

In-Sight[®] 1750 Series Wafer ID Reference Manual



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Precautions

To reduce the risk of injury or equipment damage, observe the following precautions when you install the Cognex product:

- Connectivity is possible through the following options:
 - 24VDC (+/- 10%) output connection using a UL or NTRL listed power supply
- Any other voltage creates a risk of fire or shock and can damage the components. Applicable national and local wiring standards and rules must be followed.
- This product is intended for industrial use in automated manufacturing or similar applications.
 - The safety of any system incorporating this product is the responsibility of the assembler of the system.
 - Do not install Cognex products where they are exposed to environmental hazards such as excessive heat, dust, moisture, humidity, impact, vibration, corrosive substances, flammable substances, or static electricity.
 - Route cables and wires away from high-current wiring or high-voltage power sources to reduce the risk of damage or malfunction from the following causes: over-voltage, line noise, electrostatic discharge (ESD), power surges, or other irregularities in the power supply.
 - Do not expose the image sensor to laser light. Image sensors can be damaged by direct, or reflected, laser light. If your application requires laser light that might strike the image sensor, use a lens filter at the corresponding laser wavelength. For suggestions, contact your local integrator or application engineer.
 - This product does not contain user-serviceable parts. Do not make electrical or mechanical modifications to product components. Unauthorized modifications can void your warranty.
 - Changes or modifications not expressly approved by the party responsible for regulatory compliance could void the user's authority to operate the equipment.
 - Include service loops with cable connections.
 - Ensure that the cable bend radius begins at least six inches from the connector. Cable shielding can be degraded or cables can be damaged or wear out faster if a service loop or bend radius is tighter than 10X the cable diameter.
 - This device should be used in accordance with the instructions in this manual.
 - All specifications are for reference purposes only and can change without notice.

Symbols

The following symbols indicate safety precautions and supplemental information:

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

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

 **Note:** This symbol indicates additional information about a subject.

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

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In-Sight 1750 Wafer Reader Overview

The In-Sight 1750 series wafer readers allow you to identify and decode unique markings on semiconductor wafers. In-Sight 1750 series wafer readers support a vision processor, various options for lighting and optics, and the ability to communicate over serial or Ethernet connections.



In-Sight 1750 series wafer readers include the following models:

Model	Lighting	Resolution	Working Distance
In-Sight 1751	Red LED lighting and RGB low-angle lighting	1896 x 960 image resolution	Variable
In-Sight 1752	Infrared LED lighting	1896 x 960 image resolution	Variable

Upgrading from In-Sight 1740 to In-Sight 1750

In-Sight 1750 series wafer readers have a number of hardware and software changes compared to In-Sight 1740 wafer readers. This section describes the differences between the 1740 and 1750 series wafer readers.

Hardware Changes

In-Sight 1750 wafer readers come with the following hardware changes compared to the In-Sight 1740:

- **Expanded sensor Field of View and resolution:** the image sensor of the In-Sight 1750 series is now 2 MP, and the Field of View (FoV) is now 38 mm wide compared to the 31 mm FoV width in In-Sight 1740 wafer readers. The FoV height is unchanged from 19 mm. These changes allow users to read longer, larger marks.
- **RGB external lighting on In-Sight 1751:** The In-Sight 1751 version now supports RGB light selection for the external light bar. This allows users to select green or blue low-angle light for unique substrates or high-damage areas. The internal lighting remains red only. The IR version of the 1750 series, the In-Sight 1752, remains fully IR.
- **Cable changes:** the available power I/O cables have been updated from 8-pin to 10-pin ports. This change supports connectable light options previously available through a USB port on the front face of the In-Sight 1740 series. The output voltage on the STROBE line changed from 24 V DC to 12 V DC. For pin-out specifications, see [Breakout Cable Specifications on page 71](#) and [Breakout and External Light Y-Cable Specifications on page 72](#).
- **Mounting:** the mounting holes of In-Sight 1750 series wafer readers are unchanged from the 1740 series. The mirror accessory allows for horizontal mounting in the same way as the 1740 series.

Software Changes

In-Sight 1750 wafer readers come with the following software changes compared to the In-Sight 1740:

- **Tuning Updates:** In-Sight 1750 wafer readers feature an upgraded **AI Autotune** feature that replaces the previous tuning feature in the 1740 series. Native Mode commands for tuning are still valid. When you use **AI Autotune** in the WebUI, the interface presents you with three options using different light settings. For more information, see [Autotune Settings on page 46](#).
- **Transition from Wafer ID application to WebUI:** instead of a locally installed Wafer ID application, In-Sight 1750 wafer readers now use the WebUI. You can connect to your wafer reader using the Station Manager application. For more information, see [Connect to Station Manager on page 23](#).
- **Transition from In-Sight Explorer (ISE) to In-Sight Vision Suite (ISVS):** instead of In-Sight Explorer, In-Sight 1750 wafer readers now use the In-Sight Vision Suite platform. To use Spreadsheet with In-Sight 1750 wafer readers, download the ISVS installer from support.cognex.com.

The following functions are not available in the ISVS Spreadsheet:

<i>AutoFocus</i>	<i>SetFocusDistance</i>	<i>GetSystemValidationState</i>	<i>GetBufferData</i>
<i>GetAutoFocusDistance</i>	<i>SetFocusPosition</i>	<i>ClearResultsBuffer</i>	<i>GetConnectionStatus</i>
<i>GetAutoFocusPosition</i>	<i>ApplyAcquisitionSettings</i>	<i>CombineOutputBuffers</i>	<i>ReadLatchedUserDataBuffer</i>
<i>GetFocusDistance</i>	<i>Trigger</i>	<i>FormatInputBuffer</i>	<i>ReadUserDataBuffer</i>
<i>GetFocusPosition</i>	<i>GetOnline</i>	<i>FormatOutputBuffer</i>	<i>WriteResultsBuffer</i>

Communications Changes

In-Sight 1750 wafer readers come with the following communications changes compared to the In-Sight 1740:

- **TCP/IP and serial protocols:** Electroglas (EG) and LKx5 protocols are not available on In-Sight 1750 wafer readers. In-Sight, TEL, and TSK protocols continue to be supported. The commands for the supported protocols remain unchanged for easy conversion from the 1740 series.
- **CIO-1400 not supported:** In-Sight 1750 wafer readers do not support the CIO-1400 I/O expansion module. If you experience any issues deploying your wafer reader without an expansion module, contact your Cognex sales representative or submit a ticket at support.cognex.com.

- **Native Mode changes:** In-Sight 1750 wafer readers support the majority of Native Mode commands that were available on the 1740 series, with the following exceptions:

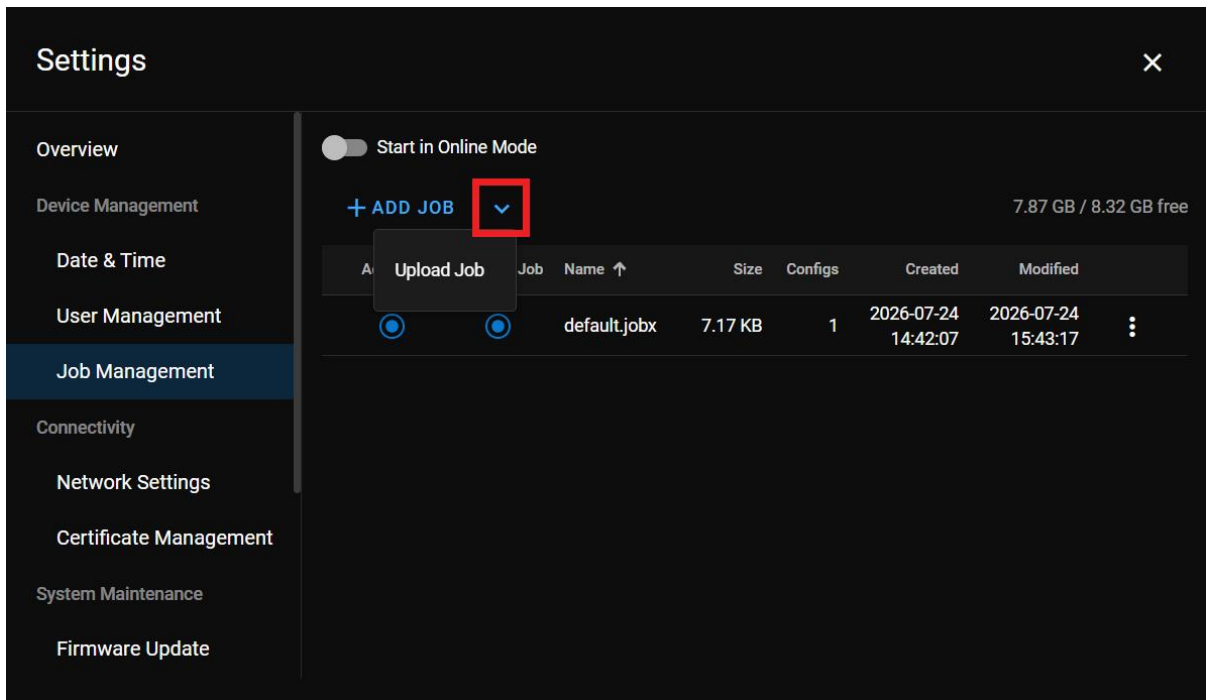
Category	Unsupported Commands
EV: Evaluate	<i>GetWaferOnlinePromptToSave()</i> <i>GetWaferRecoveryMode(WaferID)</i> <i>GetWaferTuneUpdateImage()</i> <i>SetWaferOnlinePromptToSave(OnlinePromptToSave)</i> <i>SetWaferRecoveryMode(WaferID,RecoveryMode)</i> <i>SetWaferTuneUpdateImage(UpdateImage)</i> <i>Get/SetCellName</i> <i>Get/SetCellValue</i> <i>Get/SetDeEnergizeOutputs</i> <i>GetDiagnosticLog</i> <i>Get/SetDiscreteX</i> <i>GetEasyBuilderTag</i> <i>Get/SetExternalLightMode</i> <i>Get/SetFTPSettings</i> <i>Get/SetHostTable</i> <i>GetMSBuffer</i> <i>Get/SetNetwork</i> <i>Get/SetSerialPort</i> <i>Get/SetStartup</i> <i>GetUserList</i> <i>SetEditRegion</i> <i>SetFavorHostTable</i> <i>Get/SetSystemConfig</i>
Settings	<i>RS: Read Settings</i> <i>TS: Store Settings</i> <i>WS: Write Settings</i> <i>GL: Get IP Address Lock</i> <i>SL: Set IP Address Lock</i>
Execution	<i>SM: Send Message</i> <i>MT: Send Manual Trigger</i>
Get	<i>Connections</i> <i>Expr</i> <i>/resultQueue/frozen</i>
Put	<i>Live</i> <i>Portnum</i> <i>Timeout</i> <i>Update</i> <i>Watch</i> <i>XML</i> <i>/resultQueue/frozen</i> <i>/resultQueue/clear</i> <i>/resultQueue/toString</i>

- **AcquireConfigAndRunSheet command:** In-Sight 1750 wafer readers support a new Evaluate (EV) command called **AcquireConfigAndRunSheet**, which allows you to acquire an image for Spreadsheet without running any processing in the WebUI. For more information, see [Using the Evaluate \(EV\) Command on page 66](#).

Converting 1740 Series Jobs

You can convert your old In-Sight 1740 series jobs to use with In-Sight 1750 wafer readers by performing the following procedure:

1. Download the job you want to convert from your In-Sight 1740 series wafer reader.
2. Connect the WebUI for your In-Sight 1750 wafer reader.
3. Click the gear icon in the top right of the header to open the **Settings** dialog, and select the **Job Management** tab.
4. Open the dropdown menu next to **Add Job**, and click **Upload Job**.



5. Select the 1740 series job you downloaded in the file browser, and click **Upload Job**.

Note:

Keep the following considerations in mind:

- You can only convert 1740 series jobs that use Wafer ID version 4.5.2. If your 1740 wafer reader uses an earlier version, update the firmware to version 4.5.2 before downloading the job.
- You can only convert jobs from 1741 models to In-Sight 1751 wafer readers.
- You can only convert jobs from 1742 models to In-Sight 1752 wafer readers.
- Job conversion only converts read configs, and does not transfer any Spreadsheet data or communication settings. Make sure that the configurations are operating as expected before deployment.



Setting Up Your In-Sight 1750 Wafer Reader

For a list of options and accessories, contact your Cognex sales representative.

Hardware Kit Components

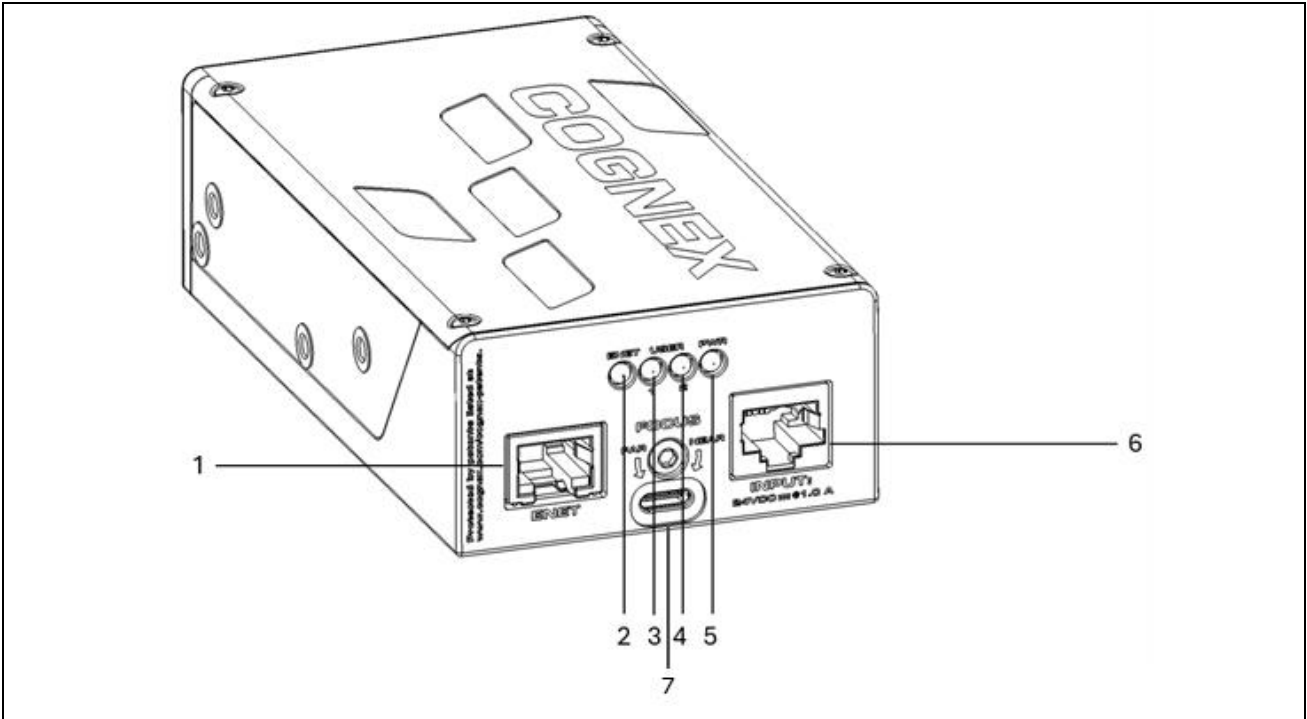
Ensure your In-Sight 1750 hardware kit includes the following components:

- In-Sight 1750 series wafer reader
- 24 VDC Power Supply and Adapter
- Ethernet Cable
- PIO Cable or Y-Cable
- Mirror for Horizontal Operation (Optional)

Note: The power supply, cables and mirror are sold separately.

Connectors and Indicators

The In-Sight 1750 wafer reader has the following connectors and indicators:



Connector/Indicator		Function
1	ETHERNET Port	Provides the Ethernet connection for network communications
2	ENET LED	Flashes GREEN when receiving data over the Ethernet connection
3	User 1 LED	Reserved
4	User 2 LED	Reserved
5	Power LED	Displays GREEN when receiving power
6	24 V DC Port	Provides connections for the 24 V DC power source, acquisition trigger, and serial communications
7	USB-C Service Port	Provides a backup Ethernet connection for servicing the device

Attach the Mirror for Horizontal Operation (Optional)

The optional horizontal mirror allows you to use the wafer reader in top or bottom-side reading applications that require a low-mounting profile. The mirror contains two pre-fastened captive hex head screws.

1. Align the pre-fastened screws on the mirror attachment to the holes on the front plate of the wafer reader.
2. Tighten the screws with a 2.5 mm hex wrench.



Mirror Mounting Configuration - External LEDs

Determine the Working Distance

The wafer reader ships with a factory-set working distance of 50.0 mm. You can mount the wafer reader vertically or horizontally, with the optional mirror mount attached.

Note:



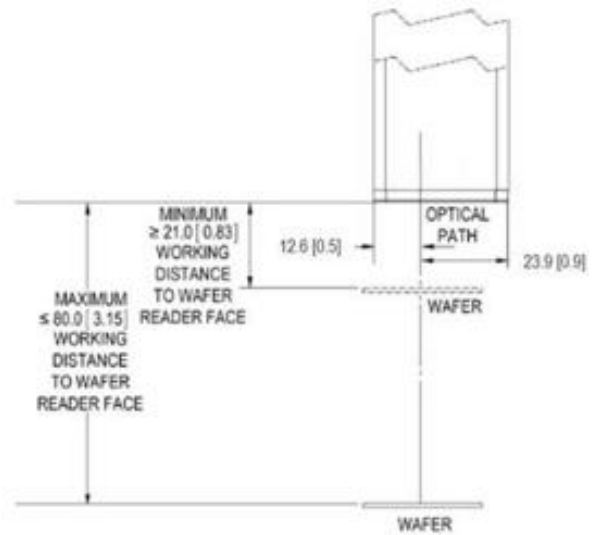
- The image orientation can require adjustment, depending on the configuration of the wafer reader and the mirror attachment.
- Dimensions are in millimeters [inches] and are for reference purposes only.

Mount the Wafer Reader Vertically

When you mount the wafer reader in the vertical position, the working distance range varies depending on whether the External LEDs are OFF or ON:



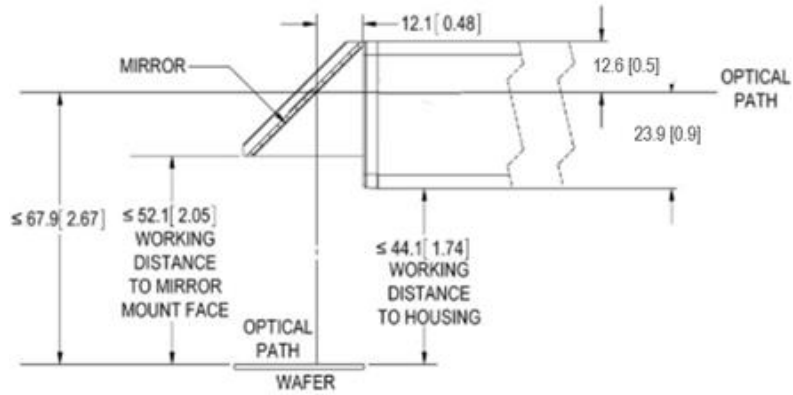
Vertical Mounting - External LEDs Off



Vertical Mounting - External LEDs On

Horizontal Wafer Reader Mounting

When you mount the wafer reader in the horizontal position, the working distance range varies depending on whether you use the External LEDs:



Horizontal Wafer Reader Mounting

Working Distances

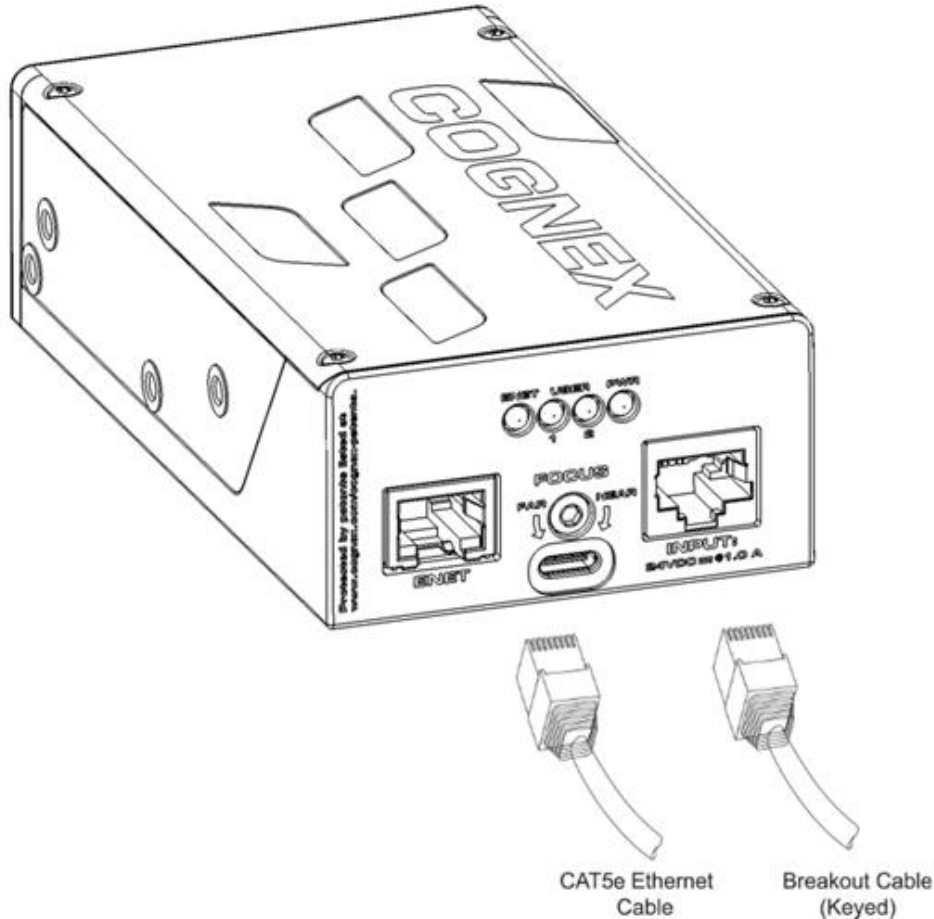
The following table shows examples of the vertical working distances and the corresponding horizontal working distances required at the same focal setting. For more information on adjusting the focus, see [Adjust the Focus on page 22](#).

Vertical Working Distance (External LEDs OFF)	Vertical Working Distance (External LEDs ON)	Horizontal Working Distance (External LEDs)	
		To Mirror Mount Face	To Housing
5.0mm	N/A	N/A	N/A
10.0mm	N/A	N/A	N/A
15.0mm	N/A	N/A	N/A
20.0mm	N/A	N/A	N/A
25.0mm	25.0mm	1mm	N/A
30.0mm	30.0mm	2.1mm	N/A
40.0mm	40.0mm	12.1mm	4.1mm
50.0mm*	50.0mm*	22.1mm*	14.1mm*
60.0mm	60.0mm	32.1mm	24.1mm
70.0mm	70.0mm	42.1mm	34.1mm
80.0mm	80.0mm	52.1mm	44.1mm
* Indicates factory-set working distance.			

Connect the Ethernet and Breakout Cables

The wafer reader supports an ETHERNET port for an Ethernet network connection, and a 24 V DC port for connection to a 24 V DC power source, acquisition trigger and serial communications.

Note: Cables are sold separately.



ETHERNET and 24 V DC Ports

Connect the Ethernet Cable

- If you are connecting to a switch/router, plug one of the RJ-45 connectors of a CAT5e shielded Ethernet cable or crossover cable into the Ethernet port and plug the other end into an available port on the switch/router.
- If you are connecting directly to a wafer reader from a remote host, plug one end of a CAT5e shielded Ethernet cable or crossover cable into the Ethernet port of the wafer reader, and plug the other end into the Ethernet port of the remote host.

Connect the Breakout Cable

1. Verify the 24VDC power supply being used is unplugged and not receiving power.
2. Attach the power (White/Green wire) and ground (Brown wire) of the Breakout Cable to the corresponding terminals on the power supply.

-
3. Connect the wires for the acquisition trigger and serial communications to their corresponding terminals on remote devices.
 4. Plug the RJ-45 connector into the 24 V DC port of the wafer reader. The connectors of the cable are keyed to the notch in the 24 V DC port. Do not force the connections, or you can damage the connector or port.
 5. Restore power to the 24 V DC power supply, and turn it on if necessary. The green power LED indicates that the wafer reader is receiving power.

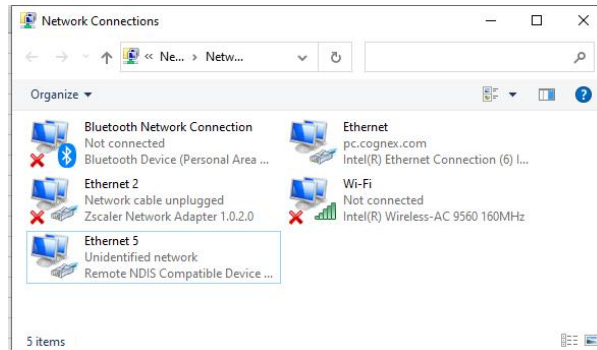
Note: You can clip unused bare wires short or tie them back using a tie made of non-conductive material. Keep all bare wires separated from the +24 V DC (White/Green) wire. See [Breakout Cable Specifications on page 71](#) for the wiring details of the Breakout Cable.

Emulating Ethernet Functionality Over USB

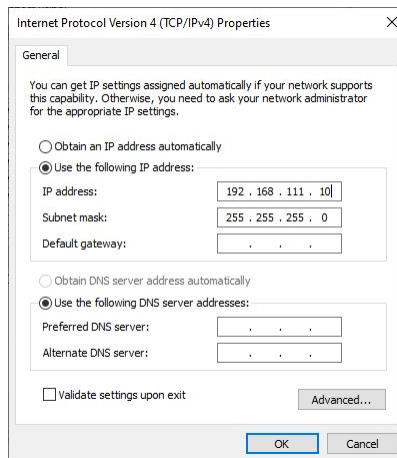
To emulate Ethernet-over-USB functionality, configure the connection between the PC and the wafer reader. The In-Sight 1750 wafer reader has the fixed IP 192.168.111.2/24 through an emulated Ethernet connection.

Configure the PC-emulated Ethernet Driver to be in the Same LAN

1. Connect the PC to the wafer reader with a USB-C cable.
2. Open **Control Panel** and select **Network and internet**.
3. Select **Network and Sharing Center**, then select **Change adapter settings**.
4. Identify the virtual adapter. On the example image below, it is Ethernet 5.



5. Right-click on the virtual adapter and select **Properties**.
6. Assign a fixed IP to the network adapter starting with 192.168.111.



External LEDs and Expansion Lights

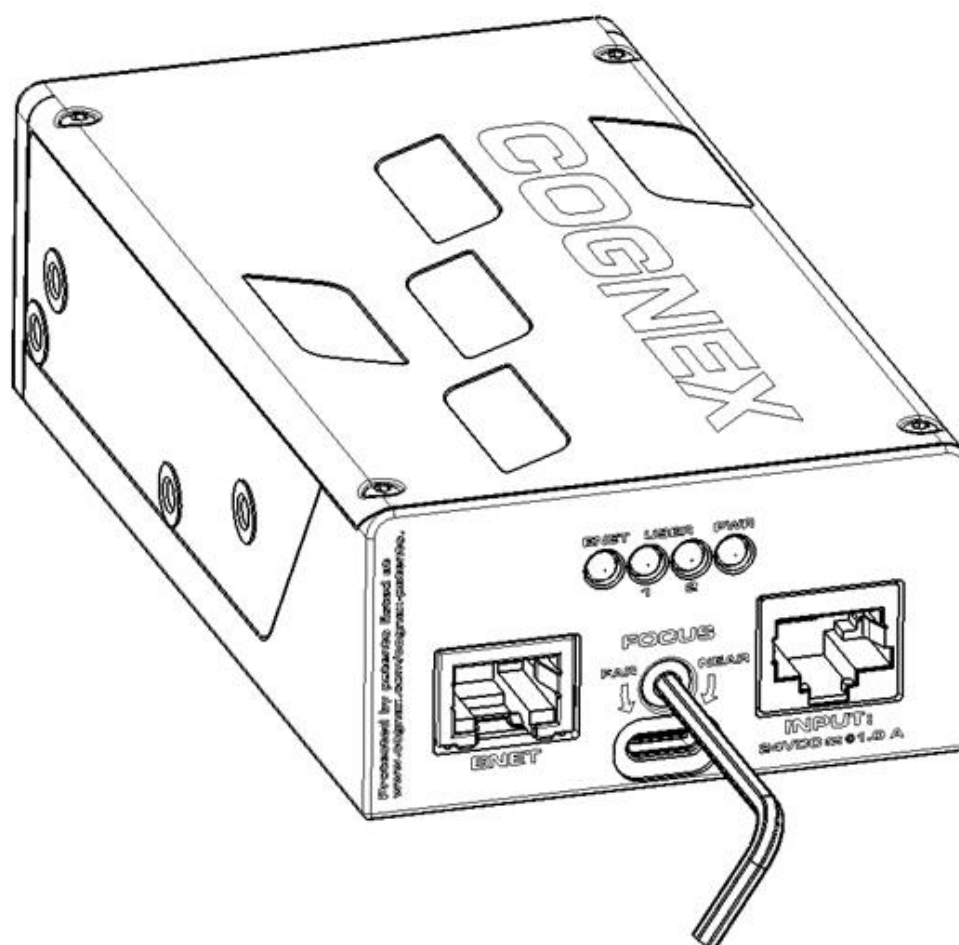
In addition to the internal light banks, the wafer reader has integrated external LEDs below the wafer reader window. If you want to use external LEDs in your application, make sure that the LEDs are unobstructed when you mount the wafer reader and any accessories.

You can also use the flying leads of the breakout cable to connect a strobe light, or the M12 connector of the Y-cable to connect expansion lights to your wafer reader.

Adjust the Focus

The wafer reader arrives with a factory-set working distance of 50.0 mm. The focus has been calibrated to accommodate this working distance. If you are mounting the wafer reader at a working distance other than 50.0 mm, perform the following steps to adjust the focus:

1. Open the **Manage Installation** dialog from the WebUI **Home** step to see focus changes in real time.
2. Remove the label covering the focus adjustment screw (M3 hex screw) located between the ETHERNET port and 24 V DC port.
3. Using a 2.5 mm hex wrench, turn the focus adjustment screw clockwise to shorten the working distance, or counter-clockwise to increase the working distance.



Location of Focus Adjustment Screw

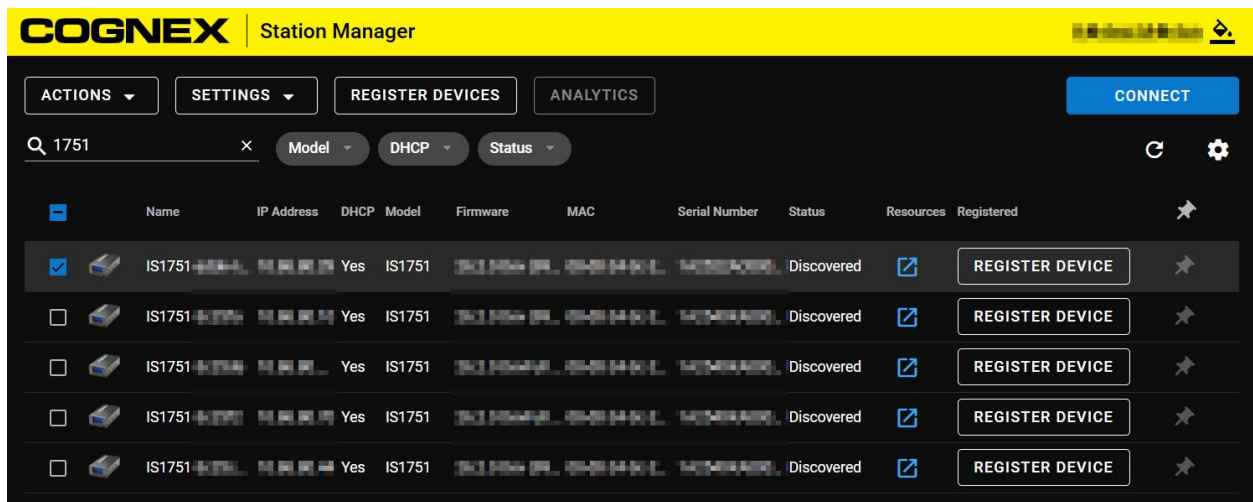
Using Your In-Sight 1750 Wafer Reader

This section provides information on the installation of Station Manager, configuring your wafer reader, and using your wafer reader with the WebUI or In-Sight Vision Suite.

Connect to Station Manager

To connect to the Station Manager:

1. Go to <https://support.cognex.com/en/products/station-manager> and select Cognex Station Manager.
2. Download the Station Manager installer and follow the on-screen steps.
3. Find and select your wafer reader.
4. Click **Connect**.



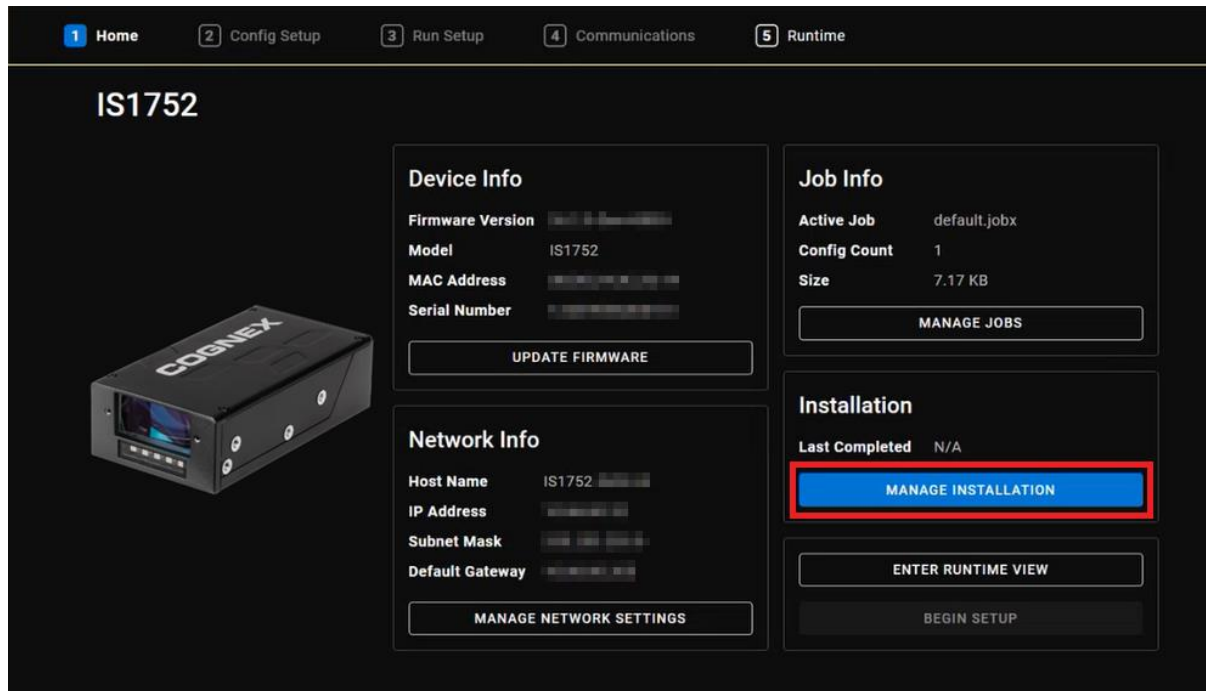
Manage Installation

After the first time you connect your wafer reader and log into the WebUI, you need to complete the **Manage Installation** process, which includes hardware and software setup.

Until you have completed the process, only the **Home** and **Runtime** app steps are available, and all other app steps are disabled. Once you have completed the process, you can go back and adjust your settings at any time as necessary, such as when you change the physical position or alignment of the wafer reader.

The configuration settings you define in the **Manage Installation** process are saved globally, and apply to every new config on the wafer reader.

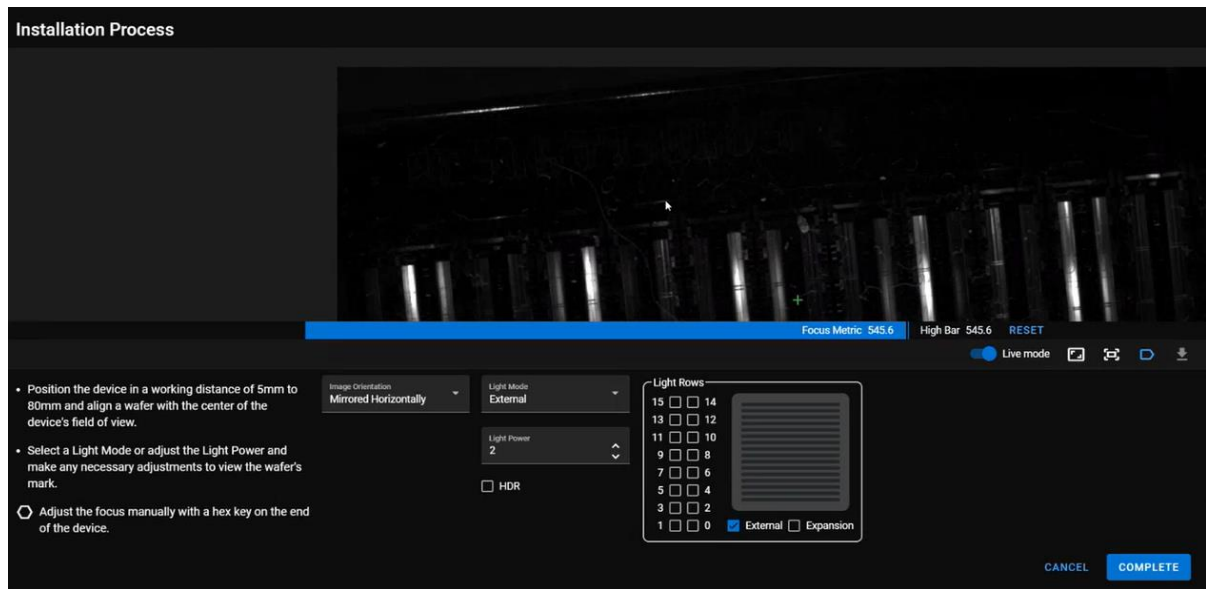
To start the process, click the **Manage Installation** button on the **Home** app step in the WebUI.



When you start the **Manage Installation** process, the image display shows a live image from the wafer reader. Read the instructions on the left-hand side under the image display carefully before adjusting your setup.

Installation Process

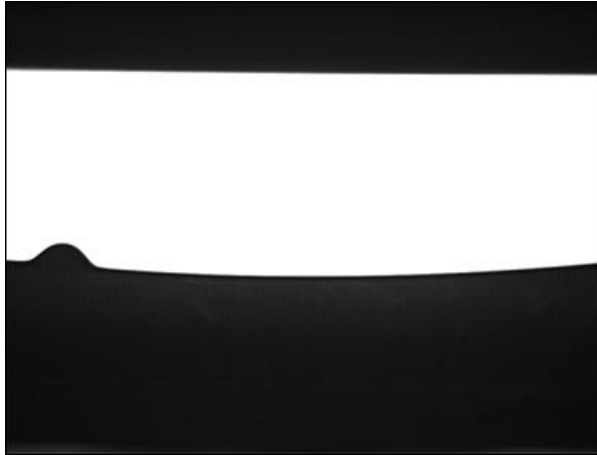
The following image shows the available configuration options in the Manage Installation dialog:



Perform the following steps to go through the installation process:

1. Mount the wafer reader at a working distance of 5 mm to 80 mm, but do not tighten the mounting screws.
2. Place a wafer in the center of the wafer reader field of view.
3. Enable the **Live mode** toggle to acquire live images.
4. Adjust the focus manually by using a hex key on the focus adjustment screw of the wafer reader. For more information, see [Adjust the Focus on page 22](#). The **Focus Metric** bar below the image display shows you how accurate the focus is.

5. Make sure that the wafer reader is perpendicular to the wafer:
 - a. Set the **Light Mode** to **Mode 1**, which uses the light rows on the center line of the wafer reader.
 - b. Increase the **Light Power** setting until the image is saturated. The recommended range is 2 - 4. If the wafer reader is perpendicular to the wafer, Mode 1 produces a bright field image where the wafer is shown as solid white.



Bright Field Image with Light Mode 1

- c. If the wafer reader is not perpendicular, Mode 1 produces a dark field image. Adjust the angle of the wafer reader until Mode 1 produces a bright field image.



Dark Field Image with Light Mode 1

- d. Cycle through each of the Light Modes. If the wafer reader is perpendicular to the wafer, Modes 1 to 3 produce a bright field image, while Modes 4 to 11 produce a dark field image.
 - e. Once you have verified that the wafer reader is perpendicular to the wafer, tighten the mounting screws.
6. In the **Image Orientation** dropdown, select the option that displays the markings on the wafer in the correct orientation to ensure that your wafer reader can read the wafer.

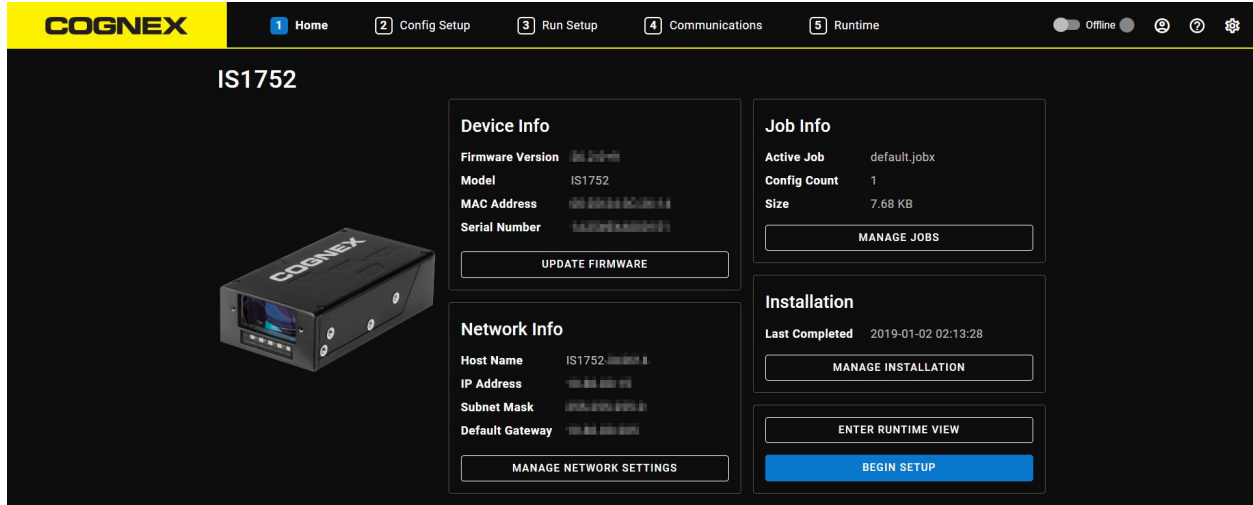
7. Adjust your light settings:
 - a. In the **Light Mode** dropdown, select one of the available presets. The higher the index of the preset, the farther the enabled light rows are from the center line of the wafer reader, which allows you to use dark field observation.
 - b. If none of the available presets gives you the results that you need, you can select **Custom** to manually enable the individual light rows, as well as the external LEDs or any light expansion using the checkboxes in the **Light Rows** section.
 - c. If you want to use the external LEDs on the wafer reader, select **External** in the **Light Mode** dropdown.
 - d. If you want to use a light expansion, select **Expansion** in the **Light Mode** dropdown.
 - e. Once you have configured your **Light Mode** settings, adjust the **Light Power** to increase or decrease the exposure.
 - f. Enable the **HDR** checkbox if you want to use High Dynamic Range (HDR) processing.
8. Once your settings are configured, click **Complete**.

The **Config Setup**, **Run Setup**, and **Communications** app steps become available. For more information, see [Application Steps on page 28](#).

Application Steps

The application steps streamline the setup and management of your wafer reader. The application steps are displayed at the top of the WebUI. You can navigate between the application steps any time by clicking on one of the steps.

The following screenshot shows the **Home** step with the five application steps displayed horizontally on the top of the WebUI.



Home

The **Home** step of the WebUI provides an overview of your wafer reader and serves as a central hub for wafer reader management and configuration.

The **Home** page contains the following elements:

Element	Description
1	The Device Info section provides information about the firmware, model, MAC address, and serial number. Click Update Firmware to open the Firmware Update dialog. For more information, see Firmware Update on page 57 .
2	The Network Info section provides information about the network configuration. Click Manage Network Settings to open the Network Settings dialog. For more information, see Network Settings on page 56 .
3	The Job Info section provides information about the active job. Click Manage Jobs to open the Job Management dialog. For more information, see Job Management on page 55 .
4	Click Manage Installation to open the Installation Process dialog, which allows you to configure your initial hardware and software settings. This step is mandatory the first time you set up your wafer reader. For more information, see Manage Installation on page 24 .

The screenshot shows the IS1752 web interface with the following sections and callouts:

- 1** Home (tab)
- 2** Config Setup (tab)
- 3** Run Setup (tab)
- 4** Communications (tab)
- 5** Runtime (tab)
- Device Info** (left panel):
 - Firmware Version
 - Model: IS1752
 - MAC Address
 - Serial Number
 - UPDATE FIRMWARE button
- Job Info** (right panel):
 - Active Job: default.jobx
 - Config Count: 1
 - Size: 7.68 KB
 - MANAGE JOBS button
- Network Info** (bottom left):
 - Host Name: IS1752
 - IP Address
 - Subnet Mask
 - Default Gateway
 - MANAGE NETWORK SETTINGS button
- Installation** (bottom right):
 - Last Completed: 2026-06-07 10:05:37
 - MANAGE INSTALLATION button (callout 4)
 - ENTER RUNTIME VIEW button (callout 5)
 - BEGIN SETUP button (callout 6)

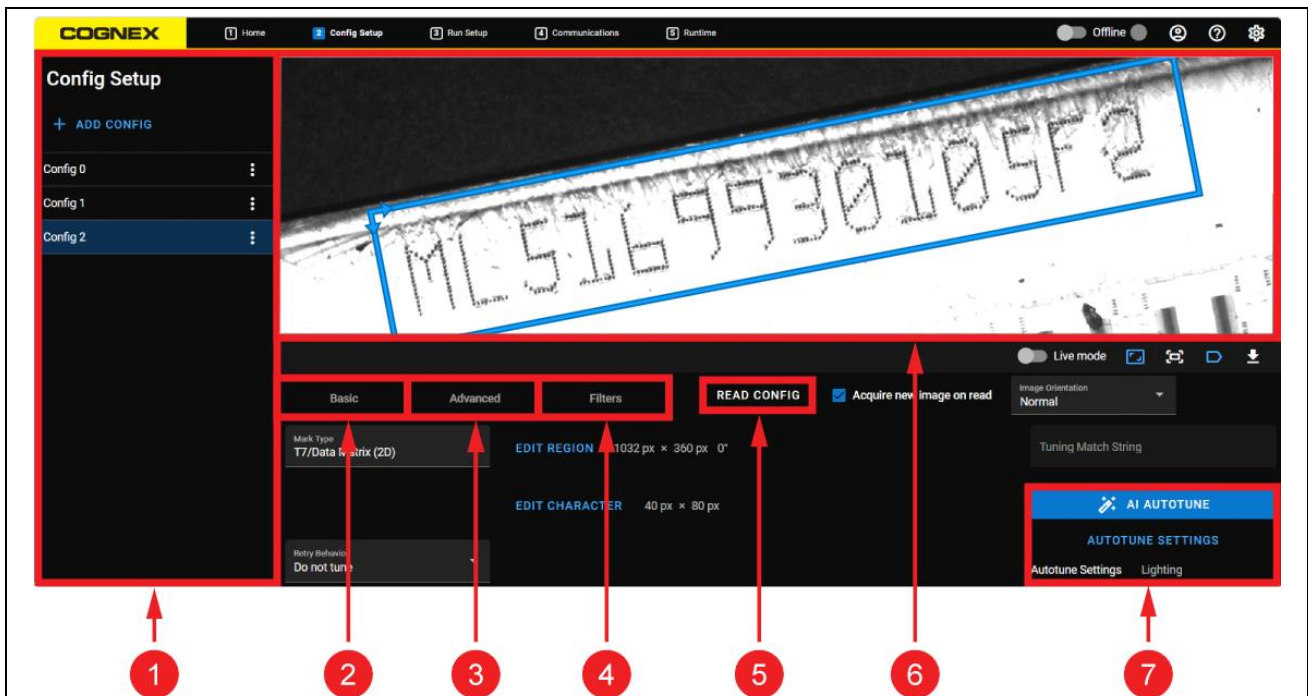
Element	Description
5	Click Enter Runtime View to go to the Runtime step, which allows you to view the acquired images and results. For more information, see Runtime on page 53 .
6	Click Begin Setup to go to the Config Setup step, which allows you to configure the acquisition and read settings for your job. For more information, see Config Setup on page 31 .

Config Setup

The **Config Setup** step of the WebUI allows you to set up one or more configurations for the active job on your wafer reader. You can create up to 50 configs. When you create a new config, it uses the orientation and lighting settings that you defined in the **Manage Installation** process. You can then customize the settings in the new config for specific applications.

The **Config Setup** step consists of the following parts:

Element	Description
1	The sidebar on the left contains a list of saved configs. You can perform the following actions in the sidebar: - Click Add Config to create a new config. - Click the ... icon next to an existing config, and select Rename Config to rename the config. - Click the ... icon next to an existing config, and select Clone Config to create a new config with the same settings.
2	The Basic tab contains config settings for mark type, region size, and mark type-specific settings. For more information, see Basic Settings on page 33 .
3	The Advanced tab contains config settings for lighting, as well as additional mark type-specific settings. For more information, see Advanced Settings on page 40 .



Element	Description
4	The Filters tab allows you to create a filter sequence using a set of filter options, which is applied to the image after acquisition. For more information, see Filter Settings on page 42.
5	Click the Read Config button to trigger a read using the current config settings. By default, the wafer reader acquires a new image for every read. If you want to perform a read with the current image, uncheck the Acquire new image on read checkbox. You can also use a saved image by dragging and dropping the image onto the image display.
6	The image display shows the last acquired image. You can toggle live mode, change the image fit, toggle result graphics, and download the current image using the controls in the bottom right corner of the image display.
7	Click the AI Autotune button to tune your lighting and filter settings using an automated artificial intelligence algorithm. The autotune algorithm runs the config with multiple different settings and returns the best candidates, which you can select to apply those settings to the config. Click Autotune Settings to open a dialog where you can adjust the settings for the autotune algorithm. For more information, see Autotune Settings on page 46.

Basic Settings

The **Basic** tab of the **Config Setup** step allows you to configure the region size, character size, and mark type, as well as mark type-specific settings for 1D, 2D and SEMI/OCR.

The following mark types are supported:

Mark Type	Description
BC 412 (1D)	Reads a SEMI T1-95 standard barcode.
IBM 412 (1D)	Reads an IBM 412 barcode.
T7/Data Matrix (2D)	Reads a SEMI T7 (ECC 200, 8 rows by 32 columns) or a generic 2D Data Matrix symbol.
QR (2D)	Reads a standard 2D QR Code.
M1.15 (SEMI)	Reads SEMI T7 standard 2D Data Matrix symbols and SEMI M12 standard 12-character alphanumeric strings using a single config. The config first attempts to read the T7 mark. If the T7 mark can be read, the read passes. If the T7 mark cannot be read, the config automatically attempts to read the alphanumeric string. If neither the T7 nor alphanumeric string can be read, the read fails.
SEMI (OCR)	Reads SEMI M12, M13, and M1.15 standard alphanumeric character strings.
IBM (OCR)	Reads IBM hexadecimal alphanumeric character strings.
Triple (OCR)	Reads Triple Density standard alphanumeric character strings.
OCR-A (OCR)	Reads the OCR-A font, which is designed for optical character recognition.
Chartered (OCR)	Reads the Chartered Semiconductor font.
CANON (OCR)	Reads CANON hexadecimal alphanumeric character strings.
Custom Edge AI Read (OCR)	Uses the In-Sight Edge AI Read tool for character recognition. The Custom Edge AI Read option allows you to manually label characters to train the AI model. For more information, see Custom Edge AI Read on page 38 .

Adjust Region Size

Click **Edit Region** to adjust the size for the Region of Interest. The wafer reader only attempts to read marks that are within the ROI.



You can adjust the region size either by using the interactive region size box on the image display, or by manually entering the region size values in the fields below the image display.

If you want to adjust the region size using the interactive box, click and drag the anchors on the sides or corners of the box to adjust width and height, and click and drag the rotation icon below the box to adjust rotation.

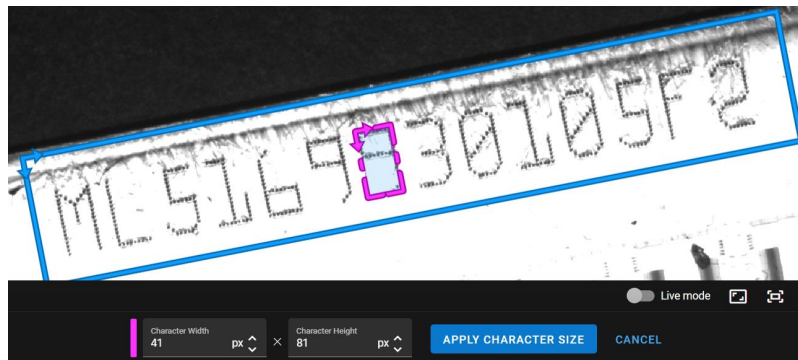
If you want to enter the values manually, populate the **Region Width** and **Region Height** fields with values in pixels, and the **Rotation** field with a value in degrees.

To adjust the position of the region, click and drag inside the box on the image display.

Click **Apply Region** to finalize the new region size settings.

Adjust Character Size

Click **Edit Character** to adjust the character size for SEMI and OCR mark types.



You can adjust the character size either by using the interactive character size box on the image display, or by manually entering the character size values in the fields below the image display.

Note: For best results, make sure that the character size box fits tightly around the characters on the image. The borders of the character size box should intersect the character edges.

If you want to adjust the region size using the interactive box, click and drag the anchors on the corners of the box to adjust width and height. The rotation is locked to match the region box rotation.

If you want to enter the values manually, populate the **Character Width** and **Character Height** fields with values in pixels.

To adjust the position of the character size box, click and drag inside the box on the image display. This does not affect the read results, as the wafer reader identifies all characters of the defined character size within the defined region of interest.

Additional Settings

All mark types have additional **Retry Behavior** and **Image Orientation** settings.

The **Retry Behavior** setting defines whether the wafer reader will attempt to rerun the config with autotuning if the first run produces a fail result. The **Retry Behavior** dropdown provides the following options:

- **Do not tune** (default): the wafer reader does not retry after a fail result.
- **Tune**: the wafer reader reruns the config with the defined autotune settings.
- **Tune & Save**: the wafer reader reruns the config with the defined autotune settings, and saves the autotuned settings to the config.

The **Image Orientation** setting allows you to mirror the image horizontally or vertically, or rotate to 180 degrees. By default, the config uses the **Image Orientation** settings defined in the Manage Installation process.

Field String Settings (1D, SEMI, and Custom Edge AI Read (OCR))

1D, SEMI, and OCR mark types have additional settings for **Field String** and **Field Definition**:

- **Field String** specifies the number and type of characters contained in the character string or encoded in a barcode. The **Field String** setting supports 1 - 30 characters of the following types:
 - Alphanumerics (A-Z, 0-9)
 - Dashes (-)
 - Dots (.)
 - Pound characters (#)
 - Spaces ()
- **Field Definition** allows you to create custom entries for the **Field String** if the mark specifies a character string or barcode. When included in the **Field String**, these entries restrict the list of valid characters at the positions in which they are inserted.
 - You can define multiple field definitions, separated by a semicolon (;).
 - The font or barcode must contain the characters listed for a field definition entry. For example: `&=123` is valid, because 1, 2, and 3 are valid characters. However, `123=&` is invalid because `'&'` is not included in the standard Semifont or barcode character sets.

For example, if the **Field Definition** is `&=123;$=3456;%=789`, and the **Field String** is `&$%*****CS`, then the only valid characters in the first position are 1, 2, or 3, the only valid characters in the second position are 3, 4, 5, or 6, and the only valid characters in the third position are 7, 8, or 9.

Additional Settings (SEMI and OCR)

The following additional settings are available for SEMI and OCR mark types:

- The **Character Threshold** setting specifies the minimum response threshold for each individual character score (25 to 100; default = 25). Each individual character score must be greater than or equal to the Character Threshold, otherwise the read fails.
- The **Accept Threshold** setting specifies the minimum response threshold for the base score (40 to 100; default = 50) for OCR marks. The meaning of the Accept value and its role in determining the pass/fail status of a read depends on the type of wafer mark.

- The **Checksum** setting selects the method by which the read result from a character string will be validated to ensure reliability, and establishes the scoring basis for determining the pass/fail status of the read.

In all cases, the base score of the character string must be higher than the specified Accept Threshold before the checksum is evaluated. Then, if the character string passes its checksum, bonus points in increments of 100 or 200 are added to the base score and the read passes. The number of bonus points added to the base score depends on the Checksum selected.

The following options are available for Checksum:

Checksum Setting	Description	Pass Criteria	Score Calculation
Virtual	The Cognex Virtual checksum attempts to validate the read result using multiple reading methods. This checksum should be used by itself only when the character string is known not to contain one of the other checksums, and then a higher Accept Threshold is strongly recommended.	If all methods read identical characters at each position in the string, the string passes the Virtual checksum and 100 points are added to the base score.	The maximum score is 200 points. The minimum passed score is 100 plus the Accept Threshold value.
SEMI	Applies the SEMI-standard checksum and the Cognex Virtual checksum. If the read result passes the SEMI checksum, 200 points are added to the base score. If the read result also passes the Virtual checksum and the results from both checksums agree, an additional 100 points are added to the score.	The read must pass the SEMI checksum to be successful, regardless of whether the Virtual checksum passes or fails.	The maximum score is 400 points. The minimum passed score is 200 plus the Accept Threshold value.
SEMI with Virtual	Applies the SEMI-standard checksum and the Cognex Virtual checksum. If the read result passes the SEMI checksum, 200 points are added to the base score. If the read result also passes the Virtual checksum and the results from both checksums agree, an additional 100 points are added to the score.	The read must pass both the SEMI and Virtual checksums to be successful. If either checksum fails, the entire read will fail. The SEMI with Virtual checksum selection is the most reliable method of validating a character string containing a SEMI checksum.	The maximum score is 400 points. The minimum passed score is 300 plus the Accept Threshold value.
BC 412 with Virtual	Applies the SEMI-standard barcode checksum and the Cognex Virtual checksum. If the read result passes the BC 412 checksum, 200 points are added to the base score. If the read result also passes the Virtual checksum and the results from both checksums agree, an additional 100 points are added to the score.	The read must pass both the SEMI BC 412 and Virtual checksums to be successful. If either checksum fails, the entire read will fail. This checksum setting is typically used when the character string is marked directly below the barcode on the wafer.	The maximum score is 400 points. The minimum passed score is 300 plus the Accept Threshold value.

Checksum Setting	Description	Pass Criteria	Score Calculation
IBM 412 with Virtual	Applies the IBM barcode checksum and the Cognex Virtual checksum. If the read result passes the IBM 412 checksum, 200 points are added to the base score. If the read result also passes the Virtual checksum and the results from both checksums agree, an additional 100 points are added to the score.	The read must pass both the IBM 412 and Virtual checksums to be successful. If either checksum fails, the entire read will fail. This checksum setting is typically only used when the character string is marked directly below the barcode on the wafer.	The maximum score is 400 points. The minimum passed score is 300 plus the Accept Threshold value.

- The **Tuning Match String** setting allows you to enter a text string, which is used as a comparative match during the AI autotuning process. The tuning process returns the Light, Size and Filter settings with the highest read score that matches the string. The Match String setting can be helpful with noisy images (for example, when the mark is scribed over a die pattern, where background noise could potentially produce incorrect read results). This option is only enabled for OCR mark types.

For more information about the AI autotuning process, see [Autotune Settings on page 46](#).

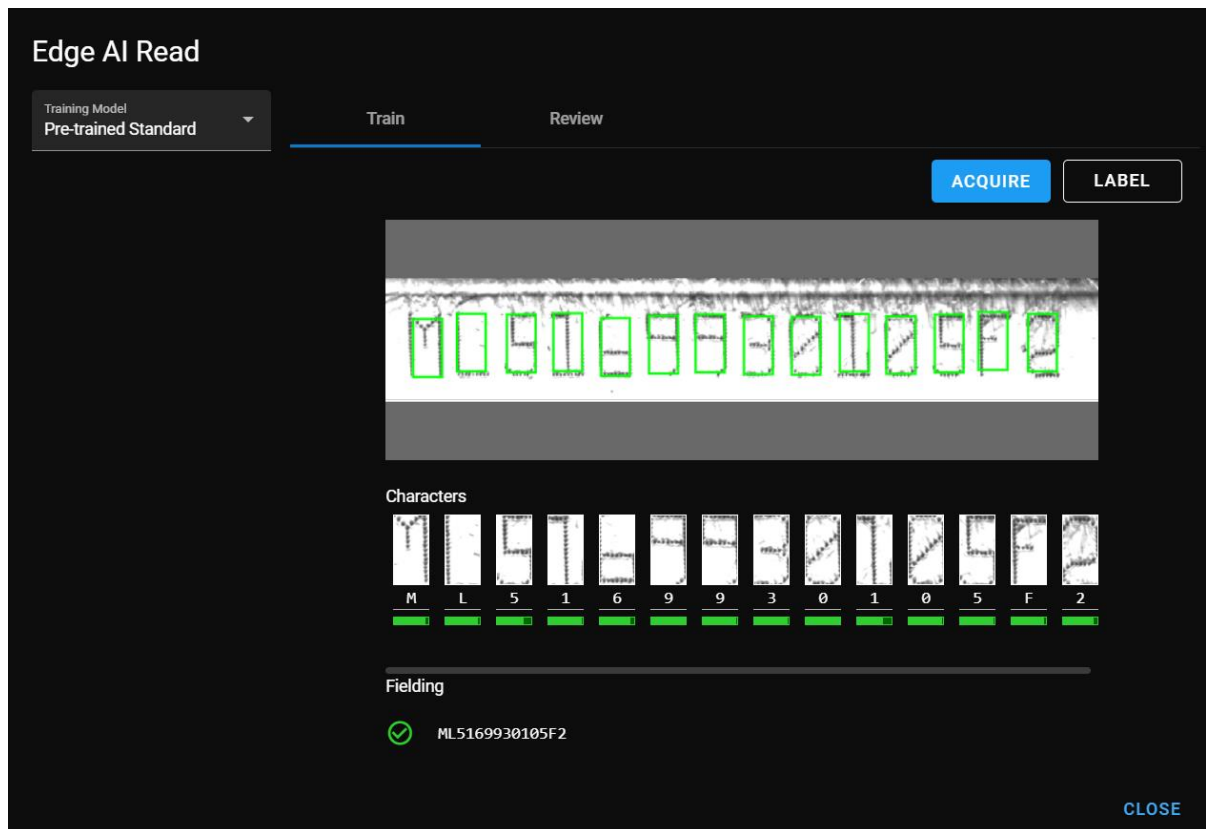
Custom Edge AI Read

The **Custom Edge AI Read (OCR)** mark type uses the In-Sight Edge AI Read text recognition function to read text from acquired images.

In addition to the basic settings available to all OCR mark types, the **Custom Edge AI Read** mark type allows you to train the text recognition model by manually labeling individual characters that the model identifies incorrectly. This allows you to fine-tune your results and eliminate misidentified characters.

Manual training is only necessary if you are not getting accurate results, as the **Custom Edge AI Read** mark type uses pre-trained models that can recognize characters in many different contexts and fonts.

To open the **Edge AI Read** configuration dialog, click **Edit Custom Mark Type**.



The **Training Model** dropdown provides the following options:

- **Pre-Trained Standard:** this model can recognize fonts with variable character size, and requires an input character size that fits the average character size. Supports uppercase characters, numerical digits, and the following special characters: ":", "/", "-", "+", "&"
- **Pre-Trained Complete:** this model provides additional character support on top of the Standard model. Supports uppercase and lowercase characters, numerical digits, all printable ASCII symbols and the € character.

To manually train the model further:

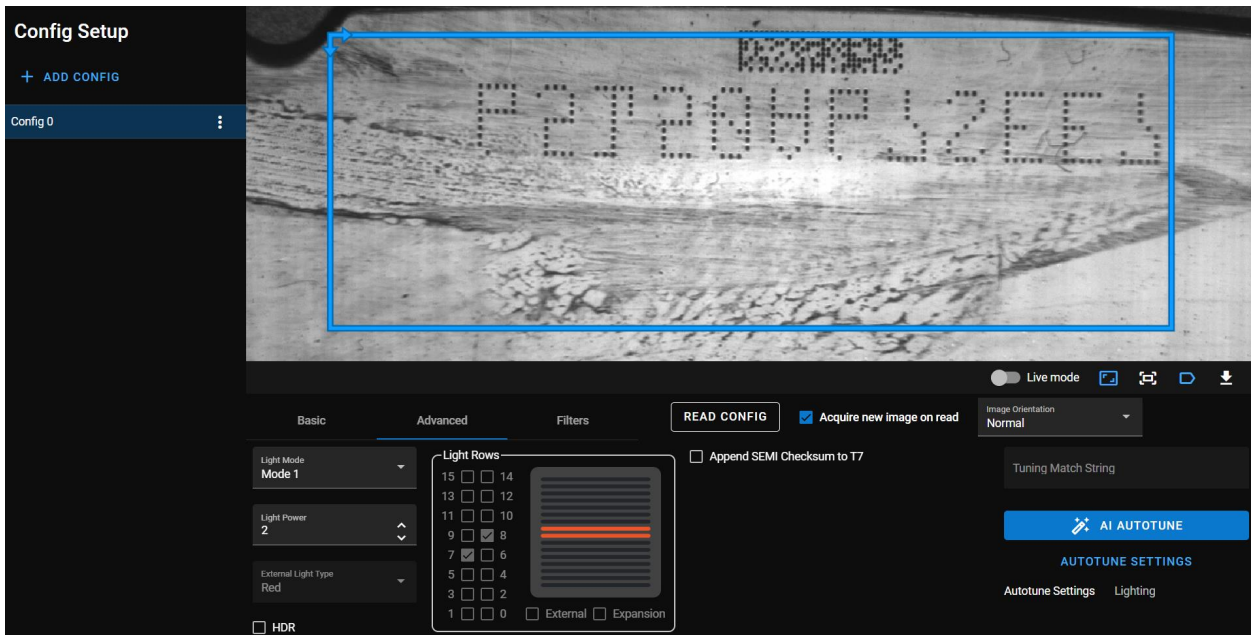
1. Click **Acquire** on the **Train** tab of the dialog. The wafer reader acquires an image, and applies the pre-trained model to the characters in the region of interest.
2. Click **Label** to modify the labels for the identified characters.
3. Enter the correct character in the text field below each character box.

4. Click **Apply Changes** once all characters are labeled correctly.
5. Repeat for multiple images to increase accuracy.

You can review the sample images and manually added labels in the **Review** tab of the dialog.

Advanced Settings

The **Advanced** tab of the **Config Setup** step allows you to change your light settings, as well as configure additional mark type-specific settings.



All new configs start with the light settings you have configured in the **Manage Installation** process. You can customize these settings for individual configs using the same light settings as described in [Manage Installation on page 24](#).

Advanced Settings for 1D Mark Types

The following settings are available for 1D mark types on the **Advanced** tab:

- **Compression:** The Compression drop-down list specifies options for decoding compressed barcodes, as well as a selection for decoding a barcode with no compression.
- **Report Hyphen:** If enabled, the last two digits of the barcode string are separated by a hyphen.
- **Report Three Digit:** If enabled, the digits that encode the wafer lot number are replaced by a three-digit number. Zeros (0) are used as placeholders if the lot number is less than three digits. For example, if the encoded lot number is "12", the lot number would be reported as "012".

Advanced Settings for 2D and SEMI Mark Types

If you select the 2D, T7, or SEMI M1.15 mark type, and the encoded string does not contain checksum characters, enable the **Append SEMI Checksum to T7** checkbox to automatically calculate the SEMI checksum and append it to the read result.

Advanced Settings for SEMI and OCR Mark Types

The following settings are available for SEMI and OCR mark types on the **Advanced** tab:

-
- **Spacing:** Determines the tolerance of the config for non-standard spacing and vertical misalignment of characters.
 - **Standard:** Limits the acceptable spacing between characters and/or vertical character misalignment to the specified SEMI standard. If the actual character spacing or alignment of the mark exceeds this standard, read failures or even misreads can occur.
 - **Relaxed:** Allows for greater spacing between characters and/or vertical character misalignment than the specified SEMI standard.

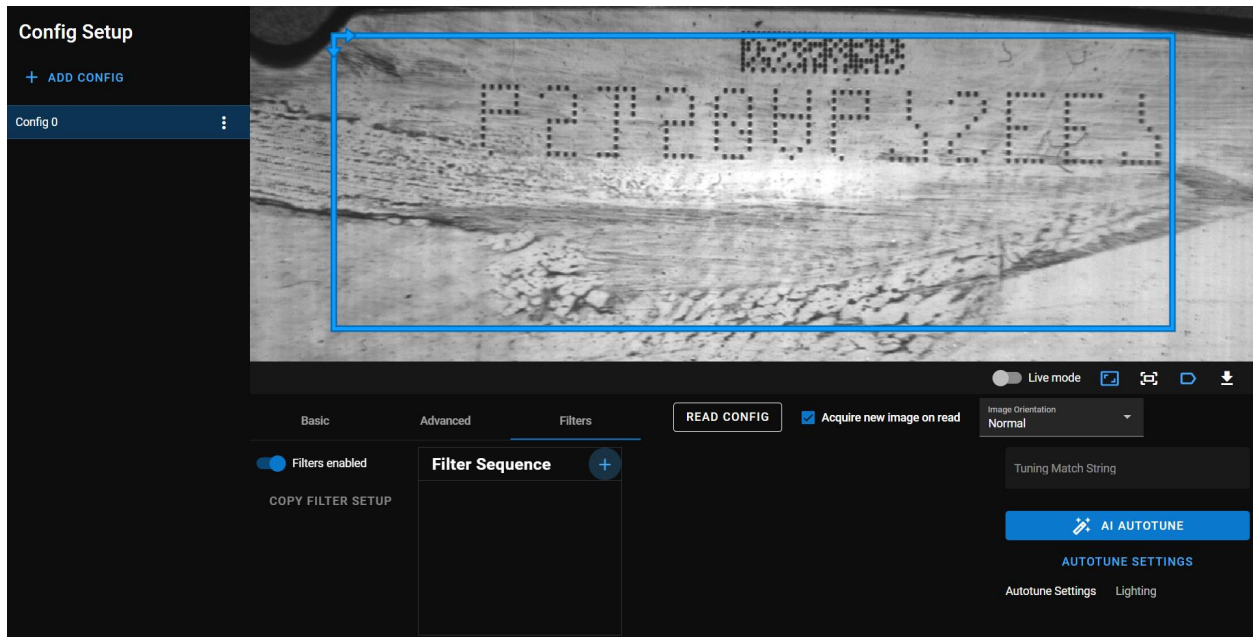


Note: The **Spacing** setting does not affect the **Optimization** setting. Relaxed spacing does not decrease the reliability of the read.

- **Optimization:** Specifies the method the OCR algorithm uses during the final stage of character analysis before returning the read result.
 - **Mode 0:** Uses a character analysis method that maximizes both the read rate and reliability for the vast majority of OCR marks. Reading time for Mode 0 is faster than Mode 1.
 - **Mode 1 (default):** Uses a character analysis method that improves character scores and increases reliability.
- **Remove SEMI checksum from output:** When checked, the wafer reader automatically removes the 2-character SEMI checksum and any special character immediately preceding the checksum ("-", ".", "#", or space) from the read result. This feature is supported for T7, M1.15, and SEMI mark types when the Checksum is SEMI or SEMI with Virtual.

Filter Settings

The **Filters** tab of the **Config Setup** step allows you to add a sequence of image processing filters to the acquired image, which can significantly improve the readability of marks that have been degraded by wafer processing effects or made difficult to image because of process coatings.



The **Filters enabled** toggle allows you to enable or disable the configured filter sequence.

If you want to transfer your configured filter sequence to another config, click **Copy Filter Setup**.

To add a filter to your filter sequence, click the **+** button in the top right corner of the **Filter Sequence** box.

The following filters are available:

Filter	Description
Low Pass	Removes high-frequency (small) noise from the image, including thin streaks and scratches, and most commonly, speckle. Low Pass blurs the mark, but this typically does not negatively impact read scores. • Height: The vertical size of the operation, in pixels. (1 - 59; default = 3; must be odd) • Width: The horizontal size of the operation, pixels. (1 - 59; default = 3; must be odd) When using Low Pass for OCR marks, Height and Width should be roughly equal to the character stroke thickness. For example, if character strokes are approximately 4 pixels thick, the recommended Height and Width of the Low Pass Operation is 4 px height and 4 px width.

Filter	Description
High Pass	Removes low-frequency noise (large background patterns) from the image, for example, horizontal bands through, or near, the mark that abruptly shifts from the grayscale values of the background to the grayscale values of the mark. - Height: The vertical size of the operation, in pixels. (1 - 59; default = 3; must be odd) - Width: The horizontal size of the operation, in pixels. ((1 - 59; default = 3; must be odd)) For the most effective High Pass filtering, set the Height to 1, and the Width roughly equal to 1 or two pixels larger than the thickness of a character stroke. For example, if character strokes are approximately 4 pixels thick, the recommended Height and Width of the High Pass Operation is 1 px height and 4 px width. Note: In most cases, a Clipping operation should follow a High Pass filter in the sequence. Because the  High Pass and Top Hat Operations attempt to filter the same type of image noise, you should generally choose only one of these filters to use in a filter.
Top Hat	Removes everything except light features that are smaller than surrounding darker features. The result is an output image that retains these light features on a dark background. Top Hat is typically used to remove horizontal image noise while forcing background uniformity. - Height: The vertical size of the operation, in pixels. (1 - 59; default = 3; must be odd) - Width: The horizontal size of the operation, pixels. (1 - 59; default = 3; must be odd) For an effective Top Hat operation, the Width should be greater than the Height. These settings eliminate some shading, background patterns, and long, horizontal lines from the image.
Erode	Shrinks bright features and grows dark features. Erosion is used with bright field images to make thin character strokes appear thicker. Erosion is sometimes useful to increase the sizes of the cells in a T7 mark type. - Height: The vertical size of the operation, in pixels. (1 - 59; default = 3; must be odd) - Width: The horizontal size of the operation, pixels. (1 - 59; default = 3; must be odd)
Dilate	Grows bright features and shrinks dark features. Dilate is used with dark field images to make thick character strokes appear thinner. - Height: The vertical size of the operation, in pixels. (1 - 59; default = 3; must be odd) - Width: The horizontal size of the operation, pixels. (1 - 59; default = 3; must be odd)
Bottom Hat	Removes everything except dark features that are smaller than surrounding lighter features. The result is an output image that displays these dark features as bright pixels on a dark background. Bottom Hat is typically used to remove horizontal image noise while forcing background uniformity. - Height: The vertical size of the operation, in pixels. (1 - 59; default = 3; must be odd) - Width: The horizontal size of the operation, pixels. (1 - 59; default = 3; must be odd)
Open	Performs an erosion operation followed by a dilation operation to remove light features that are smaller than surrounding darker features. The result is an output image that fills in the small gaps between the pixels of dark features. - Height: The vertical size of the operation, in pixels. (1 - 59; default = 3; must be odd) - Width: The horizontal size of the operation, pixels. (1 - 59; default = 3; must be odd)

Filter	Description
Close	Performs a dilation operation followed by an erosion operation to remove dark features that are smaller than surrounding lighter features. The result is an output image that fills in the small gaps between the pixels of light features. - Height: The vertical size of the operation, in pixels. (1 - 59; default = 3; must be odd) - Width: The horizontal size of the operation, in pixels. (1 - 59; default = 3; must be odd)
Fill Dark	Automatically changes contiguous areas of dark pixels into lighter pixels. This filter is similar to Clipping, except that Fill Dark operates only on pixels that are completely enclosed by lighter pixels. Fill Dark is useful for removing dark speckles from the background.
Fill Light	Automatically changes contiguous areas of light pixels into darker pixels. This filter is similar to Clipping, except that Fill Light operates only on pixels that are completely enclosed by darker pixels. Fill Light is useful for removing bright speckles from the background.
Clipping	Limits the grayscale levels in the image to a specific range of pixel values. The goal of clipping is to force the background pixels to gray level values that are distinctly brighter or darker than the foreground pixels of the mark. Clipping minimizes the problem of background patterns that cannot be removed using other filters such as Top Hat, High Pass or Low Pass. - High: The maximum grayscale value. (1 - 255; default = 255) - Low: The minimum grayscale value. (0 - 254; default = 0)
Add	Adds a fixed value to every pixel in the image to increase image brightness, which can provide a small improvement in the visibility of dark marks on a dark background. This filter is most useful in a filter when following other operations that result in a dark image such as Clipping, Bottom Hat, or Top Hat. Value: The value to be added. (0 - 255; default = 2)
AND	AND, OR, and XOR each perform "bitwise" operations on the binary representation of every pixel value in the image. Typically, these operations are only effective used in large increments of pixel values (10 to 20 pixels). AND returns a one in each bit position for which the corresponding bits of both operands are ones. The most likely result is an image that is darker than the input image. Value: Specifies the operand. (0 - 255; default =2)
OR	OR returns a one in each bit position for which the corresponding bits of either or both operands are ones. The most likely result is an image that is brighter than the input image. Value: Specifies the operand. (0 - 255; default =2)
XOR	XOR returns a one in each bit position for which the corresponding bits of either operand are ones, but not both operands. The result is an image where light pixels are made dark and dark pixels are made light. XOR (255) is the most common value of the XOR operation because it inverts all of the grayscale values in the image. Value: Specifies the operand. (0 - 255; default =2)
Equalize	Automatically increases image contrast by evening out the histogram of pixel values. This filter can provide a small increase in read scores when there is only minimal contrast difference between the mark and the background. However, Equalize often increases background noise, which may require removal by additional filter operations.
Multiply	Multiplies every pixel by a fixed value to increase image brightness, which can provide a small improvement in the visibility of dark marks on a dark background. This filter is most useful in a filter when following other filters that result in a dark image, such as Clipping, Bottom Hat, or Top Hat. Value: Specifies the pixel value. (0 - 255; default = 2)
Quantize	Reduces the image to the specified bit-depth. Value: Specifies the bit-depth. (1 - 7; default = 2)

Filter	Description
Contrast	Automatically increases the brightness of light pixels in the image while making darker pixels even darker.
Optical Density	Automatically inverts pixel values using a logarithmic scale, which enhances the visibility of a mark appearing on a background with similar gray levels.
Grey Distance	Converts each pixel of a color image or Region of Interest (ROI) to a greyscale value or to black and white. Value: Specifies the greyscale value (0 - 255) or black-and-white (-1).

Autotune Settings

The **Autotune Settings** dialog in the **Config Setup** step allows you to customize the tuning options for the AI Autotune algorithm.

The screenshot shows the 'Tuning Selections' dialog box. On the left sidebar, there are three checkboxes: 'Lighting' (checked), 'Character Size' (checked), and 'Filters' (unchecked). The main area contains a toggle for 'Use Custom Tuning Limits' (disabled). Below this, there are sections for 'Light Modes' (checked) with 11 numbered checkboxes (all checked), 'Light Power' (checked) with 'Auto' selected and 'Manual' disabled, and 'Character Size' (checked). The 'Manual' section for Light Power shows a minimum value of 0.011 and a maximum value of 435. At the bottom right, there are 'CANCEL' and 'APPLY TUNE SETTINGS' buttons.

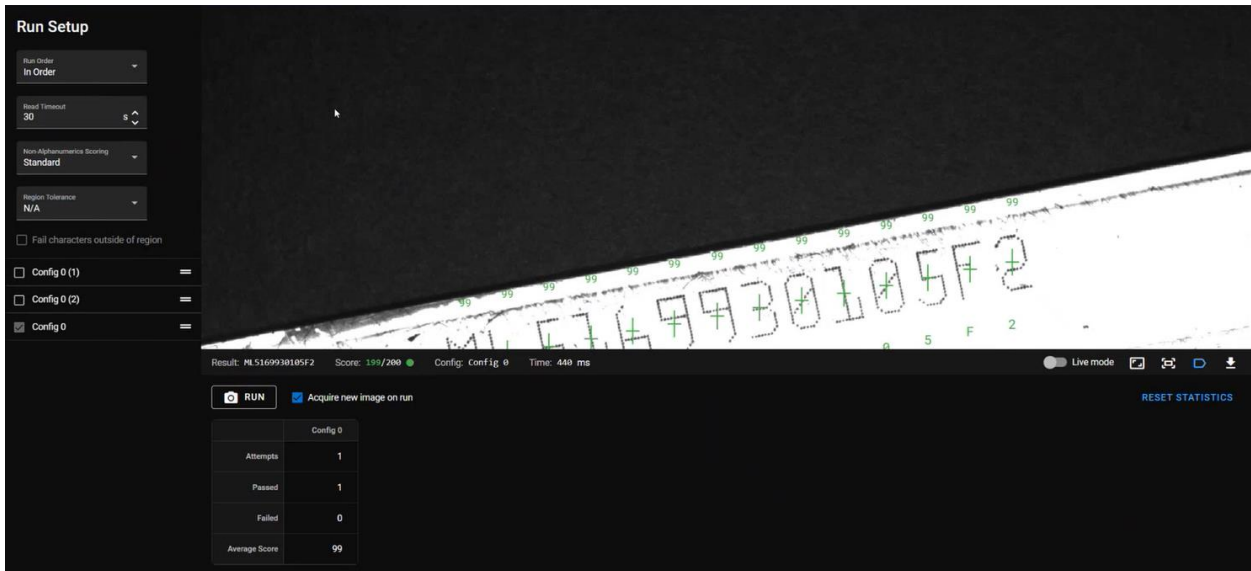
You can enable or disable entire tuning categories using the **Lighting**, **Character Size**, and **Filters** checkboxes in the sidebar on the left. For example, if you only want the AI Autotune algorithm to perform tuning for character size, uncheck the **Lighting** and **Filters** checkboxes, and check the **Character Size** checkbox.

If you want to customize individual tuning options within the tuning categories, enable the **Use Custom Tuning Limits** toggle. You can modify the following tuning options:

- **Lighting:**
 - Enable or disable the individual **Light Modes** that the AI Autotune algorithm can use.
 - Set manual minimum and maximum thresholds for **Light Power**.
- **Character Size:** set the tolerance for character size in pixels.
- **Filters:**
 - Select whether to **Optimize** your existing filter sequence, or **Replace** it with AI Autotune recommendations.
 - Define the maximum number of filter operations that the AI Autotune algorithm can use.
 - Enable or disable the individual filter operations that the AI Autotune algorithm can use.

Run Setup

The **Run Setup** step of the WebUI allows you to select what configs you want the job to run on the wafer reader, define the order that you want the configs to run in, and test your run settings. Run configurations are also called recipes.



To set up your recipe:

1. In the sidebar on the left, enable or disable the individual configs in the recipe using the checkboxes next to each config in the list. The list of configs contains all the configs that you have configured in the **Config Setup** step. To reorder the configs in the list, click and drag the handles on the right side of the configs that you want to move.
2. Configure the run order in the **Run Order** dropdown by selecting one of the following options:
 - **Last Best:** the job runs the config that produced the best result in the previous run first, and only runs the other configs in the order defined in the list if the last best config produces a failed result. The run stops when a config produces a passed result.

Note: The wafer reader retains the last best config even if you reset the **Runtime Statistics Table**.

- **In Order:** the recipe runs the configs in the order defined in the list until a config produces a passed result, then stops.
 - **All:** the recipe runs the configs in the order defined in the list, and runs all the configs regardless of any passed results.
3. In the **Read Timeout** setting, set the time in seconds that a run can take before stopping. Depending on the number of configs enabled, the amount of processing required for each config, and the **Retry Behavior** defined for each config in the **Config Setup** step, the run time can reach significant lengths, which you need to account for.

4. In the **Non-Alphanumerics Scoring** dropdown, define how you want the wafer reader to score non-alphanumerical characters in the result:
 - **Standard**: the wafer reader scores non-alphanumerical characters with the same scoring used for alphanumerical characters.
 - **Score 100 and Include**: the wafer reader scores non-alphanumerical characters as 100, and includes them in the overall score.
 - **Score 100 and Exclude**: the wafer reader scores non-alphanumerical characters as 100, but excludes them from the overall score.

Note: The **Non-Alphanumerics Scoring** setting is only relevant for OCR mark types.

5. In the **Region Tolerance** dropdown, define the tolerance for the region of interest, including both rotation and characters that partially or fully extend beyond the defined region:
 - **N/A**: Region Tolerance is disabled. The wafer reader attempts to read the string with ± 5 degrees of rotation, and all characters must be enclosed with the region. This option does not increase read time.
 - **Low**: The wafer reader attempts to read the string with ± 5 degrees of rotational tolerance, and can read characters that extend partially outside the region. This option increases read time minimally.
 - **Medium**: The wafer reader attempts to read the string with ± 10 degrees of rotational tolerance, and can read the string even if some characters are located outside of the region. This option increases read time noticeably.
 - **High**: The wafer reader attempts to read the string with ± 15 degrees of rotational tolerance, and can read the string even if several characters are located outside of the region. This option increases read time significantly.

Note: The **Region Tolerance** setting is only relevant for OCR mark types.

6. Check the **Fail characters outside of region** checkbox to fail the read if the center of any character is located outside of the region.

Note: The **Fail characters outside of region** checkbox is only relevant for OCR mark types.

7. Check the **Acquire new image on run** checkbox if you want the wafer reader to acquire a new image for each run on this step. You can also use a saved image by dragging and dropping the image onto the image display from your file explorer.
8. Click **Run** to initiate a new read with your current run settings.

The **Runtime Statistics Table** below the image display tracks the number of **Attempts**, the number of **Passed** results, and the number of **Failed** results for each enabled config, and the **Average Score** for all attempts with that config.

Click **Reset Statistics** on the right side of the page to clear the **Runtime Statistics Table**.

Communications

The **Communications** step of the WebUI allows you to configure your Ethernet and Serial communication, output formatting, and file transfer settings.

Interfaces

On the **Interfaces** tab, you can configure Ethernet and Serial communication.

The screenshot displays the 'Communications' web interface. On the left is a sidebar with three tabs: '1 Interfaces' (selected), '2 Output Formatting', and '3 File Transfer'. The main area is divided into three panels. The 'Ethernet Communications' panel has a 'Native Mode' toggle (checked), a 'Connection Port' dropdown set to '23', a 'Protocols' toggle (checked), a 'Protocol' dropdown set to 'In-Sight', and a 'Connection Port' dropdown set to '2000'. Below these are 'Input' and 'Output' checkboxes, both checked. The 'Serial Communication' panel has a 'Native Mode' toggle (unchecked), a 'Protocols' toggle (unchecked), and a 'Spreadsheet' toggle (unchecked). The 'Serial Settings' panel on the right contains several dropdowns: 'Baud Rate' (9600), 'Data Bits' (8), 'Stop Bits' (1), 'Parity' (None), and 'Handshake' (None). It also has a 'Fixed Input Length' checkbox (unchecked) and two 'Terminator' settings, both set to '13' with 'CR' as the unit.

Turn on the **Native Mode** toggle to enable Native Mode commands on the wafer reader. For more information about Native Mode commands, see the [Using Native Mode Communications on page 64](#).

If you are using Native Mode over Ethernet, you also need to specify the port using the **Connection Port** setting.

Turn on the **Protocols** toggle to enable communication over other protocols. Open the **Protocol** dropdown and select the protocol that you want to use from the following options:

- **In-Sight:** In-Sight is the default protocol for the wafer reader.
- **TSK:** Protocol for use with a TSK wafer prober.
- **TEL:** Protocol for use with a TEL wafer prober.

You can check or uncheck the **Input** and **Output** checkboxes to enable or disable input and output messages on the selected protocol.

If you are using the selected protocol over Ethernet, you also need to specify the port using the **Connection Port** setting.

For Serial Communication, you can enable either **Native Mode**, or **Protocols**, but not both at the same time.

Turn on the **Spreadsheet** toggle in **Serial Communication** to enable communication for Spreadsheet functions that use Serial communication, such as WriteSerial. You can enable **Spreadsheet** at the same time as **Native Mode** or **Protocols**.

If you enable serial communication, configure the following settings in the **Serial Settings** section:

Setting	Description
Baud Rate	Determines the baud rate of the port. You can choose from the following baud rate values: • 1200 • 2400 • 4800 • 9600 (default) • 19200 • 38400 • 57600 • 115200
Data Bits	Determines the data bits of the port. You can choose 7 or 8 as data bits. The default value is 8.
Stop Bits	Determines the stop bits of the port. You can choose 1 or 2. The default value is 1.
Parity	Determines the parity of the port. You can choose from the following: • None (default) • Even • Odd
Handshake	Determines the handshake protocol. You can choose from the following handshake protocols: • None (default) • X-On/X-Off • Hardware
Fixed Input Length	Enables the fixed input length for the line terminator. The default value is 1. The maximum value is 255.
Input Terminator	Determines the input terminator value for the line terminator. The default value is 13. The maximum value is 255.
Output Terminator	Determines the output terminator value for the line terminator. The default value is 13. The maximum value is 255.

Output Formatting

On the **Output Formatting** tab, you can define the content included in the output string, and the order of the elements in the string.

Communications <

- 1 Interfaces
- 2 Output Formatting**
- 3 File Transfer

Format String

	Output	Value	Delimiter	
☒	Output			
☒	String	ML5169930105F2	,	=
☒	Score	198.000	,	=
☒	Passed	1.000	,	=
☒	Processing Time	0.391	,	=

Delimiter: Comma (,)

String Options

☐ Leading Characters

☐ Trailing Characters

In the **Output String** section, check the checkbox for the elements that you want to include in the output string. The following options are available:

- **String**: the string in the read result.
- **Score**: the overall score of the result.
- **Passed**: a boolean value where 1 indicates a passed result, and 0 indicates a failed result.
- **Processing Time**: the processing time for the result, in seconds.

You can reorganize the order of the elements in the string by dragging and dropping the items in the list using the handle on the right side of the list item.

In the **Delimiter** dropdown, select the type of delimiter you want to use in the output string:

- **Comma**
- **Space**
- **Tab**
- **Semicolon**
- **Underscore**
- **Custom Character**

In the **String Options** section, you can optionally enable and define **Leading Characters** and **Trailing Characters** to append to the output string.

In the bottom of the **Output Formatting** tab, the WebUI displays a sample output string. Check the **Show output labels** checkbox to display labels for each element in the sample output string. The labels only appear in the sample output string on this page, and are not included during run time.

File Transfer

On the **File Transfer** tab, you can enable FTP connection.

The screenshot shows the 'File Transfer Settings' panel. On the left, a sidebar under 'Communications' has three tabs: 'Interfaces', 'Output Formatting', and 'File Transfer' (which is selected). The main area contains the following settings:

- Enable file transfer**: A toggle switch that is turned on.
- Server Address**: A text field containing '192.168.7.40' and a port field containing '23'.
- Username**: A text field containing 'cognoid417'.
- Password**: A text field with masked characters and a 'Show/Hide' icon.
- Idle Timeout**: A checkbox that is checked, followed by a value of '20' and a unit of 'sec'.
- TEST CONNECTION**: A button next to a green status indicator 'Connection Successful' and the text 'Last tested 2:16:53 PM 03/22/2023'.
- Transfer Results**: A checkbox that is checked.
- File Name**: A text field containing 'results' and a file extension field containing '.txt'.
- Transfer Images**: A checkbox that is checked.
- Images to Transfer**: A dropdown menu showing 'All images'.
- File Name**: A text field containing 'read_pics' and a file extension field containing '.bmp'.
- Include Pass/Fail Prefix**: A checkbox that is checked.
- File Type**: A dropdown menu showing 'BMP'.
- Image Quality**: A dropdown menu showing 'High'.
- Overlay Graphics**: A toggle switch that is turned on.

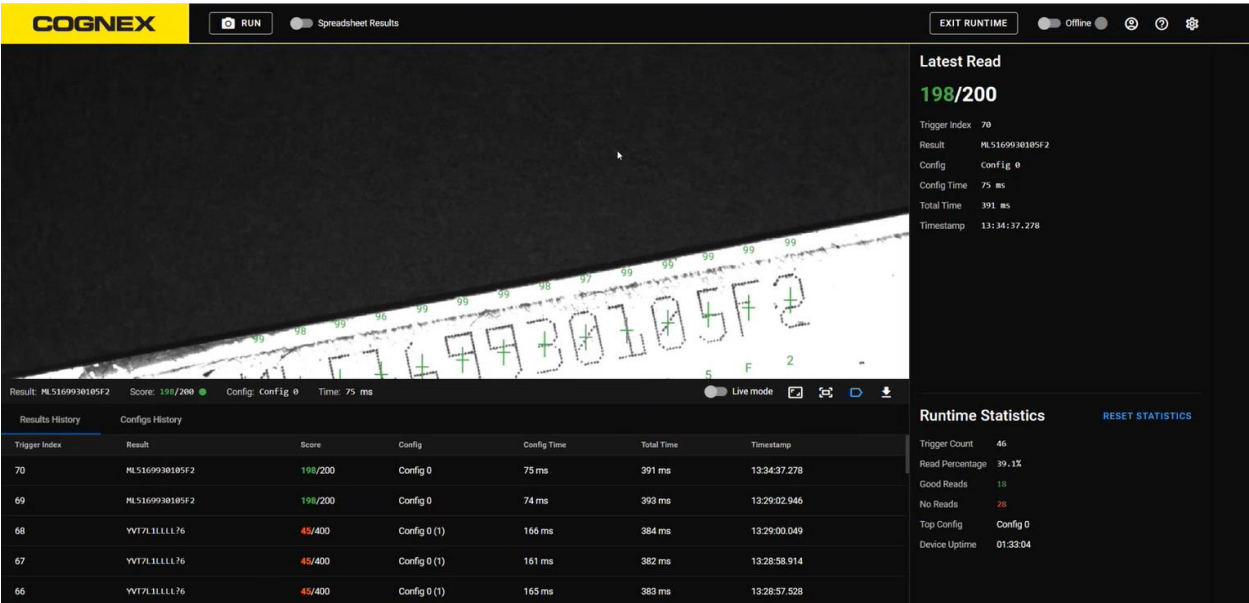
Configure the following settings for your FTP connection:

Setting	Description
Server Address	The address and port of the FTP server you want to connect to.
Username	A valid username for the FTP server.
Password	The password for the provided username.
Idle Timeout	The timeout in seconds for an idle connection.
Transfer Results	Enable or disable results transfer.
File Name	Specify the file name for the transferred results.
Transfer Images	Enable or disable image transfer.
Images to Transfer	Select what images to transfer from the dropdown options: • All images • Failed images only • Passed images only
File Name	Specify the file name for the transferred images, which is appended with an index.
Include Pass/Fail Prefix	Enable or disable adding a prefix to the file name that indicates whether the transferred image produced a passed or failed result.
File Type	Select what file type to use for the transferred images: • BMP • JPG • PNG
Image Quality	Select what image quality to use for the transferred images: • High • Medium • Low
Overlay Graphics	Enable or disable overlay graphics on the transferred images.

Once you have configured your FTP settings, click **Test Connection** to verify that your settings are correct.

Runtime

The **Runtime** app step of the WebUI allows you to view the results during run time.



The image display shows the latest result image. To the right of the image display, the **Latest Read** section provides details for the latest result, highlighting the overall score for the result at the top of the section.

Below the image display, the **Results History** tab shows the list of all the results produced during run time. The **Configs History** tab shows a statistics table with the number of **Attempts**, **Passed** and **Failed** results, and **Average Score** for each enabled config.

In the bottom right of the page, the **Runtime Statistics** section provides overall statistics for the run time, including the number of triggers, the percentage of successful reads, and the best performing config.

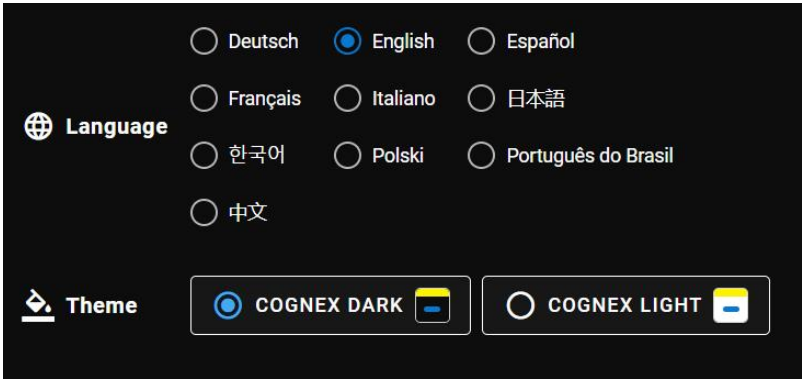
Click **Reset Statistics** to clear the **Runtime Statistics** table. Resetting the statistics clears the result and config histories.

Settings

This section describes the various setting menus available in the WebUI.

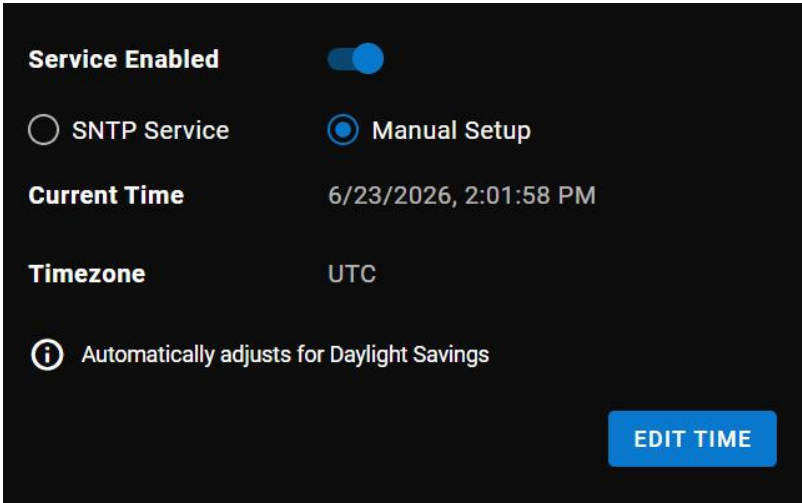
Overview

In the **Overview** tab of **Settings**, you can set up the language and theme of the WebUI.



Date & Time

In the **Date & Time** tab of **Settings**, you can configure date and time settings for your wafer reader by clicking on **Service Enabled**.

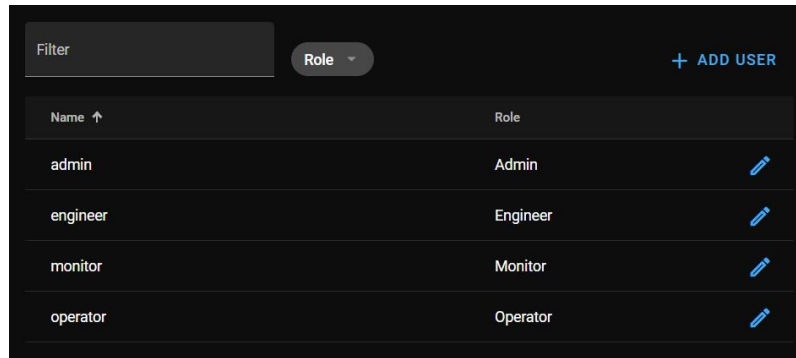


If you select **Manual Setup**, click **Edit Time** to modify the **Current Time** and **Timezone** settings.

If you select **SNTP Service**, you can configure clock time sources between your servers. Choose **Timezone** and enter the IP Addresses or Host Names of the servers.

User Management

In the **User Management** tab of **Settings**, you can manage the authorized users for your wafer reader.



You can filter the list of users by searching for user names in the **Filter** text box, or by roles using the **Role** dropdown.

Click **Add User** to open the dialog for creating a new user. Enter the user name in the **Name** field, and select the role from the **Role** dropdown. You can add a password by entering it in the **Password** and **Confirm Password** fields.

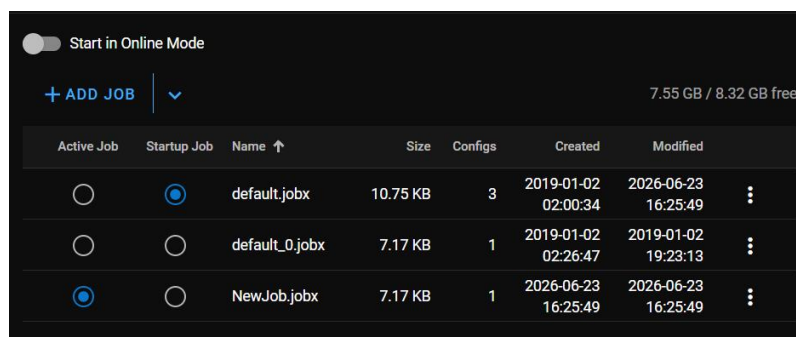
Click on the **Edit** icon for an existing user to modify the role or password for that user.

The following roles are available:

Role	Permissions
Admin	Can perform all tasks.
Engineer	Cannot edit users or perform a factory reset. Can perform all other tasks.
Operator	Can only view Home and Runtime steps, set the wafer reader Online/Offline, or change jobs.
Monitor	Can only view Home and Runtime steps.

Job Management

In the **Job Management** tab of **Settings**, you can manage the jobs on your wafer reader. Jobs are sets of configs, run settings, and communications settings that are configured for a specific application.



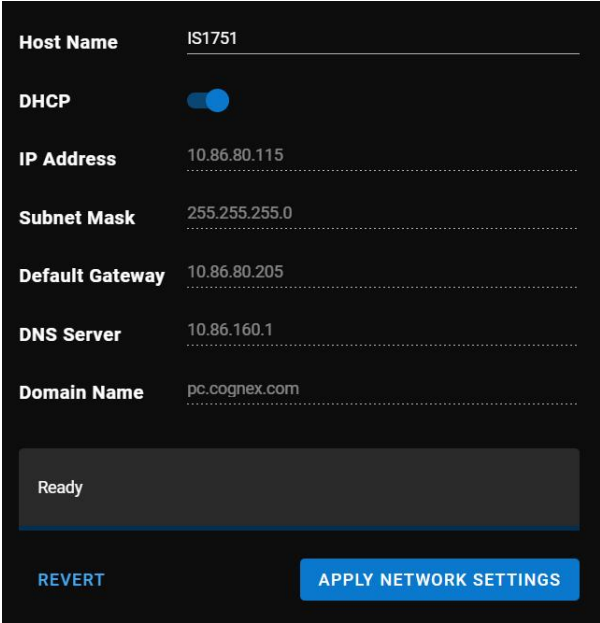
The **Start in Online Mode** toggle allows you to set whether the wafer reader starts up in Online mode. You can use the **Startup Job** radio buttons to select which job you want the wafer reader to load when powered on.

Use the **Active Job** radio buttons to select which job you want to be active in the WebUI.

Click **Add Job** to create a new job, or open the dropdown and select **Upload Job** to upload a job file from your local drive. The In-Sight 1750 wafer reader accepts and automatically converts legacy In-Sight 1740 job files.

Network Settings

In the **Network Settings** tab of **Settings**, you can configure network settings for your wafer reader. To save network settings, click on **Apply**.

A dark-themed settings panel for network configuration. It contains several rows, each with a label on the left and a text input field on the right. The labels are 'Host Name', 'DHCP', 'IP Address', 'Subnet Mask', 'Default Gateway', 'DNS Server', and 'Domain Name'. The input fields contain the values 'IS1751', a blue toggle switch, '10.86.80.115', '255.255.255.0', '10.86.80.205', '10.86.160.1', and 'pc.cognex.com' respectively. Below these fields is a dark grey bar with the word 'Ready' in white. At the bottom, there are two buttons: a blue 'REVERT' button on the left and a blue 'APPLY NETWORK SETTINGS' button on the right.

Host Name	IS1751
DHCP	☒
IP Address	10.86.80.115
Subnet Mask	255.255.255.0
Default Gateway	10.86.80.205
DNS Server	10.86.160.1
Domain Name	pc.cognex.com

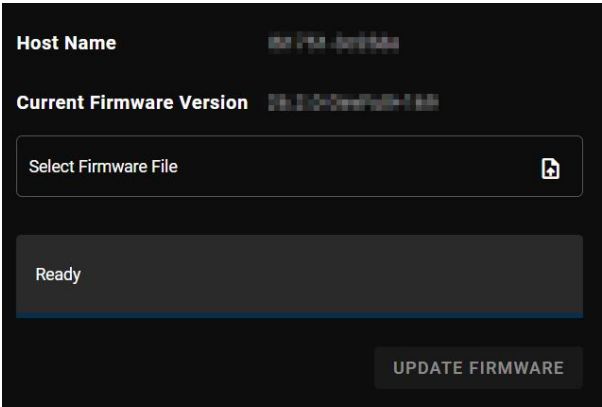
Ready

REVERT APPLY NETWORK SETTINGS

- **Host Name:** Specifies the host name.
- **DHCP:** Enables or disables DHCP.
- **IP Address:** Specifies the IP address.
- **Subnet Mask:** Specifies the subnet mask.
- **Default Gateway:** Specifies the default gateway.
- **DNS Server:** Specifies the DNS server.
- **Domain Name:** Specifies the domain name.

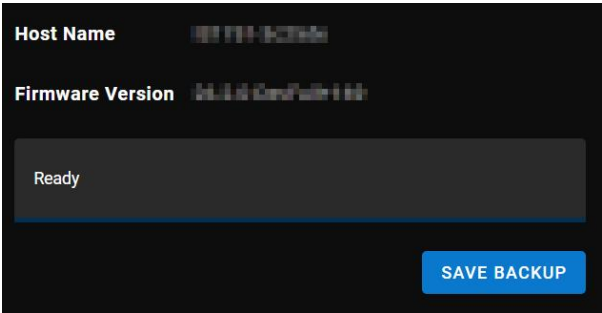
Firmware Update

The **Firmware Update** tab of **Settings** allows you to update the firmware of your wafer reader by uploading the firmware file from your PC and then clicking on **Update Firmware**.



Backup Device

The **Backup** tab of **Settings** allows you to save the wafer reader configuration to a backup file by clicking on **Save Backup**.



Restore Backup

The **Restore Backup** tab of **Settings** allows you to restore the wafer reader from a backup file by selecting your backup file and clicking on **Restore**.

To override the current network settings of the wafer reader with the network settings of the backup file, enable the **Restore Network Settings** toggle.

Note:

- If you enable the **Restore Network Settings**, the secure communication settings are copied from the backup file to the target wafer reader.
- The secure communication files are only restored if the **Restore Network Settings** toggle is enabled.

Host Name 192.168.1.100

Firmware Version 1.0.0-00000000-0000

Restore Network Settings ☐

Select Backup File

Ready

RESTORE FROM BACKUP

Note: If restoring your wafer reader changes the IP address of the reader, your connection to the wafer reader is lost when the restore process finishes. You can find the new IP address of the wafer reader using device discovery in Station Manager.

Reboot Device

The **Reboot** tab of **Settings** allows you to reboot the wafer reader.

Host Name 192.168.1.100

Ready

REBOOT DEVICE

After clicking **Reboot Device**, the screen confirms that the wafer reader initiated the reboot. Rebooting takes a few seconds to finish.

Factory Reset

The **Factory Reset** tab of **Settings** allows you to reset the wafer reader to factory settings by clicking **Factory Reset**.

Host Name 192.168.1.100

Firmware Version 1.0.0-00000000-0000

Ready

FACTORY RESET

Note: If restoring your wafer reader changes the IP address of the reader, your connection to the wafer reader is lost when the restore process finishes. You can find the new IP address of the wafer reader using device discovery in Station Manager.

Using Your Wafer Reader in In-Sight Vision Suite

In addition to the WebUI, you can also use In-Sight Vision Suite to manage your wafer reader.

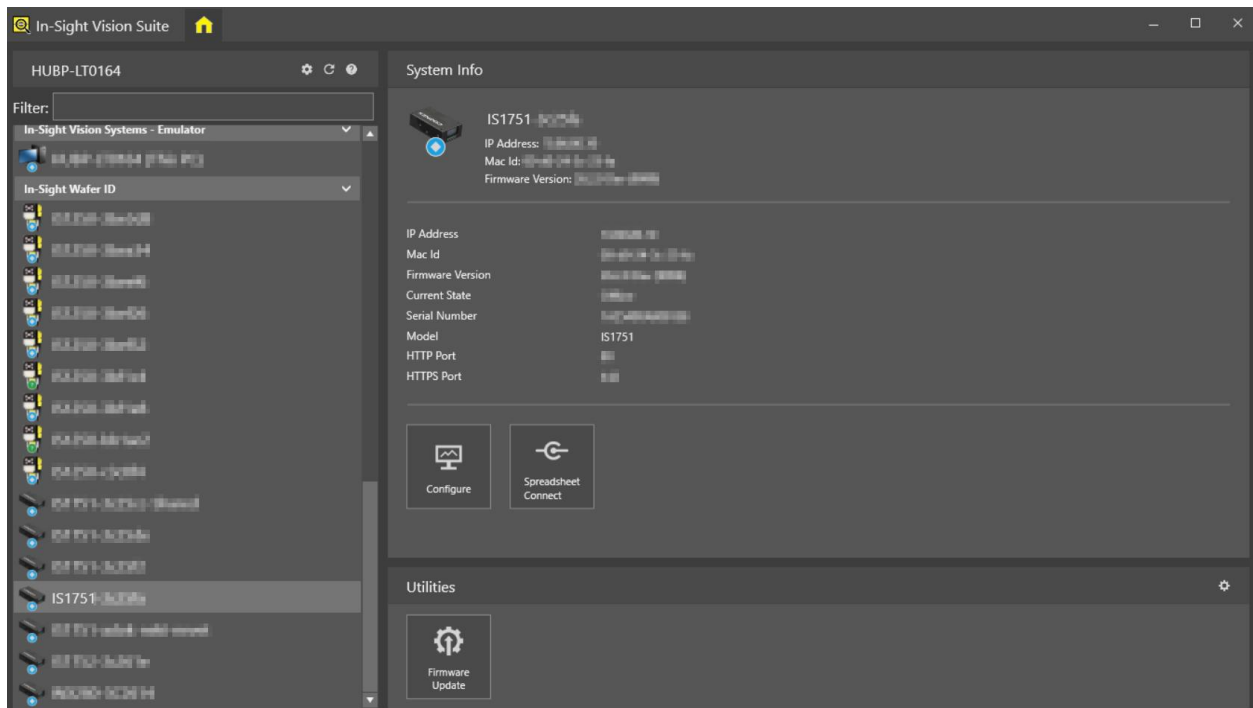
Download the latest version of the In-Sight Wafer ID installer from support.cognex.com, and install the software on your PC. The In-Sight Wafer ID installer installs the following components:

- In-Sight Vision Suite, if you do not already have it installed.
- The In-Sight Wafer ID adapter, which allows In-Sight Vision Suite to discover and connect to your wafer reader.

In the In-Sight Vision Suite home screen, open the **System Settings** menu and use one of the following **Device Discovery** options to discover your wafer reader:

- **Configure Manual Devices:** allows you to discover your wafer reader directly using an IP address.
- **Remote Subnet Settings:** allows you to discover your wafer reader by providing the remote subnet where your wafer reader is connected.

Once you have discovered your wafer reader in In-Sight Vision Suite, the wafer reader appears in the device list on the left side of the home screen, under the **In-Sight Wafer ID** heading.



If you select your wafer reader in the device list, In-Sight Vision Suite displays the device information and provides you with the following options:

- **Configure:** opens the WebUI for the wafer reader in your browser. For more information, see [Application Steps on page 28](#).
- **Spreadsheet Connect:** connects to the wafer reader using Spreadsheet. For more information, see [Using Your Wafer Reader with In-Sight Spreadsheet on page 61](#).

Note: If a user is already connected to the wafer reader, In-Sight Vision Suite does not allow you to take over the connection.

-
- **Factory Reset:** opens the Factory Reset utility, which allows you to reset your wafer reader to factory settings.
 - **Firmware Update:** opens the **Firmware Update** utility, which allows you to update the firmware on your wafer reader.

The following In-Sight Vision Suite tools in the **System Settings** menu are not applicable to In-Sight 1750 wafer readers:

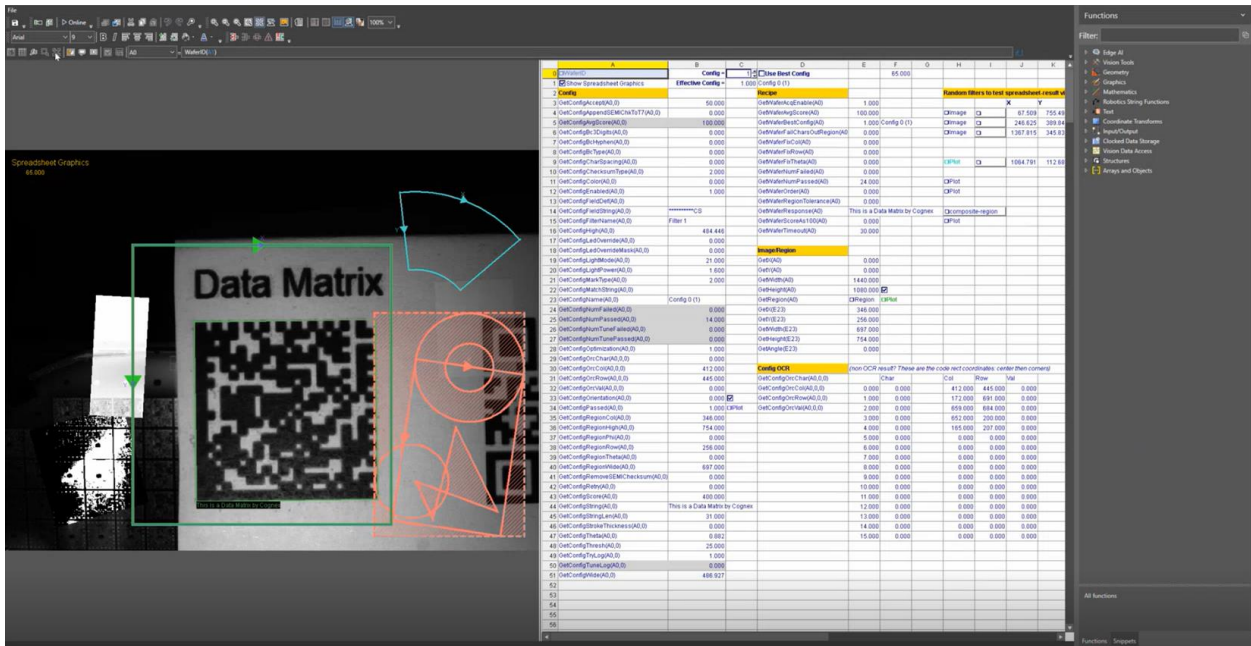
- **Compare Jobs**
- **File Server**

The **Support Feedback Utility** is not displayed in the **Utilities** list, but is still accessible and available in the **Help** menu.

Using Your Wafer Reader with In-Sight Spreadsheet

In-Sight Spreadsheet is an advanced job configuration interface for vision applications. Spreadsheet allows you to set up function chains for various tasks, such as fixturing, feature finding, or input and output configuration. You can use Spreadsheet to apply additional post-processing to the results from the WebUI, and extract more detailed statistics about the running configs.

For detailed information about using In-Sight Spreadsheet, refer to the *In-Sight Spreadsheet Help* document in the **Help** menu on the home screen of In-Sight Vision Suite.



All acquisition happens in the WebUI, including configuration. The In-Sight 1750 wafer reader does not have an **Acquisition Panel** in Spreadsheet, and does not have the *AcquireImage*, *InputImage*, or *ApplyAcquisitionSettings* functions in the **Functions** toolbox.

When you use Spreadsheet with an In-Sight 1750 wafer reader, the A0 cell is a *WaferID* structure that contains results from the WebUI.

The *WaferID* function takes only one parameter, which is controlled by the **Show Spreadsheet Graphics** checkbox in the A1 cell. When you check the checkbox, the output graphics from the WebUI are shown on the input image in Spreadsheet.

Vision Data Access Functions for Wafer Readers

In addition to the functions described in the *In-Sight Spreadsheet Help* document, the **Vision Data Access > WaferID** function group in the **Functions** toolbox also contains additional getter functions that allow you to extract configuration data from the WaferID structure:

Function	Description
<i>GetConfigAccept</i>	Returns the minimum response threshold for the raw reading score for the specified config from a WaferID data structure.
<i>GetConfigAppendSEMChkToT7</i>	Returns the index of the Append Semi Checksum to T7 setting for the specified config.

Function	Description
<i>GetConfigAvgScore</i>	Returns the average raw response score of all reads that passed for the specified config.
<i>GetConfigBc3Digits</i>	Returns 1 if wafer lot numbers are expanded to be three digits, and 0 if they are not expanded for the specified config.
<i>GetConfigBcHyphen</i>	Returns 1 if a hyphen is used to separate the last two digits of the barcode string, and 0 if a hyphen is not used for the specified config.
<i>GetConfigBcType</i>	Returns the Compressed Barcode type for the specified config.
<i>GetConfigCharSpacing</i>	Returns the character spacing value for the specified config.
<i>GetConfigChecksumType</i>	Returns the index of the Checksum selection for the specified config.
<i>GetConfigColor</i>	Returns the index of the Color selection for the specified config.
<i>GetConfigEnabled</i>	Returns the status of the Enabled checkbox for the specified config.
<i>GetConfigFieldDef</i>	Returns the contents of the Field Definition setting for the specified config.
<i>GetConfigFieldString</i>	Returns the contents of the Field String setting for the specified config.
<i>GetConfigFilterName</i>	Returns the filter name for the specified config.
<i>GetConfigHigh</i>	Returns the height of a 2D symbol or the average height of the characters in a string for the specified config.
<i>GetConfigLedOverride</i>	Returns if the custom light mode override is enabled.
<i>GetConfigLedOverrideMask</i>	Returns the decimal value of the enabled light row(s).
<i>GetConfigLightMode</i>	Returns the index of the Light Mode selection for the specified config.
<i>GetConfigLightPower</i>	Returns the Light Power selection for the specified config.
<i>GetConfigMarkType</i>	Returns the index of the mark type selection for the specified config.
<i>GetConfigMatchString</i>	Returns the contents of the Match String setting for the specified config.
<i>GetConfigName</i>	Returns the name of the specified config.
<i>GetConfigNumFailed</i>	Returns the number of failed reads for the specified config.
<i>GetConfigNumPassed</i>	Returns the number of passed reads for the specified config.
<i>GetConfigNumTuneFailed</i>	Returns the number of failed reads during a tune for the specified config.
<i>GetConfigNumTunePassed</i>	Returns the number of passed reads during a tune for the specified config.
<i>GetConfigOptimization</i>	Returns the index of the Optimization setting for the specified config.
<i>GetConfigOrcChar</i>	Returns the ASCII value of the indexed character in a string for the specified config.
<i>GetConfigOrcCol</i>	Returns the column coordinate of the indexed character in a string for the specified config.
<i>GetConfigOrcRow</i>	Returns the row coordinate of the indexed character in a string for the specified config.
<i>GetConfigOrcVal</i>	Returns the score of an indexed character in a string for the specified config.
<i>GetConfigOrientation</i>	Returns the index of the Img Orientation setting for the specified config.
<i>GetConfigPassed</i>	Returns the pass/fail status of the specified config for the most recent read.
<i>GetConfigRegionCol</i>	Returns the column setting of the Region of Interest for the specified config.
<i>GetConfigRegionHigh</i>	Returns the height setting of the Region of Interest for the specified config.

Function	Description
<i>GetConfigRegionPhi</i>	Returns the curvature setting of the Region of Interest for the specified config.
<i>GetConfigRegionRow</i>	Returns the row setting of the Region of Interest for the specified config.
<i>GetConfigRegionTheta</i>	Returns the rotation setting of the Region of Interest for the specified config.
<i>GetConfigRegionWide</i>	Returns the width setting of the Region of Interest for the specified config.
<i>GetConfigRemoveSEMIChecksum</i>	Returns the index of the Remove SEMI Checksum setting for the specified config.
<i>GetConfigRetry</i>	Returns the index of the Retry setting for the specified config.
<i>GetConfigScore</i>	Returns the score for the specified config during the most recent read.
<i>GetConfigString</i>	Returns the character results for the specified config during the most recent read.
<i>GetConfigStringLen</i>	Returns the number of characters that are contained in the result string for the specified config.
<i>GetConfigStrokeThickness</i>	Returns the stroke thickness for the specified config.
<i>GetConfigTheta</i>	Returns the orientation of the mark for the specified config.
<i>GetConfigThresh</i>	Returns the single character response threshold for the specified config.
<i>GetConfigTryLog</i>	Returns the Retry status of the specified config during the last read.
<i>GetConfigTuneLog</i>	Returns the Retry and Tune status of the specified config during the last read.
<i>GetConfigWide</i>	Returns the width of a 2D symbol or the average width of the characters in a string for the specified config.
<i>GetWaferAcqEnable</i>	Returns the status of the Disable Acquire setting.
<i>GetWaferAvgScore</i>	Returns the average raw response scores for all configs that passed.
<i>GetWaferBestConfig</i>	Returns the index of the config that passed during the last read.
<i>GetWaferFailCharsOutRegion</i>	Returns the index of the Fail Characters Outside the Region setting.
<i>GetWaferFixCol</i>	Returns the column coordinate of the fixture.
<i>GetWaferFixRow</i>	Returns the row coordinate of the fixture.
<i>GetWaferFixTheta</i>	Returns the orientation of the fixture.
<i>GetWaferNumFailed</i>	Returns the number of failed reads for all configs.
<i>GetWaferNumPassed</i>	Returns the number of passed reads for all configs.
<i>GetWaferOrder</i>	Returns the index of the Read Order setting.
<i>GetWaferRegionTolerance</i>	Returns the region tolerance value for the recipe.
<i>GetWaferResponse</i>	Returns the string of the highest score passing config from the most recent full run result.
<i>GetWaferScoreAs100</i>	Returns the state of the optional scoring setting for character positions fielded as dashes (-), dots (.), pound characters (#) and spaces ().
<i>GetWaferTimeout</i>	Returns the total amount of time in seconds to allow for a read, including retries and tuning of enabled configs.

Using Native Mode Communications

The In-Sight Native Mode protocol is an ASCII protocol that allows an In-Sight wafer reader to be controlled from any of the following:

- Custom application programs running on a PC.
- Telnet over an Ethernet network.
- Modbus TCP over an Ethernet network.
- Serial communication through a USB connection.
- Commands over an MQTT connection.

The general syntax of a Basic Native Mode command is `[command] [parameter] [terminator]`, where:

- The `[command]` consists of two characters. Some Native Mode commands take an optional `[parameter]`.
- The Basic Native Mode command is completed with a `[terminator]` character. The default terminator is CR + LF (ASCII characters 13 + 10) or NUL (ASCII character 0) when sending Native Mode commands using a telnet connection.
- When you remotely issue a Native Mode command to an In-Sight wafer reader, the wafer reader processes the command and then returns a response consisting of an ASCII string followed by the terminator character.
- Basic Native Mode commands are not case-sensitive. No spaces exist between parameters, except when numerical arguments need to be separated.

For more information about using Native Mode commands, refer to the *Native Mode Commands* section in the *In-Sight Spreadsheet Help* document.

Native Mode Commands for Wafer ID

The In-Sight 1750 wafer reader supports most Basic Native Mode commands, except **Send Manual Trigger**, **Run Job Validation**, **Cancel Job Validation**, and **Get Job Validation**. In addition, the following Wafer ID-specific Native Mode commands are available:

Command	Command Name	Description	Syntax
AE	Abort Execution	Terminates the current execution of a specified function within Spreadsheet.	AE [FunctionID]
RI	Read Image	Sends the current image, in ASCII hexadecimal format (formatted to 80 characters per line), from an In-Sight wafer reader to a remote device. When converted to binary, the resulting data is in standard BMP image format.	RI
WB	Write BMP	Sends image data from a remote device to an In-Sight wafer reader.	WB [Size] [Image] [Checksum]
WI	Write Image	Sends image data from a remote device to an In-Sight wafer reader.	WI [Size] [Image] [Checksum]

Command	Command Name	Description	Syntax
EV	Evaluate	Executes In-Sight functions as well as inserts formulas into the In-Sight Spreadsheet. For more information, see Using the Evaluate (EV) Command on page 66 .	EV [Command]

For more information about the supported Native Mode commands, including command references, see the *In-Sight Wafer Native Mode Command Reference* manual, which you can find in the [online support resources](#).

Using the Evaluate (EV) Command

The **Evaluate (EV)** Native Mode command executes commands for retrieving information from and making changes to In-Sight wafer readers.

The input argument for the EV command can be any supported wafer reader command. The EV command allows you to perform tasks such as changing a config setting or retrieving data from results.

Acquire Image for Spreadsheet Without WebUI Processing

The **EV AcquireConfigAndRunSheet** command allows you to acquire an image for Spreadsheet without running a config or recipe in the WebUI. This is useful when you want to use Spreadsheet processing without any processing in the WebUI.

To use the **AcquireConfigAndRunSheet** command, issue an EV command with the following syntax:

```
EV AcquireConfigAndRunSheet A0 [ConfigIndex]
```

This command acquires a new image in the A0 cell in Spreadsheet using the acquisition settings in the config with the specified index, without running the rest of the config.

Additional Wafer Reader-Specific Evaluate Commands

In-Sight 1750 wafer readers support most Evaluate commands that were supported by the previous generation of In-Sight 1740 series wafer readers, with the following exceptions.

For detailed command references for the supported Evaluate commands, see the *In-Sight Wafer ID Native Mode Communications Reference Manual* manual, which you can find in the [online support resources](#).

In-Sight 1750 wafer readers do not support the following Evaluate commands:

Not Supported Evaluate (EV) Commands			
GetWaferOnlinePromptToSave	GetCellValue	GetExternalLightMode	SetNetwork
GetWaferRecoveryMode	SetCellValue	SetExternalLightMode	GetSerialPort
GetWaferTuneUpdateImage	GetDeEnergizeOutputs	GetFTPSettings	SetSerialPort
SetWaferOnlinePromptToSave	SetDeEnergizeOutputs	SetFTPSettings	GetStartup
SetWaferRecoveryMode	GetDiagnosticLog	GetHostTable	SetStartup
SetWaferTuneUpdateImage	GetDiscrete	SetHostTable	GetUserList
GetCellName	SetDiscrete	GetMSBuffer	SetEditRegion
SetCellName	GetEasyBuilderTag	GetNetwork	SetFavorHostTable
GetSystemConfig	SetSystemConfig		

Specifications

In-Sight 1750 Series Wafer Reader

Specification	1751	1752
Minimum Firmware Requirement	In-Sight Wafer ID version 26.2.0	
Job/Program Memory	7.2 GB non-volatile flash memory; unlimited storage via remote network device.	
Image/Processing Memory	4 GB SD RAM	
Sensor Type	1/2.8-inch CMOS	
Sensor Properties	6.34 mm diagonal, 2.8 x 2.8 μm sq. pixels	
Resolution (pixels)	1920 x 1200 (cropped 1896 x 960)	
Electronic Shutter Speed	100 μs to 435 ms	
Acquisition	Rapid reset, progressive scan (supports partial scan), full-frame integration.	
Bit Depth	256 gray levels (8 bits/pixel).	
Image Gain/Offset	Controlled by software.	
Frames Per Second ¹	41 full frames per second.	17 full frames per second.
Illumination Area	38 mm (W) x 19 mm (H) (nominal; depends on light mode)	38 mm (W) x 19 mm (H) (nominal; depends on light mode)
LEDs	- Red LEDs, 625 nm wavelength, with the ability to read bright field and dark field images. - Green LEDs, 530 nm with the ability to read dark field images. - Blue LEDs, 465 nm with the ability to read dark field images.	IR LEDs, 850 nm wavelength, with the ability to read bright field and dark field images.
Light Modes	11 internal (bright and dark field), plus one external dark field.	
Light Power	Variable exposure controlled through software.	
Working Distance	Adjustable, with factory-set option of 50.0 mm (vertical). Recommended Working Distance Ranges: 5.0 mm to 80.0 mm (vertical with External LEDs OFF); 21.0 mm to 80.0 mm (vertical with External LEDs ON); 1.0 mm to 52.1 mm (horizontal).	
Trigger	1 opto-isolated, acquisition trigger input. Remote software commands via Ethernet and RS-232.	

¹ Maximum frames per second are job dependent and based on a 8ms exposure and a full image frame capture.

Specification	1751	1752
Discrete Inputs	None.	
Discrete Outputs	None.	
Status LEDs	1 Network Traffic/Network Status, 2 Reserved, 1 Power	
Network Communication	1 Ethernet port, 10/100/1000 Base-T, TCP/IP protocol. Supports DHCP (factory default), static and link-local IP address configuration.	
Serial Communication	1 RS-232C port (1200 to 115,200 baud rates).	
Protocols	In-Sight Native Mode, TEL and TSK.	
Power	24 $\pm$ 10% V DC, 1.0 A Max Absolute min/max 19.2 V to 30 V No Illumination: 100 mA Internal LEDs On: +40 mA External LEDs On: +20 mA	24 $\pm$ 10% V DC, 1.0 A Max Absolute min/max 19.2 V to 30 V No Illumination: 100 mA Internal LEDs On: +55 mA External LEDs On: +40 mA
Material	Aluminum housing, black painted.	
Mounting	Eight 7.3 mm deep M4 threaded mounting holes (four per side). The wafer reader must be mounted from only one side. Mounting the wafer reader from both sides may damage optical components. The maximum torque is 5.85 N-m (51.8 in-lb).	
Dimensions	125.7 mm (4.9 in) x 70 mm (2.8 in) x 36.5 mm (1.4 in) Horizontal configuration length with mirror installed: 155.5 mm (6.1 in)	
Weight	394 g (13.9 oz) With mirror installed: 430.5 g (15.2 oz)	
Operating Temperature	0°C to 40°C (32° F to 104° F)	
Storage Temperature	-30°C to 80°C (-22° F to 176° F)	
Humidity	35 to 85%, non-condensing (Operating and Storage).	
Regulatory Compliance	CE, FCC, KCC, TÜV SÜD NRTL, RoHS	
	This equipment conforms with the applicable requirements of SEMI S2-0821 and S8-0218.	

Reading Capability

Mark Type	SEMI M12, M13	SEMI M1.15	SEMI T1-95	Non-SEMI Standard
OCR	Semi font	Semi font	N/A	Triple, OCR-A, IBM, Chartered fonts
2D	N/A	T7 Data Matrix	N/A	Data Matrix, QR Code
Barcodes	N/A	N/A	BC 412	IBM 412

I/O Specifications

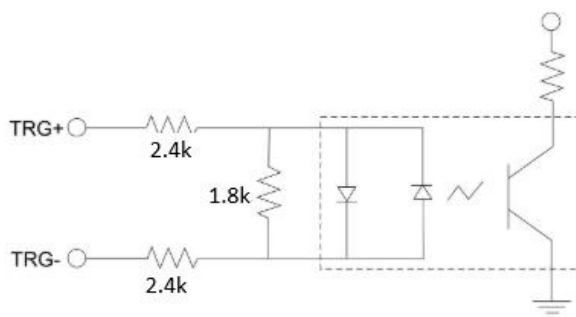
The 1750 wafer reader feature one built-in acquisition trigger input.

Acquisition Trigger Input Specifications

Specification	Description
Voltage	ON: 11 V to 30 V (24 V nominal) OFF: 0 V to 5 V (9.5 V nominal threshold)
Current	ON: 4.7 mA OFF: <250 μ A Resistance: ~6600 Ohms For higher current add external resistor (for example, 3.3 k Ω , 0.5 W for 12 mA) across inputs.
Delay	6 μ s latency between leading edge of trigger and start of acquisition. Input pulse must be a minimum of 9 μ s wide.

The acquisition trigger input is opto-isolated. To trigger from an NPN (pull-down) type photoelectric sensor or PLC output, connect pin 2 (TRG+) to +24 V and connect pin 3 (TRG-) to the output of the photoelectric sensor. When the output turns ON, it pulls TRG- down to 0 V, turning the opto-coupler ON.

To trigger from a PNP (pull-up) photoelectric sensor or PLC output, connect pin 2 (TRG+) to the output of the photoelectric sensor and connect pin 3 (TRG-) to 0 V. When the output turns ON, it pulls TRG+ up to 24 V, turning the opto-coupler ON.



Acquisition Trigger Input Schematic

Ethernet Cable Specifications

The CAT5e Ethernet cable allows you to connect the wafer reader to other network devices. You can connect the Ethernet cable to a single device or provide connections to multiple devices through a network switch or router.

Straight-Pinned		
Signal Name	RJ-45 Connectors	Wire Color
TPO+	1	WHITE/ORANGE
TPO-	2	ORANGE
TPI+	3	WHITE/GREEN
TRMA	4	BLUE
TRMB	5	WHITE/BLUE
TPI-	6	GREEN
TRMC	7	WHITE/BROWN
TRMD	8	BROWN

CAT5e Ethernet Cable 568-B Wire Pairs

Pair #	Wire Pairs
1	4 - 5
2	1 - 2
3	3 - 6
4	7 - 8

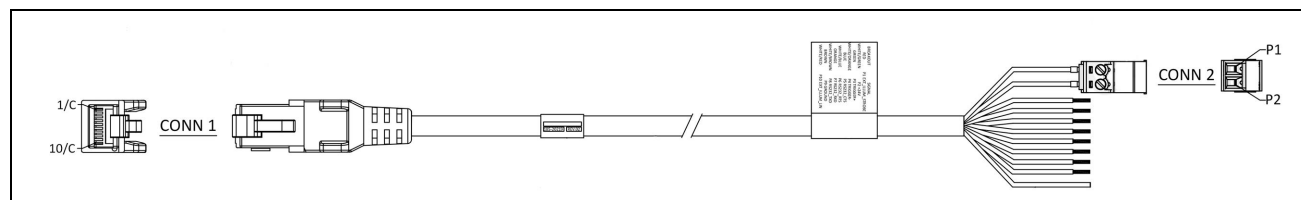
Note:



- Cables are sold separately.
- Cognex-supplied, straight-pinned and crossover network patch cables meet CAT5e specifications using 568-B standard wire pairing.

Breakout Cable Specifications

The Breakout cable provides access to power, serial communication and strobe.



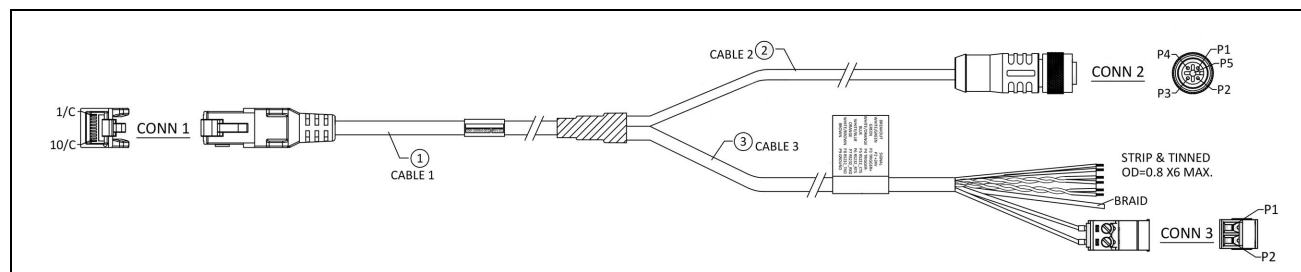
WIRE RUN LIST					
AWG	CONN1		COLOR	CONN 2	SIGNAL
26	1/C	Twisted pair	RED	-	STROBE
	10/C		WHITE/RED	-	LIN_BUS
	3/C	Twisted pair	GREEN	-	TRIGGER+
	2/C		WHITE/GREEN	1	+24 V
	7/C	Twisted pair	ORANGE	-	RS232_RXD
	4/C		WHITE/ORANGE	-	TRIGGER-
	5/C	Twisted pair	BLUE	-	RS232_CTS
	6/C		WHITE/BLUE	-	RS232_RTS
	9/C	Twisted pair	BROWN	2	GND
	8/C		WHITE/BROWN	-	RS232_TXD
SHIELD	SHELL	-	SHIELD	-	SHIELD

Note:

- Cables are sold separately.
- Unused bare wires can be clipped short or tied back using a tie made of non-conductive material. Keep all bare wires separated from the +24VDC (White/Green) wire.
- The housing of the wafer reader is internally connected to the system ground wire (pin 9 of the Breakout cable). Therefore, if the mounting surface of the wafer reader is at a non-zero ground potential, it is strongly recommended that the wafer reader be mounted on an isolated or non-conductive mount.

Breakout and External Light Y-Cable Specifications

The breakout and external light Y-cable allows you to connect your wafer reader simultaneously to power, serial communication, and triggering using the flying leads, and to external lights using the M12 connector.



WIRE RUN LIST								
AWG	CONN1		CABLE 1	CABLE 2	CONN 2	CABLE 3	CONN 3	SIGNAL
26	1	Twisted pair	RED	BLUE	4	-	-	STROBE
	10		WHITE/RED	GRAY	2	-	-	LIN_BUS
	2	Twisted pair	WHITE/GREEN	GREEN	1	WHITE/GREEN	1	+24 V
	3		GREEN	-	-	GREEN	-	TRIGGER+
	4	Twisted pair	WHITE/ORANGE	-	-	WHITE/ORANGE	-	TRIGGER-
	7		ORANGE	-	-	ORANGE	-	RS232_RXD
	6	Twisted pair	WHITE/BLUE	-	-	WHITE/BLUE	-	RS232_RTS
	5		BLUE	-	-	BLUE	-	RS232_CTS
	8	Twisted pair	WHITE/BROWN	-	-	WHITE/BROWN	-	RS232_TXD
	9		BROWN	WHITE	3	BROWN	2	GND
SHIELD	SHELL	-	SHIELD	SHIELD	5	SHIELD	-	SHIELD


Note:

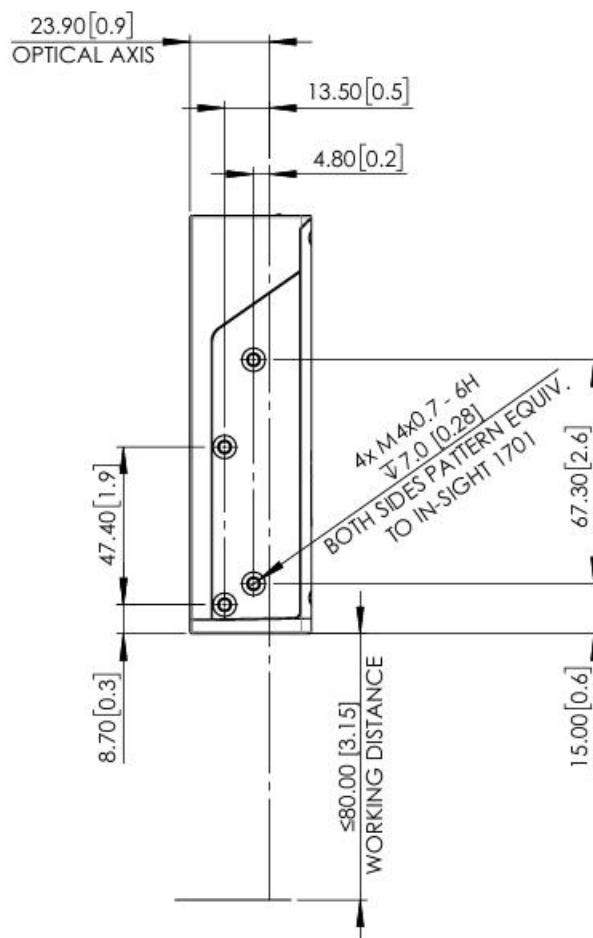
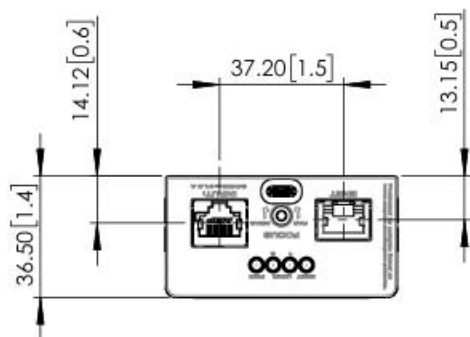
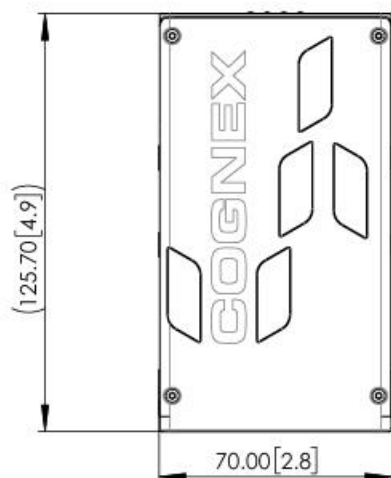
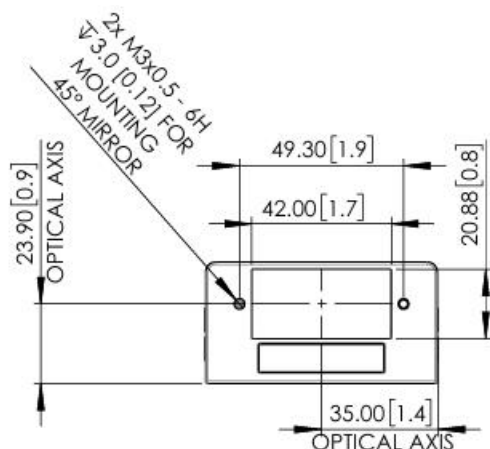
- Cables are sold separately.

Dimensional Drawings

Refer to the following dimensional drawings for the In-Sight 1750 series wafer readers.

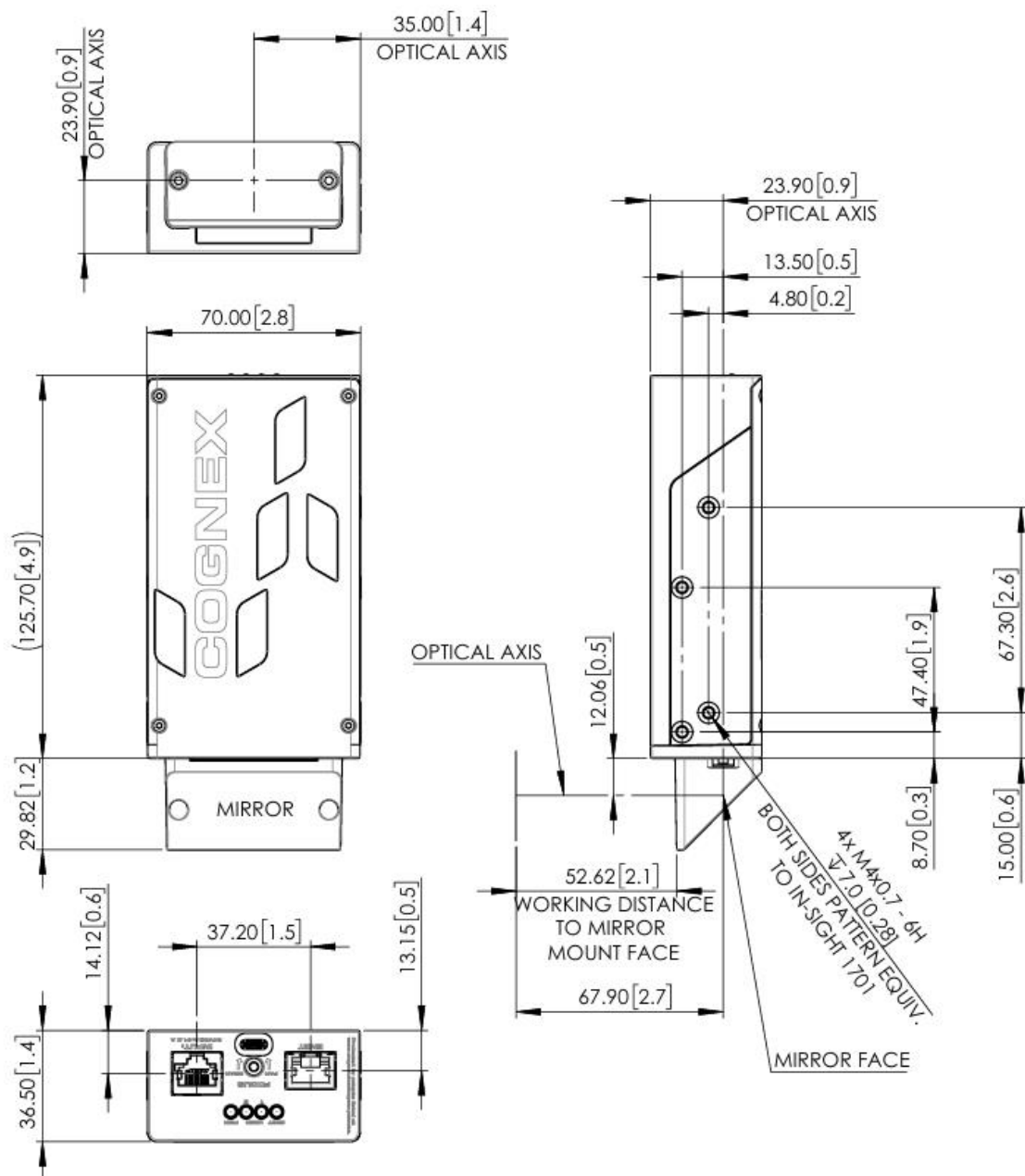
Note:


- Dimensions are in millimeters [inches] and are for reference purposes only.
- All specifications may be changed without notice.



In-Sight 1750 Series Wafer Reader Dimensions

CAUTION: The wafer reader must be mounted from only one side. Mounting the wafer reader from both sides may damage optical components. The maximum torque is 5.85 N-m (51.8 in-lb).



In-Sight 1750 Series Wafer Reader Dimensions with Horizontal Mirror Mount

CAUTION: The wafer reader must be mounted from only one side. Mounting the wafer reader from both sides may damage optical components. The maximum torque is 5.85 N-m (51.8 in-lb).

Regulations and Conformity

Note: For the most current CE and UKCA declaration and regulatory conformity information, see the Cognex support site: cognex.com/support.

In-Sight 1750 wafer readers have the Regulatory Model number 50140 and meet or exceed the requirements of all applicable standards organizations for safe operation. However, as with any electrical equipment, the best way to ensure safe operation is to operate them according to the agency guidelines that follow. Please read these guidelines carefully before using your wafer reader.

Safety and Regulatory	
Manufacturer	Cognex Corporation One Vision Drive Natick, MA 01760 USA
	In-Sight 1751: Regulatory Model 50140 In-Sight 1752: Regulatory Model 50140 This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take immediate measures. This equipment complies with the essential requirements of the EU Directive 2014/30/EU. Declarations are available from your local representative.
EU RoHS	Compliant to the most recent applicable directive.
FCC	FCC Part 15, Class A This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Korea 	This device is certified for office use only and if used at home, there can be frequency interference problems. A급 기기 (업무용 방송통신기자재): 이 기기는 업무용 (A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다. In-Sight 1751: Regulatory Model 50140 In-Sight 1752: Regulatory Model 50140
TÜV	In-Sight 1751: Regulatory Model 50140 In-Sight 1752: Regulatory Model 50140
	NRTL: TÜV SÜD, IEC/EN 61010-1.
	CB report available upon request. TÜV SÜD, IEC/EN 61010-1.
UK 	In-Sight 1250: Regulatory Model 50141 In-Sight 1751: Regulatory Model 50140 In-Sight 1752: Regulatory Model 50140 This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take immediate measures. This equipment complies with the essential requirements of the Electromagnetic Compatibility Regulations 2016. Declarations are available from your local representative.

中国 RoHS 合规声明 / China RoHS Compliance Declaration

根据《电器电子产品有害物质限制使用管理办法》(GB 26572-2025) 及《电器电子产品有害物质限制使用标识要求》(SJ/T 11364-2024), 本公司对所提供产品的有害物质含量进行如下声明:

In accordance with the "Administrative Measures on the Restriction of Hazardous Substances in Electrical and Electronic Products" (GB 26572-2025) and "Marking for the Restriction of Hazardous Substances in Electrical and Electronic Products" (SJ/T 11364-2024), our company hereby declares the hazardous substance content in the provided products as follows:



	Hazardous Substances 有害物质									
部件名称 Part Name	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价 铬 (Cr ⁶⁺)	多溴 联苯 (PBB)	多溴二苯醚 (PBDE)	邻苯二甲酸 二(2-乙基己) 酯 (DEHP)	邻苯二甲酸 丁苯酯 (BBP)	邻苯二甲酸 二丁酯 (DBP)	邻苯二甲酸 二异丁酯 (DIBP)
Regulatory Model 50140	X	O	O	O	O	O	O	O	O	O

说明 / Note:
“O”表示该有害物质在所有均质材料中的含量均低于 GB 26572-2025 的限量要求。

"O" indicates that the hazardous substance content in all homogeneous materials is below the limit requirement of GB 26572-2025.

“X”表示该有害物质在至少一个均质材料中的含量高于 GB 26572-2025 的限量要求。

"X" indicates that the hazardous substance content in at least one homogeneous material exceeds the limit requirement of GB 26572-2025.

For European Community Users

Cognex complies with Directive 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE).

This product has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment, if not properly disposed.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems for product disposal. Those systems will reuse or recycle most of the materials of the product you are disposing in a sound way.



The crossed out wheeled bin symbol informs you that the product should not be disposed of along with municipal waste and invites you to use the appropriate separate take-back systems for product disposal.

If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You may also contact your supplier for more information on the environmental performance of this product.

