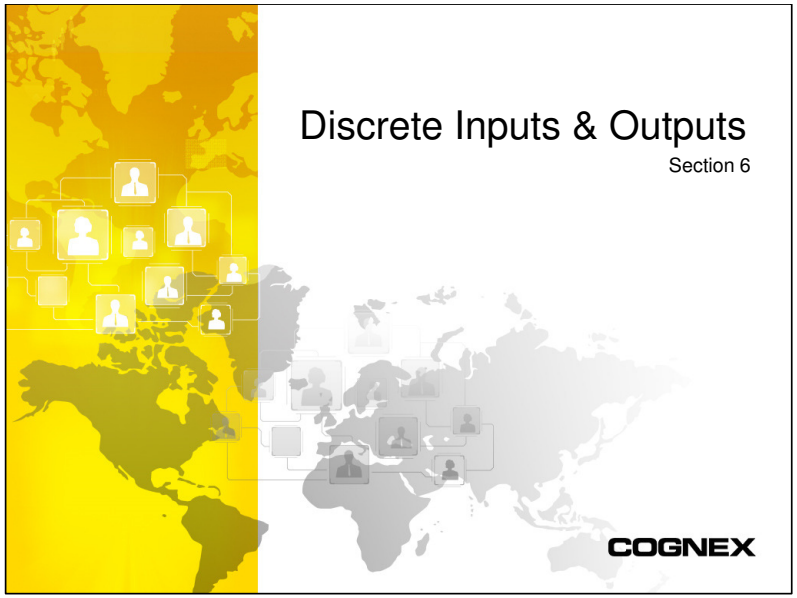
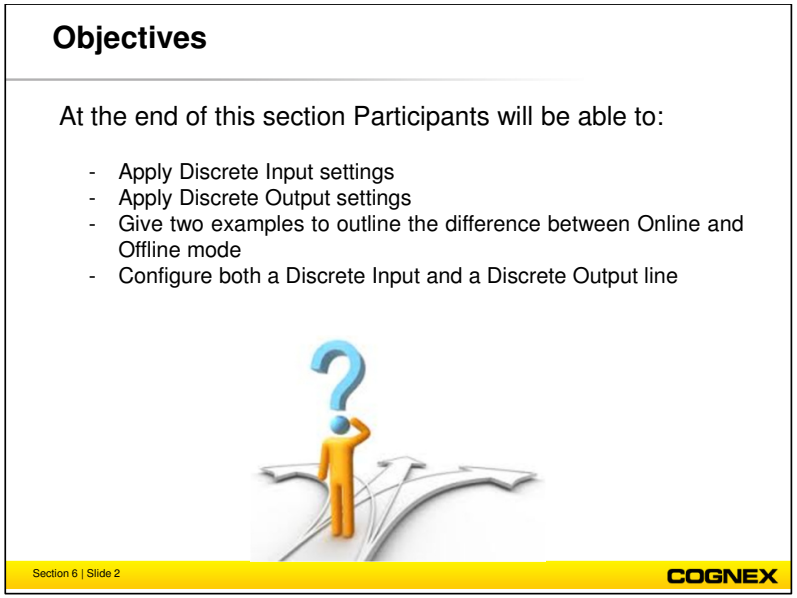



The sixth section of the In-Sight EasyBuilder Standard training will focus on **Inputs & Outputs**.

The **Inputs/Outputs** step is used to define the settings of the discrete input and output lines of supported In-Sight Vision Systems and I/O modules. You can customize the name of the line, set the signal type, select the edge transition and tool results of the signal, and force inputs or outputs to test your application.

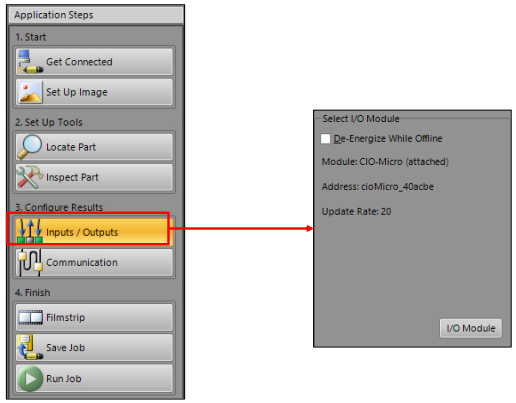





At the end of this section Participants will be able to:

- Apply Discrete Input settings
- Apply Discrete Output settings
- Give two examples to outline the difference between Online and Offline mode
- Configure both a Discrete Input and a Discrete Output line

## Configure Results – Inputs and Outputs



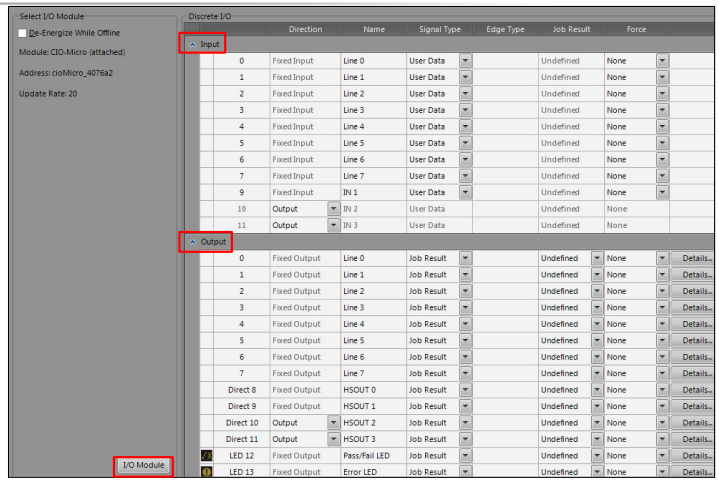

Section 6 | Slide 3 COGNEX

The **Inputs/Outputs** step is used to define the settings of the discrete lines of supported In-Sight cameras and I/O modules. You can customize the name of the Line and set the signal type.

**NOTE**: *This application step is disabled when using an emulator.*



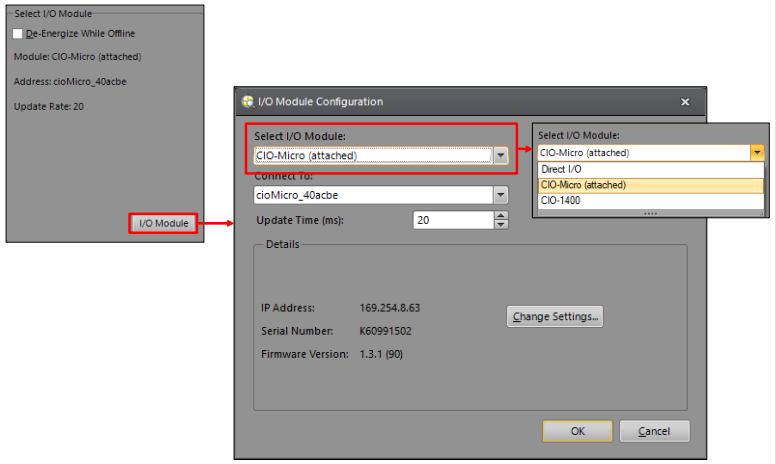
## Configure Results – Inputs and Outputs




Section 6 | Slide 4 COGNEX

The **I/O Module** button allows you to specify which IO Expansion Module is being used (or none). See next slide.

## Select I/O Module

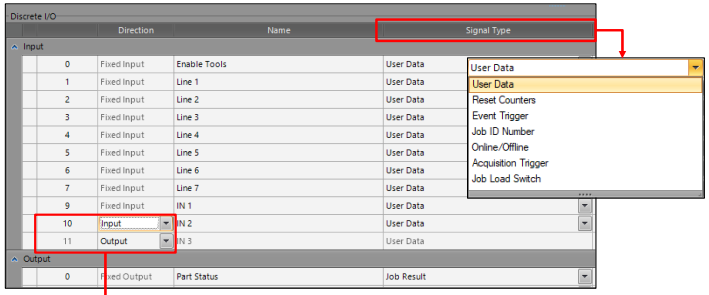



Section 6 | Slide 5 COGNEX

**Direct** means no I/O Expansion Module is linked to this camera. Only one camera can be linked to a given CIO-MICRO IO Expansion Module at a time. If you want to link a camera to a Module already linked to another camera, the other camera must remove the link by specifying Direct for module type.



## Discrete Inputs




Some lines can be configured as either an Input or Output

Section 6 | Slide 6 COGNEX

The **Discrete Inputs** Settings dialog configures the discrete input lines on the active In-Sight vision system. Discrete inputs are read into the In-Sight spreadsheet using the ReadDiscrete function.

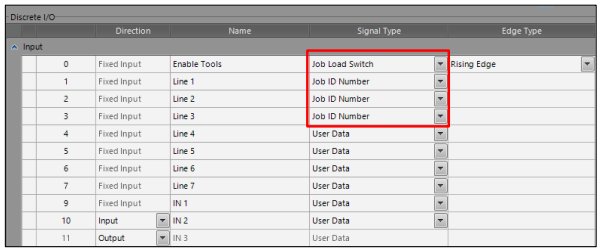
Discrete Inputs are configured under **Sensor → Discrete I/O Settings → Input Settings**.

**NOTE**: *The Discrete Input Settings dialog is not supported with the In-Sight 8405 vision system.*

Each line can be configured for one of the following functions:

- **User Data** – General purpose input line; used to turn Location and Inspection Tools On or Off.
- **Reset Counters** - Resets the EasyBuilder counters (Job.Fail_Count, Job.Inspection_Count.job, Job.Pass_Count, <Tool>.Error_Count, <Tool>.Fail_Count, and <Tool>.Pass_Count) to **0**.
- **Event Trigger** – Triggers an event, through logic created in the Spreadsheet View.
- **Job ID Number** – Provides one bit of a Job ID Number, which is loaded when the State of a different input line with a Type of Job Load Switch is ON.
- **Online/Offline** – Forces the vision system Offline or Online (**LOW** (0) = Offline, and **HIGH** (1) = Online).
- **Acquisition Trigger** – Triggers the vision system to acquire an image.
- **Job Load Switch** – ON reads all of the Job ID Number lines and loads the specified job.

## Discrete Inputs: Opening a Job




- When the Job Load Switch is activated, the job in the camera starting with the corresponding number is opened
  Examples:
  0MyJob
  3NortheastLine
  5GearInspect



1. Set exactly one Input Line's Type to **Job Load Switch.**
2. Set at least one Input Line's Signal Type to **Job ID Number**.
3. The Job ID bit is a binary coded number. Lowest line number is least significant bit (LSB). Job ID lines must be next to each other.
   Example
   - 000 = 0
   - 011 = 3
   - 101 = 5
4. Select an Input Line to configure and set the Signal Type to **Job Load Switch**. The job file that is loaded is indicted by the state (0 or 1) of any other Input Lines set to Job ID Number at the time of the Load Switch signal.

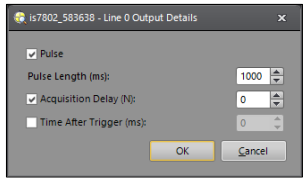
**NOTE**: *Must have a pin assigned as a Job Load Switch or the camera would constantly load jobs if the Job ID pins were high.*



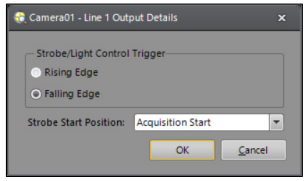
## Details Dialog

Depending on the Signal Type selected the details dialog offers additional settings

Job Result




Strobe





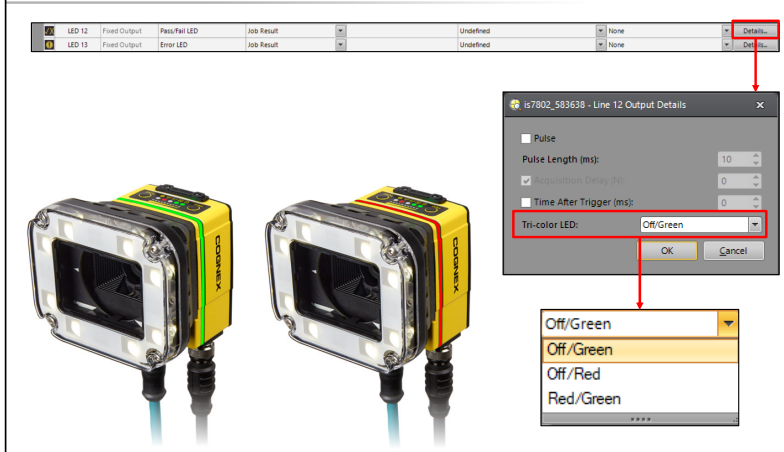

The **Details** dialog will offer additional settings dependent upon the Type selected.

- **Pulse** – When this checkbox is selected, the output will be pulsed for the duration of the Pulse Length. Clear this checkbox for steady-state output. Output must be pulsed when the Acquisition Delay is greater than 0.
- **Pulse Length (ms)** – Duration of an output pulse; In-Sight Micro 1000 series, In-Sight 5000. and In-Sight 8405 vision systems (10 to 1000 ms; default = 10), and In-Sight 7000 series and In-Sight Micro 1402, 1412 and 1500 vision systems (1 to 1000 ms; default = 10)
- **Acquisition Delay (N)** – The number of acquisition or tracking pulses (0 to 1000) to delay the output after a signal pulse is received by an output Line. If Acquisition Delay = 0, then the In-Sight sensor updates the output line immediately on evaluating the WriteDiscrete function. If Acquisition Delay is greater than 0, the output Line is always pulsed.
- **Time After Trigger (ms)** – When this checkbox is selected, the output will be fired after the specified amount of time (0 to 10,000 ms)
- **Tri-color LED**: specifies pass/fail colors on cameras with Tri-color LED, e.g., In-Sight 7802

**NOTE**: *No output details are configurable for High, Low, System Busy, Online/Offline, Lifeline and IO Module Standby Types.*

- **Strobe Start Position** – Specifies when the strobe should pulse.
- *Acquisition Start* – Specifies that the strobe will pulse as the In-Sight vision system begins its acquisition. Supported on all vision system models except the In-Sight 8405 vision system.
- *Camera Trigger* – Specifies that the strobe will pulse upon receiving a camera trigger event. Supported on all vision systems except the In-Sight 8405 vision system.
- *All Rows Exposed* – Specifies that the strobe will pulse only when all pixel rows are exposed. Supported on the In-Sight 8405 vision system only.

## Tri-Color LED

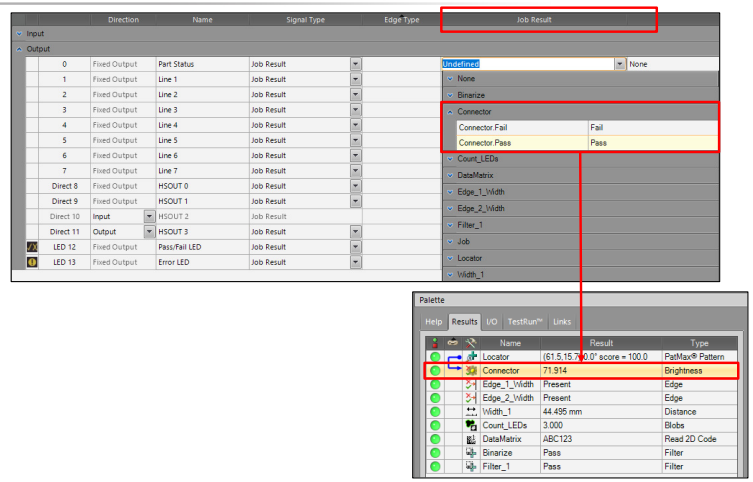



Section 6 | Slide 9 COGNEX

**Tri-color LED**: specifies pass/fail colors on cameras with Tri-color LED, e.g., In-Sight 7802. When **Signal Type** for discrete output line 12 is set to **Job Pass/Fail Cell**, then whatever cell is set up by EasyBuilder for overall job pass/fail determines the color of the Tri-Color LED.



## Job Result



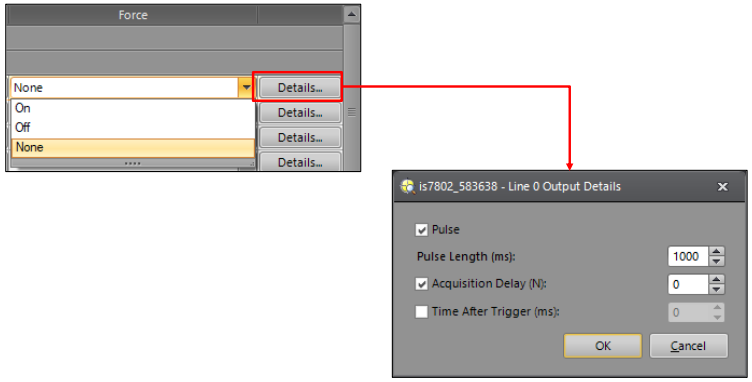

Section 6 | Slide 10 COGNEX

The tool results listed (e.g. Connector) represent an overall Pass / Fail for the individual tool. The **Job Results** are a cumulative Pass / Fail for all the tools.

The signal will be *High* (1) when the tool result is Pass and *Low* (0) when Fail.

As you can see the Job Result for Connector is a Pass (left image) and we can see in the Palette that the Connector Tool has passed.

## Force Outputs & Output Details




Section 6 | Slide 11 COGNEX

The **Force Output** option allows you to test or debug your application, prior to or after deployment. The Force Output option overrides the defined output Line settings, allowing you to 'force' an output Line on, with the In-Sight camera Online, to test the result.

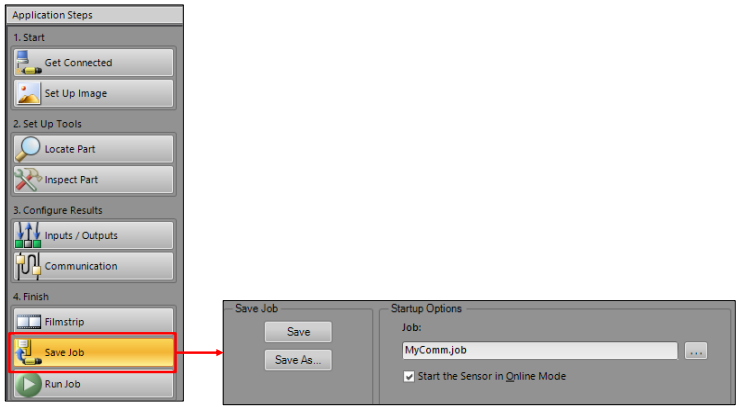
**NOTE**: *The In-Sight camera must be Online. The Force Output setting is the only Output setting that is configurable while the camera is Online.*

Click the **Details** button to open the Output Details for the selected output Line, if detailed settings are available for the specified output Signal Type.

- **Pulse** – When this checkbox is selected, the output will be pulsed. Clear this checkbox for steady-state output. Output must be pulsed when the Acquisition Delay is greater than 0.
- **Pulse Length (ms)** – Duration of an output pulse; In-Sight 5000 series, In-Sight Micro 1000 series and In-Sight 8405 vision systems(10 to 1000 ms; default = 10), and In-Sight 7000 series and In-Sight Micro 1402, 1412 and 1500 vision systems (1 to 1000 ms; default – 10).
- **Acquisition Delay (N)** – The number of acquisition or tracking pulses (0 to 1000) to delay the output after a signal pulse is received by an output Line. If Acquisition Delay = 0, then the In-Sight vision system updates the output line immediately on evaluating the EasyBuilder job. If Acquisition Delay is greater than 0, then the output Line is always pulsed.
- **Trigger After Trigger (ms)** – When this checkbox is selected, the output will be fired after the specified amount of time (0 to 10000 ms).



## Save Job




Section 6 | Slide 12 COGNEX

The **Save Job** step allows you to perform various file-management and sensor-maintenance tasks while the camera is Offline.

**NOTE**: *If the Allow Online Job Save checkbox on the User dialog is enabled, only users with Full or Protected access are allowed to save jobs while Online.*

The **Startup Options** group box allows you to specify tasks that automatically occur when the In-Sight camera is powered up including loading a default job and placing the camera *Online*.

## Summary

- Depending on the model of In-Sight, there is a number of discrete input and output lines built in
- Additional discrete inputs and discrete outputs are provided when using an I/O expansion module
- The camera must be online for discrete communication to work


COGNEX

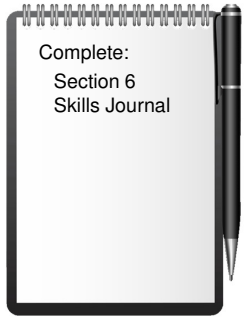
In this section we covered the following topics:

- Depending on the model of In-Sight, there is a number of discrete input and output lines built in
- Additional discrete inputs and discrete outputs are provided when using an I/O expansion module
- The camera must be online for discrete communication to work



## Skills Journal

## Lab Exercise





COGNEX

Complete:

Skills Journal (image designed by pngtree)

Lab Exercise