EN

1D/2D Codescanner C5PC

Quickstart

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1. General

1.1. Information Concerning these Instructions

- These instructions apply to the product with ID code C5PC.
- They make it possible to use the product safely and efficiently.
- These instructions are an integral part of the product and must be kept on hand for the entire duration of its service life.
- Local accident prevention regulations and national work safety regulations must be complied with as well.
- The product is subject to further technical development, and thus the information contained in these operating instructions may also be subject to change. The current version can be found at www.wenglor.com in the product's separate download area.

NOTE!
The operating instructions must be read carefully before using the product and must be kept on hand for later reference!

1.2. Explanations of Symbols

- Safety precautions and warnings are emphasized by means of symbols and attention-getting words.
- Safe use of the product is only possible if these safety precautions and warnings are adhered to.
- The safety precautions and warnings are laid out in accordance with the following principle:

Attention-Getting Word
Type and Source of Danger!
Possible consequences in the event that the hazard is disregarded.
- Measures for averting the hazard.

The meanings of the attention-getting words, as well as the scope of the associated hazards, are listed below.

DANGER!
This word indicates a hazard with a high degree of risk which, if not avoided, results in death or severe injury.

WARNING!
This word indicates a hazard with a medium degree of risk which, if not avoided, may result in death or severe injury.

CAUTION!
This word indicates a hazard with a low degree of risk which, if not avoided, may result in minor or moderate injury.

ATTENTION!
This word draws attention to a potentially hazardous situation which, if not avoided, may result in property damage.

NOTE!
A note draws attention to useful tips and suggestions, as well as information regarding efficient, error-free use.

1.3. Limitation of Liability

- The product has been developed in consideration of the current state-of-the-art and applicable standards and guidelines. Subject to change without notice. A valid declaration of conformity can be accessed at www.wenglor.com in the product's separate download area.
- wenglor GmbH (hereinafter referred to as "wenglor") excludes all liability in the event of:
    - Non-compliance with the instructions
    - Use of the product for purposes other than those intended
    - Use by untrained personnel
    - Use of unapproved replacement parts
    - Unapproved modification of products
- These operating instructions do not include any guarantees from wenglor with regard to the described procedures or specific product characteristics.
- wenglor assumes no liability for printing errors or other inaccuracies contained in these operating instructions, unless wenglor was verifiably aware of such errors at the point in time at which the operating instructions were prepared.

1.4. Copyrights

- The contents of these instructions are protected by copyright law.
- All rights are reserved by wenglor.
- Commercial reproduction or any other commercial use of the provided content and information, in particular graphics and images, is not permitted without previous written consent from wenglor.

2. For Your Safety

2.1. Use for Intended Purpose

The product is based on the following functional principle:

1D/2D Code Scanners
1D/2D code scanners read any code after simple pressing a key – whether printed, lasered, etched or directly marked (DPM). As a system supplier, wenglor also offers fully networked solutions in which codes are reliably scanned regardless of the position of the object.

This product can be used in the following industry sectors:

- Special machinery manufacturing
- Heavy machinery manufacturing
- Logistics
- Automotive industry
- Food industry
- Packaging industry
- Pharmaceuticals industry
- Clothing industry
- Plastics industry
- Woodworking industry
- Consumer goods industry
- Paper industry
- Electronics industry
- Glass industry
- Steel industry
- Printing industry
- Construction industry
- Chemicals industry
- Agriculture industry
- Alternative energy
- Raw materials extraction

2.2. Use for Other than the Intended Purpose

- Not a safety component in accordance with 2006/42/EC (Machinery Directive)
- The product is not suitable for use in potentially explosive atmospheres.
- The product may only be used with accessories supplied or approved by wenglor, or in combination with approved products. A list of approved accessories and combination products can be accessed at www.wenglor.com on the product detail page.

DANGER!
Risk of personal injury or property damage in case of use for other than the intended purpose!
Use for other than the intended purpose may lead to hazardous situations.
- Instructions regarding use for intended purpose must be observed.

2.3. Personnel Qualifications

- Suitable technical training is a prerequisite.
- In-house electronics training is required.
- Trained personnel must have uninterrupted access to the operating instructions.

DANGER!
Risk of personal injury or property damage in case of incorrect initial start-up and maintenance!
Personal injury and damage to equipment may occur.
- Adequate training and qualification of personnel.

2.4. Modification of Products

DANGER!
Risk of personal injury or property damage if the product is modified!
Personal injury and damage to equipment may occur. Non-observance may result in loss of the CE marking and the guarantee may be rendered null and void.
- Modification of the product is impermissible.

2.5. General Safety Precautions

NOTE!
- These instructions are an integral part of the product and must be kept on hand for the entire duration of its service life.
- In the event of possible changes, the respectively current version of the operating instructions can be accessed at www.wenglor.com in the product's separate download area.
- Read the operating instructions carefully before using the product.
- Protect the sensor against contamination and mechanical influences.
- Installation and removal of the product are only permissible in pressure-free piping systems which have been allowed to cool down.

2.6. Approvals and IP Protection

3. Regulations and Standards

3.1. Using Product Outside Japan

This regulation applies to C5PC readers and peripheral devices.
If you export (or provide a non-resident with) this product or a part of this product that falls under the category of goods (or technologies) specified by the Foreign Exchange and Foreign Trade Control Law as those which require permission or approval for export, you must obtain permission or approval or service transaction permission) pursuant to the law.

3.2. Conformance to EC/EU Directives

This regulation applies to C5PC code readers and peripheral devices.
- This product is in compliance with all applicable directives, 2014/30/EU, 2014/35/EU, and 2011/65/EU.
- This product complies with EC/EU Directives. EMC-related performance of the wenglor devices that comply with EC/EU Directives will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which the wenglor devices are installed.
- The customer must, therefore, perform the final check to confirm that devices and the overall machine conform to EMC standards.

3.3. Conformance to UL Standards

This regulation applies to reader and peripheral devices. This product complies with UL Standards.
- UL60950-1 2nd-edition, 2014 (Class III)

3.4. Radio Frequency Interference Requirements: FCC

This equipment has been tested for compliance with FCC (Federal Communications Commission) requirements and has been found to conform to applicable FCC standards. To comply with FCC RF exposure compliance requirements, this device must not be co-located with or operate in conjunction with any other antenna or transmitter. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3.4.1. Model C5PC Class B Statement

NOTE!

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3.4.2. Radio Frequency Interference Requirements: Canada

This device complies with Industry Canada ICES-003. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Cet appareil est conforme à la norme ICES-003 d'Industrie Canada. Son fonctionnement est soumis aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
Model C5PC: This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

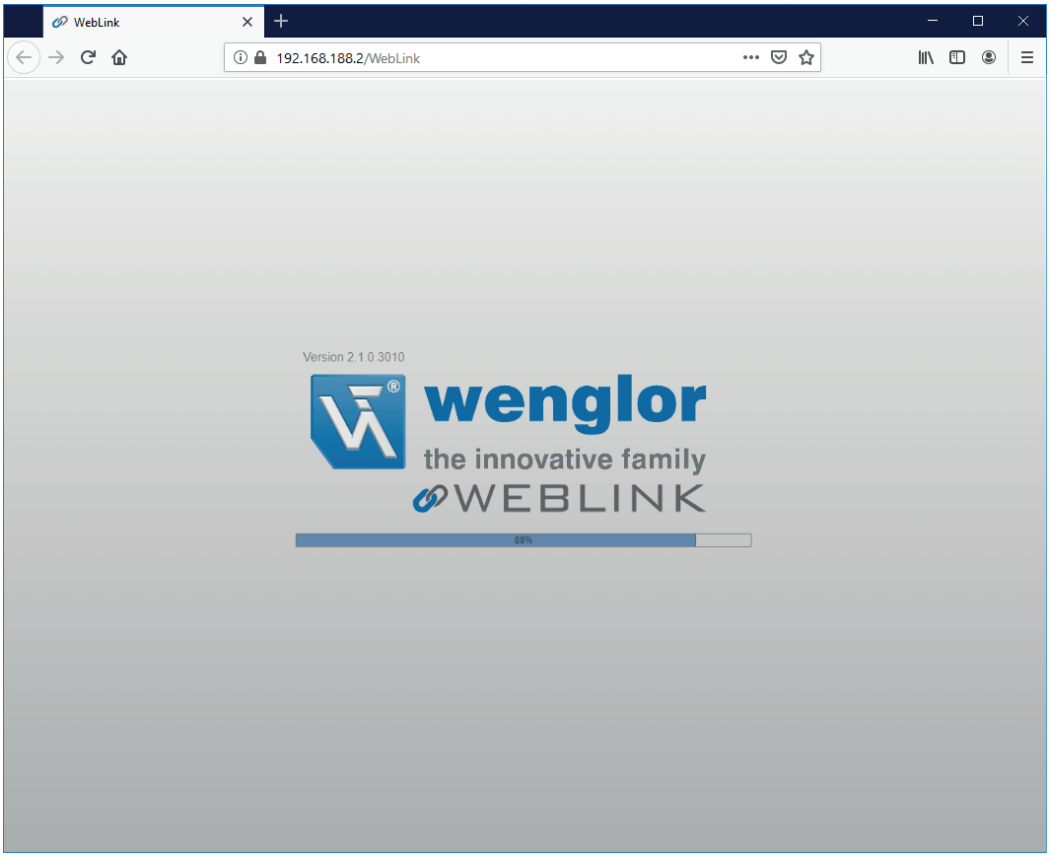
4. Overview

4.1. Introduction

The browser-based **WebLink** interface enables quick and easy configuration and testing of **C5PC** readers without the need to install or access files on a host system.
WebLink is reliable, lightweight, and operating-system-independent without compromising the power and depth of its tool set.
WebLink offers novice users an intuitive way to connect, configure, monitor, and troubleshoot a C5PC reader, and provides the power and flexibility expected by advanced users.

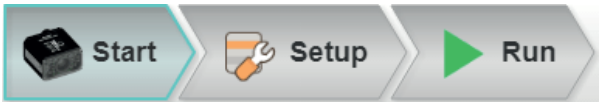
4.2. Splash Screen

After you open a browser and **enter your reader's IP address,** the first thing you will see is the **splash screen,** a portion of which is shown below. You will also see a progress bar as your WebLink session starts.



4.3. Navigation Bar

The **navigation bar** at the top of the WebLink interface features buttons for three primary views: **Start, Setup,** and **Run**.



4.4. Flash Icon

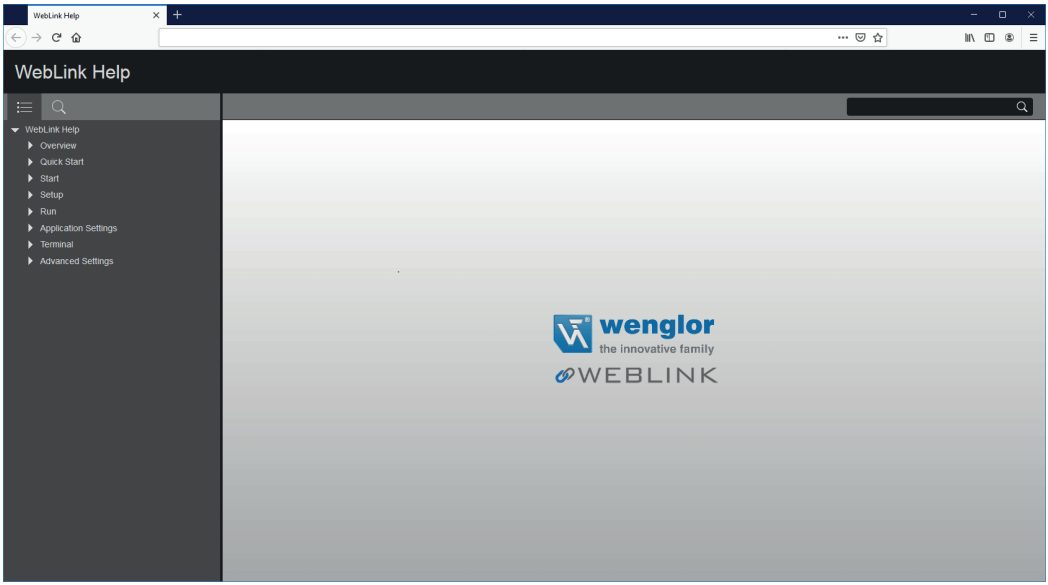
The flash icon allows you to save current settings to the reader for reboot. When the current reader settings match those saved in flash memory, the disk icon changes from red to blue.

Save to Flash Memory

Saved to Flash Memory

4.5. Help Icon

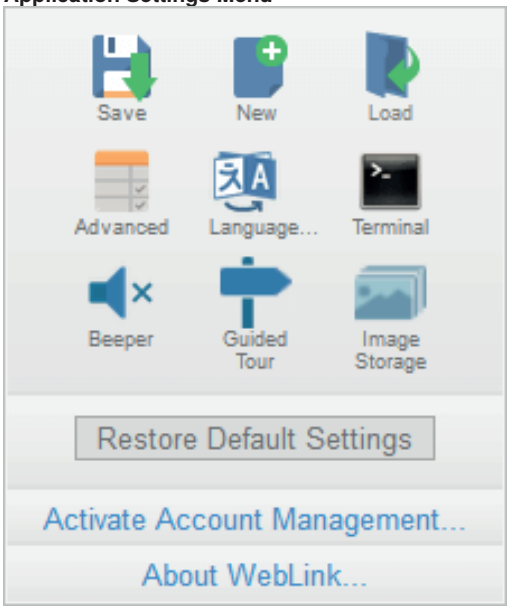
The **help icon** is located to the right of the flash icon. Click this icon to open **WebLink Help**.



4.6. Application Settings Icon

Click the **gear icon** to the right of the help icon to open the **Application Settings** menu.

Application Settings Menu



NOTE!
The **Enable USB Drive Mode** option only appears when you are using a C5KC, which supports USB connectivity.

4.7. Left Panel

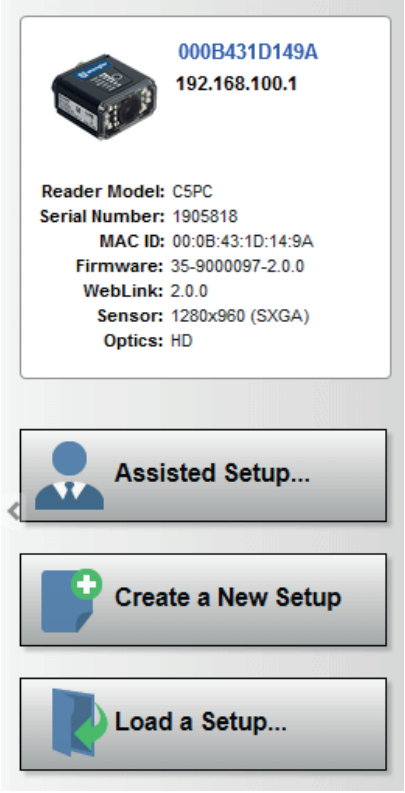
The area to the left of the **Image Area** is different depending on whether you are in the **Start** or **Setup** view. (In the **Run** view, the Image Area expands and the left panel is not present.)

4.7.1. Left Panel in Start View

In the **Start** view, the left panel shows your reader's **user-defined name, IP address, License Options, Reader Model, Serial Number, MAC ID, Firmware version, WebLink version, Sensor, Optics, Decoder** and **Speed**.

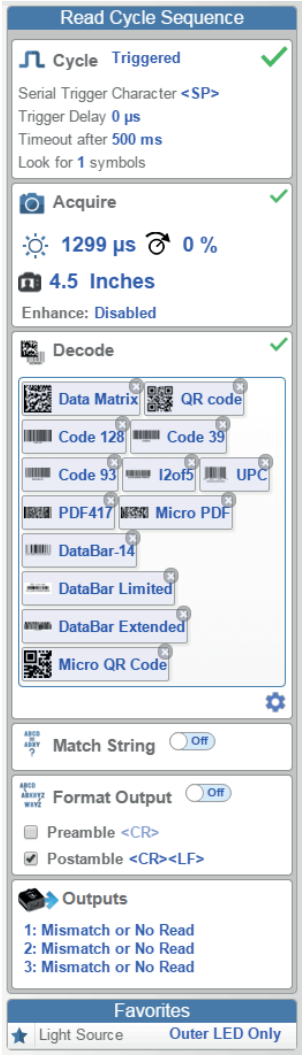
NOTE!
The information in this area is selectable so that you can copy it to a clipboard.

NOTE!
The **user-defined name** must be **19** characters or fewer.
The left panel in the Start view also contains buttons for Assisted Setup, **Create a New Setup** and **Load a Setup.**



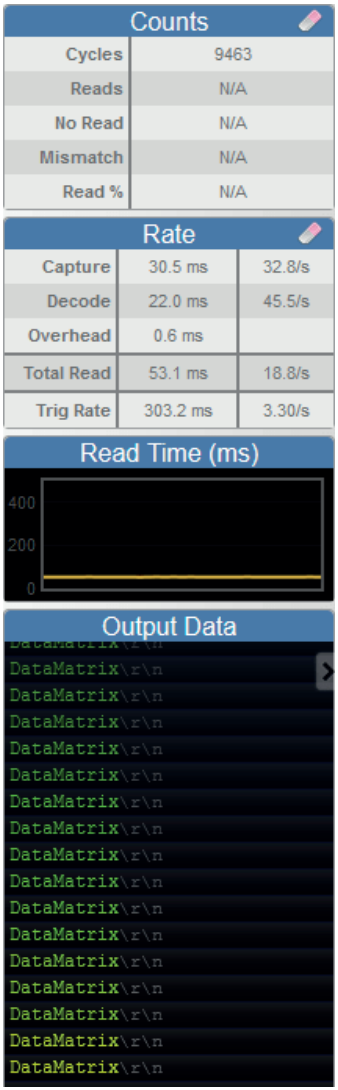
4.7.2. Left Panel in Setup View

In the **Setup** view, the left panel contains the majority of WebLink's configuration tools: **Cycle**, which allows you to set the trigger mode; **Acquire**, which allows you to set the camera's exposure and gain; **Decode**, which allows you to select which code types are required in your application; **Match String,** which allows you to set the match code mode, wildcard, text output, new master, and match string database; **Format Output,** which allows you to determine the ways in which barcode data can be formatted before it is output as a data string; **Outputs**, which allows you to determine output conditions, the output mode, the pulse width, and the output state (normally open or normally closed); and **Favorites**, which allows you to define the commands you use most frequently and gives you quick access to their command parameters.



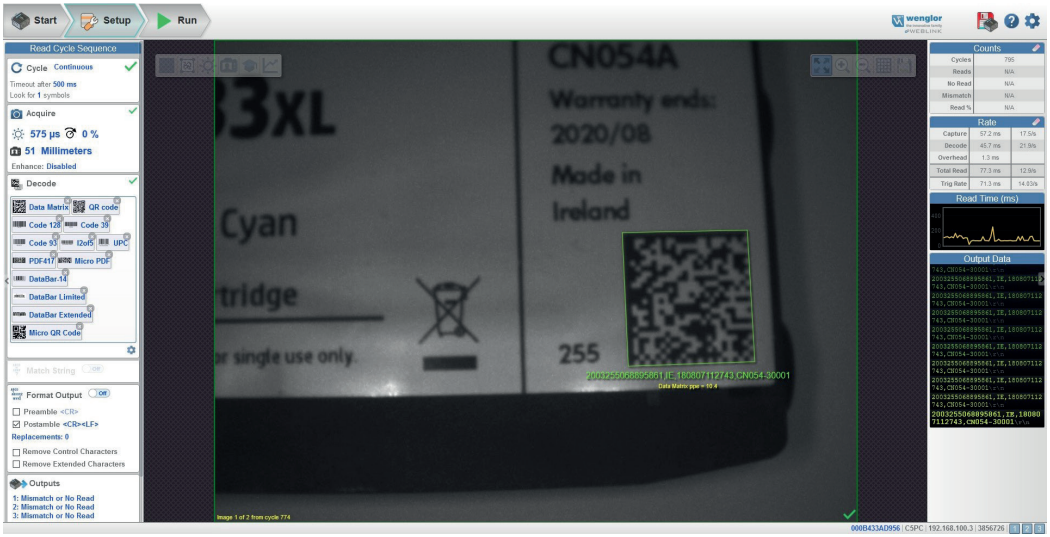
4.8. Right Panel

The area to the right of the **Image Area** shows counters for **Cycles, Reads, No Reads,** and **Mismatches** (which only applies if you have defined a match string); statistics for the rate of **Capture, Decode, Overhead, Total Read,** and **Trigger Rate;** a line graph representation of read time; and a display area for the **output of decoded data.**
You may find the information displayed on this panel to be most useful in the **Run** view, but it appears in all three of WebLink's primary views



4.9. Image Area

The **Image Area** is the main focus of WebLink. This area allows you to see what currently falls within the reader's field of view, and offers several image control tools.



4.9.1. Device Control Toolbar

The **Device Control** buttons are a convenient way to enable and disable multiple triggering methods and image processing settings in the camera directly from the **Image Area.**

Start Read Cycle
Starts the camera's read cycle.

Stop Read Cycle
Stops the camera's read cycle.

Send a Serial Trigger to the Reader
Sends a **Serial Trigger** to the camera.

Set Window of Interest
Allows you to define the **Window of Interest** directly in the Image Area interface.

NOTE!
When using an SXGA reader with Auto Photometry enabled, the Window of Interest cannot be set to a width less than 640.

Auto Photometry On
Turns **Auto Photometry** on. The camera's Auto Photometry settings defined in the **Acquire** section of the **Setup** interface are applied to the image when Auto Photometry is on.

When the reader is in **Triggered** mode and Auto Photometry is on, the best **Exposure** and **Gain** settings are determined for the next captured image. Auto Photometry functions differently in Triggered mode than in **Continuous** mode or **Presentation** mode: when Auto Photometry is on in Triggered mode, it is only a one-time setting. Exposure and Gain are not adjusted dynamically with each trigger as they would be in Continuous mode or Presentation mode.

When the reader is in Continuous mode or Presentation mode and you click the Auto Photometry button, the reader maintains optimal self-adjusting photometry and focus parameters until you click the button again to turn Auto Photometry off. Symbol data is decoded and symbol information is transmitted repeatedly as long as the symbol is within the reader's field of view and read range.

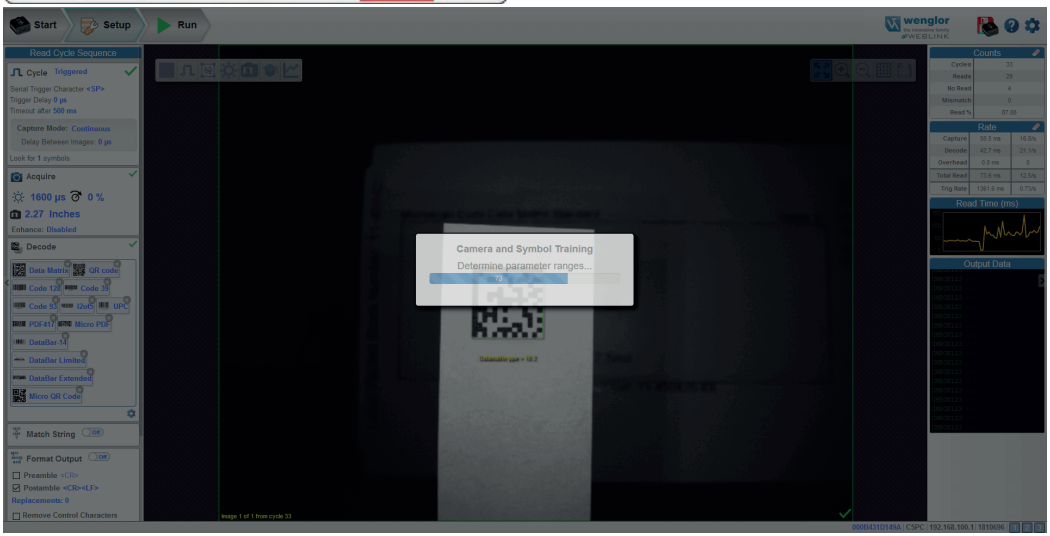
Auto Photometry Off
Turns **Auto Photometry** off.

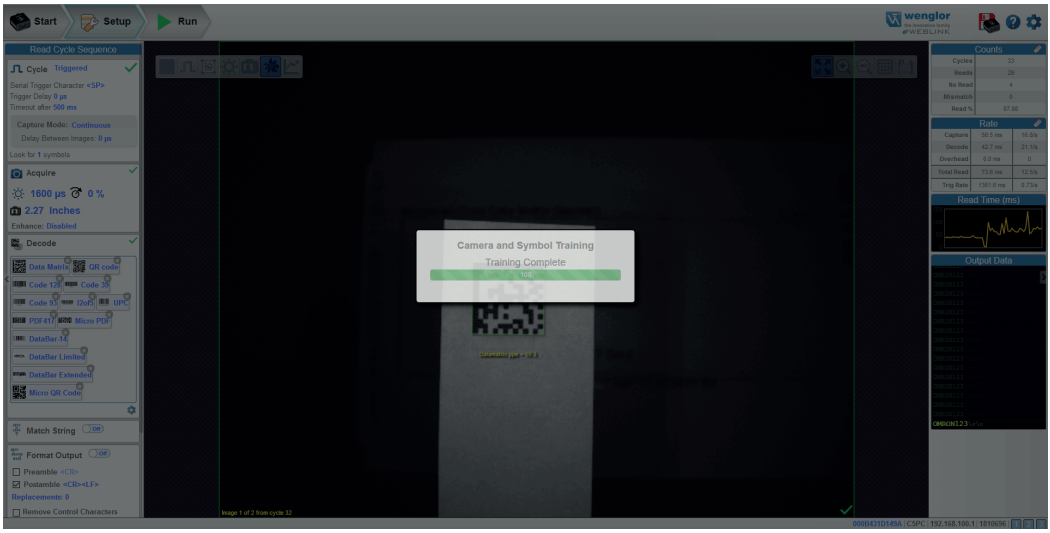
Autofocus On
Turns **Autofocus** on. The camera's Autofocus settings defined in the **Acquire** section of the **Setup** interface are applied to the image when Autofocus is on.

Autofocus Off
Turns **Autofocus** off.

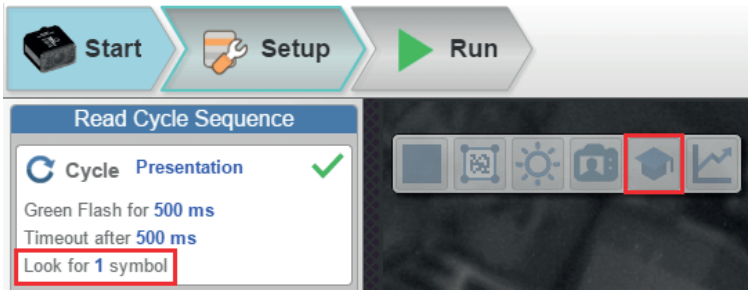
Train
Performs a full symbol calibration to find the best Focus, Exposure, and Gain, and saves relevant information regarding the decoded target symbol to allow greater decodability of similar symbols.
You will see the Determine parameter ranges... and Training Complete messages shown in the examples below during the Train operation.

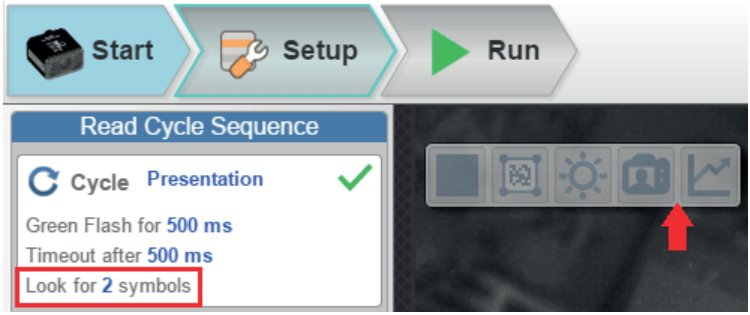
NOTE!
The Train operation will un-optimize the system once an image is processed, but you can optimize the system again after a Train operation.





NOTE!
The **Train** button only appears in the **Device Control Toolbar** when the **Read Cycle** is configured to look for **only 1 symbol.**





Optimize
Saves relevant information about the target symbol, allowing the subsequent symbols to be processed more quickly and consistently.
The reader has three optimization states: **un-optimized, optimizing** and **optimized**.

When the reader is in the **un-optimized** state and the Optimize button is clicked, the reader enters the **optimizing** state until a symbol is decoded or until the Optimize button is clicked again to deactivate the optimizing state. When a symbol is decoded during the optimizing state, the reader enters the **optimized** state.

NOTE!
A Train operation can reduce decode performance. It will un-optimize the system when an image is processed. You can re-optimize the system after a Train operation.

4.9.2. Image Control Toolbar

Fit Image to Window
Fits the captured image to the Image Area window.

Zoom In
Zooms in on the desired area of the captured image.

Zoom Out
Zooms out and decreases the size of the captured image.

NOTE!
You can also zoom in and out by scrolling up or down with your mouse, and you can move the image around by clicking and dragging.

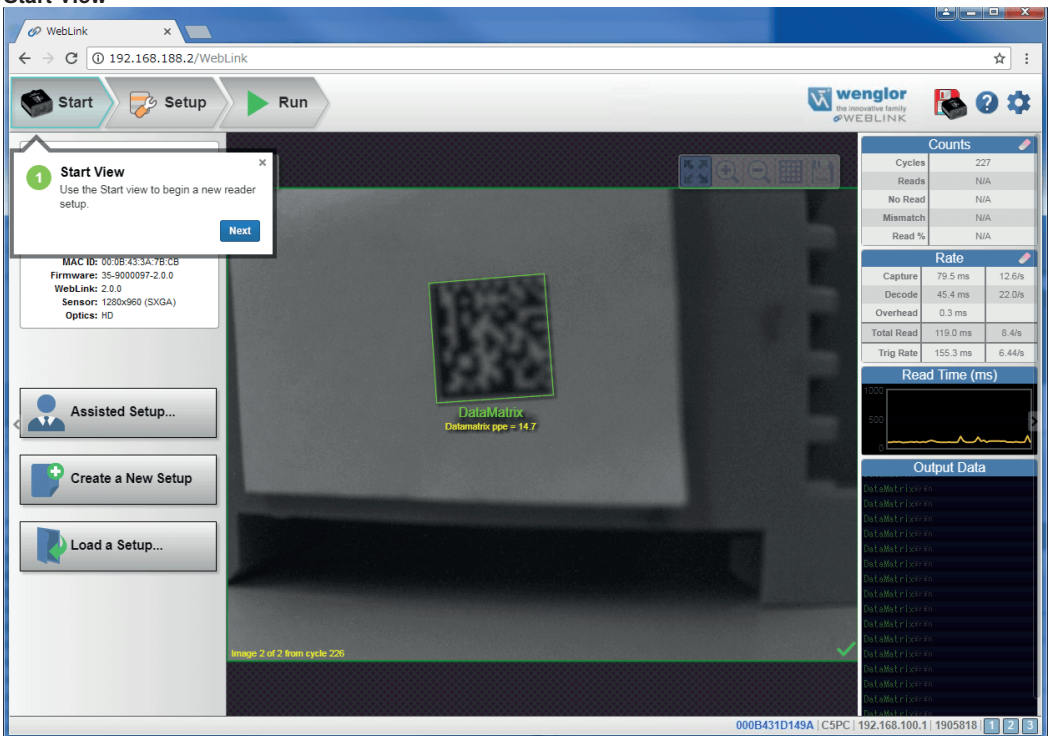
Show All Images Used in Read Cycle
Shows all the images that have been captured during the most recent read cycle.

Save Current Image
Allows you to save the current captured image to the location of your choice on your PC.

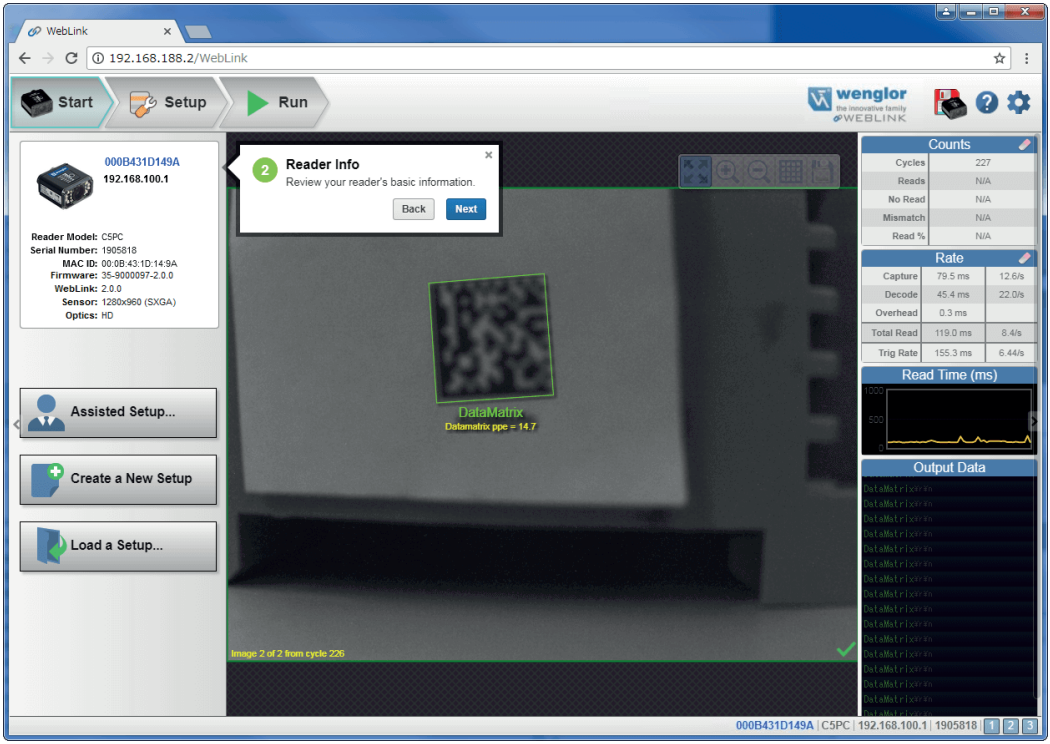
4.10. Guided Tour

The Guided Tour is a multi-step tutorial that explains the functions of the various areas of the WebLink user interface.

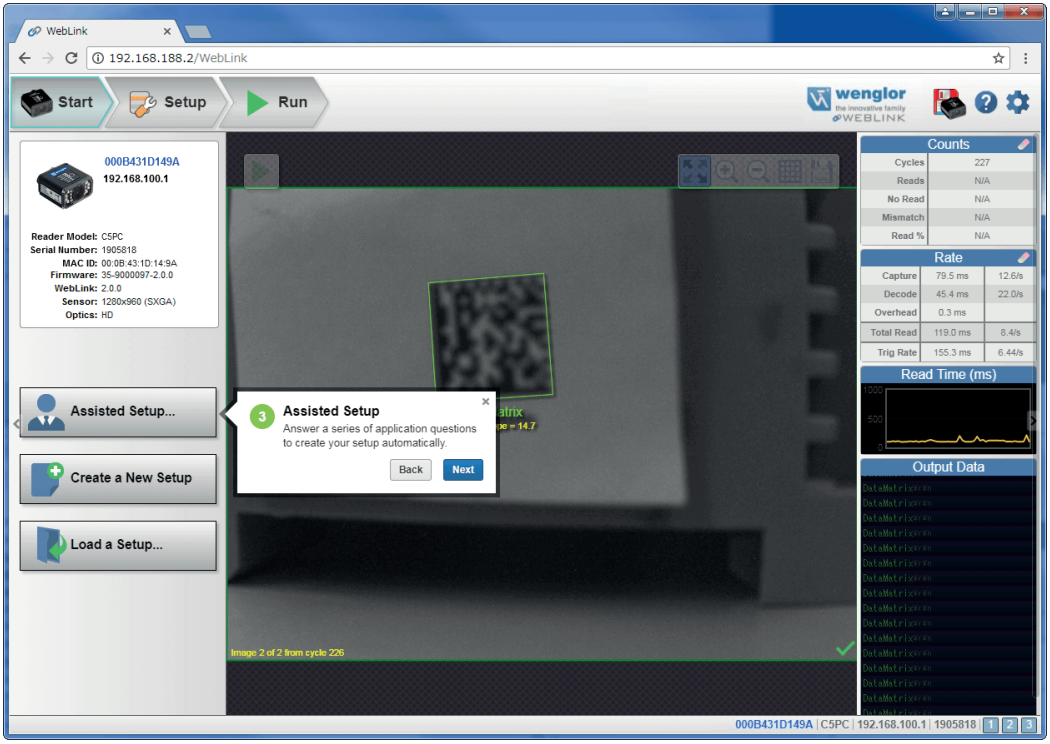
Start View



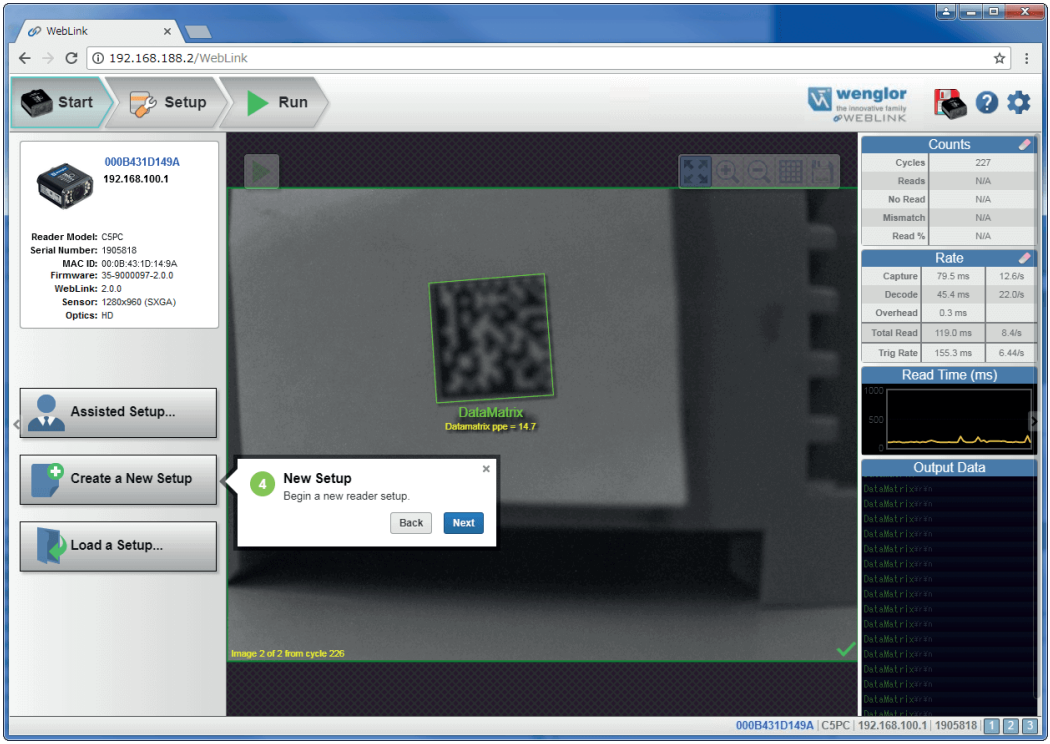
Reader Info


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
2
Reader Info
Review your reader's basic information.
Back
Next
DataMatrix
Datamatrix ppe = 14.7
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

Assisted Setup



New Setup


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
DataMatrix
Datamatrix ppe = 14.7
4
New Setup
Begin a new reader setup.
Back
Next
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

Load Setup

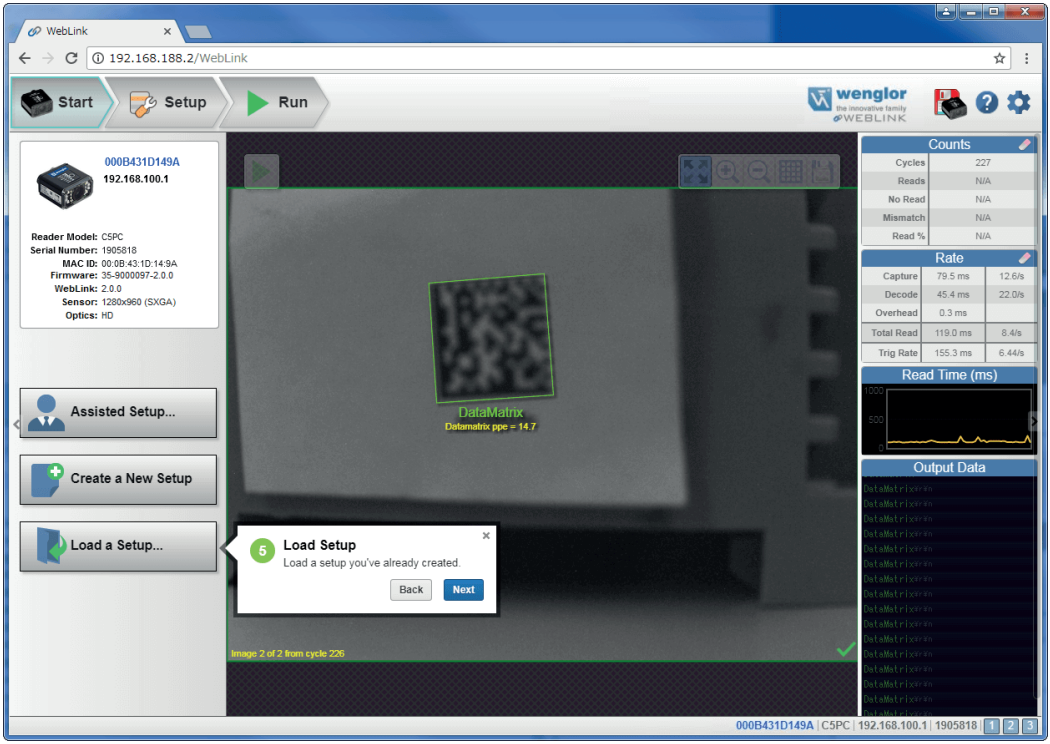
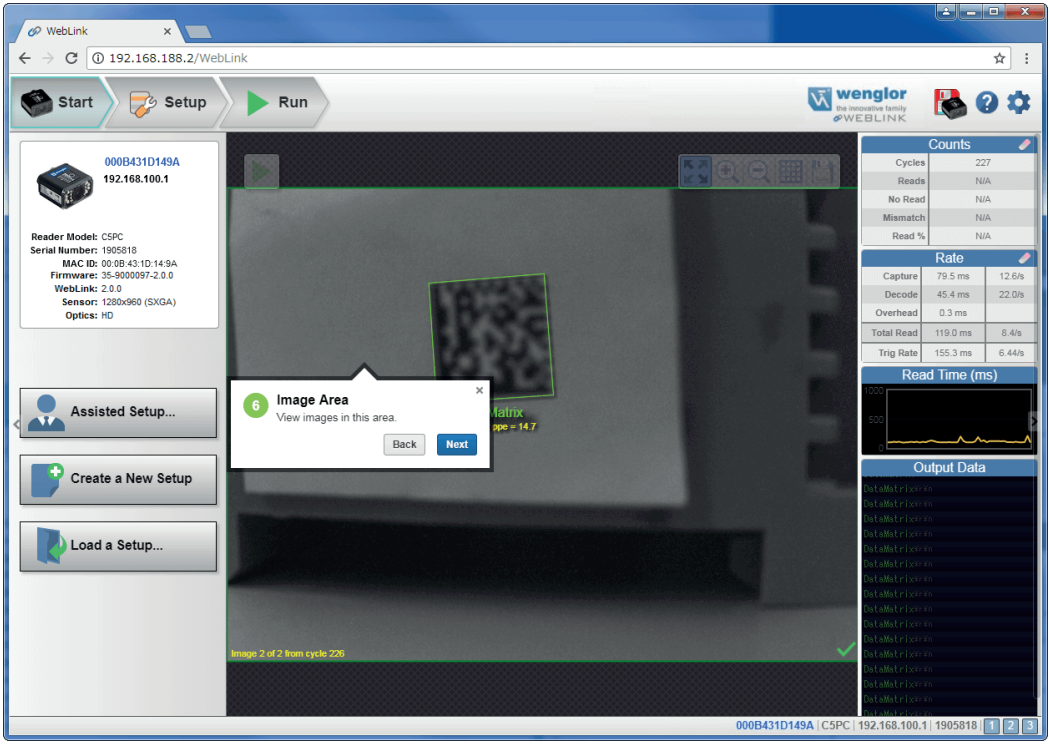

WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
DataMatrix
Datamatrix ppe = 14.7
5
Load Setup
Load a setup you've already created.
Back
Next
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

Image Area


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
6
Image Area
View images in this area.
Back
Next
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

Control Toolbar

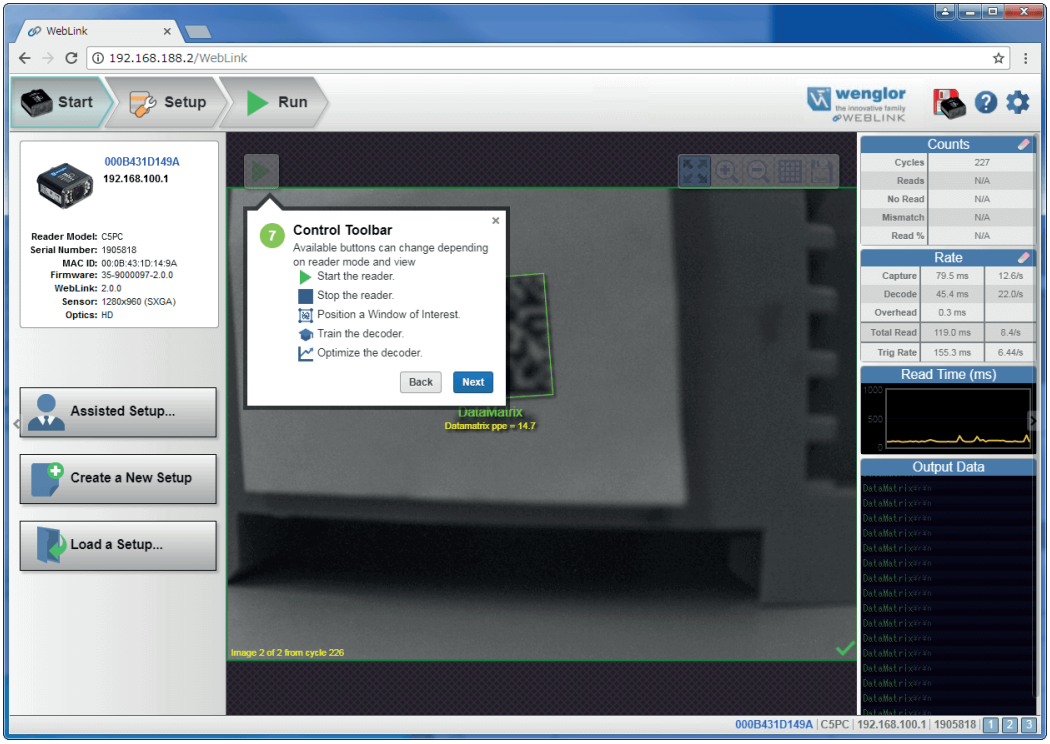
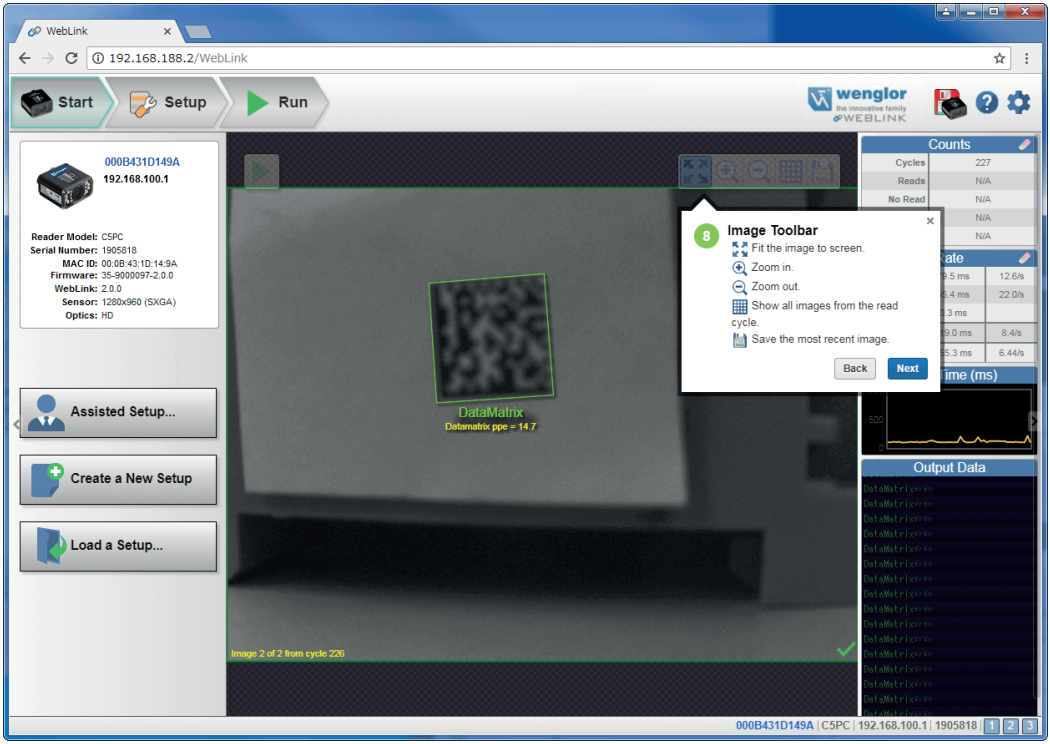
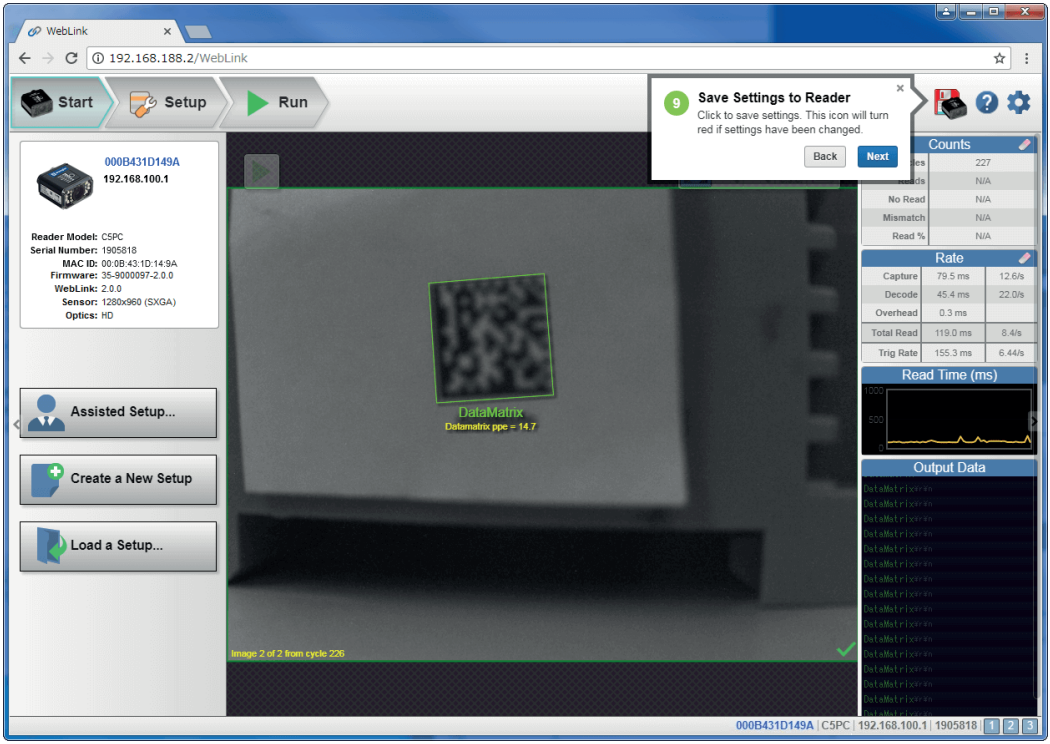


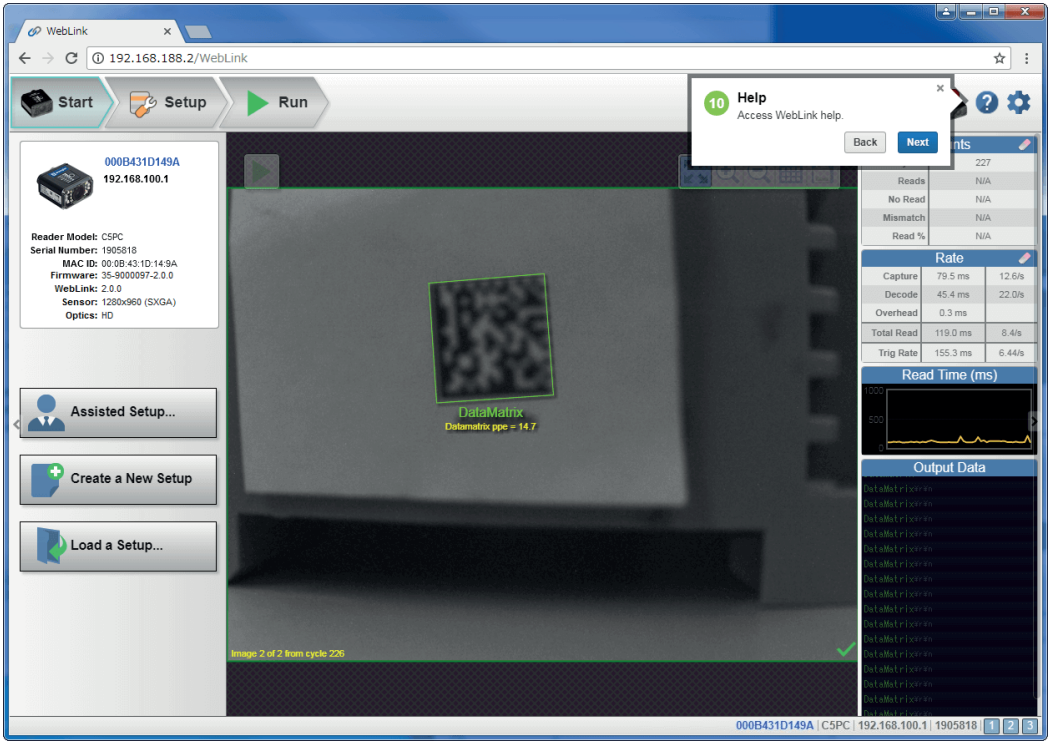
Image Toolbar



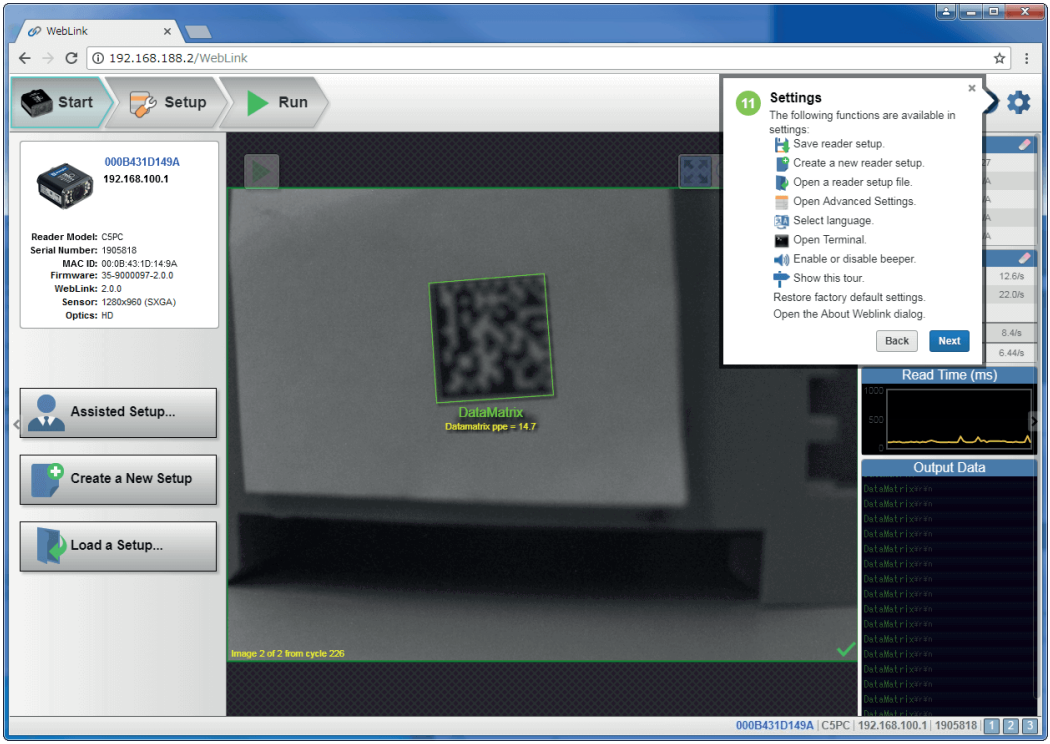
Save Settings to Reader



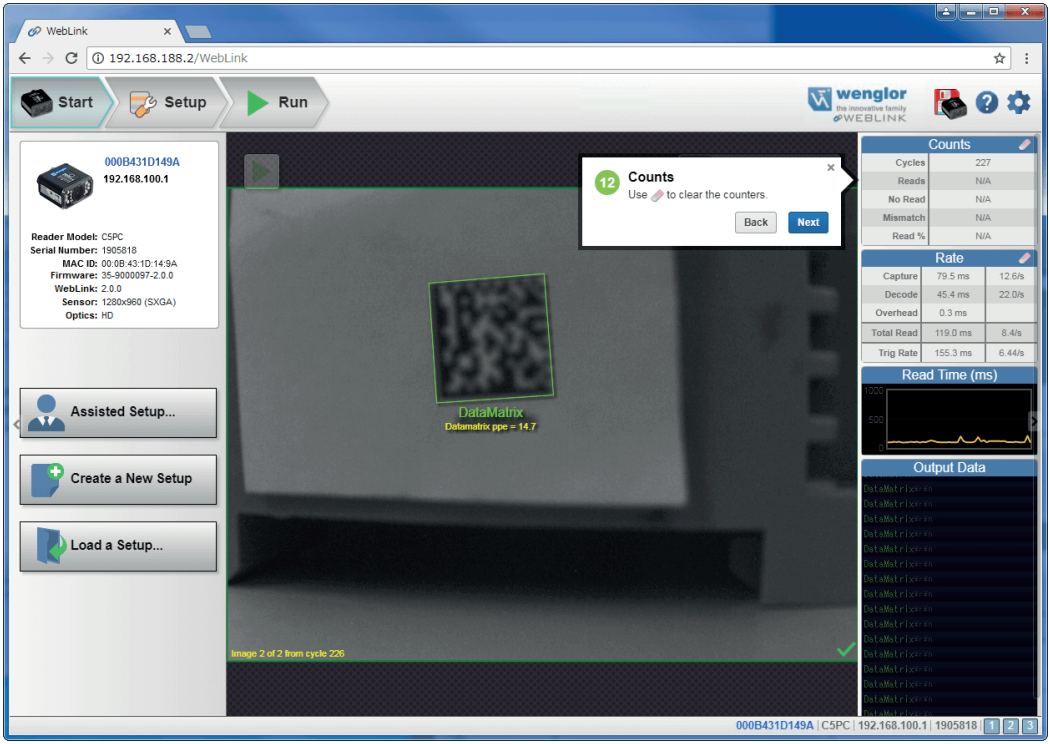
Help


WebLink
192.168.188.2/WebLink
Start
Setup
Run
Help
Access WebLink help.
Back
Next
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
DataMatrix
Datamatrix ppe = 14.7
Image 2 of 2 from cycle 226
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

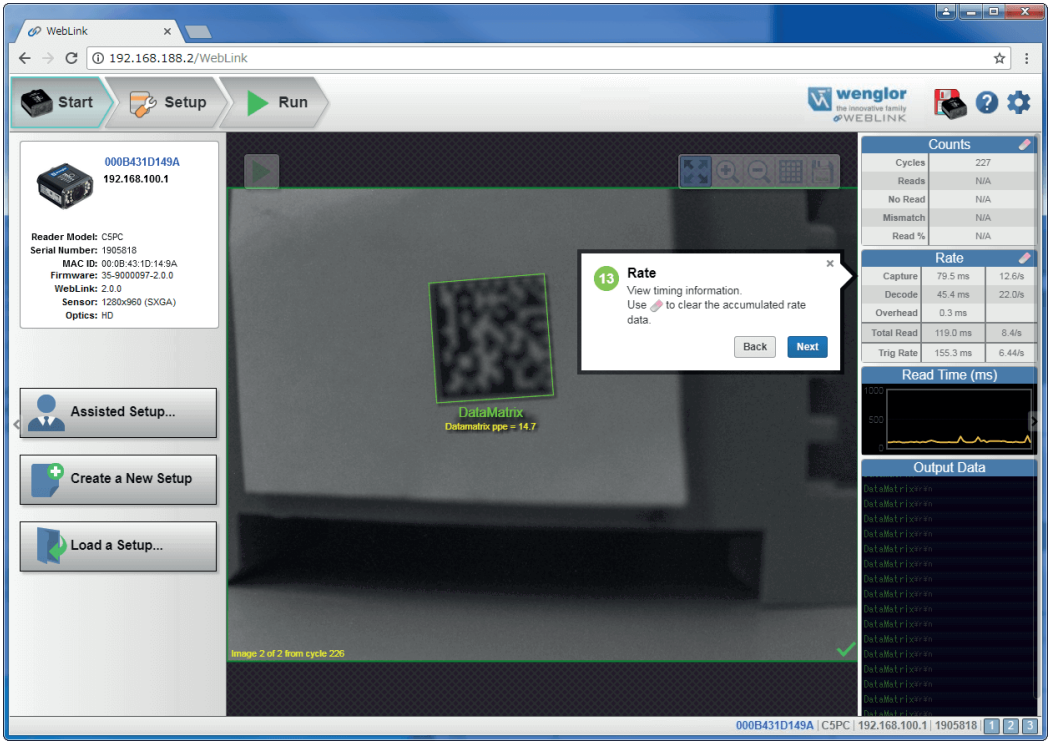
Settings


WebLink
192.168.188.2/WebLink
Start
Setup
Run
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
DataMatrix
Datamatrix ppe = 14.7
Image 2 of 2 from cycle 226
11
Settings
The following functions are available in settings:
Save reader setup.
Create a new reader setup.
Open a reader setup file.
Open Advanced Settings.
Select language.
Open Terminal.
Enable or disable beeper.
Show this tour.
Restore factory default settings.
Open the About Weblink dialog.
Back
Next
Read Time (ms)
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

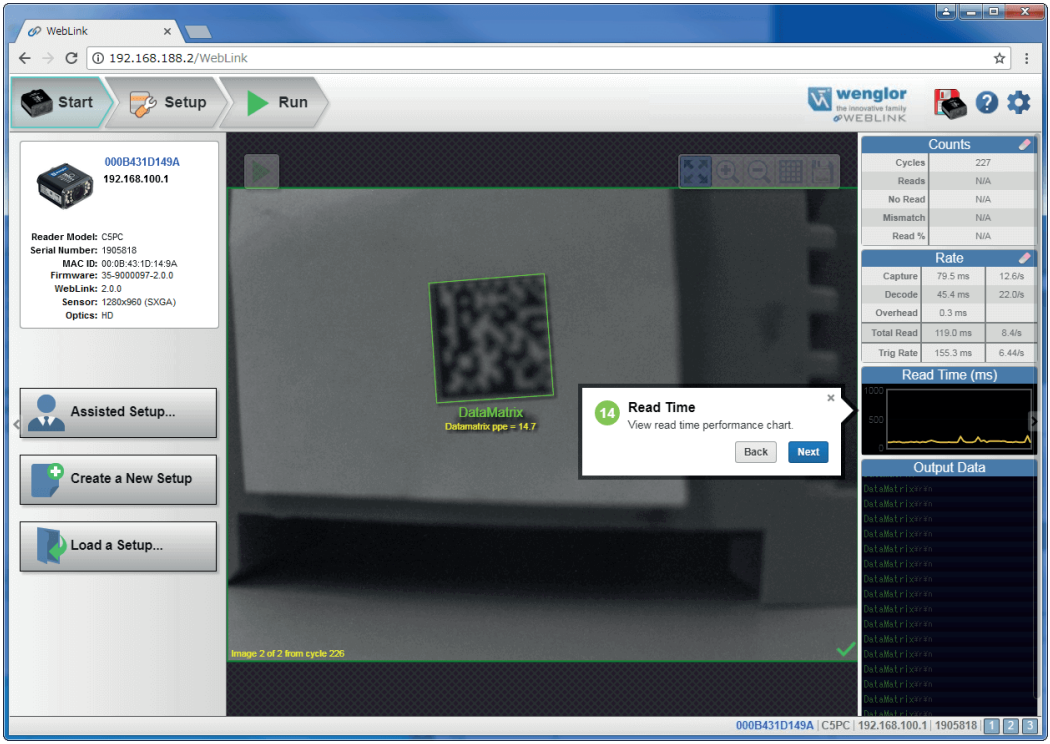
Counts


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
12
Counts
Use to clear the counters.
Back
Next
DataMatrix
Datamatrix ppe = 14.7
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

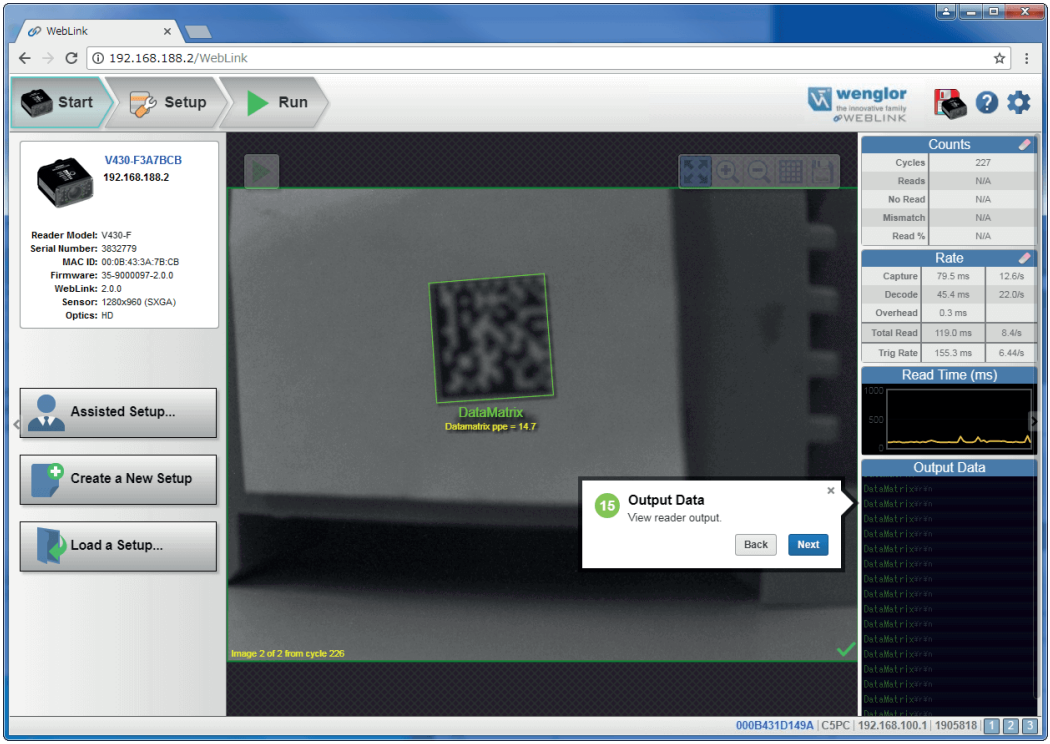
Rate


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
13
Rate
View timing information.
Use to clear the accumulated rate data.
Back
Next
DataMatrix
Datamatrix ppe = 14.7
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818 | 1 2 3

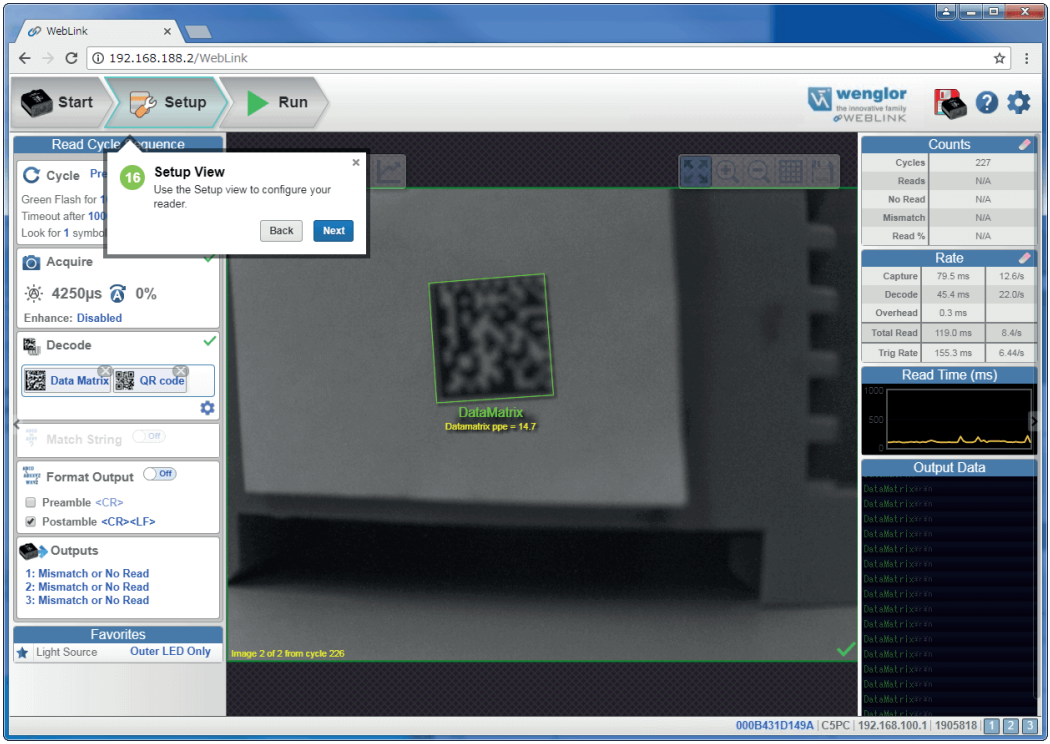
Read Time


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
000B431D149A
192.168.100.1
Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
DataMatrix
Datamatrix ppe = 14.7
Image 2 of 2 from cycle 226
14
Read Time
View read time performance chart.
Back
Next
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818 | 1 2 3

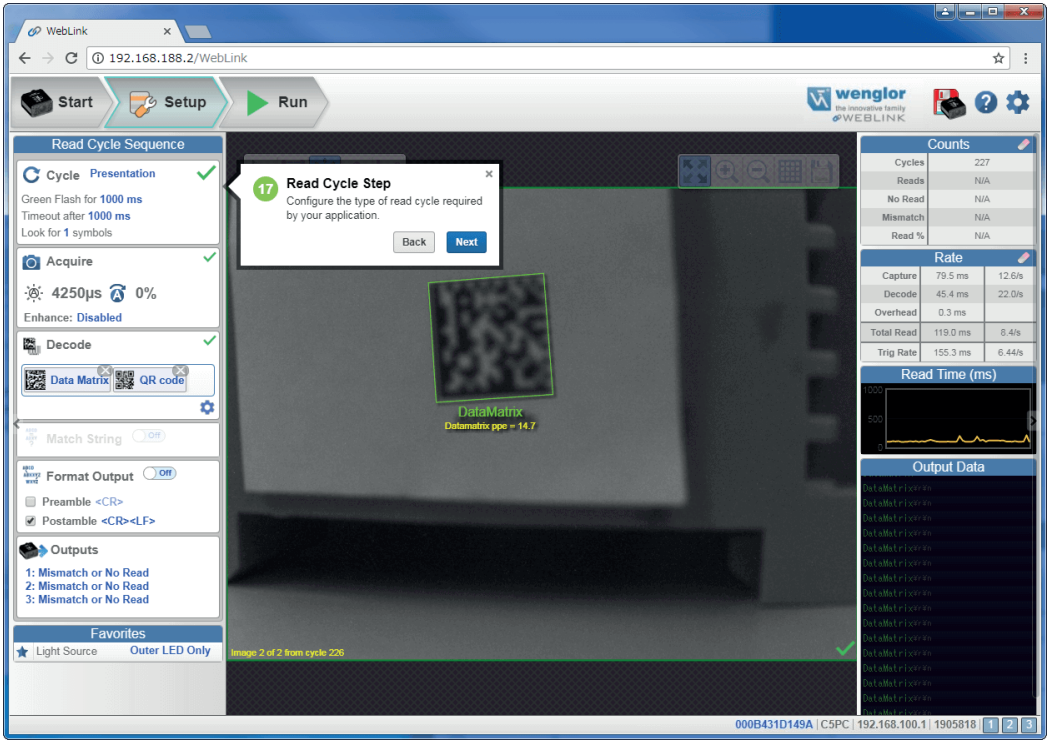
Output Data


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
V430-F3A7BCB
192.168.188.2
Reader Model: V430-F
Serial Number: 3832779
MAC ID: 00:0B:43:3A:7B:CB
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: HD
Assisted Setup...
Create a New Setup
Load a Setup...
DataMatrix
Datamatrix ppe = 14.7
15
Output Data
View reader output.
Back
Next
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818 | 1 2 3

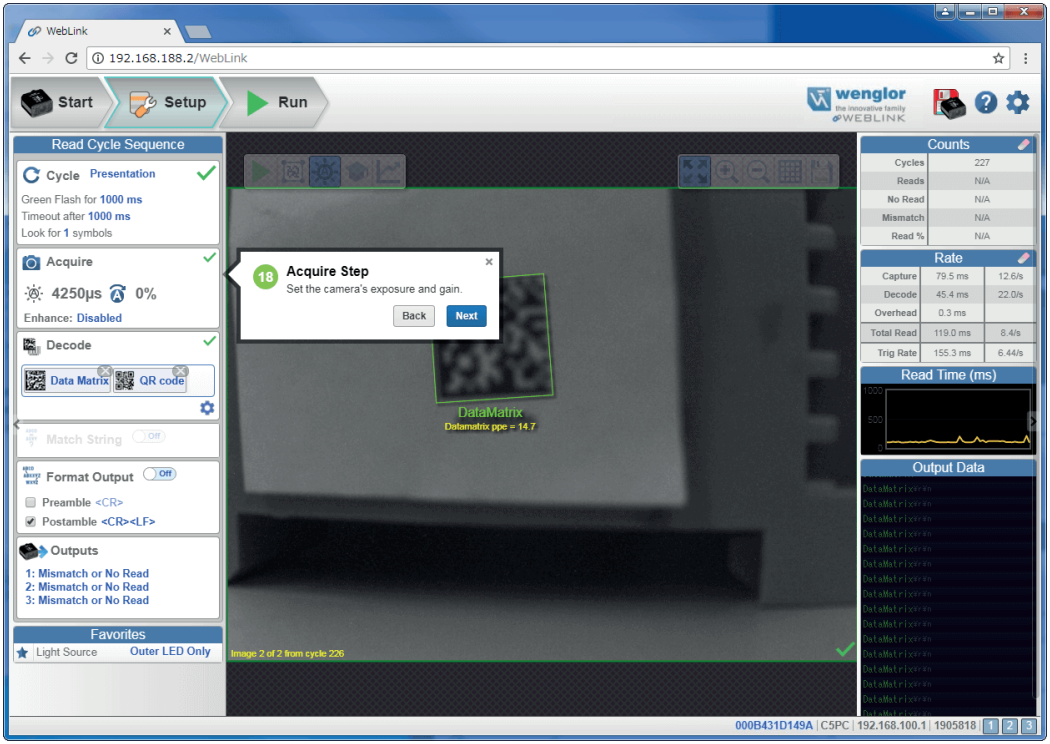
Setup View


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
Read Cycle Sequence
Cycle
Green Flash for 1
Timeout after 100
Look for 1 symbo
Acquire
4250µs
0%
Enhance: Disabled
Decode
Data Matrix
QR code
Match String
Off
Format Output
Off
Preamble <CR>
Postamble <CR><LF>
Outputs
1: Mismatch or No Read
2: Mismatch or No Read
3: Mismatch or No Read
Favorites
Light Source
Outer LED Only
16
Setup View
Use the Setup view to configure your reader.
Back
Next
DataMatrix
Datamatrix ppe = 14.7
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

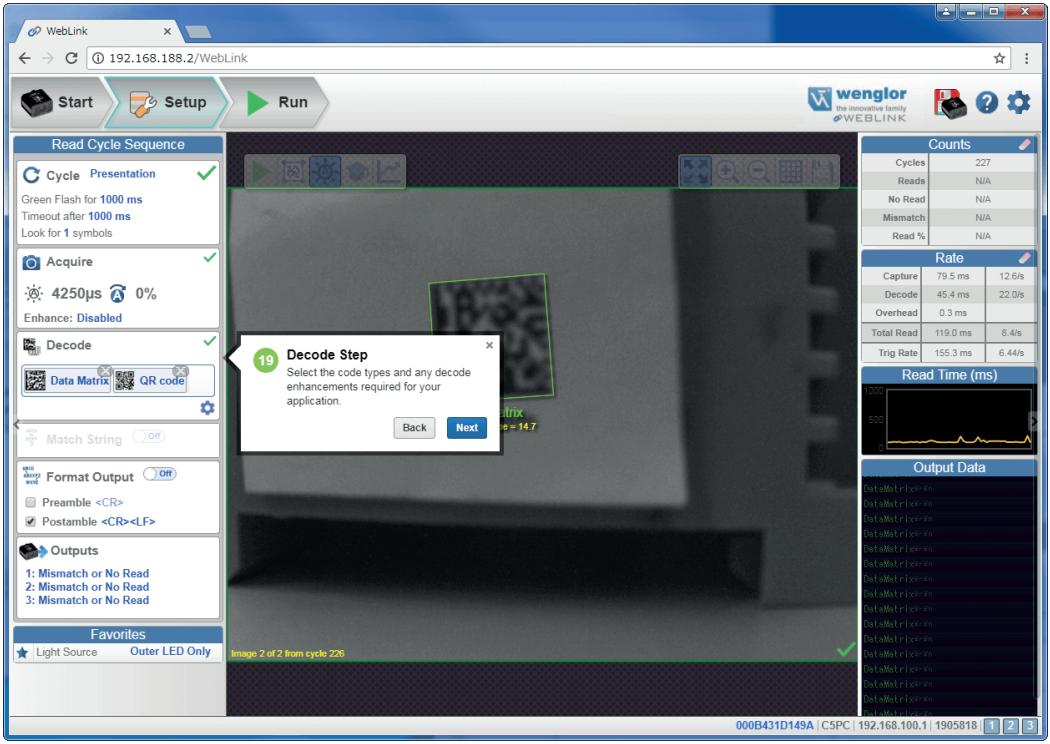
Read Cycle Step



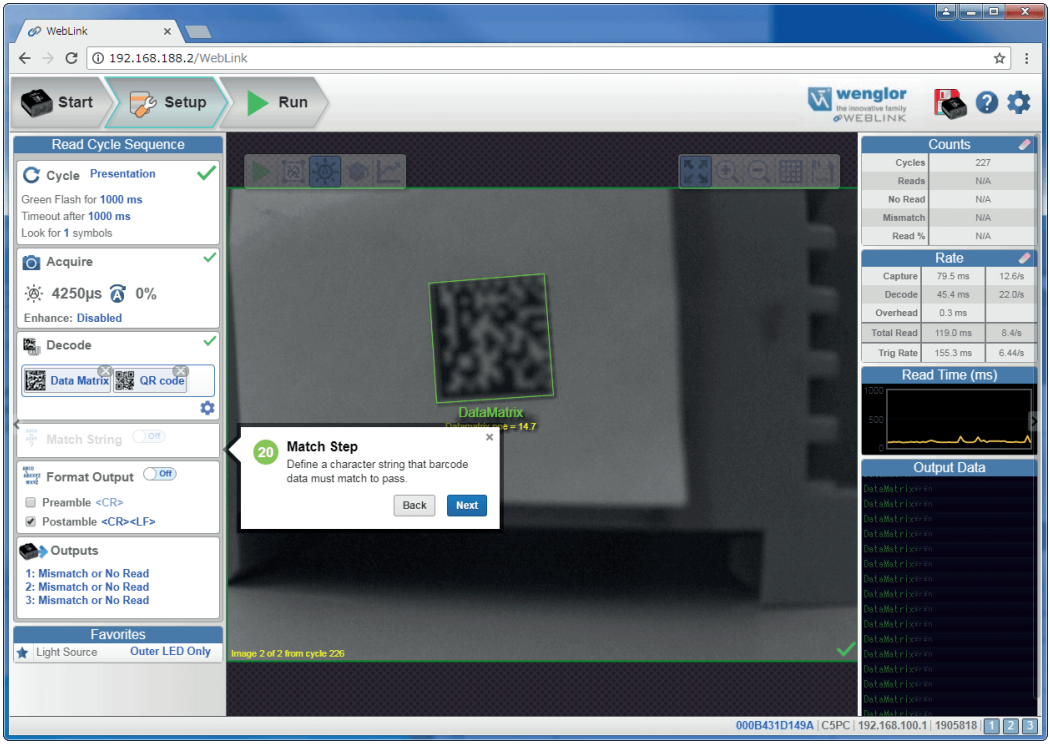
Acquire Step



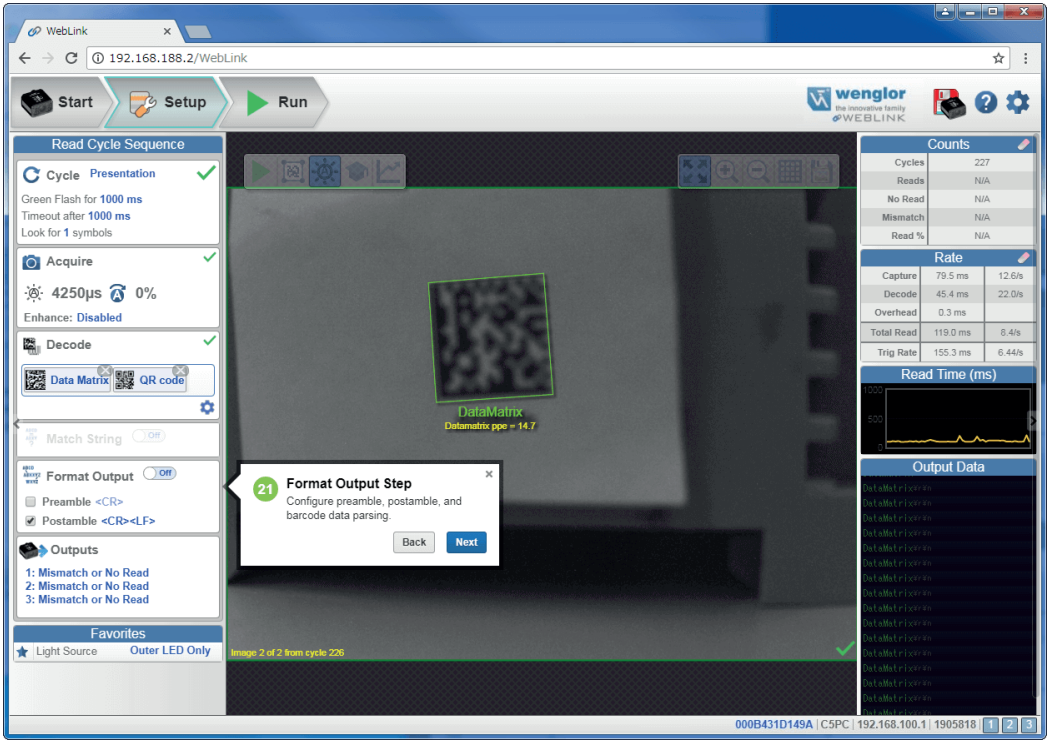
Decode Step


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
Read Cycle Sequence
Cycle Presentation
Green Flash for 1000 ms
Timeout after 1000 ms
Look for 1 symbols
Acquire
4250µs 0%
Enhance: Disabled
Decode
Data Matrix
QR code
Match String
Off
Format Output
Off
Preamble <CR>
Postamble <CR><LF>
Outputs
1: Mismatch or No Read
2: Mismatch or No Read
3: Mismatch or No Read
Favorites
Light Source
Outer LED Only
19
Decode Step
Select the code types and any decode enhancements required for your application.
Back
Next
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818 | 1 2 3

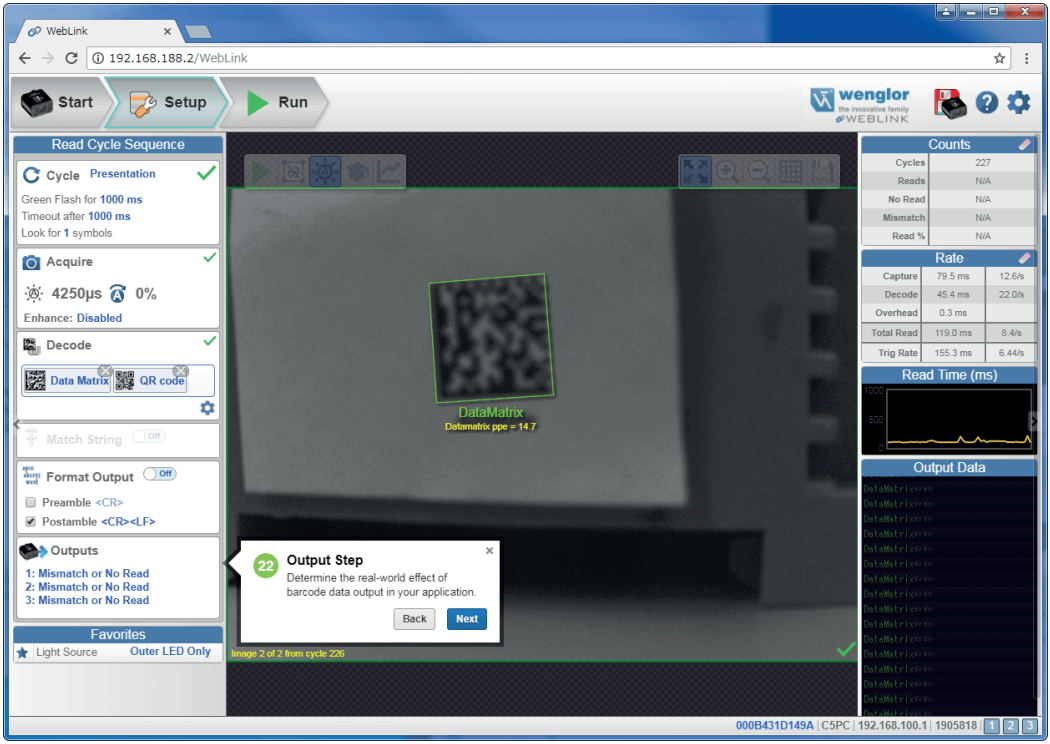
Match Step


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
Read Cycle Sequence
Cycle Presentation
Green Flash for 1000 ms
Timeout after 1000 ms
Look for 1 symbols
Acquire
4250µs 0%
Enhance: Disabled
Decode
Data Matrix
QR code
Match String
Off
Format Output
Off
Preamble <CR>
Postamble <CR><LF>
Outputs
1: Mismatch or No Read
2: Mismatch or No Read
3: Mismatch or No Read
Favorites
Light Source
Outer LED Only
DataMatrix
20
Match Step
Define a character string that barcode data must match to pass.
Back
Next
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

Format Output Step



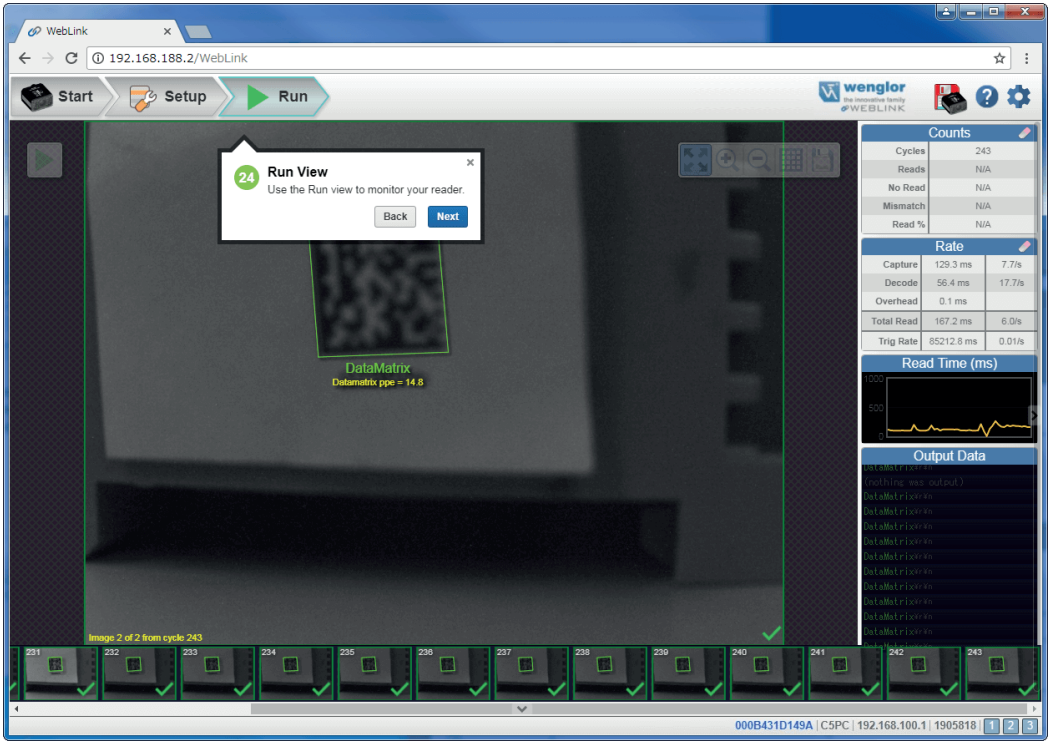
Output Step


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
Read Cycle Sequence
Cycle Presentation
Green Flash for 1000 ms
Timeout after 1000 ms
Look for 1 symbols
Acquire
4250µs 0%
Enhance: Disabled
Decode
Data Matrix
QR code
Match String
Off
Format Output
Off
Preamble <CR>
Postamble <CR><LF>
Outputs
1: Mismatch or No Read
2: Mismatch or No Read
3: Mismatch or No Read
Favorites
Light Source
Outer LED Only
DataMatrix
Datamatrix ppe = 14.7
22
Output Step
Determine the real-world effect of barcode data output in your application.
Back
Next
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818

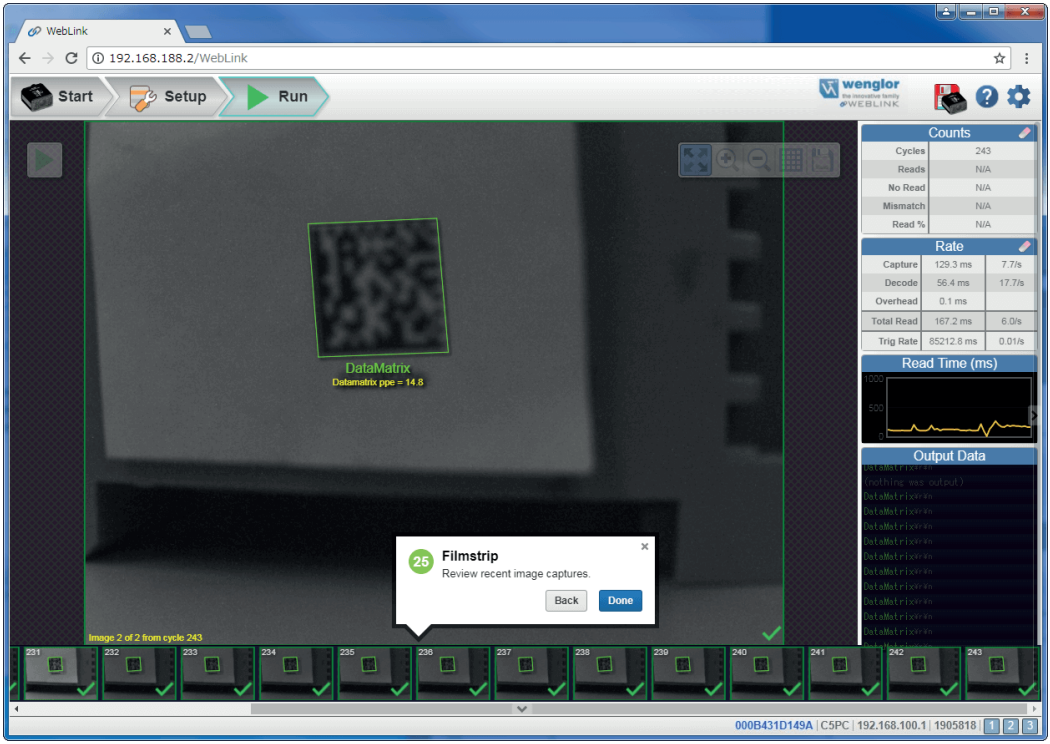
Favorites

WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
the innovative family
WEBLINK
Read Cycle Sequence
Cycle Presentation
Green Flash for 1000 ms
Timeout after 1000 ms
Look for 1 symbols
Acquire
4250µs 0%
Enhance: Disabled
Decode
Data Matrix
QR code
Match String
Format Output
Off
23
Favorites
Click the ☆ in Advanced Settings to add a command to Favorites.
Back
Next
Favorites
Light Source
Outer LED Only
DataMatrix
Datamatrix ppe = 14.7
Image 2 of 2 from cycle 226
Counts
Cycles 227
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 79.5 ms 12.6/s
Decode 45.4 ms 22.0/s
Overhead 0.3 ms
Total Read 119.0 ms 8.4/s
Trig Rate 155.3 ms 6.44/s
Read Time (ms)
1000
500
0
Output Data
000B431D149A | C5PC | 192.168.100.1 | 1905818 | 1 2 3

Run View


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
WEBLINK
24
Run View
Use the Run view to monitor your reader.
Back
Next
DataMatrix
Datamatrix ppe = 14.8
Image 2 of 2 from cycle 243
Counts
Cycles 243
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 129.3 ms 7.7/s
Decode 56.4 ms 17.7/s
Overhead 0.1 ms
Total Read 167.2 ms 6.0/s
Trig Rate 85212.8 ms 0.01/s
Read Time (ms)
1000
500
0
Output Data
(nothing was output)
231 232 233 234 235 236 237 238 239 240 241 242 243
000B431D149A | C5PC | 192.168.100.1 | 1905818 | 1 2 3

Filmstrip


WebLink
192.168.188.2/WebLink
Start
Setup
Run
wenglor
Counts
Cycles 243
Reads N/A
No Read N/A
Mismatch N/A
Read % N/A
Rate
Capture 129.3 ms 7.7/s
Decode 56.4 ms 17.7/s
Overhead 0.1 ms
Total Read 167.2 ms 6.0/s
Trig Rate 85212.8 ms 0.01/s
Read Time (ms)
Output Data
DataMatrix
Datamatrix ppe = 14.8
25
Filmstrip
Review recent image captures.
Back
Done
Image 2 of 2 from cycle 243
231 232 233 234 235 236 237 238 239 240 241 242 243
000B431D149A | C5PC | 192.168.100.1 | 1905818 | 1 2 3

5. Quick Start

This section is designed to get your **C5PC** reader up and running quickly using **WebLink**. Following these steps will allow you to get a sense of the reader's capabilities and to test sample symbols.

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Explore the Setup View 77
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Configure Acquire Settings 81
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Format Output and Configure Match String 86
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Run the Application 89

5.1. C5PC and WebLink Quick Start

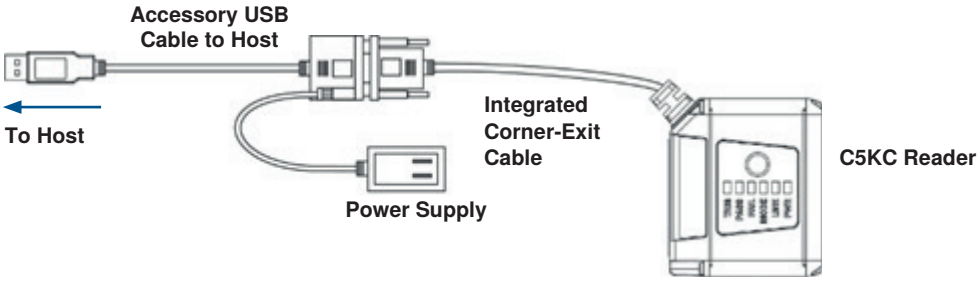
There are two ways to configure and test C5PC readers:
- wenglor's browser-based WebLink user interface, which enables you to access, configure, and test your reader without having to install software or access files on a host system (recommended);
- Serial commands that can be sent from the Terminal in WebLink or from another terminal program.

Important: The following hardware configurations are examples only. Real-world application configurations may vary considerably from those shown below.

5.1.1. Check Hardware and Connect the System

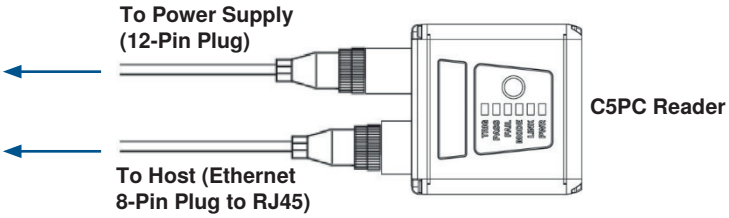
C5KC Configuration Options
- Mount the reader securely in its stand (not supplied).
- Mount the reader as required by the application.
- Connect the integrated corner-exit cable to the C5KC.
- Connect the accessory USB cable to the integrated corner-exit cable.
- Connect the USB Type A side of the USB cable to the host.
- Connect the power cable into the power source.

C5KC with DB15 to Ext. Power/USB Type A (ZDNV007)

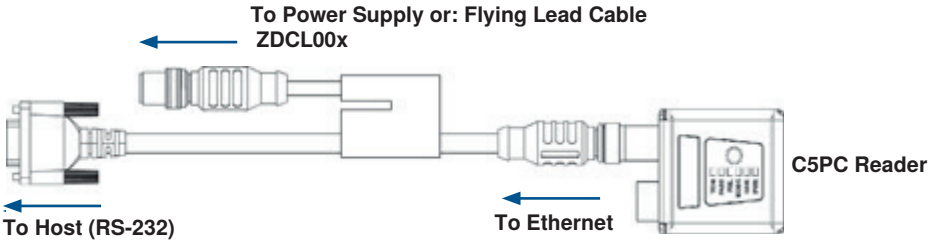


C5PC Configuration Options
- Mount the reader securely in its stand (not supplied).
- Mount the reader as required by the application.
- Connect the power cable to the C5PC.
- Connect the Ethernet cable to the C5PC.
- Connect the Ethernet cable to the host.
- Connect the power cable into the power source.

Basic C5PC Configuration

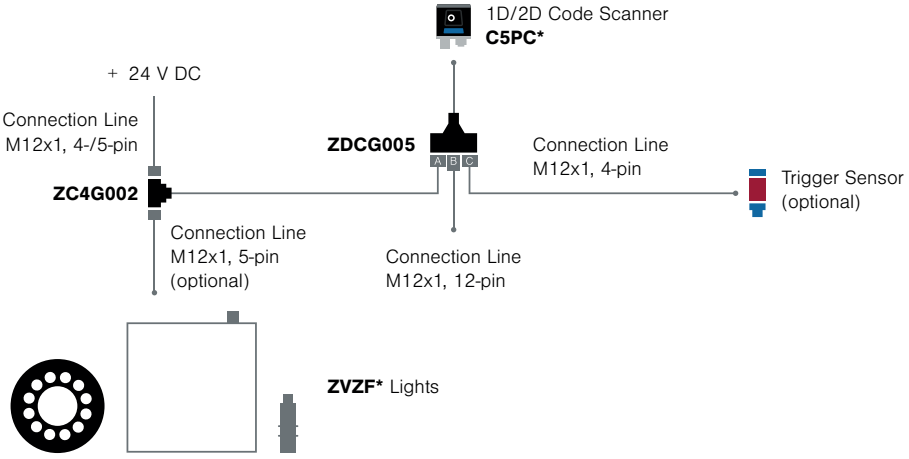


C5PC 12-Pin Socket to 9-Pin Socket and M12 Plug

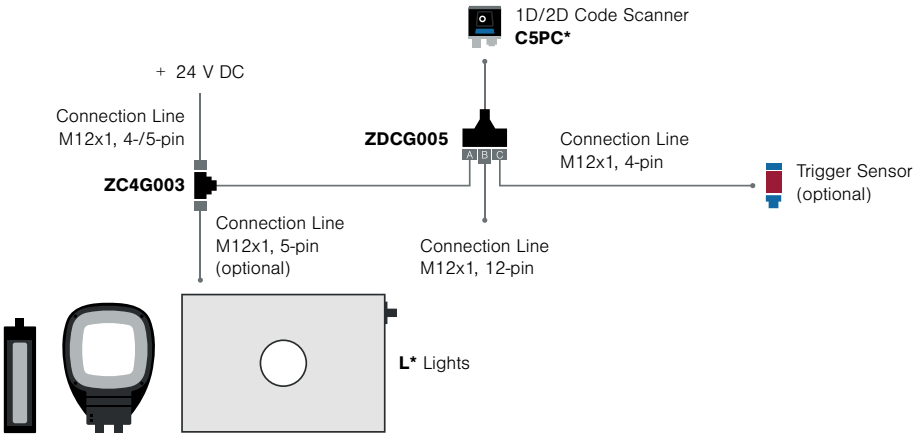


C5PC Configuration with external Illumination and Trigger Sensor

For ZVZF* Lights:



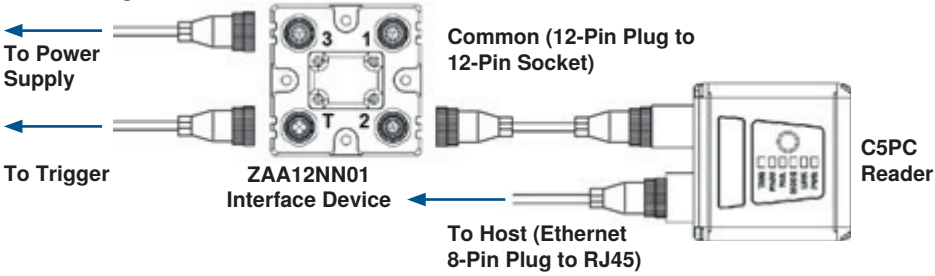
For L* Lights:



How to set up:

- Connect as described below
- When using a PNP trigger sensor, connect pin 8 (Input Commen) to GND
- When using a NPN trigger sensor, connect pin 8 (Input Commen) to + 24 V DC
- Parameter settings
  - Read Cycle: Triggered
  - Light Source: External Strobe (Advanced Settings – Camera Setup)
  - Output 3: Use as External Illumination Strobe (Advanced Settings – I/O)

C5PC Configuration with ZAA12NN01 Interface Device



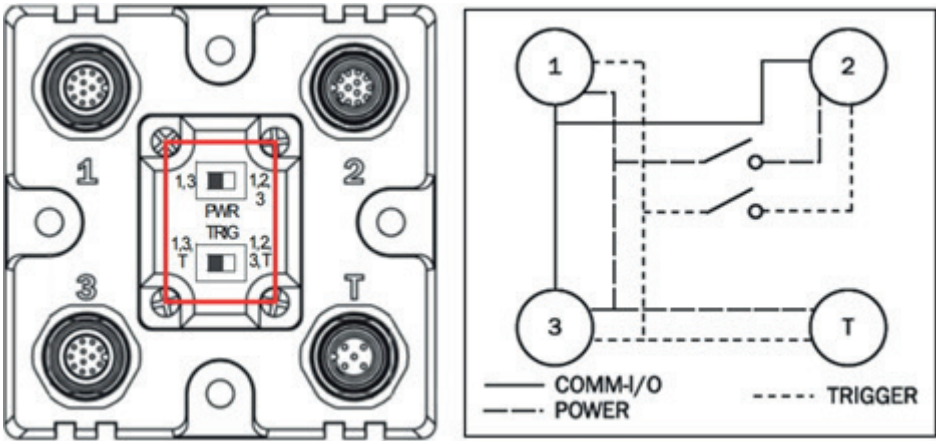
Important: See **Appendix B** for C5KC, and C5PC pin assignments.

ZAA12NN01 Interface Device
The ZAA12NN01 Interface Device simplifies the installation of C5PC readers. It is used to break out and distribute Power, Communications, and Digital I/O using standard C5PC cables and accessories.

Connectors
1. **Connector 3** – Power is supplied through Connector 3. Power is distributed to all other ZAA12NN01 Connectors to provide power to the reader, Photo Sensor (Trigger), and Smart Light.
2. **Connector 1** – Smart Lights or a Host Serial Cable are connected to Connector 1. In the case of a Smart-Light, Power and/or Power and Strobe Control are distributed to the Smart Light. In the case of the Host Serial Cable, RS-232 and Digital I/O are distributed to the DB-9 connector that can be connected to a Host.
3. **Connector T** – A Photo Sensor is typically connected to Connector T. The Trigger signal is sent directly to the reader.
4. **Connector 2** – The readers are connected to Connector 2. Power, Trigger, RS-232, and all Digital I/O including the Strobe Signal are routed through this cable.

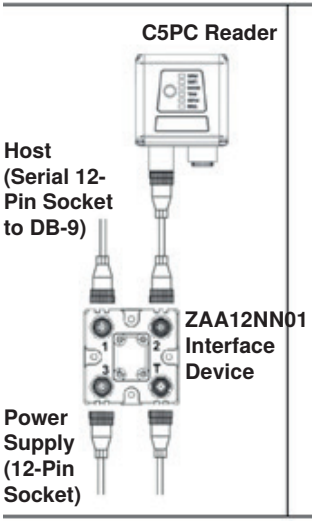
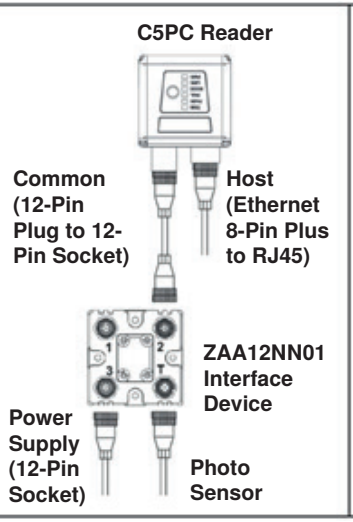
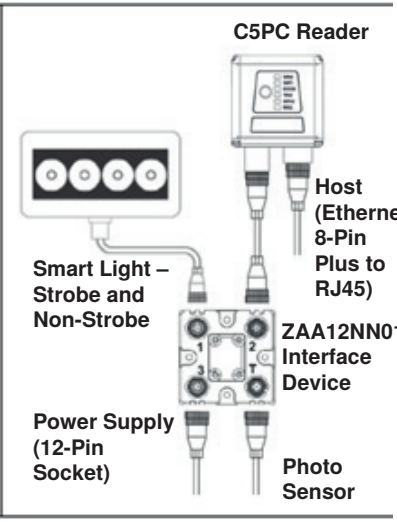
Switches
There are two switches that control how signals are routed through the ZAA12NN01 Interface Device. For the C5PC, the two switches are set to the right by default, to distribute power to all connectors, and to send the Trigger signal to the reader.

ZAA12NN01 Connector View and Switch Settings



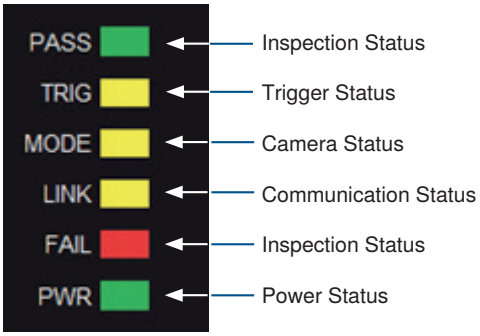
The ZAA12NN01's switches are set to the right by default for C5PC use. In this configuration, communication, power, and trigger are distributed to all connectors.

Examples of Common C5PC Configurations using the ZAA12NN01 Interface Device

Serial Standalone with ZAA12NN01	Ethernet Standalone with ZAA12NN01	Smart Light Control with ZAA12NN01
		

5.2. Check C5PC Status LEDs

C5KC and C5PC LED Indicators
The top of the C5KC and C5PC Readers have multiple LEDs that indicate different inspection, trigger, camera, communication, and power states.



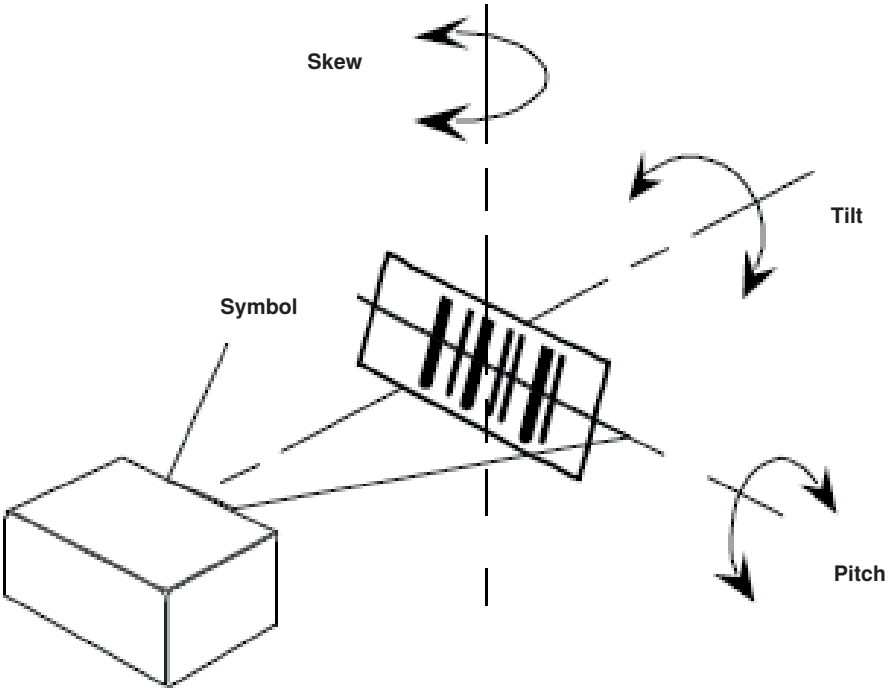
Additional Feedback from C5KC and C5PC LEDs
Green Flash – A green flash from the front of the unit indicates a Good Read.
Blue Targeting Pattern – The blue targeting pattern from the front of the unit allows the user to center an object in the reader's field of view.

LED	Status	Description
PASS	On	Active State (PASS)
	Off	Inactive State
TRIG	On Steady	Continuous Trigger
	Off	Waiting for Trigger Event
	Flashing On/Off	Trigger Event
MODE	On Steady	Unit Ready
	Off	Unit Not Ready
LINK	On Steady	Link Established
	Off	No Link/Activity
	Flashing On/Off	Link Established and Activity on Link
FAIL	On	Active State (FAIL)
	Off	Inactive State
PWR	On	Power On
	Off	No Power Applied to Unit

5.3. Mount and Position the Reader

•Position the reader several inches from the symbol. You may need to reposition the reader a few times to find the ideal distance.
•Tip the reader relative to the symbol to avoid the glare of direct (specular) reflection.
•Symbols can be rotated (tilted) at any angle; however, for best results symbols should be aligned with the field of view. In the case of linear symbols, aligning the bars in the direction of their movement (ladder orientation) will minimize the chances of blurring and will result in more consistent decodes.

Important: Avoid excessive skew or pitch. Maximum skew is ±30°; maximum pitch is ±30°. The illustration below shows approximate skew axis, pitch axis, and tilt axis.



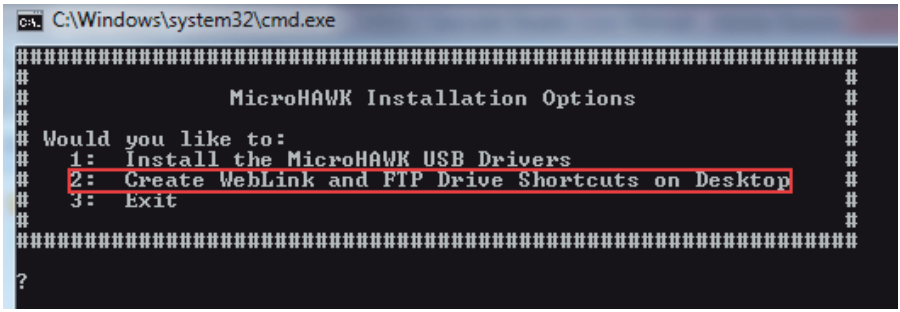
Reader and Symbol Orientation

5.4. Install WebLink Drivers (C5KC)

If you have loaded the DDU (Device Discovery Utility) onto your computer, the necessary C5KC USB drivers will already have been installed. You can plug the reader into the PC and the drivers will load automatically.

If you have not loaded the DDU onto your computer, the reader will be factory-configured to USB Drive Mode. When you first plug in the reader, it will act as a USB key. The drivers can be installed directly from the reader using the following steps.

1. **Plug the reader into a USB port and wait for the AutoPlay dialog to appear.**
2. **Click the Open folder to view files and double-click the Double-Click Here.bat batch file.**
3. **At the command prompt, select option 1 and then type Enter. The VCOM and USBLAN drivers will be installed.**
4. **At the command prompt, select option 2 to install the WebLink and FTP drive shortcuts. WebLink and C5KC FTP drive shortcut icons will appear on the desktop.**



5. **When the drivers and shortcuts have been installed, unplug the reader from the USB port.**
6. **Re-plug the reader into the USB port and wait for the reader to reboot and enter read mode (LEDs ON).**
7. **Start WebLink. The default address for the reader is 192.168.100.1. If multiple readers are installed, they will be incremented automatically. The second reader will be 192.168.100.10.**
8. **Double-click the FTP drive shortcut and log in with username: target and password: password.**
9. **The FTP drive is opened so you can access additional resources and installers in the Tools and Documentation folder.**

You are now ready to use the C5KC with WebLink.
If the reader will be used on another computer without the drivers installed, it can be placed back into USB Drive Mode from WebLink so the process described above can be repeated.
See “9.13. Enable USB Drive Mode” on page 161 **for details.**

5.5. Connect to WebLink

WebLink System Requirements

- **Operating System Requirements**
  – Microsoft Windows 10 (64-Bit) or Microsoft Windows 7 (64-Bit)

NOTE!
Using an Embedded OS (Windows CE) and/or an underpowered machine (limited RAM or limited disk space) is not recommended.

- **Hardware and Performance Requirements**
  – Intel Core i3 Duo Processor
  – 2 GB RAM / 128 MB Video RAM
  – 1 GB Hard Drive Space
  – 32-Bit Color Display
  – 4.0 Windows Experience Index

- **Browser Requirements**
  – Google Chrome (Recommended)
  – Firefox
  – Microsoft Edge
  – Opera
  – Safari (Mac-Only)

- **Browser Feature Requirements**
  WebLink requires certain features to be supported by the hosting browser. Support for these features are checked before WebLink loads, and if they are not available, an error message is displayed.
  The following features are required by WebLink and are checked at startup:
  – **Web Sockets**
  – **HTML5 Canvas**
  – **HTML5 Audio**

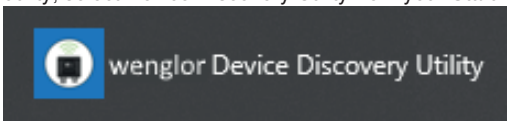
Static Connection

- Navigate to **Control Panel > Network and Sharing Center** on your PC.
- Click **Local Area Connection 4**. In the **Status** dialog, click **Properties**.
- In the **Local Area Connection Properties** dialog, select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties** again. Set your PC to a **192.168.100.X** IP address (**192.168.100.5**, for example).
- Click **OK**.
- Open a web browser and type the reader's default IP address (**http://192.168.100.1**) in the web browser's address bar. The reader will connect to WebLink.

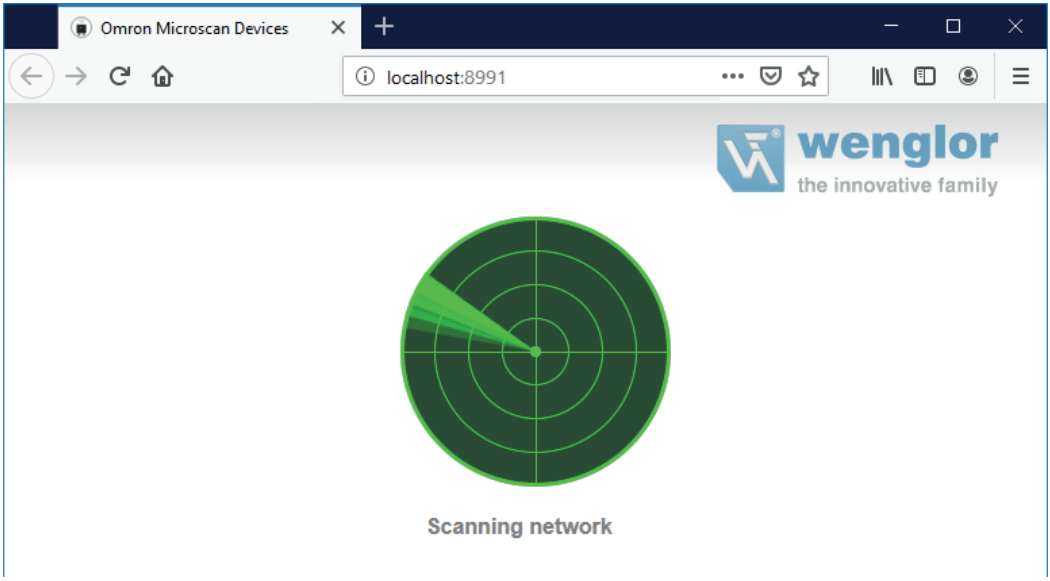
DHCP Network Connection
- Plug your reader into the your network adapter.
- Connect to the reader via **Ethernet TCP/IP**.
- Click **Search** to find the reader. When the reader appears in the field below the **Search** and **Send** buttons, select it.
- Change the reader from Static to **DHCP** and click **Send and Save**. The reader will reboot.
- When the reader is found, note the new IP address that is generated.
- Open a browser and type the new IP address. WebLink will load.

Use the Device Discovery Utility (DDU) to Connect to WebLink
You can also connect to WebLink with wenglor's **Device Discovery Utility**, available at https://wenglor.com.

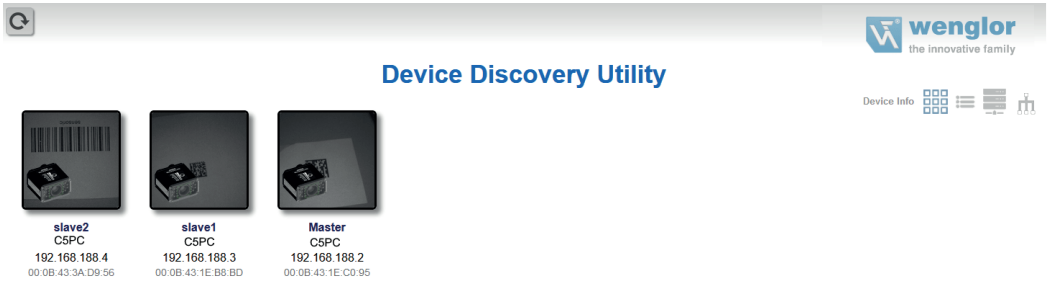
Once you have downloaded the Device Discovery Utility .exe file from wenglor's website and installed the utility, select Device Discovery Utility from your Start Menu.



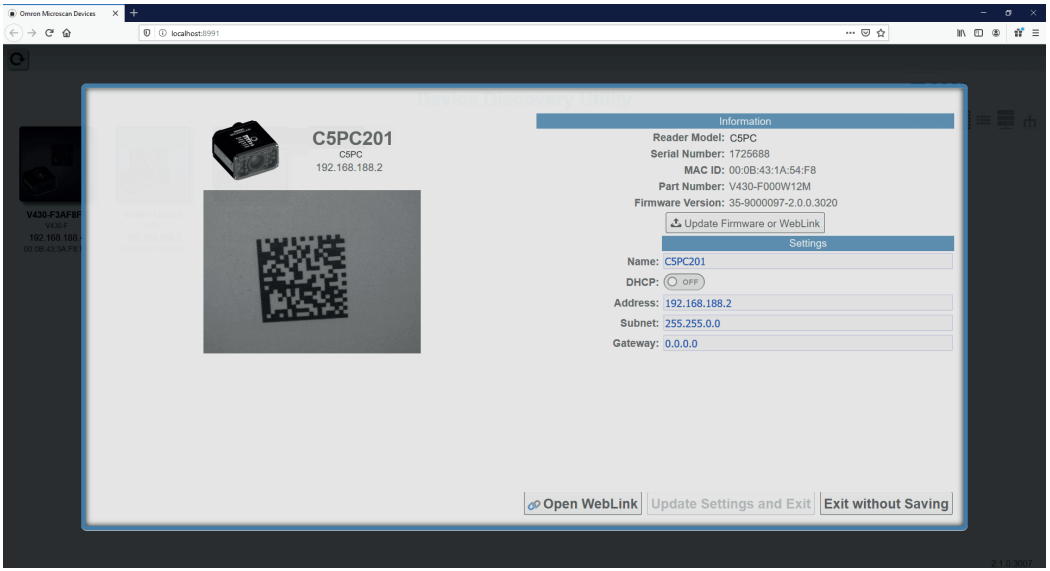
The following screen will appear.



When your reader is located on the network, its identifying information will be shown as in the example below.



Click on your reader to bring up the information and settings view.



Click **Open WebLink**. The WebLink splash screen will appear as the program opens.

5.6. Configure Daisy Chain (If Required by Application)

Daisy Chain is useful in applications where:
• More than one symbol type is present;
• A symbol may be present on multiple sides of a package;
• Symbols are presented at different depths;
• Multiple readers are required to cover a large field of view;
• There is a need to find a symbol on a circular object in any orientation.

A Daisy Chain consists of one **parent** and one or more **child** devices. The child devices report their data to the parent, which then reports the data to the network, effectively allowing all readers to act as one. In other words, the outside world interacts with one unit – the parent reader.

The **Device Discovery Utility (DDU)** is used to configure the Daisy Chain group where the parent reader and the child readers are defined. The parent reader interacts with a host computer or PLC. A parent reader that receives a trigger will send a trigger to each of the child readers. Any symbol decoded by the child readers will be communicated to the parent, which collects all of the decodes from the children and will communicate them to the host. The Daisy Chain uses one UDP packet for the decoded data from all readers. Combined data from all readers larger than 3800 bytes will not be reported.

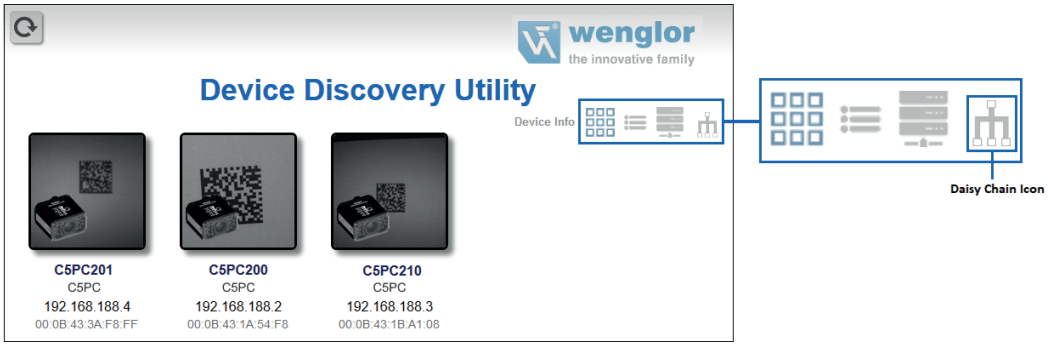
Overview of Setup Process
Use the Device Discovery Utility to define the Daisy Chain group, the parent reader, and the child readers. Use WebLink to configure each of the readers in the Daisy Chain group as desired for the application.

Tips
- **The parent reader should:**
  – Configure for application requirements: Match String, Format Output, Trigger, (Digital) Outputs, etc.

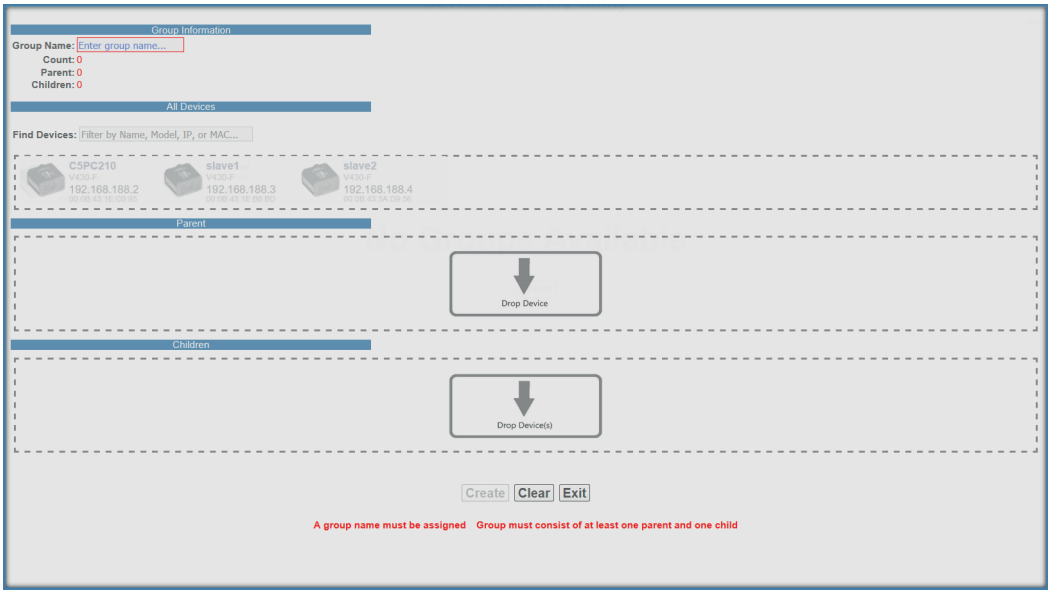
- **The child readers should:**
  – Use a Triggered cycle, such as External Edge.
  – Use a timeout that occurs before the end of read cycle on the parent reader.

- **Parent and child readers should:**
  – Save settings to the flash memory of the readers.

Setting Up a Daisy Chain Configuration with the Device Discovery Utility (DDU)
If your application requires readers to be deployed in a Daisy Chain configuration, the **DDU** can help you create such a configuration.
A Daisy Chain is a grouping of **2** to **8** readers that function as one. The DDU interface allows you to manage Daisy Chains, including their creation, monitoring, and deletion.
Connect 2 to 8 **C5PC** readers that have Daisy Chain-compatible firmware. From the DDU home page, click on the group icon located near the top-right.

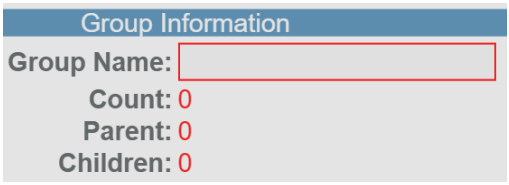


On the **Groups** page, assign a **Group Name** and click **Create**. This opens the interface that allows you to create a new Daisy Chain.
Important: Only Daisy Chain-enabled readers will appear in this view.

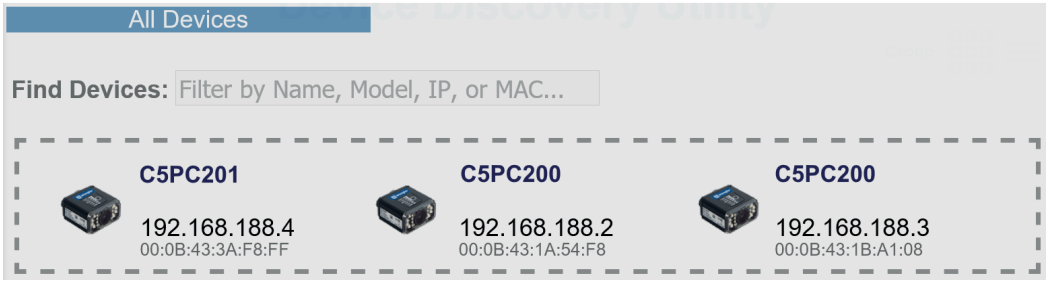


The five most important areas in the Daisy Chain creation interface are:

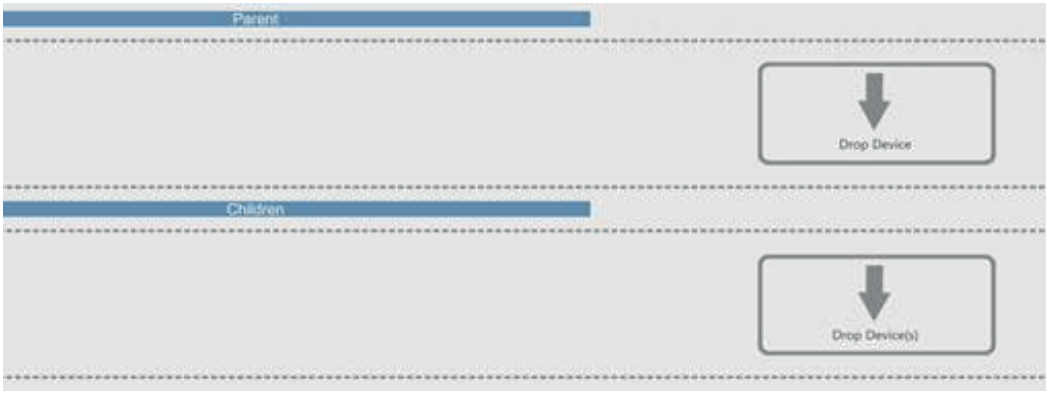
- **Group Information**: Contains the **Group Name**, Total **Count**, **Parent** Count, and **Children** Count of the Daisy Chain being created. This information is dynamically updated as you make changes. The Group Name text box is editable, and a group name must be provided to create a new Daisy Chain.



- **All Devices**: Contains all Daisy Chain-enabled devices that appear on the network. Devices are represented by an image, a model, and an IP address. Each device is clickable. You can search for specific devices using the **Filter Devices** search box.



- **Parent**: The **Parent** container is empty upon opening the interface. This container is used to store the P**arent** reader in the Daisy Chain. A maximum of one device can be placed in the Parent container. A minimum of one device must be placed here to create the Daisy Chain.
- **Children**: The **Children** container is empty upon opening the interface. This container is used to store the **Children** readers in the Daisy Chain. A minimum of one device must be placed here to create a Daisy Chain, and a maximum of seven devices may be placed here.

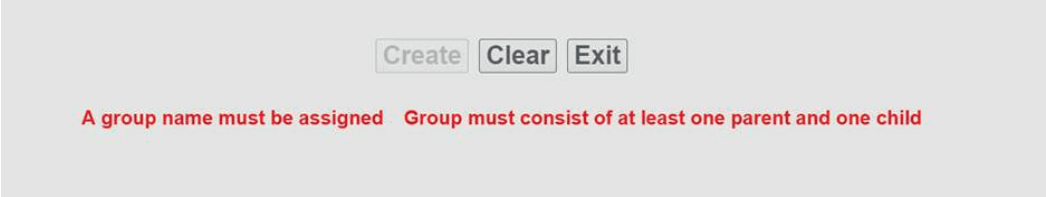


• **Buttons**: This section of the interface includes the **Create, Clear**, and **Exit** buttons.
  – **Create** creates a new Daisy Chain if all the necessary conditions are met.

NOTE!
The **Create** function does not delete a Daisy Chain and only resets the interface.

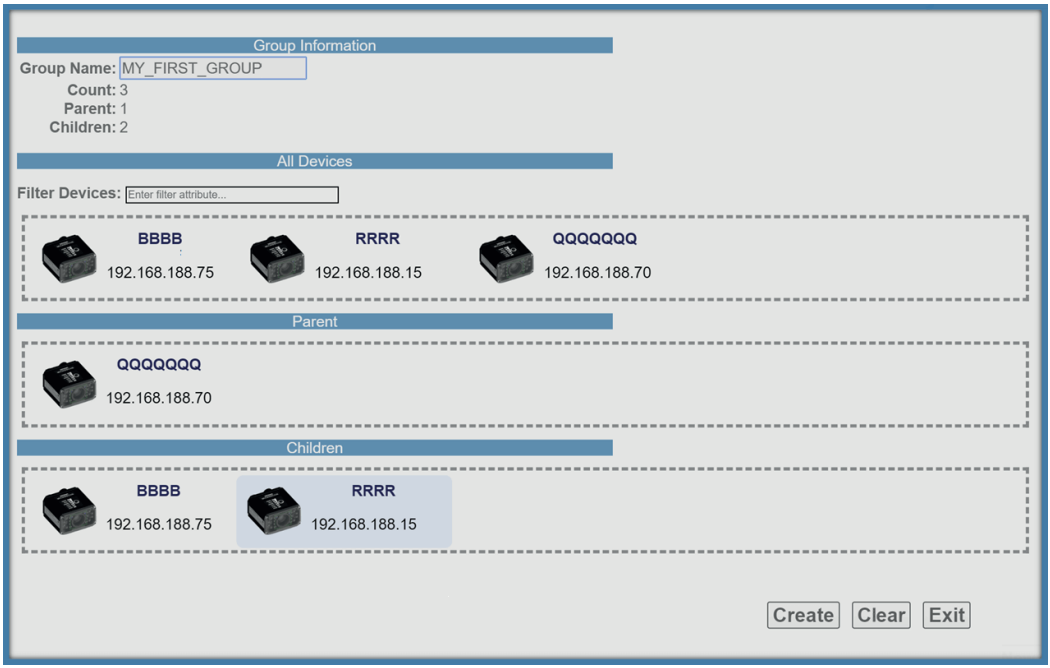
  – **Clear** resets the interface to its original state.
  – **Exit** closes the window.

Below these buttons, messages will appear that indicate any errors in the potential Daisy Chain being created. These errors appear and disappear based on dynamic validation of user input.



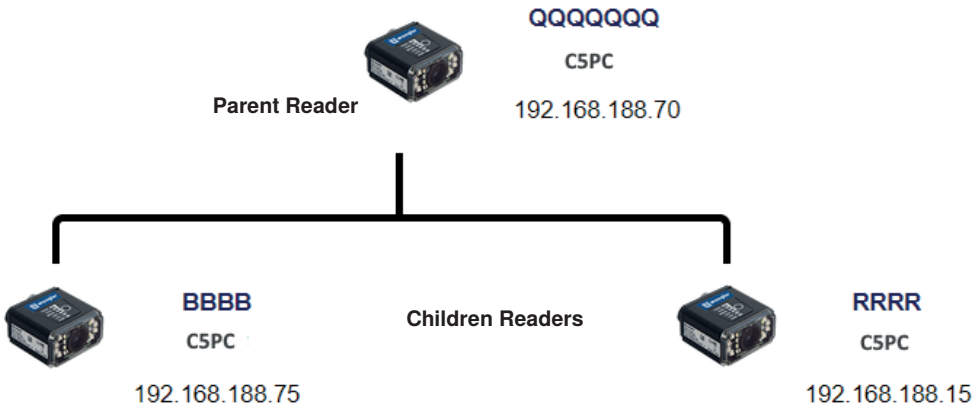
The Daisy Chain creation interface is drag-and-drop, meaning you can move devices around the page to build your Daisy Chain.
The **All Devices, Parent**, and **Children** containers are drop zones for readers. To move a device, place the cursor over a device, left-click, and hold down. Then drag the device in another drop zone by moving the cursor / reader over it and releasing your mouse's left-click button. Valid reader drop zone areas are designated by the dotted grey line surrounding them.
Drag and drop a reader into the **Parent** drop zone. Drag and drop one or more other Daisy-Chain- enabled readers into the Children drop zone. Assign a name to the group.

If errors occur (**A group name must be assigned or Group must consist of at least one parent and one child**), resolve them as needed, and then you will see that the Create button will be active. A valid Daisy Chain configuration should resemble the example below.



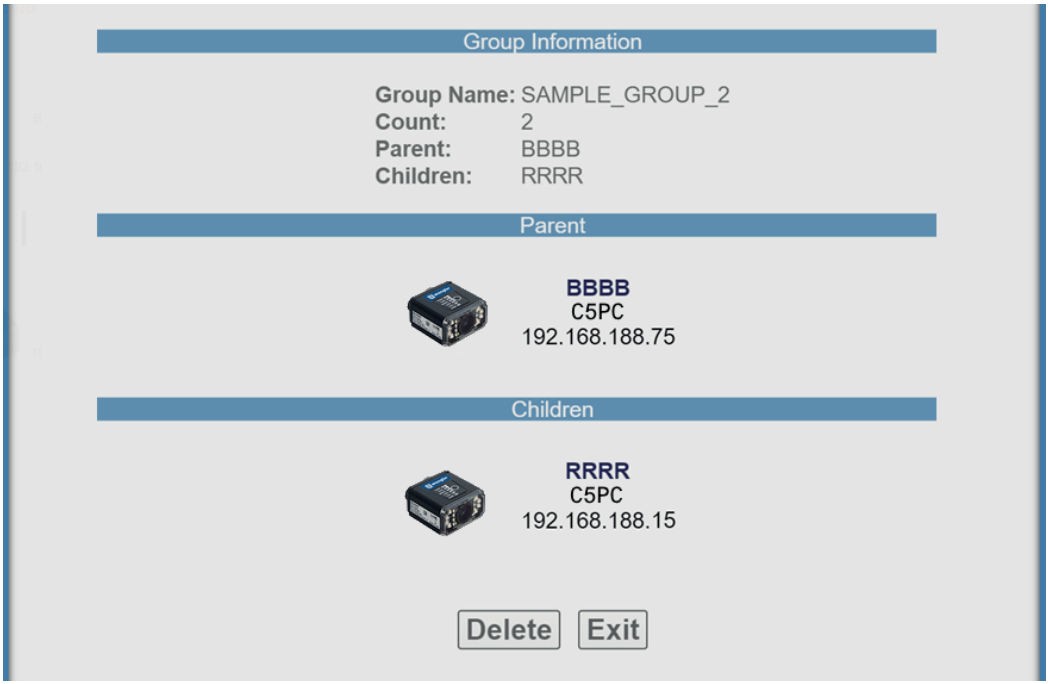
If the Daisy Chain was created successfully, the popup will close, and the newly established Daisy Chain will be displayed as a diagram or map. This diagram is generated based on the number of devices in the Daisy Chain. Whichever number of devices in the Daisy Chain, the Parent always appears above and all Children devices below.

Sample Daisy Chain with One Parent and Two Children



Sample Daisy Chain with One Parent and One Child

There is no limit on the number of Daisy Chains that can be created. All current, active Daisy Chains will appear on the Daisy Chain page in the DDU. Click on any Daisy Chain to open its information popup. This popup contains information about the Daisy Chain configuration, including Group Information, Parent reader identity, and Children reader identities. The Daisy Chain information popup also contains a Delete button, which deletes the entire Daisy Chain configuration – Parent and Children.

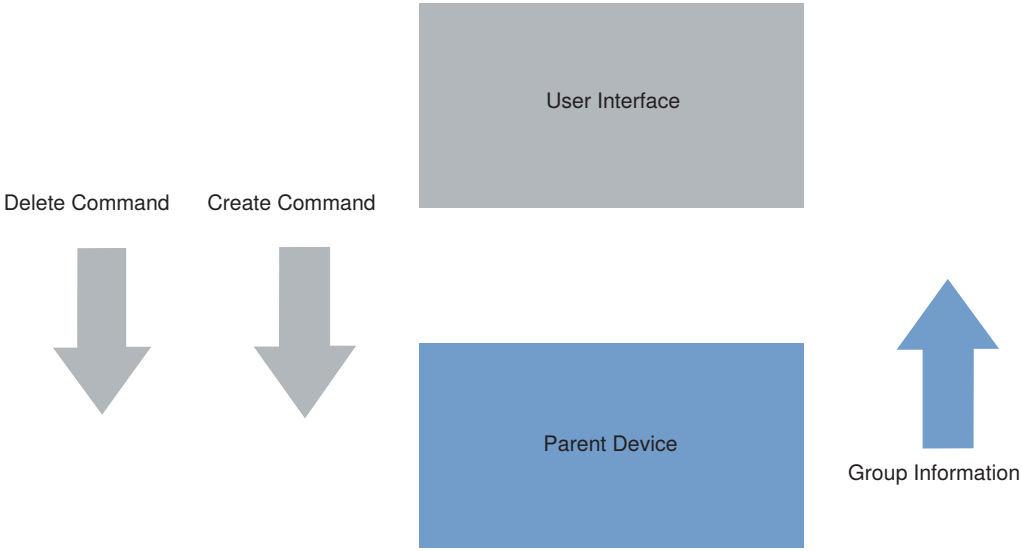


Daisy Chain Fundamentals
Parent: The master device in the group. Responsible for establishing the group on the firmware side and reporting the Daisy Chain to the DDU. There can be only one Parent in a Daisy Chain. The parent is responsible for receiving **create** and **delete** commands from the DDU.
Children: Any reader that is currently a part of a Daisy Chain that is not the Parent device is a Child device. Child readers report data to the Parent reader.

A Valid Daisy Chain:
• Must have at least two readers;
• Must consist of C5PC readers;
• Must contain one Parent reader;
• Must contain one or more Child readers (up to 8);
• Must have a group name less than 25 characters in length;
• Must have a valid group name **[a-z, A-Z, 0-9, _, –]**

The creation and deletion of Daisy Chains occurs via UDP messages that are sent from the DDU user interface to the readers. If a parent device recognizes that it has been configured in a Daisy Chain, it creates the firmware connection, and then broadcasts UDP messages that contain all the information needed by the user interface to produce a functional Daisy Chain configuration. The user interface will only create a new Daisy Chain if it receives a broadcast from the Parent device with the Daisy Chain information. The core communication between the user interface and the devices(s) is via the Parent device. The firmware is responsible for connecting the Parent device to the Children devices and then reporting the status.

A Daisy Chain consists of one Parent and one or more Children devices. The Children devices report their data to the Parent, which then reports the data to the network, effectively allowing all readers to act as one.



Error Handling

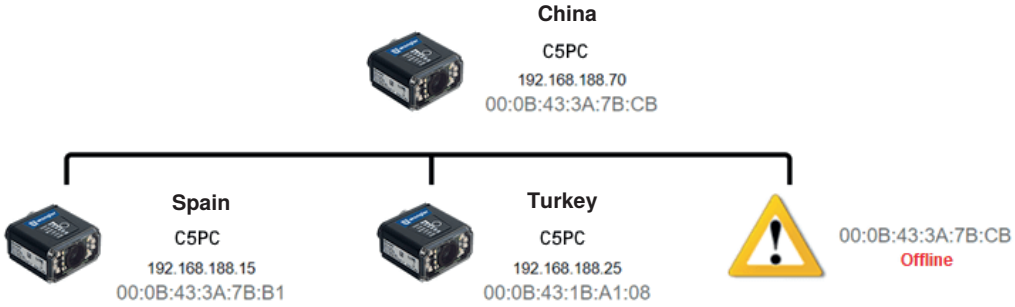
If the reader in a Daisy Chain is turned off for more than one minute, a **Disconnected** notice will appear in the dialog. This notice will disappear once the Parent reader is turned back on.

If a **Child** reader in a Daisy Chain is turned off, even temporarily, an **Offline** notice will appear below the respective Child on the reader map. Once turned back on, the Offline notice will disappear.

Some errors can occur when you have already established a Daisy Chain and confirmed that it's working. In this hypothetical error scenario, the Parent reader = **P**, the first Child reader = **C1**, the second Child reader = **C2**, and the third Child reader = **C3**.

The user shuts down the application and completely turns off power on **P, C1, C2,** and **C3**. The user comes in the following day and turns on all the devices except C3 and then starts the application.

The complete Daisy Chain can't be re-initiated because it is missing a unit. To account for this, the application will place a "dummy device" in place of the missing **C3**. The dummy device will display an error icon, the missing device's MAC address, and an **Offline** status message. It will continue show this status if the browser is restarted. This offline device can't be clicked in the Daisy Chain info page. It is only there to alert the user of the missing device.



If the user turns on **C3** when seeing the status shown in the diagram above, the application will automatically resolve the issue and a new, fully-formed Daisy Chain with **C3** as a full device will be created. There is no need to restart the browser or Parent device.

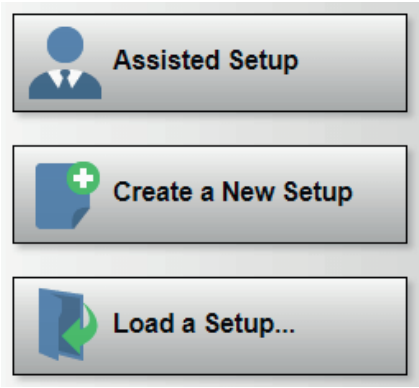
5.7. Explore the Start View

The **Start** view is the initial view you will see when the WebLink session begins. The connected reader is shown, along with its **user-defined name, IP address, License Options, Reader Model, Serial Number, MAC ID, Firmware version, WebLink version, Sensor, Optics, Decoder,** and **Speed.**

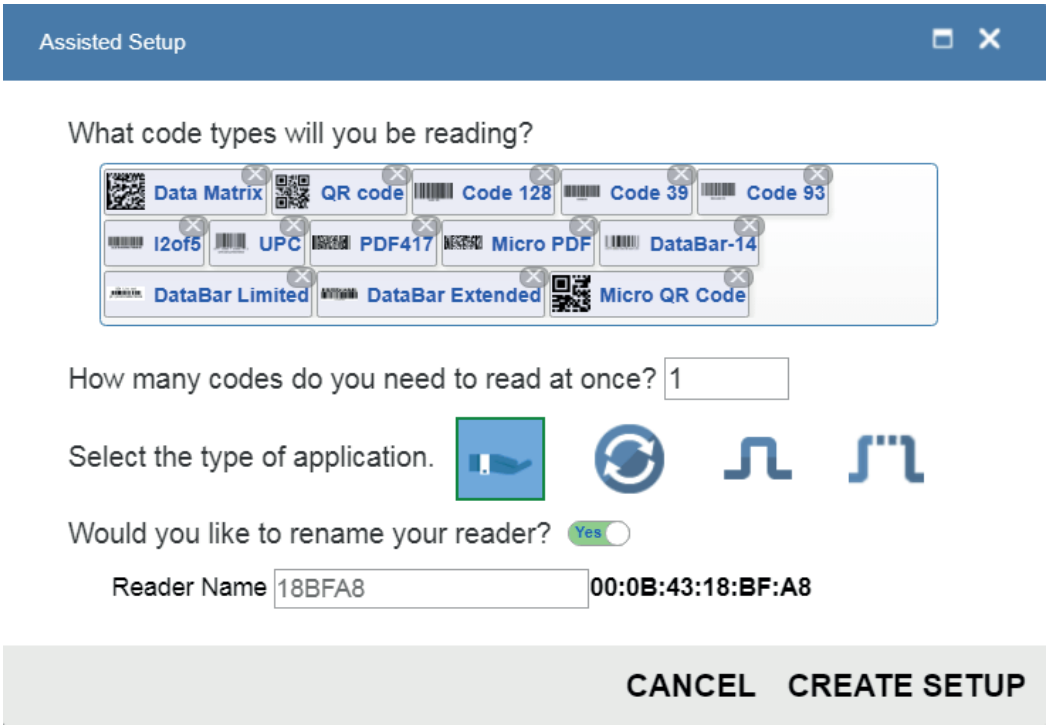
NOTE!
The **user-defined** name must be **19** characters or fewer.

This view allows you to choose **Assisted Setup**, to **Create a New Setup**, or to **Load a Setup**.

5.8. Create a New Setup or Load an Existing Setup



Assisted Setup
When you click the **Assisted Setup** button in the **Start** view, a dialog will appear asking you a series of application-based questions. Based on your answers, WebLink generates your initial setup automatically. Once the setup is created, you can fine-tune its parameters in the **Setup** view.



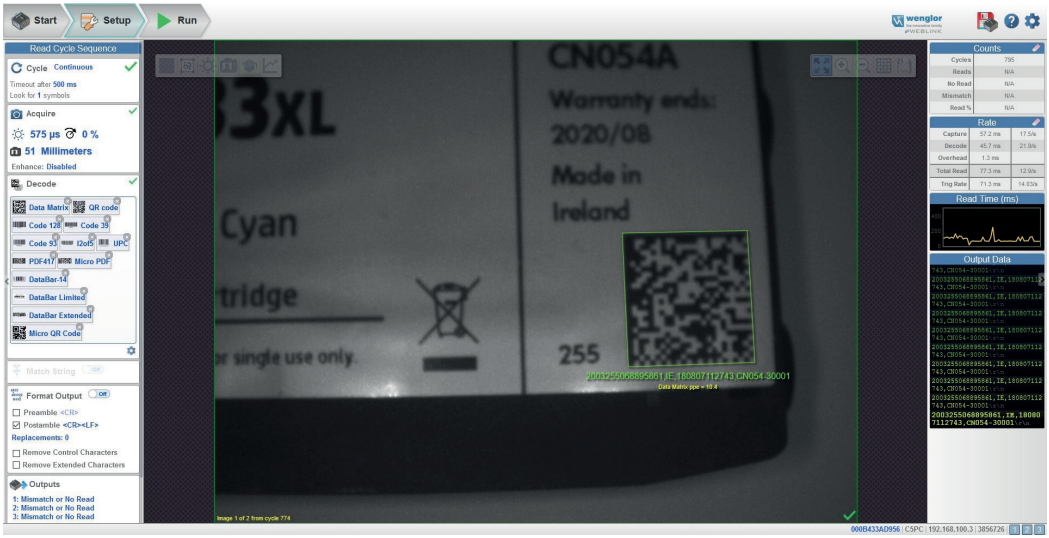
Create a New Setup
The **Start** view also allows you to **Create a New Setup** without using **Assisted Setup**. When you click the **Create a New Setup** button, WebLink searches for any differences from default in the reader parameters. If no differences from default are found, you will see the **Setup** view. If differences from default are found, an alert will appear asking if you want to restore default settings.

Load a Setup
Select **Load a Setup** to load an existing **.json** WebLink setup file.

5.9. Explore the Setup View

The **Setup** view allows you to configure all aspects of a setup. Multiple discrete sections of the interface give you the ability to set **Cycle, Acquire, Decode, Match String, Format Output, Output parameters,** and **Favorites.**
Clicking the **Save** icon at the upper right saves current settings to the reader's flash memory so the settings will be available when the reader is rebooted.
The **question mark icon** at the upper right opens **WebLink Help**.
The **gear icon** at the upper right brings up the **Application Settings** menu.

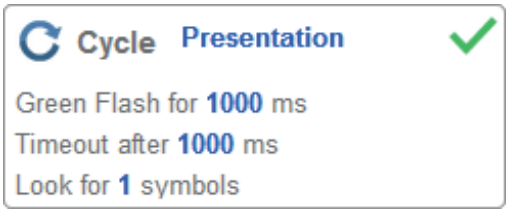
NOTE!
The **1, 2,** and **3 output indicators** at the lower right of the screen display the results of the last read cycle.



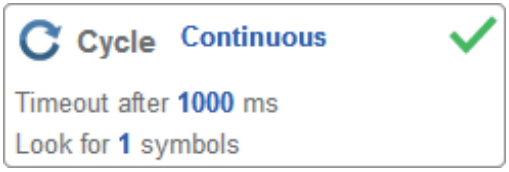
5.10. Configure Read Cycle Settings

The **Cycle** section of the **Setup** view allows you to modify the trigger, determine the number of symbols for the reader to expect, and set **Read Cycle Timeout.** A dropdown menu of various Cycle types provides a variety of options, each with configurable parameters.

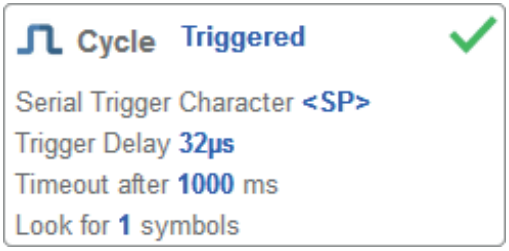
Presentation
This mode uses **Continuous Read Auto** along with **Continuous Capture Mode** and a **Timeout at End of Read Cycle. Green Flash Mode** is set to **Static Presentation** and the **Green Flash Duration** is set to **250 ms.**



Continuous
This mode allows you to set the **Read Cycle Timeout** and the expected **Number of Symbols** from **1** to **100**.



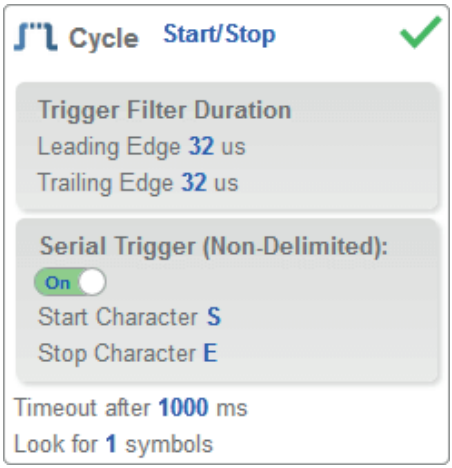
Triggered
This mode sets the read cycle to **Serial Data and Edge, End of Read Cycle** is set to **Timeout or New Trigger**, and **Capture Mode** is set to **Rapid Capture** with **1 capture.** You can adjust the **Serial Trigger, Trigger Delay, Timeout**, and **Number of Symbols**.



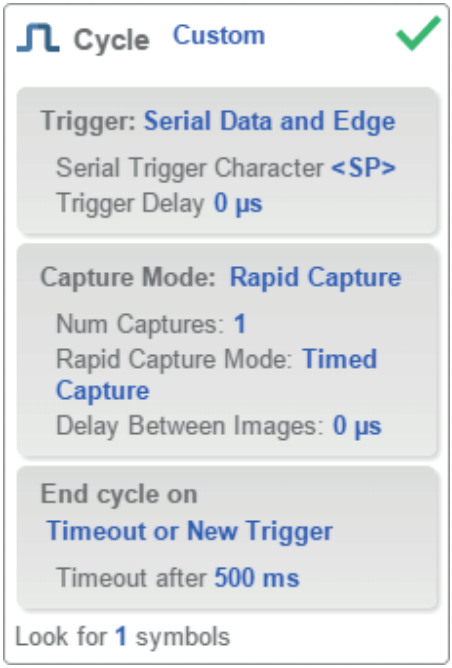
Start/Stop
This mode uses **External Level** with a **Read Cycle Timeout** and **Continuous Capture**, allowing you to set **Leading Edge** and **Trailing Edge** as well as the **Serial Trigger** and the **Start** and **Stop** characters.

- **Serial Trigger (Non-Delimited) Off**
  When Serial Trigger is set to Off, the start and stop characters are set to NULL, meaning that the trigger is disabled.

- **Serial Trigger (Non-Delimited) On**
  When Serial Trigger is set to On, the start and stop characters are set to S and E. When the trigger button is clicked, it will use the current start and stop non-delimited triggers.



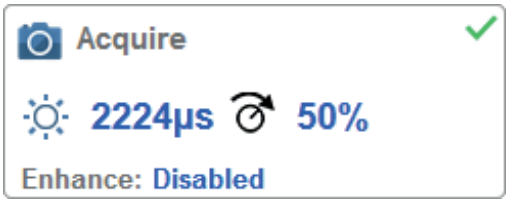
Custom
This mode allows you a wider variety of read cycle scenarios, including **Continuous Read Auto**. Use this mode to select **Trigger** mode and to set **Serial Trigger Character** and **Trigger Delay**; to select **Capture** mode and to set **Number of Captures, Rapid Capture** mode, and **Delay between Images;** and to select the **End Cycle On** setting as well as **Timeout** and **Number of Symbols.**



5.11. Configure Acquire Settings

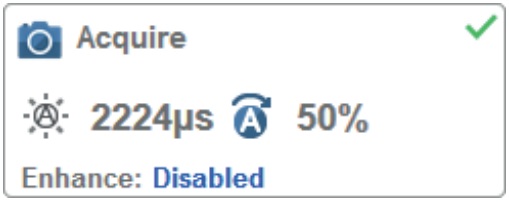
Acquire settings allow you to set **Exposure** (signified by the sun icon) and **Gain** (signified by the dial and right-pointing arrow icon) in real time. Clicking any of these settings will cause a control to appear, allowing you to modify that setting. Settings take effect immediately.

- **Important**: There are 4 levels of Gain in SXGA readers. Each level corresponds to 25 percentage points, or one quarter turn of the Gain dial shown at left.
- Level 1 = 0 to 24%
- Level 2 = 25 to 49%
- Level 3 = 50 to 74%
- Level 4 = 75 to 100%



Standard

When **Auto Photometry** is enabled instead of **Standard, Exposure** and **Gain** are read-only. The **A** shown on the sun and dial icons signifies that Auto Photometry is enabled. Auto Photometry constantly determines the best Exposure and Gain settings during each read cycle.

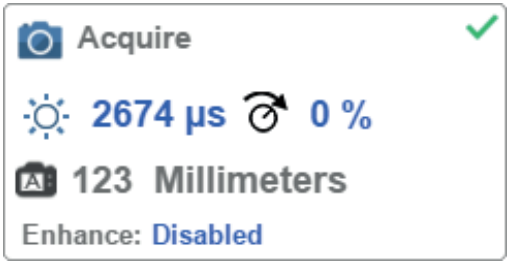


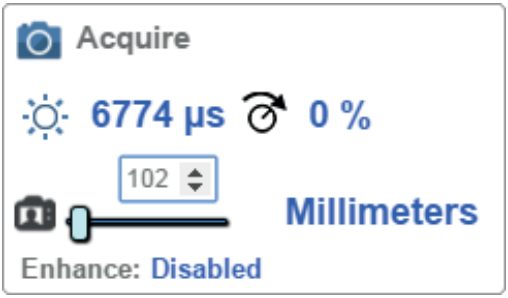
Auto Photometry

Autofocus

Autofocus can be enabled and disabled in the **Image Area** using the focus button in the **Device Control Toolbar**, and can be configured in the **Acquire** section of the **Setup** view.

While in **Continuous** mode or **Continuous Auto** mode, the reader can enable or disable Autofocus functionality, allowing it to refocus after a number of no reads. The focus button shows an **A** when Autofocus is enabled. The focus distance is updated on the fly based on the latest refocus settings.

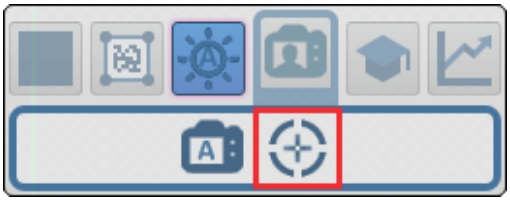




Spot Focus

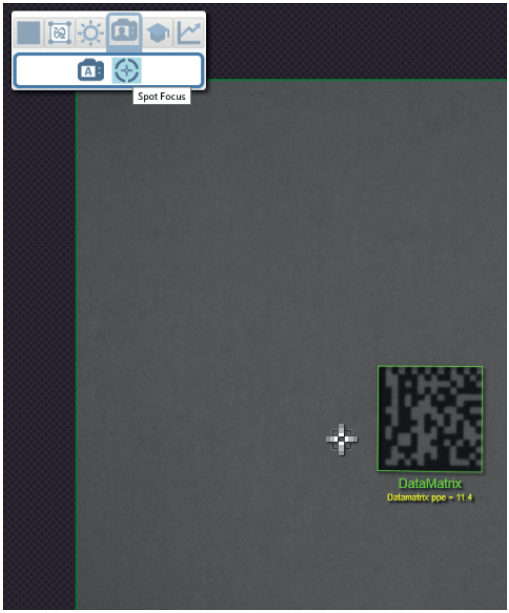
If the reader is in **Continuous** mode or **Continuous Auto** (Continuous mode with **Auto Photometry** enabled), you can perform a localized quick focus in the image.

If you click the focus button, the **Autofocus** and **Spot Focus** icons appear:



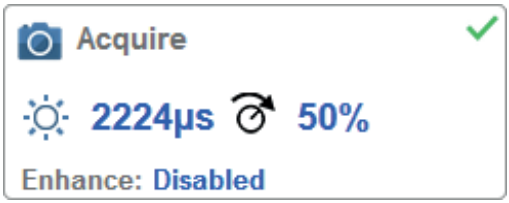
When you click the Spot Focus icon, the Select a location in the image to autofocus message appears:

The cursor transforms into crosshairs as shown in the example below. This allows you to select the section of the image in which you want to perform a quick focus.



NOTE!
If you click the Autofocus button to the left of the Spot Focus button, the reader will switch from Spot Focus to regular Autofocus functionality. If the reader is in **Triggered** mode, only the Spot Focus icon will appear.

Enhance
The **Enhance** dropdown menu at the bottom of the **Acquire** settings editor allows you to select the method for processing captured images.



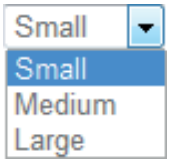
- **Grow Dark**
  Grow Dark increases the dark cell size of a symbol. It is useful for increasing the dark cell size of a dark-on-light Data Matrix symbol.

- **Shrink Dark**
  Shrink Dark increases the light cell size of a symbol. It is useful for increasing the light cell size of a light-on-dark Data Matrix symbol.

- **Connect Dark**
  Connect Dark removes minor light defects of dark cells.

- **Separate Dark**
  Separate Dark removes minor dark defects of light cells.

- **Operator Size**
  The Operator Size dropdown menu determines the size of the area or "pixel neighborhood" in which the enhance operation is being performed.



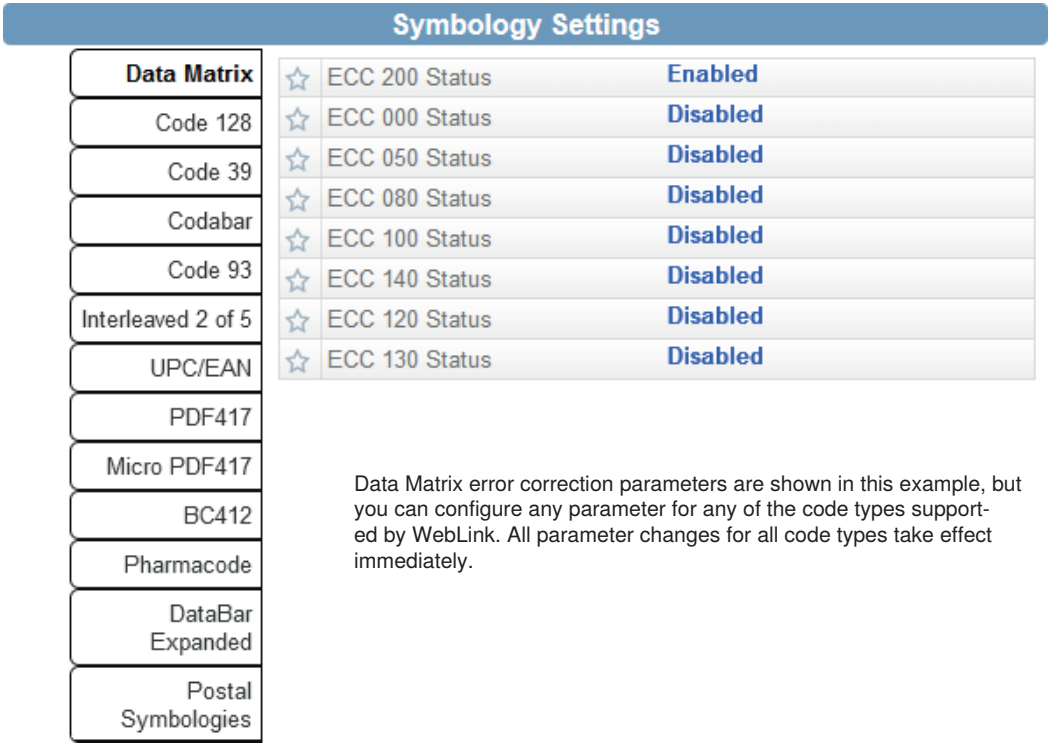
- **Small**
  Small corresponds to an area of 3 pixels by 3 pixels.

- **Medium**
  Medium corresponds to an area of 5 pixels by 5 pixels.

- **Large**
  Large corresponds to an area of 7 pixels by 7 pixels.

5.12. Configure Symbology and Decode Settings

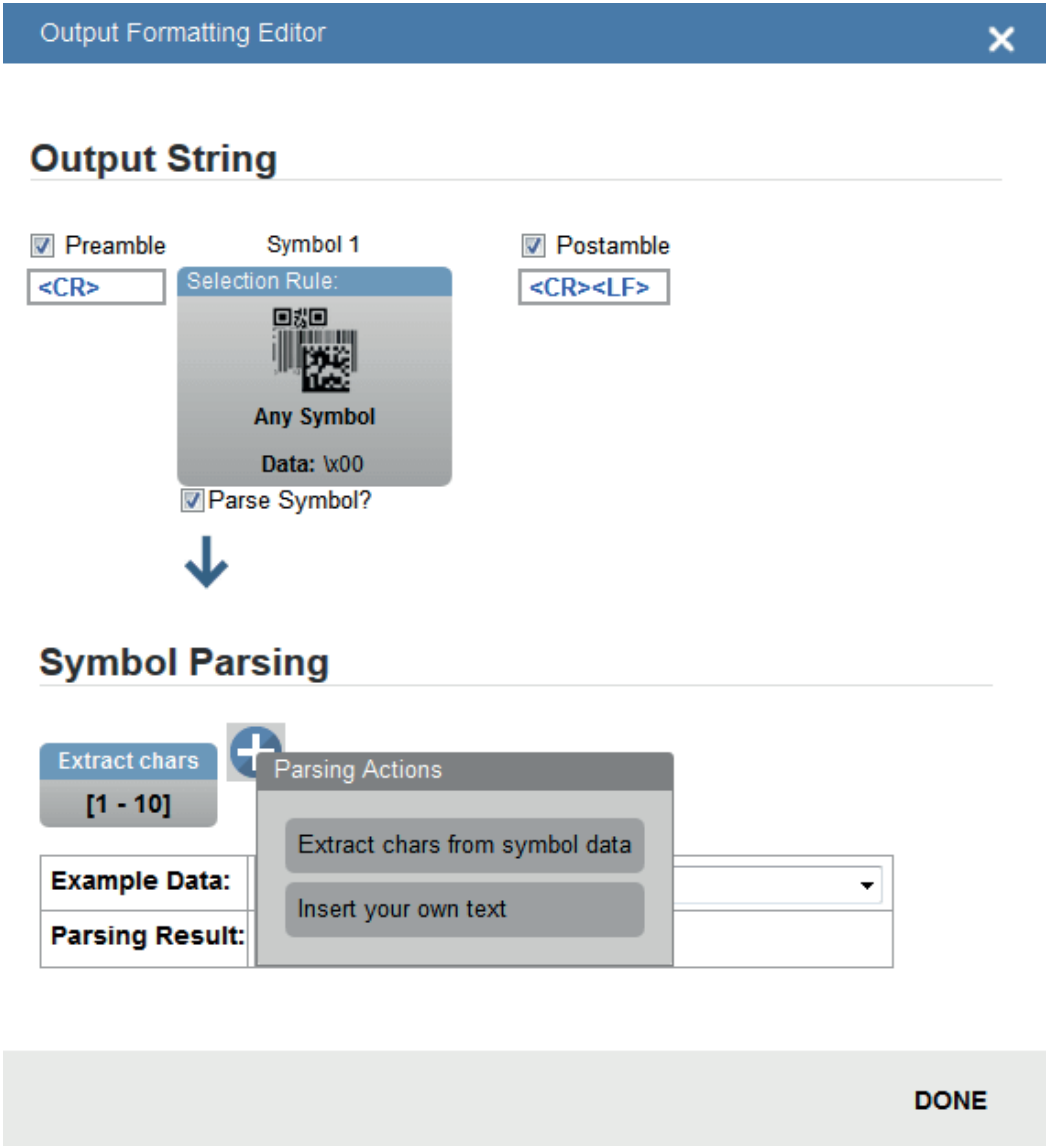
Clicking the **gear icon** at the bottom of the **Decode** dialog brings up **Symbology Settings.** This allows you to configure every parameter for every available code type.
Data Matrix error correction parameters are shown in this example, but you can configure any parameter for any of the code types supported by WebLink. All parameter changes for all code types take effect immediately.



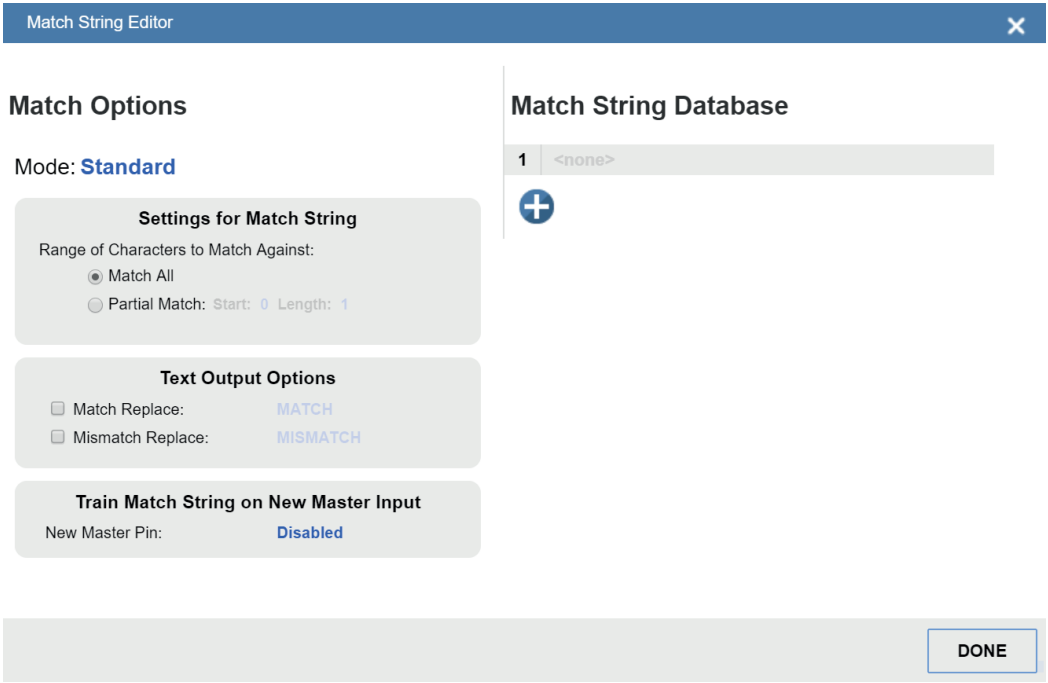
Data Matrix error correction parameters are shown in this example, but you can configure any parameter for any of the code types supported by WebLink. All parameter changes for all code types take effect immediately.

5.13. Format Output and Configure Match String

Format Output, when enabled in the **Setup** view, allows you to determine the many ways in which barcode data can be formatted and parsed before it is output as a data string. You can also set **Preamble** and **Postamble** in this dialog.



Match Options and **Match String Database,** accessible by clicking the **Match String** section in the Setup view, allow you to set the match code mode, text output, new master, and match string database.

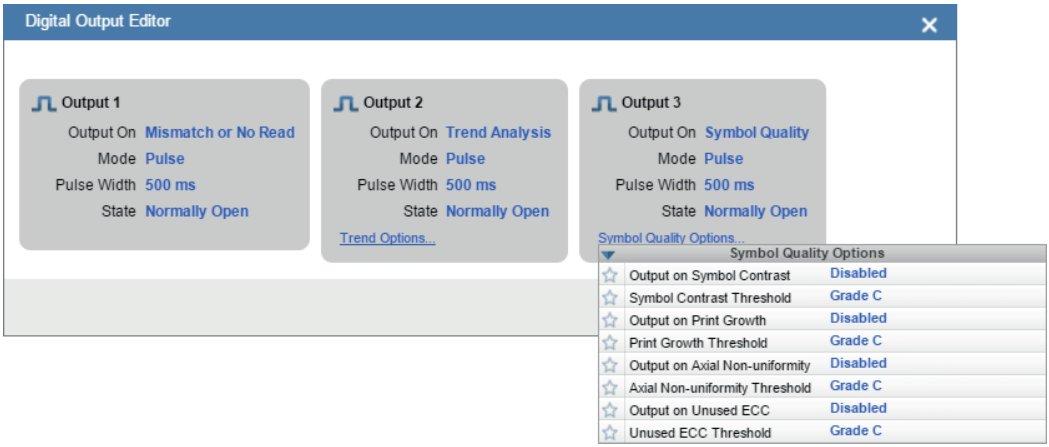


5.14. Configure Output 1, 2, and 3 Settings

Bring up the **Output 1, Output 2,** and **Output 3** dialogs by clicking on the **Outputs** section at the lower left of the **Setup** view. For each output you can determine the **Output On** behavior, **Mode, Pulse Width,** and **State**. **Outputs 2** and **3** also allow you to determine output behavior based on **Trend Options** parameters or **Verification Options** parameters.

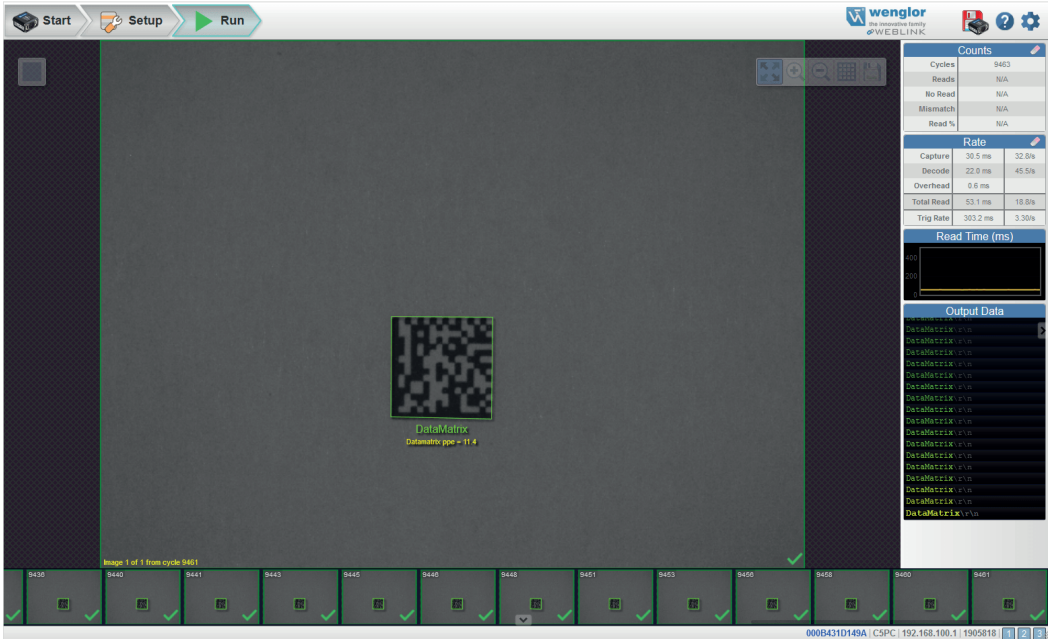
This example shows the dialog that appears when you click **Symbol Quality Options**. A similar dialog would also appear for **Trend Options** under **Output 2.**

NOTE!
The **1, 2,** and **3 output indicators** at the lower right of the screen display the results of the last read cycle.



5.15. Run the Application

In the **Run** view, you can observe the progress of the setup as it follows the parameters you have defined. The **right panel** of the UI shows **Counts** for **Cycles, Reads, No Reads,** and **Mismatches**, as well as **Rate** information for **Capture, Decode, Overhead, Total Read,** and **Trigger Rate,** as well as **Output Data**. A "**filmstrip**" below the **Image Area** shows each image capture with a green check mark for a good read and a red x for a no read.



6. Start

The Start view is the initial view you will see when the WebLink session begins.

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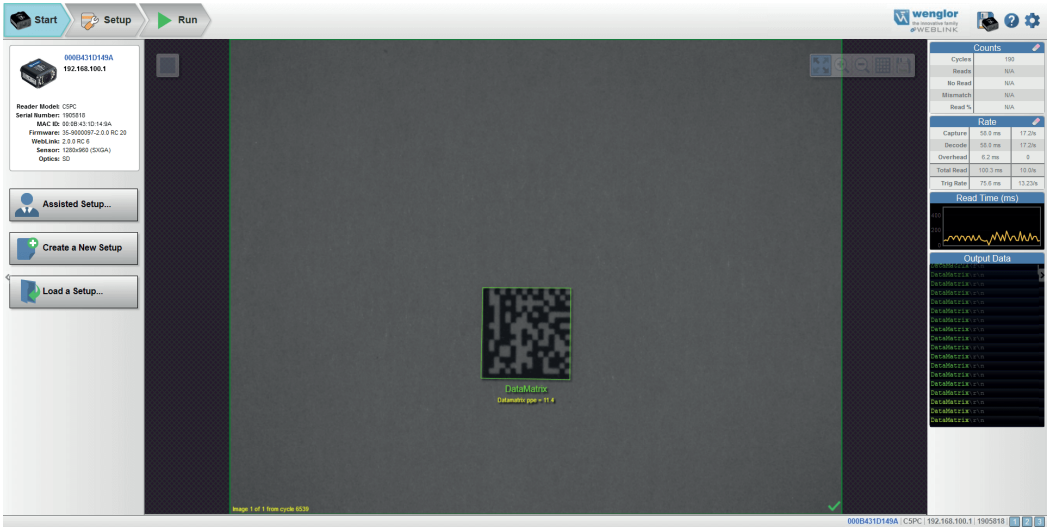
6.1. Overview

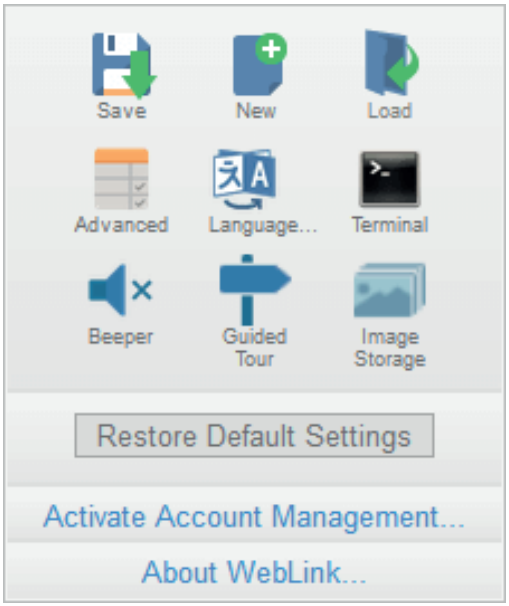
The **Start** view is the initial view you will see when the WebLink session begins. The connected reader is shown, along with its **user-defined name, IP address, Reader Model, Serial Number, MAC ID, Firmware version, WebLink version, Sensor,** and **Optics**.

NOTE!
The user-defined name must be **19** characters or fewer.
This view also allows you to choose **Assisted Setup,** to **Create a New Setup,** or to **Load a Setup.**



Click the gear icon at the upper right to bring up the **Application Settings** menu. This menu includes several functions: **Save, New, Load, Advanced, Language, Terminal, Beeper, Guided Tour, Image Storage, Restore Default Settings, Active Account Management**, and **About WebLink.**

NOTE!
The **Enable USB Drive Mode** options only appears when you are using a device that supports USB connectivity.



Clicking **About WebLink** opens the dialog shown below, which shows the current **WebLink version, Reader Model, Serial Number, Part Number, MAC ID, Sensor, Firmware version, Boot version, Decoder, Speed, Browser, Operating System,** and **Screen Resolution.**

NOTE!
The information in this dialog is selectable so that you can copy it to a clipboard. Clicking **Contact us...** takes you to the wenglor sensoric GmbH.

6.2. Assisted Setup

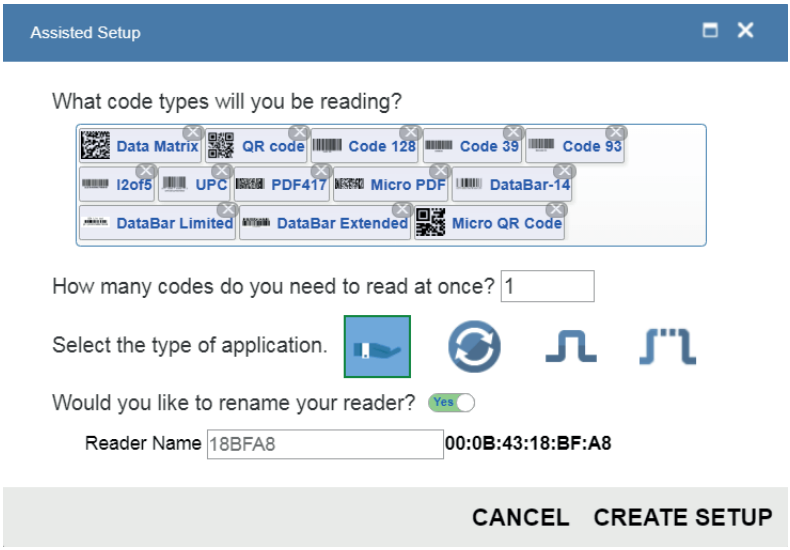
When you click the **Assisted Setup** button in the **Start** view, a dialog will appear asking you a series of application-based questions. Based on your answers, WebLink generates your initial setup automatically. Once the setup is created, you can fine-tune its parameters in the **Setup** view.

The Assisted Setup dialog is designed to be logical and intuitive, and follows this sequence:

- You are asked which code types you will be reading in your application. Code types can be added by clicking directly in the code type field and selecting them from a dropdown menu.
- Then you are asked how many codes you need to read at once (in a single read cycle). Type the number of codes you need to read directly in the text field or select a number using the up and down arrows.
- You are then given a selection of four application types, which represent the available selections in the **Cycle** area of the **left panel** in the Setup view. The icons represent the **Presentation**, **Continuous, Triggered,** and **Start** / **Stop** Cycle Types.
- The next question is whether or not you need the decoded data to match an existing string of data. This enables or disables **Match String.**
- If the answer to the previous question is **Yes**, a follow-up question appears asking for the exact output string that the decoded data must match. If the answer to the previous question is **No**, the follow-up question does not appear.
- Finally, you are asked if you want to rename the reader. If **Yes**, a text field appears in which you can type the reader's new name. The reader's MAC ID is also shown to the right of the text field.

Click **Create Setup** to configure your WebLink setup automatically based on your answers to the Assisted Setup questions.

NOTE!
Reader settings are defaulted when Assisted Setup settings take effect.



6.3. Reader Information

The Reader Information section of the left panel of the Start view shows your reader's user-defined name, IP address, Reader Model, Serial Number, MAC ID, Firmware version, WebLink version, Sensor, and Optics.

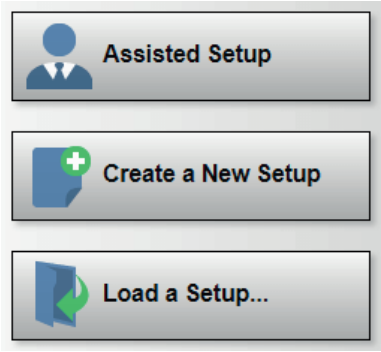
NOTE!
The user-defined name must be 19 characters or fewer.

000B431D149A

192.168.100.1

Reader Model: C5PC
Serial Number: 1905818
MAC ID: 00:0B:43:1D:14:9A
Firmware: 35-9000097-2.0.0
WebLink: 2.0.0
Sensor: 1280x960 (SXGA)
Optics: UHD

6.4. Setup Buttons

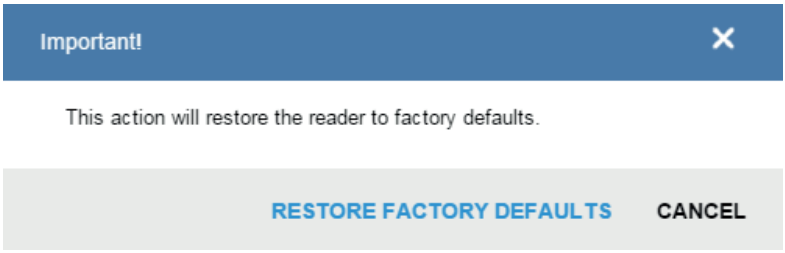


6.4.1. Assisted Setup

When you click the **Assisted Setup** button in the **Start** view, a dialog with a **series of questions** about your application will appear. Answering these simple questions allows WebLink to configure your setup for you.

6.4.2. Create a New Setup

New Setup allows you to create a new setup without using Assisted Setup. When you click the New Setup button, WebLink searches for any differences from default in the reader parameters. If no differences from default are found, you will see the **Setup** view. If differences from default are found, the following alert will appear, allowing you to choose whether to restore the reader to default settings or to cancel the New Setup.



6.4.3. Load a Setup

Select **Load Setup** to load an existing **.json** WebLink setup file.

7. Setup

The **Setup** view allows you to configure all aspects of a setup. Multiple discrete sections of the interface give you the ability to set **Autocalibration, Cycle, Acquire, Decode, Match String, Format Output, Outputs, Configuration Database,** and **Favorites.**

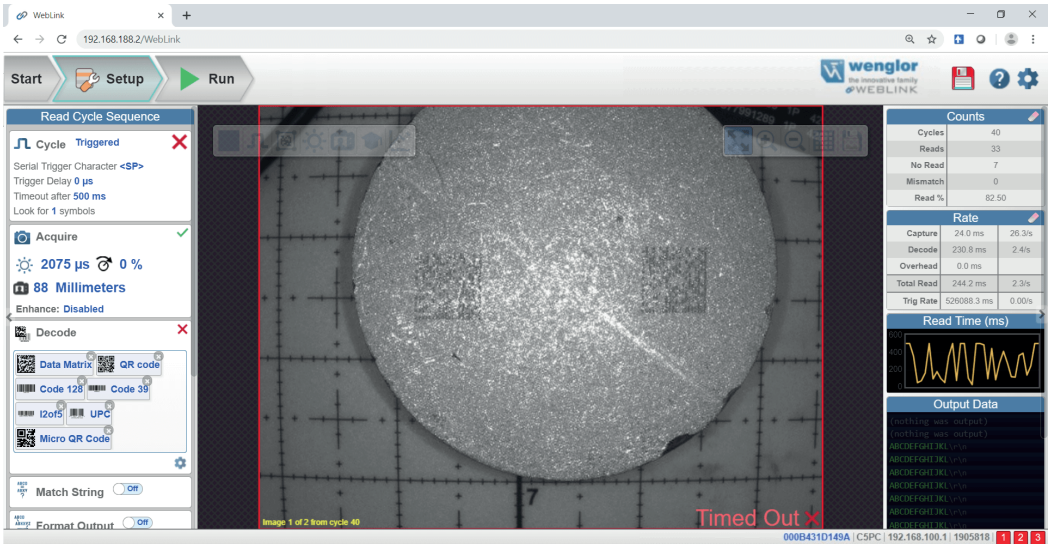
Autocalibration 97
Cycle 100
Acquire 103
Decode 107
Match String 110
Format Output 114
Outputs 120
Configuration Database 123
Favorites 131

7.1. Autocalibration

This section describes how to perform **Autocalibration** in the WebLink user interface.
Autocalibration automatically determines and sets all key parameters necessary to obtain optimum decode performance on a single easy or difficult symbol.

This feature calculates the optimum settings necessary to achieve the highest decode success rate possible, with the lowest decoding time variance between successive read cycles.

Decode speed is also optimized, but is secondary to high success rate and low read time variance, since the primary factor on a production line is successful and reliable performance.
To begin, navigate to the **Setup** view. If you don't see an image, trigger the reader to capture an image.

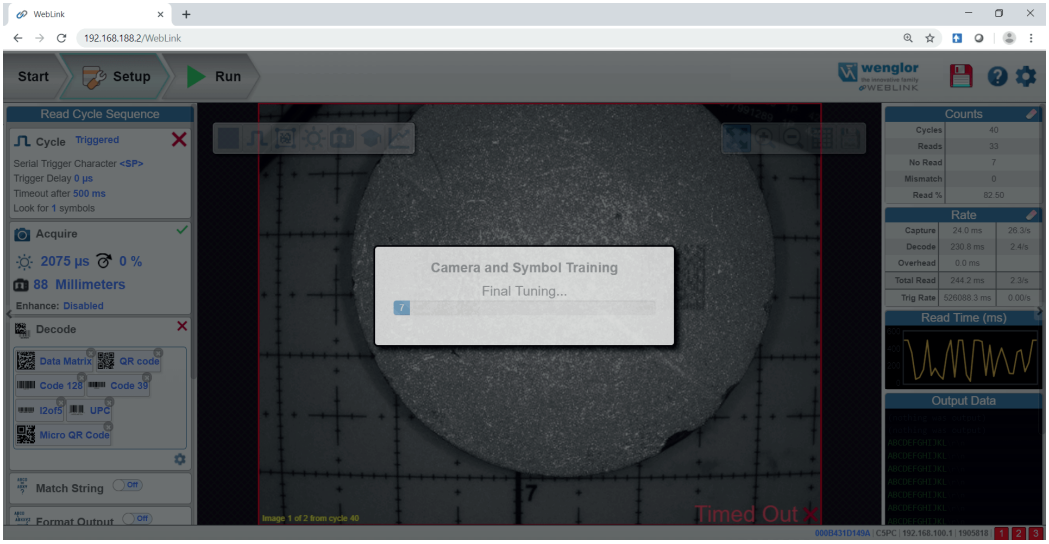


Focus the reader by clicking the **Focus** icon and selecting the **Target** icon as shown below.

When the reader has finished focusing, click the **Train** button and select the **Target** icon as shown below.

This will activate the **Autocalibration** routine.

Autocalibration progress will be shown in WebLink's **Image Area**.



When Autocalibration is complete, you will see a message stating whether it has passed or failed. If it passes, the reader's settings will be optimized to decode the symbol on which it has just been calibrated. The following settings may be affected during Autocalibration to enhance decode quality:

- Exposure
- Gain
- Morphology
- Morphology Size
- Binning

You can also use the **Optimize** button at this time to further enhance the decode capability.

Additional calibration options:

- **Gain, Exposure, Symbol Type,** and **Processing** are not used in the current calibration routine.
- **Window of Interest** can be set. This reduces the amount of time to perform calibration and reduces the area that the code will be searched for in run mode.

Calibration Options	
Gain	Quick Calibrate
Exposure	Quick Calibrate
Focus Position	Quick Focus
Symbol Type	Calibrate
Window of Interest Framing	Don't Calibrate
Window of Interest Margin	75
Linescan Height	64
Processing	Medium

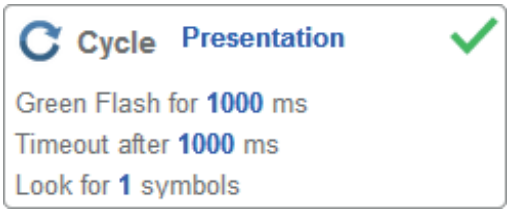
For additional details about reader calibration, including the **Calibration Options** command **<K529>**, see “5. Calibration” on page 60 (C5PC Technical Manual).

7.2. Cycle

The **Cycle** section of the **Setup** view allows you to modify the trigger, determine the number of symbols for the reader to expect, and set **Read Cycle Timeout.** A dropdown menu of various Cycle types provides a variety of options, each with configurable parameters.

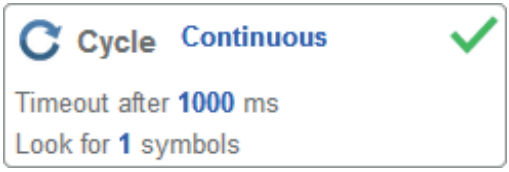
7.2.1. Presentation

This mode uses **Continuous Read Auto** along with **Continuous Capture Mode** and a **Timeout at End of Read Cycle. Green Flash Mode** is set to **Static Presentation** and the **Green Flash Duration** is set to 250 ms.



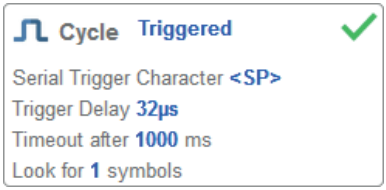
7.2.2. Continuous

This mode allows you to set the **Read Cycle Timeout** and the expected **Number of Symbols** from **1 to 100**.



7.2.3. Triggered

This mode sets the read cycle to **Serial Data and Edge, End of Read Cycle** is set to **Timeout or New Trigger,** and **Capture Mode** is set to **Rapid Capture** with 1 capture. You can adjust the **Serial Trigger, Trigger Delay, Timeout,** and **Number of Symbols.**

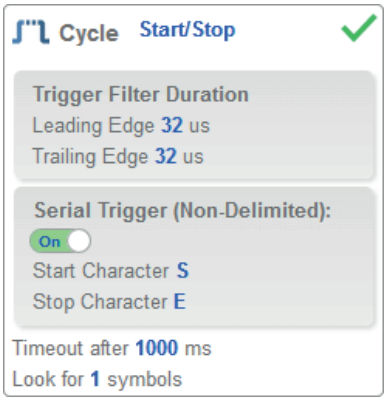


7.2.4. Start / Stop

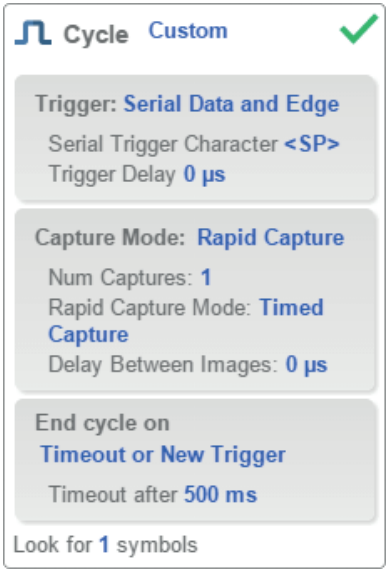
This mode uses **External Level** with a **Read Cycle Timeout** and **Continuous Capture,** allowing you to set **Leading Edge** and **Trailing Edge** as well as the **Serial Trigger** and the **Start and Stop Characters.**

Serial Trigger (Non-Delimited) Off
When **Serial Trigger** is set to **Off**, the start and stop characters are set to **NULL**, meaning that the trigger is disabled.

Serial Trigger (Non-Delimited) On
When **Serial Trigger** is set to **On**, the start and stop characters are set to **S** and **E**. When the trigger button is clicked, it will use the current start and stop non-delimited triggers.

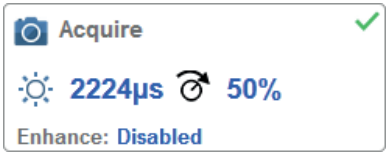


Custom
This mode allows you a wider variety of read cycle scenarios, including **Continuous Read Auto.** Use this mode to select **Trigger** mode and to set **Serial Trigger Character** and **Trigger Delay;** to select **Capture Mode** and to set **Number of Captures, Rapid Capture Mode, and Delay between Images;** and to select the **End Cycle On** setting as well as **Timeout** and **Number of Symbols.**



7.3. Acquire

Acquire settings allow you to set **Exposure** (signified by the sun icon) and **Gain** (signified by the dial and right-pointing arrow icon) in real time. Clicking any of these settings will cause a control to appear, allowing you to modify that setting. Settings take effect immediately.

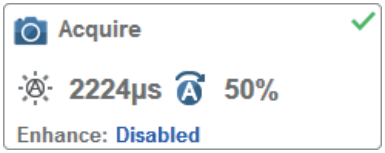


Standard

Important: There are 4 levels of Gain in SXGA C5PC readers. Each level corresponds to 25 percentage points, or one quarter turn of the Gain dial shown at left.

- Level 1 = 0 % to 24 %
- Level 2 = 25 % to 49 %
- Level 3 = 50 % to 74 %
- Level 4 = 75 % to 100 %

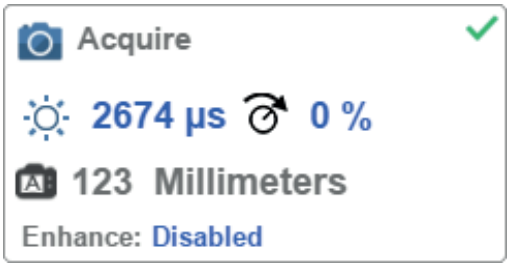
When **Auto Photometry** is enabled instead of **Standard**, Exposure and Gain are read-only. The **A** shown on the sun and dial icons signifies that Auto Photometry is enabled. Auto Photometry constantly determines the best Exposure and Gain settings during each read cycle.

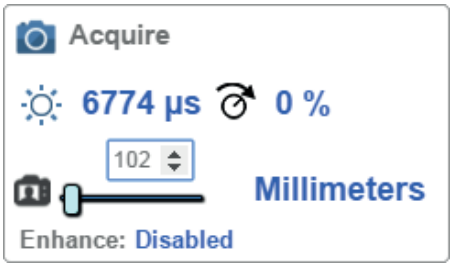


Auto Photometry

7.3.1. Autofocus

Autofocus can be enabled and disabled in the **Image Area** using the focus button in the **Device Control Toolbar,** and can be configured in the **Acquire** section of the **Setup** view.
While in **Continuous** mode or **Continuous Auto** mode, the camera can enable or disable Autofocus functionality, allowing it to refocus after a number of no reads. The focus button shows an **A** when Autofocus is enabled. The focus distance is updated on the fly based on the latest refocus settings.





7.3.2. Spot Focus

If the camera is in **Continuous** mode or **Continuous Auto** (Continuous mode with Auto Photometry enabled), you can perform a localized quick focus in the image.
If you click the focus button, the **Autofocus** and **Spot Focus** icons appear:

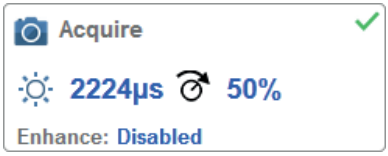
When you click the Spot Focus icon, the **Select a location in the image to autofocus** message appears.

The cursor transforms into crosshairs as shown in the example below. This allows you to select the section of the image in which you want to perform a quick focus.

Note: If you click the Autofocus button to the left of the Spot Focus button, the reader will switch from Spot Focus to regular Autofocus functionality. If the reader is in **Triggered** mode, only the Spot Focus icon will appear.

7.3.3. Enhance

The **Enhance** dropdown menu at the bottom of the **Acquire** editor allows you to select the method for processing captured images.



Grow Dark
Grow Dark increases the dark cell size of a symbol. It is useful for increasing the dark cell size of a dark-on-light Data Matrix symbol.

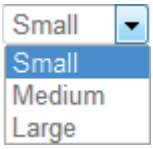
Shrink Dark
Shrink Dark increases the light cell size of a symbol. It is useful for increasing the light cell size of a light-on-dark Data Matrix symbol.

Connect Dark
Connect Dark removes minor light defects of dark cells.

Separate Dark
Separate Dark removes minor dark defects of light cells.

7.3.4. Operator Size

The **Operator Size** dropdown menu determines the size of the area or “pixel neighborhood” in which the enhance operation is being performed.



Small
Small corresponds to an area of **3 pixels by 3 pixels.**

Medium
Medium corresponds to an area of **5 pixels by 5 pixels.**

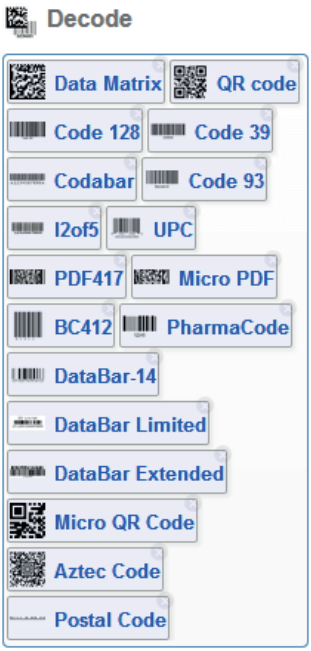
Large
Large corresponds to an area of **7 pixels by 7 pixels.**

7.4. Decode

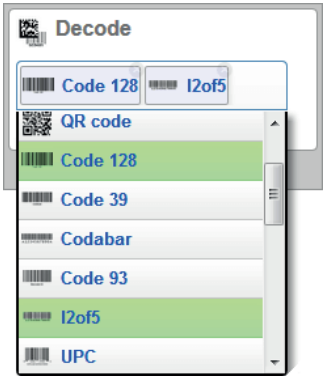
The **Decode** area of the **Setup** view allows you to choose which code types you want to enable, and to configure the parameters for those code types.
See “7. Symbologies” on page 85 (C5PC Technical Manual) for **Advanced Decoding Parameters.**

7.4.1. Code Types and Symbology Settings

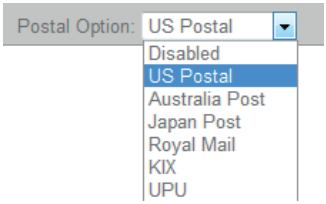
In the example below, all code types are enabled.



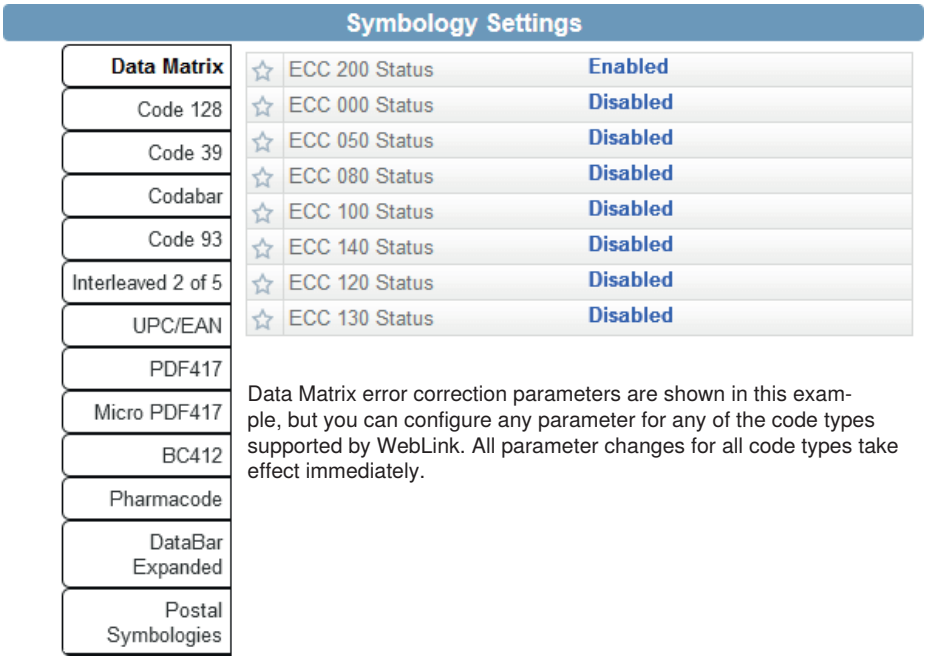
You can add code types by clicking in an empty section of the field where code types are displayed, and then selecting the desired code types from the dropdown menu.



You can also enable one of several postal code options using the **Postal Option** dropdown menu shown below.



Clicking the **gear icon** at the bottom of the **Decode** section brings up **Symbology Settings.** This allows you to configure every parameter for every available code type.
Data Matrix error correction parameters are shown in this example, but you can configure any parameter for any of the code types in the list shown below. All parameter changes for all code types take effect immediately.

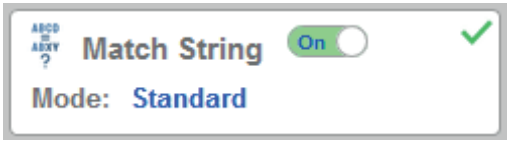


Data Matrix error correction parameters are shown in this example, but you can configure any parameter for any of the code types supported by WebLink. All parameter changes for all code types take effect immediately.

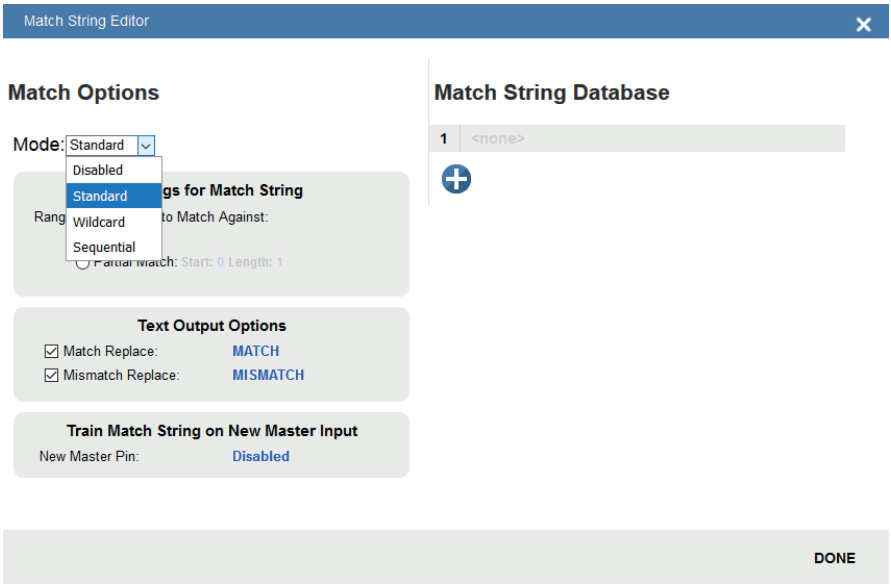
7.5. Match String

Match String will attempt to match to the decoded data. (It will not attempt to match to the Formatted Output Data).

NOTE!
Match String can only be used in **Triggered, Start/Stop**, and **Custom** modes. It cannot be used in Presentation or Continuous modes.
To open the **Match String Editor,** go to the **Setup** view and turn Match String **ON** as shown below. Then click on the **Mode** link (shown as **Standard** in the example below) to open the **Match String Editor**.



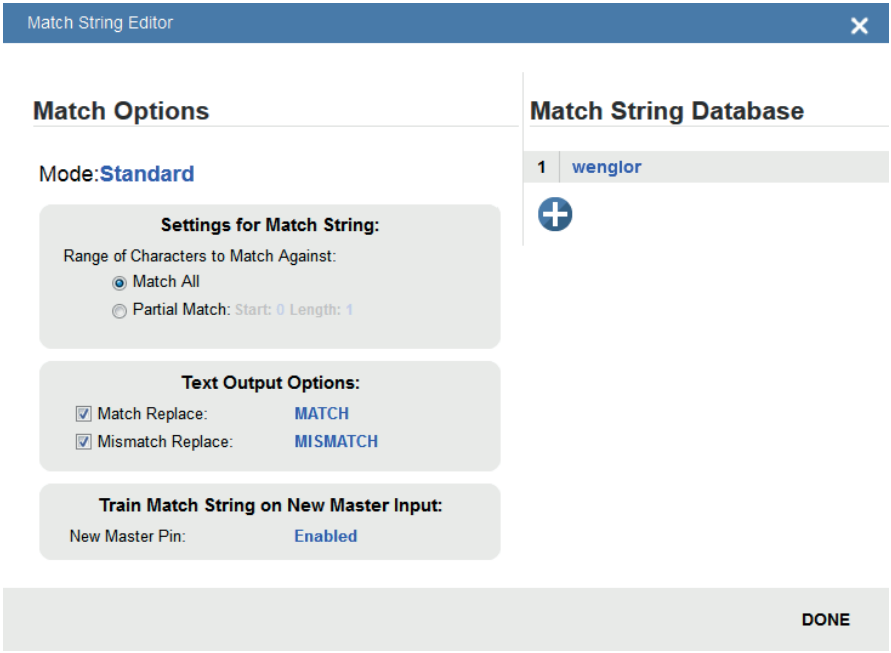
In the **Match String Editor,** click on the **Mode** link under **Match Options** to select your **Match String Mode – Standard, Wildcard, or Sequential.**



7.5.1. Standard and Wildcard Modes

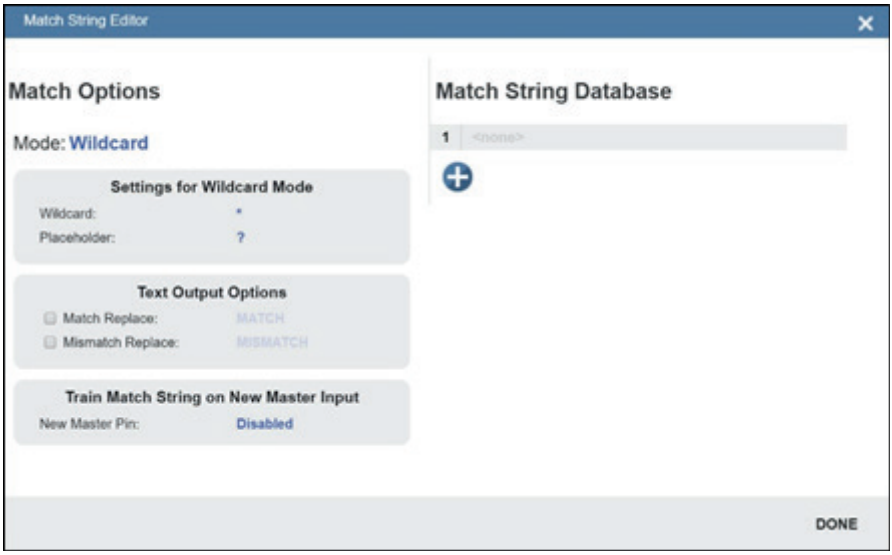
Standard mode allows you to match total or partial barcodes by defining strings in the **Match String Database. Wildcard** mode allows you to create custom matches using wildcards and placeholders.
A **wildcard** is a single character that can act as **0** or more characters. A **placeholder** is a character that can substitute for exactly one character.

Standard Mode



Select **Match All** under **Settings for Match String.**
Under **Match String Database**, input the exact decoded data as it appears when you scan the barcode.
Match All is working correctly if it successfully matches a barcode of the same length and character sequence that you input in the Match String Database.
Now select **Partial Match** under **Settings for Match String.** Choose a start position and length based on the barcode you're scanning.
Partial Match works by using the Start and Length fields and attempting to match the exact portion of text defined in the Match String Database in that location.
For example, if the decoded symbol data is **1234567**, Start=**1**, Length=**2**, and the input in the Match String Database is **12**, the match would be successful because characters 12 are in the portion of the barcode data defined by the Start and Length fields.
Try achieving several of your own Partial Matches on several portions of your barcode data, changing the Start and Length fields each time.
In both **Match All** and **Partial Match,** you can output custom text upon a successful or unsuccessful match. These fields can be activated and edited by clicking on **Match Replace** and **Mismatch Replace.**
If you enter several inputs into the **Match String Database,** the application will attempt to match all of them. If one match is successful, then the other failures are ignored, and the match is considered successful.

Wildcard Mode



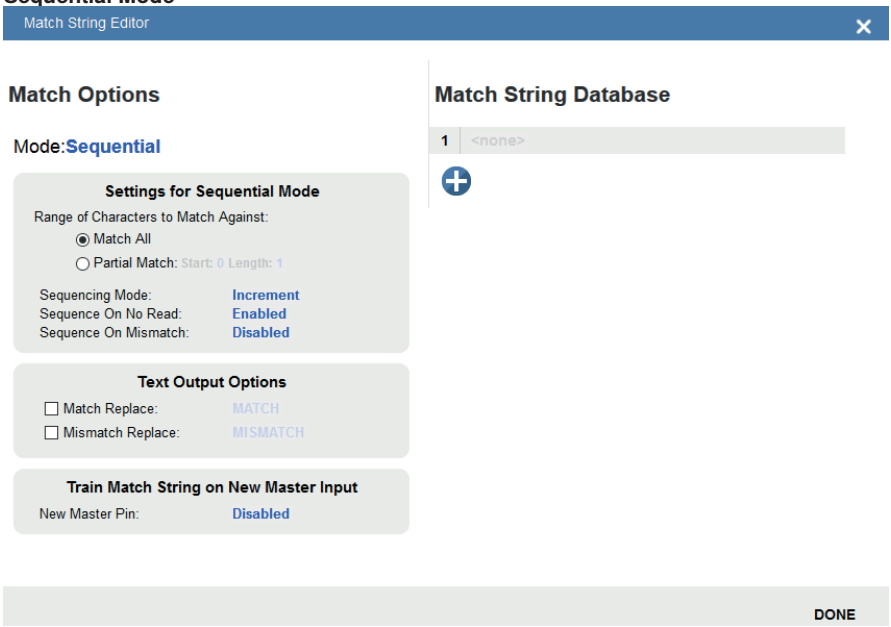
Wildcard mode gives you the ability to use wildcards and placeholders to search for matches. By default the Wildcard is * and the Placeholder is ?
You can use these wildcard and placeholder definitions when they input text into the **Match String Database.**
A **wildcard** represents one or more characters of any type. For instance, ***TEST*** looks for the text “TEST” in barcode data with any amount of characters before or after it.
***TEST** looks for the text “TEST” in barcode data with any number of characters before it, but “TEST” at the end.
TEST* looks for the text “TEST” at the beginning of the barcode data, with any number of characters after it.
If you had a barcode with data **1234567** and tried to match to the entire data string using **123***, you would have a successful match.
If you tried to match that same barcode data using ***123**, you would be unsuccessful because **123** appears at the beginning of the barcode. It’s important to remember that the wildcard character * always stands for one or more unknown characters.
Now try to match a portion of the barcode you’re scanning by using ***YOURTEXT***. If the text “YOURTEXT” appears somewhere in the middle of the barcode, the match will be successful.
A **placeholder** represents one character of any type. For example, **???TEST** tries to match a barcode that contains three characters of any type followed by the text “TEST”. **???TE?T** attempts to match a barcode that contains an unknown character where the ‘S’ previously appeared.
Placeholders and wildcards can also be used together in the **Match String Database** input fields. The concepts of both are still the same: a wildcard represents one or more unknown character, and a placeholder represents exactly one unknown character.
An example of a complex match using wildcards is shown below. Recall that wildcards and placeholders are * and ? by default, but they can be redefined.

The barcode data the example above was attempting to match was **EN-1234_AreYouReadingThis en_US 1234.**
The logic of this match is diagrammed below.

[ANY AMOUNT OF CHARACTERS][ARE][ANY AMOUNT OF CHARACTERS][THIS][ANY AMOUNT OF CHARACTERS][US][5 CHARACTERS]

* = Any amount of characters (**EN-1234_** in this case)
Are
* = Any amount of characters (**YouReading** in this case)
This
* = Any amount of characters (**en_** in this case)
US
????? = 5 Characters (1234 in this case)

Sequential Mode



Sequential mode instructs the reader to sequence after each match and to compare symbols or portions of symbols for sequential numbers.

NOTE!
If **Matchcode Type** is set to **Sequential**, the reader will behave as if **Number of Symbols** were set to **1**, regardless of the user-defined configuration.

7.6. Format Output

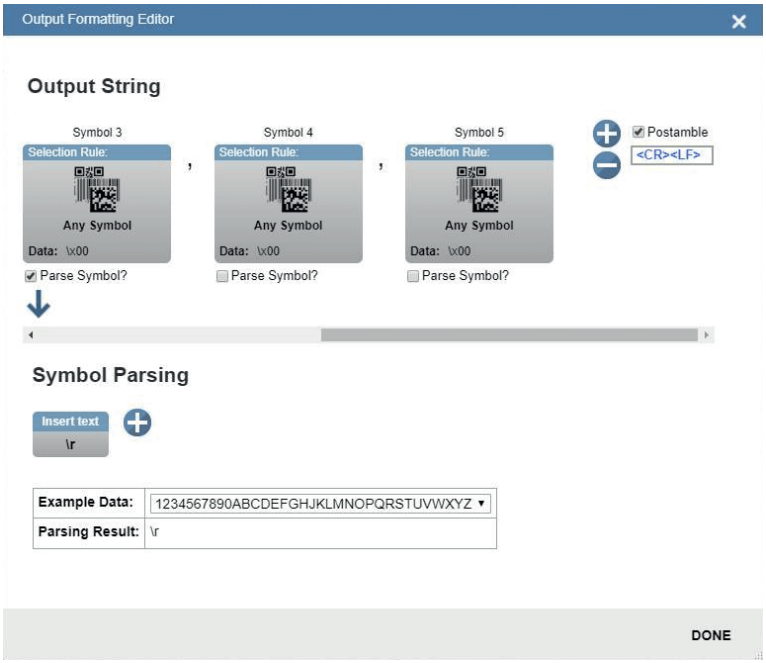
The purpose of **Format Output** is to modify decoded barcode data by inserting or extracting portions decoded strings. You can access Format Output in the left panel of the Setup view.

There are several ways to modify decoded barcode data using Format Output:

Preamble/Postamble: Applies defined text to the beginning or end of a barcode if the checkbox is selected. Preambles and Postambles are not overridden by other rules, such as Character Replace.

Parse Symbol: Symbology Type, Data, Length, and **Database Index** can be accessed by clicking on the Selection Rule images. You can define a match just as you would in the Match String editor using wildcard and placeholder rules.

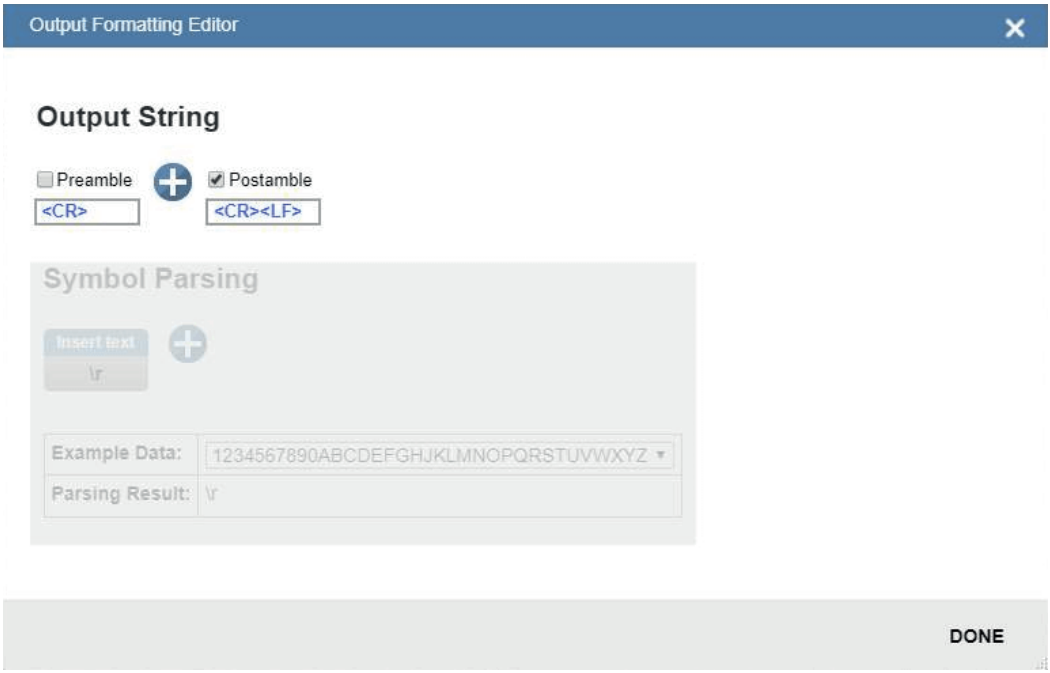
Symbol Parsing: Extract characters from symbol data or insert your own text. Click the + icon after checking the **Parse Symbol** checkbox to access symbol parsing functionality. Up to 30 parsing rules can be applied, and the results will display in the **Parsing Result** box.



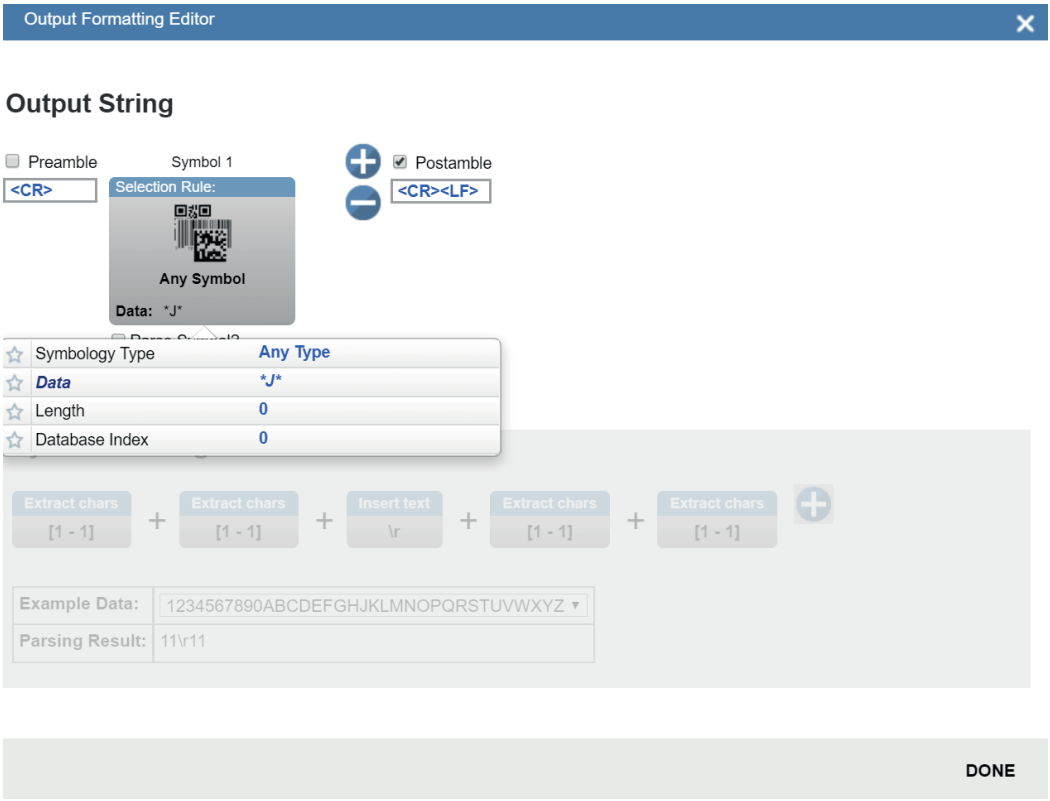
In the image above, under **Output String,** you can see that “filters” are present between the Preamble and Postamble. Click on each filter to define it. The most important field here is **Data**. The rules for entering characters in the Data field are similar to those for entering characters in the Match String Database. You simply use a combination of text, wildcards, and placeholders to attempt to match a barcode.

You can define multiple filters, and the **Symbol Parsing** actions shown in the example above (**Extract characters from symbol data** and Insert your own text) will apply if the filter definition matches a decode, just as in the Match String Editor. The filter is simply a way to apply Symbol Parsing rules to specific barcodes. If the filter matches the barcode, then the extract and insert rules will apply.

If multiple filters are defined, only a single filter that matches the barcode data is needed for the rules to be applied. Multiple defined filters do not mean that all filters must match to activate parsing rules.

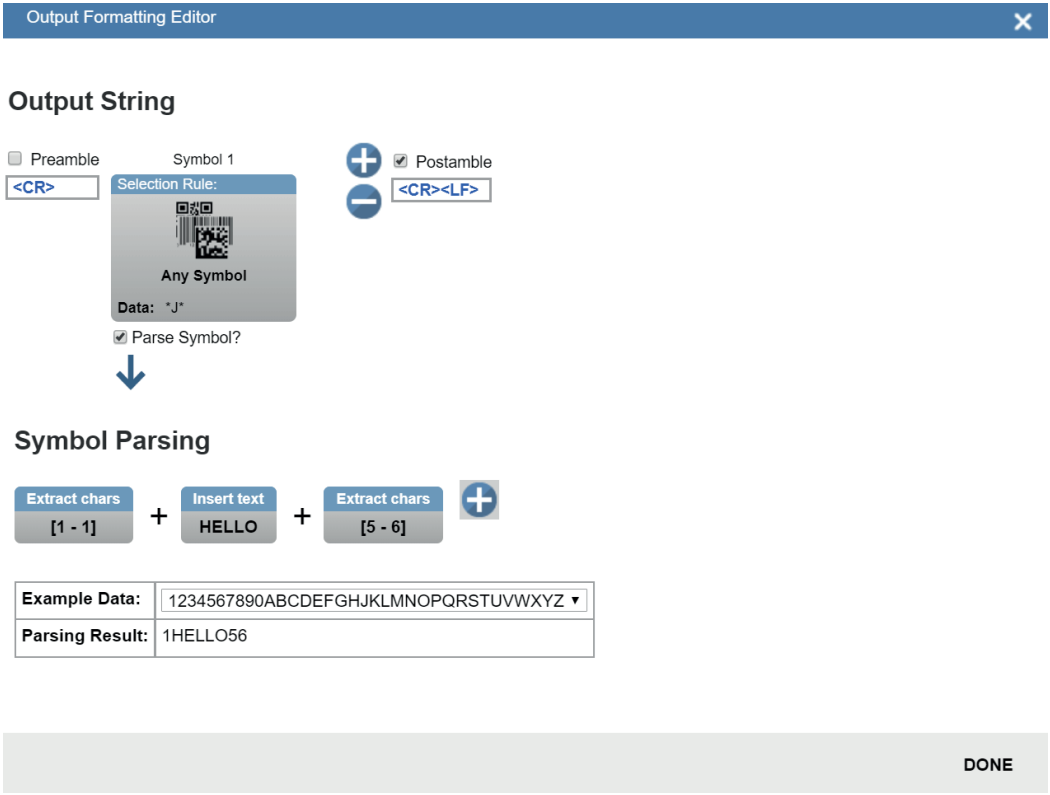


Click on the **+** button to define a new filter.

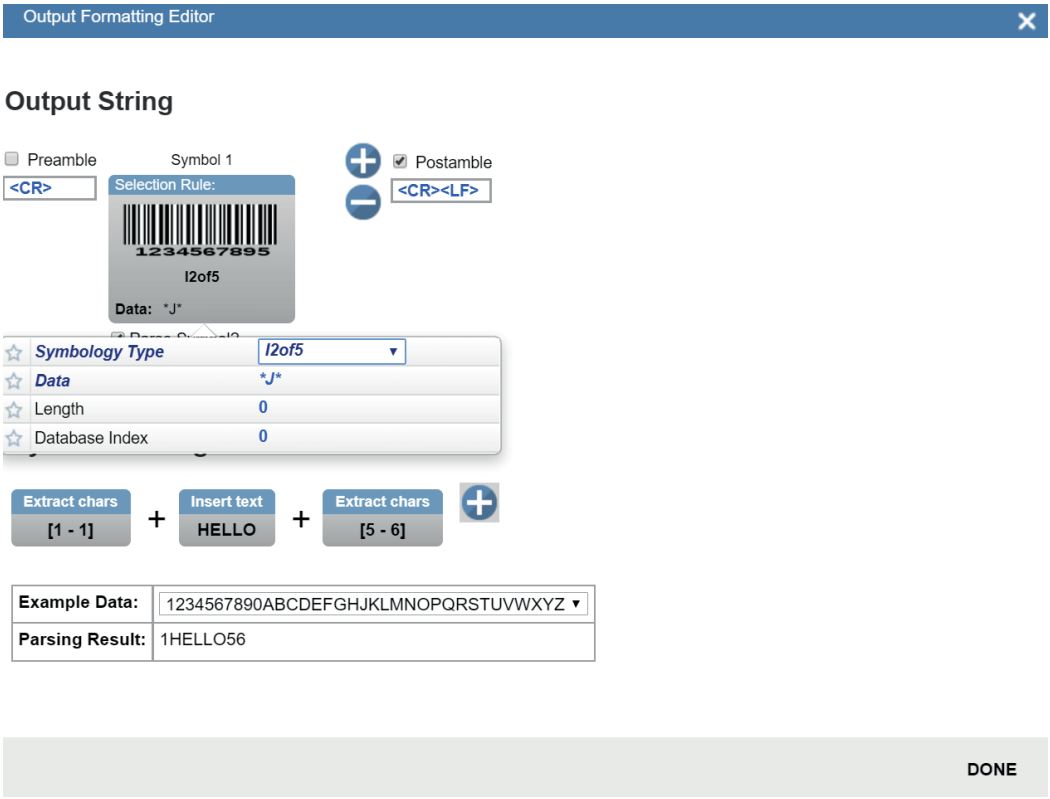


Click on the filter to open the popup, giving you access to **Symbology Type**, **Data**, **Length**, and **Database Index**.
Try changing the Data field to search for a section of a barcode using wildcard / placeholder rules.

In this example, the filter will match any barcode that contains a **J**.



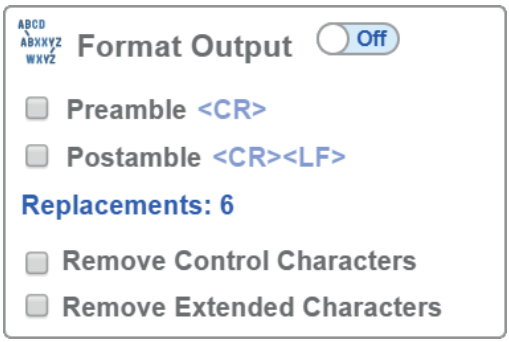
Select the **Parse Symbol** checkbox to activate the rules for this filter. In the **Symbol Parsing** section, try defining some rules.
In the example above, any barcode that contains a J will have the 3 Symbol Parsing rules above applied to it. You can also tell the system to search for “Any Symbol” or for only specific symbologies.



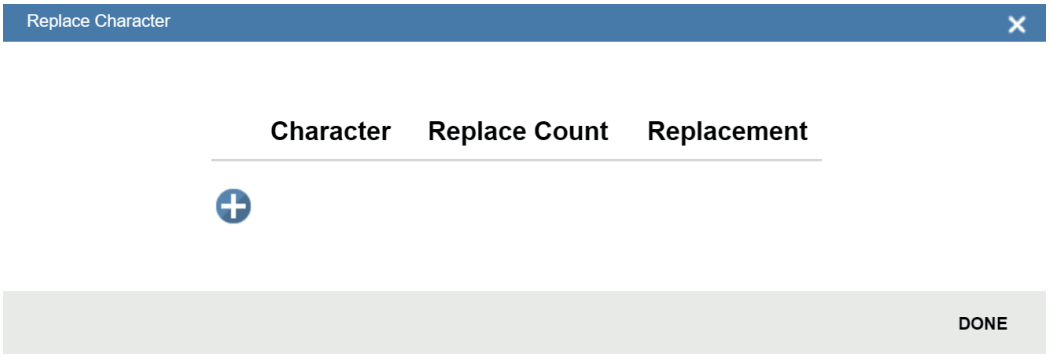
Now you can modify your filter so that the “any J” rule only applies to Interleaved 2 of 5 symbols. You could potentially define a custom rule set for several different symbologies.

7.6.1. Replace Character

Format Output also has a **Replace Character feature**. You can access the Replace Character feature by clicking on the **Replacements** link in the Format Output editor.



Before clicking on the Replacements link, note the two other boxes below the link: **Remove Control Characters** and **Remove Extended Characters**. These are used to remove all ASCII control characters and ASCII extended characters from decoded barcode data.
Click on the Replacements link to open the replacements dialog shown below.



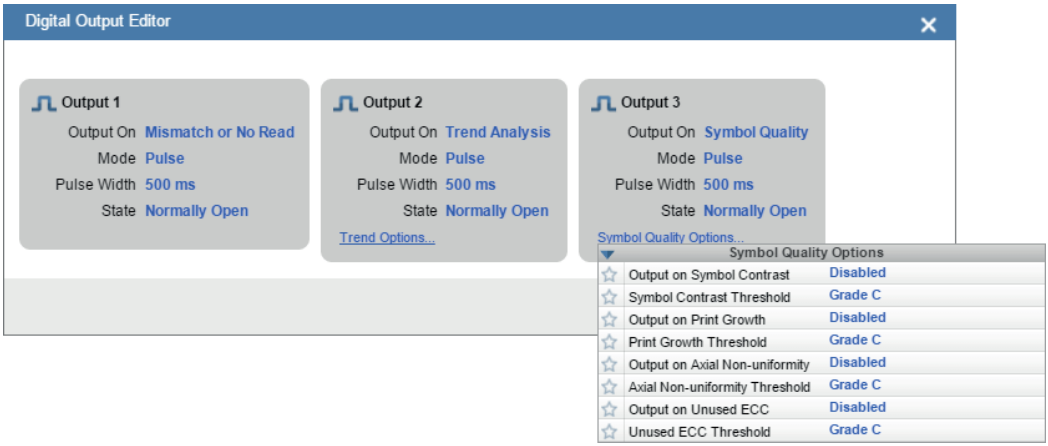
Character: The character that you want to replace.
Replace Count: How many characters you want the character to be replaced with. Valid options are **0**, **1**, and **2**.
Replacement: The character(s) that you want to replace the character with.

When you replace a character with one or more different characters, the results will be displayed in the Output Data window in the lower right panel of the WebLink user interface. Up to **25** character replacements can be defined. If duplicates are defined, an error message will appear, and only the first definition will be applied.
You can enter ASCII control characters by selecting the link below the input box. You can also enter extended ASCII characters by entering **\xHexadecimal** – for example: **\xFF.**
The number of replacements that you've defined are counted in the Replacements link in the Format Output editor.

7.7. Outputs

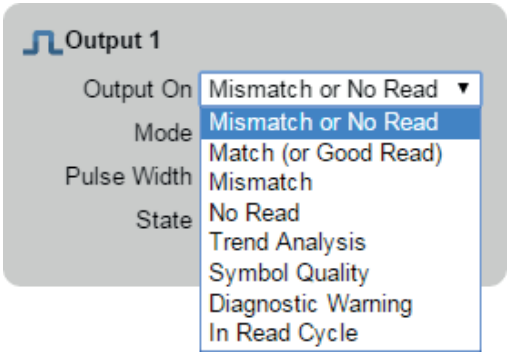
Bring up the **Output 1, Output 2**, and **Output 3** dialogs by clicking on the **Outputs** section at the lower left of the **Setup** view. For each output you can determine the **Output On** behavior, **Mode, Pulse Width**, and **State**. **Outputs 2** and **3** also allow you to determine output behavior based on **Trend Options** parameters or **Symbol Quality Options** parameters.
This example shows the dialog that appears when you click **Symbol Quality Options**. A similar dialog would also appear for **Trend Options** under **Output 2**.

NOTE!
The **1, 2**, and **3 output indicators** at the lower right of the screen display the results of the last read cycle.



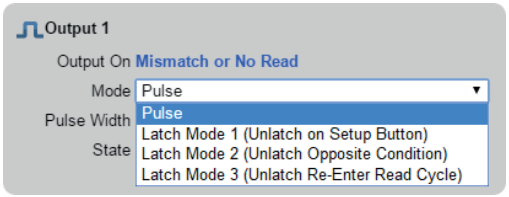
7.7.1. Output On

Output On provides discrete signalling to host software to control external devices such as PLCs and relays. It is useful for routing, sorting, and to prevent mis-packaging and mis-routing. This option allows you to set the conditions under which an output (or outputs) will be activated.



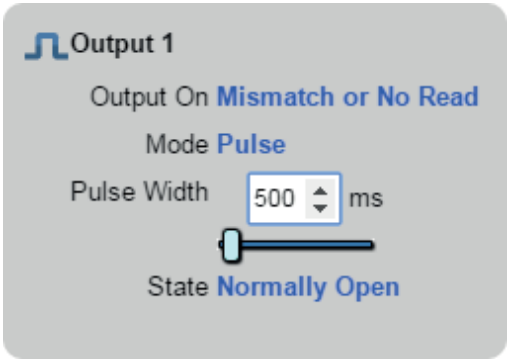
7.7.2. Mode

Output Mode sets the condition in which the discrete output is deactivated.



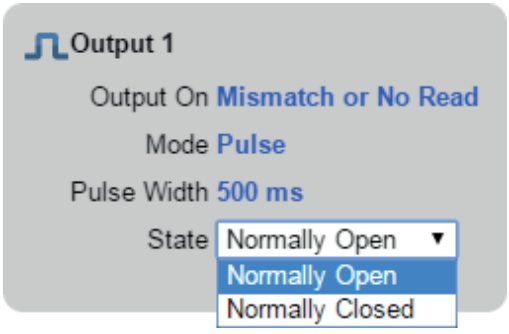
7.7.3. Pulse Width

Pulse Width sets the time in milliseconds that the discrete output remains active.



7.7.4. State

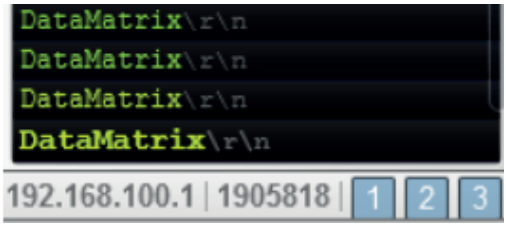
Output State allows you to set the active electrical state of the discrete output to **Normally Open** or **Normally Closed**.



7.7.5. Triggered Outputs

Triggered Outputs show when outputs are triggered and give you the ability to trigger outputs manually.

Outputs 1 - 3 are located in the lower right corner of the user interface. They function both as buttons that trigger whichever output you click, and as a display that shows which output is currently being triggered. In the example below, output 2 is being triggered.



NOTE!
These three output indicators display the results of the last read cycle.

7.8. Configuration Database

WebLink's **Configuration Database** is a system that uses two or more unique camera configurations that are automatically attempted during a read cycle. It allows for multiple camera changes to be made without interaction from the user. WebLink is used to configure the database settings and verify that all the database indexes are working correctly.

The Configuration Database can be used to fine-tune the reader's performance in your application. It can run multiple decode options in a single read cycle. You can enable Configuration Database and define the number of configurations in **Advanced Settings**. Configurations are set up individually and saved individually. Configuration database is set up in the **Setup** tab and tested in the **Run** tab. Virtually all **Acquire** and **Decode** settings can be individualized per database entry. Clicking the gear icon shows a view of all database settings. Settings can be based on Windows of Interest (WOIs), meaning a new picture is taken for each decode. Settings can also be based on Regions of Interest (ROIs), meaning decodes are attempted on a single image.

Important: **Auto Photometry** should be disabled while using the Configuration Database.

The Configuration Database is useful in applications where:
- More than one symbol type is present;
- A symbol may require different photometry settings to decode;
- Symbols are presented at different depths;
- Multiple symbols with the same data need to be decoded;
- Multiple symbols need to be read in a specific order.

7.8.1. Overview of Setup Process

Use WebLink to define the number of active database indexes, located in the **Advanced Settings.**
Use Weblink to configure each of the database indexes by selecting them in the **Setup** view.

Tips:
- The indexes are not cycled in Setup mode. Switch to Run mode for read cycle testing.
- Set the Number of Symbols to match the number of barcodes you need to decode.
- If decoding multiple barcodes in the same image, make the following changes in **Advanced Settings.**
- **Configuration Database:**
  - **Image Process Looping**: Enabled
  - **Image Dimensions:** Region of Interest
- Save each index configuration by clicking on the database icons when done.
- Index number is only output in Run mode if enabled.
- Save settings to the flash memory of the reader when all the indexes in the Configuration Database have been defined for the application.

7.8.2. Start and Run Views

You can use **Assisted Setup, Create a New Setup**, and **Load a Setup**, along with **Advanced Settings**, to manipulate reader settings.

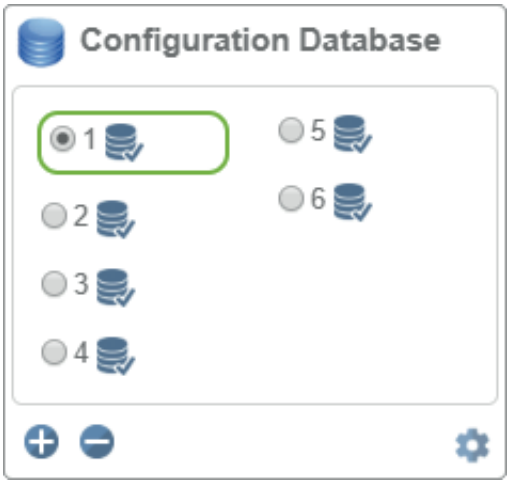
NOTE!
Assisted Setup and **Create a New Setup** will both default the reader.

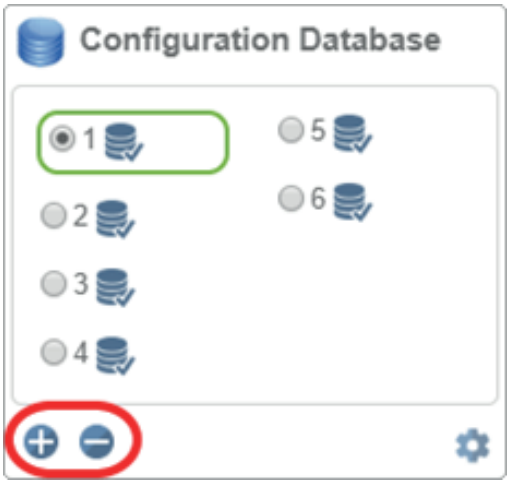
NOTE!
Advanced Settings, while in the **Start** and **Run** views, allows you to manipulate all reader settings except the individual Configuration Database index settings. The settings that are shared between the global and Configuration Database index are ignored by the reader. While in the Setup view, the reader pauses the Configuration Database and any changes to the shared settings can be saved into any of the available Configuration Database indexes.

While in the **Start** and **Run** views, you can see which database decoded the symbol:

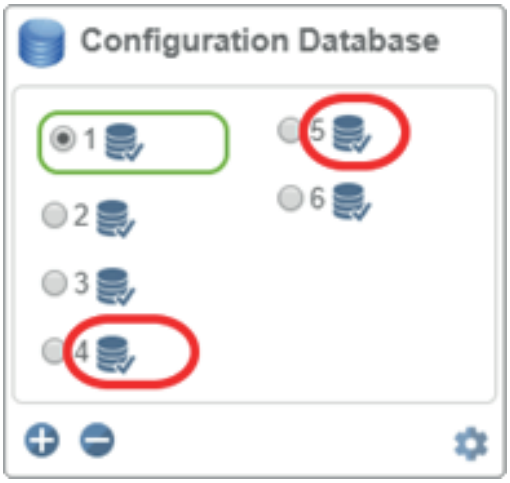
7.8.3. Setup View

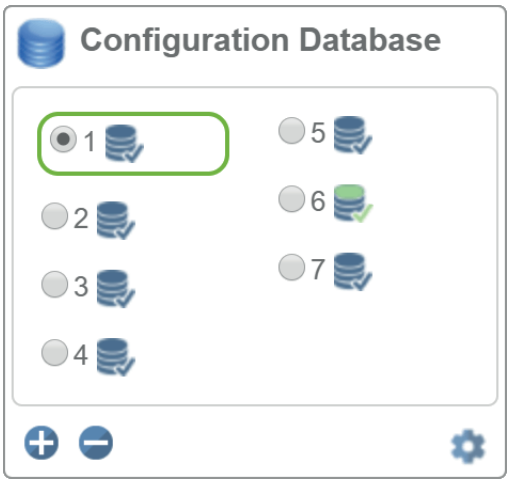
The **Setup** view displays a **Configuration Database** section that allows you to add and remove active indexes to and from the database. It also allows you to select specific indexes to modify.





Once you change settings, you can then save to any index by clicking the **Save** button available for each index.

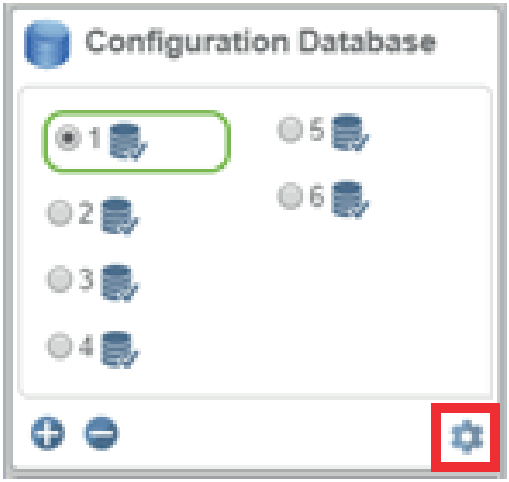




NOTE!
The Save button icons are blue for each index by default. In the example below, settings were saved to the 6th index. The Save button will continue to appear green until another setting is sent to the reader.

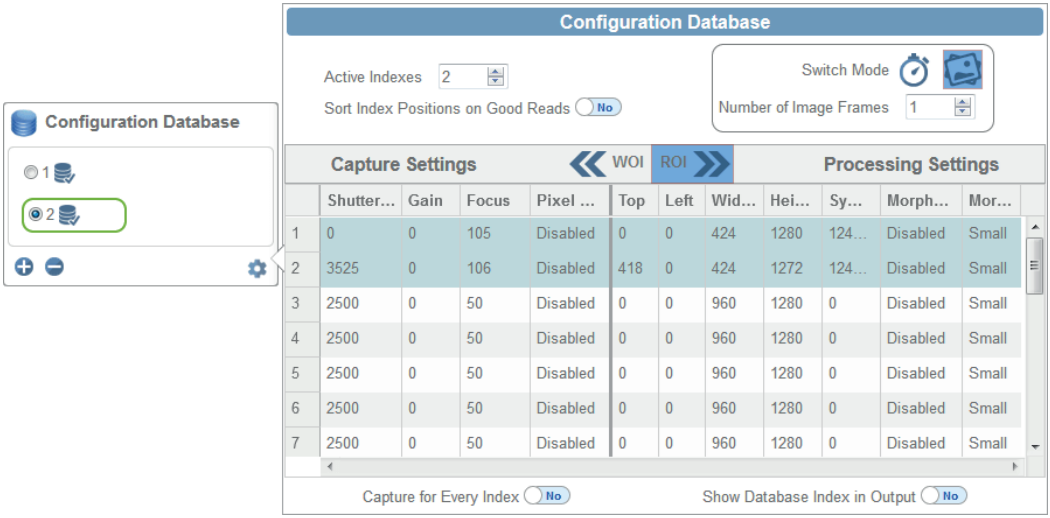
7.8.4. Configuration Database Settings Dialog

You can also access the extra Configuration Database in a popup dialog by clicking the **Extra Settings** gear icon. This provides a read-only view of the Configuration Database showing all available settings. It also includes the Advanced Settings that are available in the Advanced Settings dialog.



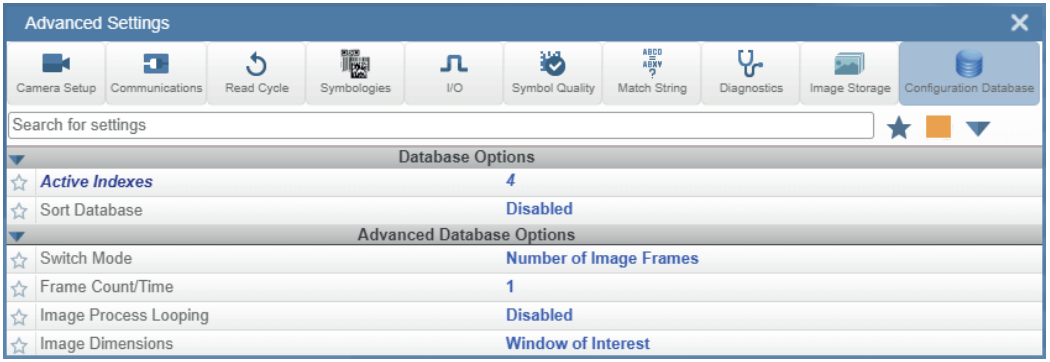
7.8.5. WOI / ROI

When you click **WOI**, the Configuration Database uses the **Top, Left, Width**, and **Height** values as **Window of Interest** values. When you click **ROI**, the Configuration Database will use **Top, Left, Width**, and **Height** values as **Region of Interest** values.

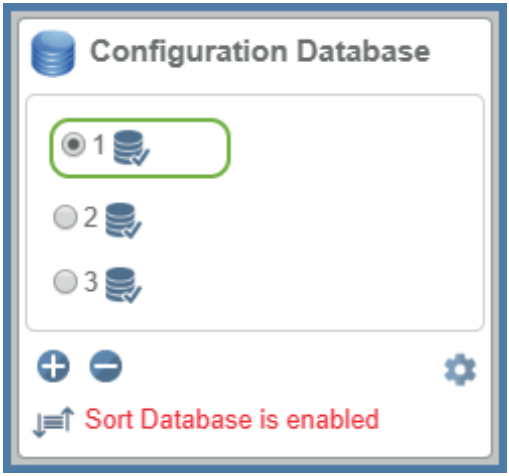


7.8.6. Advanced Settings Configuration Database

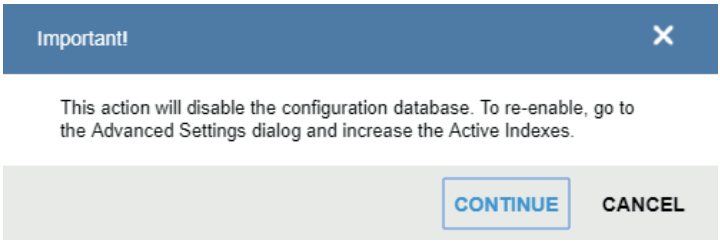
The **Advanced Settings** dialog shows the extra configuration settings not present in the Configuration Database in the left panel of the WebLink user interface. This is where you would enable the Configuration Database if it isn't already enabled.



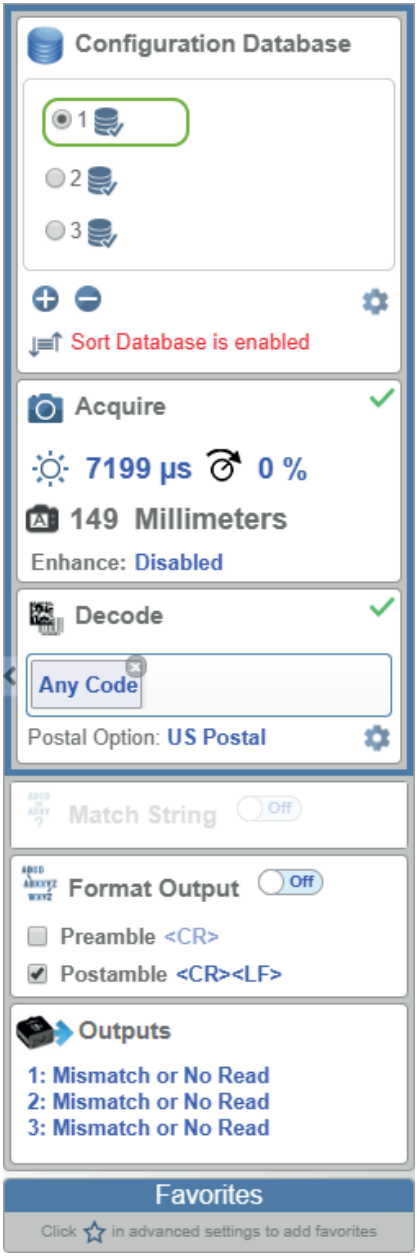
If you enable Sort Database, a warning will appear in the Configuration Database section of the left panel.



NOTE!
The primary way to enable the Configuration Database in the WebLink user interface is to open the **Advanced Settings** dialog and increase the number of **Active Indexes**. An alternate option is to use the **Terminal** and set the index count using the **<K252>** command. If there are no Active Indexes, the Configuration Database view is hidden. Once they are available, either via Advanced Settings or Terminal, the Configuration Database view will appear. If you remove the last index, a warning dialog will appear:

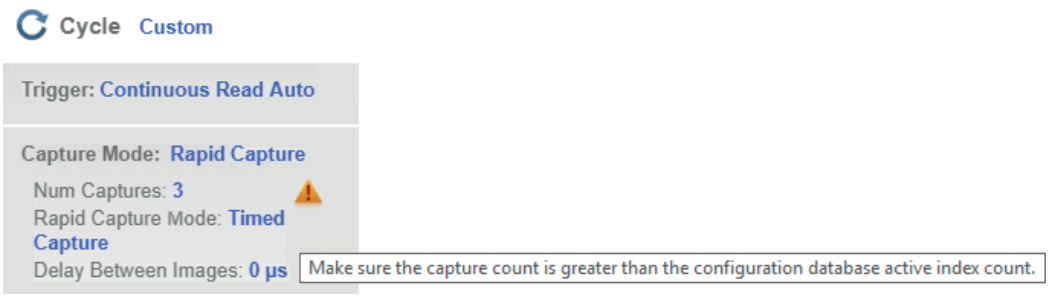


The user interface shows which settings are affected by the Configuration Database using dark blue highlighting around the Acquire and Decode steps.

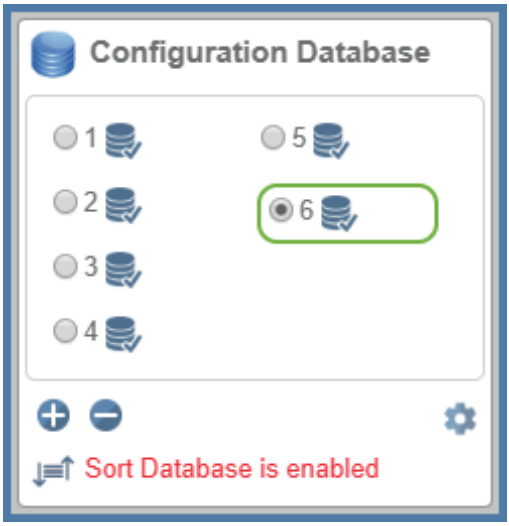


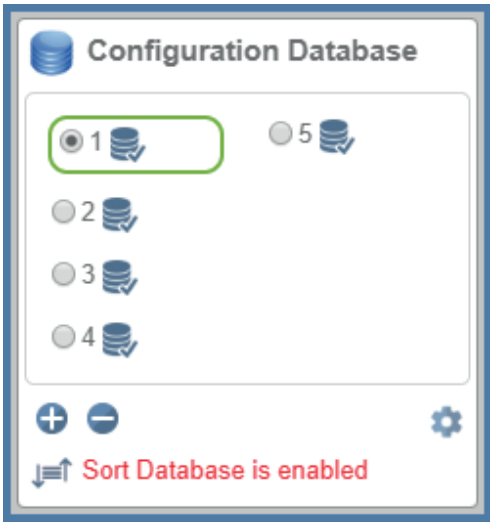
7.8.7. Additional Features

If you are in **Rapid Capture Mode** and have fewer captures than the Configuration Database has Active Indexes, the extra Active Indexes will not be triggered. A warning icon will appear if this occurs.



If you remove an index that is selected (4), WebLink will select and load index 1

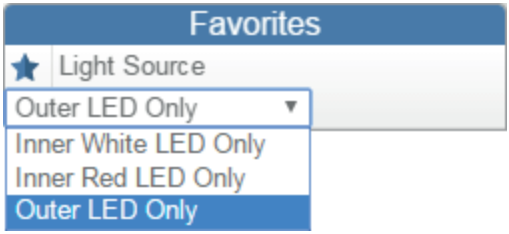


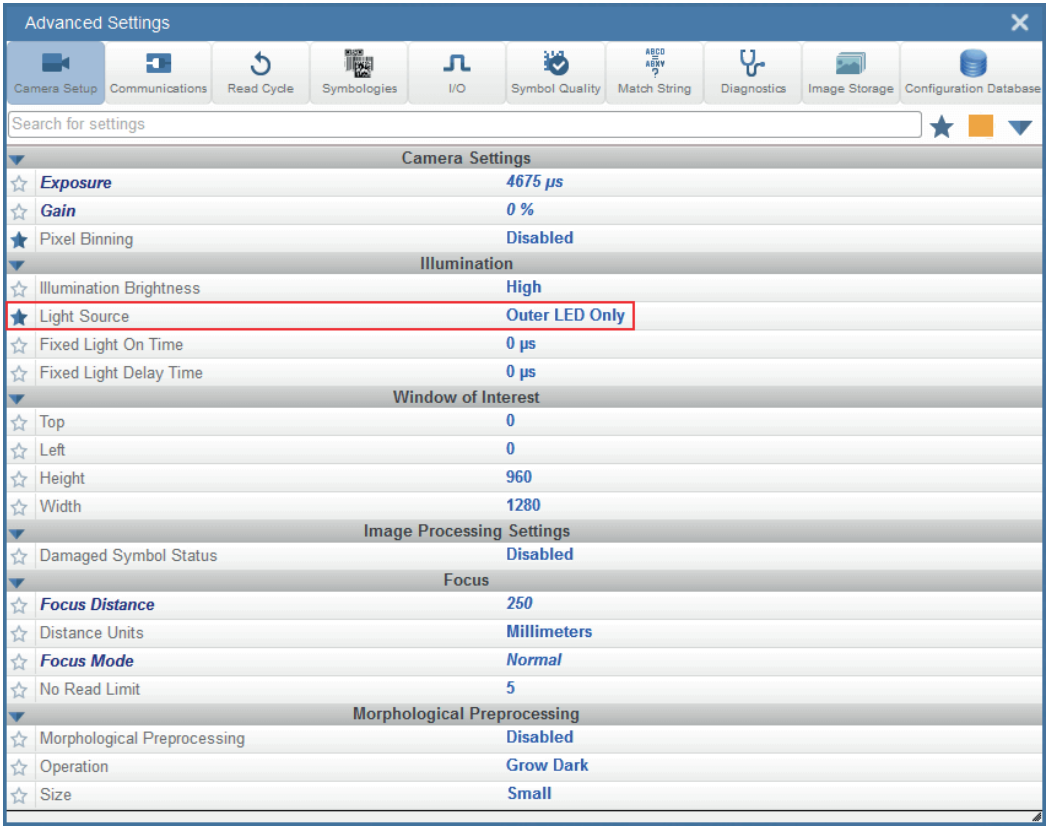


7.9. Favorites

The **Favorites** dropdown menu displays commands that you have selected as favorites by clicking the star icons next to command names in the **Advanced Settings** menus. This is useful because it allows you to change the parameters of frequently-used commands without returning to the Advanced Settings menus.

In the example below, notice that the star icon next to the **Light Source** command in the **Camera Setup** menu is selected. This causes that command to appear in the Favorites editor in the **left panel** of WebLink's **Setup** view. Commands that are displayed in Favorites can be configured in the same way as commands in Advanced Settings.





8. Run

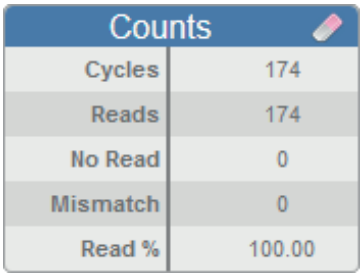
In the **Run** view, you can observe the progress of the setup as it follows the parameters you have defined. The **right panel** of the **WebLink** UI shows **Counts** for **Cycles**, **Reads**, **No Reads**, and **Mismatches**, as well as **Rate** information for **Capture**, **Decode**, **Overhead**, **Total Read**, and **Trigger Rate**, as well as **Output Data**. A "**filmstrip**" below the **Image Area** shows each image capture with a **green check mark** for a good read and a **red x** for a No Read.

Counts 133
Rate. 134
Read Time 134
Output Data 135
Image History 135

8.1. Counts

The **Counts** area of the **right panel** provides five data points:

- **Cycles** shows the total number of captures that have occurred.
- **Reads** shows how many decode attempts have been successful.
- **No Read** shows how many decode attempts have been unsuccessful.
- **Mismatch** shows how many times decoded symbol data has not matched a user-defined character string (if a **Match String** is defined).
- **Read** % shows the percentage of decode attempts that have been successful.

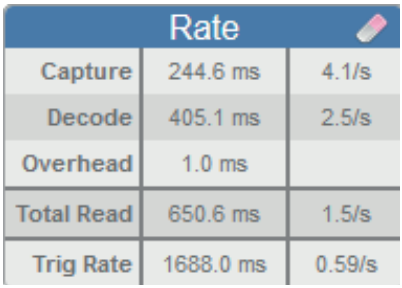


You can reset all counts by clicking the **eraser icon**.

8.2. Rate

The **Rate** area of the **right panel** provides five data points:

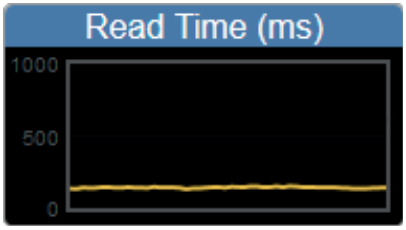
- **Capture** shows the average image capture rate per second.
- **Decode** shows the average decode rate per second.
- **Overhead** shows the average of excess processing time required to achieve captures and decodes.
- **Total Read** shows the total average time required for image capture, decoding, and overhead per second.
- **Trig Rate** shows the average number of triggers per second.



You can reset all rate data by clicking the **eraser icon**.

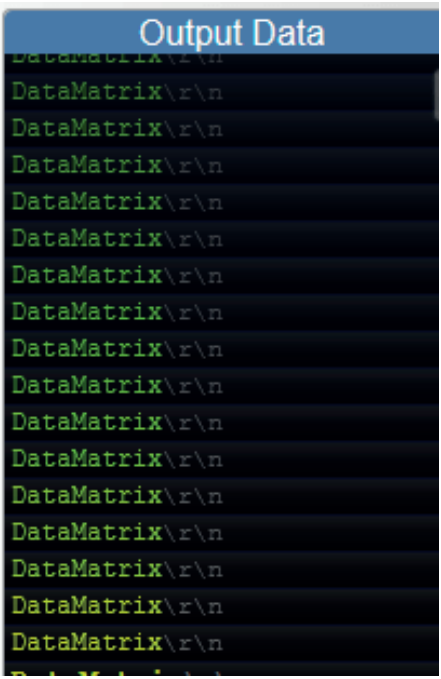
8.3. Read Time

Read Time (ms) is a real-time line graph representation of the read time data point in the **Rate** area of the **right panel.**



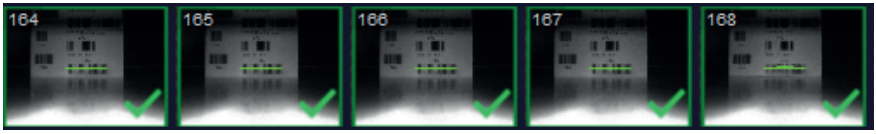
8.4. Output Data

The **Output Data** area of the **right panel** shows the data from each symbol decoded in a read cycle. The preamble and postamble are also shown here if enabled and configured.



8.5. Image History

Image History is a series of thumbnail representations of each image capture. The Image History appears below the **Image Area** in the **Run** view. Each image capture thumbnail shows a **green check mark** for a good read and a **red x** for a no read.



9. Application Settings

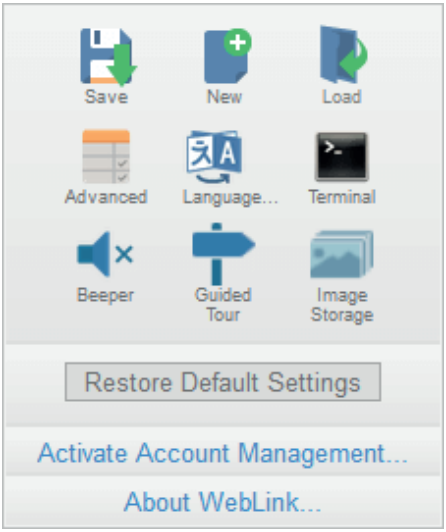
This section describes the **Application Settings** menu, which enables you to control a wide array of **WebLink** and **C5PC** functions.

Application Settings Menu 137
Save 138
New 138
Load 139
Advanced 139
Language 140
Terminal 141
Beeper 142
Guided Tour 143
Image Storage 144
Restore Default Settings 151
Activate Account Management 152
Enable USB Drive Mode 161
About WebLink 162

9.1. Application Settings Menu

Click the **gear icon** to the right of the **help icon** to open the **Application Settings** menu.

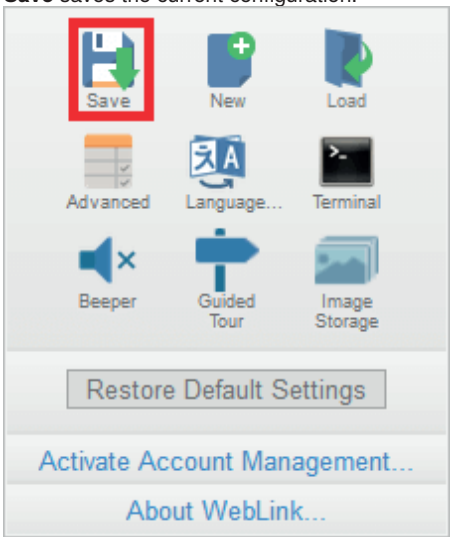
The **Application Settings** menu includes several functions: **Save, New, Load, Advanced, Language, Terminal, Beeper, Guided Tour, Image Storage, Restore Default Settings, Active Account Management, Enable USB Drive Mode*,** and **About WebLink.**



NOTE!
The **Enable USB Drive Mode** option only appears when you are using a C5KC, which supports USB connectivity.

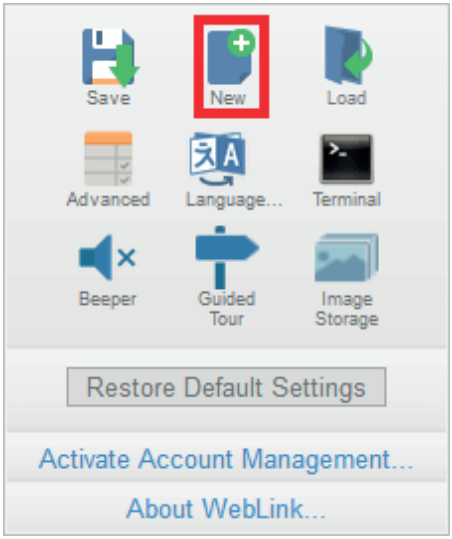
9.2. Save

Save saves the current configuration.



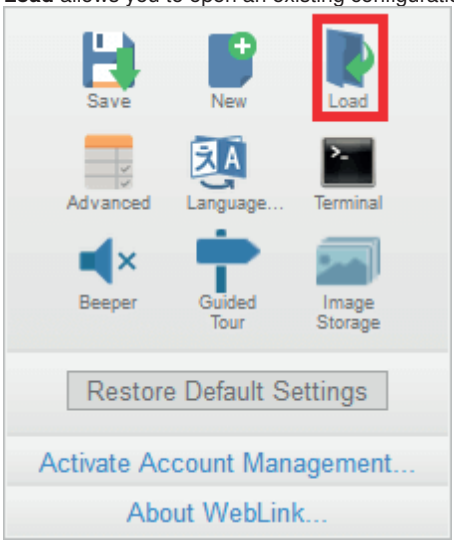
9.3. New

New opens a new WebLink session.



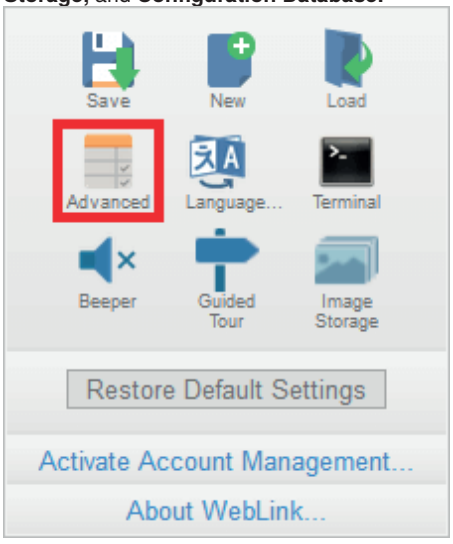
9.4. Load

Load allows you to open an existing configuration.



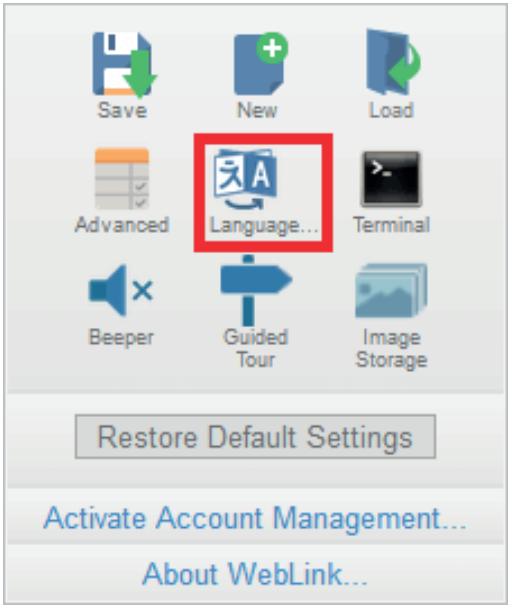
9.5. Advanced

Advanced allows you to make precise adjustments to every area of reader functionality: **Camera Setup, Communications, Read Cycle, Symbologies, I/O, Symbol Quality, Match String, Diagnostics, Image Storage,** and **Configuration Database.**

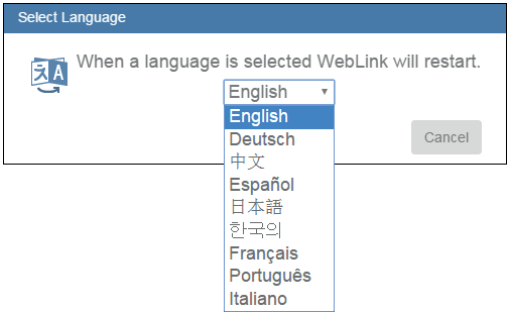


9.6. Language

Language allows you to choose the language in which you prefer to use the WebLink interface.



Important: The reader will restart when a different language is selected.

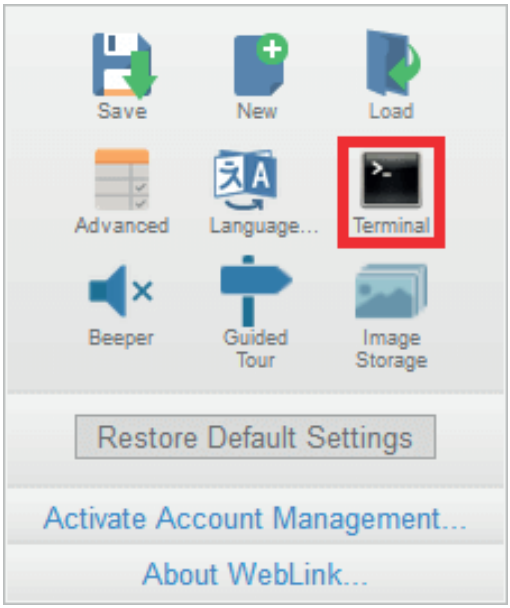


Available languages:

- English
- German
- Chinese (Simplified and Traditional)
- Spanish
- Japanese
- Korean
- French
- Portuguese
- Italian

9.7. Terminal

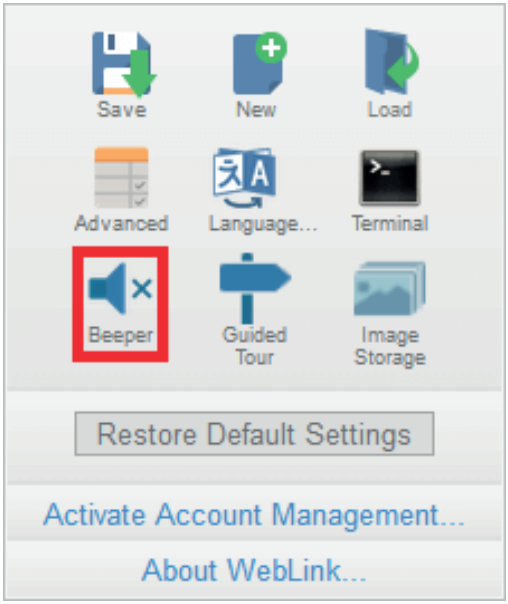
Terminal opens WebLink's Terminal interface, where serial commands can be sent, responses from the reader can be shown, and reader output can be displayed.



9.8. Beeper

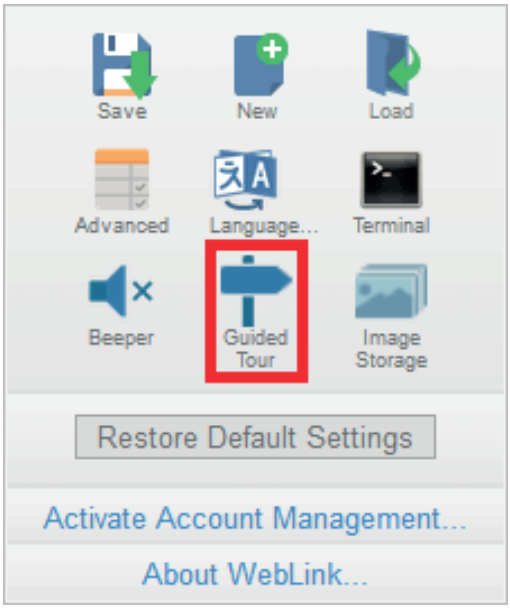
Enabling **Beeper** causes your PC to beep when WebLink receives a decode from the reader.

NOTE!
There is no beeper in C5PC reader hardware.

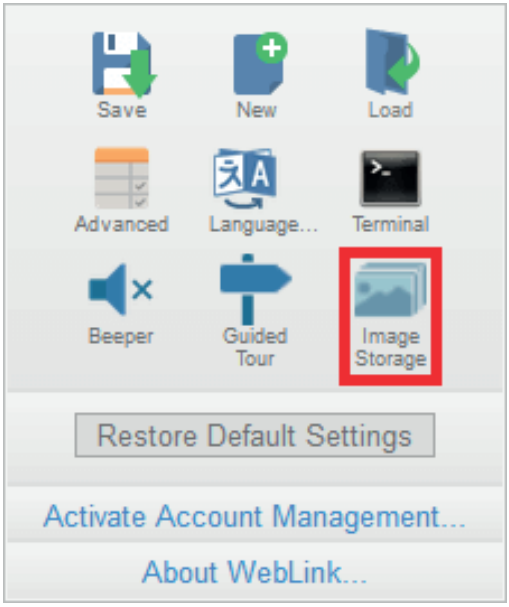


9.9. Guided Tour

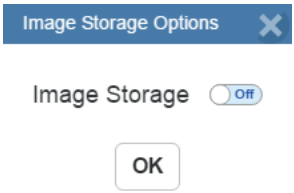
Clicking **Guided Tour** launches a tutorial that explains the functions of the various areas of the WebLink user interface.



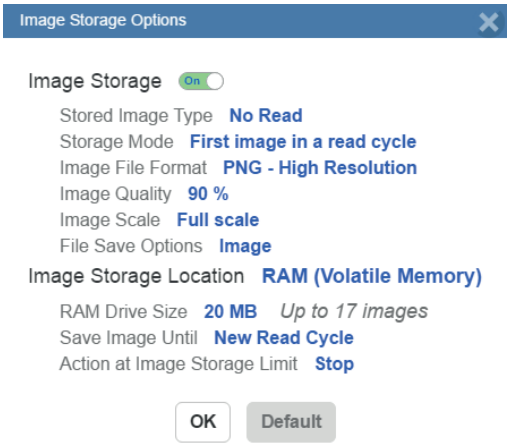
9.10. Image Storage



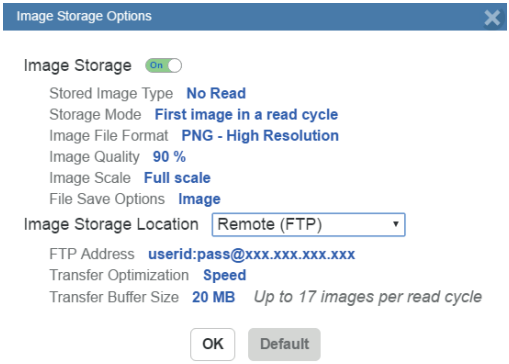
When you click the Image Storage icon in the Application Settings menu, you will see this dialog:



When you turn Image Storage **on** and click **OK**, the dialog will expand as shown below. The **Image Storage Options** dialog shows commands that allow you to control how, when, and where images captured by the camera are stored.



If **Image Storage Location** is set to **Remote (FTP)**, the **FTP Address** will appear, allowing you to input the user ID, password, and address of the applicable FTP server.



If the RAM drive size changes, the message shown below will appear in the **Image Storage Location** dialog.

If you click **Revert**, the RAM drive size returns to its previous size.

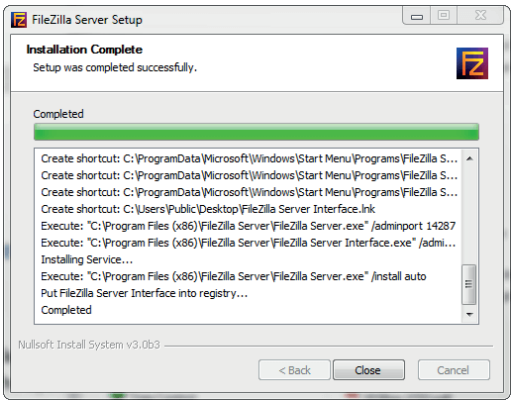
All **Image Storage** settings can also be configured in **Advanced Settings.**

9.10.1. Image Storage by External FTP Server

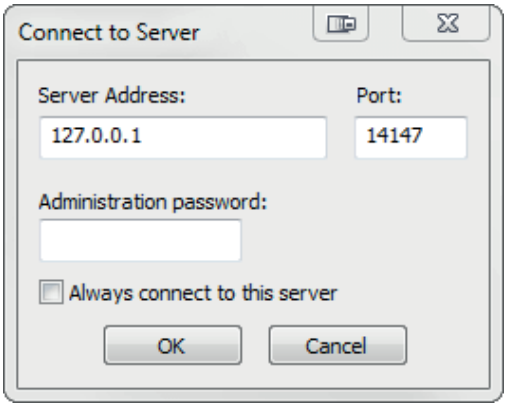
An external FTP server can be used to store images captured by the C5PC. The reader can connect to an FTP server and can send images and cycle reports to that server for storage. The following procedure describes how to set up an external FTP server.

The example procedure shown here uses **FileZilla Server**, which can be downloaded at https://filezilla-project.org/. Note that FileZilla is a Windows-only utility.

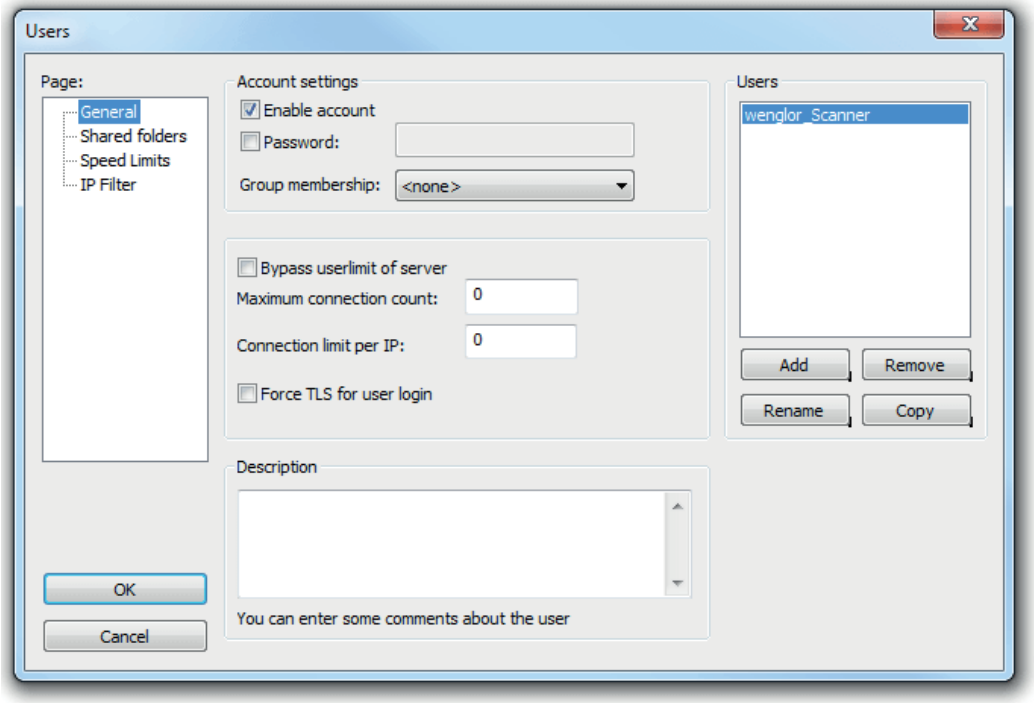
- Download and install FileZilla Server.



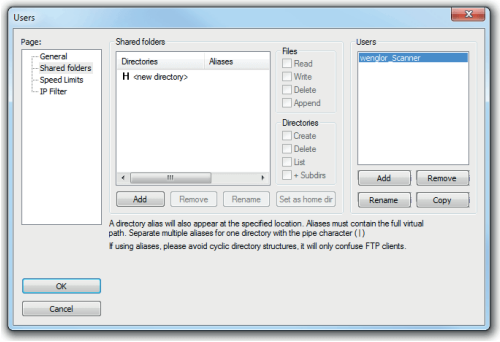
- Connect to the server. Use the **127.0.0.1** server address if you are setting up the server on your PC. Note the port that you use – **14147** in the example shown here – as the port number will be required when you log back into the server.



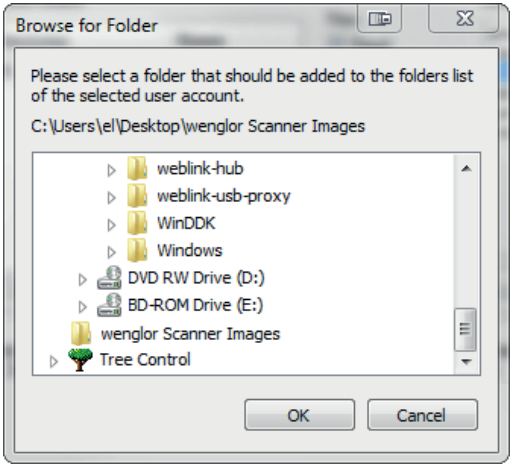
- Configure the settings on the **General** page of the **Users** dialog.



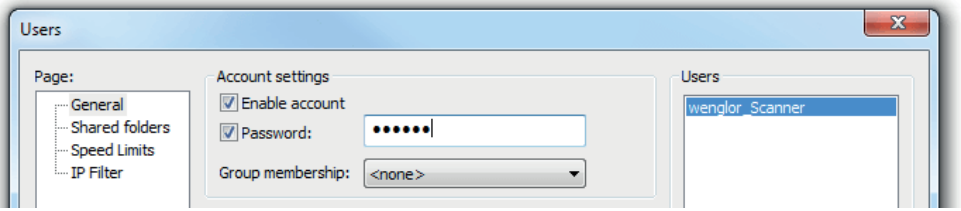
- Navigate to **Shared folders** under **Page**: in the left panel. Be sure that **Write** (under **Files**) is checked and that **Create** (under **Directories**) is checked. Add a new user group – **wenglor_Scanner** in this example.



- Browse for the folder on your PC where you want to store images. In this example, the folder is called **C:\Users\el\Desktop\wenglor Scanner Images.**

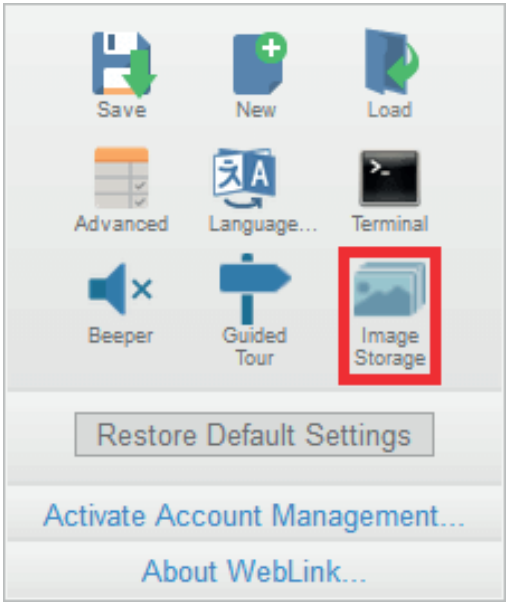


- Return to the **General** page and set a password.



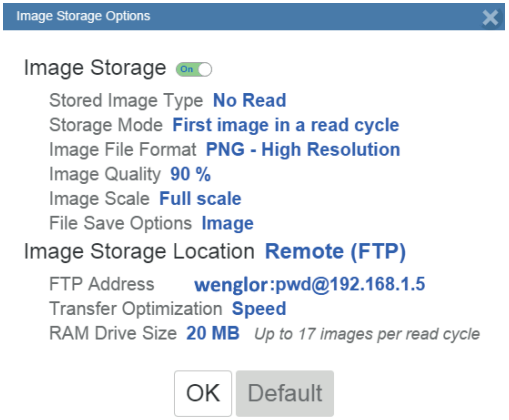
- Click **OK** and connect to your C5PC reader.

- Open **Application Settings** and click the **Image Storage** icon.



- Update your Image Storage Options, including your FTP Address.

NOTE!
pwd represents the password you set on the **General** page of the FileZilla Server interface.

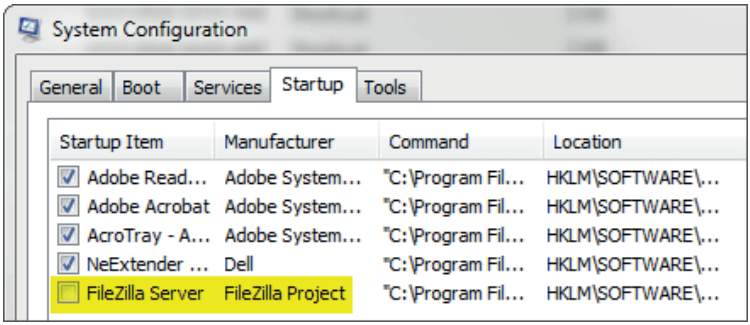


9.10.2. Start and Stop FileZilla Server

During FileZilla installation, you have the option of configuring FileZilla Server to auto-start each time the C5PC is powered on. You can also start and stop the server manually via the **Start FileZilla Server** and **Stop FileZilla Server** shortcuts shown here.

To disable FileZilla Server's auto-start feature:

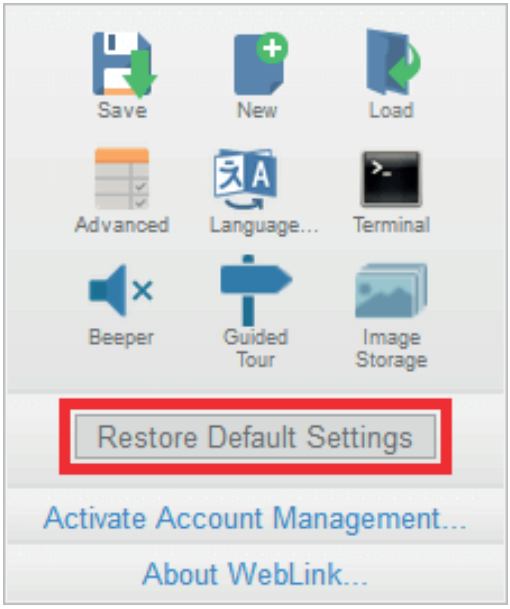
- Type the **Windows button + the 'R' key** to bring up the **Run** dialog.
- In the Run dialog's **Open**: field, type **msconfig** and then **Enter**.
- Click the **Startup** tab as shown below.
- Uncheck **FileZilla Server** so it won't launch on startup.



- Click **OK**.
- When prompted, **restart** your computer.

9.11. Restore Default Settings

Restore Default Settings returns the reader to the default state in which it was shipped from the manufacturer.

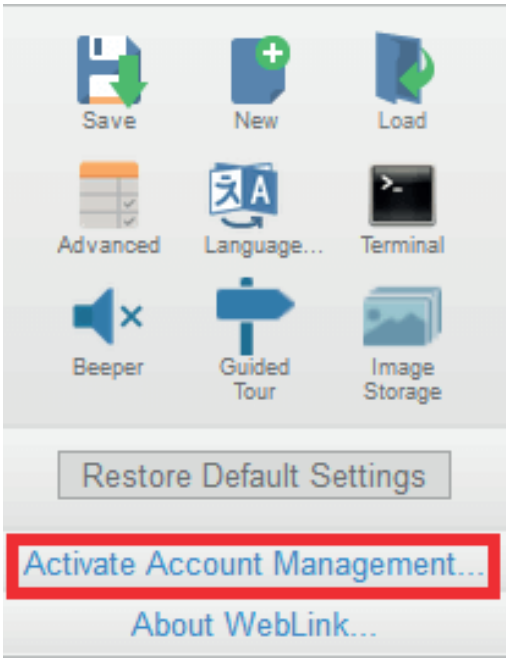


9.12. Activate Account Management

Activate Account Management allows you to set a password that will be required to open any session of WebLink. An Administrator can create, update, and delete users from an Administrator user interface. While management is active, every user must log in with a username and password established by the Administrator to use WebLink. There are three different user types, each with a different privilege level that determines their access:

- **Administrator** (Full Access as well as the ability to manage user accounts and enable or disable Account Management)
- **Controller** (Full Access)
- **Monitor** (View-Only Access)

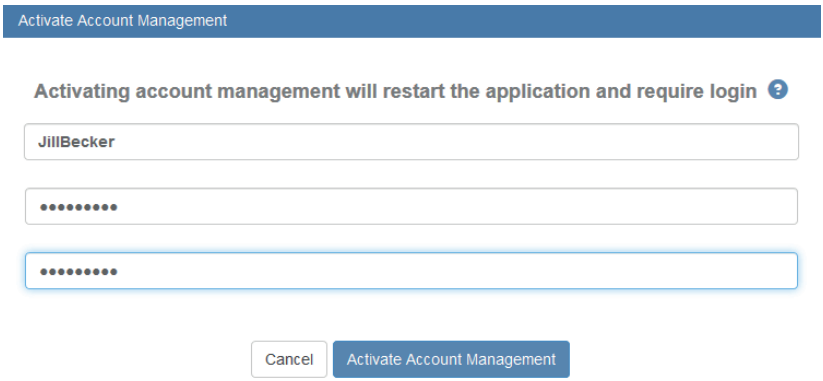
Click the gear icon at the upper right of the WebLink user interface to open the **Application Settings** menu.



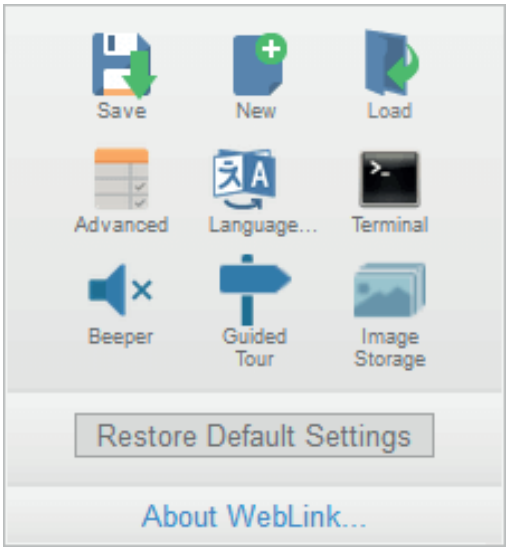
Then click **Activate Account Management** to open the dialog shown below.

Enter and verify a new username and password and then click **Activate Account Management** to password-protect the WebLink configuration.

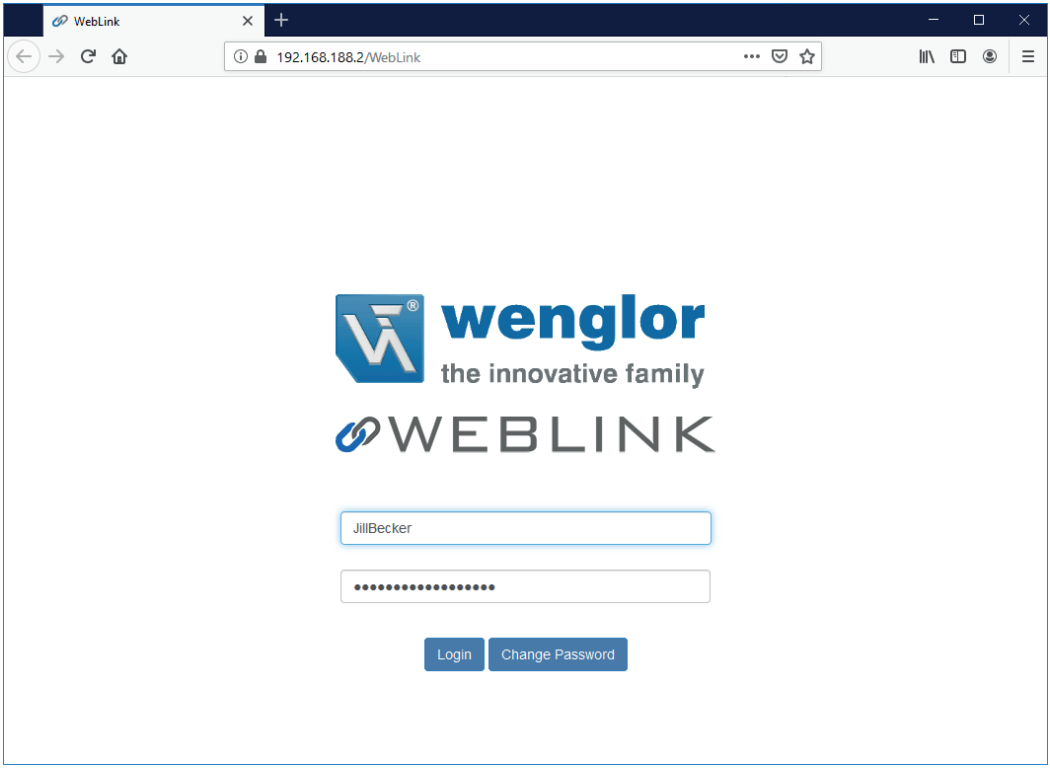
The Activate Account Management button brings up a dialog allowing you to create an Administrator account and to **Activate Account Management**. This is the same account information that you will use to log in to the application later, so be sure to remember it. After entering valid credentials, click the blue Activate Account Management button. Clicking this button will create the Administrator account and will restart the application.



NOTE!
When **Account Management** is active, **Activate Account Management** will not appear in the Application Settings menu.

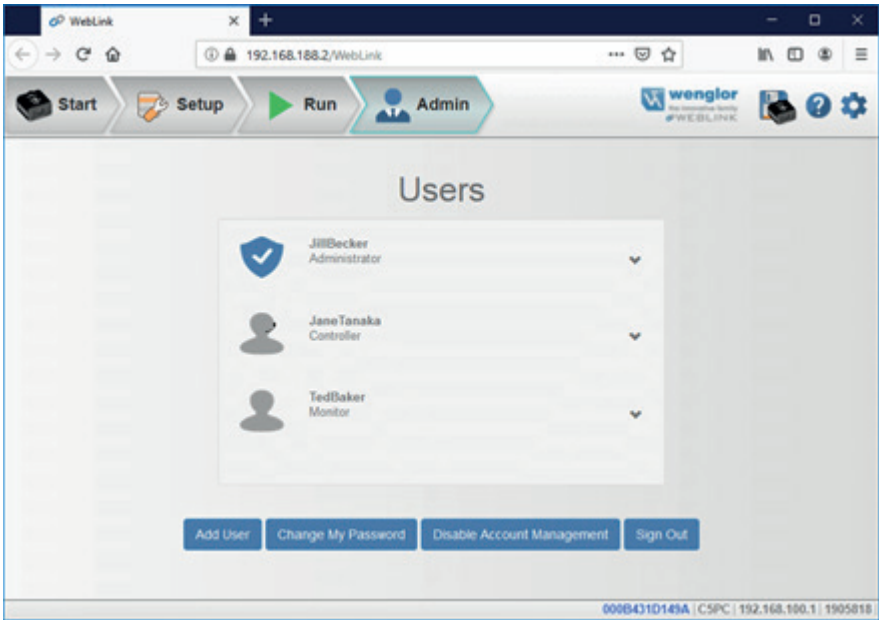


After you've clicked **Activate Account Management,** the WebLink application will be refreshed and you will see the login screen shown below. Since you haven't created other users yet, you must enter your own newly-created Administrator credentials.



9.12.1. Admin View

After successfully logging in, you will see an **Admin** tab to the right of the **Start, Setup,** and **Run** tabs. Click the **Admin** tab to view the **Account Management** interface. This interface is only visible to the Administrator.



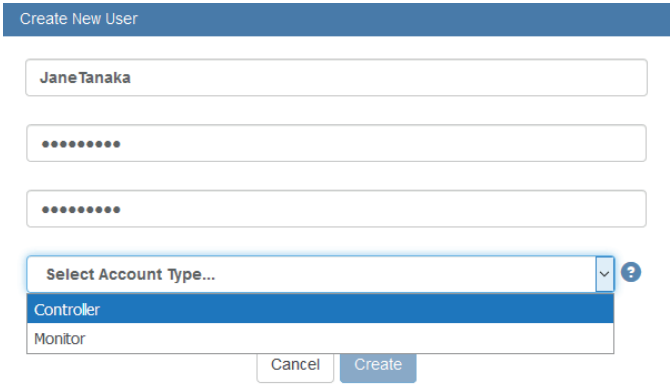
There are four primary buttons in the **Admin** view:

- **Add User**: Create a new user by establishing a username, password, and account type.
- **Change My Password**: Change Administrator password.
- **Disable Account Management**: Turn off Account Management with the option to reactivate it with existing users, or to turn off account management and delete all current users (including Administrator).
- **Sign Out:** Sign out of this account and return to the login screen.

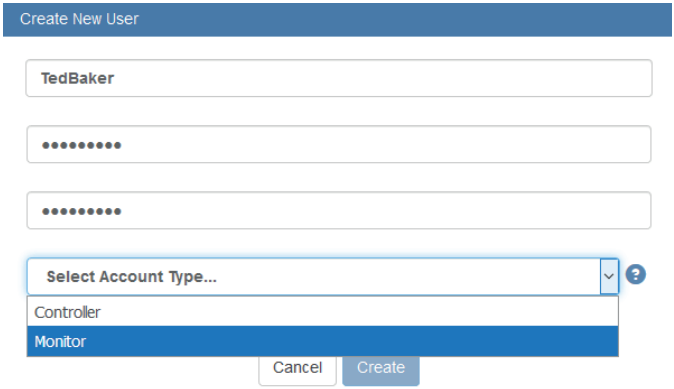
When multiple user accounts have been created, all users are shown in the list above the four primary buttons. Initially only the Administrator will be shows, but the list will grow as you create more users.
Each user tab can be expanded by clicking on the chevron icon on the far right. Before expanding, notice the basic layout of the user panel. It contains user information on account type, username, and an icon that represents the account type.

9.12.2. Managing User Accounts

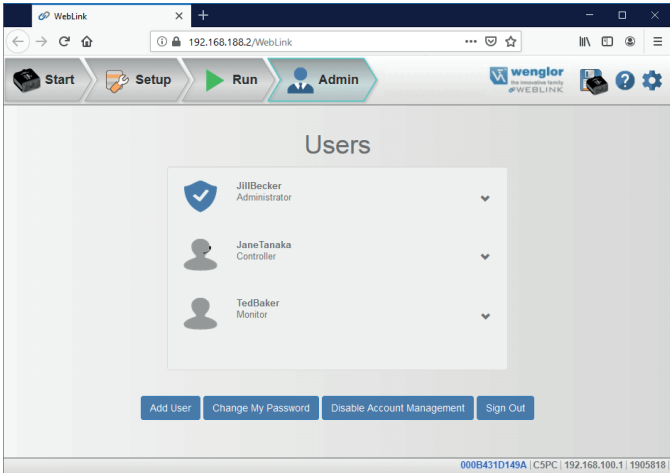
When you select **Add User**, you will see the **Create New User** dialog, which allows you to set the username, password, and account type (**Controller** or **Monitor**).



You can create users of either account type.

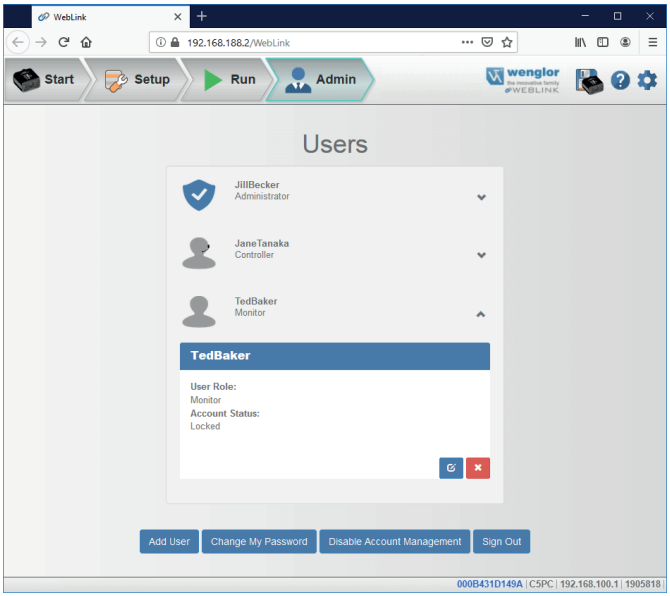


Each time you add a user, that user's information is added to the **Admin** view, as shown below.

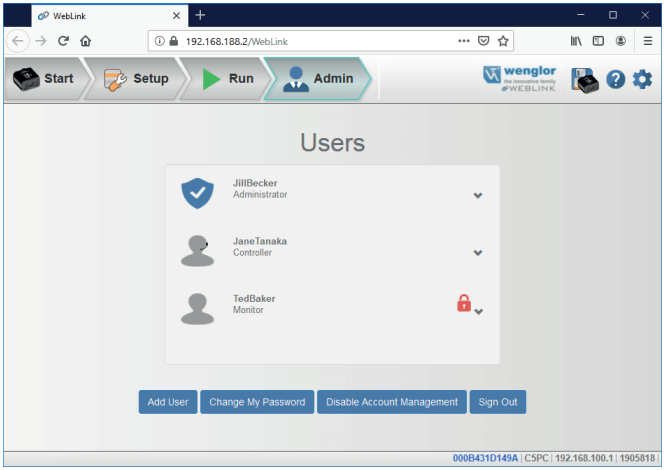


Clicking on the down arrow to the right of each user opens a view similar to the one shown below. This view allows you to update the **User Role** and **Account Status**.
You can also delete a user from this view.

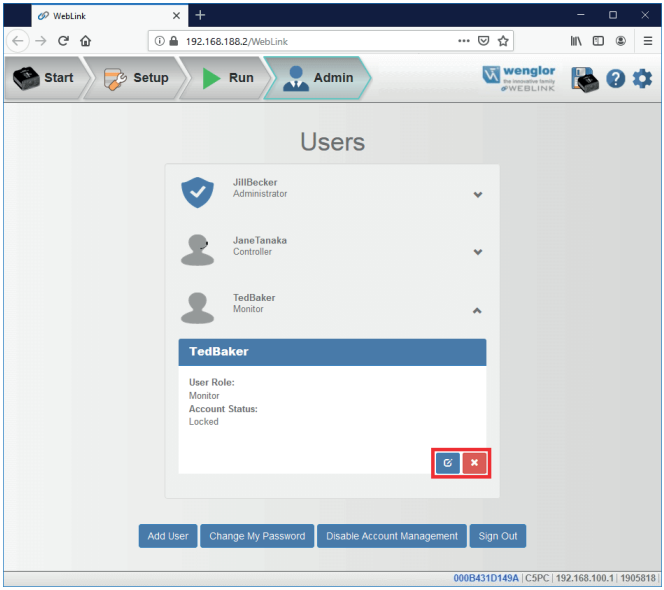
In the example shown here, the Administrator has changed the user's account from **Unlocked** to **Locked**.



When a user's account is locked, a lock icon will appear to the right of the user's name.



Two buttons appear in the lower right of each user profile when it is expanded. These buttons allow the Administrator to make changes to user accounts.

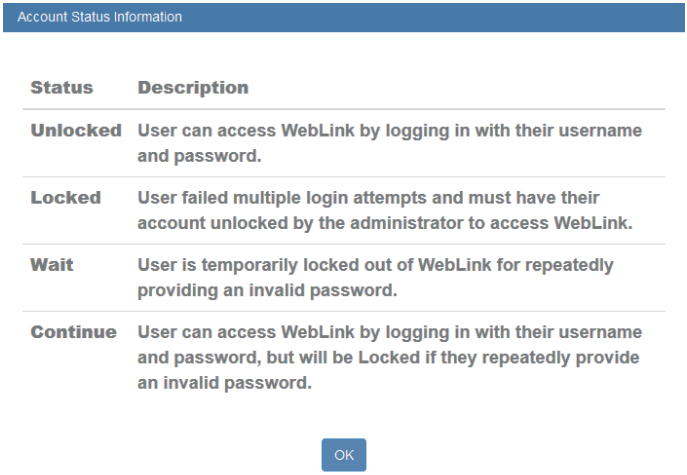


The blue button allows the Administrator to modify user information, such as password, account type, or account status.

The red button allows the Administrator to delete the user.

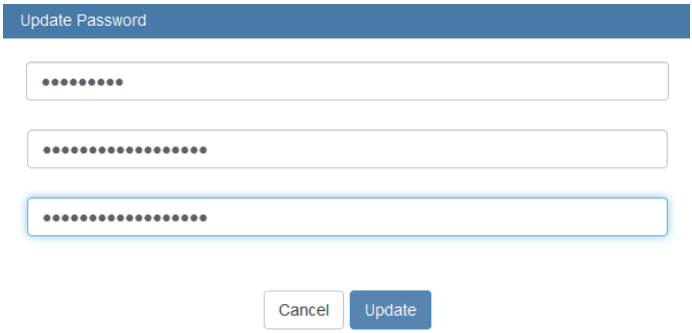
9.12.3. Account Status

There are four types of User Account Status: **Unlocked, Locked, Wait,** and **Continue**. Each status is described below.



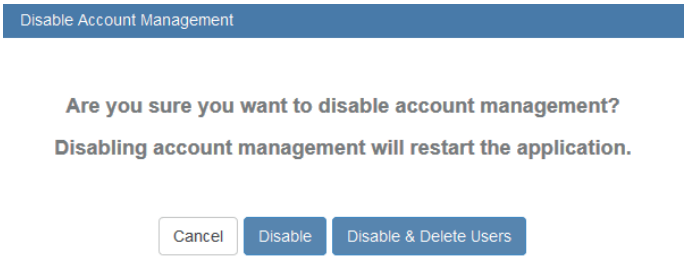
9.12.4. Changing Your Password

Clicking **Change My Password** causes the following dialog to appear, allowing you to enter and verify a new password of your choice.



9.12.5. Disabling Account Management

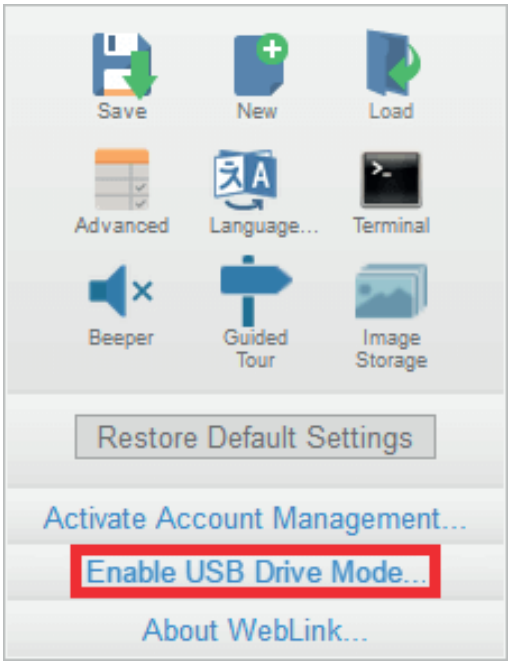
If you are the Administrator, you can either **Disable** Account Management and retain your account information and that of the other users, or you can **Disable and Delete Users**, which will erase your account information and that of the other users.



9.13. Enable USB Drive Mode

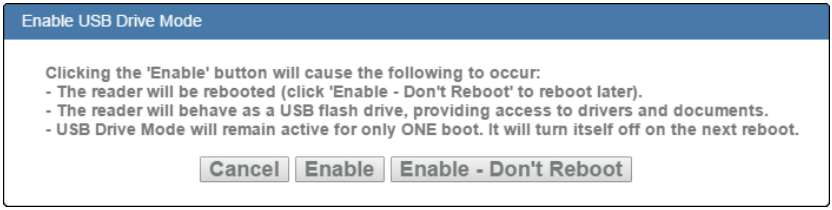
NOTE!
The **Enable USB Drive Mode** option only appears in the **Application Settings** menu when you are using a C5KC, which supports USB connectivity.

Clicking **Enable USB Drive Mode** in the **Application Settings** menu brings up the Enable USB Drive Mode dialog shown below.

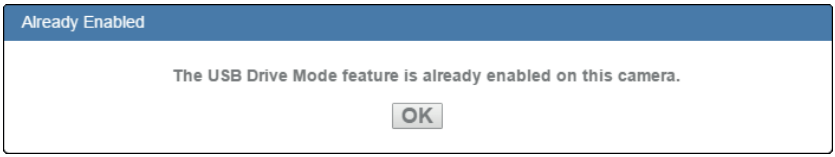


When you click the **Enable** button in the dialog, your reader will reboot, and then you can use it as you would a USB flash drive. If you click **Enable – Don't Reboot,** the camera will reboot later.

Important: The USB drive functionality self-disables on the next reader reboot. To enable USB drive functionality again, follow the same procedure described above.



If you try to enable USB Drive Mode when it's already enabled, this dialog will appear:



9.14. About WebLink

About WebLink opens the dialog shown below, which shows the current **WebLink version, Reader Model, Serial Number, Part Number, MAC ID, Sensor, Firmware version, Boot version, Browser, Operating System,** and **Screen Resolution.**
Note: The information in this dialog is selectable so that you can copy it to a clipboard.

Clicking **Contact us...** takes you to the wenglor website.

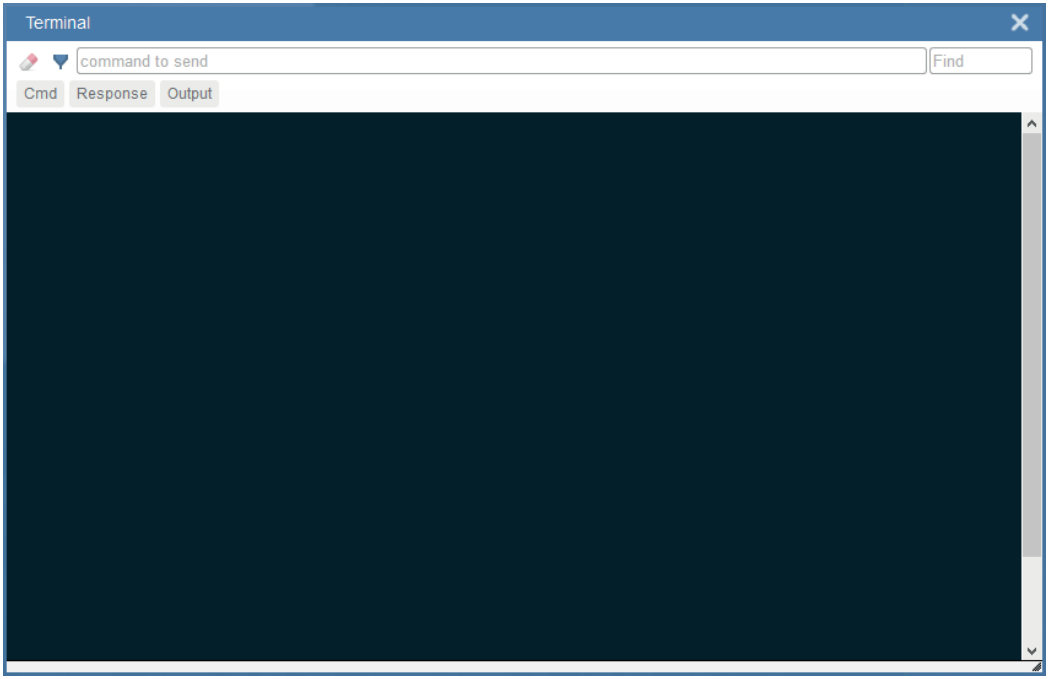
10. Terminal

The **Terminal** provides immediate visibility of decode output, allows you to send serial commands to the reader, and allows you to find specific strings within large amounts of data.

Send 164
Find. 165
Filters. 166

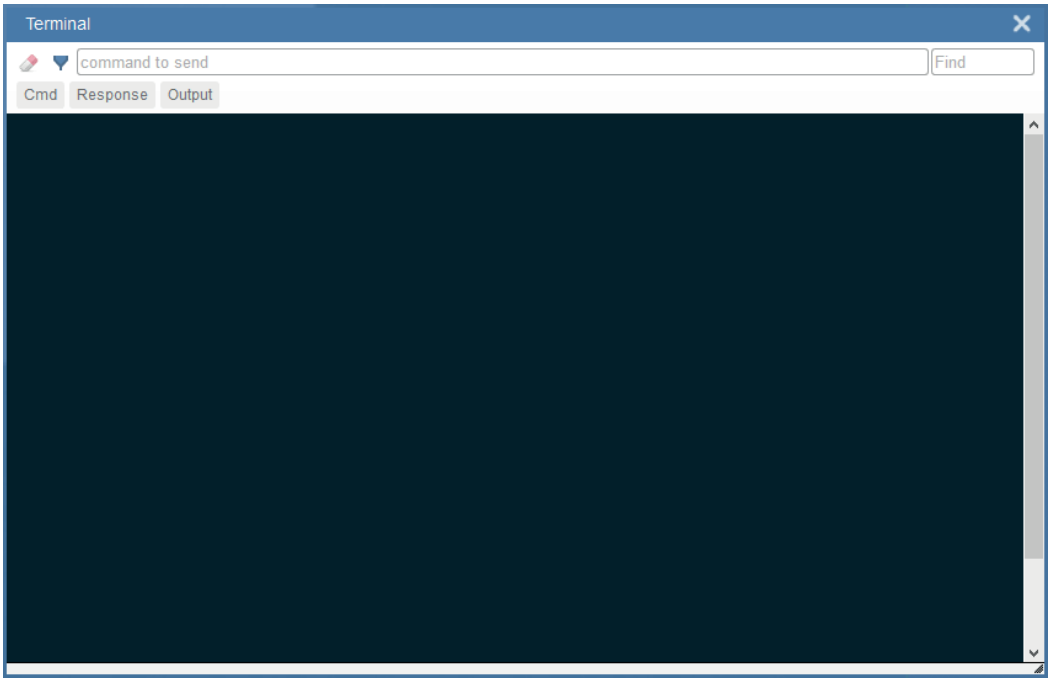
10.1. Send

The Terminal features an auto-complete function that shows several common serial command options as soon as you start typing in the **command to send** field.
The Terminal automatically adds the < and > characters to commands entered in the **command to send** field. Serial commands sent from the Terminal appear in yellow text and reader output is returned in white text. Click the **eraser icon** to clear the Terminal screen of all commands, reader responses, and decode output.



10.2. Find

The **Find** field in the top right of the window allows you to enter a specific character string to locate within the data on the Terminal screen.

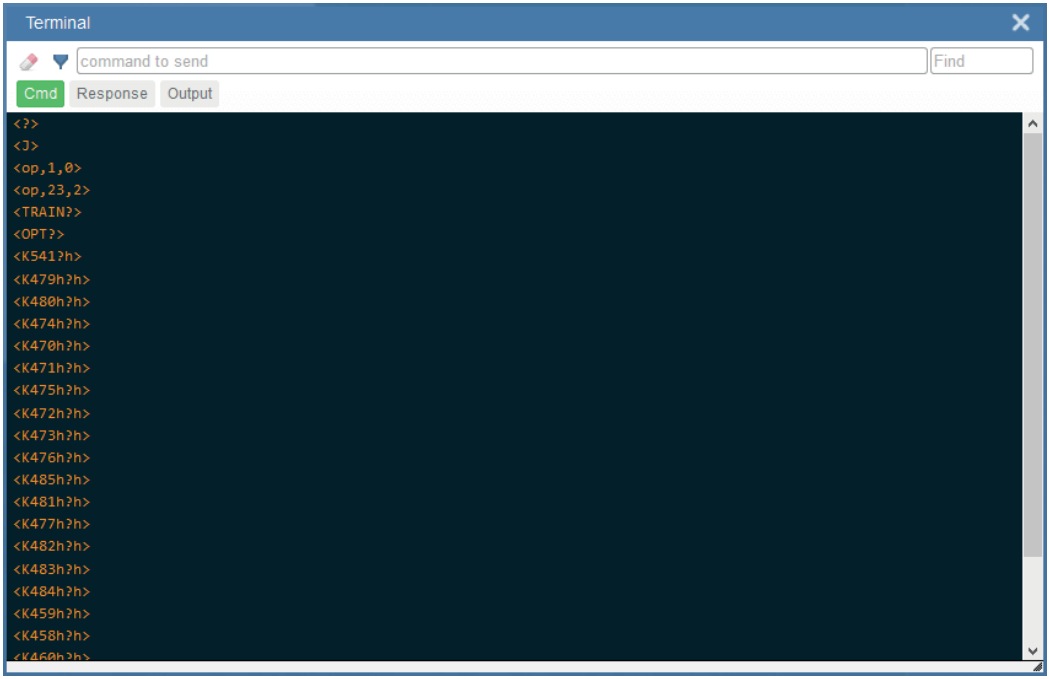


10.3. Filters

Click the **filter icon** to the right of the erase icon to display the three filter buttons.

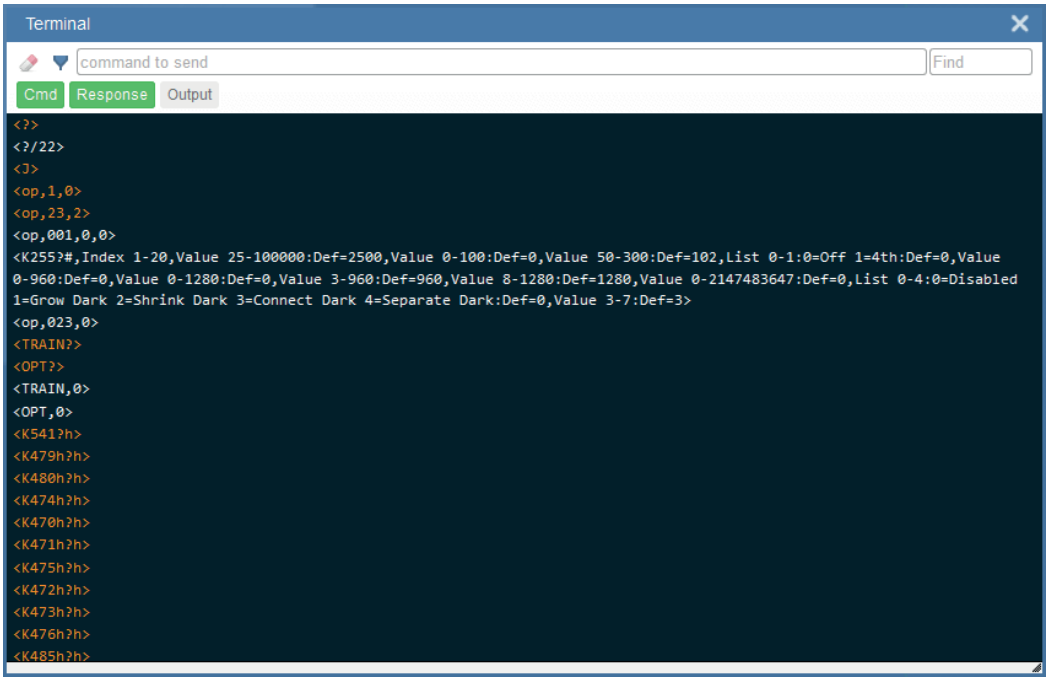
10.3.1. Cmd

When the **Cmd** filter button is selected, serial commands sent from the Terminal are shown. When only the Cmd button is selected, only serial commands are shown.



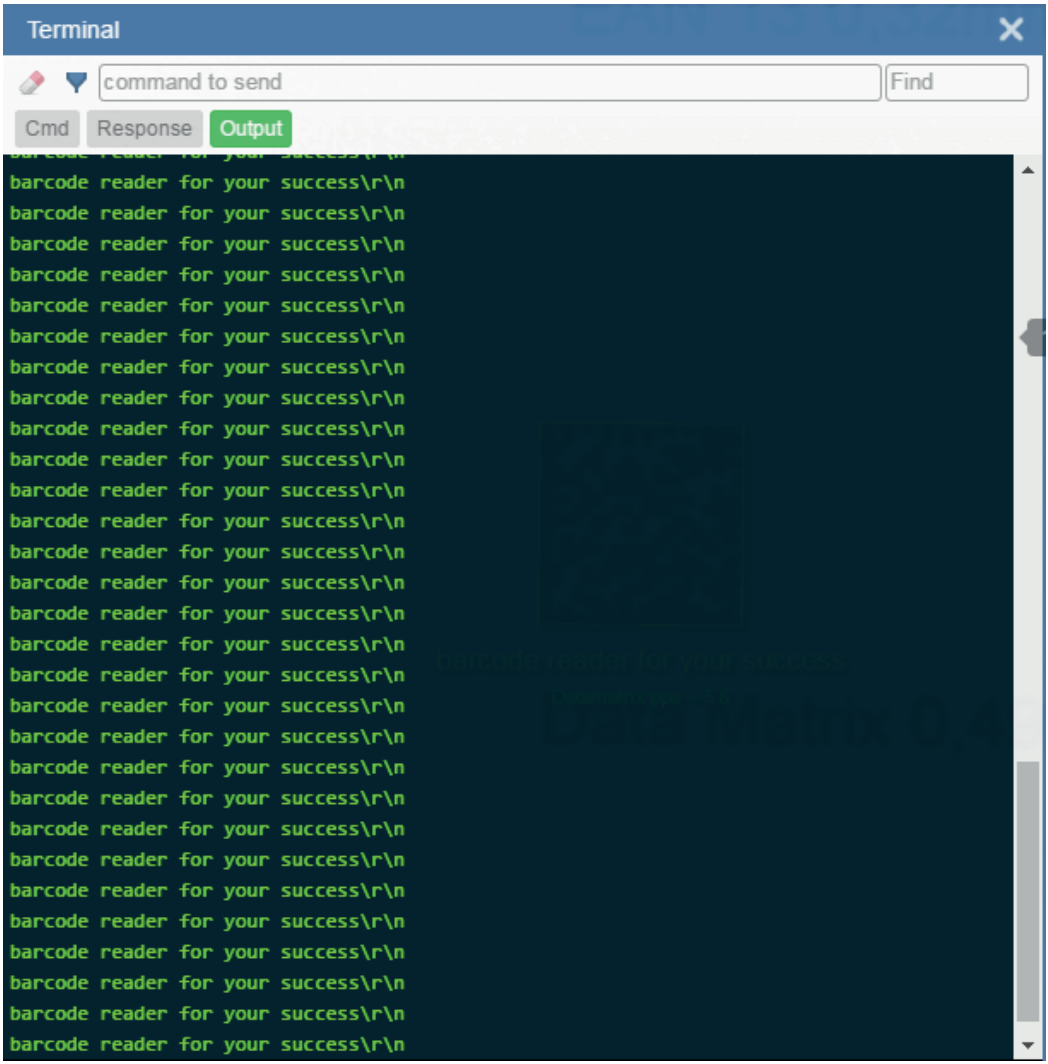
10.3.2. Response

When the **Response** filter button is selected, responses sent back from the reader are shown. When only the Response button is selected, only responses sent back from the reader are shown.



10.3.3. Output

When the **Output** filter button is selected, decode output from the reader is shown. When only the Output button is selected, only decode output from the reader is shown.



10.3.4. Notifications

If character strings searched for in the **Find** field are found but hidden by a disabled filter, a notification like the one shown below will appear above the applicable filter button. If you click that filter button, the results will be displayed in the Terminal and the notification will disappear.

11. Advanced Settings

This section provides general information about the C5PC's **Advanced Settings**, which can be configured in WebLink's user interface.

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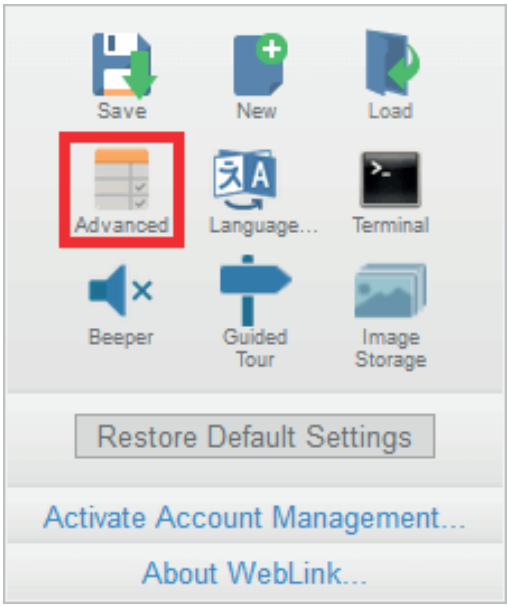
11.1. Introduction

When you click the **gear icon** to bring up the **Application Settings** menu, one of the options you will see is **Advanced**.



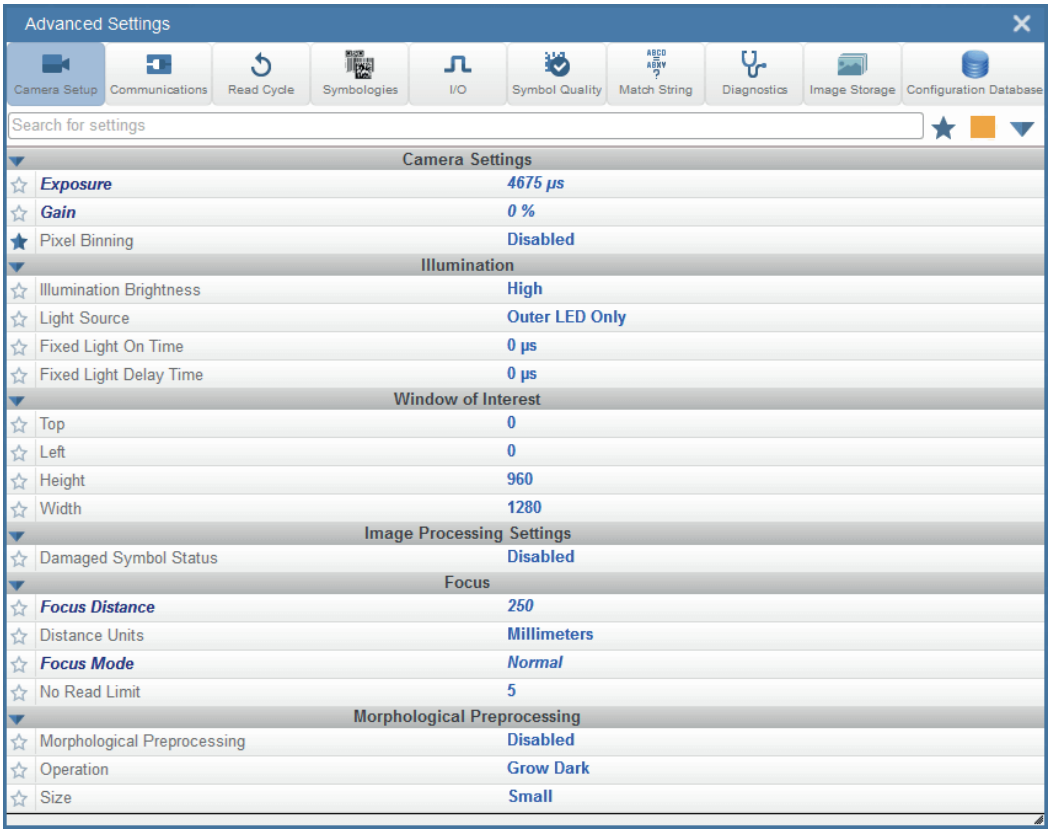
WebLink's **Advanced** settings allow you to make fine adjustments to individual command parameters in all areas of your reader's functionality: **Camera Setup, Communications, Read Cycle, Symbologies, I/O, Symbol Quality, Match String, Diagnostics, Image Storage, and Configuration Database.** Many of these commands can be configured directly in the WebLink user interface, but all parameters can be configured and examined in Advanced settings.
Advanced settings are an efficient way to send complex, multi-parameter commands to the reader.
Each menu of Advanced settings commands is shown in the following sections, and an additional section is included that shows an example of the **Differences from Default** menu, which shows only commands that are different from WebLink defaults.

11.2. Camera Setup

The **Camera Setup** menu shows all the commands that control the function of the reader's camera. Many of these command settings can also be controlled from the WebLink user interface. For example, the **Exposure** and **Gain** settings in the **Camera Settings** command can be configured in the Acquire section located in the left panel of the **Setup** view.

Command parameters can be changed directly from this menu.

11.2.1. Camera Setup Menu



NOTE!
When **Illumination Brightness** is set to **Constant**, the illumination brightness is the same power level as the High setting. However, the LEDs are continuously on once Brightness is set to Constant, and they will remain on during and after the read cycle to eliminate perceptible flashing.

Power Strobe Mode and External Strobe

Illumination Brightness	*Extreme*
Light Source	*External Strobe*
Fixed Light On Time	0
Fixed Light Delay Time	0

- **Power Strobe Mode**

Activate Power Strobe mode by setting Illumination Brightness (<K536>) to Extreme and setting Light Source to External Strobe.

- **External Strobe**

External Strobe is part of the Light Source parameter.

- **Fixed Light On Time and Fixed Light Delay Time**

Fixed Light On Time and Fixed Light Delay Time are only valid when Illumination Brightness is set to Extreme.

Use as External Illumination Strobe

Use as External Illumination Strobe is available in the **Output On** parameter of the **Output 3** command (<**K812**>) in I/O **Parameters**. **External Strobe** must be enabled for this parameter to function.

Output 3 Parameters	
Output On	*Use as Ext. Illumination Strobe*

11.3. Communications

The **Communications** menu shows all the commands that control the C5PC's connectivity to the host and to your application's network. These commands also control **Preamble** and **Postamble** settings for decoded data output, **Response Timeout, LRC Status, ACK/NAK Options, and Polling Mode Options.**
By default, the C5PC reader operates as a server, and communicates with the host over TCP/IP for both commands and data.
Command parameters can be changed directly from this menu.

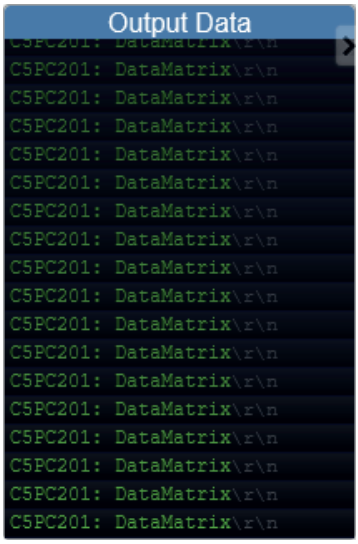
By default, the C5PC reader operates as a server, and communicates with the host over TCP/IP for both commands and data.

See **Custom Ethernet Link** in chapter “4. Communications” on page 37 (C5PC Technical Manual) for information about how to create an Ethernet interface that is bound to the command processor per your own requirements. You can set the **Transport Layer to UDP** or **TCP**, set the message **Type** to **Server** or **Client**, and set **Capabilities** to **Send Only, Receive Only, or Send/Receive.**

Daisy Chain

The **Daisy Chain** section, located beneath the **Postamble** section in the **Communications Menu** in **Advanced Settings,** allows you to enable or disable **Daisy Chain ID** functionality. Daisy Chain ID outputs the name of the reader that decoded the candidate symbol. It also allows you to determine the type of separator you want to appear between the reader ID and the barcode data output.
In the example below, Daisy Chain ID is **Enabled** and the Separator is set to:

Those two settings cause the data output to look like the example below. The reader ID is **C5PC201.**
The : character is displayed between the reader ID and the symbol data output.



See “5.6. Configure Daisy Chain (If Required by Application)” on page 64 for more information about general Daisy Chain functionality.

EtherNet/IP and PROFINET Byte Swapping

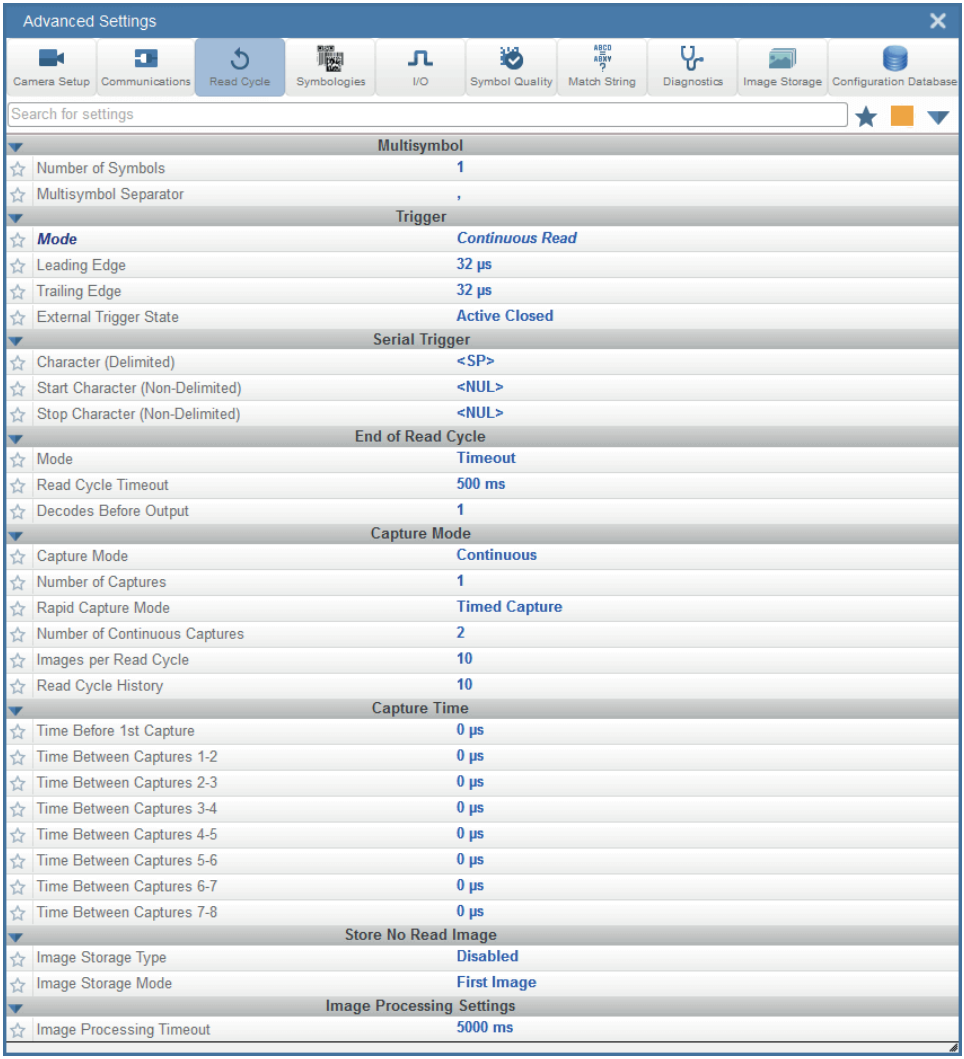
EtherNet/IP Byte Swapping and PROFINET Byte Swapping allow you to switch the order in which bytes are transmitted (big-endian or little-endian) between the camera and the PLC. If enabled, the bytes are swapped for 2-byte words.

EtherNet/IP	**Enabled**
EtherNet/IP Byte Swapping	**Disabled**
PROFINET	**Disabled**
PROFINET Byte Swapping	**Disabled**

11.4. Read Cycle

The **Read Cycle** menu shows all the commands that control all aspects of read cycle, including triggering, read cycle timing, and image processing.
Command parameters can be changed directly from this menu.

11.4.1. Read Cycle Menu

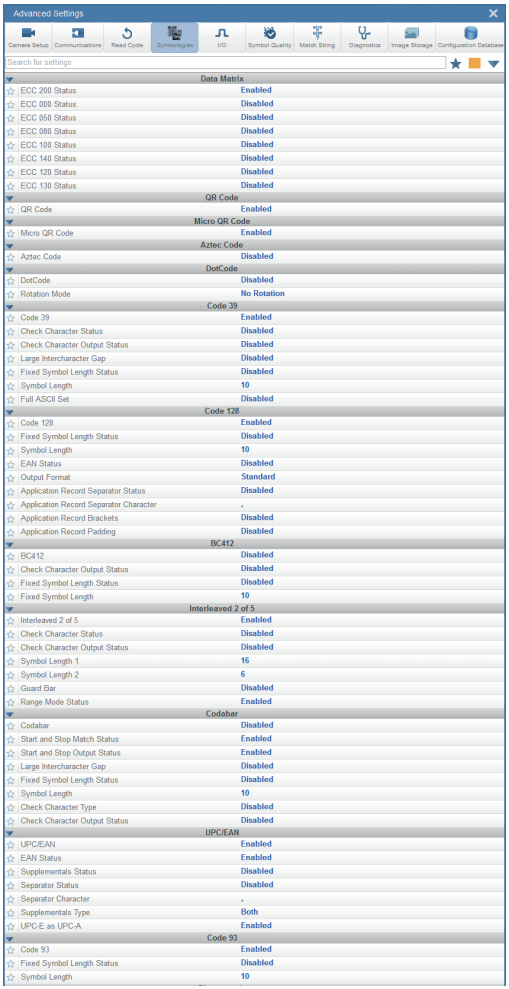


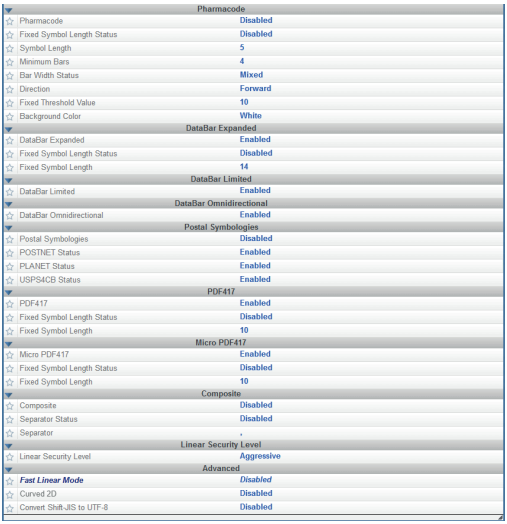
Multisymbol	
Number of Symbols	1
Multisymbol Separator	,
Trigger	
Mode	***Continuous Read***
Leading Edge	32 µs
Trailing Edge	32 µs
External Trigger State	Active Closed
Serial Trigger	
Character (Delimited)	<SP>
Start Character (Non-Delimited)	<NUL>
Stop Character (Non-Delimited)	<NUL>
End of Read Cycle	
Mode	Timeout
Read Cycle Timeout	500 ms
Decodes Before Output	1
Capture Mode	
Capture Mode	Continuous
Number of Captures	1
Rapid Capture Mode	Timed Capture
Number of Continuous Captures	2
Images per Read Cycle	10
Read Cycle History	10
Capture Time	
Time Before 1st Capture	0 µs
Time Between Captures 1-2	0 µs
Time Between Captures 2-3	0 µs
Time Between Captures 3-4	0 µs
Time Between Captures 4-5	0 µs
Time Between Captures 5-6	0 µs
Time Between Captures 6-7	0 µs
Time Between Captures 7-8	0 µs
Store No Read Image	
Image Storage Type	Disabled
Image Storage Mode	First Image
Image Processing Settings	
Image Processing Timeout	5000 ms

11.5. Symbologies

The **Symbologies** menu shows all the commands that allow you precise control of the parameters of all enabled code types. Parameters differ depending on the unique standards of each code type.
Command parameters can be changed directly from this menu.

11.5.1. Symbologies Menu





11.5.2. Advanced Decoding Parameters

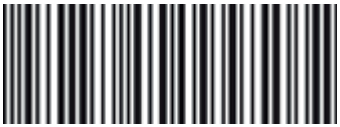
Advanced Decoding Parameters can help you read difficult and damaged symbols, and are optimized for direct part marks (DPM).

Advanced	
Fast Linear Mode	*Vertical*
Curved 2D	Disabled
Convert Shift-JIS to UTF-8	Disabled
1D Quiet Zone Violation	Disabled
Scale Image	*Both Up and Down*
2D Damaged Mode	Disabled
Attempt Morphology Manipulation	Disabled

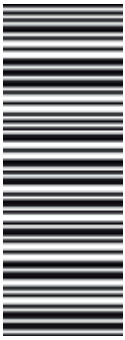
Fast Linear Mode

Definition:	Fast Linear Mode optimizes 1D symbol decoding. Fast Linear Mode accelerates 1D decode speeds by restricting the orientation in which barcodes can be aligned, and only decoding barcodes in that orientation. If you know the direction the application's symbols will be oriented relative to the reader (horizontally or vertically), set Fast Linear Mode to match that direction. This will cause the reader to decode only symbols in that orientation, thereby reducing the processing needed and speeding up decode times. If you prefer serial commands to WebLink's Advanced Settings menus, you can use the following serial command to enter your Fast Linear Mode configuration efficiently in a Terminal.
Serial Cmd:	**<K562,**Fast Linear Mode> 8
Default:	**Disabled**
Options:	**0 = Disabled** 1 = Horizontal 2 = Vertical
Examples:	**<K562,0>** = Disabled **<K562,1>** = Horizontal **<K562,2>** = Vertical

Horizontal requires that the entire symbol be oriented horizontally in the reader's field of view.



Vertical requires that the entire symbol be oriented vertically in the reader's field of view.



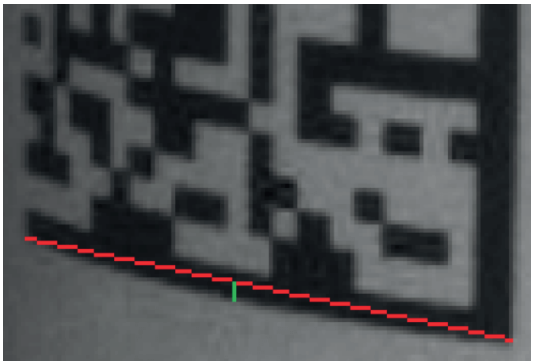
Curved 2D

Definition: **Curved 2D** is designed for **Data Matrix** and **QR Code** symbols on bottles and other cylinders.

Data Matrix on Curved Surface

QR Code on Curved Surface

Curvature in a captured image is usually created when the reader is pointing to the symbol at an angle. This algorithm, when enabled, will only be activated when the curvature is great enough. If the length ratio between the red and green line shown in the example below is greater than **20:1**, the Curved 2D algorithm will be activated.



If you prefer to use serial commands, the following command allows you to enter your-settings via a Terminal.

Serial Cmd: <**K563,**Curved 2D>
Default: **Disabled**
Options: **0 = Disabled**
1 = Enabled

Convert Shift-JIS to UTF-8

Definition: For any symbol (often QR Code but not always), this feature converts decoded **Shift-JIS** characters to UTF-8 characters.
Serial Cmd: <**K564,**Convert Shift-JIS to UTF-8>
Default: **Disabled**
Options: **0 = Disabled**
1 = Enabled

Convert Shift-JIS to UTF-8

Definition: For any symbol (often QR Code but not always), this feature converts decoded Shift-JIS characters to UTF-8 characters.
Serial Cmd: <K564,Convert Shift-JIS to UTF-8>
Default: **Disabled**
Options: **0 = Disabled**
1 = Enabled

1D Quiet Zone Violation

Definition: This feature allows a symbol to be decoded even when there is noise in the quiet zone on one or both sides of a symbol. This command is specific to UPC, Code 128, Code 39, and Codabar.
Serial Cmd: <**K565**,1D Quiet Zone Violation>
Default: **Disabled**
Options: **0 = Disabled**
1 = Enabled

Scale Image

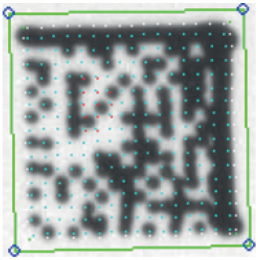
Definition: **Scale Image** allows you to scale the captured image up or down.
Scale Up is intended for symbols with low PPE (pixels per element) and small quiet zones. It scales up the image by 2x (4x by area). The maximum zoomed image size is 2600 x 2048. If the original image is greater than 1300 x 1024, it will be cropped to the center portion.
Scale Down scales the captured image to the ideal size for the reader's decoder (1/4 or 1/16 if necessary) and filters out image noise.
There is also a **Both** option that allows you to scale the image up or down.
Serial Cmd: <**K566**,Scale Image>
Default: **Disabled**
Options: **0 = Disabled**
1 = Scale Up
2 = Scale Down
3 = Both

2D Damaged Mode

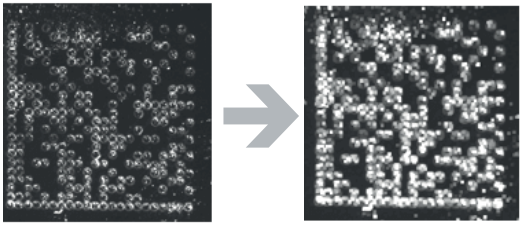
Definition: **Attempt Morphology Manipulation** applies morphology dilation and attempts to decode. If this isn't successful, it applies morphology erosion and attempts to decode.
Serial Cmd: <**K568**,Attempt Morphology Manipulation>
Default: **Disabled**
Options: **0 = Disabled**
1 = Enabled

Advanced Decoding Parameters Examples

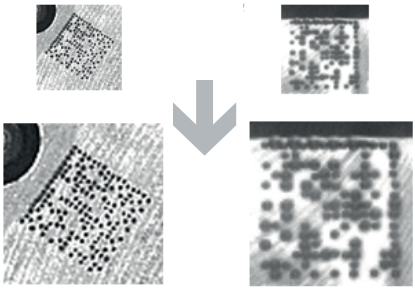
Damaged Mode
Allows for poor grid alignment



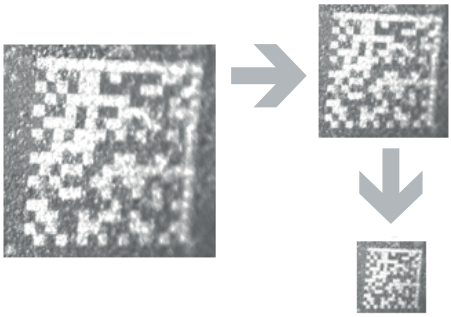
Morphology
Increases signal strength/reduces noise



Scale Up
Helps small PPE and quiet zone



Scale Down
Scales to ideal size for decoder; filters noise



Examples of 2D Damaged Mode, Attempt Morphology Manipulation, Scale Image Up, and Scale Image Down

Combining Advanced Decoding Parameters
Some Advanced Decoding Parameters can be combined and others cannot, as follows:

- **Curved 2D** and **Convert Shift-JIS to UTF-8** can be combined with each other, and both will be activated.
- **Scale Up, Scale Down, Attempt Morphology Manipulation,** and **2D Damaged Mode** can be combined with each other.
- **Fast Linear Mode Horizontal** and **Fast Linear Mode Vertical** cannot be combined with other Advanced Decoding Parameters commands.
- **1D Quiet Zone Violation** cannot be combined with other Advanced Decoding Parameters commands.

11.5.3. DotCode

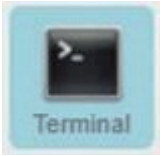
DotCode is a special code type that can be enabled using the standard Code Type dialog box or using Advanced Settings.

Important: When DotCode is enabled, no other symbologies will be decodable. You must disable DotCode to decode symbols of any other type.

DotCode parameters can be found in the Symbologies menu located in WebLink's Advanced Settings.
By default, DotCode will look for either horizontal or vertical codes with no rotation (plus or minus 3 degrees). The user can set Rotation Mode to Low Rotation (plus or minus 10 degrees) or to Omni Directional.

DotCode	
DotCode	*Enabled*
Rotation Mode	No Rotation

When using DotCode, the user can specify the exact number of rows and columns in the code to minimize the possibility of decoding errors and no reads. If you specify the exact row and column dimensions, only DotCode symbols of the same dimension are decoded.
To do this, you must enter the row and column values using a K command via the Terminal under Settings, or via another serial link.



Important: DotCode must be enabled for the column and row settings to take effect.

Serial K Command: <K561,Custom Feature Command String>

Default Setting: " "
Options: **DOTCODE_COL_ROW=?#?#**

The **?** character in **DOTCODE_COL_ROW=?#?#** should be changed to the expected number of columns and rows in the DotCode symbol.

In the example below, **40** is the number of columns, and 7 is the number of rows.
<K561,DOTCODE_COL_ROW=40#7#>

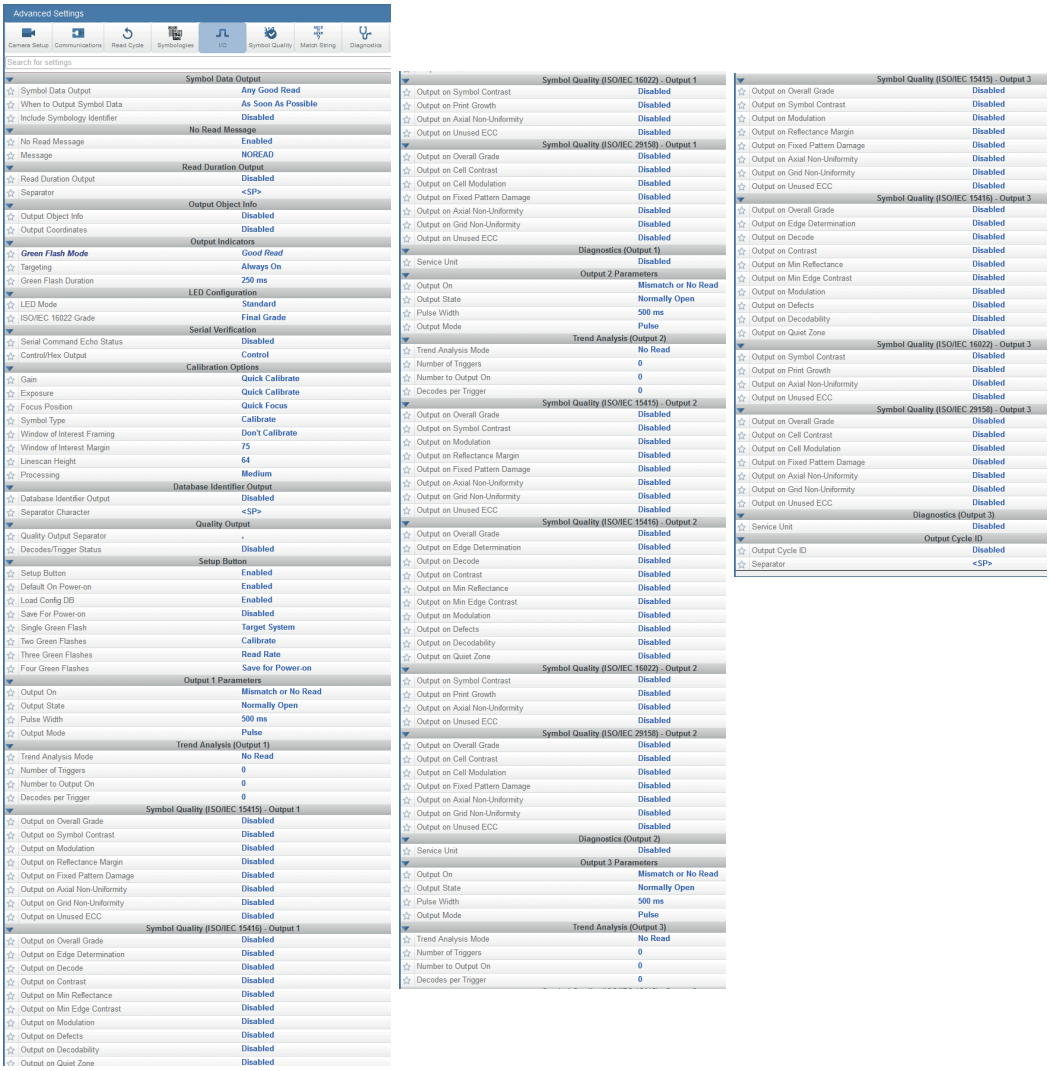
Swap columns and rows when the same symbol is oriented vertically.

<K561,DOTCODE_COL_ROW=7#40#>

11.6. I/O

The **I/O** menu shows all the commands that control a wide range of real-world reader behavior, including the enabling or disabling of messages about various reader states, the configuration of the LEDs, the enabling or disabling of messages about symbol quality, and the sending of signals to external systems such as conveyors and light stacks.
Command parameters can be changed directly from this menu.

11.6.1. I/O Menu



11.6.2. Symbol Grading

The symbol grading features presented in this document are not intended and should not be confused with symbol verification. Verifier and symbol verification is beyond the scope of this document but there are a few points worth noting to aide in understanding the features and operation provided.
Verifiers are systems designed to meet the rigorous standards within the verification specifications. To provide compliant verification verifier systems are not only designed with required features and functionality from the supported standard but also provide many general design features that help eliminate sources of variability that can impact measurements. In contrast readers are designed to provide maximum product flexibility for integration into systems that require reading for traceability. Key reader design specifications such as size, cost, reading range, and reading speed are a few items that drive differences between verifier and reader designs. Understanding these tradeoffs in design can help users optimize reader systems to provide better accuracy and repeatability in grading implementation.

- **Calibration**
  Compliant verification requires verifies have calibration processes. These processes are required to ensure proper references for grading metrics. The C5PC provides no calibration features. It is the user's responsibility to understand how lack of calibration may impact their grading measurements. In addition, some metrics in verification such as Minimum Reflectance in ISO 29158 are directly calculated using data only provide through calibration and have no means of representation without such a process.

- **Optical Positioning and Illumination Response**
  The presentation of the symbol to the reader can have numerous different impacts on grading performance. Verifiers are designed to provide an image with sharp focus, high resolution, and low optical distortion. These items allow verifiers to provide an environment that produces measurements with consistent results. When selecting and positioning a reader for grading it is important that the optical setup provide enough resolution to meet the minimum resolution requirements for that standard (reference standard section for resolution requirements). Although resolution is important the working distance from the imaging optics also plays a significant role in the light collection and optical distortion characteristics of the image system. Further away provides less optical distortion over the field of view but also will have significant impact on the distribution of light depending on the source of illumination. When preparing a system for a grading implementation you must take these items under consideration. First identify the allowable working distances that will provide the target symbols in focus and above the minimum required resolution. Next attempt to provide the most consistent illumination response over the inspection field at the farthest distance. The change in illumination response over distance will be very dependent on the illumination source and environment. Finally, the orientation and consistency of the symbol presentation within the field of view can also impact repeatability. If the illumination response is uneven in the field and the symbol rotated or moves throughout the field you can expect variability.

General Grading Functionality

- **Process Overview**
  The three specification grading functions described in this document are independent of each other as an inspection process but are dependent on the X Mode decoder being properly setup to read the symbol type provided. The grading evaluation process does not take place until a symbol has first been identified by the X Mode decoder. Once a symbol supported by an enabled grading specification has been identified by the decoder a separate grading inspection will commence. Note this inspection process can add significant processing time to the overall process and each specification requires independent processing. Furthermore, enabling any single parameter within a given specification requires the complete grading process for that specification.

Grading – ISO 15416

- **Overview**
  This section outlines the grading implementation for ISO 15416 available in the C5PC firmware. Please refer to the free AIM guide "The Layman's Guide to ANSI, CEN and ISO/IEC Linear Bar Code Print Quality Documents" or the ISO specification documents for additional detail related print quality subject matter.

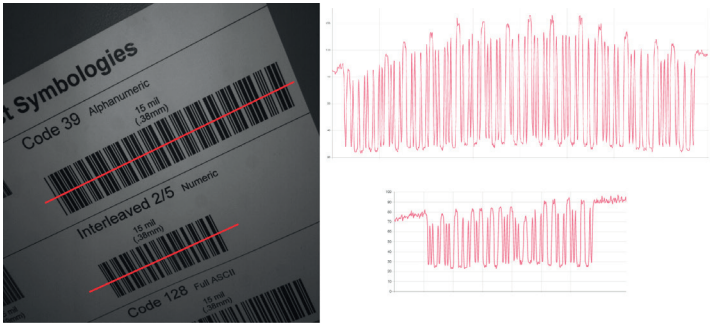
- **Supported Symbologies**
  – Code 128 / GS1-128
  – UPC-A / UPC-E / EAN-13 / EAN-8
  – Interleaved 2 of 5 / ITF-14
  – Code 39
  – Code 93
  – Codabar

- **Minimum Resolution**
  – 4.0 Pixels Per Element (Element = Nominal X Dimension)

Usage / Notes

- **Illumination and the Scan Reflectance Profile**

The accuracy and consistency of ISO 15416 grading depends greatly upon the illumination in the field of view. The ISO 15416 specification is evaluated by analyzing individual scan lines applied across the imaged symbol. These scan lines generate a signal called the scan reflectance profile which is the basis of the scan line grading methodology. This scan line grading methodology uses a fixed threshold to determine whether the signal state represents a bar or a space. Verification systems are designed to create a very flat relative signal response across the field of view. For reading a symbol there is a high tolerance to variability in the response. When grading or verifying a symbol a flat relative response is what allows the symbol to be precisely measured. Different optical configurations and illumination sources can create a wide range of responses that can impact measurements in a variety of ways.
To illustrate how variation that appears subtle to the eye can have a large impact on grading performance consider the following image from a standard reader using internal illumination. The scan reflectance profile for two line scans in the image are shown to the right of the imaged symbols. The larger symbol which spans the entire field of view shows dramatic differences. The spaces in the center of the symbol are providing 50% more signal response then the quiet zones at either edge of the field of view. Similarly, the smaller symbol lower in the field of view provides a much lower overall response throughout its region. Scenarios like this will create low modulation scores and differences in defect scores depending on the physical location of the defect. Worse yet if the symbol is moved within the field of view it will receive different scores. It is recommended that external illumination is used and evaluated closely for response characteristics when using ISO 15416 grading.



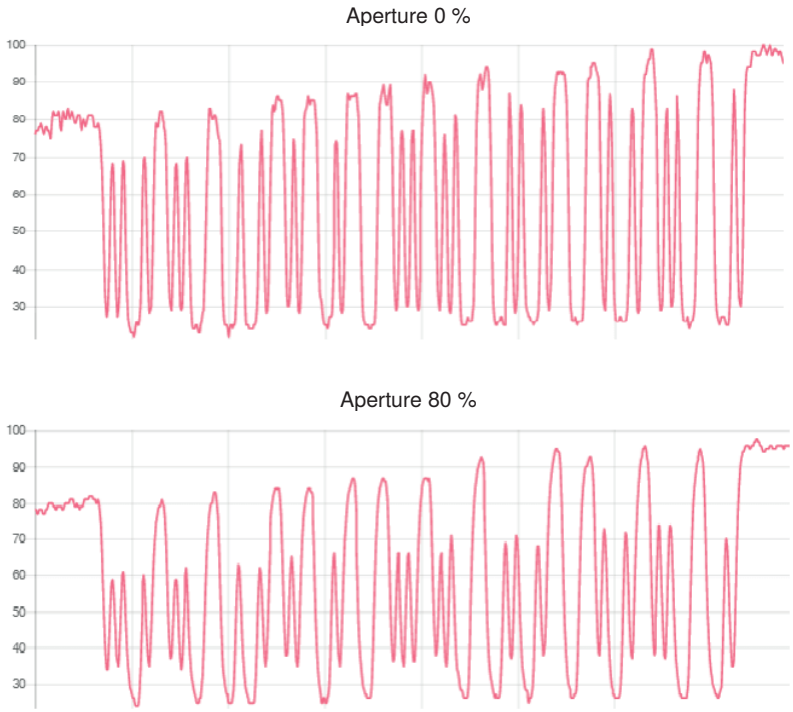
Uneven Illumination

- **Synthetic Aperture**

The synthetic aperture is a process in ISO 15416 that is applied to the image when extracting the scan line profile for grading. The aperture is an averaging process using a circular region along the scan line shown below.

Scan Line Aperture

This averaging provides a generalization of the information in the image consistent with typical reading equipment acquisition techniques. Verification systems implement the aperture based on the physical dimension of the symbol under test and the application standard guidelines such as GS1. In a reader with varying optical setup and no calibration process there is no means to know the size of the symbol under inspection. Because of this the aperture is a configurable parameter as a percentage of the narrow element of the symbol under evaluation. The default value provides a general use case similar to application standards, but it is the users responsibility to ensure this percentage matches the grading objectives. A representation of the effects of the aperture is shown below. Selecting a larger aperture creates more of an averaging effect that is less sensitive to defects but may lower modulation.



Aperture Effects

• **Overall, Scan, and Individual Parameter Grades**

The overall grade is calculated in accordance with the process defined in ISO 15416. This is often misunderstood so a review is provided here. The overall grade is an average of the individual scan grades that are applied over the inspection region. The individual scan grades are not provided but these are calculated internally as the lowest of grade of any single parameter grade evaluated in that scan or zero if the scan fails the edge determination or quiet zone requirements. The individual parameter grades provided are averages of only those parameters grades where they are evaluated. These individual average parameter grades available are not themselves part of the overall grade calculation but can be helpful information for diagnosing degrading overall grades. This creates some circumstances where the overall grade can be lower than the lowest average grade particularly when there are degrading features in the symbol from different parameters

Configuration

• **15416 Grading Serial Output**

Enable or disable the output the grading value. The output is either in value 1 to 100, or in letter grade A to F.

• **Aperture**

The size of aperture to use for grading configured as a percentage of the nominal narrow element width for the symbol under evaluation. For example, if you have a 13 mil UPC symbol and you wish to grade using a 6 mil aperture you would configure the aperture to 46% (6/13 = 0.46).

• **Overall**
  – **Disabled**
    The overall grade is not formatted as part of the symbol output.
  – **Enabled**
    The overall grade is formatted and attached to the decoded data as a value.

• **Edge Determination**
  – **Disabled**
    The edge determination is not formatted as part of the symbol output.
  – **Enabled**
    The edge determination is formatted and attached to the decoded data as a value.

• **Decode**
  – **Disabled**
    The Decode is not formatted as part of the symbol output.
  – **Enabled**
    The Decode is formatted and attached to the decoded data as a value.

• **Contrast**
  – **Disabled**
    The Contrast is not formatted as part of the symbol output.
  – **Enabled**
    The Contrast is formatted and attached to the decoded data as a value.

• **Minimum Reflectance**
  – **Disabled**
    The minimum reflectance is not formatted as part of the symbol output.
  – **Enabled**
    The minimum reflectance is formatted and attached to the decoded data as a value.

- **Minimum Edge Contrast**
  - **Disabled**
    The minimum edge contrast is not formatted as part of the symbol output.
  - **Enabled**
    The minimum edge contrast is formatted and attached to the decoded data as a value.

- **Modulation**
  - **Disabled**
    The Modulation is not formatted as part of the symbol output.
  - **Enabled**
    The Modulation is formatted and attached to the decoded data as a value.

- **Defects**
  - **Disabled**
    The Defects is not formatted as part of the symbol output.
  - **Enabled**
    The Defects is formatted and attached to the decoded data as a value.

- **Decodability**
  - **Disabled**
    The Decodability is not formatted as part of the symbol output.
  - **Enabled**
    The Decodability is formatted and attached to the decoded data as a value.

- **Quiet Zone**
  - **Disabled**
    The Quiet Zone is not formatted as part of the symbol output.
  - **Enabled**
    The Quiet Zone is formatted and attached to the decoded data as a value.

- **15416 Grading Logic Output and Threshold 1 - 3**
  This parameter defines the 15416 parameter and threshold that if fallen below will assert the appropriate output. The output must be configured to output on 15416 validation before these settings apply.

- **Output on Overall Grade**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Overall Grade Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Edge Determination**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Edge Determination Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.
- **Decode**
  – **Disabled**
    This will not be evaluated to drive the output.
  – **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Decode Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Contrast**
  – **Disabled**
    This will not be evaluated to drive the output.
  – **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Contrast Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Min Reflectance**
  – **Disabled**
    This will not be evaluated to drive the output.
  – **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Min Reflectance Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Min Edge Contrast**
  – **Disabled**
    This will not be evaluated to drive the output.
  – **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Min Edge Contrast Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Modulation**
  – Disabled
    This will not be evaluated to drive the output.
  – Enabled
    This will be evaluated against the corresponding threshold to drive the output.

- **Modulation Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Defects**
  – Disabled
    This will not be evaluated to drive the output.
  – Enabled
    This will be evaluated against the corresponding threshold to drive the output.

- **Defects Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Decodability**
  – Disabled
    This will not be evaluated to drive the output.
  – Enabled
    This will be evaluated against the corresponding threshold to drive the output.

- **Decodability Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Quiet Zone**
  – Disabled
    This will not be evaluated to drive the output.
  – Enabled
    This will be evaluated against the corresponding threshold to drive the output.

- **Quiet Zone Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

Grade Metrics

- **Overall Grade**
  The overall is calculated in accordance with the ISO 15416 specification. The overall grade is the average of the scan grades applied to the symbol. The individual scan grades are the lowest individual parameter grade seen during the individual scan. These scan grades are not available for output.
- **Minimum Reflectance**
  The Minimum reflectance is calculated and graded for each scan and provided for the overall grade calculation in accordance with the ISO 15416 specification. The minimum reflectance parameter grade and value provided for output is an average value for each measured scan over the entire symbol.
- **Minimum Edge Contrast**
  Contrast measurement assume 8 bit 0-255 grey correlate 0-100% reflectance The Minimum Edge Contrast is calculated and graded for each scan and provided for the overall grade calculation in accordance with the ISO 15416 specification. The parameter grade and value provided for output is an average value for each measured scan over the entire symbol.
- **Symbol Contrast**
  Contrast measurements assume 8 bit 0-255 grey correlate to 0-100% reflectance. Contrast is calculated and graded for each scan and provided for the overall grade calculation in accordance with the ISO 15416 specification. The parameter grade and value provided for output is an average value for each measured scan over the entire symbol.

- **Modulation**
  Modulation is calculated and graded for each scan and provided for the overall grade calculation in accordance with the ISO 15416 specification. The parameter grade and value provided for output is an average value for each measured scan over the entire symbol.
- **Defects**
  Defects are calculated and graded for each scan and provided for the overall grade calculation in accordance with the ISO 15416 specification. The parameter grade and value provided for output is an average value for each measured scan over the entire symbol.
- **Decodability**
  Decodability is calculated and graded for each scan and provided for the overall grade calculation in accordance with the ISO 15416 specification. The parameter grade and value provided for output is an average value for each measured scan over the entire symbol.
- **Decode**
  Decode is calculated and graded for each scan and provided for the overall grade calculation in accordance with the ISO 15416 specification. The parameter grade and value provided for output is an average value for each measured scan over the entire symbol.
- **Quiet Zone**
  Quiet zone is not an individually processed parameter within the ISO 15416 specification but is evaluated as part of the ISO graded decode parameter that feeds into the overall grade. Quiet zone is provided here as average scan result where a passing scan receives a A/4.0 grade and a fail receives a F/0.0.

Grading - ISO 15415

- **Overview**
  This section outlines the grading implementation for ISO 15415 available in the C5PC firmware.

- **Supported Symbologies**
  – Data Matrix ECC 200 / GS1 Data Matrix
  – QR Code

- **Minimum Resolution**
  – 6.0 Pixels Per Element (Element = Nominal Cell Dimension)

- **Configuration**
  – **15415 Grading Serial Output**
    Enable or disable the output the grading value. The output is either in value 1 to 100, or in letter grade A to F.

- **Aperture**
  The size of aperture to use for grading configured as a percentage of the nominal narrow element width for the symbol under evaluation. For example, if you have a 15 mil UPC symbol and you wish to grade using a 10 mil aperture you would configure the aperture to 67% (10/15 = 0.67).

- **Overall**
  – **Disabled**
    The overall grade is not formatted as part of the symbol output.
  – **Enabled**
    The overall grade is formatted and attached to the decoded data as a value.

- **Contrast**
  - **Disabled**
    The contrast is not formatted as part of the symbol output.
  - **Enabled**
    The contrast is formatted and attached to the decoded data as a value.

- **Modulation**
  - **Disabled**
    The modulation is not formatted as part of the symbol output.
  - **Enabled**
    The modulation is formatted and attached to the decoded data as a value.

- **Reflectance Margin**
  - **Disabled**
    The reflectance margin is not formatted as part of the symbol output.
  - **Enabled**
    The reflectance margin is formatted and attached to the decoded data as a value.

- **Fixed Pattern Damage**
  - **Disabled**
    The fixed pattern damage is not formatted as part of the symbol output.
  - **Enabled**
    The fixed pattern damage is formatted and attached to the decoded data as a value.

- **Axial Non-Uniformity**
  - **Disabled**
    The axial nonuniformity is not formatted as part of the symbol output.
  - **Enabled**
    The axial nonuniformity is formatted and attached to the decoded data as a value.

- **Grid Non-Uniformity**
  - **Disabled**
    The grid nonuniformity is not formatted as part of the symbol output.
  - **Enabled**
    The grid nonuniformity is formatted and attached to the decoded data as a value.

- **Unused ECC**
  - **Disabled**
    The unused ECC is not formatted as part of the symbol output.
  - **Enabled**
    The unused ECC is formatted and attached to the decoded data as a value.

- **15415 Grading Logic Output and Threshold 1 - 3**
  This parameter defines the 15415 parameter and threshold that if fallen below will assert the appropriate output. The output must be configured to output on 15415 validation before these settings apply.

- **Output on Overall Grade**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Overall Grade Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Symbol Contrast**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Symbol Contrast Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Modulation**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Modulation Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Reflectance Margin**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Reflectance Margin Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Fixed Pattern Damage**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Fixed Pattern Damage Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Axial Non-Uniformity**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Axial Non-Uniformity Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Grid Non-Uniformity**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Grid Non-Uniformity Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Unused ECC**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.
- **Unused ECC Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

Grade Metrics
- **Overall Grade**
  The overall is calculated in accordance with the ISO 15415 specification. The overall grade is the lowest individual parameter grade seen during the individual scan.

- **Symbol Contrast**
  Contrast measurements assume 8 bit 0-255 grey correlate to 0-100% reflectance. Symbol Contrast is calculated in accordance with the ISO 15415 specification.

- **Modulation**
  Reflectance Margin is calculated in accordance with the ISO 15415 specification.

- **Reflectance Margin**
  Reflectance Margin is calculated in accordance with the ISO 15415 specification.

- **Fixed Pattern Damage**
  Fixed Pattern Damage is calculated in accordance with the ISO 15415 specification.

- **Axial Non-Uniformity**
  Axial Non-Uniformity is calculated in accordance with the ISO 15415 specification.

- **Grid Non-Uniformity**
  Grid Non-Uniformity is calculated in accordance with the ISO 15415 specification.

- **Unused Error Correction**
  Unused Error Correction is calculated in accordance with the ISO 15415 specification.

Grading - ISO 29158

- **Overview**
  This section outlines the grading implementation for ISO 29158 available in the C5PC firmware.

- **Supported Symbologies**
  – Data Matrix ECC200 / GS1 Data Matrix

- **Minimum Resolution**
  – 6.0 Pixels Per Element (Element = Nominal Cell Dimension)

Configuration

- **29158 Grading Serial Output**
  Enable or disable the output the grading value. The output is either in value 1 to 100, or in letter grade A to F.

- **Overall**
  – **Disabled**
    The overall grade is not formatted as part of the symbol output.

- **Enabled**
  The overall grade is formatted and attached to the decoded data as a value.

- **Cell Contrast**
  – **Disabled**
    The contrast is not formatted as part of the symbol output.
  – **Enabled**
    The contrast is formatted and attached to the decoded data as a value.

- **Cell Modulation**
  – **Disabled**
    The modulation is not formatted as part of the symbol output.
  – **Enabled**
    The modulation is formatted and attached to the decoded data as a value.

- **Fixed Pattern Damage**
  – **Disabled**
    The fixed pattern damage is not formatted as part of the symbol output.
  – **Enabled**
    The fixed pattern damage is formatted and attached to the decoded data as a value.

- **Axial Non-Uniformity**
  – **Disabled**
    The axial nonuniformity is not formatted as part of the symbol output.
  – **Enabled**
    The axial nonuniformity is formatted and attached to the decoded data as a value.

- **Grid Non-Uniformity**
  - **Disabled**
    The grid nonuniformity is not formatted as part of the symbol output.
  - **Enabled**
    The grid nonuniformity is formatted and attached to the decoded data as a value.

- **Unused ECC**
  - **Disabled**
    The unused ECC is not formatted as part of the symbol output.
  - **Enabled**
    The unused ECC is formatted and attached to the decoded data as a value.

- **29158 Grading Logic Output and Threshold 1 - 3**
  This parameter defines the 29158 parameter and threshold that if fallen below will assert the appropriate output. The output must be configured to output on 29158 validation before these settings apply.

- **Output on Overall Grade**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Overall Grade Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Cell Contrast**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Cell Contrast Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Cell Modulation**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Cell Modulation Threshold**

This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Fixed Pattern Damage**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Fixed Pattern Damage Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the thresh-

old.

- **Axial Non-Uniformity**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Axial Non-Uniformity Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Grid Non-Uniformity**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Grid Non-Uniformity Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

- **Unused ECC**
  - **Disabled**
    This will not be evaluated to drive the output.
  - **Enabled**
    This will be evaluated against the corresponding threshold to drive the output.

- **Unused ECC Threshold**
  This is to use as a threshold for driving the output. Output will be driven if grade is under the threshold.

ISO 29158 Metrics

- **Overall Grade**
  The Overall Grade is the minimum grade of all evaluated parameters, noting minimum reflectance is not evaluated.

- **Cell Contrast**
  Cell Contrast is a measure of contrast that differs from ISO 15415 using a statistical value calculated from the measurements at the grid centers. Cell Contrast is calculated in accordance with the ISO 29158 specification.

- **Cell Modulation**
  Like Cell Contrast, Cell Modulation is a modified version from ISO 15415. Cell Modulation is calculated in accordance with the ISO 29158 specification. Note that the difference in the calculation for Cell Modulation versus the Modulation parameter in ISO 15415 also eliminated the need for ISO 29158 to adopt Reflectance Margin, which was added to the ISO 15415 specification.

- **Fixed Pattern Damage**
  Fixed Pattern Damage is an evaluation of the elements in the fixed patterns of the symbol that are used for locating and extracting the data successfully. Fixed Pattern Damage is calculated in accordance with the ISO 29158 specification.

- **Axial Non-Uniformity**
  Axial Non-Uniformity measures the relationship between the overall dimensions of the two axes of the symbol. Axial Non-Uniformity is calculated in accordance with the ISO 29158 specification.

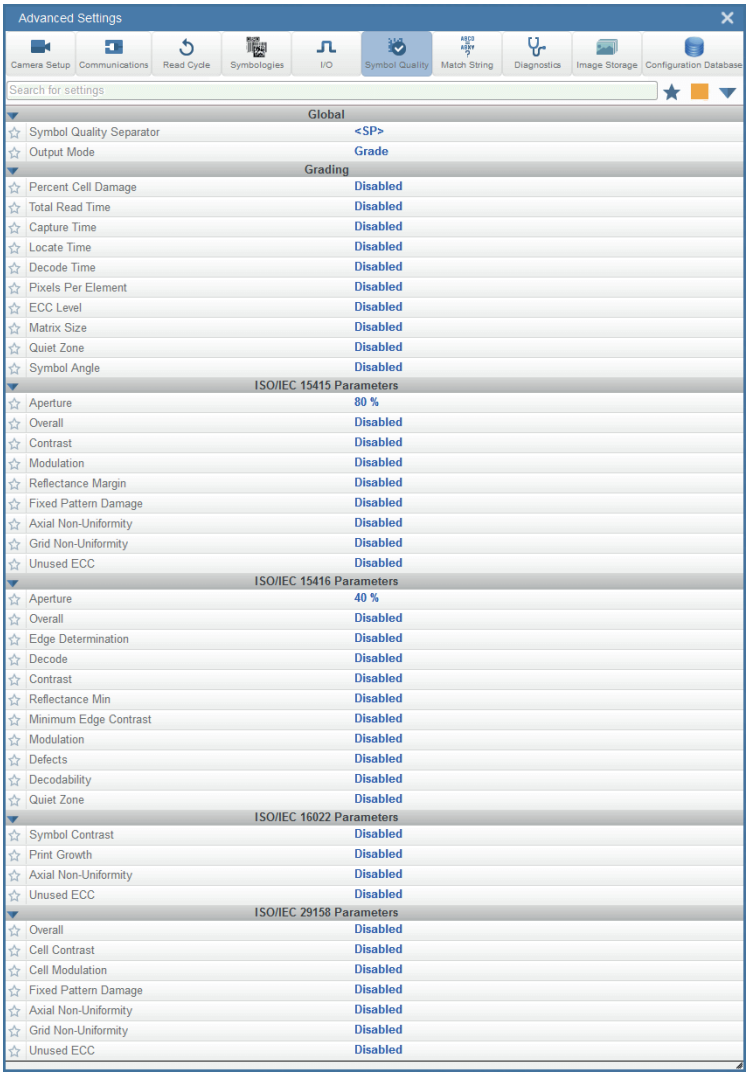
- **Grid Non-Uniformity**
  Grid Non-Uniformity measures the difference of the decoding grid in relation to the ideal grid formed from the four corners of the symbol. Grid Non-Uniformity is calculated in accordance with the ISO 29158 specification.

- **Unused Error Correction**
  Unused Error Correction measures the remaining error correction available after correcting the errors within the decoded symbol and is calculated in accordance with the ISO 29158 specification.

11.7. Symbol Quality

The **Symbol Quality** menu shows commands that allow you to define the evaluation of symbols per the ISO/IEC 16022 specification, or by a collection of commonly-used grading parameters. The two **Global** commands allow you to define the separator that will appear between instances of symbol quality output, and the format in which symbol quality evaluations will be output.
Command parameters can be changed directly from this menu.

11.7.1. Symbol Quality Menu



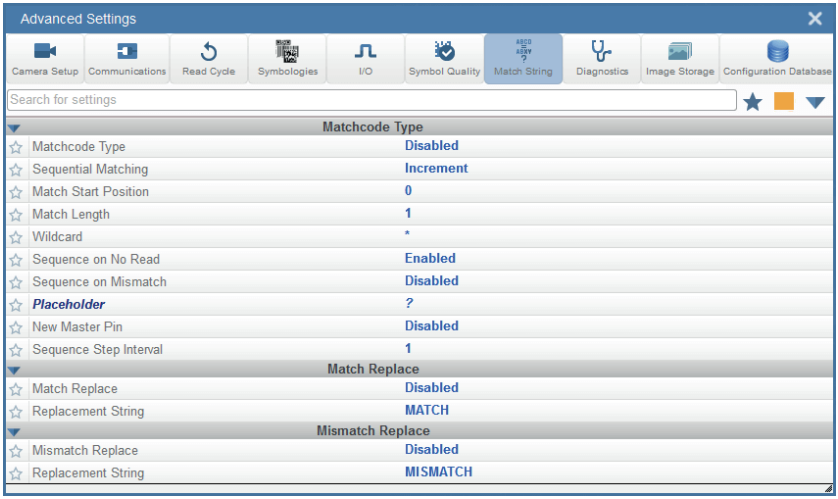
Important: For descriptions of **symbol grading** functionality, refer to the Symbol Grading section in “11.6. I/O” on page 186.

11.8. Match String

NOTE!
Match String can only be used in **Triggered, Start/Stop**, and **Custom** modes. It cannot be used in Presentation or Continuous modes.

The **Match String** menu shows all the commands that allow you to determine the type of matching behavior required of the reader, as well as new master pin functionality (enabled or disabled), and the character strings intended to replace a string of decoded data that is either a match or mismatch with the user-defined match string.
Command parameters can be changed directly from this menu.

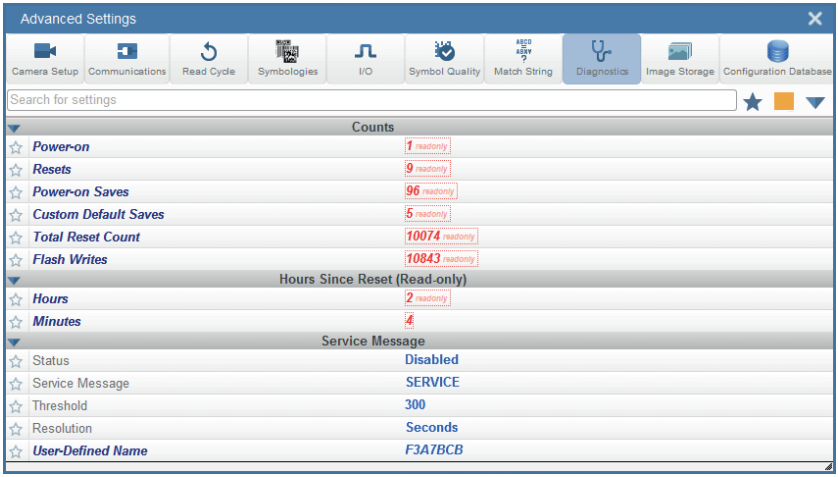
11.8.1. Match String Menu



11.9. Diagnostics

The **Diagnostics** menu shows commands that allow you to change various service messages as well as the reader's name. It also allows you to examine the read-only count values for multiple reader functions and states.
Command parameters can be changed directly from this menu.

11.9.1. Diagnostics Menu



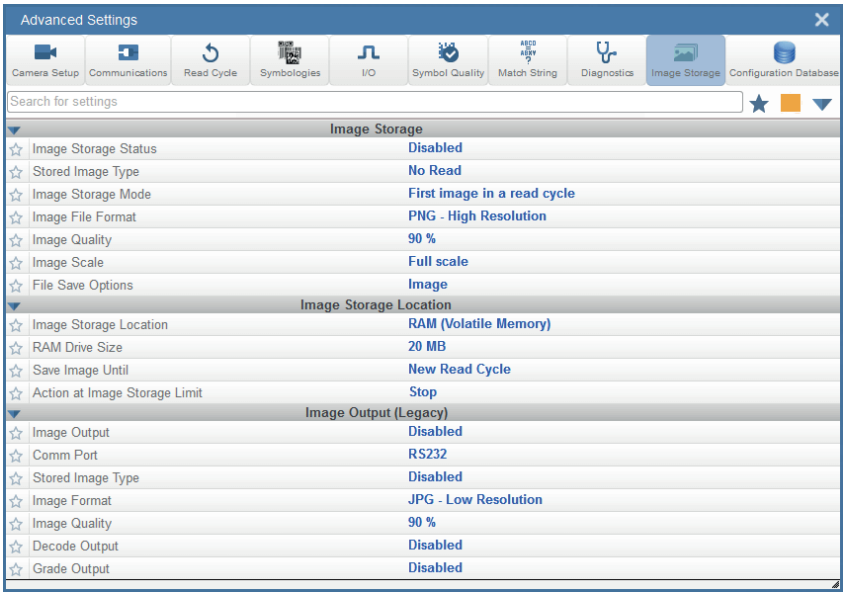
11.10. Image Storage

The **Image Storage** menu shows commands that allow you to control how, when, and where images captured by the reader are stored.
The **Image Storage** and **Image Storage Location** commands shown below are functionally identical to those described in **Application Settings.** For example, when you configure the **FTP Address** command as shown below, the outcome is the same as it would have been had you used the graphic user interface accessible from the Application Settings menu.

Image Storage Location	
Image Storage Location	*Remote (FTP)*
FTP Address	*userid* *pass* *192.168.1.1* *21*
Transfer Optimization	Speed
RAM Drive Size	20 MB

Command parameters can be changed directly from this menu.

11.10.1. Image Storage Menu

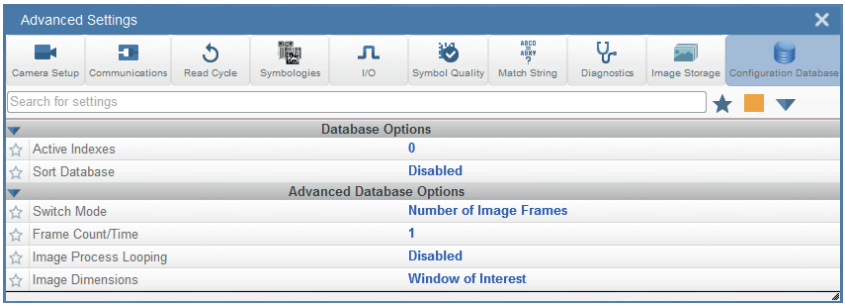


11.11. Configuration Database

The Configuration Database menu allows you to:
- Set the number of database records (groups of settings) that will be used automatically during the read cycle;
- Move the database entry that produced a successful decode to the first position in the list of database entries;
- Select the event that causes the reader to load the next database entry to current active settings;
- Determine the number of image frames that must be captured;
- Determine the amount of time that must transpire before the reader will load the next database index entry;
- Process a single captured image multiple times using different IP and decode parameters;
- Determine how the image dimension parameters will be implemented (Window of Interest or Region of Interest).

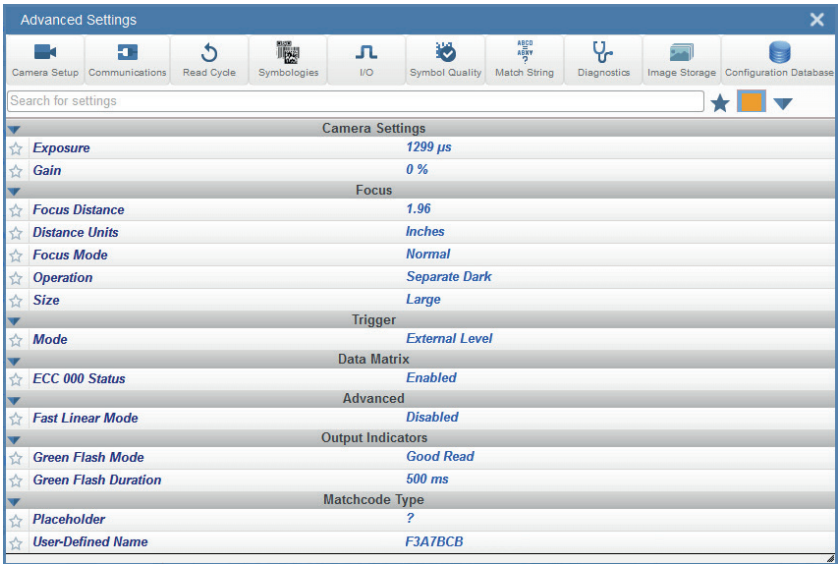
Command parameters can be changed directly from this menu.

11.11.1. Configuration Database Menu



11.12. Differences from Default

The **Differences from Default** menu shows only commands whose parameters are not currently set to Web-Link defaults. Commands from any of the eight categories may appear in this menu.

Command parameters can be changed directly from this menu.

11.12.1. Differences from Default Menu