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MICROSCAN

Quadrus MINI Imager User's Manual



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About the Quadrus MINI Imager

The key features of the Quadrus MINI are:

- Q-Mode ultra-high-speed image processing
- Megapixel optics (SXGA)
- Ultra-High Density, High Density, and Standard Density options
- Software-adjustable focus
- USB, RS-232, and RS-422/485 connectivity
- Support for both linear and 2D symbologies
- High-output LED illumination
- A multi-function EZ Button for location, calibration, and symbol reading
- A blue target pattern that identifies the center point of the field of view
- A green flash (visible from all angles) to signal a successful read
- Easy customization for a variety of specific applications
- ESD Safe option

About This Manual

This manual provides complete information on setting up, installing, and configuring the imager. The chapters are presented in the order in which an imager might be set up and made ready for operation.

Highlighting

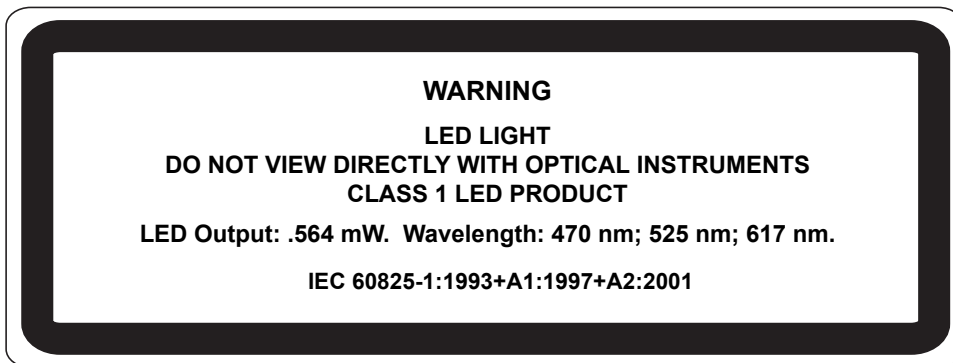
Serial commands, highlighted command fields, and default command settings are highlighted in **rust bold**. Cross-references and web links are highlighted in **blue bold**. References to **ESP**, its toolbar headings (**Communications**, **Read Cycle**, **Symbologies**, etc.), menu topics, and other points of emphasis, are highlighted in **Bold Initial Caps**.

Host Communications

There are four ways to configure and test the Quadrus MINI:

- EZ Button.
- Microscan's Windows-based **ESP** (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** window or another terminal program.
- The tree controls and graphic interfaces in **ESP's App Mode**.

Warning and Caution Summary



- Viewing the Quadrus MINI's LED output with optical instruments such as magnifiers, eye loupes, or microscopes within a distance of 100 mm could cause serious eye injury.
- Maximum LED output: .564 mW.
- Wavelength: 470 nm; 525 nm; 617 nm.
- Location of the Quadrus MINI's LED aperture window:



LED Aperture Window

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

IMPORTANT: The Quadrus MINI is intended for connection to a UL-listed direct plug-in power unit marked Class II and rated 5 VDC at 3.5 Watts, or greater if using electrical accessories.

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.

Statement of Agency Compliance



The Quadrus MINI Imager 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 Quadrus MINI Imager has been tested for compliance with CE (Conformité Européenne) standards and guidelines, and has been found to conform to applicable CE standards, specifically the EMC requirements EN 55024:1998+A1:2001+A2:2003, ESD EN 61000-4-2, Radiated RF Immunity EN 61000-4-3, ENV 50204, EFT EN 61000-4-4, Conducted RF Immunity EN 61000-4-6, EN 55022:1998+A1:2000+A2:2003 for Class A products, Class B Radiated Emissions, and Class B Conducted Emissions.

The Quadrus MINI Imager has been tested by an independent electromagnetic compatibility laboratory in accordance with the applicable specifications and instructions.

Statement of RoHS Compliance

All 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 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 Microscan's RoHS-Compliant products.

This declaration is based upon information obtained from sources which 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. 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 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.

Regarding "RoHS Directive 2011_65_EU" Microscan produces Monitoring and Control Instruments as well as Industrial Monitoring and Control Instruments as defined within the directive. 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 and supplier transition by July 2013.
- Initial "Monitoring and Control Instruments" RoHS2-compliant products available by July 2014.
- Initial "Industrial Monitoring and Control Instruments" RoHS2-compliant products available by July 2015.
- All new products introduced in 2014 are expected to be WEEE and RoHS2 compliant.

Microscan will mark the products with the 'CE' marking that complies with the RoHS2 process to acquire 'CE' certification per the example given: Example 1 >> Machinery directive + EMC directive + RoHS2 = Declaration of Conformity.

1 Quick Start

Contents

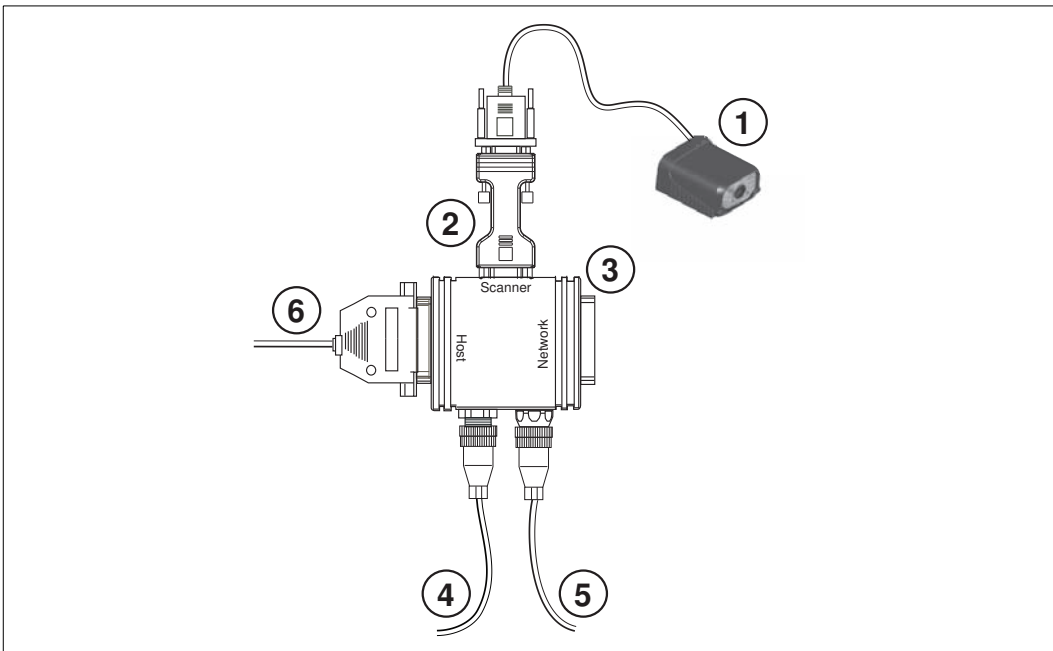
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This chapter is designed to get your Quadrus MINI Imager up and running quickly, using the **EZ** button or **ESP** (Easy Setup Program). Following these steps will allow you to get a sense of the imager's capabilities and to test sample symbols.

Detailed setup information for installing the imager into your actual application can be found in the subsequent chapters.

Step 1 — Check Required Hardware

Item	Description	Part Number
1	Quadrus MINI Imager	FIS-6300-XXXXG
2	IC-332 Adapter	FIS-0001-0035G
3	IB-131 Interface Box	99-000018-01
4	Power Supply (90-264 VAC, 24VDC, USA/Euro plug)	97-100004-15
5	Object Detector	99-000017-01
6	Communication Cable	61-300026-03



Hardware Required

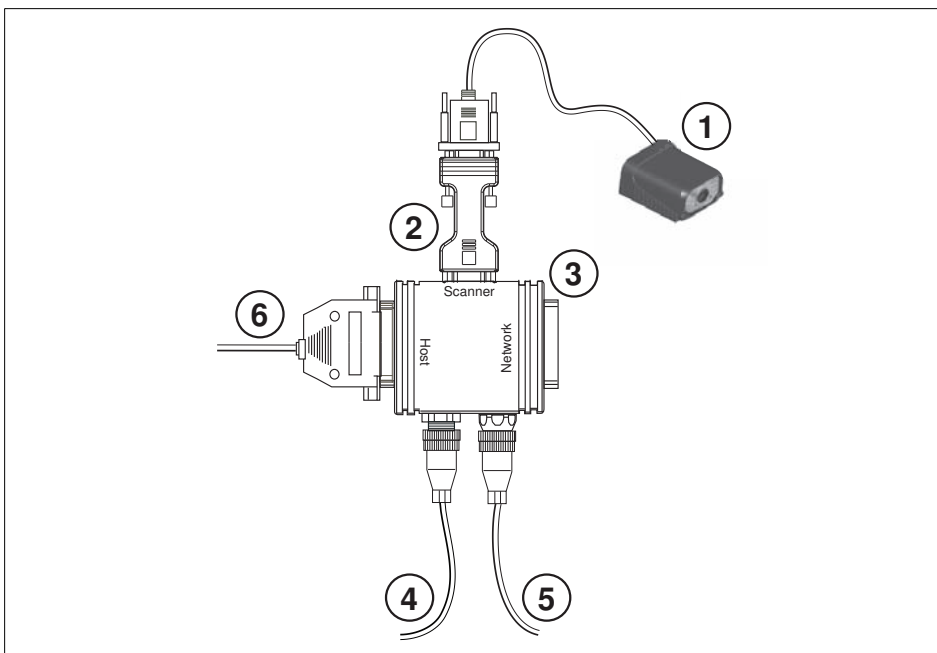
Caution: Be sure that all cables are connected **BEFORE** applying power to the system. Always power down **BEFORE** disconnecting any cables.

Step 2 — Connect the System

Connecting by RS-232/RS-422/RS-485

- Connect the imager (1) to the IB-131/IC-332 interface (2) and (3).
- Connect the host cable (6) to the host and to the host port on the IB-131 (3).
- Connect the object detector (5) to the IB-131 (3).
- Connect the power supply (4) to the IB-131 (3).
- Apply power to the imager.

Important: If you are using a **USB** model, you must connect the device to the host computer **before** powering-on. Otherwise the unit will not be recognized as a USB device.

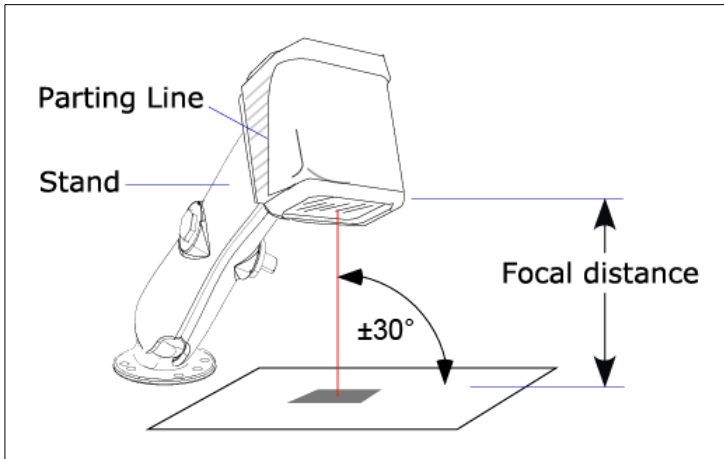


Hardware Configuration

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

Step 3 — Position Imager and Symbol

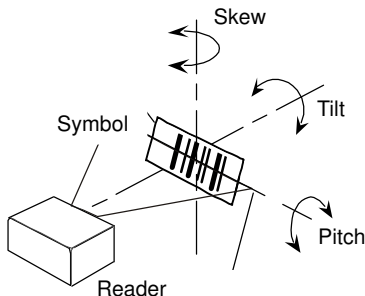
- Position the imager at a focal distance between **2** and **6** inches from the symbol.
- Tip the imager relative to the symbol to avoid the glare of direct (specular) reflection. The case parting line should be perpendicular to the plane of the symbol by either pitching the symbol or the imager as shown.
- Position the imager in a place with as little ambient light as possible.
- Symbols can be rotated (tilted) at any angle; however, for best results symbols should be aligned with the FOV (field of view).



Imager and Symbol Orientation

- In the case of linear symbols, aligning the bars in the direction of their movement (“ladder” orientation) will minimize the chances of blurring, and will produce better reads.

Important: Avoid excessive skew or pitch. Maximum skew is $\pm 30^\circ$; maximum pitch is $\pm 30^\circ$. The illustration below shows skew axis, pitch axis, and tilt axis.



Note: For accuracy of testing and performance, Microscan recommends using a mounting arm adapter kit. Contact your Microscan sales manager for details about mounting arm adapter kits and other accessories.

Step 4 — Install ESP

Easy Setup Program (ESP) is Microscan's proprietary setup and testing application. The purpose of **ESP** is to provide a quick and easy way to set up and configure Microscan readers. When the Quadrus MINI is connected to a host computer (Windows Vista, XP, or 2000), **ESP** can be used to configure reader settings and to set up communications between the reader and host.

If installing from the Microscan Tools CD:

1. Insert the Microscan Tools CD in your computer's CD drive.
2. Select **ESP Software** from the navigation bar at the left of the screen.
3. Click on **ESP Software** under the **Current Version** heading.
4. Click the **Run** button and follow the prompts in the **ESP Setup Wizard**.

Note: During installation, you may see an Internet Explorer Security Warning that states: "The publisher could not be verified." If you see this warning, click **Run** to continue installation.

If downloading from the web:

1. Go to the Download Center at www.microscan.com.
2. Create a new member account or, if you are already a member, enter your user name and password.
3. Navigate to the "Microscan Software" section of the Download Center (near the top of the page).
4. Click on the link showing the latest version of **ESP**. Extract the **ESP** installation files to a location of your choice on the host computer. *Note where your **ESP.exe** file is stored on your hard drive.*
5. At the end of the installation process, the following icon will appear on your desktop:



6. Click the **ESP** icon to start the program.

System Requirements for ESP

- 166 MHz Pentium processor (recommended)
- Windows Vista, XP, or 2000 operating system
- Internet Explorer 5.0 or higher
- 64 MB minimum RAM
- 40 MB minimum disk space
- 800 x 600 pixel minimum 256 color display

Step 5 — Select Model

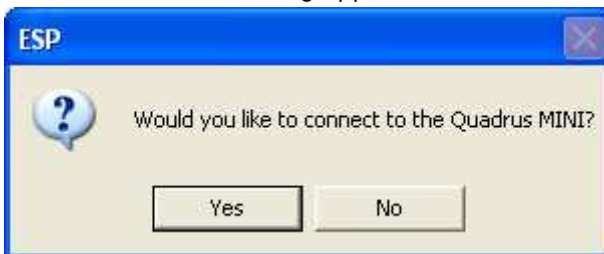
When you start **ESP**, the following menu will appear:



1. Click the button showing the Quadrus MINI.
2. Click **OK**.

Note: You can also double-click the Quadrus MINI button to make your selection.

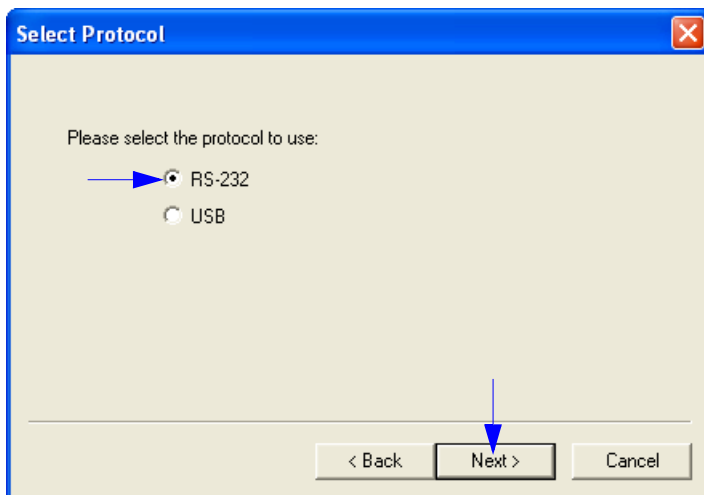
3. Click **Yes** when this dialog appears:



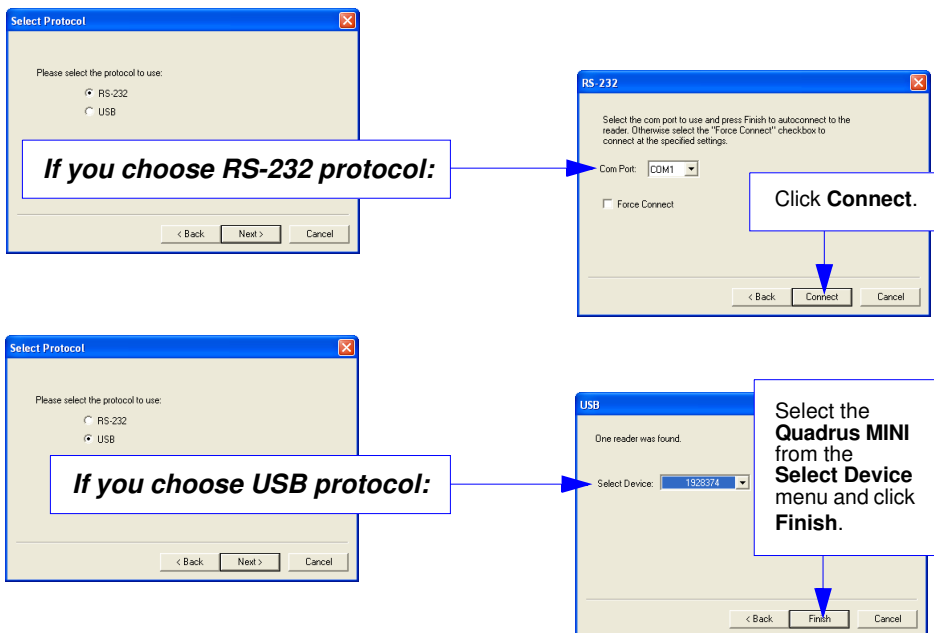
Note: If you need to select another model later, click the **Switch Model** button near the top of the screen or use **Model > New Model** in the menu toolbar.

Step 6 — Select Protocol and Connect

- Choose the connection protocol you are using and click **Next** when the **Select Protocol** dialog appears.



- Once you select your communications mode, follow the prompts to establish your connection.



Step 6 — Select Protocol and Connect (cont.)

When you are connected, you will see the green connection indicator in the status bar at the bottom right of your screen.

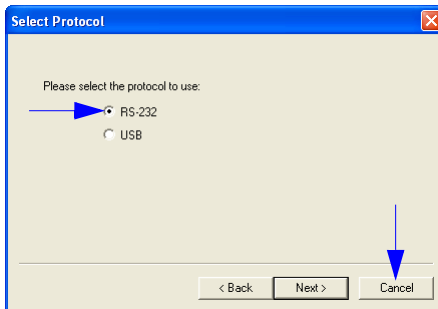
RS-232: CONNECTED Point-to-Point COM1 115.2K : N : 8 : 1

USB: CONNECTED USB HID

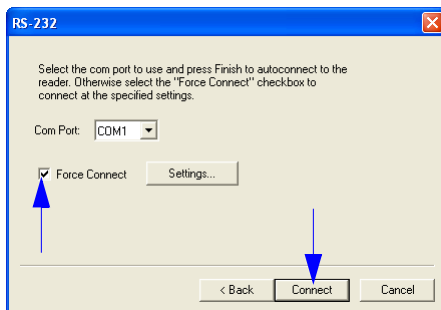
- If your RS-232 connection attempt fails, click the **Autoconnect** button, select a different communications port, and try again.

Note: If your RS-232 host settings cannot be changed to match the imager's settings:

- Click **Connect** on **ESP's** menu toolbar, and then select **Connection Wizard**.
- When the **Select Protocol** dialog appears, select **RS-232** and click **Next**.



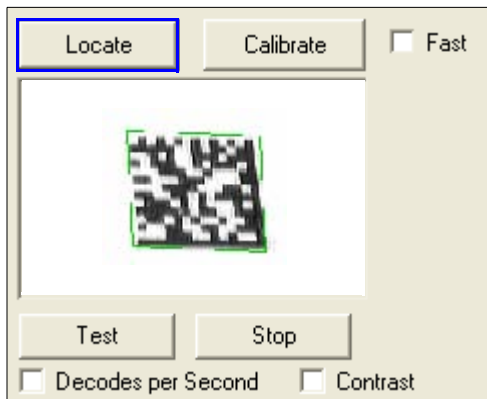
- When the **RS-232** dialog appears, check the **Force Connect** box and click the **Connect** button.



Step 7 — Locate the Symbol in the Field of View

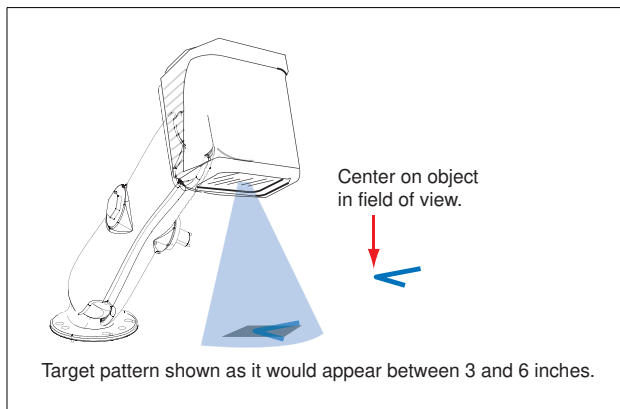
Locate by ESP

- In ESP's **EZ Mode**, click the **Locate** button to enable the blue target pattern.



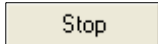
The symbol in the field of view will appear in the video view beneath the **Locate** and **Calibrate** buttons, and you will see the blue target pattern projected from the front of the imager.

- Center the target pattern on the symbol.
At 2 to 3 inches, the pattern resembles an **X**. At 3 to 6 inches, the pattern resembles a **V**.



Important: The entire symbol should fall within the field of view (FOV) of the imager. The field of view is what appears in **ESP's Locate/Calibrate** window in **EZ Mode**.

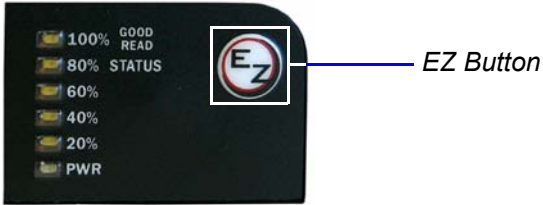
- Click the **Stop** button to end the **Locate** function.



Locate the Symbol in the Field of View

Locate by EZ Button

If you are not connected to a host computer, the EZ Button allows you to locate a symbol in the imager's field of view.



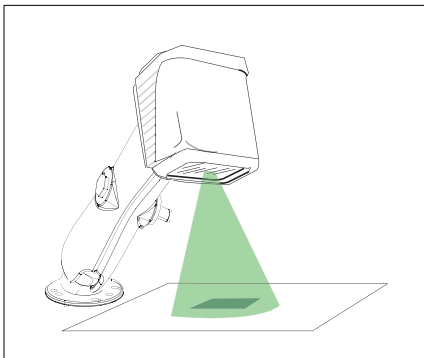
- Hold down the EZ Button for about one second and release when you hear one short beep. The amber **20%** LED will illuminate, and you will see the blue target pattern projected from the front of the imager.
- Center the target pattern on the symbol.

Note: To end all EZ Button functions, press the EZ Button once and quickly release.

Step 8 — Calibrate

Quadrus MINI settings can be adjusted automatically for optimum symbol decoding performance by either the EZ Button or by **ESP**.

During the calibration routine, the reader will flash its amber Read Rate percent LEDs and red illumination LEDs while searching camera settings and determining the best configuration for decoding symbol data. Upon successful completion of this routine, a green LED pattern will flash brightly and illuminate the symbol. If unsuccessful, the imager will emit 5 short beeps and stop searching.



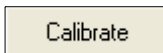
Calibrate by EZ Button

1. Hold down the EZ Button for about two seconds and release when you hear **two short beeps**. The **20%** and **40%** LEDs will illuminate.
2. The imager will search camera settings to determine the best configuration for decoding symbol data.

Note: To end all EZ Button functions, press the EZ Button once and quickly release.

Calibrate by ESP

1. Click the **Calibrate** button.



2. The imager will search camera settings to determine the best configuration for decoding symbol data.

A successful calibration will display a green frame around the symbol, and the following message will appear: "Uploading all reader parameters." After a moment the symbol data will be presented in the field below the image display window.

Calibrate by Serial Command

Send **<@CAL>** from a terminal program to begin calibration.

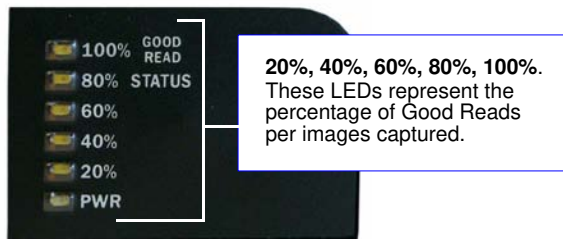
Step 9 — Test Read Rate

Read Rate indicates the number of successful decodes per second achieved by the imager.

Test Read Rate by EZ Button

1. To start the Read Rate test, hold down the EZ Button about three seconds until you hear **three short beeps**. The **20%**, **40%**, and **60%** LEDs will illuminate.

While the symbol is being inspected, the Read Rate LEDs will indicate the corresponding read rate percentage on the back of the unit.



2. To end the Read Rate test, press the EZ Button and quickly release.

Test Read Rate by ESP

1. Click the **Test** button to start the Read Rate test and **Stop** to end it.



If a symbol has been successfully decoded, the symbol's data and related features will be presented in the field below the image display window. Also, while the symbol is being inspected, the Read Rate LEDs will indicate the corresponding Read Rate percentage on the back of the unit.

2. To end the test, click the **Stop** button.

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

Test Read Rate by Serial Command

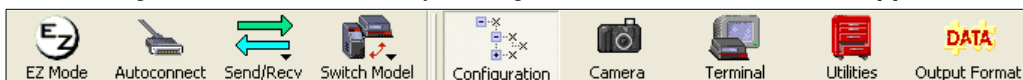
You can also start a test with the **<C>** or **<Cp>** command and end it with the **<J>** command.

Step 10 — Configure the Imager in ESP

To make setup changes to Quadrus MINI, click the **App Mode** button.

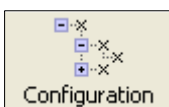


The following modes are accessible by clicking the buttons in the first row of **App Mode** icons:

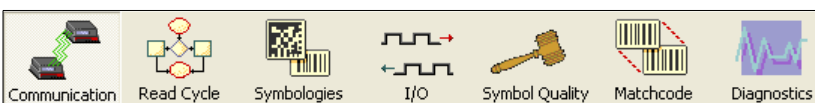


- Click the **Autoconnect** button to establish communications between **ESP** and the imager.
- Click the **Send/Recv** button to send or receive commands.
- Click the **Camera** button to access a live Video view, Evaluate image captures, Calibrate the imager, set the Window of Interest, fine-tune capture settings and processing settings in the Configuration Database, and control multiple read cycle functions in Dynamic Setup.
- Click the **Terminal** button to display decoded symbol data, and to send serial commands to the imager using text or macros.
- Click the **Utilities** button to test Read Rate, request or clear Counters, enable or disable the imager or send output pulses in Device Control, determine the Differences from Default in the current settings, add or remove master symbol data in Master Database, and verify or update the imager's Firmware.
- Click the **Output Format** button to determine the order and content of data output.

Click the **Configuration** button to display the second row of **ESP** icons.



From here you can make changes in the tree controls that can be accessed by clicking the buttons on the second row of icons in the **ESP** window.



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

