights until a beep occurs. Then, it turns off.	lights when a wrong read occurs. lights for the entire time the aiming system is enabled. It turns off only when the trigger is released and the aiming system is disabled.
Green (Figure A, 2)		lights when a symbol has been read and decoded.

1.6.2 Beeper

The Lynx™ basic software provides beeper signals for good/wrong reading or successful/unsuccessful software upgrade. Its tone, volume and duration can be directly configured by using the codes given in par. 2.11.

The application program can also manage the beeper (User Defined Beeper) when the reader is controlled by a Host PC. It is possible to activate the beeper by sending a command from the Host to the reader via the current communication interface. The codes given in par. 2.11.1 allow defining the beeper properties.



NOTE

The configuration of the User Defined Beeper does not influence or change the functioning of the beeper managed by the Lynx™ basic software.

2 CONFIGURATION USING BARCODE SYMBOLS

This section describes the programming method of using configuration barcode symbols to program your reader. By using the LYNX™ reader to read/decode these special configuration symbols, you can configure, and obtain information from its system software.

When you are reading configuration barcode symbols, carefully aim the LYNX™ 2D reader to avoid reading adjacent symbols.

The configuration barcode symbols in this chapter are divided into logical sections according to the type of configuration required, (RS232 configuration, Code selection, etc.). If arguments are required with a command, you can read additional barcode labels (typically digits) from Appendix C.

To configure your reader:

1. Open the folded page in Appendix C the Hex/Numeric table and keep it open during the device configuration.
2. Read the **Enter Configuration** code ONCE, available on the folded page in Appendix C or in par. 2.2.1.
3. Modify the desired parameters in one or more sections by reading the parameter code and selecting the value from the Hex/Numeric table or by following the given procedures.
4. Read the **Exit and Save Configuration** code ONCE, available on the folded page in Appendix C or in par. 2.2.1.

Example for step 3:

To set the maximum length of characters in a Code 39 barcode symbol that the reader will decode to 32:

- first read the Maximum Length symbol for Code 39 on page 50
- then read the symbol for the digit "3" and lastly the symbol for the digit "2" in Appendix C.

2.1 DEFAULT SETTINGS

Configuration Field	Default Setting
RS232 Communication Baud Rate Parity, Data Bits, Stop Bits Handshake Protocol FIFO Intercharacter Delay Intercode Delay	115200 No parity; 8 Data bits; 1 Stop bit None None Enabled 0 0
USB COM Emulation Handshake Protocol FIFO Intercharacter Delay Intercode Delay	None None Enabled 0 0
USB Keyboard Emulation *Keyboard Nationality Intercharacter Delay Intercode Delay	USA 0 0
WEDGE-Communication *Keyboard Nationality CapsLock CapsLock Auto-Recognition NumLock Intercharacter Delay Intercode Delay	USA OFF ON OFF 0 0
RX Timeout	10 seconds
Data Format-Symbology Independent Parameters Code Identifier Code Length *Header *Terminator	Disabled Disabled No headers CR and LF terminators for RS232, USB BULK, USB COM, USB Generic HID ENTER terminator for Wedge, USB Keyboard
Data Format-Symbology Dependent Parameters Custom Code Identifier Symbology Specific Format Header Symbology Terminator Symbology Symbology Character Substitution Symbology Character Deletion	Disabled Select All No headers No terminators No character to substitute No character to delete

* The default values of these parameters are set when reading the interface selection.

Configuration Field	Default Setting
Data Format-Concatenation	
Concatenation	Disabled
Define Concatenation	2EAN/UPC codes concatenated
Set First Concatenated Code Length	000 = any length
Set Second Concatenated Code Length	000 = any length
Set Third Concatenated Code Length	000 = any length
Set Fourth Concatenated Code Length	000 = any length
Concatenation with Intercode Delay	Disabled
Concatenation Timeout	10 seconds
Concatenation Failure Transmission	Tx codes causing failure
Transmission after Timeout	No code transmission
Concatenation Result Code ID	No code Identifier
Advanced Formatting	
Format enable/disable	Disabled
Camera Control	
Exposure Mode	Automatic, based on entire image
Power Save	
Illumination Power	Max power
EAN/UPC	
Selection	Enabled
Add-On	Disabled
UPCE Expansion	Disabled
Code 39	
Selection	Enabled - no check digit
Code39 Full ASCII	Disabled
Code Length Check	Disabled
Minimum Length	001
Maximum Length	255
Start/Stop Character	Disabled
Code 32	
Selection	Disabled
Interleaved 2 of 5	
Selection	Enabled - no check digit
Code Length Check	Disabled
Minimum Length	014
Maximum Length	255
Codabar	
Selection	Disabled
Code Length Check	Disabled
Minimum Length	001
Maximum Length	255

Configuration Field	Default Setting
Code 128 Code128 Selection Code Length Check Minimum Length Maximum Length	Enabled Disabled 001 255
EAN128 Selection Code Length Check Minimum Length Maximum Length	Disabled Disabled 001 255
Code 93 Selection Code Length Check Minimum Length Maximum Length	Disabled Disabled 001 255
PDF-417 Selection	Enabled
Data Matrix Selection Rectangular Style Minimum Code Length Maximum Code Length	Enabled - normal & inverted Enabled 0001 3600
QR Selection	Enabled
Postal Codes Selection	Disabled
Reading Parameters Trigger Mode Trigger Type Flash ON Flash OFF Beeper Tone Beeper Volume Beeper Duration Read per Cycle Scan Timeout User Defined Beeper Tone User Defined Beeper Volume User Defined Beeper Duration Code per Scan Central Code Transmission Order by Code Length Order by Code Symbology Autoscan Mode Autoscan Aiming System	Trigger level Normal trigger 2 sec 2 sec Tone 1 High volume 50 ms One read per cycle 5 sec Tone 1 High Volume 100 ms One code per scan Enabled Disabled Disabled Disabled Enabled

Configuration Field	Default Setting
Reading Parameters Autoscan Hardware Trigger Autoscan Illumination System Safety Time	Enabled Disabled 500 ms (if Autoscan mode or Software trigger type is selected and the More Reads per Cycle option is enabled).
Image Formatting <i>Image Preset 1, 2, 3, 4</i> Image Format Resolution Set JPEG Quality Factor Window Origin Window Dimensions Brightness Contrast Zoom Color Depth	JPEG format Full (640x480) 50 (0,0) (640x480) 0% 0% 100% 256 gray levels

CONFIGURATION EDITING COMMANDS

2.2 CONFIGURATION EDITING COMMANDS

2.2.1 Enter and Exit Commands

Enter Configuration



Exit and Save Configuration



2.2.2 Other Editing Commands

Cancel All



Restore Default



End of Modifications
(Exit saving only to RAM)



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

Show Software Release



Show All Data Formatting



Show General Reader Status



INTERFACE SELECTION

2.3 INTERFACE SELECTION

RS232



Wedge - IBM AT



USB BULK



USB KB EMULATION



USB COM EMULATION



USB Generic HID



RX Timeout*



00 = disabled

01-99 = timeout from 1 to 99 sec

*This parameter is valid for USB COM EMULATION, USB BULK, USB Generic HID and RS232 Interfaces only.

2.4 RS232 INTERFACE

BAUD RATE

1200 baud



2400 baud



4800 baud



9600 baud



14400 baud



19200 baud



38400 baud



57600 baud



115200 baud



PARITY

None



Odd



Even



DATA BITS

7 Bits



8 Bits



STOP BITS

1 Bit



2 Bits



ACK/NACK PROTOCOL

Disabled



Enabled



HANDSHAKE

None



XON/XOFF



RTS/CTS



FIFO

Disabled



Enabled



INTERCHARACTER DELAY

Intercharacter Delay



00 = disabled

01-99 = delay from 1 to 99 msec

INTERCODE DELAY

Intercode Delay



00 = disabled

01-99 = delay from 1 to 99 sec

USB

2.5 USB

2.5.1 USB COM Emulation

HANDSHAKE

None



XON/XOFF



RTS/CTS



ACK/NACK PROTOCOL

Disabled



Enabled



FIFO

Disabled



Enabled



USB

INTERCHARACTER DELAY

Intercharacter Delay



00 = disabled
01-99 = delay from 1 to 99 msec

INTERCODE DELAY

Intercode Delay



00 = disabled
01-99 = delay from 1 to 99 sec

2.5.2 USB Keyboard Emulation

INTERCHARACTER DELAY

Intercharacter Delay



00 = disabled
01-99 = delay from 1 to 99 msec

INTERCODE DELAY

Intercode Delay



00 = disabled
01-99 = delay from 1 to 99 sec

KEYBOARD NATIONALITY

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

Belgian



English



French



German



Italian



Japanese



Spanish



Swedish



USA



WEDGE

2.6 WEDGE INTERFACE

CAPS LOCK

Caps Lock Off



Caps Lock On



CAPS LOCK AUTO-RECOGNITION

Disabled



Enabled



Note: Caps lock manual configuration is ignored when Caps Lock Auto-Recognition is enabled

NUM LOCK

Num Lock Off



Num Lock On



INTERCHARACTER DELAY

Intercharacter Delay



00 = disabled

01-99 = delay from 1 to 99 msec

INTERCODE DELAY

Intercode Delay



00 = disabled

01-99 = delay from 1 to 99 sec

WEDGE

KEYBOARD NATIONALITY

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

Belgian



English



French



German



Italian



Japanese



Spanish



Swedish



USA



KEYBOARD SETTING

This parameter values are restored through the Interface Selection code and not Restore Default.

Set Alphanumeric Keys



The reader can be used with terminals or PCs with various keyboard types and nationalities through a simple keyboard setting procedure.

Keyboard setting consists of communicating to the reader how to send data corresponding to the keyboard used in the application. The keys must be set in a specific order.

Press and release a key to set it.

Some characters may require more than one key pressed simultaneously during normal use (refer to the manual of your PC or terminal for keyboard use). The exact sequence must be indicated to the reader in this case pressing and releasing the different keys.

Example:

If one has to press the "Shift" and "4" keys simultaneously on the keyboard to transmit the character "\$" to the video, to set the "\$", press and release "Shift" then press and release "4".

Each pressed and released key must generate an acoustic signal on the reader, otherwise repress the key. Never press more than one key at the same time, even if this corresponds to the normal use of your keyboard.

Press "Backspace" to correct a wrong key entry. In this case the reader emits 2 beeps.

Note: "CAPS LOCK" and "NUM LOCK" must be off before starting the keyboard setting procedure. "SHIFT" must be repressed for each character and cannot be substituted by "CAPS LOCK".

1. Read the "Set Alphanumeric Keys" code.
2. Press the keys shown in the following table according to their numerical order:

WEDGE

Some ASCII characters may be missing as this depends on the type of keyboard: these are generally particular characters relative to the various national symbologies. In this case:

- **The first 4 characters (Shift, Alt, Ctrl, and Backspace) can only be substituted with keys not used, or substituted with each other.**
- Characters can be substituted with other single symbols (e.g. "SPACE") even if not included in the barcode set used.
- Characters can be substituted with others corresponding to your keyboard.

The reader signals the end of the procedure with 2 beeps indicating the keys have been registered.

01 : Shift		
02 : Alt		
03 : Ctrl		
04 : Backspace		
05 : SPACE	28 : 7	51 : N
06 : !	29 : 8	52 : O
07 : "	30 : 9	53 : P
08 : #	31 : :	54 : Q
09 : \$	32 : ;	55 : R
10 : %	33 : <	56 : S
11 : &	34 : =	57 : T
12 : '	35 : >	58 : U
13 : (	36 : ?	59 : V
14 :)	37 : @	60 : W
15 : *	38 : A	61 : X
16 : +	39 : B	62 : Y
17 : ,	40 : C	63 : Z
18 : -	41 : D	64 : [
19 : .	42 : E	65 : \
20 : /	43 : F	66 :]
21 : 0	44 : G	67 : ^
22 : 1	45 : H	68 : _ (underscore)
23 : 2	46 : I	69 : `
24 : 3	47 : J	70 : {
25 : 4	48 : K	71 : |
26 : 5	49 : L	72 : }
27 : 6	50 : M	73 : ~
		74 : DEL

WEDGE

Acoustic Signals

Four types of acoustic signals are associated with the following steps:

1. Enter keyboard setup
2. Exit keyboard setup
3. SHIFT, ALT, CTRL, BACKSPACE keys
4. Keyboard keys (SHIFT, ALT, CTRL, BACKSPACE excluded)

These signals facilitate the selection of those characters requiring more than one key pressed simultaneously.

Example

The transmission of the "%" character implies two different steps:

1. Press the SHIFT key
2. Press the "5" key

The different tones produced by the reader indicate that both steps have been successful and that the character has been transmitted.

WEDGE

EXTENDED HEADER/TERMINATOR KEYS

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

These values are restored through the Interface Selection code and not Restore Default.

EXTENDED KEYBOARD TO HEX CONVERSION	
	IBM AT
HEX	KEY
83	ENTER
84	TAB
85	F1
86	F2
87	F3
88	F4
89	F5
8A	F6
8B	F7
8C	F8
8D	F9
8E	F10
8F	F11
90	F12
91	HOME
92	END
93	PG UP
94	PG DOWN
95	↑
96	↓
97	←
98	→
99	ESC
9A	CTRL (Right)
9B	Euro

SET CUSTOM EXTENDED HEADER/TERMINATOR KEYS

Set Extended Keys



The extended Header/Terminator keys for **Wedge Interface users** can be customized by defining them through a simple keyboard setting procedure.

For example, the Numeric Keypad keys can be set for use as Headers or Terminators by substituting the default extended keys during this procedure.

Press and release a key to set it.

Some characters may require more than one key pressed simultaneously during normal use (refer to the manual of your PC or terminal for keyboard use). The exact sequence must be indicated to the reader in this case pressing and releasing the different keys.

Example:

If one has to press the "Shift" and "4" keys simultaneously on the keyboard to transmit the character "\$" to the video, to set the "\$", press and release "Shift" then press and release "4".

Each pressed and released key must generate an acoustic signal on the reader, otherwise repress the key. Never press more than one key at the same time, even if this corresponds to the normal use of your keyboard.

Press "Backspace" to correct a wrong key entry. In this case the reader emits 2 beeps.

Note: "CAPS LOCK" and "NUM LOCK" must be off before starting the keyboard setting procedure. "SHIFT" must be repressed for each character and cannot be substituted by "CAPS LOCK".

1. Read the "Set Extended Keys" code.
2. Press the first 4 keys indicated in the following table.
3. Define all keys from 5 to 28 in the following table.

WEDGE

If the first 4 KEYS (Shift, Alt, Ctrl, and Backspace) are not available on your keyboard, you can only substitute them with keys not used, or substitute them with each other.

The reader signals the end of the procedure with 2 beeps indicating the keys have been registered.

CUSTOM EXTENDED KEYBOARD SETTING TABLE		
		Custom
Order	HEX	KEY
01	-	Shift
02	-	Alt
03	-	Ctrl
04	-	Backspace
05	83	
06	84	
07	85	
08	86	
09	87	
10	88	
11	89	
12	8A	
13	8B	
14	8C	
15	8D	
16	8E	
17	8F	
18	90	
19	91	
20	92	
21	93	
22	94	
23	95	
24	96	
25	97	
26	98	
27	99	
28	9A	

WEDGE

Acoustic Signals

Four types of acoustic signals are associated with the following steps:

1. Enter keyboard setup
2. Exit keyboard setup
3. SHIFT, ALT, CTRL, BACKSPACE keys
4. Keyboard keys (SHIFT, ALT, CTRL, BACKSPACE excluded)

These signals facilitate the selection of those characters requiring more than one key pressed simultaneously.

Example

The transmission of the "%" character implies two different steps:

1. Press the SHIFT key
2. Press the "5" key

The different tones produced by the reader indicate that both steps have been successful and that the character has been transmitted.

DATA FORMAT

2.7 DATA FORMAT

With the exception of the Symbology Independent Header and Terminator selections, the parameters of this group can be restored to their default values using the following default code settings:

- 1) the general "Restore Default" code, see par. 2.2.2, restores all the configuration parameter groups to their default values;
- 2) the "Data Format Default" code restores the Data Format Symbology Independent and Symbology Dependent parameters to their default values and disables the defined concatenation by resetting all its parameters.

The default values of the Symbology Independent Header and Terminator selections are set when reading the interface selection.

DATA FORMAT DEFAULT

Data Format Default



2.7.1 Symbology Independent Parameters

CODE IDENTIFIER

Disabled



Custom Code ID



AIM Standard Code ID



CODE LENGTH

Disabled



Enabled



DATA FORMAT

SET HEADERS

Set Headers



1. Set the number of characters in the range **00-10**.
2. Read the corresponding characters as Hex values from the Hex/Numeric table. Valid values are in the range:
00-7F for RS232, USB BULK, USB COM, USB Generic HID
00-9B for Wedge and USB Keyboard
3. Read the following code to enable the configuration you have set.

HEADERS

Disabled



Enabled



SET TERMINATORS

Set Terminators



1. Set the number of characters in the range **00-10**.
2. Read the corresponding characters as Hex values from the Hex/Numeric table. Valid values are in the range:
00-7F for RS232, USB BULK, USB COM, USB Generic HID
00-9B for Wedge and USB Keyboard
3. Read the following code to enable the configuration you have set.

TERMINATORS

Disabled



Enabled



DATA FORMAT

2.7.2 Symbology Dependent Parameters

The “Symbology Specific Format Default” code on page 41 allows restoring the symbology dependent parameters related to a specific code family to the default values.

CUSTOM CODE IDENTIFIER

Custom Code Identifier



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. Set the number of characters in the range **0-3**, where **0** = Code ID disabled.
3. Read the corresponding characters as Hex values from the Hex/Numeric table. Valid values are in the range **00-7F**.

SYMBOLGY SPECIFIC FORMAT

Symbology Specific Format



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. Formatting:
 - 0 = select all - Stop
 - 1 = select right - followed by Step 3
 - 2 = select left - followed by Step 3
 - 3 = select middle - followed by a number in the range **000-999** for the starting character and then, by Step 3
 - 4 = discard right - followed by Step 3
 - 5 = discard left - followed by Step 3
 - 6 = discard middle - followed by a number in the range **000-999** for the starting character and then, by Step 3
3. Set the number of characters to select/discard in the range **000-999**.

DATA FORMAT

SYBOLOGY HEADERS

Symbology Headers



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. Set the number of characters in the range **0-5**.
3. Read the corresponding characters as Hex values from the Hex/Numeric table. Valid values are in the range:
00-7F for RS232, USB BULK, USB COM, USB Generic HID
00-9B for Wedge and USB Keyboard
4. Read the following code to enable the configuration you have set.

HEADERS

Headers



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. 0 = disabled
1 = enabled

SYBOLOGY TERMINATORS

Symbology Terminators



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. Set the number of characters in the range **0-5**.
3. Read the corresponding characters as Hex values from the Hex/Numeric table. Valid values are in the range:
00-7F for RS232, USB BULK, USB COM, USB Generic HID
00-9B for Wedge and USB Keyboard
4. Read the following code to enable the configuration you have set.

TERMINATORS

Terminators



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. 0 = disabled
1 = enabled

SYBOLOGY CHARACTER SUBSTITUTION

**Symbology Character
Substitution**



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. Read the corresponding character as Hex value from the Hex/Numeric table which identifies the character to be substituted. Valid value is in the range **00-7F**.
3. Read the corresponding character as Hex value from the Hex/Numeric table which identifies the new substituting character. Valid value is in the range **00-7F**.
4. Read the following code to enable the configuration you have set.

CHARACTER SUBSTITUTION

Character Substitution



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. 0 = disabled
1 = enabled

DATA FORMAT

SYBOLOGY CHARACTER DELETION

Symbology Character Deletion



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. Read the corresponding character as Hex value from the Hex/Numeric table which identifies the character to be deleted.
Valid value is in the range **00-7F**.
3. Read the following code to enable the configuration you have set.

CHARACTER DELETION

Character Deletion



1. Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.
2. 0 = disabled
1 = enabled

SYBOLOGY SPECIFIC FORMAT DEFAULT

Symbology Specific Format Default



Select a Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.

DATA FORMAT

2.7.3 Concatenation

DEFINE CONCATENATION

Define Concatenation



1. Select the number of codes to concatenate in the range **2-4**.
2. Select the Datalogic Standard Code Identifier for each code to concatenate (repeat for same code types) from the table in Appendix B.
3. Read the following Code to enable the configuration you have set.

CONCATENATION ENABLE/DISABLE

Disabled



Enabled



Concatenation Options

FIRST CONCATENATED CODE LENGTH

Set First Concatenated Code Length



Read the number in the range
000-255.
000 = any code length

SECOND CONCATENATED CODE LENGTH

Set Second Concatenated Code Length



Read the number in the range
000-255.
000 = any code length

DATA FORMAT

THIRD CONCATENATED CODE LENGTH

Set Third Concatenated Code
Length



Read the number in the range
000-255.
000 = any code length

FOURTH CONCATENATED CODE LENGTH

Set Fourth Concatenated Code
Length



Read the number in the range
000-255.
000 = any code length

CONCATENATION WITH INTERCODE DELAY

Disabled



Enabled



This parameter is enabled with
concatenation activated (see par.
1.5.1 for details).

CONCATENATION FAILURE TRANSMISSION

TX Codes Causing Failure



No Code TX



See par. 1.5.1 for details

DATA FORMAT

CONCATENATION TIMEOUT

Concatenation Timeout



05-99 = timeout from 5 to 99 seconds.

TRANSMISSION AFTER TIMEOUT

No Code Transmission



First Code Transmission



Second Code Transmission



Third Code Transmission



DATA FORMAT

CONCATENATION RESULT CODE ID

No Code Identifier



Use First Code Identifier



Use Second Code Identifier



Use Third Code Identifier



Use Fourth Code Identifier



CAMERA CONTROL

2.8 CAMERA CONTROL

EXPOSURE MODE

Fixed



Automatic (Entire Image)



Automatic (Central Part of Image)



Automatic for Highly Reflective Surfaces



See par. 1.4.5 for details.

CAMERA CALIBRATION

Calibrate



Calibrates the correct exposure parameter values when using fixed exposure. The parameters defined will be permanently saved in the reader memory (see par. 1.4.5 for details).

2.9 POWER SAVE

ILLUMINATION SYSTEM POWER

Illumination System OFF



Low Power



Intermediate Power



Maximum Power



2.10 CODE SELECTION

Disable All Symbologies



Disable All Linear Symbologies



Disable All 2D Symbologies



2.10.1 Linear Symbologies

UPC/EAN/JAN FAMILY

EAN/UPC/JAN Disabled



EAN/UPC/JAN Enabled



Add-On Disabled



Add-On Enabled



UPCE Expansion Disabled



UPCE Expansion Enabled



CODE 39 FAMILY

Code 39 Std - Disabled



Code 39 Std - No Check Digit Control



Code 39 Std - Check Digit Control without Transmission



Code 39 Std - Check Digit Control and Transmission



Code 39 Full ASCII - Disabled



Code 39 Full ASCII- Enabled



Code Length Check - Disabled



Code Length Check - Enabled



CODE SELECTION - linear symbologies

Minimum Code Length



Read the number in the range
001-255.

Maximum Code Length



Read the number in the range
001-255.

Start-Stop Character Transmission - Disabled



Start-Stop Character Transmission - Enabled



CODE 32 FAMILY

Disabled



Enabled



INTERLEAVED 2 OF 5 FAMILY

Disabled



Enabled - No Check Digit Control



Enabled - Check Digit Control and without Transmission



Enabled - Check Digit Control and Transmission



Code Length Check - Disabled



Code Length Check - Enabled



Minimum Code Length



Read the number in the range
001-255.

Maximum Code Length



Read the number in the range
001-255.

CODE SELECTION - linear symbologies

CODABAR FAMILY

Disabled



Enabled - No Check Digit Control



Enabled - Check Digit Control without Transmission



Enabled - Check Digit Control and Transmission



Code Length Check - Disabled



Code Length Check - Enabled



Minimum Code Length



Read the number in the range
001-255.

Maximum Code Length



Read the number in the range
001-255.

CODE SELECTION - linear symbologies

CODE 128 FAMILY

Code 128 - Disabled



Code 128 - Enabled



Code Length Check - Disabled



Code Length Check - Enabled



Code 128 - Min. Code Length



Read the number in the range
001-255.

Code 128 - Max. Code Length



Read the number in the range
001-255.

EAN 128 - Disabled



EAN 128 - Enabled



CODE SELECTION - linear symbologies

**EAN 128 - Code Length Check
Disabled**



**EAN 128 - Code Length Check
Enabled**



EAN 128 - Min. Code Length



Read the number in the range
001-255.

Maximum Code Length



Read the number in the range
001-255.

CODE 93 FAMILY

Disabled



Enabled



Code Length Check - Disabled



Code Length Check - Enabled



CODE SELECTION - linear symbologies

Minimum Code Length



Read the number in the range
001-255.

Maximum Code Length



Read the number in the range
001-255.

2.10.2 2D Symbologies

PDF417

Disabled



Enabled



DATAMATRIX FAMILY

Disabled



Enabled



Minimum Code Length



Read the number in the range
0001-3600.

Maximum Code Length



Read the number in the range
0001-3600.

Rectangular Style – Disabled



Rectangular Style - Enabled



CODE SELECTION - 2d symbologies

QR FAMILY

Disabled



Enabled



POSTAL CODES FAMILY

All Disabled



Australian Post - Enabled



Japan Post - Enabled



PLANET - Enabled



POSTNET - Enabled



POSTNET with B and B' -
Enabled



CODE SELECTION - 2d symbologies

**POSTNET and PLANET -
Enabled**



**POSTNET with B and B' and
PLANET - Enabled**



KIX Code - Enabled



**Royal Mail Code (RM4SCC) -
Enabled**



READING PARAMETERS

2.11 READING PARAMETERS

TRIGGER MODE

Trigger Level



Trigger Pulse



TRIGGER TYPE

Normal Trigger



Software Trigger



FLASH MODE

Flash ON Duration



Read a number in the range **01-99**, which corresponds to a max 9.9 seconds duration.

Flash OFF Duration



Read a number in the range **01-99**, which corresponds to a max 9.9 seconds duration.

READING PARAMETERS

BEEPER TONE

Tone 1



Tone 2



Tone 3



Tone 4



BEEPER VOLUME

Beeper OFF



Low Volume



Medium Volume



High Volume



BEEPER DURATION

Beeper Duration



Read a number in the range **01-99**, which corresponds to a max 99 ms duration.

READING PARAMETERS

READ PER CYCLE

One Read per Cycle



More Reads per Cycle



SCAN TIMEOUT

Define Timeout



Read a number in the range **01-99**, which corresponds to a max 99 seconds duration. The timeout is activated when the decoding fails.

2.11.1 User Defined Beeper

USER DEFINED BEEPER TONE

Tone 1



Tone 2



Tone 3



Tone 4



READING PARAMETERS

USER DEFINED BEEPER VOLUME

Beeper OFF



Low Volume



Medium Volume



High Volume



USER DEFINED BEEPER DURATION

Set Duration



Read a number in the range **01-99**, which corresponds to a max 990 ms duration.

TEST USER DEFINED BEEPER

The following command carries out its specific function.

Test User Defined Beeper



See par. 1.6.2 for details.

READING PARAMETERS

2.11.2 Code Ordering and Selection

CODE PER SCAN

One Code per Scan



All Codes per Scan



CENTRAL CODE TRANSMISSION

The following command is available when working in "one code per scan".

Disabled



Enabled



See par. 1.5 for details.

ORDER BY CODE LENGTH

The following commands are available when working in "all codes per scan".

Disabled



Enabled - Increasing Order



Enabled - Decreasing Order



READING PARAMETERS

ORDER BY CODE SYMBOLOGY

The following commands are available when working in "all codes per scan".

Set Order



1. Select the number of codes in the range **0-9**.
2. Select the Datalogic Standard Code Identifier for each above defined code from the table in Appendix B.

See par. 1.5 for details.

2.11.3 Autoscan

AUTOSCAN MODE

Disabled



Enabled in Normal Mode



Enabled in Pattern Mode



See par. 1.4.4 for details.

AUTOSCAN AIMING SYSTEM

Disabled



Enabled



READING PARAMETERS

AUTOSCAN HARDWARE TRIGGER

Disabled



Enabled



AUTOSCAN ILLUMINATION SYSTEM

Disabled



Enabled



The following commands can be activated when it is possible to read one code per image only.

SAFETY TIME

Disabled



Enabled



Valid only with software trigger or autoscan enabled.

SAFETY TIME DURATION

Set Duration



Read a number in the range **01-99**, where 01 corresponds to 100 ms and 99 to 9.9 seconds.

CAPTURE IMAGE

2.12 CAPTURE IMAGE

In order to capture an image, you should read one of these codes (for further details see. par 1.4.3), then point at the image subject and pull the trigger. The image will be captured and sent to the host PC according to the Preset Configuration.

Capture Image using Preset 1



Capture Image using Preset 2



Capture Image using Preset 3



Capture Image using Preset 4



ADVANCED IMAGE CAPTURE

2.13 ADVANCED IMAGE CAPTURE

2.13.1 Image Preset 1

Basic Configuration

IMAGE FORMAT – PRESET 1

Bitmap Format



JPEG Format



TIFF Format



RESOLUTION – PRESET 1

Full Resolution (640 x 480)



Quarter Resolution (320 x 240)



JPEG QUALITY FACTOR – PRESET 1

JPEG Quality Factor



Set the JPEG compression level in the range **000-100**.

ADVANCED IMAGE CAPTURE

Advanced Configuration

WINDOW DIMENSIONS – PRESET 1

Origin along X Axis



Read a number in the range
0-630

Origin along Y Axis



Read a number in the range
0-470

Width



Read a number in the range
10-640

Height



Read a number in the range
10-480

ADVANCED IMAGE CAPTURE

BRIGHTNESS – PRESET 1

Increase



Read a number in the range
0-100

Decrease



Read a number in the range
0-100

CONTRAST – PRESET 1

Increase



Read a number in the range
0-100

Decrease



Read a number in the range
0-100

ADVANCED IMAGE CAPTURE

ZOOM – PRESET 1

20%



40%



60%



80%



100%



120%



140%



160%



180%



200%



COLOR DEPTH – PRESET 1

2 Grey Levels*



16 Grey Levels*



256 Grey Levels



* only for TIFF and BMP Images.

ADVANCED IMAGE CAPTURE

2.13.2 Image Preset 2

Basic Configuration

IMAGE FORMAT – PRESET 2

Bitmap Format



JPEG Format



TIFF Format



RESOLUTION – PRESET 2

Full Resolution (640 x 480)



Quarter Resolution (320 x 240)



JPEG QUALITY FACTOR – PRESET 2

JPEG Quality Factor



Set the JPEG compression level in the range **000-100**.

ADVANCED IMAGE CAPTURE

Advanced Configuration

WINDOW DIMENSIONS – PRESET 2

Origin along X Axis



Read a number in the range
0-630

Origin along Y Axis



Read a number in the range
0-470

Width



Read a number in the range
10-640

Height



Read a number in the range
10-480

ADVANCED IMAGE CAPTURE

BRIGHTNESS – PRESET 2

Increase



Read a number in the range
0-100

Decrease



Read a number in the range
0-100

CONTRAST – PRESET 2

Increase



Read a number in the range
0-100

Decrease



Read a number in the range
0-100

ADVANCED IMAGE CAPTURE

ZOOM – PRESET 2

20%



40%



60%



80%



100%



120%



140%



160%



180%



200%



COLOR DEPTH – PRESET 2

2 Grey Levels*



16 Grey Levels*



256 Grey Levels



* only for TIFF and BMP Images.

ADVANCED IMAGE CAPTURE

2.13.3 Image Preset 3

Basic Configuration

IMAGE FORMAT – PRESET 3

Bitmap Format



JPEG Format



TIFF Format



RESOLUTION – PRESET 3

Full Resolution (640x 480)



Quarter Resolution (320 x 240)



JPEG QUALITY FACTOR – PRESET 3

JPEG Quality Factor



Set the JPEG compression level
in the range **000-100**.

ADVANCED IMAGE CAPTURE

Advanced Configuration

WINDOW DIMENSIONS – PRESET 3

Origin along X Axis



Read a number in the range
0-630

Origin along Y Axis



Read a number in the range
0-470

Width



Read a number in the range
10-640

Height



Read a number in the range
10-480

ADVANCED IMAGE CAPTURE

BRIGHTNESS – PRESET 3

Increase



Read a number in the range
0-100

Decrease



Read a number in the range
0-100

CONTRAST – PRESET 3

Increase



Read a number in the range
0-100

Decrease



Read a number in the range
0-100

ADVANCED IMAGE CAPTURE

ZOOM – PRESET 3

20%



40%



60%



80%



100%



120%



140%



160%



180%



200%



COLOR DEPTH – PRESET 3

2 Grey Levels*



16 Grey Levels*



256 Grey Levels



* only for TIFF and BMP Images.

ADVANCED IMAGE CAPTURE

2.13.4 Image Preset 4

Basic Configuration

IMAGE FORMAT – PRESET 4

Bitmap Format



JPEG Format



TIFF Format



RESOLUTION – PRESET 4

Full Resolution (640 x 480)



Quarter Resolution (320 x 240)



JPEG QUALITY FACTOR – PRESET 4

JPEG Quality Factor



Set the JPEG compression level in the range **000-100**.

ADVANCED IMAGE CAPTURE

Advanced Configuration

WINDOW DIMENSIONS – PRESET 4

Origin along X Axis



Read a number in the range
0-630

Origin along Y Axis



Read a number in the range
0-470

Width



Read a number in the range
10-640

Height



Read a number in the range
10-480

ADVANCED IMAGE CAPTURE

BRIGHTNESS – PRESET 4

Increase



Read a number in the range
0-100

Decrease



Read a number in the range
0-100

CONTRAST – PRESET 4

Increase



Read a number in the range
0-100

Decrease



Read a number in the range
0-100

ADVANCED IMAGE CAPTURE

ZOOM – PRESET 4

20%



40%



60%



80%



100%



120%



140%



160%



180%



200%



COLOR DEPTH – PRESET 4

2 Grey Levels*



16 Grey Levels*



256 Grey Levels



* only for TIFF and BMP Images.

ADVANCED DATA FORMAT

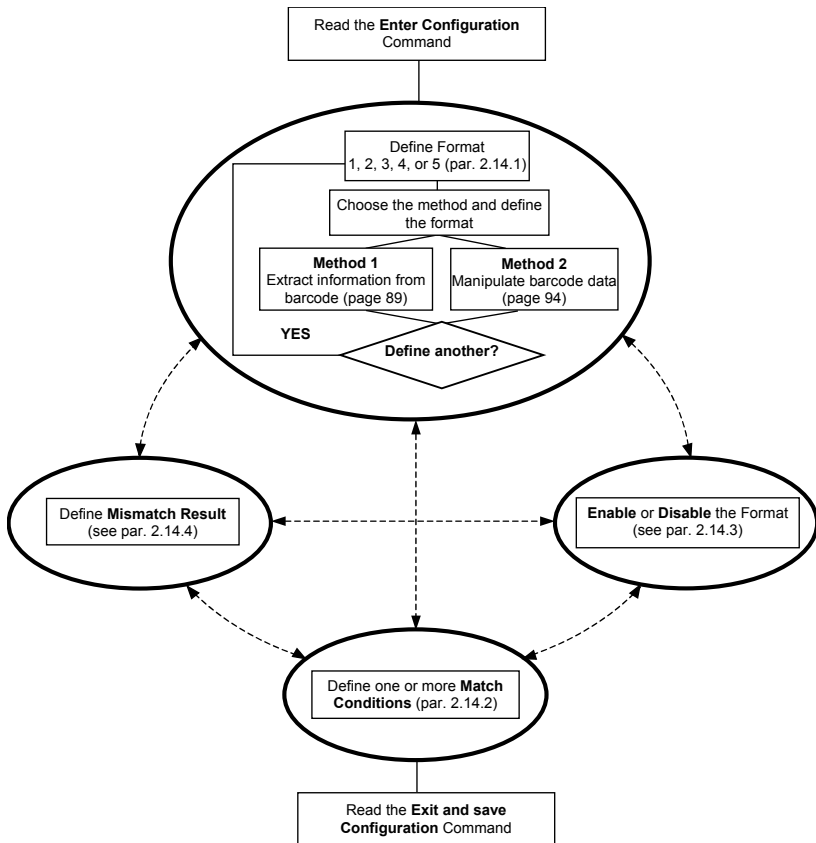
2.14 ADVANCED DATA FORMAT

Advanced data format has been designed to offer you complete flexibility in changing the format of barcode data **before** transmitting it to the host system.

Up to 5 advanced code management formats can be defined by completing the four given procedures following the desired order:

- Format Definition
- Mismatch Result
- Enable/Disable Format
- Match Conditions

The formats defined will be restored to default values when reading the general "Restore Default" code given in par. 2.2.2.



ADVANCED DATA FORMAT

2.14.1 Format Definition

STEP 1	FORMAT DEFINITION
---------------	--------------------------

Define Format 1



Define Format 2



Define Format 3



Define Format 4



Define Format 5



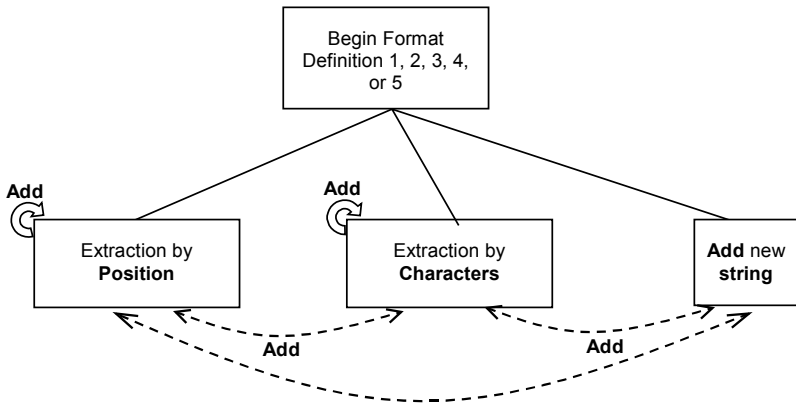
STEP 2 **FORMAT DEFINITION**

Method 1 - Extracting Information from Barcode

Method 1 allows extracting one or more fields by position or by characters from the decoded barcode. These fields are sent to the host computer as data of the output message, while the characters not included in the formatting procedure will be deleted and not inserted in the output message.

These two kinds of extraction (by position / by character) can be used together within the same format definition; furthermore, it is possible to complete the new format by adding a new string of characters. Since there is no fixed rule, the procedures can be freely put in order and repeated according to your requirement.

The only limit is determined by the size of the internal reserved memory used to define the format.

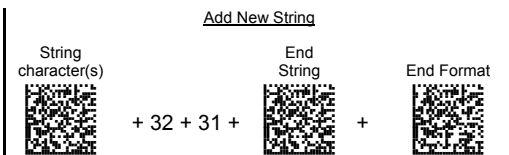
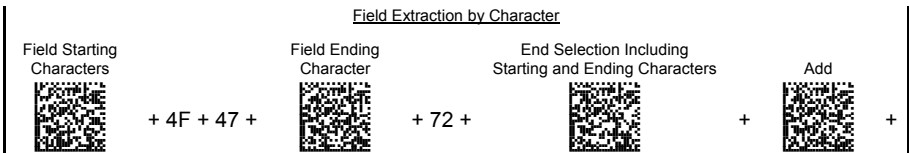
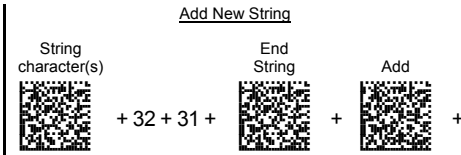
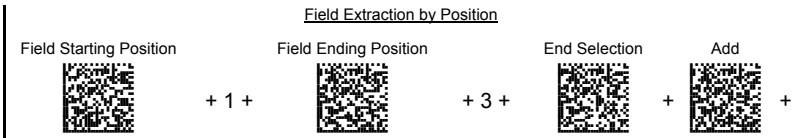
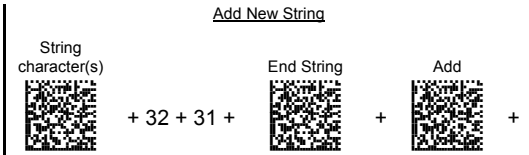


ADVANCED DATA FORMAT

Example **Method 1 Extracting Information from Barcode**

Decoded code: <DATALOGICproduct>

Formatting procedure: Add new string + Extract field by position + Add new string +
Extract field by character + Add new string



Output message: <21DAT21OGICpr21>

FIELD EXTRACTION BY CHARACTER

a) Define Field Starting Character(s)

Field Starting Character(s)



Read the Hex value from the Hex/Numeric table identifying the starting character(s) of the field to be extracted. Valid values are in the range **00-7F**.

b) Define Field Ending Character(s)

Field Ending Character(s)



Read the Hex value from the Hex/Numeric table identifying the ending character(s) of the field to be extracted. Valid values are in the range **00-7F**.

c) Field Delimiter Selection

Include Start/End Characters



Discard Start/End Characters



OR

d) EITHER Add Field or String

Add



- To add other fields selected by characters read the code and repeat this procedure from step **a** for each field to be selected;
- To add a new string of characters read the barcode and follow the procedure described on page 93 ;
- To add the procedure selecting new fields by position read the code and follow the description given on page 92.

OR

End Format Definition

End Format Definition



Read the code to end the format definition.

FIELD EXTRACTION BY POSITION

a) Define Field Starting Position

Field Starting Position



Read a number corresponding to the field starting position.

b) Define Field Ending Position

Field Ending Position



Read a number corresponding to the field ending position.

Last Position



OR

Read this code to set the field ending position to the last position of the code:

c) End Field Selection

End Selection



Read the code to end the field selection.

d) EITHER Add Field or String

Add



- To add other fields selected by position read the code and repeat this procedure from step a for each field to be selected;
- To add a new string of characters read the barcode and follow the procedure described on page 93;
- To add the procedure selecting new fields by characters read the code and follow the description given on page 91.

OR

End Format Definition

End Format Definition



Read the code to end the format definition.

ADVANCED DATA FORMAT

ADD NEW STRING

a) **Define New String**

String Character(s)



Read the Hex value from the Hex/Numeric table identifying the character(s). Valid values are in the range 00-7F.

b) **End String**

End String



Read the code to end the string defined in step a.

c) **EITHER Add Procedure**

Add



- To add the procedure extracting fields by characters follow the steps given on page 91;
- To add the procedure extracting fields by position follow the steps given on page 92;

OR End Format Definition

End Format Definition



Read the code to end the format definition.

Method 2 - Manipulating the Barcode Data

Method 2 allows modifying the barcode data by means of one of the following procedures:

- String insertion;
- String deletion;
- String substitution;
- Field deletion.

Once the data has been modified, it is sent to the host computer as data of the output message.

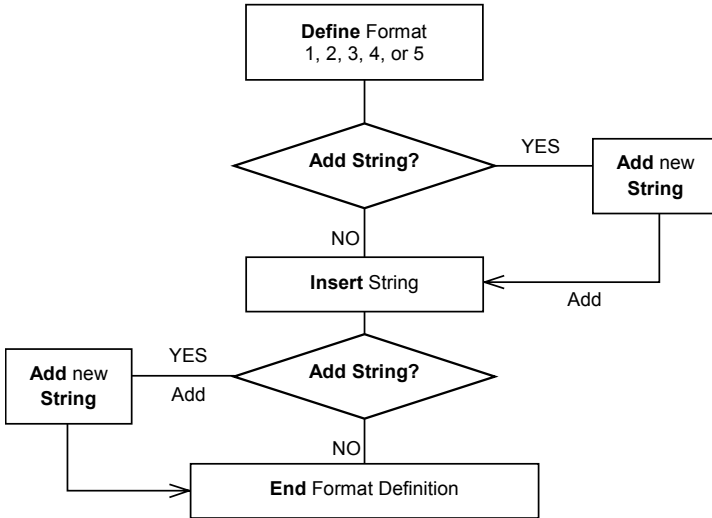
Unlike Method 1 this method does not allow associating different procedures together. This means that each format definition corresponds to a single procedure. Despite this, it is possible to add a new string of characters to the beginning or ending part of the formatted barcode.

The only limit is determined by the size of the internal reserved memory used to define the format.

ADVANCED DATA FORMAT

STRING INSERTION

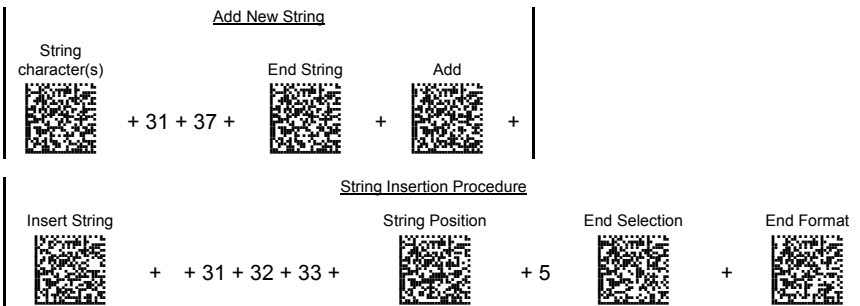
To complete this procedure proceed as follows:



Example

Decoded code: <DATALOGICproduct>

Formatting procedure: Add new string + Insert String



Output message: <17DATA123LOGICproduct>

ADVANCED DATA FORMAT

String Insertion Procedure

a)

Insert String

Insert String



Read the Hex value from the Hex/Numeric table identifying the characters to be inserted. Valid values are in the range **00-7F**.

b)

Define String Position

String Position



Read a number corresponding to the string position within the barcode.

c)

End Selection

End Selection



Read the code to end the field selection.

d)

EITHER

Add String

Add



To add a new string of characters read the barcode and follow the procedure described on page 104;

OR

End Format Definition

End Format Definition

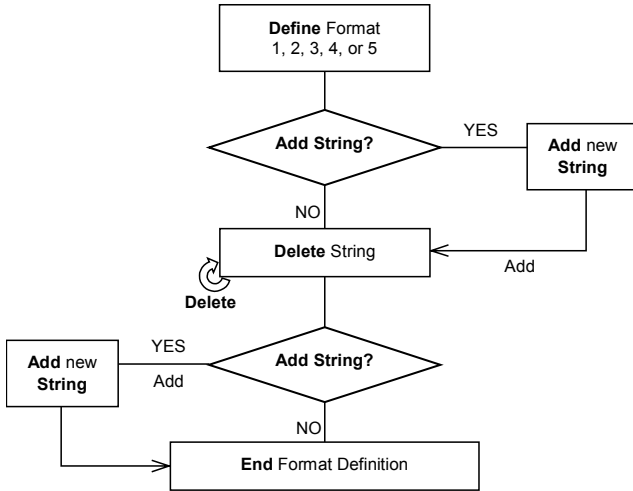


Read the code to end the format definition.

ADVANCED DATA FORMAT

STRING DELETION

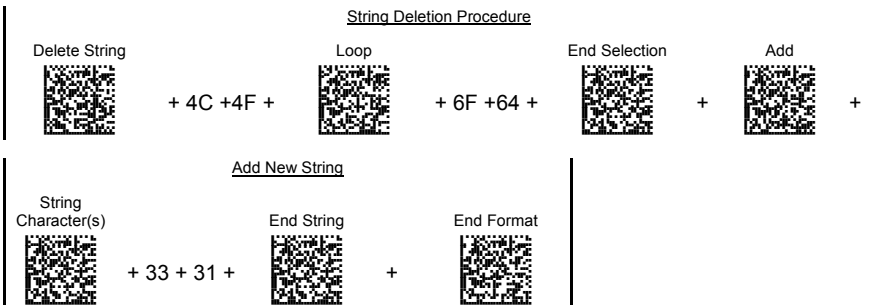
To complete this procedure proceed as follows:



Example

Decoded code: <DATALOGICproduct>

Formatting procedure: Delete First String + Delete Second String + Add New String.



Output message: <DATAGICpruct31>

String Deletion Procedure

a) **Delete String**

Delete



Read the Hex value from the Hex/Numeric table identifying the string character(s) to be deleted. Valid values are in the range **00-7F**.

b) (optional) **Select Other Strings to be Deleted**

Loop



Read the code above and repeat the procedure from step a.

c) **End Selection**

End Selection



Read the code to end the selection.

d) **EITHER Add String**

Add



To add a new string of characters read the barcode and follow the procedure described on page 104;

OR

End Format Definition

End Format Definition

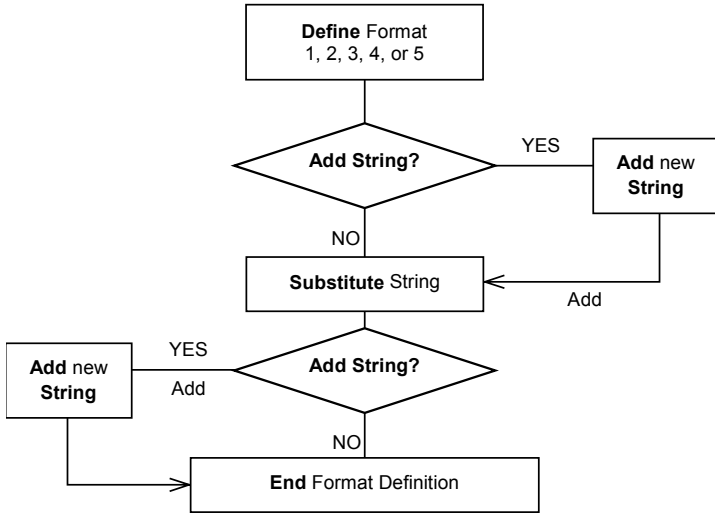


Read the code to end the format definition.

ADVANCED DATA FORMAT

STRING SUBSTITUTION

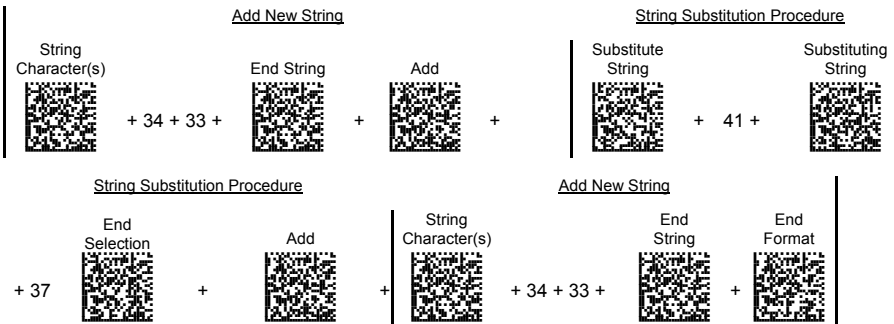
To complete this procedure proceed as follows:



Example

Decoded code: <DATALOGICproduct>

Formatting procedure: Add new string + String substitution + Add new string.



Output message: <43D7T7LOGICproduct43>

String Substitution Procedure

a) Define String to be Substituted

Substitute String



Read the Hex value from the Hex/Numeric table identifying the characters of the string to be substituted. Valid values are in the range **00-7F**.

b) Define Substituting String

Substituting String



Read the Hex value from the Hex/Numeric table identifying the characters of the substituting string. Valid values are in the range **00-7F**.

c) End Selection

End Selection



Read the code to end the selection.

d) EITHER Add String

Add



To add a new string of characters read the barcode and follow the procedure described on page 104;

OR

End Format Definition

End Format Definition

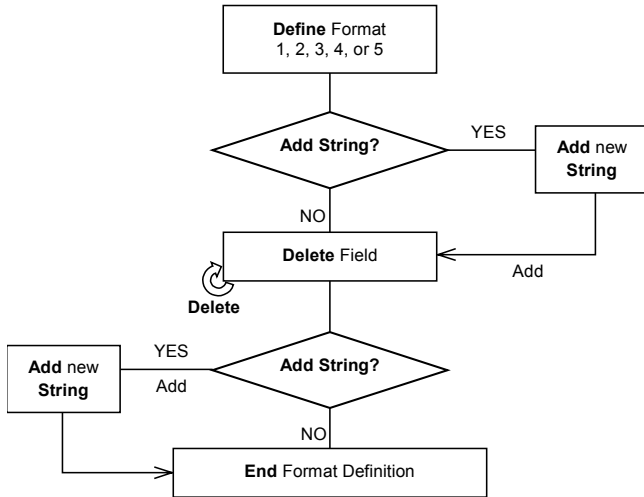


Read the code to end the format definition.

ADVANCED DATA FORMAT

FIELD DELETION

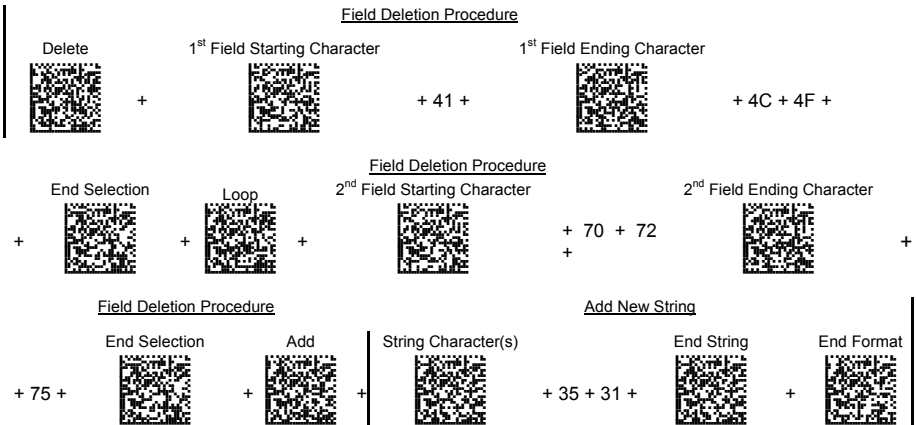
To complete this procedure proceed as follows:



Example

Decoded code: <DATALOGICproduct>

Formatting procedure: Delete First Field + Delete Second Field + Add New String.



Output message: <DGICct51>

Field Deletion Procedure

a) Delete Field

Delete



Read the code to enable the command deleting the field.

b) Define Field Starting Character

Field Starting Character



Read the Hex value from the Hex/Numeric table identifying the starting characters. Valid values are in the range **00-7F**.

c) Define Field Ending Character

Field Ending Character



Read the Hex value from the Hex/Numeric table identifying the ending character/s. Valid values are in the range **00-7F**.

d) End Field Selection

End Selection



Read the code to end the field selection.

e) (optional) Select Other Fields to be Deleted

Loop



Read the following code and repeat the procedure from step **b** for each field to be deleted:

ADVANCED DATA FORMAT

f)

EITHER

Add String

Add



To add a new string of characters read the barcode and follow the procedure described on page 104;

OR

End Format Definition

End Format Definition



Read the code to end the format definition.

ADVANCED DATA FORMAT

ADD NEW STRING

a)

Define New String

String Character



Read the Hex value from the Hex/Numeric table identifying the starting characters. Valid values are in the range **00-7F**.

b)

End String and Define Procedure

End String Plus Procedure



Read the code to end the string selection and continue defining a new procedure belonging to Method 1.

OR

End String and Format

End String & Format



Read the code to end the string and the format definition.

2.14.2 Match Conditions

By setting one or more of the following conditions it is possible to select the codes to be formatted. Follow the given steps to define the desired condition:

MATCH WITH PREDEFINED SUBSTRING

Define Matching Substring

Match with Substring



Read the above code and:

1. read a number in the range **1-5** corresponding to the desired format number;
2. set the number of characters defining the matching string in the range **00-10**;
3. read the corresponding character as Hex value from the Hex/Numeric table identifying the substring character/s. Valid values are in the range **00-7F**.

(optional)

Define Substring Position

Matching Substring Position



Read the above code and:

1. read a number in the range **1-5** corresponding to the desired format number;
2. read the number corresponding to the substring position in the range **0-255**;

AND/OR

MATCH CODE LENGTH

Define Code Length

Match Code Length



Read the above code and:

1. read a number in the range **1-5** corresponding to the desired format number;
2. read the number in the range **0-255**;

ADVANCED DATA FORMAT

AND/OR

MATCH SYMBOLOGY

Define Code Symbology

Match Symbology



Read the above code and:

1. read a number in the range **1-5** corresponding to the desired format number;
2. set the number of the matching code symbologies in the range **0-4**;
3. select the Datalogic Standard Code Identifier from the Code Identifier Table in Appendix B.

ADVANCED DATA FORMAT

2.14.3 Format Enable/Disable

Format 1



0 = disabled
1 = enabled

Format 2



0 = disabled
1 = enabled

Format 3



0 = disabled
1 = enabled

Format 4



0 = disabled
1 = enabled

Format 5



0 = disabled
1 = enabled

Disable All Formats



ADVANCED DATA FORMAT

2.14.4 Mismatch Result

The result of each format may be set in case the match conditions previously selected are not satisfied.

Once the desired formats have been enabled and a code has been read, the results corresponding to each format will be concatenated together and transmitted in the output message. For this reason, it is strongly advised to set the mismatch result for each format.

Example

Decoded Code: <DATALOGICproduct>

Format definition:

Format	Enable/Disable	Match Condition	Function	Mismatch Result
Format 1	Enabled	Code having a length of 16 characters	Select field from position1 to position3	No string
Format 2	Disabled	/	/	/
Format 3	Enabled	Code having a length of 25 characters	Substitute string "ab" with string "12"	Unformatted read code
Format 4	Enabled	Code having the substring "AT" in position 2	Insert string "789" in position 7	Unformatted read code
Format 5	Enabled	Code belonging to the PDF417 symbology	Delete string "DA" and "pr"	Unformatted read code

Output message: <DATDATALOGICproductDATALO789GICproductDATALOGICproduct>

Format 1
Format 3
Format 4
Format 5

Define Mismatch Result

Mismatch Result

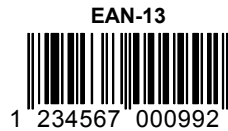
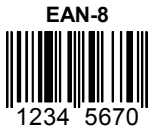
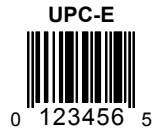


Read the above code and:

1. read a number in the range 1-5 corresponding to the desired format number;
2. 0 = empty string as output
1 = unformatted read code as output.

3 TEST BARCODE SYMBOLS

Use these test 1D and 2D symbols to check that the reader is imaging and decoding properly, according to your configuration.



Code 39 (Normal)**Code 39 (Full ASCII)****Codabar****Code 128**

Interleaved 2 of 5



PDF417



QR



DATA MATRIX NORMAL



INVERSE DATA MATRIX



4 TROUBLESHOOTING & MAINTENANCE

4.1 CABLE CONNECTIONS

Ensure your reader-to-host interface cable and the reader power supply cable are correctly and firmly attached (see "System Connections" in par. 1.3).

If the reader is simply not functioning, contact your nearest Datalogic distributor.

4.2 MAINTENANCE

You do not need to perform regular preventative maintenance on the LYNX™ reader.

Do not try to open the case, because you might damage the interior electronic components and such action voids the warranty.

You can keep your reader in good operating condition by:

- periodically cleaning the reading window using water or a mild detergent solution and a soft cloth or tissue.
- watching for any damage to the housing.



CAUTION

Do not use abrasive cleaning agents on the reader's window to avoid scratches. Do not use solvents on the housing or window to avoid damage. Do not submerge the reader in water. It is not waterproof.

5 TECHNICAL FEATURES

LYNX™ D432 / D432E Common Features

Electrical Features	
Operating Voltage	10 to 30 V
Power Consumption	
@ 12V (Stand-by)	110 mA
@ 12V (Typical)	245 mA
@ 10V (Peak current)	305 mA
Communications Features	
Standard Interfaces	RS232, Keyboard emulation AT IBM, , USB COM emulation, USB Keyboard emulation
Proprietary Interfaces	USB Bulk, USB Generic HID
Environmental Features	
Operating Temperature	0° to+ 55 °C (+32° to +131 °F)
Storage Temperature	-20° to +70 °C (-4° to +158 °F)
Humidity	0 to 95% NC
Shock resistance	IEC 68-2-32 Test ED – 1,8 m.
Mechanical Features	
Dimensions	203 x 117 x 69 mm (8 x 4.6 x 2.7 inches)
Weight	265 g (9.3 oz.) without cable
Decoding Capability	
1D	Interleaved 2 of 5, Code39, Code32, Code128, EAN 128, Code93, UPC/EAN/JAN, Codabar
2D	PDF417, DataMatrix (ECC200)
Postal Codes	POSTNET, PLANET, Japan Post, Australia Post, KIX Code, Royal Mail Code (RM4SCC)
Imaging Option	
Image	640 x 480 pixel format (VGA)
	320 x 240 pixel format (CIF);
Graphic Format	JPEG, 256 gray levels
	BMP, 2, 16, 256 gray levels
	TIFF, 2, 16, 256 gray levels

LYNX™ D432 / D432E Common Features

Optical Features	
Sensor	640 x 480 pixel element, 2D CMOS Array
Illuminator	LED array
Wavelength	In the range 630 ~ 670 nm
Max. LED Output Power	0.896 mW
LED Safety Class	Class 1 to EN 60825-1
Aiming System	Visible Laser Diode
Wavelength	650 nm
Laser Safety Class	Class 2 - EN 60825-1; Class II CDRH
Ambient light	0 - 100000 lux

LYNX™ D432

Optical Features			
Focus distance	115 mm		
Field of view	21.8° (H) x 16.7° (V)		
Horizontal field of view at distance (d) in mm	0.4d + 12		
Vertical field of view at distance (d) in mm	0.3d + 9		
Max Resolution	Linear codes - mm (mils)	Datamatrix – mm (mils)	
	0.10 (4)	0.17 (6.6)	
Depth of field*			
1D (linear):	X-dimension mm (mils)	Symbol size cm (in)	DOF cm (in)
Code39	0.13 (5)	1.2 (0.47)	8.0 to 15.0 (3.15 to 5.90)
	0.5 (20)	3.2 (1.26)	8.0 to 33.0 (3.15 to 12.99)
EAN13	0.33 (13)	3.1 (1.22)	7.5 to 24.5 (2.95 to 9.65)
2D:	X-dimension mm (mils)	Symbol size cm (in)	DOF cm (in)
POSTNET	0.5 (20)	4.0 x 0.4 (1.57 x 0.16)	11.5 to 30.0 (4.53 to 11.81)
PDF417	0.13 (5)	1.1 x 0.9 (0.43 x 0.35)	8.5 to 15.5 (3.35 to 6.10)
	0.17 (6.6)	1.4 x 1.2 (0.55 x 0.47)	7.0 to 19.0 (2.76 to 7.48)
	0.25 (10)	2.2 x 1.8 (0.86 x 0.71)	4.5 to 24.0 (1.77 to 9.45)
DataMatrix	0.19 (7.5)	0.8 x 0.8 (0.31 x 0.31)	9.0 to 13.0 (3.54 to 5.12)
	0.25 (10)	0.8 x 0.8 (0.31 x 0.31)	7.5 to 16.5 (2.95 to 6.50)
	0.38 (15)	1.0 x 1.0 (0.39 x 0.39)	6.0 to 22.0 (2.36 to 8.66)
Skew	±40°		
Pitch	±35°		
Rotation	360°		
Print Contrast (Min.)	23%		

* Reading distances are measured from the nose of the reader.

LYNX™ D432E

Optical Features			
Focus distance	65 mm		
Field of view	20° (H) x 15° (V)		
Horizontal field of view at distance (d) in mm	0.32 d + 8.67		
Vertical field of view at distance (d) in mm	0.24 d + 6.50		
Max Resolution	Linear codes - mm (mils)		Datamatrix – mm (mils)
	0.05 (2.0)		0.10 (4.0)
Depth of field*			
1D (linear):	X-dimension mm (mils)	Symbol size cm (in)	DOF cm (in)
Code39	0.076 (3)	1.2 (0.47)	5.0 to 7.5 (1.96 to 2.95)
	0.13 (5)	1.2 (0.47)	4.0 to 9.5 (1.57 to 3.74)
2D:	X-dimension mm (mils)	Symbol size cm (in)	DOF cm (in)
PDF417	0.76 (3)	0.65 x 0.55 (0.26 x 0.22)	5.0 to 8.0 (1.96 to 3.15)
	0.25 (10)	2.2 x 1.8 (0.86 x 0.71)	4.0 to 13.3 (1.57 to 5.24)
DataMatrix	0.13 (5)	0.5 x 0.5 (0.20 x 0.20)	5.0 to 7.5 (1.96 to 2.95)
	0.25 (10)	0.8 x 0.8 (0.31 x 0.31)	4.5 to 10.5 (1.77 to 4.13)
Skew	±40°		
Pitch	±35°		
Rotation	360°		
Print Contrast (Min.)	27%		

* Reading distances are measured from the nose of the reader.

A PROGRAMMING FOR EXPERT USERS

This document is addressed to expert users who are familiar with software programming languages and want to define a personalized code formatting. The provided programming language allows creating either simple or complex formatting expressions by means of the basic functions connected together through the following operators: (,) , - , + .

The syntax to be used to transmit the expressions to the Lynx™ is the following:

\$+ELB<n>formatting expression<ETX>\$-

where:

- <n> is a number in the range 1-5 corresponding to the format to be defined;
- <ETX> is the conventional character used as terminator of the command;
- the formatting expression uses ASCII characters when containing text strings. For this reason, the string must be inserted between two quotation marks. The following example shows the ASCII conversion of the "ABC" string:

\$+ELB1"414243"+#DS^C\$-

FUNCTION DESCRIPTION

All the functions and conventions to be used within the formatting expressions are listed below:

FUNCTION NAME	DESCRIPTION
FSTR	Searches for a defined substring by its starting and ending string.
FLSTR	Searches for a defined substring by its starting string and its length.
SSTR	Extracts a defined substring from the original string.
FPOS	Searches for a position of a defined substring within the original string.
LSTR	Returns a string length.
ISTR	Insert a substring in the original string.
RSTR	Substitutes a defined substring contained in the original string with a new one.

CONVENTIONS	DESCRIPTION
+	Concatenates two strings or fields.
-	Deletes a substring or a field from the original string.
#DS	Returns the string which has been decoded by the library.
#F<n>	Returns the result of a format which has been previously defined. The <n> value is in the range 1-4.

FindStringByStarting&EndingChar (FSTR)

This function has the following syntax:

FSTR<source_string, string_start, string_stop, mode>⇒string

This function searches for a substring having a defined starting character ("string_start") and a defined ending character ("string_stop") within the "source_string". It returns the string you searched for, or an empty one in case of failure.

If searching for a substring having characters already known, the "string_start" and "string_stop" arguments must share the same value.

The "mode" argument allows managing the starting character ("string_start") and the ending character ("string_stop"):

- 0 = include both starting and ending character
- 1 = include only starting character
- 2 = include only ending character
- 3 = discard both starting and ending character

FindStringByStartingChar&Len (FLSTR)

This function has the following syntax:

FLSTR<source_string, string_start, len, mode>⇒string

This function searches for a substring having a defined starting character ("string_start") and a defined length ("len") within the "source_string". It returns the string you searched for, or an empty one in case of failure.

If searching for a substring having a length already known, the "string_start" and "string_stop" arguments must share the same number.

The "mode" argument allows managing the starting character ("string_start"):

- 0 = include starting character
- 1 = discard starting character

SelectString (SSTR)

This function has the following syntax:

SSTR<source_string, pos_start, pos_end>⇒string

It extracts a substring whose characters are between "pos_start" and "pos_end" from the "source_string".

If "pos_end" is longer than the "source_string" length, no error will be generated since the exceeding characters are ignored.

The first character of every string is in position 1.

FindPosition (FPOS)

This function has the following syntax:

FPOS<source_string, search_string>⇒position

This function searches for a defined substring within the "source_string" and returns its position. If the substring is not found, the returned value is 1.

StringLength (LSTR)

This function has the following syntax:

LSTR<string>⇒length

This function returns the length of the defined string.

StringConcatenation

This function has the following syntax:

string1 + string2⇒string

This function allows concatenating two different strings in order to get a single string as result.

StringDiscard

This function has the following syntax:

```
string1 - string2⇒string
```

This function discards all the strings having the same value as "string2" which can be found in "string1". If no "string2" is found within "string1", the result returns "string1".

InsertString (ISTR)

This function has the following syntax:

```
ISTR<source_string, string1, position>⇒string
```

This function inserts a new string ("string1") within the "source_string" and places it in the defined "position".

If the value of the "position" argument is longer than "source_string" length, "string1" will be placed after the last character of the source string.

ReplaceString (RSTR)

This function has the following syntax:

```
RSTR<source_string, string1, string2>⇒string
```

This function searches for "string1" within the "source_string". All the strings having the same value as "string1" within the "source_string" will be replaced by "string2".

If no "string1" is found in the "source_string", the result returns the "source_string".

Examples

The string transmitted is "12345abcdef3790" and corresponds to the #DS function, as defined in the programming language.

- 1) expression \Rightarrow **SSTR<#DS,1,5> + SSTR<#DS,11,15> + SSTR<#DS,6,9>**
result \Rightarrow **"12345f3790abcd"**
- 2) expression \Rightarrow **FSTR<#DS, "616263", "616263", 0> + SSTR<#DS,LSTR<#DS>-3, LSTR<#DS>**
result \Rightarrow **"abc3790"**
- 3) expression \Rightarrow **FSTR<#DS, "616272", "616261", 0>**
result \Rightarrow **" null string"**
- 4) expression \Rightarrow **#DS - FSTR<#DS, "616263", "6566", 0>**
result \Rightarrow **"123453790"**

During the format definition the decoded string represented by #DS does not change.

Using Format Output in Format Definition

The input used by the above functions to define the code formatting usually corresponds to the decoded code (#DS). Actually, the formatting expression of each function can also format the result (output) produced by a preceding code formatting. The format output is represented as follow:

#F<n>, where:

<n> = format number in the range 1-4

#F = format output

Being Format 5 not included in other format expression, the format number is in the range 1-4. Furthermore, since a format expression operates upon the output of the preceding formats, the expression defining Format 1 will never contain the result of another format.

Example

The following expression is used to define Format 3:

#DS + FSTR<#F2, "6173", "6263", 0>

The expression input consists of the decoded code and the result produced by Format 2 (#F2).

The FSTR function searches for a defined substring within the #F2 result; then, it concatenates this substring and the decoded code. The result corresponds to #F3 output.

B CODE IDENTIFIER TABLE

EAN/UPC**CODABAR****CODE 128****EAN 128****CODE 93****CODE 32****CODE 39****INTERLEAVED 2 OF 5****PDF417****DATAMATRIX**

QR



AUSTRALIA POST



JAPAN POST



POSTNET



PLANET



KIX CODE

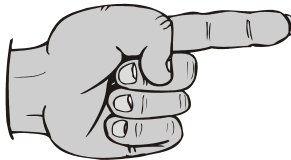


RM4SCC



C HEX AND NUMERIC TABLE

**OPEN THIS PAGE TO READ THE DESIRED
HEX AND NUMERIC SELECTIONS**



CHARACTER TO HEX CONVERSION TABLE								
char	decimal	hex	char	decimal	hex	char	decimal	hex
NUL	000	00	*	042	2A	U	085	55
SOH	001	01	+	043	2B	V	086	56
STX	002	02	,	044	2C	W	087	57
ETX	003	03	-	045	2D	X	088	58
EOT	004	04	.	046	2E	Y	089	59
ENQ	005	05	/	047	2F	Z	090	5A
ACK	006	06	0	048	30	[	091	5B
BEL	007	07	1	049	31	\	092	5C
BS	008	08	2	050	32	]	093	5D
HT	009	09	3	051	33	^	094	5E
LF	010	0A	4	052	34	`	095	5F
VT	011	0B	5	053	35	~	096	60
FF	012	0C	6	054	36	a	097	61
CR	013	0D	7	055	37	b	098	62
SO	014	0E	8	056	38	c	099	63
SI	015	0F	9	057	39	d	100	64
DLE	016	10	:	058	3A	e	101	65
DC1	017	11	;	059	3B	f	102	66
DC2	018	12	<	060	3C	g	103	67
DC3	019	13	=	061	3D	h	104	68
DC4	020	14	>	062	3E	i	105	69
NAK	021	15	?	063	3F	j	106	6A
SYN	022	16	@	064	40	k	107	6B
ETB	023	17	A	065	41	l	108	6C
CAN	024	18	B	066	42	m	109	6D
EM	025	19	C	067	43	n	110	6E
SUB	026	1A	D	068	44	o	111	6F
ESC	027	1B	E	069	45	p	112	70
FS	028	1C	F	070	46	q	113	71
GS	029	1D	G	071	47	r	114	72
RS	030	1E	H	072	48	s	115	73
US	031	1F	I	073	49	t	116	74
SPACE	032	20	J	074	4A	u	117	75
!	033	21	K	075	4B	v	118	76
"	034	22	L	076	4C	w	119	77
#	035	23	M	077	4D	x	120	78
\$	036	24	N	078	4E	y	121	79
%	037	25	O	079	4F	z	122	7A
&	038	26	P	080	50	{	123	7B
'	039	27	Q	081	51	|	124	7C
(	040	28	R	082	52	}	125	7D
)	041	29	S	083	53	~	126	7E
			T	084	54	DEL	127	7F

Enter configuration



Exit and Save configuration



0



1



5



6



2



7



3



4



8



9



AUTOSCAN PATTERN CODE

DATALOGIC S.p.A.,
Via Candini, 2
40012 - Lippo di Calderara
Bologna - Italy



04

dichiara che
declares that the
déclare que le
bescheinigt, daß das Gerät
declare que el

LYNX D432, 2D Reader
LYNX D432 E, 2D Reader

e tutti i suoi modelli
and all its models
et tous ses modèles
und seine modelle
y todos sus modelos

sono conformi alle Direttive del Consiglio Europeo sottoelencate:
are in conformity with the requirements of the European Council Directives listed below:
sont conformes aux spécifications des Directives de l'Union Européenne ci-dessous:
den nachstehenden angeführten Direktiven des Europäischen Rats:
cumple con los requisitos de las Directivas del Consejo Europeo, según la lista siguiente:

89/336/EEC EMC Directive e **92/31/EEC, 93/68/EEC** emendamenti successivi
and further amendments
et ses successifs amendements
und späteren Abänderungen
y sucesivas enmiendas

73/23/EEC Low Voltage Directive

Basate sulle legislazioni degli Stati membri in relazione alla compatibilità elettromagnetica ed alla sicurezza dei prodotti.
On the approximation of the laws of Member States relating to electromagnetic compatibility and product safety.
Basée sur la législation des Etats membres relative à la compatibilité électromagnétique et à la sécurité des produits.
Über die Annäherung der Gesetze der Mitgliedsstaaten in bezug auf elektromagnetische Verträglichkeit und Produktsicherheit entsprechen.
Basado en la aproximación de las leyes de los Países Miembros respecto a la compatibilidad electromagnética y las Medidas de seguridad relativas al producto.

Questa dichiarazione è basata sulla conformità dei prodotti alle norme seguenti:
This declaration is based upon compliance of the products to the following standards:
Cette déclaration repose sur la conformité des produits aux normes suivantes:
Diese Erklärung basiert darauf, daß das Produkt den folgenden Normen entspricht:
Esta declaración se basa en el cumplimiento de los productos con las siguientes normas:

EN 55022, August 1994:	LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENT (ITE)
EN 61000-6-2, October 2001:	ELECTROMAGNETIC COMPATIBILITY (EMC). PART 6-2: GENERIC STANDARDS - IMMUNITY FOR INDUSTRIAL ENVIRONMENTS
EN 60825-1, June 1994; AMENDMENTS A11 (1996), A2 (2001)	SAFETY OF LASER PRODUCTS – PART 1: EQUIPMENT CLASSIFICATION, REQUIREMENTS AND USER'S GUIDE.

Lippo di Calderara, 4/11/2004

Ruggero Cacioppo
Ruggero Cacioppo
Quality Assurance Supervisor

