



**DS8100A**

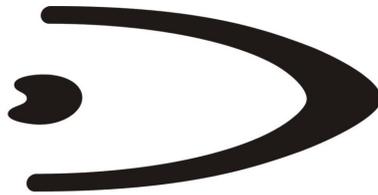
**Reference Manual**

**DATALOGIC**



# **DS8100A**

**REFERENCE MANUAL**



# DATALOGIC

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DS8100A Reference Manual

Ed.: 10/2005

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## REFERENCES

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### REFERENCE DOCUMENTATION

The documentation related to the DS8100A management is listed below:

- C-BOX100 Installation Manual
- PWR series power supply unit Installation Manuals
- PWO power supply unit Installation Manual
- GFC-80 90° deflecting mirror
- GFC-800 90° deg. mirror close distance
- SC6000 Controller Reference Manual
- Document about the Ethernet connectivity
- Help On-Line in PDF format

### SERVICES AND SUPPORT

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

- **PRODUCTS**  
Search through the links to arrive at your product page where you can download specific **Manuals** and **Software & Utilities**
- **SERVICES & SUPPORT**
  - **Datalogic Services** - Warranty Extensions and Maintenance Agreements
  - **Authorised Repair Centres**
- **CONTACT US**  
E-mail form and listing of Datalogic Subsidiaries

# SAFETY REGULATIONS

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## ELECTRICAL SAFETY

This product conforms to the applicable requirements contained in the European Standard for electrical safety EN-60950 at the date of manufacture.

	<p><i>This symbol refers to operations that must be performed by qualified personnel only. Example: opening the device.</i></p>
<b>WARNING</b>	

	<p><i>This symbol refers to operations where there is danger of electrical shock. Before opening the device make sure the power cable is disconnected to avoid electric shock.</i></p>
<b>WARNING</b>	

## LASER SAFETY

The following information is provided to comply with the rules imposed by international authorities and refers to the correct use of the DS8100A scanner.

### Standard Regulations

This scanner utilizes up to 4 low-power laser diodes. 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.

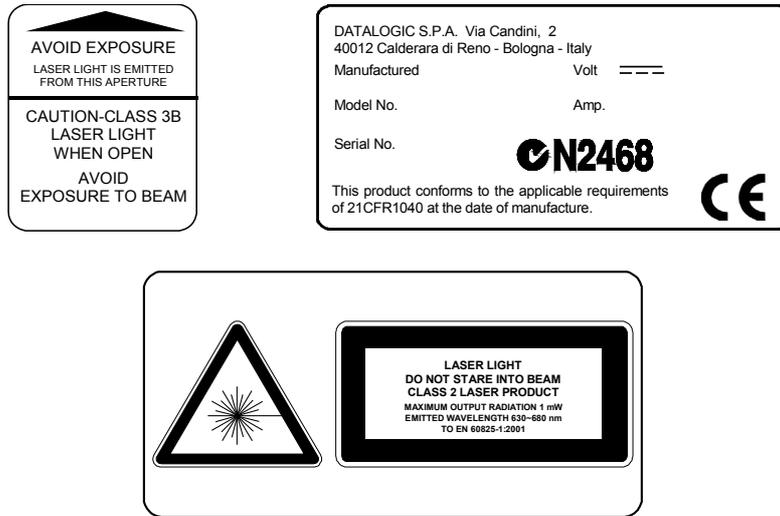
This product conforms to the applicable requirements of both EN60825-1 and CDRH 21 CFR1040 at the date of manufacture. The reader is classified as a Class 2 laser product according to EN60825-1 regulations and as a Class II laser product according to CDRH regulations.

There is a safety device which allows the laser to be switched on only if the motor is rotating above the threshold for its correct scanning speed.

	<p><i>Use of controls or adjustments or performance of procedures other than those specified herein may result in exposure to hazardous visible laser light.</i></p>
<b>WARNING</b>	

The laser light is visible to the human eye and is emitted from the window on the side of the scanner (Figure A).

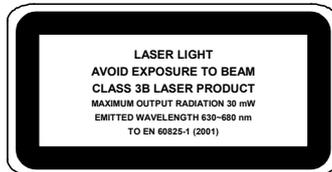
Warning labels indicating exposure to laser light and the device classification are applied onto the body of the scanner (Figure A):



**Warning and Device Class Labels**

Disconnect the power supply when opening the device during maintenance or installation to avoid exposure to hazardous laser light.

The laser diodes used in this device are classified as Class 3B laser products according to EN 60825-1 regulations and as Class IIIb laser products according to CDRH regulations. As it is not possible to apply a classification label on the laser diodes used in this device, the following label is reproduced here:



**Laser Diode Class Label**

Any violation of the optic parts in particular can cause radiation up to the maximum level of the laser diode (30 mW at 630~680 nm).

## POWER SUPPLY

- This scanner is intended to be supplied by either a UL Listed power supply marked 'Class 2' or 'LPS', output rated 20 - 30 V dc , minimum 1.5 A or by a UL Listed computer with LPS outputs.
- This scanner must be supplied by a Class II Power Supply Unit conforming to the EN 60950 safety regulation.

## WEEE COMPLIANCE



# GENERAL VIEW

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## DS8100A

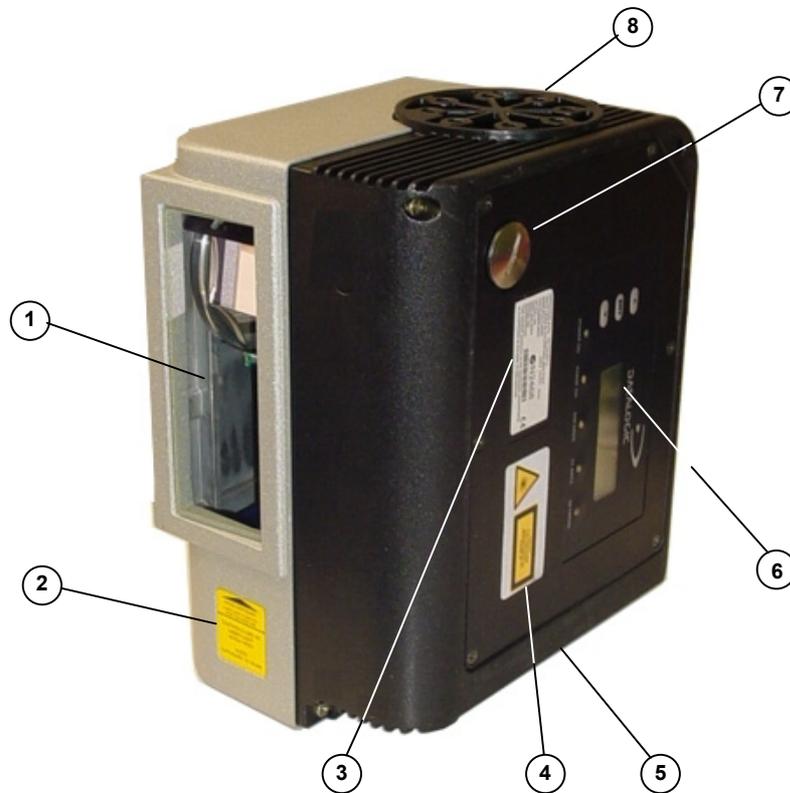
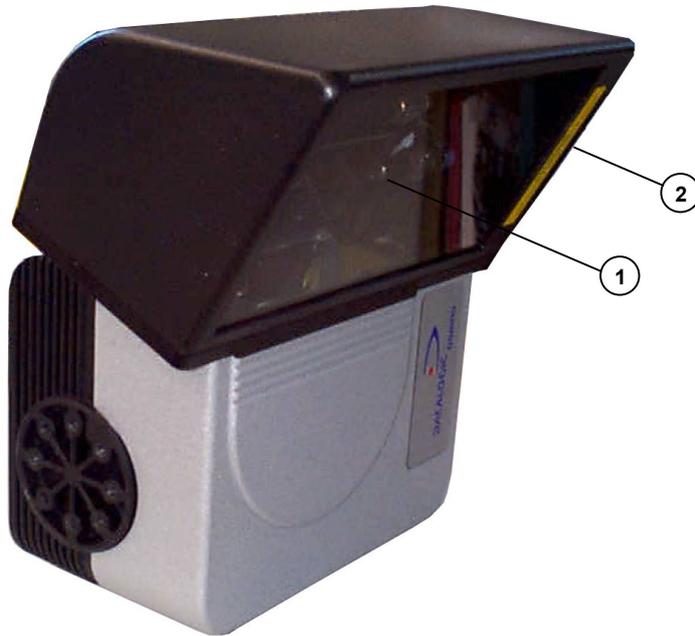


Figure A - DS8100A

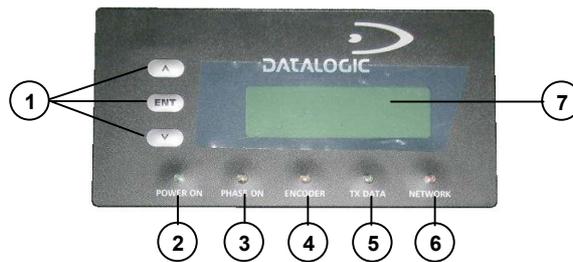
- |                                  |                      |
|----------------------------------|----------------------|
| ① Laser Beam Output Window       | ⑤ Connector Panel    |
| ② Laser Safety Label             | ⑥ Display            |
| ③ Product Label                  | ⑦ Service Access Cap |
| ④ Warning and Device Class Label | ⑧ Mounting Holes     |

# DS8100A



**Figure B - DS8100A Oscillating Mirror Version**

- ① Laser Beam Output Window
- ② Laser Safety Label



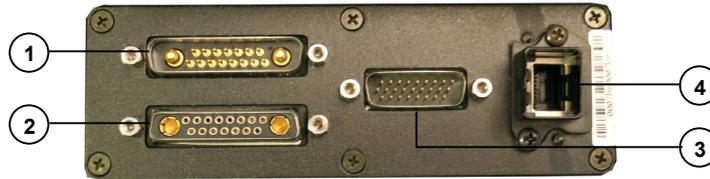
**Figure C – Display and Keypad Panel**

- |                         |                       |
|-------------------------|-----------------------|
| ① Programming Keypad    | ⑤ TX Data LED (Green) |
| ② Power On LED (Green)  | ⑥ Network LED (Red)   |
| ③ Phase On LED (Yellow) | ⑦ LCD Display         |
| ④ Encoder LED (Yellow)  |                       |



**Figure D – Connector Panel for Standard Models**

- ① Lonworks 17-pin male connector      ③ Serial interface and I/O 26-pin connector
- ② Lonworks 17-pin female connector



**Figure E – Connector Panel for Ethernet Models**

- ① Lonworks 17-pin male connector      ③ Serial interface and I/O 26-pin connector
- ② Lonworks 17-pin female connector      ④ Harting RJ industrial connector

# GUIDE TO INSTALLATION

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## POINT-TO-POINT INSTALLATION

The following can be used as a checklist to verify all the necessary steps to complete installation of the DS8100A scanner.

- 1) Read all information in the section “Safety Regulations” at the beginning of this manual.
- 2) Correctly mount the scanner according to the information in par. 2.2 and position it at the correct reading distance as shown in par. 2.5 and par. 4.4.
- 3) Make electrical connections to your DS8100A scanner by:
  - a) Connecting the DS8100A scanner to the C-BOX 100 by means of one of the CAB-601X cables provided as accessory (see par. 1.5).
  - b) Providing correct and complete system cabling through the C-BOX 100 according to the signals necessary for the layout of your application (trigger, inputs, outputs).
    - Layout: Point-to-Point, Pass Through, RS232 Master/Slave, Fieldbus. See sub-paragraphs under 2.6 for reference.
    - Cabling: Power, Main Serial Interface – RS232, RS485 Half Duplex, RS485 Full Duplex, 20 mA Current Loop, Auxiliary Interface, Inputs, Outputs, etc -. For further details, see all sub-paragraphs under par. 2.3.
- 4) Configure the DS8100A scanner by installing and running the Genius™ configuration program from the CD-ROM provided. The main steps are:
  - Select the codes to be read
  - Set-up the communication parameters
  - When PackTrack™ is required, perform PackTrack™ calibration
  - Define data formatting parameters
  - Fine tune your DS8100A scanner using the Test Mode as described in Genius™.



**NOTE**

*Fine tuning of the scanner position for barcode reading can be accomplished by performing a test through the SPY configuration tool in Genius™.*

- 5) Exit the configuration program and run your application.

The installation is now complete.

## MASTER/SLAVE LONWORKS INSTALLATION

The following can be used as a checklist to verify all the steps necessary to complete installation of the DS8100A scanner in a Master/Slave Lonworks network.

- 1) Read all information in the section “Safety Regulations” at the beginning of this manual.
- 2) Correctly mount the scanner according to the information in par. 2.2 and position it at the correct reading distance as shown in par. 2.5 and par. 4.4.
- 3) Make electrical connections to your DS8100A scanner by:
  - a) Connecting the DS8100A Master scanner to the C-BOX 100 by means of one of the CAB-601X cables provided as accessory (see par. 1.5).
  - b) Correctly terminating the DS8100A Master reader according to the information given under “Local Lonworks Network” in par. 2.3.2 and par. 2.6.5.
  - c) Completing the system wiring adding as many slave scanners as required by your system layout (refer to par. 2.6.5).
  - d) Correctly providing bus return to the last DS8100A Slave reader of the network according to the information given under “Local Lonworks Network” in par. 2.3.2 and par. 2.6.5.
- 4) Install and run the Genius™ configuration program from the CD-ROM provided. Configure the Local Lonworks Network using one of the procedures given below:
  - a) Configure the entire network through the Master as described in par. 3.2.2;
  - b) Configure the Master as described in par. 3.2.2 and locally define each slave scanner address as described in par. 3.2.3.
  - c) Define each scanner, master and slaves (with their addresses), by using the scanner keypad according to the information given in par. 2.7.1.
- 5) Configure the Master scanner through the Genius™ program. The main steps are:
  - Select the codes to be read
  - Set-up the communication parameters
  - When PackTrack™ is required, perform PackTrack™ calibration, see par. 4.2.1.
  - Define data formatting parameters
- 6) Configure each Slave scanner through the Master scanner using Genius™. The main steps are:
  - Select the codes to be read
  - When PackTrack™ is required, perform PackTrack™ calibration, see par. 4.2.1.



### NOTE

*Fine tuning of the scanner position for barcode reading can be accomplished by performing a test through the SPY configuration tool in Genius™.*

- 7) Send the configuration to the Master.

- 8) Optionally, perform the ASR Network Configuration procedure for system backup purposes (see par. 5.2.1).
- 9) Exit the configuration program and run your application.

The installation is now complete.



# 1 INTRODUCTION

---

## 1.1 PRODUCT DESCRIPTION

The DS8100A scanner is a barcode reader complete with decoder designed to provide an innovative and high performance solution in omnidirectional reading applications by combining the following advanced technologies with Datalogic solid experience in the material handling sector.

Some of the main features of DS8100A are listed below:

- scanning speed 1000 scans/sec.
- reads all popular codes.
- supply voltage from 20 to 30 Vdc.
- test mode to verify the reading features and exact positioning of the scanner without the need for external tools.
- programmable in 5 different operating modes to suit the most various barcode reading system requirements.
- light source: solid state laser diodes; the light emitted has a wave length between 630~680 nm. For laser safety precautions refer to the “Safety precautions” section at the beginning of this manual.

## 1.2 APPLICATIONS

The DS8100A barcode reader is specifically designed for industrial applications and for all cases requiring high reading performance such as:

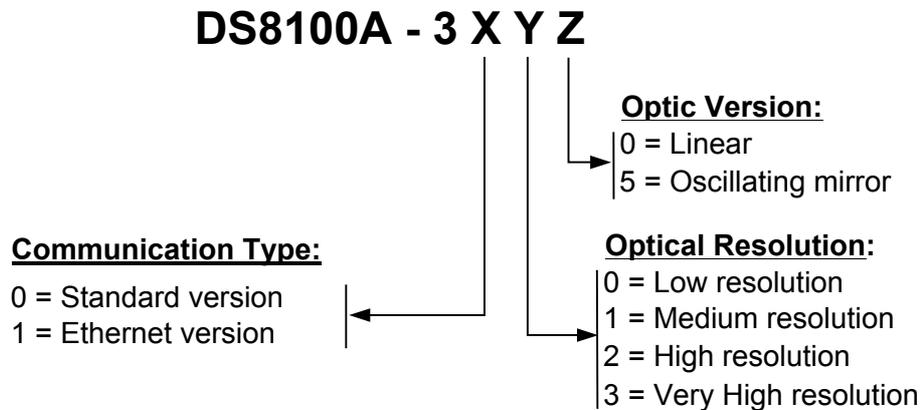
- code reconstruction
- reading of codes covered by plastic film
- reading of codes with a wide depth of field
- reading of high resolution codes positioned at long distances from the reader
- code reading on fast moving objects.

DS8100A is designed for both single-reader layouts and multi-reader layouts. For typical layouts see paragraph 2.6

Feature	Benefit
<b>ACR™</b>	<ul style="list-style-type: none"> <li>Advanced Code Reconstruction technology allows the reading of low aspect ratio labels placed anywhere on a parcel and enhances the readability of poorly printed or damaged codes.</li> </ul>
<b>CD SQUARE™</b>	<ul style="list-style-type: none"> <li>CD SQUARE™ provides useful information on label position and object shape elaborated during the barcode reading phase. This innovative technology identifies the area in which the code is located and measures the code distance from the scanner.</li> </ul>
<b>PACKTRACK™</b>	<ul style="list-style-type: none"> <li>PackTrack™ is a Datalogic patented parcel tracking system which improves the reading features in omnidirectional stations. In particular, PackTrack™ manages 6-sided reading systems when it is impossible to detect the real position of the code on the parcel, thus overcoming the need for external accessories essential in traditional tracking systems.</li> </ul>
<b>ASTRA™</b>	<ul style="list-style-type: none"> <li>Automatically SwITched Reading Area™ is the new Datalogic technology based on a multi-laser architecture and a fixed mounted optic system which concentrates the multiple laser emissions in a single laser beam. As each laser emitter is focused on a specific range of the reading area, a sophisticated electronic controller selects the best focused laser emitter with respect to the code to read. This allows the reading of medium-high density codes in a large reading area on very fast conveyors.</li> </ul>
<b>Flexibility</b>	<ul style="list-style-type: none"> <li>The high frequency laser diode modulation system guarantees complete immunity to ambient light and allows installation of the DS8100A in any working area.</li> </ul>
<b>Reading parcels on conveyors</b>	<ul style="list-style-type: none"> <li>As a result of the ASTRA™ multiple laser technology, DS8100A gives a great real time DOF even on high speed conveyors. Furthermore, DS8100A implements the Packtrack™ functionality which leads to an increase of the plant production as a result of the augmented system throughput.</li> </ul>
<b>Master working as a Multiplexer on high speed Lonworks bus</b>	<ul style="list-style-type: none"> <li>Great competitiveness of the offer, since the cost of an external multiplexer is saved;</li> <li>High data transfer on an industrial, reliable bus running at 1,2 Mbit/sec.</li> </ul>
<b>Genius™ Configurator SW</b>	<ul style="list-style-type: none"> <li>Reduced learning time, with an easy wizard approach;</li> <li>Multilanguage platform;</li> <li>All the configuration parameters stored into the scanner;</li> <li>Not dependent on the Physical interface.</li> </ul>

### 1.3 MODEL DESCRIPTION

The DS8100A scanner is available in versions that differ depending on the interface connection, the optical resolution and on the optic version:



#### 1.3.1 Oscillating Mirror Models

Oscillating mirror models are used when coverage of a large reading area is required, mainly in picket fence applications.

The oscillating mirror is placed in front of the reading aperture of the DS8100A scanner to deflect the laser beam. As the mirror moves, this sweeping function of the laser beam allows the coverage of a larger area to locate the barcodes. The code can also be reconstructed as the beam sweeps over it.

The aperture angle is symmetrical and the scan line perpendicular to the scanner is at 0° as shown in the figure below.

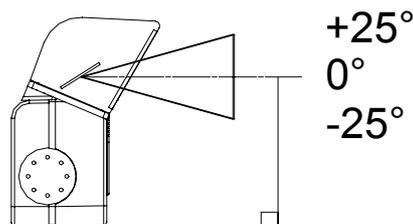


Figure 1- Oscillating Mirror Reference Angle

By configuring the oscillating speed up to the maximum value of 19 Hz, raster emulation can be performed for reading fast moving objects.

Hz	Max. Aperture
0-5	50°
6-10	30°
11-15	20°
16-19	10°

**NOTE**

*By limiting the raster width to the minimum necessary, the number of scans on the reading surface is increased.*

The oscillating mirror is completely controlled by software commands and therefore avoids complex mechanical calibrations. For details of the software configuration parameters see the Genius™ Help On Line.

## 1.4 INDICATORS

The DS8100A has five LEDs on the rear panel. The indicators have the following functions:

<b>POWER ON</b>	(green)	Indicates the scanner is turned on.
<b>PHASE ON *</b>	(yellow)	Indicates the external presence sensor is active.
<b>ENCODER *</b>	(yellow)	Indicates the external encoder signal is active.
<b>TX DATA</b>	(green)	Indicates data transmission both on the main and on the auxiliary interface.
<b>NETWORK</b>	(red)	Indicates the Lonworks network is functioning correctly. This LED is normally ON.

\* These LEDs are always OFF when the DS8100A works as Slave.

## 1.5 ACCESSORIES

The following accessories are available on request for DS8100A:

Name	Description	Part Number
PWR-120	J-box power unit 110/230 VAC 24 V 120 W	93ACC1530
PWR-240	J-box power unit 110/230 VAC 24 V 240 W	93ACC1070
PWR-480	J-box power unit 110/230 VAC 24 V 480 W	93ACC1080
BTK-8100	Bus terminator kit (5 pcs)	93ACC1090
BTK-8102	Double terminator kit (2 pcs)	93A051287
FBK-8100	Fast bracket kit (2 pcs)	93ACC1130
US-8100	Bracket kit (10 pcs)	93ACC1140
PLL-8000	Optocoupled PLL device	93ACC1280
ACS-81	Air cleaning system	93ACC1430
DF-81	Dust filter (10 pcs)	93ACC1440
FS-1	Frame shaper (8 pcs)	93ACC1750
CAB-8100	10 wire shielded cable D 9.5 mm – 50 m	93ACC1120
CAB-8101	17-pin scanner/scanner connection cable 1.2 m	93A051020
CAB-8102	17-pin scanner/scanner connection cable 2.5 m	93A051030
CAB-8105	17-pin scanner/scanner connection cable 5 m	93A051040
CAB-8305	Power and bus return cable (last Slave) 5 m	93A051268
CAB-8402	No power cable 2.5 m	93ACC1758
CAB-8405	No power cable 5 m	93ACC1759
CAB-6011	26-pin scanner to C-BOX 100 cable 1 m	93A051221
CAB-6012	26-pin scanner to C-BOX 100 cable 2 m	93A051222
CAB-6015	26-pin scanner to C-BOX 100 cable 5 m	93A051223
CAB-6502	Fam 6K-8K cross cable 2.5 m	93A051288
CAB-6505	Fam 6K-8K cross cable 5 m	93A051289
CAB-8605	Power and Lonworks termination cable (Master) 5 m	93A051290
Sentinel-5	Supervisor (up to 5 arrays)	93A101004
Sentinel-10	Supervisor (up to 10 arrays)	93A101005
Sentinel-32	Supervisor (up to 32 arrays)	93A101007
GFC-80	90° mirror	93A251020
GFC-800	90° mirror close distance	93A201103
C-BOX 100	Passive Connection Box	93ACC1510
C-BOX 300	Profibus-DP Connection Box	93A301000
C-BOX 400	DeviceNet Connection Box	93A301010
MEP-542	Photocell kit - PNP	93ACC1727
MEP-543	Photocell kit - NPN	93ACC1728
OEK-1	Optical encoder kit + 10 m cable	93ACC1600

## 2 INSTALLATION

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To install the system follow the given procedure:

1. Select the mounting location for DS8100A;
2. Mount the DS8100A scanner;
3. Position the scanner with respect to the barcode;
4. Proceed with system electrical connection;
5. Install the Genius™ program on the PC and configure the scanner.



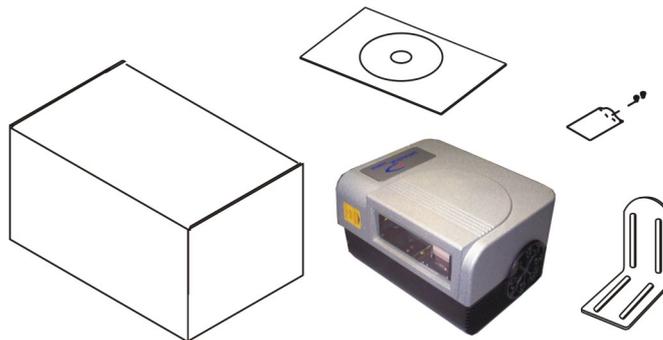
### NOTE

*Refer to the Reference Documentation for details on connecting your DS8100A reader to other devices in the system (i.e. C-BOX 100 etc.).*

### 2.1 PACKAGE CONTENTS

Verify that the DS8100A reader and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- DS8100A reader
- Installation Quick Reference + barcode test chart
- DS8100A configuration CD-ROM
- Mounting bracket and screws



**Figure 2 - DS8100A Package Contents**

## 2.2 MECHANICAL MOUNTING

### 2.2.1 Mounting the Scanner

DS8100A can be installed to operate in any position. There are 16 screw holes (M6 X 8) on the sides of the scanner for mounting. The diagram below can be used for installation; refer to par. 2.4 and par. 4.4 for correct positioning of the scanner with respect to the reading zone and scanner orientation.

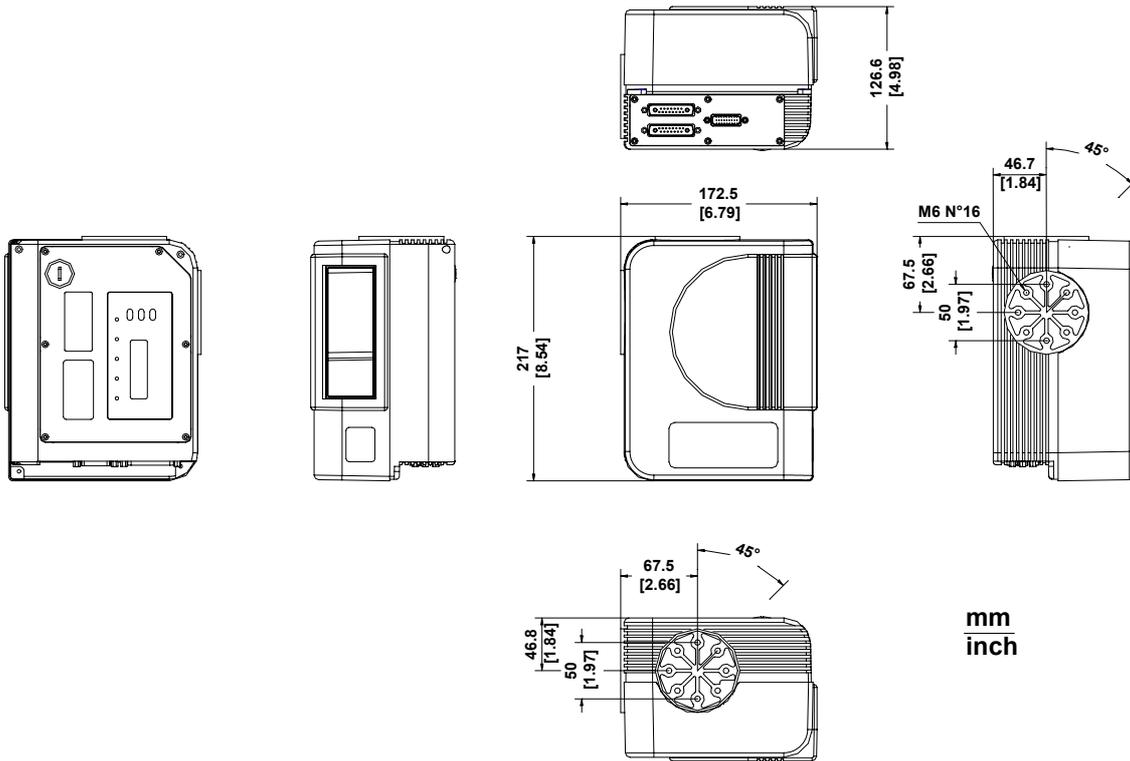


Figure 3- DS8100A Overall Dimensions

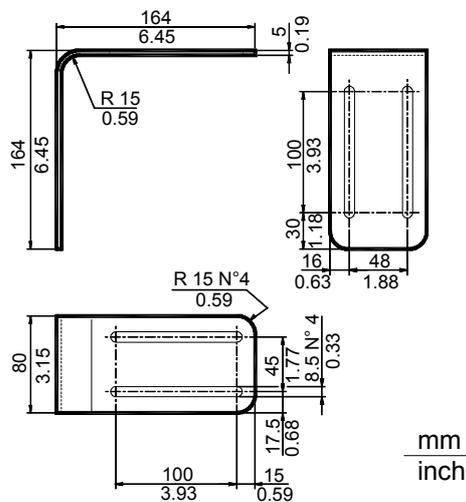


Figure 4- ST-163 Mounting Bracket Overall Dimensions

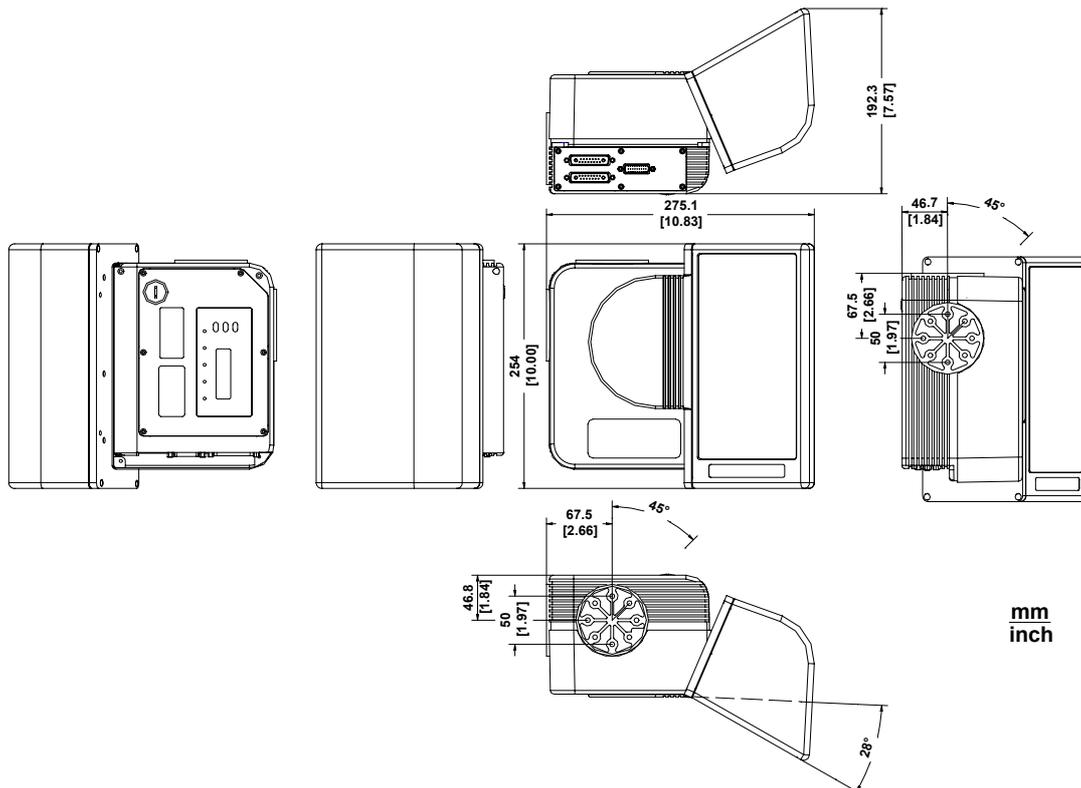


Figure 5 - DS8100A Oscillating Mirror Model Overall Dimensions

## 2.2.2 Mounting the Scanner with Accessories

The following accessories allow installing the DS8100A reader in the most suitable position for your network layout:

- ST-163 mounting bracket;
- FBK-8100 fast bracket.

The ST-163 is a 90° mounting bracket to be mounted on the reader as displayed in the image below:

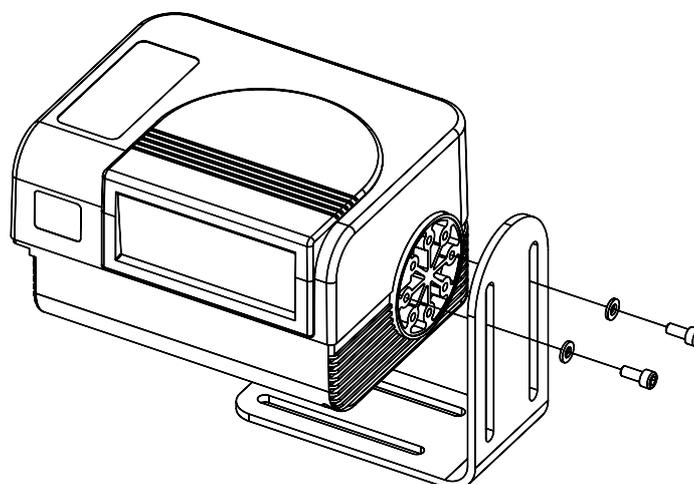


Figure 6 – Mounting the ST-163 Mounting Bracket

The FBK-8100 is a fast bracket kit allowing quick and easy mounting of the scanner on the ST-163 bracket. It is particularly useful when performing a scanner automatic replacement (see par. 5.2), since the scanner can be simply substituted with a new one while maintaining its physical position within the network.

First, it is necessary to fix the FBK-8100 round piece (2) to the ST-163 bracket (already mounted to the reading station frame) by means of the two screws (C). Then, give the scanner the correct orientation and fix it to the FBK-8100 cross piece (1) through the two screws (B). Finally, attach the assembly to the ST-163 bracket by making the FBK-8100 cross piece (1) slide into the round piece (2) and fix it by tightening the screws (A).

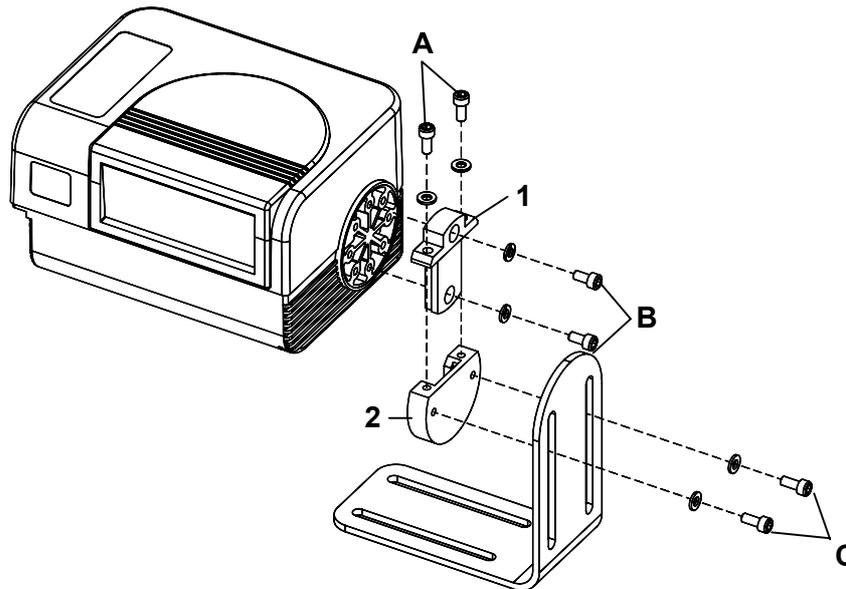


Figure 7 – Mounting the FBK-8100 and ST-163 Brackets on the Scanner

Thanks to the FBK-8100 it is always possible to substitute a mounted scanner with a new one by simply:

- unscrew the two screws (A) fixing the FBK-8100 cross piece to the FBK-8100 round piece;
- slide the cross piece (still mounted on the scanner to be substituted) out of the round piece;
- replace with a new scanner mounting the FBK-8100 cross piece with the correct orientation;
- insert and tighten the two screws (A).

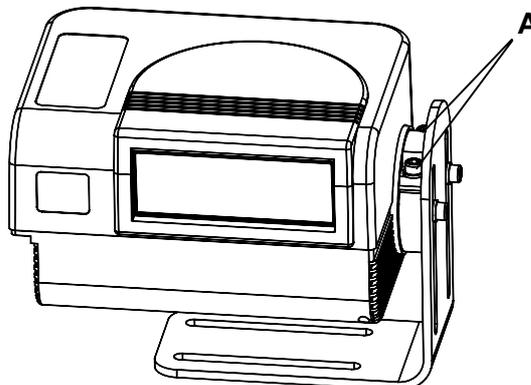


Figure 8 – Substituting a Scanner

## 2.3 ELECTRICAL CONNECTIONS

All the connectors available for each scanner model are the following:

Scanner Model	Connectors
Standard	26-pin male serial interface and I/O connector 17-pin male Lonworks connector* 17-pin female Lonworks connector*
Ethernet	26-pin male serial interface and I/O connector 17-pin male Lonworks connector* 17-pin female Lonworks connector* RJ45 Industrial modular connector

The table below gives the pinout of the C-BOX 100 terminal block connectors. Use this pinout when the DS8100A reader is connected in a network by means of the C-BOX 100:

C-BOX 100 Terminal Block Connectors				
<b>Power</b>				
1, 3, 5	VS			
2, 4, 6	GND			
7, 8	EARTH GROUND			
20, 40	Reserved			
<b>Inputs</b>				
27	EXT TRIG A (polarity insensitive)			
28	EXT TRIG B (polarity insensitive)			
29	IN 2A (polarity insensitive)			
30	IN 2B (polarity insensitive)			
31, 33	IN 3A (polarity insensitive)			
32, 34	IN 4A (polarity insensitive)			
36	IN 3B/IN 4B Reference (polarity insensitive)			
<b>Outputs</b>				
21	OUT 1+			
22	OUT 1-			
23	OUT 2+			
24	OUT 2-			
25	OUT 3A (polarity insensitive)			
26	OUT 3B (polarity insensitive)			
<b>Auxiliary Interface</b>				
35	TX AUX			
37	RX AUX			
38, 39	GND			
<b>Main Interface</b>				
	<b>RS232</b>	<b>RS485 Full-Duplex</b>	<b>RS485 Half-Duplex</b>	<b>20 mA C.L. (with INT-30 only)</b>
11, 15	TX232	TX485+	RTX485+	see INT-30 instructions
12, 16	RTS232	TX485-	RTX485-	
17	RX232	RX485+		
18	CTS232	RX485-		
10, 14, 19	SGND Main Isolated	SGND Main Isolated	SGND Main Isolated	
9, 13		RS485 Cable Shield	RS485 Cable Shield	

### 2.3.1 Main/Aux. Serial Interface and I/O Connector

The DS8100A Standard and Fieldbus models are equipped with a 26-pin male D-sub connector for connection to the host computer, power supply and input/output signals.

The details of the connector pins are indicated in the following table:

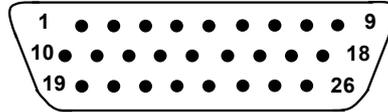


Figure 9 - 26-pin Connector

DS81100A 26-pin D-sub Connector Pinout				
Pin	Name	Function		
1	Shield	Cable shield - internally connected by capacitor to the chassis		
20	RXAUX	Receive data of auxiliary RS232 (referred to GND)		
21	TXAUX	Transmit data of auxiliary RS232 (referred to GND)		
8	OUT 1+	Configurable digital output 1 - positive pin		
22	OUT 1-	Configurable digital output 1 - negative pin		
11	OUT 2+	Configurable digital output 2 - positive pin		
12	OUT 2-	Configurable digital output 2 - negative pin		
16	OUT 3A	Configurable digital output 3 - polarity insensitive		
17	OUT 3B	Configurable digital output 3 - polarity insensitive		
18	EXT_TRIG A	External trigger (polarity insensitive)		
19	EXT_TRIG B	External trigger (polarity insensitive)		
6	IN 2A	Input signal 2 (polarity insensitive)		
10	IN 2B	Input signal 2 (polarity insensitive)		
14	IN 3A	Input signal 3 (polarity insensitive)		
15	IN 4A	Input signal 4 (polarity insensitive)		
24	IN_REF	Common reference of IN3 and IN4 (polarity insensitive)		
9,13	VS	Supply voltage - positive pin		
23,25,26	GND	Supply voltage - negative pin		
Main Interface Connector Pinout				
Pin	RS232	RS485 Full Duplex	RS485 Half Duplex	20 mA C.L. (INT-30 with C-BOX 100 only)
2	TX	TX485 +	RTX485 +	see INT-30 instructions
3	RX	RX485 +		
4	RTS	TX485 -	RTX485 -	
5	CTS	RX485 -		
7	GND_ISO	GND_ISO	GND_ISO	

## Main Interface

The main serial interface is compatible with the following electrical standards:

**RS232**

**RS485 full-duplex**

**RS485 half-duplex**

**(20 mA current loop)**

The 20 mA Current Loop interface is available by using the C-BOX 100 with the optional INT-30 accessory installed in it. The scanner communicates to the C-BOX 100 through the RS232 interface and the INT-30 converts the signals.

**The main serial interface type and its relative parameters (baud rate, data bits, etc.) are selected via software using the Genius™ utility program. For more details refer to the section "Main Serial Port" in the Genius™ Help On Line.**

Details regarding the connections and use of the main interface selection are given in the next paragraphs.

## RS232 Interface

The main serial interface is used for communication with the Host computer and allows both transmission of code data and configuring the reader. The overall maximum cable length should not exceed 15 m (50 ft).

The following pins of the 26-pin connector are used for RS232 interface connection:

Pin	Name	Function
2	TX	Transmit
3	RX	Receive
4	RTS	Request to send
5	CTS	Clear to send
7	GND-ISO	Main signal ground

The RTS and CTS signals control data transmission and synchronize the connected devices.

If the RTS/CTS hardware protocol is enabled, the DS8100A activates the RTS output to indicate a message can be transmitted. The receiving unit must activate the CTS input to enable the transmission.

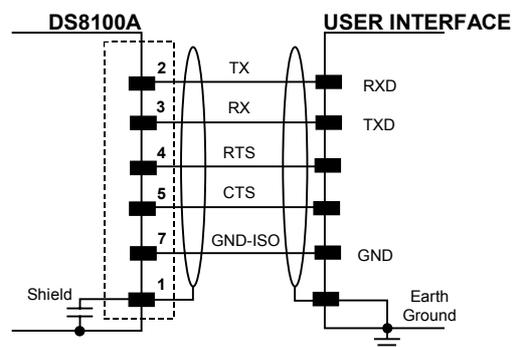


Figure 10 - RS232 Connections

### RS485 Full-Duplex Interface

The RS485 full-duplex interface is used for non-pollled communication protocols in point-to-point connections over longer distances than those acceptable for RS232 communications or in electrically noisy environments. The overall maximum cable length should not exceed 1200 m (3937 ft).

The following pins of the 26-pin connector are used for RS485 full-duplex interface connection:

Pin	Name	Function
2	TX485 +	RS485 output (+)
3	RX485 +	RS485 input (+)
4	TX485 -	RS485 output (-)
5	RX485 -	RS485 input (-)
7	GND-ISO	Main signal ground

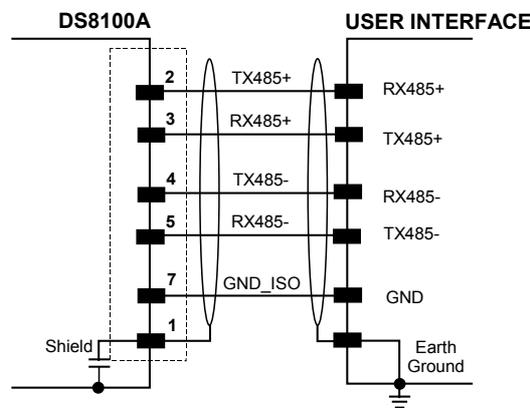


Figure 11 - RS485 Full-Duplex Interface Connections

### RS485 Half-Duplex Interface

The RS485 half-duplex interface can be used for multidrop connections with a Datalogic multiplexer or it can also be used for a master/slave layout. The overall maximum cable length should not exceed 1200 m (3937 ft).

The following pins of the 26-pin connector are used for RS485 half-duplex interface connection:

Pin	Name	Function
2	RTX485 +	RS485 input/output (+)
4	RTX485 -	RS485 input/output (-)
7	GND-ISO	Main signal ground

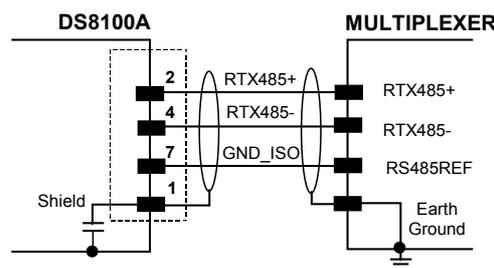


Figure 12 – RS485 Half-Duplex Interface Connections

## Auxiliary Interface

The auxiliary serial interface is equipped with RS232 full-duplex interface connections. The interface type is exclusive and is selectable through the Genius™ configuration program. The overall maximum cable length should not exceed 15 m (50 ft).

The following pins of the 26-pin connector are used for RS232 full-duplex interface connection:

Pin	Name	Function
20	RXAUX	Receive data
21	TXAUX	Transmit data
23	SGND AUX	Auxiliary signal ground

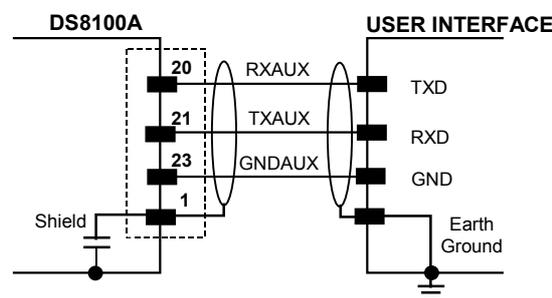


Figure 13 - RS232 Auxiliary Interface Connections

## Inputs

The inputs of the reader are on the 26-pin connector of the DS8100A.

These inputs are called EXT\_TRIG, IN2, IN3 and IN4.

Pin	Name	Function
18	EXT_TRIG A	External trigger (polarity insensitive)
19	EXT_TRIG B	External trigger (polarity insensitive)
6	IN2A	Input signal 2 (polarity insensitive)
10	IN2B	Input signal 2 (polarity insensitive)
14	IN3A	Input signal 3 (polarity insensitive)
15	IN4A	Input signal 4 (polarity insensitive)
24	IN_REF	Common reference of IN3 and IN4 (polarity insensitive)

IN2 is normally used for the Encoder input. In PackTrack™ mode, it detects the conveyor speed. The maximum Encoder frequency is 2 KHz.

EXT\_TRIG is the main presence sensor. When active, this input tells the scanner to scan for a code and that decoding can take place. The yellow LED (Figure C, 3) indicates the EXT\_TRIG is active.

IN3 and IN4 can be used as the stop signal for the reading phase.

All inputs are optocoupled, polarity insensitive, and driven by a constant current generator; the command signal is filtered through an anti-disturbance circuit which generates a delay which can be set to 5 ms or 500  $\mu$ s. In particular, EXT\_TRIG, IN3 and IN4 share the same value which usually corresponds to 5 ms when using a photoelectric sensor, while IN2 has a different value which is set to 500  $\mu$ s when this input is used for the Encoder.

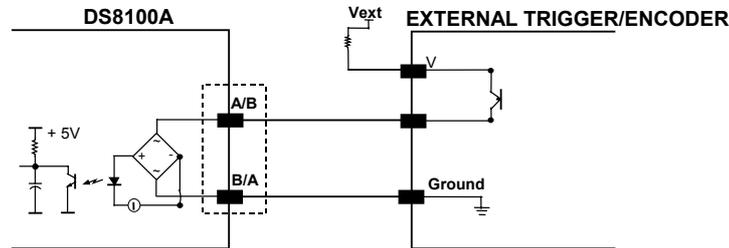


Figure 14 – PNP Command Input Connection using External Power

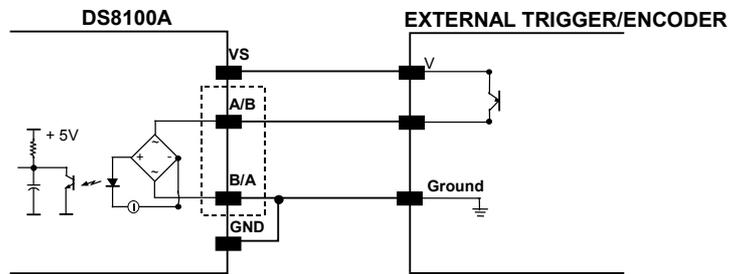


Figure 15 - PNP Command Input Connection using Scanner Power

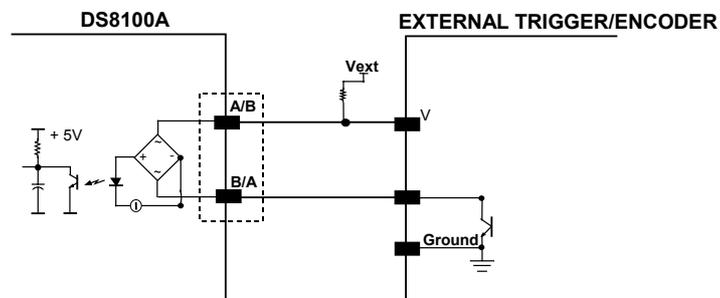


Figure 16 - NPN Command Input Connection using External Power

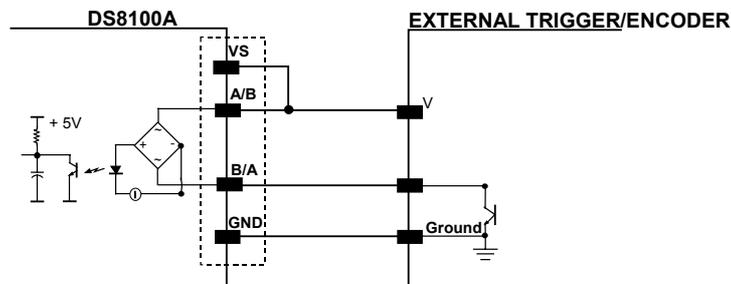


Figure 17 - NPN Command Input Connection using Scanner Power

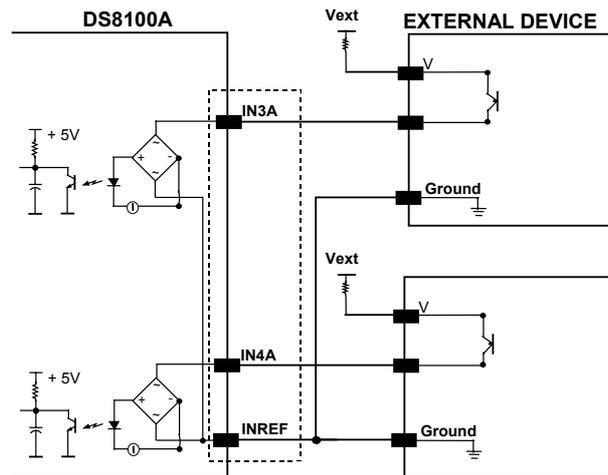


Figure 18 - IN3/IN4 PNP Input Command using External Power

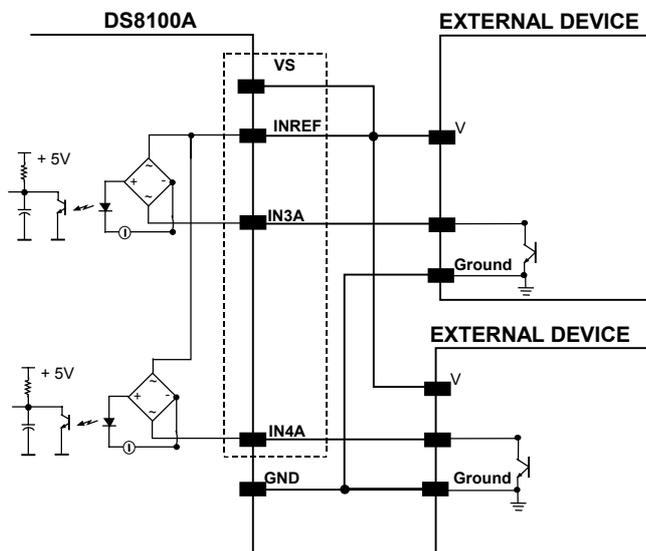


Figure 19 - IN3/IN4 NPN Input Command using Scanner Power

Input devices can be supplied by either scanner power (VS and GND) or external power supplies (Vext).

Electrical isolation between the input command logic and the scanner is maintained when powering the input devices from an external supply voltage (Vext).

The driving logic of the input signals may be powered, for convenience, with the voltage supply between pins 9 (VS) and 23 (GND) of the 26-pin I/O connector. In this case, however, the device is no longer electrically isolated.

The voltage available on the 26-pin I/O connector, is physically the same as used to power the scanner.

The electrical features of these inputs are:

- Maximum voltage 30 V
- Maximum current 10 mA

## Outputs

Three general purpose outputs are available.

Pin	Name	Function
8	OUT 1+	Configurable digital output 1 – positive pin
22	OUT 1-	Configurable digital output 1 – negative pin
11	OUT 2+	Configurable digital output 2 – positive pin
12	OUT 2-	Configurable digital output 2 – negative pin
16	OUT 3A	Configurable digital output 3 – polarity insensitive
17	OUT 3B	Configurable digital output 3 – polarity insensitive

The function of the three outputs OUT1, OUT2 and OUT3 can be defined by the user. Refer to Genius™ Help On-Line for further details.

By default, OUT1 is associated with the COMPLETE READ event, which activates when the code has been read correctly. In case the reader has been programmed to read several codes within the same reading phase, the event activates when all codes have been read.

OUT2 is associated with the NO READ event, which activates when no code has been read.

OUT3 is associated with NONE, which means that the output is always in the Line State.

The OUT1 and OUT2 electrical features are given below:

Collector-emitter voltage	30 V Max.
Collector current (pulse)	130 mA Max.
Collector current (continuous)	40 mA Max.
Saturation voltage (VCE)	1 V at 10 mA Max.
Maximum power dissipation	90 mW at 50°C (Ambient temperature).

The limit requested by the maximum power dissipation is more important than that of the maximum collector current: if one of these outputs is continuously driven, the maximum current must not be more than 40 mA although 130 mA may be reached in pulse conditions.

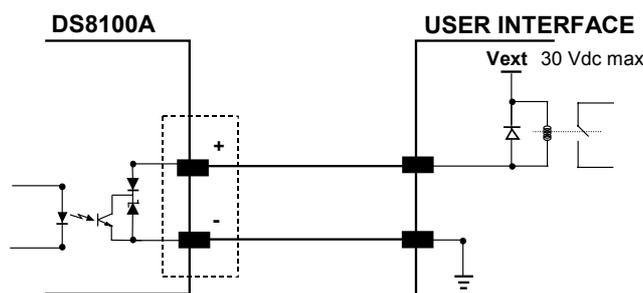


Figure 20 – Output 1 and Output 2 Interface

When the load is powered by an external power supply, the voltage must be less than 30 V.

OUT3 has different electrical features, since it is a bi-directional solid state relay with built-in current limit protection. If this output is continuously driven, the maximum current must be not more than 200 mA although more than 300 mA may be reached in pulse conditions for an ambient temperature of 25°C. At the maximum ambient temperature of 50°C the maximum respective current is 150 mA continuous and 240 mA pulse.

The OUT3 electrical features are given below:

Maximum voltage	$\pm 100$ V
Collector current (pulse)	240 mA Max.
Collector current (continuous)	150 mA Max.
R on	6 – 15 $\Omega$
R off	> 500 $\Omega$
Off-state leakage current	< 1 $\mu$ A
Maximum power dissipation	550 mW at 50°C (Ambient temperature).

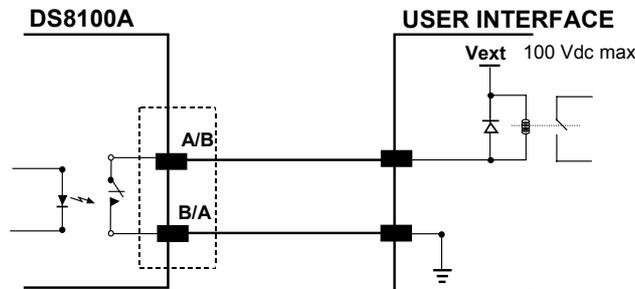


Figure 21 – Output 3 Interface

The command signal is filtered and generates a delay of about 50  $\mu$ s for OUT1 and OUT2 and 1 ms for OUT3.

### 2.3.2 Lonworks Input/Output Connector

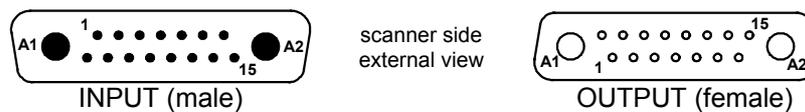


Figure 22 - Lonworks INPUT/OUTPUT Connectors

The following pinout is valid for the INPUT connector as well as for the OUTPUT connector.

Lonworks INPUT/OUTPUT 17-pin Connector Pinout		
Pin	Name	Function
A1	GND	supply voltage (negative pin)
A2	VS	supply voltage 20 to 30 vdc (positive pin)
1	Shield A	Cable shield A
2	n.c.	Not connected
3	Shield B	Cable shield B
4	n.c.	Not connected
5	n.c.	Not connected
6	n.c.	Not connected
7	VS_I/O	Supply voltage of I/O circuit
8	Lon A+	Lonworks a line (positive pin)
9	Lon A-	Lonworks a line (negative pin)
10	Lon B+	Lonworks b line (positive pin)
11	Lon B-	Lonworks b line (negative pin)
12	SYS_I/O	System signal
13	SYS_ENC_I/O	System signal
14	n.c.	Not connected
15	Ref_I/O	Reference voltage of I/O circuit

### Network Termination

When building a Lonworks system the network must be properly terminated by positioning the BTK-8102 Lonworks terminator in the DS8100A master reader and the BTK-8100 Lonworks bus return in the last DS8100A slave reader.

The BTK-8100 bus return provides a connector to be inserted in the Lonworks 17-pin female connector of the last slave reader in the network; while the BTK-8102 Lonworks terminator provides a different connector to be inserted in the Lonworks 17-pin male connector of the master reader:

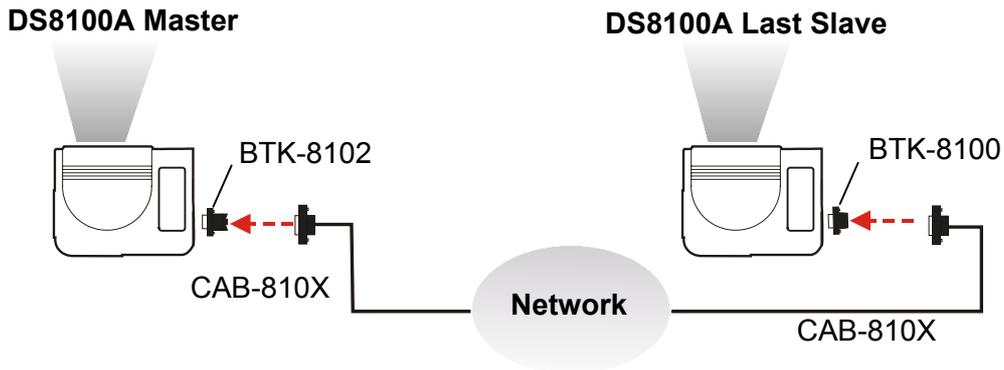


Figure 23 - BTK-8102 and BTK-8100

Two cables are also provided as accessories to terminate and power the network: CAB-8605 and CAB-8305.

CAB-8605 is a power and Lonworks termination cable to be used for connecting the DS8100A master to an external power unit within the network; while CAB-8305 is a power and bus return cable to be used for connecting the last DS8100A slave to an external power unit.

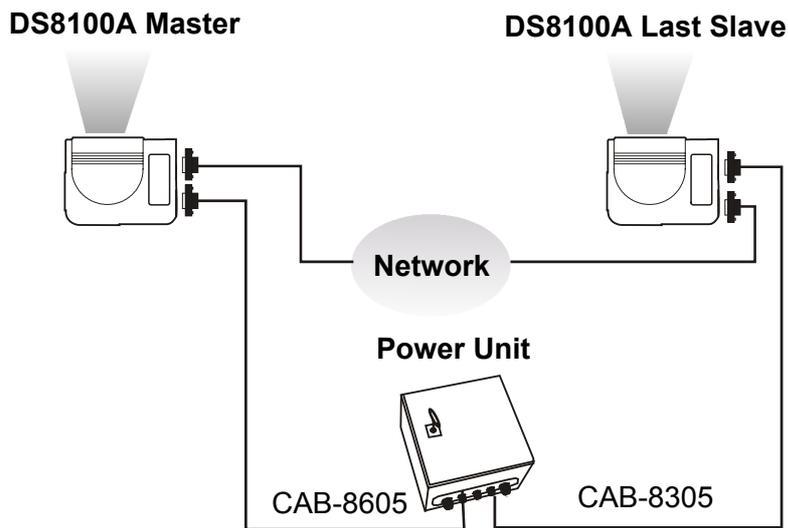


Figure 24 – CAB-8605 and CAB-8305

## Lonworks Interface

The Lonworks network is used for both input and output connection to build a multi-sided or omni-station system connecting several readers.

The DS8100A master usually employs the 17-pin female connector for output connection to the first slave, while the 17-pin male connector is terminated by inserting the BTK8102 terminator (see Figure 23 for details).

Both connectors are always employed when connecting together the slave readers. In particular, the 17-pin female connector is used for output connection and the male one for input connection. The female connector in the last slave reader is terminated by the BTK-8100 bus return to close the system network.

The following diagram represents the connection between a DS8100A working as master and a DS8100A working as a slave reader.

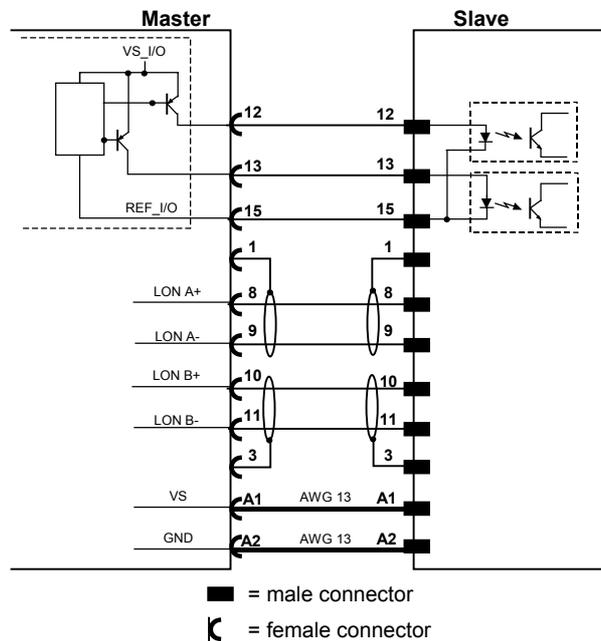


Figure 25 – DS8100A Master/Slave Lonworks Connection

The following diagrams represent different network terminations using either the BTK-8102 Lonworks terminator or the BTK-8100 bus return. In each diagram the BTK-8102 terminator is indicated by the **T** element, while the figure below shows its electrical circuit in details:

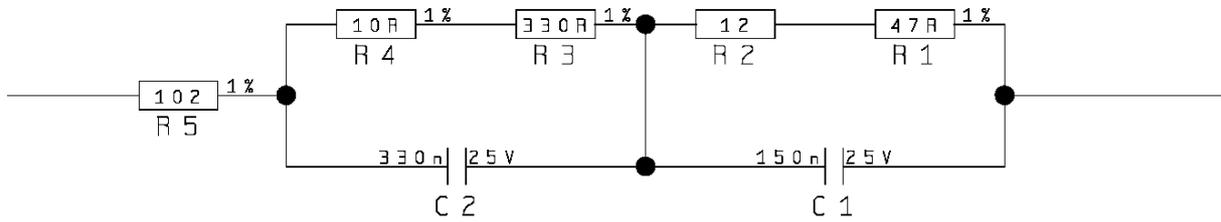


Figure 26 – BTK-8102 Electrical Circuit

The diagram below represents the termination of the double Lonworks line of a DS8100A working as master by means of the BTK-8102 terminator.

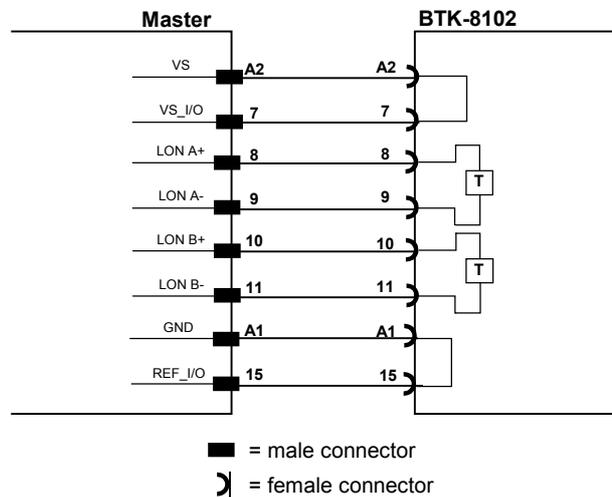


Figure 27 – DS8100A Master Termination

The diagram below represents the Lonworks bus return of a DS8100A working as slave by means of the BTK-8100 terminator.

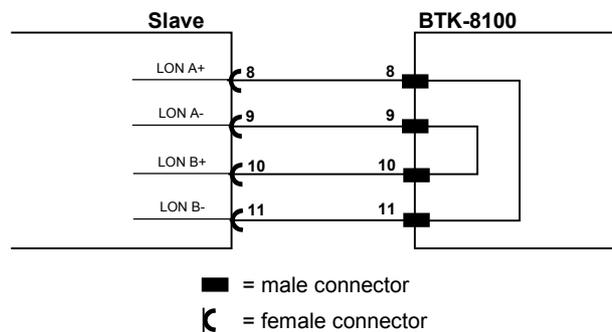


Figure 28 – DS8100A Lonworks Bus Return

### 2.3.3 Ethernet Connector

This connector is only available for DS8100A Ethernet models and allows the Ethernet connection between the host and the reader.



Figure 29 – Harting RJ Industrial® Push Pull Male Connector

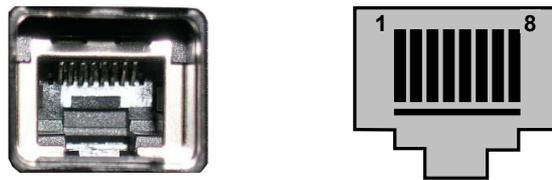


Figure 30 – DS8100A Harting RJ Industrial® Female Connector

This interface and the connector pinout (see the following table) are IEEE 802.3 10 BaseT and IEEE 802.3u 100 Base Tx compliant.

RJ45 Modular Jack Pinout		
Pin	Name	Function
1	TX +	Transmitted data (+)
2	TX -	Transmitted data (-)
3	RX +	Received data (+)
6	RX -	Received data (-)
4, 5, 7, 8	N.C.	Not connected

In order to meet EMC requirements:

- use Eth shielded cable
- connect the Ethernet interface cable shield to the plant earth ground



**NOTE**

*A ferrite (type Stewart 28A2029-0A0) must be applied on the scanner side of the Ethernet cable to reduce electrical noise. The cable shield must also be connected to the chassis of both connectors.*

## Ethernet Interface

The Ethernet interface (NIC) can be used for TCP/IP communication with a remote or local host computer by connecting the scanner to a LAN. It can also be connected directly to a host PC.

The following is an example of a connection to a LAN through a Hub using a straight through cable:

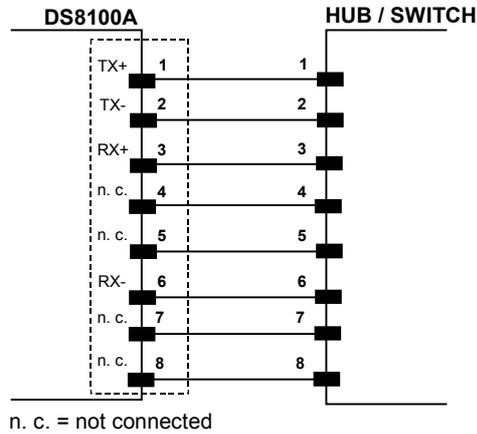


Figure 31 – Straight Through Cable

The following is an example of direct connection to a PC using an inverted cable:

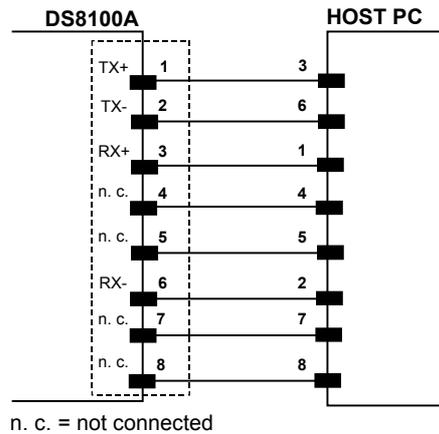


Figure 32 – Inverted Cable

For further details refer to the “Ethernet.pdf” document provided as reference documentation.

### 2.3.4 Power Supply

The supply voltage for correct operation of the scanner must be between 20 and 30 VDC. The max. power consumption is 30 W including startup current.

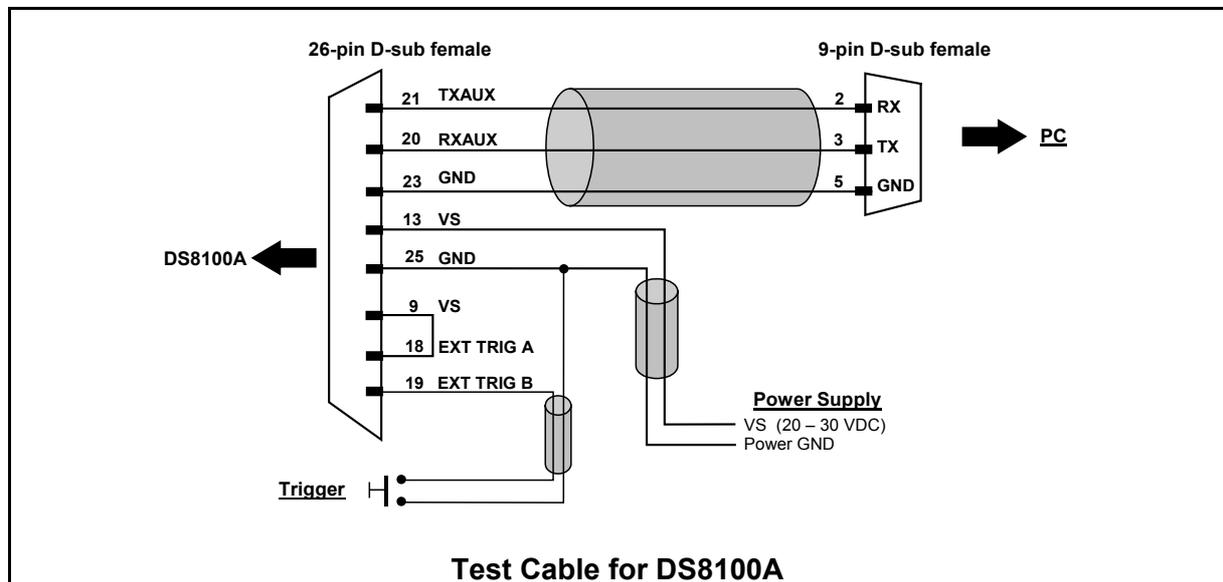
Several accessory power supplies are available to power the DS8100A(s) and reading station components. See par. 1.5.

A security system allows the laser to activate only once the motor has reached the correct rotational speed; consequently, the laser beam is generated after a slight delay from the power on of the scanner.

## 2.4 USER INTERFACE

### How To Build A Simple Interface Test Cable:

The following wiring diagram shows a simple test cable including power, external (push-button) trigger and PC RS232 COM port connections.



## 2.5 POSITIONING THE SCANNER

The DS8100A scanner is able to decode barcode labels at a variety of angles, however significant angular distortion may degrade reading performance.

When mounting the DS8100A take into consideration these three ideal label position angles: **Pitch 0°, Skew 0° to 45° and Tilt 0°.**

Follow the suggestions for the best orientation:

The **Pitch** angle is represented by the value **P** in Figure 33. Position the reader in order to **minimize** the **Pitch** angle.

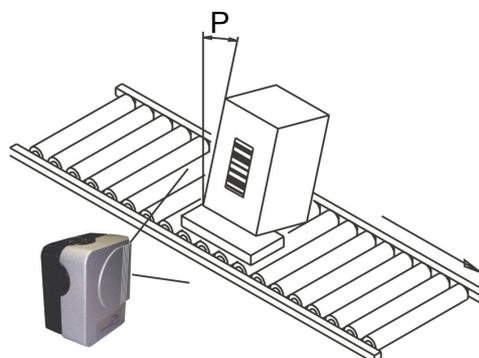


Figure 33 - "Pitch" angle

The **Skew** angle is represented by the value **S** in Figure 34.

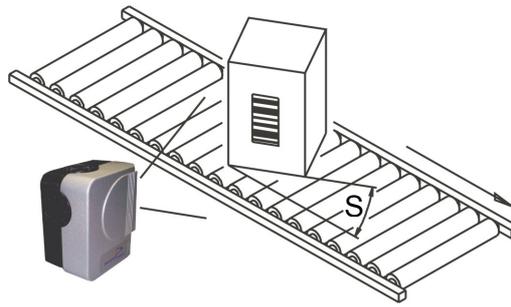


Figure 34 - "Skew" angle

The **Tilt** angle is represented by the value **T** in Figure 35. For code reconstruction see par. 4.1.

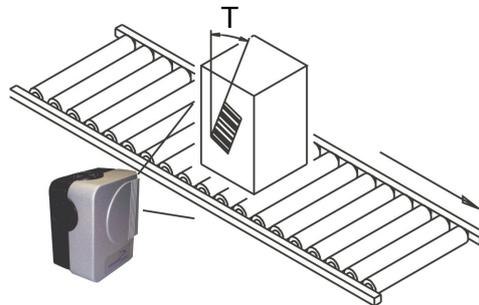


Figure 35 – "Tilt" angle

## 2.6 TYPICAL LAYOUTS

The DS8100A scanners can be connected in a variety of layouts depending on the number of scanners used and the required complexity of the reading station. These layouts range from Single Stand Alone to Complex Lonworks Networks.

Several power supplies are available to power the reading stations.

Photoelectric sensors used as code presence sensors and optical encoders to signal conveyor speed are also available accessories.

The following typical layouts refer to the system hardware configurations, but they also require the correct setup of the software configuration parameters (see par. 3.2 for details).

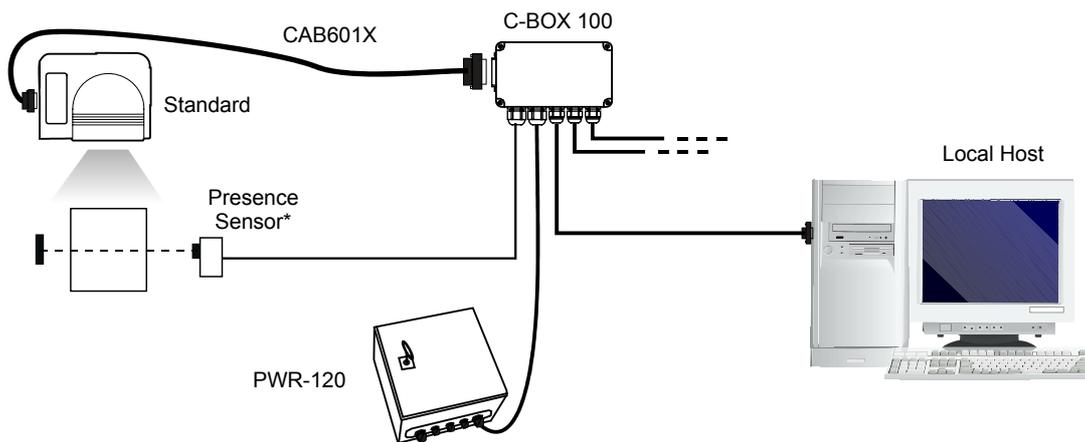
The accessories and cables indicated in the following figures are Datalogic products. We suggest their use to guarantee the correct system functioning.

## 2.6.1 Point-to-Point

Using a Point-to-Point layout, the data is transmitted on the Main interface as well as on the Auxiliary interface. The Main interface can be selected for RS232 or RS485 full-duplex communications. Two different layouts are available according to the DS8100A reader model used for the connection.

### Standard Models

When On-Line operating mode is used, the reader is activated by an External Trigger (photoelectric sensor) when the object enters its reading zone. In the following case, the signal is passed to the DS8100A by the C-BOX 100, which also supplies the system.

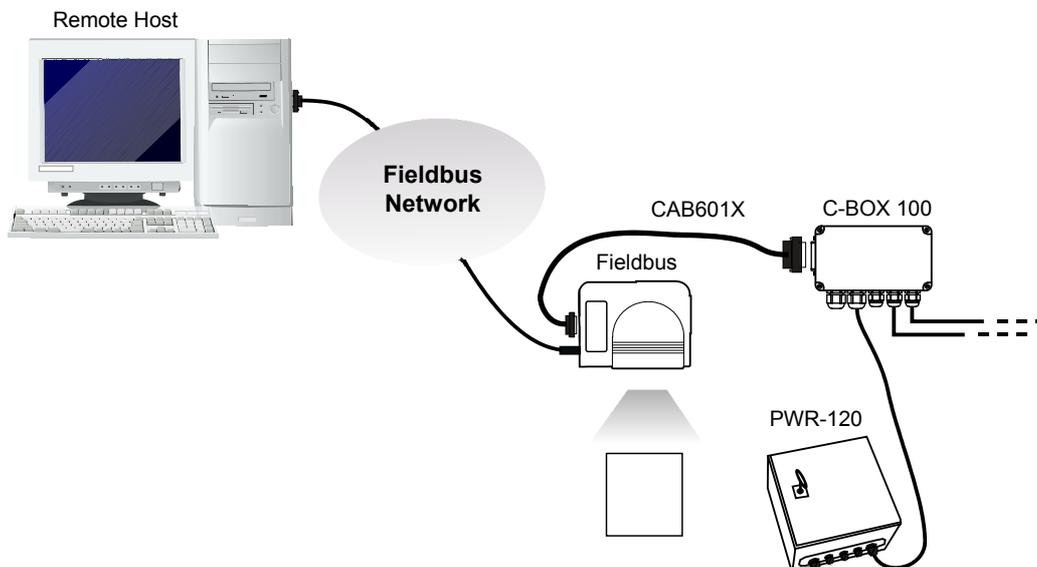


\* P.S. (Presence Sensor) connected to External Trigger input.

**Figure 36 – Point-to-Point for Standard Models**

### Fieldbus Models

In this case no External Trigger is used and the C-BOX 100 only supplies the reader. The DS8100A (Ethernet model) is connected to a fieldbus remote Host. It can be activated by a signal generated by the remote Host or always be active if working in Automatic operating mode.



**Figure 37 – Point-to-Point for Fieldbus Models**

### 2.6.2 Pass Through

When Pass Through is activated on the Auxiliary interface, the DS8100A reader can be integrated in a network consisting of different scanners not provided with a Lonworks interface.

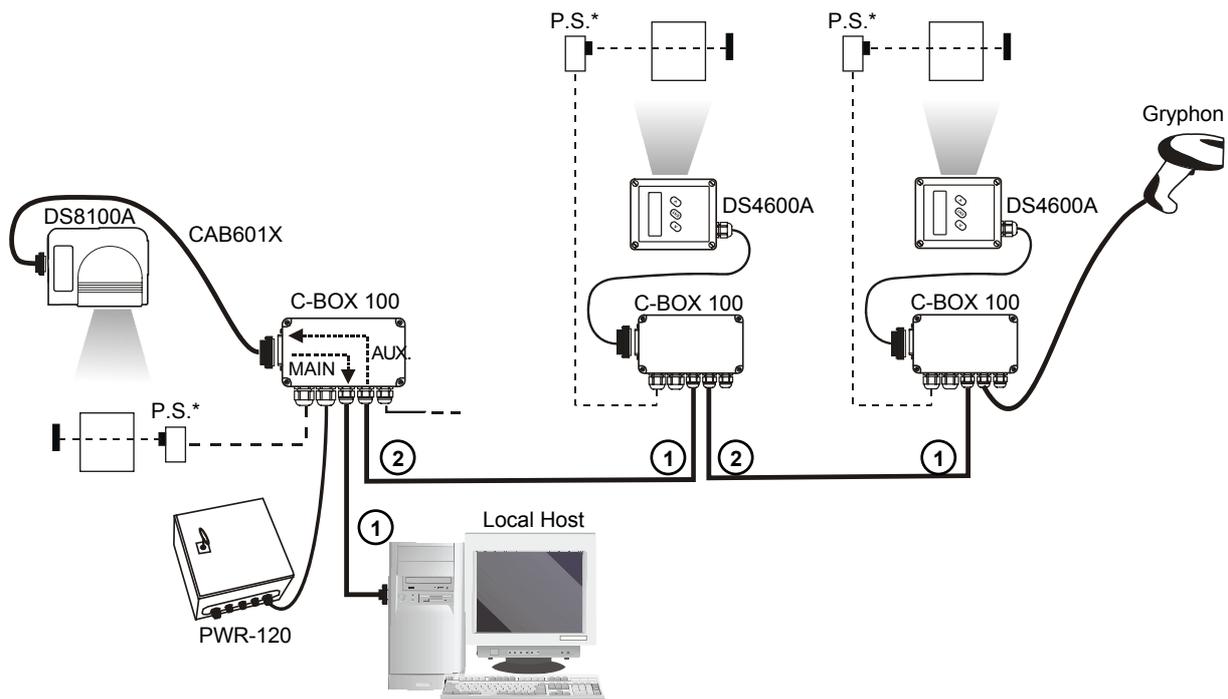
This connection mode allows two or more devices to be connected to a single external serial interface. The DS8100A transmits the messages received by its auxiliary interface onto its main interface.

In this configuration a series of scanners can be connected together using RS232 on the main interface and all messages will be passed through this chain to the host. The reading phase of each scanner is independent from the others. In Pass Through connections each scanner is provided with its relative External Trigger (multi P.S.).

Applications can be implemented to connect a device such as a hand-held reader to the Auxiliary port for manual code reading capability.

For the RS232 connections the maximum cable length is 15 m (50 ft).

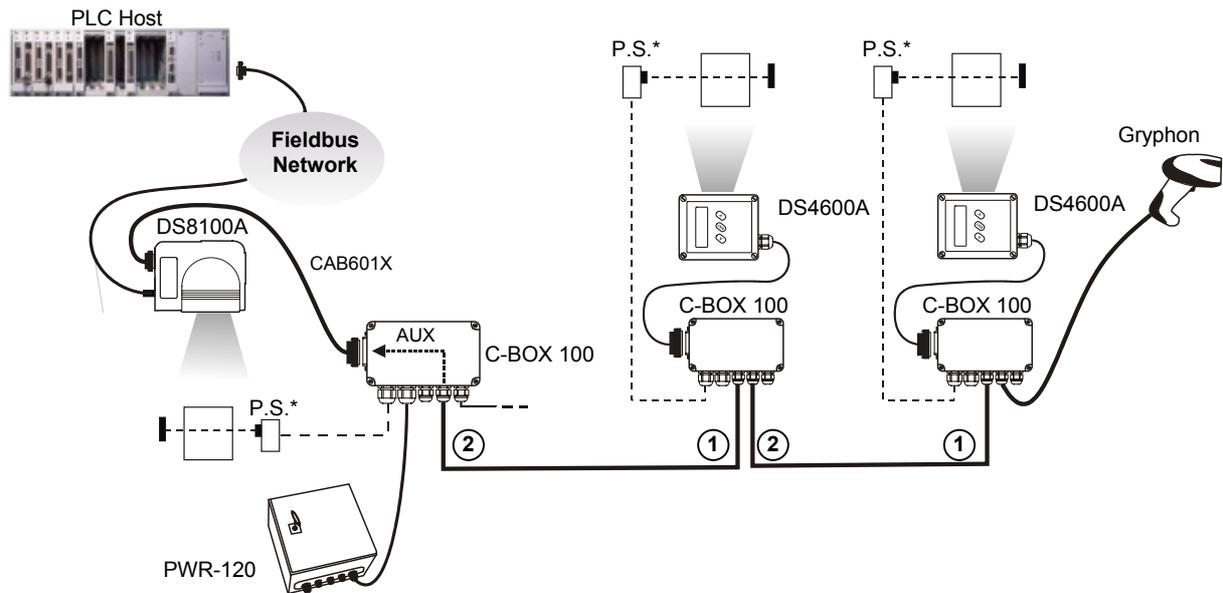
The DS4600A scanners represented in the following figures are configured in Pass Through mode.



\* P.S. (Presence Sensor) connected to External Trigger input.

- ① Main Serial Interface
- ② Auxiliary Serial Interface

Figure 38 – Pass Through Connection for DS8100A Standard Models



① Main Serial Interface    ② Auxiliary Serial Interface

\* P.S. (Presence Sensor) connected to External Trigger input.

Figure 39 – Pass Through Connection for Fieldbus Models

### 2.6.3 RS232 Master/Slave

The RS232 master/slave connection is used to integrate a DS8100A reader in a network consisting of different scanners not provided with a Lonworks interface.

The Slave scanners use RS232 only on the main and auxiliary interfaces. Each slave scanner transmits the messages received by the auxiliary interface onto the main interface. All messages will be transferred towards the master.

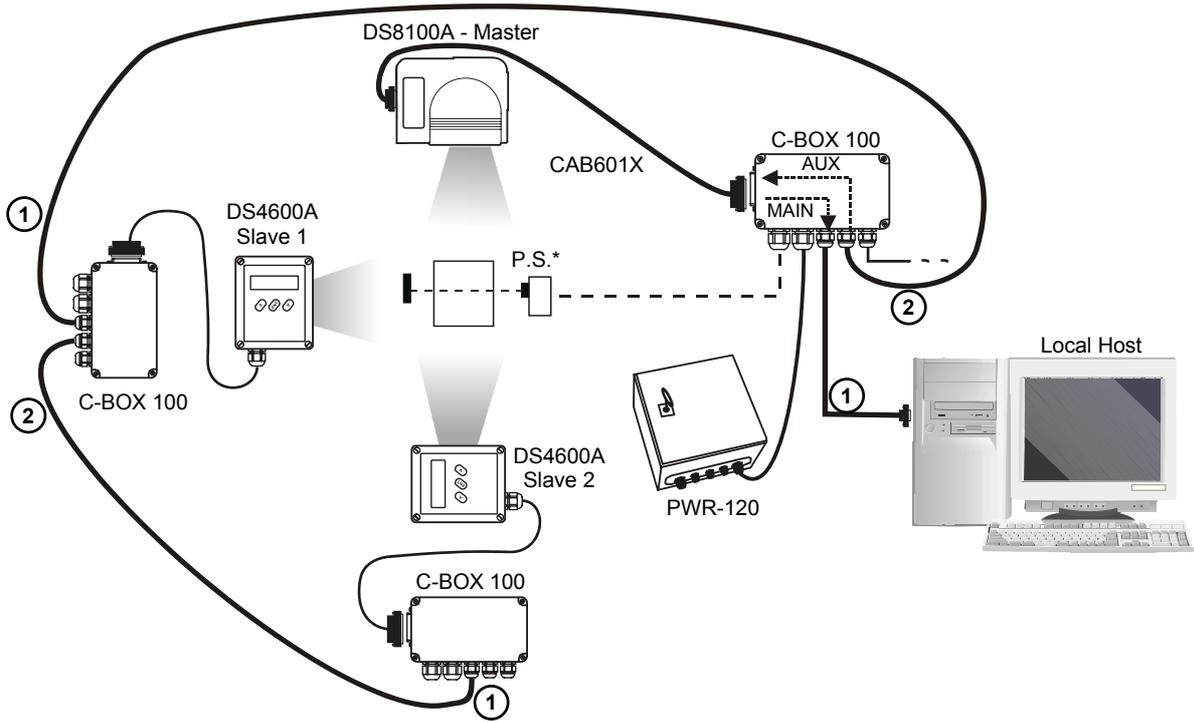
The master scanner is connected to the Host PC on the main RS232 serial interface through the C-BOX 100 (20 mA C.L. can also be used if the INT-30 accessory is installed).

In RS232 Master/Slave connections the External Trigger signal is unique to the system (single P.S.).



NOTE

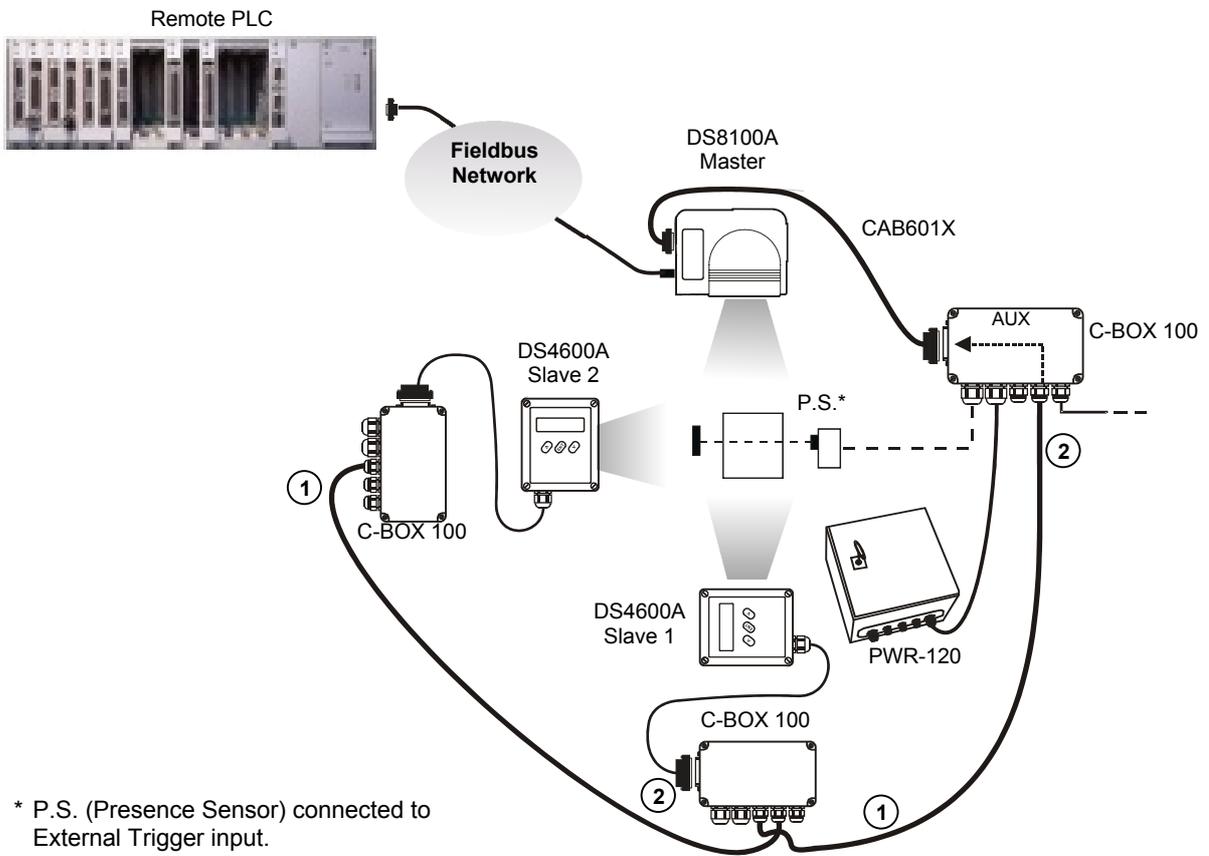
The **DS8100A Standard model**, working as Master in an RS232 network, may be simultaneously connected to a Lonworks network consisting of DS8100A slave scanners. Be careful when assigning the slave address, since the number of the first Lonworks slave must be a progressive number with respect to the address number defined for the last slave scanner of the RS232 network. For example, if the RS232 network consists of Slave 1 and Slave 2, the address to be assigned to the first Lonworks slave scanner will be Slave 3 (not Slave 1).



\* P.S. (Presence Sensor) connected to External Trigger input.

① Main Serial Interface    ② Auxiliary Serial Interface

**Figure 40 – RS232 Master/Slave for DS8100A Standard Models**



\* P.S. (Presence Sensor) connected to External Trigger input.

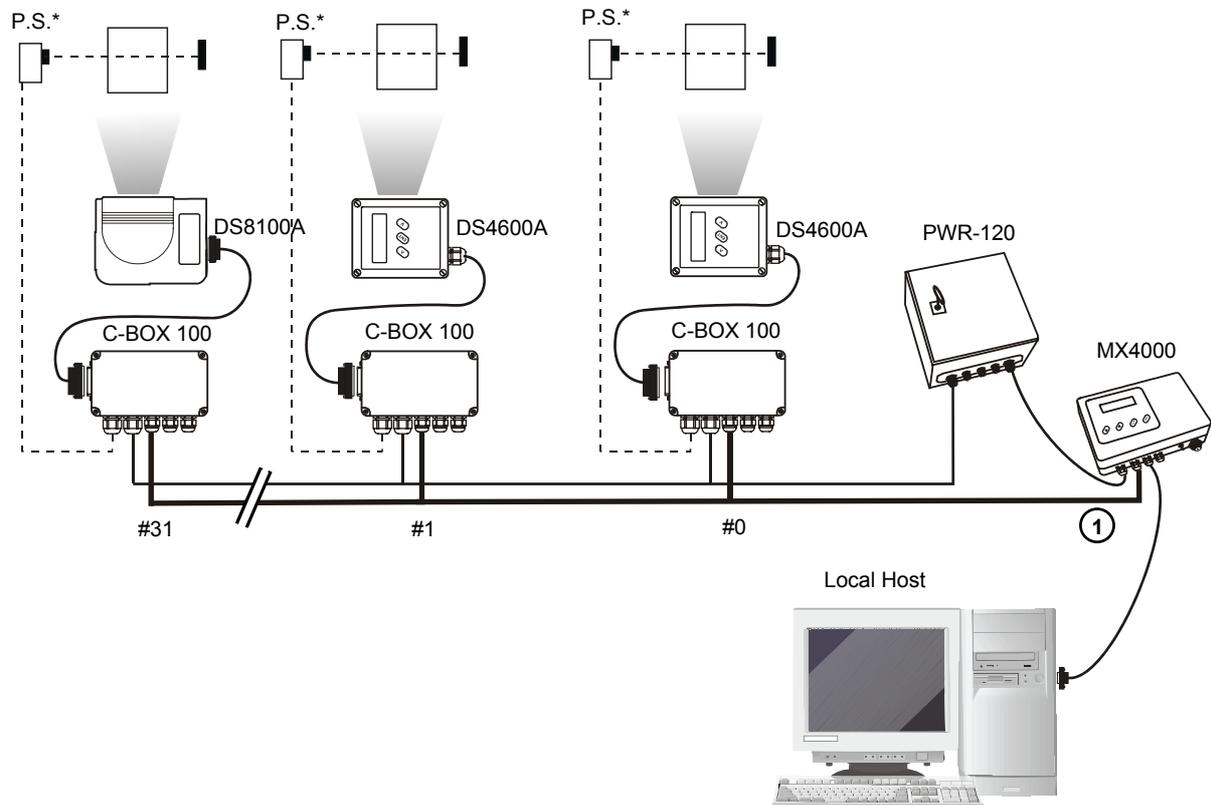
① Main Serial Interface    ② Auxiliary Serial Interface

**Figure 41 – RS232 Master/Slave for DS8100A Fieldbus Models**

## 2.6.4 Multiplexer

The Multiplexer connection is used to integrate a DS8100A slave reader in a Multidrop network consisting of different scanners not provided with a Lonworks interface.

Each scanner is connected to a Multiplexer (MX4000) with the RS485 half-duplex main interface.



\* P.S. (Presence Sensor) connected to External Trigger input.

① RS485 HD Main Interface

**Figure 42 – Multiplexer for DS8100A Standard Models**

The auxiliary serial interface of the slave scanners can be used to visualize collected data or to configure it using the Genius™ utility.

When On-Line operating mode is used, the scanner is activated by an External Trigger when the object enters its reading zone.

## 2.6.5 Local Lonworks Network

A local Lonworks network allows logically connecting a DS8100A master reader with up to 31 DS8100A slaves. Actually, the maximum number of readers to be employed in the network depends on the system operating conditions, that is adopted operating mode and amount of data stream.

When creating your network, always keep in mind the following guidelines:

- the Lonworks network logically supports a maximum number of 32 devices (master + slaves);
- it is recommended to adhere to the 8-in-16 rule (not more than 8 devices in any 16 meter bus segment (branch));
- for DS8100A scanners the total bus length may extend up to 65 m (213 ft);
- the maximum number of DS8100A readers supported also depends on the type of power propagation adopted by the system (see the specific power supply installation manual for details).

Typically the layouts can be divided into Synchronized (single P.S.) or Multidata (multi P.S.) networks. They can be small (up to 10 scanners) or large (more than 10 scanners).

Contact Datalogic S.p.A., if your network requires a higher number of readers or in case the application throughput is very high.

For further information on Lonworks network cabling and connections see the “LonWorks® TPT Twisted Pair Transceiver Module User’s Guide”, available from the website: [www.echelon.com](http://www.echelon.com).



**CAUTION**

*For DS8100A Lonworks Network layouts, power is always propagated through the 17-pin scanner connectors. A special setting is required in C-BOX 100 to pass scanner power to the presence sensor, encoder, etc.*

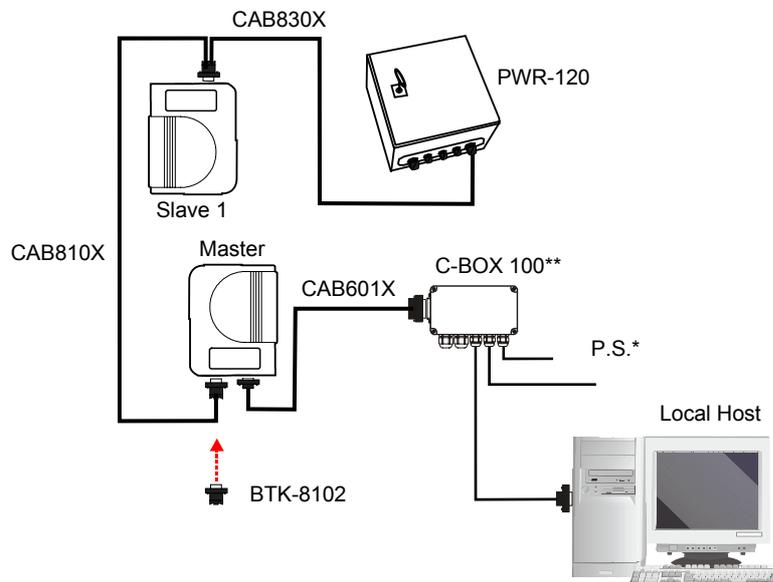
## Small Synchronized Network

When building a small local Lonworks network (less than 10 scanners), the DS8100A master reader must be connected to a local host computer or a C-BOX 100 by means of a cable connected to the 26-pin D-sub male connector.

The master reader connects to the first slave reader of the system through the local Lonworks 17-pin female connector. The local Lonworks 17-pin male connector must be properly terminated by inserting the BTK-8102 Lonworks terminator or be powered by the CAB-860X cable.

The slave readers are connected together through the local Lonworks connectors. Only the 17-pin female connector of the last slave reader must be terminated by the BTK-8100 bus return or be powered by the CAB-830X cable.

The presence sensor is connected and powered through the C-BOX 100 by the scanner and is unique to the system. There is only a single reading phase and a single message from the master reader to the Local Host. The **On-Line** operating mode is used for this layout.



\* P.S. (Presence Sensor) connected to External Trigger input.

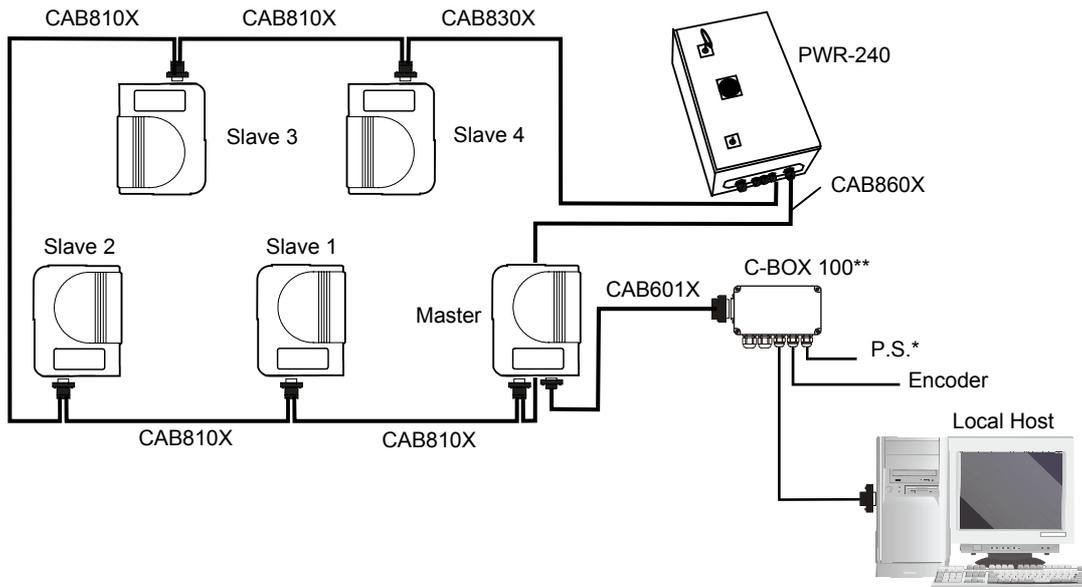
\*\* C-BOX 100 modified to accept scanner power

Figure 43 – Small Synchronized Network with 2 Readers

The following image shows a system consisting of five readers where the external signals (trigger, encoder, serial to host, etc.) are connected to the master through the C-BOX 100.

The system is powered by the PWR-240 where:

- the master is connected through CAB-860X, which also provides bus termination
- the last slave is connected through CAB-830X, which also provides bus return.
- the master and all slaves are connected together through the CAB-810X cables



\* P.S. (Presence Sensor) connected to External Trigger input.

\*\* C-BOX 100 modified to accept scanner power

**Figure 44 – Small Synchronized Network with more than 2 Readers and Single Power Unit**

## Large Synchronized Network

When building a large local Lonworks network (more than 10 scanners), an SC6000 Controller must be used together with a PWO power supply/junction box unit. In this case the SC6000 unit acts as the system master and is connected to the host through one of its interfaces.

All scanners act as slaves and are connected to the SC6000 through the PWO power supply/junction box. For DS8100A scanners, 4 branch connectors provide Lonworks communications between the scanners and the SC6000 unit. The last scanner on the line requires a Termination connector as well as any unused branches in the PWO unit.

The allowed maximum bus length is 65 m.

External devices such as a presence sensor and an encoder are all connected to the PWO.

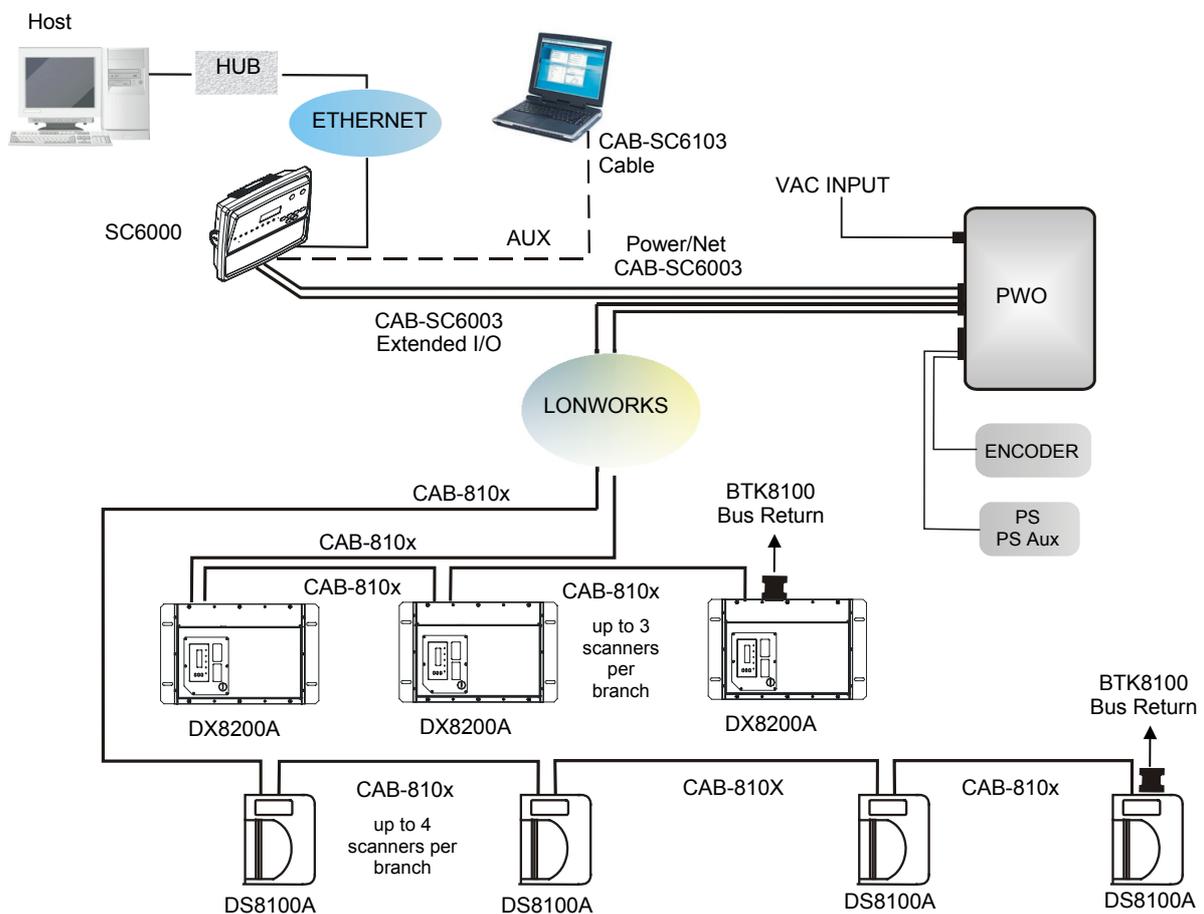


Figure 45 – Large Synchronized Network with DX8200A and DS8100A Scanners

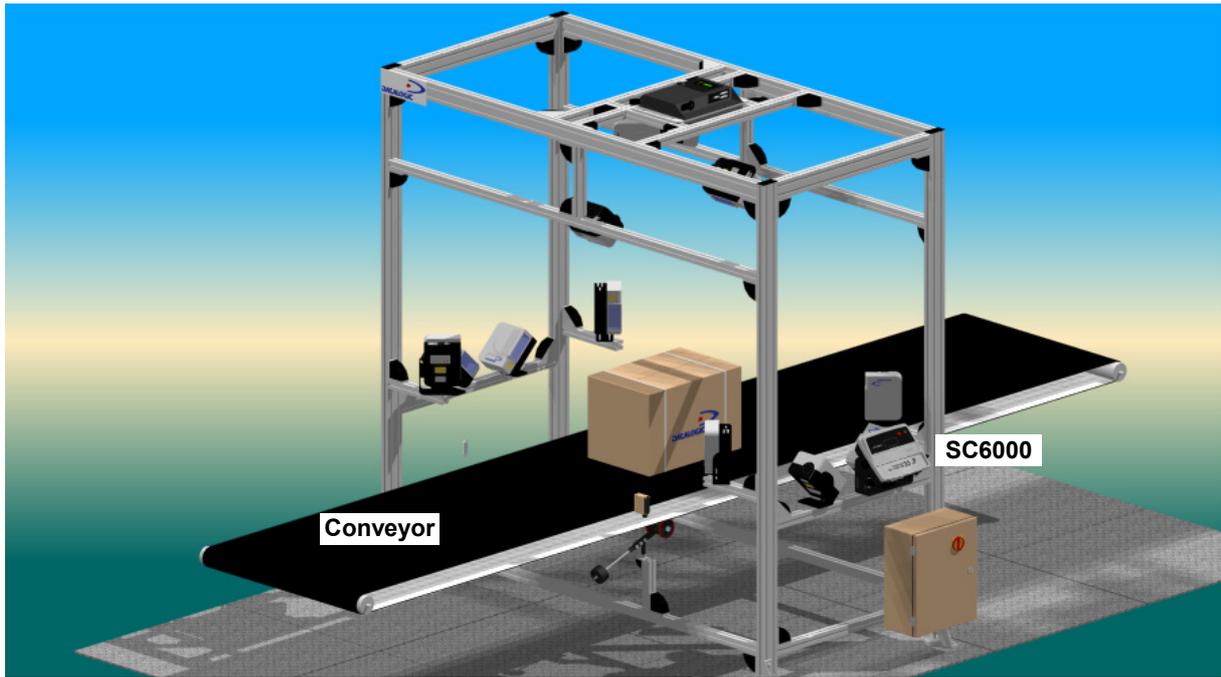


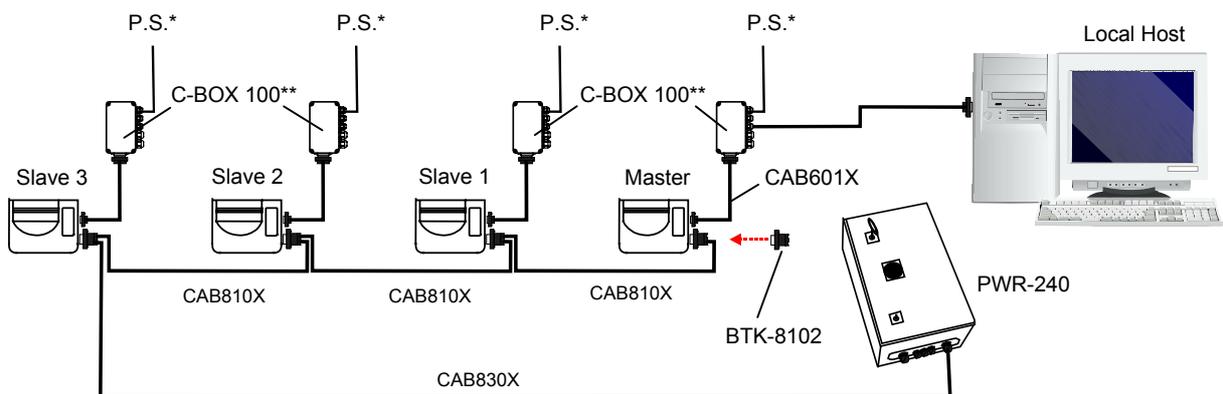
Figure 46 – Large Synchronized Network Reading Station

### Multidata Network

In this layout, one master and up to 7 DS8100A slave readers have their own P.S. and therefore multiple reading phases. Each P.S. is connected through a C-BOX 100, which in turn is connected to its relative scanner through a CAB-601X cable.

The master sends all the individual messages collected from the Lonworks interface as well as its own to the Local Host through its C-BOX 100.

The following image shows a system consisting of four readers, which are all connected together using CAB-810X cables and the system is powered by a PWR-240 power supply.



\* P.S. (Presence Sensor) connected to External Trigger input.  
 \*\* all C-BOX 100s modified to accept scanner power

Figure 47 – Multidata Network

## 2.6.6 Fieldbus Network

The Fieldbus (Ethernet) model offers connectivity without any converter or adapter needed.

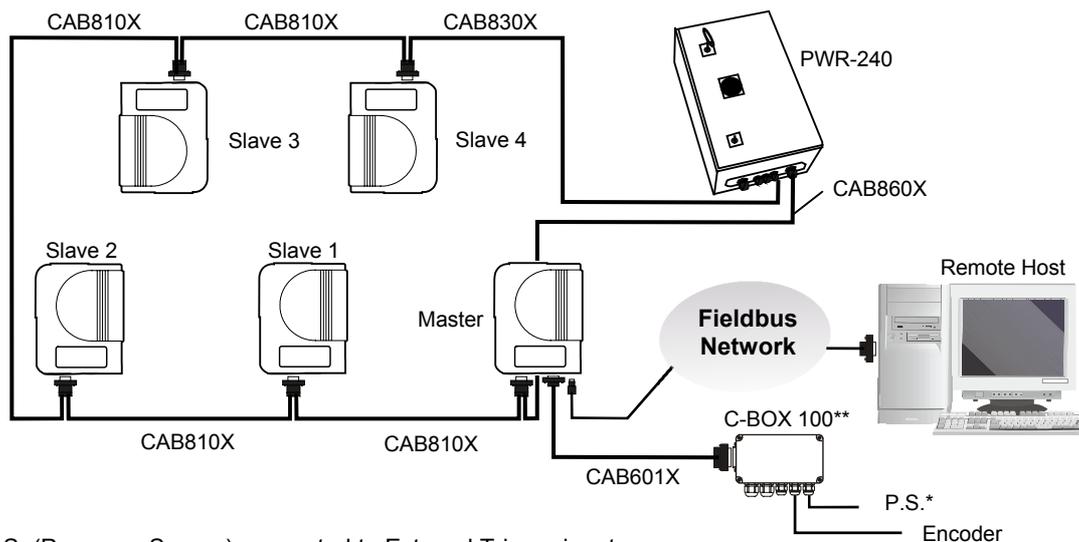
The DS8100A master Fieldbus communicates with a remote host (for ex. remote PC connected via Internet) by means of a cable connected to the Fieldbus (Ethernet) connector provided. It can be activated by a signal generated by the remote Host or by a physical presence sensor.

The external signals (trigger, encoder, serial to host, etc.) are connected to the master through the C-BOX 100.

The system is powered by the PWR-240 where:

- the master is connected through CAB-860X, which also provides bus termination
- the last slave is connected through CAB-830X, which also provides bus return.
- the master and all slaves are connected together through the CAB-810X cables

The same network layouts are available as for the DS8100A Standard model.



\* P.S. (Presence Sensor) connected to External Trigger input.

\*\* C-BOX 100 modified to accept scanner power

**Figure 48 – Fieldbus Small Synchronized Network**

## 2.7 KEYPAD AND DISPLAY

The DS8100A keypad allows entering a menu for selection of one of the following functions:

- Welcome: shows the current software release and operating mode;
- Autolearn: starts the procedure making it possible to obtain an automatic, accurate and fast configuration of DS8100A without the necessity of directly checking/modifying the relevant parameters;
- Internal Net: defines scanner function within the network (see below);
- Ethernet Mode: allows setting the scanner IP address to be used within the network;
- LCD Contrast: sets the LCD contrast ;
- Bus: not used for DS8100A scanners;
- Test Mode: allows verifying the scanner reading position and features (see below).

The same settings may be performed by using the Genius™ program (see chapter 3 for details).

### 2.7.1 Internal Net

This submenu can be used as an alternative to configuration through Genius™, to assign the DS8100A scanner within a master/slave network.

It allows defining the scanner function (slave/master) within the network and, if configured as Slave, its address.

To enter the Internal Net submenu and configure the scanner follow the given procedure:

- 1) Press and hold both the ▲ (up arrow) and ▼ (down arrow) keys for about 2 seconds to enter the Main menu;
- 2) Use the ▲ (up arrow) or ▼ (down arrow) key to select the "Internal Net" item, then press the ENT (enter) key to confirm;
- 3) Use the ▲ (up arrow) or ▼ (down arrow) key to select the "LonWAddrSel" item, then press the ENT (enter) key to confirm;
- 4) Use the ▲ (up arrow) or ▼ (down arrow) key to select your scanner function among "Master", "Slave n", "Slave jolly", "Disabled"; then, press the ENT (enter) key to confirm;
- 5) Use the ▲ (up arrow) or ▼ (down arrow) key to select the "Exit" item, then press the ENT (enter) key to confirm. Repeat this step again to exit the Main Menu and return to the scanner current operating mode.

### 2.7.2 Test Mode

Test Mode is particularly advised during the installation phase, since it causes the reader to be continuously activated allowing to verify its reading features and its reading position with respect to the barcode.

To enter the Test Mode submenu and configure the scanner follow the given procedure:

- 1) Press and hold both the ▲ (up arrow) and ▼ (down arrow) keys for about 2 seconds to enter the Main menu.
- 2) Use the ▲ (up arrow) or ▼ (down arrow) key to select the "Test Mode" item, then press the ENT (enter) key to confirm. The reader enters Test Mode.
- 3) Press the ▲ (up arrow) key to exit the Test Mode.
- 4) Use the ▲ (up arrow) and ▼ (down arrow) key to select the "Exit" item, then press the ENT (enter) key to confirm. The scanner exits the Main Menu and returns to its current operating mode.

## 3 SOFTWARE CONFIGURATION

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### 3.1 GENIUS™ INSTALLATION

Genius™ is a new Datalogic scanner configuration tool providing several important advantages:

- Wizard approach for low skilled users;
- Multi-language version;
- Defined configuration directly stored in the reader;
- Communication protocol independent from the physical interface allowing to consider the reader as a remote object to be configured and monitored.

To install Genius™, proceed as follows:

- 1) Turn on the PC that will be used for configuration, running either Windows 98, 2000/NT, or XP;
- 2) Insert the Genius™ CD-ROM;
- 3) Wait for the CD to autorun and follow the installation procedure.

### 3.2 GUIDE TO RAPID CONFIGURATION

#### 3.2.1 Wizard for Quick Reader Setup

After installing the Genius™ software program (see par. 3.1) the following window appears asking the user to choose the desired configuration level:



Figure 49 - Genius™ Wizard Opening Window

The Wizard option is advised to low skilled users, since it shows a step by step scanner configuration. The parameters to be defined are the following:

- Barcode selection and definition;
- Operating mode selection and definition (see sub-paragraphs for further details);
- Digital Inputs/Outputs configuration;
- Hardware interface selection;
- Output data format configuration.

After defining the parameter values the following window appears allowing to complete the reader configuration as follows:

- Saving the configuration to disk;
- Switching to Advanced mode;
- Sending the configuration to the scanner.



Figure 50 - Genius™ Wizard Closing Window

## Test Operating Mode

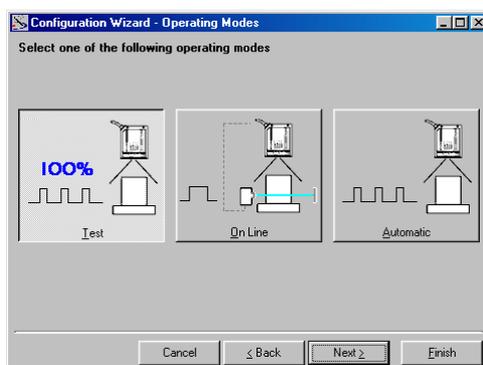
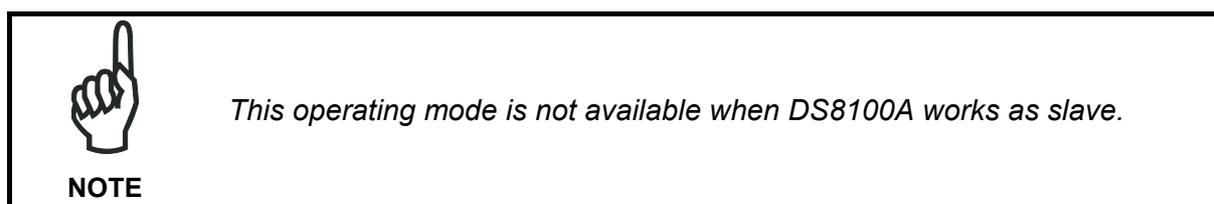


Figure 51 - Test Mode Selection

This operating mode causes the reader to be continuously activated allowing to verify its reading features and its reading position with respect to the barcode. For this reason, it is particularly advised during the installation phase of the reader.

After 100 scans, the values relative to an internal counter and the decoded code are displayed and transmitted on the serial interface. The counter reports the percentage of good reads of the label.

## On Line Operating Mode

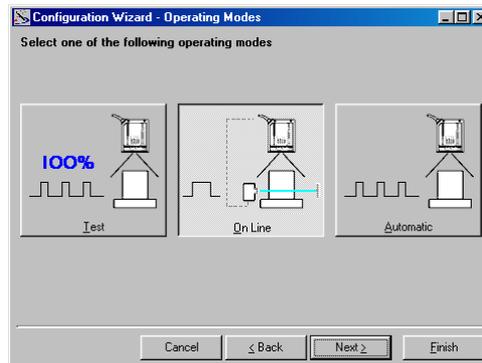


Figure 52 - On Line Mode Selection

This operating mode causes the reader to be connected to an external Presence Sensor using EXT TRIG+ and EXT TRIG- inputs.

During the active phase of the presence sensor, the DS8100A reader tries to acquire and correctly decode the code.

In case the decoding phase is successful, the barcode characters are transmitted on the serial interface. Otherwise, a no read message is sent.

## Automatic Operating Mode

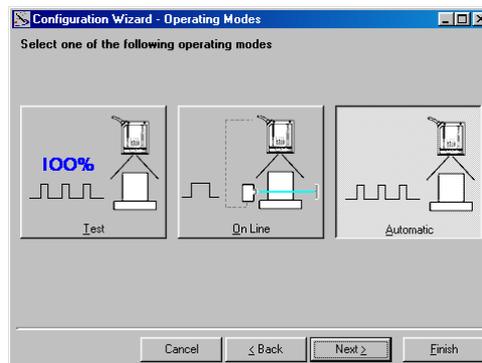


Figure 53 - Automatic Mode Selection

This operating mode does not require the connection to an external Presence Sensor.

When working in this mode the reader is continuously scanning. The reading phase is activated each time a barcode enters the reading zone. The reader stops reading after an N number of scans without a code.

Barcode characters are transmitted on the serial interface. In case of a failed reading phase no message is sent to the host computer.

### 3.2.2 Genius™ Network Setup Through Master

The Network Setup allows configuring your Local Lonworks Network through the Master using Genius™.

Three different procedures are available to define the number of network slave scanners, their label and address according to two main conditions:

Condition	Available Procedure	Feature
<u>Unknown Slave Addresses</u>	Net-Autoset	automatically assigns random addresses to slave or Stand Alone scanners.
<u>Known Slave Addresses</u>	Network Wizard	customizes the network (slave label and address definition and physical identification of a specific slave within network), updates configuration to a file and makes it ready to be sent to the Master.
	Express Network Setup	automatically performs all the operations of the Network Wizard apart from the physical identification of a specific slave scanner.



#### NOTE

*The Network Setup procedure as described requires Genius™ software version 1.06 or later. In addition, the Net-Autoset procedure requires scanner software version 6.40 or later.*

1. **The first operation** to perform is the configuration of your **scanner as "Master"** from the Local Device Network Settings item in the Device Menu, see figure below:

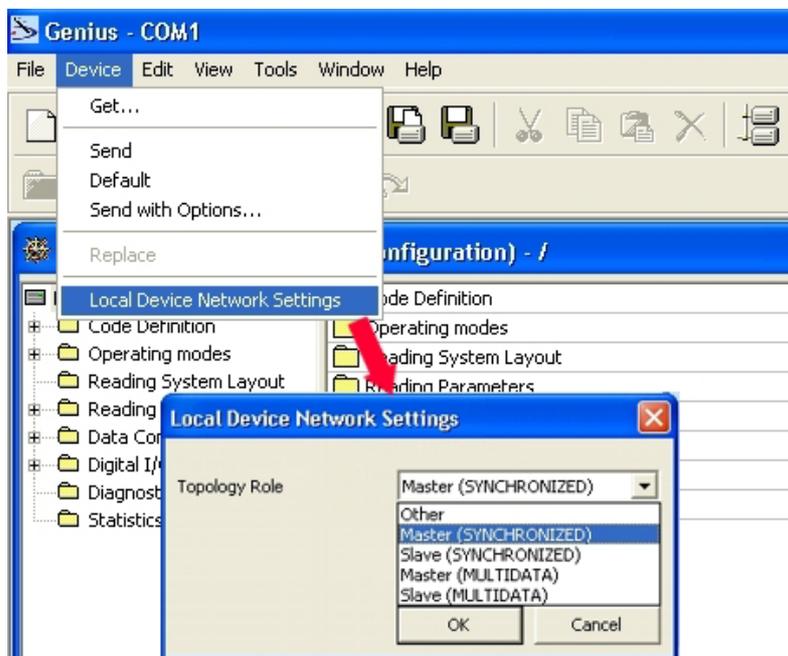


Figure 54 – Local Device Network Settings

The following dialog box appears asking whether to send the configuration to the Master or not:



- Click the "Yes" button, then click on the  icon available on the Toolbar to make the "Devices" area appear next to the Parameter Explorer window. By repeatedly clicking the icon this area will be displayed or hidden.

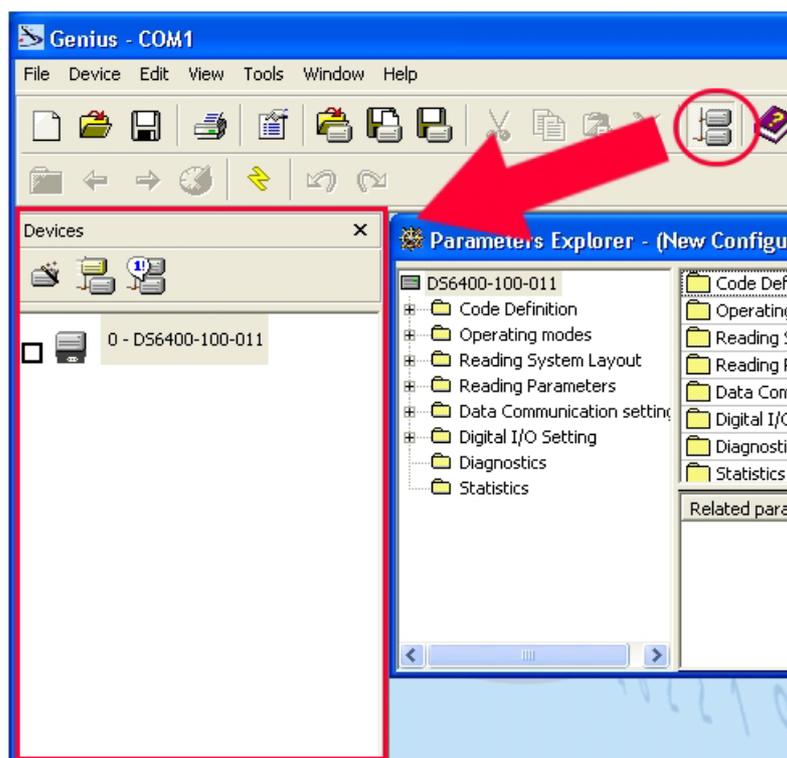


Figure 55 – Cluster Configuration

Each scanner of the cluster is indicated by the following graphical objects:



- check box allowing to select/deselect a specific scanner to perform the desired operations (i.e. program downloading);
- icon representing the scanner status;
- a label reporting information transmitted by the scanner when connected (the scanner address, generated errors, scanner description).

3. **Then, proceed with the network setup** by using one of the icons available on the Tool Bar according to the procedure to follow:



= Net-Autoset procedure



= Network Wizard procedure



= Express Network Setup procedure

## Net-Autoset

This procedure is to be used when all scanner addresses and labels are unknown (typically when configuring the network for the first time or whenever a network reconfiguration is required).



By clicking the  icon or selecting the "Net\_Autoset" option from the right-click menu, the Net-Autoset procedure is started allowing automatic assignment of random addresses to all slave or Stand Alone scanners connected within the network.

Once the procedure has been completed, it is possible to:

- define customized addresses and labels through the Network Wizard;
- display the scanner default labels through the Express Network Setup.

## Express Network Setup

Before performing this procedure, a Lonworks address must be assigned to each slave scanner. The most practical method is through the [Net-Autoset](#) procedure. See par. 3.2.3 for alternative address assignment methods.

Once all addresses have been assigned, the Express Network Setup is to be used when all scanner addresses and labels do not need to be modified.



By clicking on the  icon or by choosing the related option from the right-click menu, the procedure is started which automatically performs the following operations:

- opening the wizard;
- polling the network to discover connected scanners;
- transferring all scanners found to the "Requested Devices" area of the wizard where your network customization is defined;
- saving the new network configuration;

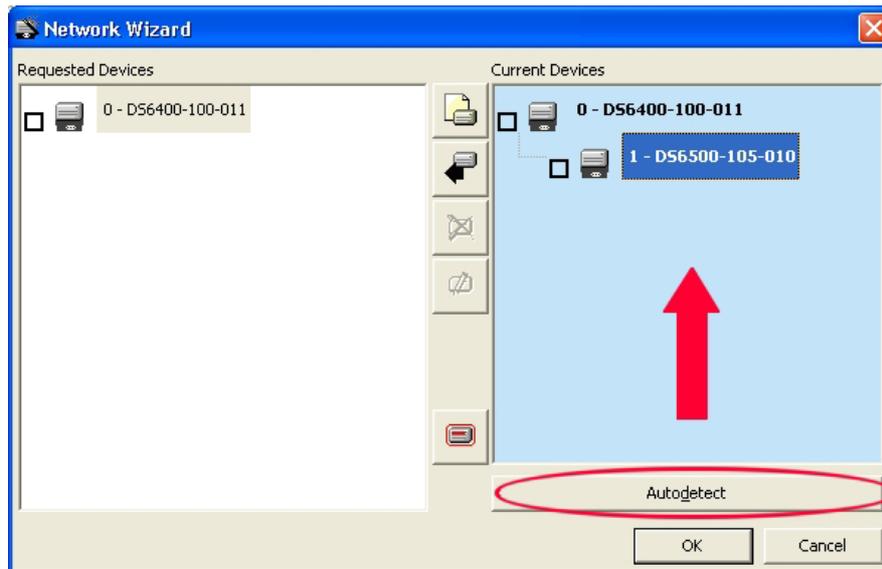
Once the procedure has been completed, a dialog box will appear asking whether to send the configuration to the Master. Choose the "Yes" option to start this procedure.

## Network Wizard

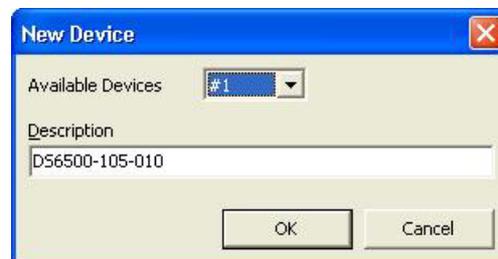
Before performing this procedure, a Lonworks address must be assigned to each slave scanner. The most practical method is through the [Net-Autose](#) procedure. See par. 3.2.3 for alternative address assignment methods.

Once all addresses have been assigned, the Network Wizard is to be used when one or more scanner addresses and labels need to be modified.

1. Click on the  button to open the Network Wizard dialog box:

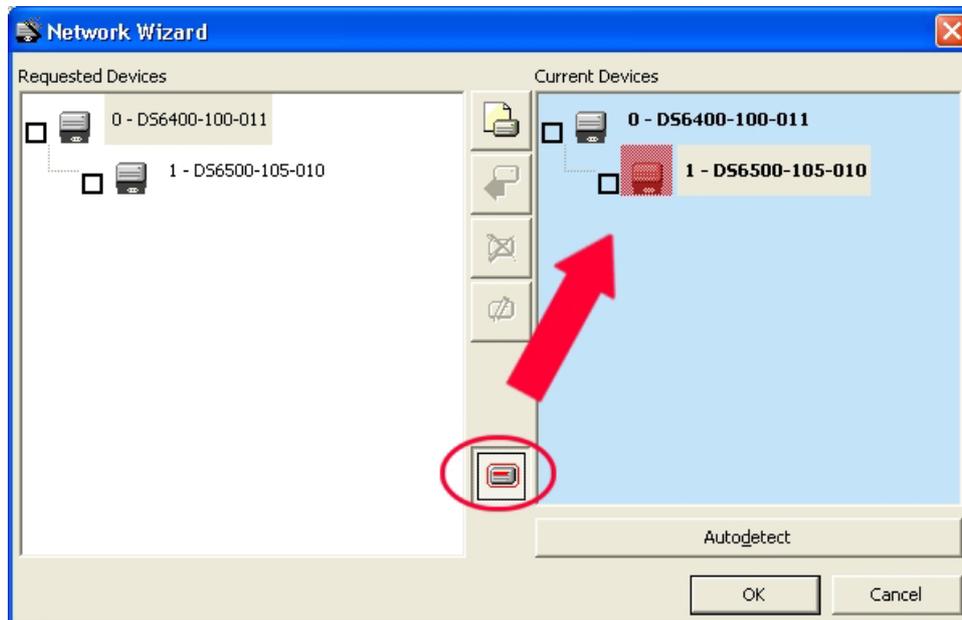


- a. if the slave scanners have already been configured and wired to the network, click on the Autodetect button to start a polling procedure of the current network. All slave scanners found will be represented in the “Current Devices” area. Then, select the desired slave scanner from the “Current Devices” area and click on the  icon (or drag and drop) to transfer it to the “Requested Devices” area where your network customization is defined. The following dialog box will appear allowing (if necessary) to change the slave address (“Available Device” field) and label (“Description” field):



- b. if the slave scanners have not been configured and wired to the network, click on the  icon to add a new device defining its address and model. The added slave scanner will be then displayed in the “Requested Devices” area. This option in any case requires that all slave scanners have their address set before the network can function.

2. If desired, select a slave scanner within the "Current Devices" area and click on the  icon (or select the "Show Device" option from the right-click menu) to make the dialog box appear as follows:



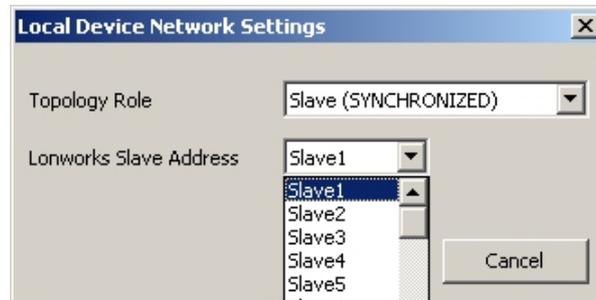
The "Show Device" option is particularly useful after the Net-Autoset procedure or whenever it is necessary to know which address is assigned to a specific slave scanner. Indeed, it activates the following signals which physically indicate the scanner corresponding to the one selected, in particular:

- in Network Wizard the icon corresponding to the selected slave scanner starts blinking red;
  - in the Physical Network all slave scanner lasers turn off except the one of the selected scanner which turns on.
3. If desired, select the transferred/added slave scanner within the "Requested Devices" area and click on the  icon to customize the scanner label and address.
4. Once your network has been customized, close the network wizard. Before closure, the program will show a dialog box asking whether to send the new configuration to the Master. Choose the "Yes" option to start this procedure.

### 3.2.3 Alternative Slave Address Assignment

As alternatives to Network Setup through the Master, each Slave scanner can be assigned an address through the following methods:

- address setting through the Local Device Network Settings item in the Device Menu with the slave scanner connected to Genius™



- manual address setting through slave scanner keyboard (see par. 2.7.1 for details)

## 3.3 ADVANCED GENIUS™ CONFIGURATION

The ADVANCED selection available when starting the Genius™ program is addressed to expert users being able to complete a detailed scanner configuration. By choosing this option it is possible either to start a new scanner configuration or to open and modify an old one. The desired parameters can be defined in the following window, similar to the MS Explorer:

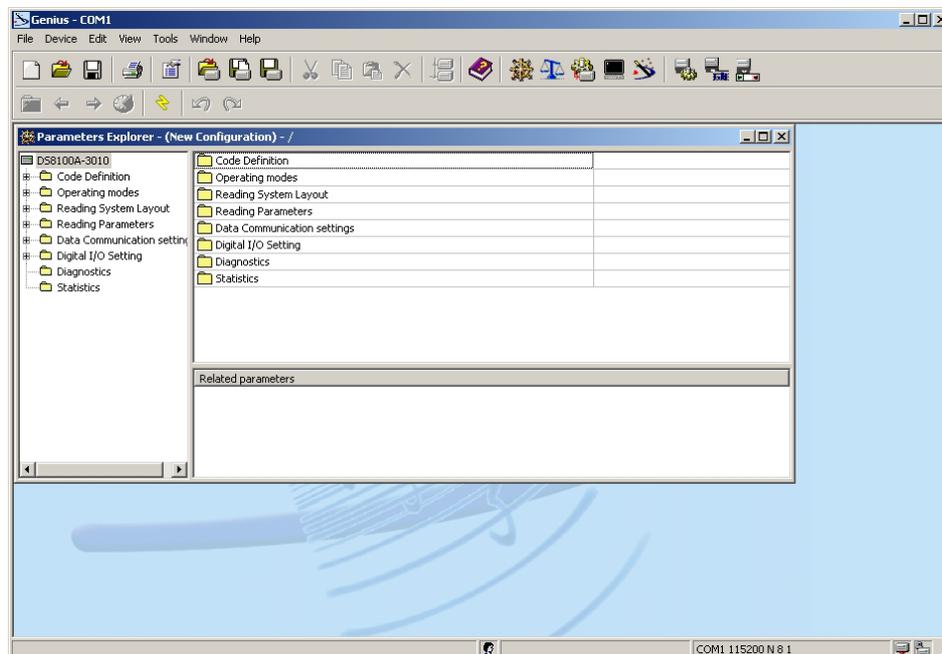


Figure 56 - Genius™ Parameter Explorer Window

The procedure for setting the scanner parameters is supported by an help on-line, which is displayed in an HTML browser. It can be selected from the Configuration Help option available in the Help menu. In addition, a context-sensitive help can be enabled by pressing the <F1> key after selecting the desired parameter.

### 3.4 PARAMETER DEFAULT VALUES

The following table contains the list of the factory default settings for the DS8100A. Genius™ also allows checking the parameter default values by selecting the "Compare parameters" option available in the Tools menu and comparing the current scanner configuration to the default one.

<u>Parameter</u>	<u>Default Setting</u>
<b>Code Definition</b>	
Code Combination	Single Label
No read Message	Global No Read Message
No Read String	<CAN>
Code Label Settings #1	
Code Symbology	Interleaved 2 of 5
Label Length	8
Min Code Position	0
Max Code Position	255
Check Digit	Disabled (unchecked)
Decoding Safety	1
Decoding Severity	3
Pattern Match String	Empty
Code Label Settings #2	
Code Symbology	Code 39
Label Length	Variable
Minimum Label Length	1
Maximum Label Length	60
Min Code Position	0
Max Code Position	255
Check Digit	Disabled (unchecked)
Decoding Safety	1
Decoding Severity	3
Pattern Match String	Empty
<b>Operating Modes</b>	
Operating Mode Selection	On Line
On Line Options	On Line 1 Input
Start Input Number	1
Start Input Active Level	Active Closed
Reading Phase Timeout	Disabled (unchecked)
<u>Verifier</u>	Disabled (unchecked)
<b>Reading System Layout</b>	
Device Assignment	Alone
<b>Reading Parameters</b>	
Beam Shutter	Disabled
Overflow Start Ratio	5
Overflow Stop Ratio	5
Reading Mode	Reconstruction
<u>Reconstruction Parameters</u>	
Enabled Stacked Code	Disabled (unchecked)

<b>Parameter</b>	<b>Default Setting</b>
<b>Reading Parameters</b>	
<u>Scan Line Amplitude</u> Amplitude Settings Enable	Disabled (unchecked)
<b>Data Communication Settings</b>	
Host Application Protocol Type	Standard
<u>Data Format</u>	
Header TX Start	With data
Termination After No Read Message	Enabled (checked)
Message Tx Trigger Selection	On Decoding
Format Type	Standard
Code Identifier	disabled
Parameters	
Header String	<STX>
Code Position	Disabled (unchecked)
Code Direction Identifier Enable	Disabled (unchecked)
Termination String	<CR><LF>
Data Packet Separators	<CR><LF>
Code Field Length Setting	Variable Length
<u>Main Serial Port</u>	
Data Tx	Enabled (checked)
Parameters	
Main Port Communication Mode	Standard
Main Port Electrical Interface	RS232
Handshake	None
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
<u>Auxiliary Serial Port</u>	
Data Tx	Enabled (checked)
Pass Through	Disabled (unchecked)
Parameters	
Baud Rate	115200
Parity	None
Data Bits	8
Stop Bits	1
<b>Digital I/O Setting</b>	
<u>Digital Input Lines Setting</u>	
Debouncing For Input 1, 3 and 4	5ms
Debouncing For Input 2	500 $\mu$ s
Input 1 Active Level Overridden by Op. Mode	Active Closed
Input 2 Active Level Overridden by Op. Mode	Active Closed
Input 3 Active Level Overridden by Op. Mode	Active Closed
Input 4 Active Level Overridden by Op. Mode	Active Closed

<b>Parameter</b>	<b>Default Setting</b>
<b>Output 1</b>	
Line State	Normally Open
Activation Event	Complete Read
Alternative Activation Event	Wrong
Deactivation Event	Timeout
Alternative Deactivation Event	None
Deactivation Timeout (ms)	50
<b>Output 2</b>	
Line State	Normally Open
Activation Event	No Read
Alternative Activation Event	Partial Read
Deactivation Event	Timeout
Alternative Deactivation Event	None
Deactivation Timeout (ms)	50
<b>Output 3</b>	
Line State	Normally Open
Activation Event	None
Alternative Activation Event	None
Deactivation Event	None
Alternative Deactivation Event	None
<b>Diagnostics</b>	Disabled (unchecked)
<b>Statistics</b>	Disabled (unchecked)

## 4 READING FEATURES

### 4.1 ADVANCED CODE RECONSTRUCTION (ACR™ 4)

The traditional way of barcode reading could be called “Linear Reading”. In this case, the laser beam crosses the barcode symbol from its beginning to its end as shown in the following figure:



Figure 57 – Linear Reading

In Advanced Code Reconstruction mode it is no longer necessary for the laser beam to cross the label from the start to the end. With just a set of partial scans on the label (obtained using the motion of the label itself), the DS8100A is able to “reconstruct” the barcode. A typical set of partial scans is shown in the figure below:

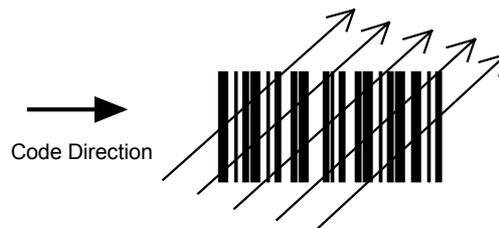


Figure 58 – Partial Scans

None of the partial scans contains the whole label. The decoder aligns each partial scan correctly and combines them in order to obtain the entire code.

The alignment is performed by calculating the time difference from one partial scan to another using a reference code element.

#### 4.1.1 Tilt Angle for Advanced Code Reconstruction

The most important parameter in Advanced Code Reconstruction is the value of the maximum tilt angle ( $\alpha$  maximum) under which the code reconstruction process is still possible.

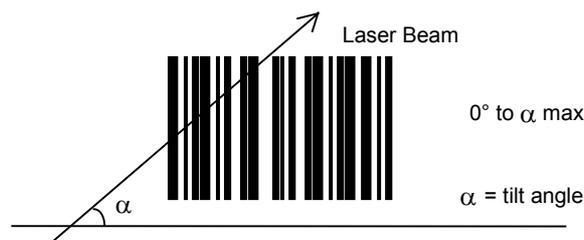


Figure 59 – Tilt Angle

The decoder will be able to read the label with a tilt angle between  $+\alpha$  max and  $-\alpha$  max as shown in the following figure:

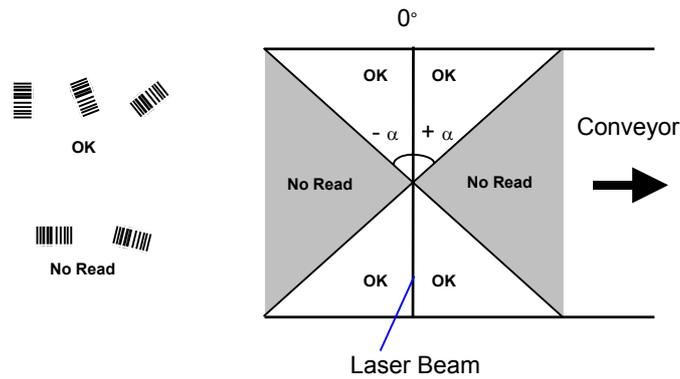


Figure 60 – Reading Zones with  $\alpha$  Max

The formulas to calculate  $\alpha$  maximum depend on various parameters such as: label height, number of scans per second, code motion speed, etc. Minimum label heights at different conveyor speeds are given in the tables in par. 4.3.1, depending on standard  $\alpha$  values of  $45^\circ$  and  $30^\circ$ .

### 4.2 PACKTRACK™

PackTrack™ is a patented operating mode for Datalogic Omni-Directional Reading Stations used to read and correctly assign codes read on different packs when placed in the scanner Reading Area at the same time.

In fact, in the following example, the codes of two or more consecutive packs are found at the same time in the scanner reading area. Therefore, the condition occurs where, in the sequence of the two packs, the code of the second pack is read first, just before the code of the previous pack. A system without PackTrack™ would assign the code of the second pack to first pack and vice versa, thus causing a gross error in sortation.

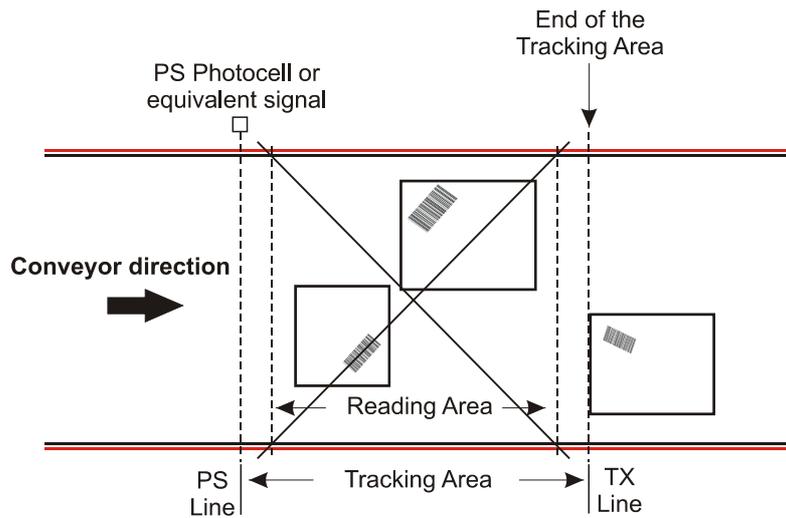


Figure 61 – PackTrack™ System Layout

Working in PackTrack™ mode requires the presence of an encoder and a presence sensor to track the moving packs.

All PackTrack™ functionalities are programmed via the Genius™ tool (refer to the Genius™ Help On-Line for details).

For correct functioning, the PackTrack™ operating mode requires a calibration just after the installation of the scanners. This operation is absolutely necessary to make the scanner recognize its position in space. Thus, a fixed reference system is required.

PackTrack™ uses a right-handed reference system (right hand with thumb = X axis; forefinger = Y axis; middle finger = Z axis) where the axis X coincides with the PS line, the Y axis coincides with the conveyor direction and the Z axis is oriented upwards from the conveyor (see figure below).

This coordinate system is absolute for the reading station, i.e. is valid for all the scanners independently from their position or orientation with respect to the conveyor.

Three barcodes are placed along the scanline. For each of them, three coordinates are shown.

### DS Scanner PackTrack™ Reference System

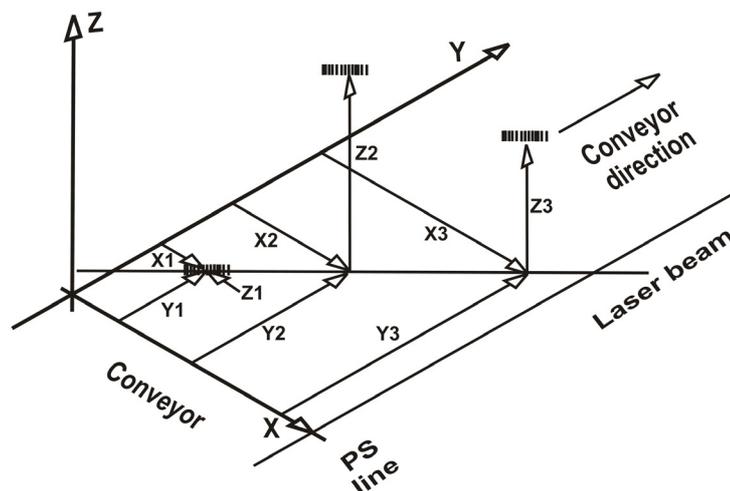


Figure 62 – DS Scanner PackTrack™ Reference System

### 4.2.1 PackTrack™ Calibration for DS8100A

By means of the Genius™ software tool SPY, the user can perform PackTrack™ calibration. Select the “SPY” option from the Tools menu or click on the related icon on the Genius™ toolbar to open the following dialog box:

**Note:** When selecting a slave scanner through the Master, click on the slave to calibrate in the Devices window, then click the SPY icon.

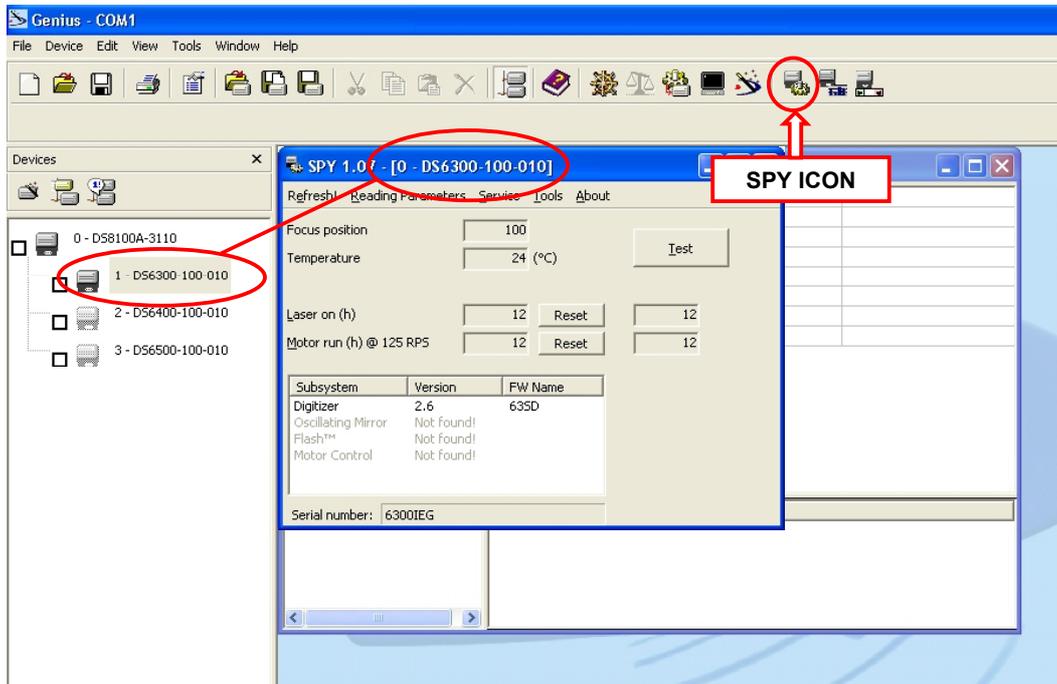


Figure 63 – Opening the Spy Window

Once the Spy window has been opened, select the “PackTrack Calibration” option from the Tools menu:

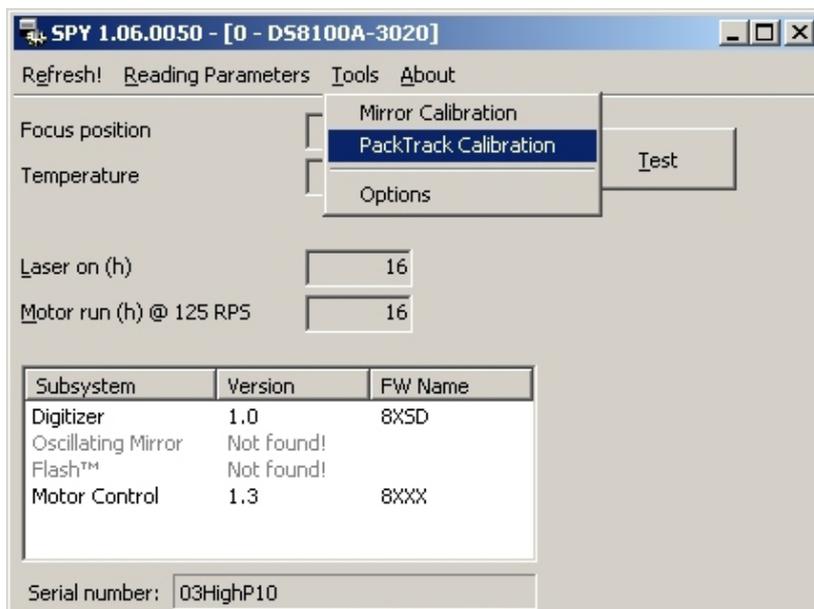


Figure 64 – Selecting PackTrack™ Calibration

By selecting the “PackTrack Calibration” option a further dialog box appears allowing to start calibration:

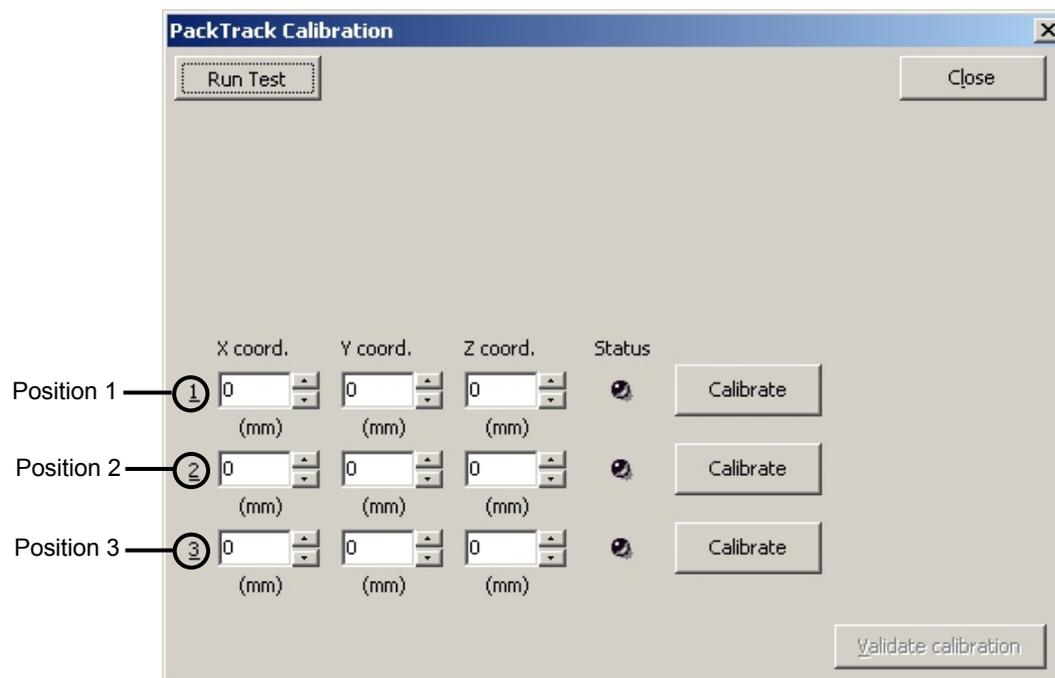


Figure 65 – Performing the PackTrack™ Calibration

1. Place the code at the desired position on the scan line (i.e. Position 1)
2. Measure the X, Y and Z coordinates relative to the center of the code and enter them into the corresponding edit boxes.
3. Press the Calibrate button for Position 1 to start the calibration.
4. Repeat the same procedure for Position 2 and Position 3.
5. Press the “Validate Calibration” button to validate the calibration settings.

Before closing the dialog box, press the Run Test button to test the calibration results and efficiency.



**NOTE**

*In the vast majority of systems the x and z data are not necessary. For these cases set  $x = 0$ ,  $z = 0$  during the calibration procedure.*

### 4.2.2 PackTrack™ Calibration for DS8100A Oscillating Mirror Models

The DS8100A oscillating mirror models can be used in PackTrack™ operating mode only when the scanner is mounted so that the scan line is parallel to the conveyor direction as shown in the following figure:

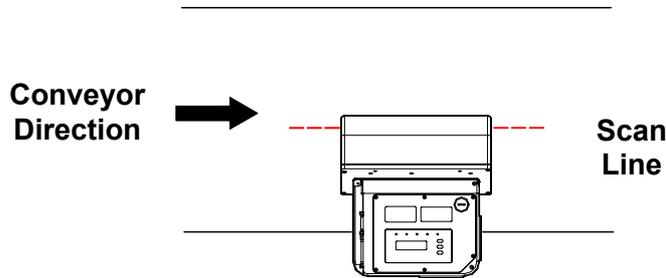


Figure 66 – Oscillating Mirror Models in PackTrack™ Mode

PackTrack™ Calibration must be made while the scanning plane is perpendicular to the conveyor plane and fixed (not oscillating).

## 4.3 PERFORMANCE

The scan rate is 1000 scans/sec.

Refer to the diagrams in par. 4.4 for further details on the reading features. These diagrams are taken on various resolution sample codes at a 25 °C ambient temperature depending on the conditions listed under each diagram.

### 4.3.1 Reading Conditions

- ANSI Grade B minimum
- 1000 scans/sec

The following tables describe the requirements for standard applications.

Conveyor Speed (m/s)		Minimum Code Height for ACR Reading (mm)											
		45°						30°					
		0.5	1	1.5	2	2.5	3	0.5	1	1.5	2	2.5	3
2/5 Interleaved Code Resolution (mm)	0.25	10	11	13	14	16	17	7	8	9	10	12	13
	0.30	12	13	14	16	17	19	8	9	10	11	12	14
	0.33	12	14	15	17	18	20	8	9	10	12	13	14
	0.38	14	15	16	18	19	21	9	10	11	12	14	15
	0.50	18	18	20	21	23	24	11	12	13	14	15	17
	0.72	24	25	26	27	28	30	15	16	16	18	19	20
	1.00	33	33	34	35	36	37	20	20	21	22	23	24

Ratio 3:1

Table 1

		Minimum Code Height for ACR Reading (mm)											
		45°					30°						
		0.5	1	1.5	2	2.5	3	0.5	1	1.5	2	2.5	3
Conveyor Speed (m/s)													
Code 39 Code Resolution (mm)	0.25	9	9	11	12	14	15	6	7	8	9	10	11
	0.30	10	11	12	13	15	16	7	7	8	10	11	12
	0.33	11	11	12	14	15	17	7	8	9	10	11	12
	0.38	12	13	13	15	16	18	8	8	9	10	12	13
	0.50	15	16	16	17	18	20	9	10	11	12	13	14
	0.72	20	21	22	22	23	24	13	13	14	14	15	16
	1.00	27	28	29	29	30	31	17	17	18	18	19	20

Ratio 3:1; Interdigit = Module Size

Table 2

		Minimum Code Height for ACR Reading (mm)											
		45°					30°						
		0.5	1	1.5	2	2.5	3	0.5	1	1.5	2	2.5	3
Conveyor Speed (m/s)													
Code 128 – Ean 128 Code Resolution (mm)	0.25	7	9	10	12	13	15	6	6	8	9	10	11
	0.30	8	9	11	12	14	15	6	7	8	9	10	12
	0.33	9	10	11	13	14	16	6	7	8	9	11	12
	0.38	10	11	12	14	15	17	6	8	9	10	11	12
	0.50	12	13	14	16	17	19	8	9	10	11	12	13
	0.72	16	17	18	19	21	22	10	11	12	13	14	15
	1.00	21	22	23	24	25	26	13	14	15	16	17	18

Table 3

		Minimum Code Height for ACR Reading (mm)											
		45°					30°						
		0.5	1	1.5	2	2.5	3	0.5	1	1.5	2	2.5	3
Conveyor Speed (m/s)													
Codabar Code Resolution (mm)	0.25	8	9	10	12	13	15	5	6	8	9	10	11
	0.30	9	9	11	12	14	15	6	7	8	9	10	12
	0.33	9	10	11	13	14	16	6	7	8	9	11	12
	0.38	10	11	12	14	15	17	7	8	9	10	11	12
	0.50	13	13	14	16	17	19	8	9	10	11	12	13
	0.72	17	18	18	19	21	22	11	11	12	13	14	15
	1.00	23	23	24	25	26	26	14	15	15	16	17	18

Ratio 3:1; Interdigit = Module Size

Table 4

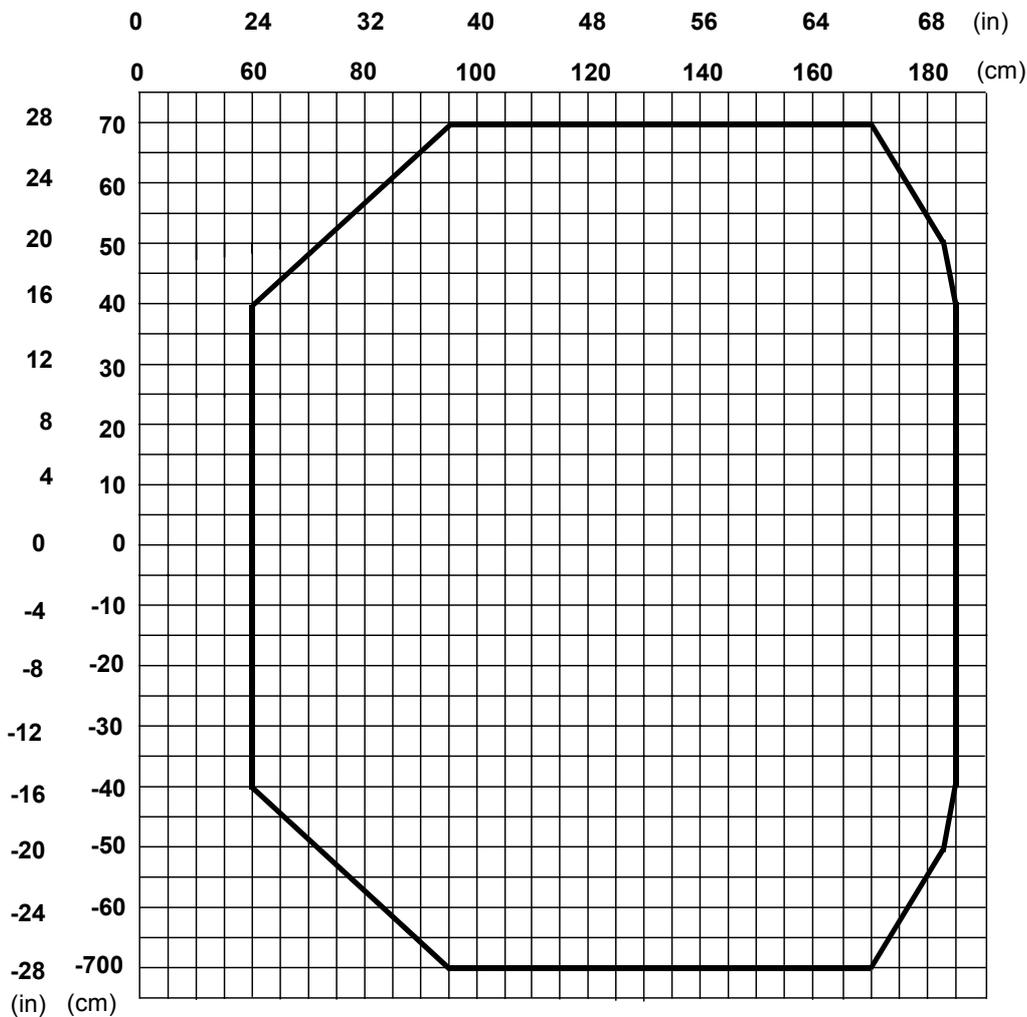
		Minimum Code Height for ACR Reading (mm)											
		45°					30°						
		0.5	1	1.5	2	2.5	3	0.5	1	1.5	2	2.5	3
Conveyor Speed (m/s)													
EAN 8-13, UPC-A Code Resolution (mm)	0.25	7	8	9	11	12	14	5	6	7	8	9	11
	0.30	8	9	10	11	13	14	6	6	7	9	10	11
	0.33	9	10	10	12	13	15	6	7	8	9	10	11
	0.38	10	11	11	12	14	15	6	7	8	9	10	12
	0.50	12	13	14	14	15	17	8	8	9	10	11	12
	0.72	16	17	18	18	19	20	10	11	11	12	13	14
	1.00	21	22	23	24	24	25	13	14	15	15	16	16

Table 5

### 4.4 READING DIAGRAMS

#### DS8100A-3X00 (0.50 mm/20 mils)

The diagram shows an average reading area obtained considering different barcode types of variable quality.



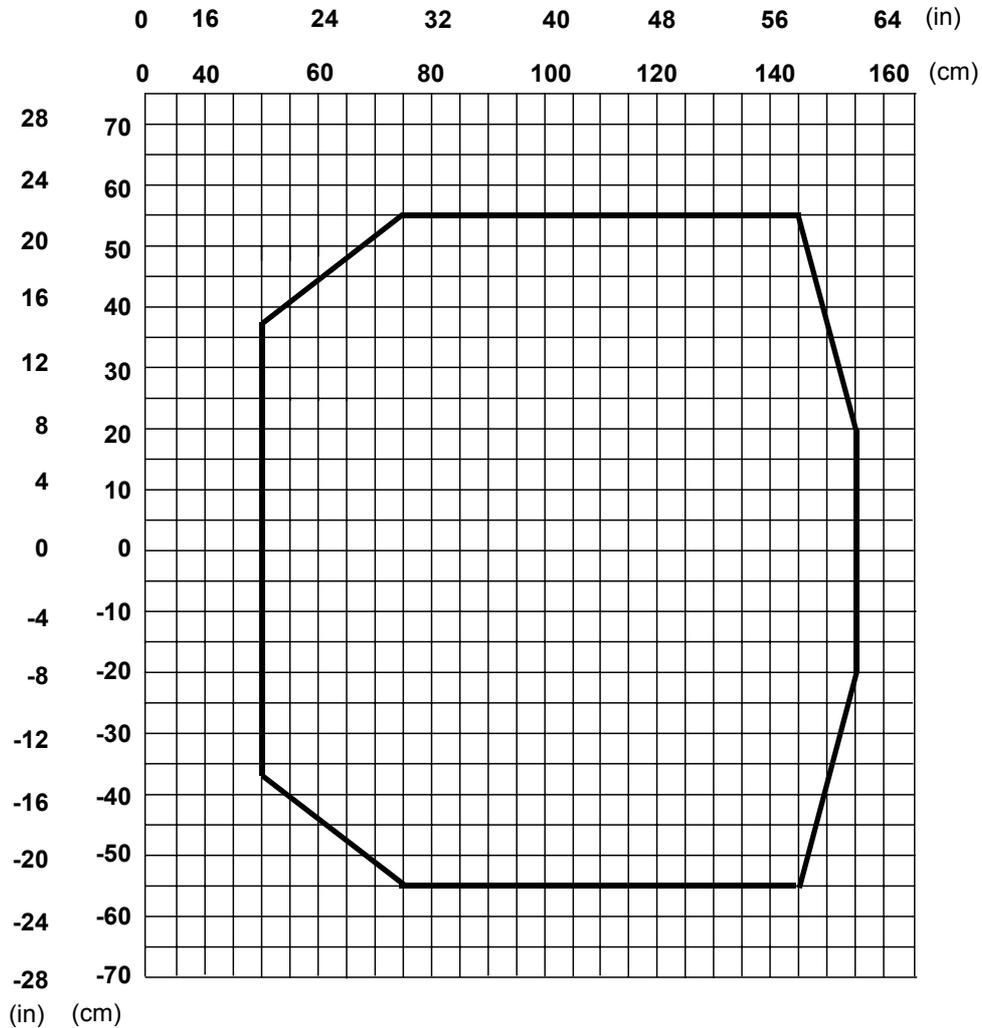
Note: (0,0) is the center of the laser beam output window.

#### CONDITIONS

- Code = Interleaved 2/5 or Code 39
- PCS = 0.90
- "Pitch" angle = 0°
- "Skew" angle = 10°
- "Tilt" angle = 0°
- Reading mode = Linear

## DS8100A-3X10 (0.38 mm/15 mils)

The diagram shows an average reading area obtained considering different barcode types of variable quality.



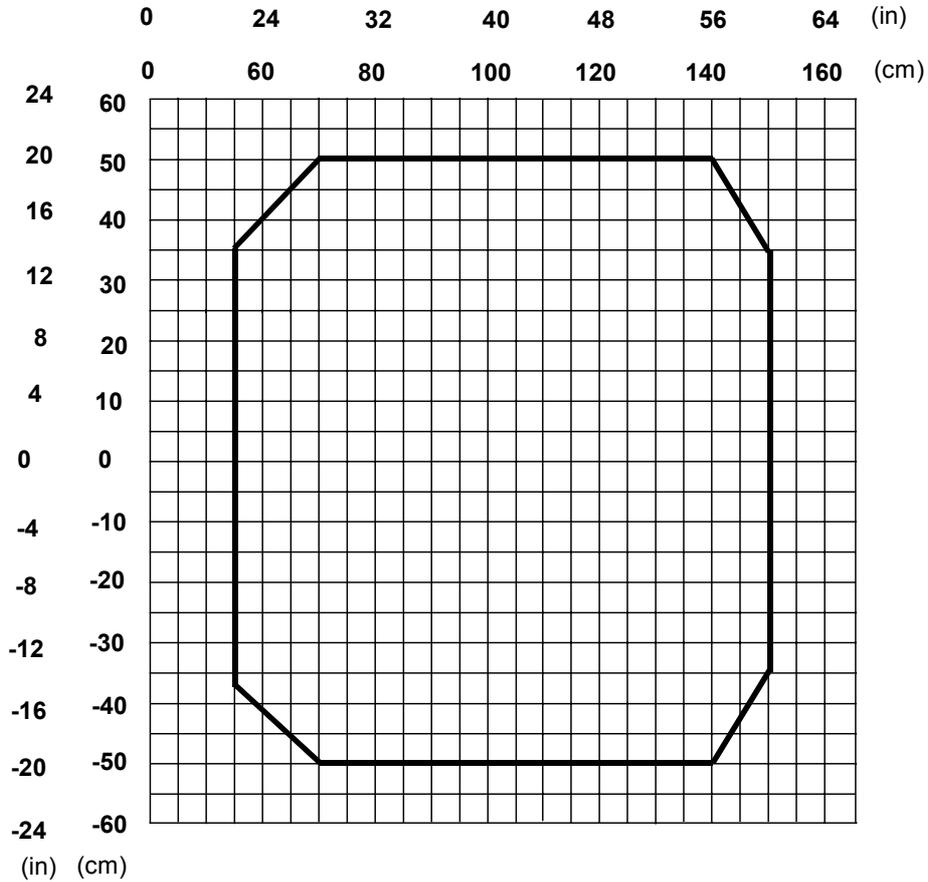
Note: (0,0) is the center of the laser beam output window.

### CONDITIONS

Code = Interleaved 2/5 or Code 39  
 PCS = 0.90  
 "Pitch" angle = 0°  
 "Skew" angle = 10°  
 "Tilt" angle = 0°  
 Reading mode = Linear

**DS8100A-3X20 (0.30 mm/12 mils)**

The diagram shows an average reading area obtained considering different barcode types of variable quality.



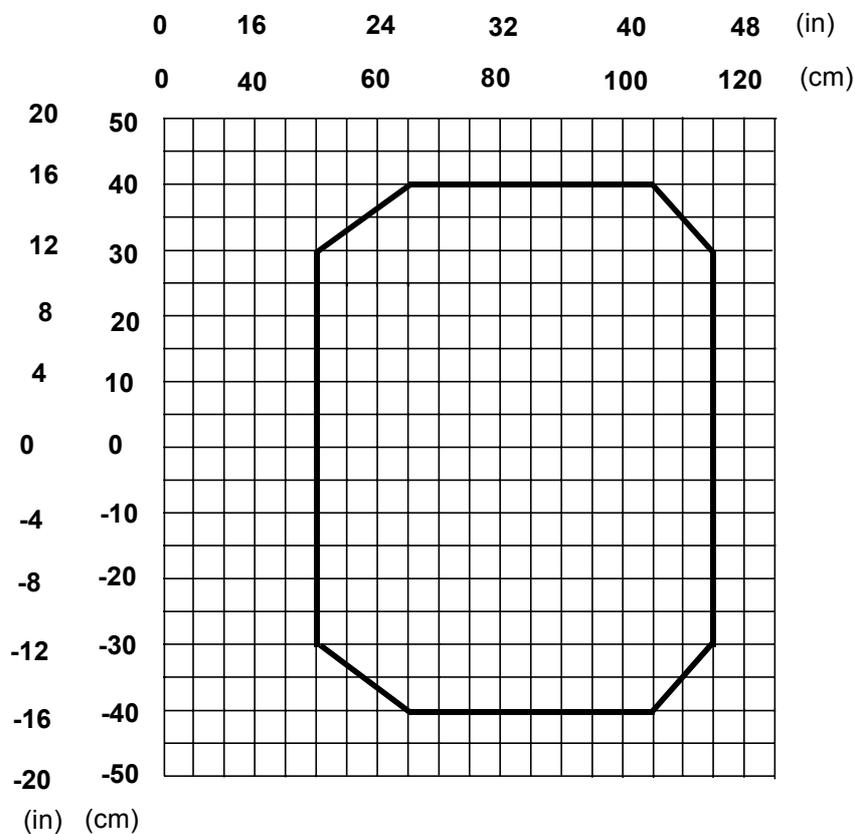
**Note:** (0,0) is the center of the laser beam output window.

**CONDITIONS**

- Code = Interleaved 2/5 or Code 39
- PCS = 0.90
- "Pitch" angle = 0°
- "Skew" angle = 10°
- "Tilt" angle = 0°
- Reading mode = Linear

## DS8100A-3X30 (0.25 mm/10 mils)

The diagram shows an average reading area obtained considering different barcode types of variable quality.



**Note:** (0,0) is the center of the laser beam output window.

### CONDITIONS

Code = Interleaved 2/5 or Code 39

PCS = 0.90

"Pitch" angle = 0°

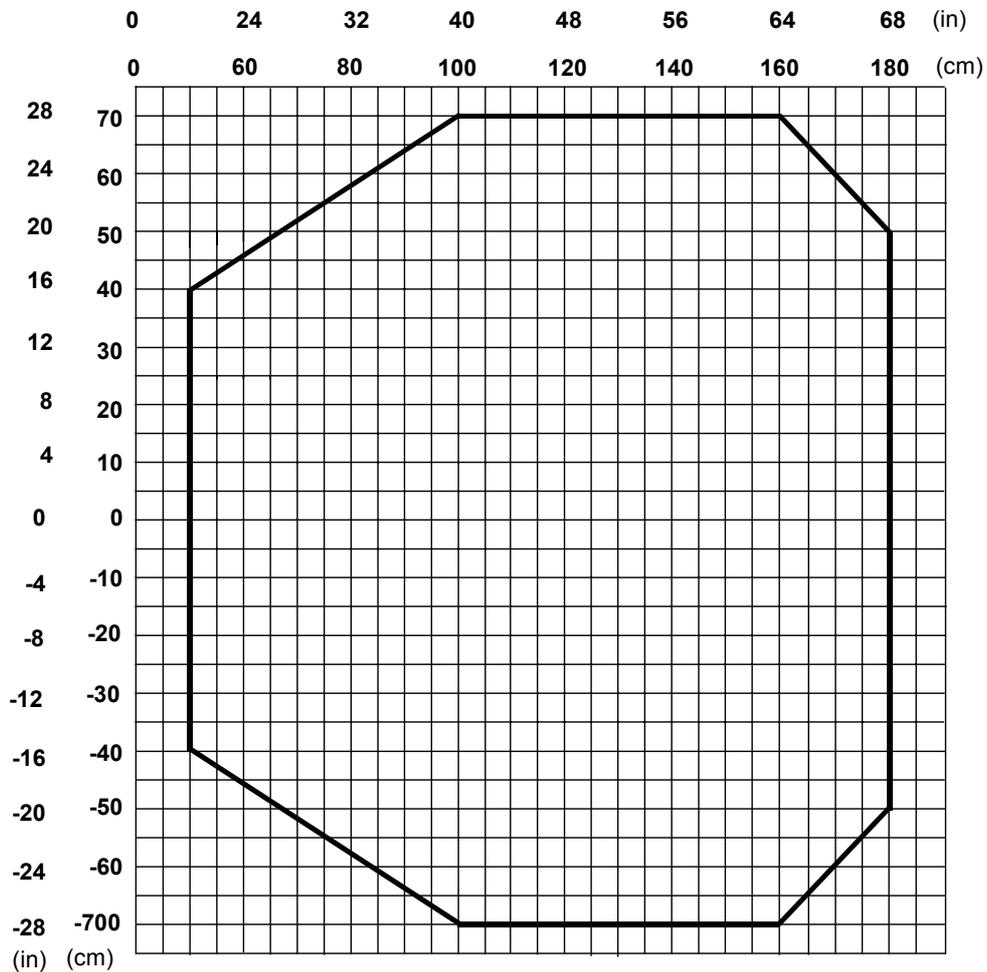
"Skew" angle = 10°

"Tilt" angle = 0°

Reading mode = Linear

**DS8100A-3X05 (0.50 mm/20 mils)**

The diagram shows an average reading area obtained considering different barcode types of variable quality.



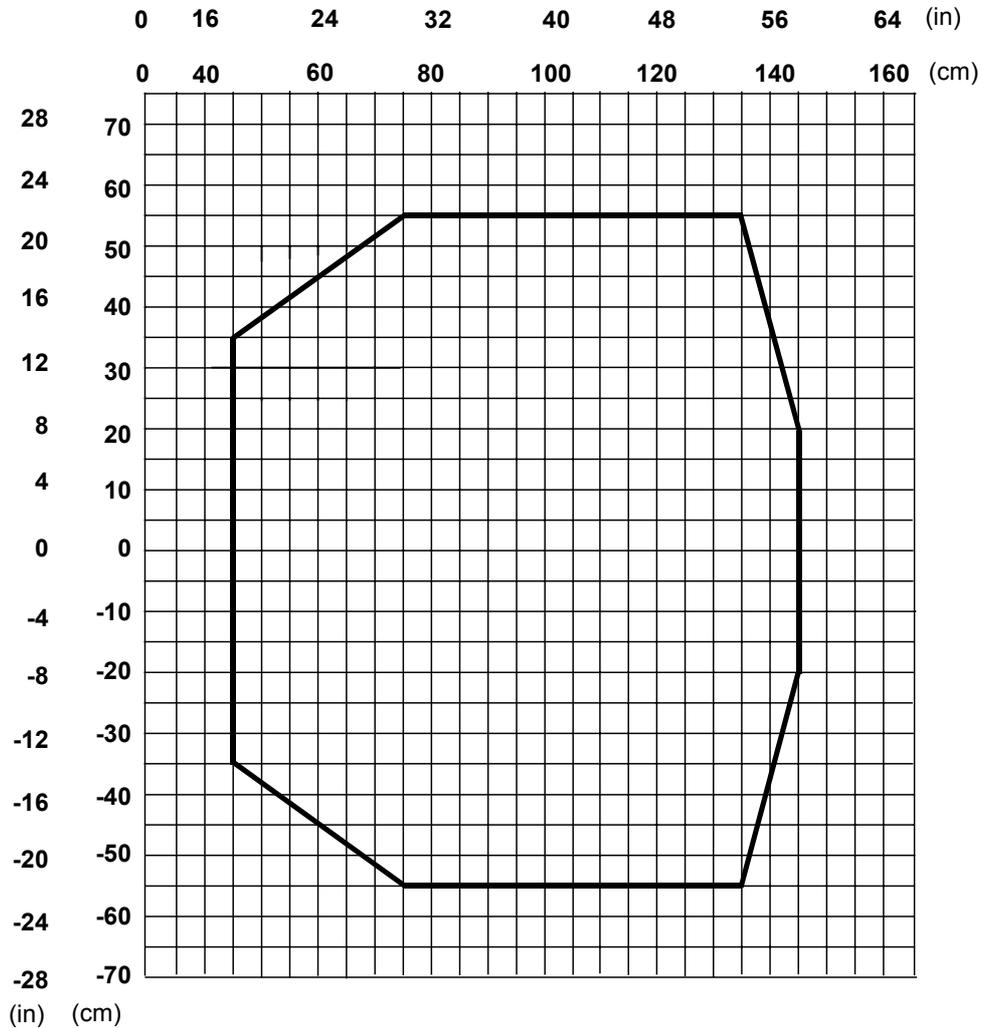
**Note:** (0,0) is the center of the laser beam output window.

**CONDITIONS**

- Code = Interleaved 2/5 or Code 39
- PCS = 0.90
- "Pitch" angle = 0°
- "Skew" angle = 10°
- "Tilt" angle = 0°
- Reading mode = Linear

## DS8100A-3X15 (0.38 mm/15 mils)

The diagram shows an average reading area obtained considering different barcode types of variable quality.



Note: (0,0) is the center of the laser beam output window.

### CONDITIONS

Code = Interleaved 2/5 or Code 39

PCS = 0.90

"Pitch" angle = 0°

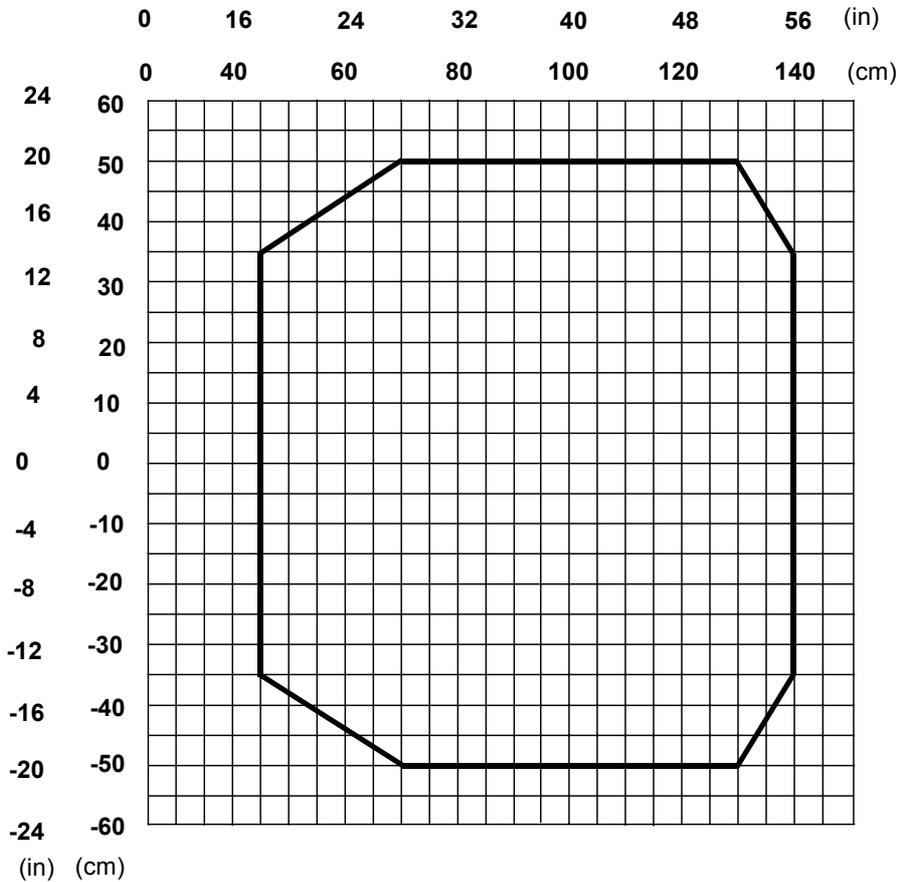
"Skew" angle = 10°

"Tilt" angle = 0°

Reading mode = Linear

**DS8100A-3X25 (0.30 mm/12 mils)**

The diagram shows an average reading area obtained considering different barcode types of variable quality.



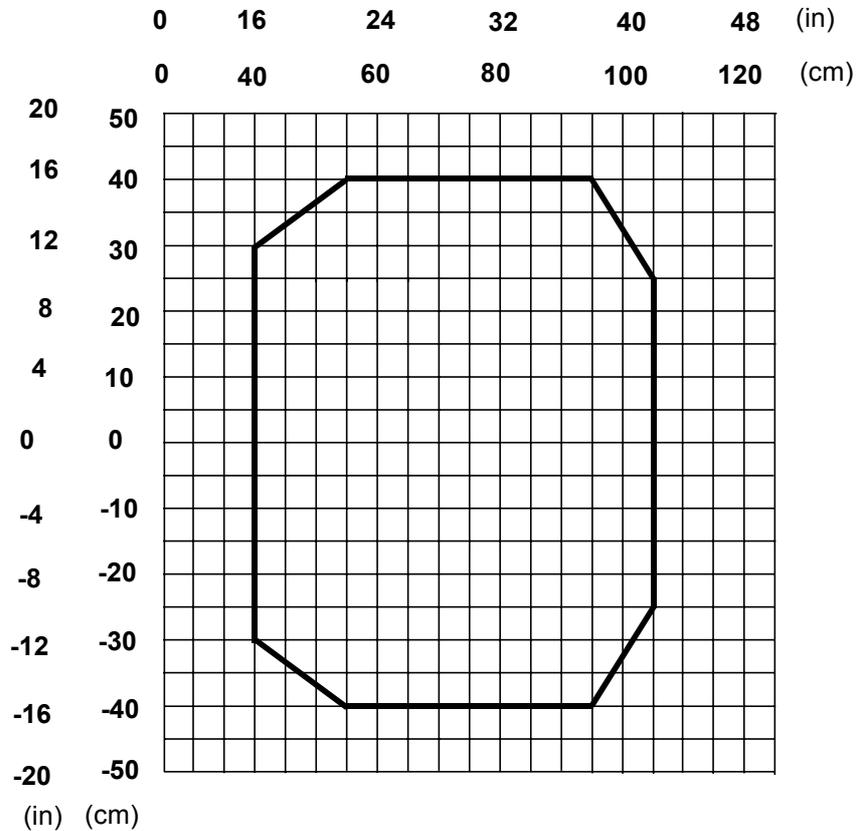
**Note:** (0,0) is the center of the laser beam output window.

**CONDITIONS**

- Code = Interleaved 2/5 or Code 39
- PCS = 0.90
- "Pitch" angle = 0°
- "Skew" angle = 10°
- "Tilt" angle = 0°
- Reading mode = Linear

### DS8100A-3X35 (0.25 mm/10 mils)

The diagram shows an average reading area obtained considering different barcode types of variable quality.



**Note:** (0,0) is the center of the laser beam output window.

#### CONDITIONS

Code = Interleaved 2/5 or Code 39  
 PCS = 0.90  
 "Pitch" angle = 0°  
 "Skew" angle = 10°  
 "Tilt" angle = 0°  
 Reading mode = Linear

## 5 MAINTENANCE

---

### 5.1 CLEANING

Clean the laser beam output window periodically for correct operation of the scanner (see Figure A and Figure B in chapter "General View").

Dust, dirt, etc. on the window may alter the reading performance.

Repeat the operation frequently in particularly dirty environments.

Use soft material and alcohol to clean the window and avoid any abrasive substances.

**WARNING**

*Clean the window of the DS8100A when the scanner is turned off or at least when the laser beam is not active.*

### 5.2 AUTOMATIC SCANNER REPLACEMENT (ASR)

The Datalogic Automatic Scanner Replacement (ASR) procedure allows restoring system functioning automatically after one or more scanners are replaced in a Master/Slave Lonworks network.

The ASR procedure is principally used for PackTrack™ configurations, since it restores the PackTrack™ calibration from the slave scanner to be substituted to the new scanner.

The Master must be prepared at the time of installation in order for this procedure to work correctly.

#### 5.2.1 ASR Network Configuration

1. On the Master scanner, **check the Modify & Backup Lon Slave Scanner Configuration parameter** in Genius™ and configure the Lonworks Slave Scanner Common Parameters (Code and Reconstruction Parameters).
2. Enable the ASR procedure through the **Enable A.S.R. parameter** in the Master configuration.
3. Send the configuration to the Master EEPROM to force the Slave Operating Mode, Code Reading Symbologies, Reconstruction parameters and store all the Slave PackTrack™ calibration tables.

Now the Slave scanners are configured through the Master and the ASR procedure is implemented.

4. Save this configuration to file (.ddc).

## 5.2.2 Scanner Replacement Procedure

**NOTE**

*The ASR procedure requires replacing one scanner at a time.*

### Slave

1. Power down the entire system.
2. Replace the Slave scanner with a new one (default settings).
3. Power up the system and wait for initialization.

### Master

1. Load the saved configuration from file (.ddc) to the new Master.
2. Power down the entire system.
3. Replace the Master scanner with the new one.
4. Power up the system and wait for initialization.

**NOTE**

*The ASR works only if both the Master and Slave devices have software 6.40 or later.*

## 6 TROUBLESHOOTING



### NOTE

*Before contacting your local Datalogic office or Datalogic Partner or ARC, it is suggested to save the device configuration to a \*.ddc file by means of the Genius™ software configuration program and check the device exact model and serial number.*

TROUBLESHOOTING GUIDE	
Problem	Suggestion
<b>Power On:</b> the "Power On" LED is not lit.	<ul style="list-style-type: none"> <li>• Is power connected?</li> <li>• If using an external power supply (like PWR-120), is it connected to the AC source?</li> <li>• If using rail power, does rail have power?</li> <li>• If using C-BOX 100, does it have power (check switch and LED)? Check if you are referring to the 26-pin connector or to the C-BOX 100 spring clamp connectors.</li> <li>• Measure voltage at pin 13 and 25 (for 26-pin connector) or at spring clamp 1 and 2 (for C-BOX 100).</li> </ul>
<b>On Line Mode:</b> the Master's "Phase On" LED is not lit (when external trigger activates).	<ul style="list-style-type: none"> <li>• Check carefully if you are referring to the 26-pin connector or to the C-BOX 100 spring clamp connectors.</li> <li>• Is sensor connected to EXT TRIG input?</li> <li>• Is power supplied to photo sensor?</li> <li>• Is power supplied to one out of the two EXT TRIG (NPN output)?</li> <li>• Is one out of the two EXT TRIG grounded (PNP output)?</li> <li>• Are the photo sensor LEDs (if any) working correctly?</li> <li>• Is the sensor/reflector system aligned (if present)?</li> </ul>
<b>On Line Mode:</b> the Master's "Phase On" LED is correctly lit but nothing happens (no reading results).	<ul style="list-style-type: none"> <li>• Is the software configuration consistent with the application condition (operating mode, etc.)? In the Genius™ software configuration program select the OPERATING MODES folder and check for related parameters.</li> </ul>
<b>Serial On Line Mode:</b> the reader is not triggered (no reading results).	<ul style="list-style-type: none"> <li>• In the Genius™ program select the OPERATING MODE folder and check if serial on line is enabled as "On Line options" parameter value.</li> <li>• Are the Start-Stop string correctly assigned?</li> <li>• Is the serial trigger source correctly connected and configured?</li> </ul>

<b>TROUBLESHOOTING GUIDE</b>	
<b>Problem</b>	<b>Suggestion</b>
<p><b>On Line Mode and Serial On Line Mode:</b> the reader does not respond correctly to the expected external signal end.</p>	<ul style="list-style-type: none"> <li>• In the Genius™ software configuration program select the OPERATING MODES folder and check the “Reading Phase Timeout” parameterization.</li> </ul>
<p><b>Reading:</b> it is not possible to read the target barcode (always returns No Read)</p>	<ul style="list-style-type: none"> <li>• Check synchronization of reading pulse with object to read.</li> <li>• Is the scan line correctly positioned?</li> <li>• Place barcode in the center of scan line and run TEST MODE (selectable by Genius™ as Operating Modes). If you still have troubles, check the following: <ul style="list-style-type: none"> <li>• Is the reading distance within that allowed (see reading diagrams)?</li> <li>• Is the Tilt angle too big?</li> <li>• Is the Skew angle less than 10° (direct reflection)?</li> <li>• Choose the CODE tab and enable different code types (except Pharmacode). LENGTH = Variable.</li> <li>• Is the barcode quality sufficient?</li> </ul> </li> <li>• If you had no success, try to perform the test using the BARCODE TEST CHART included with the product.</li> <li>• If working in PackTrack™ mode, verify that the coordinates (in particular the Y axis) are correct.</li> </ul>
<p><b>Communication:</b> the device is not transmitting anything to the host.</p>	<ul style="list-style-type: none"> <li>• Is serial cable connected?</li> <li>• Is correct wiring respected?</li> <li>• If using MAIN RS232 or RS485 interface, is the reference ground connected to proper SGND Main Isolated (also referred to as GND_ISO)? Be careful that it is not completely different from GND power ground.</li> <li>• If using C-BOX 100, be sure the RS485 termination switch is positioned to OFF.</li> <li>• Are serial host settings equivalent to serial device setting?</li> </ul>
<p><b>Communication:</b> data do not appear on the terminal.</p>	<ul style="list-style-type: none"> <li>• In the Genius™ program enable the DATA COMMUNICATION SETTINGS/MAIN-AUXILIARY PORT\DATA TX parameter.</li> </ul>
<p><b>Communication:</b> data transferred to the host are incorrect, corrupted or incomplete.</p>	<ul style="list-style-type: none"> <li>• In the Genius™ program select the DATA COMMUNICATION SETTINGS/DATA FORMAT folder and check for HEADER, TERMINATOR, SEPARATOR and FILL CHAR values.</li> <li>• Check the CODE FIELD LENGTH value, too.</li> <li>• Are the COM port parameters correctly assigned?</li> </ul>

TROUBLESHOOTING GUIDE	
Problem	Suggestion
<b>Communication:</b> the scanner "Network" LED is not lit.	<ul style="list-style-type: none"><li>• If the LED is OFF, check the connections between the DS8100A slaves and the SC6000 or DS8100A master. If the error persists, contact your Datalogic distributor.</li></ul>
<b>How do I obtain my units' serial numbers?</b>	<ul style="list-style-type: none"><li>• The device serial number is printed on a label that is affixed above the connector panel of the reader.</li><li>• The serial number is also displayed when connecting the device through the Genius™ program.</li><li>• Serial numbers consist of 9 characters: one letter, 2 numbers, another letter followed by 5 numbers.</li></ul>

## 7 TECHNICAL FEATURES

<b>ELECTRICAL FEATURES</b> (see note 1)		
Supply voltage	20 to 30 Vdc	
Power consumption	20 W typical 30 W Max. (including startup current)	
<b>Common Communication Interfaces</b>	<b>Main</b>	<b>Baud Rate</b>
	RS232	1200 to 115200
	RS485 full-duplex	
	RS485 half-duplex	
	20 mA C.L. (INT-30 with C-BOX 100 only)	19200
	<b>Auxiliary</b>	
	RS232	1200 to 115200
	<b>Other</b>	
Lonworks	1,25 Mb/s	
<b>Model-Dependent Communication Interfaces</b>	Ethernet	100 Mb/s
Inputs Ext. Trigger 1, 3 aux. digital inputs	(optocoupled NPN or PNP)	
Outputs 3 software programmable digital outputs	(optocoupled)	
<b>OPTICAL FEATURES</b> (see note 1)		
Light receiver	Avalanche photodiode	
Wavelength	630 to 680 nm	
Safety class	Class 2 - EN60825-1; Class II - CDRH	
Light source	Up to 4 semiconductor laser diodes	
Laser control	Security system to turn laser off in case of motor slow down	
<b>READING FEATURES</b>		
Scan rate	≤ 1000 scans/s	
Maximum resolution Max. reading distance Max. reading width Max. depth of field Aperture angle	(see reading diagrams in par. 4.4)	
<b>USER INTERFACE</b>		
LCD Display	2 lines by 20 characters LCD	
Keypad	3 keys	
LED indicators	Power On (green) Phase On (yellow) Encoder (yellow)	TX Data (green) Network (red)

**Note 1:** The values given are typical at 25 °C ambient temperature (if not otherwise indicated)

<b>SOFTWARE FEATURES</b>		
Readable Codes	Interleaved 2/5 Code 39 Standard Codabar Code 128 EAN 128 Code 93 (standard and full ASCII) EAN/UPC (including Add-on 2 and Add-on 5)	
Code selection	Up to 10 codes during one reading phase	
Headers and Terminators	Up to 128-byte headers and 128-byte terminators	
Operating modes	On Line, Serial On Line, Automatic, Test, PackTrack™, Continuous	
Configuration modes	Genius™ utility program	
Parameter storage	Non-volatile internal FLASH	
<b>ENVIRONMENTAL FEATURES</b>		
Operating temperature	0° to +50 °C (+32° to +122 °F)	
Storage temperature	-20° to +70 °C (-4° to +158 °F)	
Humidity	90% non condensing	
Ambient light immunity	20000 lux	
Vibration resistance IEC 68-2-6 test FC 2 hours on each axis	<b>Standard Models</b> 14 mm @ 2 to 10 Hz 1.5 mm @ 13 to 55 Hz 2 G @ 70 to 200 Hz	<b>Oscillating Mirror Models</b> 1.5 mm @ 5 to 9.1 Hz 0.5 G @ 9.1 to 150 Hz
Shock resistance: IEC 68-2-27 test EA 3 shocks on each axis	<b>Standard Models</b> 30 G; 11 ms	<b>Oscillating Mirror Models</b> 15 G; 11 ms
Protection class	IP64*	
<b>PHYSICAL FEATURES</b>		
Mechanical dimensions	<b>Standard Models</b> 217 x 172.5 x 126.6 mm (8.54 x 6.79 x 4.98 in)	<b>Oscillating Mirror Models</b> 275.1 x 192.3 x 254 mm (10.83 x 7.57 x 10 in)
Weight	<b>Standard Models</b> 5 kg (176.3 oz)	<b>Oscillating Mirror Models</b> 6.4 kg (225.7 oz)

\* sealed connectors required; use Harting RJ Industrial® Push Pull Ethernet connector for Ethernet models.

## **GLOSSARY**

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### **ACR™ 4**

Each version of the base has the powerful code reconstruction technology (ACR™ 4). The new fourth generation ACR™ considerably increases the code reconstruction reading capability in the case of damaged or very tilted barcodes.

### **Aperture**

Term used on the required CDRH warning labels to describe the laser exit window.

### **Barcode**

A pattern of variable-width bars and spaces which represents numeric or alphanumeric data in machine-readable form. The general format of a barcode symbol consists of a leading margin, start character, data or message character, check character (if any), stop character, and trailing margin. Within this framework, each recognizable symbology uses its own unique format.

### **Barcode Label**

A label that carries a barcode and can be affixed to an article.

### **Baud Rate**

A unit used to measure communications speed or data transfer rate.

### **CDRH (Center for Devices and Radiological Health)**

This organization (a service of the Food and Drug Administration) is responsible for the safety regulations governing acceptable limitations on electronic radiation from laser devices. Datalogic devices are in compliance with the CDRH regulations.

### **CD SQUARE™**

CD SQUARE™ provides useful information on label position and object shape elaborated during the barcode reading phase. This innovative technology identifies the area in which the code is located and measures the code distance from the scanner.

### **Code Positioning**

Variation in code placement that affects the ability of a scanner to read a code. The terms Pitch, Skew, and Tilt deal with the angular variations of code positioning in the X, Y and Z axes. See pars. 2.5. Variations in code placement affect the pulse width and therefore the decoding of the code. Pulse width is defined as a change from the leading edge of a bar or space to the trailing edge of a bar or space over time. Pulse width is also referred to as a transition. Tilt, pitch, and skew impact the pulse width of the code.

### **EEPROM**

Electrically Erasable Programmable Read-Only Memory. An on-board non-volatile memory chip.

### **Full Duplex**

Simultaneous, two-way, independent transmission in both directions.

### **Half Duplex**

Transmission in either direction, but not simultaneously.

**Host**

A computer that serves other terminals in a network, providing services such as network control, database access, special programs, supervisory programs, or programming languages.

**Interface**

A shared boundary defined by common physical interconnection characteristics, signal characteristics and meanings of interchanged signals.

**LED (Light Emitting Diode)**

A low power electronic device that can serve as a visible or near infrared light source when voltage is applied continuously or in pulses. It is commonly used as an indicator light and uses less power than an incandescent light bulb but more than a Liquid Crystal Display (LCD). LEDs have extremely long lifetimes when properly operated.

**Multidrop Line**

A single communications circuit that interconnects many stations, each of which contains terminal devices. See RS485.

**PACKTRACK™**

PackTrack™ is a Datalogic patented parcel tracking system which improves the reading features in omnidirectional stations. In particular, PackTrack™ manages 6-sided reading systems when it is impossible to detect the real position of the code on the parcel, thus overcoming the need for external accessories essential in traditional tracking systems.

**Parameter**

A value that you specify to a program. Typically parameters are set to configure a device to have particular operating characteristics.

**Pitch**

Rotation of a code pattern about the X-axis. The normal distance between center line or adjacent characters. See par. 2.5.

**Position**

The position of a scanner or light source in relation to the target of a receiving element.

**Protocol**

A formal set of conventions governing the formatting and relative timing of message exchange between two communicating systems.

**Resolution**

The narrowest element dimension which can be distinguished by a particular reading device or printed with a particular device or method.

**RS232**

Interface between data terminal equipment and data communication equipment employing serial binary data interchange.

**RS485**

Interface that specifies the electrical characteristics of generators and receivers for use in balanced digital multipoint systems such as on a Multidrop line.

**Scanner**

A device that examines a printed pattern (barcode) and either passes the uninterpreted data to a decoder or decodes the data and passes it onto the Host system.

**Serial Port**

An I/O port used to connect a scanner to your computer.

**Signal**

An impulse or fluctuating electrical quantity (i.e.: a voltage or current) the variations of which represent changes in information.

**Skew**

Rotation about the Y-axis. Rotational deviation from correct horizontal and vertical orientation; may apply to single character, line or entire encoded item. See par. 2.5.

**Symbol**

A combination of characters including start/stop and checksum characters, as required, that form a complete scannable barcode.

**Tilt**

Rotation around the Z axis. Used to describe the position of the barcode with respect to the laser scan line. See par. 2.5.

**Trigger Signal**

A signal, typically provided by a photoelectric sensor or proximity switch, which informs the scanner of the presence of an object within its reading zone.

**UPC**

Acronym for Universal Product Code. The standard barcode type for retail food packaging in the United States.

**Visible Laser Diode**

A light source used in scanners to illuminate the barcode symbol. Generates visible red light at wavelengths between 630 and 680 nm.

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**DS8100A-XXXX, Laser Scanner**

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:

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

**73/23/ECC 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.

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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:

<b>EN 55022, August 1994:</b>	LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENTS (ITE)
<b>EN 61000-6-2, October 2001:</b>	ELECTROMAGNETIC COMPATIBILITY (EMC). PART 6-2: GENERIC STANDARDS - IMMUNITY FOR INDUSTRIAL ENVIRONMENTS
<b>EN 60950-1, December 2001:</b>	INFORMATION TECHNOLOGY EQUIPMENT - SAFETY – PART 1: GENERAL REQUIREMENTS
<b>EN 60825-1, June 1994: Amendments A11 (1996), A2 (2001)</b>	SAFETY OF LASER PRODUCTS – PART 1: EQUIPMENT CLASSIFICATION, REQUIREMENTS AND USER'S GUIDE

Lippo di Calderara, 01/06/2005

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