Matrix-2000™

QUICK REFERENCE GUIDE

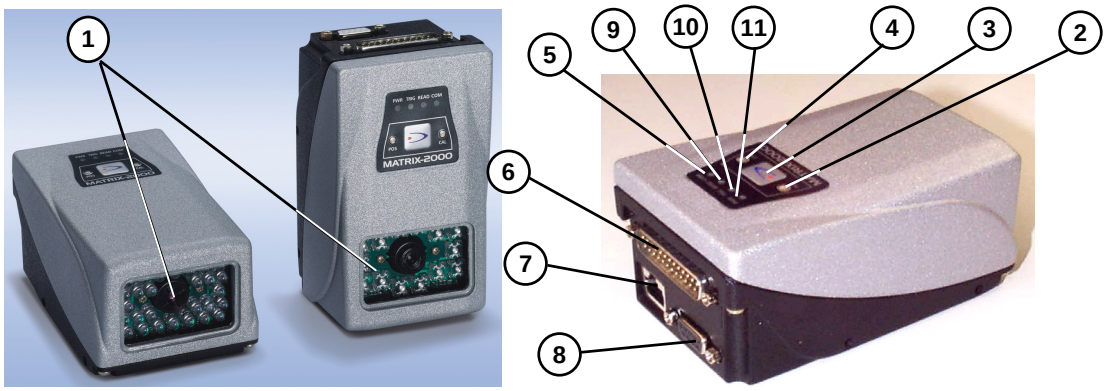


Figure A

1. Reading Window
2. Positioning LED
3. Keypad button
4. Calibration LED
5. Communication LED
6. Main/Auxiliary Interface
7. Ethernet Interface (for 21XX models only)
8. Auxiliary Interface
9. Good Read LED
10. External Trigger LED
11. Power On LED

NOTE

For further details on product installation, see the complete Installation Manual available on the CD included with this product.

Compliance:

- **This product is intended to be installed by Qualified Personnel only.**
- This product is intended to be connected to a UL Listed Computer which supplies power directly to the reader or a UL Listed Direct Plug-in Power Unit marked LPS or “Class 2”, rated 10 to 30 V, minimum 1 A.
- In order to meet the EMC requirements:
  - connect reader chassis to the plant earth ground by means of a flat copper braid shorter than 100 mm;
  - connect the main interface cable shield to pin 1 of the reader 25-pin connector;
  - use two clip-on ferrite sleeves (type Stewart 28A2029-0A0) on the main interface cable near the reader 25-pin connector;
  - connect the Ethernet interface cable shield to the reader chassis (for Matrix-21XX only)

N2468
CLASS 1 LED PRODUCT

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

c UL us LISTED ACCESSORY 45AF I.T.E.

TO EN 60825-1:2001

Model Description:

MATRIX - 2XXX-X

Device Connectivity

0 = RS232/RS485 + RS232
1 = RS232/RS485 + RS232+ Ethernet

Optics

1 = Ultra High Density (UHD)
2 = High Density (HD)
3 = Standard Density (SD)
4 = Low Density (LD)
5 = Medium Range (MR)
6 = Long Range (LR)

Image Sensor

1 = VGA CCD
5 = SXGA CMOS

Other Options

R = 90° Reading Window

ELECTRICAL FEATURES		
Power		
Supply Voltage	10 to 30 Vdc	
Power Consumption	8 W max.; 5 W typical	
Communication Interfaces		
Main		
- RS232	2400 to 115200 bit/s	
- RS485 full-duplex	2400 to 115200 bit/s	
- RS485 half-duplex	2400 to 115200 bit/s	
Auxiliary - RS232	2400 to 115200 bit/s	
Ethernet (21XX Models only)	10/100 Mbit/s	
Inputs		
External Trigger and IN2	Opto-coupled and polarity insensitive	
Outputs		
OUT1, OUT2 and OUT3	Opto-coupled	
OPTICAL FEATURES	**Models 2XX1**	**Models 2XX5**
Image Sensor	Matrix CCD	Matrix CMOS
Image Format	VGA (640x480)	SXGA (1280x1024)
Lighting System	LED array	
Wavelength	630 ~ 670 nm	
Max LED Output Power	0.7 mW	
LED Safety Class	Class 1 to EN60825-1	
USER INTERFACE		
LED Indicators	PWR, TRIG, READ, COM, POS, CAL	
Keypad Button	Configurable via VisiSet™	
SOFTWARE FEATURES		
Readable Code Symbologies		
1-D and stacked		
• PDF417 Standard • Code 128 (EAN 128) • Code 39 (Standard and Full ASCII) • Interleaved 2 of 5	• Codabar • Code 93 • EAN-8/13 - UPC-A/E (including Addon 2 and Addon 5)	
2-D		
• Data Matrix ECC 200 • QR Code	• Dot Matrix	
POSTAL		
• Australia Post • Royal Mail 4 State Customer • Kix Code • Japan Post	• PLANET • POSTNET, POSTNET (+BB) • POSTNET + PLANET, POSTNET (+BB) + PLANET	
Operating Mode	ONE-SHOT, CONTINUOUS, PHASE MODE	
Configuration Mode	By means of VisiSet™ configuration software	
Parameter Storage	Permanent memory (Flash)	
MECHANICAL FEATURES		
Dimensions	121 x 73 x 57 mm (4.76 x 2.87 x 2.24 in.)	
Weight	380 g. (13.4 oz.)	
Material	Magnesium alloy	

ENVIRONMENTAL FEATURES	
Operating Temperature Storage Temperature Max. Humidity	0 to 40 °C (32 to 104 °F) -20 to 70 °C (-4 to 158 °F) 90% non condensing
Vibration Resistance	IEC 68-2-6 test FC 1.5 mm; 10 to 55 Hz; 2 hours on each axis
Shock Resistance	IEC 68-2-27 test EA 30 G; 11 ms; 3 shocks on each axis
Protection Class	IP64 (Matrix-20XX models only) (1)

(1) Please refer to your local Datalogic Distributor for IP64 Protection class on 21XX models.

READING FEATURES		
Frame Rate	**2XX1 Models**	Up to 60 frames/sec
	2XX5 Models	Up to 16 frames/sec. with SXGA images Up to 64 frames/sec. with VGA images
Readable Codes per Frame	Up to 100	
Pitch	10° - 35°	
Tilt	0° - 360°	

MODELS	Focus Distance mm (in)	Field of View (1) mm (in)	ppi (2)	Typ. Linear and Stacked Code Resolution mm (mils)	Typ. 2D Code Resolution mm (mils)	Reading Distance (3) mm (in)	
						min.	max.
2X11 UHD	60 (2.36)	17 × 13 (0.67 × 0.51)	955	0.10 (4)	0.13 (5)	51 (2.00)	74 (2.91)
2X21 HD	85 (3.35)	25 × 19 (0.98 × 0.75)	653	0.10 (4)	0.19 (7.5)	78 (3.07)	93 (3.66)
2X31 SD	115 (6.10)	34 × 26 (1.34 × 1.02)	478	0.15 (6)	0.25 (10)	100 (3.94)	130 (4.53)
2X41 LD	80 (3.15)	54 × 40 (2.13 × 1.57)	300	0.20 (8)	0.38 (15)	70 (2.76)	105 (4.13)
2X51 MR	160 (6.29)	95 × 70 (3.74 × 2.75)	170	0.30 (12)	0.60 (24)	120 (4.72)	220 (8.66)
2X61 LR	500 (19.69)	110 × 82 (4.33 × 3.23)	148	0.30 (12)	0.60 (24)	430 (16.93)	570 (22.44)
2X25 HD MP	135 (5.31)	65 × 52 (2.56 × 2.05)	500	0.10 (4)	0.19 (7.5)	120 (4.72)	150 (5.90)
2X45 LD MP	105 (4.13)	120 × 96 (4.72 × 3.78)	270	0.20 (8)	0.38 (15)	85 (3.34)	135 (5.31)
2X55 MR MP	195 (7.68)	215 × 172 (8.46 × 6.77)	150	0.30 (12)	0.60 (24)	145 (5.7)	285 (11.22)

(1) @ focus distance
(2) Pixels per inch @ focus distance
(3) Measurement conditions:

- Test chart: provided with the reader
- Still code at the center of the FOV
- Code symbology: Data Matrix ECC 200
- Code resolution: Typ. 2D Code Resolution
- Tilt angle: 45°
- Pitch angle: 15°
- Decode mode: Predictable Code

Depending on the code resolution, symbology and number of characters in the code, the Reading Area can be different from the FOV.

Accessories:

Order no.	Accessory	Description
93A051190	CAB-6001	cable to C-BOX100 1 m
93A051200	CAB-6002	cable to C-BOX100 2 m
93A051210	CAB-6005	cable to C-BOX100 5 m
93A051271	CAB-6010	cable to C-BOX100 10 m
93ACC1510	C-BOX 100	passive connection box
93A301000	C-BOX 300	Connection box Profibus
93A301030	C-BOX 310	Connection box Profibus with display
93A301010	C-BOX 400	Connection box DeviceNet
93A301040	C-BOX 410	Connection box DeviceNet with display
93ACC1718	PG6002	AC/DC power supply unit (US)
93ACC1719	PG6001	AC/DC power supply unit (UK)
93ACC1720	PG6000	AC/DC power supply unit (EU)
93ACC1734		RS232 old/new MATRIX-2000™ adapter
93ACC1735		RS485 old/new MATRIX-2000™ adapter
93A401003	LT-100	Cone lighting system
93A401004	LT-200	Spot lighting system
93A201090	GFC-MATRIX-2000	90° deflection mirror

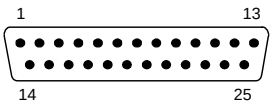
Electrical Connections:

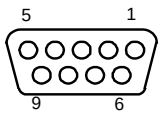
The Matrix-2000™ reader provides a 25-pin male D-sub connector for connection to power supply, Host interface (Main and Auxiliary), and input/output signals.

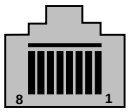
A separate 9-pin female D-sub connector provides access to the auxiliary port.

In Matrix-21XX models a RJ45 Modular Jack is provided for Ethernet connection. This interface and the connector pinout (see the following table) are IEEE 802.3 10 BaseT and IEEE 802.3u 100 BaseTx compliant.
The details of the connector pins are indicated in the following tables:

25-pin male D-sub connector pinout					
Pin	**Name**	**Function**			
1	SHIELD	Cable shield internally connected by capacitor to the chassis			
20	RXAUX	Received data of auxiliary RS232 (referred to GND)			
21	TXAUX	Transmitted 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 3 +	Configurable digital output 3 - positive pin			
17	OUT 3 -	Configurable digital output 3 - negative pin			
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, 15, 24	NC	Not connected			
9,13	VS	Supply voltage - positive pin			
23, 25	GND	Supply voltage - negative pin			
		RS232	**RS485 full-duplex**	**RS485 half-duplex**	
2	Main interface	TX232	TX485+	RTX485+	
3		RX232	RX485+		
4		RTS232	TX485-	RTX485-	
5		CTS232	RX485-		
7		GND_ISO	GND_ISO	GND_ISO	

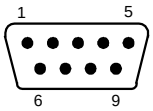
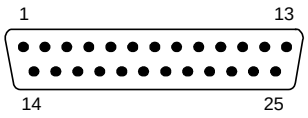


9-pin female D-sub connector pinout			
Pin	**Name**	**Function**	
2	TXAUX	Transmitted data of auxiliary RS232	
3	RXAUX	Received data of auxiliary RS232	
5	GND	Reference GND of auxiliary RS232	
1,4,6,7,8,9	N.C.	Not connected	

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	

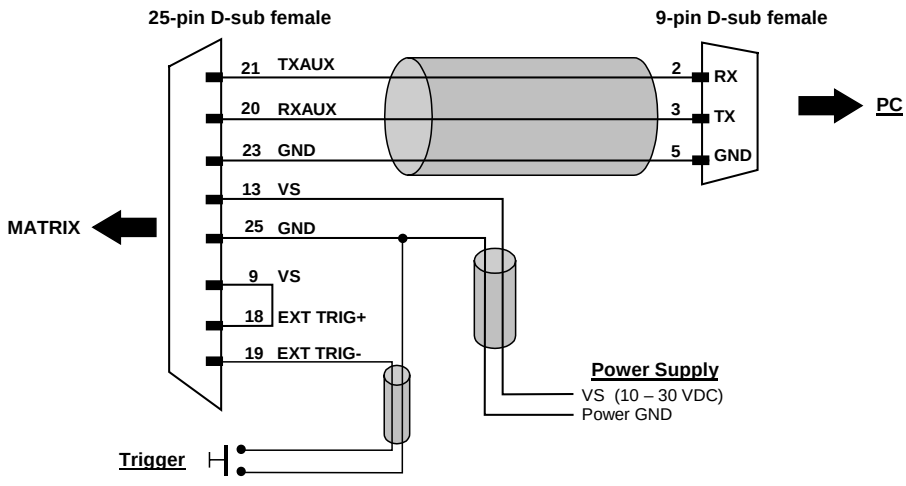
For further details refer to the Ethernet Folder in the VisiSet™ Help-On-Line and to the "MatrixEthernet.pdf" document provided as supplementary documentation.

User Interface:

RS232 PC-side connections			
			
9-pin male connector		**25-pin male connector**	
Pin	**Name**	**Pin**	**Name**
2	RX	3	RX
3	TX	2	TX
5	GND	7	GND
7	RTS	4	RTS
8	CTS	5	CTS

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.



Test Cable for Matrix-2000™

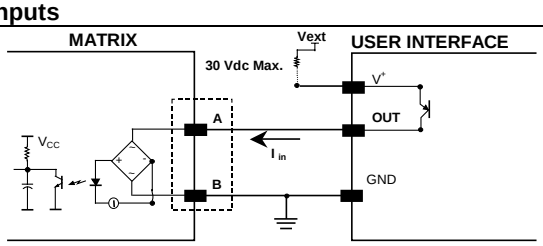
C-BOX 100 Pinout for Matrix-2000™:

The table below gives the pinout of the C-BOX 100 terminal block connectors. Use this pinout when the Matrix-2000™ reader is connected by means of the C-BOX 100:

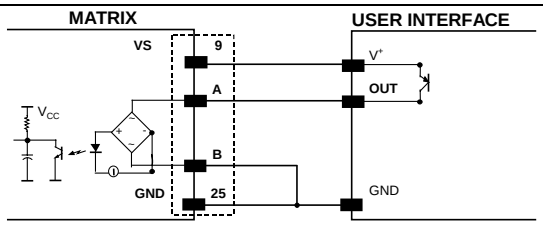
C-BOX 100 Terminal Block Connectors			
Power			
1, 3, 5	VS		
2, 4, 6	GND		
7, 8	EARTH GROUND		
20, 40	Reserved		
Inputs			
27	EXT TRIG A (polarity insensitive)		
28	EXT TRIG B (polarity insensitive)		
29	IN 2A (polarity insensitive)		
30	IN 2B (polarity insensitive)		
31, 33	NC		
32, 34	NC		
36	NC		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

Input / Output Connections:

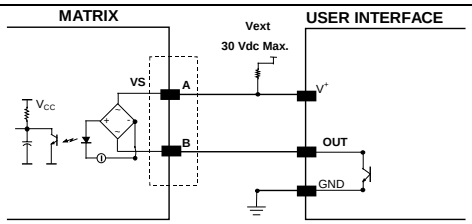
Inputs



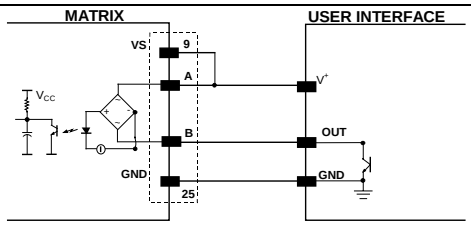
Input PNP command using external power



Input PNP command using Matrix-2000™ power



Input NPN command using external power

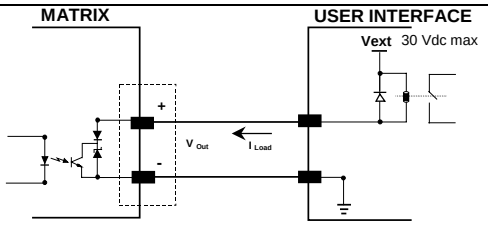


Input NPN command using Matrix-2000™ power

The electrical features of the two inputs are:

INPUT	$\lvert V_{AB} \rvert$ Min.	$\lvert V_{AB} \rvert$ Max.	I_{IN} Max.
Open	0 V	2 V	0 mA
Closed	4.5 V	30 V	10 mA

Outputs



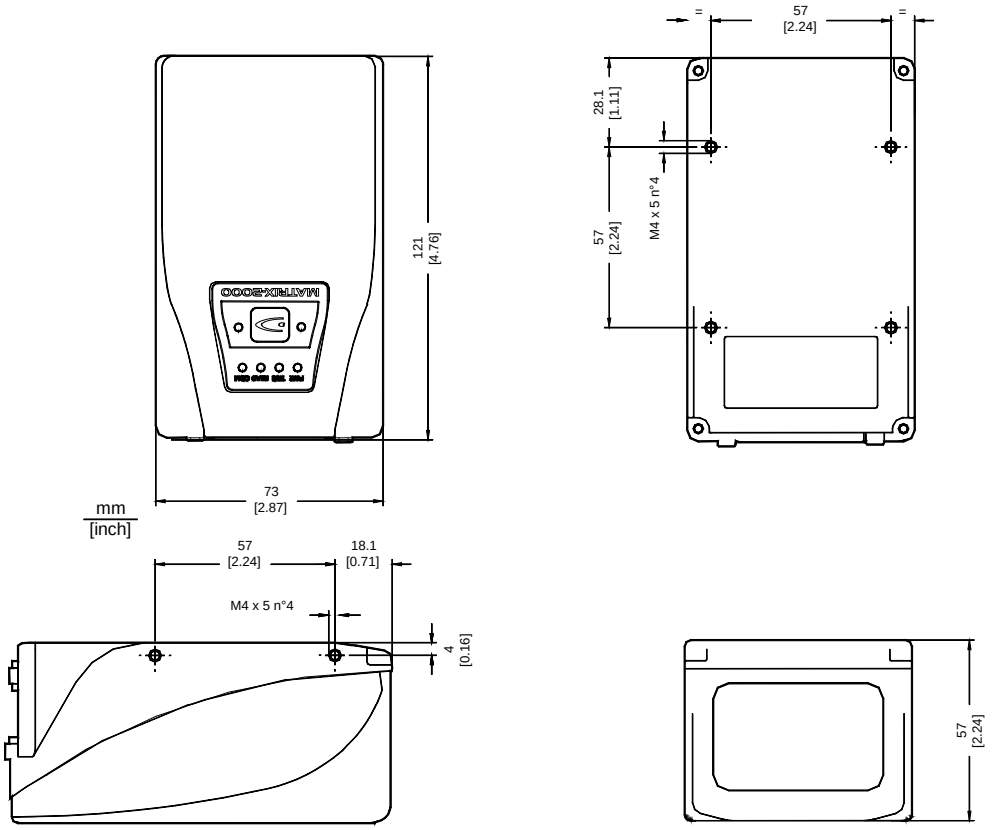
Open collector output connection

The electrical features of the three outputs are the following:

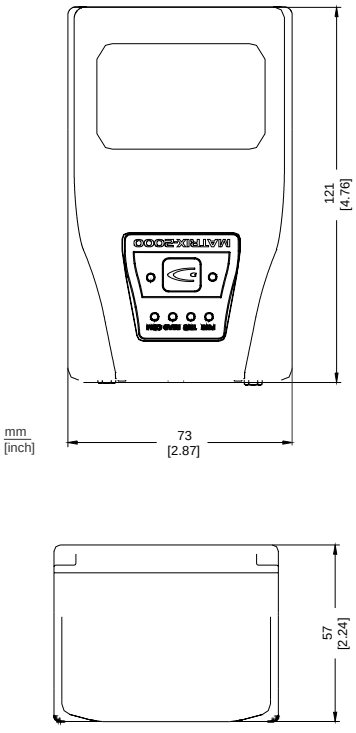
OUTPUT	I_{Load}	V_{Out}
Open	0 mA	30 Vdc Max
Closed	10 mA	1.8 Vdc Max

$P_D = V_{out} \times I_{load}$ = 170 mW Max.

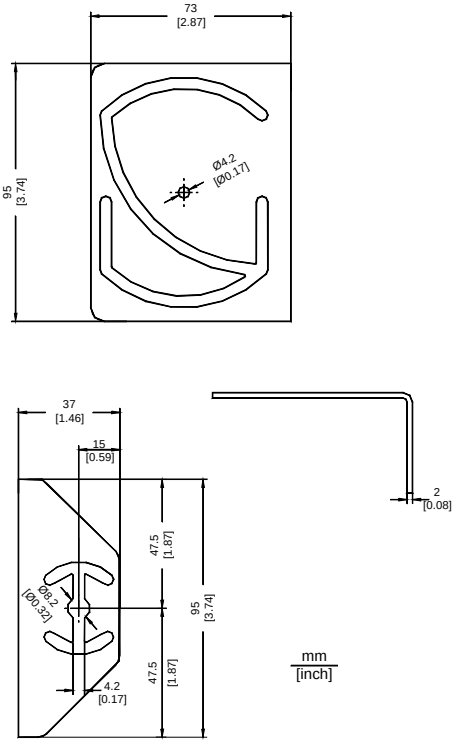
Mechanical Installation:



Overall Dimensions - Standard Model



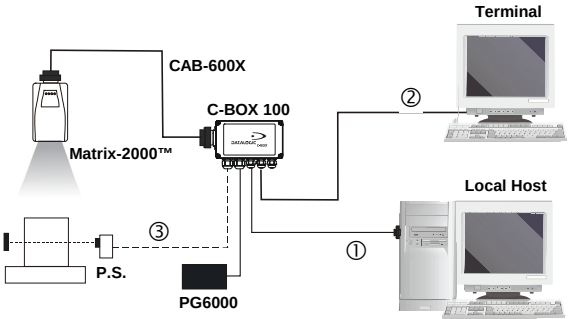
Overall Dimensions - 90° Model



Mounting Bracket Dimensions

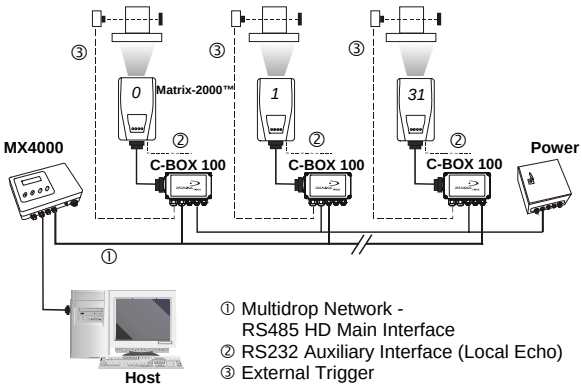
Connectivity:

Point-to-Point



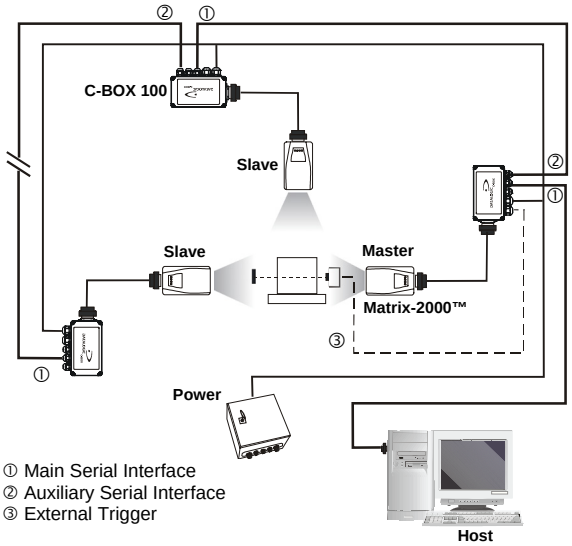
① Main Serial Interface
② Auxiliary Serial Interface
③ External Trigger

Multiplexer



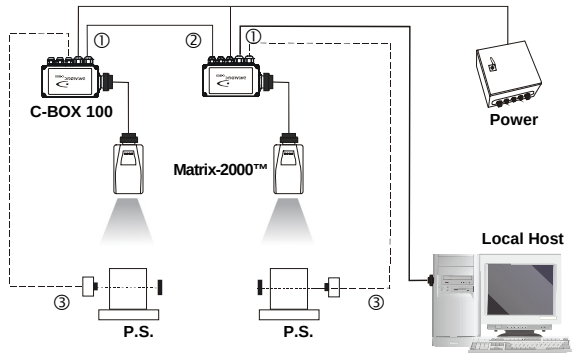
① Multidrop Network - RS485 HD Main Interface
② RS232 Auxiliary Interface (Local Echo)
③ External Trigger

RS232 Master/Slave



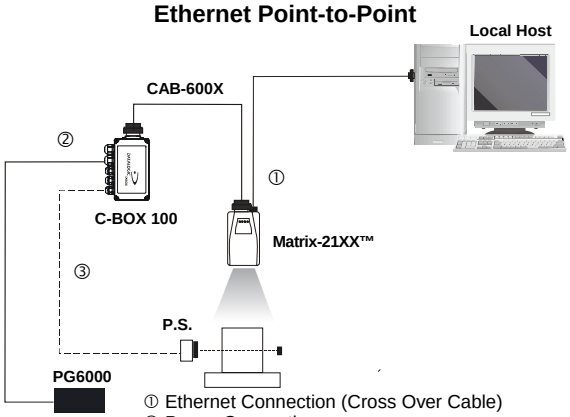
① Main Serial Interface
② Auxiliary Serial Interface
③ External Trigger

Pass Through



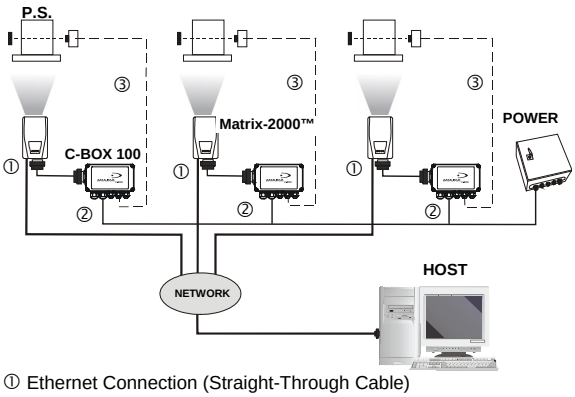
① Main Serial Interface
② Auxiliary Serial Interface
③ External Trigger

Ethernet Point-to-Point



① Ethernet Connection (Cross Over Cable)
② Power Connection
③ External Trigger

Ethernet Network



① Ethernet Connection (Straight-Through Cable)
② Power Connection
③ External Trigger

Autolearning:

The Autolearning procedure makes it possible to obtain an automatic, accurate and fast configuration of Matrix-2000™ without the necessity of directly checking/modifying the relevant parameters using VisiSet™. Valid code symbologies for this procedure are: DataMatrix ECC 200, PDF417 standard, Code 128, Code 39, Interleaved 2 of 5 and EAN-UPC.

To run the Matrix-2000™ Autolearning procedure follow these steps:

1. Position the Matrix-2000™ reader in front of the code at the correct focus distance according to your model (refer to the Reading Features table).
2. Power up the Matrix-2000™ and press the keypad button positioned on top of the reader for at least 2 seconds; Matrix-2000™ will emit 3 high pitched beeps and the POS and CAL LEDs will start blinking. Slow blinking means that positioning and calibration values must be improved.
3. To obtain the best value in terms of POSITIONING, move the code and/or the reader so as to position the code as close as possible to the center of the Field of View, keeping the correct focus distance. Check POS LED blinking: the best code positioning corresponds to fast (almost continuous) blinking. The best value in terms of CALIBRATION will automatically be achieved by the reader by changing the settings of the Acquisition parameters. Check CAL LED blinking: the best reader calibration corresponds to fast (almost continuous) blinking.
4. The Autolearning procedure will automatically exit as soon as the best positioning and calibration are reached. The code symbology read during this procedure will automatically be enabled. The new configuration parameters will be stored to permanent memory. Matrix-2000™ will emit 3 high pitched beeps.

   If positioning or calibration cannot be reached within 3 minutes, Matrix-2000™ will exit without saving the configuration parameters and will emit a long low pitched beep.

   To cancel Autolearning without saving the configuration parameters, press the keypad button at any time during the procedure: Matrix-2000™ will emit a long low pitched beep.

NOTE

Autolearning configuration parameters can be saved to temporary memory only by selecting the "Autolearning saving mode" parameter in VisiSet™.

The Autolearning function on the keypad button can be disabled by the user via VisiSet™.

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

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declare que el

MATRIX-2XXX

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:
der nachstehend angeführten Direktiven des Europäischen Rats:
cumple con los requisitos de las Directivas del Consejo Europeo, según la lista siguiente:

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

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 Etates membres relative à la compatibilité électromagnétique et à la sécurité des produits.
Über die Annäherung der Gesetze der Mitgliedsstaaten in bezug auf elektromagnetische Verträglichkeit und Produktsicherheit entsprechen.
Basado en la aproximación de las leyes de los Países Miembros respecto a la compatibilidad electromagnética y las Medidas de seguridad relativas al producto.

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

EN 55022, August 1994: LIMITS AND METHODS OF MEASUREMENTS OF RADIO DISTURBANCE CHARACTERISTICS OF INFORMATION TECHNOLOGY EQUIPMENT (ITE)

EN 61000-6-2, October 2001: ELECTROMAGNETIC COMPATIBILITY (EMC).
PART 6-2: GENERIC STANDARDS – IMMUNITY FOR INDUSTRIAL ENVIRONMENTS

Lippo di Calderara, 14/09/2004

Ruggero Cacioppo
Quality Assurance Supervisor