Logix 5000 Controllers Produced and Consumed Tags

1756 ControlLogix, 1756 GuardLogix, 1769 CompactLogix, 1769 Compact GuardLogix, 1789 SoftLogix, 5069 CompactLogix, 5069 Compact GuardLogix, Studio 5000 Logix Emulate
Important user information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice. If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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.

Reproduction of the contents of this manual, in whole or in part, without written permission of Rockwell Automation, Inc., is prohibited.

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 |
| Important: | Identifies information that is critical for successful application and understanding of the product. |

Labels may also be on or inside the equipment to provide specific precautions.

| 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. |
| ARC FLASH HAZARD: | Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE). |

Allen-Bradley, Rockwell Software, Rockwell Automation, and TechConnect are trademarks of Rockwell Automation, Inc.

Trademarks not belonging to Rockwell Automation are property of their respective companies.
Summary of changes

This manual includes new and updated information. Use these reference tables to locate changed information.

Grammatical and editorial style changes are not included in this summary.

Global changes

This table identifies changes that apply to all information about a subject in the manual and the reason for the change. For example, the addition of new supported hardware, a software design change, or additional reference material would result in changes to all of the topics that deal with that subject.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated screen shots throughout.</td>
<td>The graphical user interface has been updated in release 31 of the Logix Designer application.</td>
</tr>
<tr>
<td>Updated supported controllers.</td>
<td>Logix Designer supports new 5069 Compact GuardLogix controllers.</td>
</tr>
</tbody>
</table>

New or enhanced features

This table contains a list of topics changed in this version, the reason for the change, and a link to the topic that contains the changed information.

<table>
<thead>
<tr>
<th>Topic Name</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional Resources on page 7</td>
<td>Added controller user manuals as additional resources</td>
</tr>
<tr>
<td>Controllers and networks that support produced/consumed tags on page 12</td>
<td>Updated information on networks that support produced and consumed tags</td>
</tr>
<tr>
<td>Considerations when migrating projects that contain multicast produce tags on page 13</td>
<td>Added safety consumed tags on Compact GuardLogix 5380 and GuardLogix 5580 controllers considerations</td>
</tr>
<tr>
<td>Considerations when migrating projects that contain multicast produce tags on page 13</td>
<td>Updated the versions of software for multicast consumers running releases v18 and later</td>
</tr>
<tr>
<td>Organize tags for produced or consumed data on page 14</td>
<td>Updated the controller projects to be verified to include Compact GuardLogix 5380 and GuardLogix 5580 controllers</td>
</tr>
<tr>
<td>Create a produced tag on page 16</td>
<td>Renamed Produce a tag to Create a produce tag</td>
</tr>
<tr>
<td></td>
<td>Minor changes to the Create a produced tag procedure</td>
</tr>
<tr>
<td>Create a consumed tag on page 18</td>
<td>Minor changes to the Create a consumed tag procedure</td>
</tr>
<tr>
<td>Set RPI limits, default for producer tag on page 24</td>
<td>Updated the RPI limits and default procedure</td>
</tr>
<tr>
<td>Consideration when migrating projects that contain multicast produce tags on page 13</td>
<td>Renamed Allow Consumed Tags to Use RPI Provided by Consumer to Allow Consumed Tags to Use RPI Provided by Producer parameter</td>
</tr>
<tr>
<td>Organize tags for produced or consumed data on page 14</td>
<td></td>
</tr>
<tr>
<td>RPI limitations and negotiated default on page 22</td>
<td></td>
</tr>
<tr>
<td>Set RPI limits, default for producer tag on page 24</td>
<td></td>
</tr>
<tr>
<td>RPI I/O faults on page 36</td>
<td></td>
</tr>
<tr>
<td>Set up the consuming controller on page 26</td>
<td>Renamed Set up the consumer tag to Set up the consuming controller and updated the procedure</td>
</tr>
</tbody>
</table>
# Table of contents

## Preface

- Additional resources ............................................................................................................. 7
- Legal Notices .......................................................................................................................... 8

## Chapter 1

### Produce and consume a tag

- Introduction ........................................................................................................................ 11
- Controllers and networks that support produced/consumed tags .......................... 12
- Connection requirements of a produced or consumed tag ................................. 12
- Considerations when migrating projects that contain multicast produce tags...... 13
- Guidelines to organize tags for produced or consumed data ......................... 14
  - Bandwidth limitations adjustments ....................................................................... 15
- Create a produced tag ........................................................................................................ 16
- Create a consumed tag ...................................................................................................... 18
  - Additional steps for a PLC-5C controller ............................................................. 21
- RPI limitations and negotiated default ........................................................................ 22
- Set RPI limits, default for producer tag ..................................................................... 24
  - Unicast connection option ....................................................................................... 26
- Set up the consuming controller ..................................................................................... 26
- Verify consumed tag acceptance ..................................................................................... 28
- Produced and consumed RPI scenarios ........................................................................ 30
  - Scenario 1 ..................................................................................................................... 30
  - Scenario 2 ..................................................................................................................... 31
  - Scenario 3 ..................................................................................................................... 32
  - Scenario 4 ..................................................................................................................... 33
  - 1769-L2x and 1769-L3x RPI limits ............................................................................ 35
  - RPI I/O faults .................................................................................................................. 36

## Chapter 2

### Produce a Large Array

- Introduction ........................................................................................................................ 39
- Produce a large array ........................................................................................................... 40

### Index
Preface

This manual details how, with a Logix 5000™ controller, to produce and consume standard tags and produce a large array. For information on produced and consumed safety tags, refer to the documentation specific to the controller.

This manual is one of a set of related manuals that show common procedures for programming and operating Logix 5000 controllers.

For a complete list of common procedures manuals, refer to the Logix 5000 Controllers Common Procedures Programming Manual, publication 1756-PM001.

The term Logix 5000 controller refers to any controller based on the Logix 5000 operating system.

Additional resources

These documents contain additional information concerning related Rockwell Automation products.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replacement Guidelines; Logix 5000 Controllers Reference Manual, publication 1756-RM100</td>
<td>Provides guidelines for migrating projects from ControlLogix 5560 and 5570 controllers to ControlLogix 5580 controllers, and from CompactLogix 5370 controllers to CompactLogix 5380 controllers.</td>
</tr>
<tr>
<td>ControlLogix 5580 and GuardLogix 5580 Controllers User Manual, publication 1756-UM543</td>
<td>Provides information about designing a system, operating a ControlLogix or GuardLogix-based 5580 controllers system, and developing applications.</td>
</tr>
<tr>
<td>CompactLogix 5380 and Compact GuardLogix 5380 Controllers User Manual, publication 5069-UM001</td>
<td>Explains how to use the CompactLogix and Compact GuardLogix 5380 Controllers.</td>
</tr>
<tr>
<td>GuardLogix 5570 Controllers User Manual, publication 1756-UM022</td>
<td>Describes the GuardLogix-specific procedures to configure, operate, and troubleshoot the controller.</td>
</tr>
<tr>
<td>Compact GuardLogix 5370 Controllers User Manual, publication 1769-UM022</td>
<td>Describes the necessary tasks to install, configure, program, and operate a Compact GuardLogix 5370 controller.</td>
</tr>
<tr>
<td>Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1</td>
<td>Provides general guidelines for installing a Rockwell Automation industrial system.</td>
</tr>
</tbody>
</table>

View or download publications at http://www.rockwellautomation.com/literature. To order paper copies of technical documentation, contact a local Rockwell Automation distributor or sales representative.
Legal Notices

Copyright Notice

Copyright © 2018 Rockwell Automation Technologies, Inc. All Rights Reserved. Printed in USA.

This document and any accompanying Rockwell Software products are copyrighted by Rockwell Automation Technologies, Inc. Any reproduction and/or distribution without prior written consent from Rockwell Automation Technologies, Inc. is strictly prohibited. Please refer to the license agreement for details.

End User License Agreement (EULA)

You can view the Rockwell Automation End-User License Agreement (“EULA”) by opening the Rockwell_EULA_02102016_Final.pdf file located in your product’s install folder on your hard drive.

Open source licenses

The software included in this product contains copyrighted software that is licensed under one or more open source licenses. Copies of those licenses are included with the software. Corresponding Source code for open source packages included in this product are located at their respective web site(s).

Alternately, obtain complete Corresponding Source code by contacting Rockwell Automation via the Contact form on the Rockwell Automation website: http://www.rockwellautomation.com/global/about-us/contact/contact.page Please include "Open Source" as part of the request text.

A full list of all open source software used in this product and their corresponding licenses can be found in the OPENSOURCE folder included with the Release Notes. The default installed location of these licenses is C:\Program Files (x86)\Common Files\Rockwell\Help\<Product>\ReleaseNotes\OPENSOURCE\index.htm.

Trademark Notices

RSFieldbus, RSLinx, RSLogix, RSNetWorx for DeviceNet, RSNetWorx for EtherNet/IP, RSMACC, RSView, RSView32, Rockwell Software Studio 5000 Automation Engineering & Design Environment, Studio 5000 View Designer, SCANport, SLC, SoftLogix, SMC Flex, Studio 5000, Ultra 100, Ultra 200, VersaView, WINtelligent, XM, SequenceManager are trademarks of Rockwell Automation, Inc.

Any Rockwell Automation logo, software or hardware product not mentioned herein is also a trademark, registered or otherwise, of Rockwell Automation, Inc.

Other Trademarks

CmFAS Assistant, CmDongle, CmStick, CodeMeter, CodeMeter Control Center, and WIBU are trademarks of WIBU-SYSTEMS AG in the United States and/or other countries.

All other trademarks are the property of their respective holders and are hereby acknowledged.

Warranty

This product is warranted in accordance with the product license. The product’s performance may be affected by system configuration, the application being performed, operator control, maintenance, and other related factors. Rockwell Automation is not responsible for these intervening factors. The instructions in this document do not cover all the details or variations in the equipment, procedure, or process described, nor do they provide directions for meeting every possible contingency during installation, operation, or maintenance. This product’s implementation may vary among users.

This document is current as of the time of release of the product; however, the accompanying software may have changed since the release. Rockwell Automation, Inc. reserves the right to change any information contained in this document or the software at any time without prior notice. It is your responsibility to obtain the most current information available from Rockwell when installing or using this product.

Environmental Compliance


Contact Rockwell

Customer Support Telephone — 1.440.646.3434

Produce and consume a tag

Introduction

A Logix 5000 controller produces (broadcast) and consumes (receive) system-shared tags.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Controller_1</td>
</tr>
<tr>
<td></td>
<td>Produced tag</td>
</tr>
<tr>
<td>2</td>
<td>Controller_2</td>
</tr>
<tr>
<td></td>
<td>Consumed tag</td>
</tr>
<tr>
<td>3</td>
<td>Controller_3</td>
</tr>
<tr>
<td></td>
<td>Consumed tag</td>
</tr>
<tr>
<td>4</td>
<td>Controller_4</td>
</tr>
<tr>
<td></td>
<td>Consumed tag</td>
</tr>
</tbody>
</table>
### Term Definition

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produced tag</td>
<td>A tag that a controller makes available for use by other controllers. Multiple controllers can simultaneously consume (receive) the data. A produced tag sends its data to one or more consumed tags (consumers) without using logic.</td>
</tr>
<tr>
<td>Consumed tag</td>
<td>A tag that receives the data of a produced tag. The data type of the consumed tag must match the data type (including any array dimensions) of the produced tag. The RPI of the consumed tag determines the period at which the data updates.</td>
</tr>
</tbody>
</table>

**Controllers and networks that support produced/consumed tags**

For two controllers to share produced or consumed tags, both controllers must be in the same backplane or attached to the same control network, such as ControlNet or EtherNet/IP network. Although produced and consumed tags can be bridged over two networks, Rockwell Automation does not support this configuration. Check the documentation specific to your controller to determine which network connections it supports.

**Connection requirements of a produced or consumed tag**

Produced and consumed tags each require connections. As the number of controllers that consume a produced tag increases, the number of connections the controller has available for other operations, such as communication and I/O, decreases.

**Important:** If a consumed-tag connection fails, all other tags being consumed from that remote controller stop receiving new data.

Each produced or consumed tag uses these connections.

<table>
<thead>
<tr>
<th>This type of tag</th>
<th>Uses this many connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produced tag</td>
<td>number_of_consumers + 1</td>
</tr>
<tr>
<td>Consumed tag</td>
<td>1</td>
</tr>
</tbody>
</table>

**Example:** Connection requirements of a Produced or Consumed Tag

- A ControlLogix controller producing 4 tags for 1 controller uses 8 connections:
  - Each tag uses 2 connections (1 consumer + 1 = 2).
  - 2 connections per tag x 4 tags = 8 connections.
- Consuming 4 tags from a controller uses 4 connections (1 connection per tag x 4 tags = 4 connections).

**Communication Paths to Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, and GuardLogix 5580 controllers**

If a controller running release version 24.00.00 or earlier intends to consume tag data from Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller, the controller must have a target device in its I/O configuration for the connection. However, releases version 24.00.00 and earlier do not have profiles for Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, and GuardLogix 5580 controllers and requires a substitute profile.
Rockwell Automation recommends the following substitutes:

- To consume tags through the embedded Ethernet port on Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller, represent the controller as a Compact 5370 controller, such as the 1769-L36ERM, in the consuming controller’s I/O configuration. These controllers have a built-in Ethernet port and therefore can be addressed using an EtherNet/IP Address.

- To consume tags through the backplane port on a GuardLogix 5580 or ControlLogix 5580 controller, represent the controller as a ControlLogix 5570, such as the 1756-L75, in the consuming controller’s I/O configuration. This process allows connection using the backplane.

When migrating projects from an earlier controller model to Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller, verify that the configuration of projects containing multicast produce tags is correct.

**Considerations when migrating projects that contain multicast produce tags**

**Compact GuardLogix 5380 and GuardLogix 5580 controllers in version 31.00.00 only produce safety tags as unicast**

Compact GuardLogix 5380 and GuardLogix 5580 controllers only produce safety tags as unicast. The controllers consume safety tags as either unicast or multicast. When configuring a consumed safety tag, consider the capabilities of the producer.

- If the producer in the I/O configuration of this controller is a Compact GuardLogix 5380 or GuardLogix 5580 controller consuming a safety tag, configure the consumed tag to use unicast.

- If the producer in the I/O configuration of this controller is a Compact GuardLogix 5370, GuardLogix 5570, or GuardLogix 5560 controller, configure the safety consumed tag as either unicast or multicast.

**RPI limitations**

In releases before version 28.00.00, produced tags produce data at the requested packet interval (RPI) of the fastest requesting consumer. This RPI allows multiple consumers, with different RPI settings, to connect successfully to a producer. In releases version 28.00.00 and later, the first consumer of a produced tag determines the RPI of produced data. All subsequent consumers must request the same RPI value as the first consumer or they fail to connect and display error code 0112.

The device that sends the first consumer connection to the producing controller is the first consumer of a produced tag. The first consumer makes a request based on the order in which the producer and consumer control system powers up.
Therefore, cycling power to the system can change the first consumer. A device cannot be configured to be the first consumer. It is difficult to identify which consumer sends the first request to the producing controller, so plan accordingly when configuring multicast produced tags.

To make sure consumers of produced tags connect to Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, and GuardLogix 5580 controllers:

- For consumers running releases version 17.00.00 and earlier that are consumers of a produced tag from Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, and GuardLogix 5580 controllers:
  - Verify that all multicast consumed tags of a produced tag have the same RPI. If they do not, some consumers fail to connect.

- For multicast consumers running releases version 18.00.00 and later:
  - Verify that all multicast consumed tags of a produce tag have the same RPI, or
  - Verify that all multicast consumers are configured to **Allow Consumed Tags To Use RPI Provided By Producer**.

For more information on replacing a ControlLogix 5560/5570 controller with a ControlLogix 5580 controller or a CompactLogix 5370 controller with a CompactLogix 5380 controller, refer to *Replacement Guidelines: Logix5000 Controllers Reference Manual* (1756-RM100) in the Rockwell Automation Literature Library.

**Guidelines to organize tags for produced or consumed data**

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create the tags at the controller scope.</td>
<td>Shares only controller-scoped tags.</td>
</tr>
<tr>
<td>Use one of these data types:</td>
<td>To share other data types, create a user-defined data type that contains the required data.</td>
</tr>
<tr>
<td>- DINT</td>
<td>Use the same data type for the produced tag and corresponding consumed tag or tags.</td>
</tr>
<tr>
<td>- REAL</td>
<td></td>
</tr>
<tr>
<td>- Array of DINTs or REALs</td>
<td></td>
</tr>
<tr>
<td>- User-defined</td>
<td></td>
</tr>
<tr>
<td>To share tags with a PLC-5C controller, use a user-defined data type.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To</th>
<th>This</th>
<th>Then</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce</td>
<td>Integers</td>
<td>Create a user-defined data type that contains an array of INTs with an even number of elements, such as INT[2]. (When producing INTs, produce two or more.)</td>
</tr>
<tr>
<td>Only one REAL value</td>
<td>Use the REAL data type.</td>
<td></td>
</tr>
<tr>
<td>Guideline</td>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>Produce a tag</td>
<td>Create a user-defined data type that contains an array of REALs.</td>
<td></td>
</tr>
<tr>
<td>Consume</td>
<td>Create a user-defined data type that contains these members.</td>
<td></td>
</tr>
<tr>
<td>Data Type</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>DINT</td>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>INT[x], where x is the output size of the data from the PLC-5C controller. (If consuming only one INT, omit x.)</td>
<td>Data produced by a PLC-5C controller</td>
<td></td>
</tr>
</tbody>
</table>

Limit the size of the standard tag to 500 bytes. If transferring more than 500 bytes, create logic to transfer the data in packets. If the produced tag is over a ControlNet network, the tag may need to be less than 500 bytes.

**Important:** Produced and consumed safety tags are limited to 128 bytes.

Use the highest permissible RPI for the application. If the controller consumes the tag over a ControlNet network, use a binary multiple of the ControlNet network update time (NUT). For example, if the NUT is 5 ms, use an RPI of 5, 10, 20, 40 ms, and so forth.

Verify the correct configuration of Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller projects containing multicast produce tags.

Perform these steps to make sure consumers of produce tags can connect:
- For consumers running Logix Designer releases version 17.00.00 and earlier that are consumers of a producer from a Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller:
  - Verify that all multicast consumed tags of a produce tag have the same RPI. If they do not, some consumers fail to connect.
  - For multicast consumers running Logix Designer releases version 18.00.00 and later, perform one of these steps:
    - Verify that all multicast consumed tags of a produce tag are configured with the same RPI, or
    - Verify that all multicast consumers are configured to Allow Consumed Tags To Use RPI Provided By Producer.

Combine data that goes to the same controller. If producing several tags for the same controller, group the data:
- Into one or more user-defined data types. (This uses fewer connections than producing each tag separately.)
- According to similar update intervals. (To conserve network bandwidth, use a greater RPI for less critical data.)
For example, create one tag for data that is critical and another tag for data that is not as critical.

**See also**

[Considerations when migrating projects that contain multicast produce tags](#) on page 13

**Bandwidth limitations adjustments**

When a tag is shared over a ControlNet network, the tag must fit within the bandwidth of the network:
- As the number of connections over a ControlNet network increases, several connections, including produced or consumed tags, may need to share a network update time (NUT).
- Since a ControlNet network can pass only 500 bytes in one NUT, the data of each connection must be less than 500 bytes to fit into the NUT.

Depending on the size of the system, there may not be enough bandwidth on the ControlNet network for a tag of 500 bytes. If a tag is too large for the ControlNet network, make one or more of these adjustments.
<table>
<thead>
<tr>
<th>Adjustment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce NUT.</td>
<td>At a faster NUT, fewer connections need to share an update slot.</td>
</tr>
<tr>
<td>Increase the requested packet interval (RPI) of the connections.</td>
<td>At higher RPIs, connections can take turns sending data during an update slot.</td>
</tr>
</tbody>
</table>

For a ControlNet bridge module (CNB) in a remote chassis, choose the most efficient communication format for that chassis:

<table>
<thead>
<tr>
<th>Are most of the modules in the chassis non-diagnostic, digital I/O modules?</th>
<th>Then choose this communication format for the remote CNB module.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Rack Optimization</td>
</tr>
<tr>
<td>No</td>
<td>None</td>
</tr>
</tbody>
</table>

The Rack Optimization format uses an additional 8 bytes for each slot in its chassis. Analog modules or modules that are sending or getting diagnostic, fuse, timestamp, or schedule data require direct connections and cannot take advantage of the rack optimized form. Choosing None frees up the 8 bytes per slot for other uses, such as produced or consumed tags.

Separate the tag into two or more smaller tags.

1. Group the data according to similar update rates. For example, create one tag for data that is critical and another tag for data that is not as critical.
2. Assign a different RPI to each tag.

Create logic to transfer the data in smaller sections (packets).

See Produce a Large Array.

See also

**Produce a large array** on page 40

Create a produced tag

The produced tag sends its data to one or more consumed tags without using logic. Multiple controllers can use the produced tags simultaneously.

To create a produced tag:

1. Open the Logix Designer application and choose a controller.

   **Important:** A controller can have both producing and consuming tags, but a producer cannot consume its own data. The local controller is the consumer, and the remote controller is the producer.

2. In the **Controller Organizer**, right-click **Controller Tags** and select **Edit Tags**.

   Only controller-scoped tags can be shared.

3. In the **Tag Editor**, right-click the tag to be a producer, and select **Edit <name of tag> Properties**.
4. In **Type**, select **Produced**.

   The **Connection** becomes available when **Type** is either **Produced** or **Consumed**.

5. Select **Connection** to define the produced tag. The **Produced Tag Connection** dialog box opens.

6. In **Max Consumers**, type the number of controllers to consume (receive) this tag.

7. (optional) Select **Advanced** to open the **Advanced Options** dialog box.
   Change the RPI range limitation, negotiated default, or unicast connection.
Create a consumed tag

The consumed tag receives data of a produced tag. Match the data type of the consumed tag with the data type (including any array dimensions) of the produced tag.

Before you begin:

- In the Controller Organizer, I/O Configuration folder, add the controller that is producing the data (the other Logix 5000 controller or PLC-5 controller). Produce only controller-scoped tags.

To create a consumed tag:

1. Open the Logix Designer application and choose a controller.

   **Important:** Use both producing and consuming tags with a controller, but a producer cannot consume its own data. The local controller is the consumer, and the remote controller is the producer.

2. In the Controller Organizer, right-click Controller Tags and select Edit Tags.
3. In the Tag Editor, right-click the tag that is to consume the data, and then select Edit <name of tag> Properties.

4. In Name, type the name of the consumed tag.

5. In Type, select Consumed.

6. In Data Type, choose the data type.

<table>
<thead>
<tr>
<th>If the producing controller is</th>
<th>Then the data type should be</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logix 5000 controller</td>
<td>Same data type as the produced tag.</td>
</tr>
<tr>
<td>PLC-SC controller</td>
<td>User-defined data type with these members.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DINT</td>
<td>Status</td>
</tr>
<tr>
<td>INT[x]</td>
<td>Data produced by a PLC-SC controller</td>
</tr>
</tbody>
</table>

If consuming only one INT, omit x.
7. **Select** Connection **to define the consumed tag.** Select Connection when **Type** is either Produced or Consumed.

8. **In Producer,** choose the controller that produces the data.

   If the list is empty, add a remote controller to the Controller Organizer, I/O Configuration folder.

9. **In Remote Data,** type the name or the instance number of the produced tag.

<table>
<thead>
<tr>
<th>If the producing controller is</th>
<th>Then type or choose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logix 5000 controller</td>
<td>Tag name of the produced tag</td>
</tr>
<tr>
<td>PLC-SC controller</td>
<td>Message number from the ControlNet configuration of the PLC-SC controller</td>
</tr>
</tbody>
</table>

10. **In RPI,** enter the requested packet interval (RPI) for the connection.

    **Important:** Consuming controllers have additional setup to allow its consuming tags to use an RPI provided by a producing controller. Refer to Set RPI Limits, Default for Producer Tag for details.

11. If applicable, clear **Use Unicast Connection** to use a Multicast connection. A Unicast connection is the default.
12. Select **Status** to configure the status properties for the consumed tags.

13. In **Data Type**, choose the data type that allows for connection status.

14. Select **OK** to close the **Consumed Tag Connection** dialog box.

15. Select **OK** to close the **Tag Properties** dialog box.

   **Tip:** If consuming the tag over a ControlNet network, use RSNetWorx for ControlNet software to schedule the network.

**See also**

* Set RPI limits, default for producer tag on page 24

**Additional steps for a PLC-5C controller**

When sharing data with a PLC-5C controller:

<table>
<thead>
<tr>
<th>Action</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the ControlNet configuration of the PLC-5C controller, schedule a message.</td>
<td></td>
</tr>
<tr>
<td><strong>If the PLC-5C controller</strong></td>
<td><strong>This</strong></td>
</tr>
<tr>
<td>Produces</td>
<td>Integers</td>
</tr>
<tr>
<td>Consumes</td>
<td>Integers</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>REALs</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If the PLC-5C controller consumes REALs, reconstruct the values.

When producing REALs (32-bit floating-point values) for a PLC-5C controller, the PLC-5C controller stores the data in consecutive 16-bit integers.

- The first integer contains the upper (leftmost) bits of the value.
- The second integer contains the lower (rightmost) bits of the value.

This pattern continues for each floating-point value.

---

The following example shows how to reconstruct a REAL (floating-point value) in the PLC-5C controller.

**Example:** Reconstruct a floating point value.

The two MOV instructions reverse the order of the integers as the integers move to a new location. Because the destination of the COP instruction is a floating-point address, the COP instruction takes two consecutive integers, for a total of 32 bits, and converts them to a single floating-point value.

```
MOV Move
Source N9:3 0<
Dest N9:10 0<

MOV Move
Source N9:2 0<
Dest N9:11 0<

COP Copy File
Source #N9:10
Dest #F8:0
Length 1
```

---

**RPI limitations and negotiated default**

Requested packet interval (RPI) limitations and negotiated behavior vary depending on the Logix Designer application version that is running on the controllers.

**Behavior in release versions 28.00.00 and later**

In release versions 28.00.00 and later, the first consumer of a produce tag determines the RPI of produced data. All subsequent consumers must request the same RPI value as the first consumer or the subsequent consumers fail to connect and display error code 0112.

The first consumer of a produce tag is the device that sends the first consumer connection to the producing controller. The order in which the producer and
consumer control system powers up determines the first consumer request. Therefore, cycling power to the system can change the first consumer. A device cannot be configured to be the first consumer. Determining which consumer sends the first request to the producing controller is not possible. Plan accordingly when configuring multicast produce tags. See Considerations when migrating projects that contain multicast produce tags for more information.

Tip: The controller’s backplane and Ethernet ports can support different RPIs. If multiple consumers need to connect to the controller at different RPIs, configure them to connect through the backplane or the Ethernet port. See Connection requirements of a produced or consumed tag for more information.

Behavior in release versions 18.00.00 to version 27.00.00

In version 18.00.00 and earlier controllers can be programmed to enhance the RPI acceptance between producing and consuming tags within specified limitations for multicast connections. A producing controller verifies that the RPI of incoming connections are within the produced tag settings. If the consuming tag’s RPI falls outside the configured range, a producing controller rejects the incoming RPI and may provide an RPI (default) to the consuming controller.

This optional default RPI applies only if the consuming controller is set up to allow its consumed tags to use an RPI provided by the producer. When choosing to not use the default value, manually change a rejected RPI to make the value within the limitation settings for the produced tag.

Tip: 1769-L2x and 1769-L3x controllers have additional RPI information. See 1769-Lx2 and 1769-L3x RPI Limits for details.

With multicast consumers running Logix Designer releases version 18.00.00 and later, perform these steps to make sure consumers of produce tags can connect:

- Verify that all multicast consumed tags of a produce tag are configured with the same RPI, or
- Verify that all multicast consumers are configured to Allow Consumed Tags To Use RPI Provided By Producer.

Behavior in releases version 17.00.00 and earlier

When using releases version 17.00.00 and earlier of the application, the producer accepts an incoming RPI of a consuming controller. The producing controller does not offer a default RPI. Use multicast connections to speed up the packet intervals of existing connections from other consumers.

The RPI limitations (the range set on the produced tag) and the default process applies only to multicast connections on unscheduled networks. This feature is unavailable for controllers on the ControlNet network or unicast connections.
Scheduled bandwidths on the ControlNet network transmit critical data at pre-determined intervals of time.

**Important:** Safety tags and AXIS tags do not support RPI limits and default values. AXIS produced tags are produced at a rate equal to the Coarse Update Period of the associated motion group. Safety produced tags are produced at a rate specified by the Safety Task Period.

With controllers running releases version 17.00.00 or earlier that are consumers of a producer from a Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller, verify that all multicast consumed tags of a produce tag have the same RPI. If the consumed tags do not, some consumers fail to connect.

See also

- Considerations when migrating projects that contain multicast produce tags on page 13
- Connection requirements of a produced or consumed tag on page 12
- 1769-L2x and 1769-L3x RPI Limits on page 35

**Set RPI limits, default for producer tag**

Use the Advanced Options dialog box to establish RPI limitations (range) and default values when setting up a producing tag for multicast connections. The RPI Limits configuration is disabled when online. Limits are:

- Minimum RPI: 0.2 ms for ControlLogix controllers and for CompactLogix 5380 controllers, and 1.0 ms for all other CompactLogix controllers.
- Maximum RPI: 536870.911 ms.
- Default RPI: configurable within the minimum/maximum range.
- 1769-L2x and 1769-L3x controllers: refer to 1769-L2x and 1769-L3x RPI Limits for additional instructions.

The RPI limits apply only to multicast connections on unscheduled networks. The ControlNet network does not support this functionality.

**Important:** Use the Advanced Options dialog box to set up the unicast connection between a consumer and producer controller. The Unicast check box is selected by default. Multicast connections can change to a produced tag even though the box is checked. The check box dictates only whether this produced tag can accept a unicast connection. The consuming controller determines if the connection is unicast.

**To set RPI limits, default for producer tag:**

1. If not already opened, open the Tag Properties dialog box of the produced tag, and then select Connection. The Produced Tag Connection dialog box opens.
2. On the **Connection** tab, select **Advanced**. The **Advanced Options** dialog box opens.

3. In the **Minimum RPI** box, enter the smallest requested packet interval (fastest rate) at which consumers may consume data from the tag.

4. In the **Maximum RPI** box, enter the largest packet interval (slowest rate) at which consumers may consume data from the tag. Rockwell Automation recommends using the default value of 536870.9 ms.

5. Select the **Provide Default RPI to Consumer for Out-of-Range Requests** check box to enable the producing tag to provide an RPI to a consuming tag whenever a consuming tag has an RPI outside the range of the producer’s **Minimum** and **Maximum** RPI.

6. In the **Default RPI** box, enter the value that the producer provides to the consumer.

   **Important:** In the **Controller Properties** dialog box, **Advanced** tab, select **Allow Consumed Tags to Use RPI Provided by Producer** to allow negotiations to use the RPI provided by the producer.

7. Select **OK** to close the **Advanced Options** dialog box.

8. Select **OK** to close the **Produced Tag Connections** dialog box.

**See also**

[RPI limitations and negotiated default on page 22](#)
Chapter 1  Produce and consume a tag

1769-L2x and 1769-L3x RPI Limits on page 35

Unicast connection option on page 26

Set up the consuming controller on page 26

Unicast connection option

Unicast connections are point-to-point connections between a producing controller and consuming controller; no multiple connections. Unicast connections do not require a minimum or maximum RPI range or default RPI value.

The Allow Unicast Consumer Connections check box at the bottom of the Advanced Options dialog box is selected by default to allow multiple unicast consumers to consume from the produced tag.

When the controller is running low on controller memory, clear the Allow Unicast Consumer Connections check box to discontinue using the option. Additional producer resources allocate for each potential consumer when the check box is selected.

Set up the consuming controller

Set up the Consuming controller to allow its consumed tags to accept an RPI from the producer. Use the Advanced tab in the Controller Properties dialog box to set up the controller.
Important: For controllers running Logix Designer releases version 17.00.00 or earlier that contain consumers of a producer from Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller, verify that all multicast consumed tags of a produce tag have the same RPI. If they do not, some consumers fail to connect. See RPI limitations and negotiated default for more information.

To set up the consuming controller:

1. In the Controller Organizer, right-click the controller that was set up with a consuming tag and select Properties.

   ![Controller Organizer](image)

   The Controller Properties dialog box opens.

2. Select the Advanced tab.

   ![Controller Properties](image)

3. Select the Allow Consumed Tags to Use RPI Provided by Producer check box to allow for the RPI negotiation.
Important: The check box is only available when the controller is offline. If the check box is not selected, the consuming controller does not accept the RPI provided by the producer if the consuming controller requests an RPI that is out of the producer’s configured RPI range. As a result, an out-of-range RPI request results in a failed connection.

4. Select OK.

See also

RPI limitations and negotiated default on page 22

Verify consumed tag acceptance

When a consuming controller accepts a default RPI by a producing controller, verify the acceptance and the RPI value on the Consumed Tag Connection dialog box.

Before you begin:

- Verify the controller is online and the consumed tag is connected with the producer providing the RPI.

To verify consumed tag acceptance:

1. In the Controller Organizer, right-click the Controller Tags folder and select Edit Tags.

2. In the Tag Editor, right-click a consuming tag and select Edit <name of tag> Properties. The Tag Properties dialog box opens.
3. In the Type box, select Connection.

The Consumed Tag Connection dialog box opens. On the Connection tab, a flag to the right of the RPI box indicates the consuming controller accepted an RPI provided by the producer and the time interval of the RPI.

4. Select Cancel to exit.
See also

Set Up the Consumer Tag on page 26

Produced and consumed RPI scenarios

Scenario 1

These scenarios explain how producing and consuming tags exchange RPI for controllers.

The RPI is within range of the producing controller’s RPI Limits. No default RPI is set up for the producing controller.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Produced Tag</strong></td>
</tr>
<tr>
<td></td>
<td>Minimum RPI: 2 ms</td>
</tr>
<tr>
<td></td>
<td>Maximize RPI: 8 ms</td>
</tr>
<tr>
<td></td>
<td>Default RPI: - ms</td>
</tr>
<tr>
<td>2</td>
<td>Actual Packet Interval (API) = 3 ms</td>
</tr>
<tr>
<td>3</td>
<td>RPI = ms</td>
</tr>
</tbody>
</table>

**Version 17.00.00 and earlier:** The consuming controller is brought online with an RPI configured at 3 ms. The producer accepts the RPI requested by the consuming tag. All controllers on the multicast connection increase to 3 ms for the API, which is the interval the data is actually being produced.

**Version 18.00.00 and later:** The consuming controller is brought online with an RPI configured at 3 ms. The producing controller verifies the requested RPI by
the consumer is within the RPI limits set up for the producer. Since the request is within the range, the producing controller accepts the RPI of the consumer.

**Tip:** When using all the default settings of version 18.00.00 and later, the behavior matches that of version 17.00.00 and earlier.

### Scenario 2

The RPI is outside the range of the producing controller’s RPI Limits. No default RPI is set up for the producing controller.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1      | **Produced Tag**  
Minimum RPI: 2 ms  
Maximize RPI: 8 ms  
Default RPI: - ms |
| 2      | Error: 0111 |
| 3      | RPI = 1 ms |

**Version 17.00.00 and earlier:** The RPI requested by the consumed tag is not within the range of the producer. The producer rejects the connection and a 0111 error reports that the connection failed. Re-enter an RPI that is within the range configured on the produced tag. If a version 17.00.00 consumer tries to connect with a version 18.00.00 producer, and the RPI is outside the range of the producer, and no default is default set up, error 0111 error reports the connection as failed.
Tip: See RPI I/O Faults for an explanation of the error messages.

Version 18.00.00 and later: The RPI requested by the consumed tag is not within the RPI limitation range of the producer. The producer is not set up to provide a default RPI, so error 0111 reports that the connection failed. Re-enter an RPI within the range configured for the producer because there is no RPI default negotiation with the consumer.

See also

RPI I/O Faults on page 36

Scenario 3

The RPI is outside the range of the producing controller’s RPI Limits. A default RPI is set up for the producing controller. But, the network path contains a bridge that blocks the negotiated RPI to prevent an interruption to other controllers on the network.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1      | Produced Tag  
Minimum RPI: 2 ms  
Maximize RPI: 8 ms  
Default RPI: 5 ms |
| 2      | Error: 0112, Default RPI = 5 ms |
| 3      | RPI = 1 ms |

Tip: See RPI I/O Faults for an explanation of the error messages.

Version 18.00.00 and later: The RPI requested by the consumed tag is not within the RPI limitation range of the producer. The producer is not set up to provide a default RPI, so error 0111 reports that the connection failed. Re-enter an RPI within the range configured for the producer because there is no RPI default negotiation with the consumer.

See also

RPI I/O Faults on page 36

Scenario 3

The RPI is outside the range of the producing controller’s RPI Limits. A default RPI is set up for the producing controller. But, the network path contains a bridge that blocks the negotiated RPI to prevent an interruption to other controllers on the network.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1      | Produced Tag  
Minimum RPI: 2 ms  
Maximize RPI: 8 ms  
Default RPI: 5 ms |
<p>| 2      | Error: 0112, Default RPI = 5 ms |
| 3      | RPI = 1 ms |</p>
<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Negotiation Disabled</td>
</tr>
</tbody>
</table>

**Version 17.00.00 and earlier:** The RPI requested by the consumed tag is not within the range of the producer. The connection is rejected and error 0112 reports that the connection failed. Re-enter an RPI within the range configured on the produced tag. If a version 17.00.00 consumer tries to connect with a version 18.00.00 producer, and the RPI is outside the range of the producer, error 0112 reports the connection as failed.

**Tip:** See RPI I/O Faults for an explanation of the error messages.

**Version 18.00.00 and later:** The RPI requested by the consumed tag is not within the RPI limitation range of the producer. The producer is configured to provide an RPI default. The producer sends the default RPI to the consumer, but the consumer controller is not set up to accept a default RPI from the producer. The negotiated RPI is disabled to prevent an interruption to the multicast connection. Error message 0112 is reported. Re-enter an RPI within the range of the producer’s limits.

**See also**

RPI I/O Faults on page 36

**Scenario 4**

The RPI is outside the range of the producing controller’s RPI Limits. A default RPI is set up for the producing controller. The consumer is set up to accept the RPI provided by the producer.
**Chapter 1  Produce and consume a tag**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1      | Produced Tag  
Minimum RPI: 2 ms  
Maximize RPI: 8 ms  
Default RPI: 5 ms |
| 2      | API = 5 ms |
| 3      | Error: 0112, Default RPI = 5 ms |
| 4      | RPI = 5 ms (changed from 1 ms) |
| 5      | Negotiation Enabled |

**Version 17.00.00 and earlier:** The RPI requested by the consumed tag is not within the range of the producer. The connection is rejected and a 0112 error reports that the connection failed. Re-enter an RPI within the range configured on the produced tag. If a version 17.00.00 consumer tries to connect with a version 18.00.00 producer, and the RPI is outside the range of the producer, error 0112 reports the connection as failed.

**Version 18.00.00 and later:** The RPI requested by the consumed tag is not within the RPI limitation range of the producer. The producer is configured to provide an RPI default. The producer sends the default RPI to the consumer. The consumer is set up to accept the RPI provided by the producer. The connection is successful and the multicast connection accepts the new RPI of 5 ms.
1769-L2x and 1769-L3x RPI limits

All controllers, with the exception of the CompactLogix 1769-L2x and 1769-L3x controllers, produce data in packet intervals ranging from 0.196 through 536870.911 ms. The 1769-L2x and 1769-L3x controllers produce only in packet intervals of 2, 4, 8, 16, 32, 64, 128, 256, 512, or 1024 ms.

Entering these exact values is not required when configuring an RPI limitation range and default RPI for the 1769-L2x and 1769-L3x controllers. However, when entering an unsupported packet interval, the Logix Designer application may override the unsupported packet interval with a supported packet interval. When this occurs, the new effective value displays separately next to the unsupported value.

Similar to other controllers, the 1769-L2x and 1769-L3x controllers verify that the RPI of incoming connections are within the produced tag settings. If the consuming tag’s RPI falls outside the configured range, a producing controller rejects the incoming RPI and then provides an RPI (default) to the consuming controller.

**Important:** Set up the producing and consuming controllers to allow the consumed tags to use an RPI provided by the producer.

See RPI Limitations and Negotiated Default and Set up the consuming controller for procedures to set up the producer and consumer tags to accept a negotiated default RPI.

For the 1769-L2x and 1769-L3x controllers use the **Effective Minimum RPI**, when present, to determine the fastest packet interval allowed by the tag. When present, the **Effective Default RPI** is the largest packet interval (slowest rate) at which negotiated connections are produced for the tag.
A flag on the **Advanced Options** dialog box presents the effective RPI limit values to indicate that RPI limits are set to values that are different from the entered values.

![Advanced Options dialog box](image.png)

**See also**

- [RPI Limitations and Negotiated Default](#) on page 22
- [Set up the consuming controller](#) on page 26

**RPI I/O faults**

The table provides a description of error messages for situations where an RPI is not accepted.

<table>
<thead>
<tr>
<th>Scenario Description</th>
<th>Software Version</th>
<th>I/O Fault Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPI of consumed tag is not within the range of the producer. Producer does not support RPI negotiation or is not configured to provide a default RPI to the consumer.</td>
<td>Any</td>
<td>(Code 0111) Requested Packet Interval (RPI) out of range.</td>
</tr>
<tr>
<td>RPI of consumed tag is not within the range of the producer. Producer is returning default RPI Consumer does not support negotiation or is not configured to accept RPI from producer.</td>
<td>18.00.00 and later</td>
<td>(Code 0112) Requested Packet Interval (RPI) out of range.</td>
</tr>
<tr>
<td></td>
<td>17.00.00 and earlier</td>
<td>(Code 0112) Unknown Error.</td>
</tr>
</tbody>
</table>
## Scenario Description

<table>
<thead>
<tr>
<th>Scenario Description</th>
<th>Software Version</th>
<th>I/O Fault Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPI of consumer is out of range, but producer provides a default RPI and consumer can accept default RPI. Network path contains bridge that does not support extended error information. For I/O connectivity between two controllers, such as consuming a tag from a producing controller, both controllers must be attached to the same EtherNet/IP subnet. Two controllers cannot bridge produced or consumed tags over two subnets. For more information on setting up the network, refer to the following publication in the Rockwell Automation Literature Library: <em>EtherNet/IP Network Configuration User Manual (ENET-UM001).</em></td>
<td>18.00.00 and later</td>
<td>(Code 0112) Requested Packet Interval (RPI) out of range. Producer provided RPI blocked by the network path.</td>
</tr>
<tr>
<td>RPI of consumer is out of range, but producer provides a default RPI and consumer can accept RPI provided by producer. Network path contains scheduled network update time (NUT).</td>
<td>18.00.00 and later</td>
<td>(Code 0112) Requested Packet Interval (RPI) out of range. Cannot use producer provided RPI over a path containing a scheduled network.</td>
</tr>
</tbody>
</table>

### Prevent connection failures with Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, and GuardLogix 5580 controllers

If a consumer displays error code 0112 and fails to connect to a Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller that provides produce tags, perform these steps to make sure consumers of produce tags can connect:

- For consumers running Logix Designer releases version 17.00.00 and earlier that are consumers of a producer from a Compact GuardLogix 5380, CompactLogix 5380, CompactLogix 5480, ControlLogix 5580, or GuardLogix 5580 controller:
  - Verify that all multicast consumed tags of a produce tag have the same RPI. If they do not, some consumers fail to connect.
- For multicast consumers running Logix Designer releases version 18.00.00 and later, perform one of these steps:
  - Verify that all multicast consumed tags of a produce tag have the same RPI, or
  - Verify that all multicast consumers are configured to **Allow Consumed Tags To Use RPI Provided By Producer**.

**See also**

[Rockwell Automation Literature Library](#)
Chapter 2

Produce a Large Array

Introduction

The Logix 5000 controller can send as many as 500 bytes of data over a single scheduled connection. This corresponds to 125 DINT or REAL elements of an array. To transfer an array of more than 125 DINTs or REALs, use a produced/consumed tag of 125 elements to create a packet of data. Then use the packet to send the array piecemeal to another controller.

When sending a large array of data in smaller packets, be sure that the packet transmission is complete before moving the data into the destination array.

- Produced data over the ControlLogix backplane is sent in 50 byte segments.
- Data transmission occurs asynchronous to a program scan.

The logic that this section includes uses an acknowledge word to make sure that each packet contains new data before the data moves to the destination array. The logic also uses an offset value to indicate the starting element of the packet within the array.

Because of the offset and acknowledge elements, each packet carries 123 elements of data from the array, as shown in the Producer/Consumer Data Elements image.
In addition, the array must contain an extra 122 elements. In other words, the array must be 122 elements greater than the greatest number of elements to transfer. These elements serve as a buffer. Because each packet contains the same number of elements, the buffer prevents the controller from copying beyond the boundaries of the array. Without the buffer, transferring occurs if the last packet contains fewer than 123 elements of actual data.

Transferring a large array as smaller packets improves system performance.

- Large arrays use fewer connections than breaking the data into multiple arrays and sending each as a produced tag. For example, an array with 5000 elements takes 40 connections \((5000/125 = 40)\) by using individual arrays.
- Large arrays achieve faster transmission times than using a message instruction to send the entire array.
  - Messages are unscheduled and executed only during the system overhead portion of the Logix5550 execution. Therefore, messages can take a fairly long time to complete the data transfer.
  - Improved transfer time by increasing the system overhead time slice, but this diminishes the performance of the continuous task.

To produce a large array:

1. In the Controller Tags folder of the controller project that produces the array, create these tags.

<table>
<thead>
<tr>
<th>P</th>
<th>Tag Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>array_ack</td>
<td>DINT[2]</td>
</tr>
<tr>
<td>X</td>
<td>array_packet</td>
<td>DINT[125]</td>
</tr>
</tbody>
</table>

2. Convert the array_ack tag to a consumed tag.

For | Specify
--- | -------
Controller | Name of the controller that is receiving the packet.
3. In either the **Controller Tags** folder or the tags folder of the program that contains the logic for the transfer, create these tags.

<table>
<thead>
<tr>
<th>Tag Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>array</td>
<td>DINT(x) where x equals the number of elements to transfer plus 122 elements</td>
</tr>
<tr>
<td>array_offset</td>
<td>DINT</td>
</tr>
<tr>
<td>array_size</td>
<td>DINT</td>
</tr>
<tr>
<td>array_transfer_time</td>
<td>DINT</td>
</tr>
<tr>
<td>array_transfer_time_max</td>
<td>DINT</td>
</tr>
<tr>
<td>array_transfer_timer</td>
<td>TIMER</td>
</tr>
</tbody>
</table>

4. In the array_size tag, enter the number of elements of real data, which is the value of x from step 3 minus the 122 elements of buffer.

5. Create or open a routine for the logic that creates packets of data.

6. Enter this logic.

When the offset value in array_ack[0] is not equal to the current offset value but array_ack[1] equals -999, the consumer begins receiving a new packet, so the rung moves -999 into the last element of the packet. The consumer waits until it receives the value -999 before it copies the packet to the array. This guarantees that the consumer has new data.

When the offset value in array_ack[0] is equal to the current offset value, the consumer copied the packet to the array; so the rung checks for more data to transfer. If the offset value plus 123 is less than the size of the array, there is more data to transfer; so the rung increases the offset by 123. Otherwise, there is no more data to transfer; so the rung resets the offset value, logs the transfer time, and resets the timer. In either case, the rung uses the new offset value to create a new packet of data, appends the new
offset value to the packet, and clears the acknowledge element of the packet (packet[124]).

If the current transfer time is greater than the maximum transfer time, update the maximum transfer time. This maintains a record of the longest time to transfer data.

1. In the **Controller Tags** folder of the controller project that consumes the array, create these tags.

<table>
<thead>
<tr>
<th>P</th>
<th>Tag Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>array_ack</td>
<td>DINT[2]</td>
</tr>
<tr>
<td></td>
<td>array_packet</td>
<td>DINT[125]</td>
</tr>
</tbody>
</table>
2. Convert the array_packet tag to a consumed tag.

<table>
<thead>
<tr>
<th>For</th>
<th>Specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controller</td>
<td>Name of the controller that is sending the packet.</td>
</tr>
<tr>
<td>Remote tag name</td>
<td>array_packet</td>
</tr>
<tr>
<td></td>
<td>Both controllers use the same name for this data.</td>
</tr>
</tbody>
</table>

3. In either the **Controller Tags** folder or the tags folder of the program that will contain the logic for the transfer, create these tags.

<table>
<thead>
<tr>
<th>Tag Name</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>array</td>
<td>DINT(x) where x equals the number of elements to transfer plus 122 elements</td>
</tr>
<tr>
<td>array_offset</td>
<td>DINT</td>
</tr>
</tbody>
</table>

4. Create or open a routine for the logic that moves the data from the packets to the destination array.

5. Enter this logic.

When the offset value in array_packet[123] is different than the offset value in array_ack[0], the controller begins receiving a new packet of data; so the rung checks for the value of -999 in the last element of the packet.

If the last element of the packet equals -999, the controller received an entire packet of new data and begins the copy operation.

- The offset value moves from the packet to array_offset.
- The COP instructions copy the data from the packet to the destination array, starting at the offset value.
- The offset value moves to array_ack[0], which signals that the copy is complete.
- Array_ack[1] resets to zero and waits to signal the arrival of a new packet.

If the last element of the packet is not equal to -999, the transfer of the packet to the controller may not be complete; so -999 moves to
array_ack[1]. This signals the producer to return the value of -999 in the last element of the packet to verify the transmission of the packet.

See also

Create a Producer tag on page 16

Create a Consumer Tag on page 18
A
adjust
    bandwidth limitations 15
array
    defining data packets 39

B
bandwidth
    adjust limitations 15

C
communicate
    other controllers 11
connection
    produced or consumed tag 12
consumed tag
    connection requirements 12
consumer
    creating tag 18
    RPI scenarios 30
    using producer RPI 27
    verifying RPI 28
ControlNet
    bandwidth limits 15
create
    produced tag 16

D
default
    RPI 23

E
error messages
    RPI 36

I
I/O faults 36

L
L2x controller
    RPI limits 35
L3x controller
    RPI limits 35
limitations
    bandwidth 15
    RPI 23

P
PLC-5C
    share data 21
produced tag
    connection requirements 12
    create 16
    producer
    creating tag 16
    RPI scenarios 30

R
RPI
    I/O faults 36
    limitations, setting default 23

S
scenarios
    RPI acceptance 30

T
tag
    array 40
    consumer RPI verification 28
    consumer using producer RPI 27
    creating consumer 18
    creating producer 16
    produce 16
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 and application notes, sample code, and links to software service packs. You can also visit our Support Center at https://rockwellautomation.custhelp.com for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/services/online-phone.

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.

<table>
<thead>
<tr>
<th>United States or Canada</th>
<th>1.440.646.3434</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside United States or Canada</td>
<td>Use the Worldwide Locator available at <a href="http://www.rockwellautomation.com/locations">http://www.rockwellautomation.com/locations</a>, or contact your local Rockwell Automation representative.</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>United States</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside United States</td>
<td>Please contact your local Rockwell Automation representative for the return procedure.</td>
</tr>
</tbody>
</table>

Documentation feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete the feedback form, publication RA-DU002.

Rockwell Otomasyon Ticaret A.Ş., Kar Plaza İş Merkezii E Blok Kat:6 34752 İçerenköy, İstanbul, Tel: +90 (216) 5698400

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters
American: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe/Middle East/Africa: Rockwell Automation N.V., Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846