

Error Proofing: MultiSight Inspection Solution Connected Components Building Block



Important User Information

Solid-state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication [SGL-1.1](#) available from your local Rockwell Automation sales office or online at <http://www.rockwellautomation.com/literature/>) describes some important differences between solid-state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid-state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

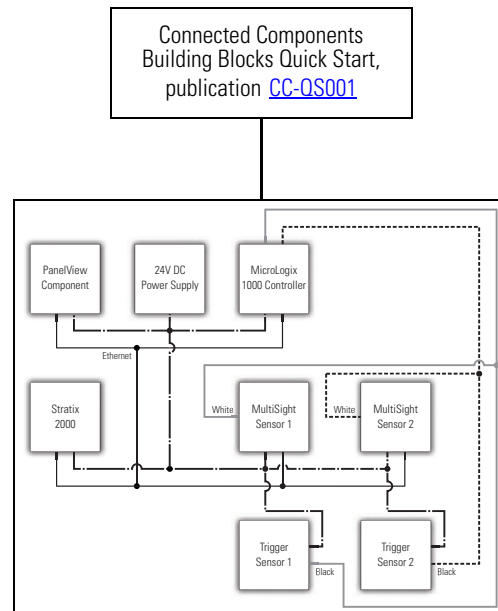
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MultiSight Sensor Setup and Calibration

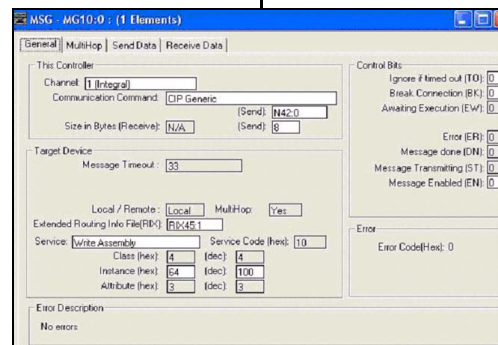
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Follow the path below to complete your 48MS MultiSight vision sensor application.

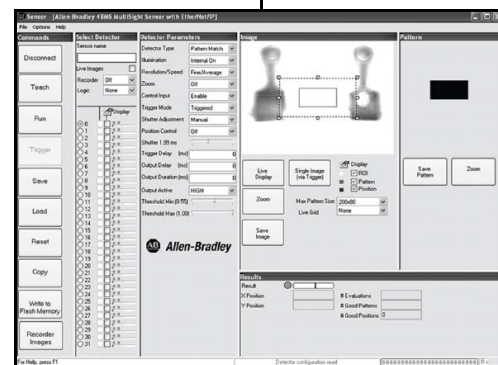
[Chapter 1: 48MS MultiSight Sensor Integration](#)



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[Appendix A: MultiSight Sensor Setup and Calibration](#)



Notes:

Introduction

This connected component building block (CCBB) quick start was created to aid machine builders in implementing 48MS MultiSight sensors with MicroLogix controller and PanelView Component terminal, all devices communicate via the Ethernet network.

The sample code enables you to select and switch between either single or grouped detectors configured in the MultiSight sensor. Further diagnostic and configuration parameters can be accessed after logging in via the PanelView Component terminal.

IMPORTANT Use this quick start along with the Connected Components Building Blocks Quick Start, publication [CC-QS001](#).
Refer to [Additional Resources on page 9](#) for a listing of other related documents.

To assist in the design and installation of your system, application files and other information are provided on the Connected Component Building Blocks Overview CD, publication CC-QR001. The CD provides bills of materials (BOM), CAD drawings for panel layout and wiring, control programs, Human Machine Interface (HMI) screens, and more. With these tools and the built-in best-practices design, the system designer is free to focus on the design of their machine control and not on design overhead tasks.

The beginning of each chapter contains the following information. Read these sections carefully before beginning work in each chapter:

- **Before You Begin** - This section lists the steps that must be completed and decisions that must be made before starting that chapter. The chapters in this quick start do not have to be completed in the order in which they appear, but this section defines the minimum amount of preparation required before completing the current chapter.
- **What You Need** - This section lists the tools that are required to complete the steps in the current chapter. This includes, but is not limited to, hardware and software.
- **Follow These Steps** - This illustrates the steps in the current chapter and identifies which steps are required to complete the examples.

Conventions Used in This Manual

This manual uses the following conventions.

Convention	Meaning	Example
Check or clear	Activate or deactivate a checkbox.	Check Disable Keying.
Click	Click the left mouse button once while the cursor is positioned on an object or selection.	Click Browse.
Double-click	Click the left mouse button twice in quick succession while the cursor is positioned on object or selection.	Double-click the application icon.
Right-click	Click the right mouse button once while the cursor is positioned on object or selection.	Right-click the 1768 Bus icon.
Select	Use the mouse to highlight a specific option.	Select the New Module folder.
Enter	Type information.	Enter your choice.
Press	Press a specific key on the keyboard.	Press Enter.
>	Use this symbol to indicate the sub-menu name.	Choose File>Menu>Options.

Additional Resources

Resource	Description
Connected Components Building Blocks Quick Start, publication CC-QS001	Provides information about how to select products and gain access to panel and wiring information.
Connected Component Building Blocks Overview CD, publication CC-QR001	Provides files for the Connected Component Building Blocks.
48MS MultiSight Vision Sensor User Manual, publication 1000000877(01)	Provides information about using the 48MS MultiSight sensor.
48MS MultiSight EtherNet/IP Add-On Logix Profile User Manual, publication 48MS-UM002	Provides information about implementing the optional EtherNet/IP interface with an RSLogix 5000 add-on profile.
MicroLogix 1100 Programmable Controllers Installation Instructions, publication 1763-IN001	Provides information about using the MicroLogix 1100 programmable controller.
PanelView Component Operator Terminals User Manual, publication 2711C-UM001	Provides information about using the PanelView Component HMI terminals.
Kinetix 300 EtherNet/IP Indexing Servo Drives User Manual, publication 2097-UM001	Provides information about using the Kinetix 300 drive.
http://www.ab.com	Provides access to the Allen-Bradley website.
http://www.ab.com/sensors/	Provides access to the Allen-Bradley sensor website.
http://www.rockwellautomation.com/knowledgebase	Provides access to self-service support.
http://www.rockwellautomation.com/components/connected	Provides access to the Connected Components website.

Notes:

48MS MultiSight Sensor Integration

Introduction

This chapter provides step-by-step instructions for wiring and configuring the 48MS MultiSight sensor for operation with the MicroLogix 1100 controller and PanelView Component terminal.

Before You Begin

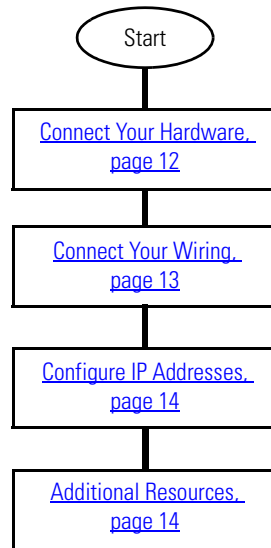
Review the Connected Components Building Blocks Quick Start, publication [CC-QS001](#), verifying that you have completed hardware design and installation, and software installation.

What You Need

- Personal computer
- PanelView Component terminal
- MicroLogix 1100 controller
- Standalone Stratix Ethernet switch (catalog number 1783-US05T or similar)
- Two Ethernet patch cables
- Two 48MS-SN1PF2-M2 MultiSight sensors
- Two 1585D-M4TBJM-2 M12>RJ45 Ethernet patch cords
- Two trigger sensors (catalog number 42CM-D8MPA-D4 or similar)
- Two MultiSight power and I/O cordsets (catalog number 889D-F8AB-2 or similar)
- Two cordsets (catalog number 889D-F4AC-2 or similar)
- Connected Components Building Blocks Overview CD, publication CC-QR001

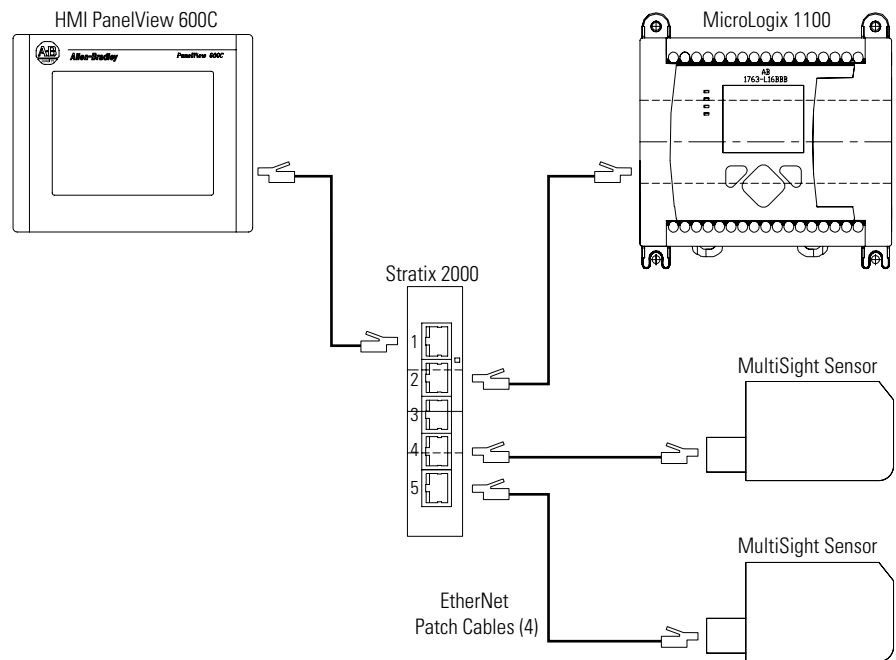
Follow These Steps

Follow these steps to connect and set up your equipment.



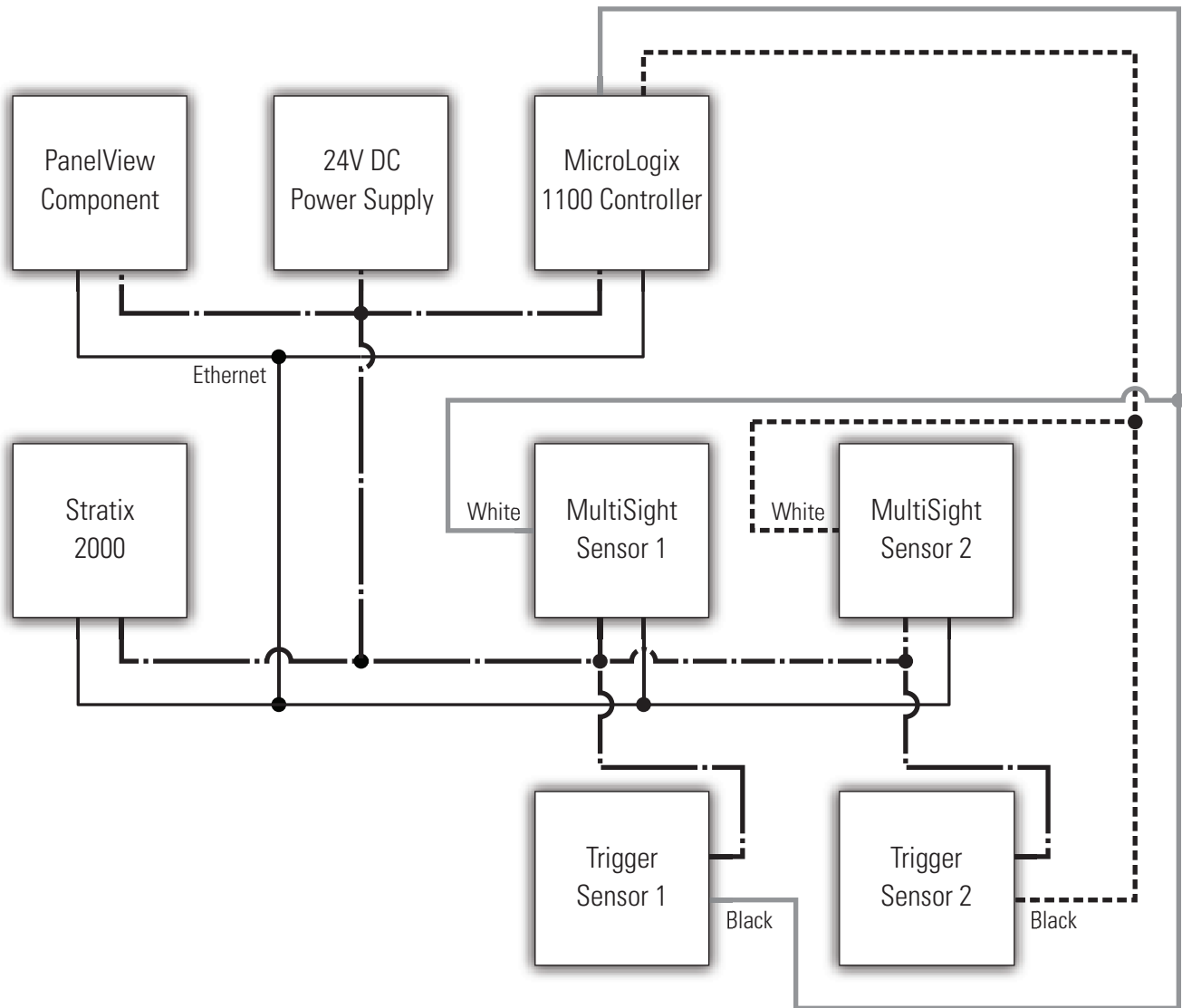
Connect Your Hardware

Connect the PanelView Component terminal, MicroLogix 1100 controller, and personal computer to the Stratix Ethernet switch with the Ethernet patch cables.



Connect Your Wiring

1. Connect 24V DC power and control signal wiring to components according to the following diagram.



2. Apply power to the MicroLogix controller.
3. Apply power to the PanelView Component terminal.

Configure IP Addresses

Chapter 3 (Controller and HMI Integration) in the Connected Components Building Blocks Quick Start, publication [CC-QS001](#), details how to set the Ethernet IP addresses in the MicroLogix 1100 controller and PanelView Component terminal. If you have not done this already, use those instructions to set the following static IP addresses in your devices.

- Set the personal computer IP address to 192.168.1.102.
- Set the PanelView Component terminal IP address to 192.168.1.101.
- Set the MicroLogix 1100 controller IP address to 192.168.1.100.
- Follow the instructions in the “Load Your HMI Screens” section of Chapter 3 to transfer your HMI screens to the PanelView Component terminal.
- Follow the instructions in the “Load Your Control Program” section of Chapter 3 to transfer your control program to the MicroLogix controller for use in your application.

Additional Resources

Refer to page [2](#) for a listing of product and information resources.

System Validation and Application Tips

Introduction

In this chapter, you will run and validate the operation of the 48MS MultiSight sensors with the MicroLogix 1100 controller and PanelView Component HMI terminal.

Before You Begin

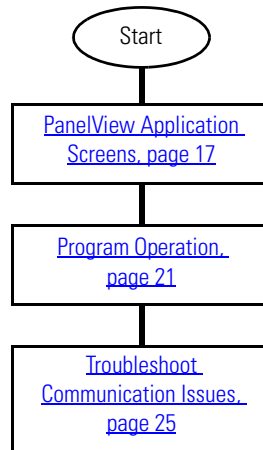
- Verify that you have completed all of the steps in [Chapter 1](#) of this document.
- Review the MicroLogix 1100 Programmable Controllers User Manual, publication [1763-UM001](#).
- Review the PanelView Component HMI Terminals User Manual, publication [2711C-UM001](#).
- Review the 48MS MultiSight Vision Sensors Installation Instructions, publication [1000000877\(01\)](#).
- Review the 48MS MultiSight EtherNet/IP Add-On Logix Profile User Manual, publication [48MS-UM002](#).

What You Need

- Personal computer
- PanelView Component terminal
- 48MS MultiSight sensors
- MicroLogix 1100 controller
- MultiSight configuration software
- Connected Component Building Blocks Overview CD, publication CC-QR001

Follow These Steps

Follow these steps to understand the operation of the 48MS MultiSight sensors. However, you can follow [Chapter 1](#) instructions and then let the system run with its default settings.



System Operation Overview

This application has been developed for controlling two MultiSight sensors from a PanelView Component HMI. The MicroLogix controller communicates via MultiSight sensors by using message instructions over the Ethernet network, where the data retrieved is then displayed on the PanelView Component terminal.

The application has different levels of access; the machine operator screen enables you to switch between the jobs configured in the MultiSight sensor and to switch between Automatic and Manual control modes. The status of the last inspection is simply given as a Pass or Fail indication.

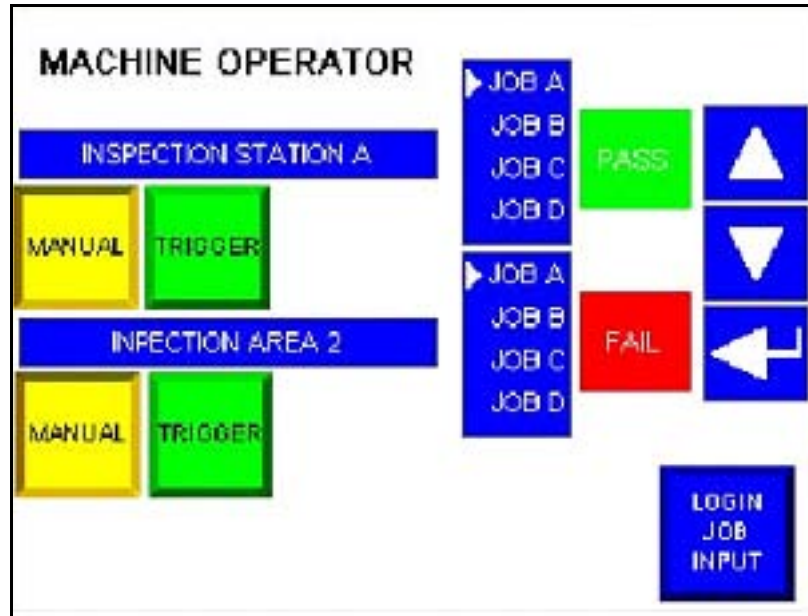
Setup and diagnostic details are also available after logging in to the HMI. You can see which detectors are enabled, the last individual detector results, and the total number of inspections.

A MultiSight sensor configuration file, sample pattern template, and MultiSight sensor Quick Start are provided with this Building Block. Complete details for connecting and configuring a MultiSight sensor are found in 48MS MultiSight Vision Sensors Installation Instructions, publication [10000000877\(01\)](#), and are not covered in this Building Block.

PanelView Application Screens

The following screens can be accessed, viewed, and modified through the PanelView Component HMI.

Machine Operator Screen




Manual/Auto Key

The MultiSight sensor is continuously triggered when in the Auto mode. The sensor is triggered by one of the trigger keys in the HMI application or by the photo-electric trigger sensor when in the Manual mode.



Trigger Key

Triggers the MultiSight sensor when in the Manual mode.

Job Selection

The right-facing triangle  indicates which job is currently selected for each MultiSight sensor.

To change jobs, the following must be done.

1. Press the control list for the sensor you want to change.
2. Use the up or down  keys until the right-facing triangle points to the correct job listing.
3. Press the return  key when the correct job is highlighted.

Pass/Fail

Indicates the last inspection result of either group/single detector based upon MultiSight sensor configuration.

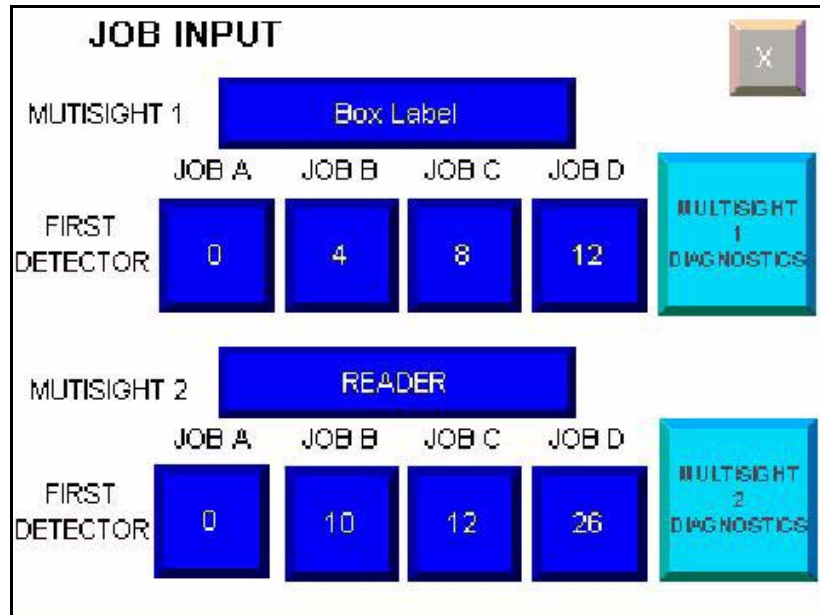
Login Job Input Key


To access the configuration and diagnostic screen, press this key and enter the following.


User: user

Password: 1234


Job Input Screen



You can enter a name, location, or description specific to your application by pressing the  key, which will access a keyboard.

TIP You can return to the Machine Operator screen by pressing the  key at any time.

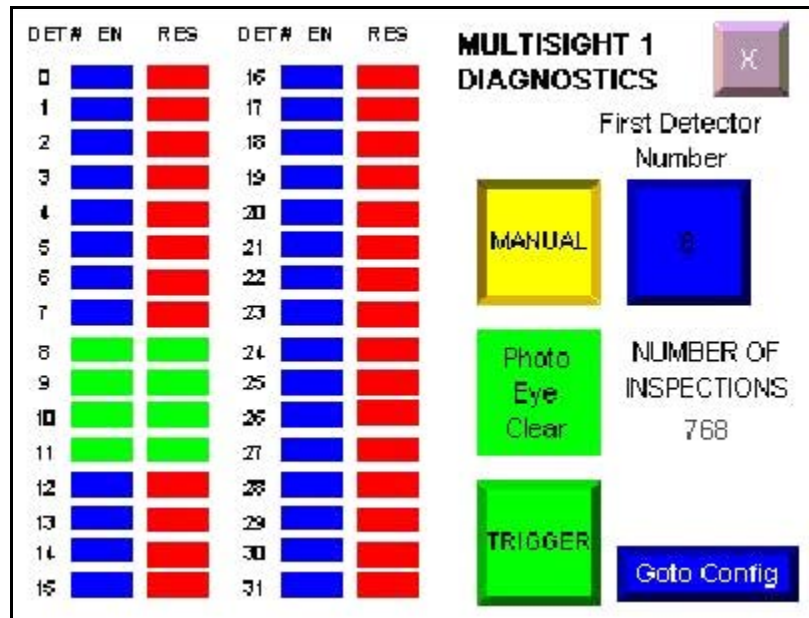
First Detector Key

This is the first detector associated with Jobs A through D, configured during MultiSight sensor setup. Pressing the key accesses a numeric keypad where you can select a different first detector number. Press the return  key to confirm the new number. The new first detector number will then be displayed on the key.


MultiSight x Diag Key

Pressing this key accesses a diagnostic screen with individual detector information and control of the MultiSight sensor.

MultiSight Diagnostics Screen



Column	Indicates
DET#	Detector number
EN	Detector status (green = enabled, blue = disabled)
RES	Inspection result (green = pass, red = fail)

TIP You can return to the Machine Operator screen by pressing the  key at any time.

Manual/Auto Key

The MultiSight sensor is continuously triggered when in the Auto mode. The sensor is triggered by one of the trigger keys in the HMI application or by the photo-electric trigger sensor when in the Manual mode.

Trigger Key

Triggers the MultiSight sensor when in the Manual mode.

Photo Eye Clear

Indicates the status of the photo-electric trigger sensor. The key color will be green when the photo-electric eye vision is clear and red when it is blocked.

First Detector Number

Indicates the number of the first detector in the group.

Number of Inspections

Indicates the total number of inspections since the MultiSight sensor was powered up.

Go to Config Key

Navigates to the PanelView Component configuration screen.

Program Operation

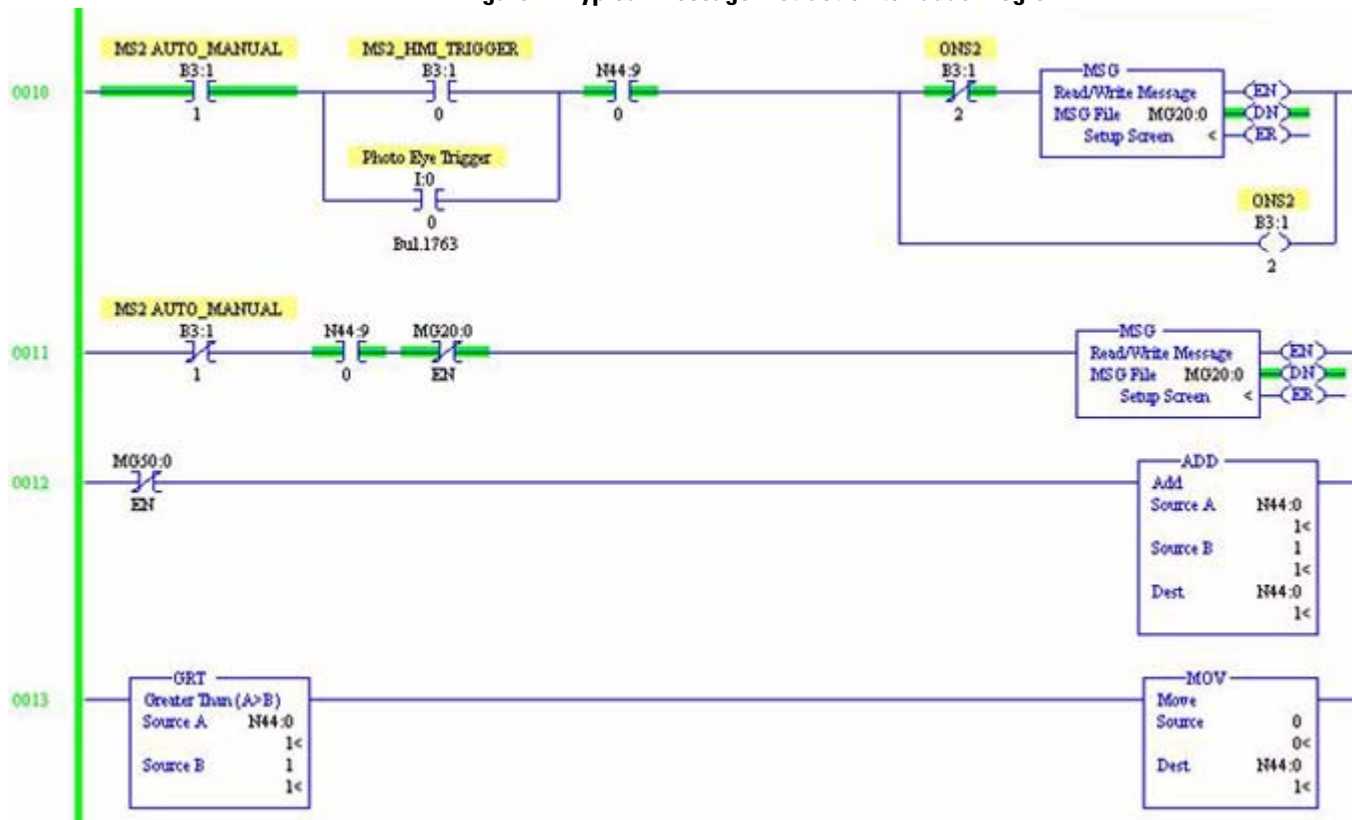
This section describes the sequence of communication between the MicroLogix and a MultiSight sensor. Control of the MultiSight sensor is performed using a write Message instruction that sets revenant control bits within the sensors. A second Message instruction is used to read data from the sensor and report the configuration status and individual detector results. This section of the quick start will outline the operation and control of a single MultiSight sensor.

1. Create four new data files.
 - a. Create an integer file that contains all data **read from** the MultiSight sensor.
 - b. Create an integer file that contains all data **sent to** the MultiSight sensor.
 - c. Create a message (MG) data file with at least two elements, one to control the Read Operation and one to control the Write Operation.
 - d. Create an Extended Routing Information (RIX) data file to store information used by the message instructions.
This file must have at least two elements, one to control the Read Operation and one to control the Write Operation.

2. Add the Message Instruction to your Ladder Logic.

The following rungs show how you can alternately read data from and write data to your MultiSight sensor.

Figure 1 - Typical Message Instruction to Ladder Logic

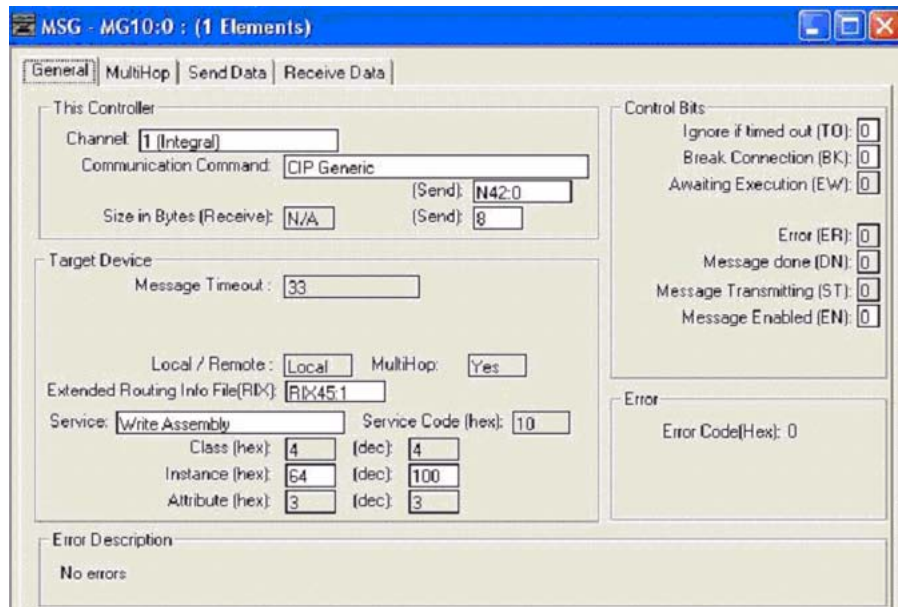


- Double-click the Setup Screen inside the Message Instruction to access the one of the following screens, depending if the Message Instruction is for writing (send) or reading (receive).

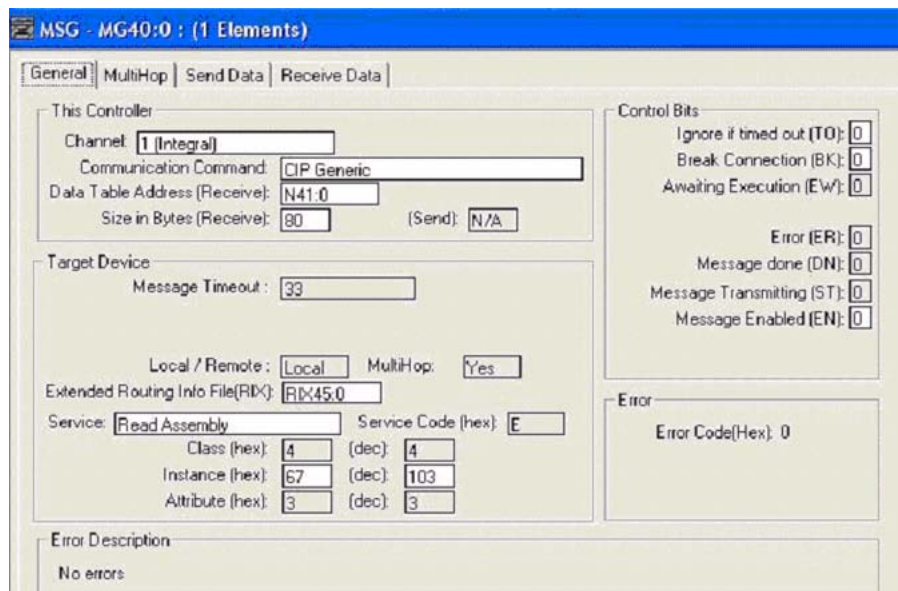
IMPORTANT Confirm that the General tab is visible (in the forefront) when the Setup screen is accessed.

Figure 2 - Typical Setup Screens for Message Instructions

For Writing Data to the Sensor (send)



For Reading Data from the Sensor (receive)



4. Double-click in the Channel data field.
 - a. Click the ▼ that appears.
 - b. From the pull-down menu, choose 1 (Integral).
 - c. Press Enter.
5. Double-click in the Communication Command data field.
 - a. Click the ▼ that appears.
 - b. From the pull-down menu, choose CIP Generic.
 - c. Press Enter.
6. Double-click in Data Table Address field.
 - a. Enter the integer file name/location where the data will be placed.
 - b. Press Enter.

IMPORTANT The word Send or Receive will appear in parentheses after the words Data Table Address, depending on the setup screen. See [Figure 2](#) on [page 22](#) for examples.

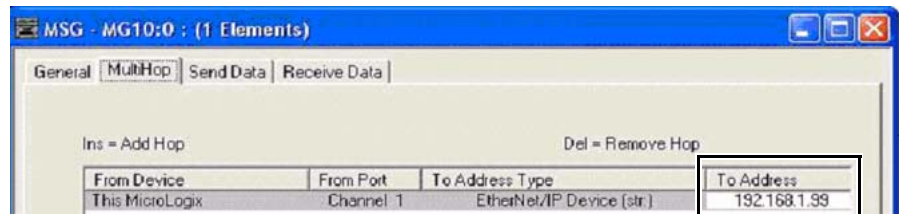
7. Enter a RIX address in the Extended Routing Info field.

Note that each Message Instruction must have its own RIX address.
8. Double-click in the Service data field.
 - a. Click the ▼ that appears.
 - From the pull-down menu, choose Read Assembly if data will be read from the MultiSight sensor.
 - From the pull-down menu, choose Write Assembly if data will be sent to the MultiSight sensor.
 - b. Press Enter.
9. Enter one of the following values in the Instance data field.
 - For read operations, enter a value of 103 (67 hex).
 - For write operations, enter a value of 100 (64 hex).

Depending on the value that you selected, the following codes will appear:

- For read operations, the Service Code field will change to E (hex).
- For write operations, the Service Code field will change to 10 (hex).
- For both read and write operations, the Class field will change to 4 (hex), and the Attribute field will change to 3 (hex).

10. Click the MultiHop tab so it is visible.
 - a. Click inside the To Address data field.
 - b. Enter the IP address for the MultiSight sensor.
 - c. Press Enter.



11. Verify that all read and write information has been added to each Message Instruction for your program.
12. Save and download the program to the PLC.

Troubleshoot Communication Issues

If you cannot communicate with the MultiSight sensor, confirm that the Ethernet port of your MicroLogix 1100 has been configured.

1. From the project tree menu, double-click Channel Configuration to access the following screen.

Channel Configuration

General | Channel 0 | Channel 1

Driver: Ethernet

Hardware Address: 00:0F:73:01:FF:08 Network Link ID: 0

IP Address: 192 . 168 . 1 . 100

Subnet Mask: 255 . 255 . 255 . 0

Gateway Address: 0 . 0 . 0 . 0

Default Domain Name:

Primary Name Server: 0 . 0 . 0 . 0

Secondary Name Server: 0 . 0 . 0 . 0

Protocol Control

BOOTP Enable DHCP Enable Msg Connection Timeout (x 1mS): 15000

SNMP Server Enable SMTP Client Enable Msg Reply Timeout (x 1mS): 3000

HTTP Server Enable Inactivity Timeout (x Min): 30

Auto Negotiate

Port Setting: 10/100 Mbps Full Duplex/Half Duplex

Contact:

Location:

OK Cancel Apply Help

2. Enter the IP address for your system.
3. Enter the Subnet Mask data for your system.
4. Click Apply.
5. Verify that the Ethernet port is working.

Notes:

MultiSight Sensor Setup and Calibration

Introduction

In this chapter, you will learn how to access, set up, and calibrate a MultiSight sensor through the provided software. See the MultiSight Vision Sensors User Manual, publication [48MS-UM001](#), for further information.

Sensor Setup

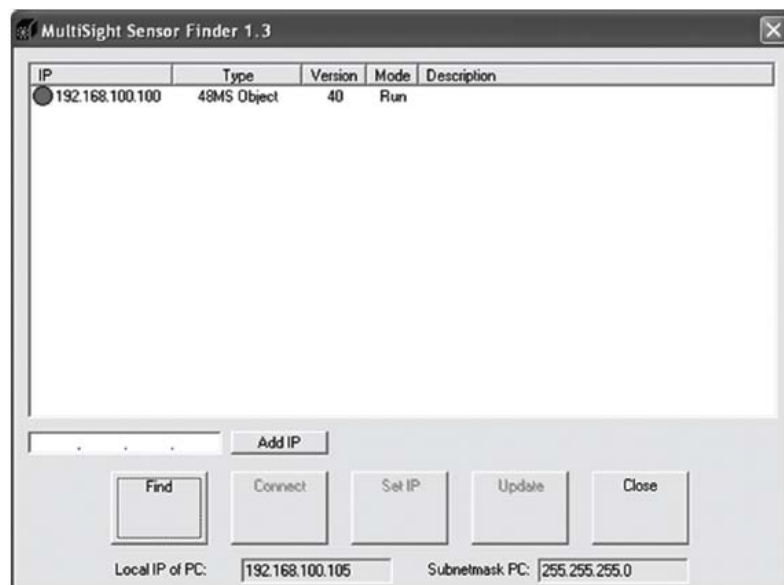
1. Double-click the MultiSight software icon to launch the Sensor Finder software.



The Sensor Finder software will show all MultiSight sensors on the local Ethernet network.

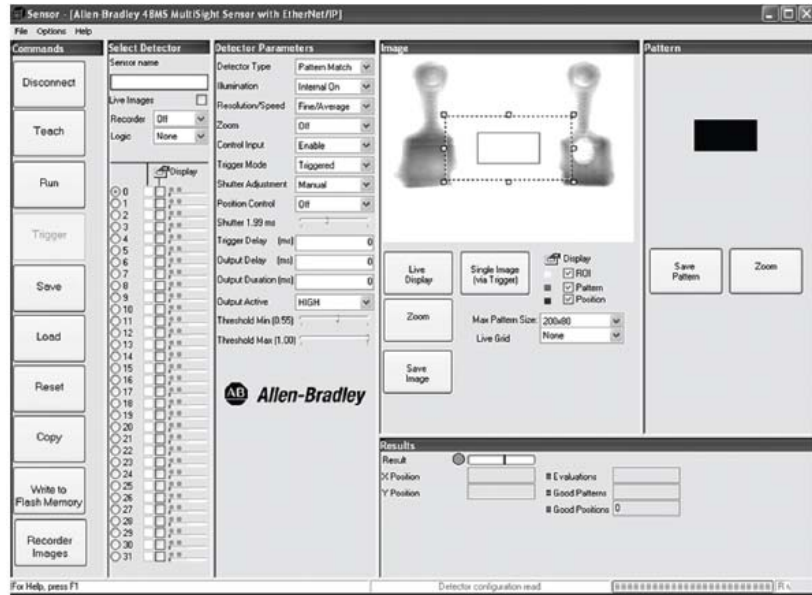
2. Select the sensor you want and set the IP address (if necessary).

The IP address and subnet mask of the personal computer is displayed at the bottom of the window.



3. Select the MultiSight IP address.
4. Click Connect to establish a connection to your chosen MultiSight sensor.

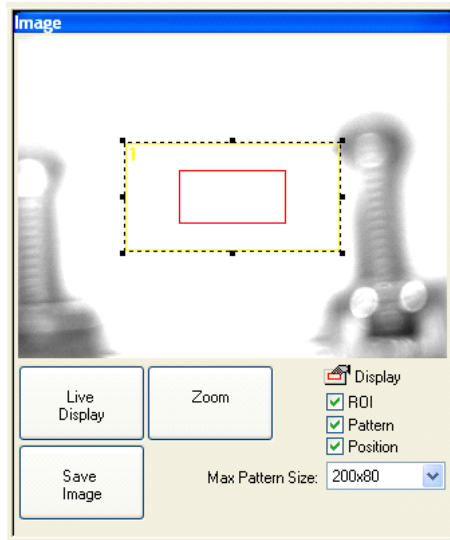
- A pop-up message will appear; click Yes to stop the Run mode.
The configuration software opens.



Sensor Image Calibration

- Click the Live Display button under the Image.

The MultiSight illumination indicators will begin flashing and you will get updated images.

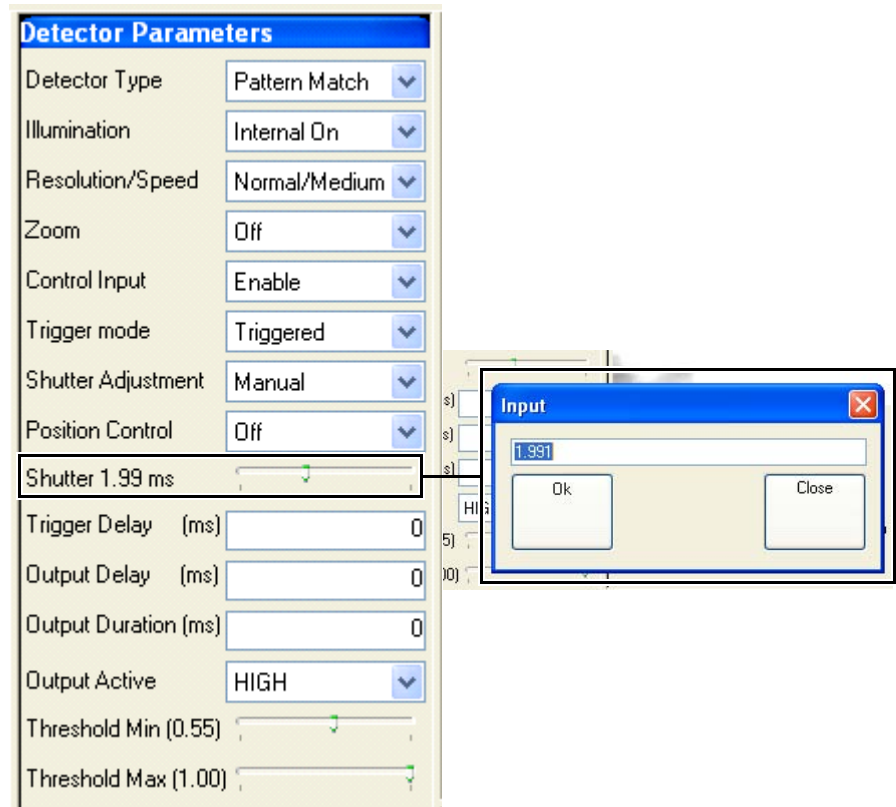


- Place the target (item for inspection) in the Image area.

The image will be too bright or too dark, and will likely be out of focus.

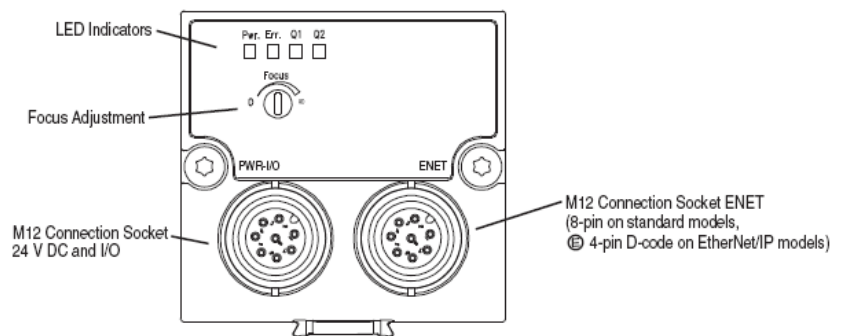
To brighten or darken the image, the sensor shutter speed must be adjusted.

3. In the Detector Parameters dialog box, click in the Shutter box to activate this input box.
4. In the Input dialog box, type a new speed until the image contrast is satisfactory.



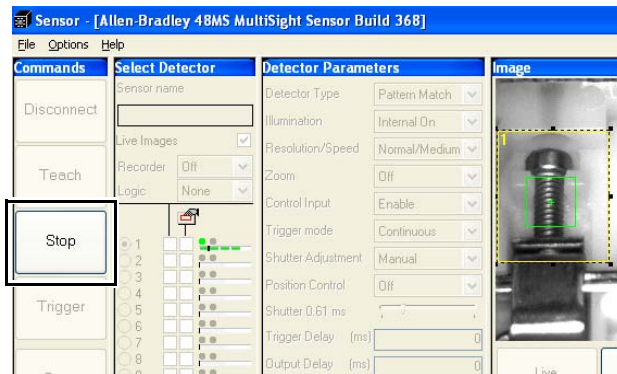
TIP In the Detector Parameters dialog box, you can drag the slide bar until the image contrast is satisfactory.

5. To manually adjust the focus, use a screwdriver to adjust the focus adjustment screw on the back of the MultiSight sensor until the image comes into focus.



You may need to readjust the shutter speed for better contrast for an ideal balance between a high level of contrast and a sharp focus.

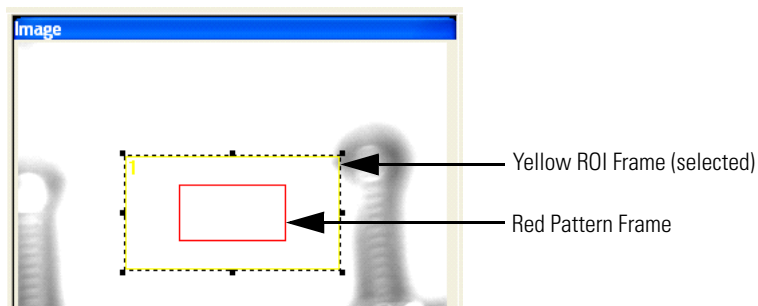
- Under the Commands section, click the Stop button to exit the Live Image mode.



Define Search Criteria

This section explains how to position the Region of Interest (ROI) and Pattern frames. The yellow ROI frame defines **where** the sensor will look for a pattern, while the red Pattern frame will define **what** the sensor will look for.

Figure 3 - ROI and Pattern Frames



The yellow ROI frame is the default selection (where the handle at each corner and along each side of the frame box is present).

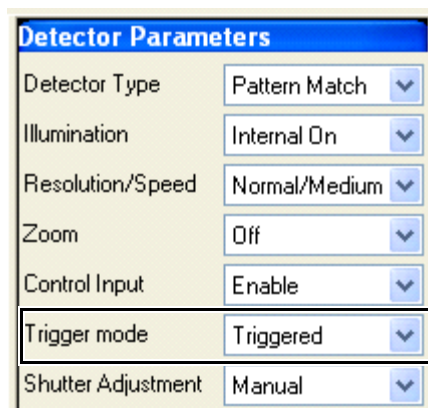
- Double-click the red Pattern frame to select it and activate its frame box handles.
- Position and resize the red Pattern frame around the unique feature to be inspected (the pattern that will always be there on a good part and never for a bad part).
- Once the Pattern frame is established, double-click the yellow ROI frame to activate the frame box handles.

4. Position and resize the yellow ROI frame.

Because it must define where the sensor will look for the pattern defined in the red Pattern box, the yellow frame must be bigger than and completely contain the red Pattern frame.

IMPORTANT Do not set the yellow ROI frame larger than necessary relative to the red Pattern frame size. The larger the yellow ROI frame size to be evaluated (relative to the red Pattern frame size), the slower the evaluation time.

5. In the Detector Parameters dialog box, choose Continuous from the Trigger mode pull-down menu to prompt a new inspection (while the sensor is in Run mode) as soon as the last inspection finishes.



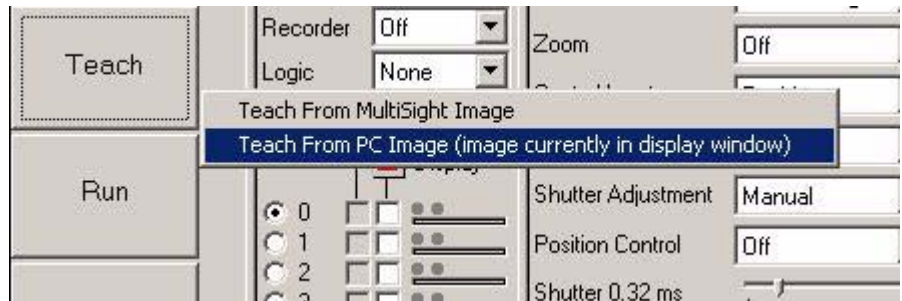
6. In the Select Detector section, click the Live Images checkbox so that images will be displayed in the software while the sensor is connected.



7. In the Commands section, click the Teach button.



- From the Teach Button menu, choose Teach From PC Image (image currently in display window).



Once the teach process is complete, the taught pattern appears in the Pattern window.



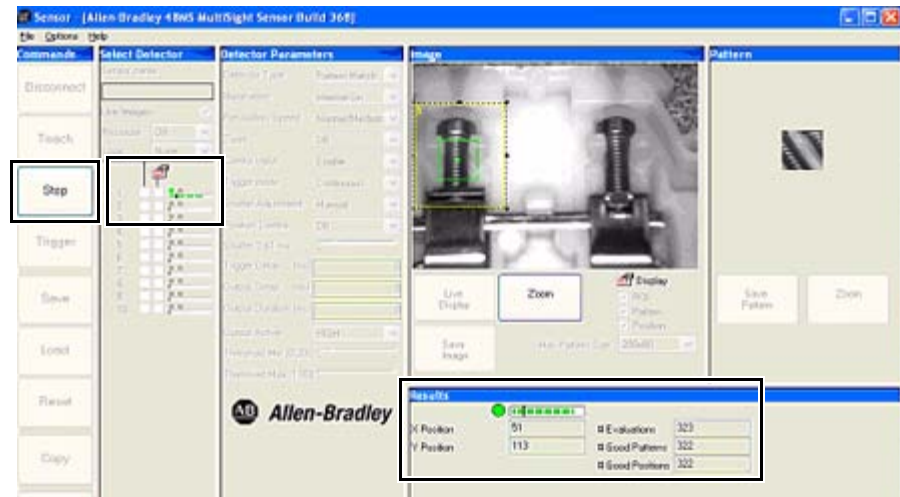
Function Test

- In the Commands section, click the Run button.



2. Confirm that the inspection is passing by referencing the indicators.

Based on the results of several good and bad parts, you may need to adjust the threshold settings.

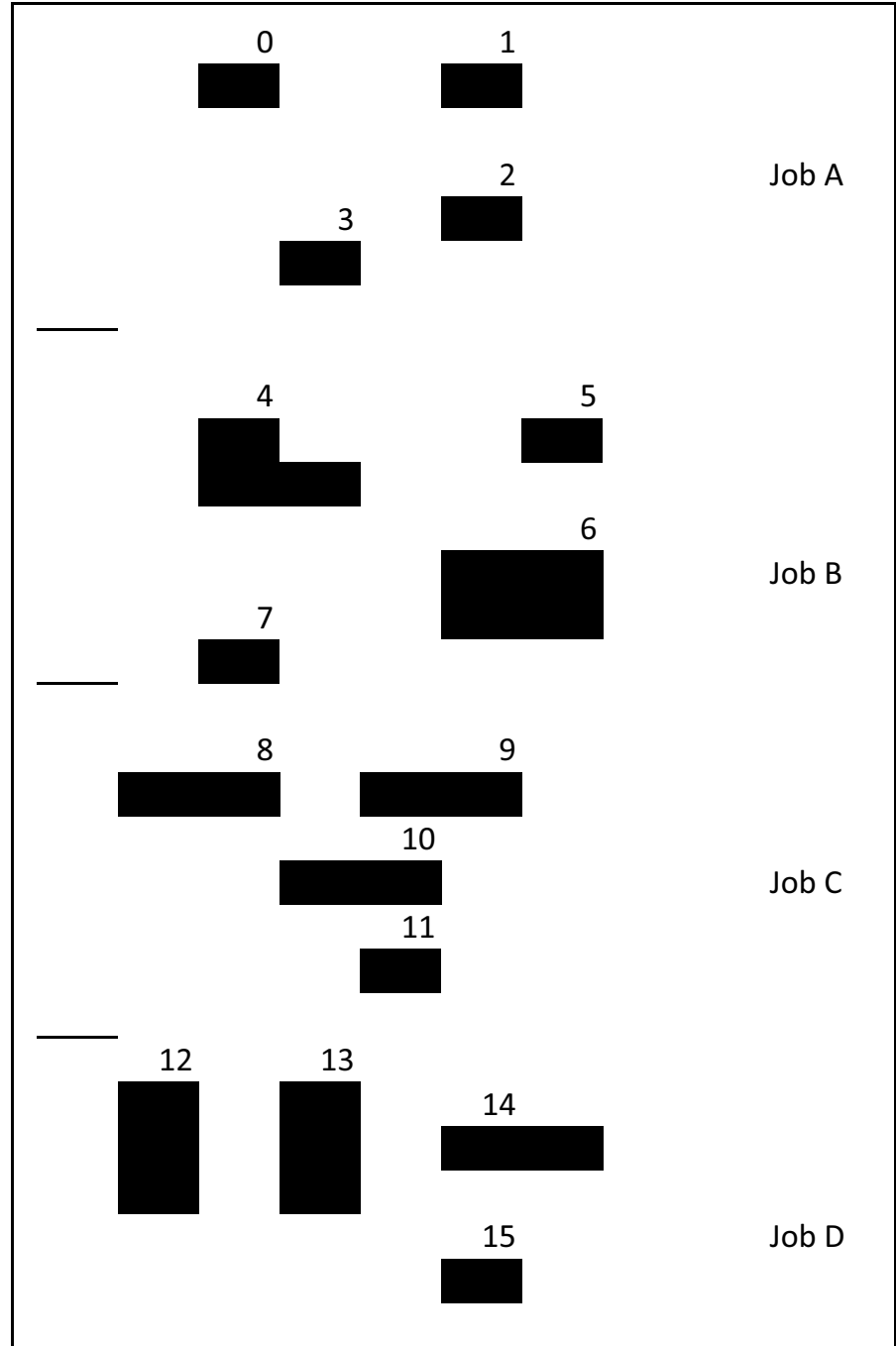


3. To adjust settings, click the Stop button in the Commands section to return to the Configuration mode and make adjustments.

Sample Pattern

The following is a sample pattern that can be used with MultiSight *.sca file provided with this Building Block.

Figure 4 - MultiSight Sample Pattern



Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support/>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration, and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/support/>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

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