Release Notes

ControlLogix Enhanced Redundancy System, Revision 19.053_kit2

Redundancy Module Catalog Numbers
1756-RM, 1756-RMXT, 1756-RM2, 1756-RM2XT

Controller Catalog Numbers
1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65, 1756-L72, 1756-L73, 1756-L74, 1756-L75

Communication Module Catalog Numbers

About This Publication

These release notes describe enhancements, corrected anomalies, known anomalies, restrictions, and application notes regarding enhanced redundancy, system revisions 19.053_kit2, 19.053 and 19.052.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Release Notes</td>
<td>2</td>
</tr>
<tr>
<td>About This Enhanced Redundancy Firmware Bundle</td>
<td>3</td>
</tr>
<tr>
<td>Compatible Software Versions</td>
<td>5</td>
</tr>
<tr>
<td>About the Redundancy Module Configuration Tool</td>
<td>6</td>
</tr>
<tr>
<td>Enhancements</td>
<td>7</td>
</tr>
<tr>
<td>Corrected Anomalies</td>
<td>9</td>
</tr>
<tr>
<td>Known Anomalies</td>
<td>11</td>
</tr>
<tr>
<td>Restrictions</td>
<td>16</td>
</tr>
<tr>
<td>Application Notes</td>
<td>18</td>
</tr>
<tr>
<td>Upgrading from an Enhanced Redundancy System</td>
<td>25</td>
</tr>
<tr>
<td>Before You Begin</td>
<td>26</td>
</tr>
<tr>
<td>Upgrade the Workstation Software</td>
<td>26</td>
</tr>
<tr>
<td>Download and Install the Redundancy Firmware Bundle</td>
<td>27</td>
</tr>
<tr>
<td>Upgrade the Redundancy Module Configuration Tool</td>
<td>28</td>
</tr>
<tr>
<td>Verify Your RMCT Version</td>
<td>29</td>
</tr>
<tr>
<td>Add the EDS Files</td>
<td>31</td>
</tr>
<tr>
<td>Prepare the Redundant Chassis for the Firmware Upgrade</td>
<td>31</td>
</tr>
</tbody>
</table>
Product Release Notes

Product release notes for the individual products that are part of this ControlLogix Enhanced Redundancy bundle are available online within the Product Compatibility and Download Center.

For example, you can access release note information specific to the 1756-EN2T ControlLogix EtherNet/IP bridge.

For more information on product release notes, see page BackCover.
About This Enhanced Redundancy Firmware Bundle

This enhanced redundancy firmware bundle is comprised of series and firmware revisions for 19.053_kit2 and for each of the modules listed in Table 1, Required Series and Firmware Revisions for Components Used in an Enhanced Redundancy System, Revision 19.053_kit2.

You can download the firmware bundle at the Product Compatibility and Download Center: http://www.rockwellautomation.com/rockwellautomation/support/pcdc.page?

Information that has been added or changed since the last revision of this publication is indicated by a change bar as shown next to this paragraph. In addition to information specific to the most recent firmware revision, the information from previous minor revisions is retained in these release notes.

We strongly recommend that you review the information provided regarding previous firmware revisions. We recommend that you do so because if you are upgrading your firmware through multiple previous revisions, all of the information specific to all of the revisions is applicable.

**IMPORTANT** References to the 1756-RM2/A module also apply to the 1756-RM2XT/A module.

The firmware bundle can be downloaded at http://www.rockwellautomation/support.com.

The bundle is identified as V19.053_kit2.

**IMPORTANT** When designing, installing, and operating the redundant chassis pair for this enhanced redundancy system revision, you can use only the modules specified in Table 1.

With regard to using ControlLogix controllers, remember the following:

– If you are using a 1756-L7x controller, you must use firmware revision 19.053.
– If you are using a 1756-L6x controller, you must use firmware revision 19.052.

However, the other components described in this document can be used with either system revision level.

Also, keep in mind the Series and Firmware Revision requirements listed apply only to components used in the redundant chassis pair, not to components used with the redundancy system outside the redundant chassis pair.

For example, you can use a 1756-CN2/B communication module, firmware revision 20.013, in a redundant chassis pair, but you cannot use any 1756-CNB communication module in the redundant chassis pair. However, you can use any enhanced or standard ControlNet communication modules in a remote chassis.
### Table 1 - Required Series and Firmware Revisions for Components Used in an Enhanced Redundancy System, Revision 19.053_kit2

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Module Description</th>
<th>Series</th>
<th>Firmware Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-CN2</td>
<td>ControlLogix ControlNet bridge module</td>
<td>B</td>
<td>20.013</td>
</tr>
<tr>
<td>1756-CN2R</td>
<td>ControlLogix redundant media ControlNet bridge module</td>
<td>C</td>
<td>25.004</td>
</tr>
<tr>
<td>1756-CN2RK</td>
<td>ControlLogix redundant ControlNet bridge (conformal coated) module</td>
<td>C</td>
<td>25.004</td>
</tr>
<tr>
<td>1756-CN2RXT</td>
<td>ControlLogix-XT™ redundant media ControlNet bridge module</td>
<td>C</td>
<td>25.004</td>
</tr>
<tr>
<td>1756-CN2</td>
<td>ControlLogix ControlNet bridge module</td>
<td>C</td>
<td>25.004</td>
</tr>
<tr>
<td>1756-CN2R</td>
<td>ControlLogix redundant media ControlNet bridge module</td>
<td>C</td>
<td>25.004</td>
</tr>
<tr>
<td>1756-CN2RXT</td>
<td>ControlLogix-XT™ redundant media ControlNet bridge module</td>
<td>C</td>
<td>25.004</td>
</tr>
<tr>
<td>1756-EN2T</td>
<td>ControlLogix EtherNet/IP bridge module</td>
<td>C (or earlier)</td>
<td>4.003</td>
</tr>
<tr>
<td>1756-EN2TR</td>
<td>ControlLogix EtherNet/IP communication module</td>
<td>C (or earlier)</td>
<td>4.004</td>
</tr>
<tr>
<td>1756-EN2TXT</td>
<td>ControlLogix-XT EtherNet/IP bridge module</td>
<td>C (or earlier)</td>
<td>4.004</td>
</tr>
<tr>
<td>1756-EN2TRXT</td>
<td>ControlLogix-XT redundant media EtherNet/IP bridge module</td>
<td>C (or earlier)</td>
<td>4.004</td>
</tr>
<tr>
<td>1756-EN2TRXT</td>
<td>ControlLogix-XT redundant media EtherNet/IP bridge module</td>
<td>C (or earlier)</td>
<td>4.004</td>
</tr>
<tr>
<td>1756-EN2TRXT</td>
<td>ControlLogix-XT redundant media EtherNet/IP bridge module</td>
<td>C (or earlier)</td>
<td>4.004</td>
</tr>
<tr>
<td>1756-L61</td>
<td>ControlLogix5561 controller</td>
<td>All</td>
<td>19.052</td>
</tr>
<tr>
<td>1756-L62</td>
<td>ControlLogix5562 controller</td>
<td>All</td>
<td>19.052</td>
</tr>
<tr>
<td>1756-L63</td>
<td>ControlLogix5563 controller</td>
<td>All</td>
<td>19.052</td>
</tr>
<tr>
<td>1756-L63XT</td>
<td>ControlLogix-XT controller</td>
<td>All</td>
<td>19.052</td>
</tr>
<tr>
<td>1756-L64</td>
<td>ControlLogix5564 controller</td>
<td>All</td>
<td>19.052</td>
</tr>
<tr>
<td>1756-L65</td>
<td>ControlLogix5565 controller</td>
<td>All</td>
<td>19.052</td>
</tr>
<tr>
<td>1756-L72</td>
<td>ControlLogix5572 controller</td>
<td>All</td>
<td>19.053</td>
</tr>
<tr>
<td>1756-L73</td>
<td>ControlLogix5573 controller</td>
<td>All</td>
<td>19.053</td>
</tr>
<tr>
<td>1756-L74</td>
<td>ControlLogix5574 controller</td>
<td>All</td>
<td>19.053</td>
</tr>
<tr>
<td>1756-L75</td>
<td>ControlLogix5575 controller</td>
<td>All</td>
<td>19.053</td>
</tr>
<tr>
<td>1756-RM2</td>
<td>ControlLogix redundancy module</td>
<td>All</td>
<td>20.005</td>
</tr>
<tr>
<td>1756-RM2XT</td>
<td>ControlLogix redundancy module</td>
<td>All</td>
<td>20.005</td>
</tr>
<tr>
<td>1756-RM</td>
<td>ControlLogix redundancy module</td>
<td>All</td>
<td>3.002</td>
</tr>
<tr>
<td>1756-RMXT</td>
<td>ControlLogix-XT redundancy module</td>
<td>All</td>
<td>3.002</td>
</tr>
</tbody>
</table>
Compatible Software Versions

Use these versions of software with this redundancy firmware bundle.

Table 2 - Required Software Versions for Enhanced Redundancy System, Revisions 19.053_kit2

<table>
<thead>
<tr>
<th>Software</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>ControlFLASH™</td>
<td>12.00.01</td>
</tr>
<tr>
<td>FactoryTalk® Services Platform</td>
<td>2.10.02 (CPR 9, SR3)(3)</td>
</tr>
<tr>
<td>FactoryTalk Alarms and Events</td>
<td>2.20.00 (CPR 9, SR2)</td>
</tr>
<tr>
<td>FactoryTalk Batch</td>
<td>11.00.00(2)</td>
</tr>
<tr>
<td>FactoryTalk View Site Edition</td>
<td>5.10.00 (CPR 9, SR2)</td>
</tr>
<tr>
<td>Redundancy Module Configuration Tool</td>
<td>7.03.06 for 19.052 and 19.053</td>
</tr>
<tr>
<td></td>
<td>8.01.05 for 19.053_kit1</td>
</tr>
<tr>
<td></td>
<td>8.02.01 for 19.053_kit2</td>
</tr>
<tr>
<td>RSLinx® Enterprise</td>
<td>5.21.00 (CPR 9, SR2)(3)</td>
</tr>
<tr>
<td>RSLinx Classic</td>
<td>2.57.00 (CPR 9, SR3)</td>
</tr>
<tr>
<td>RSLinx® 5000</td>
<td>19.01.00 (CPR 9, SR 3)</td>
</tr>
<tr>
<td>RSNetWorx™ for ControlNet</td>
<td>10.01.00 (CPR 9, SR3)</td>
</tr>
<tr>
<td>RSNetWorx® for EtherNet/IP</td>
<td></td>
</tr>
</tbody>
</table>

(1) Use the most recent FactoryTalk Services Platform Patch Roll-up with this enhanced redundancy firmware revision. For the most recent patch roll-up, see Rockwell Automation Knowledgebase Answer ID 56184, accessible at: http://www.rockwellautomation.com/knowledgebase/.

(2) Use the most recent FactoryTalk Batch Patch Roll-up with this enhanced redundancy firmware revision. For the most recent patch roll-up, see Rockwell Automation Knowledgebase Answer ID 59058, accessible at: http://www.rockwellautomation.com/knowledgebase/.

(3) See FactoryTalk View Software Considerations on page 7 for use considerations.

FactoryTalk View Software Considerations

FactoryTalk View software is required for only these human-machine interfaces (HMIs):

- PanelView™ Plus terminal
- VersaView® industrial computer running a Windows CE operating system
- RSVview® Supervisory Edition software

IMPORTANT

If you are using FactoryTalk View Site Edition software, install the RSLinx Enterprise HOTFIX. The HOTFIX improves the EtherNet/IP switchover time.

For more information, see Knowledgebase document ID 34592. To access the Rockwell Automation Knowledgebase, go to http://www.rockwellautomation.com/support.
About the Redundancy Module Configuration Tool

You can use 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT redundancy modules to commission a redundant system. These modules operate in a plug-and-play manner, that is, they can commission a system without any additional programming. However, there is additional functionality available if you use the modules with the Redundancy Module Configuration Tool (RMCT).

This enhanced redundancy system revision requires the RMCT, version 8.02.01 that is packaged with this enhanced redundancy system revision bundle. The About screen for the RMCT displays 8.2.1.0 but it's the correct version.

You can use the RMCT with the redundancy modules to complete these tasks:

- View error diagnostics
- View partnered modules’ qualification and compatibility status
- Set Auto-Synchronization parameters
- View and set Chassis ID parameters (Chassis A, Chassis B)
- Identify noncompliant modules for removal
- Configure redundancy system parameters

**IMPORTANT** This publication documents Corrected Anomalies and Known Anomalies associated with the RMCT. We recommend that you read these anomaly descriptions before using the RMCT, version 8.02.01.

Also, if you need to upgrade your RMCT separately from downloading this enhanced redundancy system revision or using RSLogix Classic software, version 2.57.00 (CPR9, SR3), see Upgrade the Redundancy Module Configuration Tool on page 28.
Enhancements

These enhancements are provided with enhanced redundancy system, release revision 19.053_kit2.

Table 3 - Enhancements Provided with Enhanced Redundancy System, Revision 19.053_kit2

<table>
<thead>
<tr>
<th>System Component</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-CN2/C support</td>
<td>The 1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-CN2RK modules are available with firmware revision 25.004 in this enhanced redundancy bundle.</td>
</tr>
<tr>
<td>1756-RM2 firmware</td>
<td>Upgraded Firmware Revision The 1756-RM2 and 1756-RM2XT modules use firmware revision 20.005 in this enhanced redundancy bundle.</td>
</tr>
<tr>
<td>1756-EN2TR/C support</td>
<td></td>
</tr>
<tr>
<td>Redundancy Module</td>
<td>The RMCT has been revised to version 8.02.01.</td>
</tr>
<tr>
<td>Configuration Tool</td>
<td></td>
</tr>
</tbody>
</table>

These enhancements are provided with enhanced redundancy release revision 19.053_kit1.

Table 4 - Enhancements in Enhanced Redundancy System, Revision 19.053_kit1

<table>
<thead>
<tr>
<th>System Components</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redundancy Module</td>
<td>Reduction in scan time of up to 35% per sync point in comparison to 1756-RM/B module, due to higher 1756-RM2/A module speed of up to 1000 Mbps.</td>
</tr>
<tr>
<td>Configuration Tool</td>
<td>Redundant fiber ports for the 1756-RM2/A module for crossloading; no single point of failure of a fiber cable.</td>
</tr>
<tr>
<td>1756-RM2</td>
<td>The redundancy module firmware now reports back to the RMCT as to which version of the RMCT it is compatible with. In the case of an incompatibility, the RMCT will show just the Module Info tab and indicate the version that the firmware is compatible with.</td>
</tr>
<tr>
<td></td>
<td><strong>IMPORTANT:</strong> To configure the 1756-RM2/A module, RMCT version 8.01.05 must be installed; otherwise, the user will not find the Module Configuration menu item after right-clicking the 1756-RM2/A module in the RSLinx RSWho browser window.</td>
</tr>
<tr>
<td></td>
<td>An ongoing synchronization process that takes a long time (up to 10 minutes, in the case of a PTP configuration error) to complete can be aborted via the Disqualify button in the RMCT. Without this feature, you must abort qualification by taking a manual action, such as cycling power to the secondary chassis or removing the redundancy module under power (RIUP).</td>
</tr>
<tr>
<td></td>
<td>There are new causes added for partner compatibility of communication modules that appear in the RMCT Status tab under Compatibility. For example, the primary and secondary partners are not on the same network (the partners must be communicating on the same network to synchronize), or one or both of the partner's keepers are invalid. Update the keepers to valid and matching keeper values.</td>
</tr>
</tbody>
</table>

These enhancements are provided with enhanced redundancy system, revision 19.052.

Table 5 - Enhancements in Enhanced Redundancy System, Revision 19.052

<table>
<thead>
<tr>
<th>System Component</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-A4LXT</td>
<td>You can use 1756-L4LXT chassis in a redundant chassis pair.</td>
</tr>
<tr>
<td>1756-EN2T,</td>
<td>You can use 1756-EN2Tr communication modules in a redundant chassis pair to access remote I/O modules over an EtherNet/IP network.</td>
</tr>
<tr>
<td>1756-EN2TR,</td>
<td></td>
</tr>
<tr>
<td>1756-EN2TXT</td>
<td></td>
</tr>
<tr>
<td>1756-L6, 1756-L7,</td>
<td>You can use these ControlLogix controllers in an enhanced redundancy system, revision 19.052.</td>
</tr>
<tr>
<td>1756-L72, 1756-L73,</td>
<td><strong>IMPORTANT:</strong> There are differences between controller product families, that is, between 1756-L6x controllers and 1756-L7x controllers. For information about those differences, see ControlLogix Enhanced Redundancy System User Manual, publication 1756-UM535.</td>
</tr>
<tr>
<td>1756-L74, 1756-L75</td>
<td></td>
</tr>
</tbody>
</table>
CIP Sync Technology

This enhanced redundancy system revision supports the use of CIP Sync technology. CIP Sync technology provides a mechanism to synchronize clocks between controllers, I/O devices, and other automation products in your architecture with minimal user intervention.

**IMPORTANT**

There are differences between using CIP Sync technology in nonredundant systems and enhanced redundancy system, revisions 19.053 and 19.052. Before you use this enhancement see these publications for a full understanding of CIP Sync technology:

- ControlLogix System User Manual, publication 1756-UM001
- ControlLogix Controllers, Revision 18 Release Notes, publication 1756-RM018
- Integrated Architecture™ and CIP Sync Configuration Application Technique, publication IA-AT003

Additionally, there are restrictions that apply when using CIP Sync technology in this enhanced redundancy system revision. For more information, see page 18.

## Table 5 - Enhancements in Enhanced Redundancy System, Revision 19.052 (Continued)

<table>
<thead>
<tr>
<th>System Component</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>This enhanced redundancy system revision supports the use of CIP Sync technology. CIP Sync technology provides a mechanism to synchronize clocks between controllers, I/O devices, and other automation products in your architecture with minimal user intervention.</td>
</tr>
</tbody>
</table>

**IMPORTANT**

There are differences between using CIP Sync technology in nonredundant systems and enhanced redundancy system, revisions 19.053 and 19.052. Before you use this enhancement see these publications for a full understanding of CIP Sync technology:

- ControlLogix System User Manual, publication 1756-UM001
- ControlLogix Controllers, Revision 18 Release Notes, publication 1756-RM018
- Integrated Architecture™ and CIP Sync Configuration Application Technique, publication IA-AT003

Additionally, there are restrictions that apply when using CIP Sync technology in this enhanced redundancy system revision. For more information, see page 18.

### Runtime Detection of Controller Modifications

This enhanced redundancy system revision supports Runtime Detection of Controller Modifications, also known as Controller Logging. This feature provides the option to detect and log changes made to 1756-L6x and 1756-L7x controllers without adding any auditing software.

### Advanced Process Control Instructions

This enhanced redundancy system revision supports the use of Advanced Process Control for process or drives applications. This revision supports these Advanced Process Control instructions:

- Coordinated Control (CC) Function Block
- Internal Model Control (IMC) Function Block
- Modular Multivariable Control (MMC) Function Block

For more information on Advanced Process Control instructions, see Logix5000™ Controllers Process Control and Drives Instructions Reference Manual, publication 1756-RM006.

### Partial Import Online

This enhanced redundancy system revision supports PIO functionality in RSLogix 5000 software. With this feature, you can execute such tasks as importing large edits to a project while it is online and in Run mode.

For more information on Partial Import Online, see the Logix5000 Controllers Import/Export Reference Manual, publication 1756-RM084.

### High-integrity Add-On Instructions

This enhanced redundancy system revision supports the use of high-integrity Add-On instructions. High-integrity Add-On instructions offer the capability to track instruction revisions and easily confirm instruction functionality.

### Redundancy System Update

This enhanced redundancy system revision supports the Redundancy System Update feature. This feature offers the capability of performing firmware updates in the secondary control chassis while the primary control chassis is controlling outputs. For more information, see [Upgrading from an Enhanced Redundancy System](#).

### Improved Controller Scan Times

This enhanced redundancy system revision provides improved controller scan times when using 1756-L7x controllers instead of 1756-L6x controller. The improved scan times are also found in applications that use the Series B redundancy module, that is, 1756-RM/B module.

### Support for Series B Hardware

This release supports the Series B 1756-RM and 1756-RMXT redundancy modules in addition to the Series A versions. However, the Series B 1756-RM and 1756-RMXT redundancy modules offer faster data transfer speeds on the backplane than the Series A 1756-RM and 1756-RMXT redundancy modules. The faster data transfer speeds are essential to obtain faster scan times when running a 1756-L7x controller in the redundant chassis pair.
Corrected Anomalies

These anomalies have been corrected with these enhanced redundancy system revisions:

Corrected Anomalies with Revision 19.053_kit2.

There are no corrected anomalies with the enhanced redundancy system, revision 19.053_kit2.

Corrected Anomalies with Revision 19.053_kit1 (or earlier)

These anomalies have been corrected with enhanced redundancy system revisions 19.053 (or earlier).

Table 5 - Enhancements in Enhanced Redundancy System, Revision 19.052 (Continued)

<table>
<thead>
<tr>
<th>System Component</th>
<th>Enhancement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redundancy Module Configuration Tool</td>
<td>Automatic Export</td>
</tr>
<tr>
<td></td>
<td>The Export All button on the Event Log tab allows all the event log records and internal diagnostic data from both redundancy modules in the redundant chassis pair to be collected automatically.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORRECTED: An internal floating point calculation may result in an incorrect value. Calculations executed internally can result in unexpected values being generated, including some instructions generating incorrect results or unintended movement of motion axes in motion applications. This anomaly may affect both motion and non-motion applications. This anomaly is not a common occurrence. However, the possibility of code generating incorrect values or unintended axis motion does exist. This anomaly can manifest itself any time the 1756-L7x controller is in Run mode. For more information on this anomaly, see 186811 - Product Safety Advisory - 2011-04-005 - L7x Processor Internal Calculations May Result in Unexpected Events Including Unintended Movement of a Motion Axis available at <a href="http://rockwellautomation.custhelp.com/">http://rockwellautomation.custhelp.com/</a> IMPORTANT: This anomaly does not exist with the 1756-L6x controllers.</td>
<td>1756-L72, 1756-L73, 1756-L74, 1756-L75</td>
</tr>
<tr>
<td>Lgx00119694, Lgx00120055, Lgx00120056</td>
<td></td>
</tr>
</tbody>
</table>

Table 6 - Corrected Anomalies in an Enhanced Redundancy System, Revision 19.053

<table>
<thead>
<tr>
<th>System Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORRECTED: Some third-party communication software may cause a major non-recoverable fault on the controller. IMPORTANT: This anomaly does not exist with the 1756-L6x controllers.</td>
<td>1756-L72, 1756-L73, 1756-L74, 1756-L75</td>
</tr>
<tr>
<td>Lgx00116419, Lgx00116066, Lgx00116418, Lgx00116420</td>
<td></td>
</tr>
</tbody>
</table>

CORRECTED: Some third-party communication software may cause a major non-recoverable fault on the controller.

IMPORTANT: This anomaly does not exist with the 1756-L6x controllers.
# Table 7 - Corrected Anomalies in an Enhanced Redundancy System, Revision 19.052

<table>
<thead>
<tr>
<th>System Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-EN2T, 1756-EN2TR, 1756-EN2TXT</td>
<td><strong>CORRECTED:</strong> Corrected an anomaly that could cause the module’s performance to degrade (possibly dropping connections and eventually asserting) when operating under heavy HMI load (close to 100% CPU) for a long period of time. This correction is only available if you are using 1756-EN communication modules, firmware revision 4.003 as listed in Table 2 on page 5. Lgp00114874</td>
</tr>
<tr>
<td>1756-EN2TR</td>
<td><strong>CORRECTED:</strong> Corrected an anomaly to close an open UDP port. Lgp00123465</td>
</tr>
<tr>
<td>1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65</td>
<td><strong>CORRECTED:</strong> Totalizer (TOT) instruction may continually remain in Program Mode. Setting the ProgValueReset input puts the Totalizer into Program Mode. The ProgOper output continues to indicate the mode requested (that is, Operator mode), however, only ProgStartReq, ProgStopReq, and ProgResetReq are recognized. Lgp00077908</td>
</tr>
<tr>
<td>1756-RM, 1756-RMXT</td>
<td><strong>CORRECTED:</strong> Cycling power to, or, updating the firmware of the 1756-RM or 1756-RMXT redundancy module or other modules in the chassis may cause the 1756-RM or 1756-RMXT redundancy module to fault and indicate error code EAM3 on the module status display. Rarely, after updating the firmware for the 1756-RM or 1756-RMXT redundancy module or any other modules in the chassis, the 1756-RM or 1756-RMXT redundancy module begins logging E750 faults and eventually an EAM3 fault occurs. To recover, uninstall both the 1756-RM or 1756-RMXT redundancy modules from the chassis and re-install them in the same chassis slots. Uninstalling and reinstalling only one of the modules may result in the fault appearing again. Lgp00094986, Lgp00099560</td>
</tr>
<tr>
<td>1756-RM, 1756-RMXT</td>
<td><strong>CORRECTED:</strong> The redundancy module fails to detect a controller in the chassis. Rarely, after applying power to a redundant chassis, the 1756-RM or 1756-RMXT redundancy module does not detect all of the controllers in the chassis. When the controller is not detected, it goes into Run mode, even if it is in the secondary chassis. In addition, the Synchronization Status tab of the RMCT does not indicate that the missing controller is present. If the controller that fails to be detected is located in the secondary chassis, the chassis pair fails to synchronize. Lgp00079417</td>
</tr>
</tbody>
</table>
Known Anomalies

These anomalies have been identified with enhanced redundancy system revisions 19.053 and 19.052.

Table 8 - Known Anomalies in an Enhanced Redundancy System, Revision 19.053 and 19.052

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65, 1756-L72, 1756-L73, 1756-L74, 1756-L75</td>
<td>An anomaly can occur when you nest simultaneous branches in a sequential function chart (SFC) routine as shown below. During normal operations, the logic does not step out of a simultaneous branch until all of the incoming legs have reached their bottom-most step. In the example shown, the logic does not step out of the Outer simultaneous branch until the left most leg has stepped out of the Inner simultaneous branch. The first time through the SFC routine, the application works as expected. On subsequent scans, however, the chart steps out of the Outer simultaneous branch even though the left leg has not reached the Inner simultaneous branch yet. This behavior occurs because the information in the bottom step, that is, the step next to the word Outer, remains from the previous scan. This stale information incorrectly causes the transition to move on as if the left leg is at the bottom step when it actually is not. To work around this anomaly, confirm all of the incoming legs have reached their bottom steps in the transition. You can check the ( x ) bits to make sure the bottom-most step of each converging leg is active before allowing the chart to advance. This check can be added to the transition logic already present. For example, the steps in the following expression are the bottom steps (see graphic above) of the incoming legs. Each step has a timer. The transition does not move on until all of the step timers have reached their preset value. The expression can be modified to be sure those steps are truly active. This is the original expression: // Unit is ready to Transition [ \text{Step1_ready.dn and Step2_ready.dn and Step3_ready.dn and Step4_ready.dn and Step5_ready.dn} ] This is the modified expression to workaround this anomaly. // Unit is ready to Transition [ \text{Step1_ready.x and Step2_ready.x and Step3_ready.x and Step4_ready.x and Step5_ready.x and Step1_ready.dn and Step2_ready.dn and Step3_ready.dn and Step4_ready.dn and Step5_ready.dn} ] IMPORTANT: The ( x ) bit is cleared when the chart transitions out of a step. Adding this check to the condition forces the engine to wait until all of those steps are genuinely active before advancing out of the simultaneous branch. Lgx00118189, Lgx00116506</td>
</tr>
<tr>
<td>1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-EN2T, 1756-EN2TR, 1756-EN2TXT</td>
<td>System Event Entry contains a module failure event when an enhanced communication module is inserted. The System Event History displays a 'Module Failure' entry when you insert a 1756-CN2x communication module or a 1756-EN2x communication module in the chassis while the redundant chassis pair is synchronized. This is not indicative of any module failure, instead it indicates only that an enhanced communication module was inserted in the chassis. Lgx00078874</td>
</tr>
<tr>
<td>1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65, 1756-L72, 1756-L73, 1756-L74, 1756-L75</td>
<td>During online editing, an anomaly can occur when testing edits to an SFC routine. Normally, test edits are applied to a test SFC routine and verified before accepting them in the program’s logic. When this anomaly occurs, test edits are implemented in the online routine. When the option appears to cancel the program edits, they are accepted despite trying to cancel the online editing operation. There are no workarounds for this anomaly. Lgx00119071</td>
</tr>
</tbody>
</table>
Table 8 - Known Anomalies in an Enhanced Redundancy System, Revision 19.053 and 19.052 (Continued)

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-EN2T, 1756-EN2TR, 1756-EN2TXT, 1756-EN2F</td>
<td>You cannot have firmware revisions 10.006 and 10.007 installed on the same computer. If you have firmware revision 10.006 installed and you attempt to install firmware revision 10.007, 10.007 generates an error directing to an incorrect .nvs file. Uninstall firmware revision 10.006 before installing 10.007 or reinstall the desired firmware revision and ignore the error. We recommend using Firmware revision 10.007 because it has corrected anomalies from firmware revision 10.006.</td>
</tr>
<tr>
<td>1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-EN2T, 1756-EN2TR, 1756-EN2TXT, 1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-EN2T, 1756-EN2TR, 1756-EN2TXT, 1756-RM, 1756-RMXT, 1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65, 1756-L71, 1756-L72, 1756-L73, 1756-L73XT, 1756-L74, 1756-L75</td>
<td>Multiple switchovers can cause connection failure to SoftLogix controllers. When a high number of consumed connections are routed through a ControlNet communication module in the primary chassis to a SoftLogix controller, the primary controller reports a connection failure, that is, error code 16#0203. This anomaly occurs despite the fact that there are no network disruptions or device power cycling.</td>
</tr>
<tr>
<td>1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-EN2T, 1756-EN2TR, 1756-EN2TXT, 1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-EN2T, 1756-EN2TR, 1756-EN2TXT, 1756-RM, 1756-RMXT</td>
<td>After a switchover is completed, the primary redundancy module incorrectly reports a Synchronized status in RSLogix 5000 software, and primary ControlNet and EtherNet/IP communication modules report a No Partner status. After a successful switchover, these components in the enhanced redundancy system give these indications: Primary communication module is PwNS Secondary communication module is DSNP Synchronization Status tab in the RMCT shows Synchronized These indications on the communication module and Synchronization Status tab incorrectly indicate that a switchover is complete but a redundancy state change is pending. Typically, the components should give these indications when the switchover is, in fact, complete and no state change is pending: Primary communication module is PwDS Secondary communication module is CMPT Synchronization Status tab in the RMCT shows Disqualified To force the completion of the pending state change and re-synchronize the redundant chassis pair, cycle power to the secondary chassis.</td>
</tr>
<tr>
<td>1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-EN2T, 1756-EN2TR, 1756-EN2TXT, 1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-EN2T, 1756-EN2TR, 1756-EN2TXT, 1756-RM, 1756-RMXT, 1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65, 1756-L71, 1756-L72, 1756-L73, 1756-L73XT, 1756-L74, 1756-L75</td>
<td>Multiple switchovers can cause connection failure to SoftLogix™ controllers. When a high number of consumed connections are routed through a ControlNet communication module in the primary chassis to a SoftLogix controller, the primary controller reports a connection failure, that is, error code 16#0203. This anomaly occurs despite the fact that there are no network disruptions or device power cycling.</td>
</tr>
</tbody>
</table>

Connections may drop temporarily if a 1756-EN2Tx communication module is not configured correctly. If your application includes a connection from a remote controller to a primary controller over an EtherNet/IP network, you must use these configuration settings for the 1756-EN2Tx communication module in the primary chassis when it is added to the remote controller's RSLogix 5000 project:

- Rack Connection = None
- Time Sync Connection = None

If the parameters are configured in any other combination, the connection between the remote controller and primary controller is temporarily dropped during a switchover. The connection is re-established after the switchover is complete.

**IMPORTANT** When you add the 1756-EN2Tx communication module to the primary controller's RSLogix 5000 project, you can use any settings for the parameters above with no effect on the connection from remote controller to primary controller.

1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64, 1756-L65, 1756-L72, 1756-L73, 1756-L74, 1756-L75

Redundant chassis synchronization fails when the controller is near its connection limit. Chassis synchronization may fail if the controller is near its connection limits. To reduce the likelihood of this anomaly, verify that you use controller connections within the limits of the controller and that at least eight controller connections are reserved for the redundant system.

- The 1756-L6x controllers support up to 250 controller connections. If your enhanced redundancy system uses these controllers, limit the number of controllers connections used to 242 or fewer connections.
- The 1756-L7x controllers support up to 500 controller connections. If your enhanced redundancy system uses these controllers, limit the number of controllers connections used to 492 or fewer connections.

**IMPORTANT** When you add the 1756-EN2Tx communication module to the primary controller's RSLogix 5000 project, you can use any settings for the parameters above with no effect on the connection from remote controller to primary controller.

Alarms scanned during the continuous task may be published to the alarm server twice after a switchover. If a switchover occurs and a continuous task that contains alarm instructions is scanned twice as a result, a duplicate 'out of scope' alarm entry may be indicated in the alarm summary object. To clear 'out of scope' entries, click Refresh alarm list.

Alarm status messages may be duplicated in the Alarm History Log in the event of a switchover. To make troubleshooting duplicate alarm states easier, consider programming alarms to indicate when a redundant system switchover occurs.

Alarms that are acknowledged just before or during a switchover may be indicated as active and unacknowledged after a switchover. If this occurs, acknowledge the alarm a second time.

If an alarm is active, then inactive, and a switchover occurs before change in the alarm state is updated to the FactoryTalk server, the FactoryTalk alarm history log may not indicate the change in alarm state.
Alarm parameters may be lost when a switchover occurs.
When a switchover occurs in a redundant system that uses alarms, certain alarm parameters may not be transferred to the new primary controller if the parameters have changed since the last crossload of data. Alarm parameters that may not transfer include the following:

- DeliveryER
- DeliveryEN
- NoSubscriber
- NoConnection
- CommError
- AlarmBuffered
- SubscNotified

Once the alarm data is buffered, the parameters are updated.

Alarms may fail to be acknowledged when the attempt to acknowledge them occurs during a switchover.
If you attempt to acknowledge an alarm while a switchover occurs, a failure to acknowledge the alarm is indicated. Attempting to acknowledge the alarm a second time is successful.

A Partial Import Online to a primary controller over a ControlNet network may fail if a system switchover occurs while the PIO is still in process. When the anomaly occurs and the PIO fails, you may see any of these errors:

- Failed to import file 'c:\...\xxx.L5x Object already exists
- Failed to import file 'c:\...\xxx.L5x Already in request mode/state
- CIP error: Problem with a semaphore
- Internal Object Identifier (IOI) destination unknown

After the switchover completes, restart the PIO with the redundant chassis pair disqualified or synchronized, and the PIO is complete.

Inhibiting equipment phase can cause disqualification.
If you inhibit an equipment phase, or a task that includes an equipment phase, in a primary controller, the secondary controller is disqualified. This disqualification results from program sequence mismatches between the primary and secondary controllers.

When you import a routine to an empty program in a synchronized enhanced redundancy system, disqualification may occur.
If tasks are not properly tuned and you execute a large PIO, the primary controller may experience a watchdog fault during the import because the Watchdog parameter is set too low. The fault causes a switchover.

When this anomaly occurs, however, once the secondary controller goes online, it shows incorrect data in its fault log. The incorrect data appears in the Task, Program, and Routine fields.

The fault log typically shows the following:

Watchdog Fault (Type 06)
Task watchdog expired. May have been caused by an infinite loop, a complex program, or a higher priority task. (Code 01)
Task: <unknown>
Program: <unknown>
Routine: <unknown>
You must execute an upload on the secondary controller to obtain correct Task, Program, and Routine watchdog information in the event of a future watchdog fault.

When a program in the primary controller is inhibited or uninhibited, the secondary may disqualify and re-qualify.

When changing the Inhibit Program setting, plan for secondary chassis disqualification according to potential implications that are specific to your application. Or, unschedule the program rather than inhibiting it.

1756-L72, 1756-L73, 1756-L74, 1756-L75 controllers display No Project message during qualification process.

While qualification is in process in a system that uses 1756-L7x controllers, controllers in the secondary chassis display No Project in their Scrolling Status Display status indicator. When qualification is complete, the secondary controllers display the name of the project loaded into the primary controller.

Repeated connection and disconnection, or irregular insertion, of the 1756-RM or 1756-RMXT redundancy modules’ fiber-optic cable results in various fault codes indicated on the module status display.

If the 1756-RM or 1756-RMXT redundancy modules’ fiber-optic cable is disconnected and connected repeatedly within short periods of time, or the cable is inserted slowly at a slight angle to the connector, the redundancy module faults and indicates error codes such as E0xx or EAxx.

To avoid experiencing these faults, wait 5…10 seconds between disconnecting and connecting the 1756-RM or 1756-RMXT redundancy modules’ fiber-optic cable and verify that the insertion is quick and straight into the connector.

Upgrade RSLinx software to version 2.56.00 or later, and RMCT, version 7.02.07 may not work.

If you are using the RMCT, version 7.02.07, and upgrade RSLinx software to version 2.56.00 or later, the RMCT may not function or be available for launch after the upgrade.

Follow these steps to restore the RMCT to normal functionality.

1. Shutdown RSLinx software.
2. Access your computer’s Control Panel and click the Change or Remove option.
3. Select RMCT and click Change/Remove.
4. Use the Repair option to restore the RMCT to reinstall all program features installed by the previous setup.

When you restart RSLinx software, the RMCT functions properly.

Remove RSLinx software, version 2.55.00 or earlier, and RMCT and see error messages.

If you remove RSLinx software, version 2.55.00 or earlier and then remove the RMCT, you may see error messages related to .dll files.

Click OK when the messages appear and removal completes successfully.

Error may occur when downgrading RSLinx software bundled with the RMCT.

If you have RSLinx software, version 2.56.00 or later and the RMCT, version 7.02.07 or later, installed on your computer, you may receive an error message when downgrading to RSLinx software, version 2.55.00 or earlier bundled with an earlier version of the RMCT.

As a consequence of this anomaly, instead of using the RMCT, version 5.02.03 or earlier, your computer continues to use the RMCT, version 7.02.07 or later. Follow these steps to workaround this anomaly.

1. Uninstall the RMCT, version 7.02.07 or later, from your computer.
2. Uninstall RSLinx software, version 2.56.00 or later, from your computer.
3. Install RSLinx software, version 2.55.00 or earlier, with the bundled RMCT, version 5.23.00 or earlier.
## Restrictions

This table lists restrictions applicable to enhanced redundancy system, revisions 19.053 and 19.052. In addition to these restrictions, see the Application Notes on page 20 for considerations specific to the type of application you are using.

### Table 9 - Restrictions in an Enhanced Redundancy System, Revisions 19.053 and 19.052

<table>
<thead>
<tr>
<th>System Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-EN2T/D</td>
<td>The 1756-EN2T module, series D, cannot be used for SIL2 applications as part of the safety loop. For more information on configurations for SIL2 applications, refer to Using ControlLogix in SIL 2 Applications Reference Manual, publication 1756-RM001.</td>
</tr>
<tr>
<td>1756-EN2T/D, 1756-EN2T/C, 1756-EN2TR</td>
<td>The existing 1756-EN2T/D module specification sheets do not list the modules as being SIL2 certified. Policies currently in place by TÜV require that only the 1756-EN2T/C or the 1756-EN2TR modules be used for SIL2 applications as part of the safety loop.</td>
</tr>
<tr>
<td>1756-CN2, 1756-CN2R, 1756-CN2RXT, 1756-CN2RK</td>
<td>1756-CN2/B and 1756-CN2R/B module firmware is not compatible with 1756-CN2/A and 1756-CN2R/A, hardware. You cannot flash series A or B firmware on series C hardware or vice versa. 1756-CN2/C, 1756-CN2R/C, 1756-CN2RXT/C, 1756-CN2RK/C module firmware is not compatible with series A and B hardware. The 1756-CN2/B and 1756-CN2R/B module firmware is not compatible with the 1756-CN2/A or 1756-CN2R/A hardware. Do not attempt to upgrade an 1756-CN2/A or 1756-CN2R/A module with 1756-CN2/B or 1756-CN2R/B firmware. Attempting to do so results in ControlFlash software displaying a severe incompatibility warning. Series A modules are not supported in redundancy. The 1756-CN2 communication modules provide a maximum of 128 CIP connections for standard (non redundancy) application use. The 1756-CN2 communication modules provide 131 CIP connections. However, three of the 131 CIP connections are always reserved for redundant control. These three redundant-system CIP connections always appear to be in use, even when no connections are open. Because three of the 131 CIP connections are reserved for redundancy, 128 CIP connections are available for nonredundant use. When using the 1756-CN2/C, 1756-CN2R/C, 1756-CN2RXT/C, and 1756-CN2RK/C communication modules, you must set the electronic keying option to Disable Keying or Compatible Match because Add-on profiles are not available for these modules.</td>
</tr>
<tr>
<td>1756-EN2T</td>
<td>Do not use 1756-EN2T communication modules, firmware revision 1.004 or earlier, in redundant chassis. 1756-EN2T communication module firmware revision 1.004 is not redundancy-compliant either in standard or enhanced redundancy systems. You must upgrade 1756-EN2T communication modules to firmware revision 4.003 to use this enhanced redundancy system revision.</td>
</tr>
<tr>
<td>1756-EN2T, 1756-EN2TR, 1756-EN2TXT</td>
<td>You cannot use Unicast connections on an EtherNet/IP network with this enhanced redundancy system revision. The 1756-EN2x communication modules provide 259 CIP connections. However, three of the 259 CIP connections are always reserved for redundant control. These three redundant-system CIP connections always appear to be in use, even when no connections are open. Because three of the 259 CIP connections are reserved for redundancy, 256 CIP connections are available for nonredundancy use. You cannot use a 1756-EWEB communication module in an enhanced redundancy system, revisions 19.053 and 19.052. If you are migrating from a ControlLogix standard redundancy system to an enhanced redundancy system, you must replace existing 1756-EWEB communication modules with any of the 1756-EN2x communication modules. Keep in mind that when you replace a 1756-EWEB communication module with a 1756-EN2x communication module your application loses functionality only available with the 1756-EWEB communication module. These are examples of functionality that is no longer available in an Enhanced Redundancy System:  - Open Sockets  - Simple Network Time Protocol (SNTP) Client  - Web pages You must account for this lost functionality in your RSLogix 5000 software project. IMPORTANT: You cannot perform online migration from 1756-EWEB communication modules to 1756-EN2T or 1756-EN2TR communication modules. Lgs00092779 The 1756-EN2x communication modules used in the enhanced redundancy system do not provide features such as socket services, web services, or the Simple Time Network Protocol (SNTP) client that are available with the ControlLogix EtherNet/IP Web Server, 1756-EWEB communication module. The 1756-EN2TR communication modules do not support Immediate Output (IOT) instructions. Because these modules do not support the IOT instruction, they cannot override the RPI in a remote chassis and immediately send new data over the EtherNet/IP network.</td>
</tr>
</tbody>
</table>
There are differences between using CIP Sync technology in nonredundant systems and enhanced redundancy systems, revisions 19.053 and 19.052.

Consider the following when you use CIP Sync technology in an enhanced redundancy system, revisions 19.053 and 19.052:

- If you enable CIP Sync Time Synchronization in the controllers in a redundant chassis pair, you must also enable Time Synchronization in the EtherNet/IP communication modules in the redundant chassis pair so all devices have a single path to the Grandmaster. If time synchronization is enabled in any controller in the primary chassis of a disqualified Redundant Chassis Pair, and no other devices, that is, EtherNet/IP communication modules, in the primary chassis have time synchronization enabled, the redundant chassis pair attempts to qualify. However, in these application conditions, the attempt to qualify fails.

- While CIP Sync technology can handle multiple paths between master and slave clocks, it resolves mastership most effectively if you configure the redundant paths so that Time Synchronization is enabled in only the minimum required number of EtherNet/IP communication modules. For example, if your redundant chassis pair has three 1756-EN2T communication modules and all are connected to the same network, enable Time Synchronization in only one of the modules.

- If the primary controller is the Grandmaster, the enhanced redundancy system automatically manages the CIP Sync clock attributes so that the controller in the primary chassis is always set to be the Grandmaster instead of the secondary controller. This clock management ensures a change to a new Grandmaster when the redundancy system switches over.

- When a switchover occurs, these events take place:
  - The Grandmaster status transfers from the original primary controller to the new primary controller. This transfer may take longer to complete than if Grandmaster status was transferred between devices in a nonredundant system.
  - The synchronization of the enhanced redundancy system may take longer to complete than when it occurs on a switchover in an enhanced redundancy system, revisions 19.053 and 19.052, that does not use CIP Sync technology.

- If you attempt to use the Redundant System Update (RSU) feature to upgrade an enhanced redundancy system, revision 16.081 or earlier, that uses Coordinated System Time (CST), the enhanced redundancy system, revisions 19.053 and 19.052 does not permit a locked switchover and the upgrade fails to complete.

To work around this restriction, first disable CST Mastership in the original redundancy system and then use RSU to upgrade to enhanced redundancy system, revision 19.053 and 19.052.

You can place a maximum of two controllers in the same chassis in a redundant chassis pair. When two controllers are used in the same chassis, they must be of the same product family. For example, you cannot place a 1756-L6x controller with a 1756-L7x controller in the same chassis.

Do not use Match Project to Controller property with redundant controllers. If you use the Match Project to Controller property available in the Advanced tab of the Controller Properties dialog box, you cannot go online with, download to, or upload from the new primary controller after a switchover. This is because the serial number of the new primary controller is not the same as the serial number of the old primary controller and the project cannot be matched to the newly-switched-to controller.

**Firmware Supervisor**
You cannot use the Firmware Supervisor feature available in RSLogix 5000 software.

**Event Tasks**
You cannot use event tasks in a ControlLogix enhanced redundancy systems. When you enable redundancy, you must change event tasks to nonevent tasks or delete them from your project.

**SERCOS Motion or Integrated Motion on the EtherNet/IP Network**
You cannot use Motion in ControlLogix enhanced redundancy systems.
Consider these application notes when configuring, programming, and using your enhanced redundancy system, revisions 19.053_kit2.

Add-on Profile Availability

Add-on Profiles (AOP) offer the most current device configuration options in RSLogix 5000 software. AOPs are available between software releases.

You can download AOPs from:

**TIP**
You may need to click on the ‘>’ symbol next to the ‘Custom Download Files’ to expand the AOP list.

Note: The version listed in the tables is the version of the AOP, not the version of the supported firmware.

You use the RSLogix 5000 Module Profiles Setup Wizard to install the AOP.

**IMPORTANT**
AOPs are not available for the 1756-CN2/C, 1756-CN2R/C, 1756-CN2RXT/C, 1756-CN2RK/C communication modules.
Consider the following:

- If your RSLogix 5000 software version does not allow you to configure a device to exactly match the physical device, you must download and install the device's AOP.

For example, if your enhanced redundancy system includes a 1756-EN2T/D module and the software project requires the module be configured with Electronic Keying = Exact Match, you must install the AOP first.

- If you cannot download or install an AOP, we recommend that you use Electronic Keying = Compatible Module or Disable Keying until you can.

### Maintaining SIL2 Certified Systems

The existing 1756-EN2T/D module specification sheets do not list the modules as being SIL2 certified. Policies currently in place by TÜV require that only the 1756-EN2T/C or the 1756-EN2TR modules be used for SIL2 applications as part of the safety loop.

For more information on configurations for SIL2 applications, refer to Using ControlLogix in SIL 2 Applications Reference Manual, publication 1756-RM001.

### Out-of-box Switch (888) Behavior Change

With the 1756-EN2T/D modules, firmware 10.006 or later, and 1756-EN2TR/C modules, firmware revision 10.007, when the switches are set to 888 to perform an out-of-box reset and the module is installed in a chassis, remember the following:

1. The module does not become active on the backplane.
2. Other modules do not recognize the module.
3. RSLinx Classic software does not recognize the module.
4 If the module is installed in the primary chassis of a qualified redundant chassis pair, a switchover does not occur.

**Performance Differences between Redundancy Modules’ Series**

You cannot mix the 1756-RM2/A or 1756-RM2XT/A redundancy modules with the 1756-RM/A or 1756-RM/B modules.

Redundancy module speeds of up to 1000 Mbps can be reached when using a 1756-RM2/A module with another 1756-RM2/A module, revision 19.053_kit1.

You can use any series of the 1756-RM or 1756-RMXT redundancy modules in an enhanced redundancy system, revision 19.053 or 19.052. You can also mix series of RM redundancy modules within a partnered set. For example, you can use a 1756-RM/A module in the primary chassis and a 1756-RM/B module in the secondary chassis.

However, your system experiences the best scan performance if you use a 1756-RM2/A or 1756-RM2XT/A redundancy module with 1756-L7x controllers in both chassis.

Your system does not experience faster scan performance when either 1756-RM/A or 1756-RM/B redundancy modules are used with a 1756-L6xcontroller.

**Performance Difference with 1756-L65 Controller**

With enhanced redundancy system, revisions 19.052, the ControlLogix 1756-L65 controller’s performance differs from that of the ControlLogix 1756-L64 controller.

For more information, see the ControlLogix Enhanced Redundancy System User Manual, publication 1756-UM535.

**EtherNet/IP Networks and Redundant Systems**

Beginning with enhanced redundancy system, revisions 19.053 and 19.052, you can execute these tasks on an EtherNet/IP network:

- HMI/workstation communication and messaging
• Communication with I/O modules in remote chassis
• Communication between devices via produced/consumed tags - For more information about this task, see Produced/Consumed Tags Between Primary Controllers and Nonredundant Controllers.

Some connections to an enhanced redundancy chassis pair may briefly drop if the connection path between the device and the redundant chassis pair is made exclusively over an EtherNet/IP network.

For more information, see Possible Communication Delays on EtherNet/IP Networks on page 24.

Produced/Consumed Tags between Primary Controllers and Nonredundant Controllers

If controllers in the redundant chassis pair produce tags over an EtherNet/IP network that controllers in remote chassis consume, the connection from the remote controller to the redundant controller may briefly drop during a switchover if the remote chassis’ EtherNet/IP communication modules do not use specific firmware revisions.

Use these firmware revisions for EtherNet/IP communication modules in the remote chassis to maintain connections during a switchover.

<table>
<thead>
<tr>
<th>EtherNet/IP Communication Module in Remote Chassis</th>
<th>Minimum Firmware Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-EN2F</td>
<td>4.002</td>
</tr>
<tr>
<td>1756-EN2T</td>
<td></td>
</tr>
<tr>
<td>1756-EN2TR</td>
<td></td>
</tr>
<tr>
<td>1756-EN3TR</td>
<td></td>
</tr>
<tr>
<td>1756-ENBT</td>
<td>6.001</td>
</tr>
<tr>
<td>1768-ENBT</td>
<td>4.001</td>
</tr>
<tr>
<td>1769-L2x</td>
<td>19.011</td>
</tr>
<tr>
<td>1769-L3xE</td>
<td></td>
</tr>
<tr>
<td>1788-ENBT</td>
<td>3.001</td>
</tr>
</tbody>
</table>

**IMPORTANT** The minimum firmware revisions listed above only apply to EtherNet/IP communication modules in the remote chassis.

You can only use the ControlLogix modules in the redundant chassis pair, listed in Required Series and Firmware Revisions for Components Used in an Enhanced Redundancy System, Revisions 19.053 or 19.052 on page 5.
Minimum Value for the Watchdog Time

Use this table to determine which equation to use to calculate the watchdog time for each task in your program.

<table>
<thead>
<tr>
<th>If</th>
<th>Then use this equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using ControlNet I/O</td>
<td>((2 \times \text{maximum_scan_time}) + 150 \text{ ms})</td>
</tr>
<tr>
<td>Using Ethernet I/O</td>
<td>((2 \times \text{maximum_scan_time}) + 100 \text{ ms})</td>
</tr>
</tbody>
</table>

The \text{maximum\_scan\_time} is the maximum scan time for the entire task when the secondary controller is synchronized.

Synchronizing after Disqualification

If your secondary chassis becomes disqualified, or you manually disqualify it, take these actions before you try to synchronize the chassis:

- Verify that the synchronization status of the primary module is full compatibility.
- Wait at least 15 seconds after the redundant chassis are disqualified before you try to synchronize them.

Resetting the IP Address for a ControlLogix EtherNet/IP Communication Module

If necessary, you can reset a 1756-EN2x communication module’s IP address to the factory default value. To return to the factory default, set the module’s rotary switches to 888 and cycle power.

After cycling power to the EtherNet/IP communication module, you can either set the module’s switches to the desired address or set the switches to 999 and use one of these methods to set the IP address:

- BOOTP-DHCP server
- RSLinx Classic software
- RSLogix 5000 software

For more information, EtherNet/IP Modules in Logix5000 Control Systems User Manual, publication ENET-UM001.
Using Different 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT Redundancy Module Firmware Revisions

The firmware bundle available for enhanced redundancy system, revision 19.053_kit2, includes a new electronic data sheet (EDS) file for the 1756-RM2 and 1756-RM2XT redundancy modules. You must install the EDS files available with the enhanced redundancy system, revision 19.053_kit2 firmware bundle or you cannot launch or, consequently, use the RMCT, version 8.02.01 in an enhanced redundancy system, revision 19.053_kit2 application.

If you continue to use the EDS file made available with enhanced redundancy system, revision 16.081 and earlier, Series B redundancy modules used in an enhanced redundancy system, revision 19.053 and 19.052 appear as Series A redundancy modules in the Device Type column of an RSWho browse screen.

In this case, that is, using the EDS file made available with enhanced redundancy system, revision 16.081 or earlier, use the information in the Online Name column to identify your redundancy modules' Series level. The information in the Online Name column is accurate.

We recommend that you use the EDS file for redundancy modules that is included with the enhanced redundancy system, revisions 19.053_kit1 firmware bundle. With the new EDS file, the RSWho software Device Type column shows a generic 1756-RM device type, as shown in this graphic.

<table>
<thead>
<tr>
<th>Address</th>
<th>Device Type</th>
<th>Online Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>01</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>02</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>03</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>04</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>05</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>06</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>07</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>08</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>09</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
<tr>
<td>01</td>
<td>1756-RM2</td>
<td>RMCO_RTPPO</td>
<td>Active</td>
</tr>
</tbody>
</table>

**Generic 1756-RM Redundancy Module Device Type**

**1756-RM/B Redundancy Module Indication**
Possible Communication Delays on EtherNet/IP Networks

Brief communication delays may occur if the connection between a component and the redundant chassis pair uses a path exclusively over an EtherNet/IP network and a switchover occurs. After the switchover is complete, communication resumes automatically.

These connection types may experience the communication delay when a switchover occurs:

- HMI to redundant chassis pair

- FactoryTalk Batch server to redundant chassis pair

  The Batch Server detects the lost connection and repeatedly attempts to re-establish the connection until successful. However, while the connection is lost, the Batch Server puts the recipes, or entire batch, in the held state.

  After the connection between the Batch Server and the redundant chassis pair is re-established, you can clear the communication failure and restart the recipes. The Batch Server keeps the recipes in the held state until the failure is cleared and recipes restarted.

- FactoryTalk Alarms and Events Service to redundant chassis pair

  If any alarms are generated while the connection is lost, that data is buffered. When the connection is re-established, you must acknowledge the connection loss.

If your application requires that the connections described above are maintained during a switchover, we recommend that the connection bridge between the component and a redundant chassis pair with an EtherNet/IP network to ControlNet network path.

I/O connections do not experience delays when a switchover occurs.
You can upgrade an enhanced redundancy system revision to another while your process continues to run. This is also known as Redundancy System Update (RSU).

Important
RSU is available only when upgrading from an enhanced redundancy system revision to another. You cannot use this process to upgrade from a standard redundancy system to an enhanced redundancy system.

Important
The term 1756-RM is synonymous with 1756-RM2 in the text and graphics throughout this section.

Complete these tasks to upgrade your redundancy system from one enhanced redundancy system revision to another enhanced redundancy revision while your process continues to run.

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before You Begin</td>
<td>26</td>
</tr>
<tr>
<td>Upgrade the Workstation Software</td>
<td>26</td>
</tr>
<tr>
<td>Upgrade the Redundancy Module Configuration Tool</td>
<td>28</td>
</tr>
<tr>
<td>Verify Your RMCT Version</td>
<td>29</td>
</tr>
<tr>
<td>Add the EDS Files</td>
<td>31</td>
</tr>
<tr>
<td>Prepare the Redundant Chassis for the Firmware Upgrade</td>
<td>31</td>
</tr>
<tr>
<td>Upgrade the Primary Chassis 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT Redundancy Module Firmware</td>
<td>44</td>
</tr>
<tr>
<td>Upgrade the Secondary 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT Redundancy Module Firmware and All Other Modules' Firmware in the Secondary Chassis</td>
<td>45</td>
</tr>
<tr>
<td>Prepare the RSLogix 5000 Project for the Upgrade</td>
<td>49</td>
</tr>
<tr>
<td>Lock the System and Initiate a Switchover to Upgrade</td>
<td>52</td>
</tr>
<tr>
<td>Upgrade the New Secondary Chassis Firmware</td>
<td>54</td>
</tr>
<tr>
<td>Synchronize the Redundant Chassis</td>
<td>55</td>
</tr>
</tbody>
</table>
Before You Begin

Consider these points before you begin upgrading your enhanced redundancy system to a new revision:

- During the upgrade procedures, you cannot use RSLogix 5000 software to change the mode of the controller. Instead, use the keyswitch on the front of the controller.

- Leave RSNetWorx for ControlNet software closed or offline throughout this procedure. If the software is open or online, you see errors in the RSNetWorx for ControlNet software during the upgrade process.

- Remember the following when completing the tasks described in the rest of this section:
  - Do not make any changes to the RSLogix 5000 project other than those identified in these tasks.
  - Verify that no one will be or is making changes to the project.
  - Do not use a FactoryTalk Batch Server to change equipment phase-states when upgrading your enhanced redundancy system.

Upgrade the Workstation Software

Before you download and upgrade software for your redundant system, use one of these methods to fully shutdown RSLinx Classic software:

- Right-click the RSLinx Classic icon in the notification area of the screen and choose Shutdown RSLinx Classic.

- With RSLinx Classic software open, from the File menu, choose Exit and Shutdown.

Install the software required for your redundant system configuration. See Compatible Software Versions on page 7 for software versions required for use with this enhanced redundancy system revision.
Use the installation instructions or release notes provided with each software version for installation procedures and requirements.

**Download and Install the Redundancy Firmware Bundle**

Download and install the redundancy firmware revision bundle from the Rockwell Automation Support website at:  
[www.rockwellautomation.com/support/](http://www.rockwellautomation.com/support/)

Follow these steps.

1. From the Get Support Now menu, click the Downloads link.
2. From Additional Resources, click Firmware Updates.
3. Click Control Hardware.
   
   The Flash Firmware Updates window appears.
5. Enter your Serial Number.
6. Click Qualify For Update.
7. Click Finish when the Qualified For Update window appears.
8. Download the zipped file.
9. Install the Redundancy Firmware Bundle.
Upgrade the Redundancy Module Configuration Tool

The RMCT, version 8.02.01, is included in the enhanced redundancy system, revisions 19.053_kit2 bundle. Once this bundle is installed, you can use the RMCT, version 8.02.01.

Complete these steps if you ever need to reinstall the RMCT, version 8.02.01.

2. Download the version listed for this redundancy firmware revision.
3. Open the executable file and use the Installation Wizard to install the tool.

Verify Your RMCT Version

Complete these steps to check or verify the version of the RMCT you have installed.

1. Launch RSLinx Classic software.
2. Click the RSWho icon.
3. Right-click your redundancy module and choose Module Configuration.

The Module Configuration dialog box opens.
4. Right-click the title bar and choose About.

The About dialog box opens and indicates the RMCT version.

The RMCT launches at the version that is compatible with the 1756-RM or 1756-RMXT redundancy module firmware that is currently installed.

If you upgrade your RMCT version but do not upgrade your 1756-RM or 1756-RMXT redundancy module firmware revision compatible with the new RMCT version, the About dialog box may not reflect the new RMCT version.

**Verify Your RMCT Version**

Complete these steps to check or verify the version of the RMCT you have installed.

1. Launch RSLinx Classic software.
2. Click the RSWho icon.
3. Right-click your redundancy module and choose Module Configuration.

The Module Configuration dialog box opens.

4. Right-click the title bar and choose About.

The About dialog box opens and indicates the RMCT version.

**TIP**

The RMCT launches at the version that is compatible with the 1756-RM or 1756-RMXT redundancy module firmware that is currently installed.

If you upgrade your RMCT version but do not upgrade your 1756-RM or 1756-RMXT redundancy module firmware revision compatible with the new RMCT version, the About dialog box can not reflect the new RMCT version.
Add the EDS Files

If needed, obtain EDS files for modules in your system from the Rockwell Automation Support website at:
http://www.rockwellautomation.com/resources/eds/.

Once you have downloaded the required EDS file, launch the EDS Hardware Configuration Tool by choosing Start > Programs > Rockwell Software > RSLinx Tools > EDS Hardware Installation Tool.

The tool then prompts you to Add or Remove EDS files.

Prepare the Redundant Chassis for the Firmware Upgrade

Complete these steps to prepare both the primary and secondary redundant chassis for redundancy firmware upgrades.

1. Set the keyswitch of the primary and secondary controllers to REM.
   
   If the redundant controllers in both chassis of the redundant chassis pair are not in Remote Program (REM) mode, the redundancy firmware upgrade cannot be completed.

2. Open RSLinx Classic software and browse to the redundancy module.

3. Right-click the redundancy module and choose Module Configuration.

4. Click the Configuration tab.
5. From the Auto-Synchronization pull-down menu, choose Never.

6. Click Apply, and then click Yes.

7. Click the Synchronization tab.

8. Click Disqualify Secondary, and then click Yes.

The secondary chassis is disqualified as indicated by the RMCT at the bottom-left of the RMCT and on the redundancy module’s status display.

9. Click OK and close the RMCT.

Closing the RMCT helps prevent a timeout from occurring when the redundancy module’s firmware is upgraded.
Replace a Module in the Secondary Chassis that has the Same Catalog Number and Firmware Revision

These steps only apply when the primary chassis is at revision 19.053 kit 2. These steps are used when performing a direct communication module replacement, for example, when replacing a communication module in the secondary chassis with a module that has the same:

- Catalog number
- Series
- Firmware (after updating the firmware, if necessary)

When you replace communication modules, make sure that the node address (for ControlNet modules), rotary switches, and Port Configuration (for Ethernet modules) match the existing modules.

1. Using the Redundancy Module Configuration Tool (RMCT):
   a. Set Auto-qualification to Never.
   b. Disqualify the redundant chassis pair (if not already disqualified).

2. Remove the module from the secondary chassis and replace it with the new module.

3. If applicable, update the module firmware by using ControlFLASH.

4. In the RMCT, from the Auto-Synchronization pull-down menu, choose your preferred method.

5. Manually synchronize the chassis, if needed.
Replace 1756-EN2T or 1756-EN2TR Modules

This section describes how to replace ControlLogix EtherNet/IP communication modules in a ControlLogix enhanced redundancy system.

You can replace EtherNet/IP communication modules in this enhanced redundancy system as follows:

- Replace 1756-EN2T/C (or earlier) modules with 1756-EN2T/D modules.
- Replace 1756-EN2TR/B (or earlier) modules with 1756-EN2TR/C modules.

**IMPORTANT**

The following section describes the requirements and tasks used to replace 1756-EN2T modules with 1756-EN2T/D modules.

The same requirements and tasks apply when you replace 1756-EN2TR modules with 1756-EN2TR/C modules with the only differences being between specific catalog numbers and series levels.

For example, before replacing 1756-EN2T modules, make sure you have installed the correct firmware on all 1756-EN2T/D modules.

The same task applies when you replace 1756-EN2TR modules. That is, before you replace 1756-EN2TR modules, make sure you have installed the correct firmware on all 1756-EN2TR/C modules.

You can replace the 1756-EN2T modules with 1756-EN2T/D by using the following methods:

- **Synchronization and Switchover for the 1756-EN2T Modules** - Use this method if either of the following conditions exist:
  - The module being replaced is a 1756-EN2T module is in a system revision 19.053, 19.053 Oct. 2011, 19.053_kit2.
  - Electronic Keying is not set to Exact match.
  - Rotary switch settings are not set between 2...254.

  For more information on this method, see page 35.

- **Upgrade the Firmware by Using Redundancy System Update** - You must use this method if the following conditions exist:
  You are upgrading for an enhanced redundancy system:
  - Revisions 16.54, 16.80, 16.81, 16.81 kit1, 16.81 kit2, 16.81 kit3, 16.81 kit4, 19.52.
  - Revisions 19.53, 19.53 (Oct. 2011), 19.53 kit1, 19.53 kit2 and either of the following conditions:
    - EtherNet/IP modules Electronic Keying is set to Exact match.
    - EtherNet/IP modules Electronic Keying is not set to Exact match and rotary switch settings are set between 2...254.

  You must install the AOP described on page 18 for the 1756-EN2T/D module in order to use Exact Match.
For more information on this method, see page 18.

**IMPORTANT**

Consider the following:

- Before replacing 1756-EN2T/C (or earlier) modules, make sure you have installed the correct firmware on all 1756-EN2T/D modules.
- When you upgrade 1756-EN2T/C (or earlier) modules to 1756-EN2T/D modules, you must do so in pairs. If not the system cannot synchronize after a switchover.
- Partnered pairs of 1756-EN2T modules must use the same values for the following parameters for IP address swapping to work in the system:
  - IP Addresses
  - Network Mask
  - Gateway address

### Synchronization and Switchover for the 1756-EN2T Modules

You can replace 1756-EN2T modules with 1756-EN2T/D modules without using the redundancy system update (RSU) feature if the following conditions exist:

- The module being replaced is a 1756-EN2T module is in a system revision 19.053, 19.053 Oct. 2011, 19.053_kit1, 19.53 kit2.
  - Electronic Keying is not set to Exact match.
  - Rotary switch settings are not set between 2...254.

Complete these steps to replace 1756-EN2T modules with 1756-EN2T/D modules.

1. Make sure the existing module and replacement module use the same IP, Network Mask, and Gateway addresses.
2. If necessary, upgrade the recent Redundancy Module Configuration tool (RMCT).
   
   See About the Redundancy Module Configuration Tool on page 6 for instructions.
3. In the RSLogix 5000 software, go online with the primary controller.
4. Verify Electronic Keying is set to Compatible Module or Disable Keying.

![Module Definition](image)

5. In the RSLinx Classic software, start the RMCT for the 1756-RM module in the primary chassis.

![Configuration Tab](image)

6. On the Configuration tab, from the Auto-Synchronization pull-down menu, choose Never.

![Auto-Synchronization](image)

7. Click Apply.

![Disqualify Secondary](image)

9. Verify that the Synchronization Status tab indicates the modules are fully compatible.

![Synchronization Status](image)

10. Turn off power to the secondary chassis.

11. Remove the 1756-EN2T module from the secondary chassis.

12. If necessary, configure the 1756-EN2T/D module with the correct IP address before inserting it into the secondary chassis.

13. Insert the 1756-EN2T/D module into the secondary chassis and turn on power to the chassis.

14. On the Synchronization tab, synchronize the secondary chassis.

![Synchronize Secondary](image)

Wait for synchronization to complete.
15. Initiate a switchover.

16. Turn off power to the secondary chassis.

17. Remove the 1756-EN2T module from the secondary chassis.

18. If necessary, configure the 1756-EN2T/D module with the correct IP address before inserting it into the secondary chassis.

19. Insert the 1756-EN2T/D module into the secondary chassis and turn on power to the chassis.

20. On the Configuration tab, from the Auto-Synchronization pull-down menu, choose Always.

21. Click Apply, Yes, and OK.

22. Verify that the secondary chassis has qualified.
Replace 1756-CN2 Modules

This section describes how to replace ControlLogix ControlNet communication modules in a ControlLogix enhanced redundancy system. You can replace ControlNet communication modules 1756-CN2/B, 1756-CN2R/B, and 1756-CN2RXT/A/B modules with 1756-CN2/C, 1756-CN2R/C, 1756-CN2RXT/C, or 1756-CN2RK/C modules.

**IMPORTANT**

**ControlNet Communication Modules**

- References to the 1756-CN2/B modules also apply to the 1756-CN2R/B module.
- References to the 1756-CN2/C modules also apply to the 1756-CN2R/C, 1756-CN2RXT/C, 1756-CN2RK/C, modules.
- Catalog numbers 1756-RM and 1756-RM2 refer to any series modules.

You can replace the 1756-CN2/B modules with 1756-CN2/C by using the following methods:

- **Synchronization and Switchover for the 1756-CN2 Modules** - Use this method if the module being replaced is a 1756-CN2/B module is in a system revision 19.053, 19.053 Oct. 2011, 19.053_kit1. For more information on this method, see page 39.

- **Upgrade the Firmware by Using Redundancy System Update** - You must use this method if you are upgrading an enhanced redundancy system, revisions 19.052, 19.053, 19.053 Oct. 2011, 19.053_kit1, 16.54, 16.80, 16.81, 16.81 kit1, 16.81 kit2, 16.81 kit3, 16.81 kit4.
  For more information on this method, see page 43.

**IMPORTANT**

When you upgrade 1756-CN2/B, modules to 1756-CN2/C modules, you must do so in pairs. If not the system cannot synchronize after a switchover.

### Synchronization and Switchover for the 1756-CN2 Modules

You can replace 1756-CN2/B modules with 1756-CN2/C modules without using the redundancy system update (RSU) feature if the following conditions exist:

- The module being replaced is a 1756-CN2/B module is in a system revision 19.053, 19.053 Oct. 2011, 19.053_kit1.

Complete these steps to replace 1756-CN2/B, modules with 1756-CN2/C modules.

1. Make sure the existing module and replacement module use the same ControlNet node address.
2. If necessary, upgrade the recent Redundancy Module Configuration tool (RMCT).
3. If you are using a 1756-RM2, upgrade the firmware to 20.005.
4. In the RSLogix 5000 software, go online with the primary controller.
5. Verify Electronic Keying is set to Compatible Module or Disable Keying.

![Module Definition](image)

6. In the RSLinx Classic software, start the RMCT for the 1756-RM module in the primary chassis.

![Configuration Tab](image)

7. On the Configuration tab, from the Auto-Synchronization pull-down menu, choose Never.

![Auto-Synchronization Menu](image)

8. Click Apply.

10. Turn off power to the secondary chassis.

11. Remove the 1756-CN2/B module from the secondary chassis.

12. If necessary, configure the 1756-CN2/C module with the correct ControlNet address before inserting it into the secondary chassis.

13. Insert the 1756-CN2/C module into the secondary chassis and turn on power to the chassis.

14. Verify that the Synchronization Status tab indicates the modules are fully compatible.

15. On the Synchronization tab, synchronize the secondary chassis.

Wait for synchronization to complete.
16. Initiate a switchover.

![Redundancy Module](image)

17. Turn off power to the secondary chassis.

18. Remove the 1756-CN2/B module from the secondary chassis.

19. If necessary, configure the 1756-CN2/C module with the correct ControlNet address before inserting it into the secondary chassis.

20. Insert the 1756-CN2/C module into the secondary chassis and turn on power to the chassis.


![Redundancy Module Options](image)

22. Click Apply, Yes, and OK.

23. Verify that the secondary chassis has qualified.
You can upgrade an enhanced redundancy system revision to another while your process continues to run. This is known as Redundancy System Update (RSU).

**IMPORTANT** Remember the following before using this section:
- RSU is available when upgrading only from an enhanced redundancy system revision to another. You cannot use this process to upgrade from a standard redundancy system to an enhanced redundancy system.
- If you are upgrading from a system using revision 19.052, 19.053, 19.053 Oct 2011, 19.053_kit1, 16.054, 16.080, 16.81, or 16.81_kit4 any Ethernet communication modules that have the rotary switch set must first be updated by using the [Upgrading from an Enhanced Redundancy System on page 25](#).

This applies when you are updating 1756-EN2T/C (or earlier) modules with 1756-EN2T/C (or earlier) modules.
- You can upgrade only from firmware revision 16.054 or later, to firmware revision 19.053.

Therefore, if you are not upgrading from ControlLogix enhanced redundancy system, revision 16.054 or later, ignore this section.
- The term 1756-RM is synonymous with 1756-RM2 in the text and graphics throughout this section.
- You must use this process if the following conditions exist:
  - 19.53, 19.53 (Oct. 2011), 19.53_kit1, 19.53_kit2 and either of the following conditions:
    - EtherNet/IP modules Electronic Keying is set to Exact match.
    - EtherNet/IP modules Electronic Keying is not set to Exact match and rotary switch settings are set between 2...254.
  - Your RSLogix 5000 software project requires EtherNet/IP modules to use Electronic Keying = Exact Match.

You must install the AOP described on page 18 for the 1756-EN2T/D module or 1756-EN2TR/C to use Exact Match.

Complete the steps in this table to upgrade your redundancy system from one enhanced redundancy system revision to another enhanced redundancy revision while your process continues to run.

<table>
<thead>
<tr>
<th>Task</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before You Begin</td>
<td>26</td>
</tr>
<tr>
<td>Upgrade the Workstation Software</td>
<td>26</td>
</tr>
<tr>
<td>Download and Install the Redundancy Firmware Bundle</td>
<td>27</td>
</tr>
<tr>
<td>Upgrade the Redundancy Module Configuration Tool</td>
<td>28</td>
</tr>
<tr>
<td>Verify Your RMCT Version</td>
<td>29</td>
</tr>
<tr>
<td>Add the EDS Files</td>
<td>31</td>
</tr>
<tr>
<td>Prepare the Redundant Chassis for the Firmware Upgrade</td>
<td>31</td>
</tr>
<tr>
<td>Upgrade the Primary Chassis 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT Redundancy Module Firmware</td>
<td>44</td>
</tr>
<tr>
<td>Upgrade the Secondary 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT Redundancy Module Firmware and All Other Modules’ Firmware in the Secondary Chassis</td>
<td>45</td>
</tr>
<tr>
<td>Prepare the RSLogix 5000 Project for the Upgrade</td>
<td>49</td>
</tr>
</tbody>
</table>
### Upgrade the Primary Chassis 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT Redundancy Module Firmware

Wait at least 45 seconds before you begin updating the 1756-RM firmware. During this time, the redundancy module conducts internal operations to prepare for an upgrade.

Complete these steps to upgrade the firmware of the 1756-RM module in the primary chassis.

1. Launch ControlFLASH software and click Next.
2. Select the redundancy module catalog number and click Next.
3. Browse to the module and select it.
4. Click OK.
5. Select the firmware revision to upgrade to and click Next.
6. Click Finish.
The firmware begins to update. When the update is complete, the Update status dialog box indicates completion.

![Update status dialog box indicating completion](image)

**Upgrade the Secondary 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT Redundancy Module Firmware and All Other Modules’ Firmware in the Secondary Chassis**

Power on the secondary chassis. Wait 45 seconds before you begin updating the secondary chassis firmware. During this time, the redundancy module conducts internal operations to prepare for an upgrade.

Complete these steps to upgrade the firmware in the secondary chassis.

1. Complete the following steps for each module in the secondary chassis, including a new controller, if applicable.

2. If you are replacing or upgrading your module hardware, remove the module from the secondary chassis and replace it with the new module.

   **IMPORTANT** When replacing communications modules, make sure that the node address (for ControlNet modules), rotary switches, and Port Configuration (for Ethernet modules) match the existing modules.

If you are replacing a controller, Use this table to determine if your planned primary and secondary controllers can be used together in the redundant chassis.

**Table 11 - Controller Compatibility**

<table>
<thead>
<tr>
<th>Primary Controller</th>
<th>Compatible Secondary Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>1756-L62</td>
<td>1756-L62, 1756-L63, 1756-L64, 1756-L65</td>
</tr>
<tr>
<td>1756-L63</td>
<td>1756-L63, 1756-L64, 1756-L65</td>
</tr>
<tr>
<td>1756-L64</td>
<td>1756-L64, 1756-L65</td>
</tr>
<tr>
<td>1756-L65(1)</td>
<td>1756-L65</td>
</tr>
<tr>
<td>1756-L71</td>
<td>1756-L71, 1756-L72, 1756-L73, 1756-L74, 1756-L75</td>
</tr>
<tr>
<td>1756-L72</td>
<td>1756-L72, 1756-L73, 1756-L74, 1756-L75</td>
</tr>
<tr>
<td>1756-L73</td>
<td>1756-L73, 1756-L74, 1756-L75</td>
</tr>
<tr>
<td>1756-L74</td>
<td>1756-L74, 1756-L75</td>
</tr>
<tr>
<td>1756-L75</td>
<td>1756-L75</td>
</tr>
</tbody>
</table>

**IMPORTANT** Controller compatibility is the same for the XT controllers as the standard controllers.
3. Consider these important steps in this table.

**IMPORTANT**

- Continue with step 12, if you are upgrading from a system using revision 16.054, 16.080, 16.81, 16.81 kit4, 19.052, 19.053, 19.053 Oct 2011, or 19.053_kit1, if you are replacing 1756-EN2T/C (or earlier) modules with EN2T/D modules, and the modules being replaced have rotary switches set to 2...254.

4. Launch ControlFLASH software and click Next.

5. Select the redundancy module catalog number and click Next.

6. Browse to the module and select it.

7. Click OK.

8. Select the firmware revision to upgrade to and click Next.

9. Click Finish.

The firmware begins to update. When the update is complete, the Update status dialog box indicates completion.
10. If you are replacing or upgrading your controller hardware, remove the controller from the secondary chassis and replace it with the new controller.

11. Complete steps 1…6 for each module in the secondary chassis, including a new controller, if applicable.

12. Make a note of the primary Ethernet module’s Port Configuration including the following:
   - IP Address
   - Network Mask
   - Gateway Address

![Port Configuration Diagram]
13. Disconnect the Ethernet cables from the secondary Ethernet module.

14. If a 1756-EN2T/D module is the replacement module, then set the 1756-EN2T/D module switches to 888 and insert it in the secondary chassis.

15. After the reset is complete, remove the module from the secondary chassis.

16. If a 1756-EN2T/C module is being updated, remove the 1756-EN2T/C from the secondary chassis.

17. Set the switches to 999 and reinsert the module into the secondary chassis.

18. Bridging across the backplane (or via the Ethernet module’s USB port), configure the secondary Ethernet module's Port Configuration to match the primary Ethernet module's Port Configuration from step 12.

19. Confirm the secondary 1756-EN2T/D module uses firmware revision 10.007 or that the EN2T/C (or earlier) module is at firmware version 5.008.

If necessary, complete the following steps to update module firmware.

a. Launch ControlFLASH software and click Next.

b. Select the Ethernet module catalog number and click Next.
c. Browse to the module and select it.

d. Click OK.
e. Select the firmware revision to upgrade to and click Next.
f. Click Finish.

The firmware begins to update. When the update is complete, the Update status dialog box indicates completion.

Wait for the update to complete.

20. After the update completes, connect the Ethernet cable to the secondary Ethernet module, cycle power on the secondary chassis, and wait for communication to resume on the network.

21. Check the Synchronization tab in the RMCT to verify that compatibility is Full for all modules in the chassis.

22. Repeat step 12…step 21 for all Ethernet modules that have their rotary switches set between 2…254.

Once you have upgraded the firmware for each module in the secondary chassis, prepare the RSLogix 5000 project for the upgrade.

Prepare the RSLogix 5000 Project for the Upgrade

Complete these steps to prepare the RSLogix 5000 program and controllers for the upgrade.

1. Launch RSLogix 5000 software and go online with the primary controller.

2. Verify that the watchdog time is set to a value that corresponds with the requirements of the enhanced redundancy system revision and your application.
See Minimum Value for the Watchdog Time on page 22 for information about calculating the minimum watchdog time.

3. Cancel or assemble any pending test edits.
4. Remove all Sequential Function Chart (SFC) forces from the project.
5. Verify that no changes need to be made to the following:
   - I/O forces
   - I/O configuration

   After this step, changes to I/O cannot be made until after the enhanced redundancy system revision upgrade is complete and both chassis are synchronized.

6. If you are upgrading an enhanced redundancy system, revision 16.081 or earlier, disable CST Mastership.
7. Configure the controllers and communication modules in the redundant chassis pair as necessary.
8. Save the project.
9. Go offline.
10. Click Controller Properties.
11. Click Change Controller.
12. Specify the controller revision you are upgrading to.
13. If you installed a new controller while upgrading the primary chassis firmware, specify the new controller catalog number.
14. Click OK.
15. Access the Module Properties for each communication module in the chassis and specify the module firmware revision you are upgrading to.

TIP If you are unable to specify the new revision, you need to change the Electronic Keying parameter to Compatible Keying.

16. Save the project.

17. Download the project to the secondary controller.

The secondary controller is at the higher network address of the two available for the redundant chassis.

18. After the download is complete, go offline.

You are now ready to lock the system and initiate a locked switchover to update the primary chassis. Continue with Lock the System and Initiate a Switchover to Upgrade on page 52.
Lock the System and Initiate a Switchover to Upgrade

Once you have downloaded the RSLogix 5000 project you prepared, complete these steps to lock your system and initiate a switchover.

**IMPORTANT**  
Remain offline while completing these steps.

- Once you have locked the system, do not abort the system lock. Aborting the system lock during this procedure clears the project from the secondary controller.
- Do not disconnect any communication cables while completing these steps.
- Completing a locked switchover causes SFC instructions to be reset to their initial state. This can result in SFC instructions executing twice.

1. In RSLinx Classic software, right-click the 1756-RM or 1756-RMXT redundancy module in the primary chassis and choose Module Configuration to open the RMCT.

2. Click the System Update tab.

3. Click Lock For Update, and then click Yes.

4. Wait for the system to lock.

   The System Update Lock Attempts log indicates when the system lock is complete.
5. Click Initiate Locked Switchover, and then click Yes.

This step results in your secondary chassis assuming control and becoming the primary chassis. When the switchover is complete, the Locked Switchover Attempts log indicates success.

<table>
<thead>
<tr>
<th>Locked Switchover History</th>
<th>Initiation Time</th>
<th>Status</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-1</td>
<td>—</td>
<td>Not attempted</td>
<td>—</td>
</tr>
<tr>
<td>N-2</td>
<td>—</td>
<td>Not attempted</td>
<td>—</td>
</tr>
<tr>
<td>N-3</td>
<td>—</td>
<td>Not attempted</td>
<td>—</td>
</tr>
</tbody>
</table>

In addition to the log, the text in chassis status row indicates the switchover state.

Chassis B: Primary with Disqualified Secondary  
Auto-Synchronization State: Never

Once your locked switchover is complete, upgrade the firmware revisions for modules in the new secondary chassis.

**IMPORTANT** Following the locked switchover, secondary controllers no longer contain a user application and their configuration settings are reset to the factory-default settings. The new secondary controllers use the default settings and the components in the secondary chassis are upgraded and the system is synchronized.
Upgrade the New Secondary Chassis Firmware

**IMPORTANT** Update the Gateway address of the primary chassis ethernet module to 192.168.1.1, if you are upgrading from a system using revision 19.052, 19.053, 19.053 Oct 2011, or 19.053_kit1, and Electronic Keying is set to Exact Match, Compatible Module or Disable Keying and you are either:

a. Updating 1756-EN2T/C (or earlier) modules with 1756-EN2T/C (or earlier) modules, and the modules being replaced have rotary switches set to 2...254.

b. Replacing 1756-EN2T/C (or earlier) modules with EN2T/D modules, and the modules being replaced have rotary switches set to 2...254.

Complete these steps to upgrade the firmware of all of the modules in the new secondary chassis, except for the 1756-RM or 1756-RMXT redundancy module that was already upgraded as described in Upgrade the Primary Chassis 1756-RM2, 1756-RM2XT, 1756-RM, or 1756-RMXT Redundancy Module Firmware on page 44.

1. If you are replacing and upgrading your module hardware, remove the module from the secondary chassis and replace it with the new module.

   **TIP** When replacing communications modules, make sure that the node address (for Control net modules), rotary switches, and Port Configuration (for Ethernet modules) match the existing modules.

2. If it is an Ethernet module:
   a. Make a note of the rotary switch setting on the modules that you are replacing.
   b. Set rotary switches on the replacement module to 888 and insert the module into the chassis.
   c. After reset completed, remove the module.
   d. Set the rotary switches to original values that you noted in step a.
   e. Insert the module.
   f. Go into the module properties and restore the values that you noted in step 12 on page 47.

3. Launch ControlFLASH software and click Next.

4. Select the module catalog number and click Next.
5. Browse to the module and select it.

6. Click OK.

7. Select the firmware revision to upgrade to and click Next.

8. Click Finish.

   The firmware begins to update. When the update is complete, the Update status dialog box indicates completion.

9. Complete steps 1…7 for each module in the new secondary chassis, including the new controllers, if applicable.

Once you have either replaced or upgraded the firmware for each of the modules in the new secondary chassis, continue by synchronizing the redundant chassis.

**Synchronize the Redundant Chassis**

Complete these steps to synchronize the redundant chassis after firmware in both chassis have been upgraded to the same revision.

1. In RSLinx software, right-click the 1756-RM or 1756-RMXT module in the primary chassis and choose Module Configuration to open the RMCT.
2. On the Synchronization tab, synchronize the secondary chassis.

![Synchronization Tab](image)

Wait for synchronization to complete.

3. Initiate a switchover.

![Initiate Switchover](image)

4. In the new secondary, set the rotary switches back to the original configuration.

5. Repeat this for all Ethernet modules that need the rotary switches set back to 2...254.

6. From the Auto-Synchronization pull-down menu, choose the frequency that suits your application.

![Auto-Synchronization Menu](image)
7. Manually synchronize the chassis, if needed.

8. Set the redundancy module date and time according to your preference.

9. Click OK.

10. Close the RMCT.

Your redundant system firmware upgrade is now complete.

**Update IP Address Set Via Software to Address Set Via Rotary Switches**

This section describes how to change Ethernet IP address settings set by software to IP addresses set by rotary switches when your system must continue to operate during the update.

One reason to change IP address settings to the rotary switch option is if your system is experiencing a Duplicate IP address condition and IP address swapping is disabled.

**IMPORTANT** Remember the following before using this section:

- If you are replacing 1756-EN2T/C (or earlier) modules, firmware revision 5.008 (or later), ignore this section.
- If you are replacing 1756-EN2T/D modules, ignore this section.
- You must execute this procedure before the Redundancy System Update procedure.
- **You must physically be present** at the location of the redundant chassis to do this upgrade.
- You can upgrade only from firmware revision 16.054 or later, to firmware revision 19.053. Therefore, if you are not upgrading from ControlLogix enhanced redundancy system, revision 16.054 or later, ignore this section.
- The term 1756-RM is synonymous with 1756-RM2 in the text and graphics throughout this section.

Complete the following steps.

1. Open RSLinx Classic software and browse to the redundancy module.
2. Right-click the redundancy module in the primary chassis and choose Module Configuration.

3. Verify that the chassis are synchronized.

4. On the Configuration, choose Never from the Auto-Synchronization pull-down menu.

5. Click Apply, and then click Yes.

6. Remove the secondary 1756-EN2T module from its chassis and disconnect the Ethernet cables from the module.

7. Configure the IP address on the primary 1756-EN2T module. The following steps use RSLinx Classic software.
a. Right-click the module icon and choose Module Configuration.

![Module Configuration](image1.png)

b. On the Port Configuration tab, enter the desired IP address, Network Mask (if not entered automatically), and click OK. This example uses the values in the following screen capture.

![Port Configuration](image2.png)

8. Set the rotary switches on the removed secondary module to 888.
9. Reinstall the module into the secondary chassis.

**IMPORTANT** Make sure the module is not physically connected to the network before reinstalling it.

10. After the module resets, remove it again.
11. Set the rotary switches on the secondary module to the desired IP address.
12. Reinstall the module in the chassis and reconnect it to the network. Any Duplicate IP address errors that existed previously are no longer present.
13. On the Synchronization tab in the RMCT, click Synchronize Secondary to synchronize the chassis.

![Synchronization Tab](image)

14. On the same tab, click Initiate Switchover to switch the primary and secondary chassis in the system.

![Initiate Switchover Button](image)

15. Remove the new secondary 1756-EN2T module from its chassis and disconnect the Ethernet cables from the module.

16. Set the rotary switches on the removed secondary module to 888.

17. Reinstall the module into the secondary chassis.

**IMPORTANT** Make sure the module is not physically connected to the network before reinstalling it.

18. After the module resets, remove it again.

19. Set the rotary switches on the secondary module to the desired IP address.

20. Reinstall the module in the chassis and reconnect it to the network.

Any Duplicate IP address errors that existed previously are no longer present.
21. On the Configuration, choose Always from the Auto-Synchronization pull-down menu.

![Image of configuration settings]

22. Verify that the chassis are synchronized.

23. Click Apply, and then click Yes.

**Replace 1756-RM/A or 1756-RM/B Redundancy Modules with 1756-RM2/A Redundancy Modules**

You can replace your current redundancy modules with 1756-RM2/A without initiating a switchover.

**TIP** For the following steps, ‘redundancy’ modules refers to 1756-RM/A or 1756-RM/B modules.

Before executing these steps, review the most recent Redundancy Bundle release notes to determine the 1756-RM2 firmware revision and RMCT version required. You can find this information at the Product Compatibility and Download Center at [http://www.rockwellautomation.com/support/downloads.html](http://www.rockwellautomation.com/support/downloads.html).

1. Install the compatible version of the RMCT software.
   - You must shut down RSLinx Classic software to perform the installation, and then restart RSLinx Classic software after the installation is complete.

2. On the RMCT Configuration tab, from the Set Auto-Synchronization pull-down menu, choose Never.

3. Using the RMCT, disqualify the redundant chassis pair (if not already disqualified.)

4. Unplug the fiber cable on both of the redundancy modules.

5. Close any open RMCT sessions connected to the current redundancy modules that are being replaced.

6. Remove the redundancy module pair (in any order) from the redundant chassis.

7. Insert the 1756-RM2/A redundancy module pair (in any order) in the redundant chassis into the same slots as the redundancy modules.

8. If not already installed, use RSLinx Classic software to upload the EDS file from the 1756-RM2/A module.
If needed, obtain the EDS file for the 1756-RM2/A module. Right-click the module in RSWho and choose ‘Upload EDS file from device’.

9. Update the primary and secondary 1756-RM2/A modules to the appropriate firmware revision.

10. Reconnect the fiber cable on either CH1 or CH2 of the 1756-RM2/A redundancy module.

11. Optional: Connect a second fiber cable on the remaining channel for fiber redundancy.

12. Wait for at least 45 seconds after connecting the fiber cables.

13. Launch the RMCT again for the newly-installed 1756-RM2/A modules.

14. On the RMCT Configuration tab, from the Auto-Synchronization pull-down menu, choose the original value.

15. Using the RMCT, Synchronize the system again (if it is not already qualified).
**Storing a Project to a Nonvolatile Memory Card While Your Process Is Running**

Use this procedure to store an updated project and firmware to the nonvolatile memory card of the controller while your process is running.

<table>
<thead>
<tr>
<th>IMPORTANT</th>
<th>The ControlLogix controllers use these nonvolatile memory cards.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cat. No.</td>
<td>Nonvolatile Memory Card</td>
</tr>
<tr>
<td>1756-L6x</td>
<td>1784-CF64 or 1784-CF128 CompactFlash cards</td>
</tr>
<tr>
<td>1756-L7x</td>
<td>1784-SD1 or 1784-SD2 Secure Digital cards</td>
</tr>
</tbody>
</table>

This section describes how to store a project to a nonvolatile memory card in a secondary controller without interrupting your process.

**IMPORTANT**

The ControlLogix controllers use these nonvolatile memory cards.

We recommend that you store the same project on both controllers' nonvolatile memory cards. By doing so, you can be assured that if a controller, primary or secondary, loses the project from its internal memory, you can load the most recent project back onto that controller.

If you store the same project on both controllers' nonvolatile memory cards, while the process is running, you must save the project on the controllers while they are in the secondary controller state. To do so, you save the project on the secondary controller, conduct a switchover and save the project on the new secondary controller. For more information, see the steps below.

Complete these steps to store the project to the nonvolatile memory card on a secondary controller.

1. **Verify that the redundant chassis are synchronized.**

   ![Chassis A: Primary with Synchronized Secondary
   Auto-Synchronization State: Always](image)

   If the redundant chassis are not synchronized, synchronize them before continuing with the next step.

2. **In the RMCT, click the Configuration tab.**

3. **From the Auto-Synchronization pull-down menu, choose Never.**
4. Click Apply, and then click Yes.
5. On the Synchronization tab, click Disqualify Secondary.

6. In RSLogix 5000 software, go online with the secondary controller.

7. Use the steps described in the Logix5000 Controllers Nonvolatile Memory Programming Manual, publication 1756-PM017 to store the project.

   **IMPORTANT**  
   Remain offline after you have stored the project to nonvolatile memory. You must stay offline through the remainder of this procedure.

8. In the RMCT, from the Auto-Synchronization pull-down menu, choose your preferred method.

9. Synchronize the chassis.

   If you do not need to store the project to the nonvolatile memory card in the primary controller, you are done.
10. If you want to store the project to the primary controller’s nonvolatile memory card, execute a switchover as described in these steps.
   a. In RSLinx Classic software, right-click the 1756-RM module and choose Module Configuration to open the RMCT for the primary redundancy module.
   b. Click the Synchronization tab.
   c. Click Initiate Switchover.

The Redundancy Configuration Tool dialog box opens.

11. Click Yes.

The switchover begins. When the switchover is complete, the previously primary controller is now the secondary controller.

12. Return to step 1 on page 44 to store the project on the new secondary controller.
Access Product Release Notes

Product release notes for the products used with this enhanced redundancy firmware bundle are available online within the Product Compatibility and Download Center.

1. From the Quick Links list on http://www.ab.com, choose Product Compatibility and Download Center.

2. From the Compatibility Scenarios tab or the Get Downloads tab, search for and choose your product.

Start by selecting products

Product Search:

search by name or description  All Categories  All Families  Go

Example: 1756-L61, LS5, Logix, Ethernet

You can also filter by product category or family.

3. Click the download icon to access product release notes.
Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ControlLogix Enhanced Redundancy System Manual, publication 1756-UM535</td>
<td>Provides design, installation, and troubleshooting information specific to the enhanced redundancy system.</td>
</tr>
<tr>
<td>FactoryTalk Batch PhaseManager User's Guide, publication BATCHX-UM010</td>
<td>This a guide for those using PhaseManager, FactoryTalk Batch, and RSLogix 5000 software to develop a batch automation system using phase logic for Logix5000 controllers.</td>
</tr>
<tr>
<td>PhaseManager User Manual, publication LOGIX-UM001</td>
<td>This manual provides details about using PhaseManager software and includes details about tags associated with the PHASE data type.</td>
</tr>
<tr>
<td>ControlFLASH Firmware Upgrade Kit Quick Start, publication 1756-QS105</td>
<td>Contains information on how to upgrade module firmware.</td>
</tr>
<tr>
<td>ControlLogix Controllers User Manual, publication 1756-UM001</td>
<td>Contains information on how to install, configure, program, and operate a ControlLogix system.</td>
</tr>
</tbody>
</table>

You can view or download publications at http://www.rockwellautomation.com/literature. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.
Rockwell Automation Support

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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.

<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 at <a href="http://www.rockwellautomation.com/support/americas/phone_en.html">http://www.rockwellautomation.com/support/americas/phone_en.html</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 this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.

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