COGNEX

DataMan® Setup Tool

Reference Manual

2021 March 19
Revision: 6.2.3.1

Legal Notices

Table of Contents

Symbols

The following symbols indicate safety precautions and supplemental information:

WARNING: This symbol indicates a hazard that could cause death, serious personal injury or electrical shock.

CAUTION: This symbol indicates a hazard that could result in property damage.

Note: This symbol indicates additional information about a subject.

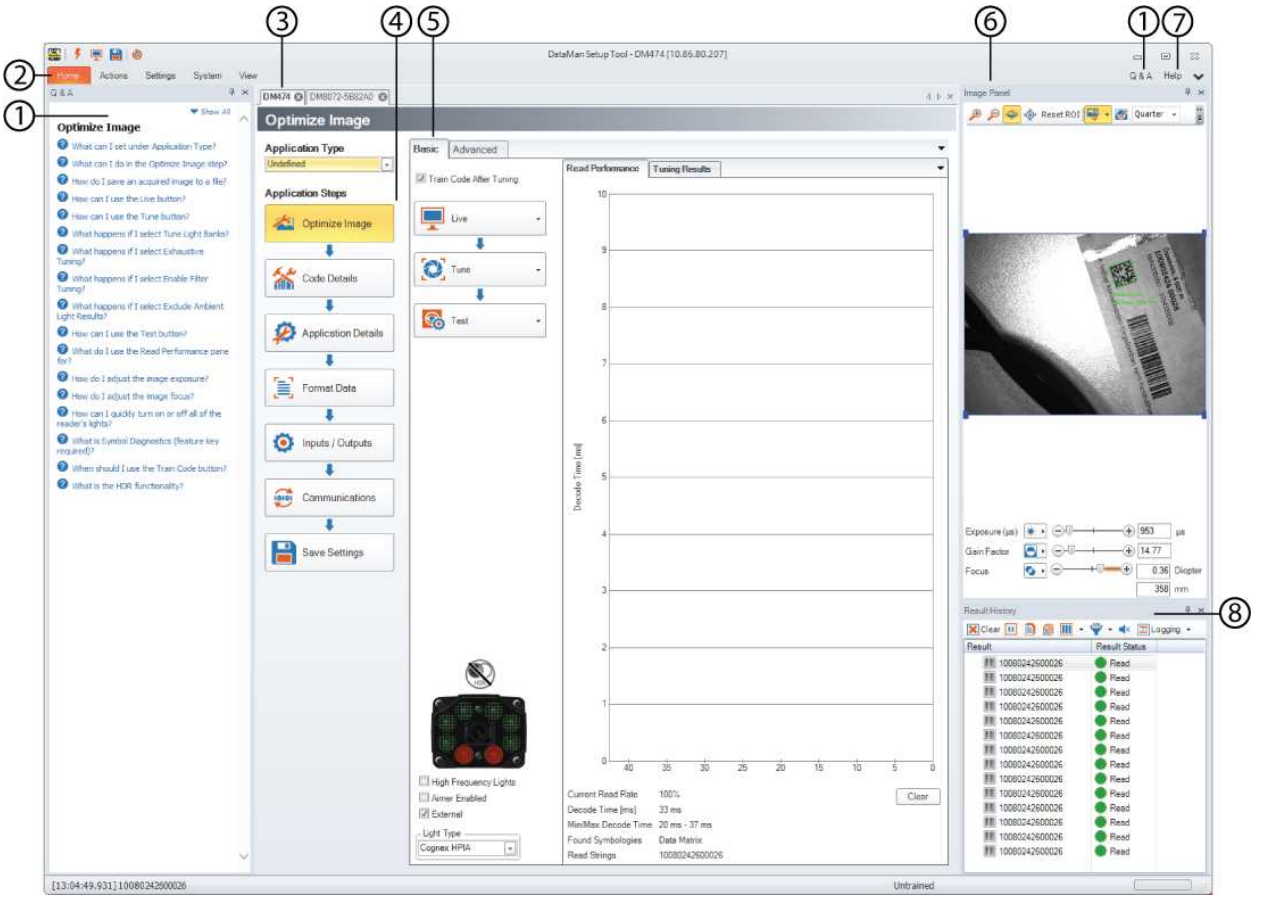
Tip: This symbol indicates suggestions and shortcuts that might not otherwise be apparent.

Getting Started

About the DataMan Setup Tool

Using the DataMan Setup Tool, you can access a wide range of options involving DataMan readers and base stations, including reviewing images of the codes being read live, or setting up the reader to transfer NoRead Images via FTP for later review. The DataMan Setup Tool is a common platform across all models. It simplifies deployment by putting the most common controls in a single page, allowing you to see how different options affect the reader or the base station in real time.

Overview



1	Q and A (context sensitive help)
2	Home pane
3	Documents (with the settings related to the devices you connect to)
4	Application steps
5	Tabs
6	Image Panel
7	Help (PDF, CHM and HTML help files)
8	Result History

The following sections provide more details about the installation of the software and the components of the GUI.

Installation and Layout

This section explains the installation of the Setup Tool, the default layout of the Setup Tool GUI and the layout customization options.

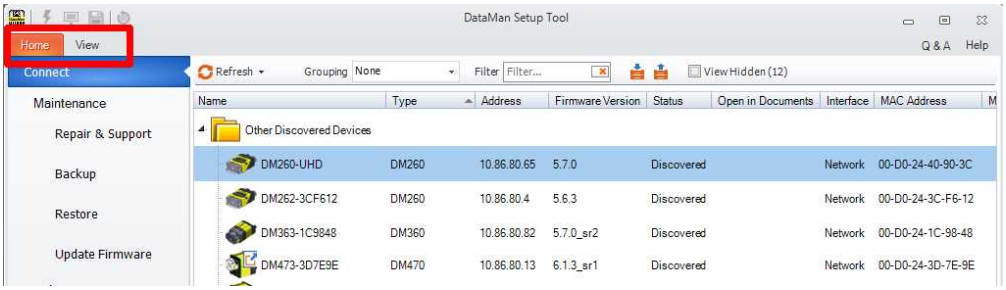
Installing the DataMan Setup Tool and Connecting the Device

Perform the following steps to install the DataMan software on the PC you will use to configure the settings for each DataMan device:

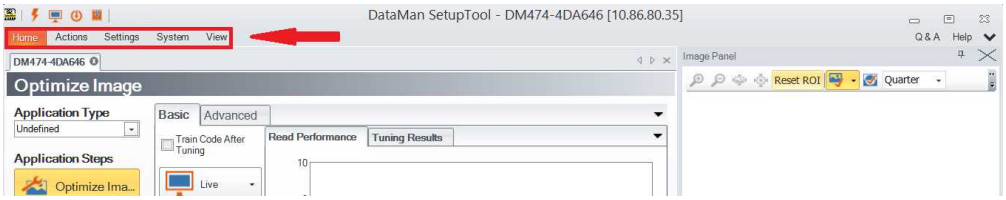
1. Check the DataMan ***Release Notes*** for a full list of system requirements.
2. Download the **DataMan Setup Tool** from http://www.cognex.com/support/dataman and follow the on-screen steps.
   If the installation utility does not start automatically, double-click the ***setup.exe*** file in the download folder.
3. Connect your DataMan device to your PC.
4. Choose **Start->Cognex->DataMan Software vX.X.X->Setup Tool** to launch the Setup Tool (where **vX.X.X** stands for the relevant revision of the software).
5. If you connect DataMan devices through USB/serial, click ***Refresh*** to have the Setup Tool auto-detect them. For network devices, the Setup Tool automatically refreshes the list.
   Any DataMan device available over your network will appear in the **Connect** menu.
6. Select a COM port listing or Network device listing corresponding to your DataMan device and click ***Connect***.

Tabs

The tabs of the DataMan Setup Tool are context sensitive. When you first open the Setup Tool, you will see a tab next to the **Home** page: **View**.

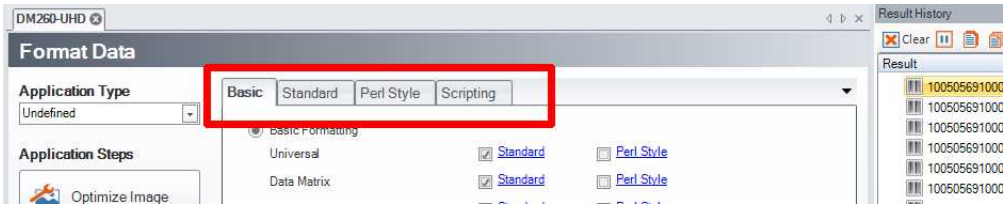


After selecting and connecting to a device, more tabs will be available.



Tabs also change based on the document you are actively using. For example, when using **Compare Configurations**, you will see the tabs below:

There are further tab options on specific panes, for example on the **Format Data** pane.



For further information on the tabs and their functions, see the respective sections in this document.

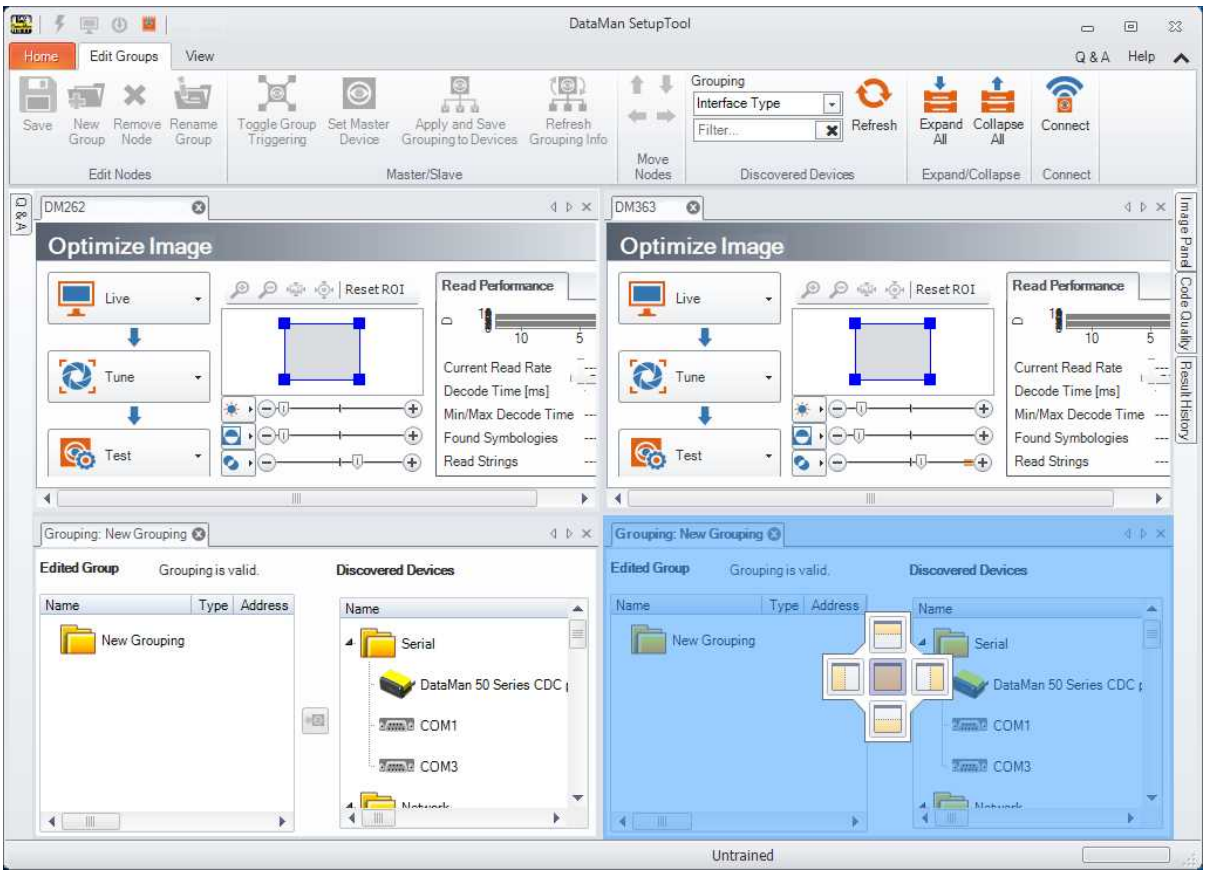
Layout

The DataMan Setup Tool makes it possible for you to customize the layout to fit the computer screen or to make the desired components larger and the less used components smaller.

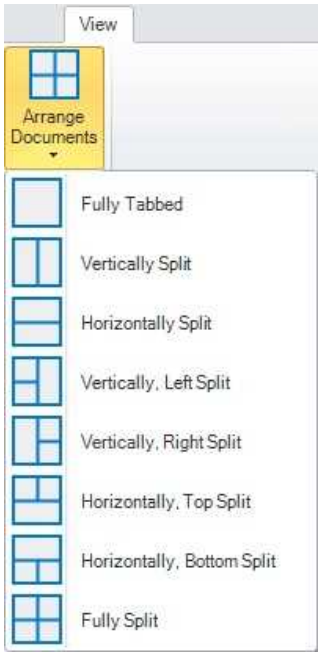
Layout Customization

The customizable components of the Setup Tool are:

- documents
- groupings
- Image Panel
- Result History
- Process Monitor



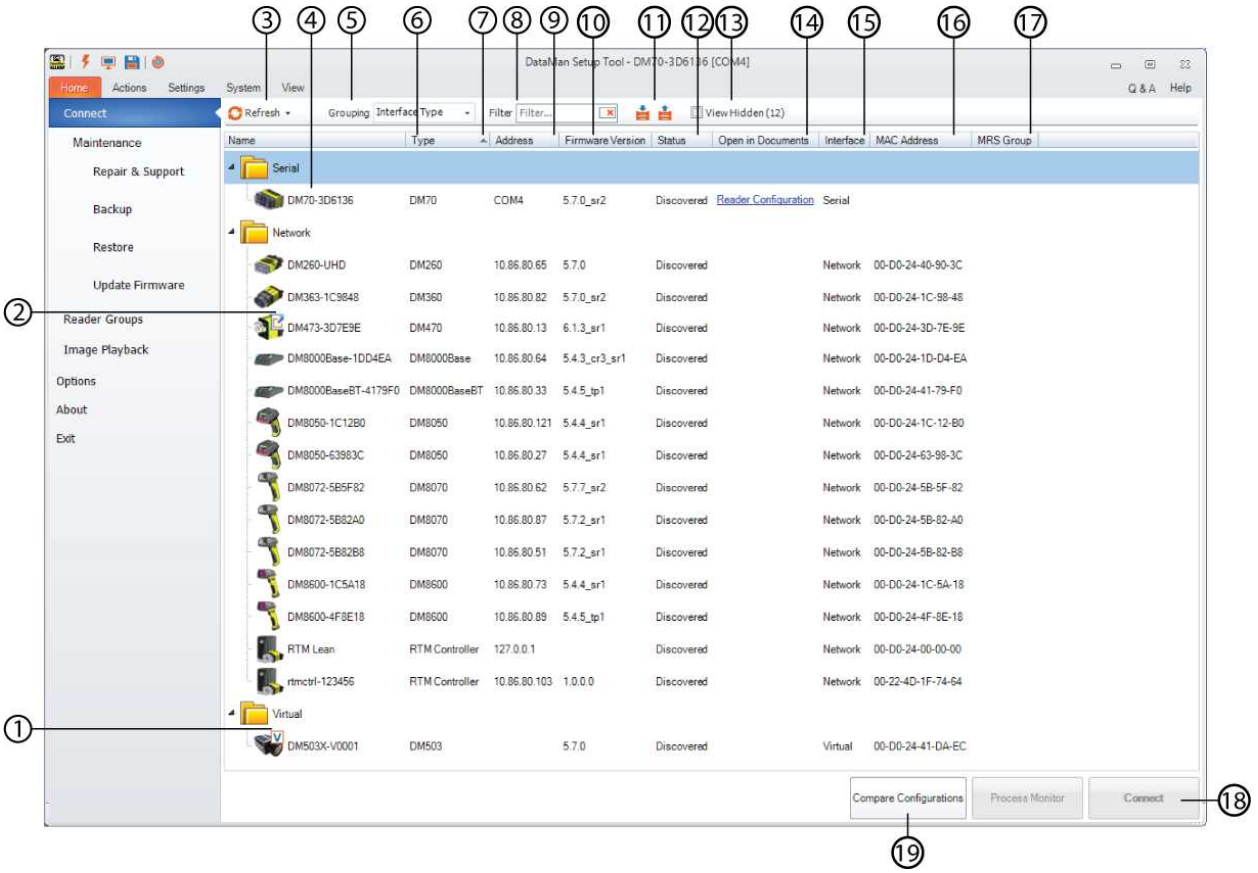
You can drag and drop the grabbed documents wherever you wish, but the ribbon bar under **View** also offers buttons for tiling the windows horizontally or vertically:



Setup Tool Home Pages

Connect Page

The **Connect** page allows you to connect to a single device or several devices at the same time. The devices are shown in a tree structure. The tree structure shows additional information for each device in separate columns.



1	Device marked with a V sign: virtually added device
2	Device marked with an arrow: manually added device
3	Refresh
4	Device name
5	Grouping (for more details, see Section Device Grouping)
6	Device type
7	Sorting
8	Filtering
9	IP Address
10	Firmware version
11	Expanding/collapsing the device tree
12	Device status
13	View Hidden
14	Open in Documents

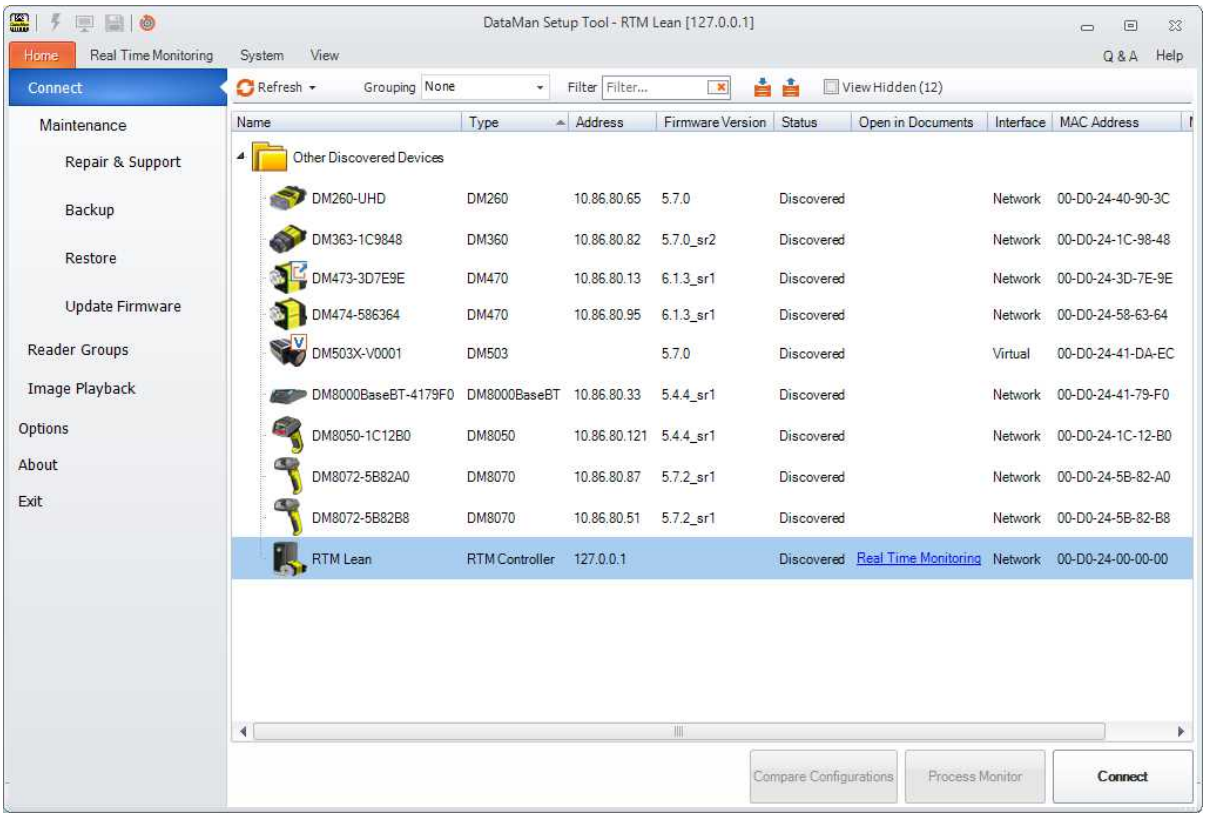
15	Interface
16	The MAC address of the DataMan device
17	The Primary Reader Group the device belongs to in case of Multi-Reader Sync grouping
18	Connect
19	Compare Configurations

To hide a device, bring the cursor over the device, right click and then click **Hide From List**. You can unhide a device by checking the **View Hidden** checkbox.

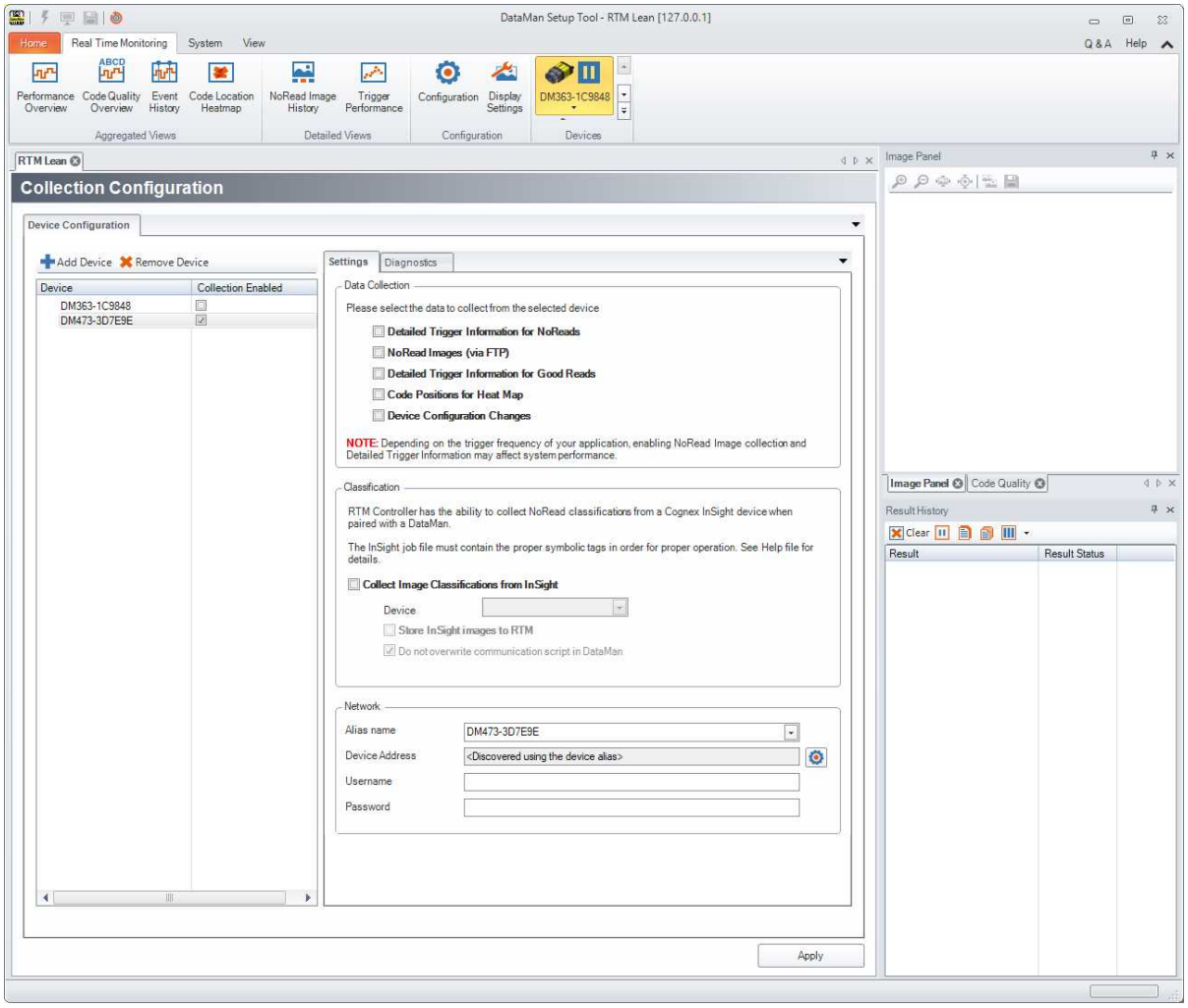
Each device you connect to has its own tab, which is called a document. When you close a document tab, connection to the device is closed. If the device reboots (for example, because of a firmware update), the document tab remains open, and the progress bar and messages inform you about the state of the device. If a connection is lost, the document tab does not get automatically closed, an overlay message informs you about this event. If the reader goes offline, the overlay message remains visible until the device is rediscovered or until you close the document tab.

RTM Lean

Real Time Monitoring (**RTM**) Lean is a feature built into the DataMan Setup Tool that allows for the collection and analysis of different kinds of data. RTM Lean collects data of devices on the network and displays this data in graphs. Connect to RTM Lean as a regular device on the **Connect** page.



1. Connect to RTM Lean and select the device(s) you want to monitor.
2. Set your options in the **Settings** tab and/or the **Diagnostics** tab and click **Apply**.



The target device for data acquisition, as well as the selection of the type of data collected, can be set up under **Configuration** in the upper toolbar. By default, RTM Lean collects statistical data: Read Rate, NoRead count, average decode time, trigger count, trigger overrun, buffer overflow, and process control metrics, if enabled on the device.

For a more detailed description of RTM Lean capabilities and options, see the **Q & A** of the page that can be opened from the top right corner.

Troubleshooting a Failed Connection

If you cannot connect to your reader, there are a number of settings you can verify.

- Click **Refresh** to determine which ports have readers connected to them. Clicking **Refresh** sends a query string on all COM ports and across the Ethernet network subnet. A DataMan 8000 wireless reader must be awake to respond to the query. Squeeze the trigger to wake up the reader.
- Make sure that you are not using the keyboard, keyboard wedge, or HID connection: you must use USB Serial, RS-232 Serial, Ethernet or Wireless network to connect the Setup Tool to the reader.

Serial Connection

- Make sure that you have scanned the configuration code (**USB COM** or **RS-232 Serial**) that matches the type of physical connection you are using.

- Make sure that the COM ports list shows a port where your reader is connected.
- You can use a terminal emulation program such as PuTTY to determine whether the reader is sending any data if the reader is connected to a COM port on the PC.

Ethernet Connection

- Make sure that the firewall or antivirus application installed on your computer makes communication with Ethernet devices possible by allowing the appropriate ports. These are: Cognamer:1069 and Setup Tool:44444.
- Verify that your device appears in the list of Network devices.
- Make sure that the IP address you provided in the **Add Network Device** option is correct.

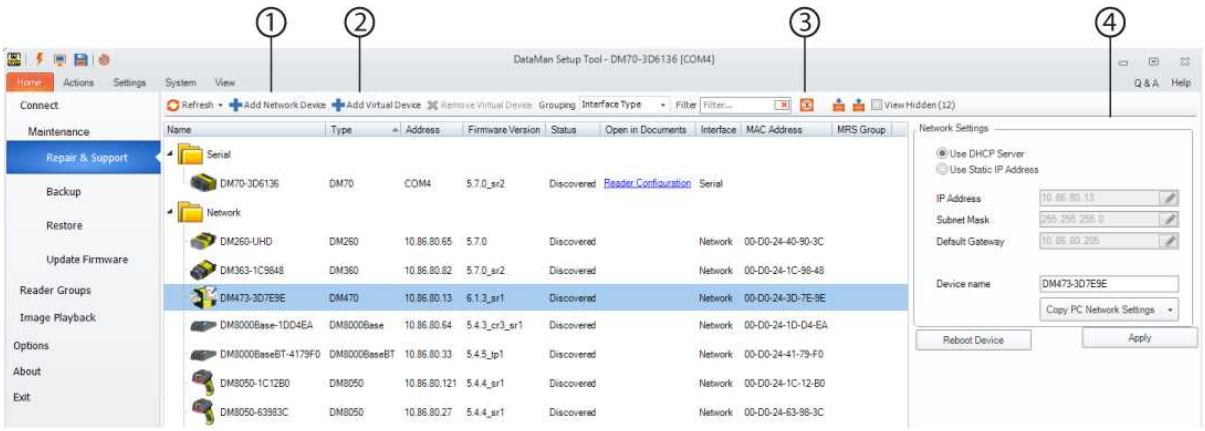
Wireless Connection

- Make sure that the reader is not in sleep mode. Squeeze the trigger to wake it up.
- Make sure that a connection is established between your reader and the base station connected to your PC. Unplug both the power and communication cables from the base station, reconnect the cables, then replace the handset in the base station. Wait until the handset indicates that it is linked (with an audible signal) before attempting to connect again.
- Make sure the base station is connected to power.

Maintenance

The **Maintenance** page can be used to set the network settings of a misconfigured network device or change the HID mode of a serial device to CDC, as well as for backing up and restoring device configurations, and updating firmware.

Repair and Support



1	Add Network Device	Click **Add Network Device** for the dialog window to pop up. You can provide here the IP address of the device you want to add.

2	Add Virtual Device	The **Add Virtual Device** function allows you to create a virtual device based on either a custom configuration file or a device with default configuration. This can be used to look at different panes in the Setup Tool without the need of a device to connect to. Pressing the button initiates a wizard that guides you through the steps of creating a virtual device. Initial options are to use a configuration/backup file for creation or use the factory default settings. After the wizard is finished, a new virtual device is added to the list of discovered devices, indicated by a V icon. The virtual device is not visible for others on the network. Even after closing the Setup Tool and opening it again, you only have to add the virtual device once. You can connect to the virtual device in the same way as a regular device. All configuration changes are rejected (everything is read-only) and no features, functions, and actions work on virtual devices.
3	Export icon	Clicking the **Export Cognex Support File** icon initiates Cognex Support File generation, which generates a .zip file containing a collection of preset data logs. This feature is only available if at least one device is selected. Clicking the button pops up a dialog box where you can specify the data types to be included in the support .zip file in a list of checkboxes. You can manually edit the **User Comment** field. The destination folder of the support file can be modified using the '...' icon. You can select to open the containing folder after the file generation or send it as an attachment with the default email client (.eml). The output of the process is a .zip file. The file name contains the device name and the date of creation. An additional descriptor.xml in the zip contains the following data: • Date • Discovery ID • Device name • Device type • Serial number • MAC address • Feature Keys • Communication interface • Firmware version • List of files present in the zip
4	Network Settings	Use the **Copy PC Network Settings** button to fill in the subnet mask and gateway information for your device. Make sure you manually update the IP Address to your device's IP address, after your PC network settings have been copied.

Backup

Generate a backup file containing the configuration and logs of one or more devices. To do so, highlight the device(s) you want to backup and click the **Backup** button in the bottom right corner, or press **Alt+B**. If multiple devices are selected, each device generates a backup file. Each backup file is put in a subfolder that matches the name of the device. The backup file name contains the device name and date of generation.

The backup file is a .zip file with a .dmb extension. The file contains config.cdc, config.cfg, and descriptor.xml. The xml contains the following data:

- Date
- Discovery ID
- Device name

- Device type
- Serial number
- MAC address
- Feature Keys
- Communication interface
- Firmware version
- List of files present in the zip

Click the **Open Backup Folder** button to find the backup files. To change where backup files are saved, go to the **Options** page and edit the **Backup Location** box.

A **Latest Backup Date** column helps you keep track of the backup files. You can also sort devices based on the date of their backup by clicking **Latest Backup Date**.

Restore

The **Restore** page allows the restoration of backed up configuration files on one or more devices. Select a device you want to restore and specify a configuration source in the **Configuration Source** window on top.

You have the following four options:

- **Configuration File**: the Setup Tool uses the specified configuration file for restoration. Click the '...' icon to specify the folder containing the backup file you want to use. Configure the folder in the **Options** page.
- **Device**: the Setup Tool uses a specified single device to restore its configuration to all target devices.
- **Latest Backup**: the Setup Tool searches for the latest backup for the selected devices. If multiple devices are selected, all devices get their own latest backup.
- **Factory Defaults**: the Setup Tool restores the device's configuration to factory defaults.

After the source is selected, as well as a target device (or devices), click the **Restore** button in the bottom right corner.

Update Firmware

The **Update Firmware** page allows you to update the selected device or devices to the desired firmware version. In the **Firmware File** section on top, browse for firmware files by clicking the '...' icon. The right folder automatically opens. After selecting the firmware file, click the **Update Firmware** button to initiate the update. After a firmware update, the device reboots and automatically reconnects to the Setup Tool.

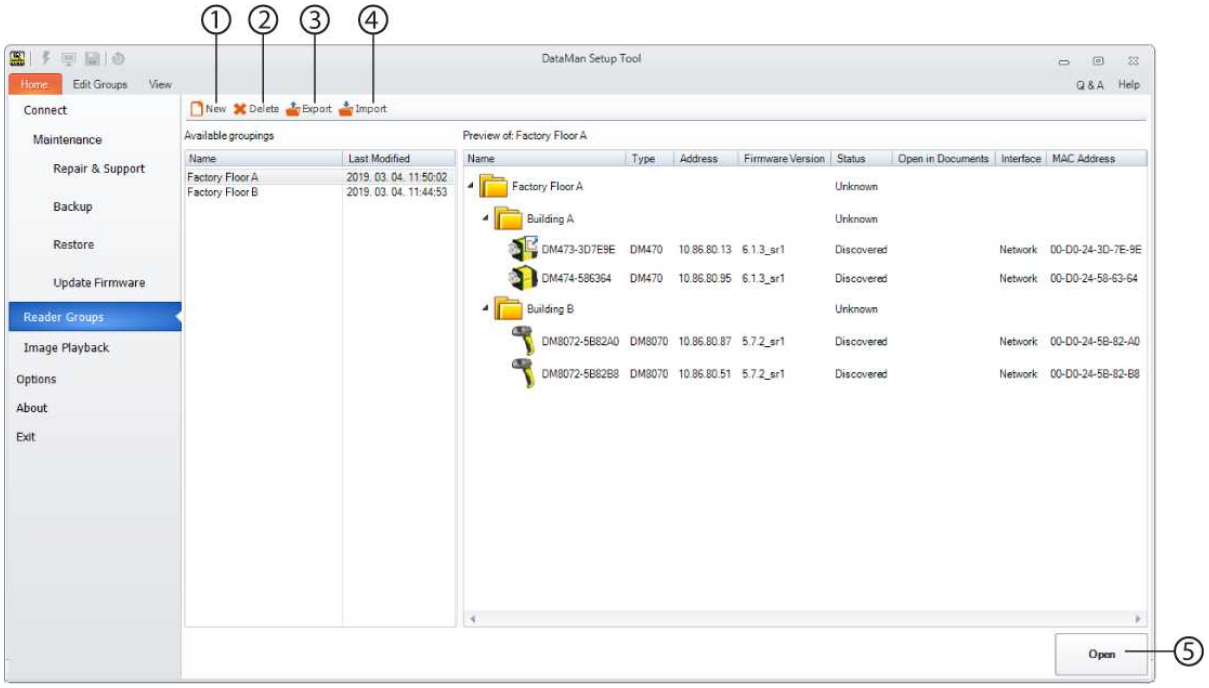
Firmware files are supplied as compressed archives. You must upload the firmware in its compressed form; do not attempt to uncompress a firmware file before uploading it.

Device Grouping

Device grouping helps you manage a larger number of devices, as well as define Multi-Reader Sync groups. The DataMan Setup Tool offers built-in groups on the **Connect** page. You can also specify your own custom groups. Creating a new group or editing an existing group can be started from the **Reader Groups** page.

Reader Groups

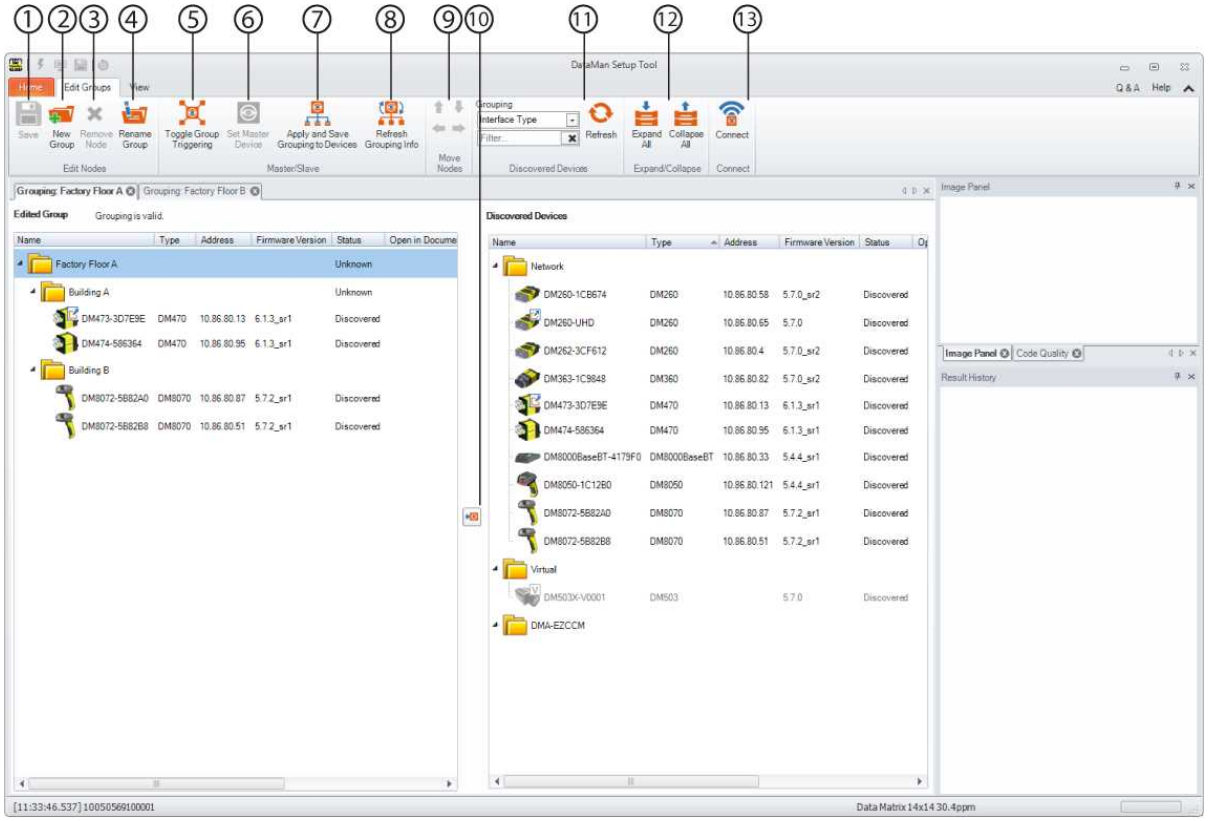
The available readers can be grouped on a custom basis and you can organize your readers in a custom tree. The list of already created custom groupings is shown on the left. When you select a custom group, it gets displayed on the right as a "preview".



1	Create a new group
2	Delete an existing group
3	Export an existing group
4	Import saved groups to the Setup Tool
5	Open an existing group

Custom Grouping

Custom groupings are displayed in a tree structure. You can select different nodes and start different operations in them. The group editor tree supports drag and drop functionality. Clicking the **Edit Groups** tab to hide the settings options.



The group editor has two device tree controls: the one on the left is the tree of the currently edited group, whereas the one on the right is the list of discovered devices. Filtering, grouping and sorting is available on this device tree.

1	Save	Save your changes for them to take effect. If you want to add a new group on the root level, you have to first save your first group, then click the Reader Groups page and click New. For more information, see *Reader Groups* on page 16.
2	New Group	If a new group is created, it automatically gets a root node. The name of the root node is also the name of the custom group. For each group, there can be only one root node. To create a new group node, select the desired target node and click the **New Group** button.
3	Remove Node	Select the target node(s) or a device on the left to remove it.
4	Rename Group	Click into the node's name, press F2 on the keyboard or click the **Rename Group** button. In the case of a root node, the whole grouping gets renamed. After the renaming is initiated by one of these methods, the group name becomes editable in the tree.
5	Toggle Group Triggering	Select a valid group node (the name of the group is fit to be a Multi-Reader Sync (MRS) group name) and press the **Toggle Group Triggering** button. The devices in the group are set to be part of the MRS group with the name of the group node's name. This option is available only if *all* readers in the group support Multi-Reader Sync triggering.
6	Set Primary Device	Select the device you want to designate as Primary Device.
7	Apply and Save Grouping to Devices	Click **Apply and Save Grouping to Devices** to save the grouping information to the devices in the selected group.
8	Refresh Grouping Info	Use this option to refresh the information belonging to the Edited Group (that is, the tree on the left).

9	Move Nodes	You can move a node in the edited tree. A node can be moved either up or down in its current group, into the next group or out of the current one. After selecting the desired node to move, the **Move nodes** option becomes available in the ribbon bar with the following arrows becoming green: • Down: Move the node down among its siblings. • Up: Move the node up among its siblings. • Out of Current Group: Move the node up one level (out of the current group). • Into Next group: Move the node down one level (into the next group).
10	Add Discovered Device(s)	Select one or more devices in the right-hand side device tree (**Discovered Devices**) and use the **Add Discovered Device(s)** button to add it to the currently selected group node on the left side (**Edited Group**). Alternatively, you can drag and drop a device from the right to the target grouping node on the left.
10	Discovered Devices	Select an option from the **Grouping** drop-down menu to reorganize the discovered devices list into groupings according to the picked option (for example, Device Type organizes the devices into groups consisting of the same device type). Typing in the **Filter...** box allows you to filter for devices with names containing what you typed. Click **Refresh** to refresh the discovered devices list and to reapply the chosen filter type on the list.
11	Expand/Collapse	Expand or collapse the full tree, or you can expand or collapse specific nodes by clicking the triangle left of the node.
12	Connect	Connect to a device either in or outside a group.

Note: The target node must not be a device node.

Managing Multi-Reader Sync Groups

In the DataMan Setup Tool, Multi-Reader Sync configuration is part of the grouping editor, but the ribbon bar also has tools to configure the Multi-Reader Sync trigger group. The following Multi-Reader Sync group management options are offered by the Setup Tool:

• **Making a group to be a Multi-Reader Sync trigger (MRS) group**: By selecting a valid group node (the name of the group is fit to be an MRS group name) and pressing the **Toggle Group Triggering** button, the devices in the group are set to be part of the MRS group with the name of the group node's name. This option is available only if *all* readers in the group support Multi-Reader Sync triggering.

• **Clearing a Multi-Reader Sync group triggering**: Selecting an MRS group node and click the **Toggle Group Triggering** button, then click Apply and Save Grouping to Devices. The MRS group entries are removed from all devices in the group.

• **Setting the Primary device**: Some trigger modes may require to explicitly specify the Primary device. This can be achieved by selecting a device in a Multi-Reader Sync group and clicking the **Set Primary Device** button. This function is also available in the case of trigger types that do not require a specified primary device, so it can be stored in the custom-edited grouping and be displayed at a later time.

• **Misconfigured MRS groups**: It is possible that the data regarding Multi-Reader Sync group triggering becomes different in the device from what was stored in the SetupTool. Warnings appearing in such cases help you identify these issues. The warning messages are the following:

- **Incompatible trigger types**: If the devices in the MRS group have incompatible trigger types, the node of the MRS group has a warning sub-node that displays this information. This is an error.
- **Primary device not specified**: The MRS group may not require a Primary device, but some trigger modes do require it, so this message is only shown as a warning.

- **MRS group name mismatch**: It is possible that the MRS group name stored in the device is different from what is stored in your own grouping. Click **Apply and Save Grouping to Devices** to solve the issue.
- **MRS info not available**: Discovering exact information about Multi-Reader Sync trigger settings cannot be done without at least a "minimalist" connection. Until the valid information is retrieved by pressing the **Refresh** button, this information entry is shown for the device.

Image Playback

This page lets you view images that were transferred to the computer as set in **Data Logging** or the **Buffering and Transfer** pane's **Image PC Transfer** tab.

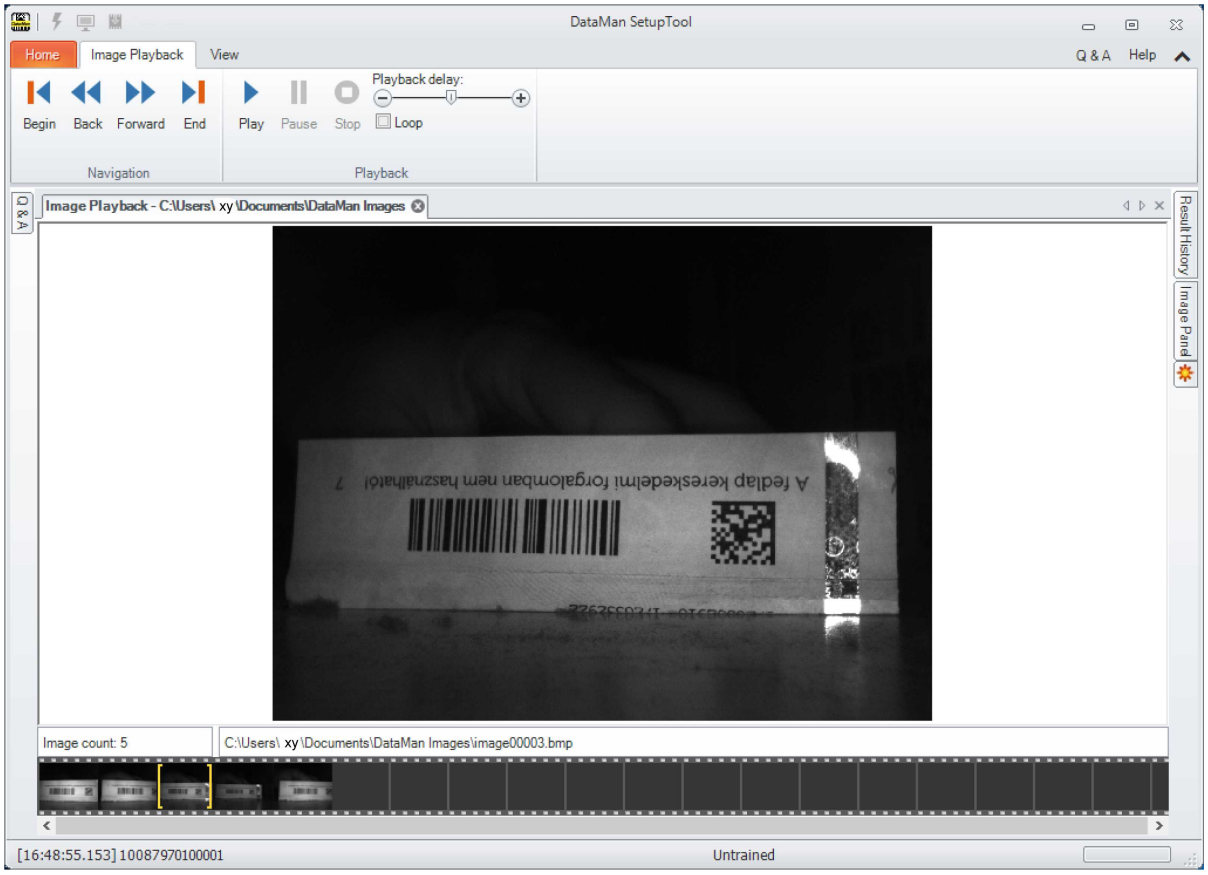
Set Image Playback through Data Logging

1. Connect to the Setup Tool.
2. In the **Image Panel** on the right, click **Logging**.
3. From the drop-down list, select if you want to log NoRead images, decoded images, or both.
4. From the drop-down list, click **Logging and reporting settings**.
5. The DataMan Setup Tool **Options** window pops up. In the **Data Logging** tab, set the file path for your images.
6. In the **Home** page, click **Image Playback**.
7. Select the folder you set in Step 5 and in the bottom right corner click **Open**.

Set Image Playback through Buffering and Transfer

1. Connect to the Setup Tool.
2. In the top, click **Settings**.
3. Click **Buffering and Transfer**.
4. Click the **Image Buffering** tab and set which images you want to buffer.
5. Click the **Image PC Transfer** tab. Here you can set the Transfer Folder and the Filename Format.
6. Start triggering.
7. As you trigger, you can see the number of buffered images increasing.
8. Click **Transfer Now**.
9. Click the **Open in Image Playback** button.

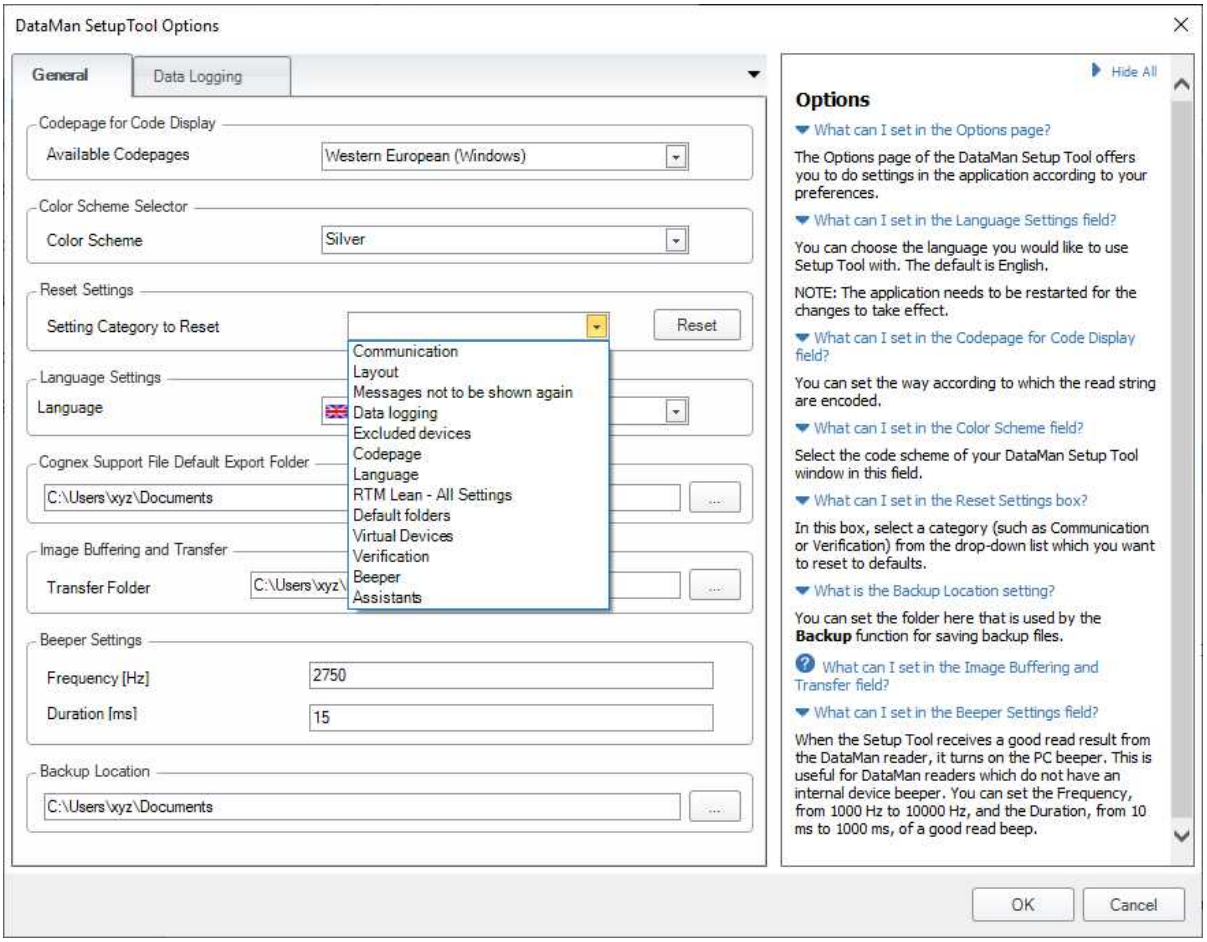
The images are opened in the **Image Playback** tab.


DataMan SetupTool
Home
Image Playback
View
Q & A
Help
Begin
Back
Forward
End
Navigation
Play
Pause
Stop
Playback delay:
Loop
Playback
Image Playback - C:\Users\ xy \Documents\DataMan Images
Q & A
Result History
Image Panel
Image count: 5
C:\Users\ xy \Documents\DataMan Images\image00003.bmp
[16:48:55.153] 10087970100001
Untrained

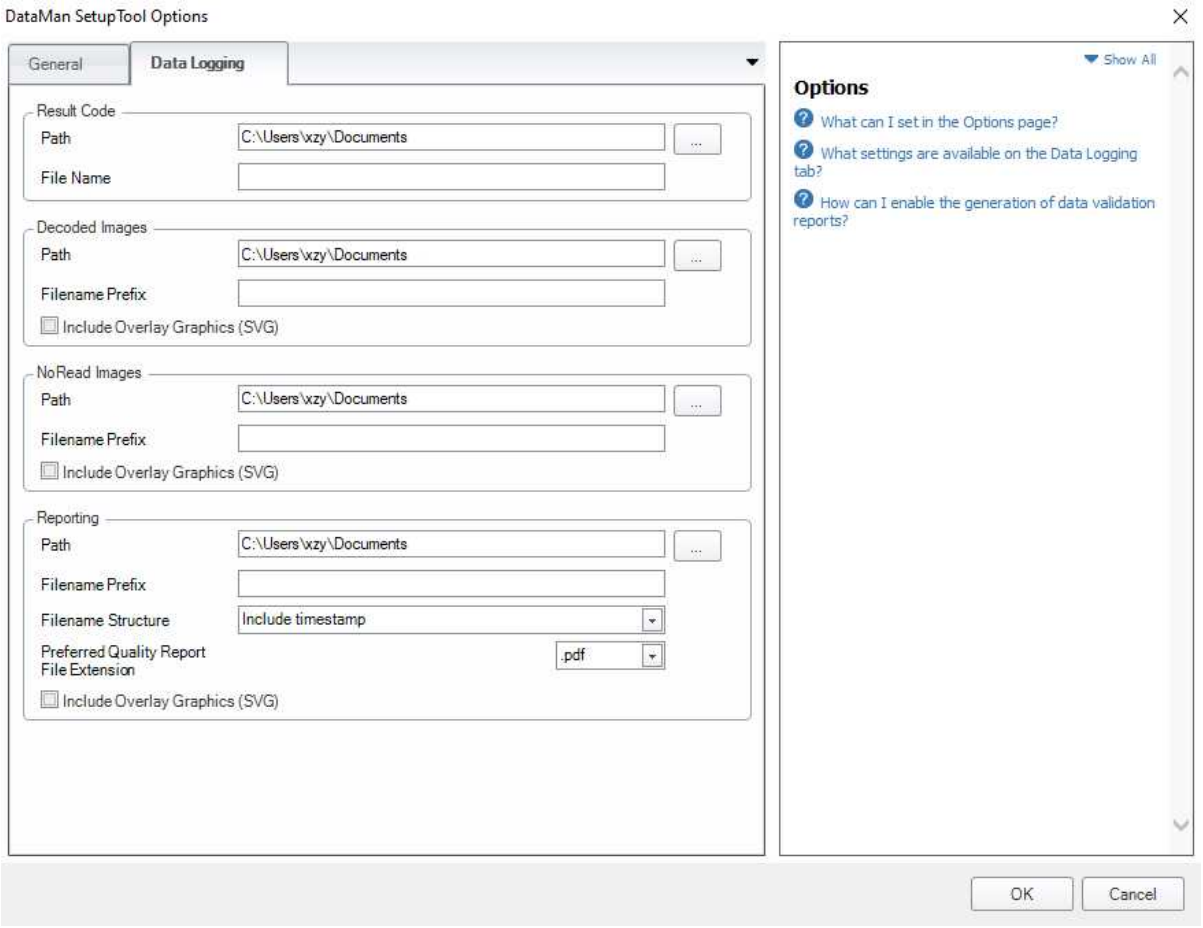
Options

The **Options** page of the DataMan Setup Tool offers you to do settings in the application according to your preferences.

On the **General** tab, you can set the language, the codepage for code display, and the color scheme of the Setup Tool itself. You can also select a category which you want to reset to defaults. In addition, you can set the backup folder, the support file folder, the image buffering folder and the beeper here.



On the **Data Logging** tab, you can set the folders into which *result codes*, *decoded images*, *NoRead images* and *reports* are to be saved.



About

The About page's pop-up window gives information about the installed DataMan Setup Tool, its version, a link to the support page and the copyright information.

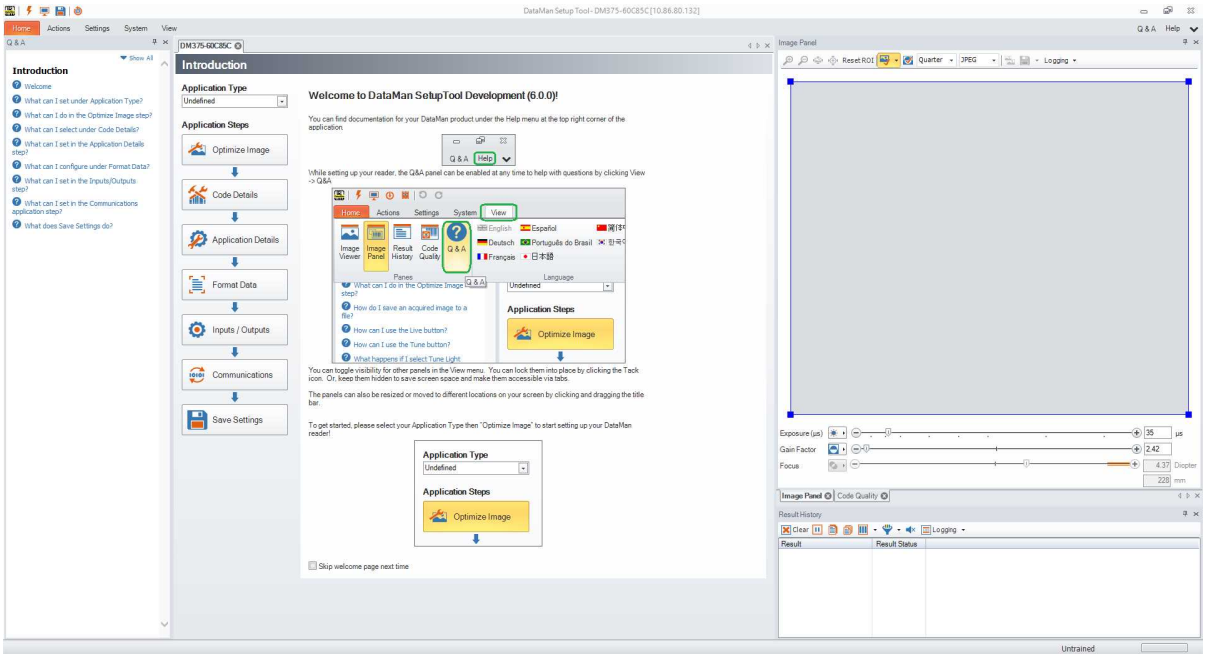
Configuring the DataMan Device

Setting Up the DataMan Device

This section describes how to use the DataMan Setup Tool once you have connected to it. It contains information on the most essential functions that you can use when setting up your reader and reading codes.

Application Steps Overview

After you connect to a device, the following page opens:



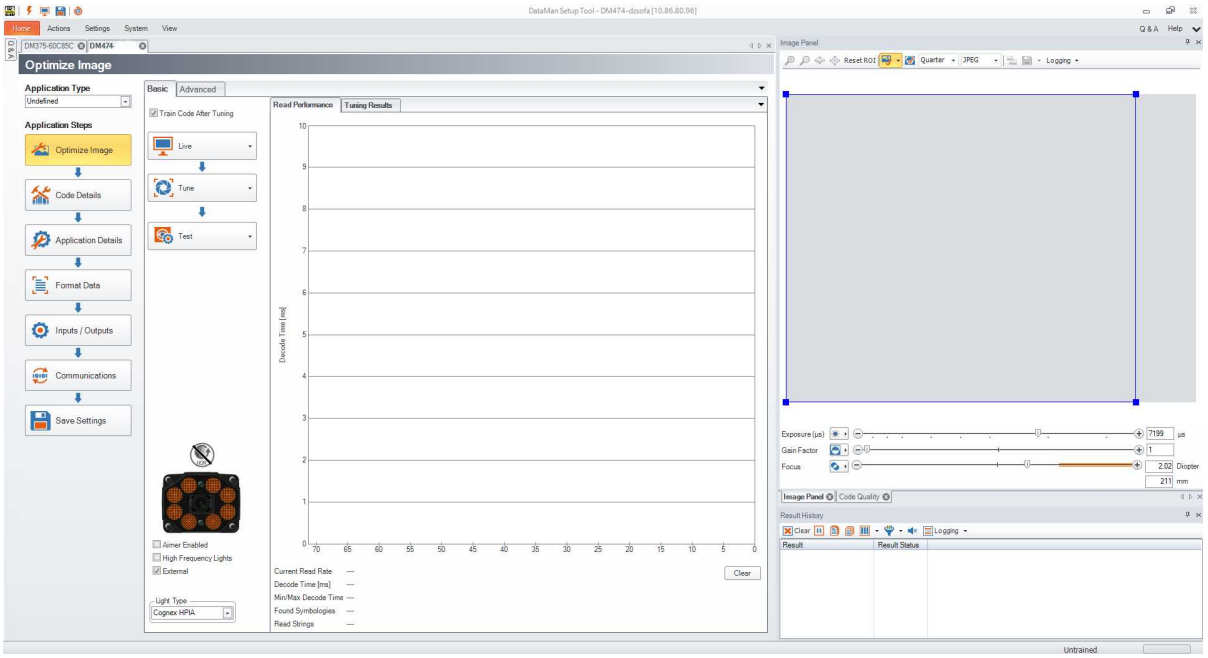
On the left hand side you can see a column displaying **Application Steps**, with which you can quickly configure and set up your device. Most of the steps have basic and advanced setting options on different panes.

In the **Advanced** tab you have all basic and further configuration options. In a table-style view you can see the settings and the corresponding values. When you click a row in the table, you can either immediately set or change a value, choose a value from a drop-down list, or click the three dots at the end of the row line. In the last case a window pops up with further setting options.

1. Set the **Application Type** by selecting one of the options from the drop-down list.
2. **Optimize Image** is for light and imager settings, live display, tuning and testing.
3. **Code Details** is for symbology settings,
4. **Application Details** is for trigger settings, decode settings as well as displayed image settings.
5. **Format Data** provides setting options regarding data formatting including standard, perl style, and script-based.
6. Implement system settings in **Inputs / Outputs**.
7. **Communications** is for serial and Ethernet settings, network settings, custom commands and industrial protocol settings.
8. Click **Save Settings** to save your configuration to the device.

Optimize Image

The first application step is **Optimize Image**, providing you a means for a quick setup in one step. Three buttons (Live, Tune, and Test) help you setup the reader in this pane.



Each button contains additional options that appear by clicking the arrow on the side of each button.

Live

Click the **Live** button to enter Live mode. Live mode not only monitors what the device sees, but it decodes as well. In the drop-down window of the **Live** button, you can find further options to configure Live mode and reader settings.

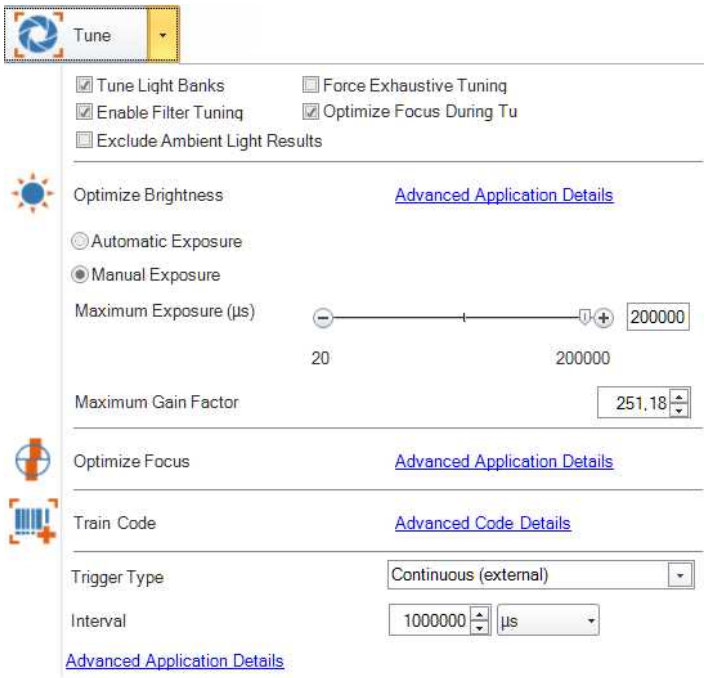
The following controls provide a subset of frequently used reader settings, which are duplicates of controls from other DataMan Setup Tool panes:

- **Decoding**: the device decodes the images taken
- **Focus Feedback** displays a color-coded meter on the right side of the image view. The meter indicates the focus of the lens (lower is less focused).
- **Automatic Exposure**: the reader automatically determines the best exposure settings.

In the **Image Panel**, you can change the region of interest (ROI) of the reader by sliding/dragging the blue ROI box. This is the area the reader will attempt to perform reads on.

Tune

Click the **Tune** button to automatically find the best settings for your reading. The advanced window reveals the following features:



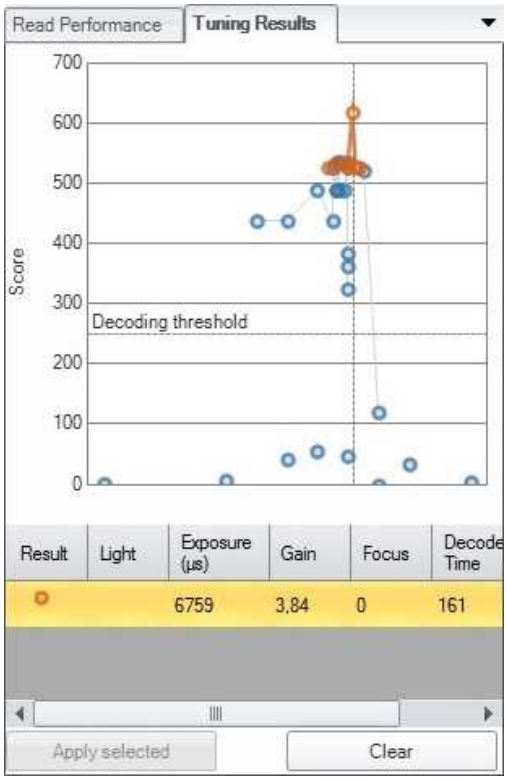
- Click **Optimize Brightness** to set the recommended brightness for your device automatically (only available if *Manual Exposure* is set), or, for advanced settings, click the link next to the button to navigate to the appropriate pane under **Application Details**. Alternatively, click the brightness icon under the image, or use the slider for manual brightness setup.
- Choose between **Automatic Exposure** or **Manual Exposure** as desired for your application. Camera gain can be controlled by a separate slider.
- Use the **Maximum Gain Factor** to set the target's maximum pixel brightness.
- Click **Optimize Focus** to set the recommended focus for your device automatically. For advanced settings, click the **Advanced Application Details** link to navigate to the **Advanced** tab under **Application Details** or the appropriate pane under **Light and Imager Settings**. Alternatively, click the focus icon under the image, or use the slider for manual focus setup.

  Note: Optimize Focus only appears when your device is equipped with a liquid lens.

- Click **Train Code** to train codes, or click the link next to the button to navigate to advanced code training settings.
- You can configure the reader with any of the following **Trigger Types** if **Manual Exposure** is set (some trigger types are not available on all devices):
  - **Single**
  - **Presentation**
  - **Manual**
  - **Burst**
  - **Self**
  - **Continuous**

  For more information on trigger types, see *Application Details* on page 31.

The **Tuning Results** pane on the right shows a detailed tuning graph.



You can select a result other than the recommended one by clicking on it and then clicking **Apply selected** in the bottom row:

- If you set **Tune Light Banks**, the device tunes the light banks. If you know which light settings you want to use, disable it, so the tuning doesn't overrule your preset.
- Selecting **Exhaustive Tuning** will *force* tuning the light banks. When Exhaustive Tuning is disabled, and the reader succeeds to read the code with the primary light setting, it will stop to try other light bank combinations. If Exhaustive Tuning is on, the reader will continue to try all combinations to look for the best one, no matter whether or not the first one succeeded.
- If **Enable Filter Tuning** is selected, the DataMan Setup Tool applies filters to the read image. The filter that was used to successfully read the code is then shown in the Tuning Results window under **Image Filter**.
- If you want the focus to be automatically optimized during tuning, check the **Optimize Focus During Tuning** option.
- **Exclude Ambient Light Results** if you want to exclude ambient light results for the tuning process. Ambient light results are automatically selected otherwise, because they are the prevailing illumination type for fixed-mount readers.

Test

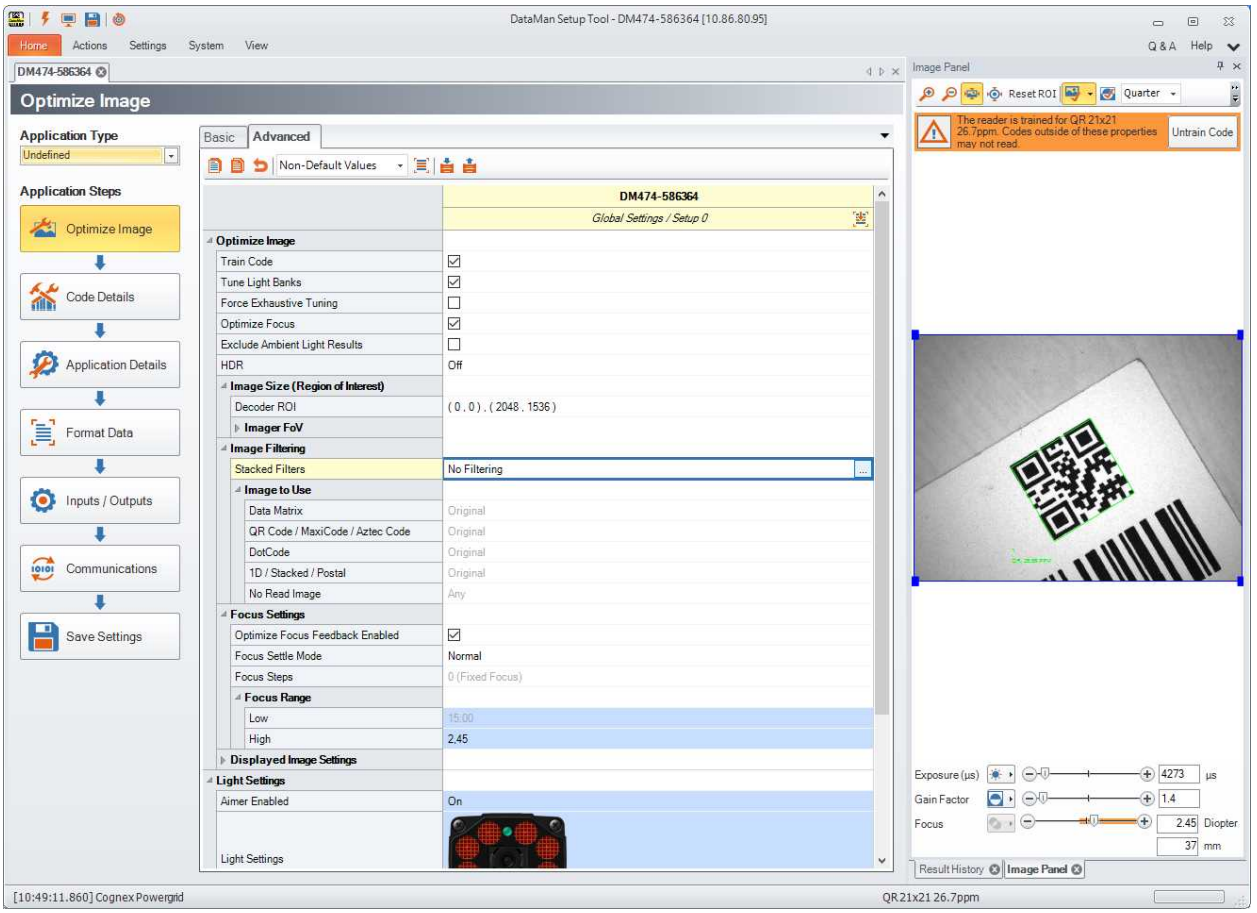
Click the **Test** button to test your device with a configuration, without any disruption to production.

If you selected a trigger type that is external (that is, not Presentation or Self trigger mode) under the **Tune** button, you can trigger the reader automatically using **Test mode** to validate and test your application. You can set up an appropriate duty cycle for the reader using the **Trigger On** and **Trigger Off** times. The **Trigger(s) per Second** value shows the calculated trigger frequency.

You can reduce either **Trigger On** or **Trigger Off** times to reduce the cycle time, and thus increase trigger frequency.

Note: Depending on the read setup, code to read, and connection interface, there might be speed limitations. At higher speeds, it is recommended to disable image transfer. For more information, see the Q & A pane in the DataMan Setup Tool.

In the **Advanced** tab you have further configuration options. In a table-style view you can see the settings and the corresponding values for optimizing your image (**Image Size**, **Image Filtering**, **Focus Settings** and **Displayed Image Settings**) as well as setting light values **(External Lights** and **High Frequency Lights**).

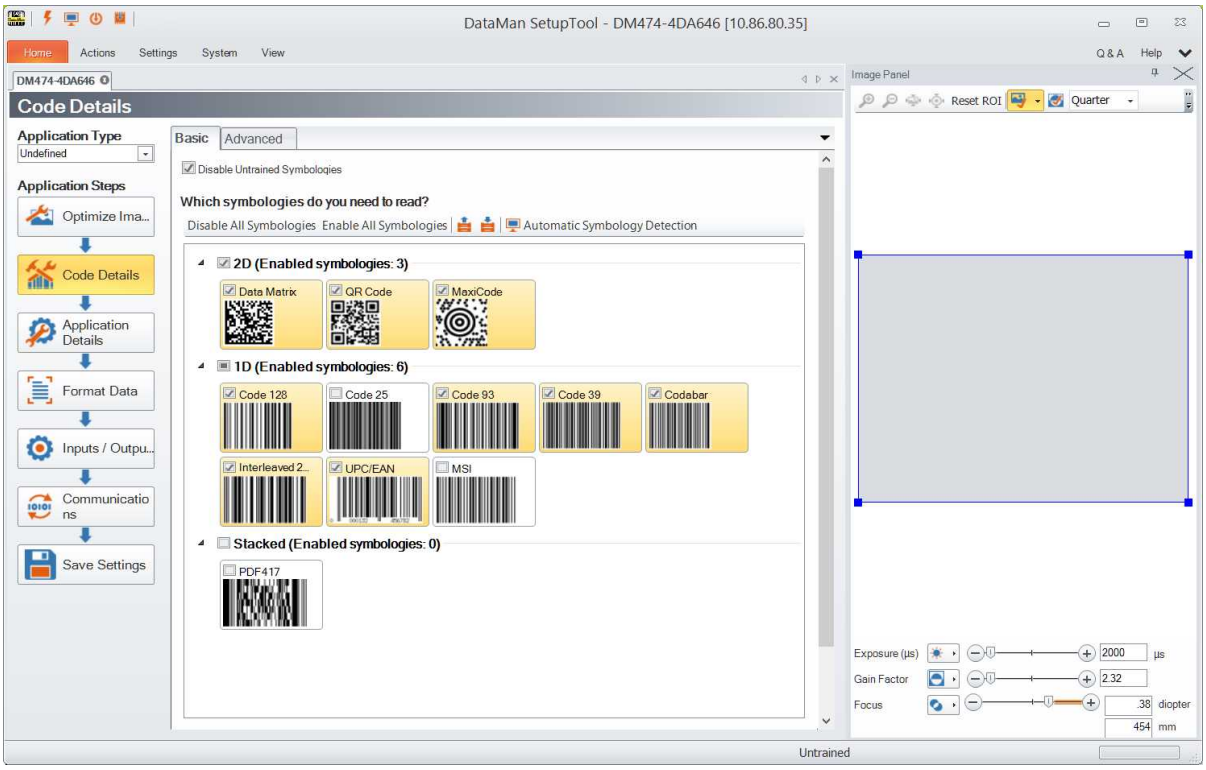


Read Performance

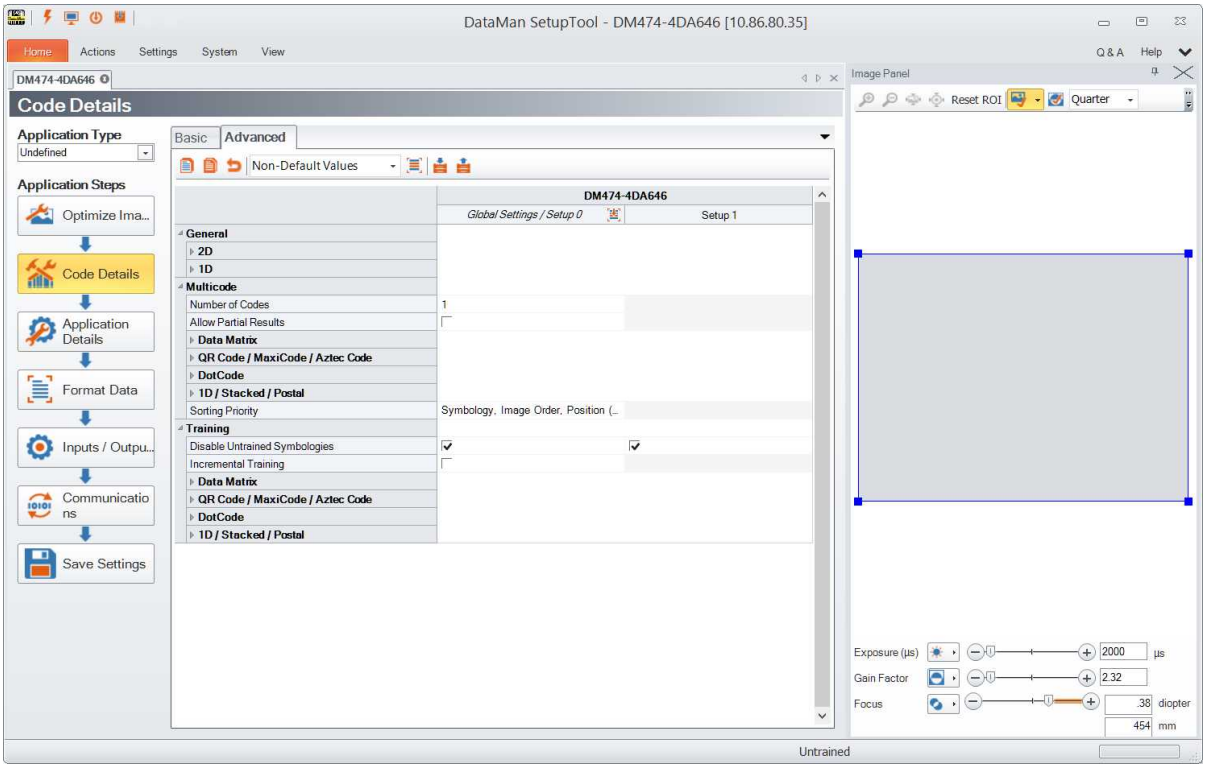
With the graphs in the **Read Performance** pane on the right, you can monitor decode times and Read Rates in real time. Click the **Clear** button to reset the graph.

Code Details

In this application step you can select the different types of symbologies to be used. On the **Basic** tab you can disable all or untrained symbologies and enable all of them. You also have the option to select 2D, 1D, Stacked and Postal symbologies separately and set the number of codes you need to read for each trigger.

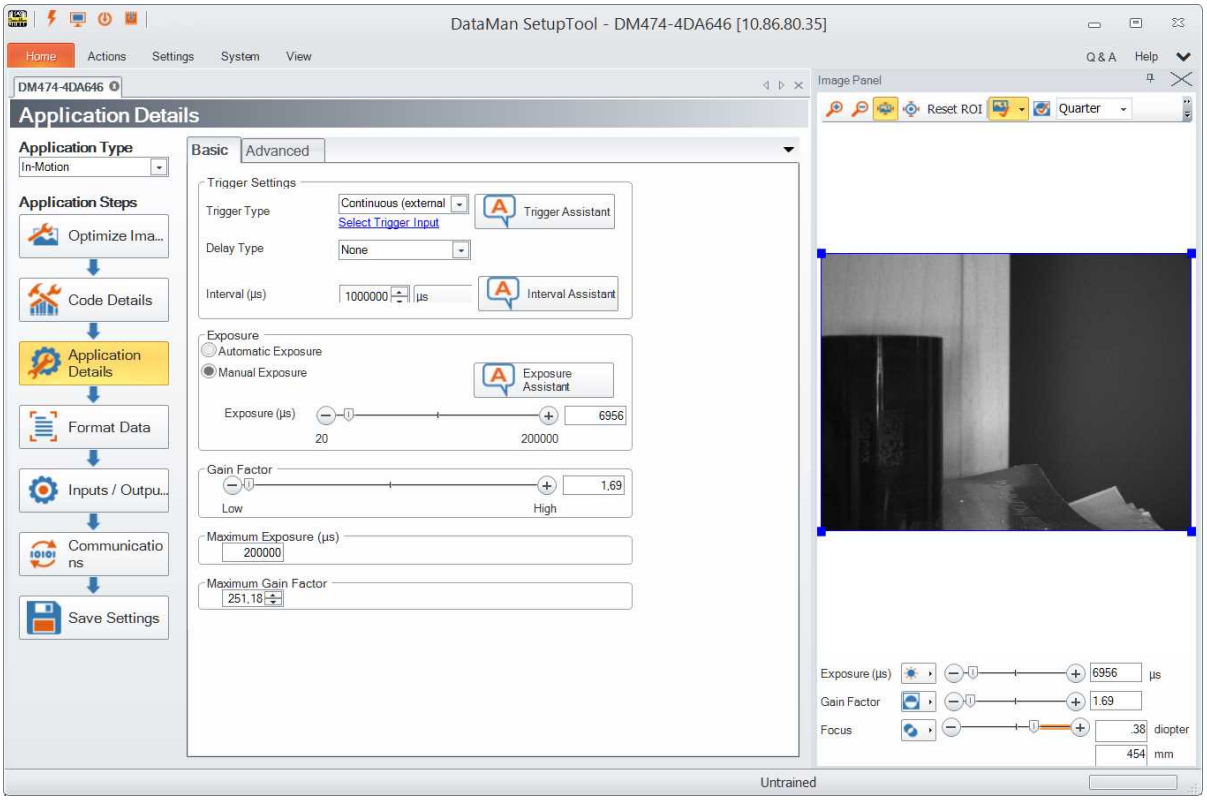


In the **Advanced** tab you have further configuration options. In a table-style view you can see the settings and the corresponding values for general code details (**1D** or **2D**) as well as setting **Multicode** values and configuring codes for **Training**.



Application Details

This step deals with light and imager settings. The **Basic** tab gives you the opportunity to set the trigger types, its delay, timeout, interval and burst length. Exposure options and data can also be given.



You can configure the reader with any of the following **Trigger Types** if **Manual Exposure** is set (some trigger types are not available on all devices):

- **Single** triggering acquires a single image and attempts to decode any symbol it might contain. This trigger mode supports a read timeout.

  Note: If there are multiple read setups, it is possible that multiple images are taken.

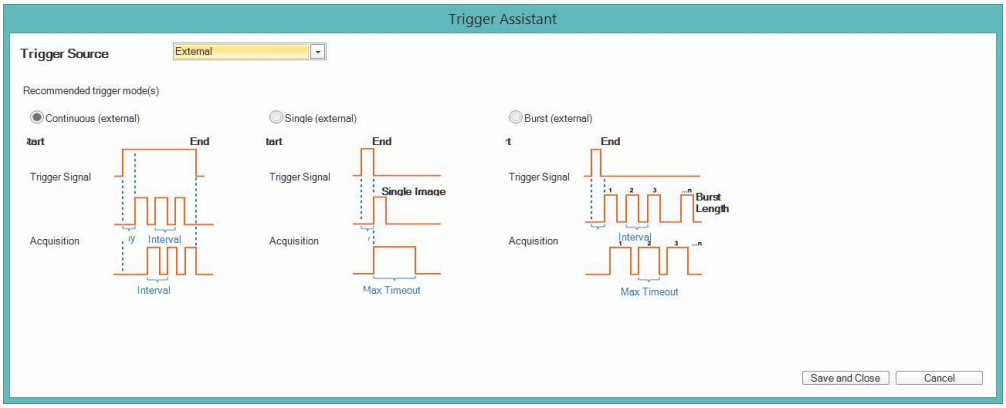
- **Presentation** triggering continuously scans for a symbol and decodes it each time one is detected.
- **Manual** triggering acquires images as long as the trigger signal remains active, and stops when a symbol is found and decoded or the trigger signal ends.
- **Burst** triggering acquires a set number of images and decodes the first symbol it detects within the group. You can configure the number of images within each burst as well as the interval between each image acquisition. This trigger mode supports a read timeout.
- **Self** triggering is similar to presentation triggering in that the reader continuously scans for a symbol and decodes it each time one is detected. Unlike presentation mode, however, a decode attempt occurs with every image and the reader disables the Automatic Exposure settings that allow the reader to automatically determine the best exposure settings for a desirable level of brightness in the image. You can specify several parameters in self triggering mode, such as whether the reader will read the same code more than once or how long to wait before scanning for the next code. In Self trigger mode, the trigger interval indirectly specifies a read timeout.
- **Continuous** triggering acquires images as long as the trigger signal remains active. The reader acquires images at a specific interval and attempts to scan any symbol each successive image contains.

Note: Several fixed-mount readers have variants (such as S models or L models), and many of these only support certain trigger types. Please consult the appropriate Reference Manual to check what trigger types are supported by your variant.

Three different assistants (**Trigger Assistant**, **Interval Assistant**, and **Exposure Assistant**) help you in configuring these settings.

Trigger Assistant

1. If you have not already done so, first select an **Application Type**.
2. Click the **Trigger Assistant** button. A window pops up.
3. Select the **Trigger Source** from the drop-down list: Undefined, Internal or External. You get a recommendation from the assistant for the trigger modes. Graphical presentations of the trigger types help you decide. Select the trigger type and click **Save and Close**.



Interval Assistant

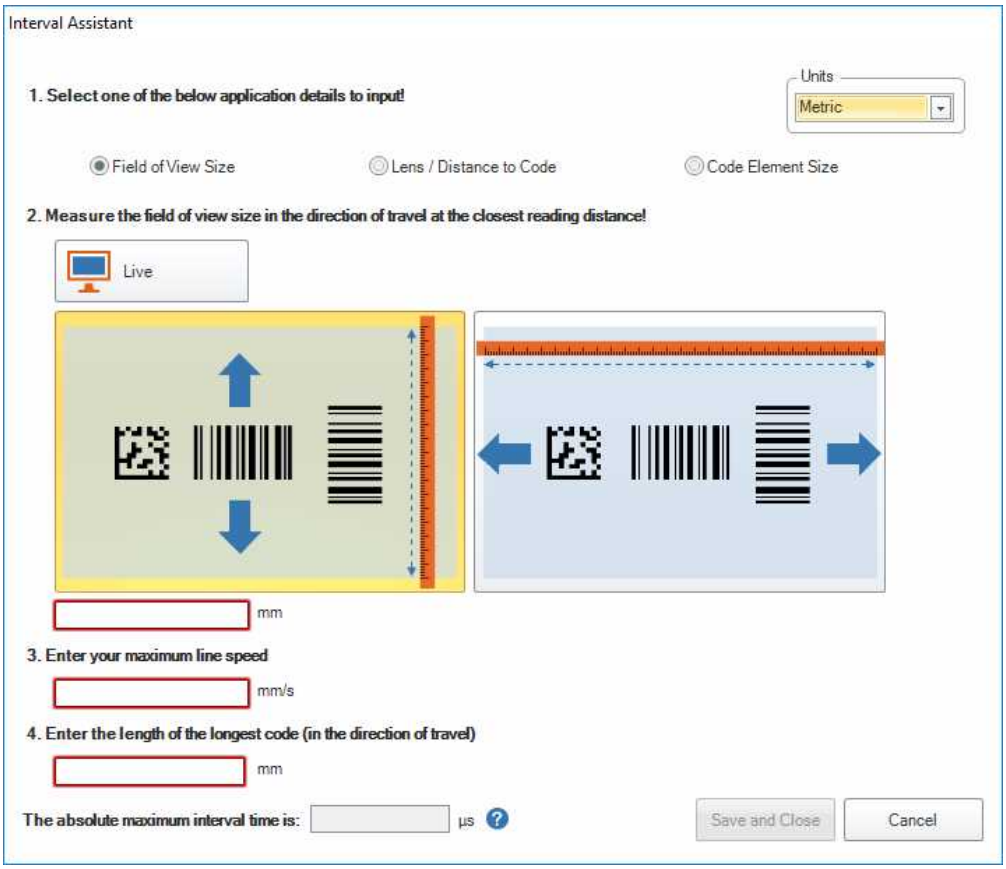
In the case of Self and Continuous modes the Interval Assistant can help you make further settings. You can select three ways to calculate the necessary data. In the top right corner select the units (standard or metric) you wish to calculate in.

With the help of **Field of View** you can calculate the longest possible interval time by measuring the physical field of view and giving the maximum line speed and the size of the longest code.

Clicking **Lens / Distance to Code** is calculating with the distance of the code from the lens. Give the focal length from the drop-down and select the direction in which the code is traveling. Here you also need to give the maximum line speed and the size of the longest code.

Code Element Size calculates with the size of the most narrow code element. Enable **Test Mode** to read your code. You also need to give the direction your code is traveling in, the maximum line speed and the size of the longest code.

At the bottom of the Assistant you get the recommended maximum interval time.

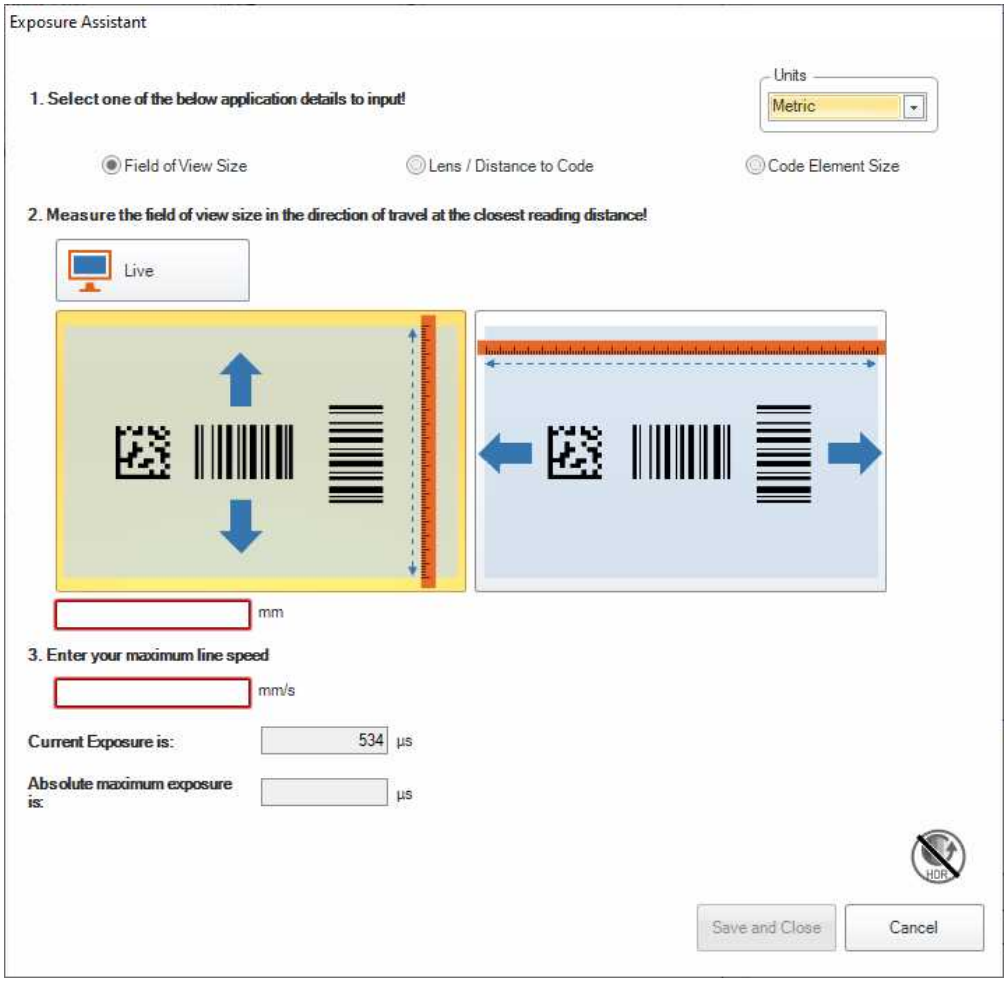


Exposure Assistant

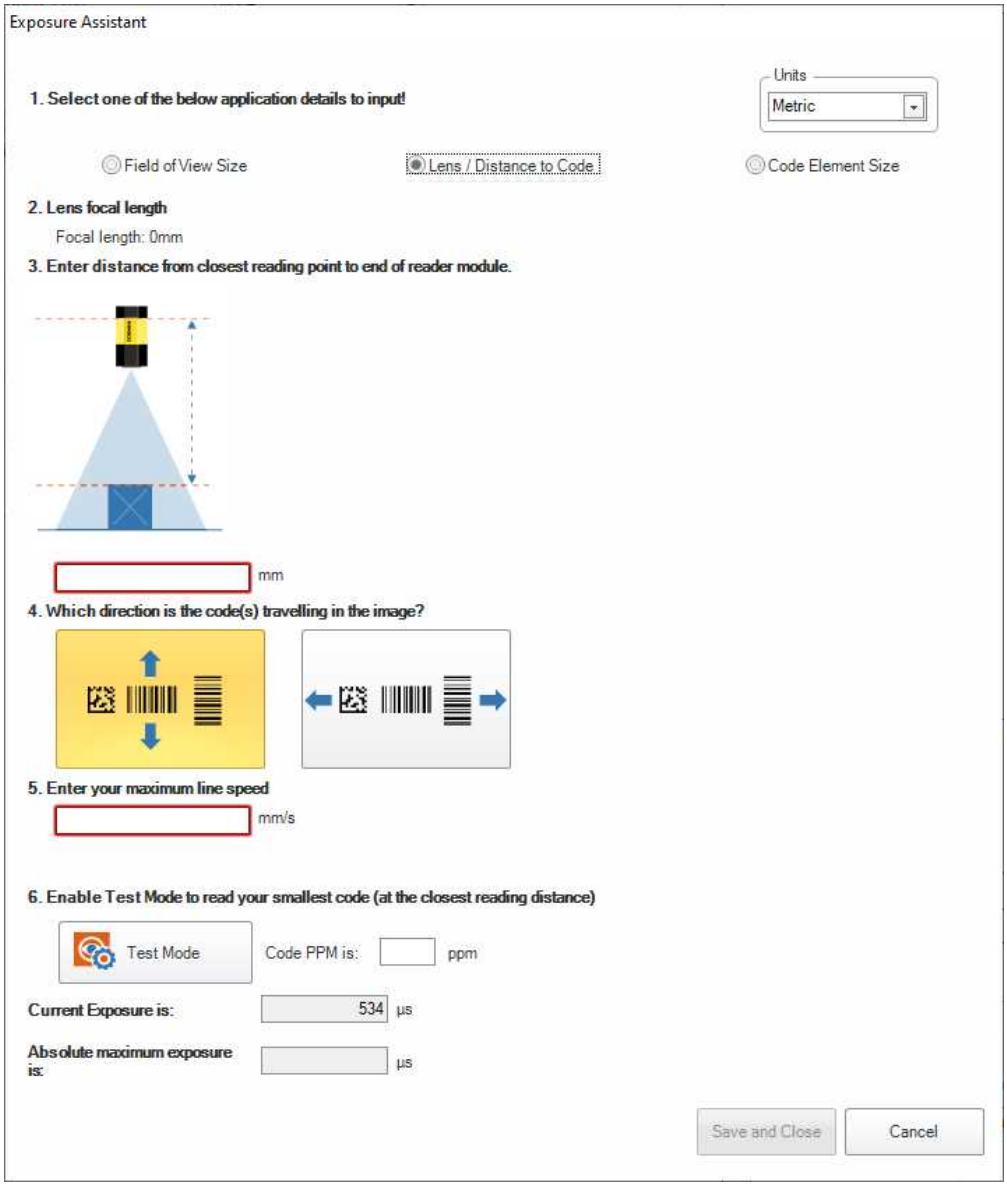
Exposure Assistant works in case of **In-Motion** and **Hand Presentation** application types.

In-Motion Applications

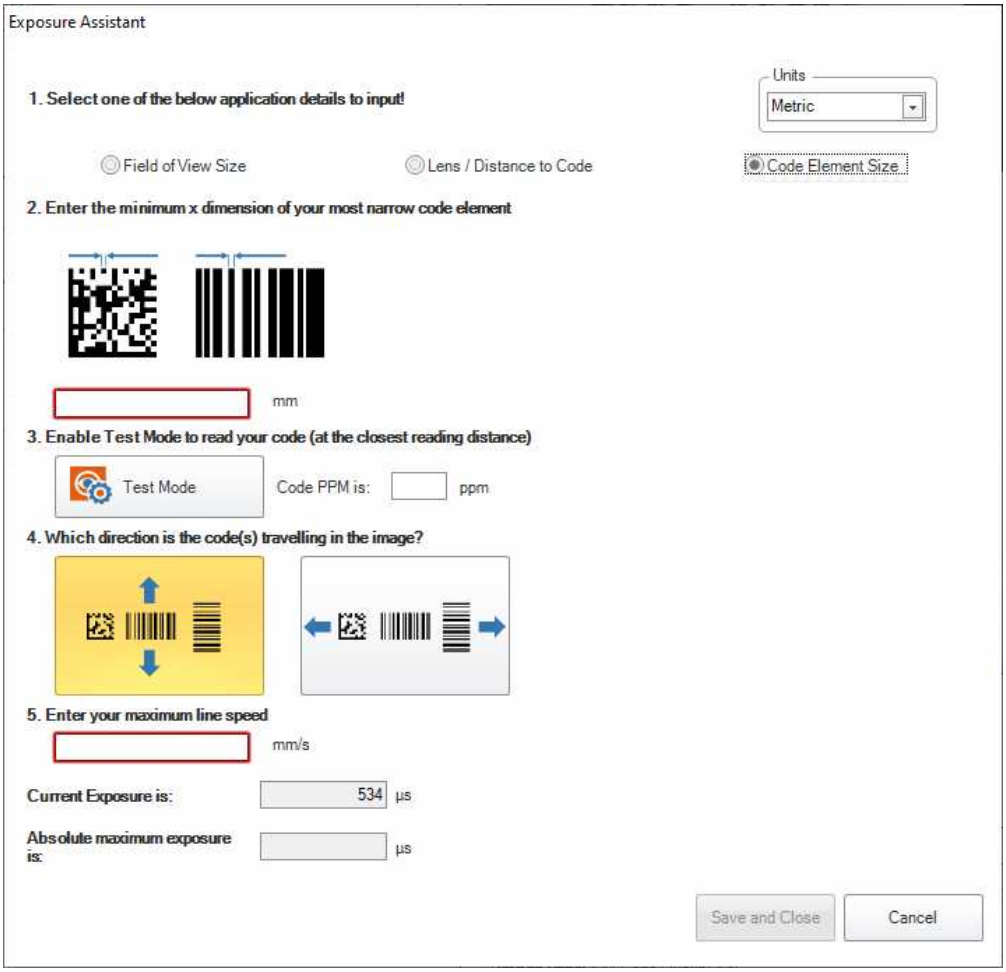
For In-Motion applications, you can select three ways for your calculations: **Filed of View Size**, **Lens / Distance to Code**, and **Code Element Size**. Clicking **Field of View Size** helps you calculate the recommended maximum exposure time by measuring the physical field of view and giving the maximum line speed.



Clicking **Lens / Distance to Code** calculates with the distance of the code from the lens. In case your reader is not equipped with a liquid lens, give the focal length from the drop-down list, and select the direction in which the code is traveling. Enter the maximum line speed here. You can enable **Test Mode** to read your smallest code.



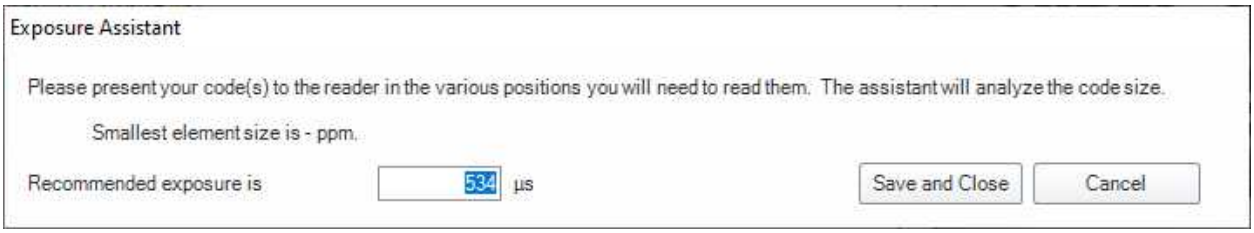
Code Element Size calculates with the size of the most narrow code element. Enable **Test Mode** to read your code. Give the direction your code is traveling in and the maximum line speed.



At the bottom of the Assistant you get the current and the recommended maximum exposure time.

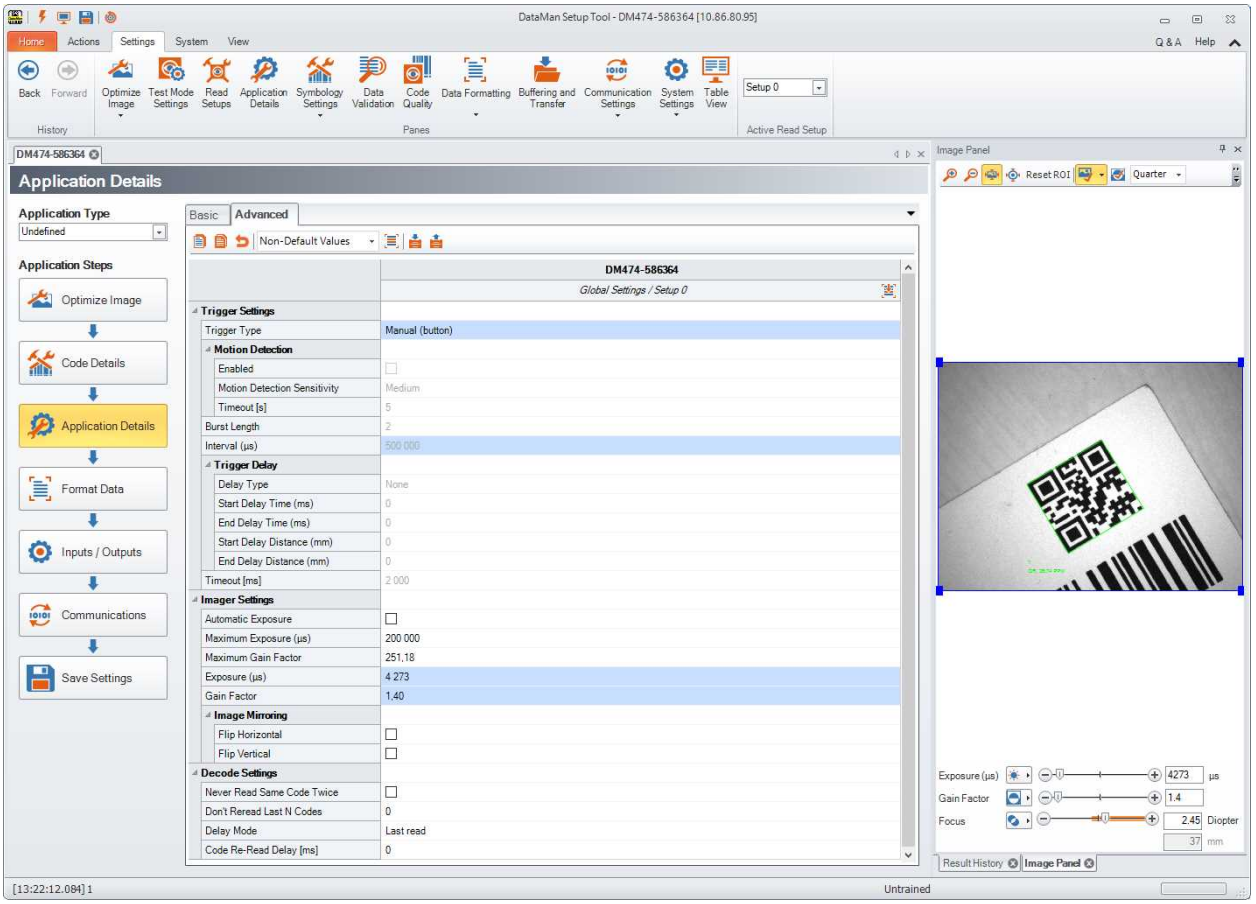
Hand Presentation Applications

If you have a Hand Presentation type application, present your code(s) to the reader in the positions you want to read them. The assistant analyzes the code size and changes the **Smallest element size** to the actual value.



Application Details Advanced Options

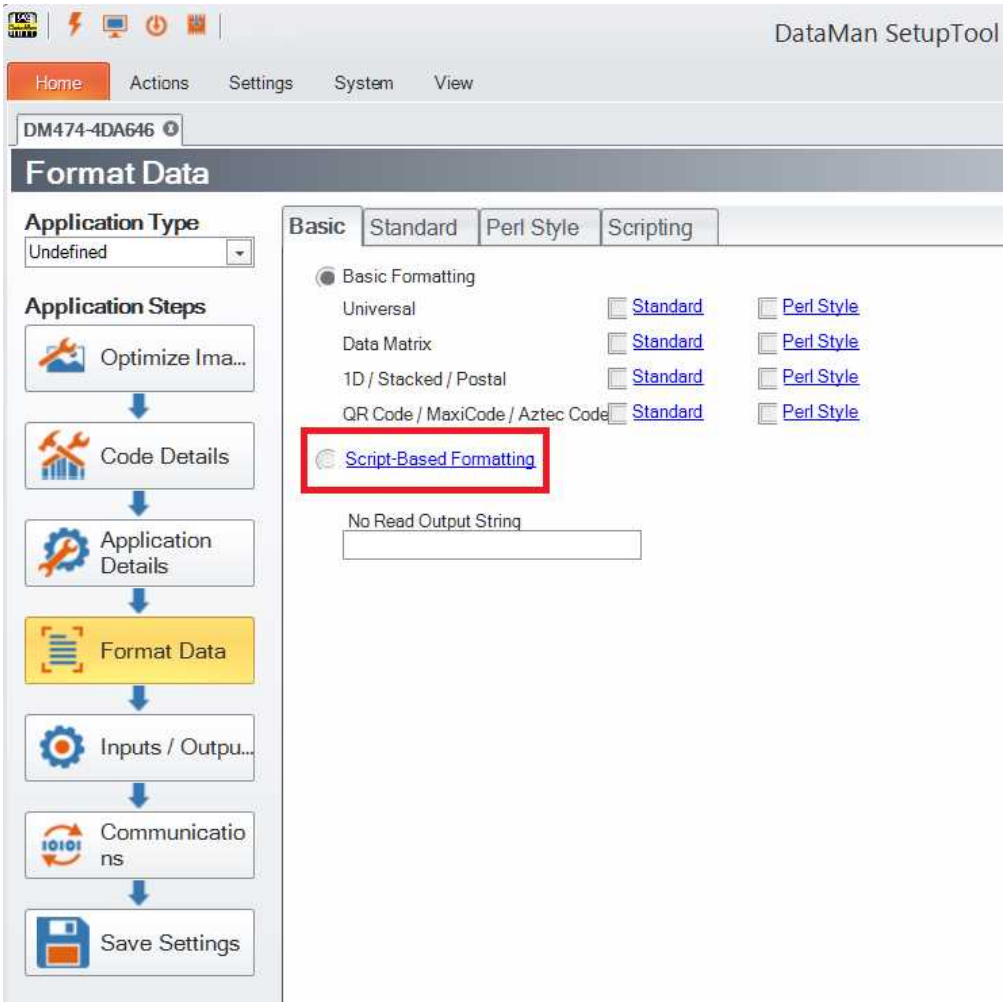
In the **Advanced** tab you have further configuration options. In a table-style view you can see the settings and the corresponding values for triggering (**Motion Detection** and **Trigger Delay**), the imager (including **Image Mirroring**) as well as setting decode values.



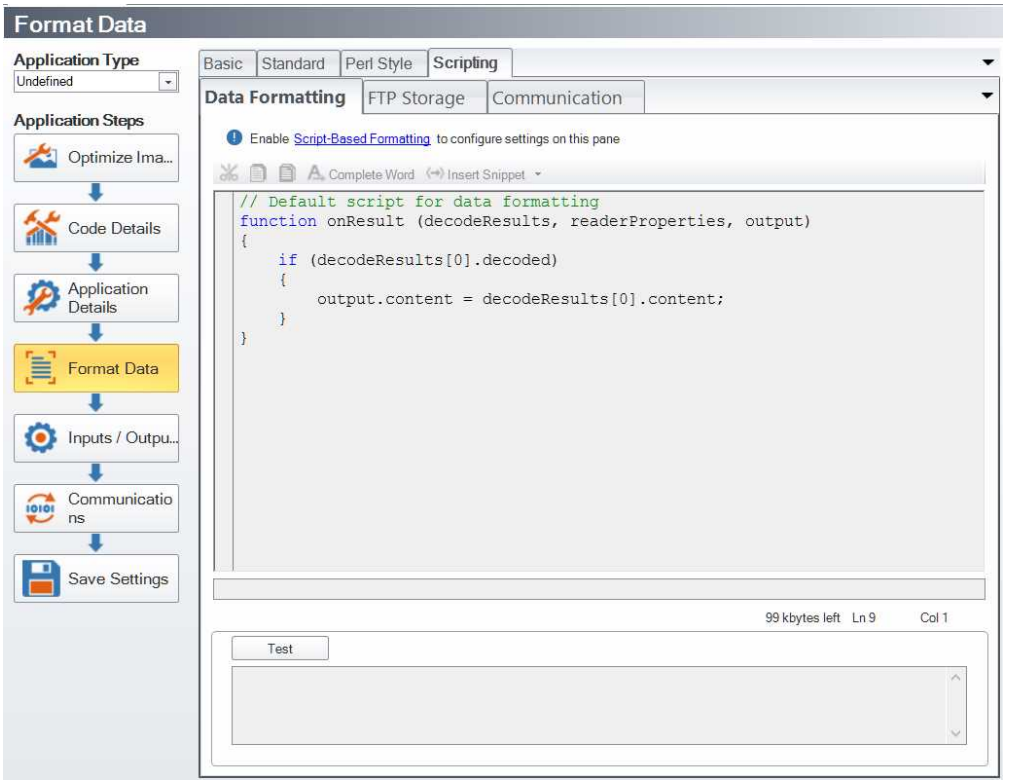
Format Data

In addition to standard formatting possibilities, you have the option to write a script inside the Setup Tool. The script itself runs on the device for data formatting. Your device must be equipped with the Scripting feature key in order to use data formatting scripting.

You can enable script-based formatting under the **Format Data** application step's **Basic** tab. Clicking **Data Formatting** in the **Settings** pane also navigates you to the **Format Data** application step:

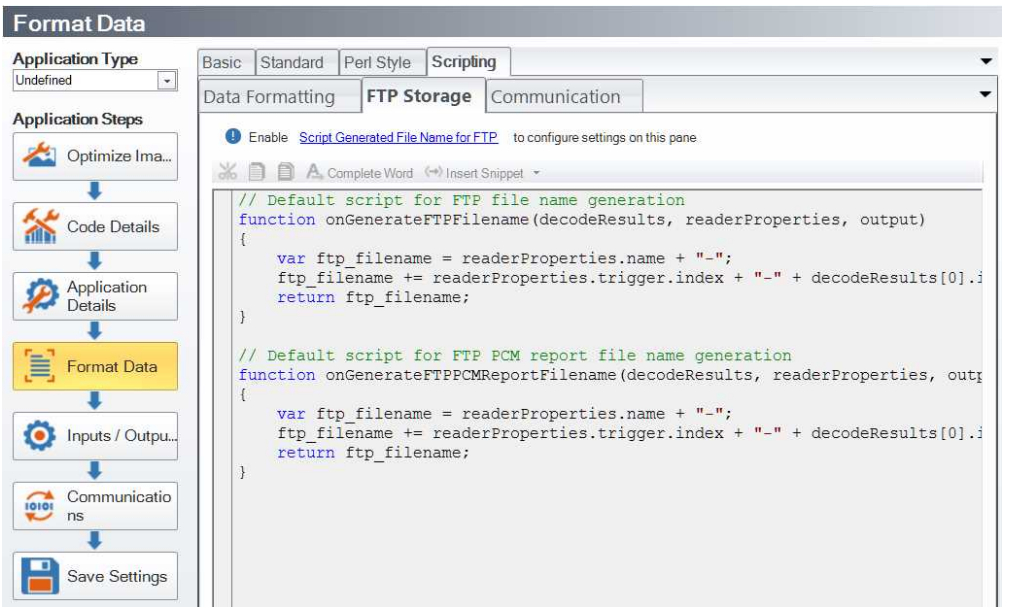


When script-based formatting is enabled, you can define a JavaScript module to format data according to your needs on the **Scripting** tab of the **Format Data** application step.

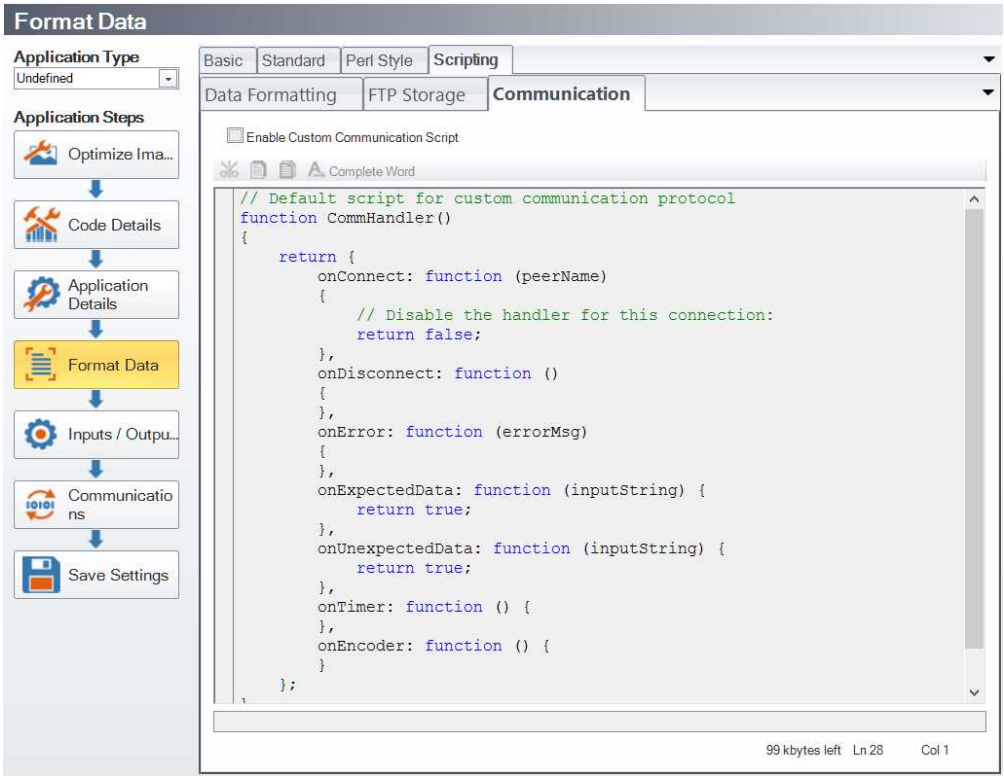


Click the **Scripting** tab.

If your DataMan device uploads its images to an FTP server, the images on the server get a certain file name. This file name can be customized with the help of the script that can be edited under the **FTP Storage** tab.



On the **Communication** tab, you can edit your custom communication protocols.



For more information on the custom communication protocols, see the ***DataMan Communications and Programming Guide***.

The script for data formatting not only allows you to have different data formatting combinations, but you can also perform operations on the output channel, for example, to pull output 1 up. You can configure read results flexibly and configure reader events before the result returns.

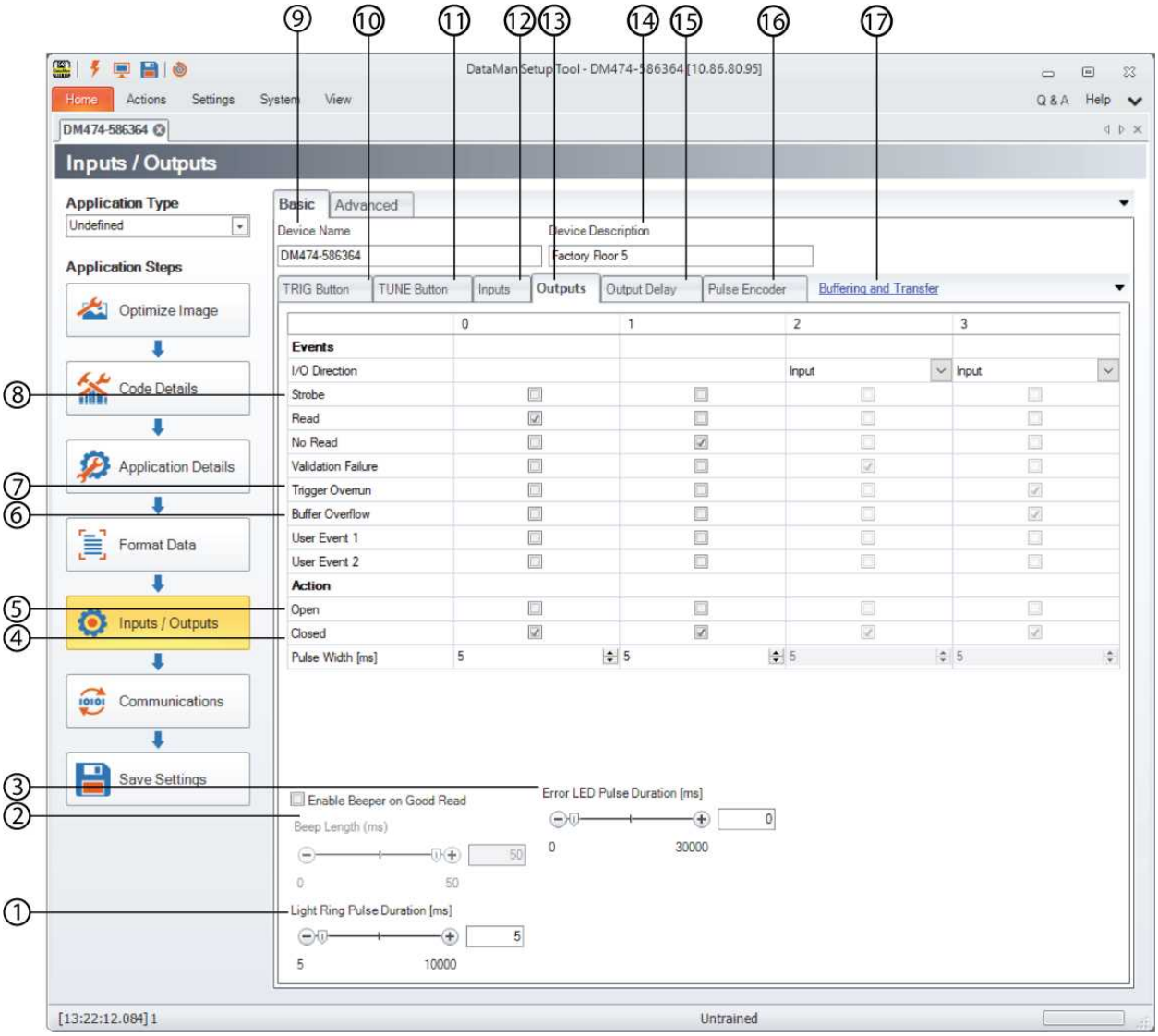
For the details of how to write the script and for scripting examples, please see the ***DataMan Communications and Programming Guide***. In the Setup Tool, you can find scripting samples by clicking the arrow of the **Insert Snippet** drop-down menu or right-clicking within the text field and selecting **Insert Snippet** from the pop-up list.

You can open your own scripts through the DataMan Setup Tool's **Scripting** -> **Open Script...** option.

Inputs / Outputs

This application step is the place to configure the device I/O.

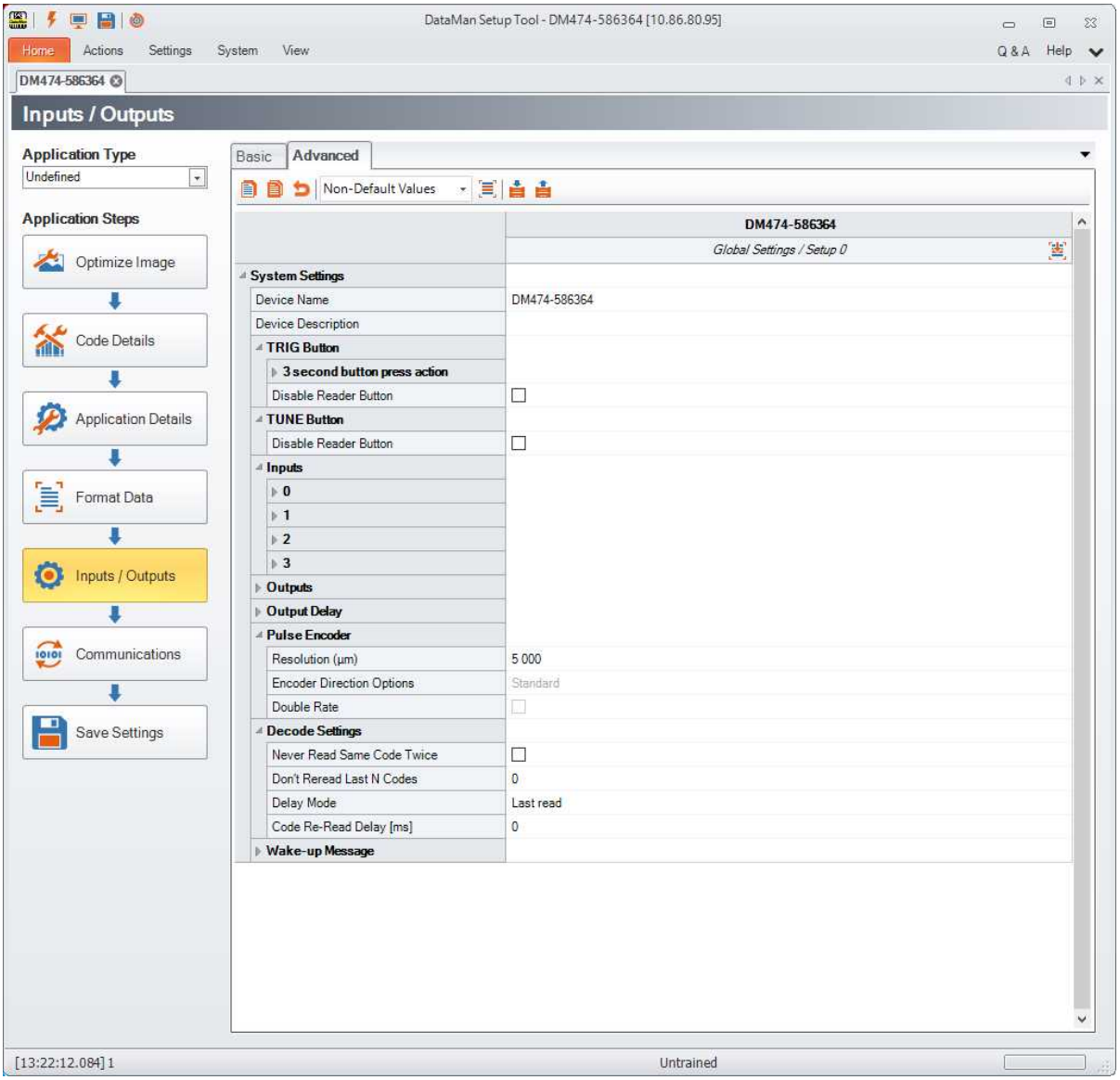
The **Basic** tab enables you to configure the behavior of the trigger and tune buttons, inputs, outputs and pulse encoder data. Height sensor data can also be set for devices for which it is relevant.



1	Light Ring Pulse Duration	For readers with a light ring, the duration of the light ring's illuminated state can be specified here in milliseconds.
2	Enable Beeper on Good Read	Set the Beep Length for good reads to a value between 0 and 50 ms.
3	Error LED Pulse Duration	You can move the slider to the desired millisecond that is used to determine how long the Error LED pulses on fixed-mount devices. The Error LED is found on the top of the device. Setting the slider to '0' causes the red error LED to turn off if the device log is retrieved, while every value above '0' causes the red error LED to turn off automatically after the selected time is expired.
4	Closed	The open or closed state means the state of the relay. If an Event happens from the list above, the output can be open or closed. For example, if a Read event happens, in the case of Closed, the output 0 will become output 1. Also, you can close an output line indefinitely by specifying a pulse width of 0 milliseconds, but be aware that any event that triggers this output line will cause it to remain closed until you cycle the power to the reader or clear outputs with a discrete input setting.
5	Open	
6	Buffer Overflow	Buffer Overflow means that it would be possible to acquire an image, but there is no space left to save it. In other words, images are acquired faster than they can be processed. One possible situation is when decoding takes longer than what the image/trigger interval is.

7	Trigger Overrun	Trigger Overrun means that the image could not be acquired because the camera was busy (for example, due to an ongoing burst or a long exposure).
8	Strobe	You can reserve an output for external illumination by checking Strobe on one of the output lines. You can also configure polarity by choosing Open or Closed in the appropriate Outputs column.
9	Device name	You can give the device a more meaningful name for your production environment, such as the location or the inspection task.
10	TRIG Button	You can choose trigger button press functionality only in Single, Burst, and Self trigger modes. The 3 second button press action possibilities are the following: • Optimize Brightness • Optimize Focus (if your device is equipped with a liquid lens) • Read Configuration Code • Train Code • Set Match String • Test Mode You can also check **Disable Reader Button** if you do not want the physical TRIG button on the reader to work. When a checkbox is selected, the action assigned to an input does not occur immediately after activating the input. It takes place only when the next trigger is performed.
11	TUNE Button	Check the **Disabled Reader Button** if you do not want the physical TUNE button on the reader to work.
12	Inputs	In addition to the different actions that you can use the input line for, here you can also set the change in signal that triggers an image acquisition (under **Polarity**). Use **Debounce Delay** to define how long the trigger signal must be detected to be recognized as valid. Use a shorter value to compensate for ESD line noise and higher values to compensate for noise in electromechanical relays. You might have to experiment with the setting to choose the most appropriate value for your production environment.
13	Outputs	The **Outputs** tab lets you configure the behavior of all output lines available to the reader. For any line you can configure the event and action of the output line.
14	Device Description	Device description is a freely editable text field where you can add notes to the device or important additional information.
15	Output Delay	Set the output delay in Manual, Single, Burst, and Continuous trigger modes. When using a pulse encoder, you can specify the distance to the output and map the pulse to the distance. The distance to output value is corrected based on the value of the resolution (it is adjusted to the closest multiple of resolution rounded to millimeters). Use the **Distance to output (mm)** control to set the distance from trigger to when the result is output.
16	Pulse Encoder	When using a pulse encoder, you can specify the distance to the output and map the pulse to the distance. The distance to output value is corrected based on the value of the resolution (it is adjusted to the closest multiple of resolution rounded to millimeters). Use the **Resolution (mm)** control to define the resolution.
17	Buffering and Transfer	For more information on **Buffering and Transfer**, see *Buffering and Transfer* on page 52.

The **Advanced** tab provides you with a table-style view of the settings you can configure on the **Basic** tab. In addition to setting the device name and description, you can configure the TRIG Button, the TUNE Button, Input and Output lines, Output Delay, and a Pulse Encoder.



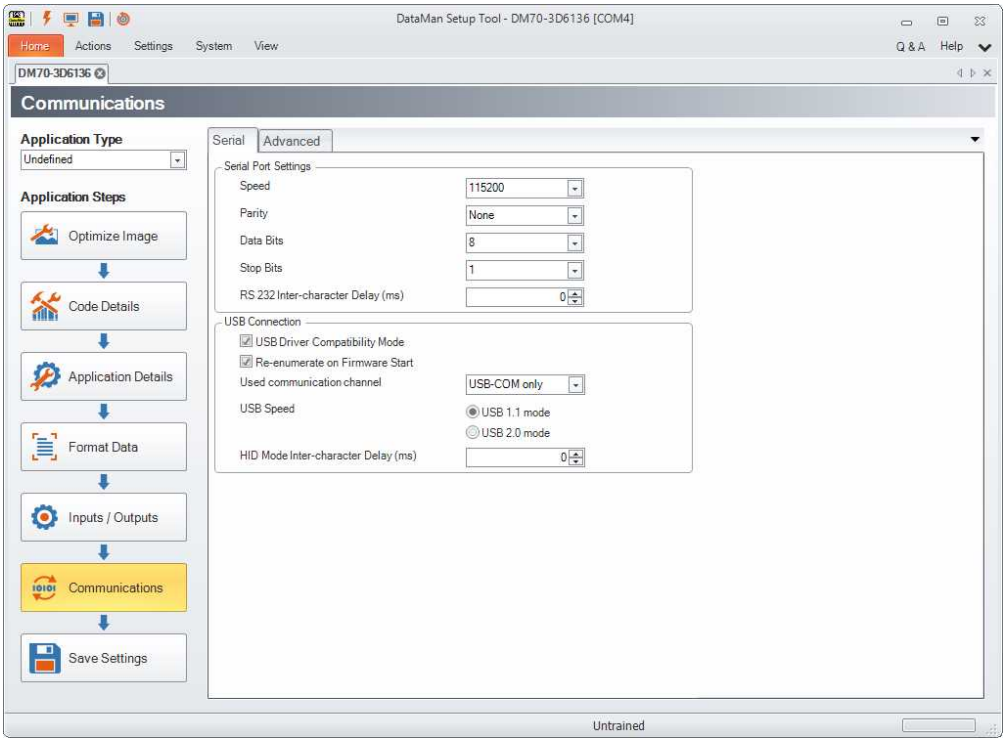
Under **Decode Settings**, you can set **Never Read Same Code Twice**. This suppresses the reporting of the same code string twice in a row and within a single trigger sequence when enabled. It is available for all trigger modes, but is only valid in Multicode Reading, since the only way to get more than one code in a single trigger sequence is in Multicode Readings. If **Never Read the Same Code Twice** is unchecked, the device re-reads and re-transmits the same code after the specified **Code Re-Read Delay (in milliseconds)**.

Under **Wake-up Message**, enable or disable **Output Diagnostic String on Wake-up**. When enabled, the reader transmits a diagnostic string whenever the reader starts up. For Telnet connections the readers transmits the diagnostic string with each new connection. For serial connections, the baud rate is automatically set to 38,400 when the message is sent, regardless of the settings made in the Setup Tool.

Communications

On the three tabs of the **Communications** application step, serial and Ethernet settings can be implemented. Click the appropriate tab to enter your setting values.

On the **Serial** tab, you can configure serial port values (speed, parity, data bits, stop bits or RS-232 Inter-character Delay (ms)) as well as USB connection settings.



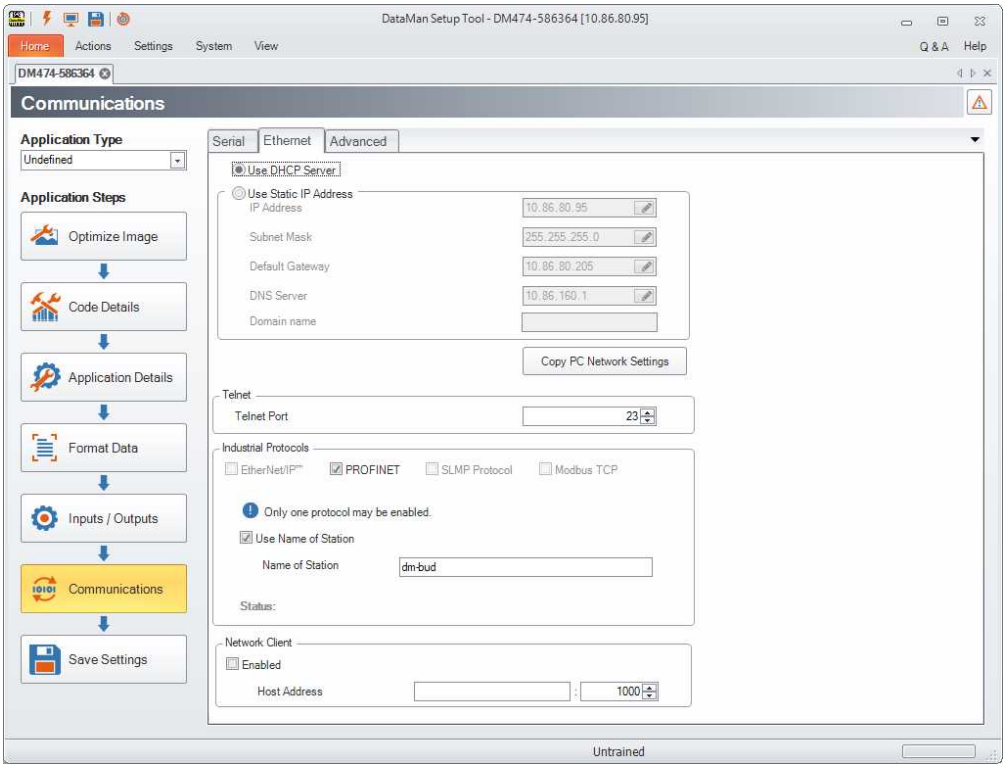
By default, the DataMan reader uses a USB driver that can help the reader recover from an electrostatic discharge (ESD) event. Use **USB Driver Compatibility Mode** if you require strict conformance to the USB specification.

In the **Used communication channel** option, you can set the communication method via USB. Depending on the used device, the following options are available:

- USB-COM only: Choose this option to reach the device through a serial port.
- USB-HID only: This option ensures that the device will behave like a USB keyboard.
- USB-COM + USB-HID: This is a combination of the above modes.

Note: In the case of USB-COM only, some devices may also be listed under HID devices, even if they lack HID functionality.

On the **Ethernet** tab, configure network settings for your wireless or tethered reader. If you are using a wireless reader, configure network settings on the base station.



Select the **Use DHCP Server** option to have the reader assigned an IP address by a DHCP server (if one is available), or enter the network settings manually. Contact your network administrator for an appropriate value or click **Copy PC Network Settings**. Your own PC network settings will be copied in the above fields, including the IP address of your computer. Make sure you do not forget to update this to the IP address of your reader.

Under **Telnet**, you can set the **Telnet Port**. The reader allows TCP connections to port 23, which is the default TCP port for Telnet applications. If you use a Telnet client, the only parameter you will have to provide is the reader's IP address. If you are using another application or SDK to connect, make sure that it uses the same TCP port setting as your reader does. The reader will automatically send code output over this connection. You are able to transmit DataMan Control Commands (DMCC) over this connection as well.

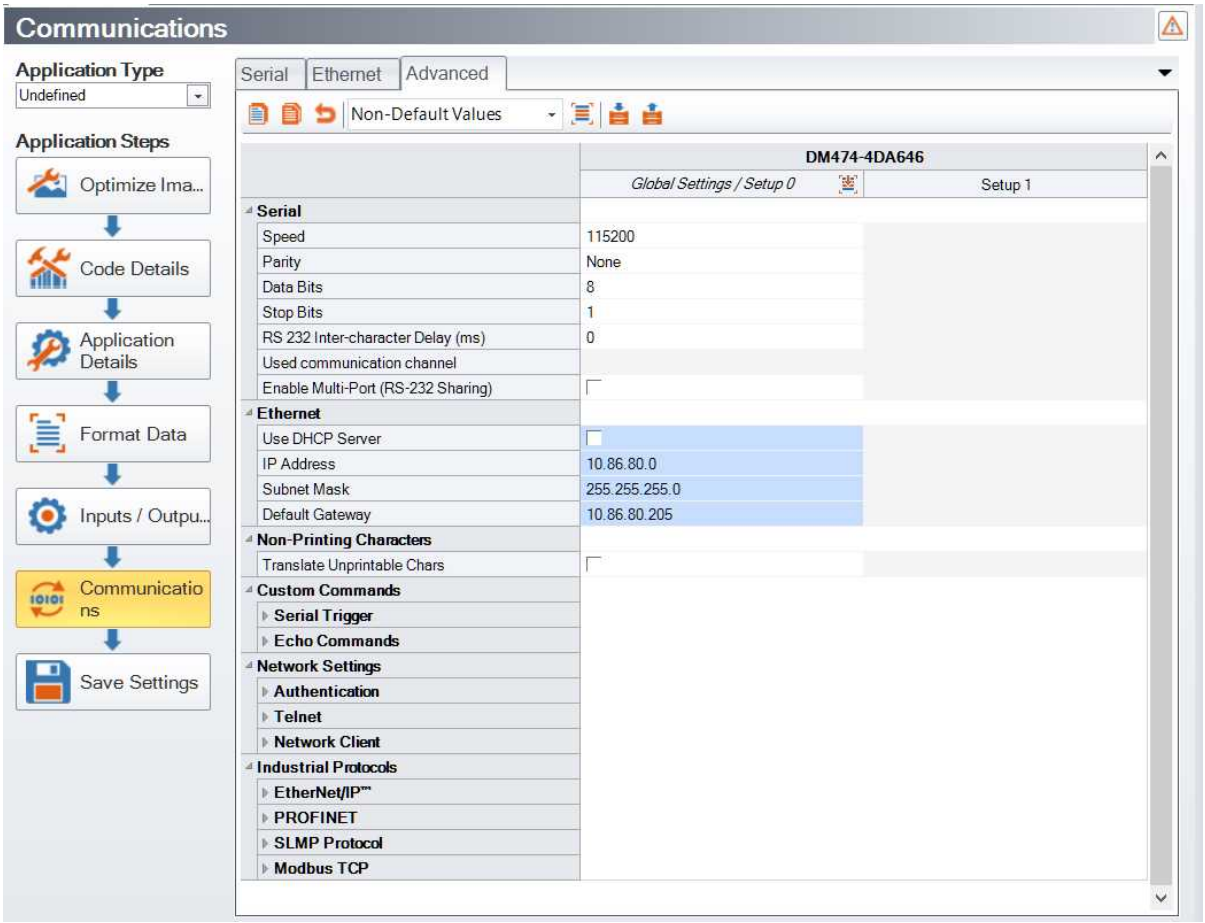
Under **Industrial Protocols**, you can choose one of the following protocols: **EtherNet/IP**, **PROFINET**, **SLMP Protocol** or **Modbus TCP**. The **Status** field of the industrial protocols displays the last logged message of the status dialog. The message will remain displayed until another message is logged. If no industrial protocol is enabled, the status field remains blank. Status messages vary by protocol, and some protocols do not log any messages.

For **Modbus TCP**, you have the option to set **Idle Timeout**. **Idle Timeout** is the amount of time that a port is held open with no outgoing traffic. Once the reader opens a connection to an FTP server, the reader keeps that connection open as long as traffic occurs. If no traffic occurs for the set Idle Timeout period, the connection is closed. This can be useful if an FTP transfer only happens seldom and the network overhead for keeping the connection open is not desired.

The **Network Client** behavior is a means for the reader to actively open an Ethernet connection to another device on the network. Once open, the connection will have the same basic operational behavior as the DataMan Telnet connection; it can produce read results (transmit results to the external device) and it can act as a DMCC server (process commands received from the external device).

For further information, see the *Dataman Industrial Protocols Manual*.

In the **Advanced** tab you have further configuration options. In a table-style view you can see the settings and the corresponding values for serial and Ethernet connections.



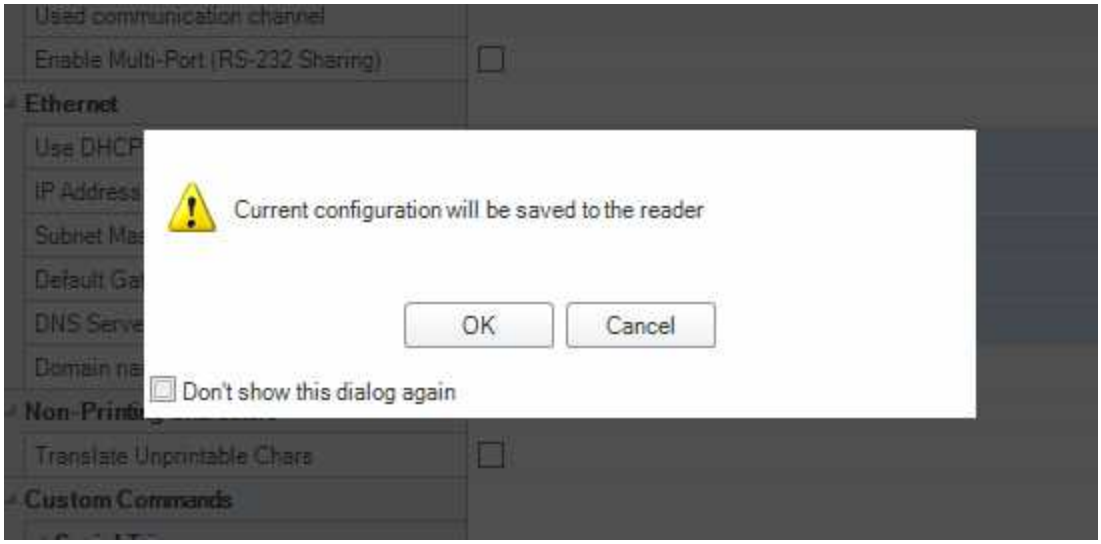
In addition, you can set **Non-Printing Characters**. Normally, the raw values for non-printing characters are transmitted when the reader is configured for COM communications. These values are not visible at all when the reader is configured in keyboard wedge configurations. You can configure the reader to convert non-printing characters into sequences of keyboard printable characters such as <CR> by enabling the Translate Unprintable Characters feature. Eight-bit ASCII character codes with values of 0x00 through 0x1F and 0x7F are converted when **Translate Unprintable Characters** is enabled.

Under **Serial Trigger**, the **Trigger ON** and **Trigger OFF** commands support a character limit with a resulting sequence that may have, at most, 32 bytes. Depending on how many escape sequences you use this means that the valid length of the acceptable string can vary between 32 characters (no escape sequences) and 128 (32 * 4-char escape sequences [e.g. \002]) characters.

Under **Custom Commands**, you can also set **Echo Commands**. When enabled, Echo Commands will echo back the commands you send to the reader as soon as the command, delimited by the Command Header and Command Footer strings, is received. Custom commands are provided to be used by a PLC or similar device and not intended to be manually entered. The inter-character delay is set to a small value, roughly 50 ms, so that slow typing of a custom command will be not recognized past the first character. A **Trigger ON** or **Trigger OFF** command greater than a single character must be sent as a string from another application.

Save Settings

When you are finished with the application steps, click the **Save Settings** step to save all your configuration at once. In a pop-up window, the Setup Tool informs you that your configuration changes will be saved. You can cancel at this point and make further changes. You also have the option to check the **Don't show this dialog again** box.


Used communication channel
Enable Multi-Port (RS-232 Sharing)
Ethernet
Use DHCP
IP Address
Subnet Mas
Default Gat
DNS Serve
Domain na
Current configuration will be saved to the reader
OK
Cancel
Don't show this dialog again
Non-Printa
Translate Unprintable Chars
Custom Commands

Actions

After connecting to a device, several tabs appear next to **Home**.

When you click the **Actions** tab, the following ribbon bar pops up.

You also have the option to keep the bar visible while you are looking at other panes of the Setup Tool by clicking the downward arrow next to **Help** in the upper right corner.

On the **Actions** tab, you can issue or simulate a trigger or input line action, enable live display, optimize brightness and focus, and tune the reader. You can also enable Test Mode here. For more information, see *Test Mode* on page 49. Click **Switch to Process Monitor** to start the Process Monitor. For more information, see *Process Monitor* on page 60. You can also upload and train images and codes on this tab.

Settings

After connecting to a device, several tabs appear next to **Home**.

When you click the **Settings** tab, the following ribbon bar pops up.

This section deals with the various configuration options available in the Settings ribbon bar.

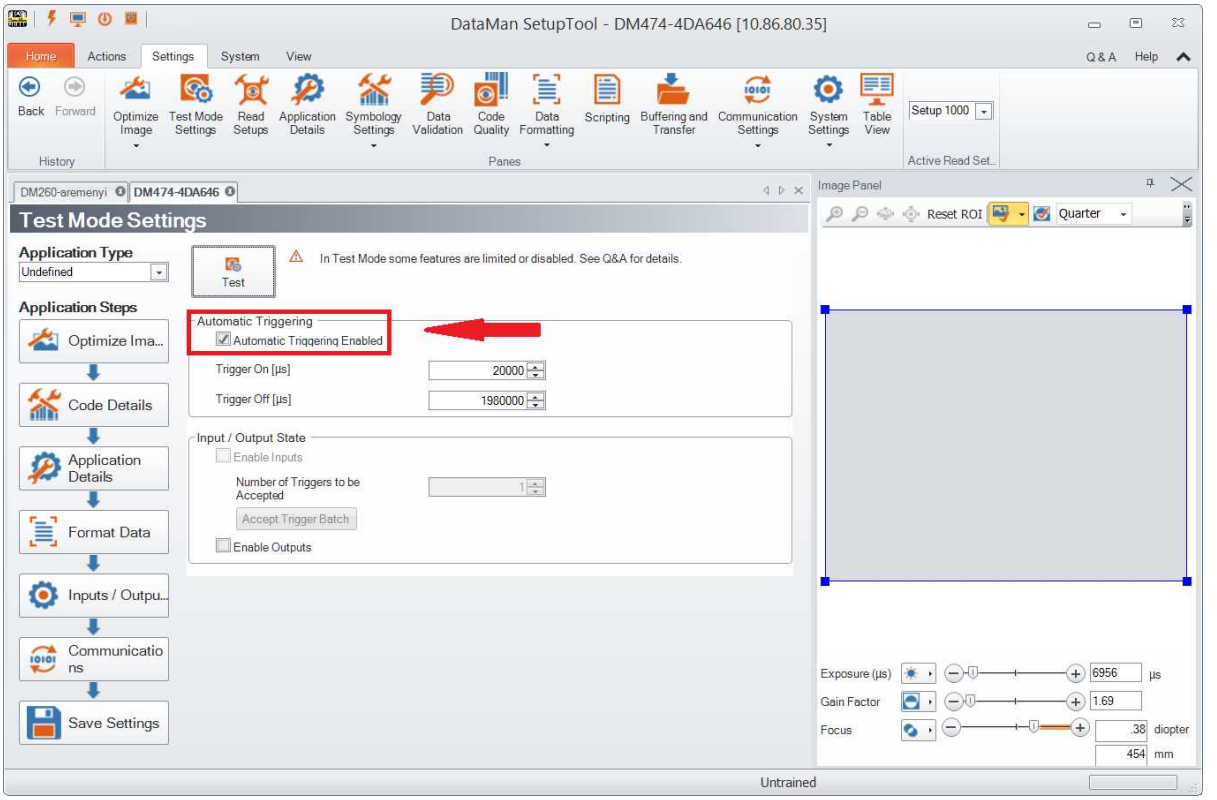
Test Mode

Test Mode lets you configure and test a reader that is connected to a production line without needing to slow down or stop your line. While in Test Mode, the reader by default ignores all external trigger sources and disables all input and output lines. To enter **Test Mode**, perform one of the following actions:

- Press the button (to which you previously assigned this function in the Setup Tool's **Inputs / Outputs** pane's **TRIG Button** tab) on the device for 3 seconds
- Send a DataMan Control Command (DMCC)
- Click the **Enable Test Mode** button in the DataMan Setup Tool (**Actions**)

In the ribbon bar under **Settings** in the Setup Tool, click **Test Mode Settings**. The Test Mode Settings pane appears.

Check **Automatic Triggering Enabled**, and the reader will simulate external triggers at the interval that you specify.



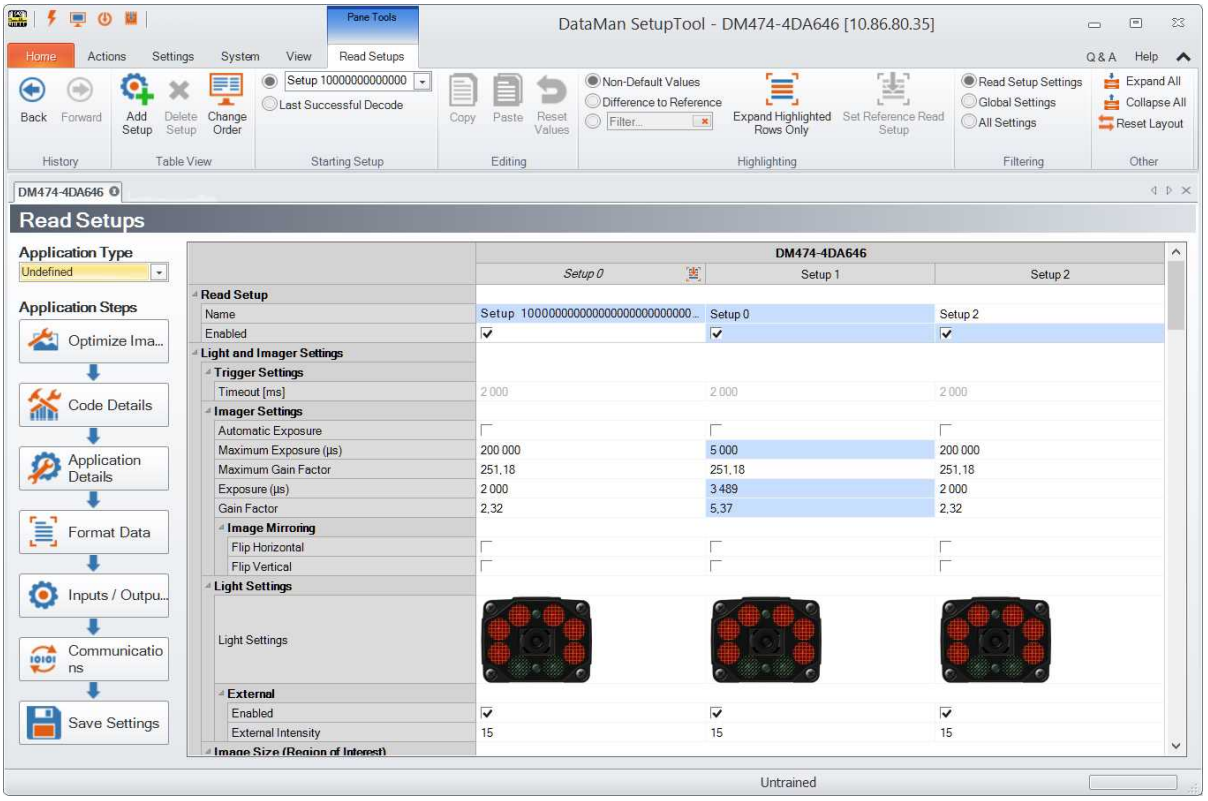
If Automatic Triggering is not enabled, click **Accept Trigger Batch** in the **Input / Output State** field, and the reader will accept and process a limited number of external triggers at production speed.

In both cases, you can view images and decodes using production settings, but at a slower rate and without sending output signals to your line.

Read Setups

It is possible to configure a variety of acquisition parameters for your DataMan reader in a unified **Read Setups** pane.

Under **Settings** click the **Read Setups** button. The Read Setups pane appears.

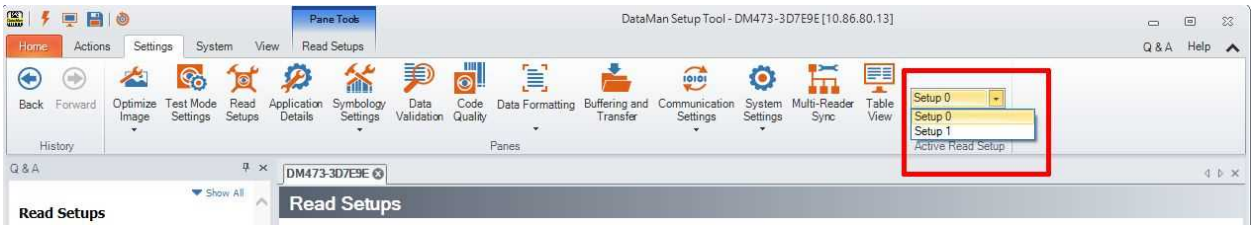


Your reader can be configured for up to 16 different settings. In Single, Continuous, Self, and Burst trigger modes, you can enable multiple (or all) setups, and the DataMan reader goes through all of the configured imager combinations until there is a decoded image or there are no images left (that is, a NoRead Image).

You can change the parameters for the setups in the Read Setup pane's appropriate table cell.

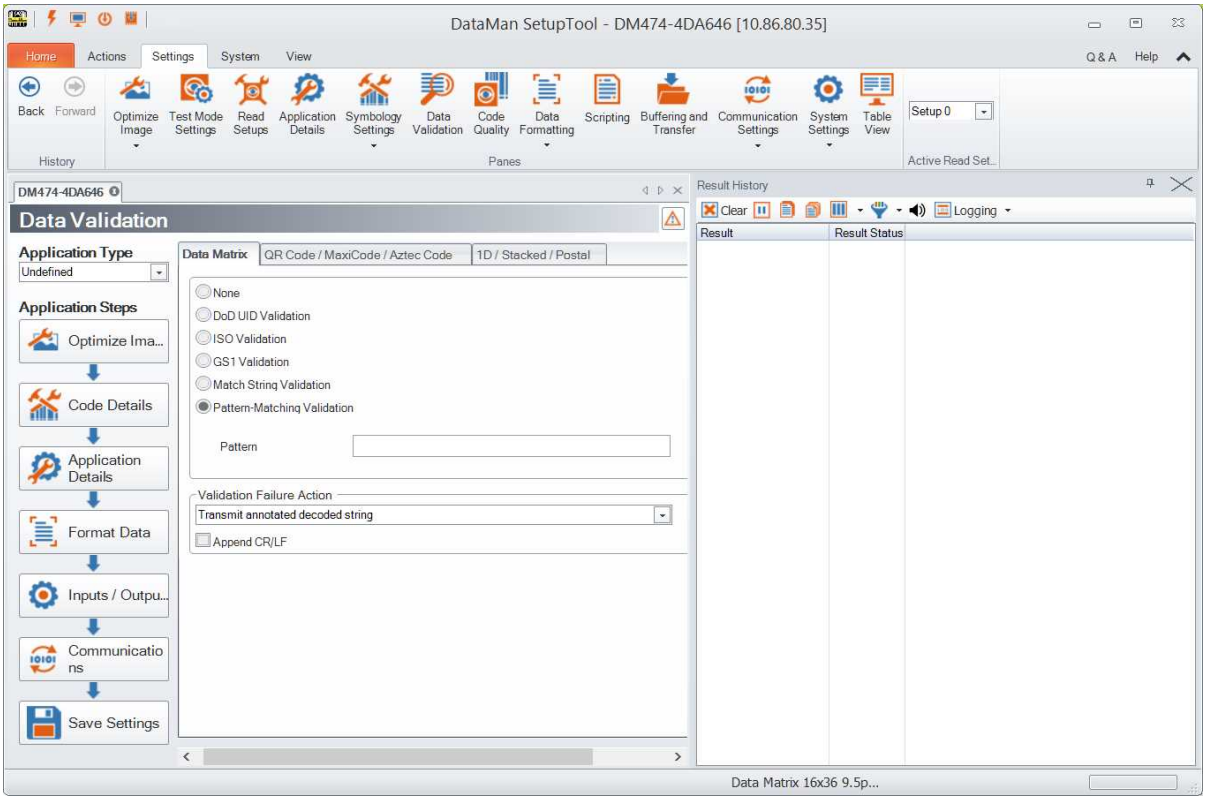
Choose to start the read setup process with either a specific setup, or the **Last Successful Decode**.

The currently selected setup also gets represented in other panes. For example, you can check and change the active Read Setup in the Settings ribbon bar:



Data Validation

Data Validation is used to confirm that the data encoded by a symbol is in the correct format for a particular company, industry or international standard.

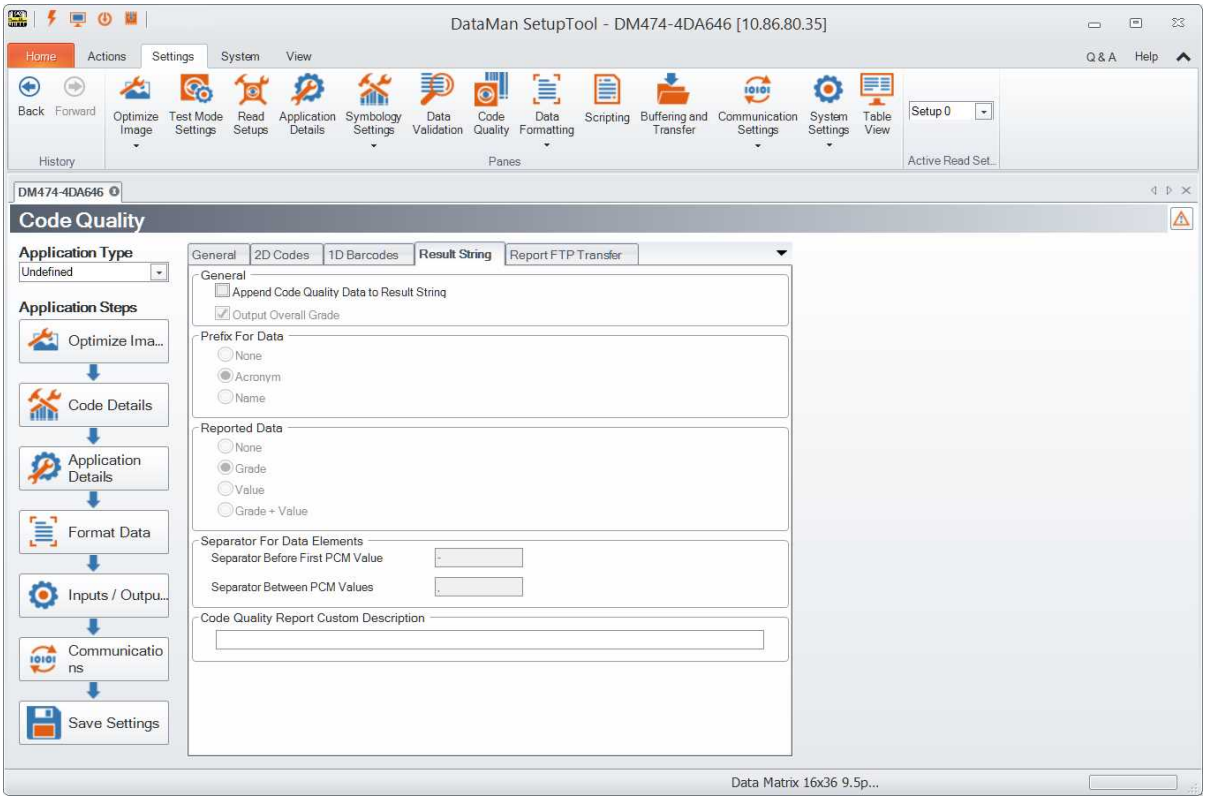


Data Matrix, QR Code/MaxiCode/Aztec Code and 1D/Stacked/Postal code categories can be validated against standards/well formedness.

Code Quality

Under **Code Quality** you can set the desired code quality standard you want to use for quality assessment for your code type. Once you set this on the **General** tab, you can navigate to the appropriate code quality standard's sub-tab under the **1D Barcodes** or **2D Codes** tabs and customize for specific grades the grading thresholds, including specific grades in the overall grade and their display in the report.

Note: MicroQR is not supported for code quality grading.



After you set up your device to compute **ISO/IEC 15415**, **AIM-DPM/ISO/IEC TR29158**, **SEMI T10**, or **DotCode for 2D Codes** under the **General** tab in the **Code Quality** pane, the **2D Codes**, **1D Barcodes** tabs allow you to manage aspects of those types of code grading.

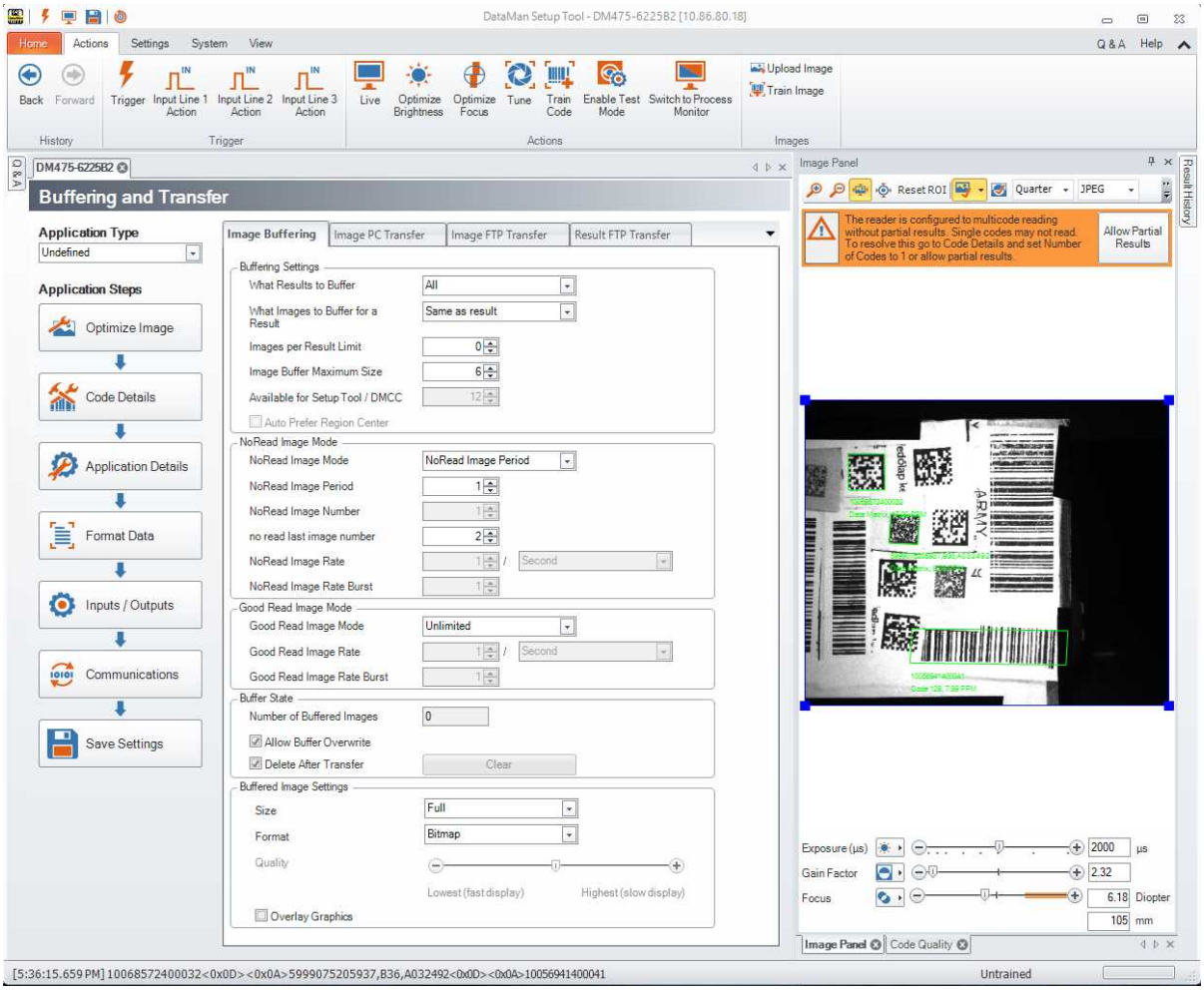
In the **Result String** tab, check **Append Code Quality Data to Result String** to enable token based data formatting and allow code quality result data to be appended to result strings. If checked, **Output Overall Grade** outputs the overall code quality grade (which is defined as the minimum grade of selected metrics) in the result string.

The **Report FTP Transfer** tab allows you to set up code quality results to be sent via FTP in the form of an HTML report.

Buffering and Transfer

Buffering and Transfer lets you control what images are recorded and saved on the reader, it lets you view images that are saved on the reader, and it lets you transfer those images to your PC.

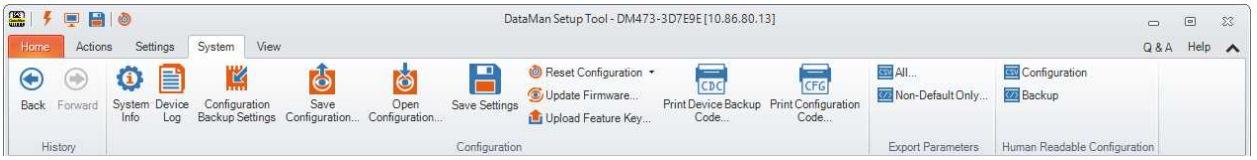
- The **Image Buffering** tab lets you control what images to save to the reader.
- The **Image PC Transfer** tab lets you control how images are transferred from the reader to your PC.
- The **Image FTP Transfer** tab lets you set up automatic image transfers from the reader to your PC.
- The **Result FTP Transfer tab** lets you to configure the reader with the IP address and port number necessary to send decode results to an FTP server.



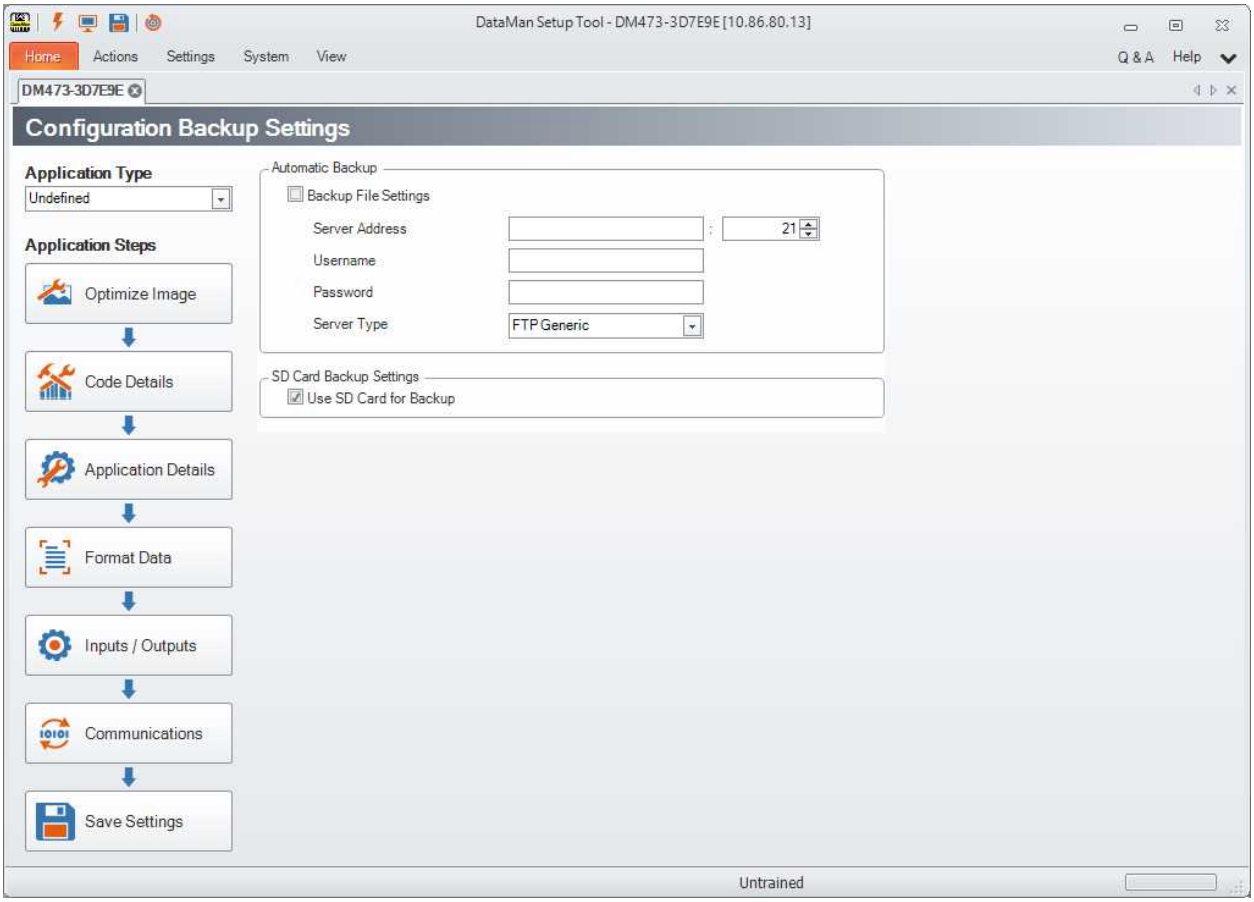
Note: The **Buffering and Transfer** function does not perform any decoding.

System

The **System** tab enables you to save and open configuration settings related to the device your Setup Tool is connected to. In addition, you can export parameters or save configuration in human readable form (a .txt file).



Click **Configuration Backup Settings** to define the way you save your configuration.



Automatic Backup works with devices connected through Ethernet. When enabled, this function does a device configuration backup to an external storage (an FTP server) every time the configuration is saved to flash. Restore can be done manually by either the Setup Tool or DMCC commands. For devices equipped with an SD Card, check **Use SD Card for Backup** to save your configuration there.

Configure the reader with the IP address and port number necessary to specify where you want to save the configuration. You can also set a username and password combination.

View

The **View** tab helps you to display different views related to the data you want to check. The following options are available:

Displays the **Image Viewer** window.

Displays the **Image Panel** toolview where you can view the images read by the device.

Displays the **Result History** toolview in which you can view and log read results.

Displays the **Code Quality** toolview where you can do and view the necessary code quality settings.

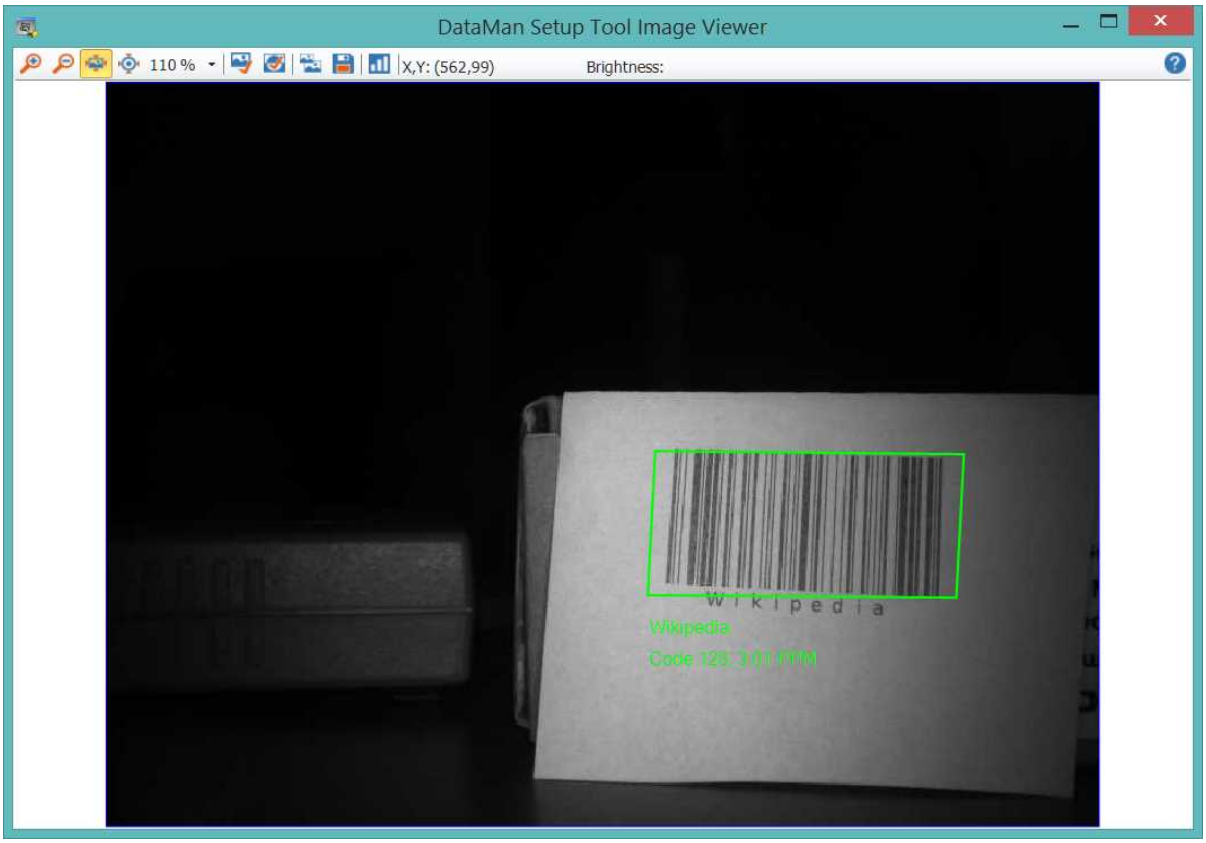
Displays the **Q & A** pane in which you can see questions and answers related to the options appearing on the open document.

Clicking the downward arrow belonging to this option, you can select the layout in which you want to display the panes you selected.

Clicking **Syncronized Navigation** makes the same navigation steps you made occur in all open device documents.

Image Viewer

To open the Image viewer, connect to a reader and in the upper toolbar, click the **View** tab. There, click the **Image Viewer** button. The **Image Viewer** window pops up:

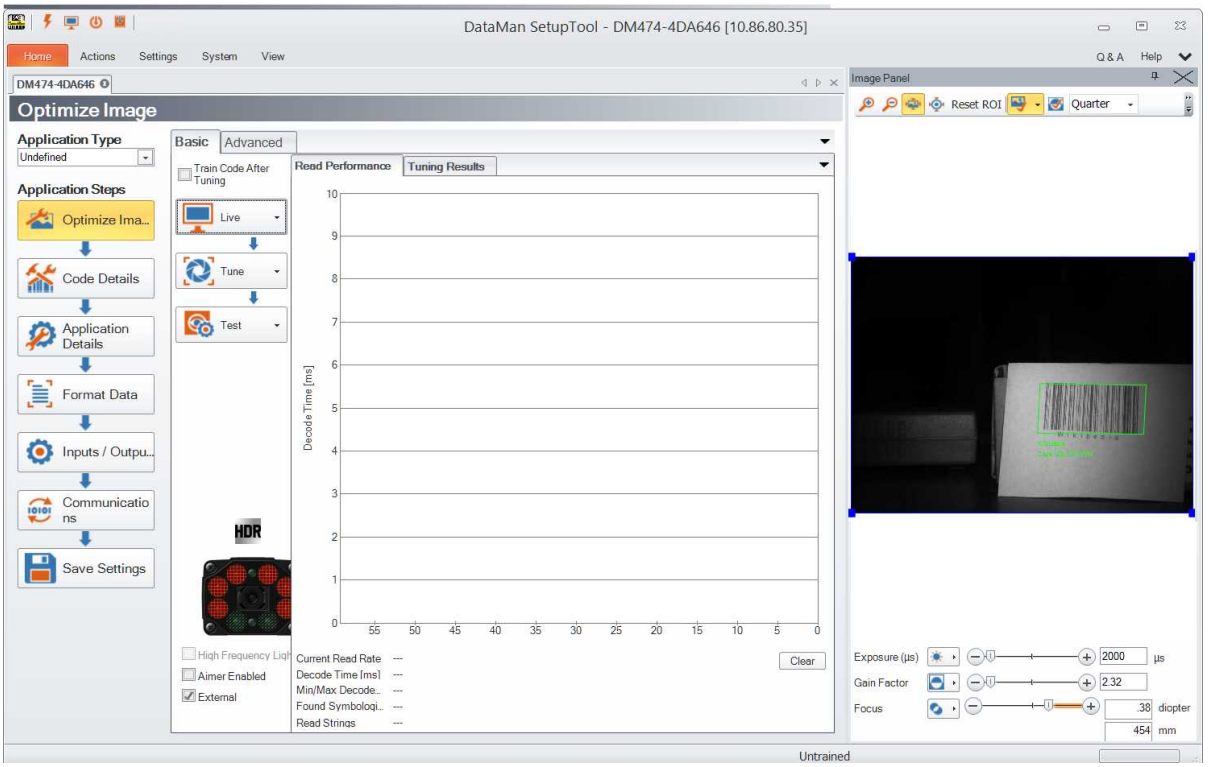


In this window, you can view the image read by your reader. The image is zoomable, it can be copied to the clipboard or saved to a selected folder. You can also check the histogram of the read image and the brightness data of a selected point in the image. Use the buttons on the toolbar ribbon of this window to carry out these tasks.

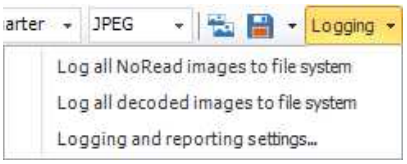
Because of multi-reader support, several device document tabs can be open at a time, which means that there can be multiple image sources at the same time. The **Image Viewer** receives image data only from the active device document. If the active document cannot provide image data (for example, it is a **Reader Group Editor**), the content of the **Image Viewer** window will be empty.

Image Panel

You can view the read image on the right hand side of the window: the **Image Panel** is always displayed by default. On the **View** tab you can switch on and off by clicking the icon. This window can also be docked in different places of the application.



You have the option to zoom in and out of the image. In addition, log NoRead and decoded images to the file system from this pane using the **Logging** options. Click the More Buttons drop-down arrow on the far right side of the **Image Panel**:

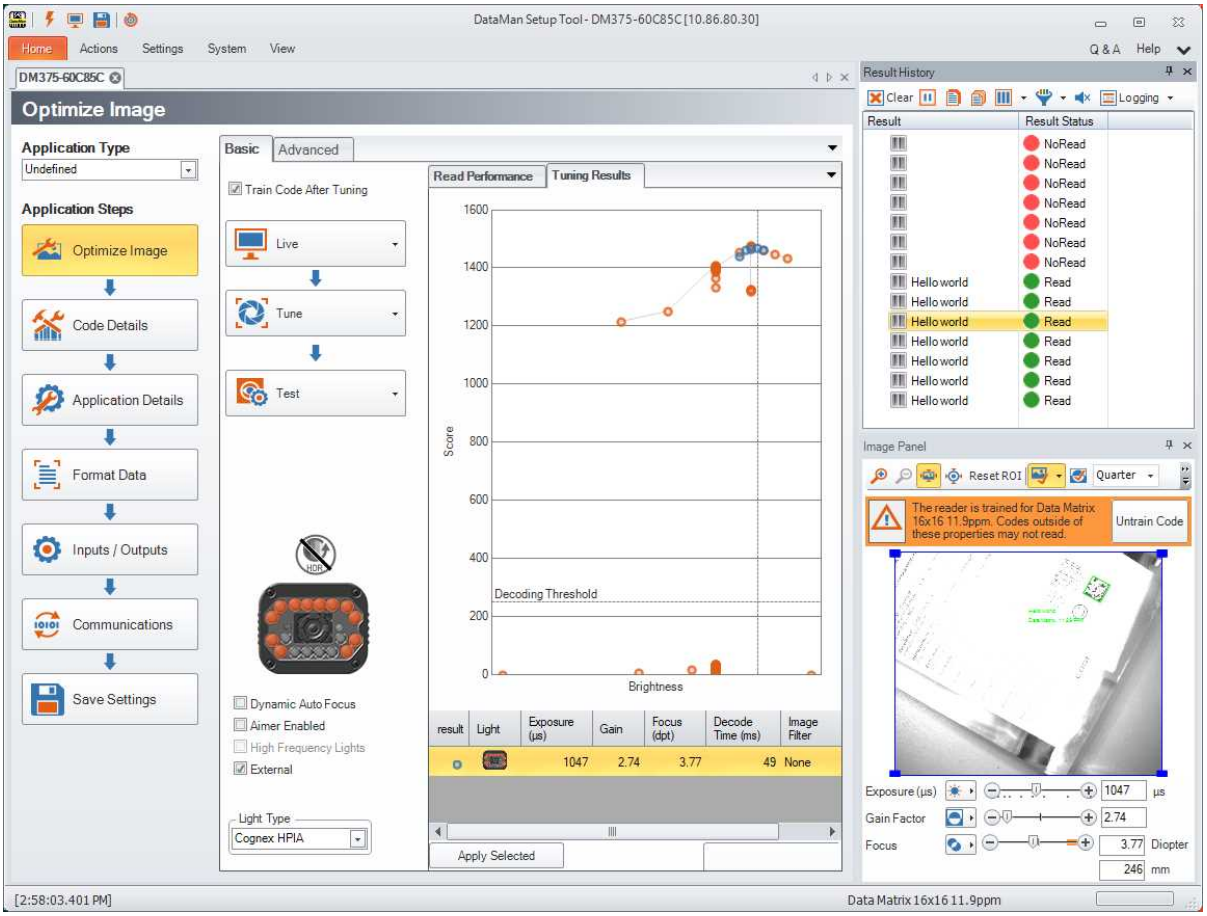


Clicking the last option here opens the **Setup Tool Options** window, in which you can set the default folder where logs of NoRead and decoded images are to be saved.

Results Viewer

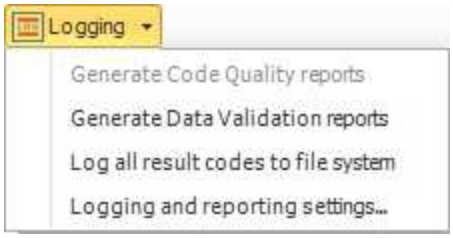
Similarly to the **Image Panel**, the **Result History** window can be configured in different layouts. The **Result History** window is displayed by default, but in case you have closed it, you can have it displayed again by clicking **View** and then clicking the **Result History** icon.

The result data comes from the active document.



You can customize the layout of this pane using the available options, that is, you can choose what data should be shown in the columns of the table.

Select what you want to log from the **Logging** drop-down list:

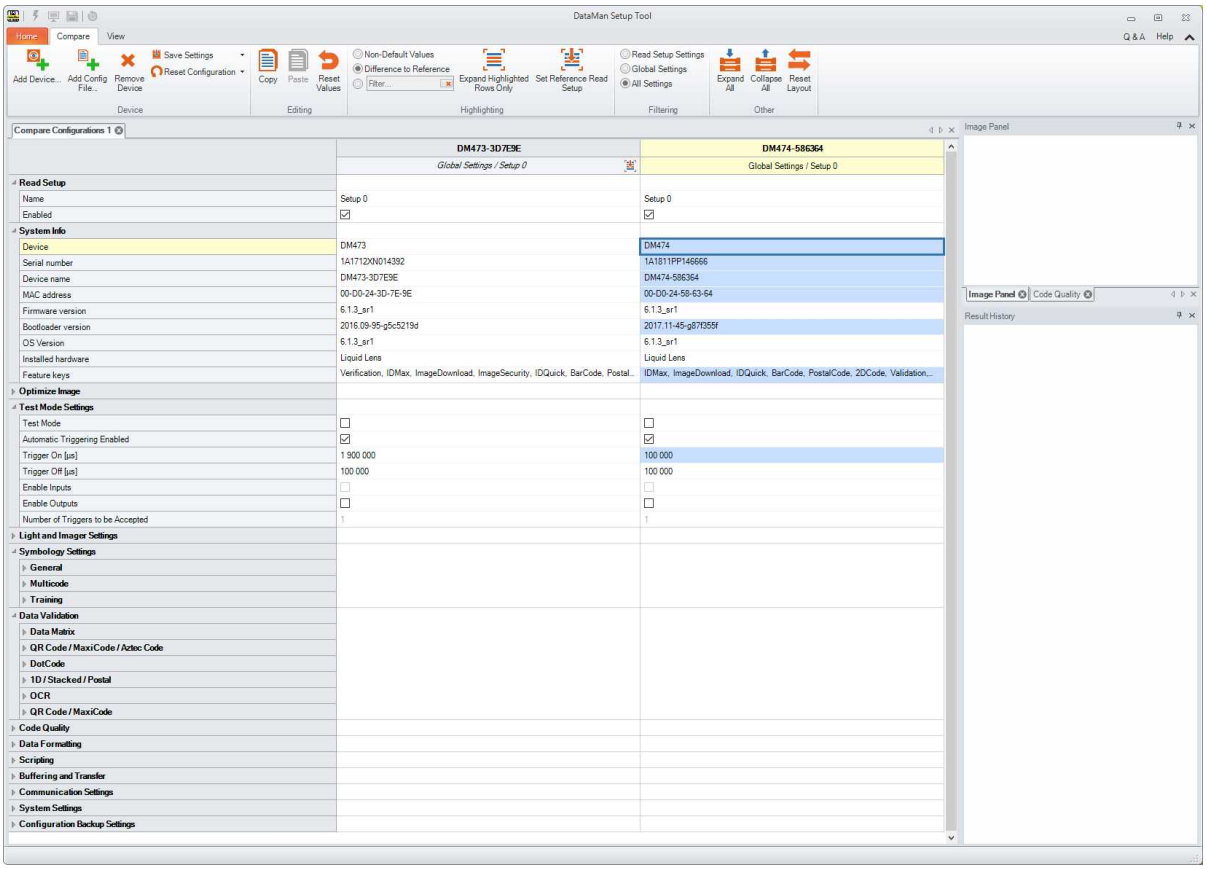


Clicking the last option here opens **Options**, in which you can set the default folder where reports and the logs of result codes are to be saved.

Compare Configuration

Use the Compare Configuration page to set, copy, compare, or restore device configurations and settings. You can use multiple devices to quickly synchronize configurations or check for inconsistencies. Select multiple devices from the device list and click the **Compare Configuration** button to initiate the comparison in a new document.

The table view lists all settings of the selected devices, while the menu on top allows you to take a number of actions relating to these settings.



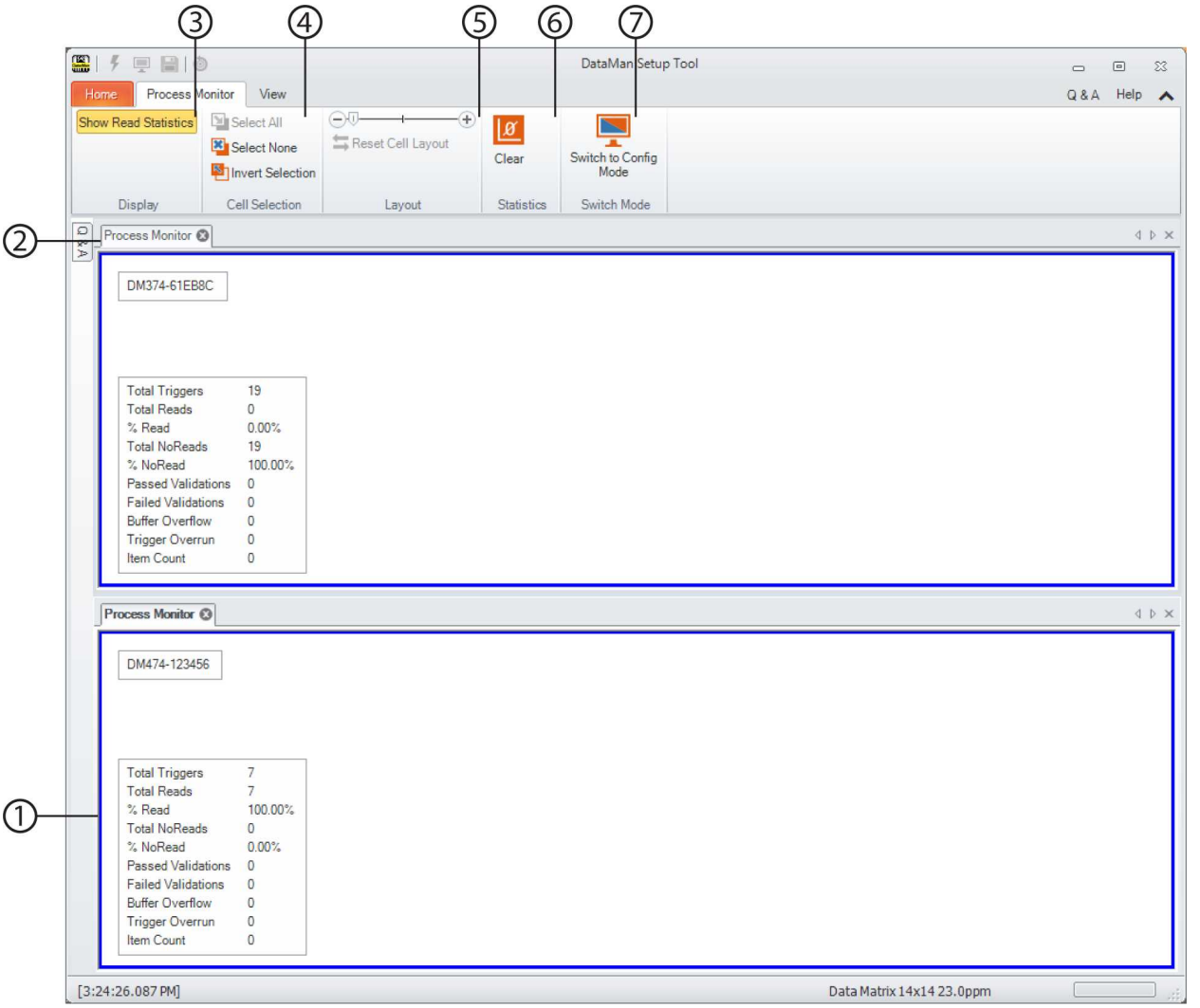
For more detailed information on **Compare Configuration** features, see the **Q & A** of the page that can be opened from the top right corner.

Process Monitor

As it operates, a DataMan device logs statistics such as the number of triggers received, the number of symbols read (and not read), and the number of trigger overruns.

You can choose to have a separate Process Monitor document for each device, or you can have a single Process Monitor document for every device you want to monitor. If you want to have one Process Monitor document for each of your devices, select your device and then click the **Process Monitor** button and repeat this process for every device. If you want to monitor all of your devices on a single Process Monitor page, click the arrow on the **Process Monitor** button and click the **Add to Process Monitor** option that pops up.

If the **Process Monitor** button is disabled, it is because the device you selected does not support process monitoring or the device is open in this or another Setup Tool connection. After you connected to the Setup Tool, a DataMan device stops generating statistics about decode attempts by default. To re-enable process statistics when connected to the Setup Tool, you must manually start the Process Monitor. In the upper toolbar, click **Actions**, then click **Switch to Process Monitor**.



1	Statistical data of one of the monitored devices. Each device gets its own window (in this example).

2	Process Monitor tab. Here only one tab is shown, but you can have multiple tabs.
3	Show Read Statistics: you can turn displaying statistical data on and off.
4	Cell Selection group: you can select multiple readers before doing mass actions.
5	Layout: reset the cell layout.
6	Clear Statistics: clear the read statistics in the selected panels any time during runtime.
7	Switch to Config Mode: switches to configuration mode

Note: One device can be opened in only one Process Monitor document at a time. In the **Connect** page, the **Open in Documents** column shows which devices use the Process Monitor.