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QX-830 Compact Industrial Scanner User Manual



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The information and specifications described in this manual are subject to change without notice.

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For technical support, e-mail: helpdesk@microscan.com.

Warranty

For current warranty information, see: www.microscan.com/warranty.

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About the QX-830 Compact Industrial Scanner

The key features of the QX-830 Compact Industrial Scanner are:

- X-Mode™ symbol reconstruction and aggressive decode algorithm
- Ethernet TCP/IP and EtherNet/IP™
- Ultra-high-performance processing
- Real-time decoding
- Green Flash performance indicator
- LED array for performance, communication, and I/O user feedback
- EZ Button for setup and testing
- Compact size for easy integration into a wide variety of applications

Scanner Communication

There are three ways to configure and test the QX-830:

- Omron Microscan's Windows-based **ESP Software** (Easy Setup Program), which offers point-and-click ease of use and visual responses to user adjustments.
- Serial commands, such as **<K100,1>**, that can be sent from **ESP's Terminal** or another terminal program.
- The **EZ Button** on the side of the scanner.

"EtherNet/IP" is a trademark of the Open DeviceNet Vendors Association.

Warning and Caution Summary

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna;
- Increase the separation between the equipment and receiver;
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected;
- Consult the dealer or an experienced radio/TV technician for help.

For connection to a UL-listed direct plug-in power unit marked Class II and rated 10 to 28 VDC at 5 watts or greater.

European models must use a similarly rated Class I or Class II power supply that is certified to comply with standard for safety EN 60950.

CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

There are no user-serviceable parts in the scanner. Opening the scanner voids the Omron Microscan Systems, Inc. warranty and could expose the user to laser diode power of up to 7 mW.

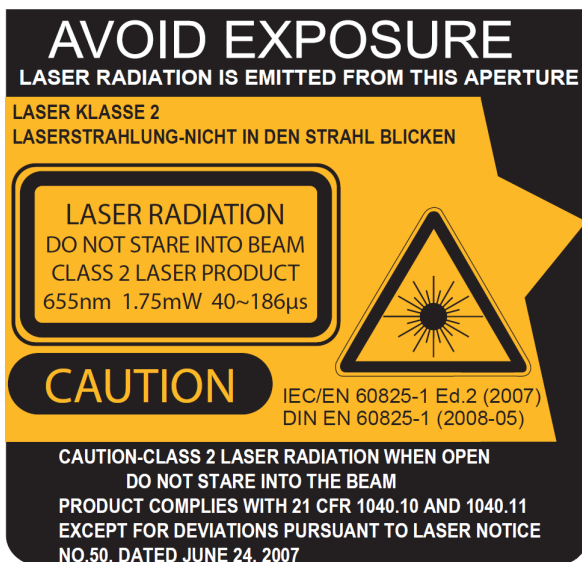
The laser beam can be harmful to eyesight. Avoid eye contact with the laser beam. Never point the beam at other people, or in a direction where people may be passing.

CAUTION: LASER RADIATION - DO NOT STARE INTO BEAM - CLASS 2 LASER PRODUCT; 655nm, 1.75mW, 40~186 μ S.

DANGER: (Invisible) Laser Radiation when open (and interlock defeated). AVOID DIRECT EXPOSURE TO BEAM.



Warning and Caution Summary (cont.)



- Wavelength: 655 nm
- Beam Divergence: 0.4mrad (typ.)
- Pulse Duration: 40~186µs
- Maximum Power: 1.75mW
- Location of the QX-830's laser aperture:



Laser Aperture

AVOID EXPOSURE – Laser Radiation is emitted from this aperture.

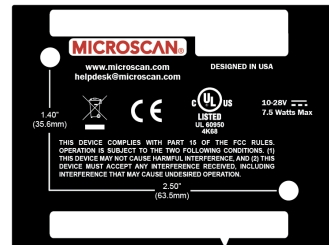
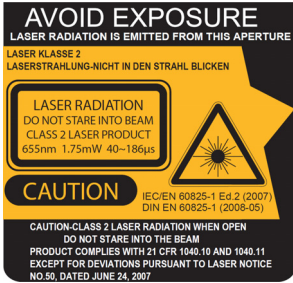
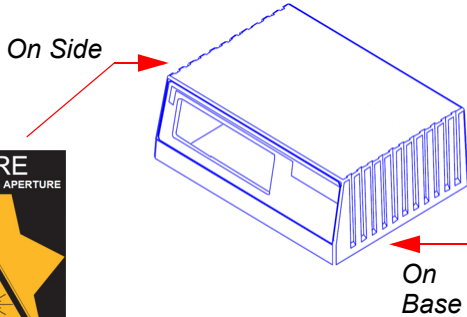
CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

IMPORTANT: The QX-830 is intended for connection to a UL-listed direct plug-in power unit marked Class 2 and rated 5 VDC at 3.5 Watts, or greater if using electrical accessories. European models must use a similarly rated Class 1 or Class 2 power supply that is certified to comply with standard for safety EN 60950.

Warning and Caution Summary (cont.)

Warning Label Placement

These labels are located on the QX-830 Compact Industrial Scanner.



Statements of Compliance



The QX-830 has been tested for compliance with FCC (Federal Communications Commission) regulations and has been found to conform to all applicable FCC Rules and Regulations.

To comply with FCC RF exposure compliance requirements, this device must not be co-located or operate in conjunction with any other antenna or transmitter.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



The QX-830 has been tested for compliance with CE (Conformité Européenne) standards and guidelines, and has been found to conform to applicable CE standards, specifically the following requirements:

Heavy Industrial: EN 61000-6-2:2005

Radiated Emissions: EN 55022:2006 Class A 30-1000 MHz

Conducted Emissions: EN 55022:2006 Class A .15-30 MHz

The QX-830 has been tested by an independent electromagnetic compatibility laboratory in accordance with the applicable specifications and instructions.



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Производитель: «Омрон Майкроскан Системс Инк., США, Рентон, штат Вашингтон 98057, 700 SW 39th Street

Representative: Omron Electronics Limited Liability Company, 125040, Russian, Moscow, Ulitsa Pravdy, 26. OGRN 10677746976582

Представитель: Общество с ограниченной ответственностью "Омрон Электроникс", 125040, Российская Федерация, город Москва, улица Правды, дом 26, ОГРН 10677746976582

Date of Manufacture: The first two digits of the serial number are the two-digit year of manufacture, or the year of manufacture +20 for serial numbers starting with 3.

Дата изготовления: первые две цифры серийного номера являются двумя последними цифрами года изготовления + 20 для серийных номеров, начинающихся с 3.

Statement of RoHS Compliance

All Omron Microscan readers with a 'G' suffix in the FIS number are RoHS-Compliant. All compliant readers were converted prior to March 1, 2007. All standard accessories in the Omron Microscan Product Pricing Catalog are RoHS-Compliant except 20-500013-01 and 98-000039-02. These products meet all the requirements of "Directive 2002/95/EC" European Parliament and the Council of the European Union for RoHS compliance. In accordance with the latest requirements, our RoHS-Compliant products and packaging do not contain intentionally added Deca-BDE, Perfluorooctanes (PFOS) or Perfluorooctanic Acid (PFOA) compounds above the maximum trace levels. To view the document stating these requirements, please visit:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0095:EN:HTML>

and

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:372:0032:0034:EN:PDF>

Please contact your sales manager for a complete list of Omron Microscan's RoHS-Compliant products.

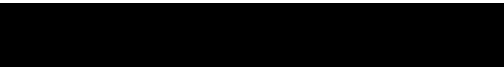
This declaration is based upon information obtained from sources which Omron Microscan believes to be reliable, and from random sample testing; however, the information is provided without any representation of warranty, expressed or implied, regarding accuracy or correctness. Omron Microscan does not specifically run any analysis on our raw materials or end product to measure for these substances.

The information provided in this certification notice is correct to the best of Omron Microscan's knowledge at the date of publication. This notice is not to be considered a warranty or quality specification. Users are responsible for determining the applicability of any RoHS legislation or regulations based on their individual use of the product. In regards to "RoHS Directive 2011_65_EU" Omron Microscan produces Monitoring and Control Instruments as well as Industrial Monitoring & Control Instruments as defined within the directive. Omron Microscan has developed and is implementing a RoHS2 compliance plan with the intention of bringing all active products listed in our current marketing literature within full compliance as per the directive deadlines.

Key milestones for the transition plan are as follows:

- Complete internal product audit by July 2014.
- Initial "Monitoring and Control Instruments" RoHS2 compliant products available by December 2014
- Initial "Industrial Monitoring & Control Instruments" RoHS2 compliant products available by July 2015
- All new products introduced in 2015 are expected to be WEEE & RoHS2 compliant.

Omron Microscan will mark the products with the 'CE' marking that complies with the RoHS2 process to acquire 'CE' certification per the example given: Example >> Machinery directive + EMC directive + RoHS2 = Declaration of Conformity.



1 Quick Start

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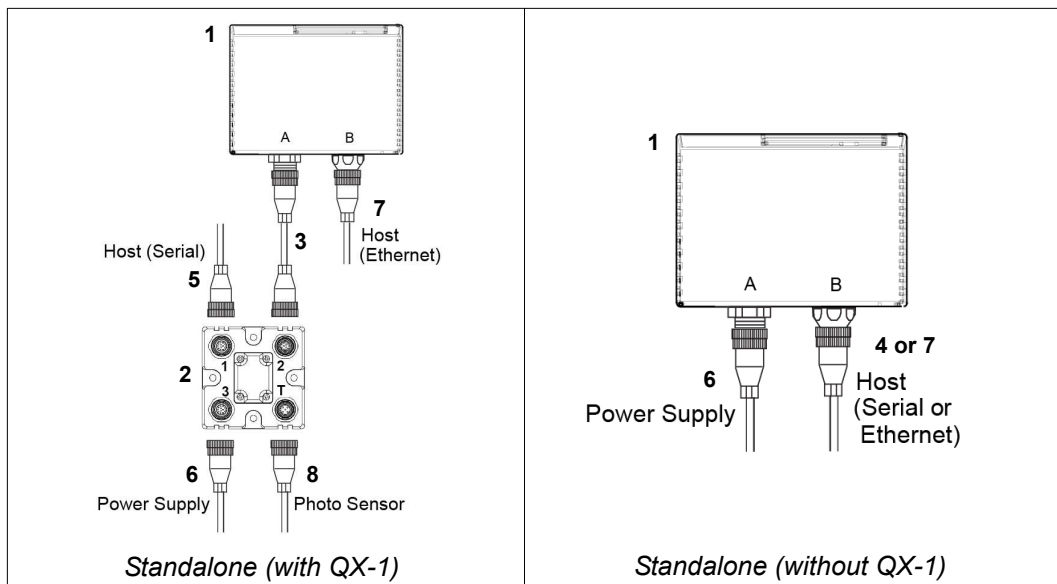
This section explains how to set up and test the QX-830 quickly using **ESP** (Easy Setup Program). Detailed setup information for installing the scanner into an application can be found in subsequent sections.

Step 1 — Check Hardware

Item	Description	Part Number
1	QX-830 Compact Industrial Scanner	FIS-0830-XXXXG
2	QX-1 Interface Device	98-000103-02
3	QX Cordset, Common, M12 12-pin Socket to M12 12-pin Plug, 1 m	61-000162-02
4	QX Cordset, Host, Serial, M12 12-pin Plug to DB9 Socket, 1 m	61-000152-02
5	QX Cordset, Host, Serial, M12 12-pin Socket to DB9 Socket, 1 m	61-000153-02
6	QX Power Supply, 100-240VAC, +24VDC, M12 12-pin Socket	97-000012-01
7	QX Cordset, Host, Ethernet, M12 8-pin Plug (Ultra-Lock) to RJ45, 1 m	61-000160-01
or	QX Cordset, Host, Ethernet, M12 8-pin Plug (Screw-On) to RJ45, 1 m	61-000160-02
8	QX Photo Sensor, M12 4-pin Plug, NPN, Dark On, 2 m	99-000020-02

Note: The QX-830 does not require an Ethernet crossover cordset, because the scanner itself performs automatic internal crossover (transmit-to-receive switching). Omron Microscan offers a standard straight-through (un-crossed) Ethernet cordset (61-000160-01 or -02).

Important: Do not attempt to power more than four scanners with a single power supply in a daisy chain configuration. Add a QX-1 and one power supply for every four additional scanners in the daisy chain.



Hardware Required

Caution: Be sure that all connections are secure **BEFORE** applying power to the system. Always power down **BEFORE** disconnecting any cables.

Step 2 — Connect the System

Important: If you are connecting Ultra-Lock cordsets to the QX-830 and QX-1, align the pins first and then push the connector into place. Do not twist the connectors, as this will bend the pins.

Important: Do not attempt to power more than four scanners with a single power supply in a daisy chain configuration. Add a QX-1 and one power supply for every four additional scanner in the daisy chain.

Note: The configuration instructions below are for simple, direct connections to an RS-232 or Ethernet host. The QX-1 can be added to RS-232 or Ethernet configurations in which greater flexibility and complexity are required. The first diagram in Step 1 shows a standalone configuration that includes the QX-1.

RS-232 Standalone (without QX-1)

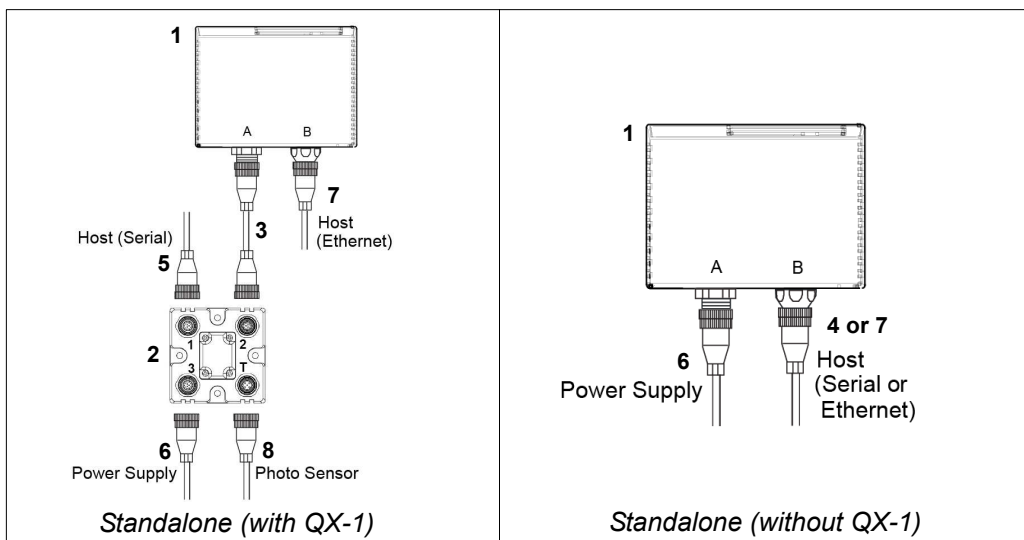
- Connect the Serial Communication Cable from “B” on the QX-830 to the host.
- Connect the power supply to “A” on the QX-830.
- Plug in the power supply.

Ethernet Standalone (without QX-1)

Important: Configure Ethernet-enabled readers off-line and then connect to network when ready for dynamic use.

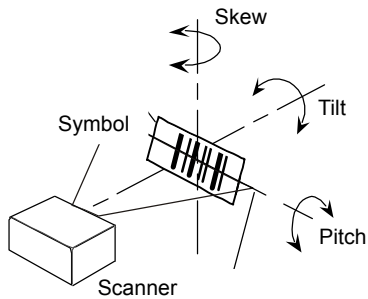
Note: The QX-830 does not require an Ethernet crossover cordset, because the scanner itself performs automatic internal crossover (transmit-to-receive switching). Omron Microscan offers a standard straight-through (un-crossed) Ethernet cordset (61-000160-01 or -02).

- Connect the Ethernet Communication Cable from “B” on the QX-830 to the host network.
- Connect the power supply to “A” on the QX-830.
- Plug in the power supply.



Step 3 — Position Scanner and Symbol

- Place a test symbol in a location with as little ambient light as possible.
- Position the scanner at the focal distance used in the application.
- Align the test symbol with the scanner's field of view.
- Tip the scanner relative to the test symbol to avoid glare from specular reflection.



Maximum pitch: $\pm 50^\circ$
Maximum skew: $\pm 40^\circ$

Step 4 — Install ESP

ESP Software can be found on the Omron Microscan Tools Drive that is packaged with the QX-830.

1. Follow the prompts to install ESP from the Tools Drive.
2. Click on the ESP icon to run the program.



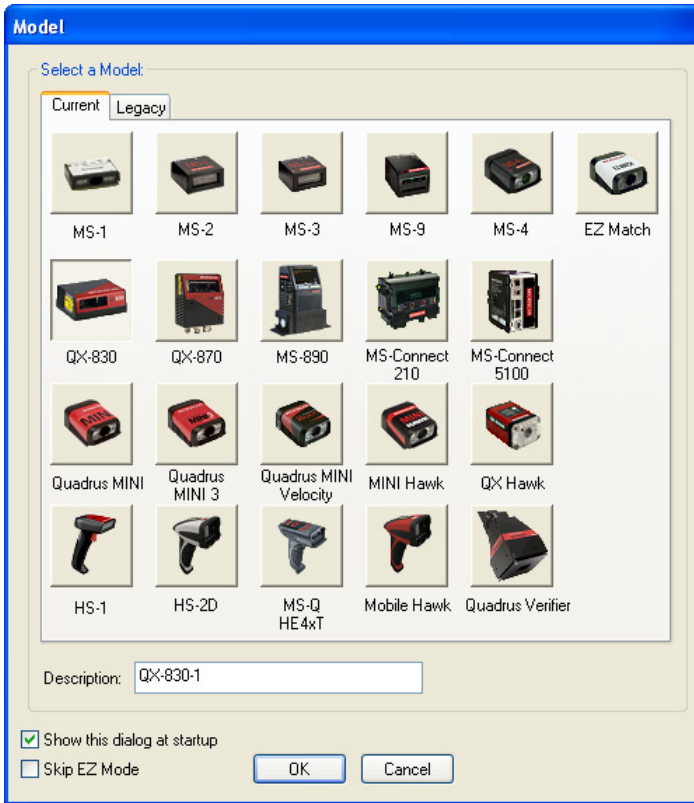
Note: ESP can also be installed from the **Download Center** at www.microscan.com.

ESP System Requirements

- 233 MHz Pentium PC
- Windows 8, 7, Vista, or XP operating system (32-bit or 64-bit)
- Internet Explorer 6.0 or higher
- 128 MB RAM or greater
- 160 MB free disk space
- 800 x 600 256 color display (1024 x 768 32-bit color recommended)

Step 5 — Select Model

When **ESP** is opened, the following menu will appear:



1. Click the button showing the QX-830.
2. Click **OK**.
Note: The QX-830 can also be selected by double-clicking the button showing the QX-830.
3. Click **Yes** when this dialog appears:



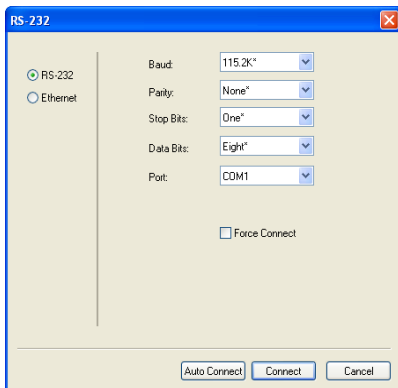
Note: To select another model later, click the **Switch Model** button near the top of the screen or use **Model > New Model** in the menu toolbar.

Step 6 — Connect

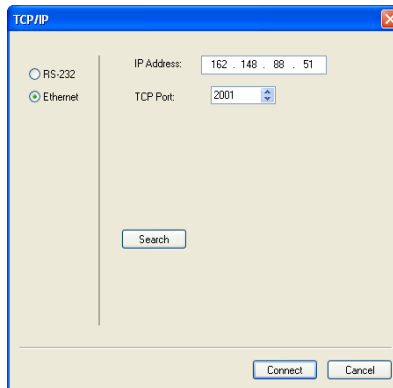
Connection Wizard

To connect using the Connection Wizard:

- Click **Connect** on the menu toolbar, and then select **Connection Wizard**.
- Select **RS-232** or **Ethernet** to activate the appropriate display.
- Configure RS-232 or Ethernet settings as required by the application, and click **Connect**.



RS-232 Connection Wizard



Ethernet Connection Wizard

- When a connection is established, the green indicator in the status bar at the bottom right of the screen will be visible:



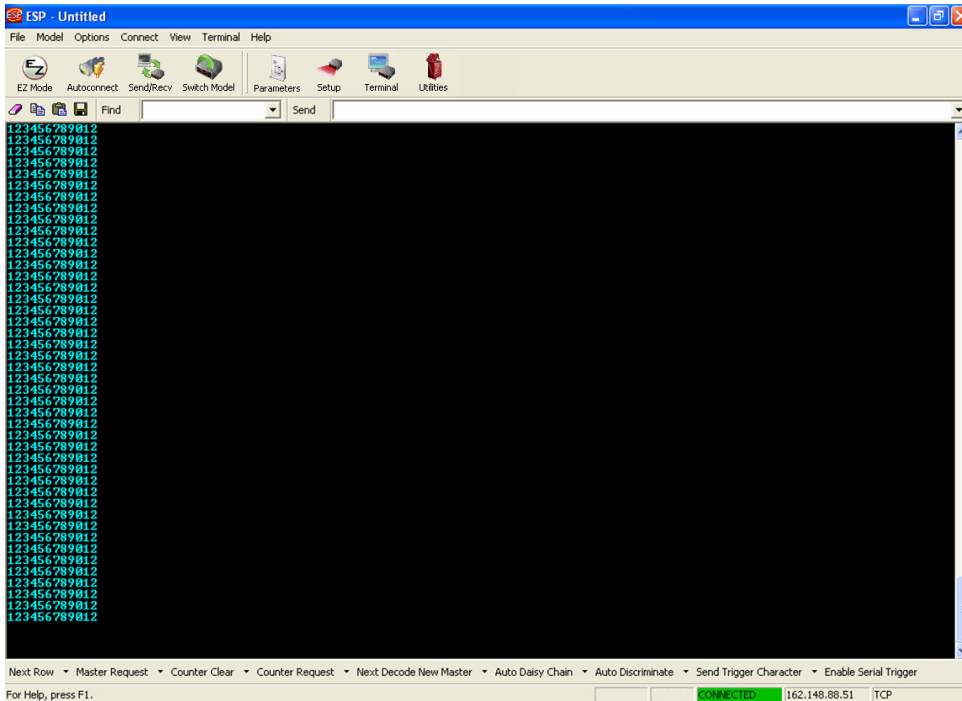
Important: The scanner is in **Continuous Read Mode** by default. For best connection results, be sure that no decodable symbols are within the scanner's field of view while attempting to connect.

Connect (cont.)

Step 6 — Connect (cont.)

Ethernet TCP/IP

Once the QX-830 is connected, incoming symbol data can be displayed in the **Terminal**, as shown below.



Step 7 — Test Read Rate

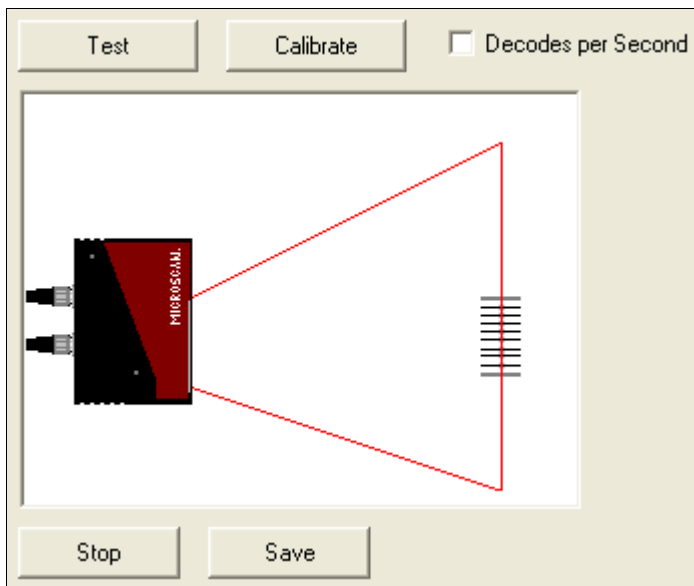
Read Rate indicates the number or percentage of successful decodes per second achieved by the scanner.

1. Click the **Test** button in ESP's **EZ Mode** to start the Read Rate test.

Symbol data and read rate percentage information should appear in the **Symbol Information** table in the bottom portion of the view. The Read Rate LEDs on the side of the QX-830 will indicate the percentage of successful decodes per second.

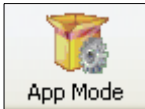
2. Click **Stop** to end the Read Rate test.

Note: Read Rate can also be tested using the **Read Rate** interface in **Utilities**.



Step 8 — Configure the Scanner

Click the **App Mode** button to make configuration changes to the scanner.



The following modes are accessible by clicking the buttons at the top of the screen:



- Click the **EZ Mode** button to return to EZ Mode.
- Click the **Autoconnect** button to establish communication.
- Click the **Send/Recv** button to send or receive commands.
- Click the **Switch Model** button to open the model menu, or to return to a previous model.
- Click the **Parameters** button to show the tabbed tree control views.
- Click the **Setup** button to show the tabbed interface views.
- Click the **Terminal** button to display decoded symbol data and to send serial commands.
- Click the **Utilities** button to access Read Rate, Counters, Device Control, Differences from Default, Master Database, Digital Bar Code, and Firmware.

For further details, see **Omron Microscan ESP Help** in the dropdown Help menu.

Step 9 — Save Changes in ESP

To make changes to a configuration setting:

Parameters	ESP Values
[-] Communications	
[+] RS232 A	Enabled
[+] RS232 B	Disabled
[+] RS422	Enabled
[+] Ethernet	Point-to-Point
[+] Protocol Selection	Disabled
[+] External Data Routing	Disabled
[+] Array Communication Modes	Disabled
[-] Preamble	Disabled*
... Preamble Characters	Disabled*
[+] Postamble	Enabled

1. Left-click on the + to expand the desired tree.

2. Double-click on the desired parameter and click once in the selection box to view options.

3. Place the cursor in the selection box, scroll down to the setting to be changed, and click once on the setting.

4. Left-click again on the open screen to complete the selection.

5. Right-click on the open screen and select **Save to Reader** to implement the command in the scanner.

Saving Options

- **Send, No Save.** Changes will be lost when power is re-applied to the scanner.
- **Send and Save.** This activates all changes in current memory *and* saves to the scanner for power-on.

Save Changes in ESP

2 Using ESP

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This section explains the basic structure and elements of **ESP** (Easy Setup Program).

When **ESP** is opened, unless otherwise specified in **ESP Preferences**, the **EZ Mode** view will appear. **App Mode** contains several configuration menus (**Communication**, **Read Cycle**, **Symbologies**, **I/O Parameters**, **Matchcode**, and **Diagnostics**), a **Setup** interface, a **Terminal** interface, and a **Utilities** interface.

ESP can be used to configure the QX-830 in three different ways:

- **Graphic User Interfaces:** Scanner settings can be configured using such point-and-click tools as buttons, spin boxes, check boxes, and drag-and-drop functions.
- **Tree Controls:** Each configuration menu contains a list of all option settings that pertain to that specific area of scanner operation. For example, the **Read Cycle** menu shows a **Laser Setup** command, and then a list of the parameters **Laser On/Off**, **Laser Framing Status**, **Laser On Position**, **Laser Off Position**, and **Laser Power**. Each parameter can be configured using dropdown menus or fields where characters can be entered.
- **Terminal:** **ESP's Terminal** allows the user to send serial configuration and utility commands directly to the scanner by typing them in the provided field.

Information about using specific commands in **ESP** is provided in subsequent sections.

For **ESP** system requirements, see [ESP System Requirements](#) in Chapter 1, [Quick Start](#).

EZ Mode

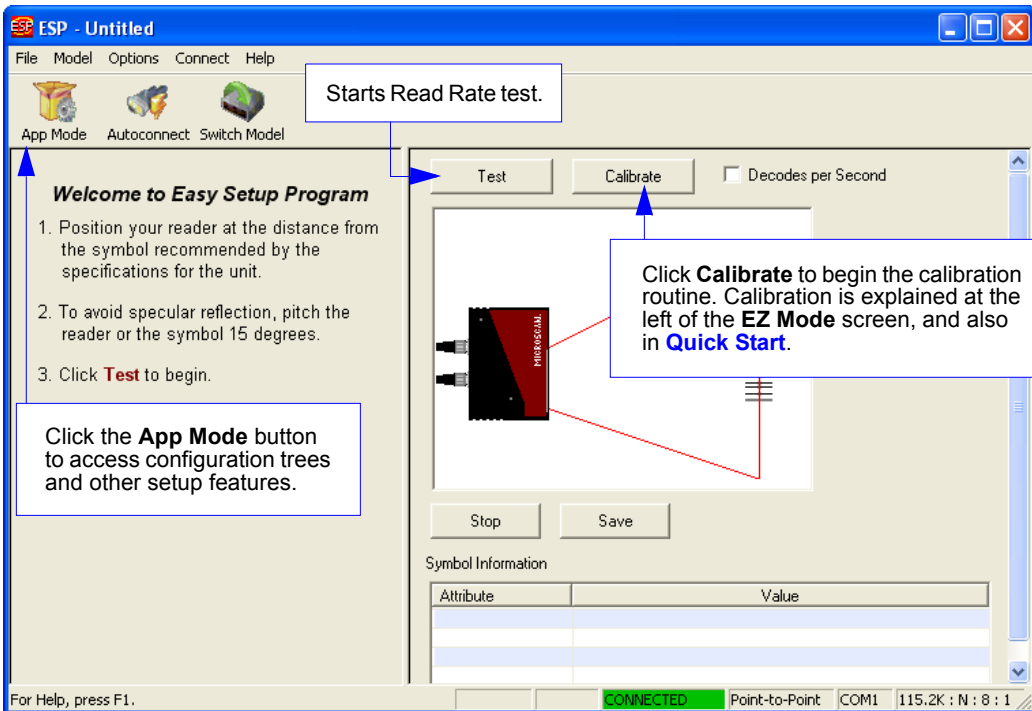
EZ Mode allows the user to test read rate and calibrate the scanner. After connecting to the scanner, the **EZ Mode** view will appear. On-screen instructions assist the user with positioning, testing, and calibration.

Test

Click the **Test** button to start the read rate test for a quick indication of the scanner's read capabilities and the limits of the application. When **Decodes per Second** is unchecked, the test will count the percentage of decodes relative to the number of actual scans. Click **Stop** to end the test.

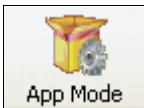
Calibrate

The calibration routine that will optimize the scanner by comparing Read Rates at various camera and image processing settings.



App Mode

From **EZ Mode**, click on the **App Mode** button to access the tabbed tree controls in **Parameters**, the intuitive user interfaces in **Setup**, the **Terminal** interface, and the **Utilities** interface.



Note: The **App Mode** and **EZ Mode** buttons appear in the same position to allow easy switching between these primary modes.

