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MICROSCAN

MS-2 CCD Reader User's Manual

P/N 83-000002 Rev C

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This limited warranty specifically excludes the following: (1) Any products or parts that have been subject to misuse, neglect, accident, unauthorized repair, improper installation, or abnormal conditions or operations; (2) Any products or parts that have been transferred by the original purchaser; (3) Customer mis-adjustment of settings contrary to the procedure described in the Microscan Systems Inc. owners manual; (4) Upgrading software versions at customer request unless required to meet specifications in effect at the time of purchase; (5) Units returned and found to have no failure will be excluded; (6) Claims for damage in transit are to be directed to the freight carrier upon receipt. Any use of the product is at purchaser's own risk. This limited warranty is the only warranty provided by Microscan Systems Inc. regarding the product. Except for the limited warranty above, the product is provided "as is." To the maximum extent permitted by law, this express warranty excludes all other warranties, express or implied, including but not limited to, implied warranties of merchantability and. Technical support questions may be directed to: helpdesk@microscan.com Register your product with Microscan: www.microscan.com/register fitness for a particular purpose. Microscan Systems Inc. does not warrant that the functions contained in the product will meet any requirements or needs purchaser may have, or that the product will operate error free, or in an uninterrupted fashion, or that any defects or errors in the product will be corrected, or that the product is compatible with any particular machinery.

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Table of Contents

About the MS-2 CCD Reader

The key features of the MS-2 CCD Reader are:

- Ultra-compact size
- CCD image sensor
- LED illumination
- No moving parts
- Low power draw (voltage: 5V; current: 150 mA)
- ESP and K command support
- Up to 220 scans per second
- 0.8 to 12.8” (20 to 325 mm) read range
- High Density and Low Density options
- Integrated right-angle option
- LED status indicators
- IP54-rated enclosure
- RS-232 connectivity

About This Manual

This manual provides complete information on setting up, installing, and configuring the MS-2 CCD Reader. The sections are presented in the order in which a reader 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 two ways to configure and test the MS-2 CCD Reader:

- Microscan’s Windows-based **ESP** (Easy Setup Program) Software, which offers point-and-click ease of use and visual responses to user adjustments.
- Serial commands, such as **<K200,0>**, that can be sent from **ESP**’s **Terminal** or another terminal program.

Warning and Caution Summary

WARNING

LED LIGHT
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
CLASS 1 LED PRODUCT WITH CLASS 1 INTERNAL RADIATION

Maximum LED Output: 141.2µW

IEC 60825-1:1993+A1:1997+A2:2001

- Viewing the MS-2'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: 141.2µW
- Location of the MS-2'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 MS-2 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 safety standard EN 60950.

Statement of Agency Compliance

The MS-2 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 MS-2 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 MS-2 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 the 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 Perfluorooctanoic Acid (PFOA) compounds above the maximum trace levels. To view the documents 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.

1 Quick Start

Contents

This section is designed to get your MS-2 CCD Reader up and running quickly using **ESP** (Easy Setup Program). Following these steps will allow you to get a sense of the reader's capabilities and to test symbol decode performance.

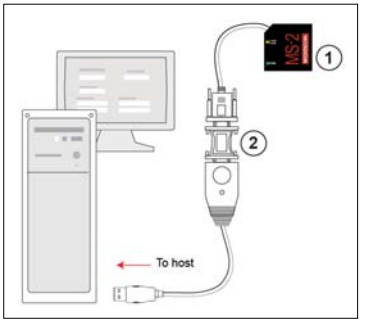
Detailed setup information for installing the reader into your application can be found in the subsequent sections.

Step 1 — Check Hardware

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

USB Hardware

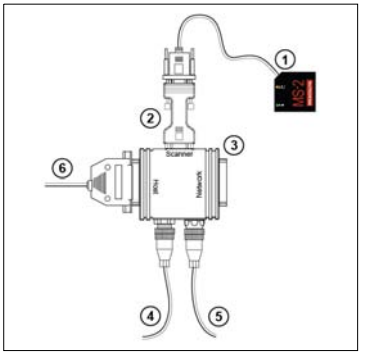
Item	Description	Part Number
1	MS-2 CCD Reader	FIS-0002-000XG
2	IC-3USB Interface Kit	98-000051-01



USB Hardware Required

RS-232 Hardware

Item	Description	Part Number
1	MS-2 CCD Reader	FIS-0002-000XG
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



RS-232 Hardware Required

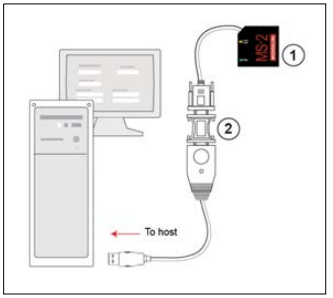
Step 2 — Connect the System

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

Connecting by USB

- Connect the reader (**1**) to the IC-3USB Interface Kit (**2**).
- Connect the IC-3USB Interface Kit (**2**) to the host computer.

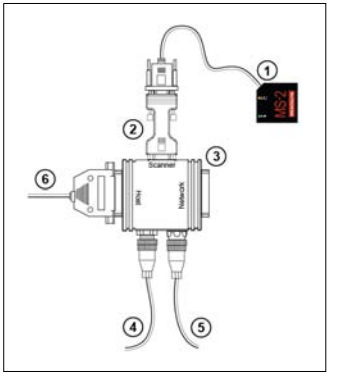
  The reader is powered by the USB connection.



USB Hardware Configuration

Connecting by RS-232

- Connect the reader (**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 reader.



RS-232 Hardware Configuration

Step 3 — 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 MS-2 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 4 — Select Model

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

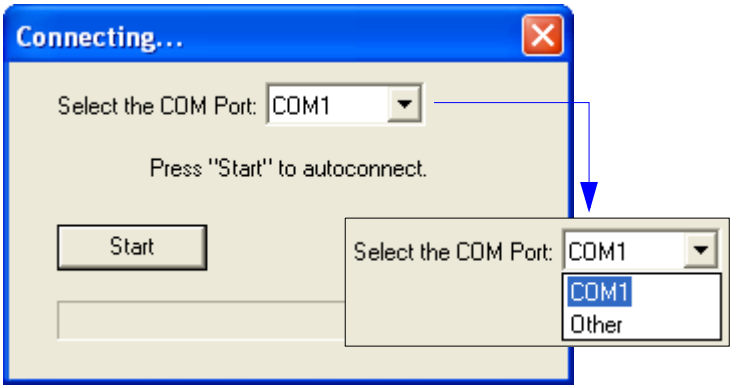
1. Click the button showing the MS-2.
2. Click **OK**.

   Note: You can also double-click the MS-2 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.

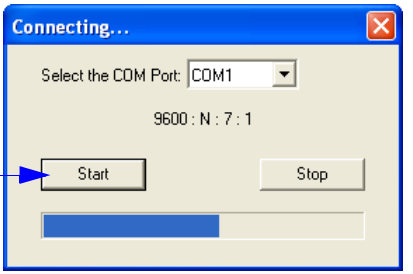
Step 5 — Autoconnect

- Click **Start** when the **Autoconnect** dialog appears.



- If your communications port is not the default **COM1**, use the dropdown menu to change your port.

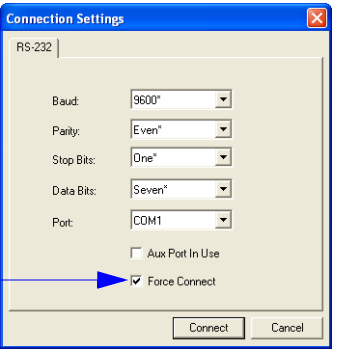
- Once you have chosen the correct port, click **Start** to connect.



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

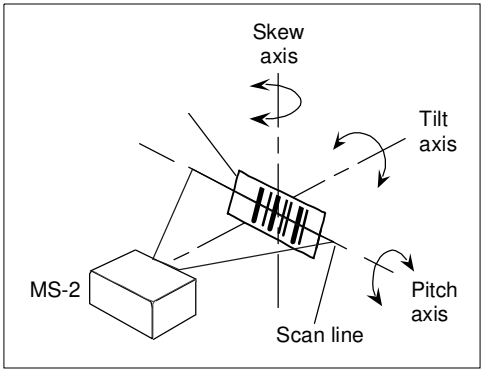
- If the connection attempt fails, click the **Autoconnect** button, select a different communications port, and try again.

Note: If your RS-232 or USB host settings cannot be changed to match the reader's settings, select **Connect** from the **Connect** dropdown menu on ESP's menu toolbar. When the **Connection Settings** dialog appears, check the **Force Connect** box and click the **Connect** button.



Step 6 — Position the Reader

- Set up a symbol at the distance you will be using in your application. Refer to the **Read Ranges** for your MS-2 model (High Density or Low Density) to determine the optimal distance.
  Note: If you are using an Interleaved 2 of 5 symbol, verify that the number or characters being scanned matches the symbol length enabled for I 2/5 (default is **10** and **6**).
- Avoid bright light or infrared light from other sources, including other readers.
- Pitch the reader or symbol at a minimum of **±15°** to avoid specular reflection (the return of direct, non-diffused light).
- Avoid excessive skew or pitch. Maximum skew is **±30°**; maximum pitch is **±30°**.



Reader and Symbol Orientation

Note: Code 39 is the default symbology enabled. If you are uncertain of your symbology, perform the following steps:

1. Enable all symbologies using **ESP**.
2. Enable **Symbology Identifier** at the bottom of ESP's **Symbologies** tree control.

3. Decode the symbol and compare the symbology identifier character to the list on page **5-20** to determine your symbology.
4. Disable all other symbologies.

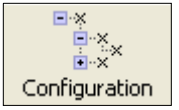
Step 7 — Configure the Reader

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

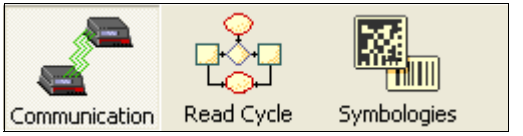
The following modes are accessible by clicking the buttons in the first row of **App Mode** icons:

- Click the **Autoconnect** button to establish communications between **ESP** and the reader.
- Click the **Send/Recv** button to send or receive commands.
- Click the **Terminal** button to display decoded symbol data, and to send serial commands to the reader using text or macros.
- Click the **Utilities** button to test Read Rate, request or clear Counters, enable or disable the reader 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 reader's firmware.

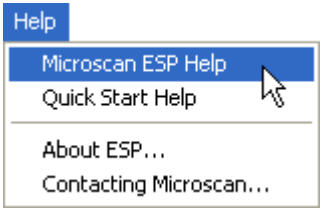
Click the **Configuration** button to display the second row of **ESP** icons.



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.

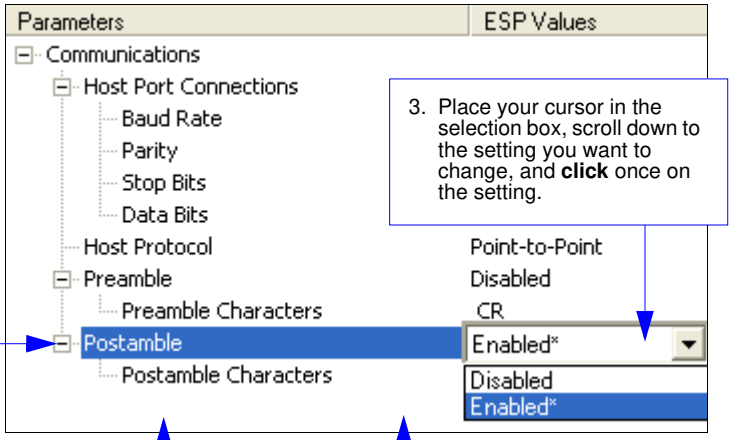


For further details, see **Microscan ESP Help** in the dropdown Help menu.



Step 8 — Save Configuration in ESP

To make changes to a configuration setting:



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.

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

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

Saving Options

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

2 Using ESP

Contents

This section is designed to help you understand the basic structure and elements of **ESP** (Easy Setup Program).

When you open **ESP**, unless otherwise specified in the **ESP Preferences** dialog accessible from the **Options** heading on the menu toolbar, you will enter **EZ Mode** for initial setup. From there, you can enter **Application Mode** (**App Mode**) and access three configuration menus (**Communications**, **Read Cycle**, and **Symbologies**), a **Terminal** interface, and a **Utilities** interface.

ESP can be used to configure the MS-2 CCD Reader in three main ways:

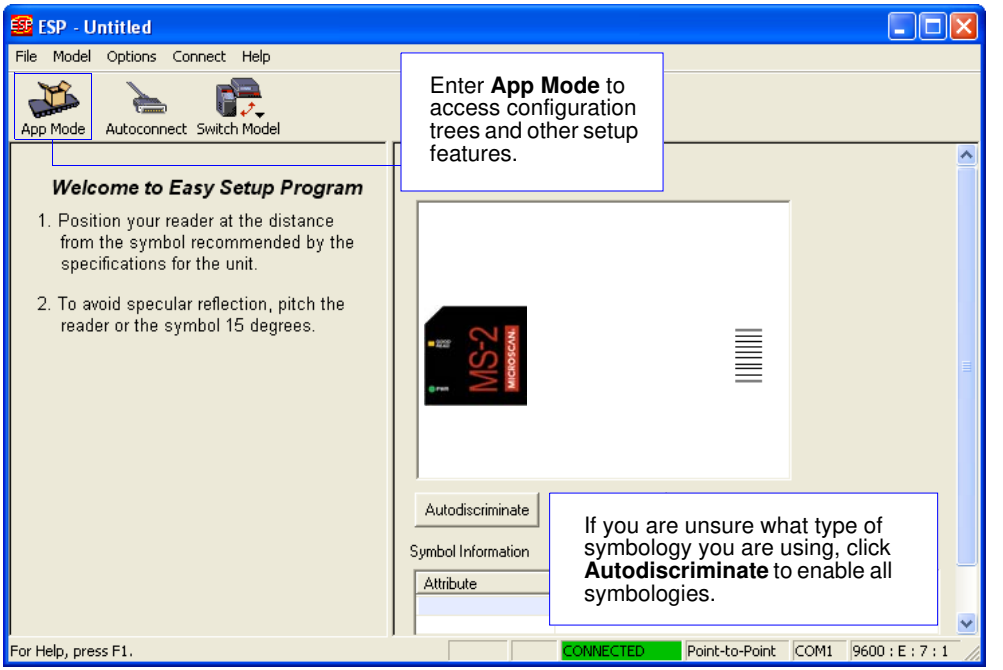
- **Tree Controls:** Each configuration menu contains a list of all option settings that pertain to that specific element of reader operation. For example, the **Communications** menu shows a **Host Port Connections** option, and then a list of the sub-options **Baud Rate**, **Parity**, **Stop Bits**, and **Data Bits**. Each of these sub-options is configurable by using dropdown menus.
- **Graphic User Interfaces:** Reader settings can be configured using such point-and-click tools as radio buttons, zoom in/zoom out sliders, spin boxes, check boxes, and drag-and-drop functions.
- **Terminal: ESP**'s **Terminal** allows you to send serial configuration and utility commands directly to the reader by typing them in the provided text field.

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

For **ESP** system requirements, see **System Requirements for ESP** in Chapter 1, **Quick Start**.

EZ Mode

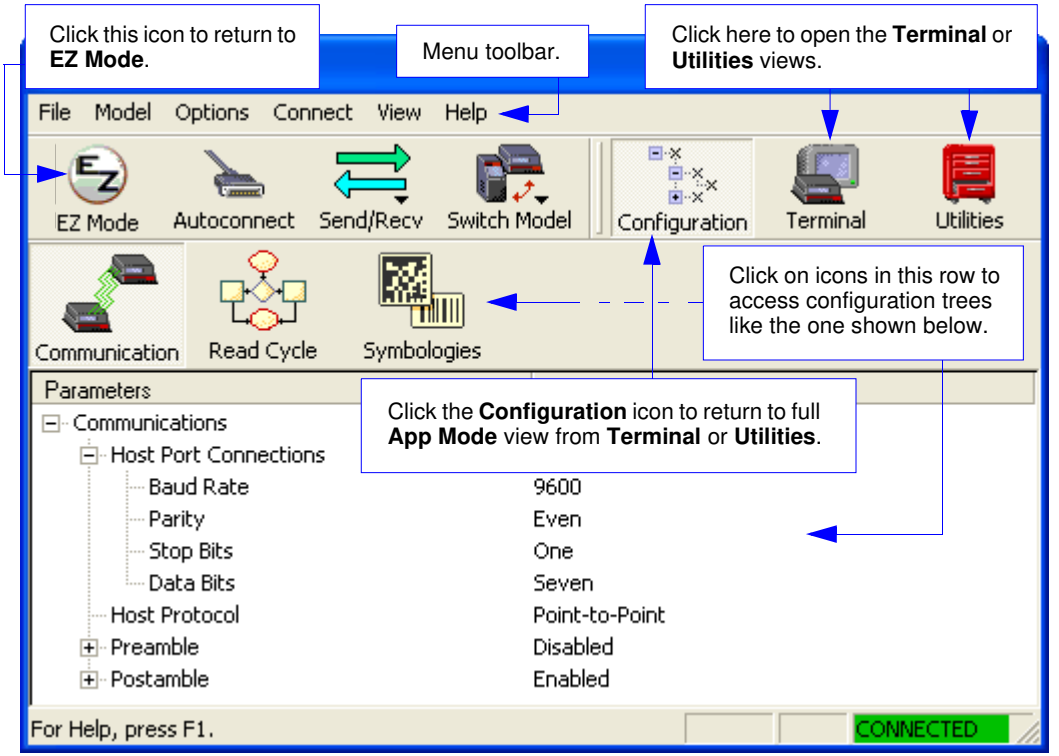
EZ Mode offers instructions on positioning the reader in relation to a test symbol, and also features an **Autodiscriminate** function that automatically enables all symbologies.



Application Mode

From **EZ Mode**, you can click on the **App Mode** button to access specific configuration menus, **Utilities** tools, **Camera** setup, **Output Format** options, and a **Terminal** window where serial commands can be entered.

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



Note: See the corresponding sections in this manual for specific information on any of the views or modes mentioned above.

Menu Toolbar

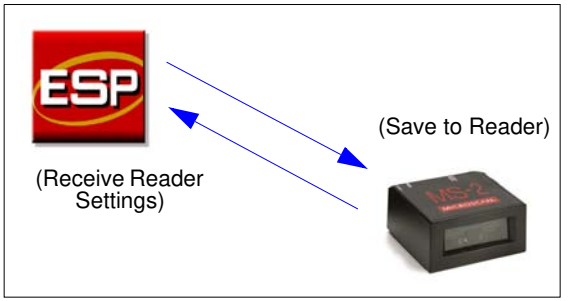
File > New

Whenever **New** is selected, the default configuration of **ESP** is loaded.

Open/Save

When **Save** or **Save As** is selected, the **ESP** configuration is saved to the host computer's hard drive and available whenever the same file is selected under **Open**.

Important: When you save menu changes to your hard drive, these changes are not saved to your reader. The illustration below shows how settings can be saved and received between **ESP** and the reader, and **ESP** and the host hard drive.



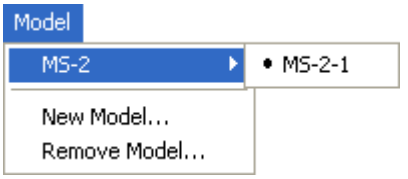
Import/Export

Import converts the ASCII settings from a text file to **ESP** configuration settings.

Export converts the active **ESP** configuration settings to an ASCII text file.

Model

In the **Model** menu you can select any of the models supported by **ESP**. When you choose a different model, the connection to your present model will be terminated.



To connect to another model, select **New Model**, choose a new model from the **pop-up menu** that appears, and click **OK**.

Note: When you save an **ESP** file, you are saving the settings of all the models defined in that file.