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MICROSCAN

Mobile Hawk Handheld DPM Imager User Manual



P/N 84-100021 Rev B

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About the Mobile Hawk Handheld DPM Imager

The key features of the Mobile Hawk Handheld DPM Imager are:

- MAXlite™ illumination technology
- Best-in-class X-Mode DPM decode algorithms
- Image Enhance optimization for difficult-to-decode direct part marks
- LED targeting pattern
- USB and RS-232 interface options
- Fast processing
- Rugged design
- Sustains 50+ drops from six feet to concrete

About This Manual

This manual provides complete information on setting up, installing, and configuring the Mobile Hawk Handheld DPM Imager. 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 Mobile Hawk 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 Mobile Hawk 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, EFT EN 61000-4-4, Surge EN 61000-4-5, Conducted RF Immunity EN 61000-4-6, Magnetic Field Immunity EN 61000-4-8, Voltage Dips EN 61000-4-11, Emissions EN 55022, Class B Radiated Emissions, and Class B Conducted Emission, Current Harmonic Emissions IEC 61000-3-2, Voltage Fluctuation and Flicker IEC 61000-3-3 Class B.

Statement of RoHS Compliance

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

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

and

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

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

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In regards to “RoHS Directive 2011_65_EU” Microscan produces Monitoring and Control Instruments as well as Industrial Monitoring & Control Instruments as defined within the directive. Microscan has developed and is implementing a RoHS2 compliance plan with the intention of bringing all active products listed in our current marketing literature within full compliance as per the directive deadlines.

Key milestones for the transition plan are as follows:

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

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

1 Quick Start

Contents

Check Required Hardware 1-2
USB Interface 1-3
RS-232 Interface 1-4
Install ESP 1-5
Select Model 1-6
Select Protocol and Connect to Imager 1-7

This section is designed to get your Mobile Hawk Handheld DPM Imager up and running quickly so you can get a sense of its capabilities and test sample symbols. Detailed setup information for configuring the imager 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 Mobile Hawk:

- One Mobile Hawk Handheld DPM Imager
- One 12 ft. USB cable (pre-attached to imager)

Parts List for RS-232 Mobile Hawk:

- One Mobile Hawk Handheld DPM Imager
- Cable clip attachment
- Spacer
- Two threaded screws
- RS-232 Interface Kit (Optional Accessory)
  - 8 ft. coiled R-232 cable
  - Power supply (U.S., Euro, or UK)

USB Interface

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

USB Configuration

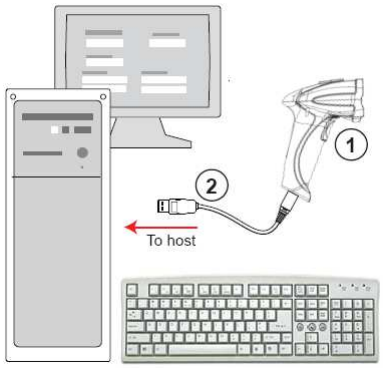
Item	Description	Part Number
1	Mobile Hawk Handheld DPM Imager	FIS-6170-0001G
2	USB Cable	Included

Installation Steps for USB

1. Connect the USB cable to the host.
2. Open any program in your host computer that can receive keyboard text, such as Notepad.
3. Read the Reset to USB Factory Defaults symbol below:

M049_03

Reset to USB Factory Defaults



USB Configuration

4. Read the Save Settings symbol.

M188_02

Save Settings

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	Mobile Hawk Handheld DPM Imager	FIS-6170-0001G
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 Mobile Hawk.
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.

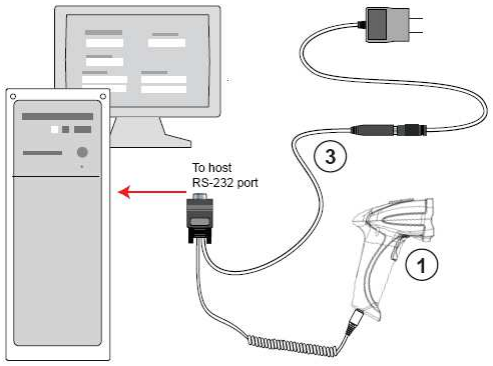


M188_02

Save Settings



Test Symbol
(ABCDEFGHIJKLMNOP)



RS-232 Configuration

Install ESP

ESP Software can be found on the Microscan Tools Drive that is packaged with the Mobile Hawk.

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



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

ESP System Requirements

- 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 imager must be in one of the modes below to communicate with ESP.

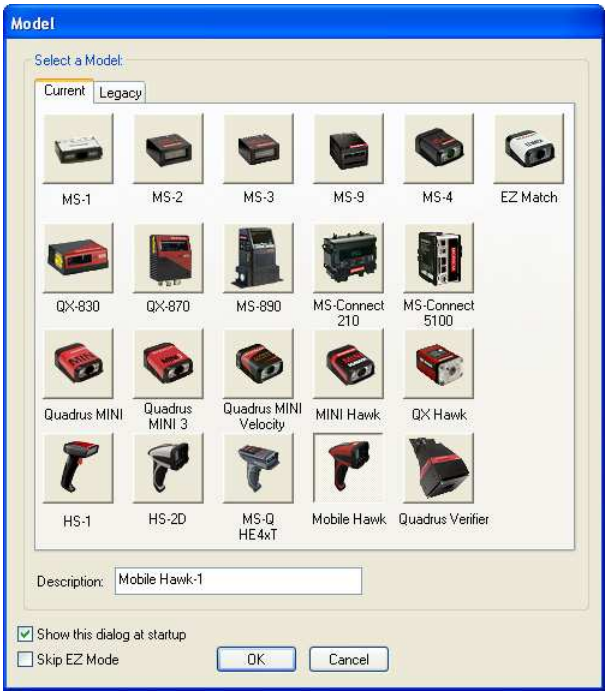
USB	USB Connect Mode
RS-232	RS-232 Connect Mode

Save Settings

M188_02

Select Model

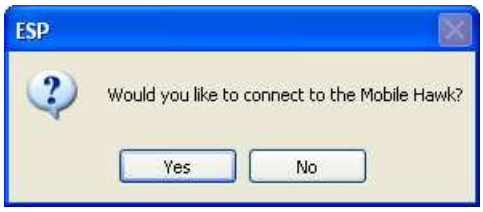
When you start ESP, the following menu will appear:



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



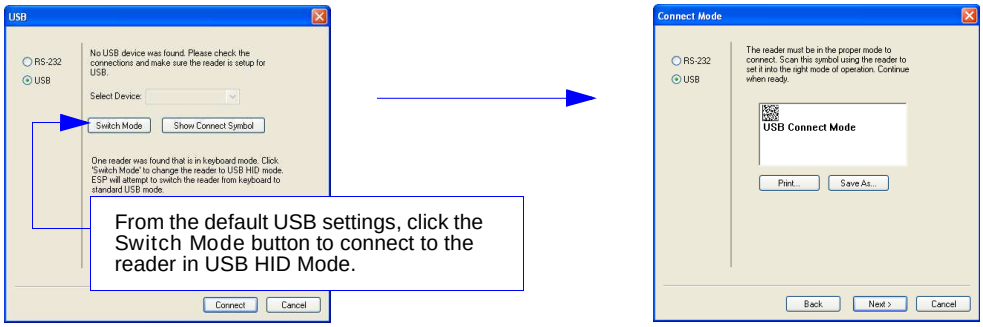
1. Click the Mobile Hawk button and then click OK. If you do not want to make this selection every time you start ESP, uncheck “Show this dialog at startup”.
2. Select the default reader name (Mobile Hawk-1), or type a name of your choice in the Description text field and click OK.
3. Click Yes when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



Select Protocol and Connect to Imager

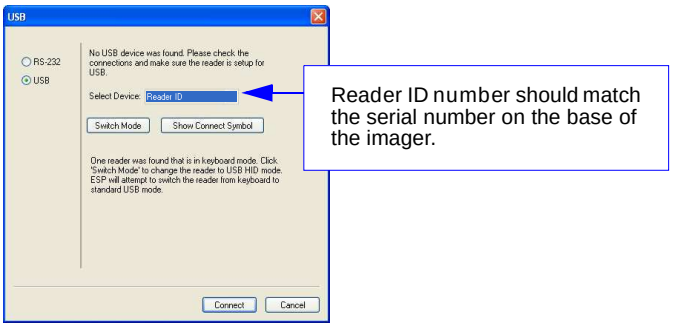
USB (Standard)

- 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 imager 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:



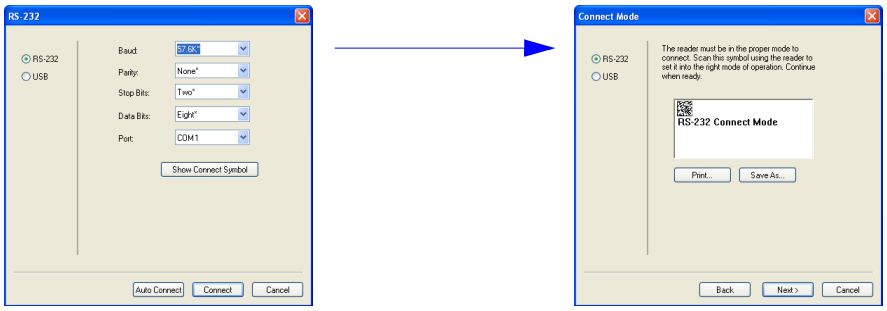
- You will see a “Reader ID” number in the Select Device field. Click Connect.
- When you are connected successfully, the CONNECTED message will appear in a green box in the status bar at the bottom right of the screen.



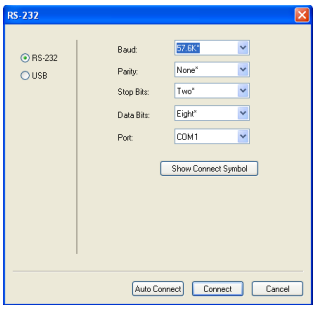
You are now ready to configure your imager using ESP. Subsequent sections provide more detailed information about ESP’s configuration options.

RS-232 Option

- 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 imager 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 imager using ESP. Subsequent sections provide more detailed information about ESP's configuration options.

2 Using ESP

EZ Mode 2-2
Application Mode 2-4
Tree Controls 2-5
Menu Toolbar 2-6
Send/Receive 2-16

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 Mobile Hawk Handheld Imager in the following ways:

- Tree Controls: Each configuration menu contains a list of all option settings that pertain to that specific element of imager 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 imager 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 imager up and running quickly, and will acquaint you with the ESP interface.

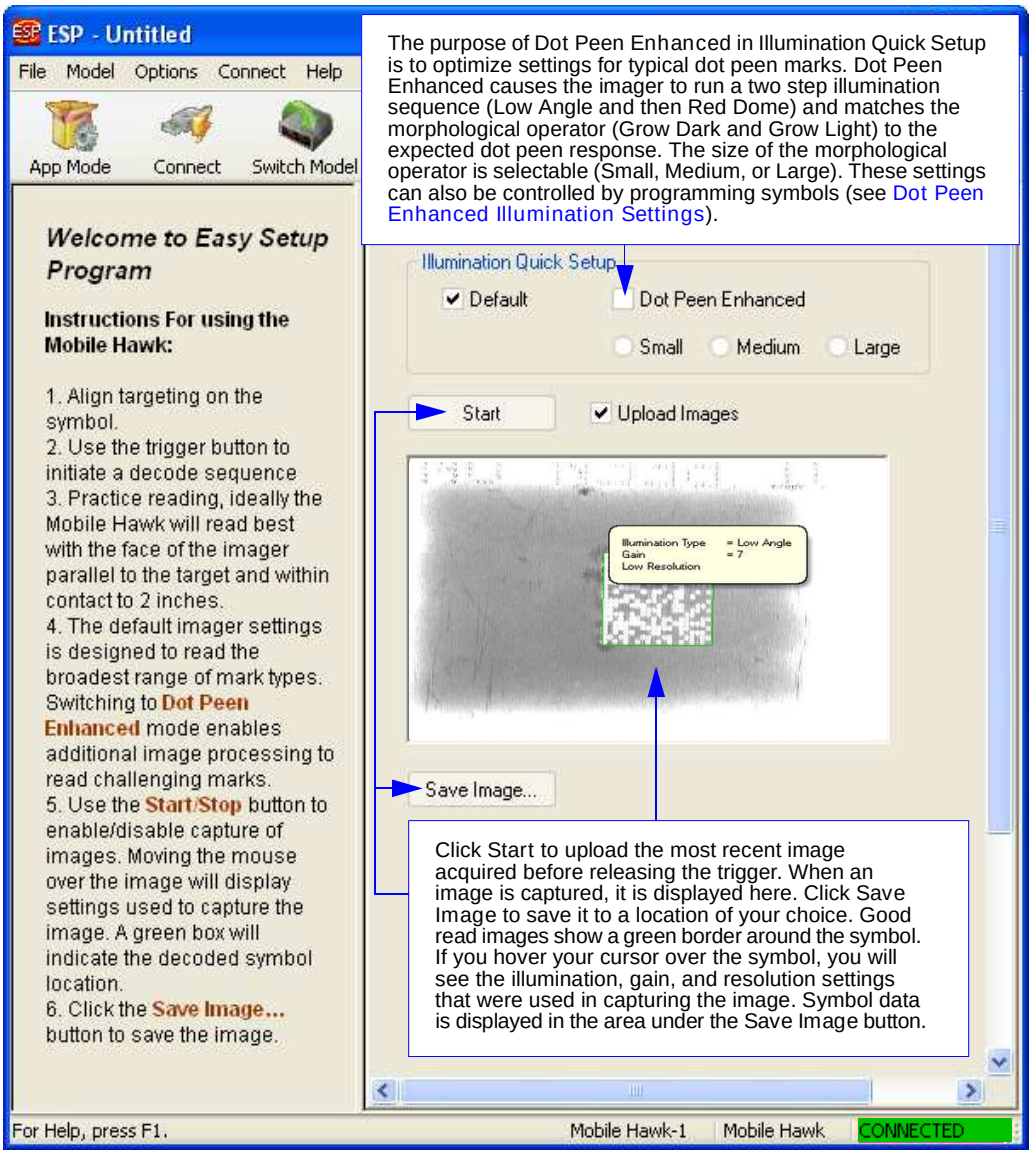


Image Quality

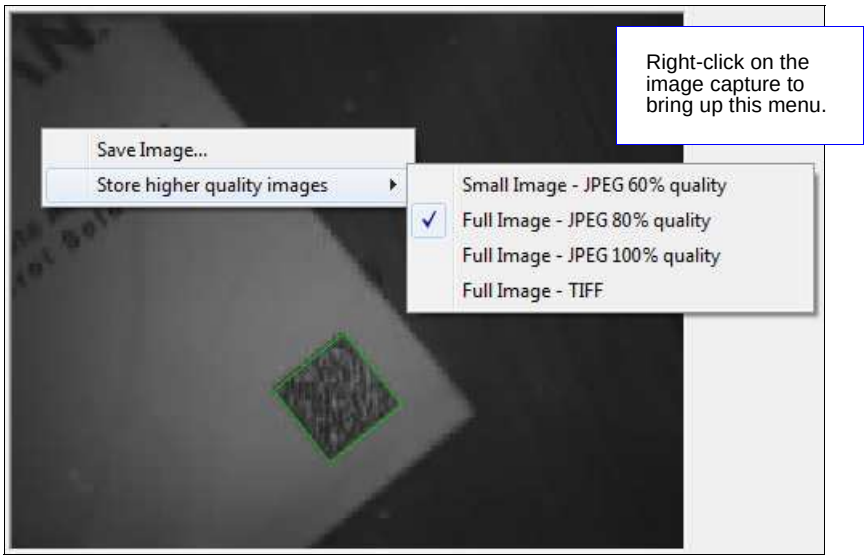
The video view in EZ Mode (and also on the Video tab in I/O Parameters) allows you to capture images from the Mobile Hawk for further analysis. If Upload Images is checked and you click the Start button, image captures will be uploaded automatically for every good read. Images will also be uploaded for every no read, upon release of the imager's trigger.

You can right-click on a captured image to bring up the menu shown below. If you select Store higher quality images, you will see a dropdown menu with JPEG 60% quality (small size), JPEG 80% quality (full size), JPEG 100% quality (full size) and TIFF (full size).

The imager's illumination setup can be restored by clicking the Default box in the EZ Mode view. Refer to the Basic Operations section for more information about the Mobile Hawk's illumination capabilities.

Note: If you have difficulty viewing TIFF images with Windows Picture and Fax Viewer, it is recommended that you use Paint or viewer software that is optimized for TIFF files.

Note: TIFF images are large files and take significantly longer to download than JPEG images.

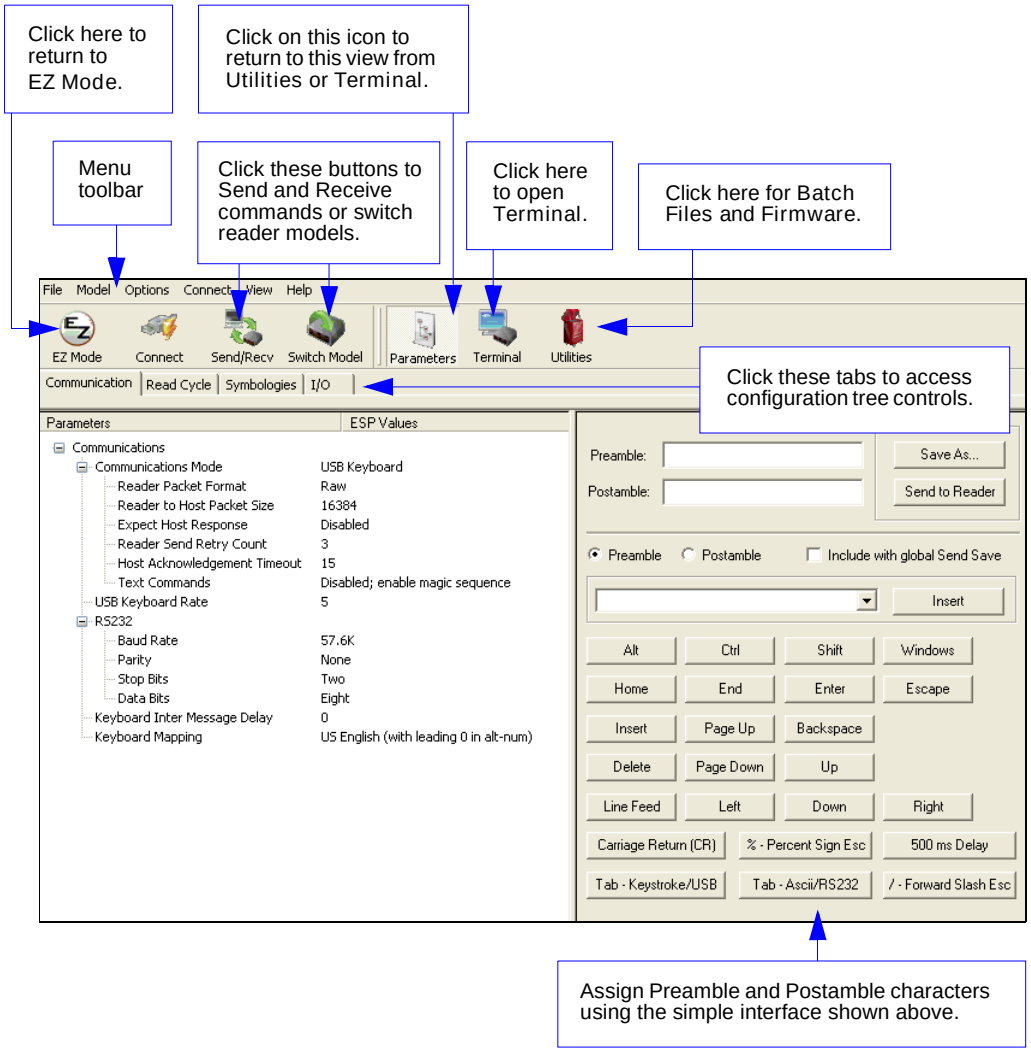


Note: Image size will vary depending on user settings for Region of Interest, and whether or not Low Resolution Image is checked in the Illumination dialog in ESP.

Image Save Mode	Region of Interest	Low Resolution	Final Image Size
Small Size (Displayed)	1280 x 1024	No	320 x 256
Small Size	1280 x 1024	Yes	320 x 256
Small Size	800 x 600	No	400 x 296
Small Size	800 x 600	Yes	400 x 296
Full Size	1280 x 1024	No	1280 x 1024
Full Size	1280 x 1024	Yes	640 x 512
Full Size	800 x 600	No	800 x 600
Full Size	800 x 600	Yes	400 x 296 (JPEG); 400 x 300 (TIFF)

Application Mode

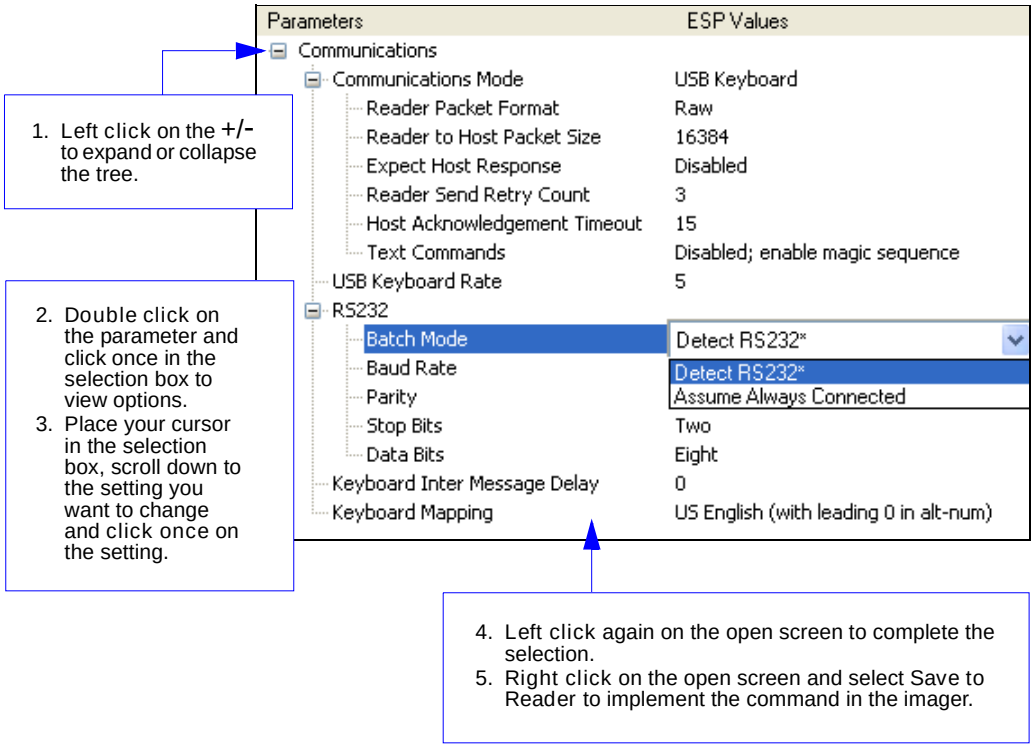
Application Mode gives you access to a robust configuration environment, including tree controls that let you make precise changes to operation parameters, and graphic interfaces that make configuring your imager easy and intuitive.



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 controls:



The imager 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

Menu Toolbar

File > New

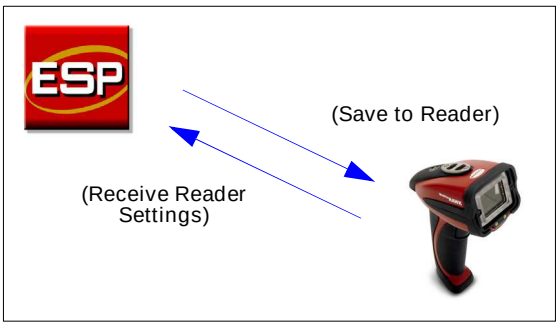
Whenever New is selected from the File menu, the default configuration of ESP is loaded.



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 imager. The diagram below shows how settings can be saved and received between ESP and the imager, and ESP and the host hard drive.



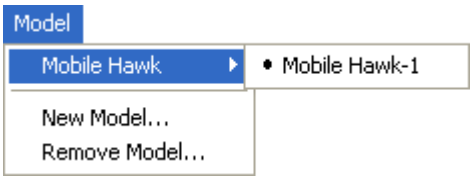
Import / Export

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.

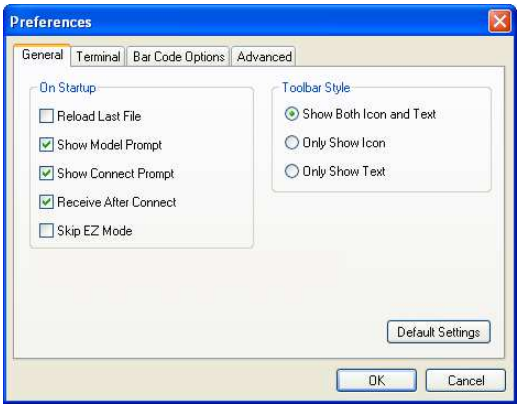


Options

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.

Show Connect Prompt

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

Receive After Connect

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

Skip EZ Mode

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

Show Both Icon and Text

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

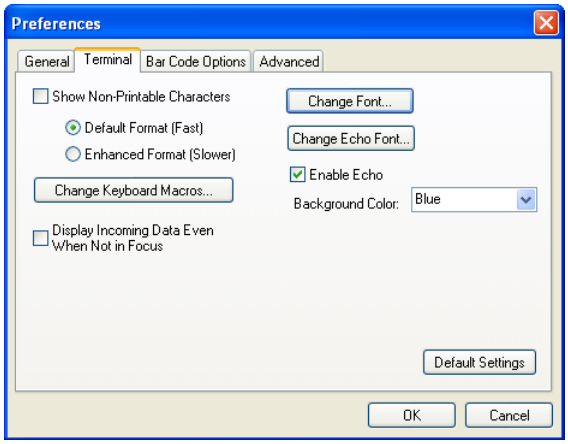
Sets the toolbar to display names of operations only, without icons.

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.

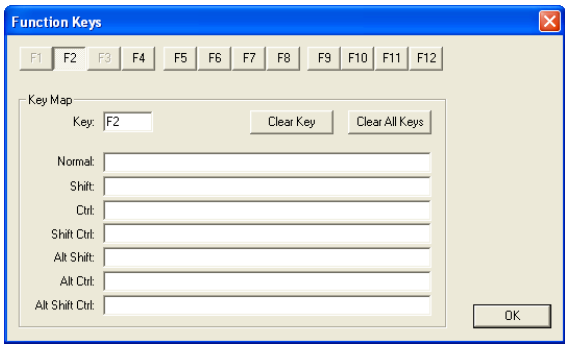
When Display incoming data even when not in focus is checked, data from the imager will continue to appear in the terminal even when ESP is not the top window on the host computer’s screen.

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.

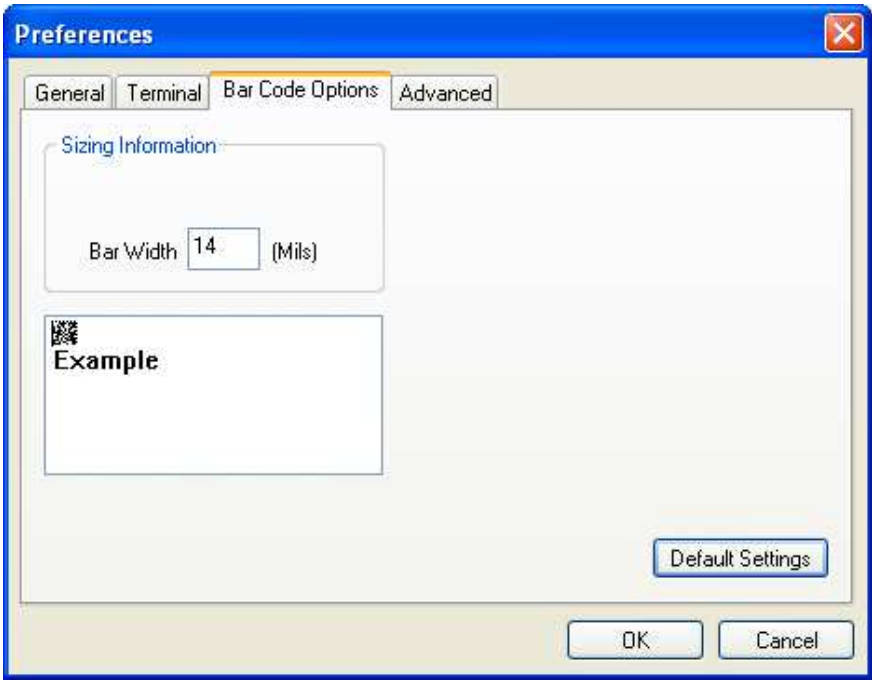
Change Font

Sets the font characteristics for data received from the imager.

Change Echo Font

Sets the font characteristics of user-entered data.

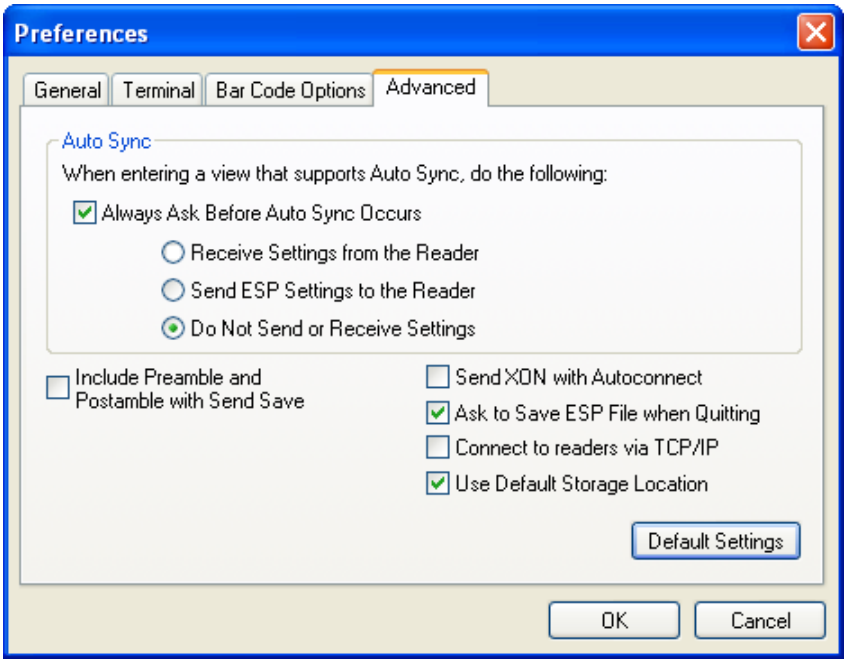
Bar Code Options Tab



Sizing Information

Sets Bar Width (in mils) of symbols that can be created in ESP.

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 imager's settings to ESP when Auto Sync is enabled. Send ESP Settings to the Reader will automatically send all imager configuration settings chosen in ESP to the imager. Do Not Send or Receive Settings creates a condition in which Auto Sync will not send imager settings to ESP, or send ESP settings to the imager.

Include Preamble and Postamble with Send Save

Sends Preamble and Postamble settings along with other settings when a Send and Save is performed.

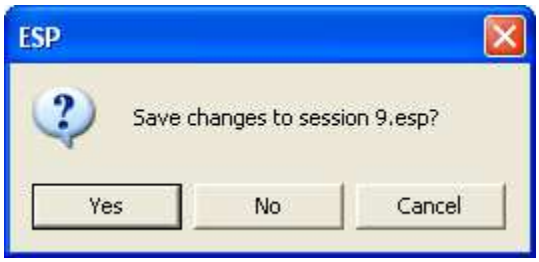
Send XON with Auto-Connect

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

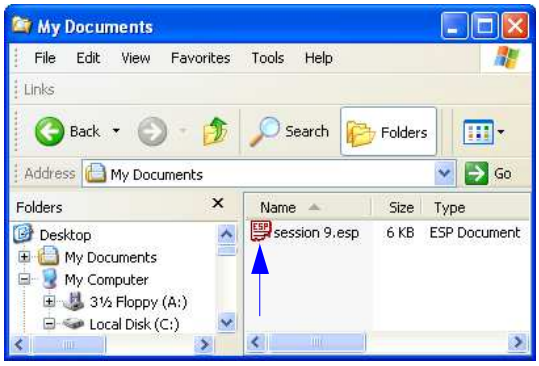
Preferences > Advanced Tab (cont.)

Ask to Save ESP File when Quitting

When enabled, prompts the user to save a .esp file when ending a session.



The .esp file will be saved in the location specified by the user.



Connect to Readers via TCP/IP

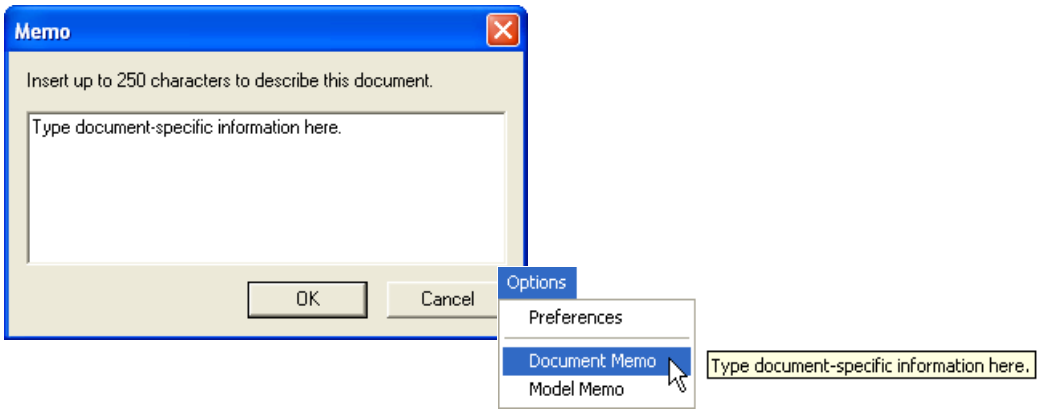
When enabled, shows the TCP/IP Connection Wizard by default.

Use Default Storage Location

When enabled, automatically stores data in ESP's Application Data folder.

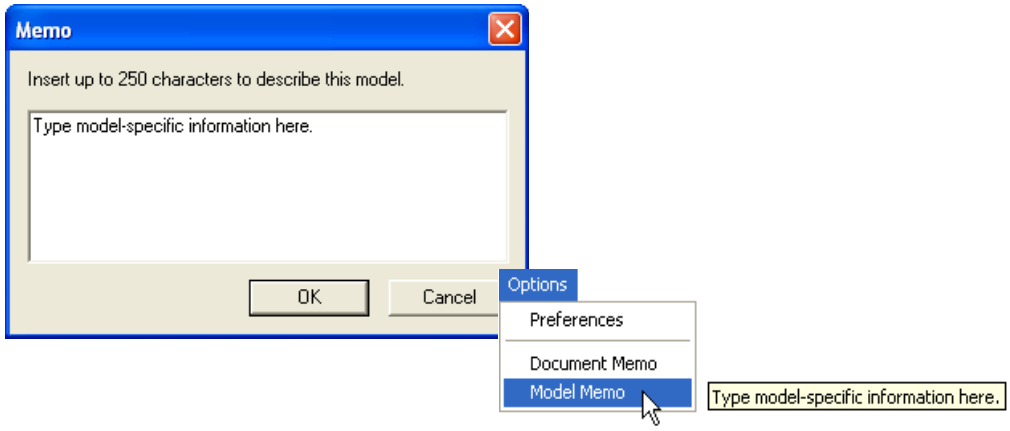
Document Memo

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 imager via the Connection Wizard, you will first need to select the correct protocol (see Select Protocol and Connect to Imager).

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

RS-232:

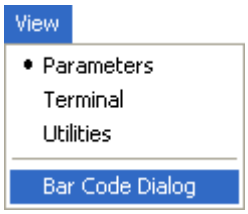


USB:



View

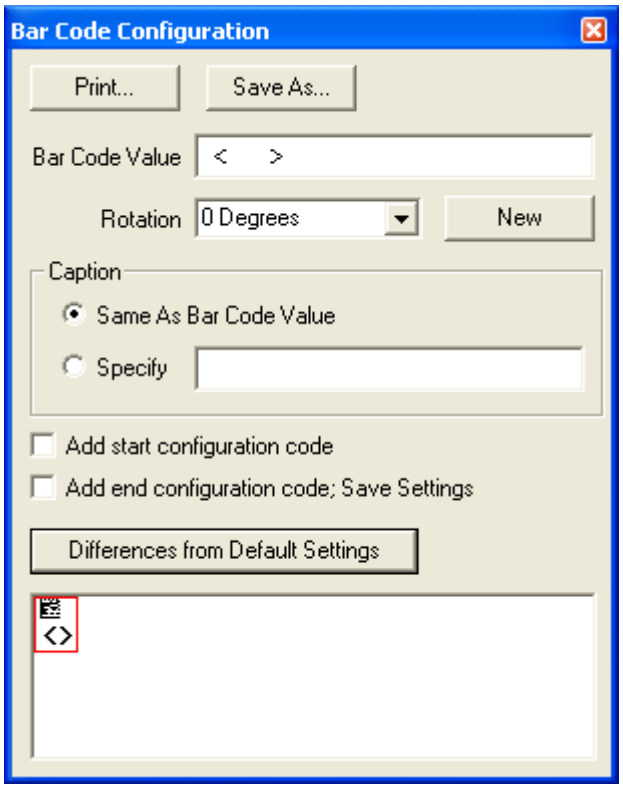
The options in the View menu correspond to icons on the operations toolbar (Parameters, Setup, Terminal, Utilities). Each option allows you to configure the imager or to perform various other functions in the chosen view.



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 imager.



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

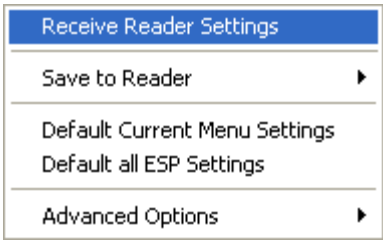
From the Send/Recv menu, select Receive Reader Settings.

This option is useful if you want to receive the imager's settings and save them as a file for later retrieval. For example, if your imager 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 imager'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 imager'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 imager, you will lose those ESP settings if you choose to receive settings from the imager.

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 imager.

Default

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

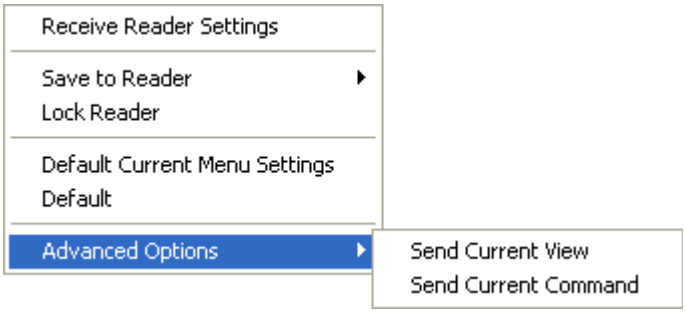
Advanced Options

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

Targeting and Decoding 3-2
Scanning Guidelines..... 3-3
Decode Zones and Lighting Zones..... 3-4
Illumination System 3-7
Illumination Sequence 3-9

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

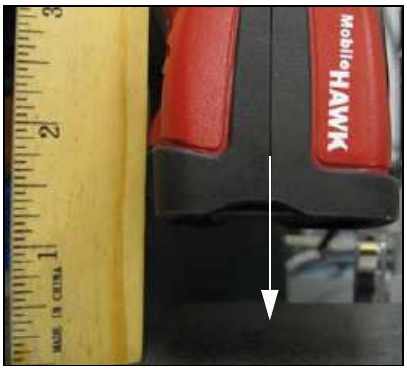
Targeting and Decoding

The Mobile Hawk features simple blue targeting LEDs to indicate optimal read range.

1. Hold the imager about 6” from the mark and align the blue targeting pattern as shown below.



2. Move the front of the imager steadily downward toward the mark and parallel to the mark surface.



3. The imager will decode the mark at the optimal read distance – typically from the point of contact to .50” (contact – 12.70 mm).

Test Symbol

ABCDEFGHIJKLMNOP

Targeting LEDs

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

M734_01
Targeting LED On

M735_01
Targeting LED Off

M188_02
Save Settings

Scanning Guidelines

The Mobile Hawk makes reading the most difficult direct part marks easy. The following guidelines will help ensure optimal performance:

- In the default illumination setup, allow the Mobile Hawk to run through its illumination sequences before terminating the read cycle. The Mobile Hawk captures several images with each illumination zone, evaluating the optimum settings. If reading the same part or same part type, the Mobile Hawk always uses the most recent good read settings as a starting point so subsequent reads will be faster.
- Hold the Mobile Hawk still – do not swipe or move the imager. Pull the trigger and hold until a read is indicated by the green LED.
- Hold the Mobile Hawk such that its front surface is parallel to the mark surface, and the mark is centered. Unlike other readers that require a tilt to read, the Mobile Hawk is designed to operate this way.



Correct – Move in steadily with front of imager parallel to surface.



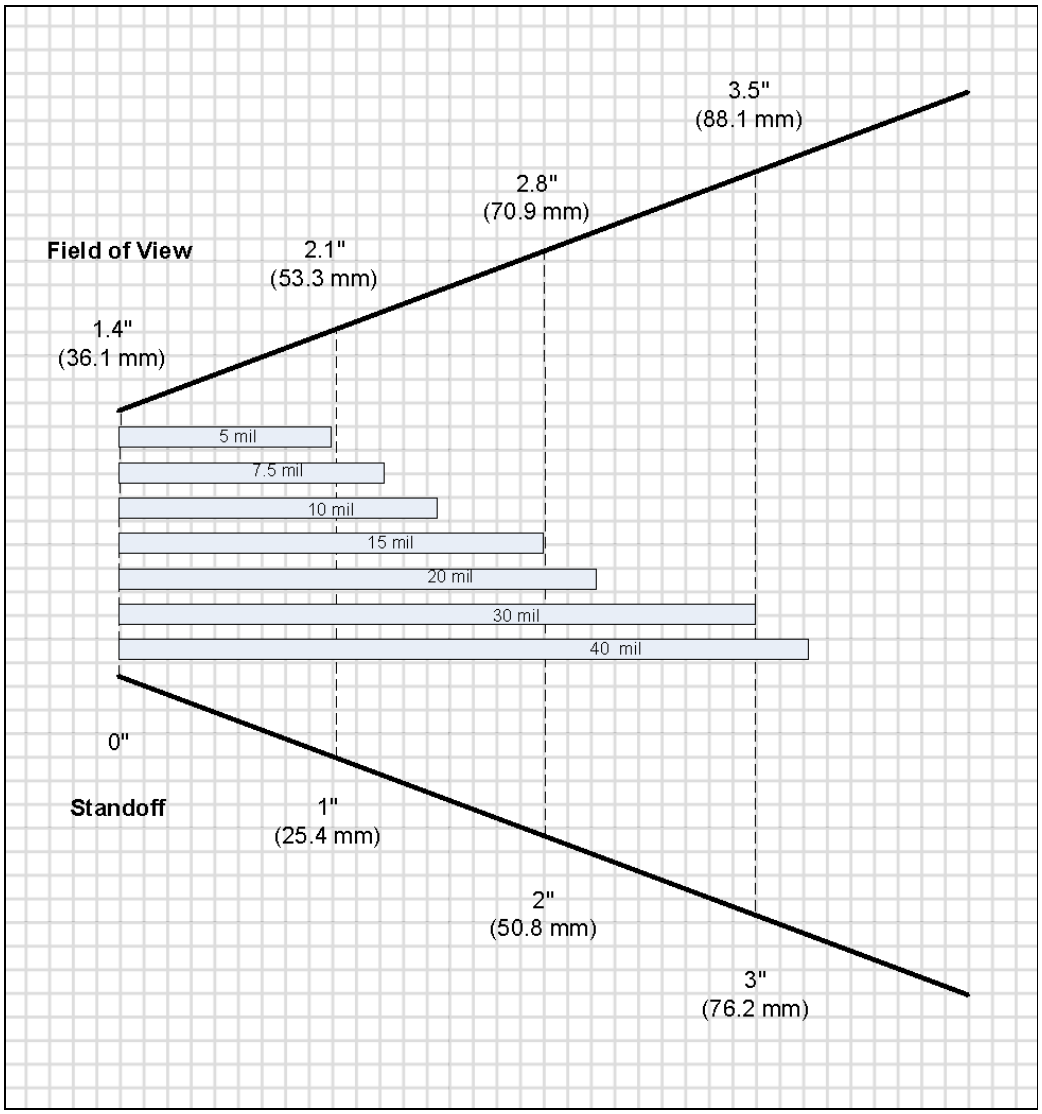
Incorrect – Too far away and off axis to target.

- The Mobile Hawk features omnidirectional decoding. Centering the mark within the field of view will yield the best decode performance.

Decode Zones and Lighting Zones

The following chart provides a guideline for overall read performance based on mark size. Actual range for direct part marks will vary based on mark parameters and the illumination zone required for readings. The chart below is intended as a guideline.

Decode Zones

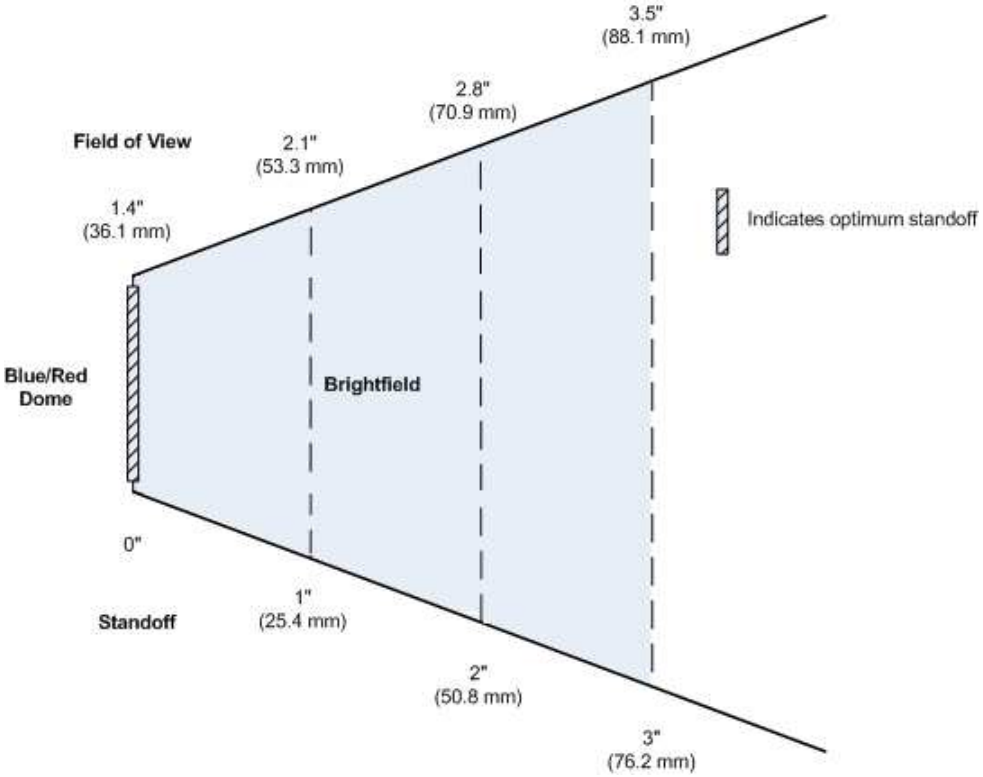


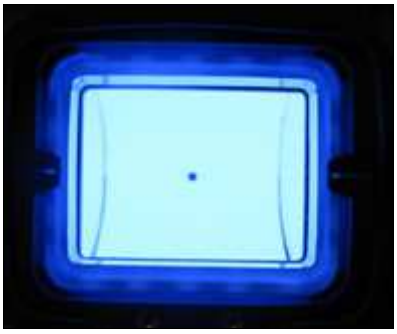
Lighting Zones

The following charts indicate the illumination zones based on the Mobile Hawk MAXlite design.

Dome Lighting Zone

Dome illumination de-emphasizes surface texture and elevation (curved surface).





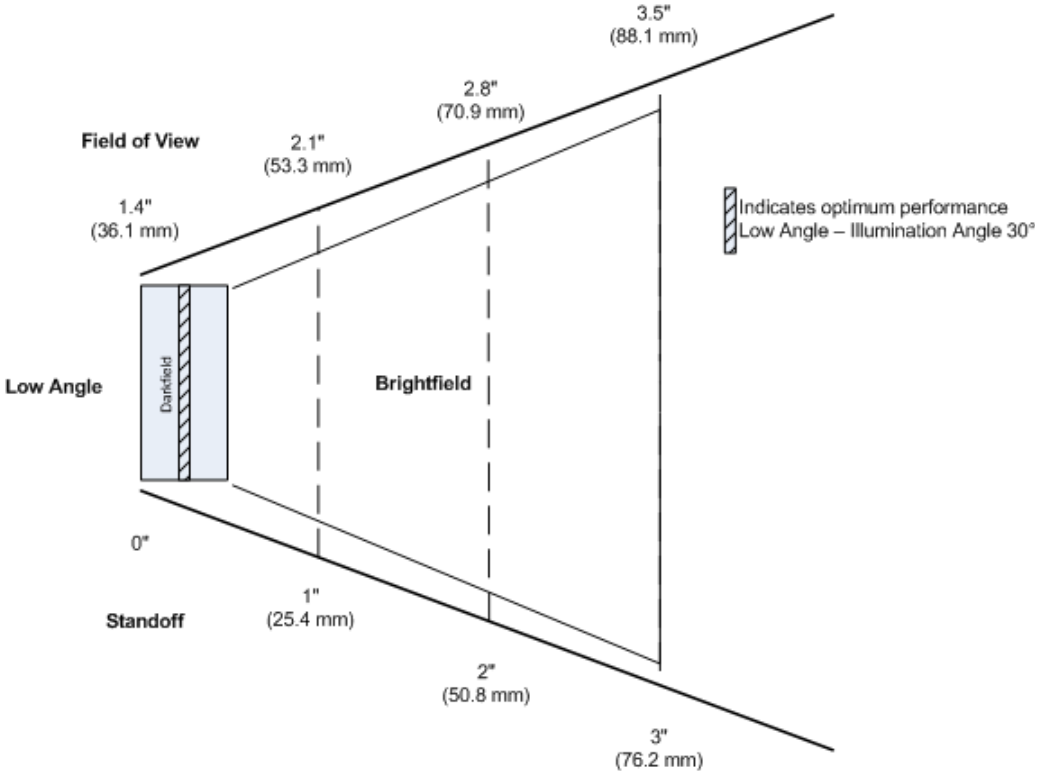
Dome Illumination



Texture and Elevation are De-Emphasized on the Mark's Surface

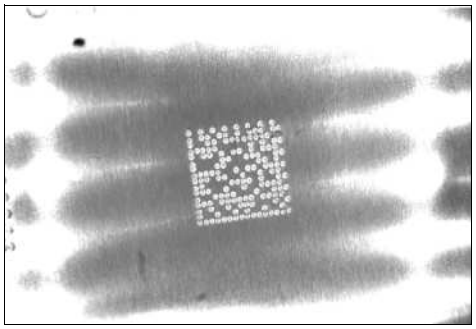
Low Angle Lighting Zone

Low Angle illumination emphasizes surfaces texture and elevation (curved surface).





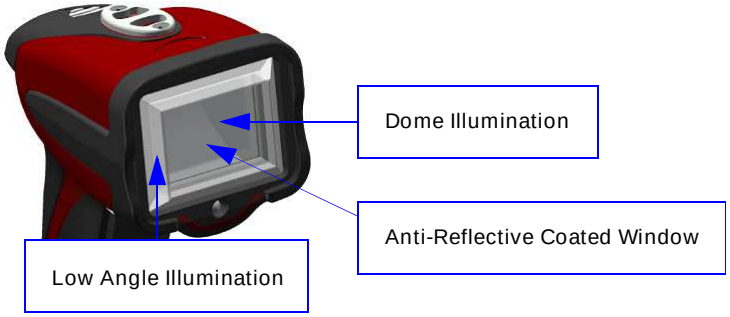
Low-Angle Illumination



Texture and Elevation are Emphasized on the Mark's Surface

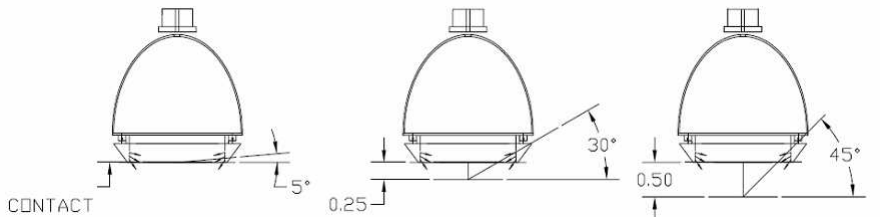
Illumination System

The Mobile Hawk incorporates the MAXlite (multi-axis lighting) illumination system, designed to ensure reliable decoding of the toughest direct part marks. Through an advanced combination of low angle (dark field) and multi-colored dome (bright field) illumination techniques, MAXlite provides even illumination of flat, shiny surfaces, enhancing embossed features, or differentiating features on curved surfaces.

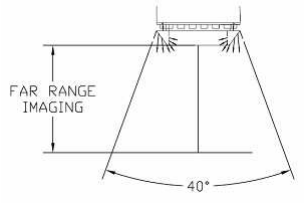


Low Angle (Dark Field) Illumination

The low angle illumination zone provides what is called “dark field” illumination, ideal for very low-contrast marks such as laser-embossed or engraved marks. This zone is useful on both specular and non-specular surfaces and emphasizes surface texture. The optimum lighting angle for most marks is 30 degrees, which occurs when the Mobile Hawk is approximately 0.25” away from the target mark. This illumination zone actually directs light inward at an angle, which varies with the actual working distance and provides a good source of low angle illumination from contact (5 degrees) to about 0.5 inch (45 degrees). Beyond this working distance for low angle illumination the illumination zone converts to a general purpose illuminator due to a portion of the illumination passing straight through the prism. This can be useful in providing “bright field” illumination. This zone was designed for reading larger marks such as 1D symbols at longer working distances.



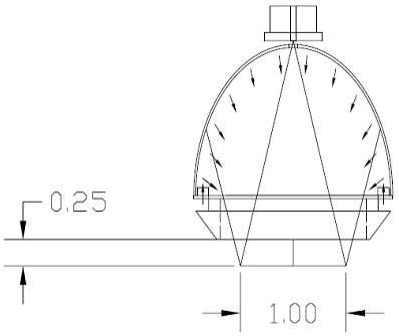
Low Angle Illumination Zone 1 (Contact to 0.5”)



Low Angle Illumination Zone 2 (0.5” and greater)

Dome Illumination

Dome illumination provides diffused, uniform light. The large, solid angle of illumination supports imaging of shiny flat surfaces or curved surfaces. This zone is useful on specular and non-specular surfaces, ideal for de-emphasizing surface texture and elevation (curves). The dome provides the widest area of coverage at close working distances. It is important to note that for marks that are a large percentage of the diameter of a curved surface, closer distances will provide the best performance. In addition to illuminating marks on curved surfaces, dome illumination also provides diffuse, even bright field illumination, which will provide thorough coverage on a wide variety of direct part marks.



Dome Illumination

Blue Dome vs. Red Dome Illumination

The Mobile Hawk features two colors of dome illumination to add another dimension of decode optimization for direct part marks. Using the opposite light spectrum as a part's surface color will make the part feature appear darker. Using the same light spectrum will make the part feature appear lighter. The example below shows a green part surface with a laser-etched Data Matrix.



Blue Dome Illumination



Red Dome Illumination

Illumination Sequence

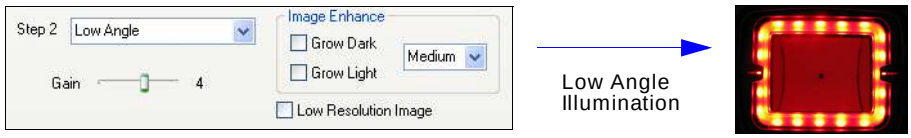
The Mobile Hawk is configured to provide the broadest reading capabilities “out of the box”. Just point and shoot to read most marks. This is achieved by combining the MAXlite illumination system with Microscan’s advanced X-Mode algorithms. The Mobile Hawk automatically cycles through a default combination of the MAXlite illumination zones each time the user pulls the trigger to decode a mark. The imager will then lock onto the settings used in the last good read and move those to the first step in the next sequence.

The Mobile Hawk has four steps defined in this default illumination sequence:

1. Low Angle Illumination with Low Resolution Image



2. Low Angle Illumination with Full Resolution Image



3. Blue Dome Illumination



4. Red Dome Illumination



With ESP Software, the user can change this sequence or define a different sequence. It is possible to have one step to as many as eight steps defined. ESP allows the user to evaluate the best settings.

Note: Decode speed can be improved with fewer illumination steps.

Note: Hovering over an uploaded image in ESP with your cursor will display the settings used to capture the image.

In addition to the general purpose sequence, a special sequence has been defined for dot peen marks. This adds additional X-Mode pre-processing to the sequence steps, allowing you to read some of the most challenging direct part marks with ease.

4 Communications

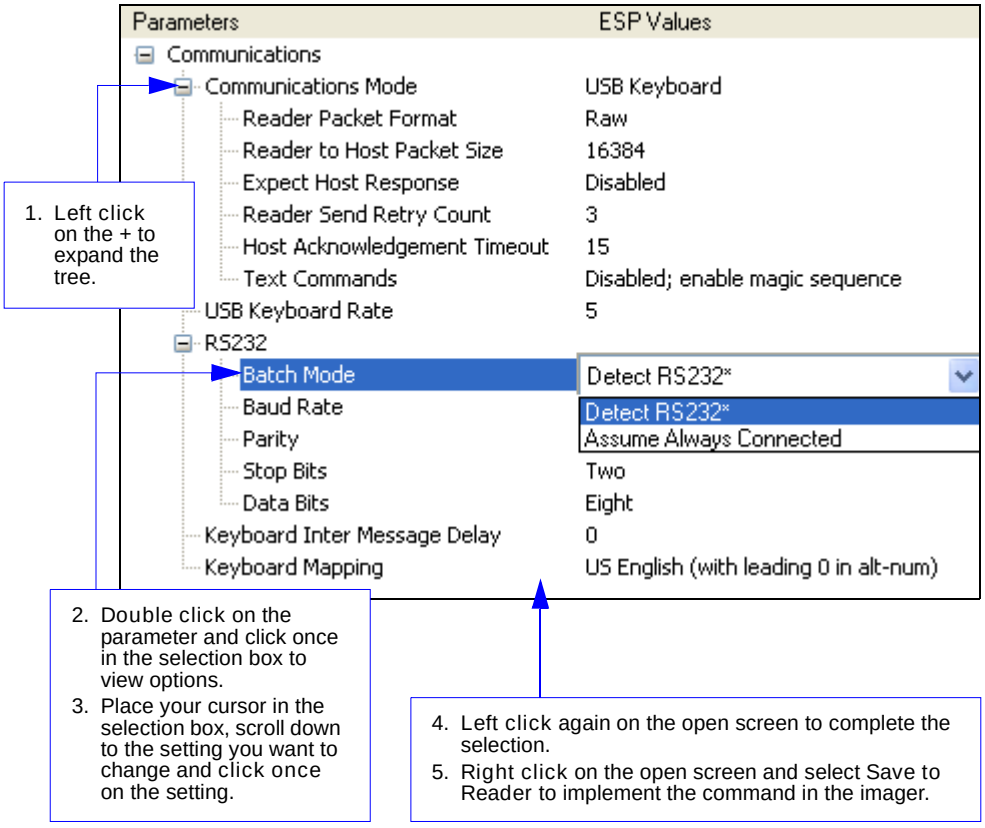
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Other Communications Settings in ESP 4-14

This section includes connection parameters and options for communicating with the Mobile Hawk Handheld DPM Imager in various interfaces.

Communications by ESP

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



Communications Overview

All Mobile Hawk Handheld DPM Imagers 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 Mobile Hawk and the host the USB port.


M135_04

USB Virtual COM Mode

This mode allows an Mobile Hawk in a USB configuration to function as a virtual serial COM port. This mode requires installation of a USB Virtual COM driver. The USB Virtual COM Port Driver can be found in the Download Center on the Microscan website.


M668_01

USB HID POS (Terminal ID 131)

This mode allows a USB-cabled Mobile Hawk to communicate as a USB HID POS (Terminal ID 131) device.


M736_01


M188_02
Save Settings

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


M096_01

19.2K


M093_01

2400


M097_01

38.4K


M094_01

4800


M098_01

57.6K (Default)


M095_01

9600


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


M188_02 Save Settings

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.

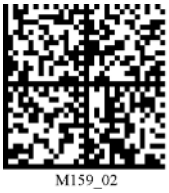
Important: Be sure to save all settings before reading any of the following preamble symbols—otherwise your settings may be lost.


M188_02

Save Settings

Set the desired preamble by reading the appropriate symbol below.

Serial Preamble


M159_02

Comma


M164_02

Space


M218_02

Tab


M214_02

Carriage Return
Line Feed


M404_01

Erase All
Preamble Data

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


M406_02

Erase Preamble and Postamble Data

USB or PS/2 Keyboard Preamble


M159_02

Comma


M164_02

Space


M166_01

Tab


M404_01

Erase All Preamble Data

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


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.

Serial Postamble


M160_04

Comma


M165_04

Space


M219_04

Tab


M168_04

Carriage Return


M169_04

Line Feed


M170_04

Carriage Return
Line Feed


M405_02

Erase All
Postamble
Data

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


M406_02

Erase Preamble
and Postamble
Data

USB or PS/2 Keyboard Postamble


M160_04

Comma


M165_04

Space


M167_04

Tab


M161_04

Enter


M405_02

Erase All Postamble Data

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

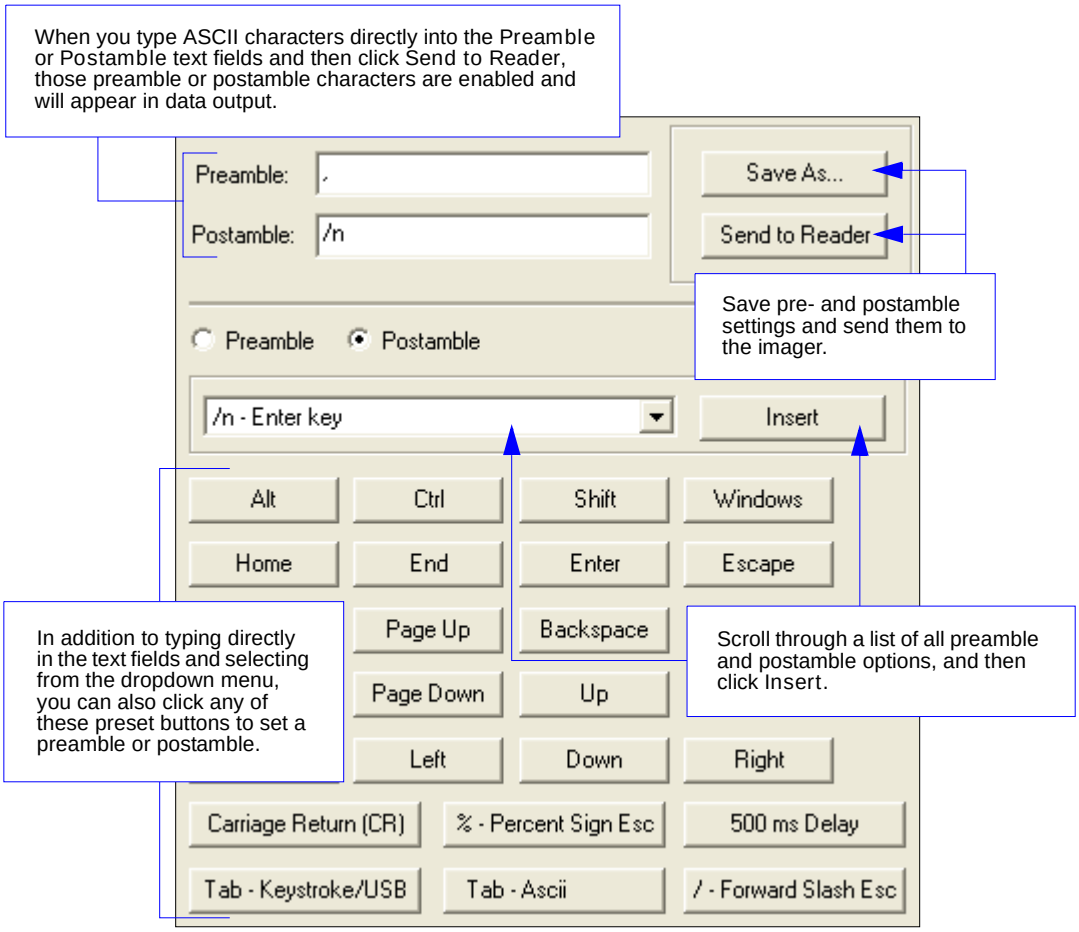

M406_02

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)

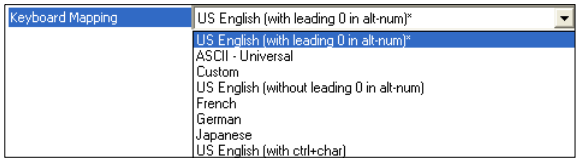

M584_02

Disable Alternate OS


M188_02

Save Settings

Keyboard Mapping by ESP



Text Commands

When the Text Commands feature is enabled, the Mobile Hawk can accept text commands via RS-232 connections and USB Virtual COM modes.

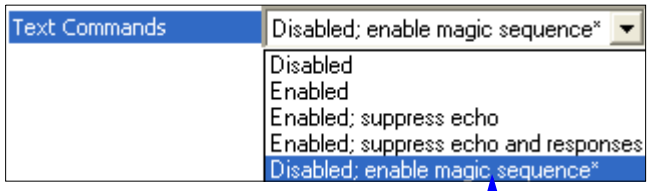
Note: Text Commands are not supported in USB HID Mode.

M198_01
Enable Text Commands

M197_02
Disable Text Commands (Default)

M188_02
Save Settings

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 imager 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.



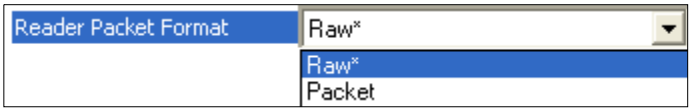
Enter the magic sequence in this text field and click Send.

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 Mobile Hawk at the rate specified (1 to 255 ms).

Keyboard Inter Message Delay



Places a delay between each character that is output by the imager when in Keyboard Mode. Useful for applications that require a slower output rate.

5 Read Cycle

Contents

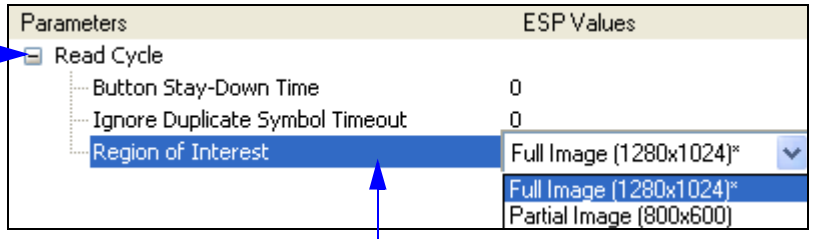
Read Cycle by ESP....5-2
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Ignore Duplicate Symbol Timeout....5-4
Region of Interest....5-5

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

Read Cycle by ESP

To make changes to configuration settings in the Read Cycle 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 imager.

Button Stay-Down Time

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



Ignore Duplicate Symbol Timeout

Ignore Duplicate Symbol Timeout sets the imager not to output the same symbol data multiple times within the time period designated.



Region of Interest

Region of Interest allows the user to determine the size of the image window to be captured and decoded.

Note: Using a smaller Region of Interest, if possible, may enhance read cycle performance.

Full Image (1280 x 1024) (Default)



Q038_01

Partial Image (800 x 600)



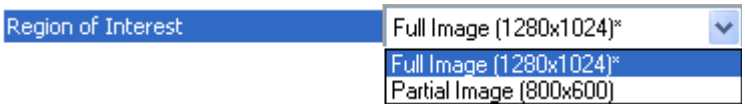
Q039_01



M188_02

Save Settings

Region of Interest by ESP



6 Symbologies

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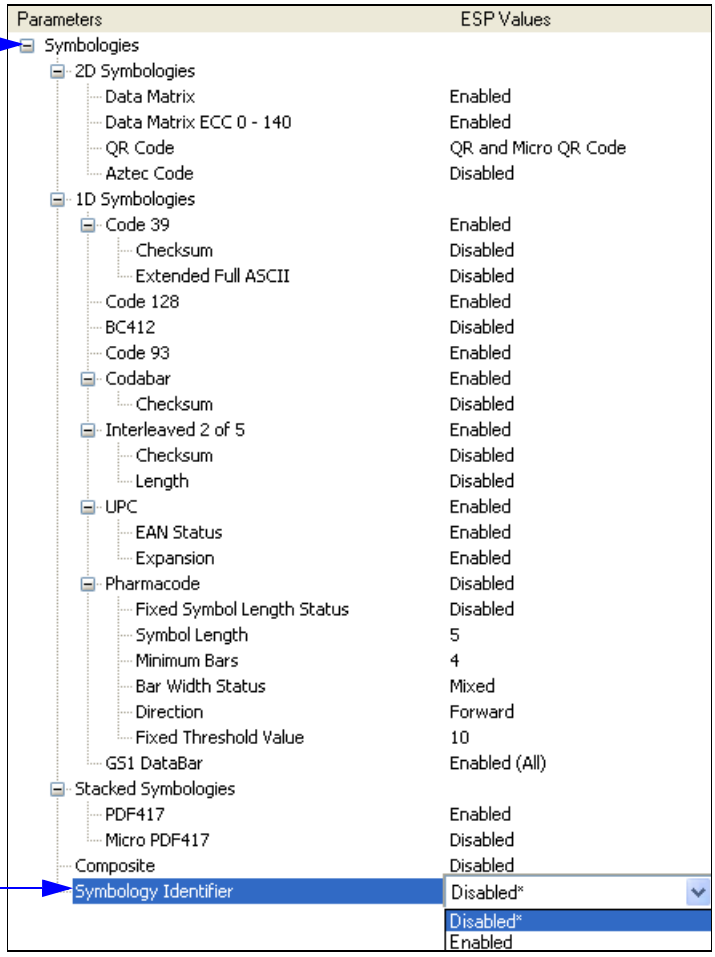
This section describes the various symbol types that can be read and decoded by the imager. See http://www.aimglobal.org/standards/aimpubs.asp for additional information.

Note: Disabling unused symbologies may substantially improve the Mobile Hawk's decode speed.

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 imager.

Aztec

Read the following symbols to enable/disable Aztec settings:

Aztec On

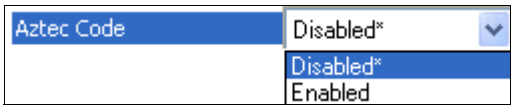
M273_01

Aztec Off (Default)

M272_01

M188_02 Save Settings

Aztec by ESP



Sample Aztec Symbol

BC412

Read the following symbols to configure BC412 settings:

BC412 Off (Default)



BC412 On



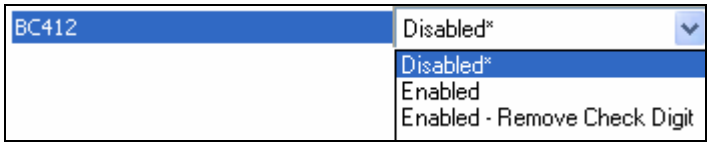
BC412 On, Remove Check Digit





Save Settings

BC412 by ESP



Sample BC412 Symbol



Codabar

Read the following symbols to enable/disable Codabar settings:

Codabar On (Default)

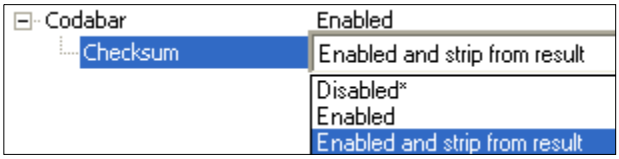

M275_01

Codabar Off


M274_01


M188_02 Save Settings

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

Code 39

Read the following symbols to configure Code 39 settings:

Code 39 On (Default)



Code 39 Off



Enable Checksum



Disable Checksum (Default)



Enable Checksum and Strip from Result



Code 39 Extended Full ASCII On



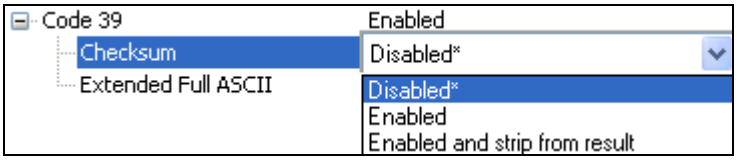
Code 39 Extended Full ASCII Off (Default)





Save Settings

Code 39 by ESP



Sample Code 39 Symbol



Code 93

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

Code 93 On (Default)


M281_02

Code 93 Off


M280_01


M188_02 Save Settings

Code 93 by ESP



Sample Code 93 Symbol



Code 128

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

Code 128 On (Default)



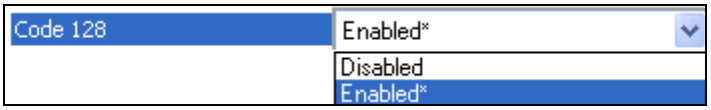
Code 128 Off





Save Settings

Code 128 by ESP



Sample Code 128 Symbol



Composite

Composite consists of a 1D component associated with an adjacent 2D component. A successful decode is required for both the 1D and 2D components before the Mobile Hawk outputs a result. When Composite is enabled, the unit decodes the 1D component first.

Important: EAN-8, EAN-13, UPC-A, and UPC-E cannot be decoded individually when Composite is enabled.

Read the following symbols to enable or disable Composite:

Composite On


M285_02

Composite Off (Default)


M284_02


M188_02 Save Settings

Composite by ESP



Sample Composite Symbol



Data Matrix

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

Data Matrix ECC 0-140 On (Default)

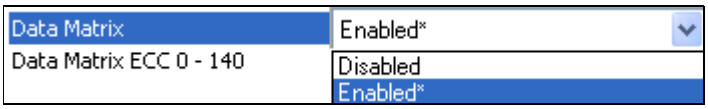

Q005_01

Data Matrix ECC 0-140 Off


Q006_01


M188_02 Save Settings

Data Matrix by ESP



Sample Data Matrix Symbol



GS1 DataBar

Read the following symbols to configure GS1 DataBar settings:

All DataBar On (Default)

M267_01

All DataBar Off

M266_01

DataBar Limited On

M268_01

DataBar-14 and DataBar-14 Stacked On

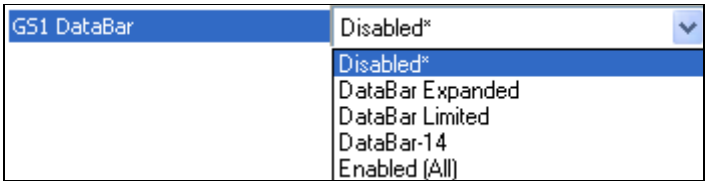
M271_01

DataBar Expanded On

M269_01

M188_02 Save Settings

GS1 DataBar by ESP



Sample DataBar-14 Limited Symbol

Sample DataBar-14 Stacked Symbol

Sample DataBar Expanded Symbol

Sample DataBar-14 Symbol

Interleaved 2 of 5

Read the following symbols to configure 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 Checksum On


M250_01

Interleaved 2 of 5 Checksum Off


M249_01

Interleaved 2 of 5 Checksum On and Strip from Result


M251_01


M188_02 Save Settings

Interleaved 2 of 5 by ESP



Sample Interleaved 2 of 5 Symbol


0123456789

MicroPDF417

Read the following symbols to enable/disable MicroPDF417 settings:

MicroPDF417 On



MicroPDF417 Off (Default)





Save Settings

MicroPDF417 by ESP



Sample MicroPDF417 Symbol



PDF417

Read the following symbols to enable/disable PDF417 settings:

PDF417 On (Default)

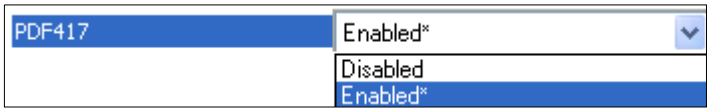

M293_01

PDF417 Off


M292_01


M188_02 Save Settings

PDF417 by ESP



Sample PDF417 Symbol



Pharmacode

Read the following symbols to enable/disable Pharmacode settings:

Pharmacode Off (Default)

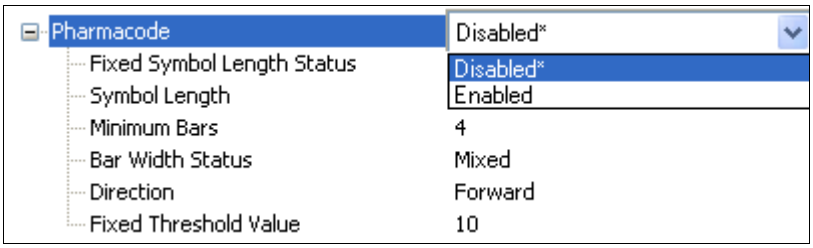

M408_01

Pharmacode On


M409_01


M188_02 Save Settings

Pharmacode by ESP



Fixed Symbol Length Status

When enabled, the imager will check the symbol length against the symbol length field. If disabled, any length will be considered valid.

Symbol Length

Specifies the exact number of bars that must be present for the imager to recognize and decode the Pharmacode symbol.

Minimum Bars

Sets the minimum number of bars that a Pharmacode symbol must have to be considered valid.

Bar Width Status

If set to Mixed, the imager will autodiscriminate between narrow bars and wide bars. If set to All Narrow, all bars will be considered as narrow bars. If set to All Wide, all bars will be considered as wide bars. If set to Fixed Threshold, it will use the fixed threshold value to determine whether the bars are narrow or wide. The Bar Width Status setting will be ignored when the imager is able to tell the difference between the narrow and the wide bars.

Pharmacode

Direction

Specifies the direction in which a symbol can be read.

Fixed Threshold Value

Used when Bar Width Status is set to Fixed Threshold. Defines the minimum difference in pixels that will distinguish a narrow bar from a wide bar.

Sample Pharmacode Symbol



QR Code

Read the following symbols to configure QR Code settings:

QR Code On


M263_01

QR Code and Micro QR Code Off


M260_01

Micro QR On



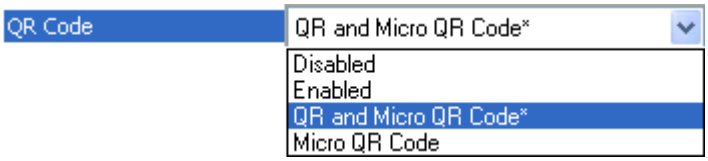
QR Code and Micro QR Code On (Default)


M687_03


M188_02

Save Settings

QR Code by ESP



Sample QR Code Symbol



Sample Micro QR Code Symbol



UPC/EAN

Read the following symbols to configure UPC/EAN settings:

UPC On (Default)



UPC Off



UPC Expansion On (Default)



UPC Expansion Off



EAN On (Default)



EAN Off





Save Settings

UPC/EAN by ESP



Sample UPC-E Symbol



Sample UPC-A Symbol



Symbology Identifier

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



Symbology Identifier On



Symbology Identifier Off (Default)



Save Settings

Symbology Identifier by ESP



AIM Symbology Identifiers

A	Code 39
C	Code 128
d	Data Matrix
e	GS1 DataBar / Composite
E	UPC/EAN
F	Codabar
G	Code 93
I	Interleaved 2 of 5
L	PDF417 / MicroPDF417
Q	QR Code / Micro QR Code
X	Other (Pharmacode)
z	Aztec

7 I/O Parameters

Contents

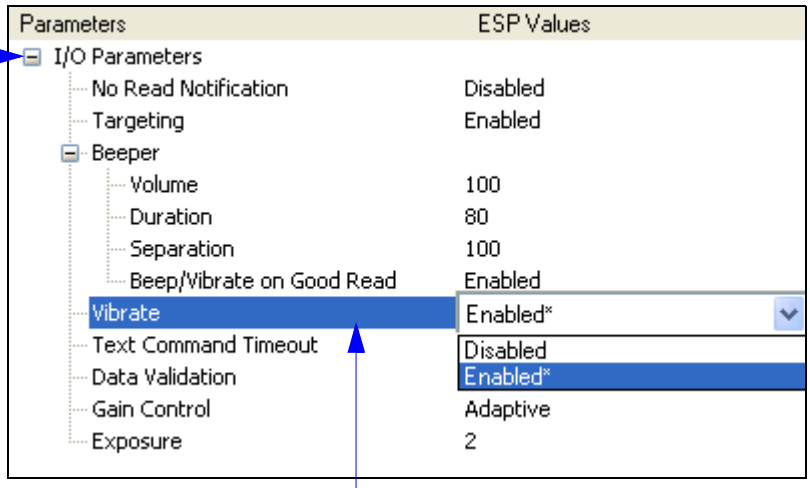
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Exposure 7-5
Data Validation 7-6

This section contains information on how to set your imager 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 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 imager.

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


M188_02

Save Settings

Gain Control

Gain Control is a system that controls gain in the captured image—how bright or dark the resulting image will be. The higher the gain, the brighter the image.

When the Mobile Hawk is set to Adaptive mode, it will automatically maintain the proper setting for gain based on the captured image in order to produce the best setting to perform a decode. In the Manual setting the gain is fixed to whatever value is set by gain slider controls on the Illumination tab in I/O Parameters.



Exposure

The larger the Exposure value, the longer the pixels in the candidate image are exposed, allowing the imager to collect more light.

Note: A larger exposure value may cause blurred images.



Data Validation

Data Validation is used to confirm that a decoded string from the imager has complied with a particular company, industry, or ISO standard. Mobile Hawk Data Validation is compliant with Department of Defense Unique Identification and ISO/IEC 15434 (Information Technology – Transfer Syntax for High-Capacity ADC Media) requirements.

Unique Identification

Unique Identification is a mandatory Department of Defense (DoD) requirement on all solicitations issued January 1, 2004 or later. This policy mandates the use of Unique Item Identifiers (UIIs) encoded within Data Matrix symbols on equipment and parts procured by DoD. The Mobile Hawk complies with Department of Defense Standard Practice Identification (MIL-STD-130).

Once the imager decodes the Data Matrix symbol, and if Unique Item Identifier (UII), Current Part Number (CPN), and Lot/Batch Number (LBN) are turned on, the Mobile Hawk checks the ISO/IEC 15434 syntax with ISO/IEC 15418 (ANSI MH10.8.2 – AI and DI) and ISO/IEC 21849 (ATA – TEI) semantics to construct the UII, CPN, and LBN.

Unique Identification Features

The following data output options are applicable to Data Matrix ECC 200 symbols only and have no effect on other symbologies.

UII Enabled	Allows the imager to read only message streams encoded in Data Matrix ECC 200 symbols, then to construct and output a UII string. The message streams include validation of Unique Item Identifier (UII), Current Part Number (CPN), and Lot/Batch Number (LBN) strings. When the imager decodes a symbol but the symbol data does not compy with UII format, it will stop capturing images and the green LED will illuminate without beeping, vibrating, or outputing the string.
UII Enabled with Pass Through	Allows the imager to read UII messages in Data Matrix ECC 200 symbols and non-UII messages in any type of symbols. The imager's behavior is the same as with UII Enabled.
UII Enabled with Error Messages	Allows the imager to read UII messages in Data Matrix ECC 200 symbols and output detailed information such as construction type, data components, or error messages. The imager's behavior is the same as with UII Enabled.
Data Validation Disabled	Disables both UII and ISO/IEC 15434 data validation.

Unique Identification Output Examples

UII Enabled

UII:UN123456789ABCDEFG
CPN:87654321
LBN:87654321
UII:12345678 CPN:87654321
UII:12345678 LBN:87654321

UII Enabled with Pass Through

UII:UN123456789ABCDEFG
CPN:87654321
LBN:87654321
UII:12345678 CPN:87654321
UII:12345678 LBN:87654321
DATA:Microscan Precision Data Acquisition and Control Solutions

UII Enabled with Error Messages

UII:UN123456789ABCDEFG;Construct_1;25SUN123456789ABCDEFG;;;;;;
CPN:87654321;PNR;PNR 87654321;;;;;;
LBN:87654321;30T;30T87654321;;;;;;
UII:12345678 CPN:87654321;Construct_1_2/PNR;UID 12345678;PNR 87654321;;;;;
UII:12345678 LBN:87654321;Construct_1/30T;25S12345678;30T87654321;;;;;
(15434 ERROR: HEADER - 1ST POSITION);Microscan Precision Data Acquisition and Control Solutions;;;;;;;

Data Validation Disabled

The imager will return to normal output behavior without performing data validation.

ISO/IEC 15434

ISO/IEC 15434 specifies a transfer structure, syntax, and coding of messages and data formats when using high capacity automatic data capture (ADC) technologies.

The following ISO/IEC 15434 data output options are applicable to Data Matrix ECC 200 symbols only and have no effect on other symbologies.

ISO/IEC 15434 Enabled	Allows the imager to read only ISO/IEC 15434-compliant message streams in Data Matrix ECC 200 symbols then output the ISO/IEC 15434 string. This implementation only checks the header/trailer format and proper format indicator (00-99 and DD). The output string has a prefix, a format indicator, and data components.
ISO/IEC 15434 Enabled with Error Messages	Allows the imager to read only ISO/IEC 15434-compliant messages in Data Matrix ECC 200 symbols and output detailed information such as prefix, format indicator, data components, or error messages.
Data Validation Disabled	Disables both UII and ISO/IEC 15434 data validation.

ISO/IEC 15434 Output Examples

ISO/IEC 15434 Enabled

(15434);05;0100061414199999;211A0B9C3D6;;;;;

(15434);06;7L0A1B3C;1P4202435;S10936;;;;

(15434);06;17V0A1B2;1P4202435;S10936;;;;

ISO/IEC 15434 Enabled with Error Messages

(15434);05;0100061414199999;211A0B9C3D6;;;;;

(15434);06;7L0A1B3C;1P4202435;S10936;;;;

(15434);06;17V0A1B2;1P4202435;S10936;;;;

(15434 ERROR: HEADER - 3RD POSITION);[)<▲DD↔CAG 12345↔SER 67890123▲♦;;;;;;;

(15434 ERROR: TRAILER - END OF TRANSMISSION);[)>▲12↔CAG 12345↔SER 67890123▲♣;;;;;;;

(15434 ERROR: HEADER - GROUP SEPARATOR);[)>▲12▲CAG 12345♦029SER 67890123▲♦;;;;;;;

Data Validation Disabled

The imager will return to normal output behavior without performing data validation.

Data Validation Settings

The following symbols control Data Validation functions:


Q048_01

UII
Enabled


Q049_01

UII Enabled
with Pass Through


Q050_01

UII Enabled with
Error Messages


Q051_01

ISO/IEC 15434
Enabled


Q052_01

ISO/IEC 15434 Enabled
with Error Messages


Q053_01

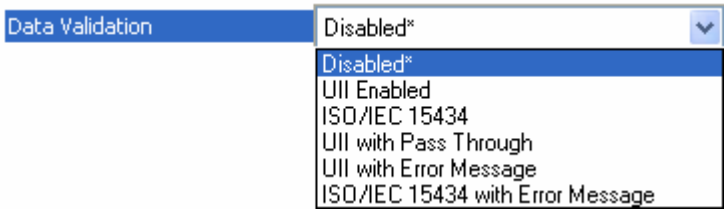
Data Validation
Disabled (Default)


M188_02

Save Settings

Data Validation by ESP

Each of the Data Validation Settings can also be enabled in ESP's I/O Parameters tree control.



Detailed Output Format

The table below describes data validation output in detail.

Note: UII Enabled with Pass Through will add the prefix DATA to non-UII output for all symbologies.

Note: UII Enabled with Error Messages will output the following format: UII/CPN/LBN; DF0; DF1; DF2; DF3; DF4; DF5; DF6; DF7.

Note: When ISO/IEC 15434 output is in compliance with the standard, the format is (15434); DF0; DF1; DF2; DF3; DF4; DF5; DF6; DF7. When it is not in compliance with the standard, the output is (15434 ERROR: xxxx);;;;;;;; where DF0 is the format indicator showing which type of data qualifier is in use.

UII Enabled	
Content of Decoded Data Matrix Symbol	UII/CPN/LBN
Valid UII	UII:UII_data Example: UII:12345678
Valid CPN Valid LBN	CPN:CPN_data Example: CPN:87654321 LBN:LBN_data Example: LBN:87654321
Valid UII and CPN Valid UII and LBN	UII:UII_data CPN:CPN_data Example: UII:12345678 CPN:87654321 UII:UII_data LBN:LBN_data Example: UII:12345678 LBN:87654321
Valid UII and Invalid CPN Valid UII and Invalid LBN	UII:UII_data (CPN ERROR) Example: UII:12345678 (CPN ERROR) UII:UII_data (LBN ERROR) Example: UII:12345678 (LBN ERROR)
Invalid UII and Valid CPN Invalid UII and Valid LBN	(UII ERROR) CPN:CPN_data Example: (UII ERROR) CPN:87654321 (UII ERROR) LBN:LBN_data Example: (UII ERROR) LBN:87654321
None of the above (Invalid UII; Invalid CPN; Invalid LBN; Invalid UII and Invalid CPN; Invalid UII and Invalid LBN)	No output data

UII Enabled with Error Messages		
Content of Decoded Data Matrix Symbol	UII/CPN/LBN	DFO
Valid UII	UII:UII_data Example: UII:12345678	Constructed UII type Example: Contruct_1
Valid CPN Valid LBN	CPN:CPN_data Example: CPN:87654321 LBN:LBN_data Example: LBN:87654321	Constructed CPN type Example: PNR Constructed LBN type Example: 30T
Valid UII and CPN Valid UII and LBN	UII:UII_data CPN:CPN_data Example: UII:12345678 CPN:87654321 UII:UII_data LBN:LBN_data Example: UII:12345678 LBN:87654321	Constructed UII/CPN type Example: Construct_1/PNR Constructed UII/LBN type Example: Construct_1/30T
Valid UII and Invalid CPN Valid UII and Invalid LBN	UII:UII_data (30P ERROR: xxxx) UII:UII_data (PNR ERROR: xxxx) UII:UII_data (240 ERROR: xxxx) UII:UII_data (30T ERROR: xxxx)	Constructed UII type Example: Construct_1
Invalid UII and Valid CPN Invalid UII and Valid LBN	(UII ERROR: xxxx) CPN:CPN_data (UII ERROR: xxxx) LBN:LBN_data	Constructed CPN type: 30P, PNR, 240 Constructed LBN type: 30T
Invalid UII	(UII ERROR: xxxx) (15434 ERROR: xxxx) Example: (UII ERROR: DATA ELEMENT CHARACTER)	Original decoded data
Invalid CPN Invalid LBN	(30P ERROR:xxxx) (PNR ERROR:xxxx) (240 ERROR:xxxx) (30T ERROR:xxxx) (15434 ERROR: xxxx)	Original decoded data
Invalid UII and Invalid CPN Invalid UII and Invalid LBN	(UII ERROR: xxxx) (30P ERROR: xxxx) (UII ERROR: xxxx) (PNR ERROR: xxxx) (UII ERROR: xxxx) (240 ERROR: xxxx) (UII ERROR: xxxx) (30T ERROR: xxxx)	Original decoded data

Error Messages

The following is a list of potential error messages.

15434 ERROR: DATA ELEMENT SEPARATOR
15434 ERROR: DOUBLE TRAILER
15434 ERROR: FORMAT INDICATOR
15434 ERROR: HEADER - 1ST POSITION
15434 ERROR: HEADER - 2ND POSITION
15434 ERROR: HEADER - 3RD POSITION
15434 ERROR: HEADER - 4TH POSITION
15434 ERROR: HEADER - GROUP SEPARATOR
15434 ERROR: TRAILER - END OF TRANSMISSION
15434 ERROR: TRAILER - RECORD SEPARATOR
PNR ERROR: TOO LONG
PNR ERROR: TOO SHORT
PNR ERROR: CHARACTER
30P ERROR: TOO LONG
30P ERROR: TOO SHORT
30P ERROR: CHARACTER
240 ERROR: TOO LONG
240 ERROR: TOO SHORT
240 ERROR: CHARACTER
UII ERROR: DATA ELEMENT CHARACTER
UII ERROR: DATA ELEMENT TOO LONG
UII ERROR: DATA ELEMENT TOO SHORT
UII ERROR: LOWER CASE CHARACTER
UII ERROR: NEED UII ELEMENT FIRST
UII ERROR: SPACE AFTER TEI DATA QUALIFIER
UII ERROR: TEI DATA QUALIFIER
UII ERROR: UII ELEMENT INCOMPLETE
UII ERROR: WRONG FORMAT INDICATOR
UII ERROR: UII STRING TOO LONG

Additional Notes

- DF1 – DF7: If the UII/CPN field is “(15434 ERROR: xxxx)”, DF1 – DF7 are filled in with an empty string. Otherwise, the fields are used to display data elements. If there are fewer than seven data elements, an empty string is filled in at the end. If there are more than seven elements, only the first seven elements are displayed.
- There is a space between UII and CPN in both tables (UII:12345678 CPN:87654321).
- The constructed UII type can be Contruct_1, Contruct_2, Construct_1_2, or IUID_EQUIVALENT.
- The constructed CPN type can be PNR, 30P, or 240. The constructed LBN type can be 30T.

8 Advanced Operations

Contents

Dot Peen Enhanced Illumination Settings 8-2
Illumination Settings by ESP 8-3
Lock Settings 8-6

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

Dot Peen Enhanced Illumination Settings

The Mobile Hawk's Dot Peen Enhanced illumination settings can be controlled using the configuration symbols shown here. They can also be controlled in ESP's EZ Mode.

Note: The illumination default mode will reset the imager's illumination settings to factory default.



Illumination Default Mode



Dot Peen Enhanced Illumination Mode - Large Mark



Dot Peen Enhanced Illumination Mode - Medium Mark



Dot Peen Enhanced Illumination Mode - Small Mark



Save Settings

Illumination Settings by ESP

The Mobile Hawk's illumination settings can also be controlled using the graphic interface on the Illumination tab in ESP's I/O Parameters view.

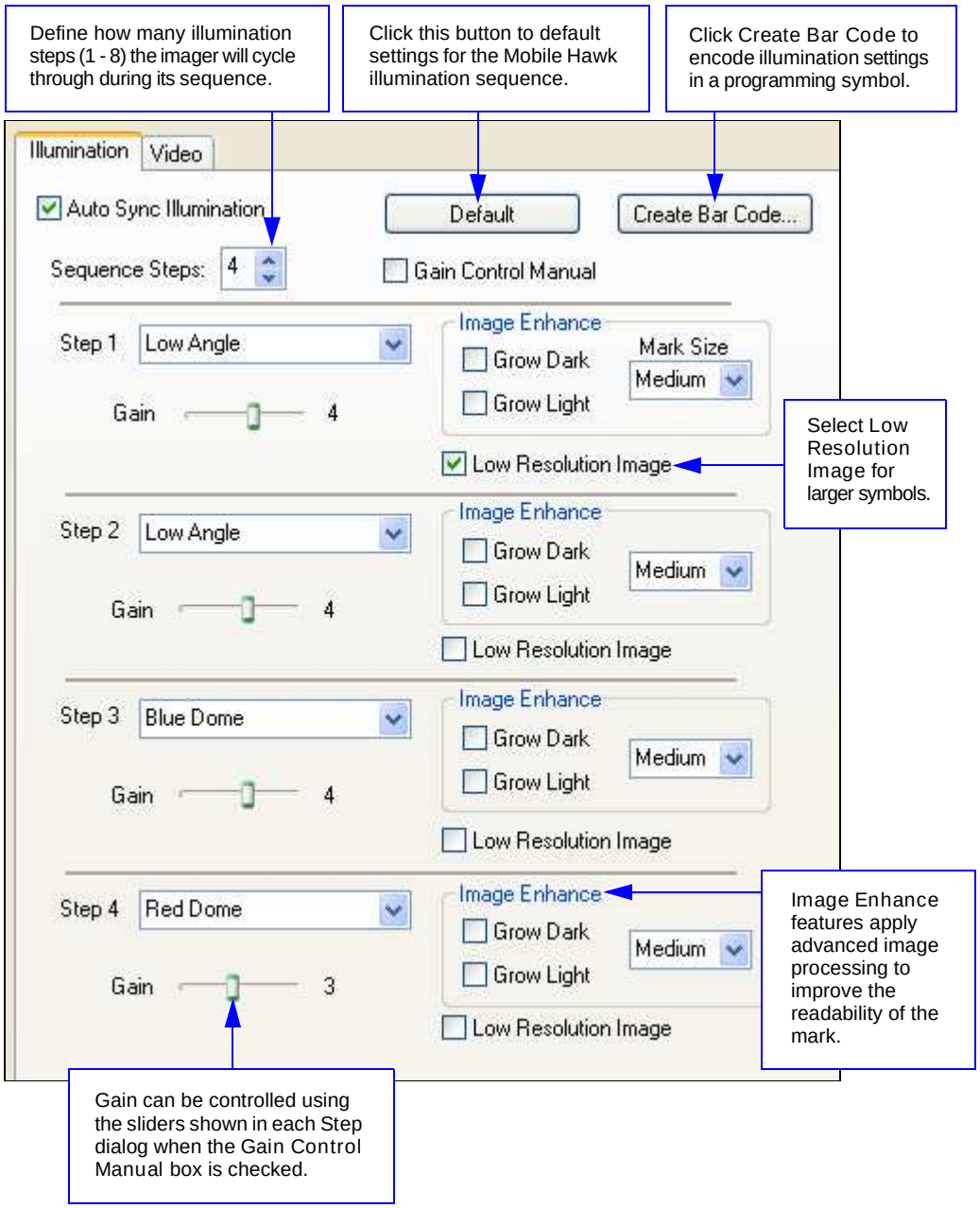
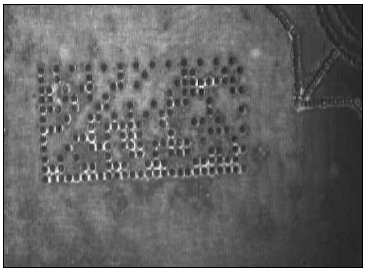
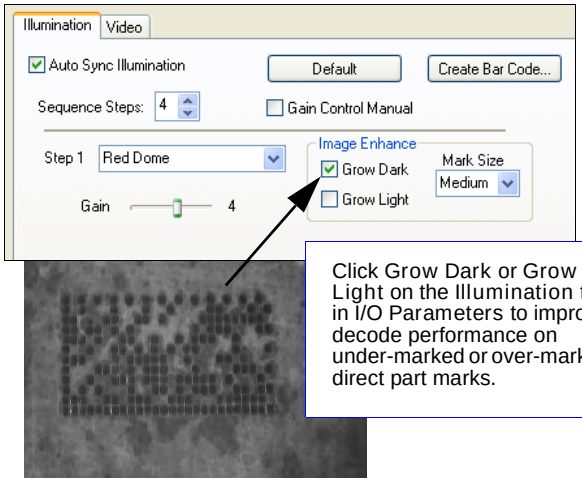


Image Enhance Settings

Image Enhance settings apply morphological pre-processing (erosion and dilation) to symbol cells to improve readability. Symbols that are under-marked or over-marked can benefit from Image Enhance settings. The Grow Dark and Grow Light checkboxes allow you to determine which cells will be enhanced (grown).



Red Dome Illumination Without Image Enhance



Red Dome Illumination With Image Enhance – Grow Dark (Medium Mark Size)

Grow Dark

Grow Dark enhances the symbol's dark cells.

Note: Grow Dark corresponds with the morphological process of erosion.

Grow Light

Grow Light enhances the symbol's light cells.

Note: Grow Light corresponds with the morphological process of dilation.

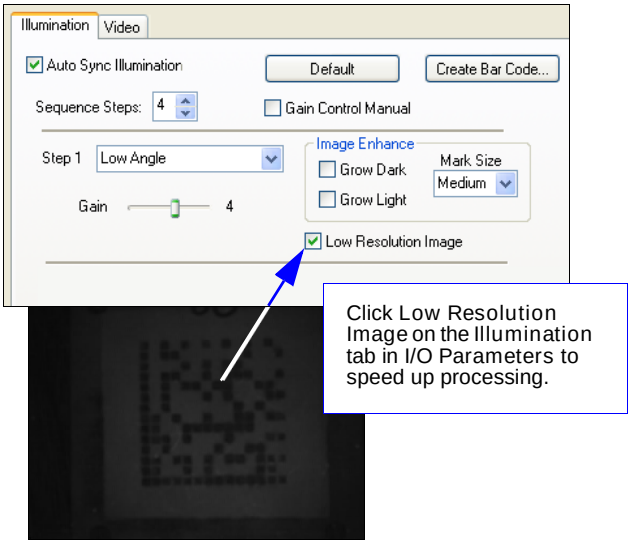
Low Resolution Image

Low Resolution Image reduces the number of pixels in the image by 50%, which is helpful when the symbol to be decoded has a large number of pixels per element (e.g. a large Data Matrix with a 100 mil cell size, or a 1D symbol with large bar widths). This feature improves processing speed, because the image sizes are smaller.

Note: Low Resolution with Low Angle is the first step in the Mobile Hawk's illumination sequence, because it covers the widest range of potential candidate symbols.



14x14 – 1.5 in^2
100 mil Cell Size
Without Low Resolution



14x14 – 1.5 in^2
100 mil Cell Size
With Low Resolution

Lock Settings

Read the symbols below to lock or unlock imager settings.

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



Lock Imager Settings



Unlock Imager Settings



Save Settings

9 Terminal

Contents

Terminal View....9-2
Find....9-3
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Macros....9-5
Terminal Right-Click Menu....9-6
Terminal Dropdown Menu....9-7

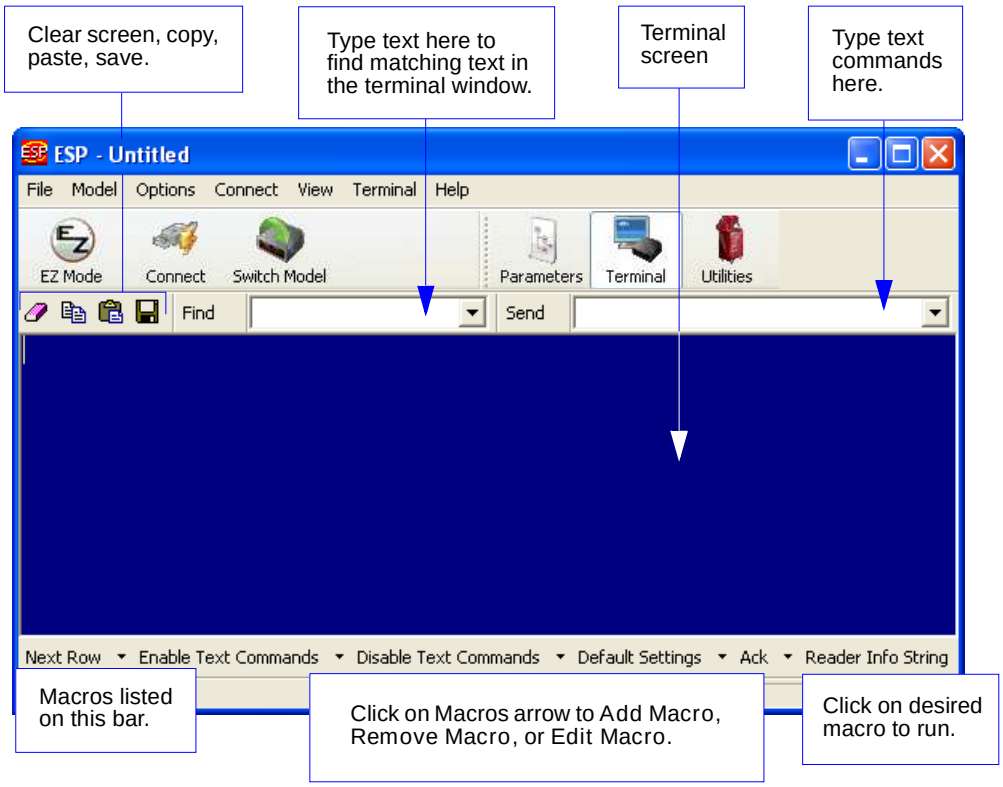
This section describes the Terminal interface and macro functions in ESP.

Terminal View

Click the Terminal button.



You will see the following view:



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

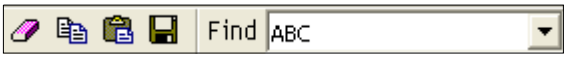
The Terminal view also displays symbol data or information from the imager.

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.

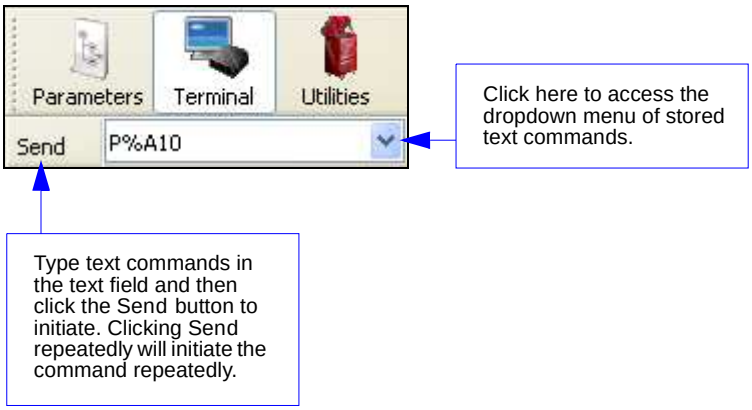
   The first instance of “ABC” will be highlighted in the terminal window.

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 imager. (See Text Commands.)

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

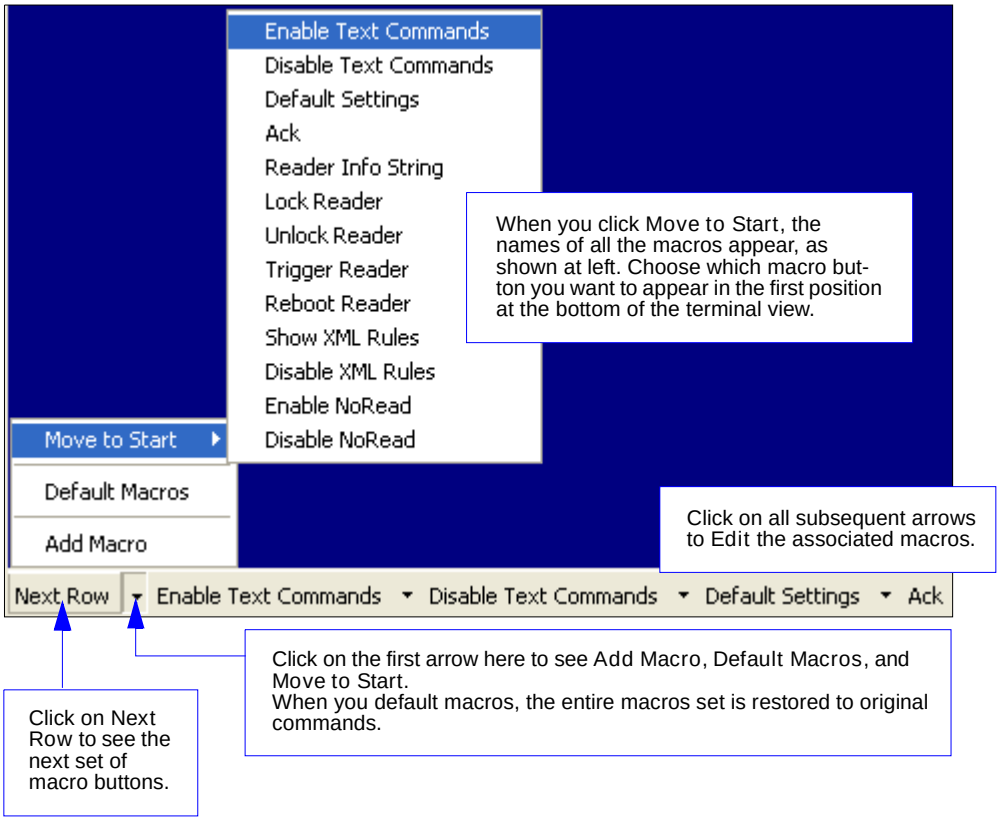


Once text commands are initiated, they are saved in a dropdown menu that can be accessed by clicking the arrow to the right of the text field.

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

Macros

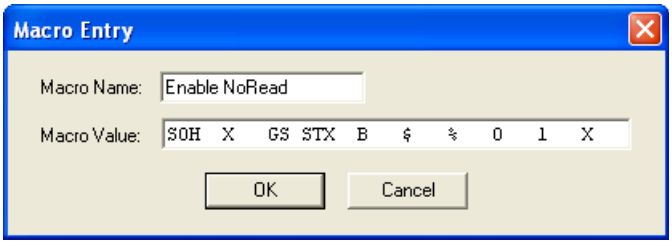
Macros can be stored in a macro selection bar, edited in a separate window, and executed by clicking on the macro name.



Clicking on a macro button executes the related command. The command is also sent to the imager 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

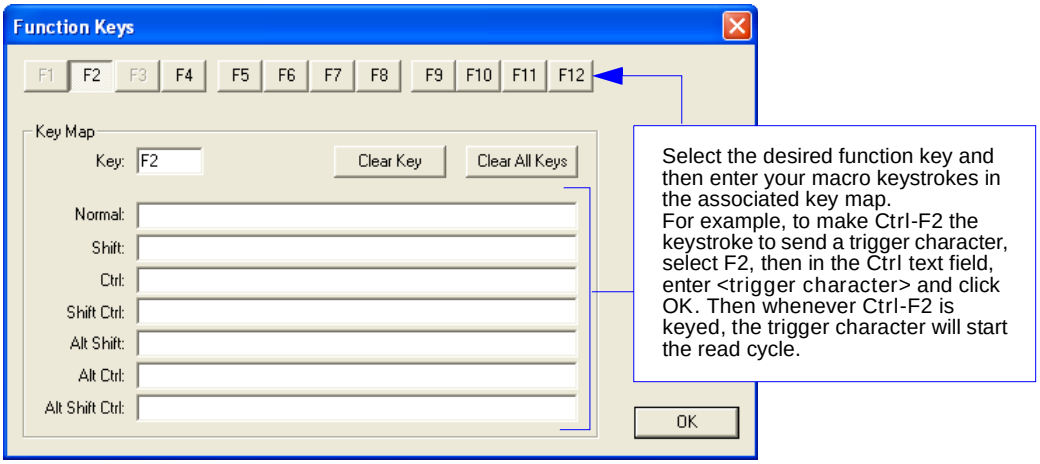
Right click in the terminal window to display the following menu:



- 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 imager.
- 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

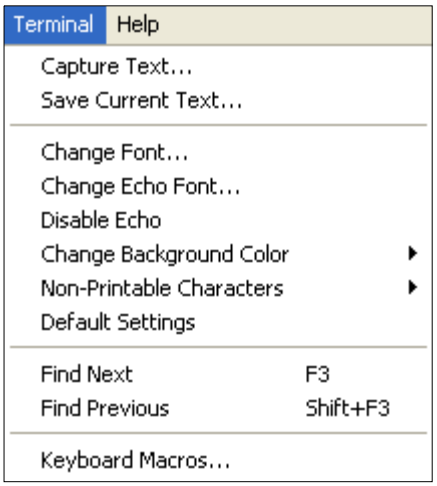
The Function Keys dialog allows you to assign commands to specific function keys on a standard keyboard. Note that the F1 key is reserved for opening ESP Help, and the F3 key is reserved for the Find Next function.



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.

10 Utilities

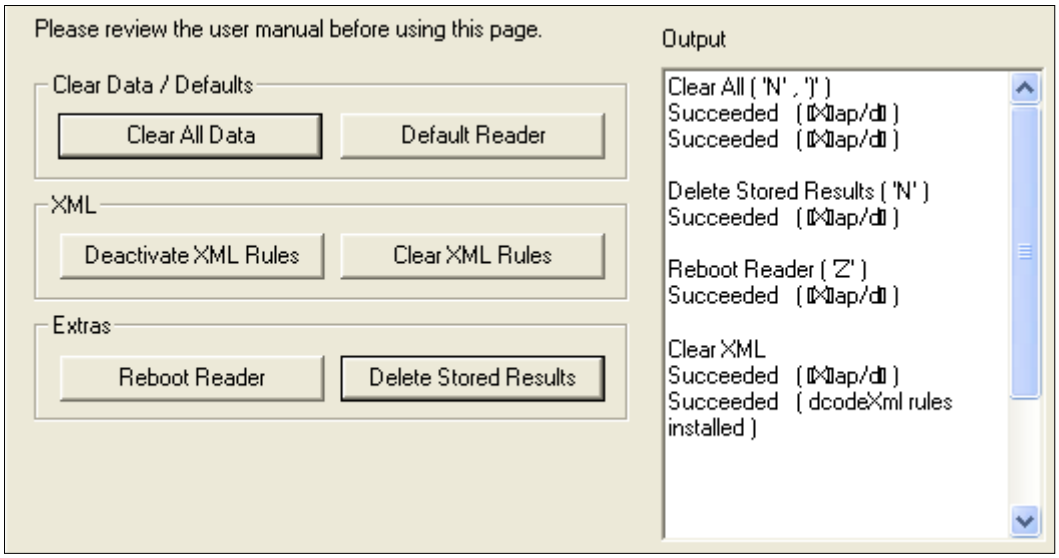
Contents

Device Control....10-2
Differences from Default....10-3
Firmware....10-4
Advanced....10-6

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 Mobile Hawk settings that are not default settings; Firmware, where you can update your imager's firmware; and Advanced, which allows you to collect batch files for customized imager configuration and optimization.

Device Control

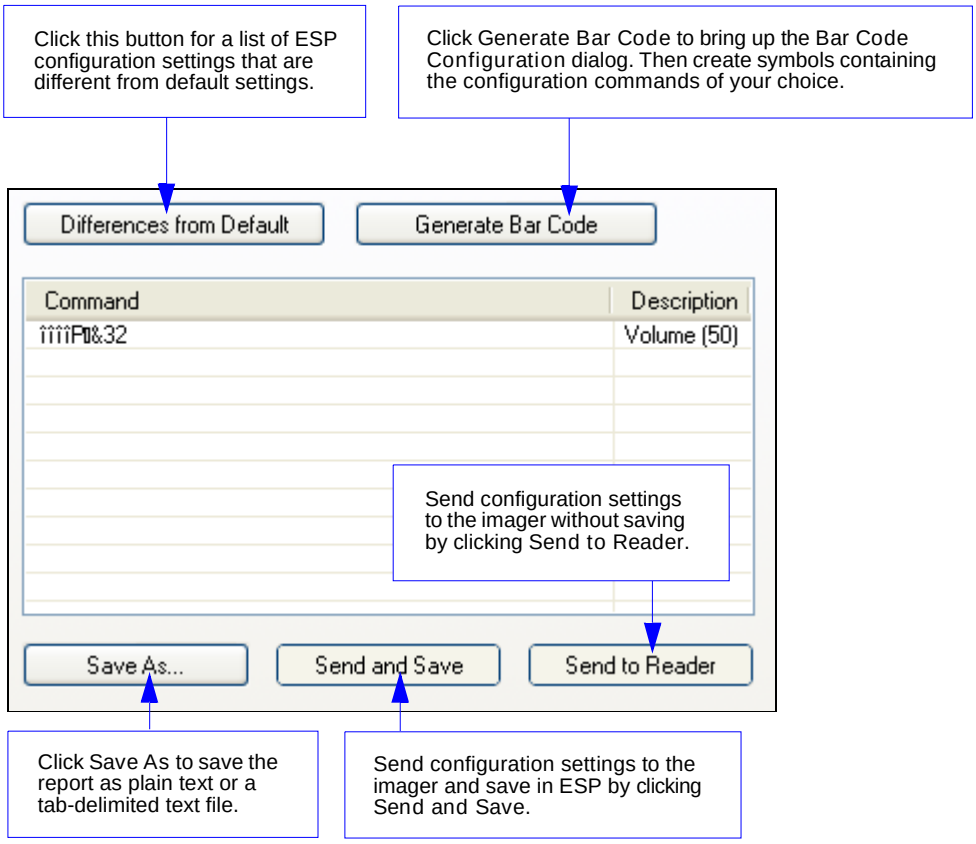
This feature allows you to clear data stored in the imager's memory, to default the imager, to deactivate or clear XML rules, to upload or delete stored errors, to reboot the imager, and to delete stored results.



- Clear All Data removes decoded symbol data and commands in the imager's memory.
- Default Reader returns the imager 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 imager's memory and functionality, returning it to the most recent configuration you have saved.
- Delete Stored Results erases logged data.

Differences from Default

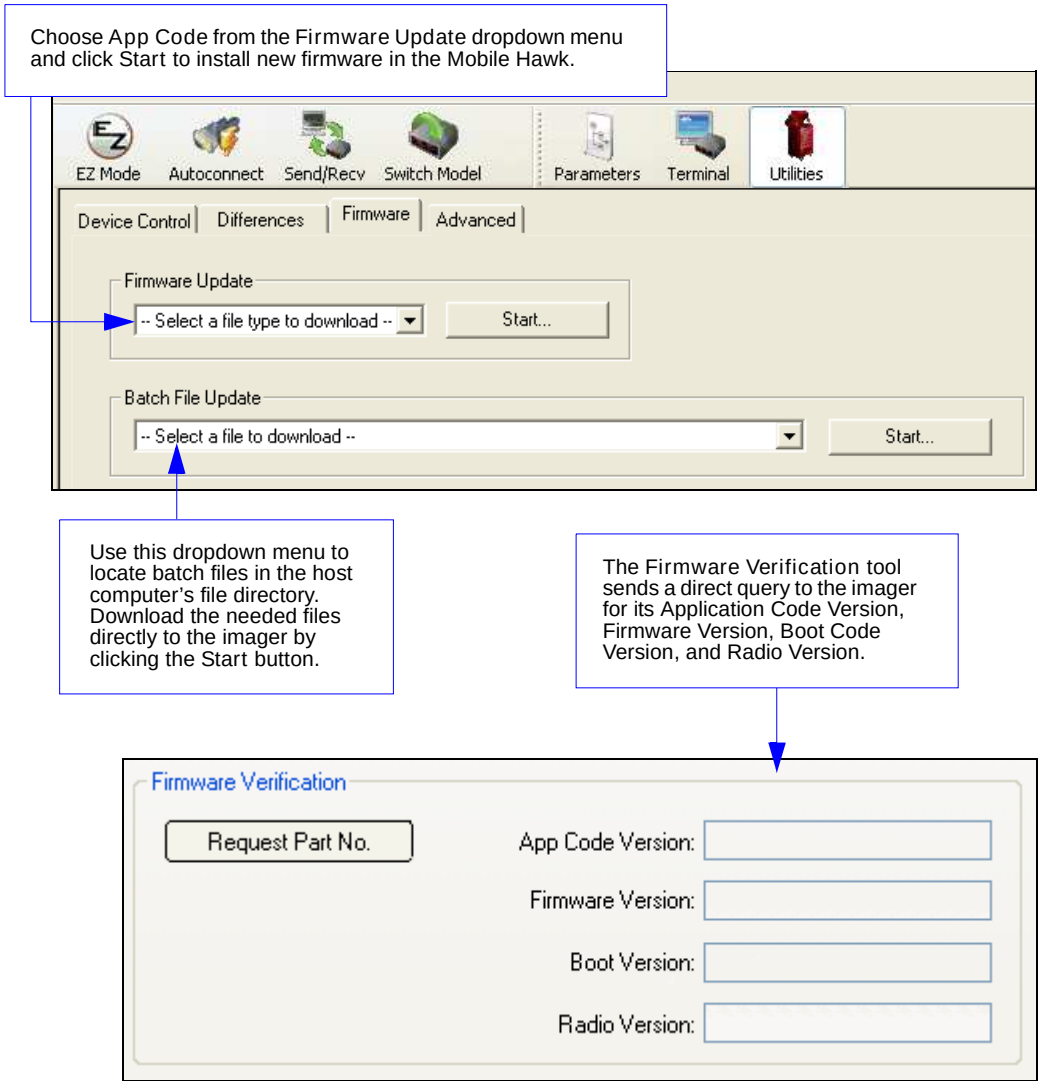
Clicking the Differences from Default button will cause ESP to check all stored configuration settings and compare them to default settings. All settings that are different from default will appear in the left column (shown below), and descriptions of those settings will appear in the right column.



- 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 imager 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 imager's firmware and to update batch files.



Note: To ensure correct operation, cycle power to the imager (turn the imager off and then on) after the firmware update is complete.

Imager ID

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

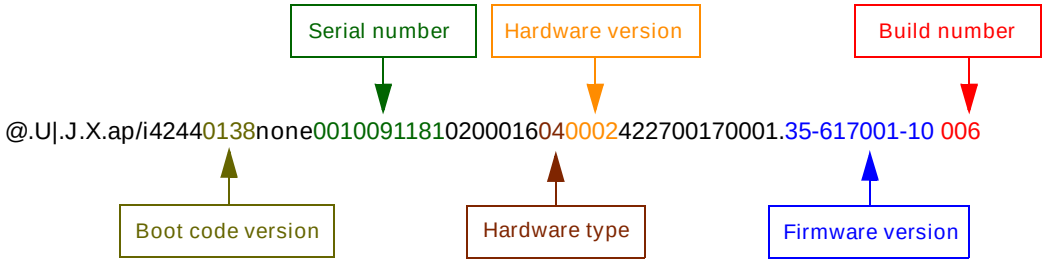


Imager ID



Save Settings

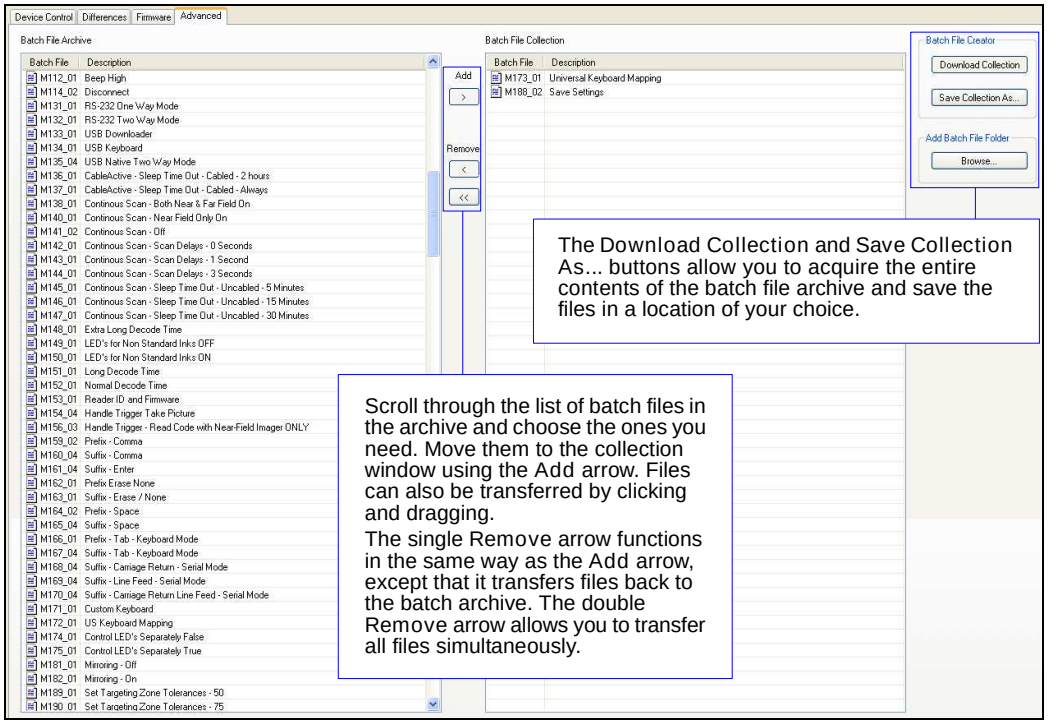
The host's text program will output a data string containing the imager's identifying information in the following format:



Advanced

The Advanced tab in Utilities features an archive of all batch files containing imager configuration commands. Each batch file's extension is .crb, and each file contains the fundamental code for programming the imager. 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 imager for your application.



Appendices

Appendix A General Specifications A-2
Appendix B Electrical Specifications A-4
Appendix C Default/Reset Procedure A-7
Appendix D Maintenance A-8
Appendix E Troubleshooting A-9

Appendix A — General Specifications

Mechanical
Height: 7” (180 mm)
Width: 2.5” (63 mm)
Depth: 4.5” (114 mm)
Weight: 7.2 oz. (204 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 >50 drops of 6’ (1.8 meters) to concrete

MAXlite Illumination
Combination Dome and Low Angle illumination system.
Dome: 2-color, 640nm (red) and 470nm (blue)
Low Angle: Quadrant 30°, 640nm (red)

Symbologies
Aztec, BC412, Codabar, Code 39, Code 93, Code 128, Data Matrix (ECC 0-200), GS1 DataBar, Interleaved 2 of 5, MicroPDF417, Micro QR Code, PDF417, Pharmacode QR Code, UPC/EAN

Image Collection Options
Sensor: CMOS
Sensor Array: 1280 x 1024

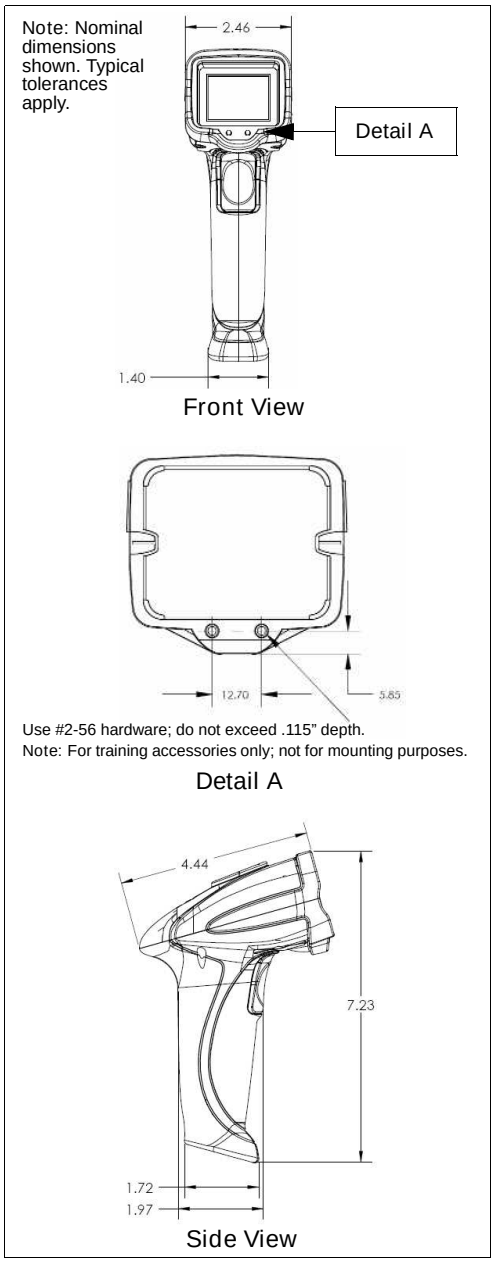
Communication Protocols
Standard Interface: USB, RS-232

Read Parameters
Rotational Tolerance: ±180°
Focal Range: 0 to 2” (0 to 50.8 mm)
Focal Point: Optimal at 0.25” (6.3 mm)
Field of View: Horiz. 1.59” (40.39 mm) x Vert. 1.27” (32.31 mm) at optimum focus
Print Contrast Resolution: 20% minimum contrast
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, blue-line targeting pattern

Image Output Options
Format: JPEG, TIFF

Electrical
Power Requirements: 5 VDC (mA)
Typical: 408mA Peak: 500mA Idle: 285mA



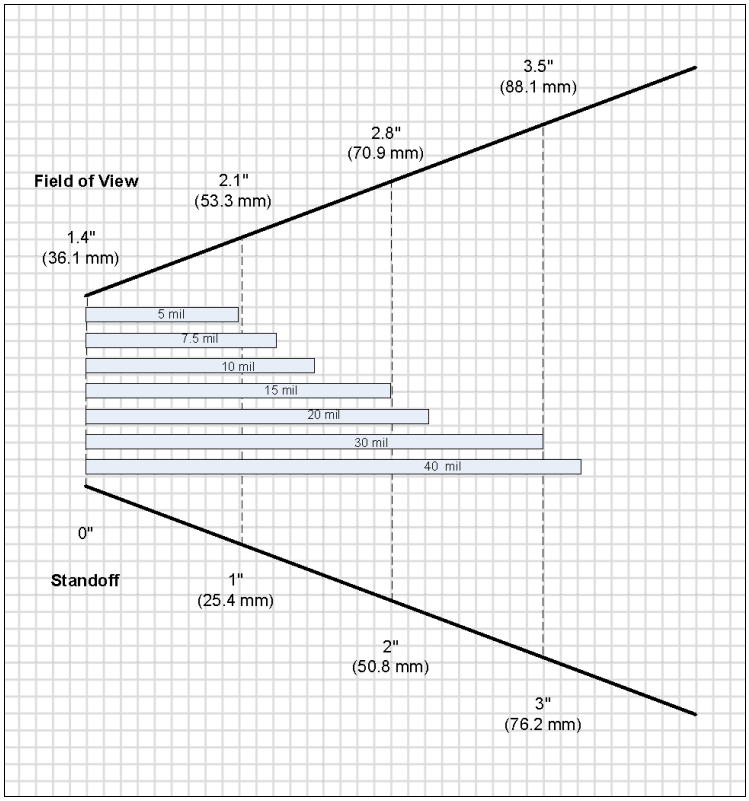
Mobile Hawk Dimensions

Safety Certifications
FCC, CE, RoHS/WEEE

Copyright ©2014
Microscan Systems, Inc.

All rights reserved. Specifications subject to change.
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. Standard Warranty–One-Year Limited Warranty on parts and labor. Extended 3-Year Warranty available.

Read Ranges



FIS Options

FIS-6170-0001G	Mobile Hawk Handheld DPM Imager, USB

Accessories

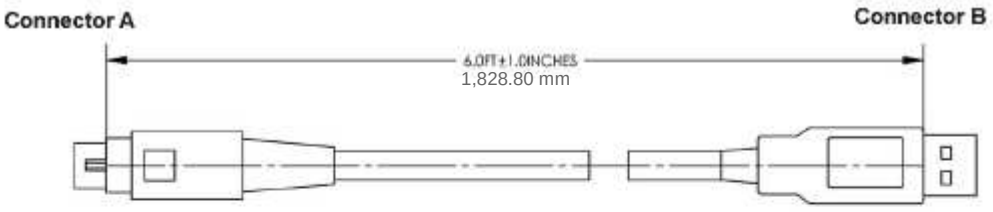
98-000074-04	Kit, RS-232 U.S. Power Supply
98-000074-05	Kit, RS-232 EU Power Supply
98-000074-06	Kit, RS-232, UK Power Supply

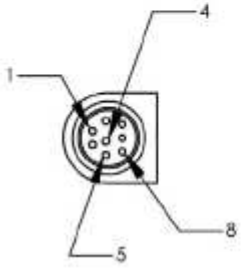
Appendix B — Electrical Specifications

Power Requirements: 5 VDC (mA)
Typical: 408mA; Peak: 500mA, Idle: 285mA

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

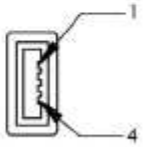
USB Cable Pinouts



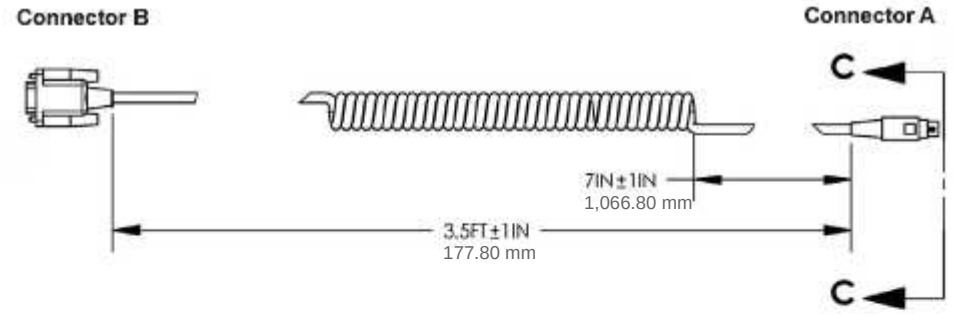


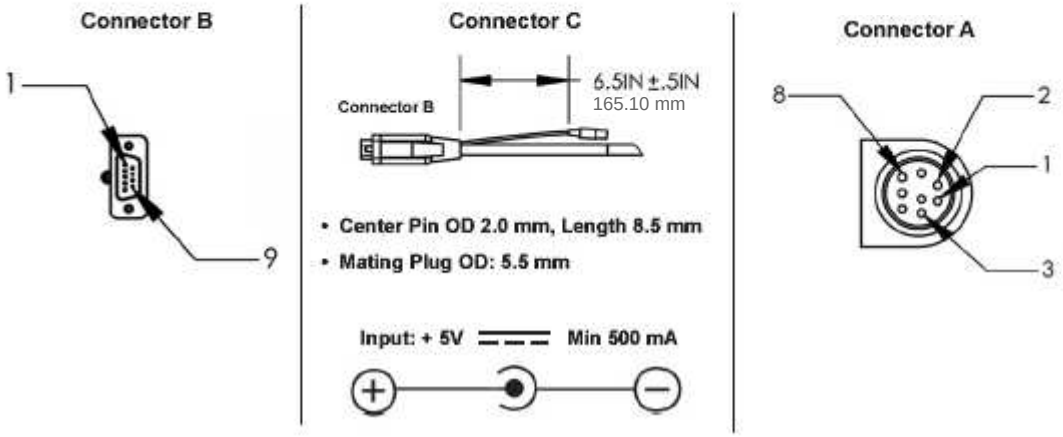
WIRING TABLE:

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

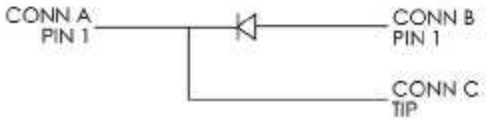




WIRING DIAGRAM:

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 — Default/Reset Procedure

If the Mobile Hawk locks up or becomes unresponsive, or if you would like to clear all configuration and programming from the imager, follow the procedure below.

Important: The following procedure will clear the buffer, default configuration, and XML programming, including Preamble and Postamble.

1. Unplug the Mobile Hawk from the PC.
2. While holding down the trigger, plug the reader into the USB port on the PC. You will hear five rapid beeps.
3. Let go of the trigger after the five rapid beeps. The imager is now in Boot Mode.
4. Hold down the trigger again for approximately five seconds until it reboots. The imager will vibrate first and then beep several times.
5. The imager should now operate in default mode. Save the default settings by reading this symbol:



M188_02

Appendix D — Maintenance

The Mobile Hawk provides reliable and efficient operation with a minimum of care. Although specific maintenance is not required, the following periodic checks ensure dependable operation.

Cleaning the Mobile Hawk Window

The Mobile Hawk has a clear, anti-reflective coated optical window that protects the Mobile Hawk illumination system and optics. The window should be clean to allow optimum performance. The Mobile Hawk uses technology that is much like a digital camera, and marks or debris on the window will interfere with image captures. Avoid touching the coated surface, as fingerprints may impede decode performance.

In many cases the window can be cleaned by wiping with a lint-free lens cloth to remove dust, debris, and fingerprints. Care should be taken not to apply too much pressure, as a trapped particle may scratch the window.

If cleaning of the window becomes necessary, follow this procedure:

- Use a minimal amount of Isopropyl Alcohol to dampen. Do not saturate the surface, as this may cause streaking.
- Drag the moistened cotton swab, cotton ball, or soft, clean cloth across the coated surface. Do not rub.
- Repeat this procedure until no contaminants remain.

Note: Many products designed for cleaning plastic lens eyewear, such as pre-moistened towelettes or lens cloths, can be used to clean the Mobile Hawk window.

Cleaning the Mobile Hawk Housing

If the housing becomes dirty, clean it with a soft, non-abrasive cloth that has been moistened with water. A mild detergent may be used to clean the housing, but the detergent should then be rinsed away with a water-moistened cloth.

Caution: Do not submerge the Mobile Hawk in water. The housing is not watertight. Do not use abrasive cloths or tissues on the Mobile Hawk window — abrasive cloths or tissues may scratch the window.

Appendix E — Troubleshooting

Problem: No Data Output.

When the trigger is pulled, the unit beeps and then triple-beeps, but does not output data.

Error Messages (String Output): None.

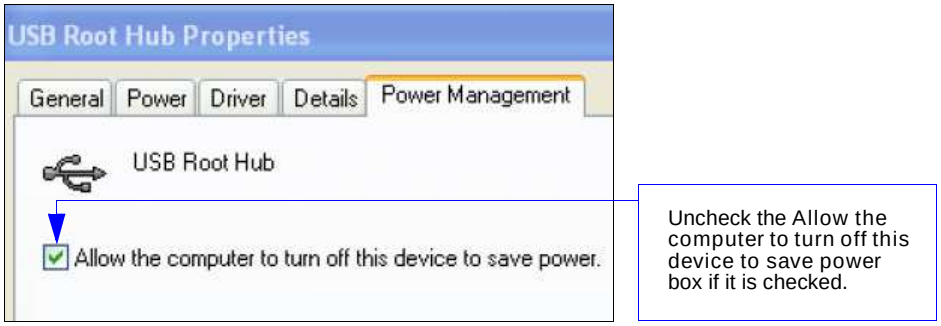
Possible Cause: Mobile Hawk is not connected (USB or Serial) to the PC.

Solution:

1. Check to make sure the PC supports “High Power Devices” (self-powered hubs, some laptops, etc.). Right-click on My Computer in the Windows Start menu, select Properties, click the Device Manager button on the Hardware tab, expand the Universal Serial Bus controllers menu item, right-click on USB Root Hub, select Properties, and then select the Power tab.



2. Make sure the PC is not allowed to power down the device. Follow the same path described above, but select the Power Management tab instead of the Power tab.



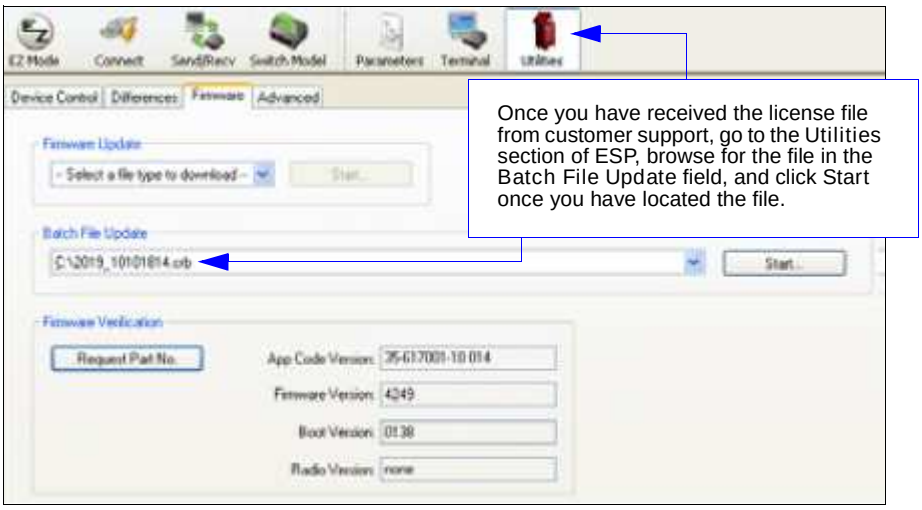
Problem: No Illumination – License Key Failed.

The unit is unable to decode, and it is not cycling through its illumination settings. (Targeting, if enabled, does appear when the trigger is pulled.)

Error Messages (String Output): “License Key Failed”

Possible Cause: The Mobile Hawk license has been deleted.

Solution: Request license file (2019_(serial number).crb) from Microscan customer support. Unit serial number and license must match.



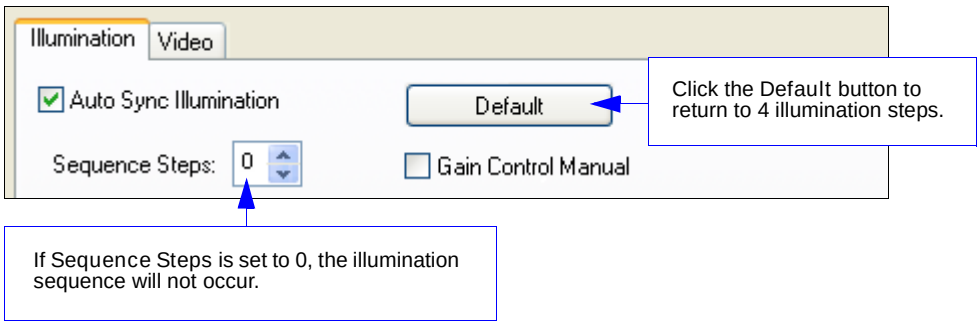
Problem: No Illumination – No Process Sequence Defined.

The unit is unable to decode, and it is not cycling through its illumination settings. (Targeting, if enabled, does appear when the trigger is pulled.)

Error Messages (String Output): “No Process Sequence Defined; Please Set the Unit to Default Settings”

Possible Cause: No illumination sequence has been defined for the Mobile Hawk.

Solution: Reset the default illumination sequence.



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