Lab Exercise 1.1 – Getting Connected

At the end of this lab exercise, Participants will be able to:

- Set the IP Address on both their Computer and DataMan Reader
- Connect to the DataMan reader

The Participant will utilize the following DataMan Functions to successfully complete this exercise:

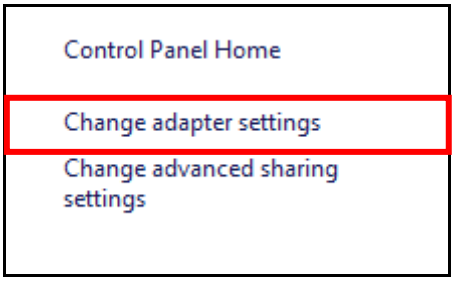
- Setup Tool
- Connect to Reader

Set a Static IP Address on your computer.

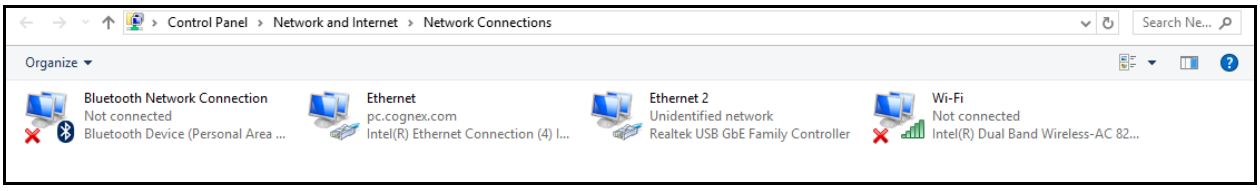
Follow the steps below to complete the lab exercise:

1. Open the **Network and Sharing Center**.

2. Select **Change adapter settings** from the right-hand menu.



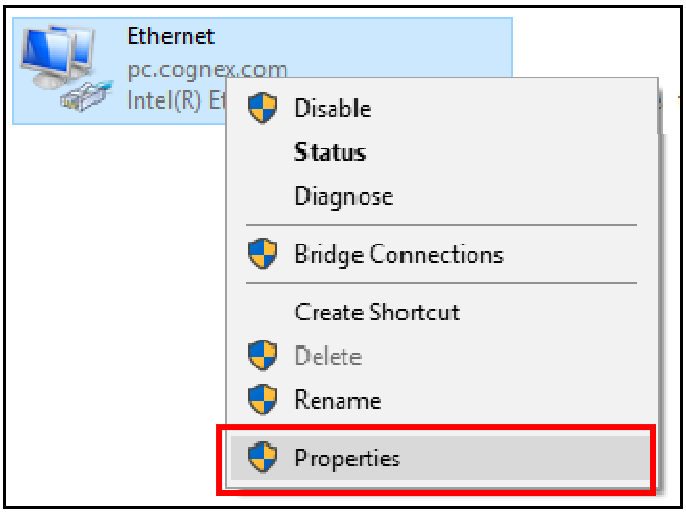
The **Network Connections** display.



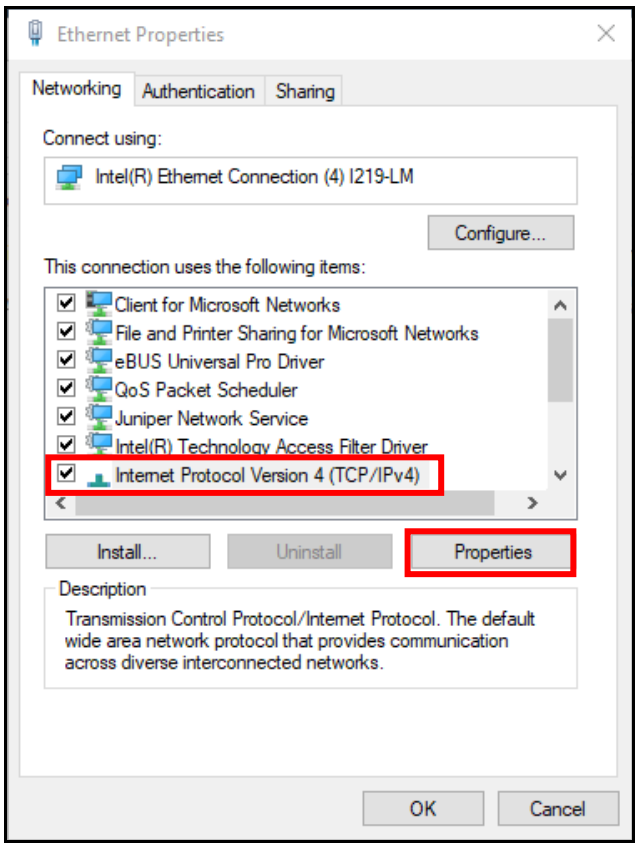
3. Select the **Ethernet** adapter.

NOTE: *If you have a VPN connection make sure that you do not select that adapter.*

4. Right click and select **Properties** from the list.



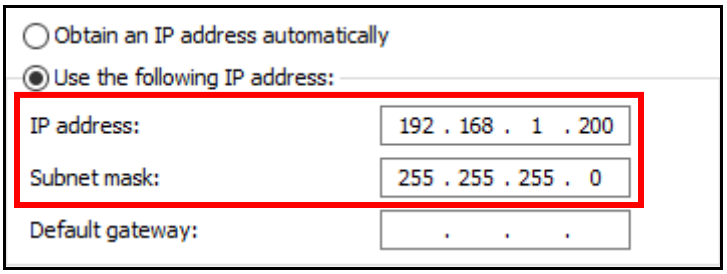
The **Ethernet Properties** display.



5. Click the **Internet Protocol Version 4 (TCP/IPv4)** link and click the **Properties** 

button.

6. Click the **Use the following IP address** button and enter the information below and click the **OK** OK button.

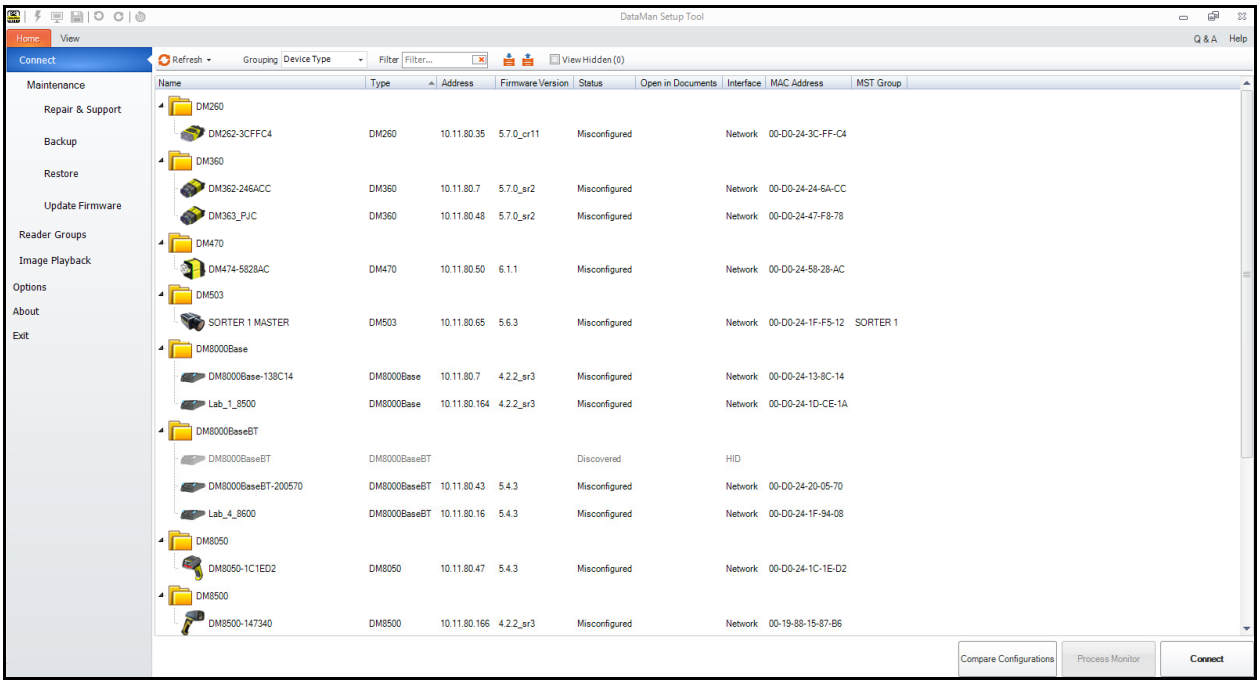


7. Click the **Close** Close button to close the Ethernet Properties dialog box.

Launch the DataMan Setup Tool

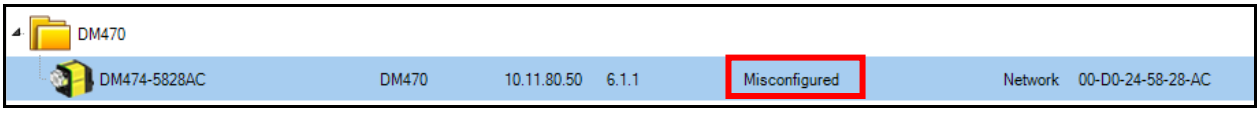
Follow the steps below to complete the lab exercise:

1. Click the **DataMan** DataMan 6.1.3_sr2 ... icon on your desktop to launch the DataMan software. The **DataMan Setup Tool** launches showing all the readers on the network.

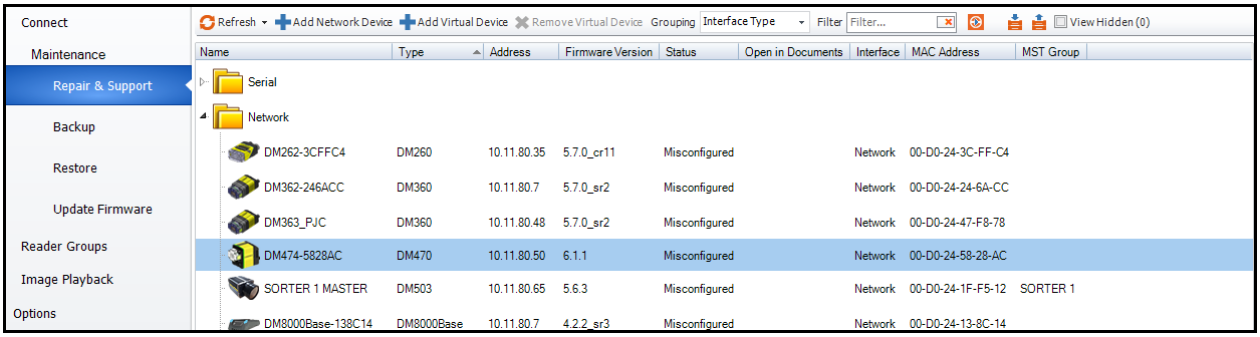


2. Select your DataMan Fixed Mount Reader from the list to highlight.

   NOTE: *This exercise uses the DM474 – notice that the Status is **Misconfigured**. This is because the reader is in DHCP mode and you have set a static IP Address on your laptop.*

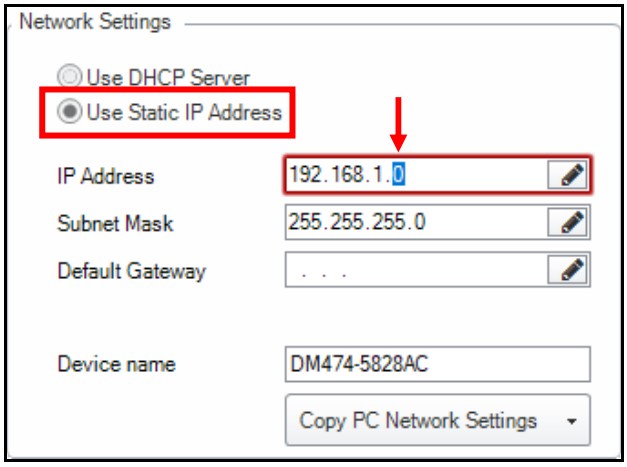


3. Click the **Repair & Support** tab on the left-hand menu (with your Reader highlighted).

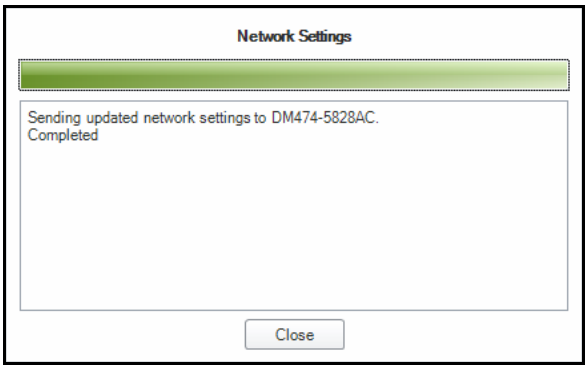


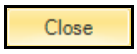
The **Network Settings** display on the right-hand side of the screen.

4. Click the **Use Static IP Address** radio button and the **Copy PC Network Settings**  button and select *[Intel(R) Ethernet Connection (4) 1219-LM]* from the drop-down list.
This auto-populates the IP Address, and Subnet Mask to match your computer's IP address.

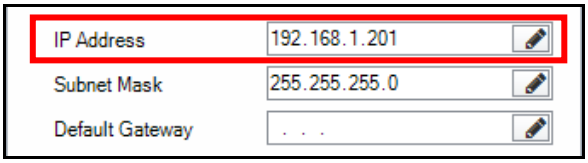


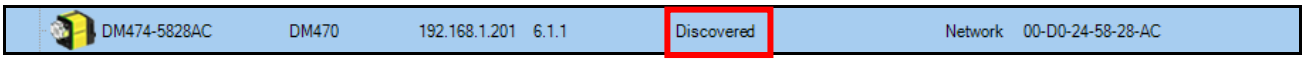
5. Change the last # in the IP Address to *201* and click the **Apply**  button.
The network settings are updating.



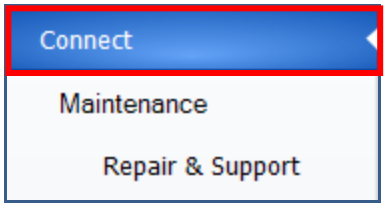
6. Click the **Close** 

button.
The IP Address has been assigned to the Reader and the Status is now **Discovered**.

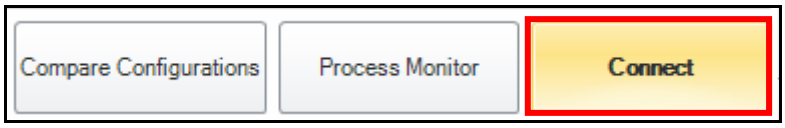




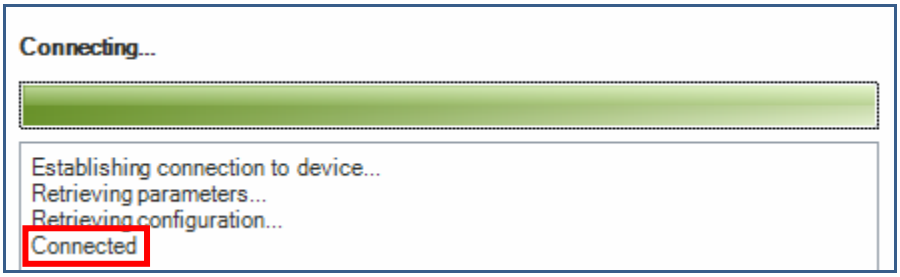
7. Return to the Connect tab



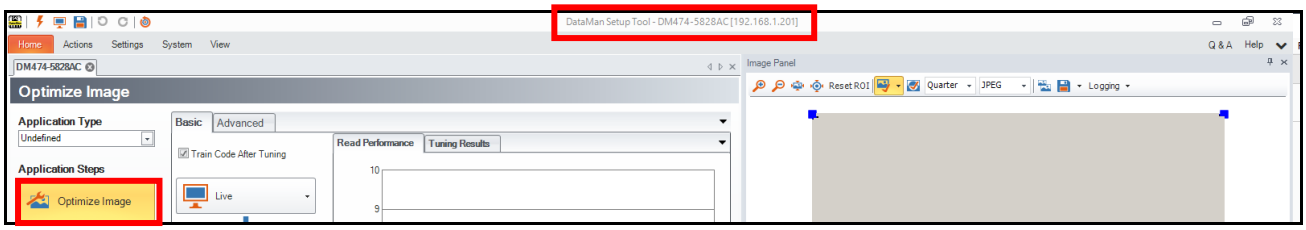
8. With your Reader highlighted click the **Connect** button at the bottom of the screen.



You are now connected to the reader.



And, have entered the DataMan Setup Tool in the **Optimize Image** step.



Lab Exercise 2.1 – Optimize Image

At the end of this lab exercise, Participants will be able to:

- Optimize the reader settings using the Tune button
- Utilize the Test button

The Participant will utilize the following DataMan Functions to successfully complete this exercise:

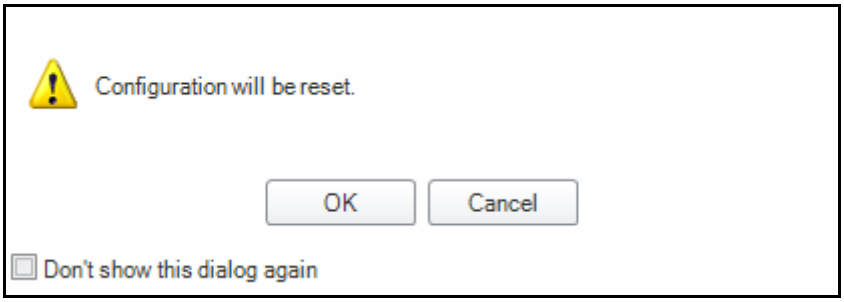
- Tune button
- Test button

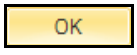
Tuning

Follow the steps below to complete the lab exercise:

1. Click the **Reset Configuration** button from the **System** Menu.

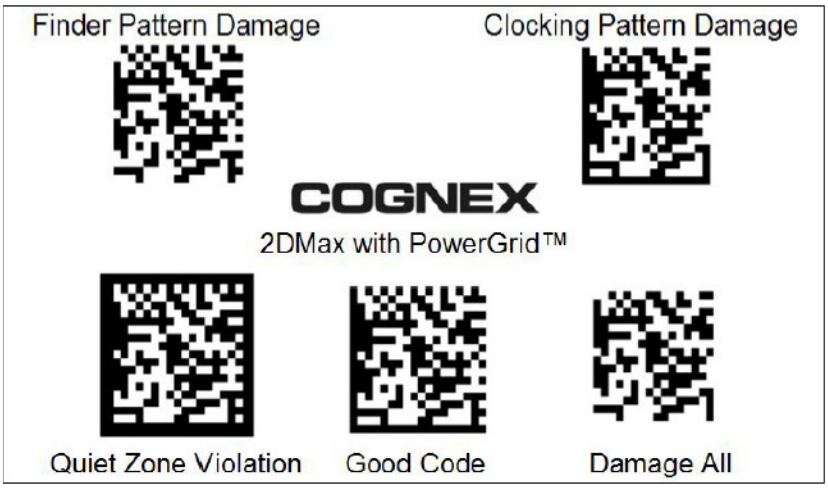
The **Configuration reset** dialog box displays.



2. Click the **OK**  button to continue.

3. Navigate to the **Optimize Image** step.

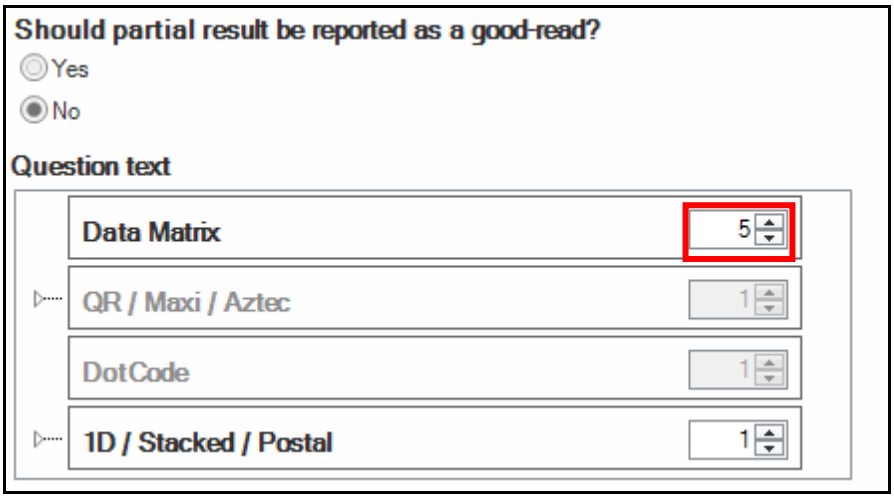
4. Click the **Live** button to enable Live Mode and place the Power Grid demo plate in the FOV.



5. Click the **Live** button to disable Live Mode.
6. Press the **Tune** button on the top of the Reader for less than 1 second.
   NOTE: *You have discovered a hidden feature – Tapping the Tune button toggles the aimer lights. Press the Tune button until the aimer is ON.*
7. Now press and hold the **Tune** button on top of the Reader for approximately 5 seconds until it initiates the tune sequence. You will notice the LEDs flash.
   NOTE: *The Reader will go through the following process:*
   - *Optimize focus*
   - *Optimize brightness*
   - *Cycle exposure values*
   - *Plot points on the graph*
     - *Dots above the horizontal line are good reads*
     - *More dots higher on the graph is the sign of a robust algorithm!*
   - *When completed it will display and automatically apply the optimum settings*
8. Click the **Trigger** button to show that it can read the good code.
9. Click the **Test** button and cover all but one of the codes on the plate to show that the Power Grid algorithm can easily read all the damaged codes.
   1. Quiet Zone Violation
   2. Finder Pattern Damage
   3. Clocking Pattern Damage
   4. Damage All

10. Click the **Code Details** step and set the number of codes (Application Steps → Code Details → Number of Codes) to **5** hit the **<Enter>** key.

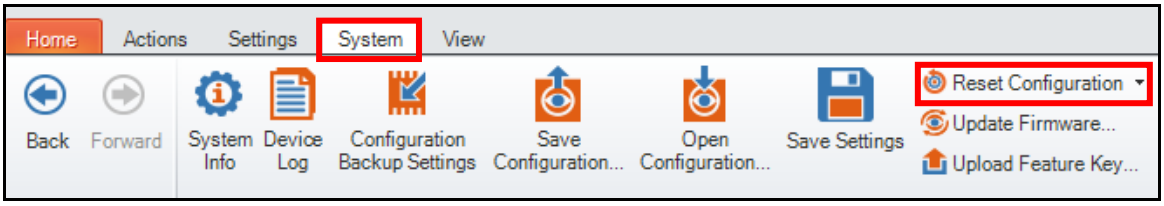
11. Set the number of Data Matrix codes to **5** and click the **Trigger** button to read all the codes on the plate at the same time.



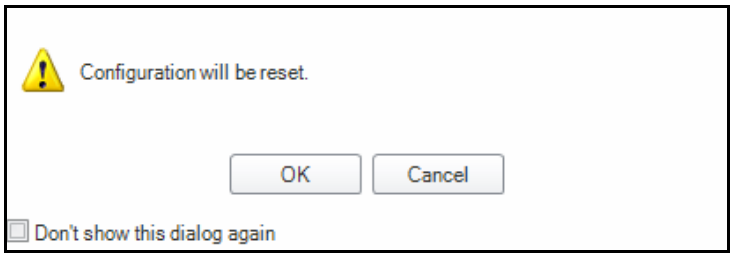
All 5 Data Matrix codes are read:

Advanced Tuning Settings:

1. Click the **Reset Configuration** button from the System menu.

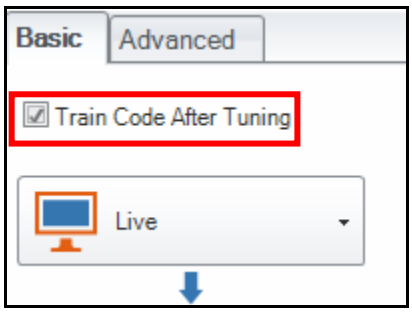


The **Configuration reset** dialog box displays.



2. Click the **OK**  button to close the dialog box.

Notice that the **Tune Code After Tuning** checkbox is checked by default.



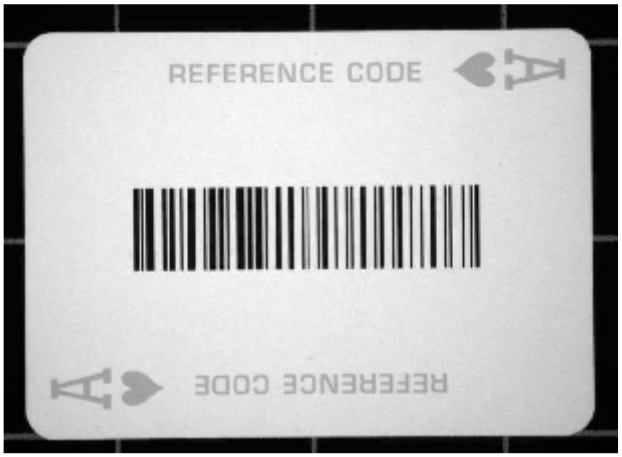
NOTE: *This feature trains on code properties such as:*

- *Symbology Type*
- *Pixels per Module*
- *1D Orientation*
- *2D Grid Size*

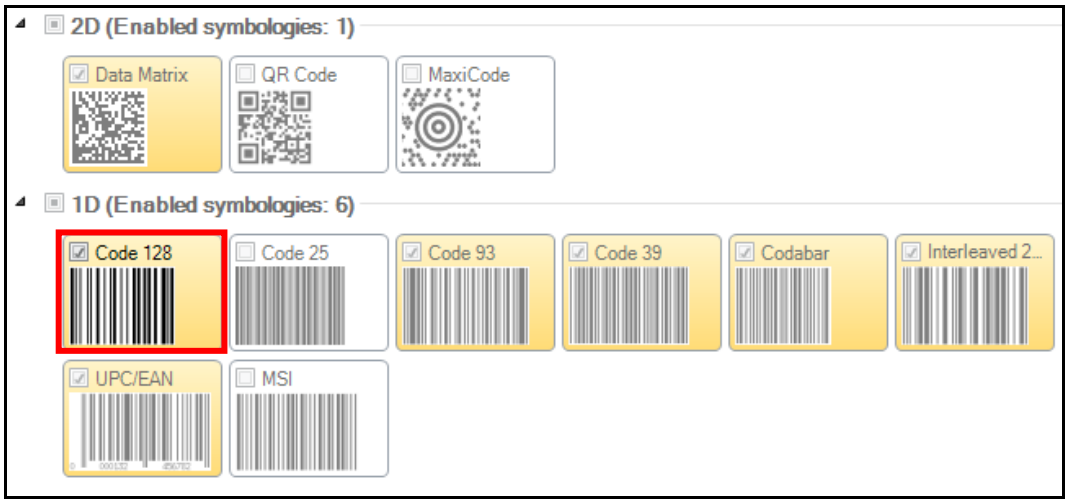
Codes with properties that differ from the trained properties may not read

3. Tune the reader on the Ace of Hearts. Do this by clicking the **Tune** button.

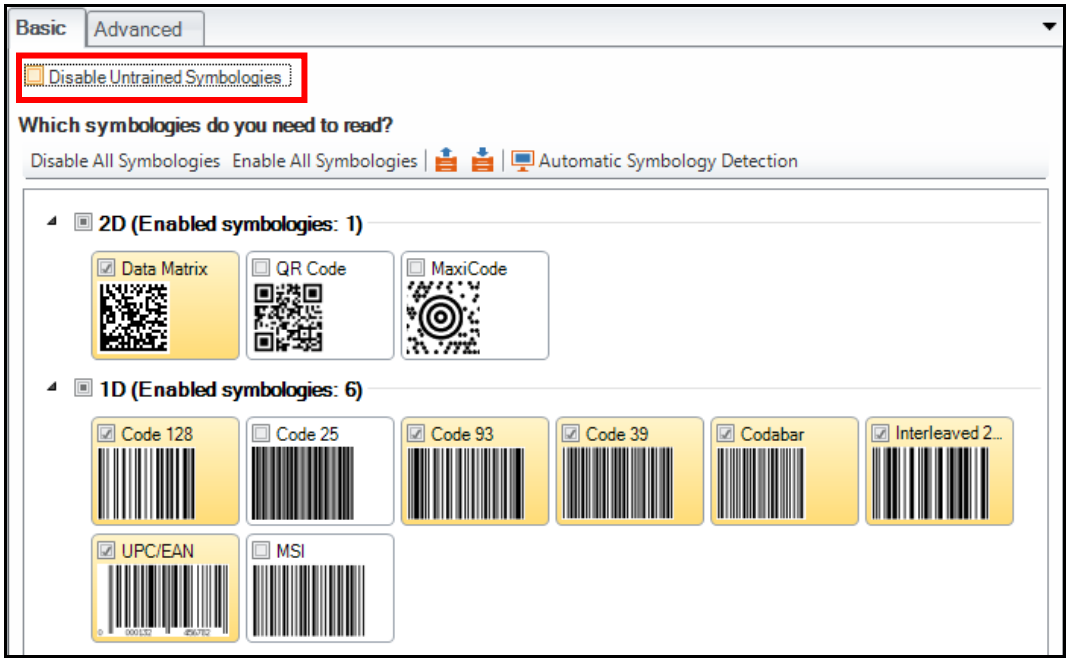
4. Turn the card 90° and click the **Trigger** button.
Notice that the code did not read because it is trained on a specific orientation.



5. Click the **Code Details** step and notice that other symbologies are greyed out because the reader is trained on Code 128.

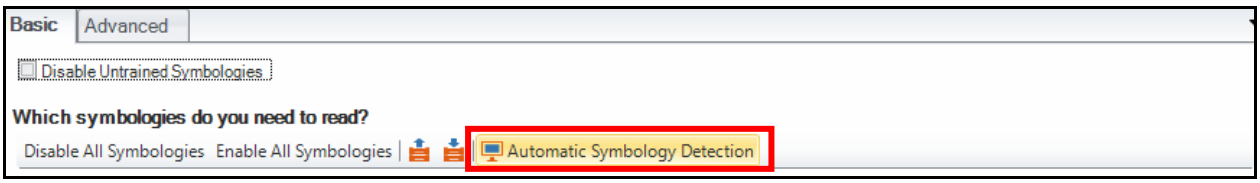


6. Turn the card back to its original orientation.
7. Move the card close to and further away from the reader while triggering.
   NOTE: *At some point the reader will not read the code because the ppm will be larger than the trained properties.*
8. Click the **Disable Untrained Symbologies** checkbox to uncheck the box. All codes are now active.

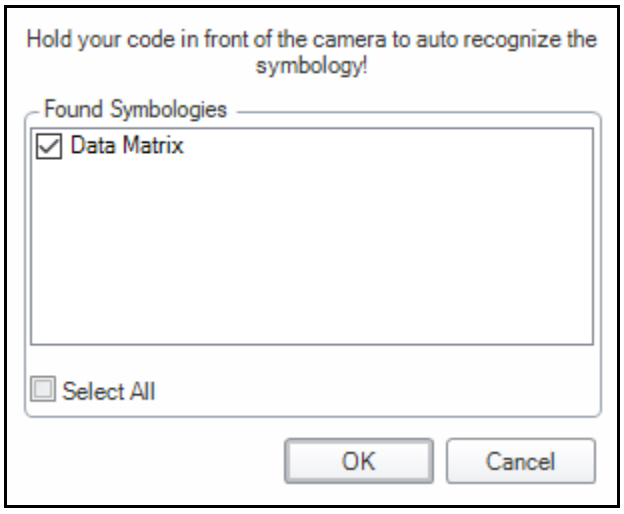


Can you read a Data Matrix code now? _____

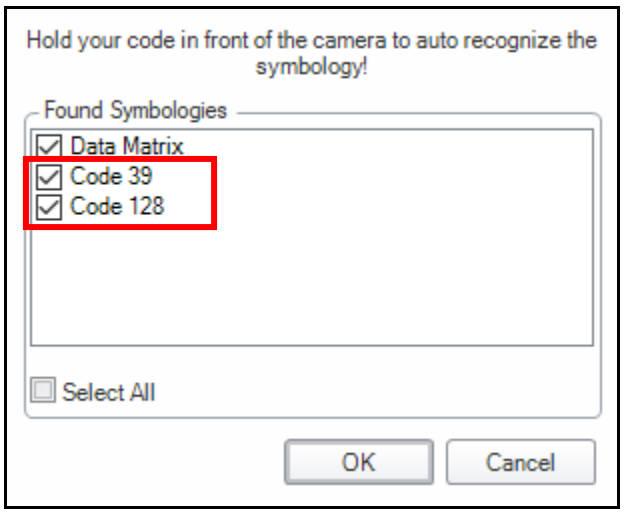
9. Click the **Automatic Symbology Detection** button.

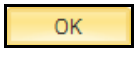


The **Found Symbologies** dialog displays.

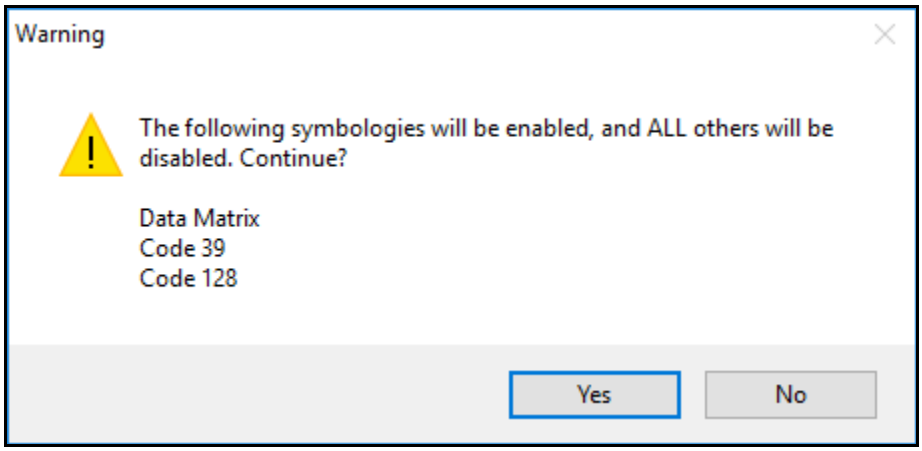


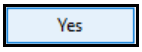
10. Hold the *Ace of Clubs*, *Ace of Hearts* and *Queen of Hearts* in front of the reader to auto recognize the symbology on each card.
The reader recognizes the symbology on each card and adds them to the **Found Symbologies** list.



11. Click the **OK**  button.

The **Warning** box displays.



12. Click the **Yes**  button to continue.

The three **Found Symbologies** are now selected

13. Click the **Untrain Code** button.

Can you read a 1D code in any orientation now?_____

Lab Exercise 2.2 – Code Details

At the end of this lab exercise, Participants will be able to:

- Filter specific barcodes by symbology type and string length
- Utilize extended mode for challenging codes
- Read 2 codes within the FOV within the same trigger cycle

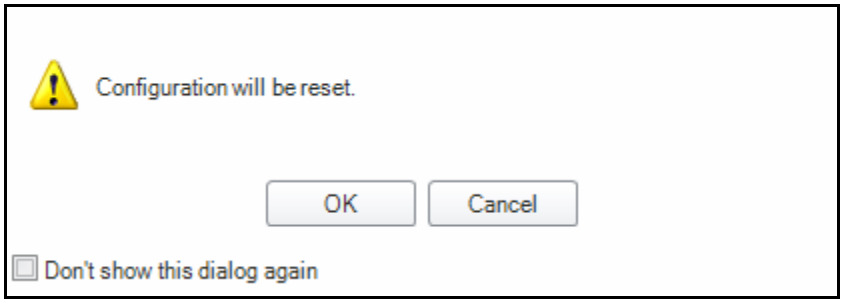
The Participant will utilize the following DataMan Functions to successfully complete this exercise:

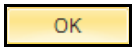
- Setup Tool
- DataMan Application Steps
  - Code Details

Follow the steps below to complete the lab exercise:

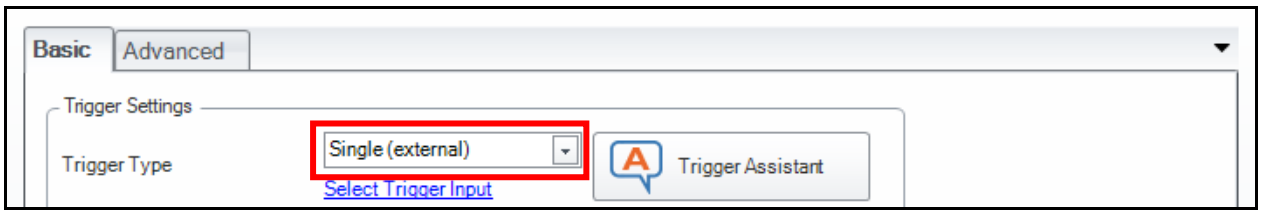
1. Connect your DataMan reader to the DataMan Setup Tool.
2. Click the **Reset Configuration** button from the **System** Menu.

The **Configuration reset** dialog box displays.

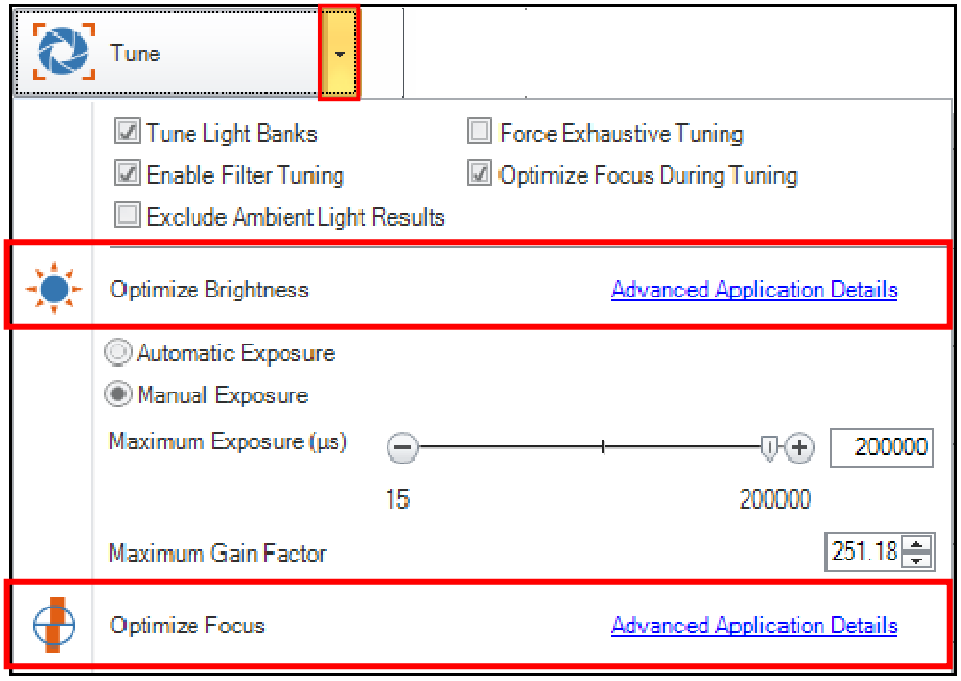


3. Click the **OK**  button to continue.

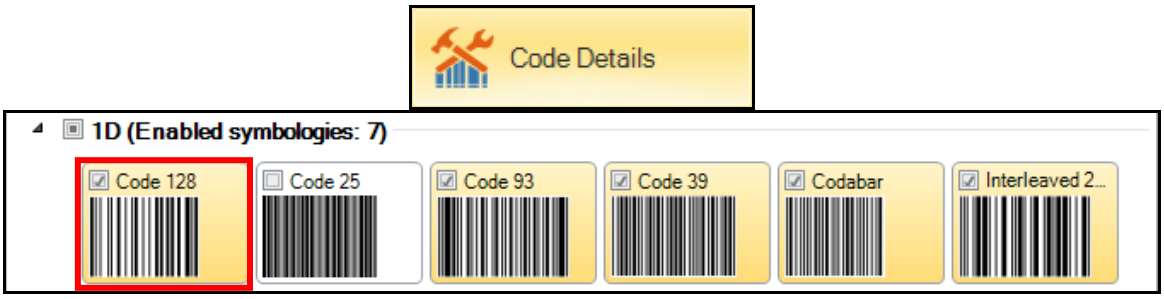
4. Navigate to the **Application Details** step and set the **Trigger Type** to *Single (external).*



5. Navigate to the **Optimize Image** step and click the down arrow on the **Tune** button to *Optimize Brightness* and *Optimize Focus* using the Ace of Hearts.

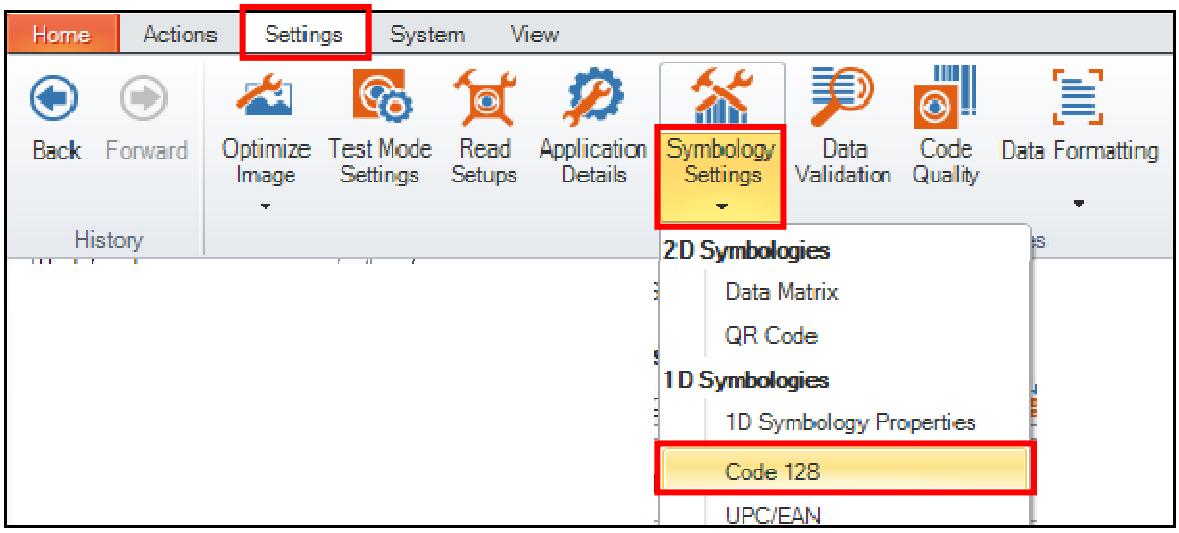


6. Navigate to the **Code Details** step – check the *Code 128* checkbox.

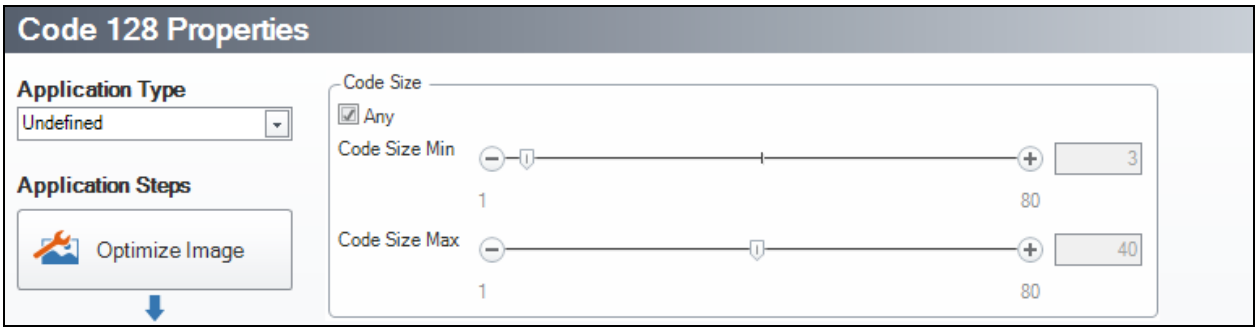


7. Click the **Trigger** button to read the Ace of Hearts. Leave the code enabled.

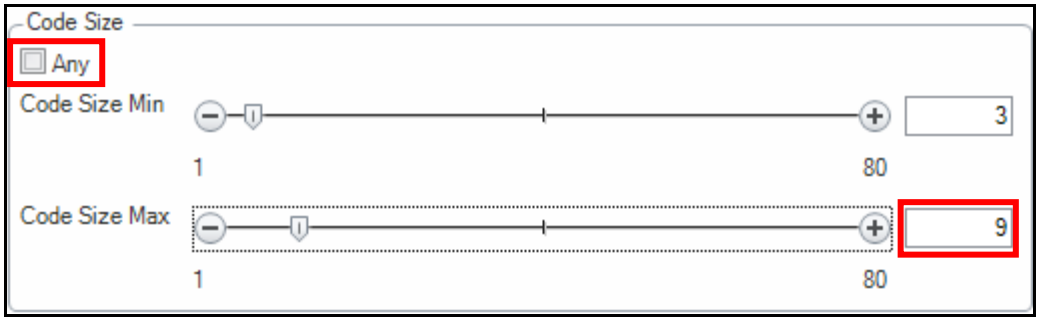
8. Navigate to the Settings Menu, click the down arrow of the Symbology Settings and select *Code 128.*



The **Code 128 Properties** display.



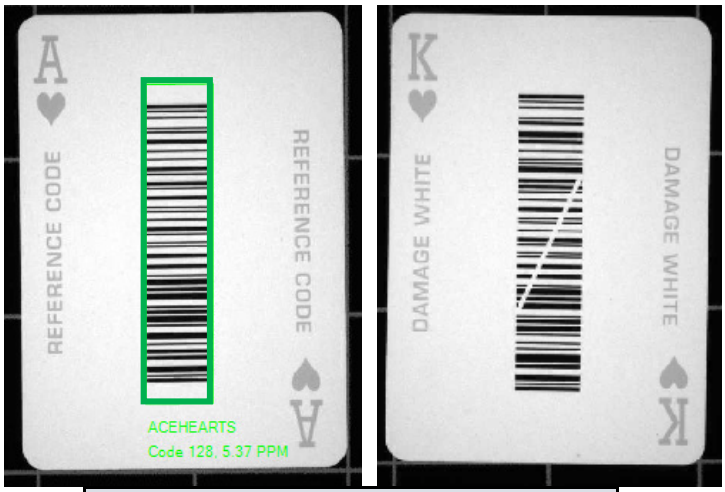
9. Uncheck the **Any** checkbox and set the **Code Size Max** to *9*.



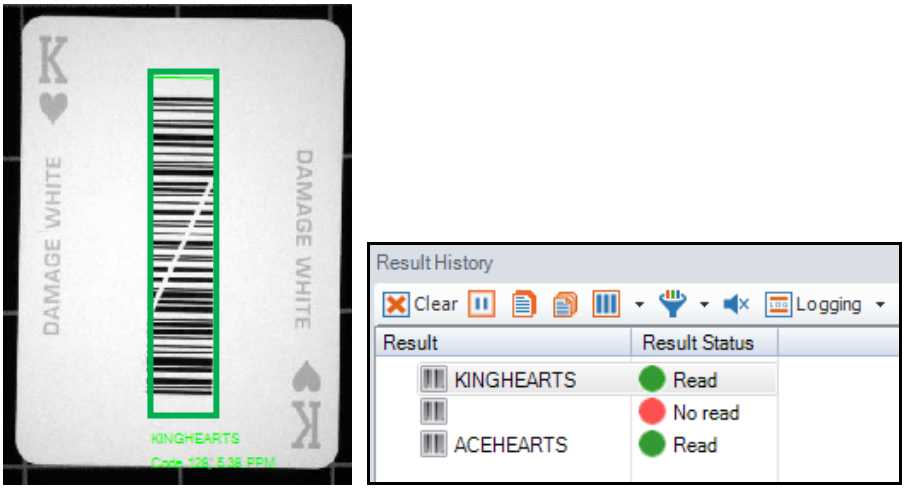
NOTE: *The reader will not read any codes with a data string length that is greater than 9 characters.*

10. Read the *Ace of Hearts* (ACEHEARTS = 9 characters) and the *King of Hearts* (KINGHEARTS = 10 characters).

Confirm that the Ace of Hearts = READ and the King of Hearts = NO READ.

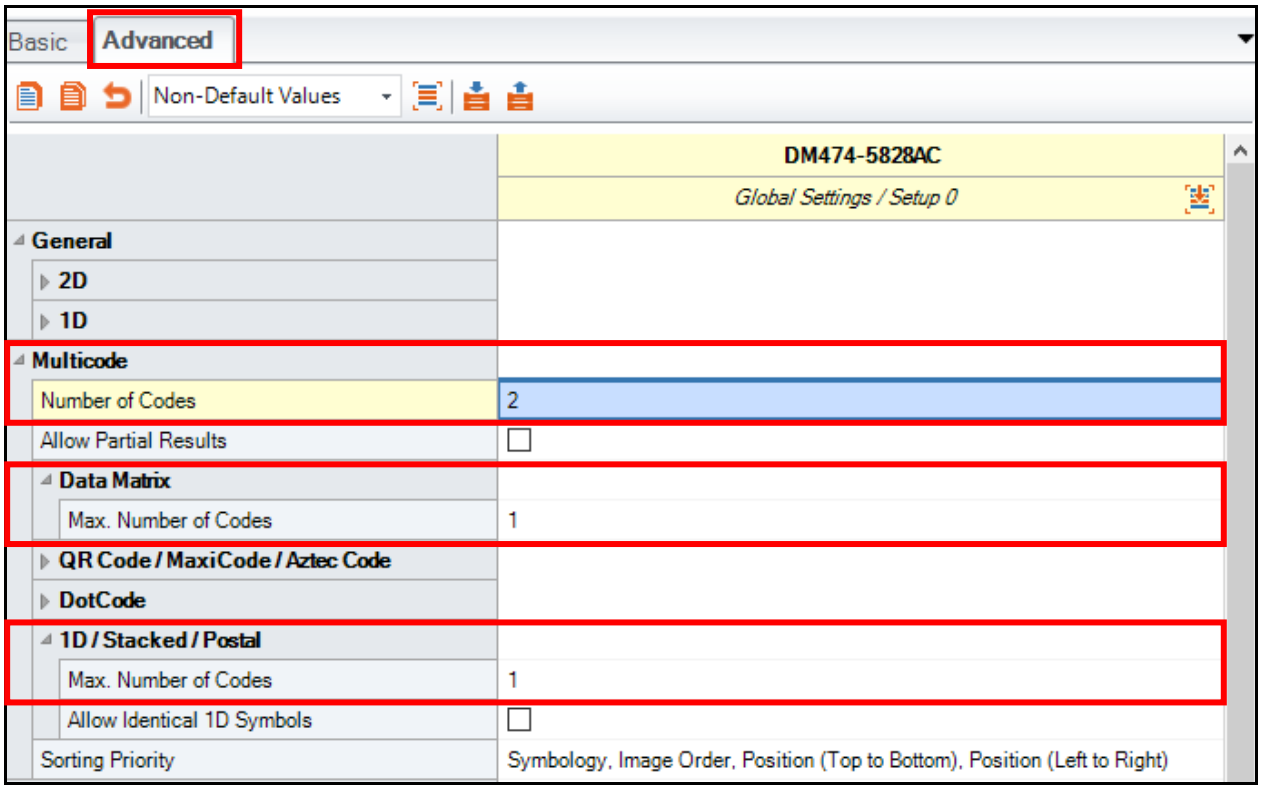


11. Change the **Code Size Max** to *10* and confirm the King of Hearts can now be read.

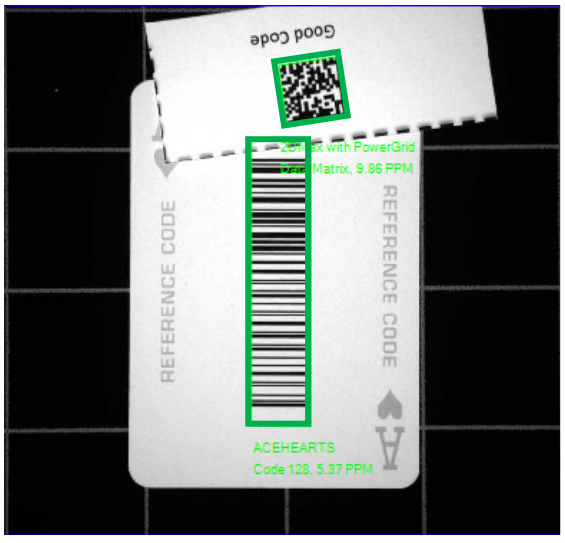


12. Navigate to the **Code Details** step – check the *Data Matrix* checkbox.

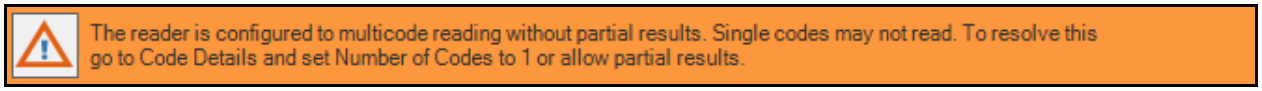
13. Place the *Data Matrix* code and the *Ace of Hearts* in the FOV.
14. Click the **Advanced** tab and set the following:
    - Number of Codes = 2
    - Data Matrix – Max Number of Codes = 1
    - 1D / Stacked / Postal – Max Number of Codes = 1

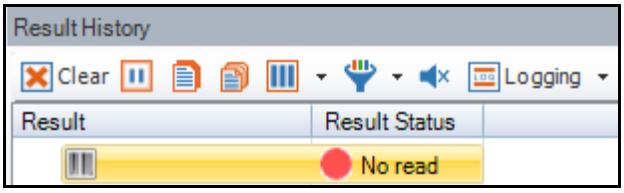


15. Click the **Trigger** button.
    Both codes are read.



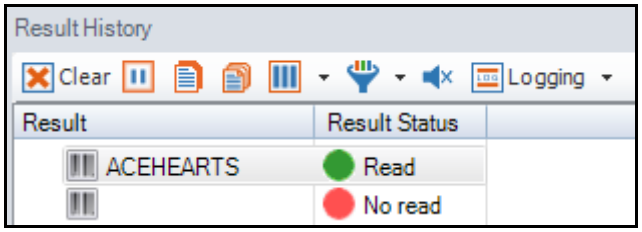
16. Try to read only the *Ace of Hearts* or the *Data Matrix* code.
Are you able to read only one code? _____





17. Check the **Allow Partial Results** checkbox and click the **Trigger** button to read the *Ace of Hearts*.

The reader will read the Ace of Hearts.



Lab Exercise 3.1 – Application Details

At the end of this lab exercise, Participants will be able to:

- Determine which Trigger Mode to use to get the best read result

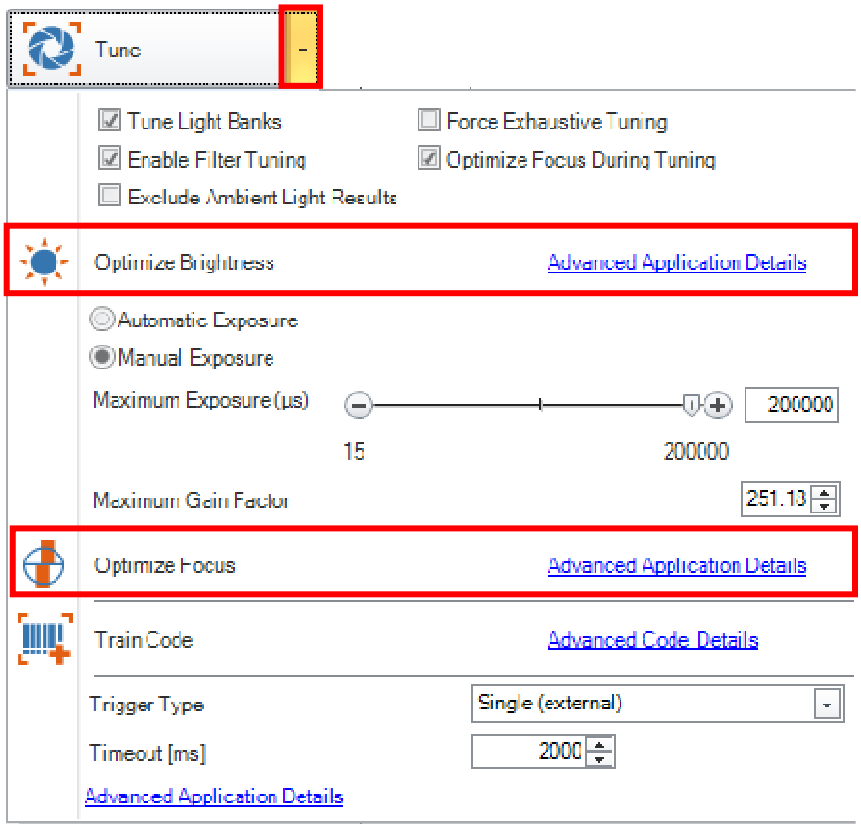
The Participant will utilize the following DataMan Functions to successfully complete this exercise

- Trigger Modes

Trigger Modes

Follow the steps below to complete the lab exercise:

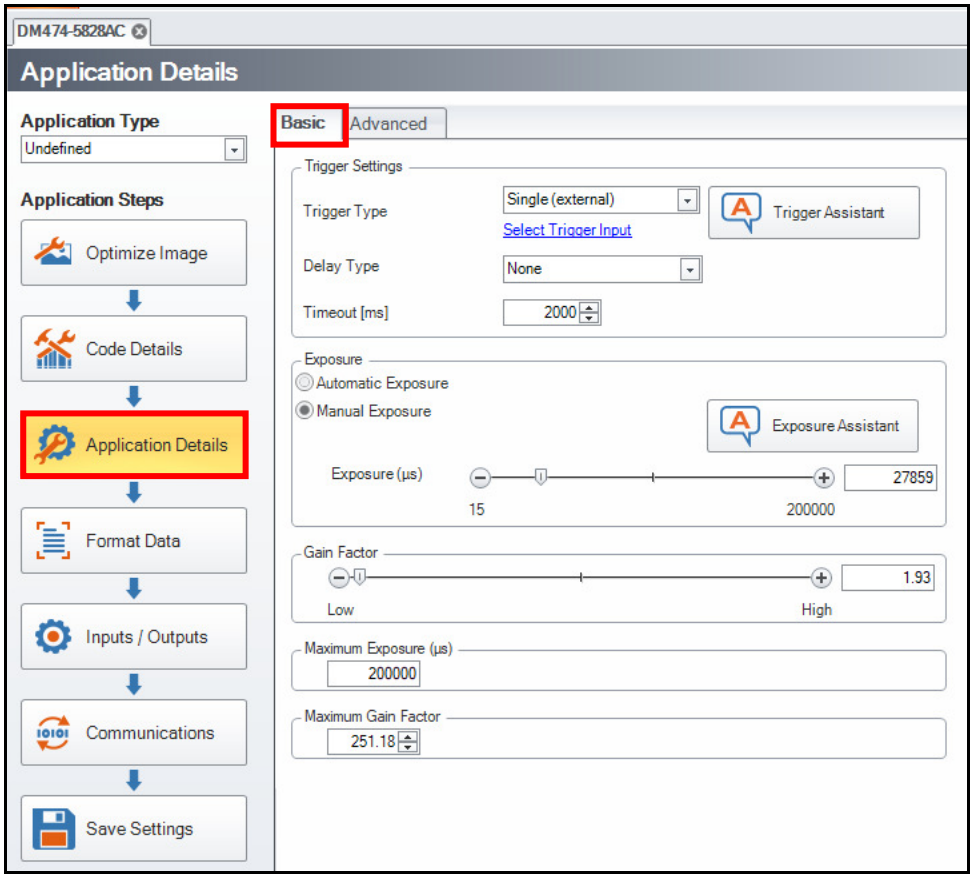
1. Place the *Ace of Hearts* card in the field of view.
   NOTE: *If you do not have a DataMan deck of cards, use the images printed in the Resources section of the training manual.*
2. Click the down arrow on the **Tune** button to open the Tune menu.



3. Click on **Optimize Brightness** and **Optimize Focus** from the Tune menu.

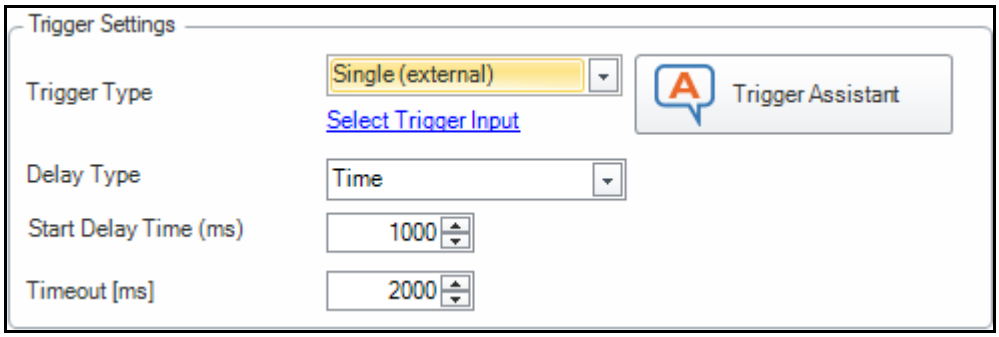
The **Ace of Hearts** displays in the Field of View (FOV).

4. Click the **Application Details** step.
   The **Basic Application Details** display.



Single (external) Trigger Type

1. Set the **Trigger Type** to *Single (external)*.
2. Click the **Trigger** button and notice that it only acquires one image per trigger.
3. Set the **Delay Type** to *Time* and set the **Start Delay Time (ms)** to *1000ms*.



4. Click the **Trigger** button and notice that it now has a delay of 1 second before acquiring the image.
5. Set the **Start Delay Time (ms)** back to *0*.

Continuous (external) Trigger Type

1. Set the **Trigger Type** to *Continuous (external)*.
2. Remove the card from the FOV.
3. Hold down the trigger button and move a code through the FOV. Notice that once the reader reads the code, the string is output, and the trigger cycle ends.
4. Set the **Interval Time** to 100,000µs. Notice how much faster the reader acquires between images.
5. Set the **Interval Time** to 0µs. Notice that the reader updates to the max frame rate of the reader.
6. With this interval, trigger the reader and attempt to read the code. If the code is not read it is because the decode time is longer than the entered µs.
7. Change the **Interval Time** back to 100,000µs and note the reader reads the code.

Burst (external) Trigger Type

1. Set the **Trigger Type** to *Burst (external)*.
2. Remove the code from the FOV.
3. Set the Interval time to 1,000,000 µs.
4. Trigger the reader and notice it acquires 2 burst images with the default settings.

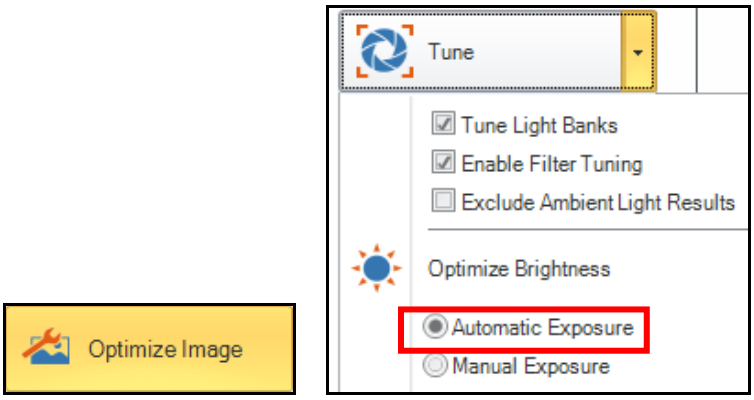
   NOTE: *All images in a burst sequence can be viewed in the Results Display menu by enabling Transfer All Images from the Advanced tab of the Optimize Image application step.* ***Optimize Image → Display Image Settings → Image Transfer Settings → Transfer All Images.***

5. Return to the **Application Details** step, and set the Burst Length to 9, and the Interval time to 500,000 µs.
6. Click the trigger button and pass the card through the FOV.

   NOTE: *The images in a burst sequence can be viewed in the Results History window by expanding the + sign.*

Manual (button) Trigger Type

1. Set the **Trigger Type** to *Manual (button)*.
2. Hold down the trigger button until it reads the Ace of Hearts code.
3. Click the **Optimize Image** step and click the **Automatic Exposure** radio button in the Tune menu.



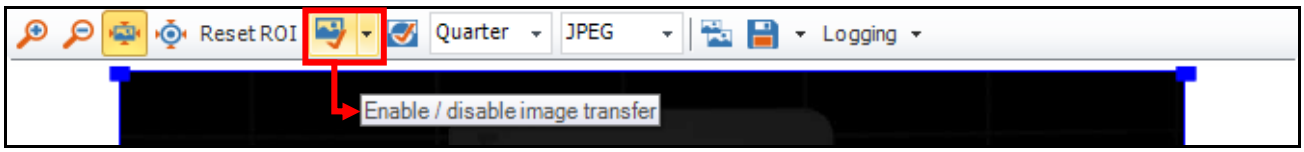
4. Remove the card from the FOV and move your hand closer to and further away from the light while holding the trigger – notice the auto exposure taking place.

Presentation (internal) Trigger Type

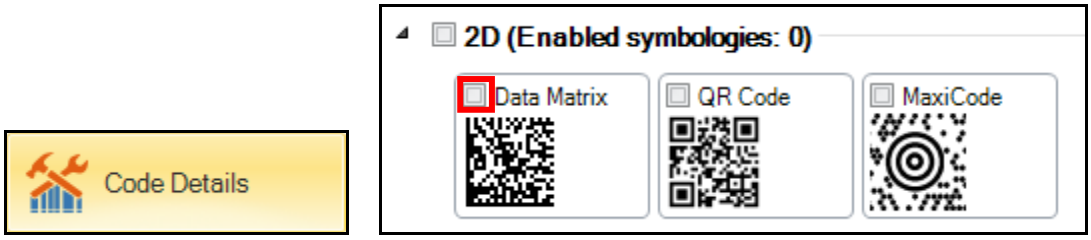
1. Return to the **Application Details** step.
2. Set the **Trigger Type** to *Presentation (internal)*.
3. Place the card in the FOV – notice that it reads continuously.

Self (internal) Trigger Type

1. Set the **Trigger Type** to *Self (internal)*.
2. Set the Interval time to 40,000 µs.
3. In the Image Panel, click the **Enable/disable image transfer** button to disable the image transfer.

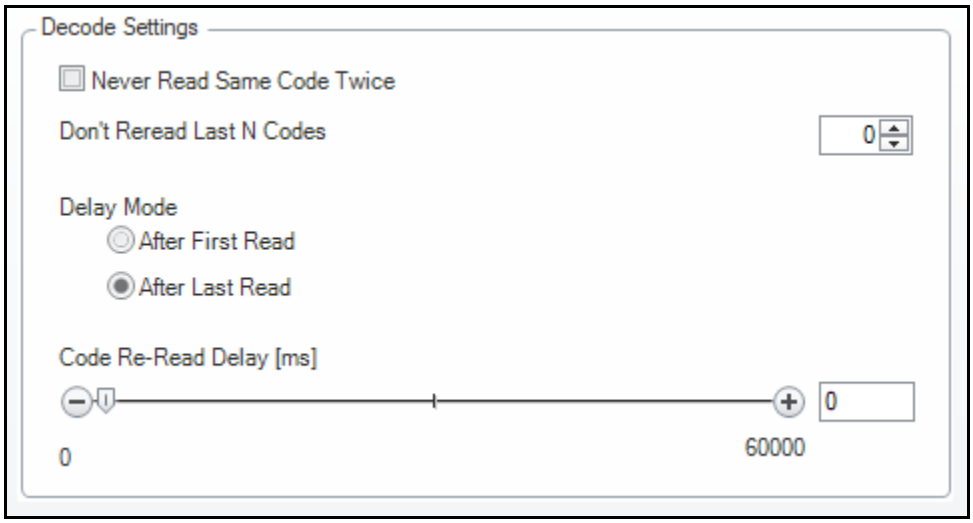


4. On the **Code Details** Application Step, uncheck the Data Matrix check-box to disable the symbology. The reader is now reading even faster!



Bonus:
Never Read Same Code Twice

Perform with your Reader still in Self (internal) trigger mode with your card in the FOV.



Enable the Never Read Same Code Twice box

- √ Try to read the same code twice and notice that it will not do so unless another code is read in between (Read the Ace of Hearts and then the King of Hearts)
- √ Place another card in the FOV and notice the read
- √ Place the Ace of Hearts back and notice that it will read it again.

Disable the Never Read Same Code Twice box

- √ Change the Delay Mode to After First Read
- √ Set the Re-Read Delay to 1000 ms
- √ Leave the code in the FOV and notice that the reader outputs every 1 second
- √ Change the Delay Mode to After Last Read
- √ Leave the code in the FOV and notice that it will only output once
- √ The code must be removed from the FOV for 1 second before it will output again

Lab Exercise 4.1 – Data Validation

At the end of this lab exercise, Participants will be able to:

- Utilize the Data Validation functionality
- Calculate the mil size of a barcode and the maximum FOV for that code size
- Explore the Process Control Metrics available in the Setup Tool

The Participant will utilize the following DataMan Functions to successfully complete this exercise:

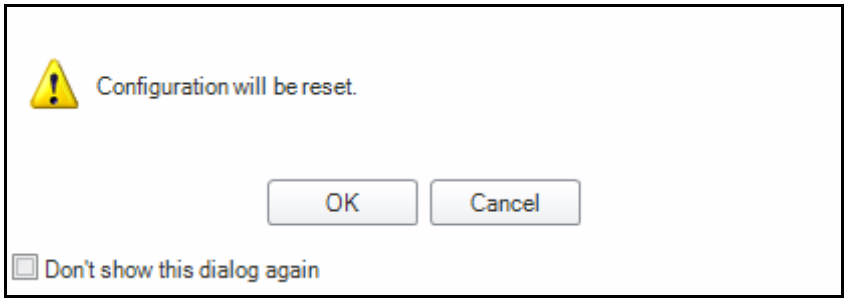
- Setup Tool
- DataMan Validation
- Process Control Metrics

Data Validation – Match String Validation

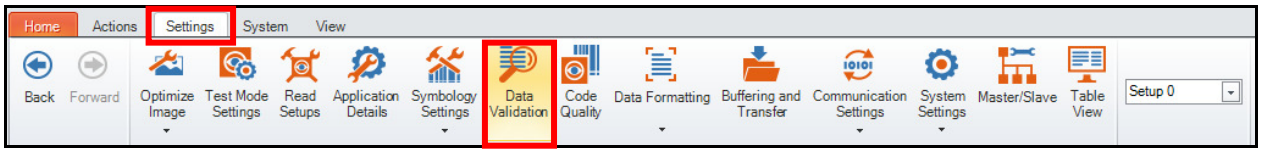
Follow the steps below to complete the lab exercise:

1. Connect your DataMan reader to the DataMan Setup Tool.
2. Click the **Reset Configuration** button from the **System** Menu.

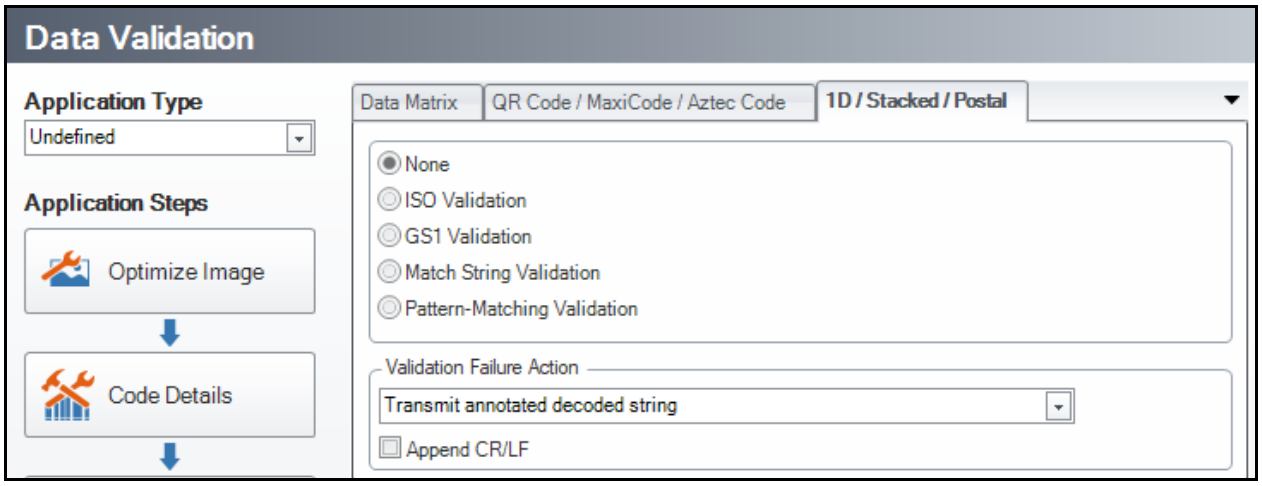
The **Configuration reset** dialog box displays.



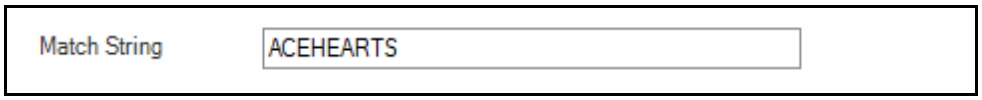
3. Click the **OK**  button to continue.
4. Navigate to the **Optimize Image** step and click the down arrow on the **Tune** button to *Optimize Brightness* and *Optimize Focus* using the Ace of Hearts.
5. Click the **Trigger**  button to ensure you can read the Ace of Hearts.
6. Navigate to the **Settings** Menu and select **Data Validation**.



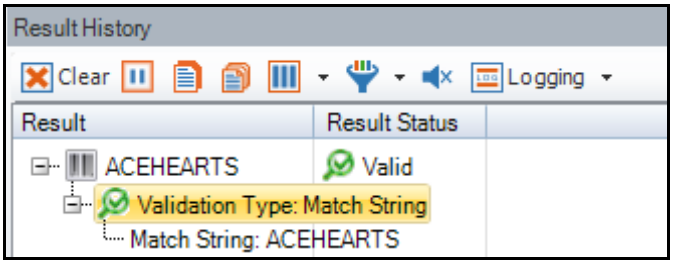
The **Data Validation** page displays.



7. On the **1D/Stacked/Postal** tab select *Match String Validation*.
   NOTE: *Match String Validation enables you to specify an exact string to match against the string encoded by the symbol. Only symbols containing a string that matches the specified string will generate a Pass result.*
   The Match String field displays.
8. Enter **ACEHEARTS** in the Match String field.

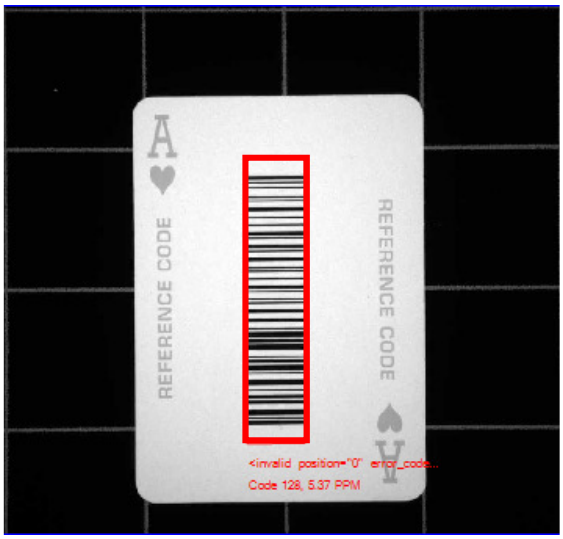


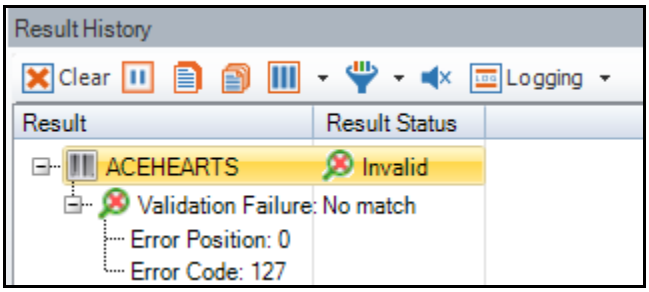
9. Click the **Trigger** button and review the results.
   NOTE: *Click the **Plus sign** to expand the results.*



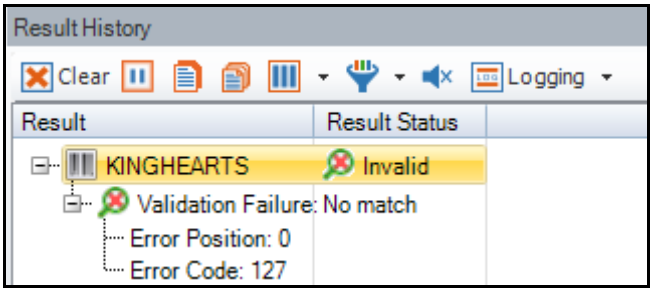
10. Enter **ACECLUBS** in the Match String field.

11. Click the **Trigger** button and review the results.

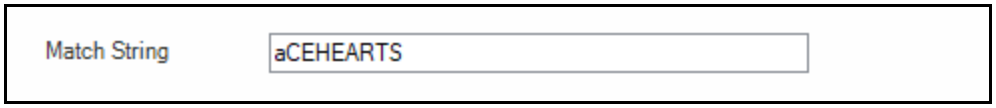




12. Change the card in the FOV to the *King of Hearts.*
13. Click the **Trigger** button and review the results.

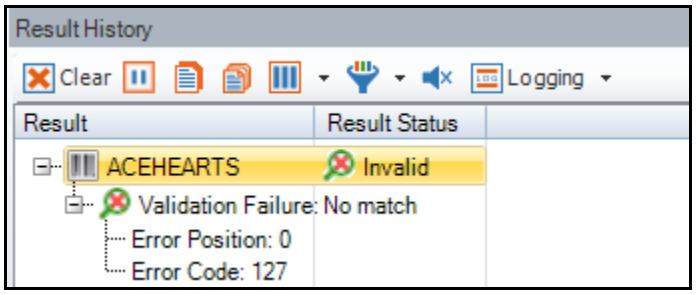


14. Change the card in the FOV back to the *Ace of Hearts.*
15. Enter aCEHEARTS in the Match String field.



16. Click the **Trigger** button and review the results.

Is it valid? _____

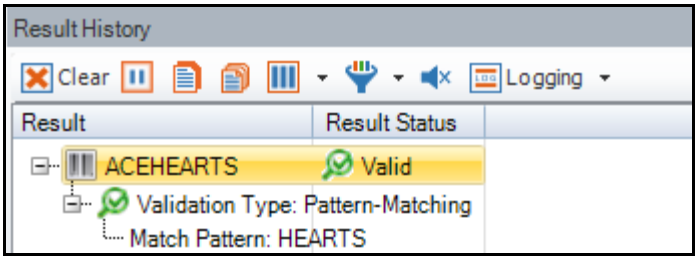


NOTE: *aCEHEARTS is not a valid match. The Match String field is case sensitive.*

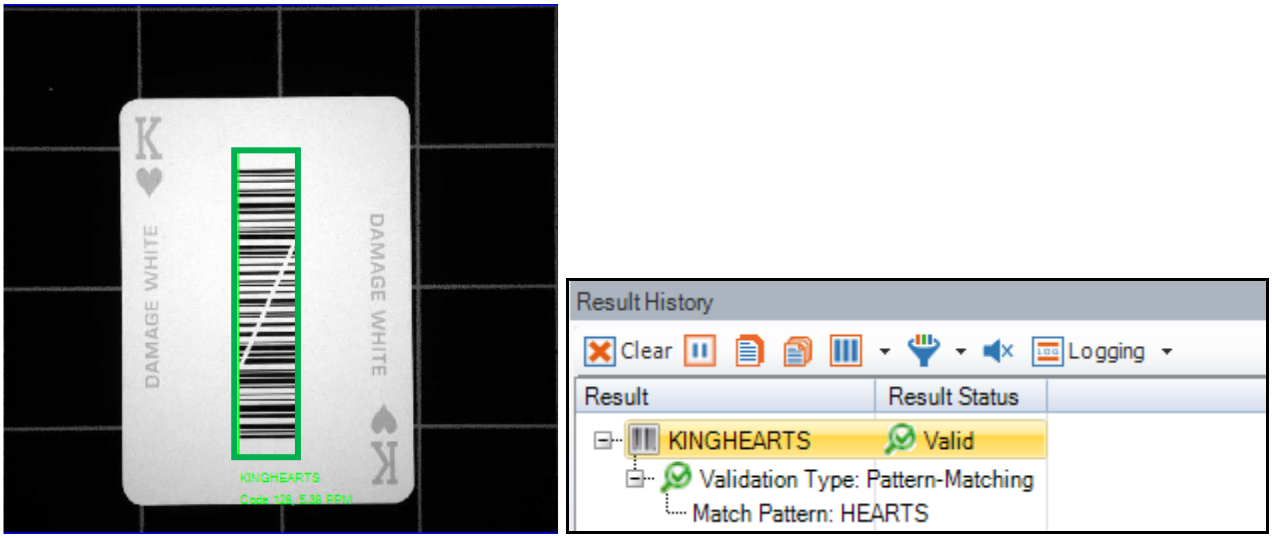
Data Validation – Pattern-Matching Validation

17. On the **1D/Stacked/Postal** tab select *Pattern-Matching Validation*.
    NOTE: *Pattern-Matching Validation enables a user to input a specific string of characters to confirm if they are present in the data string.*
    The **Pattern** field displays.
18. Enter HEARTS in the pattern field.

19. Click the **Trigger**  button and review the results.

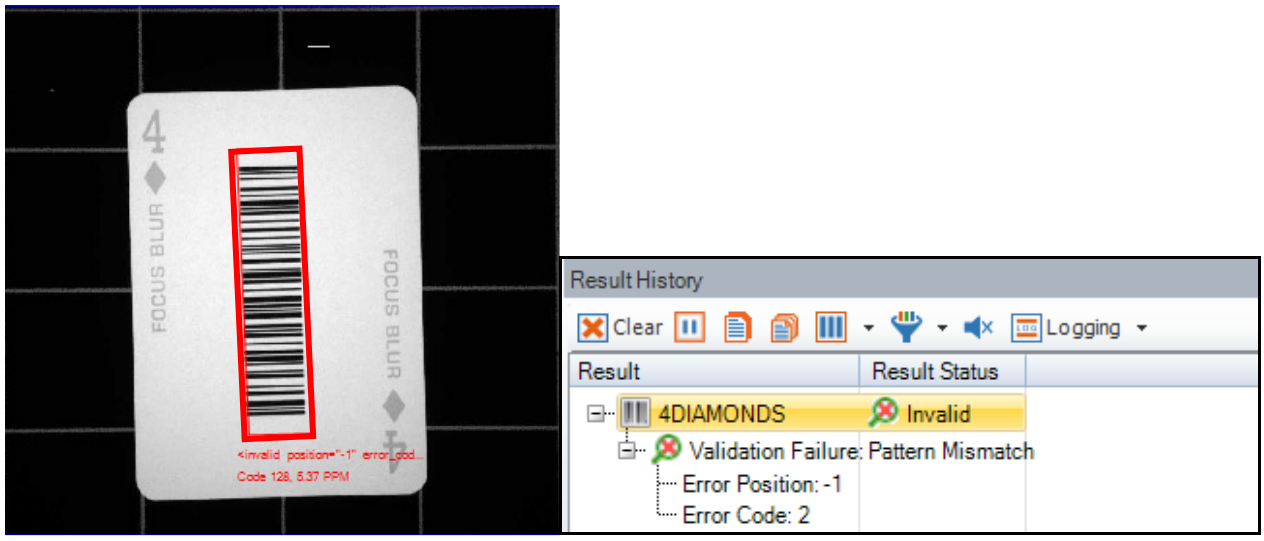


20. Change the card in the FOV to the *King of Hearts.*
21. Click the **Trigger** button and review the results.



NOTE: *Both codes are valid because HEARTS is a subset of the string contained in both strings.*

22. Change the card in the FOV to the *4 of Diamonds.*
23. Click the **Trigger** button and review the results.



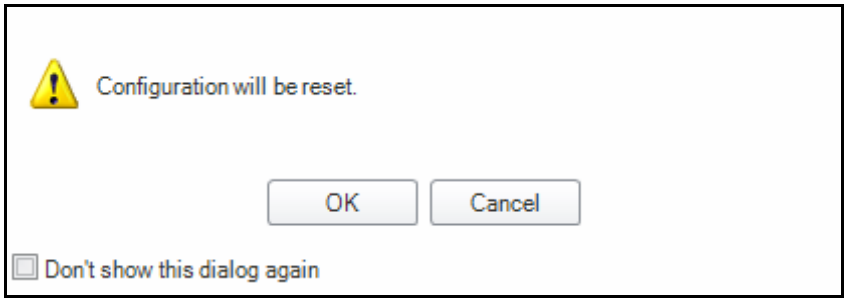
NOTE: *The code fails because the pattern (Diamonds) does not match the pattern we were searching for (Hearts).*

Read Setups

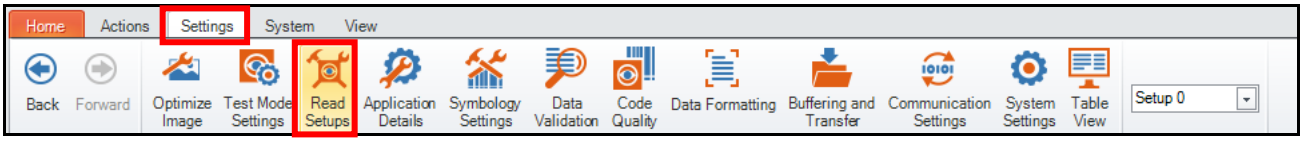
Follow the steps below to complete the lab exercise:

1. Connect your DataMan reader to the DataMan Setup Tool.
2. Click the **Reset Configuration** button from the **System** Menu.

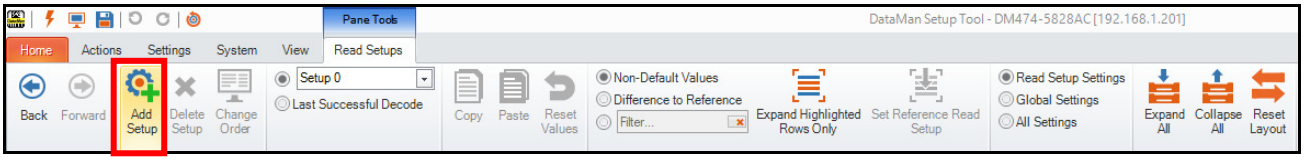
The **Configuration reset** dialog box displays.



3. Click the **OK**  button to continue.
4. Navigate to the **Application Details** step and set the Trigger Type to *Single (external)*.
5. Navigate to the **Optimize Image** step and click the down arrow on the **Tune** button to *Optimize Brightness* and *Optimize Focus* using the Ace of Hearts.
6. Click the **Trigger**  button to ensure you can read the Ace of Hearts.
7. Navigate to the **Settings** Menu and select **Read Setups**.

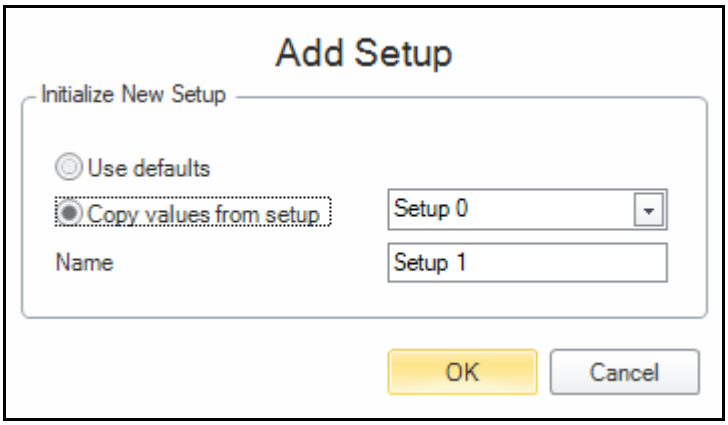


8. Click the **Add Setup** button to add a second read setup.



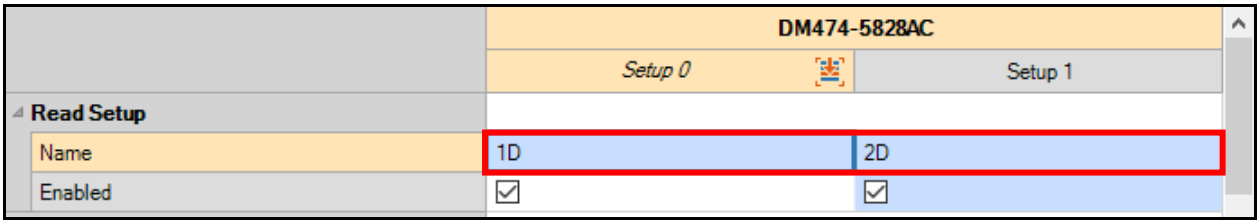
The **Add Setup** dialog displays.

NOTE: *You have the option to use the default values or copy values from the current setup.*

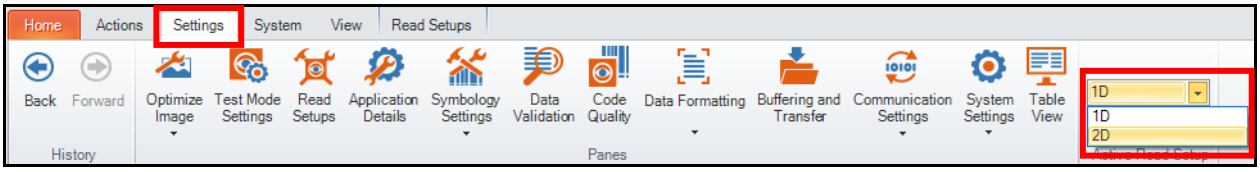


9. Select the **Copy Values from setup** and click the **OK**  button.

10. Change the **Name** of the setups – click into the **Setup0** field and rename to *1D* and click into the **Setup1** field and rename to *2D*.

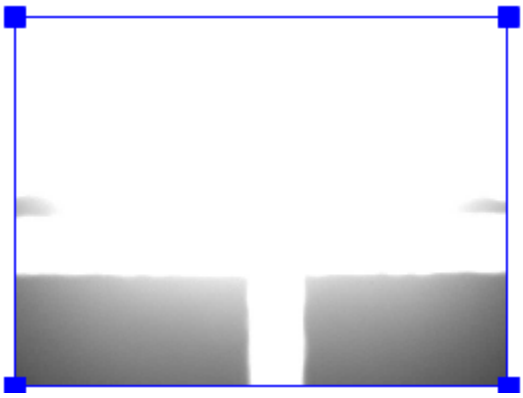


11. Return to the **Settings** tab and select *2D* from the **Active Read Setup** drop-down list.

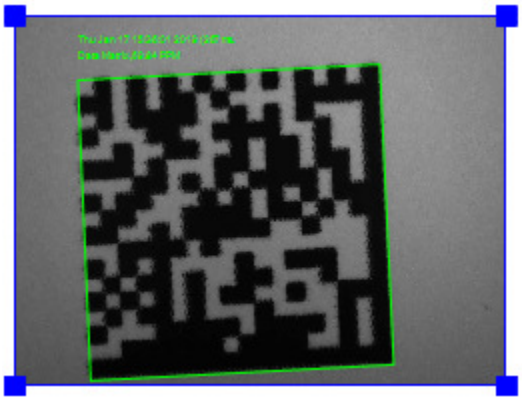


12. Hold the Data Matrix code about 3 – 4 inches from the lens of the reader and click the **Trigger**  button.

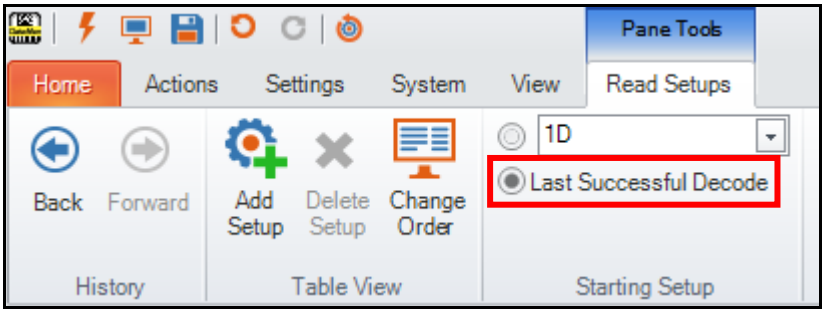
The reader does not read the code – it is too close to the lens.



13. While in the 2D Active Setup, with the Data Matrix code 3 – 4 inches in front of the reader Tune the code.
NOTE: *The settings required to read the code at this distance will automatically be applied to the setup.*

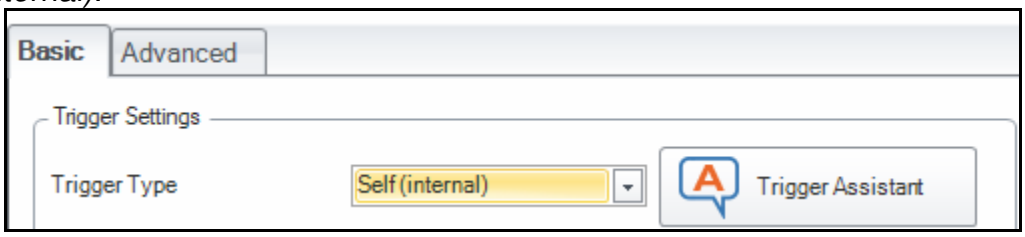


14. When it is done, click the **Last Successful Decode** radio button as the Starting Setup.



15. Trigger the reader to confirm that the reader can now read both the 1D code at desk level and the 2D code close to the lens.
NOTE: *When you trigger the reader, if it can get a read, it does. If No Read, (you switched codes) it will trigger again utilizing the second setup.*

16. Navigate to the **Application Details** step and change the **Trigger Type** to *Self (internal)*.



17. Set the **Interval (µs)** field to *500,000 µs*.

The reader will now cycle through both reads continually.

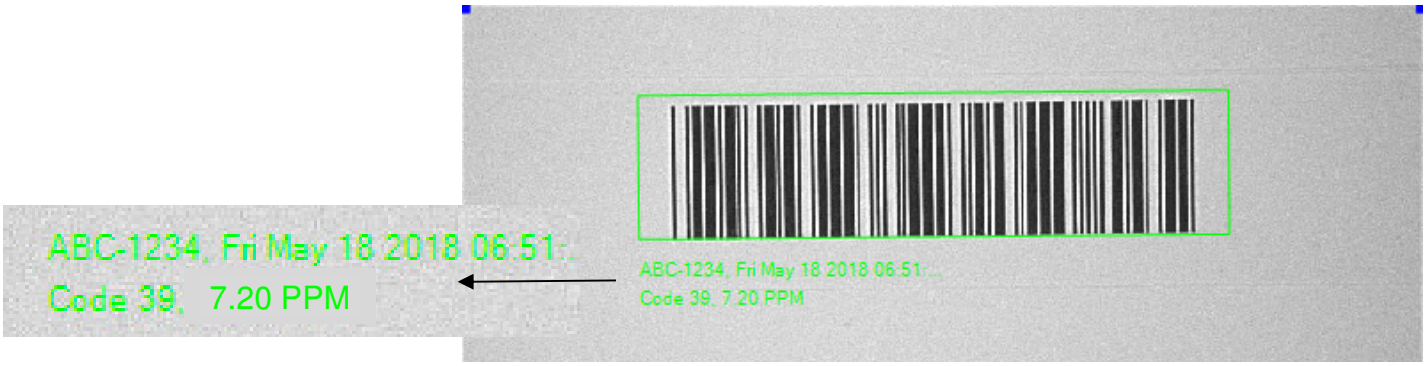
Calculate Mil Size – **If time allows**

Follow the steps below to complete the lab exercise:

1. Connect your DataMan reader to the DataMan **Setup Tool**.
2. Adjust the mounting of the reader so that the horizontal FOV is the exact width of this paper.
3. Click the **Live** button to place the reader into Live View, move the reader until the barcode below is in the center of the FOV.
4. Navigate to the **Code Details** step and confirm the **1D** symbologies are enabled.

5. Return to the **Optimize Image** step and click the **Trigger** button to read the barcode below.

6. Navigate to the **Code Details** step and confirm the **1D** symbologies are enabled.



7. Note the PPM value reported in the results display.

   NOTE: *This is the number of pixels in the minimum module.*

8. Calculate the mil size of the bar code.
   a. Pixel Width = 8.5 (in) / Horizontal Pixels
   b. Mil Size = Pixel Width *PPM value = pixels per narrow bar* 1000
      a. 8.5 (in) / 1280 pixels = .00664 *3.15 ppm = 0.0209* 1000 **= 21mil**

   NOTE: *Recommended Minimum mil sizes per code:*
   1D Linear – 1.1 PPM
   2D Printed – 2.5 PPM
   2D Direct Part Mark – 4 PPM
9. Calculate the Maximum FOV with the 21 mil code for the DataMan 262.
   a. ((Mil Size / 1000) / minimum recommended PPM) * Reader Pixels
   b. ((21 / 1000) / 1.0) * 1280 = **26.88 in Max FOV**

Lab Exercise 4.2 – Format Data

At the end of this lab exercise, Participants will be able to:

- Format the output data and No Read strings using a DataMan 8600 USB handheld

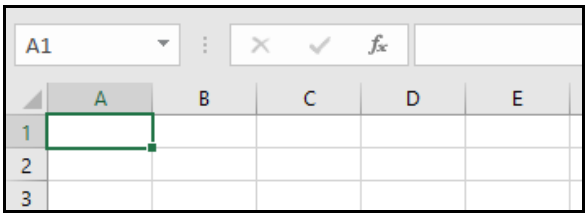
The Participant will utilize the following DataMan Functions to successfully complete this exercise:

- Setup Tool

Follow the steps below to complete the lab exercise:

1. Connect your DataMan handheld reader to the DataMan Setup Tool.
2. Open a blank Excel spreadsheet on your computer and highlight a cell.
3. Using your handheld reader, scan the Ace of Hearts barcode.

   Was anything entered in the highlighted cell?



NOTE: *The answer is No, if your reader is in USB Com mode. It may need to be converted to USB Keyboard mode. When in USB Keyboard mode, the reader will emulate a keyboard input, typing the decoded data string wherever the curser is located on the screen.*

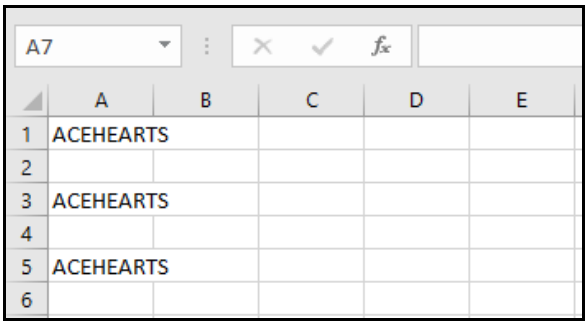
4. Scan the USB Keyboard code below.

	USB Keyboard DM50 • DM60 • DM70 • DM150 • DM8000 • MX-1000 • MX-1502	

NOTE: *The code above is used for corded readers only. If you are communicating through a Base Station via USB, there is a separate code to Enable the USB Keyboard for the base station shown below.*

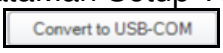
	Enable USB Keyboard for the base station *Reboot needed for enabling USB keyboard for the base station!* DM8000Base	

5. Now, highlight a cell in the Excel spreadsheet and scan the Ace of Hearts several times.
   Was anything entered in the cells this time?

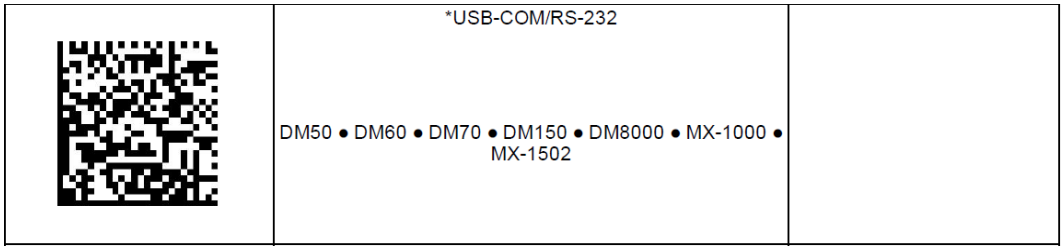


NOTE: *The answer is Yes. The cells between scans are skipped because the default data formatting includes both a <CR> and <LF> at the end of the string which Excel interprets as 2 <Return> commands.*

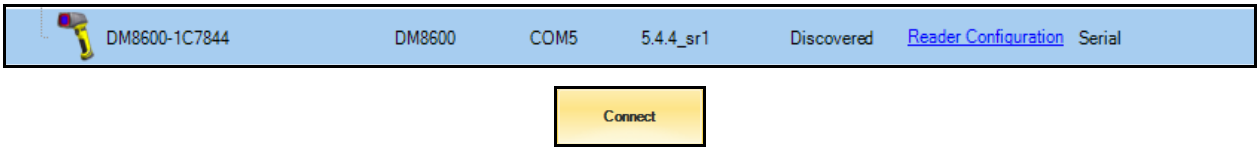
What if we do not want the extra space?
If your reader is in USB Keyboard it will need to be converted to USB-COM mode.

6. In the **Repair & Support** tab of the DataMan Setup Tool, select the DM8600 reader and click the **Convert to USB-COM** 

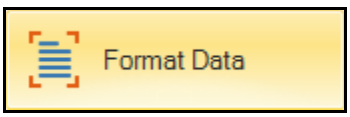
button, or, you can scan the USB-COM code below.



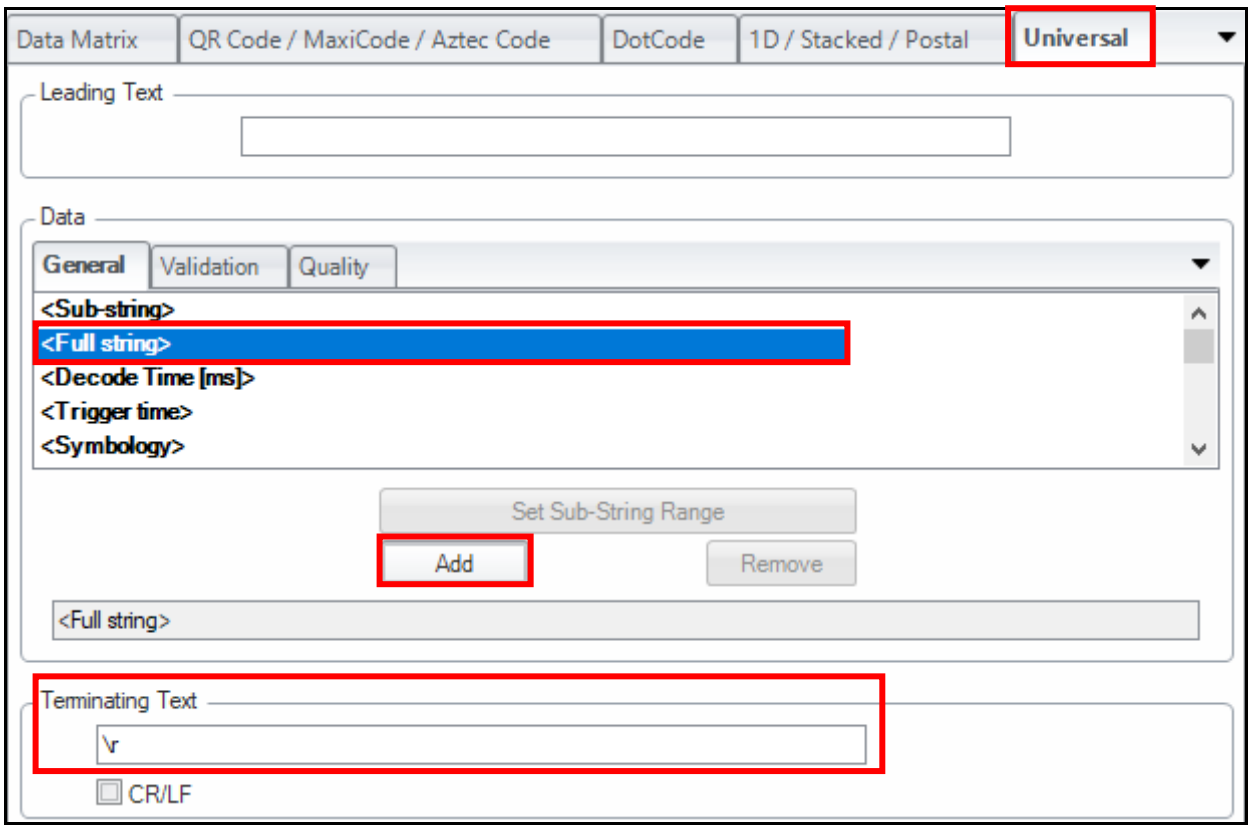
7. When your reader is back in USB-COM mode, you can select it from the Connect window and click the **Connect** button.



8. Navigate to the **Format Data** application step and check the **Universal Standard** box under Basic Formatting

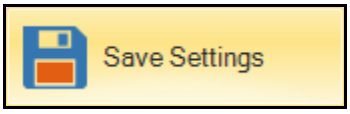


9. Click on the **Standard** hyperlink.
   The **Universal** menu displays.

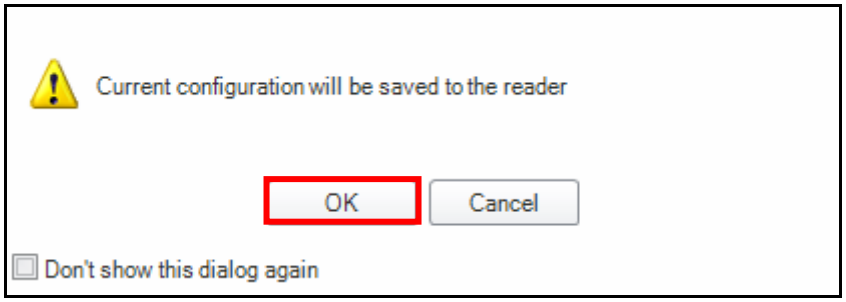


9. Select **<Full string>** under the Data General tab and click the **Add**  button.

10. Type **\r** in the **Terminating Text** field.
    NOTE: *The \r translates only to <CR>.*
11. Save the settings to the reader by clicking the **Save Settings** button in the Application Steps.

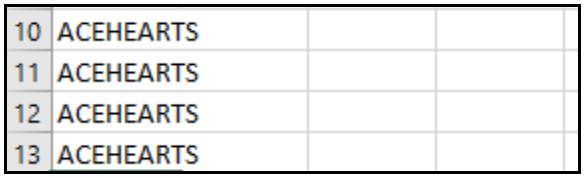


12. The Configuration dialog box displays. Click the **OK**  button to continue.

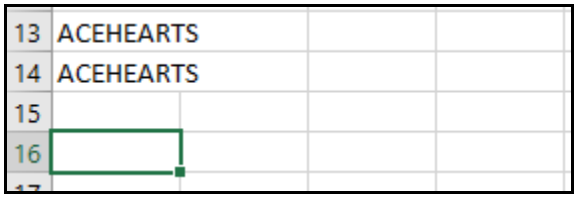


13. Click the Round **X** on the DM8600 pane to disconnect the reader.

14. Scan the USB Keyboard code in Step #4.
15. Place your curser in a cell in the Excel spreadsheet and scan the Ace of Hearts bar code a few times.
    Notice that it is no longer skipping a cell.

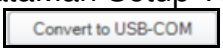


16. Trigger the reader without reading a barcode to generate a No Read and notice the output sequence.
    It is skipping a cell again.

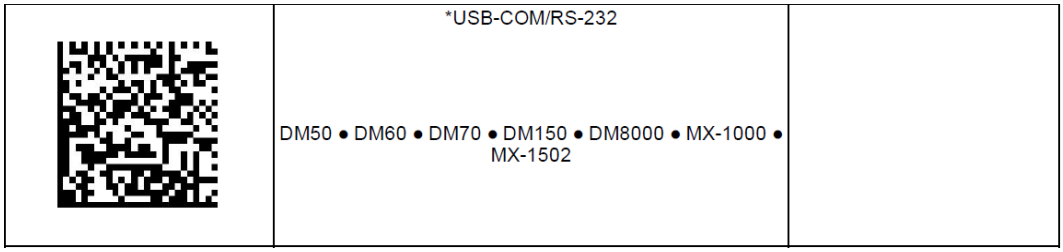


NOTE: *This is because the data formatting applies to a No Read also because we created it in the Universal tab. So, the reader is sending a blank string + <CR>.*

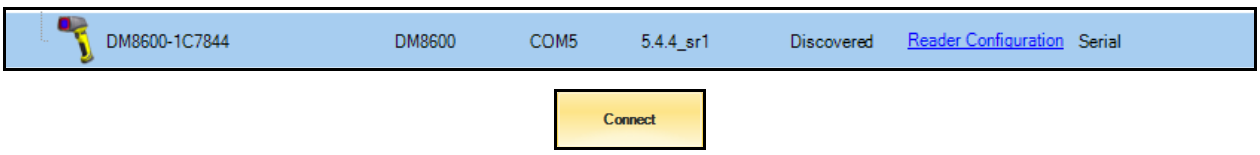
What if we don't want to skip a cell during a No Read?

17. In the **Repair & Support** tab of the DataMan Setup Tool, select the DM8600 reader and click the **Convert to USB-COM** 

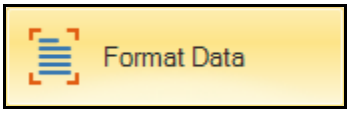
button, or, you can scan the USB-COM code below.

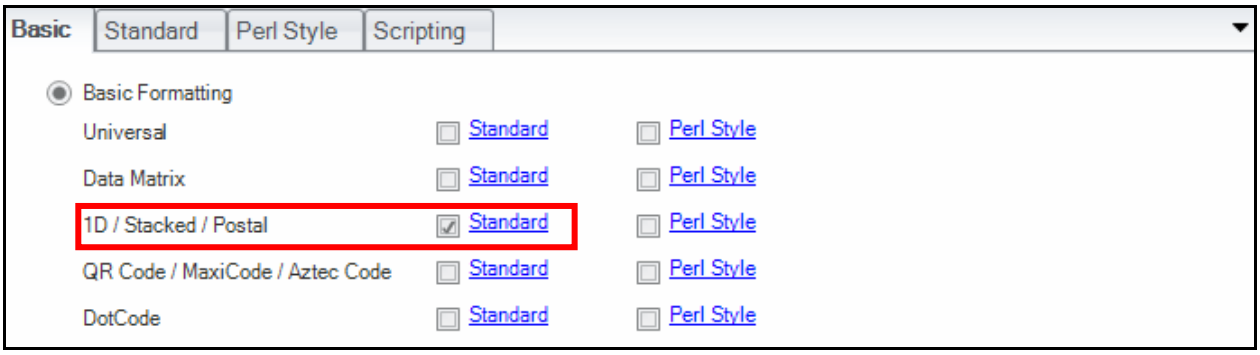


18. When your reader is back in USB-COM mode, you can select it from the Connect window and click the **Connect** button.

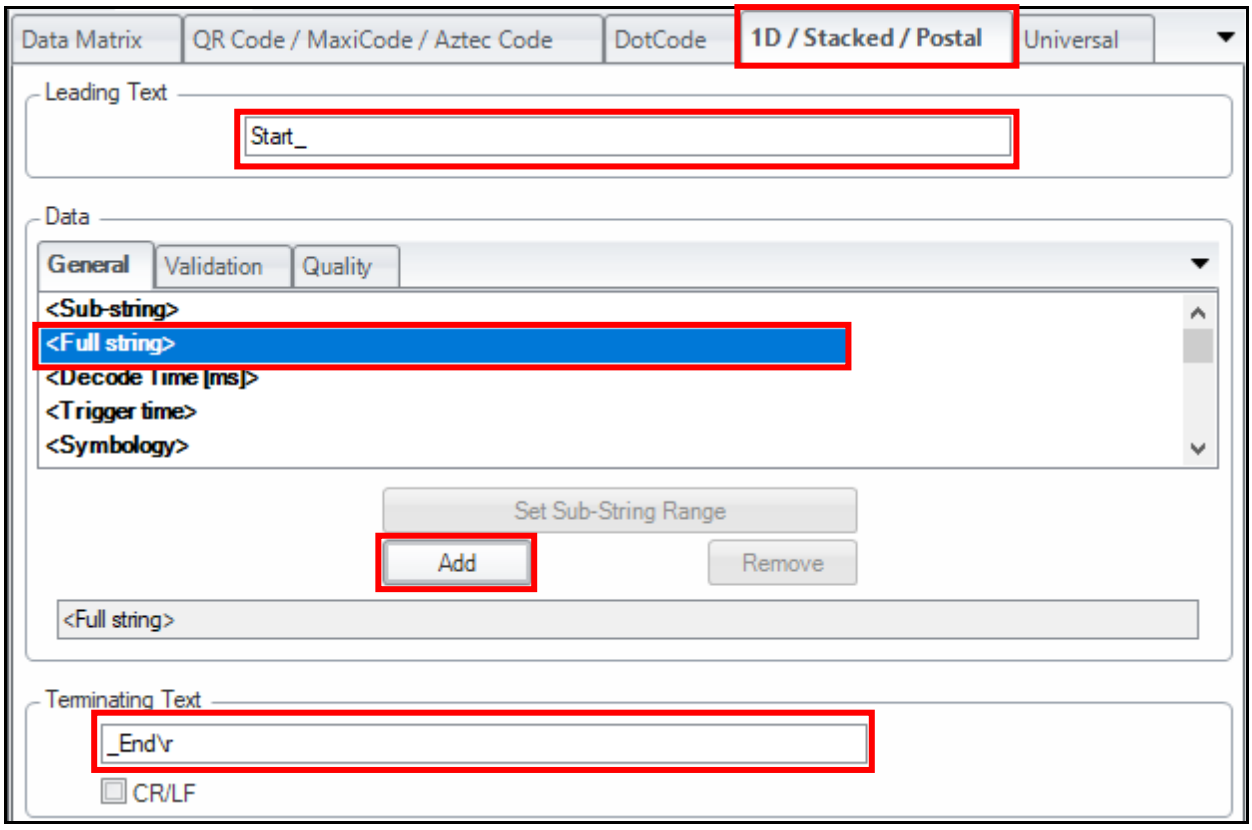


19. Navigate to the **Format Data** application step and uncheck the Universal Standard box and check the **1D** / **Stacked** / **Postal** box under Basic Formatting





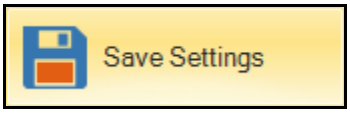
20. Click on the **Standard** hyperlink.
    The **1D** / **Stacked** / **Postal** menu displays.

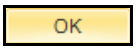


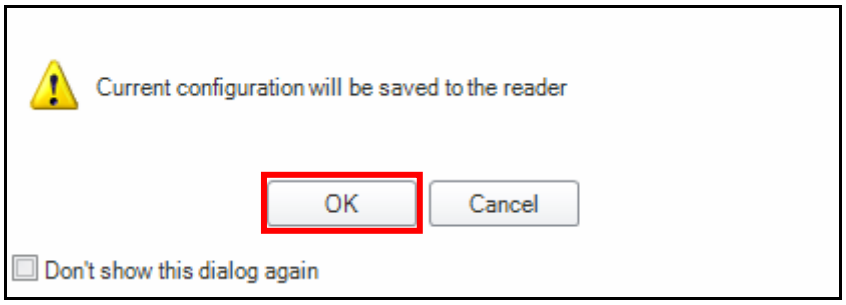
21. Select **<Full string>** under the Data General tab and click the **Add** button.

22. Type ***Start_*** in the **Leading Text** field and ***_End\r*** in the **Terminating Text** field.

23. Save the settings to the reader by clicking the **Save Settings** button in the Application Steps.

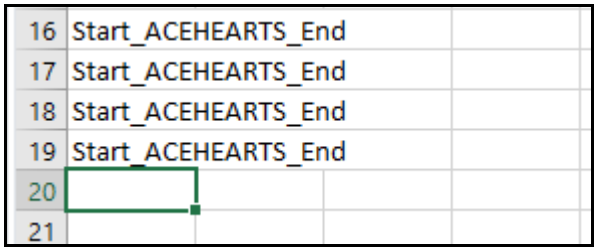


24. The Configuration dialog box displays. Click the **OK**  button to continue.



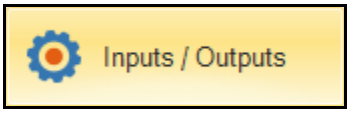
25. Click the Round **X** on the DM8600 pane to disconnect the reader.

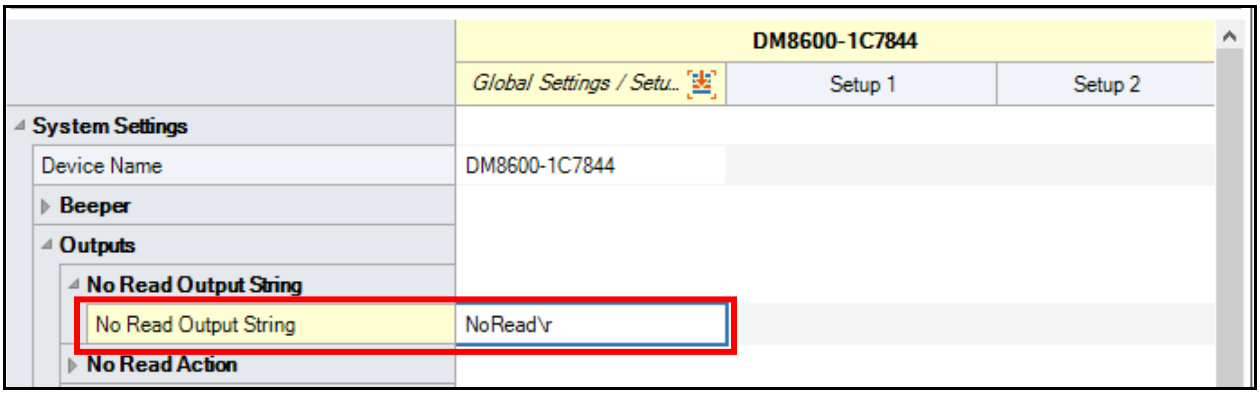
26. Scan the USB Keyboard code in Step #4.
27. Place your curser in a cell in the Excel spreadsheet and scan the Ace of Hearts bar code a few times and also create some No Reads.



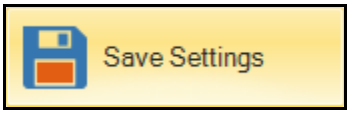
Notice the new data formatting and that it is no longer skipping a cell for No Reads. But, what if we want to define a specific No Read string?

28. Connect to the reader using the process in step #6.
29. Define a No Read string
30. Navigate to the **Inputs** / **Outputs** application step, click the **Advanced** tab, open the **No Read Output String** menu and enter ***NoRead\r*** in the No Read Output String field.

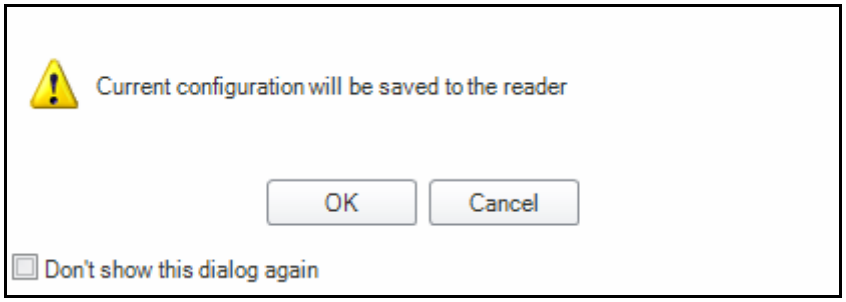




31. Save the settings to the reader by clicking the **Save Settings** button in the Application Steps.



32. The Configuration dialog box displays. Click the **OK**  button to continue.



33. Click the Round **X**  on the DM8600 pane to disconnect the reader.

34. Scan the USB Keyboard code in Step #4.
35. Place your curser in a cell in the Excel spreadsheet and scan the Ace of Hearts bar code a few times and also create some No Reads.

25	Start_ACEHEARTS_End
26	Start_ACEHEARTS_End
27	Start_ACEHEARTS_End
28	NoRead
29	NoRead
30	NoRead
31	Start_ACEHEARTS_End
32	Start_ACEHEARTS_End

Scripting Lab #1

Multi Code Reading Demo

The *challenge* is to read codes that are close together on a box, making sure there are no double reads and all the codes are output in one string.

The *solution* is a script that allows the user to read 3 codes but holds the output until all 3 codes have been read. Then it outputs all 3 codes at once. If the same code reads twice the script will cause a data validation failure action and the user can continue scanning until 3 unique codes are read.

The *Never read the same code twice* functionality in the Setup tool only applies to multi-code reading within a single trigger. To ensure the same code is not read on separate triggers a script is needed.

Scan Configuration Codes:

Here is an example to simulate scanning a box:

Reset to Factory Defaults:

Custom RPC:

Sample Codes:

```
// Read 3 codes but hold the output until the last code is read
var storedResults = [];

function onResult (decodeResults, readerProperties, output)
{
    if (decodeResults[0].decoded)
    {
        if (storedResults.indexOf(decodeResults[0].content) == -1)
        {
            // if decoded then add to storedResults
            storedResults.push(decodeResults[0].content);
        }
        else
        {
            // if the same code is scanned twice the reader will error
            output.events.system = Event.system.validationFailure;
        }
    }


    // if there are three storedResults
    if (storedResults.length >= 3)
    {
        // output all three
        output.content = storedResults.join(",");
        storedResults = [];
    }
    else
    {
        // output nothing if there are not 3 codes
        output.content = ""
    }

}
```

Lab Exercise 5.1 – Inputs / Outputs

At the end of this lab exercise, Participants will be able to:

- Disable the TRIG Button and TUNE Button on the reader
- Disable the beeper on a good read

The Participant will utilize the following DataMan Functions to successfully complete this exercise:

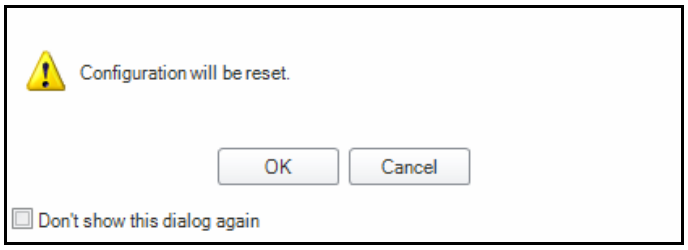
- TRIG Button tab
- TUNE Button tab
- Outputs tab

Inputs and Outputs

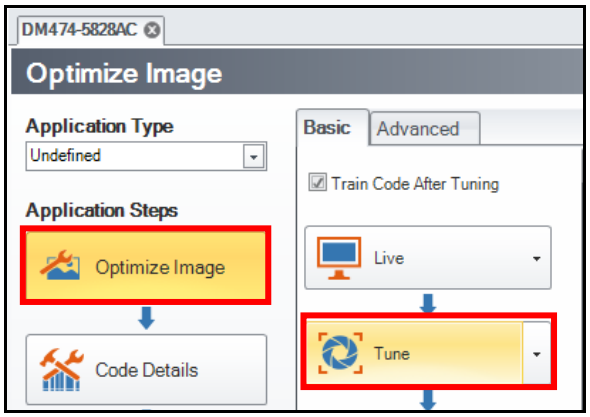
Follow the steps below to complete the lab exercise:

1. Connect your DataMan reader to the DataMan Setup Tool via Ethernet.
2. Click the **Reset Configuration** button from the **System** Menu.

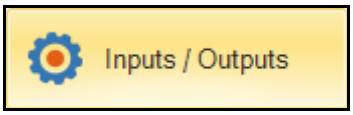
3. The **Configuration reset** dialog box displays. Click the **OK**  button to continue.



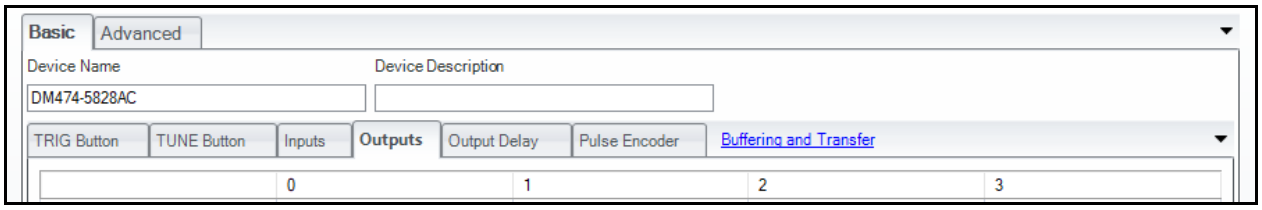
4. Click the **Tune** button on the **Optimize Image** application step to Tune the reader on the Ace of Hearts.



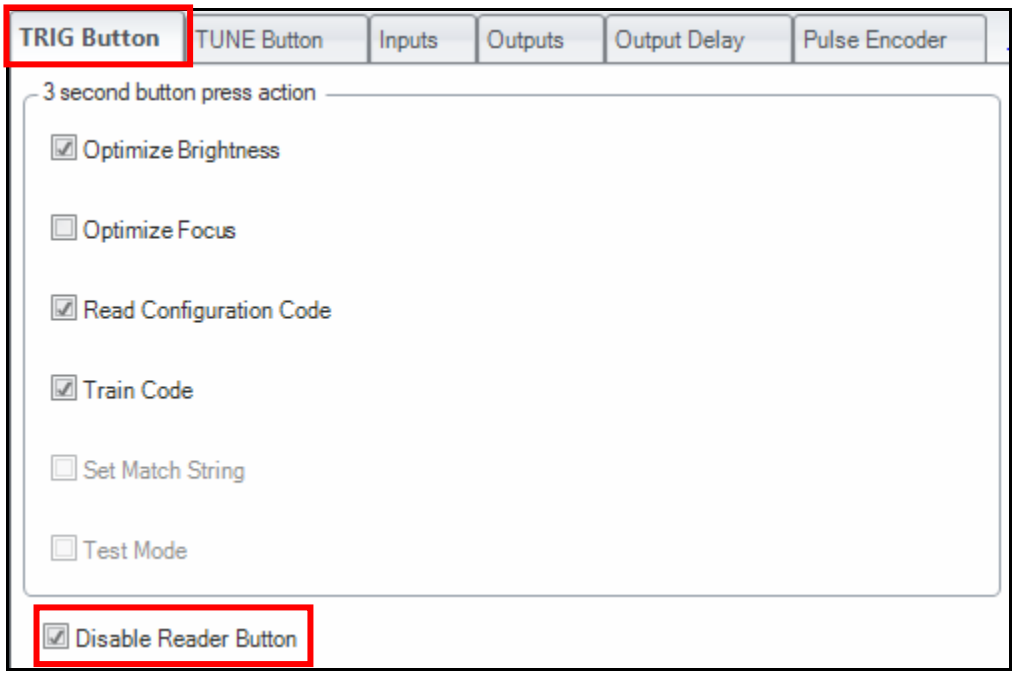
4. Click the **Tune** button on the **Optimize Image** application step to Tune the reader on the Ace of Hearts.
5. Navigate to the **Inputs/Outputs** application step.



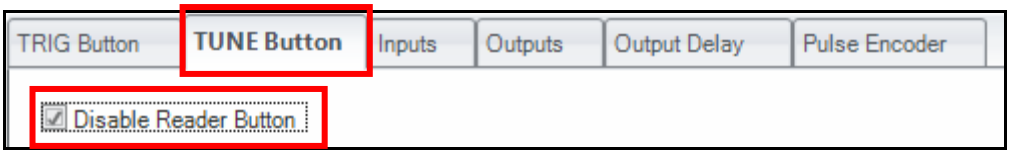
The **Inputs/Outputs** page displays.



6. Click the **TRIG Button** tab.
   The **TRIG Button** controls display.



7. Check the **Disable Reader Button** checkbox as shown above.
8. Next, click the **TUNE Button** tab.



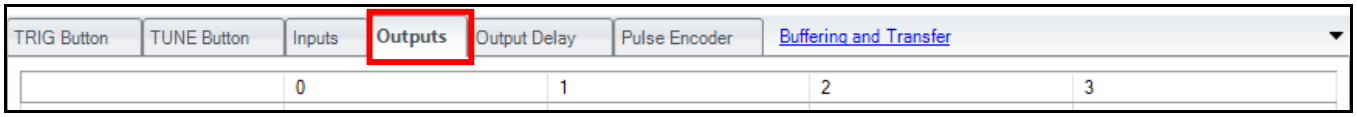
9. Check the **Disable Reader Button** checkbox as shown above.
10. Click the **TUNE** button on your reader.

11. Click the **TRIG** Button on your reader.

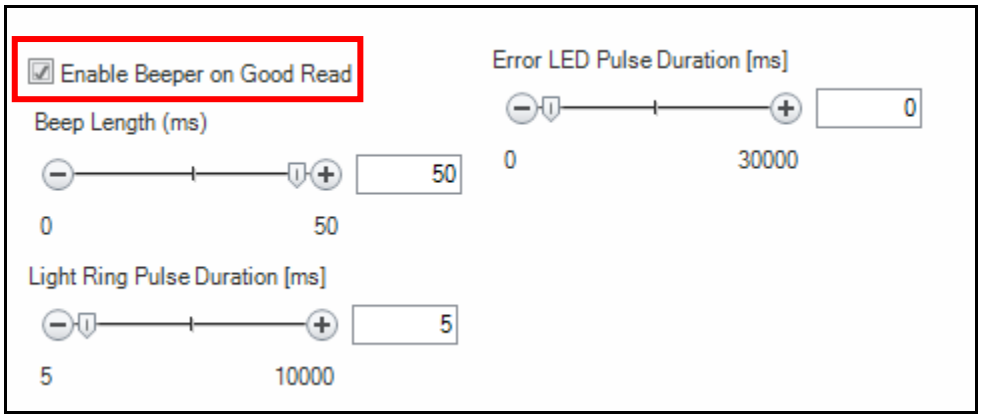
    Did anything happen?

12. Trigger your reader multiple times to get both good and bad reads on the Ace of Hearts. Notice the beeping sound on the good reads.

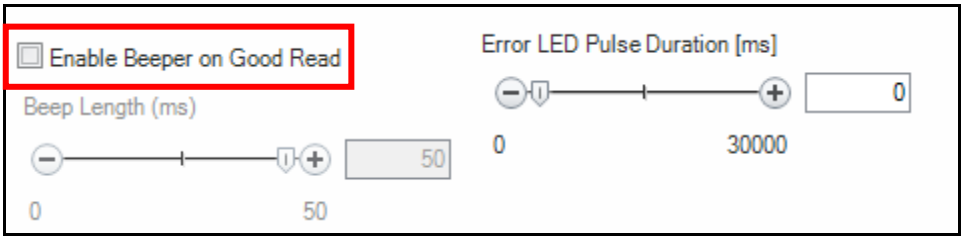
13. Click the **Outputs** tab.



Notice the **Enable Beeper on Good Read** checkbox is checked.



14. Uncheck the **Enable Beeper on Good** Read checkbox.



15. Trigger your reader multiple times to get both good and bad reads on the Ace of Hearts. Notice, there is now no beeping sound for any of the reads – good or bad.

Master / Slave

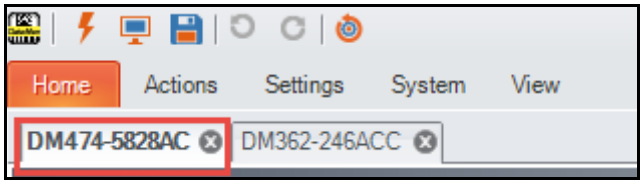
If the DataMan readers in the classroom are on the network the Instructor will tell you which reader you should select as your second reader. Each class member will have the opportunity for their reader to be the Master and the Slave in the grouping.

If you are using a DataMan 470 series reader it will require a feature key to complete this activity.

Follow the steps below to complete the lab exercise:

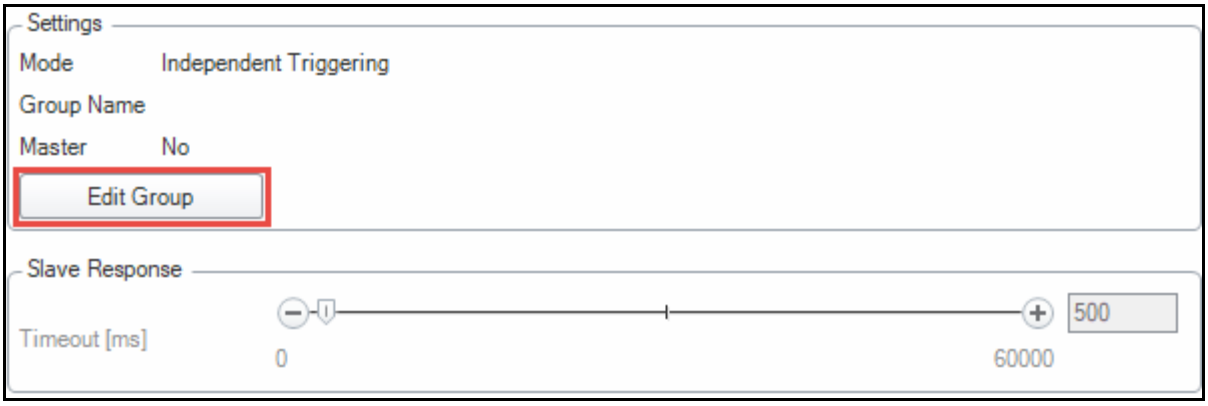
1. Connect your DataMan reader to the DataMan Setup Tool.
2. Click the **Reset Configuration** button from the **System** Menu.
3. The **Configuration reset** dialog box displays. Click the **OK** 

button to continue.
4. Connect to a second reader on the network.
5. Click the tab that corresponds to your reader, and click the **Settings** tab.



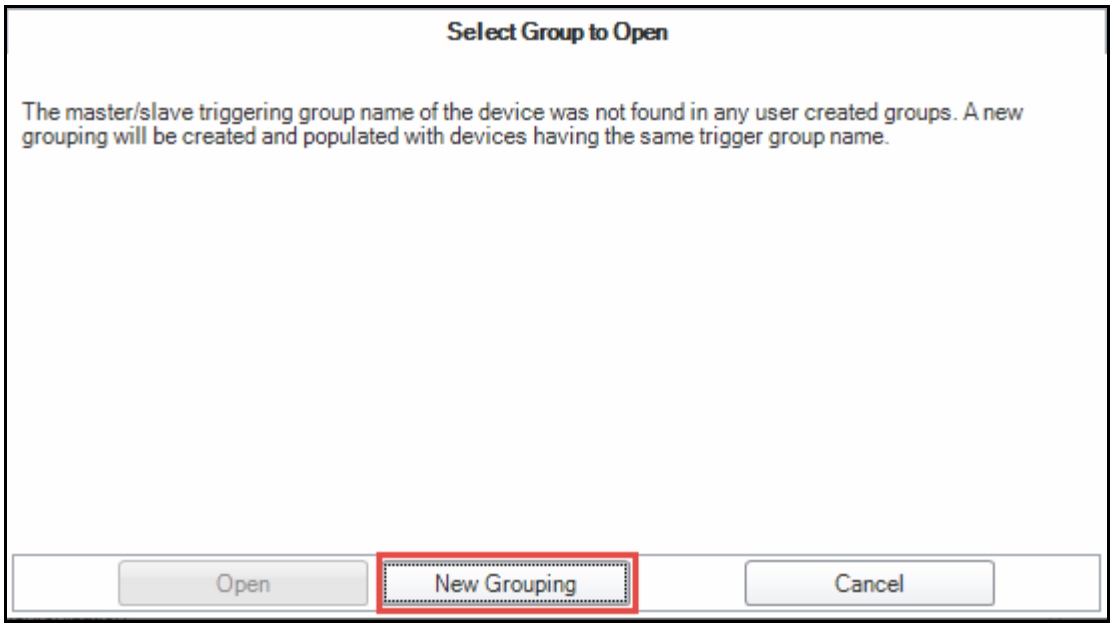
6. Click the **Master/Slave** button on the Settings tab.

The **Master/Slave** settings display.

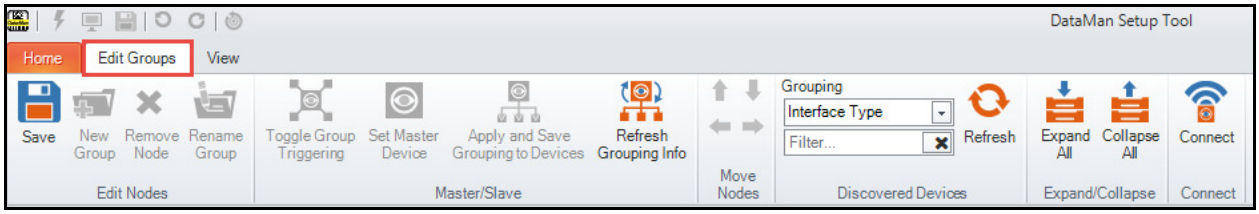


7. Click the **Edit Group** button.

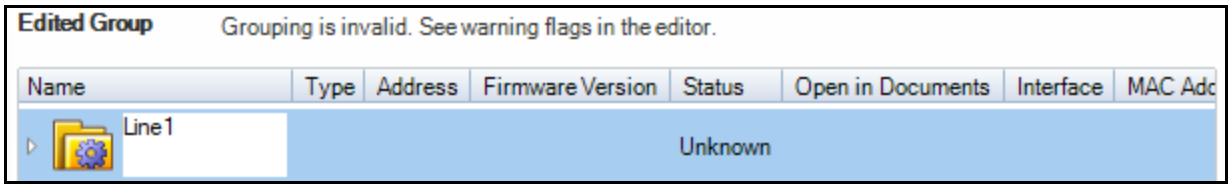
The **Select Group to Open** dialog displays.



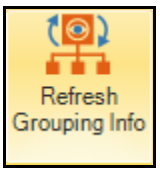
The **Edit Groups** tab displays.



8. Click on the folder with your reader's name. Confirm that the Grouping tab is selected.
9. Rename the folder to **Line1**.



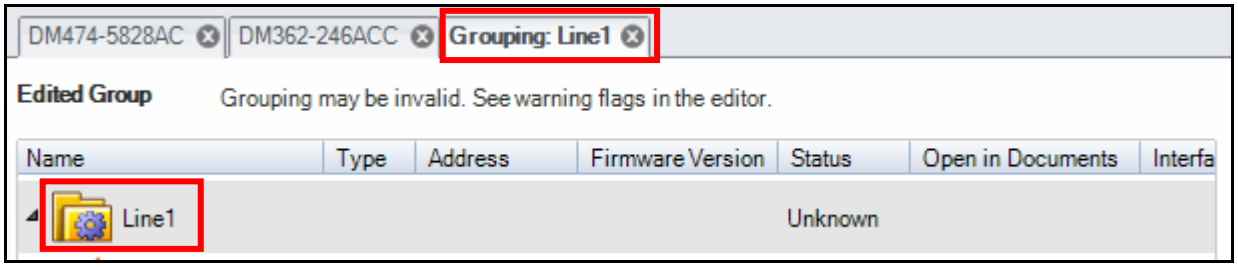
10. Click the **Refresh Grouping Info** button.
    This will update the PC.



11. Click the **Apply and Save Grouping to Devices** button.

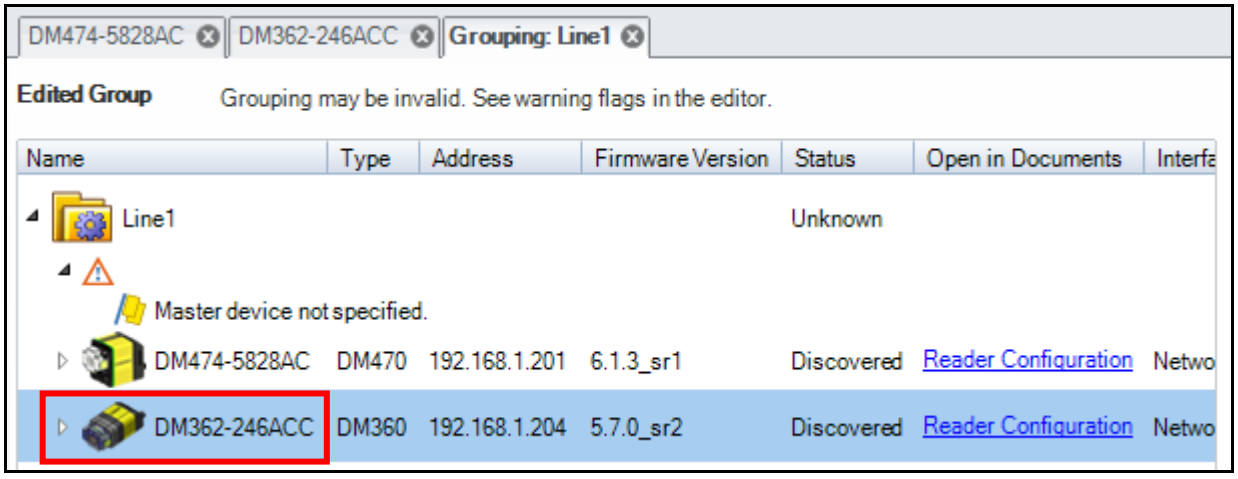
This will update the Reader.

12. Confirm the Grouping Tab and Group Name have updated to Line1.



13. Click the **Grouping: Line 1** tab.

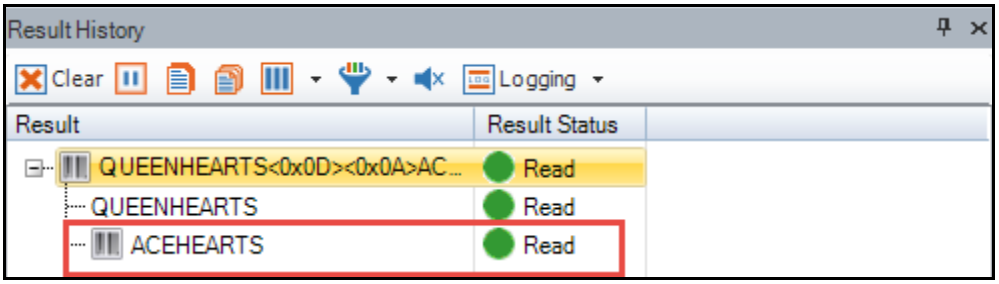
14. Highlight your second reader on the Discovered Devices and click the **Add Discovered Device(s)** button to add it to the group.
NOTE: *You can also drag and drop the reader into the group.*
The second reader is added to the group folder.



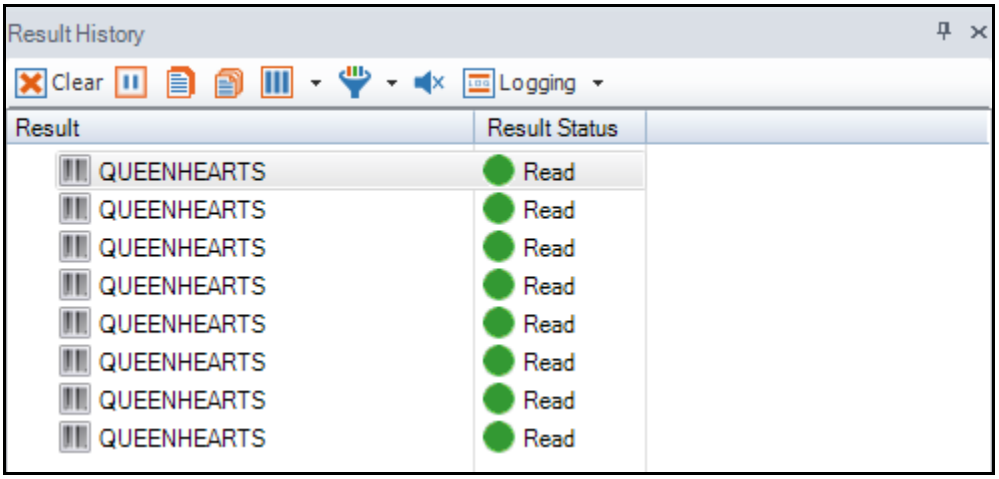
15. Select your reader and click the **Set Master Device** button.

16. Click the **Refresh Grouping Info** button.
    This will update the PC.
17. Click the **Apply and Save Grouping to Devices** button.
    This will update the Reader and eliminate error messages.
18. Click on the reader tab belonging to your DataMan reader.
19. Place the *Ace of Hearts* under your reader, and the *Queen of Hearts* under your second reader.
20. Click the **Trigger** button.
    The LEDs on both readers will flash.
21. Expand the Decode Results, verify the Master Reader is the collector of the decoded information.

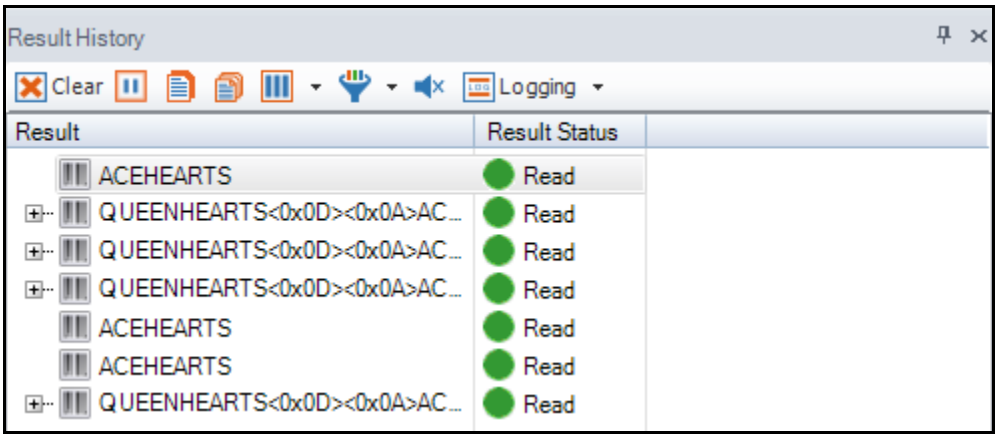
    NOTE: *The code with the image graphic is from the Master Reader*.



22. Click the second reader's tab.
23. Click the **Trigger** button.
    The LEDs on both readers will flash.
24. Review the **Results History** of your second reader.



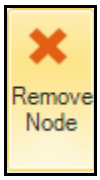
25. Click your Master reader's tab and review the **Results History**.



26. The Configured Settings on both the Master and Slave Readers must be the same.
    a. Code Details step
        a. 1D = Code 128 checked
        b. How many codes = 2
        c. Partial Results = Yes
        d. Codes = 2 1D/Stacked/Postal
    b. Application Details
        a. Trigger = Continuous
        b. Decode Settings
            i. Never Read Same Code Twice = checked
            ii. Code Re-Read Delay = 300
27. Click the **Trigger**  button.
    The LEDs on both readers will flash.
28. Review the results for both readers.

Remove a Reader from a Group

1. Click on the **Grouping: Line1** tab.
2. Click on the **Edit Groups** tab.
3. Click on the **Reader** to be removed from the group.
4. Click on the **Edit Groups** tab and click the **Remove Node** button.



6. Click the **Refresh Grouping Info** button.
7. Click the **Apply and Save Grouping to Devices** button.

Lab Exercise 6.1 – Deployment

At the end of this lab exercise, Participants will be able to:

- Utilize the utilities available in the DataMan Setup Tool to finish deploying the application

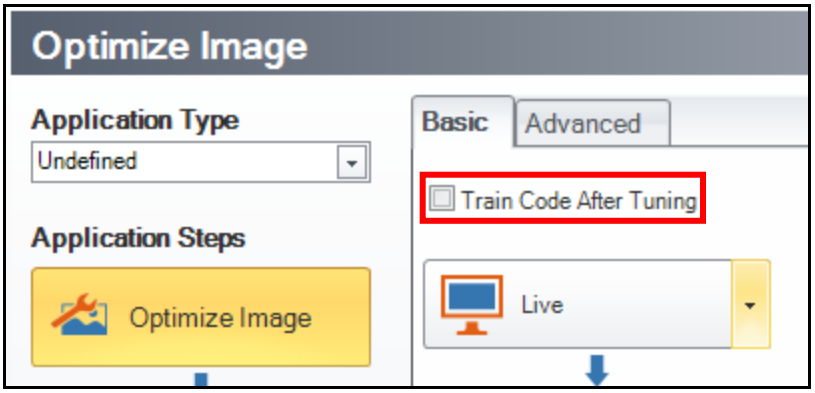
The Participant will utilize the following DataMan Functions to successfully complete this exercise:

- Code Quality Metrics
- RTM Lean
- Backup/Restore Configurations
- Update Firmware

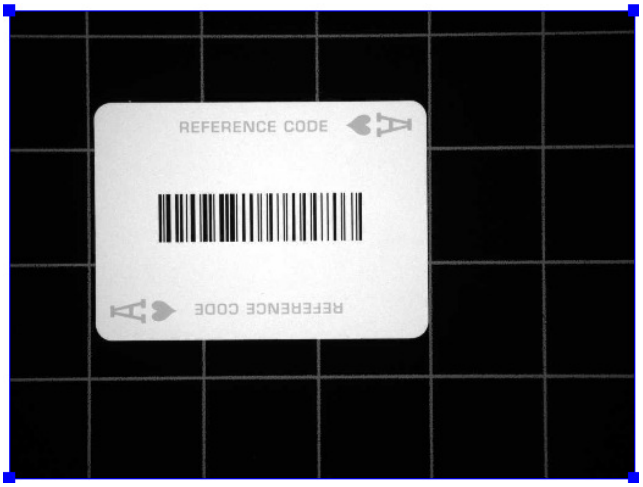
Code Quality Metrics – 1D Codes

Follow the steps below to complete the lab exercise:

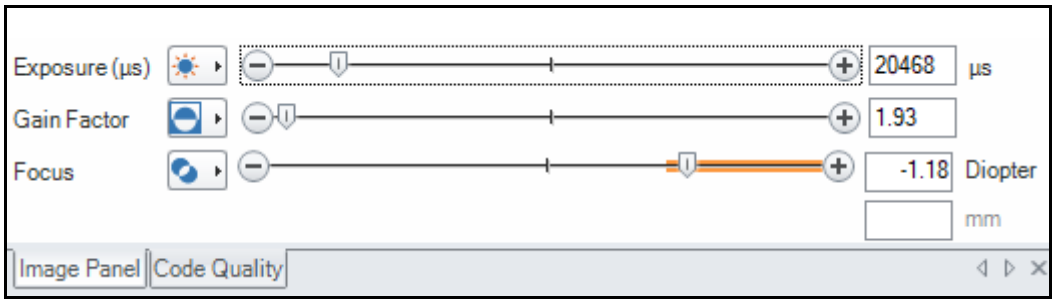
1. Connect your DataMan reader to the DataMan Setup Tool.
2. Navigate to the Optimize Image application and uncheck the **Train Code After Tuning** checkbox.



3. Tune the reader on the *Ace of Hearts* with the barcode horizontal in the image.

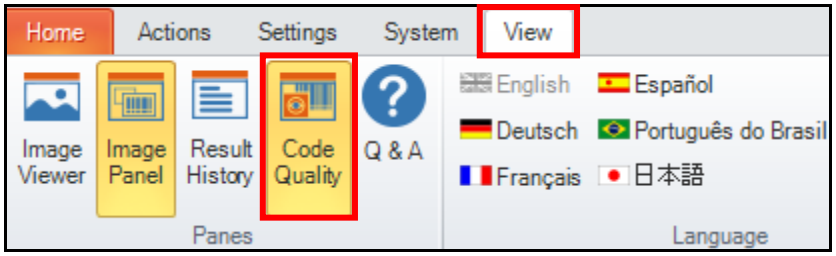


4. Manually adjust the settings using the settings below the image.
   NOTE: *Your settings will likely not match those in the screenshot below. Adjust your settings to create a good contrast between dark and light.*



5. Trigger the reader to ensure that it can read the code.

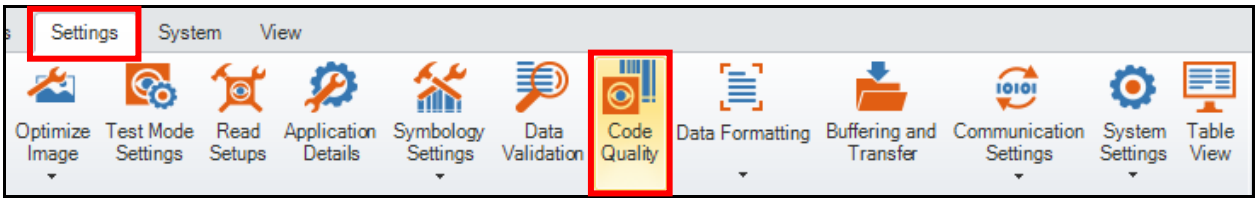
6. Open the **View** menu and click the **Code Quality** button.



   The Code Quality window opens.

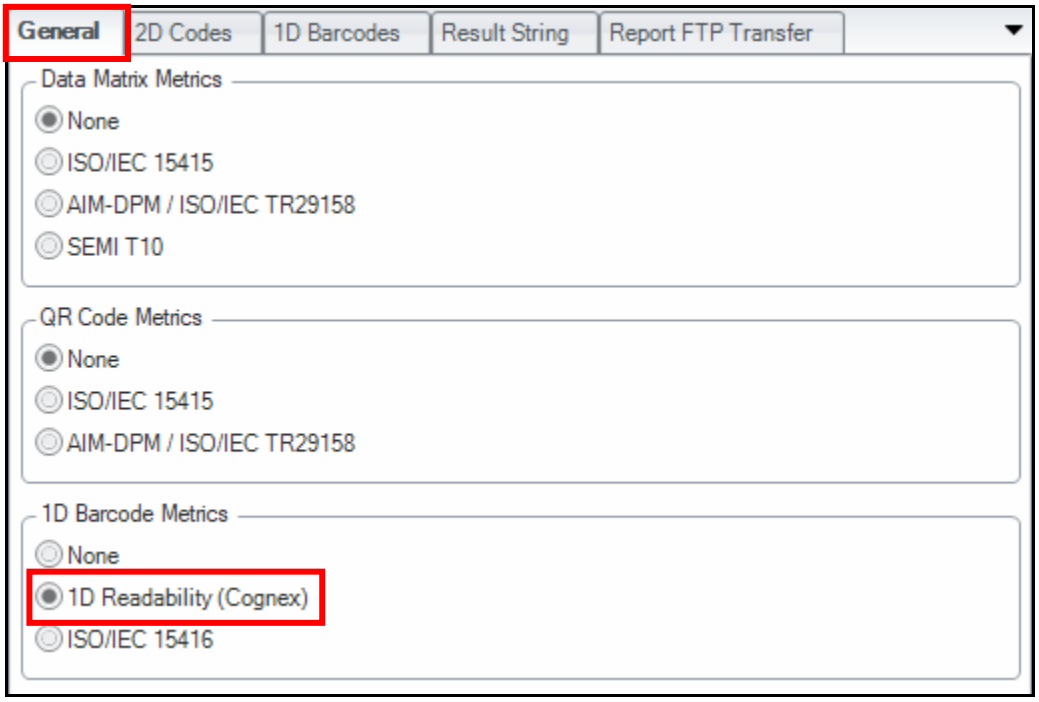
7. Trigger the reader and confirm the *Ace of Hearts* is read.
   Note that nothing displays in the **Code Quality** window. We need to enable this.

8. Open the **Settings** menu and click the **Code Quality** button.



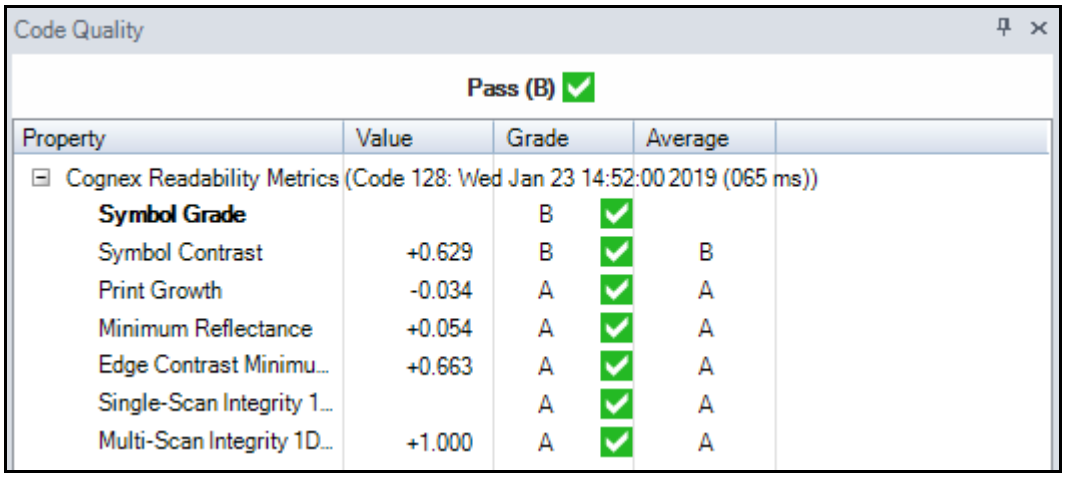
The **Code Quality** menu displays.

9. Under the **General** tab, click the **1D Readability (Cognex)** radio button under the 1D Barcode Metrics options.

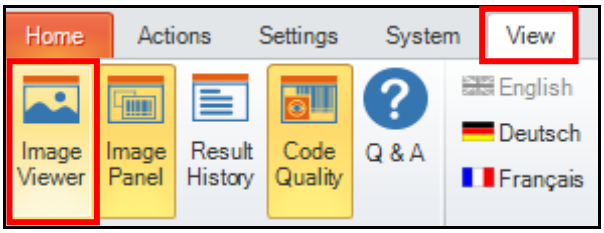


10. Trigger the reader.

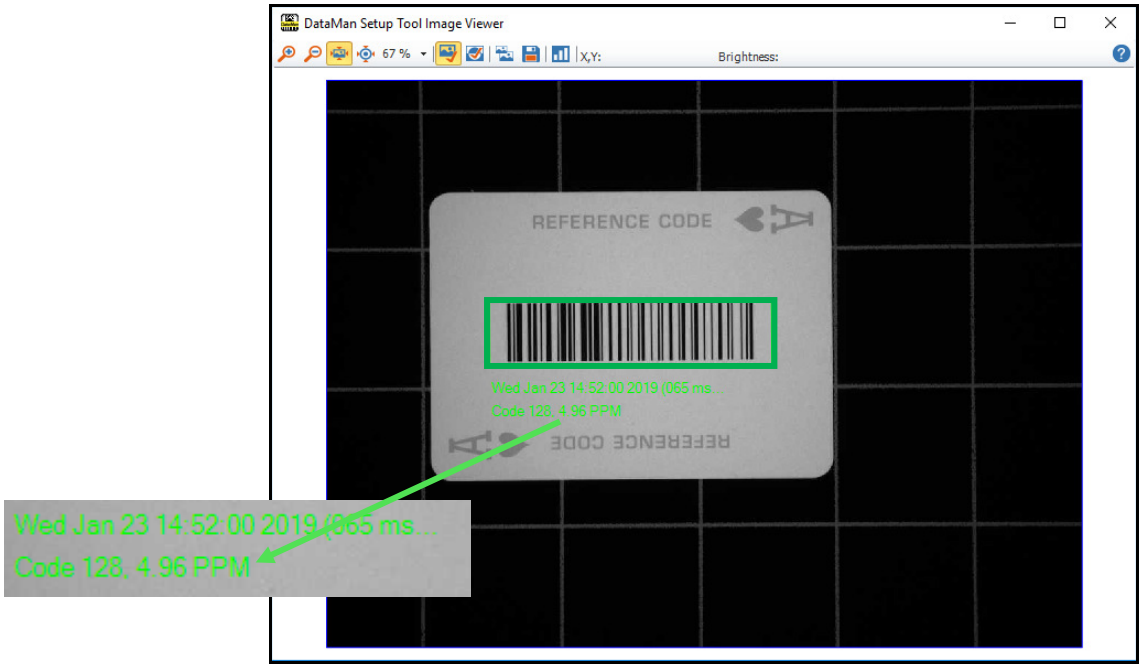
Review the results in the **Code Quality** window.



11. Open the **View** menu and click the **Image Viewer** button.

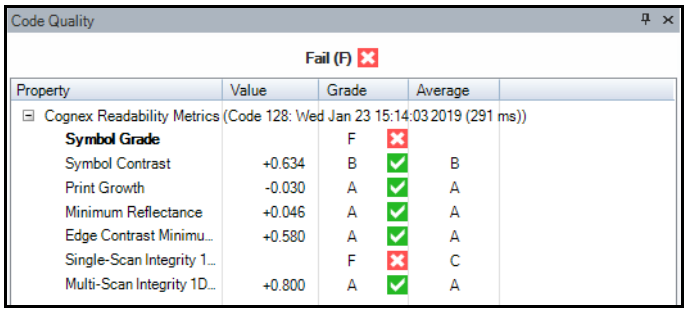


The **DataMan Setup Image Viewer** pop up window displays.

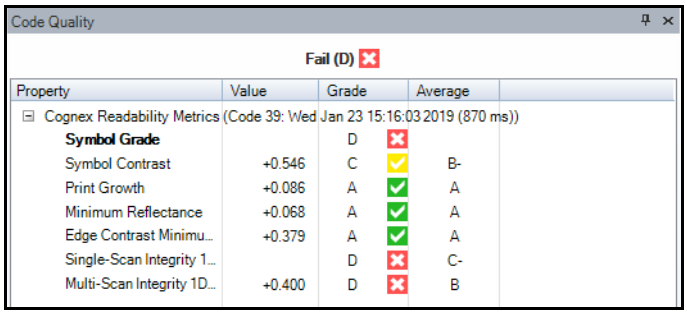


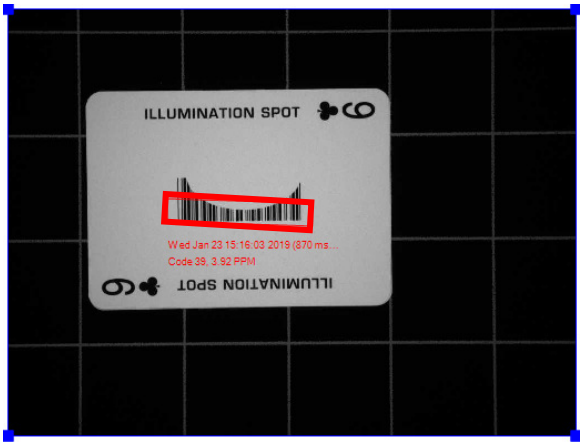
Notice the PPM – it is 4.96, this is within the 3-5 range which is ideal for 1D grading.

12. Change the card to the *King of Hearts* and trigger your reader. Review the results in the **Code Quality** window.



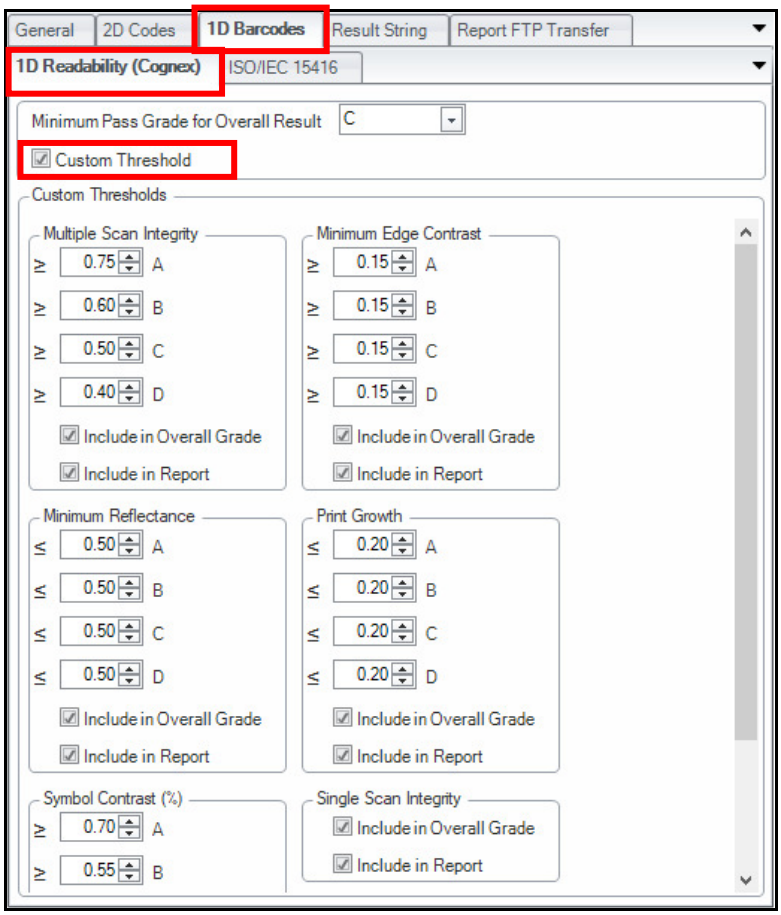
13. Change the card to the *9 of Clubs* and trigger your reader. Review the results in the **Code Quality** window.





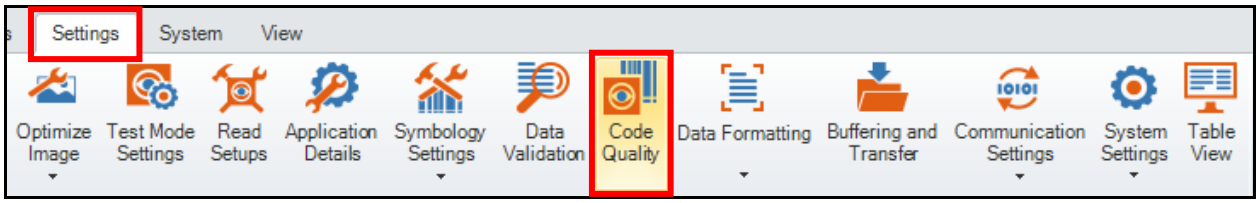
14. Look at the **Scan Integrity** grades for each. Notice how they are different.

NOTE: *The system assigns grades A-F based on thresholds for each of the parameters. However, the customer may not be interested in specific parameters, or they may want to adjust the values that define the A-F grade. This is done in the* ***1D Barcodes*** *tab in the Code Quality menu by checking the* ***Custom Threshold*** *checkbox.*



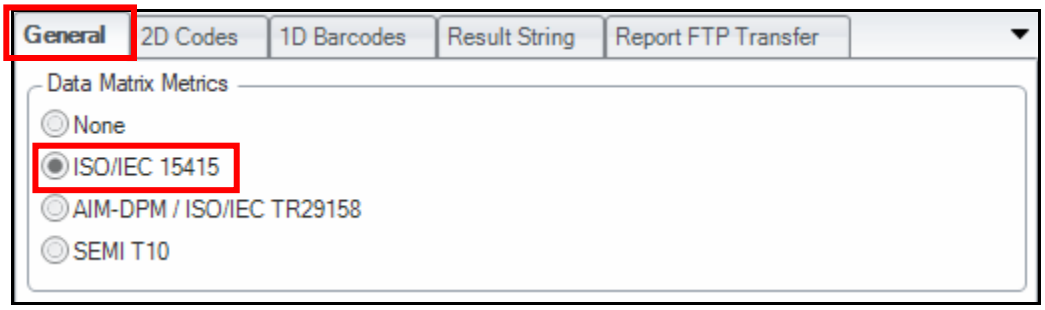
Code Quality Metrics – Data Matrix Codes

15. Open the **Settings** menu and click the **Code Quality** button.



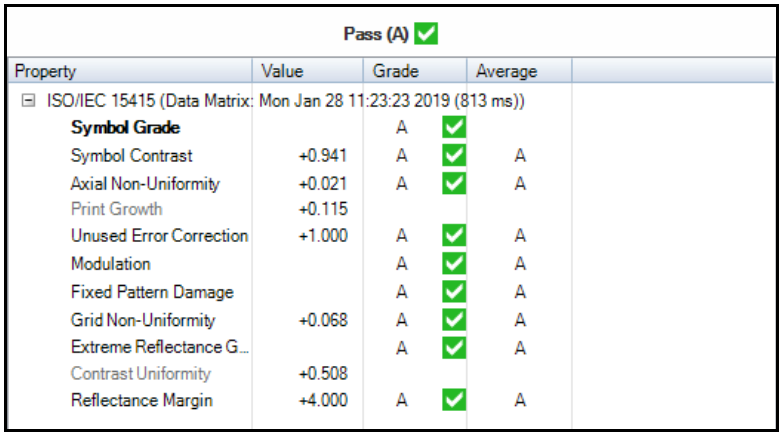
The **Code Quality** menu displays.

16. Under the **General** tab, click the **ISO/IEC 15415** radio button under the Data Matrix Metrics options.



17. Trigger the reader using the Good Data Matrix Code printed in the Resources section.

18. Review the **Code Quality** results to confirm you get a good grade when reading the Data Matrix code.



19. Put the *Damaged Code* in the FOV and trigger your reader.

Notice that the Fixed Pattern Damage metric fails.

Fail (F)

Property	Value	Grade	Average
ISO/IEC 15415 (Data Matrix: Mon Jan 28 13:03:52 2019 (735 ms))			
Symbol Grade		F	
Symbol Contrast	+0.941	A	A
Axial Non-Uniformity	+0.010	A	A
Print Growth	+0.096		
Unused Error Correction	+1.000	A	A
Modulation		A	A
Fixed Pattern Damage		F	B
Grid Non-Uniformity	+0.024	A	A
Extreme Reflectance G...		F	B
Contrast Uniformity	+0.708		
Reflectance Margin	+4.000	A	A

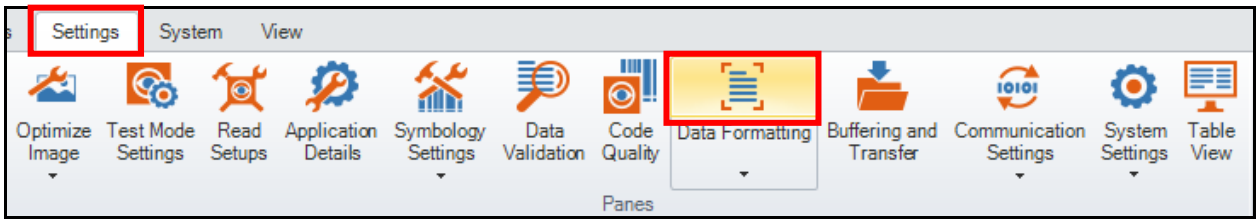
Code Quality Reports

Code Quality works while the system is up and running, so you have a couple of options to output the data in real-time.

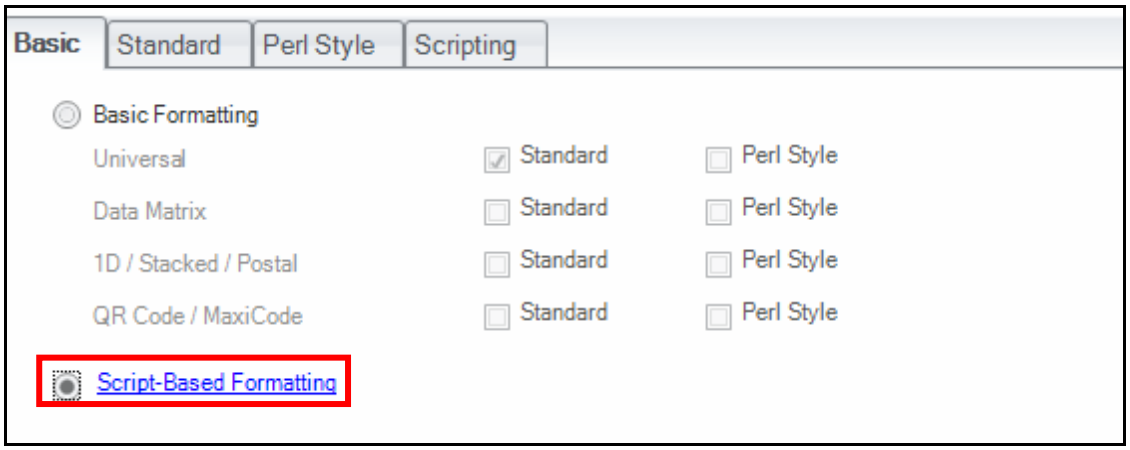
The first method is to add the grade and code quality values to the output string, so it can be monitored by the customer's system.

Follow the steps below to complete the lab exercise:

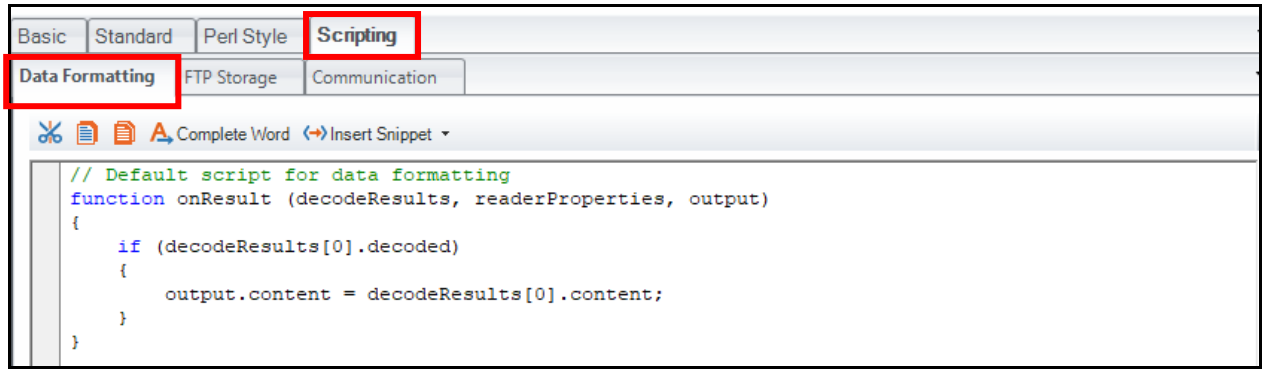
1. Open the **Settings** menu and click the **Data Formatting** button.



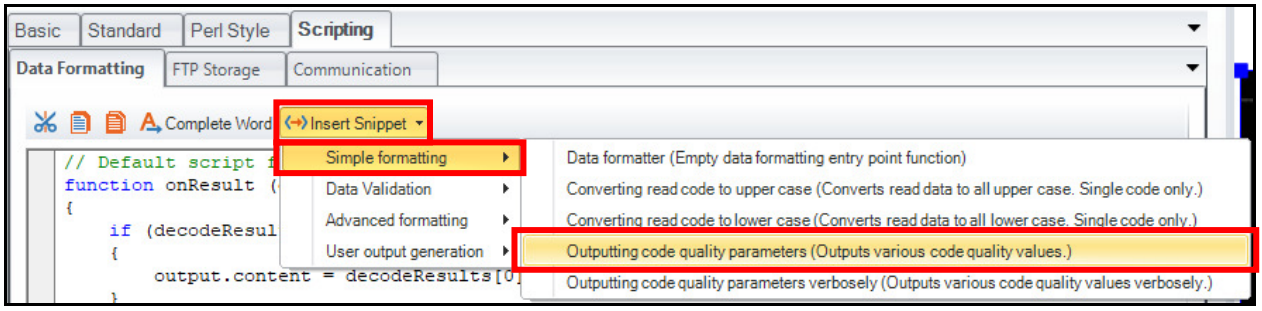
2. Click the **Script-Based Formatting** radio button and click into the blue hyperlink.



The **Scripting Data Formatting** page displays.



3. Click **Insert Snippet → Simple Formatting → Outputting code quality parameters**.



The **Snippet script** displays.

```
            output.content = decodeResults[0].content +
                "SC: " + decodeResults[0].metrics.symbolContrast.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.symbolContrast.grade + ")" +
                " PG: " + decodeResults[0].metrics.printGrowth.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.printGrowth.grade + ")" +
                " SSI: " + decodeResults[0].metrics.singleScanInt.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.singleScanInt.grade + ")" +
                " MSI: " + decodeResults[0].metrics.multiScanInt.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.multiScanInt.grade + ")" +
                " MR: " + decodeResults[0].metrics.reflectMin.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.reflectMin.grade + ")" +
                " MEC: " + decodeResults[0].metrics.edgeContrastMin.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.edgeContrastMin.grade + ")";
        }
    }
}
```

4. Place the Good Code in the FOV and trigger your reader.
   Notice that the script added the same parameters you see in the Code Quality pane (at the bottom of the screen) to the output string:

```
2DMax with PowerGrid SC: 0.94(A) ANU: 0.02(A) PG: 0.11(A) UEC: 1.00(A) MOD: 4.00(A) FPD: 4.00(A) MR: -1.00(NA) GNU: 0.06(A) ExtRef (15415 only): 1.00(A)
```

Code Quality

Pass (A) ✓

Property	Value	Grade	Average
ISO/IEC 15415 (Data Matrix: 2DMax with PowerGrid SC: 0.94(A) ANU: 0.02(A) PG: 0.11(A) UEC: 1.0			
Symbol Grade		A ✓	
Symbol Contrast	+0.941	A ✓	A
Axial Non-Uniformity	+0.020	A ✓	A
Print Growth	+0.109		
Unused Error Correction	+1.000	A ✓	A
Modulation		A ✓	A
Fixed Pattern Damage		A ✓	B-
Grid Non-Uniformity	+0.063	A ✓	A
Extreme Reflectance G...		A ✓	B-
Contrast Uniformity	+0.517		
Reflectance Margin	+4.000	A ✓	A

- SC = Symbol Contrast
- ANU = Axial Non-uniformity
- PG = Print Growth
- UEC = Unused Error Correction
- MOD = Modulation
- FPD = Fixed Pattern Damage
- MR = Reflectance Margin
- GNU = Grid Non-uniformity
- ExtRef = Extreme Reflectance Grade

NOTE: *This is completed with the sample script that we enabled, and as a result it is completely customizable.*

```
            output.content = decodeResults[0].content +
                "SC: " + decodeResults[0].metrics.symbolContrast.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.symbolContrast.grade + ")" +
                " PG: " + decodeResults[0].metrics.printGrowth.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.printGrowth.grade + ")" +
                " SSI: " + decodeResults[0].metrics.singleScanInt.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.singleScanInt.grade + ")" +
                " MSI: " + decodeResults[0].metrics.multiScanInt.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.multiScanInt.grade + ")" +
                " MR: " + decodeResults[0].metrics.reflectMin.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.reflectMin.grade + ")" +
                " MEC: " + decodeResults[0].metrics.edgeContrastMin.raw.toFixed(2) +
                "(" + decodeResults[0].metrics.edgeContrastMin.grade + ")";
        }
    }
}
```

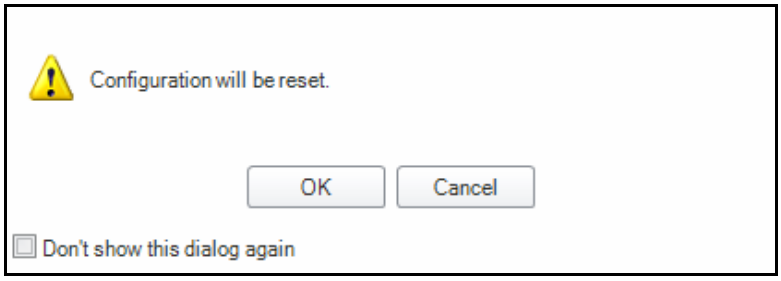
NOTE: *As you can see, you can change the order and labels very easily with no programming experience required. The end user simply accepts and outputs and parses the data in the system to take action where needed.*

RTM Lean

Follow the steps below to complete the lab exercise:

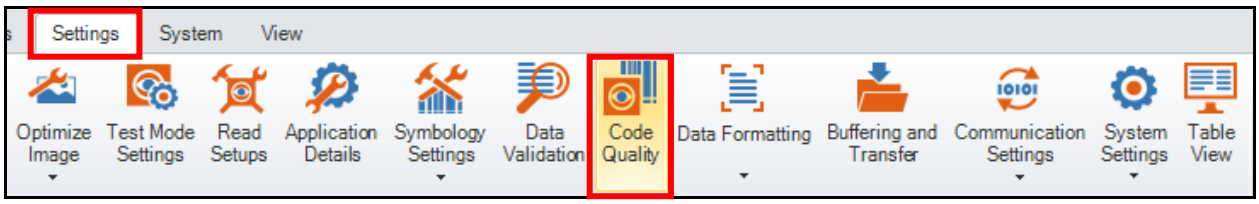
1. Connect your DataMan reader to the DataMan Setup Tool.
2. Click the **Reset Configuration** button from the **System** Menu.

The **Configuration reset** dialog box displays.

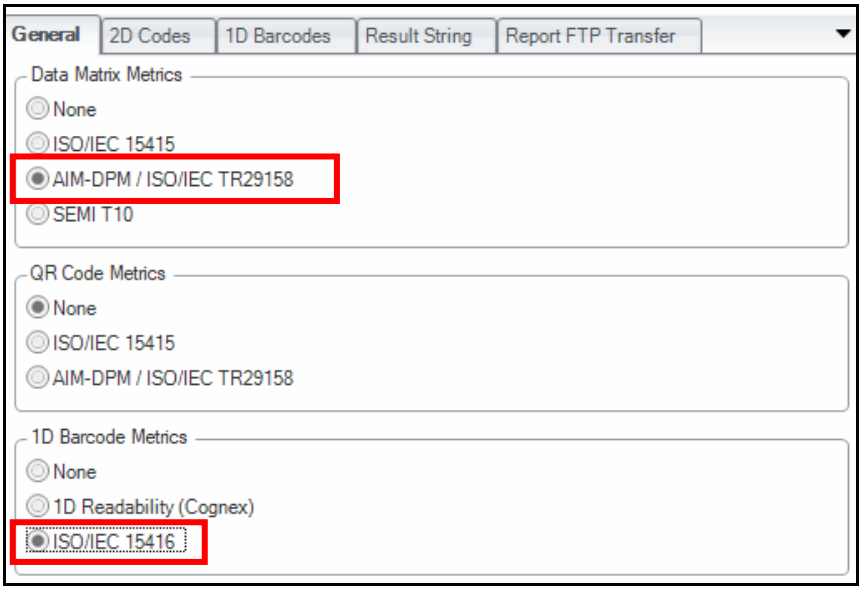


3. Click the **OK**  button to continue.

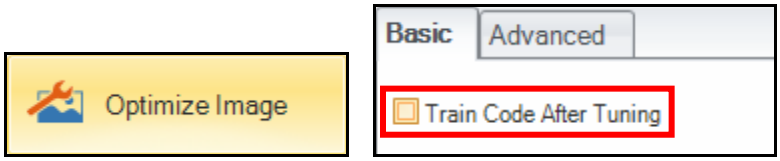
4. Open the **Settings** menu and click the **Code Quality** button.



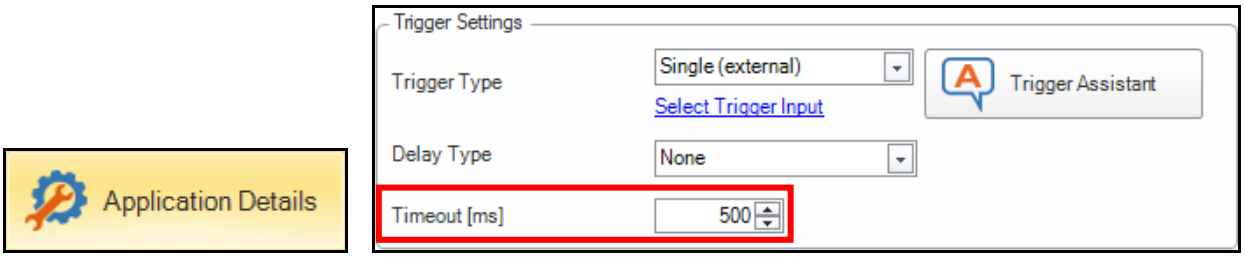
5. Check the **Data Matrix Metrics** *AIM-DPM/ISO/IEC TR29158* and the **1D Barcode Metrics** *ISO/IEC 15416* radio buttons.



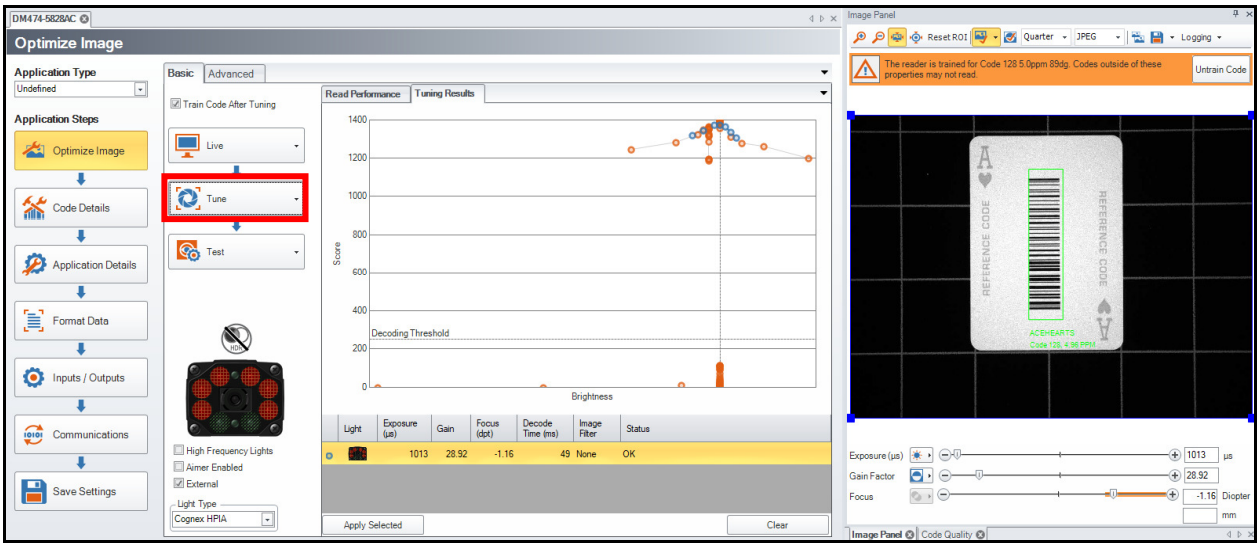
6. Navigate to the **Optimize Image** application step and uncheck the **Train Code After Tuning** checkbox.



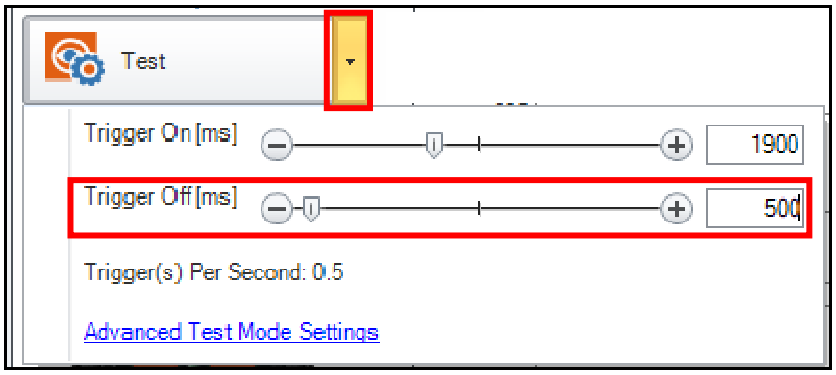
7. Navigate to the **Application Details** application step and set the Timeout[ms] to 500.



8. Return to the **Optimize Image** application step and click the **Tune** button to Tune the reader on the Ace of Hearts.

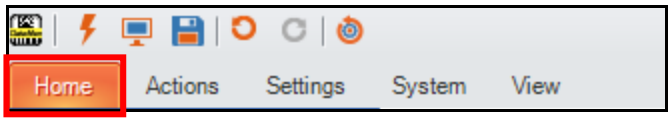


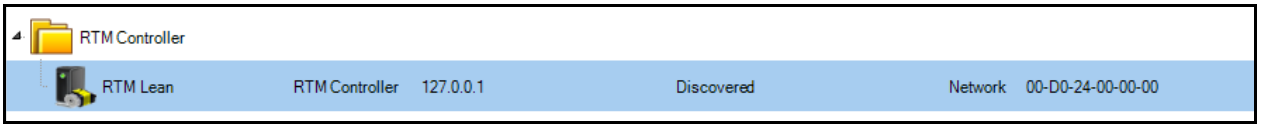
9. Click the down arrow on the **Test** button and set the **Trigger Off [ms]** to *500*.



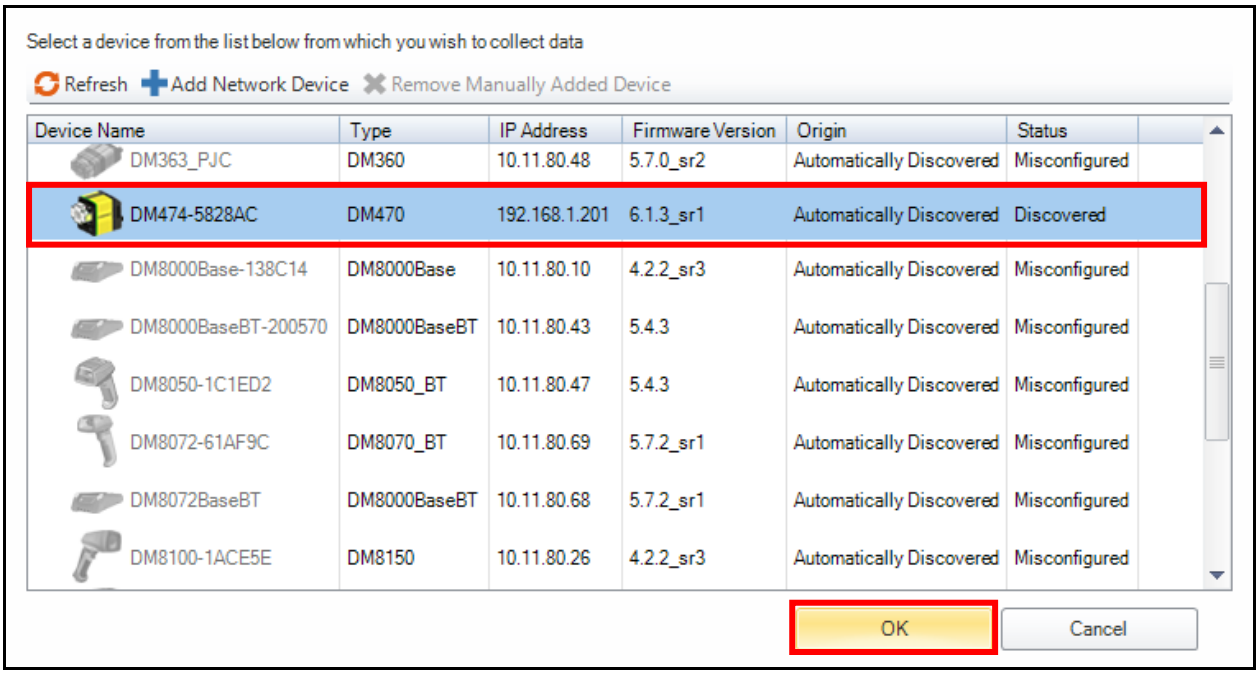
10. Click the **Test** button to enable Test Mode. This will simulate an external trigger to the reader roughly 2 times per second.

11. Return to the **Home** page and Connect to the **RTM Lean** Network Device.





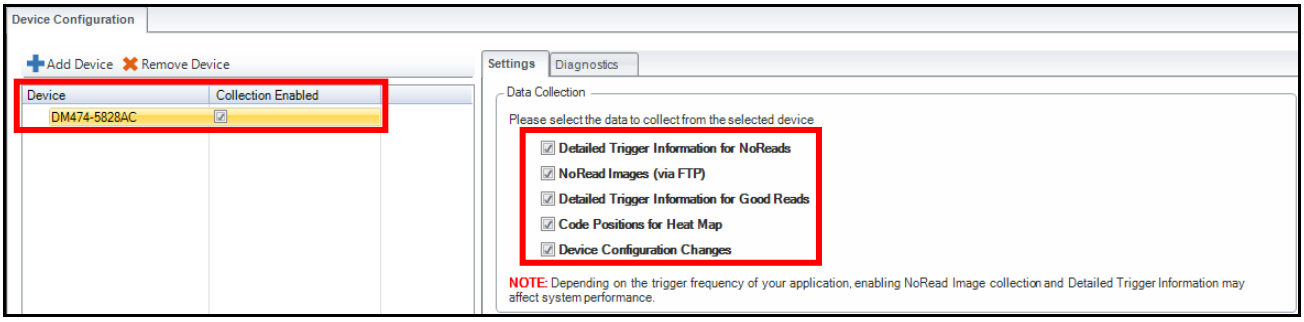
12. The list of available readers displays. Select your reader from the list and click the **OK**  button.



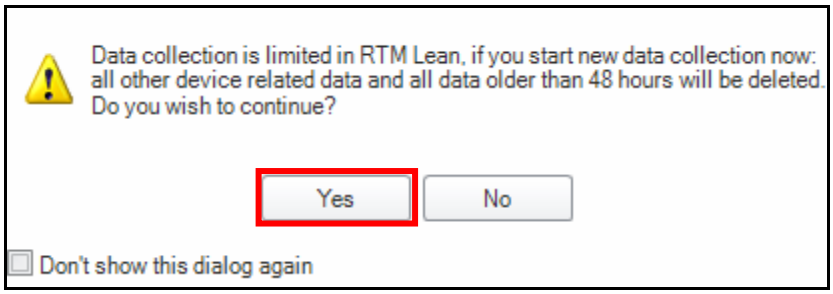
The **Collection Configuration** page displays.

NOTE: *You are connected to the DM474 and the RTM Lean Network Device.*

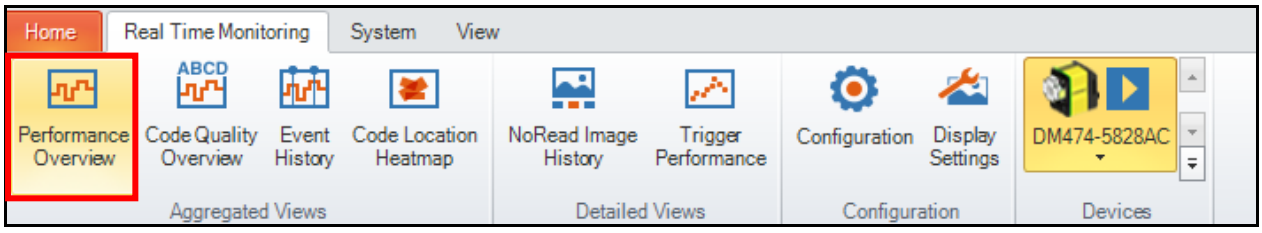
13. Check all the checkboxes within the **Data Collection** Settings section and the **Collection Enabled** checkbox, then click the **Apply** Apply button.
NOTE: *If you are already connected to the RTM Lean you may need to click the Configuration cog to get to the Collection Configuration page.*



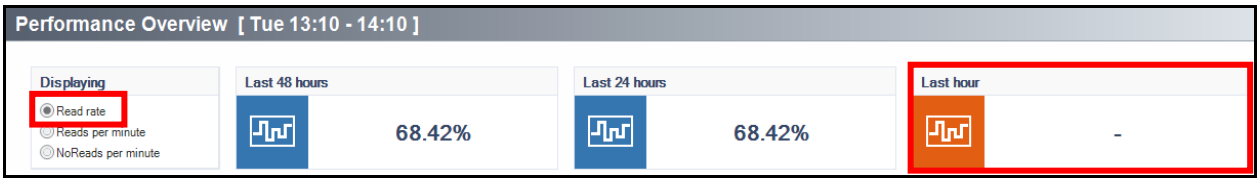
The **Data Collection** warning box displays.



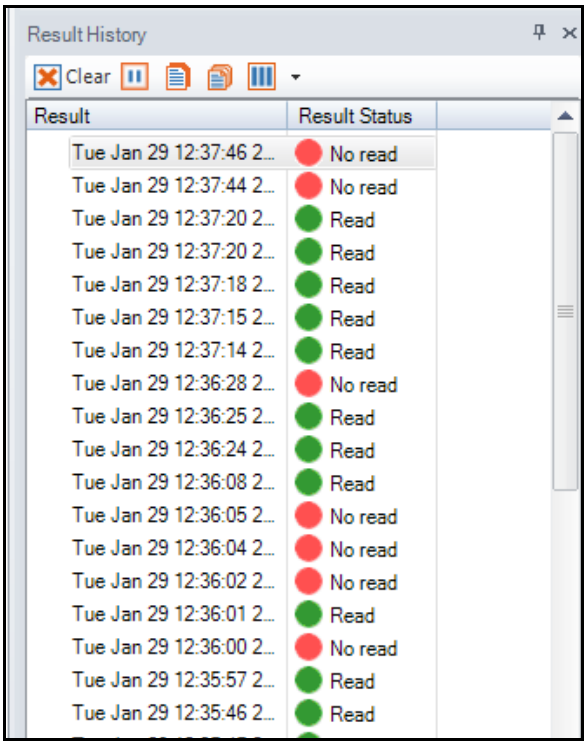
14. Click the **Yes** Yes button to continue.
NOTE: *The Real Time Monitoring window within the Setup Tool must remain open for data to be collected*.
15. Click the **Performance Overview** button to enter the Performance Overview page.



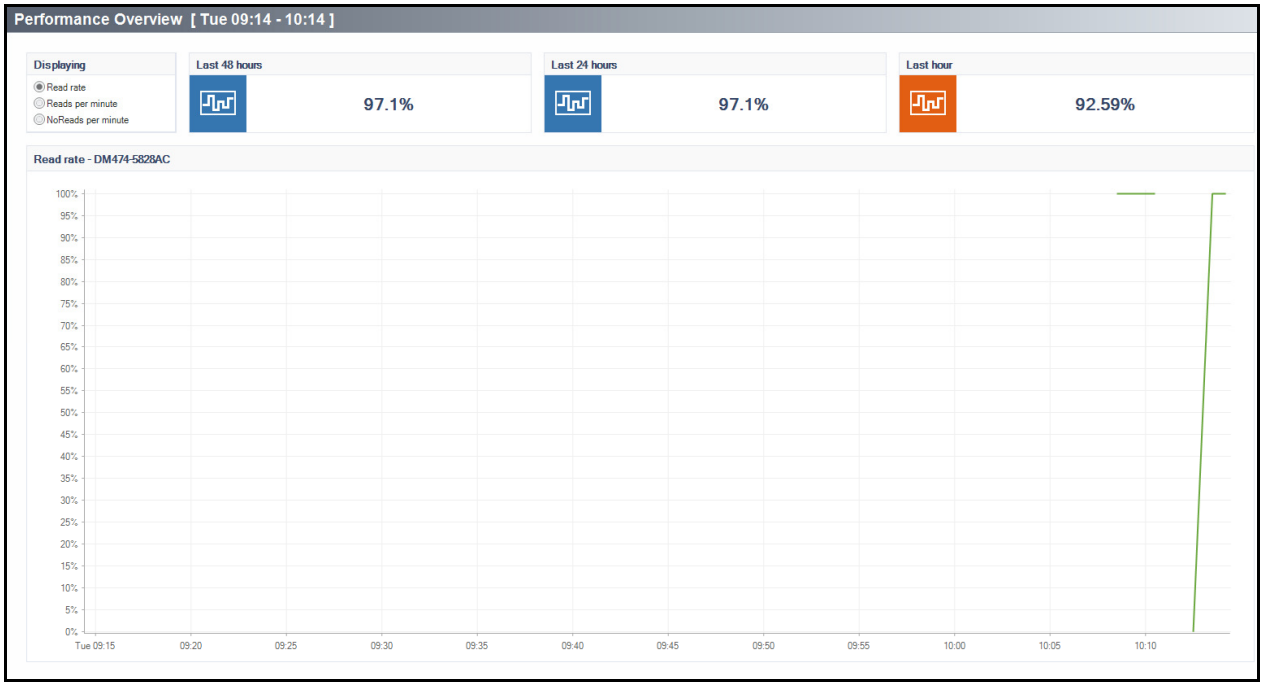
16. Check the **Read rate** radio button and select the **Last hour** chart. This will show the statistics for the last hour only.



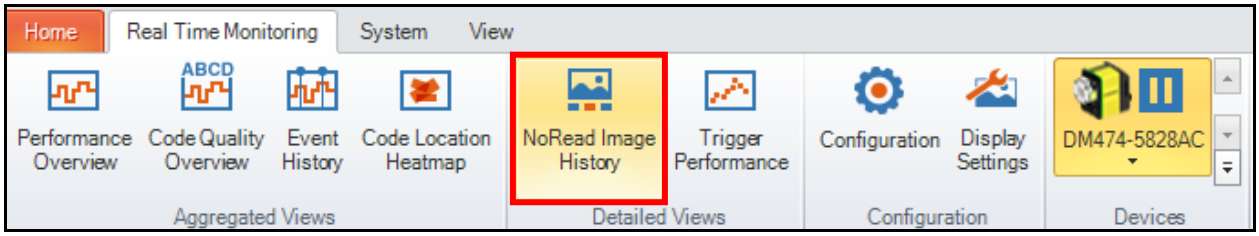
17. Trigger the reader on the Ace of Hearts – get a collection of good and bad reads. Put your finger or another object over the code so the reader cannot read it to get the bad result.



18. Review the Read rate result graph for the Last hour – notice how the graph dips when there is a bad read result.



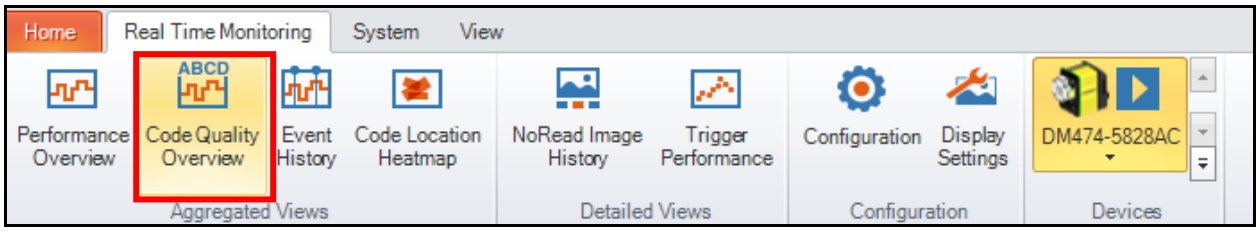
19. Click the **NoRead Image History** button to see the no read images that have been automatically stored there.

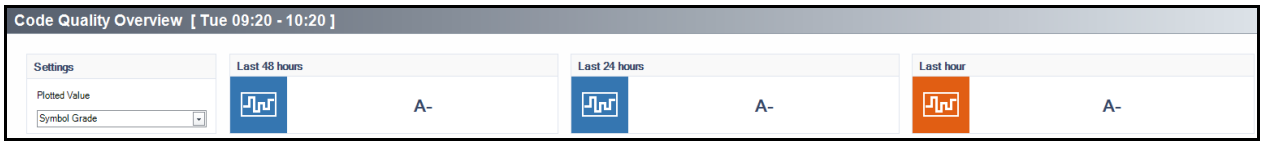


Time Stamp	Trigger Index	Classification	Name
1/29/2019 12:55:51 PM	66	N/A	DM474-5828AC
1/29/2019 12:55:50 PM	65	N/A	DM474-5828AC
1/29/2019 12:51:38 PM	54	N/A	DM474-5828AC
1/29/2019 12:51:36 PM	53	N/A	DM474-5828AC
1/29/2019 12:51:32 PM	52	N/A	DM474-5828AC
1/29/2019 12:51:30 PM	51	N/A	DM474-5828AC
1/29/2019 12:51:25 PM	50	N/A	DM474-5828AC
1/29/2019 12:46:25 PM	45	N/A	DM474-5828AC
1/29/2019 12:46:22 PM	44	N/A	DM474-5828AC

NOTE: *The Time Stamp matches the performance chart, so you can correlate the performance trend to the specific no-read images.*

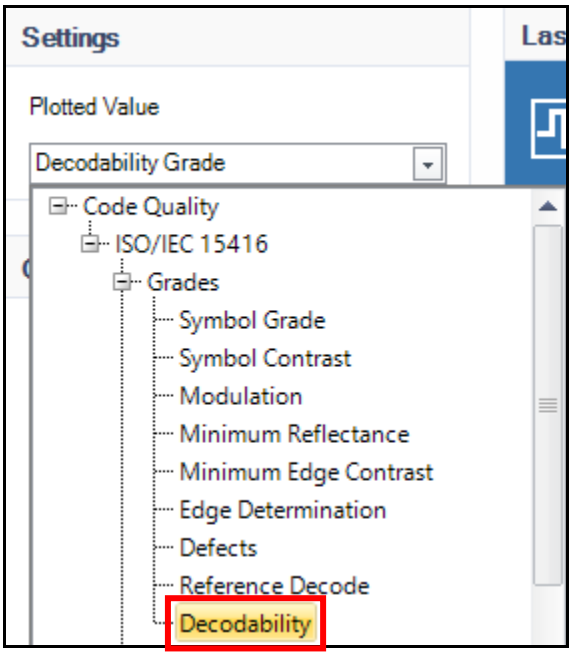
20. Click the **Code Quality Overview** button to view the statistics available to the reader.



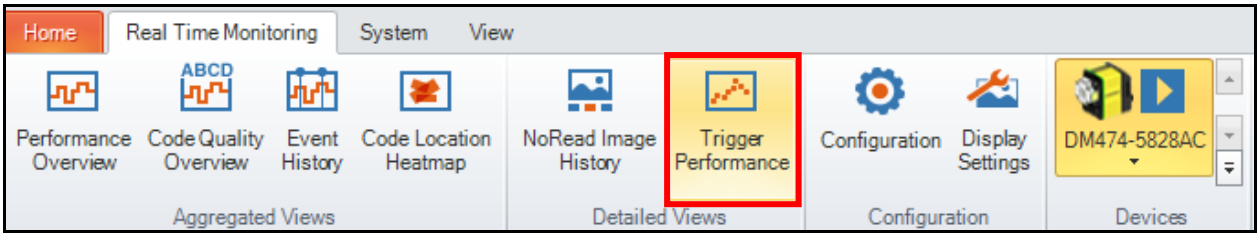


NOTE: *The drop down on the left will allow you to see the statistics that are available to the reader. In other words, if you do not have the grading turned on, your device does not have a PCM feature key, or you are not running 5.7 (or higher) firmware, you will not see anything in the list.*

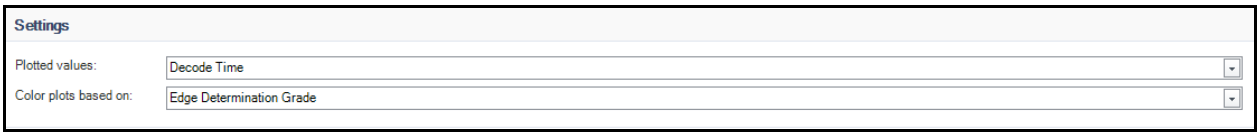
21. Change the Plotted Value to **Decodability Grade** (1D ISO/IEC 15416 → Grades → Decodability.

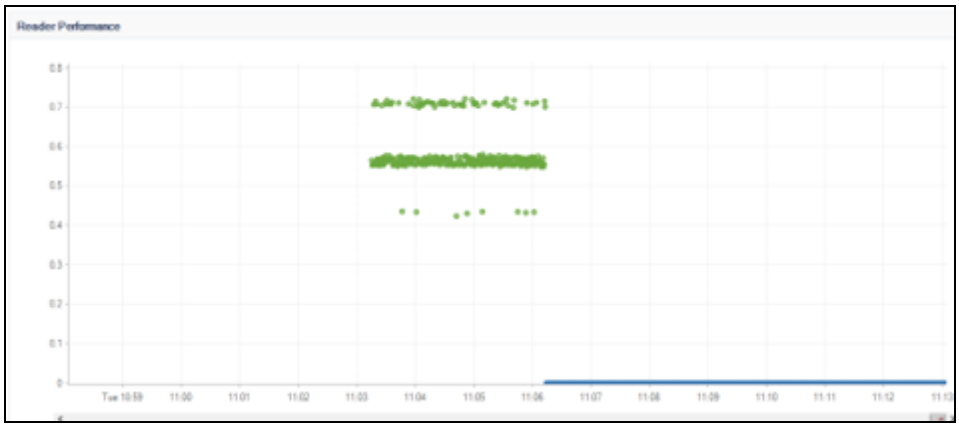


21. Place the *King of Hearts* under the reader and notice to Decodability because of the damage inside of the code.
22. Click the **Trigger Performance** button.



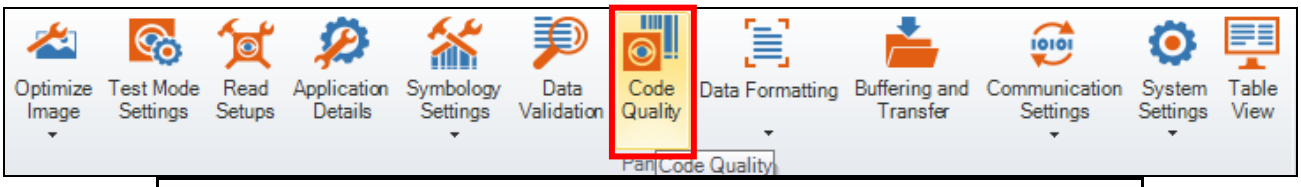
23. Select *Decode Time* for the **Plotted values** field, and *Edge Determination Grade* for *Color plots based on* field.

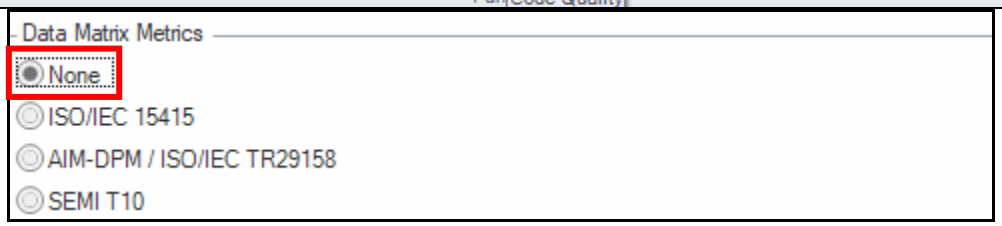




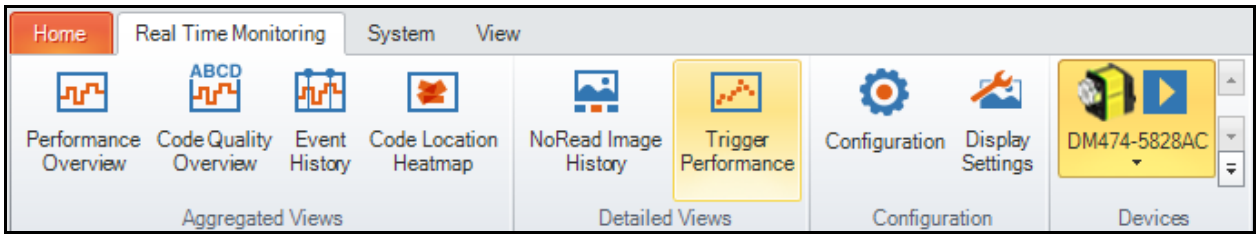
NOTE: *If you click on any of the points corresponding to a no-read, then you can see a snapshot of the image here as well.*

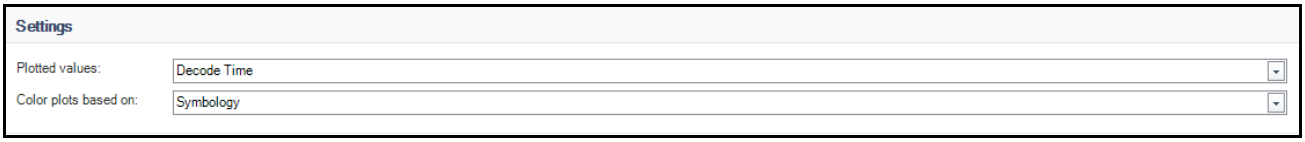
24. Click the **Code Quality** button and disable the **Data Matrix** symbology.





25. Return to Trigger Performance and select *Decode Time* for the **Plotted values** field, and *Symbology* for **Color plots based on** field.





NOTE: *If you introduced any high decode times due to no-reads while changing cards then you may need to adjust the slide bar at the bottom of the graph to get a more granular view. Here you should be able to see how decode times increased when we introduced the King of Hearts, because the damage added more time, but then decreased when we turned off Data Matrix, as the decoder has less to search for.*

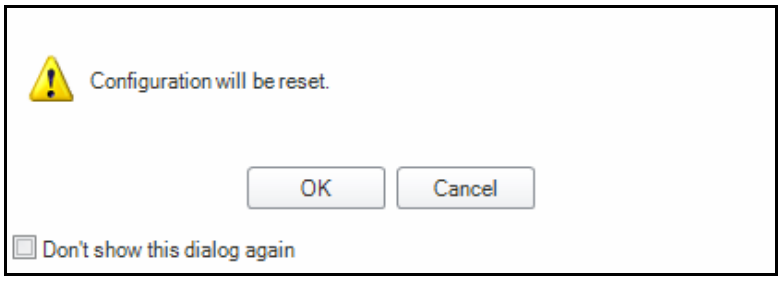
Buffering and Transfer

In this lab you will learn how to save images to your PC using the Buffering and Transfer menu. You will also learn how to use the Auto no-read image saving functionality.

Follow the steps below to complete this lab exercise:

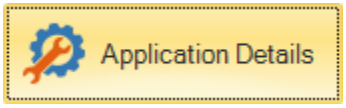
1. Connect your DataMan reader to the DataMan Setup Tool.
2. Click the **Reset Configuration** button from the **System** Menu.

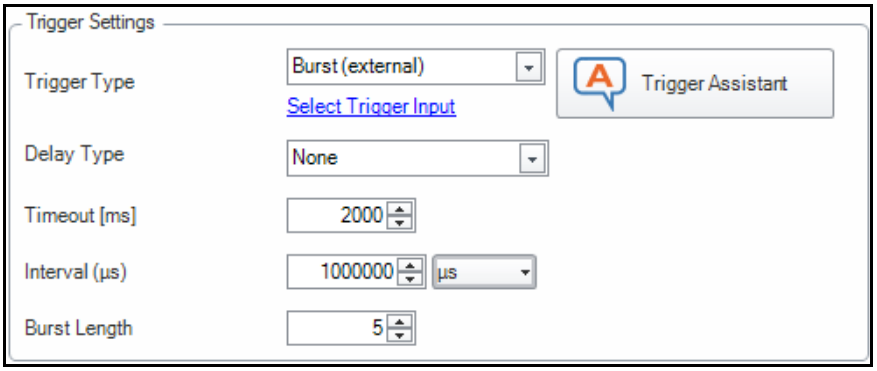
The **Configuration reset** dialog box displays.



3. Click the **OK**  button to continue.

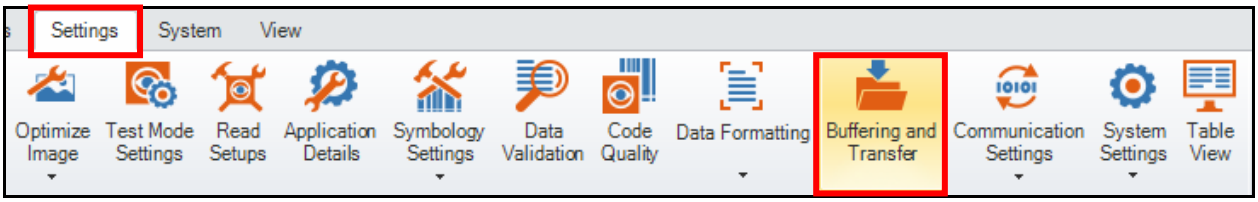
4. Navigate to the **Application Details** step and set the following *Trigger Settings* parameters:
   - **Trigger Type** = *Burst*
   - **Interval (µs)** = *1,000,000* (1s)
   - **Burst Length** = *5*



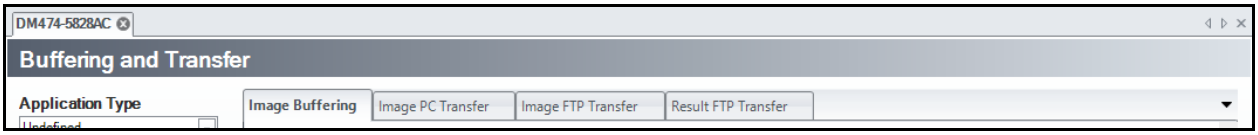


5. Return to the **Optimize Image** step – open the **Tune** menu and use the *Optimize Brightness* and *Optimize Focus* settings to ensure that you can read the Ace of Clubs.

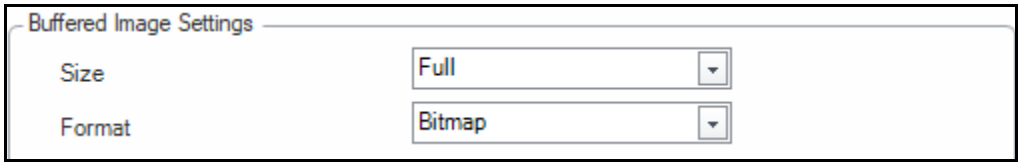
6. Open the **Settings** menu and click the **Buffering and Transfer** button.



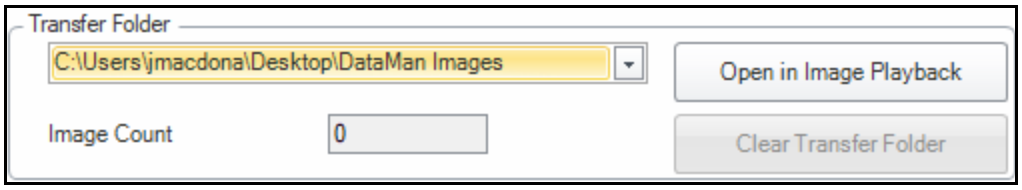
The **Buffering and Transfer** page displays.



7. Scroll down to the **Buffered Image Settings** and notice that the **Size** is set to *Full* and the **Format** is set to *Bitmap*.
NOTE: *These are required settings to re-process an image.*

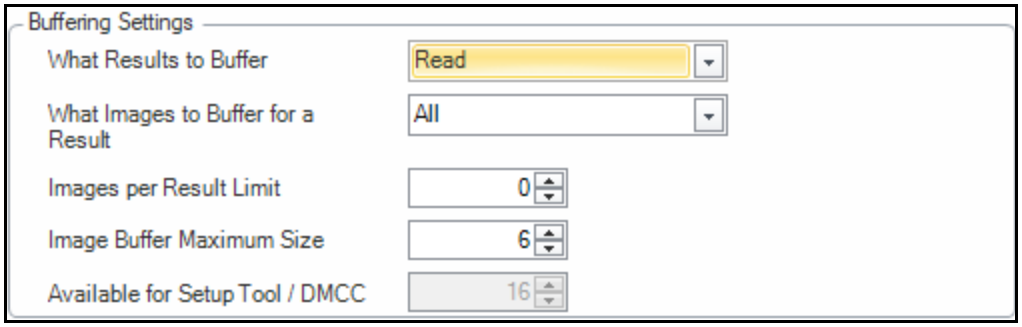


8. Click the **Image PC Transfer** tab and create a folder to store images on your PC.



9. Click the **Image Buffering** tab and set the following settings:
   - **What Results to Buffer** = *Read*
   - **What Images to Buffer for a Result** = *All*

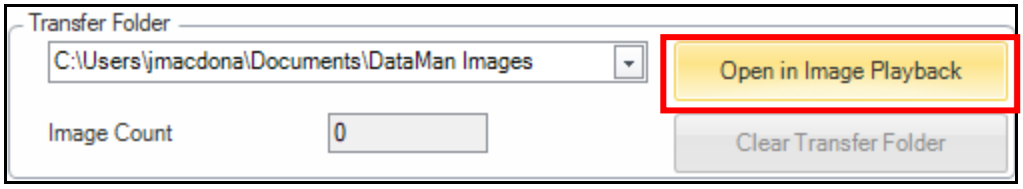
   Leave all other settings as the Defaults.



10. Trigger the reader and put the barcode in the FOV so that it can be read on the 3rd image.
NOTE: *Since we did not define a multi-code scenario, the reader will stop acquiring when the code is read. So, after 3 images, the reader stops acquiring.*

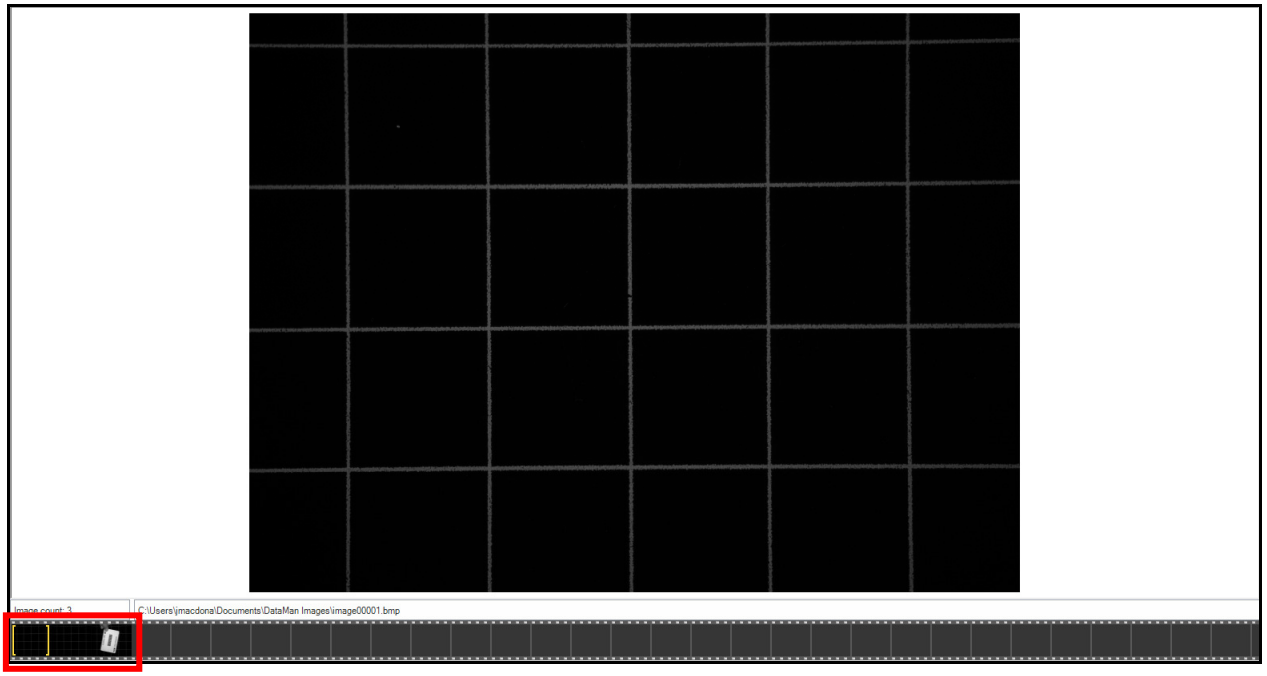
11. Click on the **Image PC Transfer** tab – notice that the Number of Buffered Images is 1. This is because we told it to buffer ALL Images for a Result.
12. Click the **Transfer Now** button.

13. Click the **Open in Image Playback** button. A new tab opens.



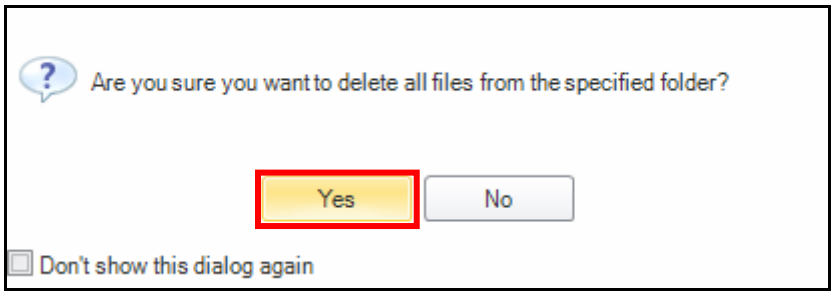
An **Image Playback** tab opens.

We can see all 3 images that were taken until the code was read in the filmstrip.

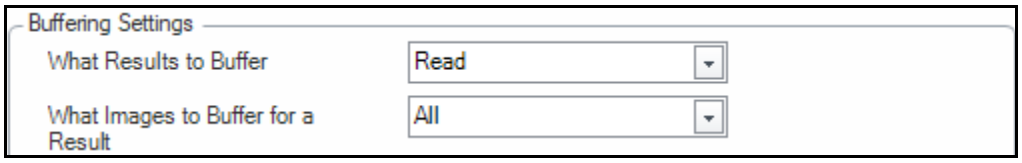


14. Return to the Reader tab and click the **Clear Transfer Folder** button.

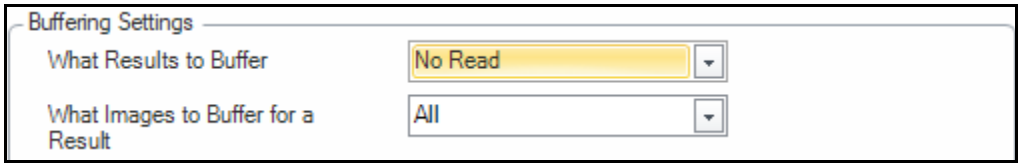
15. Click the **Yes** button to delete all files from the specified folder.



16. Trigger your reader while covering part of the barcode so that it cannot be read and move it through the FOV.
17. After the 5 images have been acquired, look in the **Image PC Transfer** tab.
    - Are there any Buffered Images?
        - No – because the What Results to Buffer field is set to Read and there were no images read in this trigger cycle



18. Click on the **Image Buffering** tab and change the **What Results to Buffer** to *No Read* and repeat step 16.



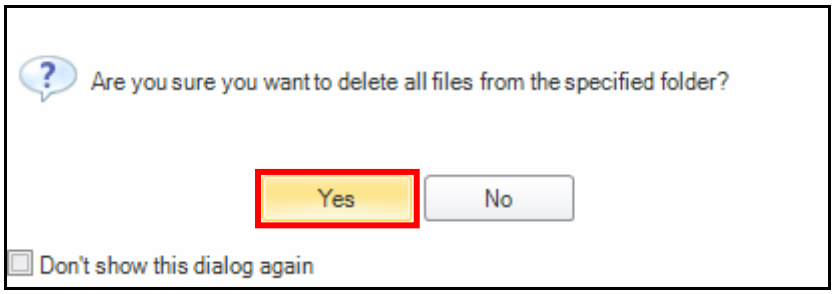
19. After the 5 images have been acquired, look in the **Image PC Transfer** tab.
    - Are there any Buffered Images?
        - Yes – you should now see 5 because the What Results to Buffer field is set to No Read and there were 5 no read images in this trigger cycle.

20. Click the **Transfer Now** button.

21. Click the **Open in Image Playback** button. Notice that the 5 No Read images are now visible.

22. Return to the Reader tab and click the **Clear Transfer Folder** button.

23. Click the **Yes** button to delete all files from the specified folder.

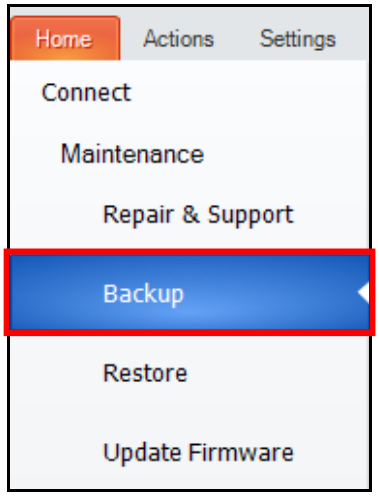


Backup

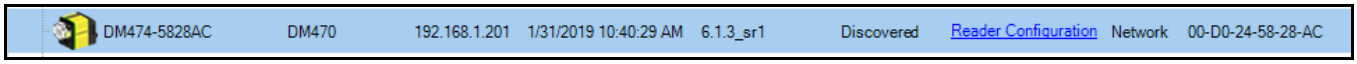
Follow the steps below to complete this lab exercise:

1. Click the **Home** tab.

2. Click the **Backup** function.

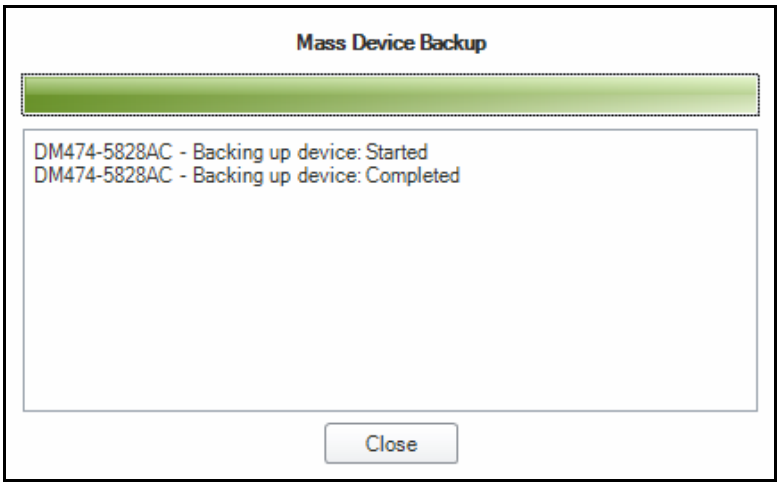


3. Select the **Reader** (or Readers) to backup.



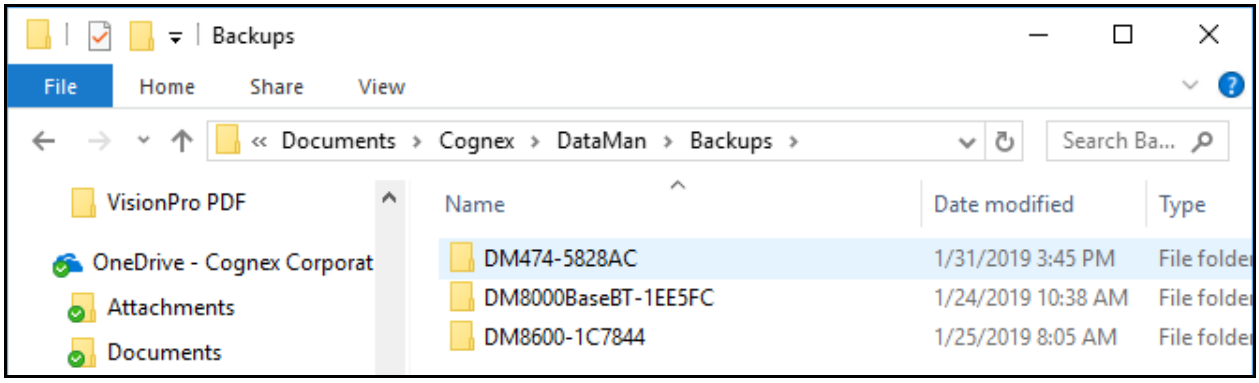
4. Click the **Backup** button in the lower right-hand corner.

The **Backup** is run.

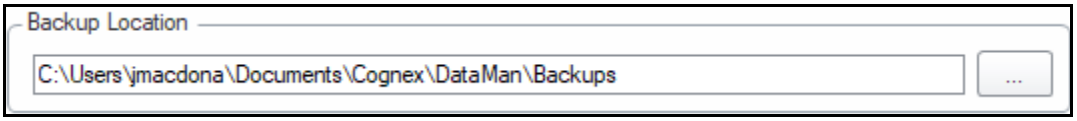


5. Click the **Close** 

button.
NOTE: *This creates a folder on the C: drive with the Reader Name and places a .dmb file into the folder.*



NOTE: *The Location for the DataMan backup can be updated under the Home tab in the Options menu.*

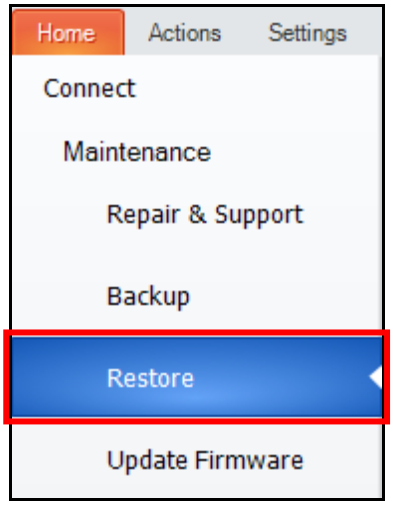


Restore

Please read through the steps, but do not complete the Restore of your reader.

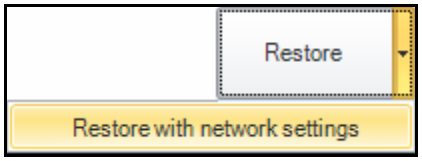
1. Click the **Home** tab.

2. Click the **Restore** function.



3. The Configuration Source displays. Click the **Latest Backup** radio button.

4. Click the down arrow on the **Restore** button and click **Restore with network settings**.



This will start a system reboot.

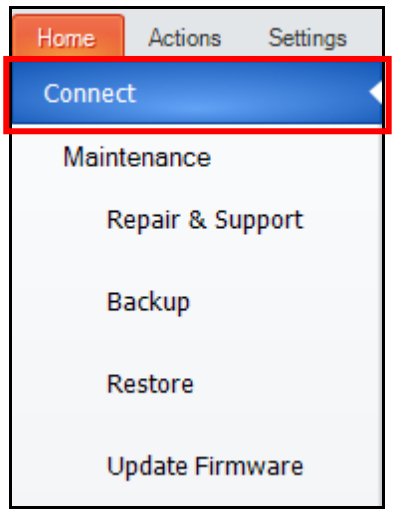
Compare Configurations of Multiple Readers

Follow the steps below to complete this lab exercise:

NOTE: *You must have at least two readers to compare configurations.*

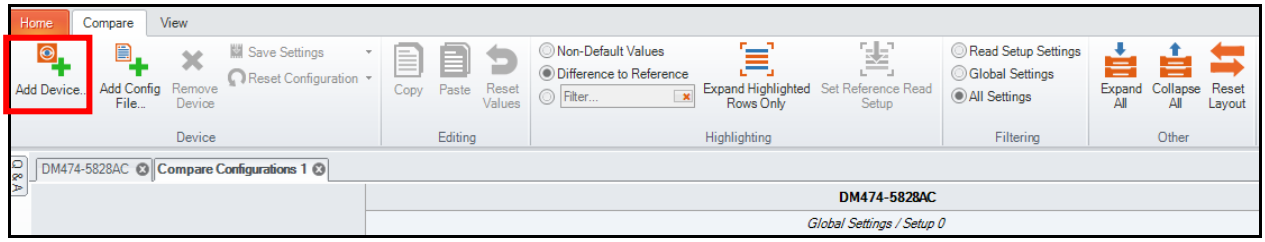
1. Click the **Home** tab.

2. Click the **Connect** function.



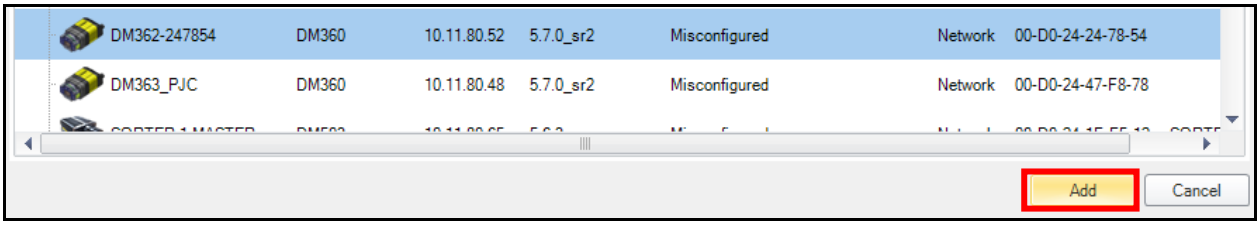
3. **Verify** or **Connect** to a reader (this will be used as the reference Reader).
4. Click the **Compare Configurations** button in the lower right-hand corner.

The **Compare Configurations 1** tab opens.



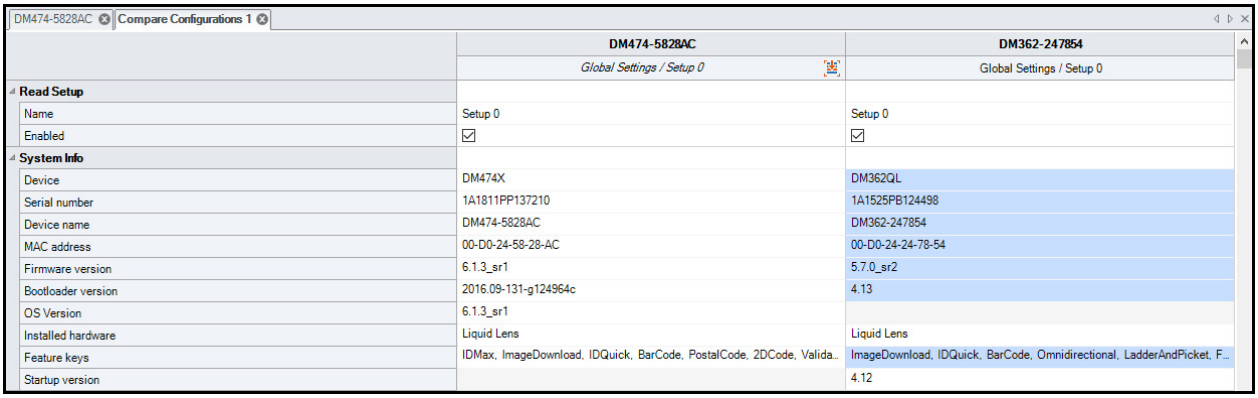
5. Click the **Add Device** button.

6. Select a Reader from the list and click the **Add**  button.



The readers display to allow a side by side comparison.

NOTE: *The filter is set to **Difference to Reference**, so the differences are highlighted in blue on the 2nd reader so you can see at a quick glance what is different.*



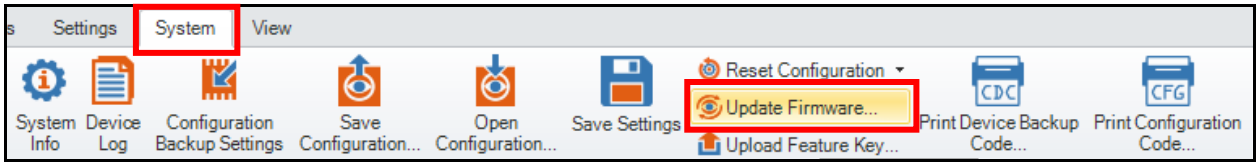
	DM474-5828AC	DM362-247854
	Global Settings / Setup 0	Global Settings / Setup 0
Read Setup		
Name	Setup 0	Setup 0
Enabled	☑	☑
System Info		
Device	DM474X	DM362QL
Serial number	1A1811PP137210	1A1525PB124498
Device name	DM474-5828AC	DM362-247854
MAC address	00-D0-24-58-28-AC	00-D0-24-24-78-54
Firmware version	6.1.3_sr1	5.7.0_sr2
Bootloader version	2016.09-131-g124964c	4.13
OS Version	6.1.3_sr1	
Installed hardware	Liquid Lens	Liquid Lens
Feature keys	IDMax, ImageDownload, IDQuick, BarCode, PostalCode, 2DCode, Valida..	ImageDownload, IDQuick, BarCode, Omnidirectional, LadderAndPicket, F...
Startup version		4.12

Update Firmware

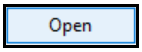
Please read through the steps, but do not update the firmware on your reader.

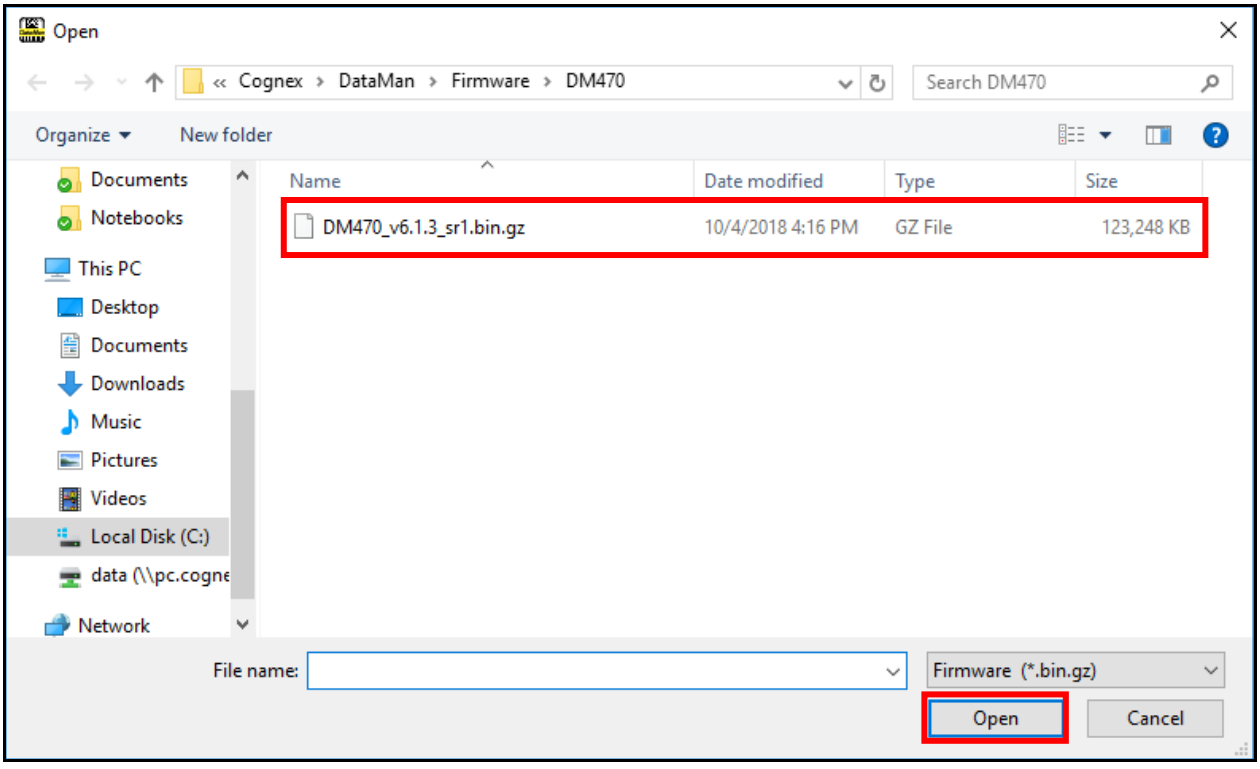
1. Download, install and launch the latest compatible version of the DataMan Setup tool on your PC.
2. Connect to your reader.

   NOTE: *When updating a handheld reader it is important that the reader is updated first and then the base. Make sure the reader and base are on the same firmware.*
3. Click the **System** tab and click the **Update Firmware** link.

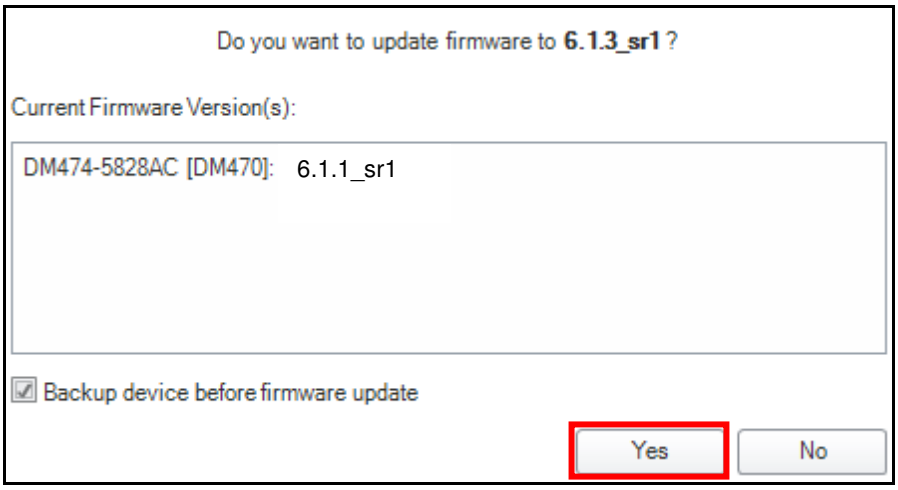


The **Do you want to apply your new settings to non-volatile memory?** displays.

4. Click the **No** button.
5. The firmware dialog displays, highlight the latest version and click the **Open**  button.

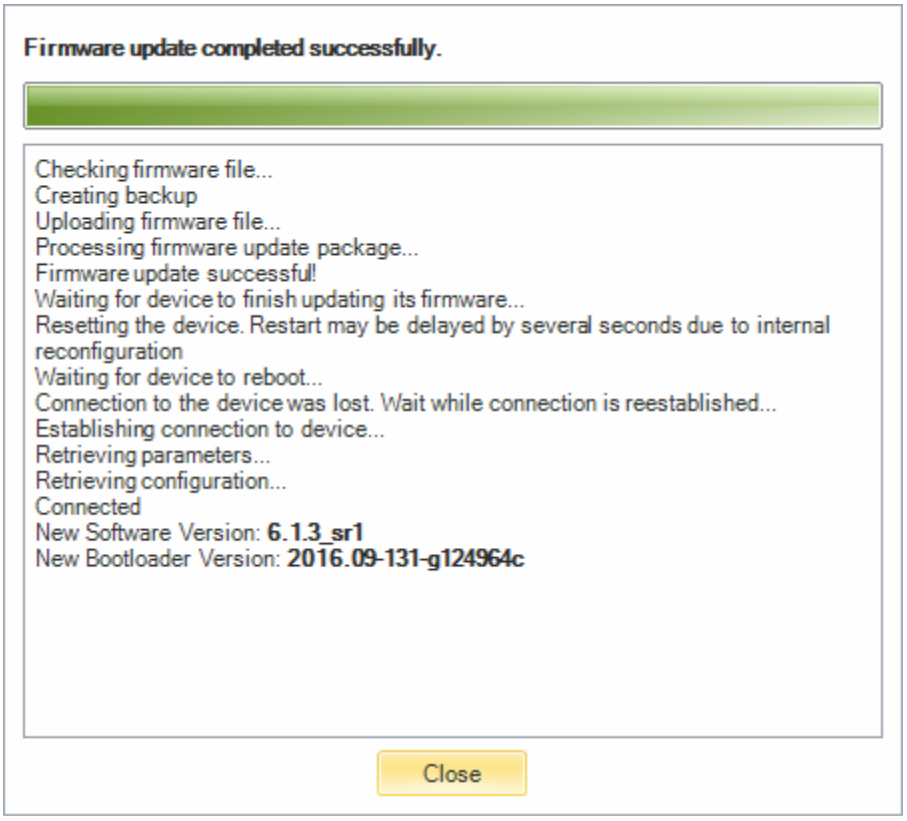


The **Current Firmware Version** dialog displays.



6. Click the **Yes**  button.

The system will update the firmware.



7. Click the **Close**  button.

FTP with DataMan – *If time allows*

NOTE**: To complete this lab you may need to turn off your WiFi and/or pause firewalls.

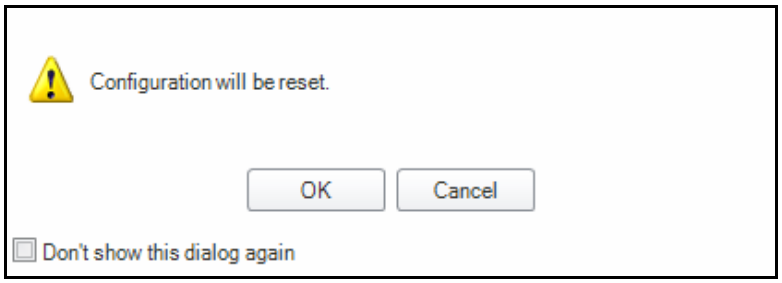
All Ethernet-enabled DataMan readers support FTP. This allows you to send images to a remote server so customers can understand *why* their codes did not read.

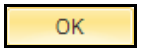
We can use the FTP server built into In-Sight Explorer to demonstrate the FTP capabilities.

Follow the steps below to complete the lab exercise:

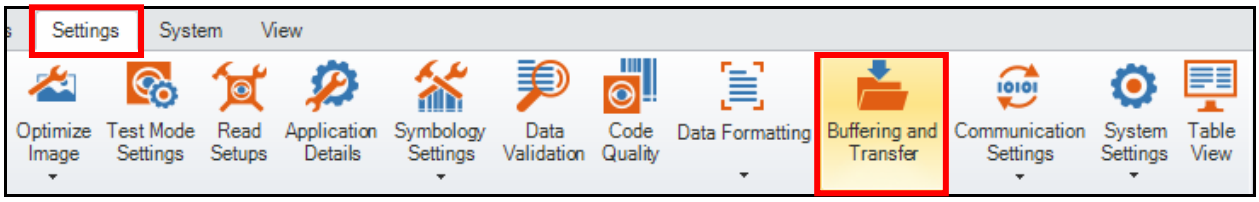
1. Connect your DataMan reader to the DataMan Setup Tool via Ethernet.
2. Click the **Reset Configuration** button from the **System** Menu.

The **Configuration reset** dialog box displays.



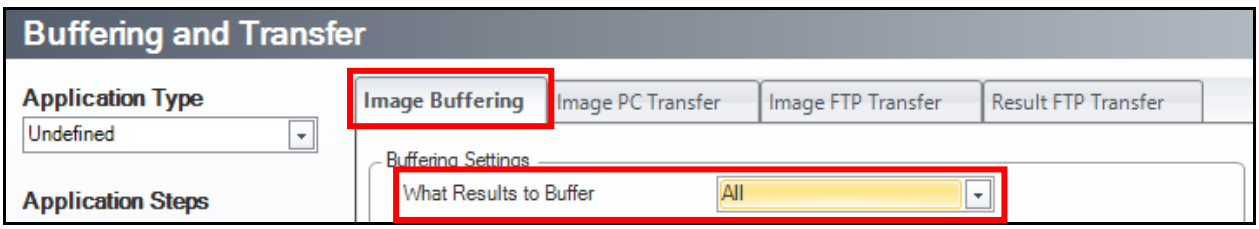
3. Click the **OK**  button to continue.

4. Open the **Settings** menu and click the **Buffering and Transfer** button.

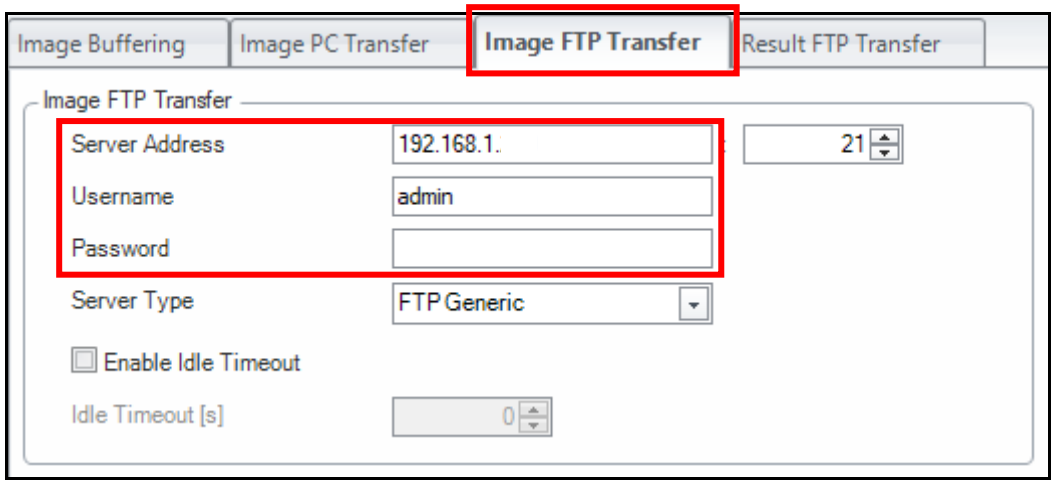


The **Buffering and Transfer** page displays.

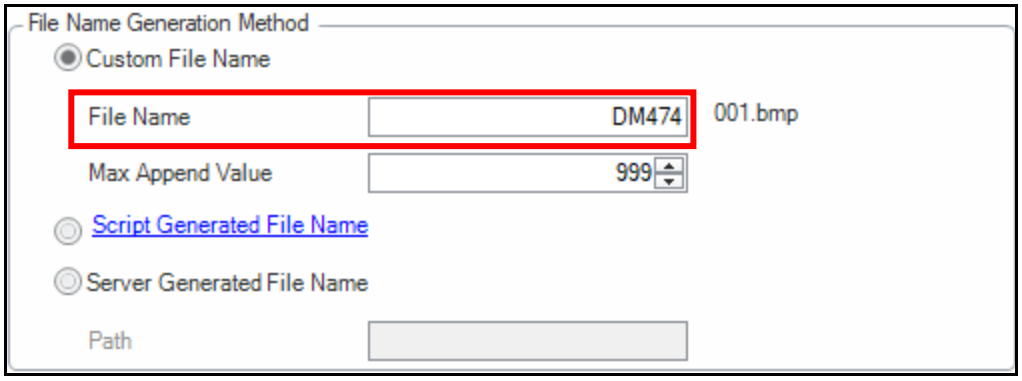
5. Remain on the **Image Buffering** tab and change the **What Results to Buffer** setting to *All*. Allow all other settings to remain as the defaults.



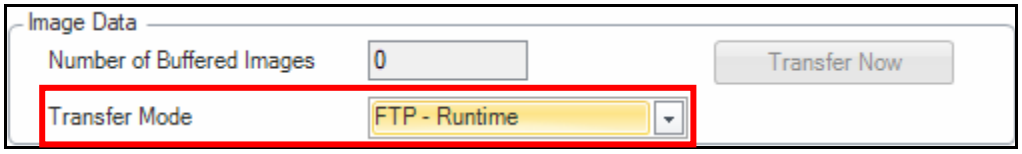
6. Click the **Image FTP Transfer** tab and set the following Image FTP Transfer settings:
   - **Server Address** – *static IP Address of YOUR PC*
   - **Username** – *admin*
   - **Password** – *leave empty*



7. In the **File Name Generation Method** section of the Image FTP Transfer tab change the **File Name** to something that identifies your reader (such as the reader model).



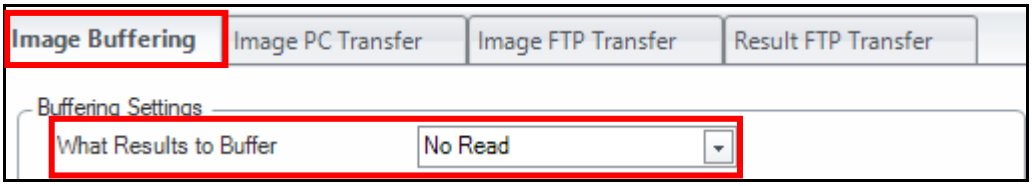
8. In the **Image Data** section of the Image FTP Transfer tab change the **Transfer Mode** to *FTP - Runtime*.



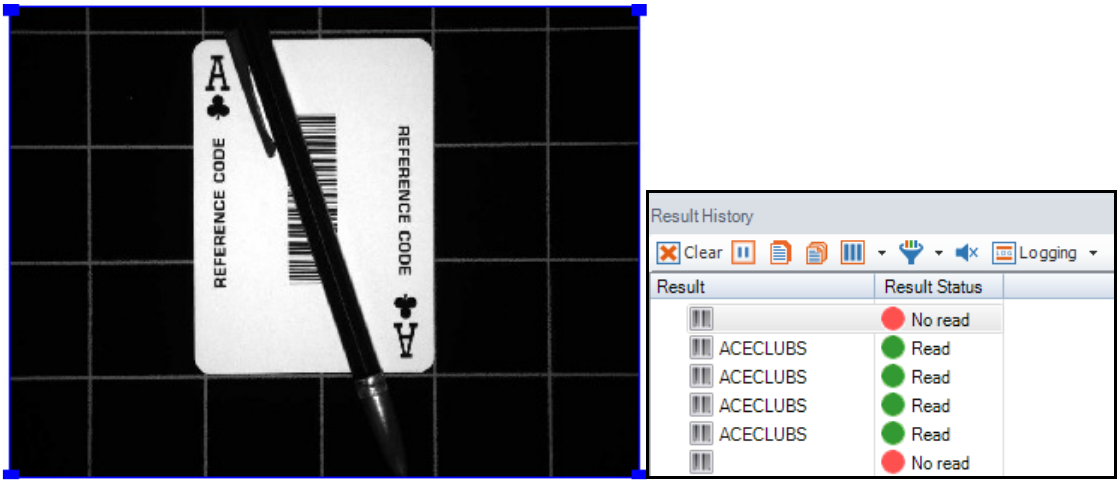
9. Open the FTP folder – C:\ ProgramData\Cognex\In-Sight\Emulators\5.6.1.
   Note: *Your FTP path may be slightly different depending on your In-Sight Explorer version.*
10. Trigger your reader.

NOTE: *You likely will get No results. This is because you need to turn on the emulator by starting In-Sight Explorer. Open and minimize In-Sight Explorer. No need to connect to a sensor.*

11. Give it a few seconds to start up and you will see the image from the previous trigger get transferred automatically. Trigger the reader again to send additional images.
    NOTE: *The BMP images are fully capable of being dragged back into the Setup Tool to verify a read.*
12. Return to the **Image Buffering** tab and change the **What Results to Buffer** setting to *No Read*.

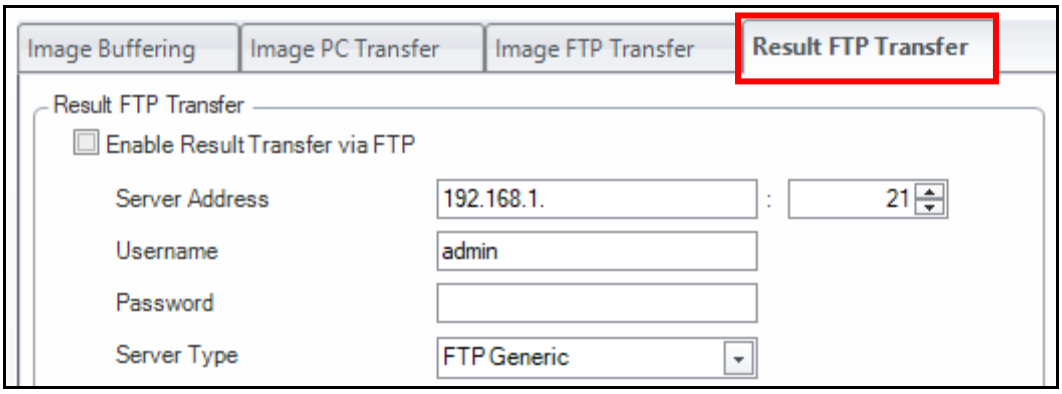


13. Trigger your reader and block part of the code until you get a No Read.

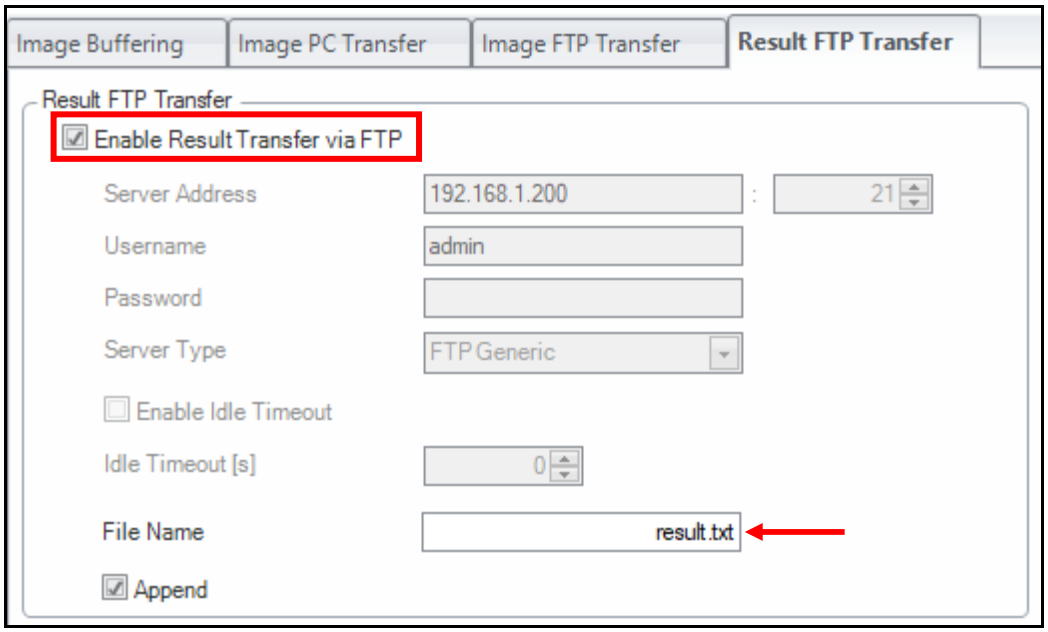


You can also send the results that were read via FTP.

14. Click on the **Result FTP Transfer** tab. Enter the **Server Address** and **Username** as you did for the Image FTP Transfer fields.



15. Check the **Enable Result Transfer via FTP** checkbox.



16. Trigger some reads on different barcodes and open the *result.txt* file to view the results.

Lab Exercise 7.1 – Troubleshooting

At the end of this lab exercise, Participants will be able to:

- Troubleshoot a variety of issues that will be wrong with the system

The Participant will utilize the following DataMan Functions to successfully complete this exercise:

- DataMan Actions
- DataMan Settings
- DataMan System

Follow the steps below to complete the lab exercise:

NOTE: *The system should be backed up on a user accessible computer or laptop.*

1. The Instructor will ask you to leave the classroom. When you return to the room you will need to troubleshoot any issues with your system and successfully read a code .

   NOTE: *You should not have to adjust anything in your program. The changes will be environmental. Make the environment adjust to your program, not the program to fit the environment.*

2. Once you have successfully finished troubleshooting your system, please assist others in need.

Lab Exercise 8.1 – Determine Correct Optics

At the end of this lab exercise, Participants will be able to:

- Use the Optics Advisor and Charts to determine the correct optics for your application that will use a DataMan Reader.

The Participant will utilize the following DataMan Functions to successfully complete this exercise:

- Lens Advisor Software
- DataMan Optics Charts

Getting the Correct Optics

1. Collect the following information and record the:
   a. Working Distance (WD)
   b. Field of View (FOV)

   If known:

   c. Size of Code
   d. Focal Length
2. Use the Lens Advisor Calculator to determine the Lens needed to achieve an in focus image for the DataMan using a C-mount lens.
   NOTE: *The calculator is located in the Optics Lab Folder or on the Cognex web site at: http://www.cognex.com/ExploreLearn/UsefulTools/LensAdvisor/*
   a. FOV- 100 X 200 mm WD- 300 mm
      - ☐ 32 mm F/2
      - ☐ 6 mm Lens F/1.4
      - ☐ 16 mm Lens F/5.6

   b. FOV- 10 X 20 mm WD-300 mm
      - ☐ 150 mm F/4
      - ☐ 50 mm Lens F/2.3
      - ☐ 16 mm Lens F/1.4

   c. FOV- 10 X 20 mm WD- 100 mm
      - ☐ 75 mm F/8
      - ☐ 25 mm Lens F/1.4
      - ☐ 50 mm F/ 5.6

Thought Question:

What would you expect the Focal length to be if we reduced the working distance to 50mm for the FOV of 10 X 20 mm?

3. Use the DataMan Optics Chart to determine the Lens needed to achieve an in focus image for the DataMan using a Liquid Lens:

   NOTE: *The Charts are found at the end of this lab or in the class lecture PPTs.*

   a. FOV- 40 X 60 mm WD-300 mm Code Size 20 mil 2D
      - ☐ Liquid Lens 18.8 mm
      - ☐ Liquid Lens 13.3 mm

   b. FOV- 40 X 60 mm WD-100 mm Code Size 10 mil 2D
      - ☐ Liquid Lens 18.8 mm
      - ☐ Liquid Lens 13.3 mm

   c. FOV- 40 X 60 mm WD-140 mm Code Size 10 mil 1D
      - ☐ Liquid Lens 13.3 mm
      - ☐ Liquid Lens 18.8mm

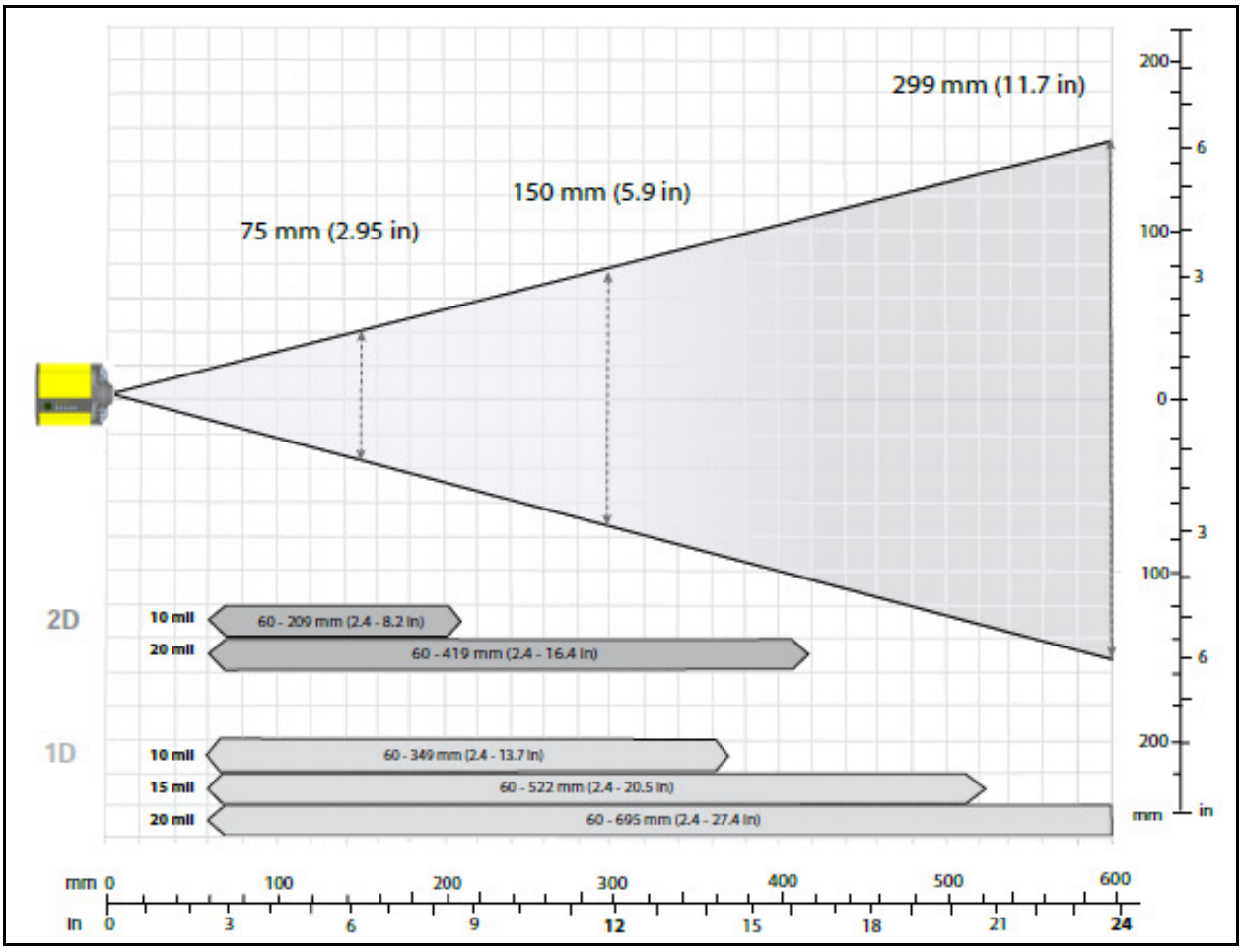
Thought Question:

Could you use a C-Mount instead of a Liquid Lens, what are the advantages of using a liquid lens?

If Time Permits:

Use the Specific Optics information in each exercise above to determine the Lens needed to achieve an in focus image for the DataMan 100/200 but use the DataMan 100/200 charts found in the appendix of the class lecture PPTs.

Optics Chart for Liquid Lens 18.8 mm – use for objects that are far away



Optics Chart for Liquid Lens 13.3 mm – use for objects that are near