MICROSCAN

HS-2D Handheld Reader User's Manual

P/N 83-100002 Rev A

Disclaimer

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

Latest Manual Version

For the latest version of this manual, see the Download Center on our web site at:
www.microscan.com.

Technical Support

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Table of Contents

About the HS-2D Handheld Reader

The HS-2D Handheld Reader, with point-and-click triggering, can read both 1D and 2D symbols and transfer (or buffer and transfer later) decoded data. The HS-2D Handheld Reader is available in USB and RS-232 cabled options.

The HS-2D features a 1.3 million pixel CMOS sensor, and a 400 MHz processor. The imager automatically discriminates between all major 1D and 2D symbologies.

The HS-2D Handheld Reader can be configured by reading Data Matrix symbols encoded with a wide variety of setup commands, or by using Microscan's **ESP**® Software.

About This Manual

This manual provides complete information on setting up, installing, and configuring the HS-2D Handheld Reader. The chapters are presented in the order in which the imager would be assembled, configured, and optimized.

Highlighting

Cross-references and web addresses are highlighted in **blue bold**.

References to **ESP**, its toolbar headings (Communications, Symbologies, I/O Parameters, etc.) and menu headings are highlighted in **Bold Initial Caps**.

Statement of Agency Compliance

The HS-2D has been tested for compliance with FCC regulations and was found to be compliant with all applicable FCC Rules and Regulations.

IMPORTANT NOTE: 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.

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

The HS-2D has been tested for compliance to CE (Conformité Européenne) standards and guidelines and was found to conform to applicable CE standards, specifically the EMC requirements EN 55024, 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, Class B Radiated Emissions, and Class B Conducted Emissions.

Statement of RoHS Compliance

All Microscan readers 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 HS-2D Handheld Reader up and running quickly so you can get a sense of its capabilities and test sample symbols. Detailed setup information for configuring the reader for your specific application can be obtained in the subsequent sections.

Your interface type will determine how data is received by your host. When sending data by USB, you must open a text editor in your host computer. When sending data serially, you must use a terminal program such as HyperTerminal or **ESP**'s **Terminal** view (RS-232 only).

Check Required Hardware

Parts List for USB HS-2D Handheld Reader:

- One HS-2D Handheld Reader
- One 6 ft. USB cable (pre-attached to reader)

Parts List for RS-232 HS-2D Handheld Reader:

- One HS-2D Handheld Reader
- Cable clip attachment
- Spacer
- Two threaded screws
- 8 ft. coiled R-232 cable
- Power supply

USB Interface

Note: The USB interface draws its power from the host computer.

USB Configuration

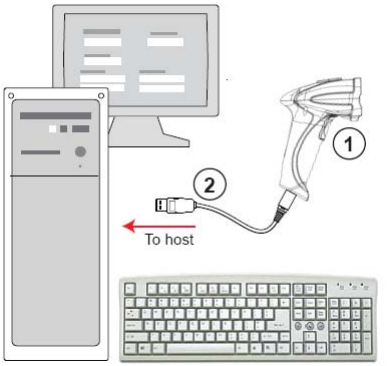
Item	Description	Part Number
1	HS-2D Handheld Reader	**98-000107-01**
2	USB Cable	Included

Installation Steps for USB

1. Connect the USB cable to the HS-2D.
2. Connect the USB cable to the host.
   You do not need to power off your host computer.
3. Open any program in your host computer that can receive keyboard text.
4. Read the **Reset to USB Factory Defaults** symbol below:

M049_03

Reset to USB Factory Defaults



USB Configuration

5. Read the **Save Settings** symbol.

Save Settings

M188_02

Test Symbol
(ABCDEFGHIJKLMNOP)

RS-232 Interface

Note: Unlike USB, the RS-232 interface does not draw its power from the host computer.

RS-232 Configuration

Item	Description	Part Number
1	HS-2D Handheld Reader	98-000107-01
3	RS-232 Interface Kit (USA)	98-000074-04
	RS-232 Interface Kit (Europe)	98-000074-05
	RS-232 Interface Kit (UK)	98-000074-06

Installation Steps for RS-232

1. Power-off the host computer.
2. Connect the 8-pin mini-DIN on the cable to the HS-2D.
3. Connect the 9-pin D-sub connector to the host computer's serial port.
4. Connect the cable to the power supply.
5. Plug in the power supply and power-on the host computer.
6. Start up a terminal program (such as **ESP**'s **Terminal** view or HyperTerminal) and set to **57.6K** baud, **8** data bits, **none** parity, and **2** stop bits.
7. Read the **Reset to RS-232 Factory Defaults** symbol below.

M418_02

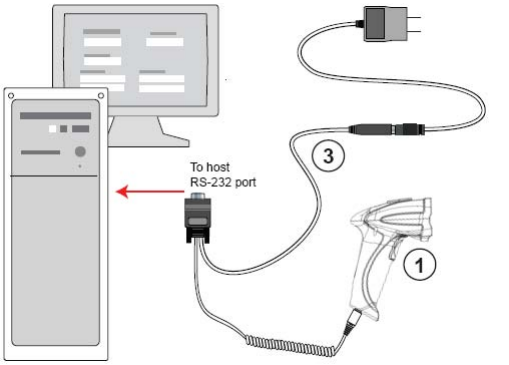
Reset to RS-232 Factory Defaults

8. Read the **Save Settings** symbol.

Save Settings

M188_02

Test Symbol
(ABCDEFGHIJKLMNOP)



RS-232 Configuration

Install ESP

ESP Software can be found on the Microscan Tools CD that is packaged with the HS-2D.

1. Follow the prompts to install ESP from the CD.
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

- 166 MHz Pentium processor (Pentium II processor recommended)
- Windows Vista, XP, or 2000 operating system
- Internet Explorer 5.0 or higher
- 64 MB minimum RAM (128+ MB RAM recommended)
- 80 MB hard drive space
- 800 x 600 minimum 256 color display (1024 x 768 32-bit color recommended)

Important: The reader must be in one of the modes below to communicate with **ESP**.

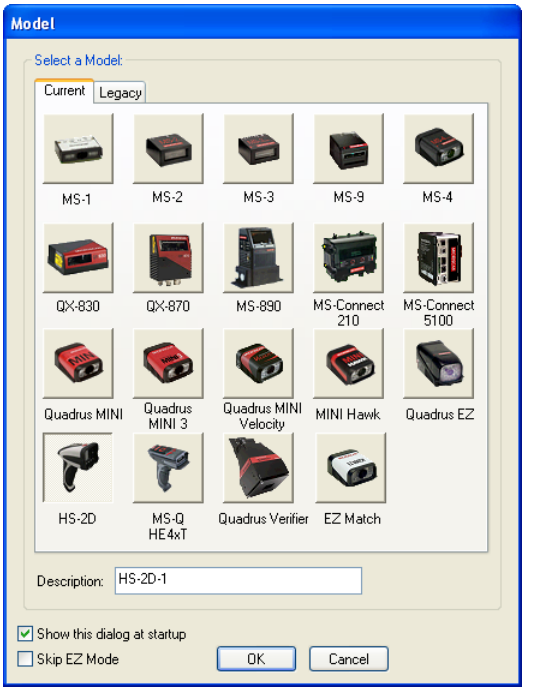
USB	**USB Connect Mode**	
RS-232	**RS-232 Connect Mode**	


M188_02

Save Settings

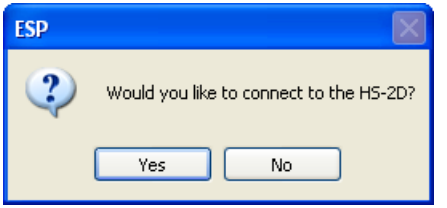
Select Model

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



If you need to select another model later, click **Switch Model** at the top of the screen.

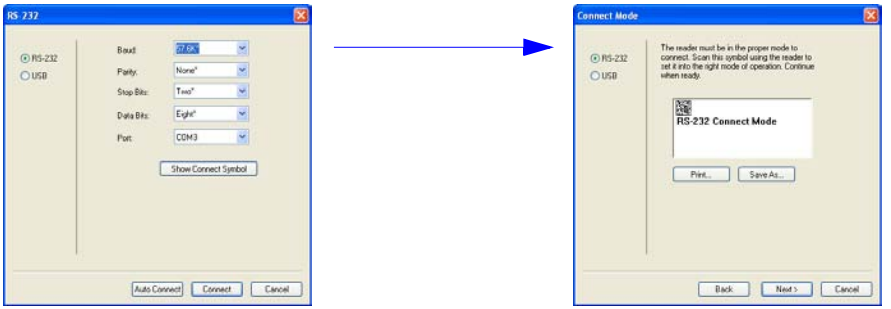
1. Click the HS-2D button and then click **OK**. If you do not want to make this selection every time you start **ESP**, uncheck “Show this dialog at startup”.
2. Select the default reader name (**HS-2D-1**), or type a name of your choice in the **Description** text field and click **OK**.
3. Click **Yes** when this dialog appears:



Select Protocol and Connect to Reader

RS-232

- In the **Select Protocol** dialog box, select the communications protocol you are using and click **Next**.



- Print the **RS-232 Connect Mode** symbol (also shown in the **Install ESP** step) and decode it with the reader to ensure that you are in the correct communications mode. Keep the printed symbol in a convenient place for future use.
- Click **Next** when you are finished.
- The **Com Port** dialog will then reappear. Select which communications port you are using. If you don't see your communications port listed on the dropdown menu, select **Other**.

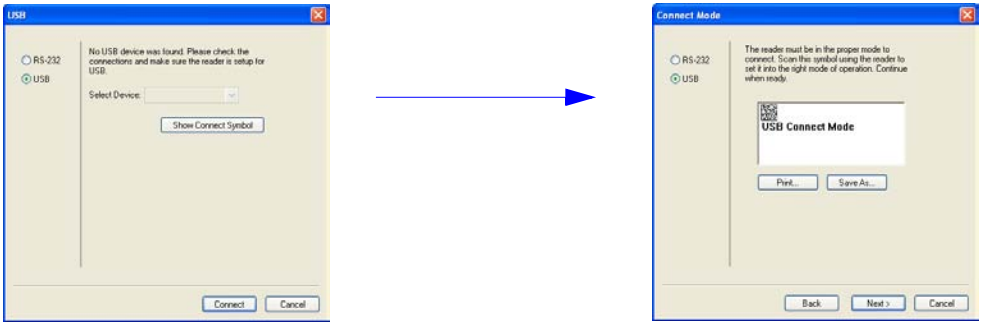
- Click **Connect**.
- When you are connected successfully, the **CONNECTED** message will appear in a green box in the status bar at the bottom right of the screen.

If the connection attempt fails, enable a different communications port, check your port connections, and try again.

You are now ready to configure your reader using **ESP**. Subsequent sections provide more detailed information about **ESP**'s configuration options.

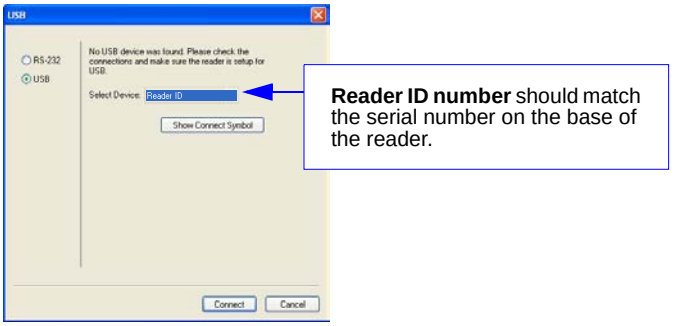
USB

- In the **Select Protocol** dialog box, select the communications protocol you are using and click **Next**.



- Print the **USB Connect Mode** symbol (also shown in the **Install ESP** step) and decode it with the reader to ensure that you are in the correct communications mode. Keep the printed symbol in a convenient place for future use.
- Click **Next** when you are finished.

The **Select Device** dialog will then reappear:



- You will see a " Reader" ID number in the **Select Device** field. Click **Connect**.
- When you are connected successfully, the **CONNECTED** message will appear in a green box in the status bar at the bottom right of the screen.

You are now ready to configure your reader using **ESP**. Subsequent sections provide more detailed information about **ESP**'s configuration options.

2 Using ESP

This section is designed to help you understand the structure and application of **ESP**.

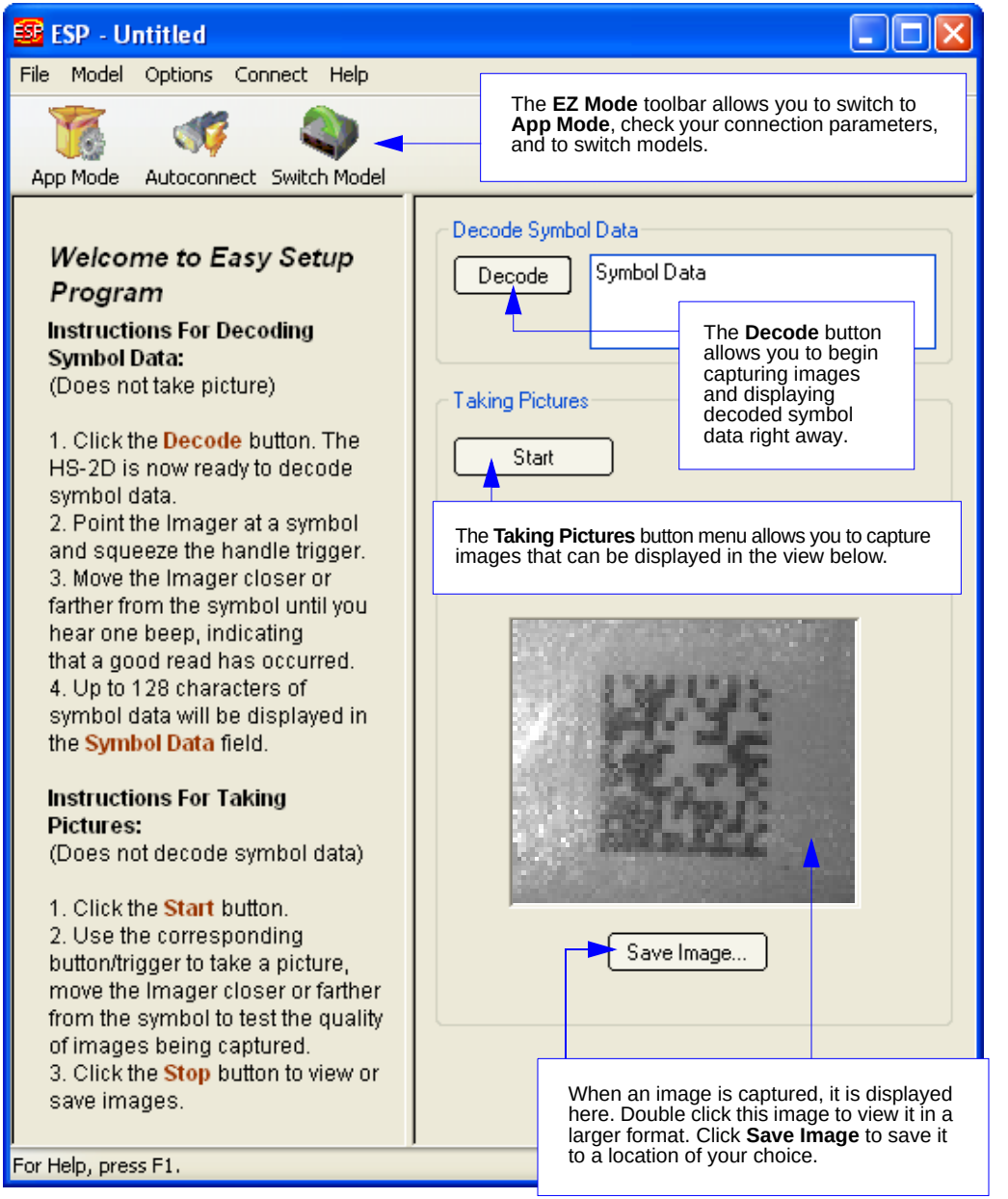
When you open **ESP**, unless otherwise specified in the **ESP Preferences** dialog accessible from the **Options** heading on the menu toolbar, you will enter **EZ Mode** for initial setup. From there, you can enter **Application Mode** (**App Mode**) and access several configuration menus (**Communications**,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

ESP can be used to configure the HS-2D Handheld Reader in the following 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 **Communications Mode** command, and then the options **RS-232 Serial**, **USB Keyboard**, and **USB Native (HID)**, all of which are accessible from a dropdown menu.
- **Graphic User Interfaces:** Settings can be configured using such point-and-click tools as radio buttons, tabs, spin boxes, check boxes, and drag-and-drop functions.
- **Terminal: ESP**'s **Terminal** interface allows you to send configuration and utility commands directly to the reader by typing them in the provided text field.

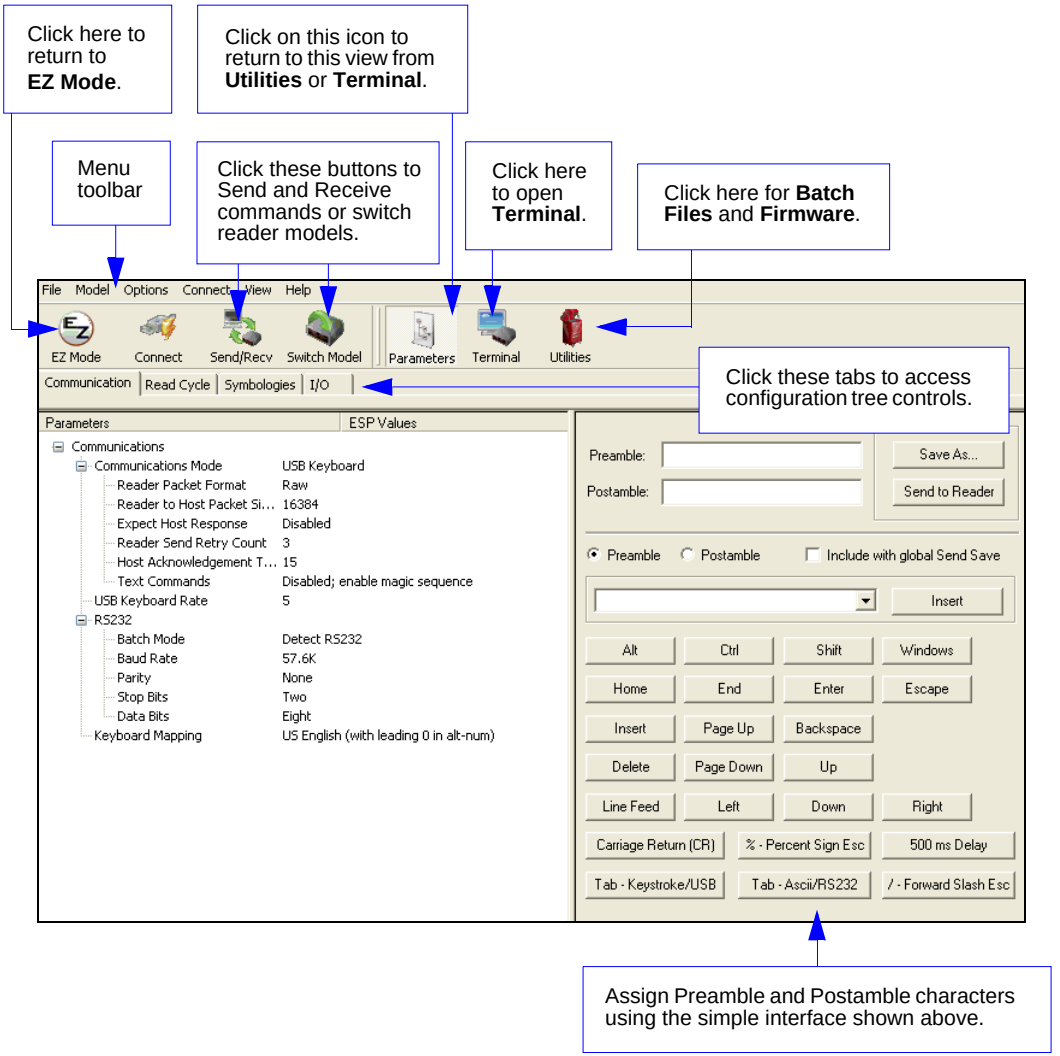
EZ Mode

The **EZ Mode** screen is the first thing you will see when you start **ESP**. **EZ Mode** will help you get your reader up and running quickly, and will acquaint you with the **ESP** interface.



Application Mode

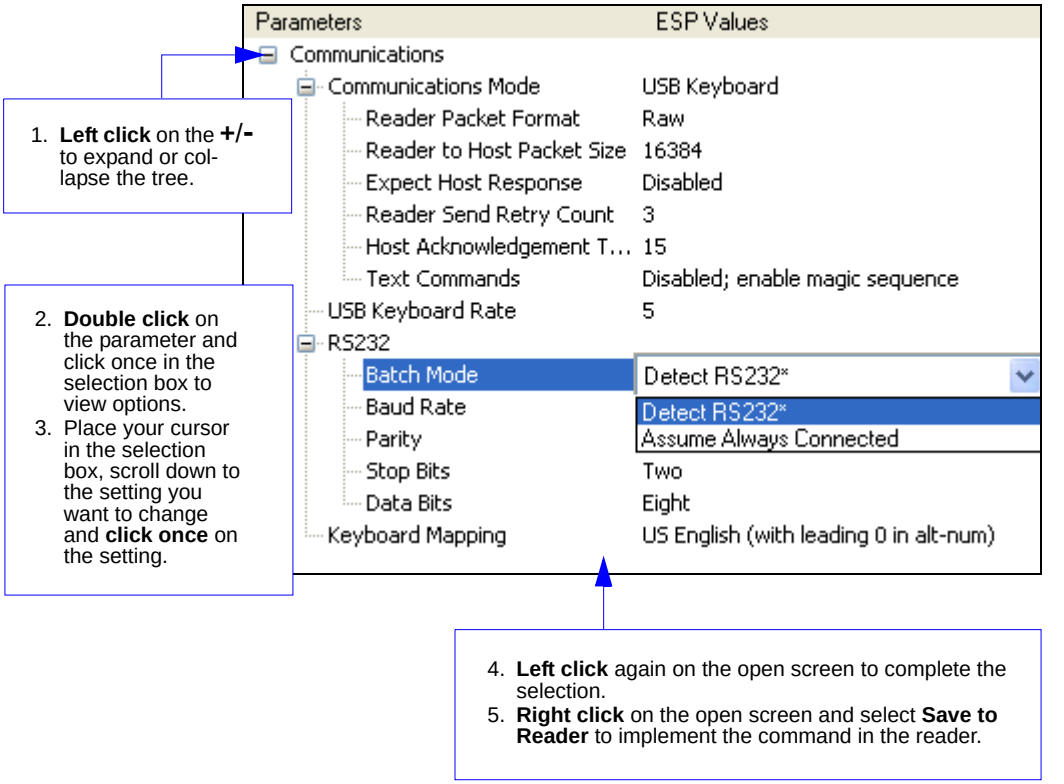
Application Mode gives you access to a robust configuration environment, including tree controls that let you make precise changes to operation parameters, and graphic interfaces that make configuring your reader easy and intuitive.



Note: For specific information on any of the icons shown above in the operations bar or configuration bar, see corresponding sections.

Tree Controls

To make changes to configuration settings in the tree control menus:



The reader must be in one of the modes below to communicate with **ESP**.

USB	**USB Connect Mode**	
RS-232	**RS-232 Connect Mode**	

Menu Toolbar

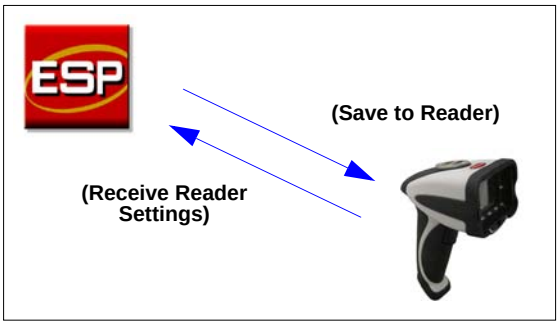
File > New

Whenever **New** is selected from the **File** menu, 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**.

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



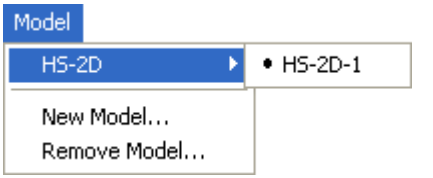
Import / Export

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

The **Model** menu allows you to select between reader models. When you choose another model, the current connection with your present model will be terminated.



New Model

To connect to another model, select **New Model**, choose the model you want, and click **OK**.

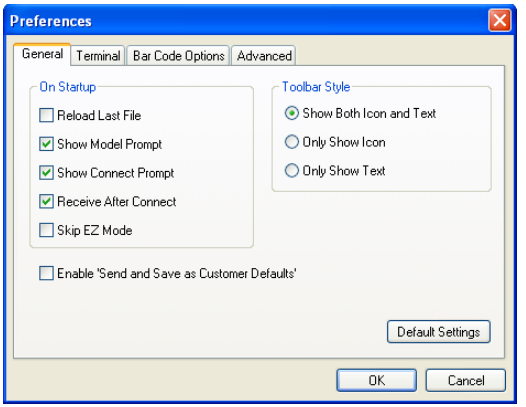
All models you have selected and enabled will continue to appear in the dropdown model menu. The **New Model** option is repeated when you click the **Switch Model** button on the top row of icons.

Options

You can use the **Options** menu to save memos and set up **ESP** preferences.

Preferences will be saved and loaded into **ESP** the next time **ESP** is opened, whether or not you save the **ESP** file to the host computer.

Preferences > General Tab



Reload Last File

At startup, reloads the last file saved to the computer.

Show Model Prompt

At startup, remembers the last connected model and displays it in the **Connecting...** dialog whenever you attempt to connect.

Skip EZ Mode

At startup, skips **EZ Mode** and opens directly in **App Mode**.

Show Connect Prompt

At startup, displays the **Would you like to connect...** prompt.

Receive After Connect

At startup, loads the reader's settings into **ESP**. (This is not recommended if you want to preserve your **ESP** settings for future use.)

Show Both Icon and Text (Default)

Sets the toolbar to display icons and names of all operations.

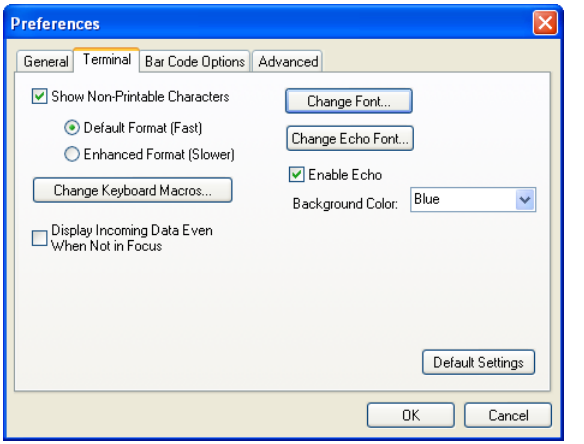
Only Show Icon

Sets the toolbar to display only icons representing operations, without text.

Only Show Text

Sets the toolbar to display names of operations only, without icons.

Terminal Tab

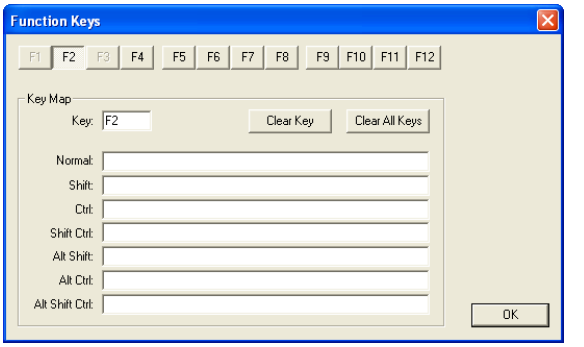


When **Show Non-Printable Characters** is checked, characters such as 'CRLF' will be displayed in the terminal window. When the **Enhanced Format** radio button is checked, subscript and superscript formatting is shown.

When **Display incoming data even when not in focus** is checked, data from the reader will continue to appear in the terminal even when **ESP** is not the top window on the host computer's screen.

When **Enable Echo** is checked, the terminal window displays user-entered data.

Change Keyboard Macros



Clicking the **Change Keyboard Macros** button brings up the **Function Keys** dialog. In this dialog you can select the desired function key and then enter your macro keystrokes in the associated key map. For example, to make **Ctrl-F2** the keystroke to send a trigger character, select **F2**, then in the **Ctrl** row, enter **<trigger character>** and click **OK**. Then whenever the **Ctrl-F2** keystroke is pressed, the trigger character will start the read cycle.

Note: The **F1** key is reserved for opening **ESP** Help and the **F3** key is reserved for the **Find Next** function.

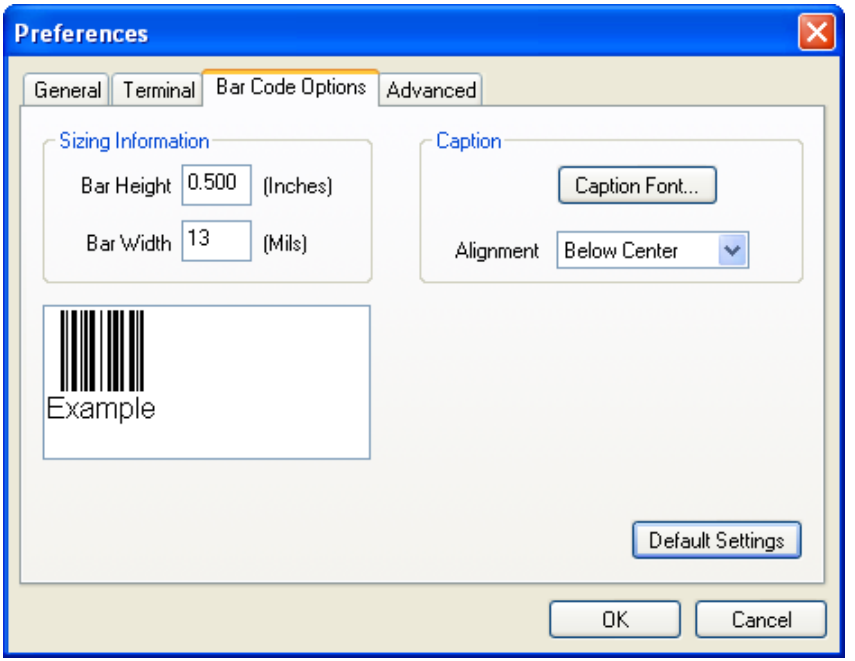
Change Font

Sets the font characteristics for data received from the reader.

Change Echo Font

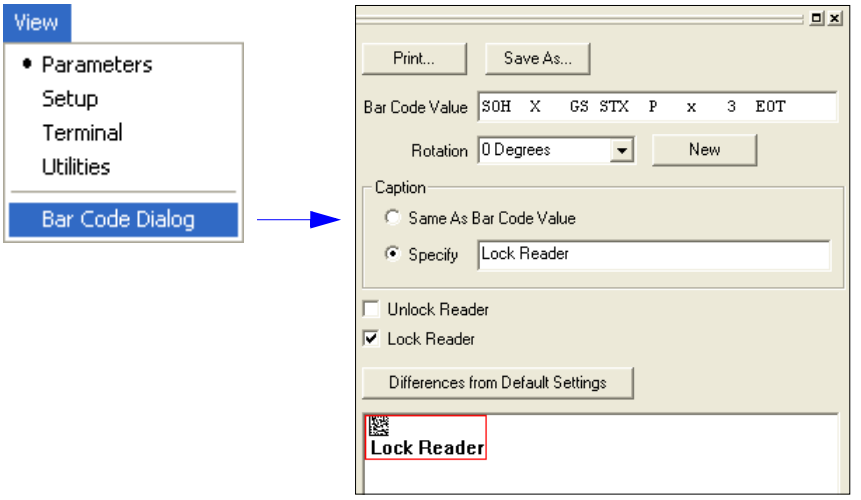
Sets the font characteristics of user-entered data.

Bar Code Options Tab

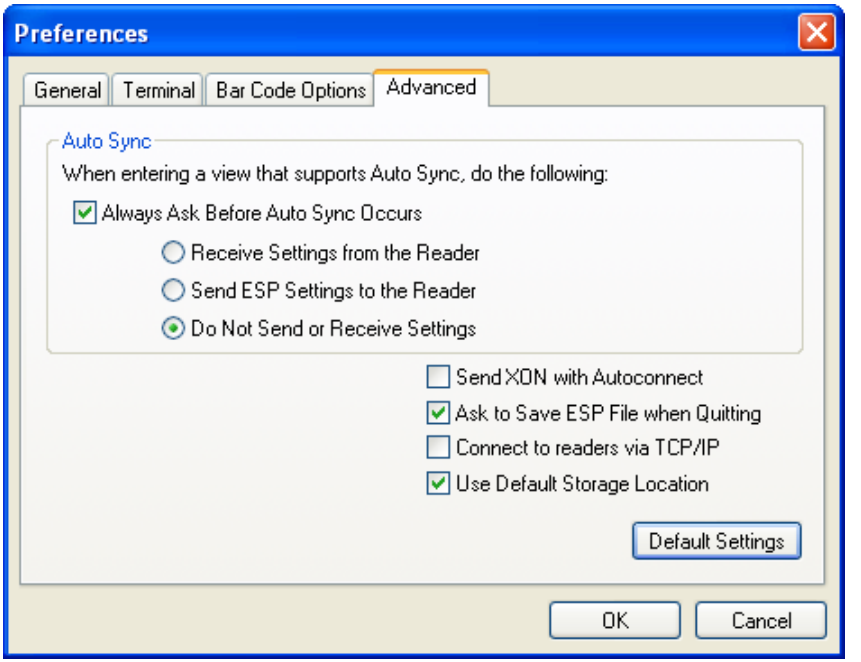


Sizing Information

Sets element size (in thousands of an inch) of symbols that you create and print from the **Bar Code Dialog** under **View**.



Advanced Tab



The Auto Sync dialog on the **Advanced** tab allows you to determine whether Auto Sync will be automatically enabled in sections of **ESP** where it is used, or if it will ask you before it enables Auto Sync functions.

Always Ask Before Auto Sync Occurs

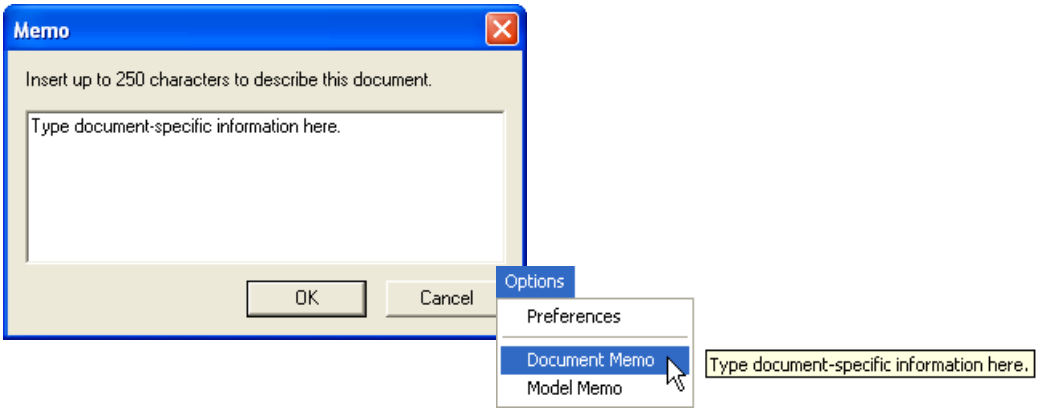
If you check this option box, you are then able to determine what specific Auto Sync functions will be enabled. **Receive Settings from the Reader** will automatically send the reader's settings to **ESP** when Auto Sync is enabled. **Send ESP Settings to the Reader** will automatically send all reader configuration settings chosen in **ESP** to the reader. **Do Not Send or Receive Settings** creates a condition in which Auto Sync will not send reader settings to **ESP**, or send **ESP** settings to the reader.

Send XON with Auto-Connect

Sends an **XON** (**Begin Transmission**) command to the reader before starting the **Auto-Connect** routine.

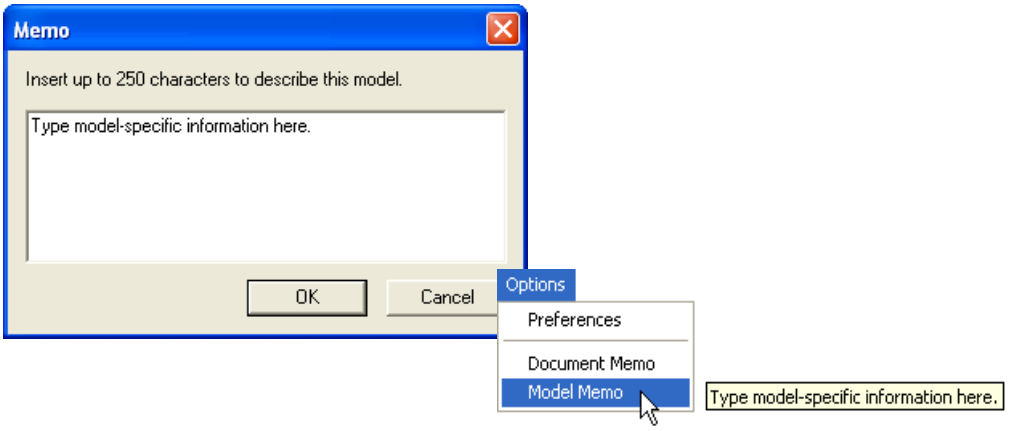
Document Memo

The information you type in the **Document Memo** field will appear in a context-sensitive text box whenever your cursor hovers over the **Document Memo** item on the **Options** menu.



Model Memo

Similar to **Document Memo**, the information you type in the **Model Memo** field will appear in a context-sensitive text box whenever your cursor hovers over the **Model Memo** item on the **Options** menu. Memos created in **Model Memo** are specific to the model enabled when the message was created.



Note: Memos must be saved in a **.esp** file if you want them to available in your next session. If you do not save your current session, any memos that you have entered during the session will be discarded, and will be unavailable in your next session.

Connection Wizard

When you choose to connect to the reader via the **Connection Wizard**, you will first need to select the correct protocol (see **Select Protocol and Connect to Reader**).

When you have successfully connected to the reader you will see one of the two following displays in the status bar at the lower right of the screen:

RS-232:

USB:

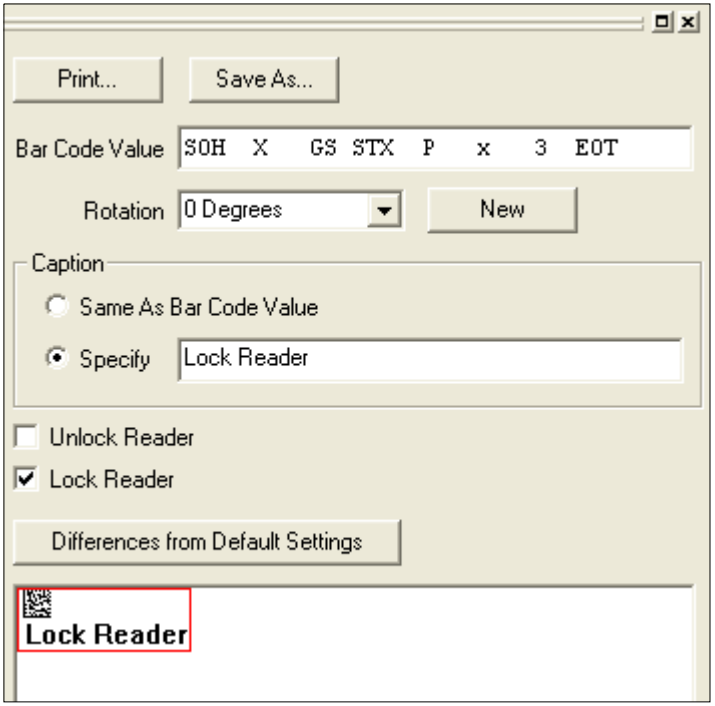
View

The options in the **View** menu correspond to icons on the operations toolbar (**Parameters**, **Setup**, **Terminal**, **Utilities**). Each option allows you to configure the reader or to perform various other functions in the chosen view.

The **View** menu also allows you to access the **Barcode Dialog**.

Bar Code Dialog

In the **Bar Code Dialog** you can directly type the text and commands you want to encode. This allows you to create configuration symbols that you can print and read with the reader.



Send/Receive

To access **Receive**, **Save**, **Default**, and **Advanced** options, click the **Send/Recv** button.

You can also access these options by right-clicking in any of the configuration views.

Receive Reader Settings

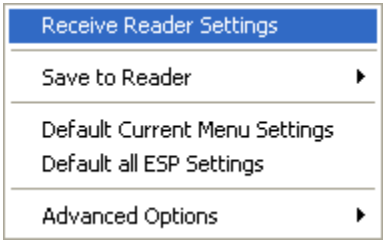
From the **Send/Recv** menu, select **Receive Reader Settings.**

This option is useful if you want to receive the reader's settings and save them as a file for later retrieval. For example, if your reader has settings that you do not want to change, choosing **Receive Reader Settings** will allow you to load those settings to **ESP** and save them as an **ESP** file.

Receiving the reader's settings also assures that you will not subsequently save any unwanted configuration changes previously made in **ESP**.

Select this option if you want to upload the reader's settings to **ESP**. For example, if your **ESP** file has a number of custom settings that you want to maintain and download to the reader, you will lose those **ESP** settings if you choose to receive settings from the reader.

Save to Reader



Send, No Save

This saves **ESP** settings to current memory.

Send and Save

This activates all changes in current memory *and* saves to the reader.

Default

When you select **Default Current Menu Settings** or **Default all ESP Settings** you are *only* defaulting settings in **ESP**. The reader is not affected unless you download new settings.

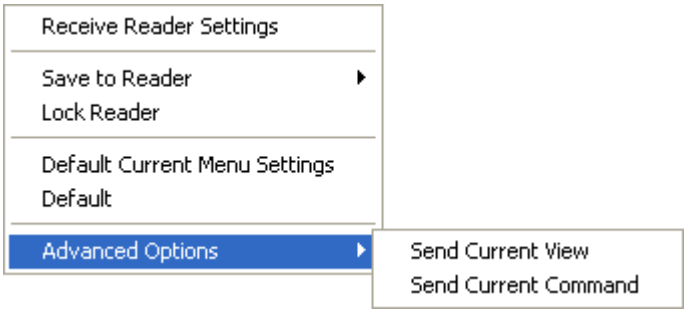
Advanced Options

Send Current View

This is the same as **Save to Reader > Send No Save** except that only the commands in the current menu tree are sent.

Send Current Command

This is the same as **Send Current View** above, but only saves the command that is currently selected.



3 Basic Operations

Contents

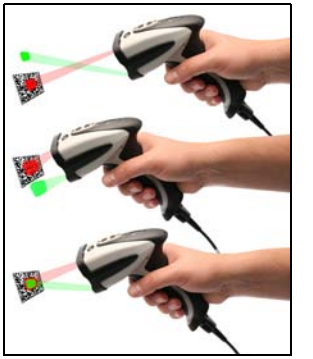
This section explains how to practice targeting and triggering, and how to begin configuring the reader.

Practice Targeting

When first connecting, allow approximately 3 seconds for the reader to initialize.

1. Hold the reader steady and point at a symbol about **2.3 inches** (**5.8 cm**) away.
2. Squeeze and hold the trigger. Red and green targeting spots will appear in front of the reader.
3. Center the red and green spots on the symbol and wait a second or two for a decode.

   For configuration symbols, you will hear **2 beeps** when a good read occurs. For data symbols, you will hear **1 beep** when a good read occurs.
4. If no decode occurs, slowly draw away from the symbol while holding the laser spot steadily in place.



Test Symbol

ABCDEFGHIJKLMNOP

Targeting Suggestions

- Typically, you should not hold the reader exactly perpendicular to the symbol. Position the reader about 15 to 30 degrees to avoid specular reflection.
- Do not wave the reader side-to-side or up-and-down, or attempt to sweep across a symbol; sudden movements will create fuzzy images and result in failed read attempts.
- The reader is omnidirectional and can read a symbol from any position (The exception to this is with certain linear symbols; in these cases, the read area will be oriented to the length of the symbol.)

Targeting LEDs

Read the configuration symbols below to enable or disable red and green targeting LEDs.

M732_01
Red Targeting LED On

M733_01
Red Targeting LED Off

M734_01
Green Targeting LED On

M735_01
Green Targeting LED Off

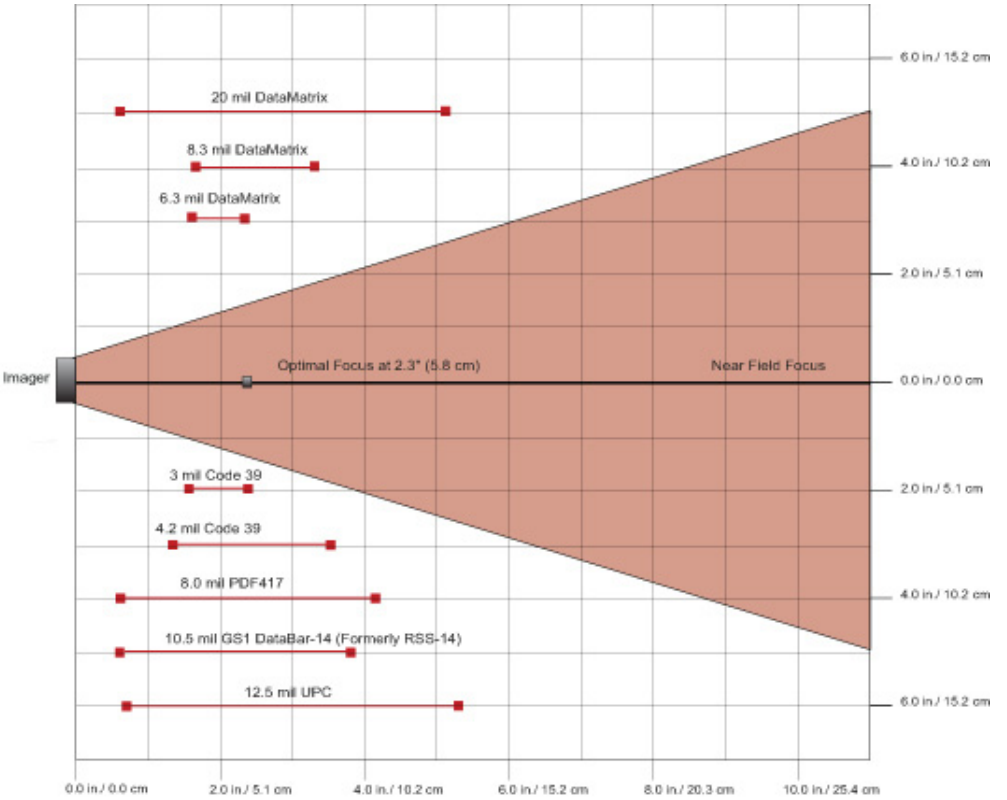
Determine Optimum Position

1. Position the reader in front of the symbol.
   - **2.3** inches (**5.8 cm**).
2. Determine the optimum read position by triggering at different distances and angles.

   Smaller symbols require the unit to be held close to the optimal focal distance. For larger symbols, which have a larger depth of field, refer to the chart below.

Test Symbol

ABCDEFGHIJKLMNOP



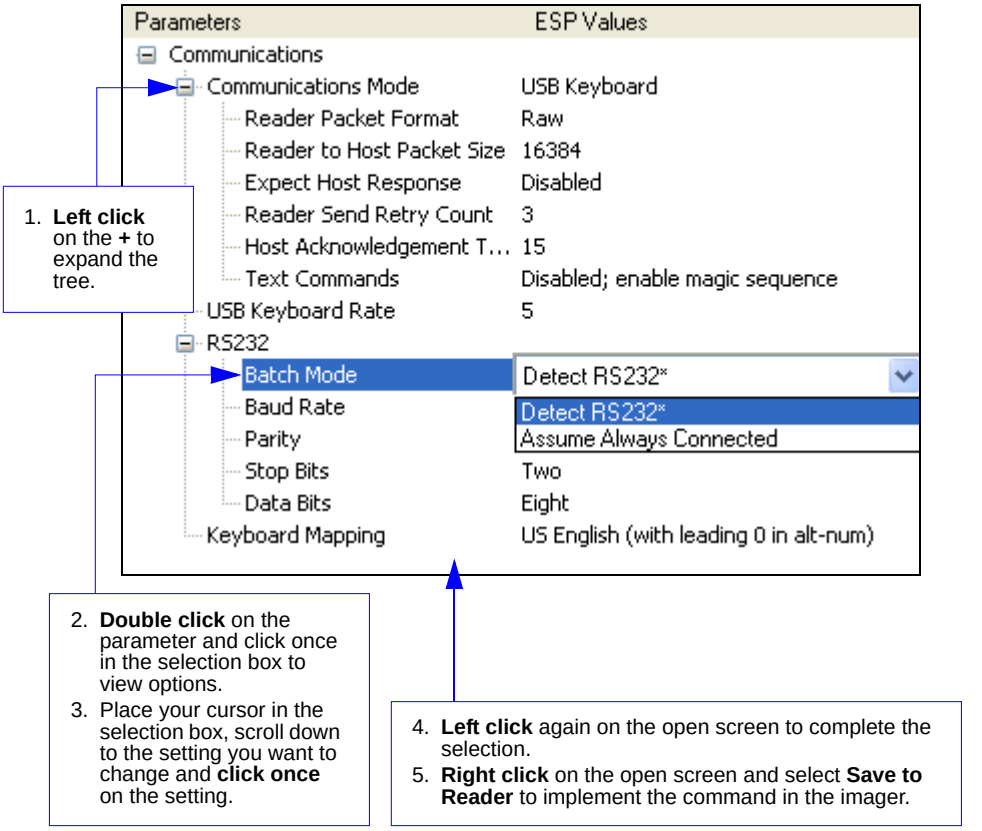
4 Communications

Contents

This section includes connection parameters and options for communicating with the HS-2D Handheld Reader in various interfaces.

Communications by ESP

To make changes to configuration settings in the **Communications** tree control:



Communications Overview

All HS-2D Handheld Readers are shipped with a USB cable. You can also add RS-232 capabilities and configure your imager accordingly. Whenever you default the imager, it will return to the default settings of whichever interface you are using. Defaulting the imager does not remove preamble and postamble formatting.

Note: You must use **USB Connect Mode** or **RS-232 Connect Mode** to connect to **ESP**. Once the imager is connected to **ESP**, you can select your communications mode and set other communication parameters.

USB

With USB communications, the imager connects directly to the host's USB port from which it draws its power. Data is displayed by any open Windows-based program that can capture text in USB Keyboard Mode.

RS-232

With RS-232 communications the imager communicates with the host through a communications program such as HyperTerminal.

Default settings for establishing RS-232 communications are:

Baud =	**57.6K**
Stop Bits =	**2**
Data Bits =	**8**
Parity =	**None**

USB Interface

USB Keyboard is the default interface in which data is transferred to a Windows-based text program as keyboard data.

See **USB Interface** for detailed steps on setting up the USB Interface.

USB Keyboard Mode

Data is entered as keyboard sequences. You need to read this symbol whenever you are changing from a different interface to USB.


M134_02

USB Downloader Mode

This mode is the standard way of transferring unformatted, unpacketized data to the imager through the USB port.


M133_01

USB Native Two-Way Mode

This mode is used when the user needs error-corrected communication between the HS-2D and the host the USB port.


M135_04

USB Virtual COM Mode

This mode allows an HS-2D in a USB configuration to function as a virtual serial COM port. This mode requires installation of a USB Virtual COM driver. Contact your Microscan sales representative to request this driver, as well as installation instructions.


M668_01

USB HID POS (Terminal ID 131)

This mode allows a USB-cabled HS-2D to communicate as a USB HID POS (Terminal ID 131) device.


M736_01

RS-232 Interface

Enabling either of these modes will disable USB communications and require you to default the imager or read the “USB Keyboard” symbol to return to USB.

See **RS-232 Interface** for detailed steps on setting up the RS-232 Interface.

RS-232 Default Settings

This mode is the standard way of transferring unformatted, unpacketized data through the RS-232 port.


M418_02

You will need to read this symbol whenever you set up RS-232 communications.

Baud Rate (RS-232)

Baud Rate is the rate at which the imager and host transfer data. It only needs to be changed if necessary to match the host setting.


M092_01 ***1200***


M093_01 ***2400***


M094_01 ***4800***


M095_01 ***9600***


M096_01 ***19.2K***


M097_01 ***38.4K***


M098_01 ***57.6K (Default)***


M099_01 ***115.2K***


M188_02 ***Save Settings***

Parity (RS-232)

Parity is an error detection routine in which one data bit in each character is set to **1** or **0** so that the total number of 1 bits in the data field is even or odd. It only needs to be changed if necessary to match the host setting.


M103_01

None (Default)


M104_01

Odd


M102_01

Even

Stop Bits (RS-232)

Stop Bits are added to indicate the end of each character. This setting should only be changed if necessary to match the host setting.


M106_01

2 Stop Bits (Default)


M105_01

1 Stop Bit

Data Bits (RS-232)

Data Bits are the total number of bits in each character. This setting only needs to be changed if necessary to match the host setting.


M101_01

8 Data Bits (Default)


M100_01

7 Data Bits

Preamble

A **preamble** is a character or series of characters that is added to the beginning of a decoded data string. Preamble characters will appear in the order that they are enabled (left to right). For example, if you enable a comma and then a space, and then decode a symbol containing the data 'ABC', your output will look like this:

, ABC

The only limit to the number of preambles enabled is the total memory size available.

Important: Be sure to save all settings before reading any of the following preamble symbols—otherwise your settings may be lost.


M188_02

Save Settings

Set the desired preamble by reading the appropriate symbol below.


M159_02

Comma


M164_02

Space


M166_01

Tab (USB Only)


M218_02

Tab


M404_01

Erase All Preamble Data


M214_02

Carriage Return Line Feed

Important: Use only with serial applications.

Note: To erase all preamble *and* postamble data, read the following symbol:


M406_02

Erase Preamble and Postamble Data

Postamble

A **postamble** is a character or series of characters that is added to the end of a decoded data string. Postamble characters will appear in the order that they are enabled (left to right). For example, if you enable a space and then a comma, and then decode a symbol containing the data 'ABC', your output will look like this:

ABC ,

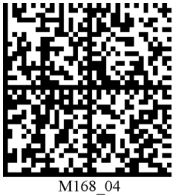
The only limit to the number of postambles enabled is the total memory size available.

Important: Be sure to save all settings before reading any of the following postamble symbols—otherwise your settings may be lost.


M188_02

Save Settings

Set the desired postamble by reading the appropriate symbol below.


M168_04

Carriage Return

Important: Use only with serial applications.


M160_04

Comma


M169_04

Line Feed

Important: Use only with serial applications.


M170_04

Carriage Return Line Feed

Important: Use only with serial applications.


M165_04

Space


M161_04

Enter

Important: Use only with USB or PS/2 Keyboard modes.


M167_04

Tab

Important: Use only with USB or PS/2 Keyboard modes.


M219_04

Tab (RS-232 Only)


M405_02

Erase / None

Important: Reading this symbol will erase all postamble data.

Note: To erase all postamble *and* preamble data, read the symbol at right:

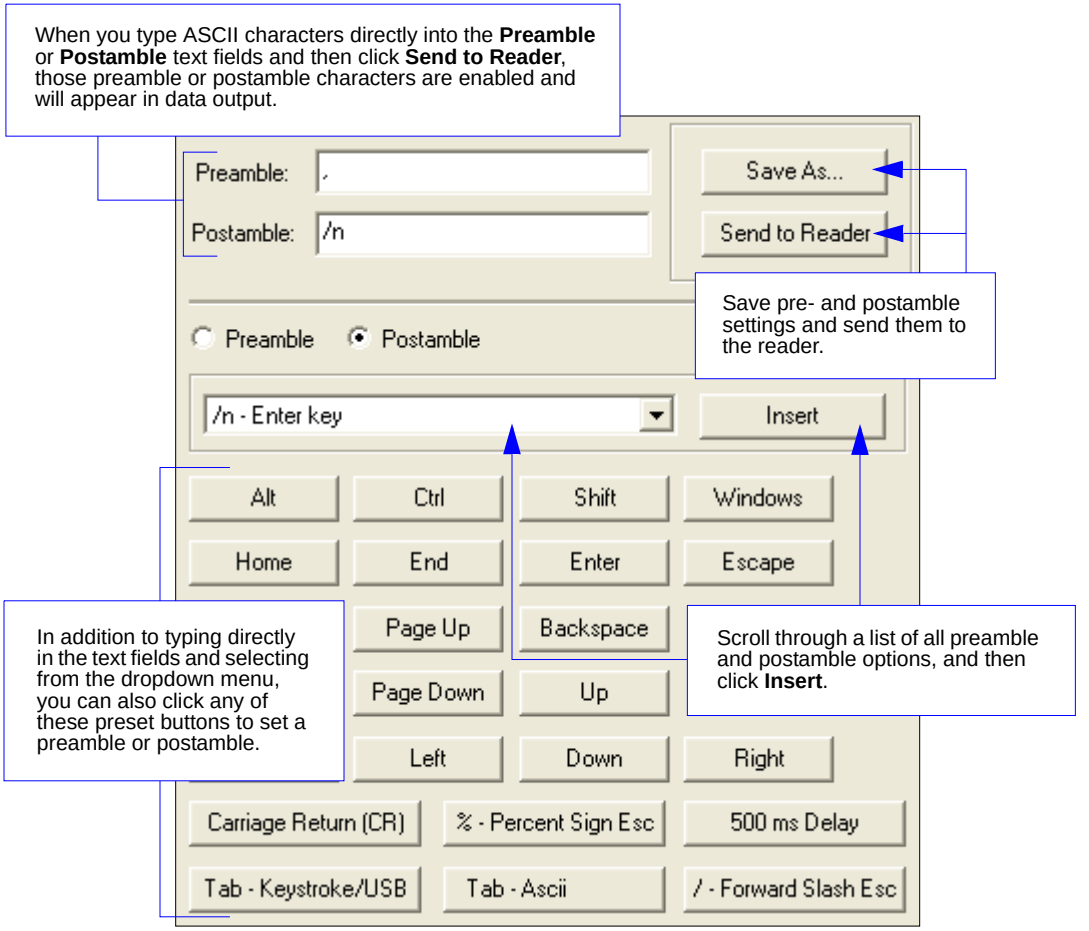

M406_02

Erase Preamble and Postamble Data

Preamble and Postamble by ESP

Characters can also be added to the beginning and end of data strings using **ESP**. There are a few different ways to do this, using the interface shown below.

You will see the Communications tree control on the left, and the Preamble/Postamble interface on the right.



Keyboard Mapping

The **Keyboard Mapping** feature provides alternatives for keyboards that do not conform to US English mapping.

Note: Universal Keyboard mapping is slightly slower than the other language-specific options, because it maps data by reference to the full set of ASCII characters. The advantage of Universal Keyboard mapping is that it allows any language and keyboard layout to be mapped.

Important: Keyboard Mapping is not to be confused with USB Keyboard Mode, which has an entirely different function—namely to enable USB cabled communications. (See **USB Interface**).


M172_01

US English, No Leading 0 for non-printable characters (Default)


M602_01

US English, Leading 0 for non-printable characters


M606_01

US English, Ctrl + char. for non-printable characters


M603_01

French


M604_01

German


M605_01

Japanese


M173_01

Universal Keyboard


M171_01

Custom Keyboard

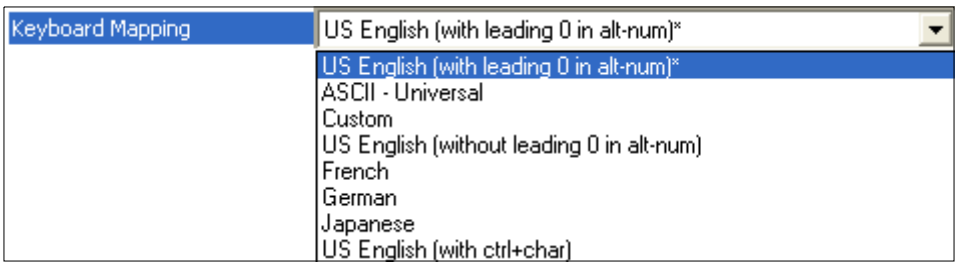

M585_02

Enable Alternate OS (Windows CE/MAC/Unix/ Linux)


M584_02

Disable Alternate OS

Keyboard Mapping by ESP



Text Commands

When the **Text Commands** feature is enabled, the HS-2D can accept text commands via RS-232 connections and USB Virtual COM modes.

Note: Text Commands are not supported in USB HID Mode.

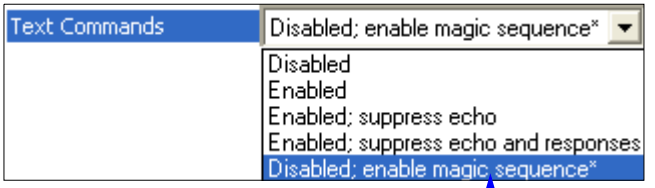
M198_02

Enable Text Commands (Default)

M197_02

Disable Text Commands

Text Commands by ESP



When **Magic Sequence** is enabled, it allows the user to enable **Text Commands** by entering a predetermined series of keystrokes.

When **Text Commands** are set to **Enabled; Suppress Echo**, text that a user enters in the terminal will not be shown. When **Text Commands** are set to **Enabled; Suppress Echo and Responses**, neither user-entered data or reader responses will be shown, and only decoded symbol data will appear in the terminal.

See **Terminal Right-Click Menu** for a way to change Echo settings directly in the terminal view.

Entering Magic Sequence

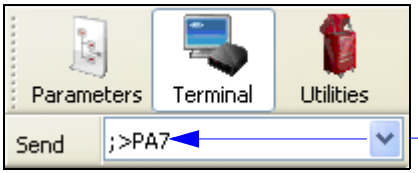
The magic sequence is **;>PA** followed by a numeric value of **1**, **3**, or **7**.

1 = Enable Text Commands

3 = Enabled; Suppress Echo

7 = Enabled; Suppress Echo and Responses

In the example below, the magic sequence entered will Enable Text Commands and Suppress Echo and Responses.



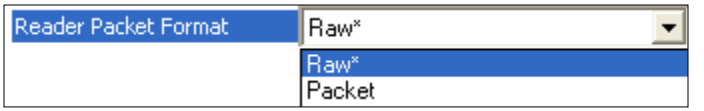
Enter the magic sequence in this text field and click **Send**.

Once the magic sequence has been sent, you can send text commands from the same text field.

Other Communications Settings in ESP

Some **ESP** Communications options are unique to the software, and do not have corresponding programming symbols. These options are explained below.

Reader Packet Format



Data that is sent from the imager to the host in **Raw** format is sent without packet framing or check characters. **One-Way** communication is in a raw format, no response is expected from the host, and data is not resent.

Packetized data is sent with framing (a preamble communicating the amount of data to be transmitted, and a postamble containing error detection) and check characters, and a response is expected from the host. **Two-Way** communication is in packet format.

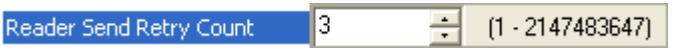
Reader to Host Packet Size

The **Reader to Host Packet Size** is the amount of data (in bytes) that is sent to the host in packet format. This feature allows you to set the maximum allowable packet size.

Expect Host Response

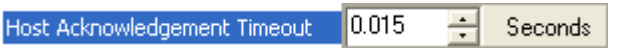
When **Expect Host Response** is enabled, the imager will re-transmit data if it doesn't receive acknowledgement from the host.

Reader Send Retry Count



Reader Send Retry Count sets the number of times the imager will re-transmit data before abandoning further send attempts. The minimum retry count is **1**, which represents the initial transmission.

Host Acknowledgement Timeout



The **Host Acknowledgement Timeout** is the amount of time (in seconds) that the imager will wait for an acknowledgement from the host before re-sending data.

USB Keyboard Rate

Requests that the host polls the USB HS-2D at the rate specified (**1** to **255** ms).

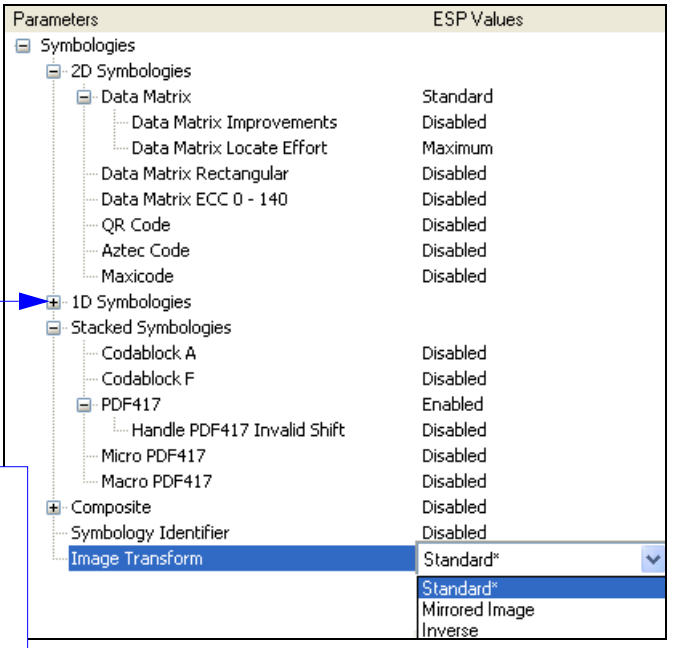
5 Symbologies

Contents

This section describes the various symbol types that can be read and decoded by the reader. See **http://www.aimglobal.org/standards/aimpubs.asp** for additional information.

Symbologies by ESP

To make changes to configuration settings in the **Symbologies** tree control:



1. **Left click** on the **+** to expand the tree.

2. **Double click** on the parameter and click once in the selection box to view options.
3. Place your cursor in the selection box, scroll down to the setting you want to change 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 reader.

Aztec

Read the following symbols to enable/disable **Aztec** settings:

Aztec On


M273_01

Aztec Off (Default)


M272_01

Aztec by ESP

Sample Aztec Symbol

Codabar

Read the following symbols to enable/disable **Codabar** settings:

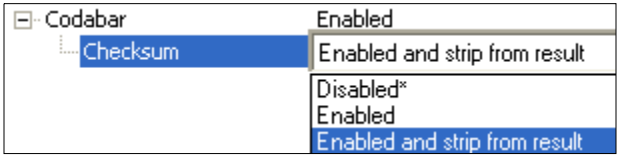
Codabar On (Default)

M275_01

Codabar Off

M274_01

Codabar by ESP



ESP allows you to enable a checksum, or to enable a check sum and remove it from the decode result.

Sample Codabar Symbol

A123456789A

Codablock A / Codablock F

Read the following symbols to enable/disable **Codablock A** and **Codablock F** settings:

Codablock A On


M760_01

Codablock A Off (Default)


M759_01

Codablock F On


M277_01

Codablock F Off (Default)


M276_01

Codablock by ESP

Important: When Codablock F and Code 128 are both enabled, there is some risk of mistakenly decoding a damaged Codablock F symbol as a Code 128 symbol. Therefore, whenever possible, Code 128 should be disabled when Codablock F is enabled.

Using **Codablock F On** will disable Code 128. Using **Codablock F Off** will re-enable Code 128.

Sample Codablock F Symbol

Code 11

Read the following symbols to enable/disable **Code 11** settings:

Code 11 Enabled with 2 Checksum Digits


M394_01

Code 11 Disabled (Default)


M393_01

Enabled with 1 Checksum Digit


M395_01

Enabled with 2 Checksum Digits and Stripped from Result

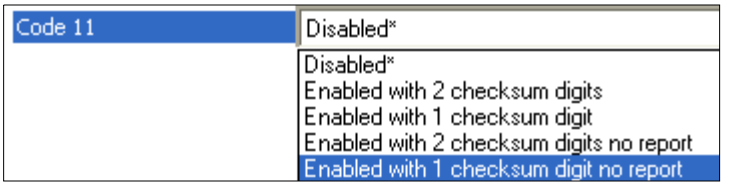

M396_01

Enabled with 1 Checksum Digit and Stripped from Result


M397_01

Code 11 by ESP

Note: "No Report" in **ESP** has the same meaning as "Stripped from Result".



Sample Code 11 Symbol

Code 39

Read the following symbols to enable/disable **Code 39** settings:

Code 39 On (Default)


M235_01

Code 39 Off


M234_01

Enable Checksum


M237_01

Disable Checksum (Default)


M236_01

Enable Checksum and Strip from Result


M238_01

Code 39 Extended Full ASCII On


M233_01

Code 39 Extended Full ASCII Off (Default)


M232_01

Code 39 Narrow Margins On


M390_01

Code 39 Narrow Margins Off (Default)


M389_01

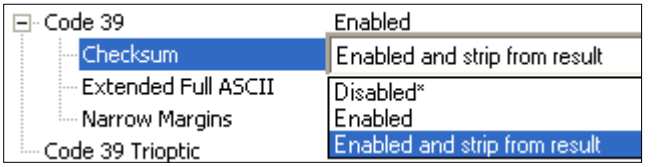
Code 39 Trioptic On (Default)


M671_01

Code 39 Trioptic Off


M670_01

Code 39 by ESP



Sample Code 39 Symbol

Sample Code 39 Trioptic Symbol

Code 93

Read the following symbols to enable/disable **Code 93** settings:

Code 93 On (Default)

M281_02

Code 93 Off

M280_01

Code 93 by ESP

Sample Code 93 Symbol

Code 128

Read the following symbols to enable/disable **Code 128** settings:

Code 128 On (Default)


M283_01

Code 128 Off


M282_01

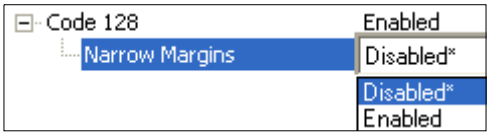
Code 128 Narrow Margins On


M392_01

Code 128 Narrow Margins Off (Default)


M391_01

Code 128 by ESP



Sample Code 128 Symbol

Composite

To read Composite symbols:

1. Enable the corresponding linear component.
2. Read the **Composite On** symbol below.
3. Set **Maximum Decodes per Read** to **2**.

Important: Both the applicable linear symbology portion of the Composite symbol as well as **Composite On** must be enabled before the reader can fully decode a Composite symbol.

Composite On

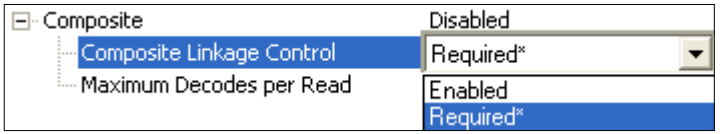
M285_02

Composite Off (Default)

M284_02

Composite by ESP

Composite Linkage Control



When **Composite Linkage Control** is set to **Required**, symbol data will only be output if both the 2D and 1D components of the symbol are decoded. When not required, symbol data will be output even when only one of the components is decoded.

Maximum Decodes per Read

Maximum Decodes per Read represents the maximum number of candidate symbols in the field of view that can be decoded during a read cycle. Note that decode speed will decrease as the **Maximum Decodes per Read** value is increased.

Data Matrix

Read the following symbols to enable/disable **Data Matrix** settings:

Data Matrix Rectangle On


M242_01

Data Matrix Rectangle Off (Default)


M241_01

Data Matrix Inverse On


M239_01

Data Matrix Inverse Off (Default)


M240_01

Enable Data Matrix Improvements (Low Contrast and Binarized Symbols)


M744_01

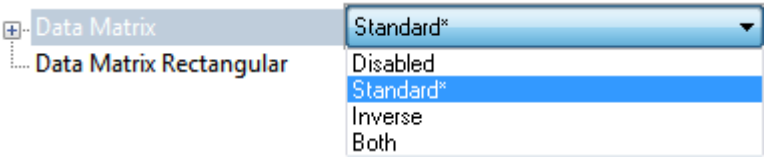
Disable Data Matrix Improvements (Default)


M745_01

Sample Data Matrix Symbol

Sample Rectangular Data Matrix Symbol

Data Matrix by ESP



Interleaved 2 of 5

Read the following symbols to enable/disable **Interleaved 2 of 5** settings:

Interleaved 2 of 5 On (Default)


M244_01

Interleaved 2 of 5 Off


M243_01

Interleaved 2 of 5 Two Digits On


M246_01

Interleaved 2 of 5 Two Digits Off


M245_02

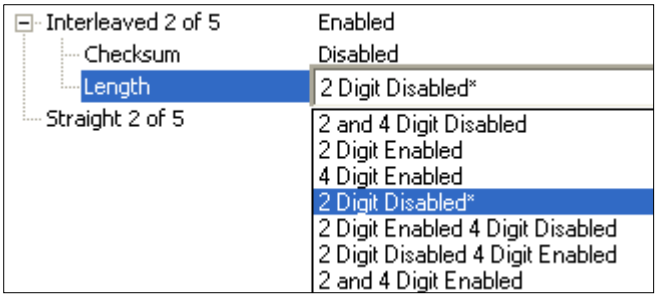
Interleaved 2 of 5 Four Digits On


M248_01

Interleaved 2 of 5 Four Digits Off


M247_01

Interleaved 2 of 5 by ESP



Sample Interleaved 2 of 5 Symbol

Maxicode

Read the following symbols to enable/disable **Maxicode** settings:

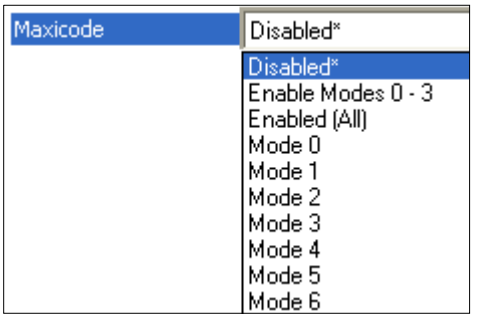
Maxicode On


M289_04

Maxicode Off (Default)


M288_01

Maxicode by ESP



Mode 0 = Reserved

Mode 1 = Reserved

Mode 2 = **US Carrier** with postal symbols up to 9 digits in length.

Mode 3 = **International Carrier** with alphanumeric postal symbols up to 6 characters in length.

Mode 4 = **Standard Symbol** – Use this mode to encode information for purposes other than the shipping industry. Up to approximately 90 characters can be encoded in this mode.

Mode 5 = **Secure Symbol** – Use this option to encode information with additional error correction. Up to approximately 74 characters can be encoded in this mode.

Mode 6 = **Reader Program** – This option allows scanner manufacturers to program their scanners.

Sample Maxicode Symbol

Matrix 2 of 5

Read the following symbols to enable/disable **Matrix 2 of 5** settings:

Matrix 2 of 5 On (Default)


M675_01

Matrix 2 of 5 Off


M674_01

Matrix 2 of 5 by ESP

Matrix 2 of 5	Disabled
	Disabled
	Enabled*
	Enable Checksum
	Enable Checksum not output
	Enable decode 1 digit symbol
	Enable decode 2 digit symbol
	Enable decode 1 and 2 digit symbol
	Enable decode 1 digit with checksum
	Enable decode 2 digit with checksum
	Enable decode 1 and 2 digit with checksum
	Enable decode 1 digit w checksum not output
	Enable decode 2 digit w checksum not output
	Enable decode 1, 2 digit w checksum not output

Sample Matrix 2 of 5 Symbol

MicroPDF417

Read the following symbols to enable/disable **MicroPDF417** settings:

MicroPDF417 On


M301_01

MicroPDF417 Off (Default)


M300_01

MicroPDF417 by ESP

Sample MicroPDF417 Symbol

MSI Plessey

Read the following symbols to enable/disable **MSI Plessey** settings:

MSI Plessey On


M291_01

MSI Plessey Off (Default)


M290_01

MSI Plessey by ESP

Sample MSI Plessey Symbol

NEC 2 of 5

Read the following symbols to enable/disable **NEC 2 of 5** settings:

NEC 2 of 5 On (Default)


M673_01

NEC 2 of 5 Off


M672_01

NEC 2 of 5 by ESP

NEC 2 of 5	Disabled
	Disabled
	Enabled*
	Enable Checksum
	Enable Checksum not output
	Enable decode 1 digit symbol
	Enable decode 2 digit symbol
	Enable decode 1 and 2 digit symbol
	Enable decode 1 digit with checksum
	Enable decode 2 digit with checksum
	Enable decode 1 and 2 digit symbol
	Enable decode 1 digit w checksum not output
	Enable decode 2 digit w checksum not output
	Enable decode 1, 2 digit w checksum not output

Sample NEC 2 of 5 Symbol

PDF417

Read the following symbols to enable/disable **PDF417** settings:

PDF417 On (Default)


M293_01

PDF417 Off


M292_01

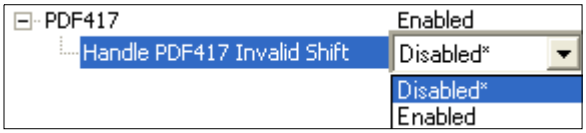
MacroPDF417 On


M287_01

MacroPDF417 Off (Default)


M286_01

PDF417 by ESP



Sample PDF417 Symbol

Pharmacode

Read the following symbols to configure **Pharmacode** settings:

Pharmacode On;
No Color, Standard Rules, Horizontal Decode, Normal Direction


M409_01

Pharmacode On;
Color, Relaxed Contrast, Horizontal Decode, Normal Direction


M410_01

Pharmacode On;
No Color, Standard Rules, Vertical Decode, Normal Direction


M411_01

Pharmacode On;
Color, Relaxed Contrast, Vertical Decode, Normal Direction


M412_01

Pharmacode On;
No Color, Standard Rules, Horizontal Decode, Reverse Direction


M413_01

Pharmacode (cont.)

Pharmacode On;
Color, Relaxed Contrast, Horizontal Decode, Reverse Direction


M414_01

Pharmacode On;
No Color, Standard Rules, Vertical Decode, Reverse Direction


M415_01

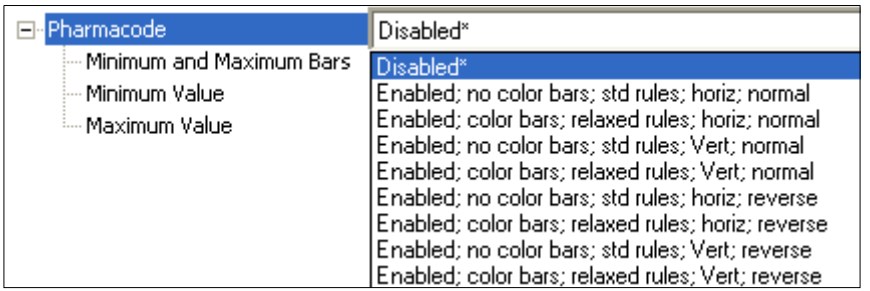
Pharmacode On;
Color, Relaxed Contrast, Vertical Decode, Reverse Direction


M416_01

Pharmacode Off (Default)


M408_01

Pharmacode by ESP



Sample Pharmacode Symbol

QR Code

Read the following symbols to enable/disable **QR Code** settings:

Standard QR Code On


M261_01

QR Code Off (Default)


M260_01

Inverse On


M262_01

Inverse and Standard On


M263_01

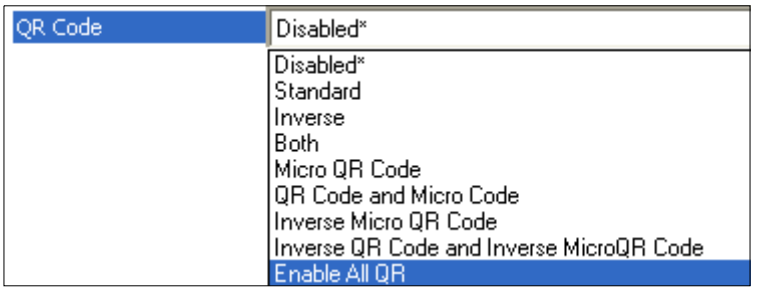
All QR Code On


M609_03

Inverse and Micro QR On


M687_03

QR Code by ESP



Sample QR Code Symbol

Sample Micro QR Code Symbol

GS1 DataBar

Read the following symbols to enable/disable **DataBar** settings:

DataBar Limited On


M268_01

DataBar-14 and DataBar-14 Truncated On


M271_01

DataBar-14 Stacked On


M270_01

DataBar Expanded On


M269_01

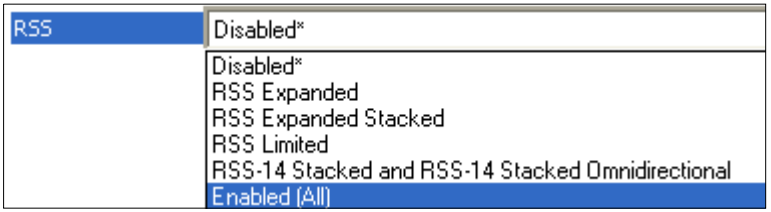
All DataBar On


M267_01

All DataBar Off (Default)


M266_01

GS1 DataBar by ESP



Sample DataBar-14 Truncated Symbol

Sample DataBar-14 Stacked Symbol

Sample DataBar Expanded Symbol

Sample DataBar-14 Symbol

UPC/EAN/JAN

Read the following symbols to enable/disable **UPC/EAN/JAN** settings:

UPC On (Default)


M295_01

UPC Off


M294_01

UPC Narrow Margins On


M299_01

UPC Narrow Margins Off (Default)


M298_01

Note: Unless necessary, enabling **Narrow Margins** are not recommended.

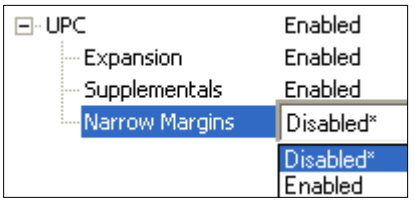
UPC Extension On


M297_01

UPC Extension Off (Default)


M296_01

UPC/EAN/JAN by ESP



Sample UPC-E Symbol

Symbology Identifier

When **Symbology Identifier** is enabled, an AIM (Association for Automatic Identification and Mobility) preamble is added to decoded data output (see **AIM Symbology Identifiers**). This preamble identifies what kind of symbology has been decoded.

Symbology Identifier On

Symbology Identifier Off (Default)

Symbology Identifier by ESP

AIM Symbology Identifiers

A	Code 39
B	Telepen
C	Code 128
d	Data Matrix
e	GS1 DataBar
E	UPC/EAN
F	Codabar
G	Code 93
H	Code 11
I	Interleaved 2 of 5
L	PDF417
M	MSI Code
O	Codablock
p	Pharmacode
P	Plessey Code
Q	QR Code / Micro QR Code
X	Other Symbology
z	Aztec
Z	Non-Barcode Data

Modifier Characters

Modifier characters are determined by adding the option values of each symbology. If the sum is larger than 9, use A, B, C, D, E, or F in place of 10, 11, 12, 13, 14, and 15.

Code 39 Option Values

0	No check character or full ASCII
1	Reader has performed mod 43 check
2	Reader has performed mod 43 check and stipped the check character
4	Reader has performed full ASCII conversion

Telepen Option Values

0	Full ASCII mode
1	Double-density numeric mode
2	Double-density numeric followed by full ASCII
4	Full ASCII followed by double-density numeric

Code 128 Option Values

0 Standard

1 Function code 1 in first character position

2 Function code 2 in second character position. Concatenation according to ISBT.

4 Specification has been performed and concatenated data follows.

6 I/O Parameters

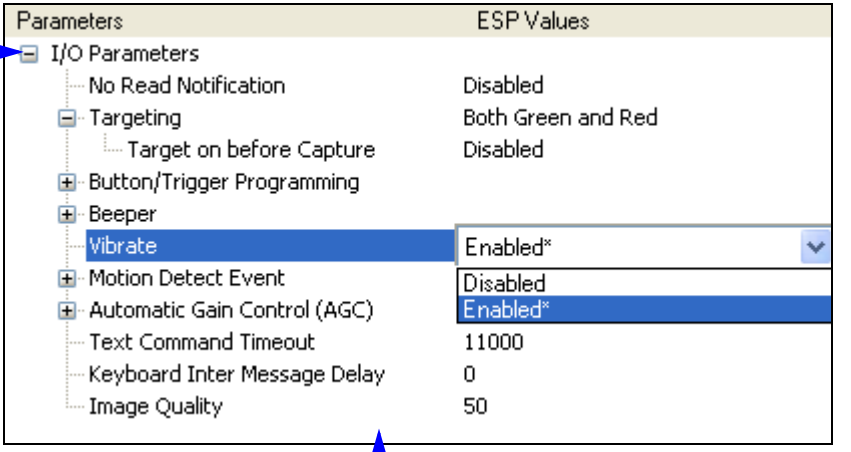
Contents

This section contains information on how to set your reader to the most efficient and effective parameters for your application.

I/O Parameters by ESP

To make changes to configuration settings in the **I/O Parameters** menu tree control:

1. **Left click** on the **+** to expand the tree.



2. **Double click** on the parameter and click once in the selection box to view options.
3. Place your cursor in the selection box, scroll down to the setting you want to change 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 reader.

HS-2D Operational Feedback

Condition	Sound/Vibration	LED
Successful Power-On	1 Beep / Vibration	Sequence: **AMBER GREEN AMBER**
Successful Connection with Host via USB	1 Beep / Vibration	None
Successful Decode and Data Transfer to Host	1 Beep / Vibration	Flash **GREEN**
Configuration Symbol Successfully Decoded and Processed	2 Beeps / Vibrations separated by short pause	Flash **GREEN**

Beep and Vibration Modes

Read the following symbols to set beep and vibration modes.


M107_01

Vibrate On / Beep On (Default)


M109_01

Vibrate On / Beep Off


M108_01

Vibrate Off / Beep On

Automatic Gain Control (AGC)

AGC is a system that controls gain in order to maintain high performance over a range of input levels. Gain is essentially the ratio of output to input. Gain settings affect how the HS-2D decodes symbols and captures images.

AGC Frame Adjust Count

AGC Frame Adjust Count sets the number of image frames captured and discarded before the main image capture. This feature gives the gain control time to adjust.

Image Quality

Image Quality allows the user to adjust the quality and size of images captured by the reader.

1 represents the lowest possibly image quality and size, and **75** represents the highest possible image quality and size.

7 Advanced Operations

Contents

This section introduces several settings that can be applied to speed up processing or improve readablility in various circumstances.

Continuous Operations

Continuous Read

Read the following symbols to enable or disable Continuous Read.


M140_02

Continuous Read On


M141_03

Continuous Read Off

Continuous Read, Trigger Delays

Read the following symbols to set the delay time between decodes.


M142_01

0 Seconds (Default)


M143_01

1 Second


M144_01

3 Seconds

Continuous Read, Duplicate Read Delays

Read the following symbols to determine the time interval between a decode and the rejection of a subsequent duplicate decode.


M222_01

0 Seconds (Default)


M223_01

1 Second


M224_01

3 Seconds

Lock Settings

Read the symbols below to lock or unlock reader settings.

Note: This feature does not lock preamble and postamble programming symbols, Clear XML Rules, or postamble erase/none commands.


M429_01

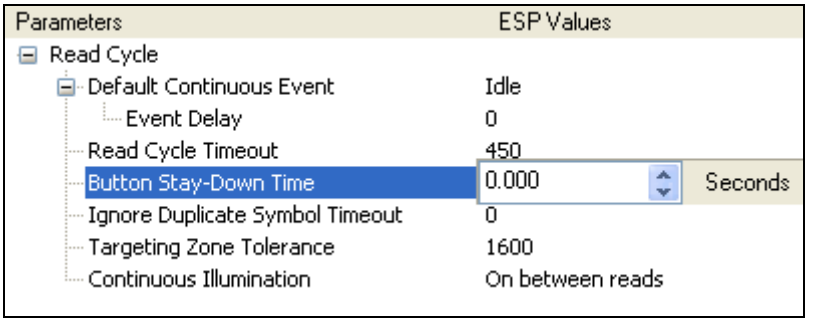
Lock Reader Settings


M428_01

Unlock Reader Settings

Button Stay-Down Time

Button Stay-Down Time sets the amount of time (in seconds) that the reader will continue to process the current “decode symbol” event. The reader will behave as if the trigger is being activated for this specified amount of time.



Available **Button Stay-Down Time** values are 0.000 to 2147483.750 (in seconds).

Mirroring

Mirroring allows the HS-2D to decode symbols that are reversed. When Mirroring is enabled, all other decode functionality is disabled.

Note: Once the reader has been set to **Mirroring On**, it can only return to its default mode by reading the **Mirroring Off** symbol below.

Mirroring On

M182_01

Mirroring Off (Default)

M181_02

Image Transform

In **ESP**, the **Mirroring** feature is part of the **Image Transform** command.

When Image Transform is set to **Standard**, **Mirrored Image** is disabled.

When Image Transform is set to **Mirrored Image**, the HS-2D's optics reverse the captured image before attempting to decode.

Motion Detection

Motion Detection causes the HS-2D to attempt a decode whenever it senses motion in its field of view.

Motion Detection On

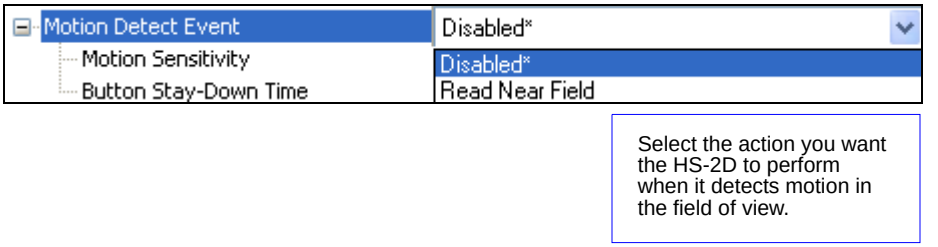
M701_01

Motion Detection Off (Default)

M702_01

Motion Detection by ESP

Motion Detection settings can be refined further using the options in **ESP**.



Motion Sensitivity

The HS-2D's sensitivity to motion in the field of view can be configured as shown below.

Note: The lower the number, the greater the sensitivity.

Note: For **Motion Sensitivity** to function correctly, Button Stay-Down Time should be increased.

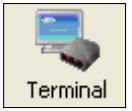
8 Terminal

Contents

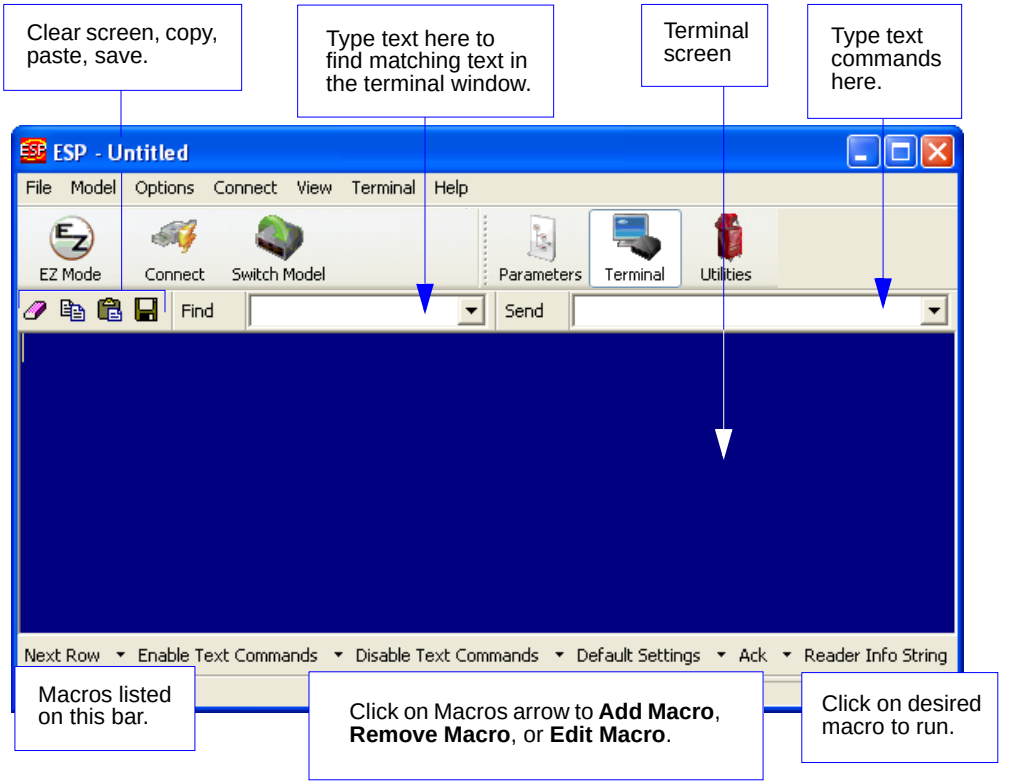
This section describes the **Terminal** interface and macro functions in **ESP**.

Terminal View

Click the **Terminal** button.



You will see the following view:



The Terminal interface allows you to send commands to the reader by using macros, by copying and pasting, or by typing commands in the **Send** text field.

The Terminal view also displays symbol data or information from the reader.

You can also right click on the Terminal screen to bring up a menu of further options.

Find

The **Find** function allows you to enter text strings to be searched for in the terminal window. For example, suppose a series of symbols have been scanned into the terminal view and you want to determine if a particular symbol whose data begins with “ABC” has been read.

1. Type “ABC” into the **Find** box.

2. Press **Enter**.

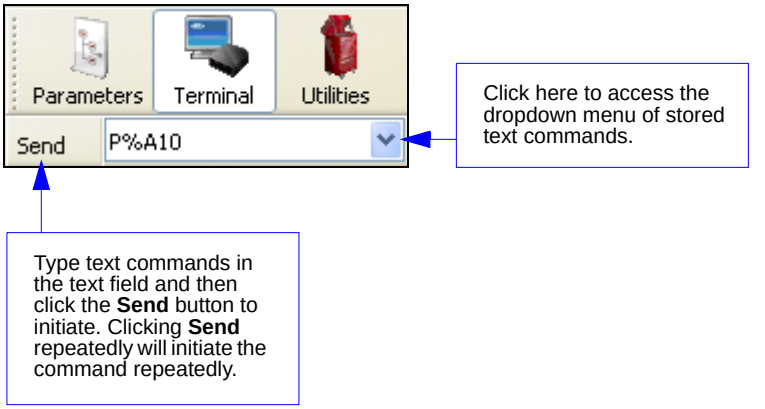
   The first instance of “ABC” will be highlighted in the terminal window.

3. Click the **Find** button to the left of the text field to locate additional instances of “ABC”.

Send

The **Send** function allows you to enter text commands and then send them to the reader. (See **Text Commands**.)

For example, suppose you want to disable the vibrate function in the reader. To disable vibrate using a text command, you would enter “P%A10” (the command that disables vibrate) in the text field and click **Send**.

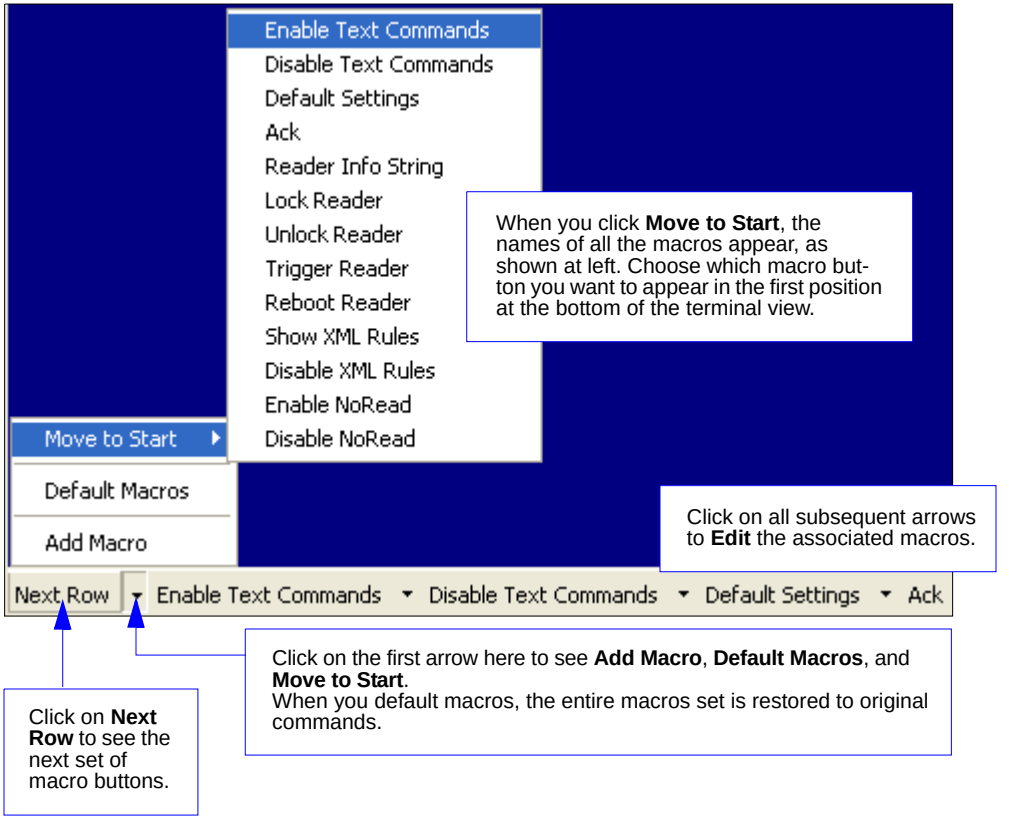


Once text commands are initiated, they are saved in a dropdown menu that can be accessed by clicking the arrow to the right of the text field.

You can also send the current command repeatedly by clicking the **Send** button repeatedly.

Macros

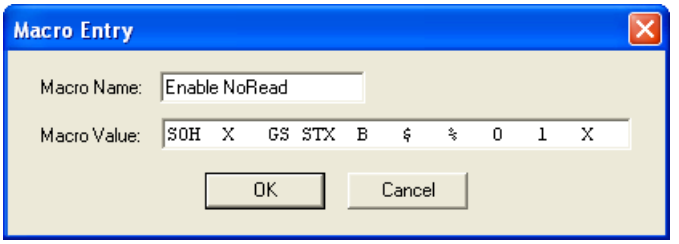
Macros can be stored in a macro selection bar, edited in a separate window, and executed by clicking on the macro name.



Clicking on a macro button executes the related command. The command is also sent to the reader at the same time it is displayed.

Editing a Macro

When you click the arrow next to a any macro and select **Edit**, the following dialog appears:



You can edit an existing macro or type in the **Macro Name** text field and define it in the **Macro Value** text field.

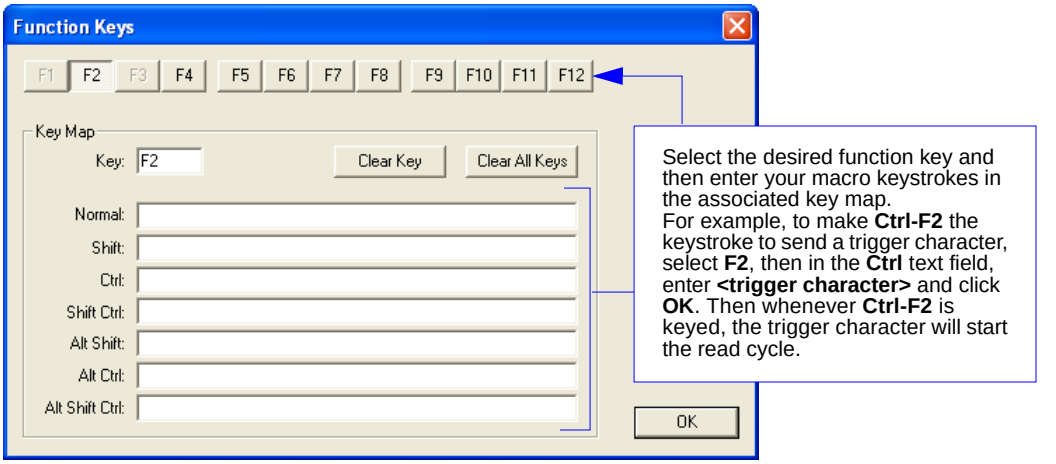
Terminal Right-Click Menu

Right click in the terminal window to display the following menu:

- **Copy** selected text to clipboard.
- **Paste** from terminal or other text.
- **Clear** all text in terminal window.
- **Select All** text in the terminal window.
- **Save...** incoming and outgoing data into a text file.
- **Change Font...** of data received from the reader.
- **Change Echo Font...** to change the appearance of user-entered data.
- **Disable Echo** to hide user-entered data.
- **Change Background Color** of the terminal window.
- **Non-Printable Characters** can be shown or hidden in the terminal view in **Standard** or **Enhanced** format.
- **Default Settings** to return all of the above to original settings.
- **Keyboard Macros** brings up the **Function Keys** dialog, which allows you to create customized macro functions.

Function Keys

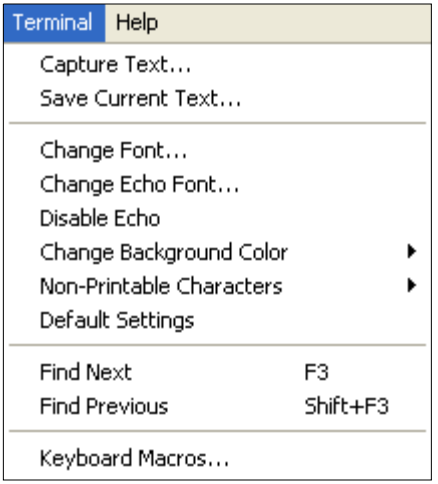
The **Function Keys** dialog allows you to assign commands to specific function keys on a standard keyboard. Note that the **F1** key is reserved for opening **ESP** Help, and the **F3** key is reserved for the **Find Next** function.



Note: This feature is also available from the **Terminal Dropdown Menu** and the **Terminal** tab of the **Preferences** dialog.

Terminal Dropdown Menu

The terminal dropdown menu allows you to capture and save current text, and it also includes the functions defined for the **Terminal Right-Click Menu**.



- **Capture Text...** lets you append data in real time to a text file of your choice. While in operation, the text file cannot be opened. You can select **Pause** to interrupt the capture flow or **Stop** to end the flow and open the file.
- **Save Current Text...** saves all text in the terminal window to a text file of your choice.
- **Find Next** locates the next instance of the specified data string in the terminal. This function can also be activated by pressing **F3**.
- **Find Previous** locates the most recently occurring instance of the specified data string in the terminal.
- **Keyboard Macros** brings up the **Function Keys** dialog, which allows you to create customized macro functions.

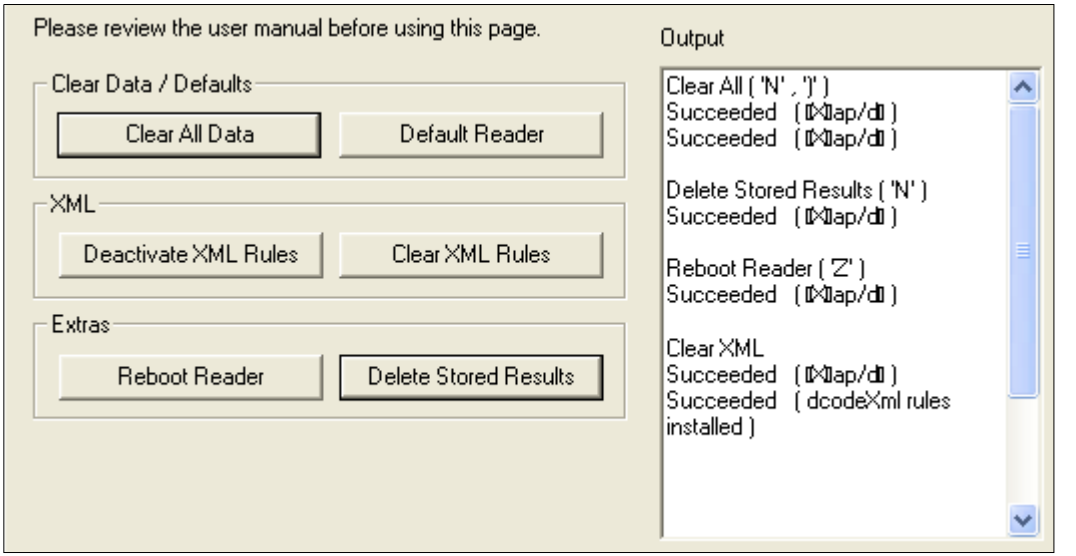
9 Utilities

Contents

This section explains **ESP**'s **Utilities** features. These include **Device Control**, an interface that lets you perform major operations with one click; **Differences from Default**, which shows all currently enabled HS-2D settings that are not default settings; **Firmware**, where you can update your reader's firmware; and **Advanced**, which allows you to collect batch files for customized reader configuration and optimization.

Device Control

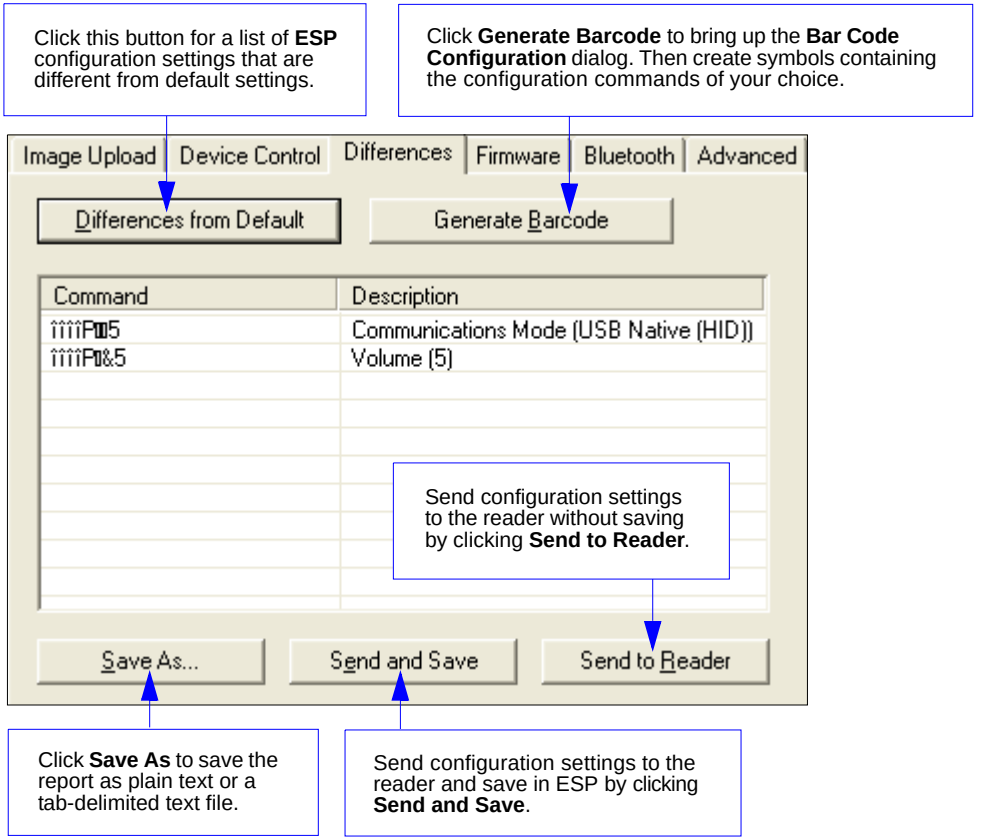
This feature allows you to clear data stored in the reader's memory, to default the reader, to deactivate or clear XML rules, to upload or delete stored errors, to reboot the reader, and to delete stored results.



- **Clear All Data** removes decoded symbol data and commands in the reader's memory.
- **Default Reader** returns the reader to its default state, without any optimization or configuration.
- **Deactivate XML Rules** turns off, but does not erase, preambles, postambles, and XML commands.
- **Clear XML Rules** removes preambles, postambles, and other XML commands.
- **Reboot Reader** refreshes the reader's memory and functionality, returning it to the most recent configuration you have saved.
- **Delete Stored Results** erases logged data.

Differences from Default

Clicking the **Differences from Default** button will cause **ESP** to check all stored configuration settings and compare them to default settings. All settings that are different from default will appear in the left column (shown below), and descriptions of those settings will appear in the right column.

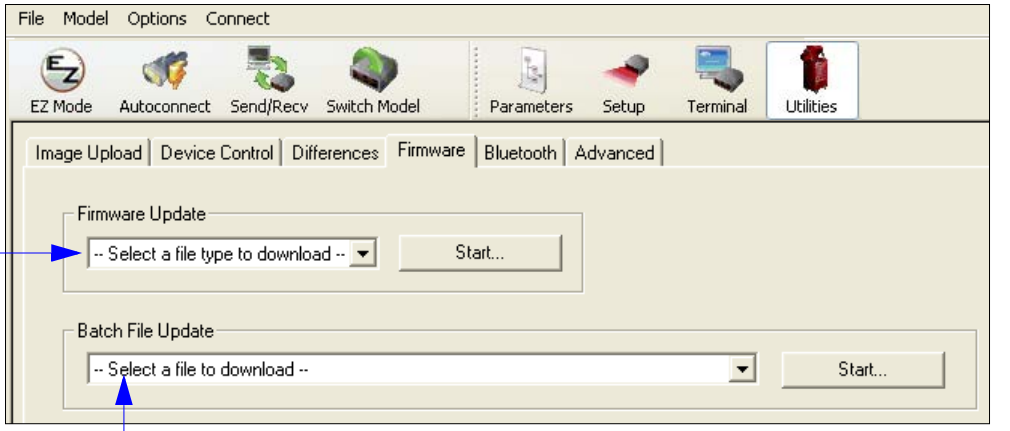


- To create a symbol containing any of the command settings in the table, click **Generate Barcode**. This will bring up the **Bar Code Configuration** dialog.
- To save the **Differences from Default** report, either as plain text or as a tab-delimited text file, click **Save As**.
- Click **Send and Save** to send the settings to the reader and save them, or **Send to Reader** to send the settings without saving them.

Firmware

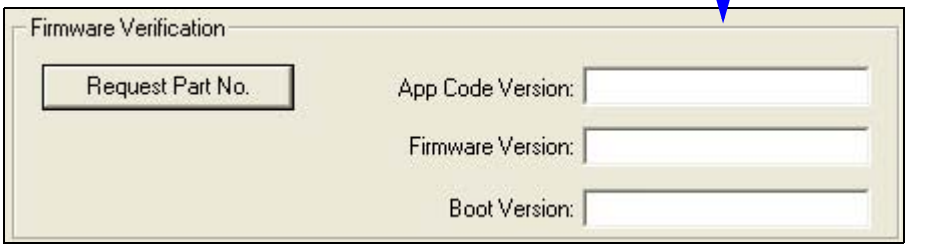
The **Firmware** view in **ESP Utilities** is a simple way to update and verify your reader's firmware and to update batch files.

Choose **App Code** from the **Firmware Update** dropdown menu and click **Start** to install new firmware in the HS-2D.



Use this dropdown menu to locate batch files in the host computer's file directory. Download the needed files directly to the reader by clicking the **Start** button.

The **Firmware Verification** tool sends a direct query to the reader for its Application Code Version, Firmware Version, and Boot Code Version.

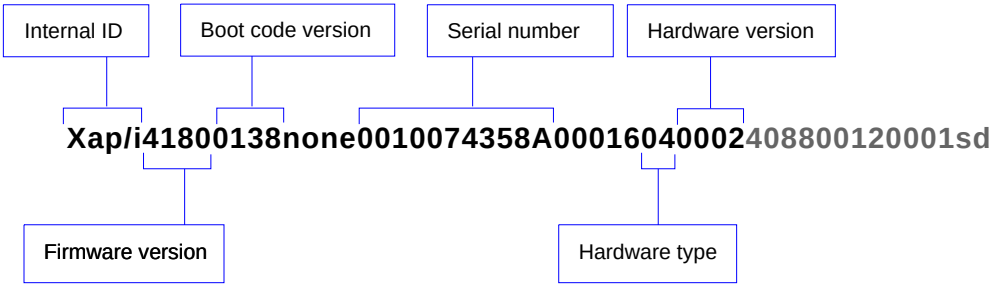


Reader ID

Another way to query the reader for its identifying information is by reading the following symbol:

Reader ID

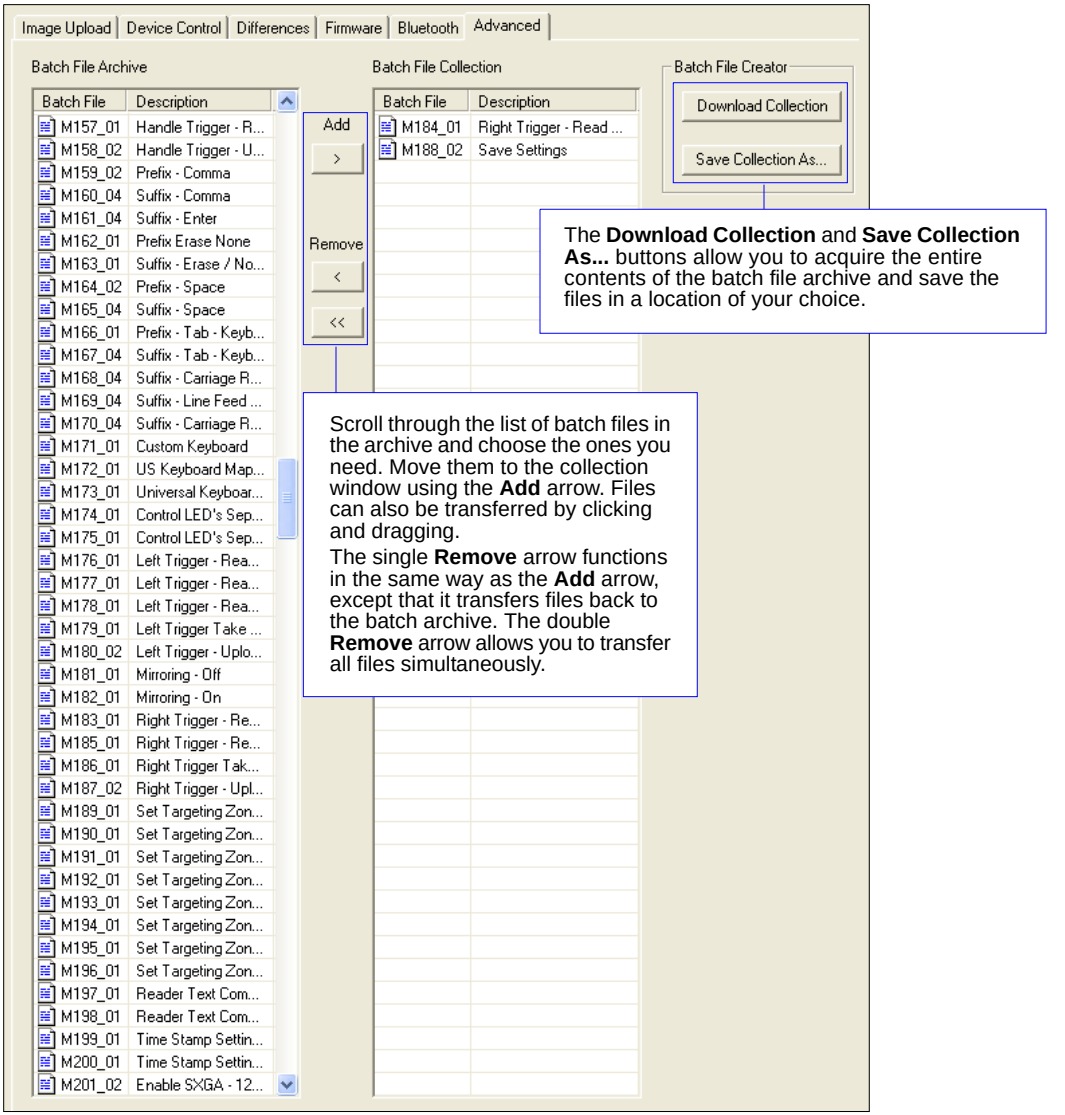
The host's text program will output a data string containing the reader's identifying information in the following format:



Advanced

The **Advanced** tab in **Utilities** features an archive of all batch files containing reader configuration commands. Each batch file's extension is .crb, and each file contains the fundamental code for programming the reader. Notice that the names of the batch files correspond with the numbers beneath all the Data Matrix configuration symbols.

This tool allows you to use the batch file data to create your own symbols, or to collect only the files that you use frequently to configure the reader for your application.



Appendices

Appendix A — General Specifications

Mechanical

Height:	7” (180 mm)
Width:	2.5” (63 mm)
Depth:	4.5” (114 mm)
Weight:	6.4 oz. (181 g) (not including cable)

Environmental

Operating temperature: 0° to 50°C (32° to 122°F)
Storage temperature: –20° to 65° C (–4° to 150°F)
Humidity: 5 to 95% (non-condensing)
Shock: Withstands multiple drops of 6’ (1.8 meters) to concrete

CE Standards

Immunity: EN 55024
ESD: EN 61000-4-2
Radiated RF: EN 61000-4-3
Keyed Carrier: ENV 50204
EFT: EN 61000-4-4
Conducted RF Immunity: EN61000-4-6
Emissions: EN55022, Class B Radiated, Class B Conducted

Symbologies

2D Symbologies: Data Matrix, Aztec, QR Code, Micro QR Code, Maxicode
Stacked Symbologies: PDF417, MicroPDF417, GS1 DataBar (Composite and Stacked)
Linear Symbologies: Code 39, Code 128, Code 11, Interleaved 2 of 5, Matrix 2 of 5, NEC 2 of 5, UPC/EAN, Codabar, MSI Plessey, Codablock F, Pharmacode, Code 93

Light Collection Options

Sensor: CMOS, progressive scan, 1.33 MP, 256 grayscale
Sensor Array: 1280 by 1024
Field of View: 43.48° horizontal by 31.86° vertical
Focal Point: Optimal at 2.3” (5.8 cm)

Communication Protocols

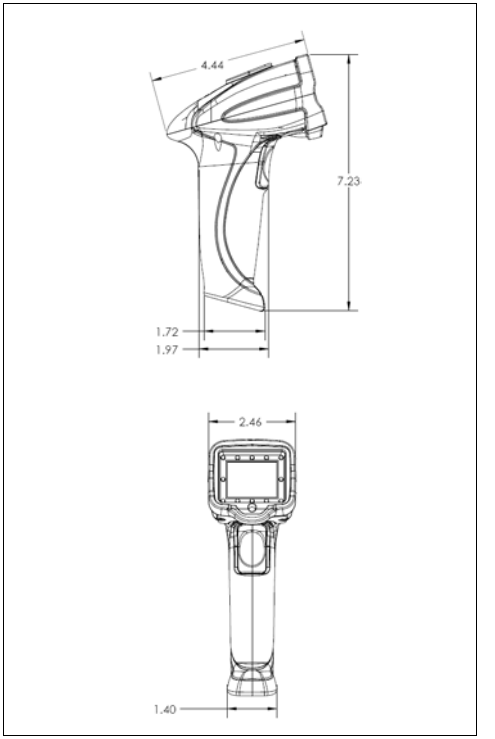
Standard Interface: USB, RS-232

Read Parameters

Pitch: ±60° (front to back); *Skew:* ±60°; *Rotational Tolerance:* ±180°
Focal Range: .5 to 6” (12 to 152 mm)
Print contrast Resolution: 25% (1D symbols); 35% (PDF417); absolute dark/light reflectance differential, measured at 650 nm
Ambient Light Immunity: Sunlight: Up to 9,000 ft. candles, 96,890 lux

Indicators

Status Indicators: Vibration motor, audible tones, visual feedback with multi-color LED



HS-2D Dimensions

Image Output Options

Format: JPEG, raw (uncompressed)

Safety Certifications

FCC, CE, RoHS/WEEE

ISO 9001 Certified
Issued by TüV USA

Product specifications are given for typical performance at 25°C (77°F) using grade A labels. Performance characteristics may vary at high temperatures or other environmental extremes. Warranty–One year limited warranty on parts and labor. Extended warranty available.

Read Ranges

Narrow Bar Width	Read Range
.0063" (.160 mm)	1.50 to 2.5" (32 mm to 64 mm)
.0083" (.211 mm)	1.75 to 3.2" (44 mm to 81 mm)
.020" (.508 mm)	.50 to 5.2" (13 mm to 132 mm)

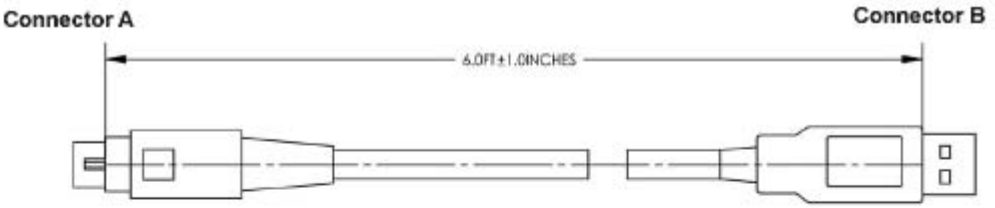
Read ranges based on Grade A Data Matrix symbols. Data subject to change.

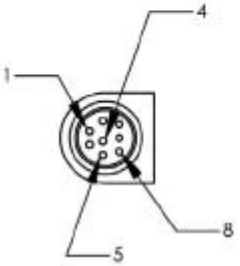
Appendix B — Electrical Specifications

Power Requirements: 5 VDC (mA)
Typical: 330 mA; *Peak:* 345 mA, *Idle:* 250 mA

PIN 1	VIN- Input Voltage to the voltage regulators/battery charging IC
PIN 2	RS-232_TX - RS-232 level serial transmit signal
PIN 3	RS-232_RX - RS-232 level serial receive signal
PIN 4	PS/2_DATA_UART_RX_USB_DP - PS/2 clk to host/ UART transmit signal/ USB Data plus signal
PIN 5	PS/2_DATA_UART_RX_USB_DM - PS/2 data to host or keyboard/ UART receive signal/ USB Data minus signal
PIN 6	PS/2_CLK_KB - PS/2 clock signal to the keyboard
PIN 7	~TRIG - trigger from the handle
PIN 8	GND - signal ground
Shield	Shield Ground

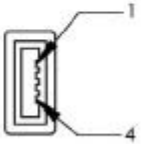
USB Cable Pinouts



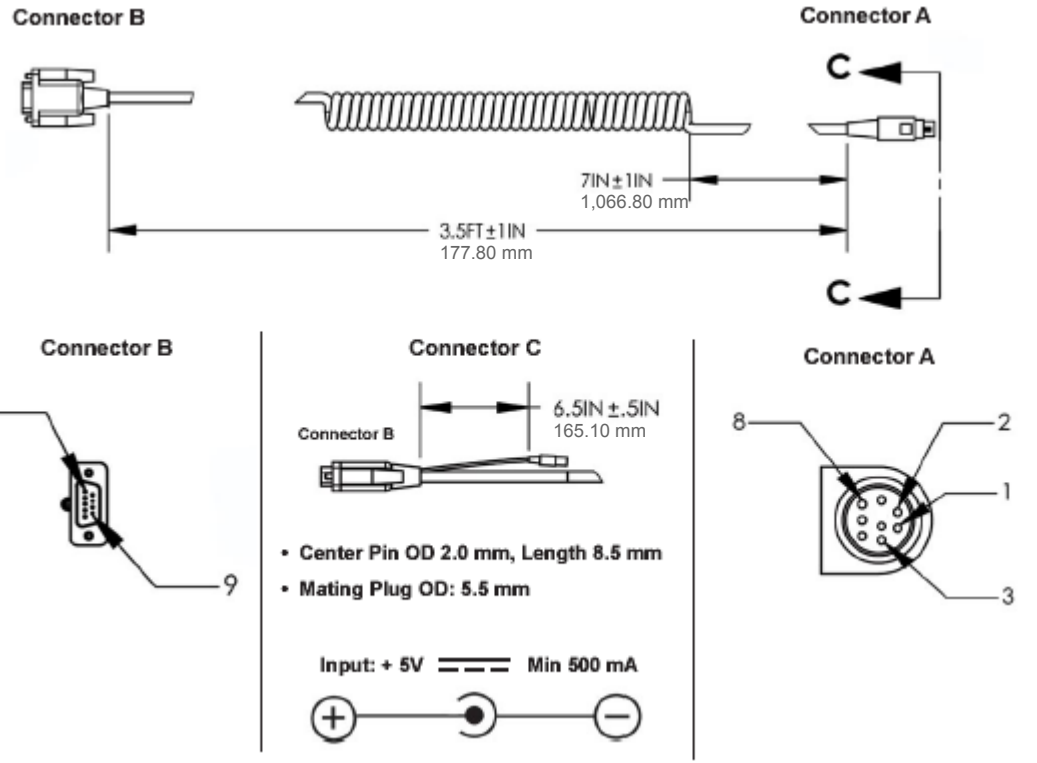


WIRING TABLE:

CONN A	NAME	WIRE	COLOR	CONN B
1	V+	24AWG	RED	1
2	NC			
3	NC			
4	D+	28AWG	GREEN (TWISTED)	3
5	D-	28AWG	WHITE (TWISTED)	2
6	NC			
7	NC			
8	GND	24AWG	BLACK	4
SHELL	---	DRAIN	BARE	SHELL



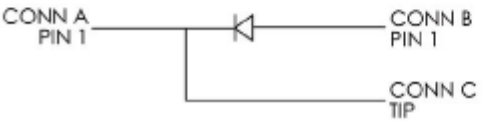
RS-232 Cable Pinouts



WIRING DIAGRAM:

CONN A	NAME	WIRE	COLOR	CONN B	WIRE	COLOR	CONN C
1	PWR	24AWG	RED	1	24AWG	RED	TIP
2	TX	28AWG	BROWN	2			
3	RX	28AWG	ORANGE	3			
4	NC						
5	NC						
6	NC						
7	NC						
8	GND	24AWG	BLACK	5	24AWG	BLACK	RING
9	NC						
SHELL	—	DRAIN	BARE	SHELL			

* SEE WIRING DIAGRAM BELOW FOR CONN A PIN 1, CONN B PIN 1 AND CONN C TIP



Appendix C — HS-2D Maintenance

HS-2D maintenance guidelines are provided below.

Cleaning the HS-2D Window

The HS-2D window should be clean to allow optimum performance. The window is the clear plastic piece inside the front of the reader. Do not touch the window, as fingerprints may impede decode performance. The HS-2D uses CMOS technology that is much like a digital camera, and marks on the window will interfere with image captures.

If the window becomes dirty, clean it with a soft, non-abrasive cloth or a facial tissue (no lotions or additives) that has been moistened with water. A mild detergent may be used to clean the window, but the window should be wiped with a water-moistened cloth or tissue after using the detergent. The HS-2D housing may be cleaned in the same way.

For applications that require cleaning with disinfectant, please use products with the following ingredients:

- Isopropyl Alcohol
- Ethyl Alcohol (Denatured Grade)

Do not use bleach.