

C-BOX 400/410

Installation Manual



C-BOX 400/410

INSTALLATION MANUAL





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

C-BOX 400/410

Ed.: 03/2004

ALL RIGHTS RESERVED

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

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

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

© Datalogic S.p.A. 2004

821001010

CONTENTS

	GUIDE TO INSTALLATION	iv
	GENERAL VIEW	v
	SAFETY PRECAUTIONS.....	ix
	Power Supply.....	ix
	Safety Notes	ix
1	GENERAL FEATURES	1
1.1	Description	1
1.1.1	DeviceNet	2
2	INSTALLATION.....	3
2.1	Package Contents.....	3
2.2	Opening the Device	4
2.3	Mechanical Installation.....	5
2.4	Electrical Connections and Setup	7
2.4.1	Power Supply.....	8
2.4.2	System Wiring.....	10
2.4.3	Scanner Chassis Grounding Jumper Settings	12
2.4.4	DeviceNet Node Address (MAC ID) and Baud Rate Selection	12
2.4.5	Connection to a DeviceNet Network	13
	C-BOX 4X0 Configuration for DeviceNet Slave Node.....	14
2.4.6	OM4000 Jumper Settings	14
2.5	Configuration Switch and 9-Pin Internal Connector	15
2.6	Barcode Scanner Requirements	17
2.7	Operating Modes	17
2.7.1	GET/TEST/SEND Functions.....	18
2.7.2	LED Indicators	20
2.8	DeviceNet Connector (M12 Male External Sealed Micro Connector)	22
3	TECHNICAL FEATURES	23

GUIDE TO INSTALLATION

The following can be used as a checklist to verify all of the steps necessary for complete installation of the C-BOX 4X0.

- 1) Read all information in the section "Safety Precautions" at the beginning of this manual.
- 2) Correctly position and mount the C-BOX 4X0 within the reach of the barcode scanner cable, according to the information in paragraph 2.3.
- 3) Provide correct system cabling according to the signals necessary for your application and DeviceNet settings (see all sub-paragraphs under 2.4).

The installation is now complete.

GENERAL VIEW

C-BOX 400



Figure A

- ① 25-pin scanner connector
- ② Shield Nut
- ③ Compression Connectors
- ④ DeviceNet Connector
- ⑤ Cover screws (4)

C-BOX 410



Figure B

① LCD display

② Keypad

C-BOX 400/410

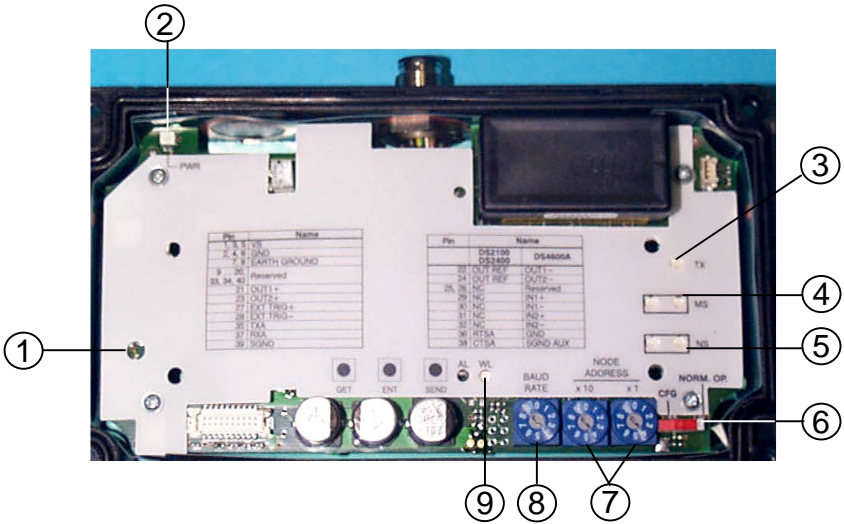


Figure C - Cover Inside

- ① LCD contrast trimmer
- ② Power on (PWR) LED
- ③ Transmission (TX) LED
- ④ Module status (MS) LEDs
- ⑤ Network status (NS) LEDs
- ⑥ Configuration switch
- ⑦ Node address selectors
- ⑧ Baud rate selector
- ⑨ Warning (WL) LED

C-BOX 400/410

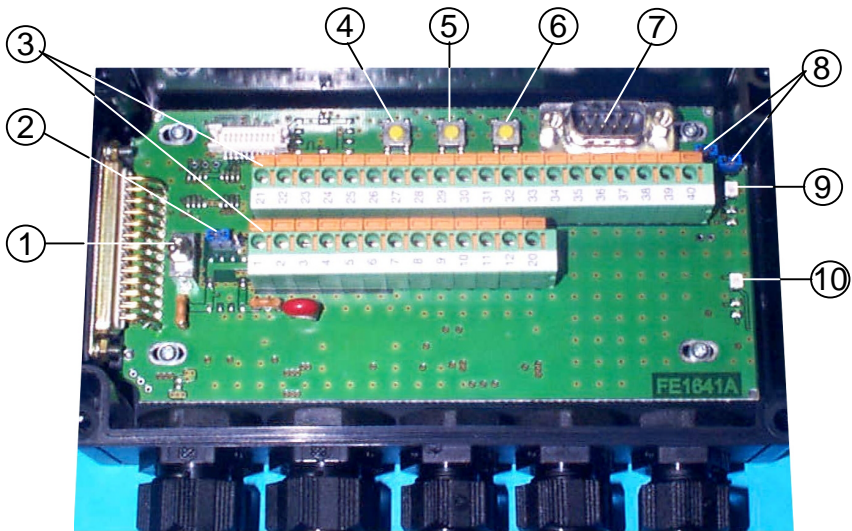


Figure E - Bottom Inside

- | | |
|--------------------------------------|----------------------------|
| ① Power on switch | ⑥ SEND button |
| ② Scanner chassis grounding selector | ⑦ Auxiliary port connector |
| ③ Spring clamp terminal blocks | ⑧ OM4000 jumpers |
| ④ GET button | ⑨ Warning LED |
| ⑤ TEST button | ⑩ Power polarity error LED |

SAFETY PRECAUTIONS

POWER SUPPLY

ATTENTION: READ THIS INFORMATION BEFORE INSTALLING THE PRODUCT

- This product is intended to be installed by Qualified Personnel only.

The C-BOX 4X0 is intended to be supplied either by a UL Listed NEC Class 2 power source, or a UL Listed ITE Limited Power Source (LPS), rated 10-30 V dc, minimum 0.5 A.

See par. 2.4.1 for correct power supply connections.

SAFETY NOTES

Observe the general rules for DeviceNet components when planning the C-BOX installation.

Observe the guidelines in the DeviceNet specifications. DeviceNet is a trademark of Open DeviceNet Vendor Association, Inc. (ODVA). Please refer to ODVA (www.odva.org) for further details.

Please observe the following to avoid risk to personnel and damage to equipment and to ensure that the C-BOX 4X0 functions correctly:

Safety regulations	Observe the applicable safety and accident prevention regulations. The C-BOX must only be installed or uninstalled by qualified technical personnel with appropriate electro-technical qualifications.
Bus cable	Bus wiring should only take place using DeviceNet cable. The high data transfer rates can only be guaranteed with the correct cable type.
Cable lengths	Refer to the manual for the DeviceNet master and to the ODVA documentation for information on maximum cable lengths for DeviceNet.

Terminating resistors	Two 121 Ohm, 1% Metal Film, ¼ Watt terminating resistors should be installed at each side of the DeviceNet trunk line (not at the end of a drop line or in a node). If the bus is incorrectly terminated, this can lead to errors in data transfer or bus failure. Please refer to ODVA documentation for further details.
Bus connectors	It is recommended to use only commercially available DeviceNet connectors for connecting the bus.

1 GENERAL FEATURES

1.1 DESCRIPTION

The C-BOX 4X0 is a connection box available in two models: C-BOX 400, without display, and C-BOX 410, with a LCD display.

It operates as a DeviceNet “Group 2 Only Slave” using the predefined Master/Slave connection set. The Polled, Bit Strobe and Change of State (COS) protocol types are available.

It can be used as an accessory of the Datalogic scanners to perform the following functions:

- Facilitate the connection of the scanner signals using a spring clamp connector.
- Perform a conversion from RS232 to DeviceNet to connect a RS232 scanner to a DeviceNet network.
- Get the scanner configuration and store it in memory.
- Force the scanner to the Test operating mode.
- Send the configuration stored in memory to the scanner.
- In the C-BOX 410, visualize the data packet sent by the scanner on the LCD.

The C-BOX 400 / C-BOX 410 mechanical dimensions are 167 x 115 x 61 mm (6.57 x 4.53 x 2.40 in.). The C-BOX 400 weighs about 470 g (16.50 oz); the C-BOX 410 weighs about 530 g (18.70 oz).

Electrical connection is provided through spring clamp terminal blocks inside the C-BOX 4X0.

The scanner is connected to the C-BOX 4X0 through a 25-pin connector placed on the left side of the housing.

A 9-pin connector placed inside the C-BOX 4X0 facilitates connection between an external PC and the auxiliary serial interface of the scanner.

The external M12 male connector is used to connect the C-BOX 4X0 to a DeviceNet network.

A dedicated shield nut offers the possibility to further increase the C-BOX 4X0 noise immunity by simply connecting the ground. The fixing screw type is 4-40 UNC, 1/8 inch.

1.1.1 DeviceNet

DeviceNet is a low level network that provides connections between simple industrial devices (sensors, actuators) and higher level devices (controllers), and eliminates expensive hardwiring.

It allows the transport of control oriented information associated with low level devices and the transport of other information which is indirectly related to the system being controlled, such as configuration parameters.

DeviceNet is a standard open network allowing the interchangeability of simple devices while making interconnectivity of more complex devices.

The DeviceNet communication link is based on a broadcast oriented communication protocol: the Controller Area Network (CAN) for Media Access Control and Physical Signaling.

CAN defines the syntax or form of the data movement.

DeviceNet is a trademark of Open DeviceNet Vendor Association, Inc. (ODVA). Please refer to ODVA (www.odva.org) for further details.

2 INSTALLATION

2.1 PACKAGE CONTENTS

Verify that the C-BOX 4X0 and all the parts supplied with the equipment are present and intact when opening the packaging; the list of parts includes:

- 1) C-BOX 4X0
- 2) Installation manual
- 3) C-BOX 4X0 configuration CD-ROM
- 4) 2 mounting screws

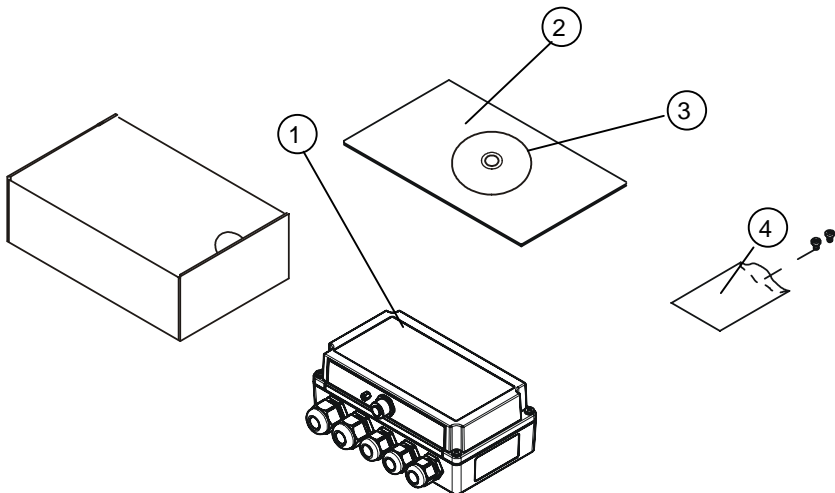


Figure 1 - C-BOX 4X0 Package Contents

2.2 OPENING THE DEVICE

To install the C-BOX 4X0 or during normal maintenance, it is necessary to open it by unscrewing the four cover screws:



CAUTION

The C-BOX 4X0 must be disconnected from the power supply during this operation.

C-BOX 4X0

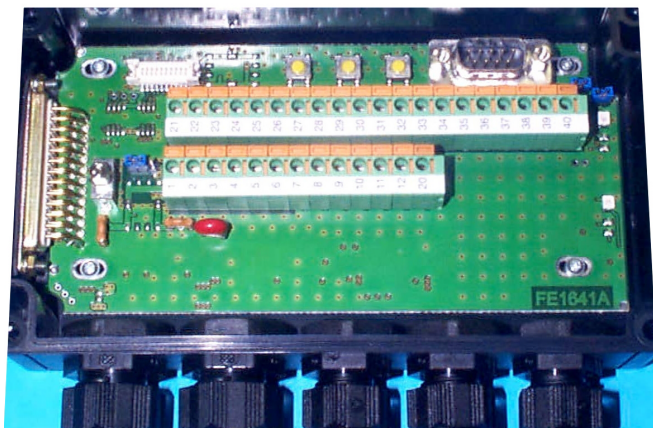


Figure 2 - Opening the C-BOX 4X0

It is possible to perform the following operations:

- Proceed with the cable connections (see paragraph 2.4.2).
- Set the DeviceNet Node Address (MAC ID) selection on the rotary switches.
- Set the DeviceNet Baud Rate on the specific rotary switch.
- Mount the C-BOX 4X0 to a wall or panel.

2.3 MECHANICAL INSTALLATION

The diagram below gives the overall dimensions of the C-BOX 4X0 and may be used for its installation.

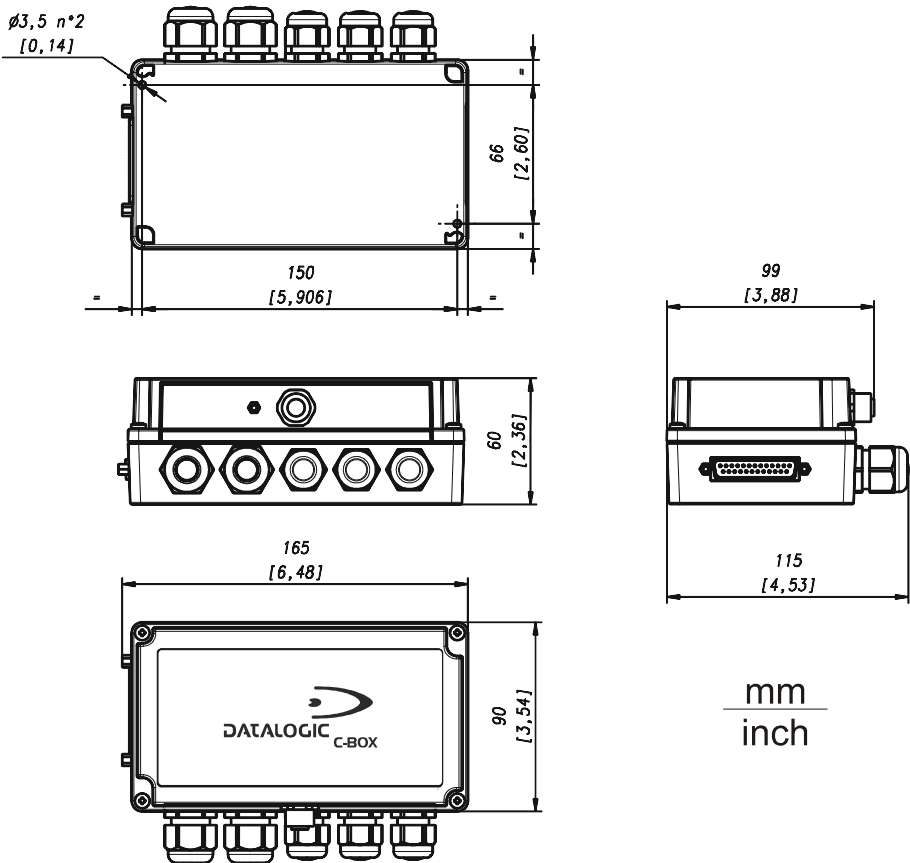


Figure 3 - Overall Dimensions

C-BOX 4X0 can be installed to operate in different positions. The two screw holes inside the housing of the C-BOX 4X0 are for mechanical fixture (Figure 4).

To mount the C-BOX 4X0:

- 1) Open the C-BOX 4X0 by unscrewing the 4 cover screws. If necessary, using the two mounting holes inside the device as a pattern, mark the panel with an appropriate object and then drill two holes in the panel.
- 2) Align the C-BOX 4X0 and insert two screws and screw them into the panel until tight (see Figure 4).

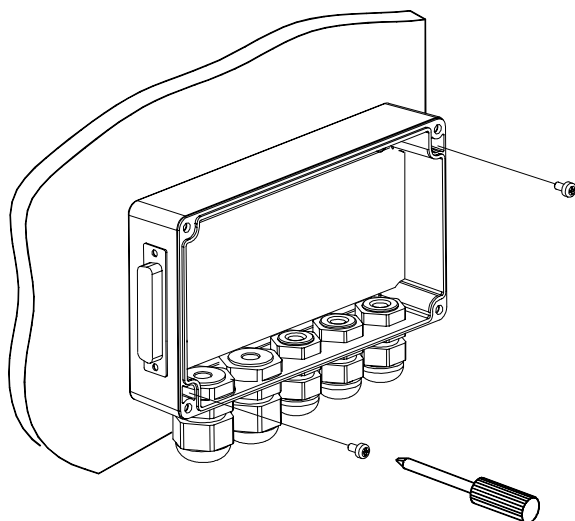


Figure 4 - Mounting C-BOX 4X0

2.4 ELECTRICAL CONNECTIONS AND SETUP

The following figure shows the typical layout.

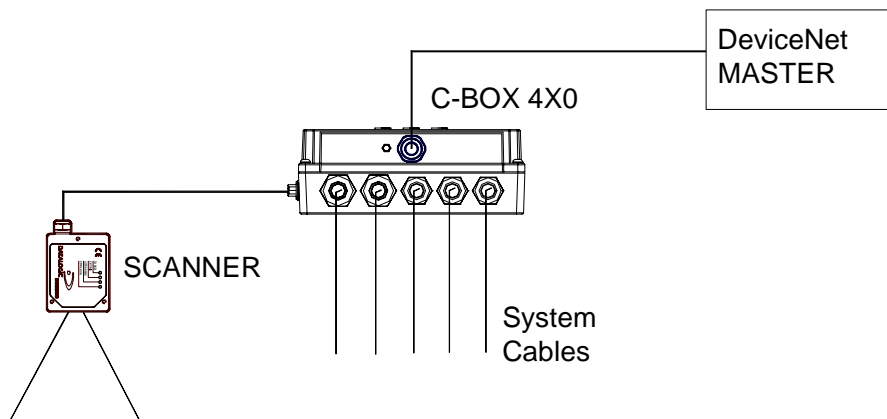


Figure 5 – System Layout

A PC can be connected to the C-BOX 4X0 (and consequently to the scanner auxiliary interface) through the internal 9-pin connector. This allows monitoring of the data transmitted by the scanner or configuration through the WinHost utility (see the scanner Installation Manual for more details). The scanner auxiliary interface signals are also available on the internal spring clamp connectors.

After making system cabling and switch settings (see sub-paragraphs under 2.4), connect the scanner to the 25-pin connector on the left side of the C-BOX 4X0 housing.

Switch ON the C-BOX 4X0 power switch (see Figure 6).

By default, after power on, an automatic connection procedure takes place between the C-BOX 4X0 and the scanner. During this phase, requiring a few seconds, the warning LED is turned ON. Once the procedure had been completed successfully, the warning LED is turned OFF.

To disable this automatic connection procedure, refer to WinHost Help Online.

After system functioning has been verified, close the C-BOX 4X0 using the 4 cover screws making sure the rubber seal is fitted correctly between the parts of the housing.

2.4.1 Power Supply

Power is supplied to the C-BOX 4X0 through the pins provided on the spring clamp connector.

The power switch (see Figure 6) switches the power supply ON or OFF for both the C-BOX 4X0 and the connected scanner.

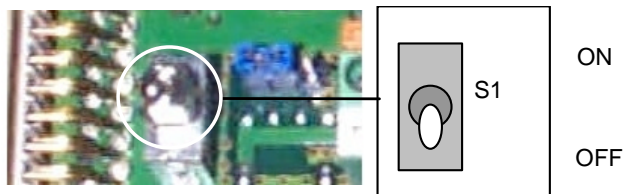


Figure 6 - Power Switch ON/OFF Positions

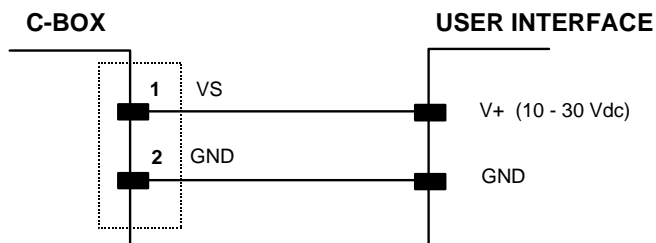


Figure 7 - Power Supply Connections

The power supply must be between 10 and 30 Vdc only.



NOTE

Pin 1 is also electrically connected to pins 3 and 5, just as pin 2 is electrically connected to pins 4 and 6. This is useful for external trigger/inputs connections.



Incorrect grounding of the C-BOX 4X0 can injure personnel and damage equipment. Make sure that the C-BOX is correctly grounded.

WARNING

The C-BOX 4X0 is protected against polarity reversal through a red LED which turns on in case of wrong polarity. When this condition occurs, all other C-BOX LEDs will be off until the power feed is connected with correct polarity.

NOTE

2.4.2 System Wiring

The connection and wiring procedure for C-BOX 4X0 is described as follows:

- 1) Open the C-BOX 4X0 as described in paragraph 2.2.
- 2) Verify that the C-BOX 4X0 power switch is off (see Figure 6).
- 3) Unscrew the compression connectors and pass all the system cables through them into the C-BOX 4X0 housing.
- 4) To connect the power and input/output signals:
 - Prepare the individual wires of the system cables by stripping the insulation back approximately 1 cm.
 - Using a device such as a screwdriver, push down on the lever directly next to the clamp (see Figure 8).
 - Insert the wire into the clamp and release the lever.

The wire will now be held in the spring clamp.

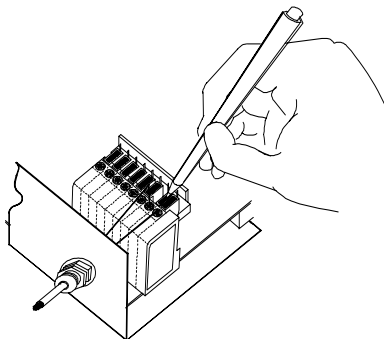


Figure 8 - System Cable Connections

The wiring used can be solid or stranded but must meet the following specifications.

All positions:	24 - 16 AWG	0.2 - 1.5 mm ²
----------------	-------------	---------------------------

The C-BOX 4X0 spring clamp connector pinouts are indicated in the following table.

Refer to the scanner Installation Manual for details.

Pin	Name	
1, 3, 5	VS	
2, 4, 6	GND	
7, 8	EARTH GROUND	
9...12, 20, 33, 34, 40	Reserved	
21	OUT1+	
23	OUT2+	
27	EXT TRIG+	
28	EXT TRIG-	
35	TXA	
37	RXA	
39	SGND	
	DS2100 DS2400	DS4600-A
22	OUT REF	OUT1-
24	OUT REF	OUT2-
25, 26	NC	Reserved
29	NC	IN1+
30	NC	IN1-
31	NC	IN2+
32	NC	IN2-
36	RTSA	GND
38	CTSA	SGND AUX



NOTE

Pin 7 or 8 should be connected to the earth ground.

Pins 13... 19 are not present in the C-BOX 4X0 models.

2.4.3 Scanner Chassis Grounding Jumper Settings

The scanner chassis grounding method can be selected by positioning a jumper (see Figure 9). In this way the scanner chassis can be connected to earth ground (only if pins 7 or 8 are connected to a good earth ground) or to the power supply ground signal. The scanner chassis can also be left floating but, in this case, the jumper must be removed.

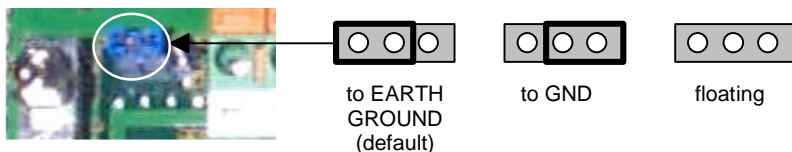


Figure 9 – Scanner Chassis Grounding

The C-BOX 4X0 is now installed which completes the electrical connections for your scanning system.

2.4.4 DeviceNet Node Address (MAC ID) and Baud Rate Selection

To interface the C-BOX 4X0 with a DeviceNet network, the Node Address (MAC ID) and the baud rate should be set using the rotary switches placed in the cover inside.

The valid address range for the Node Address (MAC ID) is from 00 to 63.

If an invalid value is detected (64-99), the C-BOX cannot communicate with the DeviceNet network and the red LED (MS LEDs) is turned on. The MAC ID value 99 is reserved.

The Node Address can also be assigned through WinHost. Refer to Help on-Line.

The valid range for the baud rate selection is:

- 0 = 125 Kb per second
- 1 = 250 Kb per second
- 2 = 500 Kb per second

If an invalid value is detected (3-9), the C-BOX 4X0 cannot communicate with the DeviceNet network and the red LED (MS LEDs) is turned on.

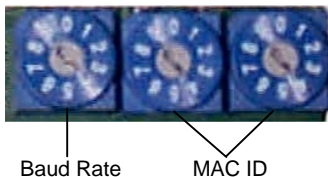


Figure 10 - Rotary Switches

2.4.5 Connection to a DeviceNet Network

The following figure shows a DeviceNet layout with C-BOX 4X0 devices connected to a DeviceNet Master:

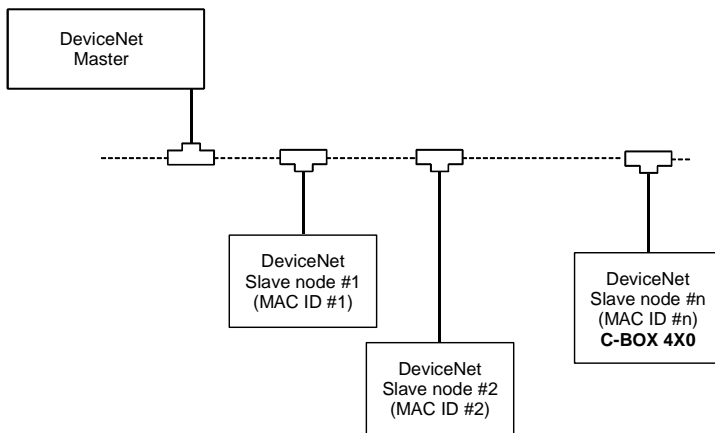


Figure 11 - DeviceNet Connection

It is recommended to use only commercially available DeviceNet connectors for connecting to the bus. If the C-BOX is installed at the beginning or end of the DeviceNet cable segment, it is recommended to use DeviceNet connectors, which contain an integrated terminating resistor.

To ensure that the C-BOX functions without errors, the shield of the DeviceNet cable must be grounded.

- Ensure that the DeviceNet connector uses the pin assignments shown in par 0.
- Attach the DeviceNet connector to the DeviceNet interface socket on the C-BOX 4X0 by screwing it.

C-BOX 4X0 Configuration for DeviceNet Slave Node

In order to setup the C-BOX 4X0, you need to install the function blocks in your PLC programming software and configure it.

The procedure below can be generally applied for this purpose:

1. Start the DeviceNet configurator on the Master.
2. Insert the CD-ROM with the Electronic Data Sheet (.EDS) file into the drive of the programming device (usually a PC).
3. Load the .EDS file in the configurator.
4. Configure the C-BOX 4X0 (through WinHost) setting the parameters according to the DeviceNet network application as described in the configurator's Help On-Line or User's Manual.



NOTE

Further information on DeviceNet protocol and Flow control is provided in the C-BOX 400/410 DeviceNet document and Help On-Line installed from the configuration CD-ROM provided in the C-BOX package.

2.4.6 OM4000 Jumper Settings

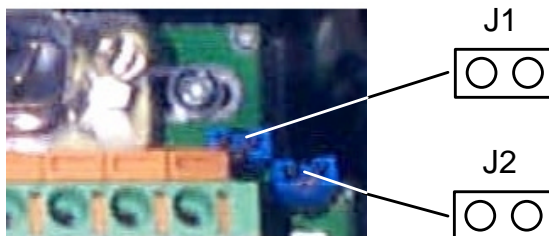


Figure 12 - OM4000 Jumpers

The jumpers allow connection to the EXT TRIG signals on separate spring clamp terminals for applications which use the OM4000 Oscillating Mirror in Trigger Mode.

They are used together and they have the following significance:
when a jumper is in the J1 position (see Figure above) pin 40 is connected to pin 27 (EXT TRIG+); a jumper in J2 position connects pin 20 to pin 28 (EXT TRIG-).

If the jumpers are removed pin 20 and pin 40 are disconnected.

2.5 CONFIGURATION SWITCH AND 9-PIN INTERNAL CONNECTOR

The 9-pin internal connector may have two different functions according to the position of the configuration switch.



Figure 13 - Configuration Switch

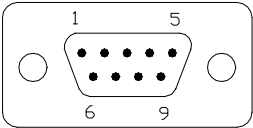


Figure 14 - 9-pin Male Connector

POSITION



MODE

Normal Operation (default): In this position, the C-BOX 4X0 is in the normal operating mode. It communicates with the scanner through the 9-pin internal connector and the scanner auxiliary serial interface. The internal connector pinout is illustrated in the following table:

9-pin connector pinout		
Pin	Name	Function
1		N.C.
2	RXA	Auxiliary RS232
3	TXA	Auxiliary RS232
4		N.C.
5	SGND	Signal Ground
6		N.C.
9		N.C.
DS2100 - DS2400		
7	CTSA	Auxiliary Handshake RS232
8	RTSA	Auxiliary Handshake RS232
DS4600-A		
7	SGND AUX	Auxiliary Signal Ground
8	GND	Ground

POSITION



MODE

CFG: When the switch is in this position, the C-BOX 4X0 is in configuration mode. The communication with the scanner is interrupted and pins 2 and 3 are no longer dedicated to the scanner auxiliary interface but to the C-BOX 4X0 configuration (see table below). The system enters configuration mode and waits to be configured through WinHost (see WinHost Help On Line).

The C-BOX 410 display visualizes an appropriate message.

Once the C-BOX 4X0 configuration is completed, it is necessary to replace the switch in the Normal Operation position. At the end of the reboot phase, the C-BOX 4X0 is ready to function with the new configuration.

9-pin connector pinout in Configuration mode		
Pin	Name	Function
2	RX	C-BOX 4X0 Configuration
3	TX	C-BOX 4X0 Configuration
5	SGND	Signal Ground

**CAUTION**

When the C-BOX 4X0 configuration is completed, remember to replace the Configuration switch in the Normal Operation position.

2.6 BARCODE SCANNER REQUIREMENTS

- 1) The C-BOX 4X0 can be connected to the following barcode scanners through the 25-pin connector illustrated in Figure A.

DS2100	DS2400	DS4600-A
--------	--------	----------

For DS2100 and DS2400 scanners, it is necessary to use RS232 model (X0XX) while DS4600-A RS232 interface must be selected by the user.

- 2) At least one Terminator Character should be enabled in the connected scanner (see the Terminator parameters in the Data Format section of the Help On Line).

The Node Address and the Baud Rate must be pre-set through the three rotary switches (see Figure 10).

2.7 OPERATING MODES

With the C-BOX 4X0, three operating modes are possible:

Normal Operation: Once the connection procedure is completed (the warning LED is OFF), the C-BOX 4X0 is ready to receive code strings from the barcode scanner's RS232 main interface. Then, it converts them to the DeviceNet network.

GET/TEST/SEND: Through the C-BOX 400 internal buttons and the C-BOX 410 external keypad, it is possible to communicate with the barcode scanner to perform one of the following functions:

- Get barcode scanner configuration
- Force the barcode scanner in TEST mode
- Send a configuration to the barcode scanner

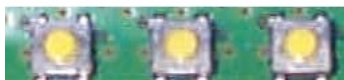
At the end of each function the barcode scanner returns to the previous operating mode.

Configuration (CFG): When the CFG switch is in CFG position (left) it is possible to configure the C-BOX 4X0 parameters.

2.7.1 GET/TEST/SEND Functions

The C-BOX 4X0 has three internal function buttons. In the C-BOX 410, these three buttons are also available on the cover and their function is indicated on the display.

C-BOX 4X0



GET TEST SEND

C-BOX 410



The procedure to enable the GET/TEST/SEND function is the following:

1. Press both the buttons left and right at the same time for at least one second; the warning LED is turned ON.
2. Release the buttons.
3. Press the left button corresponding to the GET function, the center button corresponding to the TEST function **or** the right button corresponding to the SEND function.

GET – (left button): the C-BOX 4X0 reads the current barcode scanner configuration and permanently copies it in its own memory support (EEPROM). The C-BOX 4X0 preserves this configuration also when switched off.

TEST - (center button): the C-BOX 4X0 forces the barcode scanner to run the Test Operating Mode (refer to the scanner Installation Manual for details). Press any button to quit the Test Operating Mode and restore the barcode scanner normal operating mode.

SEND - (right button): the C-BOX 4X0 sends the configuration previously stored in its own permanent memory support to the barcode scanner's EEPROM.

**NOTE**

Once the buttons are released in step 1, a ten-second timeout starts. If no button is pressed within this time (no function is selected), the procedure will be cancelled.

The C-BOX 400 warning LED (Figure 17) is turned OFF at the end of each procedure.

The C-BOX 410 display visualizes self-explaining messages about GET/TEST/SEND functions.

2.7.2 LED Indicators

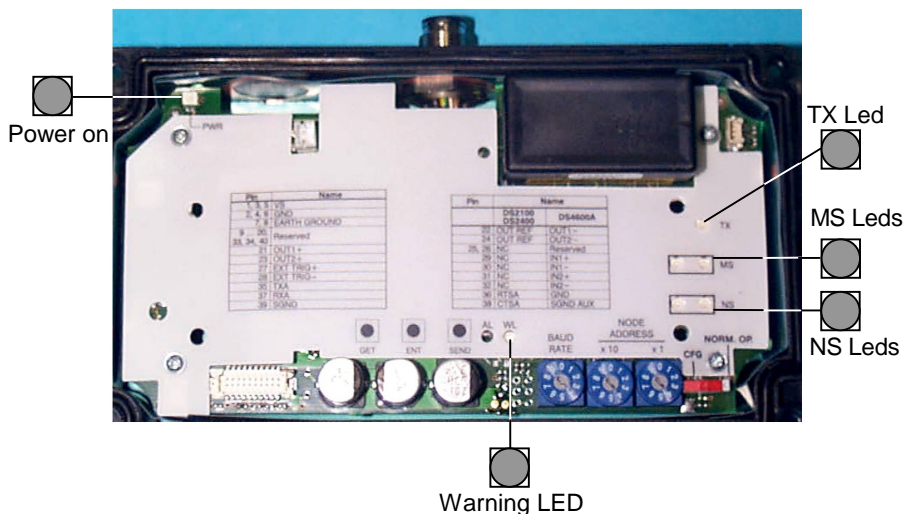


Figure 15 - LED Indicators

In the C-BOX 400 the Warning LED is repeated in the bottom inside.

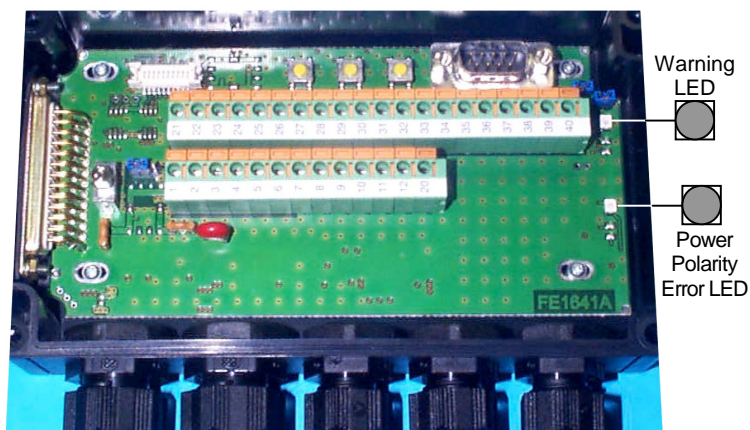


Figure 16 - C-BOX 400

The internal LEDs of the C-BOX 4X0 (see Figure 15) indicate the following:

- POWER ON (PWR)** (red) indicates the C-BOX 4X0 is connected to the power supply and the power switch is ON.
- WARNING (WL)** (red) indicates a warning or error condition. It is ON when the Auto-Connection procedure with a Datalogic reader is in progress (the system is busy), during a GET/TEST/SEND procedure or during the Configuration Mode. It blinks when an error condition occurs. Normally this LED should be OFF.
- TRANSMISSION (TX)** (green) indicates there is communication between the Application and the DeviceNet module. Upon communication, this LED will blink slightly.
- MODULE STATUS (MS)** (green and red) indicates the status of the DeviceNet module.
 A correct module initialization is signaled by the green LED (on).
 Both OFF = no power supply or module initialization in progress;
 Green ON = the module is operating in normal condition;
 Green FLASHING = waiting for commissioning;
 Red FLASHING = recoverable fault;
 Red ON = unrecoverable fault.
- NETWORK STATUS (NS)** (green and red) indicates the status of the DeviceNet network.
 A correct connection between the device and the network is signaled by the green LED (on).
 Both OFF = no power supply or device not on line;
 Green ON = link OK, on line, connected;
 Green FLASHING = on line, not connected;
 Red FLASHING = connection timeout;
 Red ON = critical link failure;
 Both FLASHING = the device has detected a network access error and is in Communication Faulted State. The device has subsequently received and accepted an identify Communication Faulted Request – Long Protocol message.



NOTE

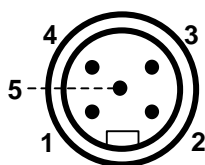
According to the DeviceNet specifications, during the device startup a LED test procedure is executed to check the MS and NS LEDs. They flashed according to the following sequence:

1. MS green LED
2. MS red LED
3. NS green LED
4. NS red LED

POWER POLARITY ERROR (red) indicates a wrong polarity. While activated, all other LEDs will be off until the power feed is connected with correct polarity.

2.8 DEVICENET CONNECTOR (M12 MALE EXTERNAL SEALED MICRO CONNECTOR)

To connect C-BOX 4X0 as a DeviceNet node, use a standard DeviceNet cable with an M12 female connector and plug it into the M12 male external connector.



M12 external male connector pinout		
Pin	Name	Function
1	Shield/Drain	Shield
2	V+	Bus power supply
3	V-	Bus reference
4	CAN_H	CAN bus data line - H
5	CAN_L	CAN bus data line - L

3 TECHNICAL FEATURES

ELECTRICAL FEATURES		C-BOX 400	C-BOX 410
Power			
Supply voltage		10 to 30 Vdc	
Power consumption max.		2.3 W + scanner	3.8 W + scanner
USER INTERFACE			
LED indicators		Power ON, Warning, Tx	
PHYSICAL FEATURES			
Mechanical dimensions		167 x 115 x 61 mm (6.57 x 4.53 x 2.40 in.)	
Weight		about 470 g. (16.50 oz.)	about 530 g. (18.70 oz.)
SOFTWARE FEATURES			
Parameter storage		Non-volatile internal memory	
DEVICENET INTERFACE			
Interface type		CAN	
Data transfer rate		Kbit/s 125, 250, 500 (user selectable)	
ENVIRONMENTAL FEATURES			
Operating temperature		-10° to 50 °C (+14° to 122 °F)	
Storage temperature		-20° to 70 °C (-4° to 158 °F)	
Humidity max.		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 30G; 11 ms; 3 shocks on each axis	
Protection class		IP64 (when correctly connected to the scanner)	



NOTE

The features given are typical at a 25 °C ambient temperature (if not otherwise indicated).