Introduction

This application example describes how to configure a GuardLogix controller to own POINT Guard I/O modules that reside in the same chassis as standard POINT I/O modules. In this example, the standard POINT I/O modules are owned by a ControlLogix controller.

Features and Benefits

- Reduced panel space compared to CompactBlock I/O
- Blend Safety and standard I/O in a single POINT I/O chassis
## Important User Information

Solid state equipment has operation characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://literature.rockwellautomation.com) 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.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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

<table>
<thead>
<tr>
<th><strong>WARNING</strong></th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IMPORTANT</strong></td>
<td>Identifies information that is critical for successful application and understanding of the product.</td>
</tr>
<tr>
<td><strong>ATTENTION</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>SHOCK HAZARD</strong></td>
<td>Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.</td>
</tr>
<tr>
<td><strong>BURN HAZARD</strong></td>
<td>Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.</td>
</tr>
</tbody>
</table>
General Safety Information

**IMPORTANT**
This application example is for advanced users and assumes that you are trained and experienced in safety system requirements.

**ATTENTION**
A risk assessment should be performed to make sure all task and hazard combinations have been identified and addressed. The risk assessment may require additional circuitry to reduce the risk to a tolerable level. Safety circuits must take into consideration safety distance calculations which are not part of the scope of this document.

Contact Rockwell Automation to find out more about our safety risk assessment services.

**Description**

This application example shows how to configure safety POINT Guard I/O modules to communicate safety data to a GuardLogix controller. A standard ControlLogix controller also resides in the same chassis and is configured to exchange standard data with POINT I/O modules.

**Safety Function**

POINT Guard input and output modules can be connected on EtherNet/IP and DeviceNet (via the 1734-PDN adapter) networks, allowing safety data to be exchanged between the safety I/O modules and the GuardLogix controller system using the CIP Safety protocol.

The CIP Safety protocol is an end-node to end-node safety protocol which allows routing of CIP Safety messages to and from CIP Safety devices through bridges, switches, and routers.

The protocol also lets standard and safety devices co-exist on the same wire, along with mixed connections on the same device.

**Bill of Material**

This application example uses these components.

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>F/W Rev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-L62S</td>
<td>GuardLogix safety controller</td>
<td>17</td>
</tr>
<tr>
<td>1756-LSP</td>
<td>GuardLogix safety partner</td>
<td>17</td>
</tr>
<tr>
<td>1756-L63</td>
<td>ControlLogix controller</td>
<td>17</td>
</tr>
<tr>
<td>1756-ENBT/A</td>
<td>Ethernet module</td>
<td>4</td>
</tr>
<tr>
<td>1756-A4</td>
<td>ControlLogix 4-slot chassis</td>
<td>N/A</td>
</tr>
<tr>
<td>1756-PA72</td>
<td>ControlLogix power supply</td>
<td>N/A</td>
</tr>
<tr>
<td>1734-AENT</td>
<td>POINT I/O Ethernet adapter</td>
<td>3</td>
</tr>
<tr>
<td>1734-IB8S</td>
<td>8-point safety input module</td>
<td>1</td>
</tr>
<tr>
<td>1734-OB8S</td>
<td>8-point safety output module</td>
<td>1</td>
</tr>
<tr>
<td>1734-IB4</td>
<td>4-point input module</td>
<td>3</td>
</tr>
<tr>
<td>1734-OB8</td>
<td>8-point relay output module</td>
<td>3</td>
</tr>
</tbody>
</table>

Publication SAFETY-AT022B-EN-P– July 2009
Setup and Wiring

Setup your hardware configuration as shown.

System Overview

System Setup

Setup your hardware configuration as described below:

Logix5000 Chassis

Place the corresponding hardware in the appropriate slots.

<table>
<thead>
<tr>
<th>Slot Number</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1756-L62S</td>
</tr>
<tr>
<td>1</td>
<td>1756-LSP</td>
</tr>
<tr>
<td>2</td>
<td>1756-L63</td>
</tr>
<tr>
<td>3</td>
<td>1756-ENBT/A</td>
</tr>
</tbody>
</table>

1734 Point IO Chassis

Place the corresponding hardware in the appropriate slots.

<table>
<thead>
<tr>
<th>Slot Number</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1734-AENT</td>
</tr>
<tr>
<td>1</td>
<td>1734-IB8S</td>
</tr>
<tr>
<td>2</td>
<td>1734-OB8S</td>
</tr>
<tr>
<td>3</td>
<td>1734-IB4</td>
</tr>
<tr>
<td>4</td>
<td>1734-OB8</td>
</tr>
</tbody>
</table>

Configure the GuardLogix Controller

To configure the GuardLogix controller, first you need to create a new project in RSLogix 5000 software and add the 1756-ENBT EtherNet/IP bridge to your controller organizer. Then, you add the 1734-AENT POINT I/O Ethernet adapter to your Ethernet network and configure communication for the POINT Guard I/O modules.
Create a GuardLogix Controller Project

Follow these steps to configure the GuardLogix controller and add the 1756-ENBT EtherNet/IP bridge module.

1. Open RSLogix 5000 software.

2. From the File menu, choose New to create a new project.

3. Fill out the New Controller dialog box as shown and click OK.
4. In the Controller Organizer, right-click 1756-Backplane and choose New Module.

![Controller Organizer screenshot]

5. In the Select Module dialog box, click the + sign to expand Communications and select the 1756-ENBT/A module.

![Select Module dialog box]

6. Click OK.
7. In the Select Major Revision dialog box, choose 4 and click OK.

![Select Major Revision dialog box]

8. In the New Module dialog box, type the module name and choose slot 3.

![New Module dialog box]

9. Click OK.

The 1756-ENBT module appears in the Controller Organizer with Ethernet displayed below it.
Configure the 1734-AENT Adapter

Follow these steps to add the 1734-AENT Ethernet Adapter to your controller project.

1. Right-click Ethernet and choose New Module.

2. In the Select Module dialog box, click the + sign to expand Communications and then select the 1734-AENT adapter.
3. In the New Module dialog box, type the module name and IP address.

4. Click Change.

5. In the Module Definition dialog box, change the Major Revision to 3 and the Chassis Size to 5.

The 1734-AENT must be set to major firmware version 3 or later to communicate with POINT Guard I/O modules. The chassis size of 5 reflects the 4 POINT Guard I/O modules in addition to the 1734-AENT adapter.

6. Click OK.
7. At the prompt, click Yes.
8. On the New Module Properties dialog box, click OK.

The 1734-AENT adapter appears in the Controller Organizer with the Point IO 5 Slot Chassis backplane displayed below it.

Configure the POINT Guard I/O Modules

Follow these steps to add the 1734-IB8S and 1734-OB8S modules to the POINT I/O backplane.

1. Right-click PointIO 5 Slot Chassis and choose New Module.
2. In the Select Module dialog box, click the + sign to expand Safety and select the 1734-IB8S module.

![Select Module dialog box]

3. Click OK.

4. In the Module Definition dialog box, type a name for the 1734-IB8S module.

![Module Properties: POINTGuard_Adapter:1 (1734-IB8S 1.1)]

In the module definition section, you can modify the type of status information that is contained within the module defined data structure.
5. Choose the Input Configuration tab and configure the inputs you are using in your application.

![Module Properties: PointIO_ENet_Adapter:1 (1734-IB85 1.1)](image1)

6. Choose the Test Output tab and configure the test outputs you are using in your application.

![Module Properties: PointIO_ENet_Adapter:1 (1734-IB85 1.1)](image2)
7. Choose the Safety tab.

8. Configure your RPI and Connection Reaction Time Limit in accordance with the requirements of your application.

9. Click OK.

   The 1734-IB8S module appears in the Controller Organizer.
10. Right-click PointIO 5 Slot Chassis and choose New Module.

11. In the Select Module dialog, click the + sign to expand Safety and select the 1734-OB8S module.

12. Click OK
13. In the Module Definition dialog, type a name for the 1734-OB8S module.

![Module Properties: POINTGuard_Adapter:2 (1734-OB8S 1.1)](image)

In the module definition section, you can modify the type of status information that is contained within the module defined data structure.

14. Choose the Output Configuration tab and configure the outputs you are using in your application.

![New Module](image)
15. Choose the Safety tab.

16. Configure your RPI and Connection Reaction Time Limit in accordance with the requirements of your application.

17. Click OK.

The 1734-OB8S module appears in the Controller Organizer.

You have completed configuring your project to communicate with the POINT Guard I/O modules.
Establish Communication and Download the GuardLogix Project

The data you use in your application code can be found within the controller tags. PointIO_ENet_Adapter:1:X corresponds to data for the 1734-IB8S and PointIO_ENet_Adapter:2:X corresponds to data for the 1734-OB8S module.

Follow these steps to download your project.

1. From the Communications menu, choose Who Active.

2. From the Who Active dialog box, navigate to the 1756-L62S controller and click Download.
3. In the Download dialog box, check Designate this controller as CST Master, and then click Download.

![Download dialog box]

4. Place the Controller in Remote Run mode.

**Fixing Communication Errors**

At this point you may have communication errors with the 1734-AENT, 1734-IB8S, and/or the 1734-OB8S as indicated by the yellow triangle symbols.

**Module State Error**

The most common error associated with the 1734-AENT at this point is “Module or state of module does not allow object to perform requested service.” The cause of this error is very likely that the chassis size in the project does not reflect the chassis size configured in the adapter.

Follow these steps to fix this error.
1. Open the Module Properties dialog box of the 1734-AENT.
2. Choose the Chassis Size tab.
3. Click Set Chassis Size in Module.

Safety Network Mismatch or Configuration Ownership Errors

If you are seeing a yellow triangle on the 1734-IB8S or 1734-OB8S module, you are likely seeing a Safety Network Mismatch error or Configuration Ownership error.

Follow these steps to correct these errors.

1. Open the Module Properties dialog box for the affected module.
2. Choose the Safety tab.
3. Click Reset Ownership.

Configure the ControlLogix Controller

To configure the ControlLogix controller, first you need to create a new project in RSLogix 5000 software and add the 1756-ENBT EtherNet/IP bridge to your controller organizer. Then, you add the 1734-AENT POINT I/O Ethernet adapter to your Ethernet network and configure communication for the POINT I/O modules.

Create a ControlLogix Controller Project

Follow these steps to create a ControlLogix project for standard control.
1. Open RSLogix 5000 software.
2. From the File menu, choose New.
3. Fill out the New Controller dialog box as shown and click OK.

4. In the Controller Organizer, right-click 1756-Backplane and choose New Module.
5. In the Select Module dialog box, click the + sign to expand Communications and select the 1756-ENBT/A module.

6. Click OK.

7. In the Select Major Revision dialog box, choose 4 and click OK.
8. In the New Module dialog box, type the module name and choose slot 3.

9. Click OK.

The 1756-ENBT module appears in the controller organizer with Ethernet displayed below it.
Configure the 1734-AENT Adapter

Follow these steps to add the 1734-AENT Ethernet Adapter to your controller project.

1. Right-click Ethernet and choose New Module.
2. In the Select Module dialog, click the + sign to expand Communications and then select the 1734-AENT adapter.

3. In the New Module dialog box, type the module name and IP address.

4. Click Change.
5. In the Module Definition dialog box, change the Major Revision to 3 and the Chassis Size to 5.

![Module Definition Dialog Box]

The 1734-AENT must be set to major firmware version 3 or later to communicate with POINT I/O modules. The chassis size of 5 reflects the 4 POINT I/O modules in addition to the 1734-AENT adapter.

6. Click OK.

7. At the prompt, click Yes.

8. On the New Module Properties dialog box, click OK.

   The 1734-AENT adapter appears in the Controller Organizer with the PointIO 5 Slot Chassis backplane displayed below it.
Configure the POINT I/O Modules

Follow these steps to add the 1734-IB4 and 1734-OB8 modules to the POINT I/O backplane.

1. Right-click PointIO 5 Slot Chassis and choose New Module.
2. In the Select Module dialog box, click the + sign to expand Digital and select the 1734-IB4 module.

3. Click OK.

4. In the New Module dialog box, type a name for the 1734-IB4 module and click OK.

The 1734-IB4 module appears in the Controller Organizer.
5. Right-click PointIO 5 Slot Chassis and choose New Module.

6. In the Select Module dialog box, click the + sign to expand Digital and select the 1734-OB8 module.
7. In the New Module dialog box, type a name for the 1734-OB8 module and click OK.

The 1734-OB8 module appears in the Controller Organizer.

Establish Communication and Download the ControlLogix Project

Follow these steps to download your project.

1. From the Communications menu, choose Who Active.

2. From the Who Active dialog box, navigate to the 1756-L63 controller and click Download.

3. Place the Controller in Remote Run mode.
Performance Data

The total number of safety, digital, analog, and specialty POINT I/O modules that can be added to a 1734-AENT adapter is limited by number of connections used.

The total number of connections that a 1734-AENT adapter can support is 20.

The number of connections consumed by each module is defined in this table.

<table>
<thead>
<tr>
<th>Module</th>
<th>Connection Type</th>
<th>Connections Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital I/O</td>
<td>Direct</td>
<td>1 per module</td>
</tr>
<tr>
<td>Digital I/O</td>
<td>Rack Optimization</td>
<td>2 connections total</td>
</tr>
<tr>
<td>Analog I/O</td>
<td>Direct</td>
<td>1 per module</td>
</tr>
<tr>
<td>Specialty I/O</td>
<td>Direct</td>
<td>1 per module</td>
</tr>
<tr>
<td>1734-OB8S</td>
<td>Input/Output Data</td>
<td>2 per module</td>
</tr>
<tr>
<td>1734-IB8S</td>
<td>Input/Output Data</td>
<td>2 per module</td>
</tr>
<tr>
<td>1734-IB8S</td>
<td>Input Data Only</td>
<td>1 per module</td>
</tr>
</tbody>
</table>
Additional Resources

For more information about the products used in this example, refer to these resources.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>POINT Guard I/O Safety Modules Installation &amp; User Manual, publication 1734-UM013</td>
<td>Provides installation and operation information for the POINT Guard I/O Modules.</td>
</tr>
<tr>
<td>GuardLogix Controllers User Manual, publication 1756-UM020</td>
<td>Provides information on operating a GuardLogix Controller</td>
</tr>
<tr>
<td>GuardLogix Controller Systems Safety Reference Manual, publication 1756-RM093</td>
<td>Provides information on safety requirements for safety systems that use GuardLogix controllers.</td>
</tr>
<tr>
<td>ControlLogix Controllers User Manual, publication 1756-UM001</td>
<td>Provides information on using a ControlLogix controller.</td>
</tr>
<tr>
<td>POINT I/O Input Modules Installation Instructions, publication 1734-IN051</td>
<td>Provides information on mounting and wiring POINT I/O input modules</td>
</tr>
<tr>
<td>POINT I/O Output Modules Installation Instructions, publication 1734-IN018</td>
<td>Provides information on mounting and wiring POINT I/O output modules</td>
</tr>
</tbody>
</table>

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