

# ControlLogix Enhanced Redundancy System, Revision 16.81

## Redundancy Module Catalog Numbers

1756-RM, 1756-RMXT

## Controller Catalog Numbers

1756-L61, 1756-L62, 1756-L63, 1756-L63XT, 1756-L64

## Communication Module Catalog Numbers

1756-CN2/B, 1756-CN2R/B, 1756-CN2RXT/B, 1756-EN2T,  
1756-EN2TXT

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## About This Publication

These release notes describe enhancements, corrected anomalies, and known anomalies specific to redundancy system firmware revision 16.81.

Information newly-added to this release note is indicated by change bars like the one shown to the right of this paragraph.

## About This Redundancy Firmware Bundle

This redundancy firmware bundle is comprised of firmware revisions for each of the modules listed in this table.

### IMPORTANT

Only the modules specified in the table below can be used in the enhanced redundancy system and this firmware revision.

Modules that are not listed in the table are not compatible with the enhanced redundancy system and are not supported by this redundancy firmware revision.

| Cat. No.    | Module Description                                 | Series | Firmware Revision |
|-------------|--|--------|-------------------|
| 1756-CN2    | ControlLogix ControlNet bridge module              | B      | 20.011            |
| 1756-CN2R   | ControlLogix redundant ControlNet bridge module    | B      |                   |
| 1756-CN2RXT | ControlLogix-XT redundant ControlNet bridge module | B      |                   |
| 1756-EN2T   | ControlLogix EtherNet/IP bridge module             | Any    | 2.007             |
| 1756-EN2TXT | ControlLogix-XT EtherNet/IP bridge module          | Any    |                   |

| Cat. No.   | Module Description                | Series | Firmware Revision |
|------------|-----------------------------------|--------|-------------------|
| 1756-L61   | ControlLogix5561 controller       | Any    | 16.81             |
| 1756-L62   | ControlLogix5562 controller       |        |                   |
| 1756-L63   | ControlLogix5563 controller       |        |                   |
| 1756-L63XT | ControlLogix-XT controller        |        |                   |
| 1756-L64   | ControlLogix5564 controller       |        |                   |
| 1756-RM    | ControlLogix redundancy module    | A      | 2.05              |
| 1756-RMXT  | ControlLogix-XT redundancy module |        |                   |

The firmware bundle can be downloaded at:  
<http://support.rockwellautomation.com>. It is identified as V16.81EnhClxRed.

## Compatible Software Versions

Use these versions of software with this redundancy firmware bundle.

| Software                             | Version                             |
|--------------------------------------|-------------------------------------|
| FactoryTalk Services Platform        | 2.10.01 (CPR 9, SR1) <sup>(1)</sup> |
| FactoryTalk Alarms and Events        | 2.10.00 (CPR 9)                     |
| FactoryTalk Batch                    | 10.00.26                            |
| FactoryTalk View Site Edition        | 5.00.00 (CPR 9)                     |
| Redundancy Module Configuration Tool | 6.2.10                              |
| RSLinx Enterprise                    | 5.17 (CPR 9, SR1) <sup>(2)</sup>    |
| RSLinx Classic                       | 2.54 <sup>(3)</sup>                 |
| RSLogix 5000                         | 16                                  |
| RSNetWorx for ControlNet             | 8.00 (CPR 9, SR1)                   |

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

<sup>(2)</sup> See FactoryTalk View Software Considerations on page 4 for use considerations.

<sup>(3)</sup> If your redundant system is comprised of ControlLogix-XT modules placed in a 1756-A5XT chassis, RSLinx Classic software, version 2.55, or later, is required.

## FactoryTalk View Software Considerations

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

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

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**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 R154640079. To access Rockwell Automation's Knowledgebase, go to <http://support.rockwellautomation.com>.

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## About the Redundancy Module Configuration Tool

The Redundancy Module Configuration Tool (RMCT) is required for use with the 1756-RM module. Use the RMCT to:

- configure redundancy system parameters. For example, to configure the Auto-Synchronization parameter.
- view redundancy system event logs when troubleshooting your system.

The RMCT is not packaged with this redundancy firmware revision.

RSLinx Classic software includes the RMCT, however, it is not likely to be the version that is compatible with this firmware revision. Complete these steps to obtain the compatible version of the RMCT.

1. Access Knowledgebase Answer ID 29511 (available at: <http://www.rockwellautomation.com/knowledgebase/>).
2. Download the version listed for this redundancy firmware revision.
3. Open the executable file and use the Installation Wizard to install the tool.

For information about checking the version of your RMCT, see Upgrade the Redundancy Module Configuration Tool (RMCT) on [page 29](#).

## Enhancements

These enhancements are provided with enhanced redundancy firmware revisions 16.81, 16.80, and 16.54.

### Enhancements with Revision 16.81

This enhancement is provided with standard redundancy firmware revision 16.81.

| System Component  | Enhancement   |
|---|---|
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | <p>The false execution time of Add-On Instructions have been improved.</p> <p>With previous revisions, the false execution time of an Add-On Instruction was dependent on the number of parameters (input, output, and inout) configured for the instruction. The more parameters configured, the longer the false execution time of the Add-On Instruction.</p> <p>With this revision, the false execution time of an Add-On Instruction is now constant if a scan false routine is not created. To determine the false execution time of Add-On Instructions based on your controller, reference the values published in the Logix5000 Controllers Execution Time and Memory Use Reference Manual, publication <a href="#">1756-RM087</a>.</p> <p>Lgx00106477</p> |

### Enhancements with Revision 16.80

These enhancements are provided with enhanced redundancy firmware revision 16.80.


#### Enhancements with Revision 16.80

| System Component  | Enhancement  |
|---|--|
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | <p>Support for redundant controller use with alarm features of FactoryTalk Alarms and Events software.</p> <p>This redundancy firmware revision provides support for alarms as supported by FactoryTalk Alarms and Events software. Alarms can now be embedded in the controller with two new instructions, ALMD and ALMA, available in RSLogix 5000 software. These digital and analog alarm instructions are fully self-contained.</p> <p>Support for redundant controller use with equipment phases.</p> <p>This redundancy firmware revision provides support for equipment phases that can be implemented by using FactoryTalk Batch software and the RSLogix 5000 PhaseManager feature. See the Application Notes on <a href="#">page 22</a> for more information about using a redundant system and equipment phases.</p> |

Enhancements with Revision 16.80

| System Component   | Enhancement   |                          |        |       |   |       |                          |     |         |   |     |       |                          |     |       |
|--------------------|---|--------------------------|--------|-------|---|-------|--------------------------|-----|---------|---|-----|-------|--------------------------|-----|-------|
| 1756-RM, 1756-RMXT | <p>Auto-qualification and synchronization processes of the 1756-RM module are stopped after a chassis pair first fails to synchronize.</p> <p>In previous firmware revisions, if the Auto-Qualification parameter is set to Always and the controller in the secondary chassis faulted, or a communication module was removed from the chassis, the 1756-RM module would continuously attempt to qualify the redundant chassis. As a result of the continuous attempts to qualify, the event logs became filled with synchronization failure events, thus making the originating fault more difficult to troubleshoot.</p> <p>With this firmware enhancement, the 1756-RM module stops auto-qualification and synchronization attempts after the first fault occurs. This makes troubleshooting the original fault easier.</p> <p>Lgx00080574</p>   |                          |        |       |   |       |                          |     |         |   |     |       |                          |     |       |
|                    | <p>Synchronization failure reports enhanced by adding 'Partner Module not Found' cause.</p> <p>In previous revisions, if synchronization failed due to partner modules being at incompatible firmware revisions or a secondary module was not installed or powered, then failure was indicated by the same cause statement in the synchronization log of the RMCT. For both types of failures, 'Module Pair Incompatible' was indicated as the cause.</p> <p>With this firmware revision, the 1756-RM module can differentiate between partner incompatibilities and a missing secondary module. The RMCT indicates a missing secondary module by stating 'Partner Module not Found' in the Cause column of the Recent Synchronization Attempts log.</p> <div><div>Recent Synchronization Attempts:</div><table><tr><th>Order</th><th>Result</th><th>Cause</th></tr><tr><td>N</td><td>Abort</td><td>Partner Module not Found</td></tr><tr><td>N-1</td><td>Success</td><td>—</td></tr><tr><td>N-2</td><td>Abort</td><td>Module Pair Incompatible</td></tr><tr><td>N-3</td><td>Abort</td><td>Module Pair Incompatible</td></tr></table><div><div>Module is not installed or powered in chassis</div><div>Modules are at different firmware revisions.</div></div></div> | Order                    | Result | Cause | N | Abort | Partner Module not Found | N-1 | Success | — | N-2 | Abort | Module Pair Incompatible | N-3 | Abort |
| Order              | Result  | Cause                    |        |       |   |       |                          |     |         |   |     |       |                          |     |       |
| N                  | Abort   | Partner Module not Found |        |       |   |       |                          |     |         |   |     |       |                          |     |       |
| N-1                | Success   | —                        |        |       |   |       |                          |     |         |   |     |       |                          |     |       |
| N-2                | Abort   | Module Pair Incompatible |        |       |   |       |                          |     |         |   |     |       |                          |     |       |
| N-3                | Abort   | Module Pair Incompatible |        |       |   |       |                          |     |         |   |     |       |                          |     |       |

Enhancements with Revision 16.80

| System Component    | Enhancement   |                     |   |        |        |   |                       |             |   |                     |                 |        |        |   |                       |        |   |
|---------------------|---|---------------------|---|--------|--------|---|-----------------------|-------------|---|---------------------|-----------------|--------|--------|---|-----------------------|--------|---|
| 1756-RM, 1756-RMXT  | <p>The timestamps of Lock for Update and Initiate Locked Switchover commands are more precise.</p> <p>In previous firmware revisions, when the redundant system was locked for an update or a locked switchover was initiated, the 1756-RM module would indicate the same time for the both the initiation and completion of those commands.</p> <p>With this revision, the initiation and completion of each these commands is timestamped accordingly and the difference in time between initiation and completion can be observed.</p> <div><div>System Update Lock Attempts</div><table><tr><th>System Lock History</th><th>Initiation Time</th><th>Status</th><th>Result</th></tr><tr><td>N</td><td>6/3/2009 08:11:18:989</td><td>In Progress</td><td>Lock for update initiated at :6/3/2009 08:11:18:989</td></tr></table></div> <div></div> <div><div>System Update Lock Attempts</div><table><tr><th>System Lock History</th><th>Initiation Time</th><th>Status</th><th>Result</th></tr><tr><td>N</td><td>6/3/2009 08:11:18:989</td><td>Locked</td><td>System locked at :6/3/2009 08:11:50:680</td></tr></table></div> | System Lock History | Initiation Time                                     | Status | Result | N | 6/3/2009 08:11:18:989 | In Progress | Lock for update initiated at :6/3/2009 08:11:18:989 | System Lock History | Initiation Time | Status | Result | N | 6/3/2009 08:11:18:989 | Locked | System locked at :6/3/2009 08:11:50:680 |
| System Lock History | Initiation Time   | Status              | Result  |        |        |   |                       |             |   |                     |                 |        |        |   |                       |        |   |
| N                   | 6/3/2009 08:11:18:989   | In Progress         | Lock for update initiated at :6/3/2009 08:11:18:989 |        |        |   |                       |             |   |                     |                 |        |        |   |                       |        |   |
| System Lock History | Initiation Time   | Status              | Result  |        |        |   |                       |             |   |                     |                 |        |        |   |                       |        |   |
| N                   | 6/3/2009 08:11:18:989   | Locked              | System locked at :6/3/2009 08:11:50:680             |        |        |   |                       |             |   |                     |                 |        |        |   |                       |        |   |

Lgx00083167

## Enhancements with Revision 16.54

These enhancements were provided with enhanced redundancy firmware revision 16.54.

### Enhancements Provided with Revision 16.54

| System Component  | Description  |
|---|--|
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | Firmware revision 16.54 provides redundancy support for controller programming with Add-On Instructions.   |
|   | Synchronization points for programs within the RSLogix 5000 project can be configured.   |
|   | Redundancy firmware revision 16.54 provides the ability to limit which programs are followed by synchronization and data crossloading. In many applications, changing this can reduce the overall impact to the task scan time by reducing the number of times a data area is synchronized. Removing a synchronization point results in 1 ms of overhead time saved. |
|   | However, reducing the number of synchronization points may delay the switchover time because more programs may need to be re-scanned by the new primary controller as it starts at the last synchronization point.   |
|   | Synchronization is performed at the end of the last program in the task's program list, regardless of the program's Synchronize Data after Execution setting.  |
|   | To change the synchronization setting of a program, access the program's Program Properties dialog box and check or uncheck Synchronize Data after Execution.  |
| <b>1756-L64</b>   | The ControlLogix5564 controller is supported for use in the redundant system with this firmware revision.  |
| <b>Redundancy Module Configuration Tool (RMCT)</b>                        | System Event History accessible via the Redundancy Module Configuration Tool (RMCT).   |
|   | A system event history tab is available in the RMCT and is visible only when the session is launched while online with the 1756-RM module. This feature automatically captures key events occurring in the redundant system that tell why a switchover occurred or why redundancy was lost.  |
|   | Certain events also indicate what caused the chassis pair to become synchronized. There are 10 most recent entries available for viewing. Each entry has a user comment attached to it that can be used to enter system maintenance information.   |
|   | For more details, see the online help of the RMCT.   |
|   | Lgx00073250  |
|   | Event Log provides additional module information.  |
|   | The 1756-RM module is able to report any changes in the application firmware revision and the backplane serial number via entries posted to the Event Log. This information indicates that a firmware upgrade took place and whether the chassis location of the 1756-RM module was changed.   |
|   | Lgx00073278  |



**Enhancements Provided with Revision 16.54**

| <b>System Component</b>                            | <b>Description</b>  |
|--|---|
| <b>Redundancy Module Configuration Tool (RMCT)</b> | <p>The Synchronization Status tab provides module type and firmware revision data.</p> <p>Within the RMCT, the Synchronization Status tab displays the product-name string and firmware revision of redundancy-compliant modules in the chassis.</p> <p>Lgx00073729</p>   |
| <b>1756-RM, 1756-RMXT</b>                          | <p>User-identity parameters are retained through a power-cycle.</p> <p>The user identity parameters are now 64 characters in length and are stored in nonvolatile memory of the 1756-RM modules. The parameters are saved to nonvolatile memory whenever a change is made.</p> <p>Lgx00073247</p> <p>The qualification state of the redundant chassis pair is indicated on the module status display.</p> <p>The 1756-RM module in the secondary chassis displays a "QFNG" four character code when the redundant chassis pair is qualifying for synchronization.</p> <p>Lgx00073276</p> <p>The primary 1756-RM module is the Wall Clock Time (WCT) master for the secondary 1756-RM module.</p> <p>The 1756-RM module in the primary chassis is the master of the currentTime attribute of the WCT object. When a secondary 1756-RM module is connected, the currentTime attribute in the primary 1756-RM module will be copied over to the secondary 1756-RM module to make them the same. The currentTime attribute on the secondary 1756-RM module will be synchronized every second.</p> <p>Lgx00073248</p> <p>The 1756-RM module may be accessed when in a major fault state.</p> <p>In some applications, it may be possible to communicate with the 1756-RM module even if it has already experienced a major nonrecoverable fault. This allows the fault code to be read remotely and facilitates the retrieval of event logs while in the faulted state.</p> <p>Lgx00073258</p> |

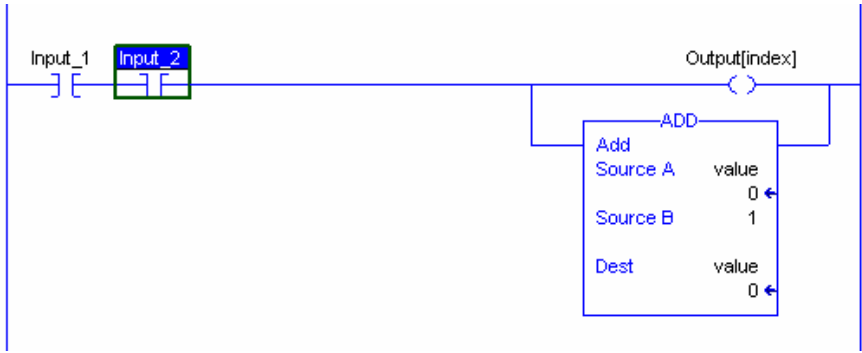
## Corrected Anomalies

These redundancy system anomalies have been corrected in enhanced redundancy firmware revisions 16.80 and 16.54.

### Corrected Anomalies with Revision 16.81

These anomalies have been corrected with standard redundancy firmware revision 16.81.

| System Component   | Description  |
|--|--|
| 1756-L61,<br>1756-L62,<br>1756-L63,<br>1756-L63XT,<br>1756-L64 | <p>A Digital Alarm (ALMD) configured to trigger when the input condition of the alarm is false, does not trigger if the alarm condition is false when you conduct a download or return to run mode.</p> <p>When the Condition parameter of the ALMD instruction is not set (that is, Input = 0) <b>and</b> either the program has recently been downloaded to the controller, or the controller has been changed from Run to Program and back to Run mode, the alarm is not activated (that is, the InAlarm bit is not set).</p> <p>These behaviors may result, depending on your application:</p> <ul style="list-style-type: none"> <li>• Programming designed to respond to the activated alarm is not executed.</li> <li>• Messages designed to be indicated at the operator station in response to the activated alarm are not indicated.</li> <li>• The alarm's history log does not indicate that the alarm was activated.</li> </ul> <p>If you choose not upgrade to this revision, you must toggle the Condition parameter from set (that is, Input = 1) to not set (that is, Input = 0) to activate the alarm.</p> <p>If your Condition parameter is set, then the alarm activates as expected after a download or change to the controller mode.</p> <p style="text-align: right;">Lgx000103444</p> |

| System Component  | Description  |
|---|--|
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | <p>Fault handlers can be defined at the controller and program scope levels. These fault handlers are typically used to handle major recoverable faults that can occur during runtime execution of an application due to programming errors. A typical example of this would be handling indirect addressing that has gone out of range; <code>MyTag[index]</code>, where <code>index</code> is larger than the size of the array.</p> <p>Faults can also be handled by the controller during pre-scan of the controller program on the transition to Run mode. Again, for example, the handling of indirect addressing that has gone out of range.</p> <p>There is an anomaly when these methods attempt to handle a fault.</p> <p>These are the possible ways the anomaly can manifest itself:</p> <ul style="list-style-type: none"> <li>• The controller will experience a major non-recoverable fault. I/O goes to their configured safe state, and the user application is cleared from memory. At this point, a Code 1 Type 60 or 61 major recoverable fault will be logged in the controller. This requires you to redownload the application.</li> <li>• Tag data corruption.</li> <li>• Online saving or uploading failures.</li> <li>• Anomalous program execution.</li> </ul> <p>For example, if a rung is being scanned false and there is an instruction that has false execution, the fault handler executes so the remainder of the rung will scan true. In the example below, the OTE instruction has an index out of range. After returning from the fault handler, the ADD instruction will execute, even though the rung input conditions are false.</p>  <p>On redundancy systems only, when the fault handler or power-up handler contains an Add-On Instruction, the new primary controller may fault with a major non-recoverable fault on the second switch-over. These fault conditions can leave the redundancy system without a running primary controller.</p> <p style="text-align: right;">Lgx00106481, Lgx00107423, Lgx00100766, Lgx00106478</p> |

## Corrected Anomalies with Revision 16.80

These anomalies have been corrected with enhanced redundancy firmware revision 16.80. The descriptions in this table describe the anomalous behavior that you may experience if you do not update to this revision.

### Corrected Anomalies with Enhanced Redundancy Firmware Revision 16.80

| System Component                                | Anomaly Description  |
|---|--|
| <b>1756-CN2,<br/>1756-CN2R,<br/>1756-CN2RXT</b> | <p>The 1756-CN2, series B module cannot use a ControlNet network address of 96, or greater, in a redundant chassis pair. If you set the switches on the 1756-CN2, series B module to 96 or greater, and place it in a secondary chassis, the module faults.</p> <p>With this firmware revision, the node address switches of the ControlNet module in the secondary chassis can be set at an address of 98, or less.</p> <p style="text-align: right;">Lgx00082110</p>   |
|   | <p>A connection closing during phase two of redundant chassis qualification results in a synchronization failure.</p> <p>With this firmware revision, a connection closing during qualification does not cause a synchronization failure.</p> <p style="text-align: right;">Lgx00092857</p>  |
|   | <p>Attempts to use the ControlNet bridge modules on an unconfigured ControlNet network results in a failure to qualify and synchronize the redundant chassis.</p> <p>With this firmware revision, ControlNet modules in a redundant chassis can qualify and synchronize when the ControlNet network is not scheduled.</p> <p style="text-align: right;">Lgx00091856</p>  |
|   | <p>After an event on a 1756-CN2 or 1756-CN2R module causes disqualification of the redundant chassis pair, the secondary chassis continues to appear to be synchronized for up to 30 seconds after the disqualifying event. Even though the redundant chassis pair does not indicate disqualification immediately, the PartnerChassisRedundancyState attribute immediately indicates that no partner is present.</p> <p>During the delayed disqualification, a switchover cannot successfully occur.</p> <p>With this firmware revision, the secondary chassis disqualifies without delay.</p> <p style="text-align: right;">Lgx00090120</p> |
|   | <p>Upon powerup, the OK status indicator of the 1756-CN2 or 1756-CN2R modules may be red and the module status display indicates either:</p> <ul style="list-style-type: none"> <li>• CmdConnOpen.cpp Line 630.</li> <li>• RMEventLog.cpp Line 841.</li> </ul> <p>This is a result of the ControlNet module inaccurately detecting the size of the redundant chassis.</p> <p>With this firmware revision, the correct chassis size is accurately detected.</p> <p style="text-align: right;">Lgx00082907</p>   |

**Corrected Anomalies with Enhanced Redundancy Firmware Revision 16.80**

| <b>System Component</b> | <b>Anomaly Description</b>   |
|-------------------------|--|
| <b>1756-EN2T</b>        | <p>After a power cycle switchover and HMI loading, CIP Sync functions of the 1756-EN2T module fail when used in a redundancy system.</p> <p>Rarely, the 1756-EN2T module may powerup and not synchronize CIP Sync time to the grandmaster or may synchronize with an incorrect time.</p> <p>With this firmware revision, the CIP Synch time of the 1756-EN2T module synchronizes with the grandmaster on powerup.</p> <p style="text-align: right;">Lgx00083465, Lgx00082870</p>   |
|                         | <p>As a result of a delayed 1756-EN2T module-response, the 1756-RM module failed and indicated communication error EAE8 after power to the redundant chassis was cycled.</p> <p>With this firmware revision, no delayed response of the 1756-EN2T module occurs.</p> <p style="text-align: right;">Lgx00079052</p>   |
|                         | <p>The 1756-EN2T module refuses all outbound connections via the Ethernet port.</p> <p>After cycling power on the Ethernet switch or router that the 1756-EN2T module is connected to, the 1756-EN2T module may become unresponsive. The affected module does not respond to Ethernet network, backplane, or USB traffic, even though the status indicators remain green and the status display shows no errors.</p> <p>With this revision, the 1756-EN2T module maintains outbound connections.</p> <p style="text-align: right;">Lgx00081018</p> |
|                         | <p>After a switchover, the new primary 1756-EN2T module resets if the partnered 1756-EN2T module that was the primary is faulted. This may result in a slight delay of the new primary chassis taking control.</p> <p>With this firmware revision, if the primary 1756-EN2T module is faulted, the partnered 1756-EN2T module becomes the new primary without resetting and the delay in the new primary chassis taking control cannot occur.</p> <p style="text-align: right;">Lgx00082818</p>  |
|                         |  |

**Corrected Anomalies with Enhanced Redundancy Firmware Revision 16.80**

| <b>System Component</b>   | <b>Anomaly Description</b>   |
|---|--|
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | After a redundant system is synchronized, if the secondary controller is removed or is faulted, the primary 1756-RM module faults with an E054 error code. Removing and reinserting the primary 1756-RM module re-initiates qualification and resolves the error.<br><div>Lgx00083316</div>  |
|   | When an Add-On Instruction is used in the Power-Up Handler or Controller Fault Handler routines, a major nonrecoverable fault (MNRF) occurs on the new primary after two switchovers.<br><div>Lgx00088390</div>  |
|   | When redundant controllers are used to produce data communicated on a ControlNet network, at a switchover the produced data reverts to an earlier value until the next requested-packet interval (RPI) <b>after</b> an output scan occurs.<br><div>Lgx00090100</div>   |
|   | Redundant chassis synchronization fails when ControlLogix controllers are used in a redundant system where the redundant controller is consuming data produced by a GuardLogix controller.<br><div>Lgx00091317</div>   |
|   | After a switchover, an Add-On Instruction stack overflow error occurs on the new primary controller. This anomaly may occur when: <ul style="list-style-type: none"> <li>• Add-On Instructions are used in the continuous task.</li> <li>• the 'During unused System Overhead Time Slice' parameter (specified in the Controller Properties dialog box, Advanced tab) is set to 'Reserve for System Tasks, eg Communications'.</li> </ul> <div>Lgx00093699</div> |
|   | If a redundant controller is producing data to a consuming controller in the same redundant chassis, when a switchover or a locked switchover occurs, the produced data reverts to an earlier value until the next requested-packet interval (RPI) <b>after</b> an output scan occurs.<br><div>Lgx00090167, Lgx00091180</div>  |
|   | A block-transfer message error 16#301 occurs for an extended time period after a successful switchover. This anomaly occurs when the 1756-L6x controller is programmed with a block transfer of data to analog I/O via a 1756-DHRIO module.<br><div>Lgx00092774</div>  |

**Corrected Anomalies with Enhanced Redundancy Firmware Revision 16.80**

| <b>System Component</b>       | <b>Anomaly Description</b>   |
|-------------------------------|--|
| <b>1756-RM,<br/>1756-RMXT</b> | <p>At times, the 1756-RM module status display may go blank soon after power is applied to the chassis. In addition, the OK status indicator stays solid red.</p> <p>Attempts to access the 1756-RM module via the backplane are unsuccessful and communication via the fiber-optic cable does not occur.</p> <p>Other modules in the chassis will powerup as though in a nonredundant chassis.</p> <p style="text-align: right;">Lgx00082630</p>  |
|                               | <p>The 1756-RM module may log minor faults E8AC and E2WZ after the chassis pair is already synchronized. This minor fault codes occur rarely and are logged solely for information purposes - they do not indicate noteworthy problems with the system.</p> <p style="text-align: right;">Lgx00080482, Lgx00097734</p>   |
|                               | <p>While synchronized, 1756-RM module may fault with an error EA84 or EA28 on switchover.</p> <p>If the Ethernet cable to a synchronized and primary 1756-EN2T module is broken or damaged, the 1756-RM module may fault with an error EA84 or EA28 fault code. However, a switchover successfully executes.</p> <p style="text-align: right;">Lgx00084385</p>   |
|                               | <p>Repeatedly disconnecting and connecting the fiber-optic cable while the redundant chassis pair is qualifying causes the 1756-RM modules to fault. Fault codes that may be indicated are E0Ix fault codes.</p> <p style="text-align: right;">Lgx00084595</p>   |
|                               | <p>Comments cannot be added to older events in the System Event History tab.</p> <p>In the System Event History tab, commented entries already saved to nonvolatile memory cannot be edited. However, new events generated (after the last attempt to save to nonvolatile memory) can be edited.</p> <p style="text-align: right;">Lgx00084176</p>   |
|                               | <p>After completing a firmware upgrade to either the 1756-CN2 or 1756-EN2T modules, an error EK24 is indicated by the redundancy module and the redundant chassis fails to qualify.</p> <p style="text-align: right;">Lgx00076384</p>  |
|                               | <p>After a power cycle, the 1756-RM module occasionally remains in Test mode as indicated by the module status display continuously indicating THG1. In addition to THG1 indicated on the module status display, the controller reports a '(Type 03) I/O Fault (Code 20) Unable to read ControlBus chassis' error.</p> <p>Also, if the 1756-RM module that remains in Test mode is located in the secondary chassis, then the communication modules in both chassis indicate a duplicate node.</p> <p style="text-align: right;">LGX00080649</p> |
|                               |  |

**Corrected Anomalies with Enhanced Redundancy Firmware Revision 16.80**

| <b>System Component</b>       | <b>Anomaly Description</b>  |
|-------------------------------|---|
| <b>1756-RM,<br/>1756-RMXT</b> | <p>After applying power to the redundancy module, the OK indicator is steady red and the module status display does not provide any indication of the module status (that is, the module status display is blank). Power-up processes of the redundancy module are not carried out and the module's Event Log does not indicate that power-up processes have been initiated.</p> <p style="text-align: right;">Lgx00081559</p>  |
|                               | <p>Repeated attempts to automatically synchronize redundant chassis after certain qualification checkpoints may cause the primary 1756-RM module to fault as indicated by the:</p> <ul style="list-style-type: none"> <li>• steadily red OK indicator.</li> <li>• blank module status display.</li> <li>• major faults EG1G and EG1a indicated in the Event Log.</li> </ul> <p style="text-align: right;">Lgx00087889</p>   |
|                               | <p>The 1756-RM module indicates that the primary modules are not compatible with secondary modules and the redundant chassis fail to qualify. This occurs after multiple modules within the primary chassis received firmware upgrades at the same time, or nearly the same time.</p> <p style="text-align: right;">Lgx00083164</p>   |
|                               | <p>The 1756-RM module indicates error code E010 after attempts to complete online edits while synchronized.</p> <p>This anomaly may occur when multiple programs are used and:</p> <ul style="list-style-type: none"> <li>• inhibited programs are uninhibited.</li> <li>• synchronization and crossloading is not carried out at the end of each of the inhibited programs.</li> </ul> <p style="text-align: right;">Lgx00090176</p>   |
|                               | <p>Editing any parameters of the User-Defined Identity within a few seconds of disqualification or a switchover results in the synchronization status changing to incompatible.</p> <p style="text-align: right;">Lgx00091144</p>   |
|                               | <p>After running in the synchronized state for several days, a 1756-RM module of the pair may fault and indicate error code E8A0.</p> <p>The system-response to the fault depends on the location of the 1756-RM module. If the faulted 1756-RM module is in the:</p> <ul style="list-style-type: none"> <li>• primary chassis, a switchover occurs</li> <li>• secondary chassis, disqualification occurs</li> </ul> <p>To restore redundancy, remove and reinsert the faulted 1756-RM module. Then, synchronize the chassis.</p> |

**Corrected Anomalies with Revision 16.54**

Enhanced redundancy firmware revision 16.54 did not have any corrected anomalies as it was an initial enhanced-platform release.



## Known Anomalies

This table lists the known anomalies specific to the enhanced redundancy firmware revisions 16.81, 16.80, and 16.54.

### Known Anomalies

| System Component  | Description  |
|---|--|
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | <p>Redundant chassis synchronization fails when a large number of controller connections are used.</p> <p>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. Try to limit the number of controllers connections used to 243 connections, or less.</p> <p style="text-align: right;">Lgx00063311</p>  |
|   | <p>Alarms scanned during the continuous task may be published to the alarm server twice after a switchover.</p> <p>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.</p>   |
|   | <p>Alarm status messages may be duplicated in the Alarm History Log in the event of a switchover.</p> <p>To make troubleshooting duplicate alarm states easier, consider programming alarms to indicate when a redundant system switchover occurs.</p>   |
|   | <p>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.</p>  |
|   | <p>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.</p>  |
|   | <p>The alarm parameters may be lost when a switchover occurs.</p> <p>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:</p> <ul style="list-style-type: none"> <li>- DeliveryER</li> <li>- DeliveryEN</li> <li>- NoSubscriber</li> <li>- NoConnection</li> <li>- CommError</li> <li>- AlarmBuffered</li> <li>- SubscNotified</li> </ul> <p>Once the alarm data is buffered, the parameters are updated.</p> <p style="text-align: right;">Lgx00093529</p> |
|   |  |
|   |  |

**Known Anomalies**

| <b>System Component</b>   | <b>Description</b>  |
|---|---|
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | <p>Alarms may fail to be acknowledged when the attempt to acknowledge the alarm occurs during a switchover.</p> <p>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.</p> <p>Lgx00093826</p>   |
| <b>1756-RM,<br/>1756-RMXT</b>   | <p>The redundancy module fails to detect a controller in the chassis.</p> <p>Rarely, after powering the redundant chassis, the 1756-RM module is unable to detect all of the controllers placed in the chassis. When the controller fails to be 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.</p> <p>If the controller that fails to be detected is located in the secondary chassis, the chassis pair fails to synchronize.</p> <p>Lgx00079417</p> <p>Repeated connection and disconnection of the 1756-RM modules' fiber-optic cable results in various fault codes indicated on the module status display.</p> <p>If the 1756-RM modules' fiber-optic cable is disconnected and connected repeatedly within short periods of time, the redundancy module faults and indicates error codes such as E0XX or EAXX.</p> <p>To avoid experiencing these faults, wait 5...10 seconds between disconnecting and connecting the 1756-RM modules' fiber-optic cable.</p> <p>Lgx00084595, Lgx00091960</p> <p>Cycling power to, or, updating the firmware of the 1756-RM module or other modules in the chassis may cause the 1756-RM module to fault and indicate error code EAM3 on the module status display.</p> <p>Rarely, after updating the firmware the 1756-RM module or any other modules in the chassis, the 1756-RM module begins logging E750 faults and eventually an EAM3 fault occurs. To recover, uninstall both the 1756-RM 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.</p> <p>Lgx00094986, Lgx00099560</p> |

## Restrictions

The restrictions listed in this table are applicable to redundancy firmware revisions 16.81 and 16.80. In addition to these restrictions, see the Application Notes on [page 22](#) for considerations specific to the type of application you are using.

### Restrictions with Redundancy Firmware Revision 16.80

| System Component   | Description  |
|--|--|
| <b>1756-CN2,<br/>1756-CN2R,<br/>1756-CN2RXT</b>                | <p>1756-CN2 and 1756-CN2R, series B module firmware is not compatible with 1756-CN2 and 1756-CN2R, series A hardware.</p> <p>The 1756-CN2 and 1756-CN2R, series B module firmware 20.009 is not compatible with the 1756-CN2 and 1756-CN2R, series A hardware. Do not attempt to upgrade an 1756-CN2 or 1756-CN2R, series A module with 1756-CN2 or 1756-CN2R, series B firmware. Attempting to do so results in ControlFlash software displaying a severe incompatibility warning.</p> <p>The 1756-CN2/B and 1756-CN2R/B modules provide a maximum of 128 CIP connections for standard (non redundancy) application use.</p> <p>The 1756-CN2 module provides 131 total CIP connections, however, 3 of the 131 CIP connections are always reserved for redundant control. These 3 redundant-system CIP connections always appear to be in use, even when no connections are open.</p> <p>Because 3 of the 131 CIP connections are reserved for redundancy, 128 CIP connections are available for nonredundant use.</p> |
| <b>1756-CN2/A</b>  | The 1756-CN2 series A module, cannot be used in any redundant chassis. The 1756-CN2 series A module is not redundancy compliant in either a standard or enhanced redundancy system.  |
| <b>1756-CN2,<br/>1756-CN2R,<br/>1756-CN2RXT,<br/>1756-EN2T</b> | <p>System Event Entry contains a module failure event when an enhanced communication module is inserted.</p> <p>The System Event History displays a 'Module Failure' entry when you insert a 1756-CN2 series B module, or a 1756-EN2T 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.</p> <p>Lgx00078874</p>  |
| <b>1756-EN2T</b>   | <p>Do not use 1756-EN2T modules at firmware revision 1.004, or lower, in redundant chassis.</p> <p>1756-EN2T module firmware revision 1.004 is not redundancy-compliant either in standard or enhanced redundancy systems. 1756-EN2T modules at firmware revision 1.004 must be upgraded to revision 2.003, or later. Once upgraded, the 1756-EN2T module is redundant-system compliant.</p>   |

**Restrictions with Redundancy Firmware Revision 16.80**

| <b>System Component</b>   | <b>Description</b>   |
|---|--|
| <b>1756-EN2T</b>  | <p>The 1756-EN2T module provides a maximum of 256 CIP connections for standard (non redundant) application use.</p> <p>The 1756-EN2T module provides 259 total CIP connections, however, 3 of the 259 CIP connections are always reserved for redundant control. These 3 redundant-system CIP connections always appear to be in use, even when no connections are open.</p> <p>Because 3 of the 259 CIP connections are reserved for redundancy, 256 CIP connections are available for non redundancy use.</p> <p>The 1756-EN2T module used in the enhanced system does not provide features such as socket services, web services, or the Simple Time Network Protocol (SNTP) client.</p>  |
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | <p>Inhibiting or removing an inhibition from a redundant controller program can cause the secondary chassis to disqualify, then to qualify again.</p> <p>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.</p> <p style="text-align: right;">Lgx00090432</p> <p>Do not use Match Project to Controller property with redundant controllers.</p> <p>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.</p> <p style="text-align: right;">Lgx00063573</p> <p>Deleting I/O modules from a project while online with the controller may cause a major nonrecoverable fault (MNRF) on the secondary controller.</p> <p>If your application requires that you delete I/O modules from the project while online with the controller, disqualify the secondary chassis before deleting the I/O modules.</p> <p style="text-align: right;">Lgx00095282</p> <p>Disqualify redundant chassis before running the Data Preserved Download Tool.</p> <p>If you attempt to run the Data Preserved Download Tool with a ControlLogix redundancy-enabled controller while the controllers are synchronized, the Data Preserved Download Tool begins to run, but then becomes inoperable and must be terminated.</p> <p style="text-align: right;">Lgx00099382</p> |

**Restrictions with Redundancy Firmware Revision 16.80**

| <b>System Component</b>   | <b>Description</b>  |
|---|---|
| <b>1756-L61,<br/>1756-L62,<br/>1756-L63,<br/>1756-L63XT,<br/>1756-L64</b> | <p>If you have either a:</p> <ul style="list-style-type: none"> <li>• 1756-L64 controller at firmware revision 1.10 (boot firmware)</li> <li>• 1756-L61, 1756-L62, 1756-L63 at firmware revision 1.7 (boot firmware)</li> </ul> <p>then you need to update the controller firmware with the controller placed in a nonredundant chassis.</p> <p>If you install the controller in a redundant chassis, a major nonrecoverable fault (MNRF) may occur, or, it may remain in a faulted state. The controller indicates this fault by the OK status indicator being solid red.</p> <p>The label on the side of the controller indicates the series controller and the boot firmware revision as shown in the example here.</p> <div data-bbox="487 735 876 913"> </div> <p>Complete these steps to upgrade from the boot firmware revision.</p> <ol style="list-style-type: none"> <li>1. Put the controller in a nonredundant chassis.</li> <li>2. Update the controller.</li> <li>3. Put the controller in the redundant chassis.</li> </ol> <p>After you have updated the controller from the boot firmware revision, any further updates can be made while the controller is in the redundant chassis.</p> <p><b>Exception</b></p> <p>If your controller is already running in a redundant system and you want to update it to a later revision, you may leave it in the existing redundancy system during the firmware update.</p> |

## Application Notes

Consider these application notes when configuring, programming, and using your redundant system.

### EtherNet/IP Networks and Redundant Systems

#### IMPORTANT

In a redundant system, use an EtherNet/IP network only for HMI/workstation communication and messaging.

**Do not** use an EtherNet/IP network for:

- communication with I/O modules.
- communication between devices via produced/consumed tags.

### 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.

| If   | Then use this equation                              |
|--|---|
| Switchover time is critical to system performance                            | $(2 * \text{maximum\_scan\_time}) + 150 \text{ ms}$ |
| Module firmware will be updated in the field                                 | $(\text{maximum\_scan\_time}) + 245 \text{ ms}$     |
| You need to safeguard against the removal of a intermodule fiber-optic cable | $(\text{maximum\_scan\_time}) + 390 \text{ ms}$     |

The *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:

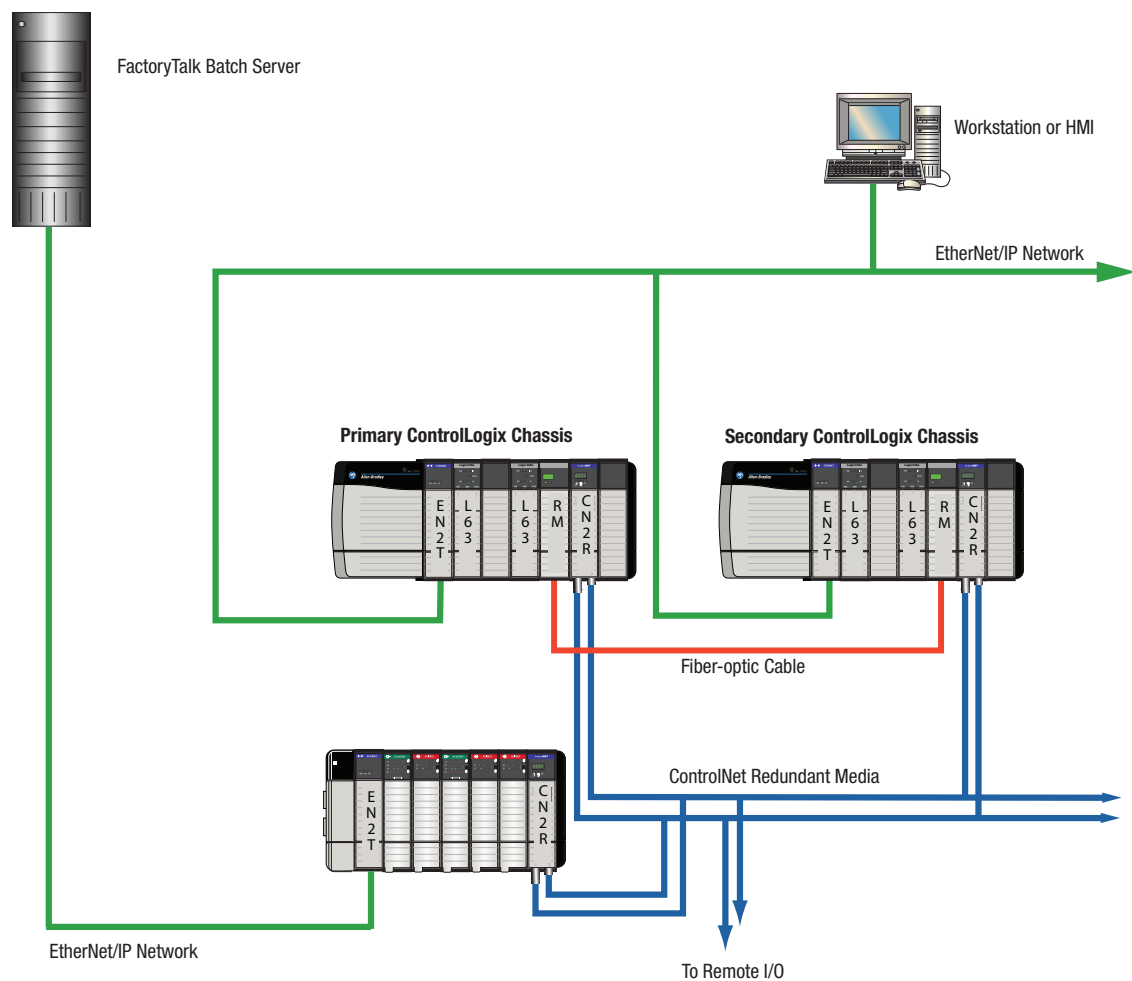
- Verify that the synchronization status of the primary module is full compatibility.
- Wait at least 15 seconds after the redundant chassis are disqualified before you try to synchronize them.

## Using a Redundant System with a FactoryTalk Batch Server

To connect a ControlLogix redundancy system to a FactoryTalk Batch Server, you must bridge from the ControlNet network of the redundant system to the EtherNet/IP network, and then connect to the FactoryTalk Batch Server.

You cannot connect to the FactoryTalk Batch Server directly from an EtherNet/IP module placed in the redundant chassis.

This illustration demonstrates one method of bridging the ControlNet network of the redundant system to the EtherNet/IP network that the FactoryTalk Batch Server is running on.



## Using a Redundant System and CIP Equipment Phases

When implementing a redundant system that uses Common Industrial Protocol (CIP) equipment phases, we recommend certain programming considerations to help avoid potential issues with your redundant system.

### Using the *EquipmentPhase.StepIndex* Tag

Each CIP equipment phase that you have in your project has a status tag of a PHASE data type. One of the members of the PHASE data type is *EquipmentPhase.StepIndex*. The *.StepIndex* tag stores data that indicates the step currently in progress. This tag can also be used to advance through steps if the next step value is moved into the *.StepIndex* tag on completion of a step.

The screenshot shows the 'Controller Tags - MyPhaseManager(controller)' window. The 'Scope' is set to 'MyPhaseManager'. The 'PHASE' data type is selected. The 'Drain\_Tank' tag is expanded, showing its members. The 'Drain\_Tank.StepIndex' member is highlighted, and an arrow points to it with the label '.StepIndex Member'. Another arrow points to the 'PHASE' data type of the 'Drain\_Tank' tag with the label 'PHASE Data Type'.

| Name                    | Value | Data Type |
|-------------------------|-------|-----------|
| - Drain_Tank            | {...} | PHASE     |
| + Drain_Tank.State      | 64    | DINT      |
| - Drain_Tank.Running    | 0     | BOOL      |
| - Drain_Tank.Holding    | 0     | BOOL      |
| - Drain_Tank.Restarting | 0     | BOOL      |
| - Drain_Tank.Stopping   | 0     | BOOL      |
| - Drain_Tank.Aborting   | 0     | BOOL      |
| - Drain_Tank.Resetting  | 0     | BOOL      |
| - Drain_Tank.Idle       | 1     | BOOL      |
| - Drain_Tank.Held       | 0     | BOOL      |
| - Drain_Tank.Complete   | 0     | BOOL      |
| - Drain_Tank.Stopped    | 0     | BOOL      |
| - Drain_Tank.Aborted    | 0     | BOOL      |
| + Drain_Tank.Substate   | 0     | DINT      |
| - Drain_Tank.Pausing    | 0     | BOOL      |
| - Drain_Tank.Paused     | 0     | BOOL      |
| - Drain_Tank.AutoPause  | 0     | BOOL      |
| + Drain_Tank.StepIndex  | 0     | DINT      |
| + Drain_Tank.Failure    | 102   | DINT      |
| + Drain_Tank.UnitID     | 0     | DINT      |



Verify that the current `EquipmentPhase.StepIndex` tag value is crossloaded to the secondary controller by:

- using a buffer to hold the target step value (that is, the value of the next step) and update that value when a step transition occurs.
- creating logic to move the target step value into the `EquipmentPhase.StepIndex` tag once the current step is completed.

If those programming considerations are made, after a switchover, the new primary controller begins executing according to the `EquipmentPhase.StepIndex` tag value, where if:

- the switchover occurs just **after** the tag value is updated, the step newly-transitioned to executes as expected without duplication.
- the switchover occurs just **before** the tag value is updated, the current step executes again before transitioning to the next step.

Because of the small possibility of steps being executed twice upon a switchover, we recommend that you organize steps and phase logic into groups that will not be affected if a step is executed twice as a result of a switchover.

For more information about programming for step execution after a switchover, see Knowledgebase Answer ID 62193 available at: <http://support.rockwellautomation.com>.

For more information about the PHASE data type, see the PHASEManager User Manual, publication [LOGIX-UM001](#).

Lgx00098349

## Using Unit Tags

Batch Projects containing CIP equipment phases that require the use of Unit Tags also require that a non-CIP data server be used to service the Unit Tags. Either of these data servers can be used:

- OPC data server, available with RSLinx Classic software
- LiveData data server, available with RSLinx Enterprise software

However, when a redundant system is used, communication through an OPC or LiveData data server may be interrupted when a switchover or qualification occurs.

We recommend that, if possible, you use the LiveData data server to service Unit Tags. This is because communication interruptions that may result from a switchover or qualification are less likely to occur when the LiveData data server is used.

For more information about communication interruptions with both the OPC and LiveData servers, see Knowledgebase Answer ID 62192 available at: <http://www.rockwellautomation.com/support>.

Lgx000095842

## Multiple CIP Data Servers with One FactoryTalk Batch Server

If you take a controller offline and download its project while the same FactoryTalk Batch Server is communicating with other ControlLogix controllers in the system that are running CIP equipment phases, you may experience a range of conversation statuses on the CIP data servers associated with the other controllers. If the other CIP data servers encounter the status changes, the FactoryTalk Batch Server may issue a hold command (HOLD) to any recipes that are currently running.

You may experience this if your redundant or nonredundant ControlLogix system is configured and running with these components:

- A single FactoryTalk Batch Server that is running CIP equipment phases
- The CIP equipment phases are running in more than one ControlLogix controller
- The FactoryTalk Batch Server is configured with a separate CIP data server for each ControlLogix controller

- The FactoryTalk Batch system is patched with patch 10.00.00.26 or later. (Patch 10.00.00.26 is required for use with redundancy firmware revision 16.80.)

If your system is configured as described above, and you take one of the ControlLogix controllers offline and download the project, these changes in conversation statuses may occur.

- A. The other CIP data servers that the FactoryTalk Batch Server is communicating with may temporarily indicate a SUSPECT or LOST conversation status.
- B. As a result of the LOST state on the CIP data servers, the FactoryTalk Batch Server issues a HOLD command and phases or recipes that are running go to a held state.
- C. The conversation statuses of the CIP data servers eventually transition back to GOOD after a few minutes.
- D. When the CIP data servers return to the GOOD conversation status, you can manually click Clear Failures and Restart from the Batch View to resume recipe execution.

The potential for you to experience this issue with your CIP data servers depends upon:

- the size of the project being downloaded from the offline controller.
- the configuration of Timeout and Retry settings for the CIP data servers in the Area Model. These settings are used by the Batch server to determine how long to wait before changing the CIP data server conversation status to SUSPECT or LOST.

For more information about using multiple CIP data servers with one FactoryTalk Batch Server, see Knowledgebase Answer ID 62369 available at: <http://support.rockwellautomation.com>.

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## Upgrade From An Enhanced Redundancy Revision

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

| Task  | Page |
|---|------|
| Before You Begin  | 28   |
| Upgrade Workstation Software                            | 29   |
| Upgrade the Redundancy Module Configuration Tool (RMCT) | 29   |
| Download and Install Redundancy Firmware Bundle         | 31   |
| Update EDS Files  | 31   |
| Prepare the Redundant Chassis for the Firmware Upgrade  | 32   |
| Update Primary 1756-RM Module Firmware                  | 34   |
| Update the Secondary Chassis Firmware                   | 35   |
| Prepare the RSLogix 5000 Project for the Upgrade        | 37   |
| Update Primary 1756-RM Module Firmware                  | 34   |
| Lock and Switchover the System for Update               | 39   |
| Update the New Secondary Chassis Firmware               | 41   |
| Synchronize the Redundant Chassis                       | 42   |

### Before You Begin

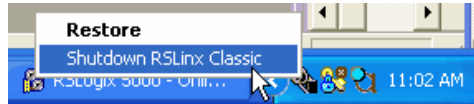
#### IMPORTANT

- During the upgrade procedures, you will not be able to 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. Otherwise, you will see errors in the RSNetWorx software during the update process.
- While completing these tasks to upgrade your redundancy firmware:
  - 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.

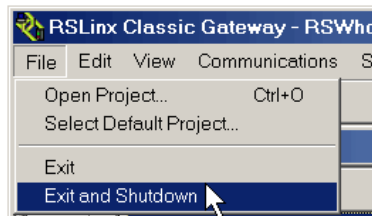
## Upgrade Workstation Software

Before you download and upgrade software for use with 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.



Obtain and install the software required for your redundant system configuration and application. See Compatible Software Versions on [page 3](#) for versions required for use with this redundancy firmware revision.

Use the installation instructions or release notes provided with each software version for installation procedures and requirements.

## Upgrade the Redundancy Module Configuration Tool (RMCT)

Obtain and install the compatible version of the RMCT by accessing Knowledgebase Answer ID 29511 (available at: <http://www.rockwellautomation.com/knowledgebase/>).

Download the version specified for this redundancy firmware revision, then open the executable file to install the tool.

### Verify Your RMCT Version

Complete these steps to check or verify the version of the Redundancy Module Configuration Tool (RMCT) you have installed.

#### TIP

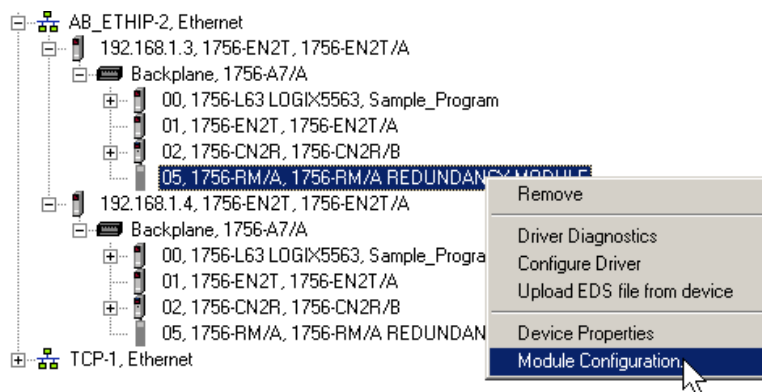
The RMCT launches at the version that is compatible with the 1756-RM module firmware that is currently installed.

If you have not upgraded your 1756-RM module firmware after upgrading your RMCT version, the RMCT version that is indicated may not reflect the version you upgraded to.

1. Launch RSLinx Classic software.
2. Click RSWho.

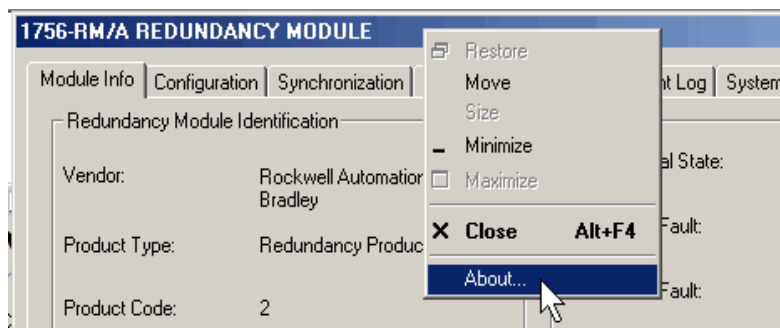


3. Right-click your redundancy module and choose Module Configuration.



The Module Configuration dialog box opens.

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



The About dialog box opens and indicates the RMCT version.



## Download and Install Redundancy Firmware Bundle

Download and install the redundancy firmware revision bundle from the Rockwell Automation Support website at:

<http://support.rockwellautomation.com>.

The redundancy firmware bundles are posted in the Downloads section and are classified in the Control Hardware category.

## Update 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.

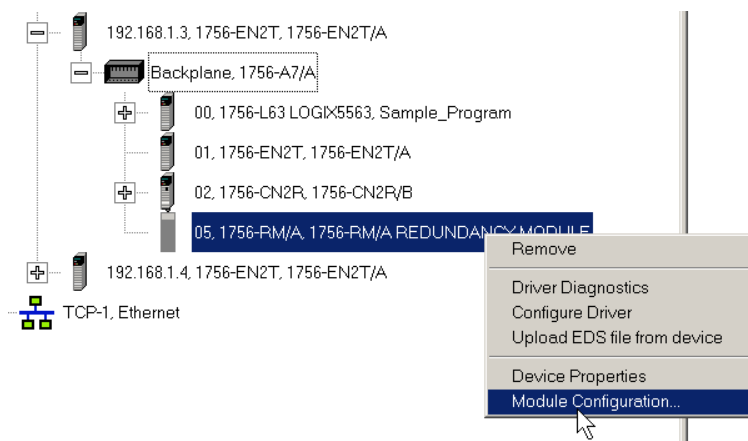
## Prepare the Redundant Chassis for the Firmware Upgrade

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

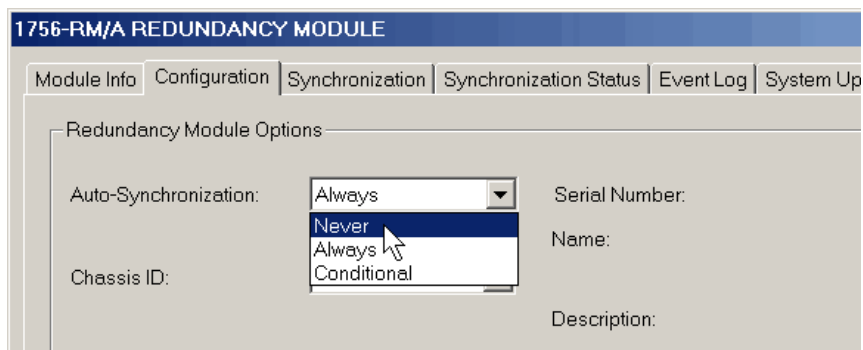
1. Set the keyswitch of the primary and secondary controllers to REM.

If the redundant controllers 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 select Module Configuration.



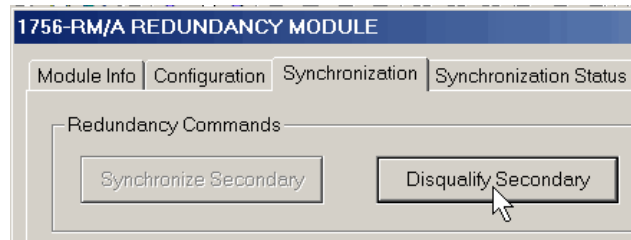
4. Click the Configuration tab.
5. From the Auto-Synchronization pull-down menu, choose Never.



6. Click Apply, then click Yes.

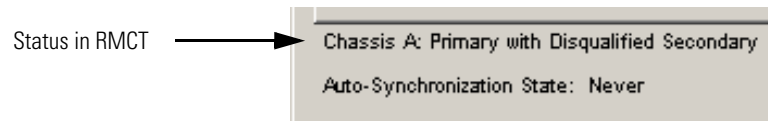


7. Click the Synchronization tab.



8. Click Disqualify Secondary, 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.

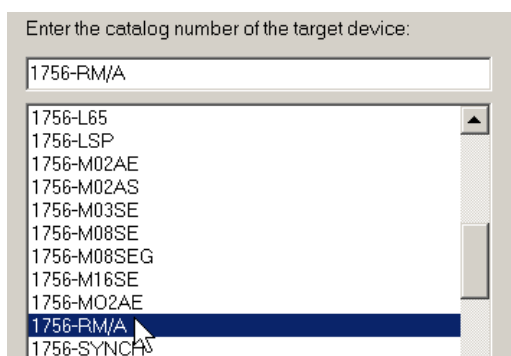
Closing the RMCT helps prevent a timeout from occurring when the redundancy module's firmware is upgraded.

## Update Primary 1756-RM Module Firmware

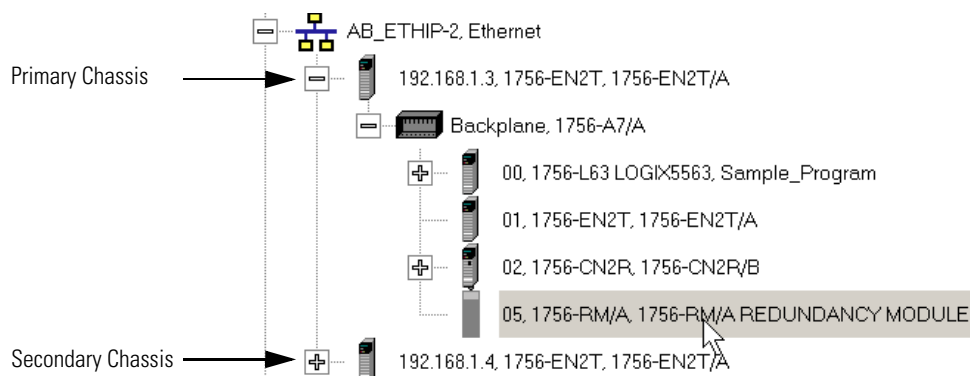
Wait 45 seconds before you begin updating the 1756-RM firmware. During this time, the redundancy module conducts internal operations to prepare for an upgrade.

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

1. Launch ControlFlash software and click Next.
2. Select the redundancy module catalog number and click Next.



3. Browse to the redundancy 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 upgrade is complete, the Update status dialog box indicates completion.

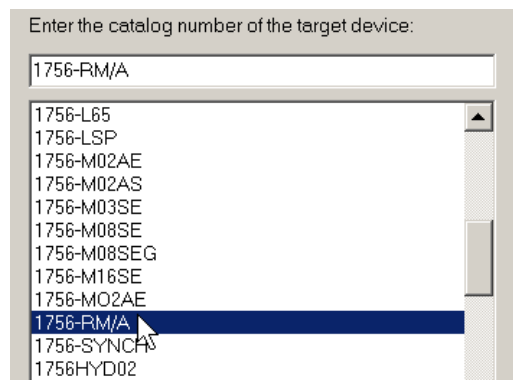
Status: Update complete. Please verify this new firmware update before using the target device in its intended application.

## Update the Secondary Chassis Firmware

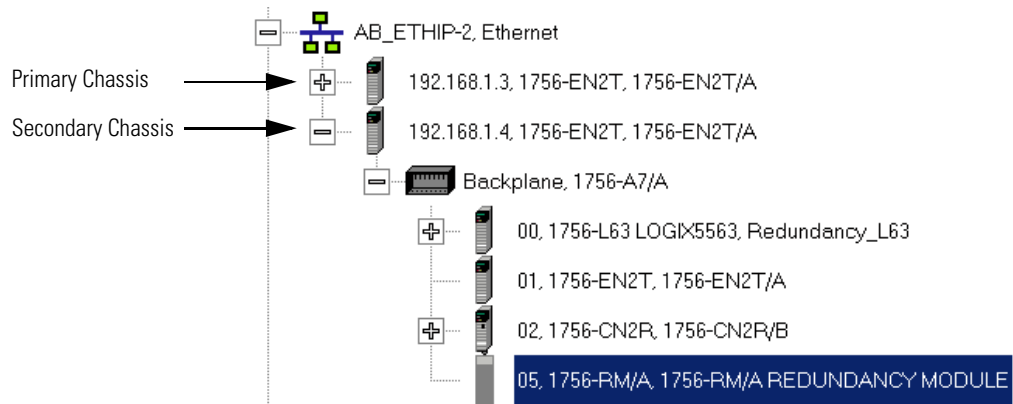
Wait 45 seconds before you begin updating the secondary chassis firmware. During this time, the redundancy module conducts internal operations to prepare for an upgrade.

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

1. Launch ControlFlash software and click Next.
2. Select the redundancy module catalog number and click Next.



3. Browse to the redundancy 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 upgrade is complete, the Update status dialog box indicates completion.

Status: Update complete. Please verify this new firmware update before using the target device in its intended application.

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

---

**IMPORTANT**

If you are replacing and upgrading your redundant controllers, verify that the planned secondary controller provides the same, or greater, memory as the primary controller.

---

Use this table to determine if your planned primary and secondary controllers can be used together in the redundant chassis.

**Controller Compatibility**

| Primary Controller | Compatible Secondary Controller        |
|--------------------|--|
| 1756-L61           | 1756-L61, 1756-L62, 1756-L63, 1756-L64 |
| 1756-L62           | 1756-L62, 1756-L63, 1756-L64           |
| 1756-L63           | 1756-L63, 1756-L64                     |
| 1756-L64           | 1756-L64                               |

8. Complete steps 2...6 for each module in the secondary chassis, including the new controller, if applicable.

Once you have upgraded the firmware for each of the modules in the secondary chassis, continue by preparing 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.

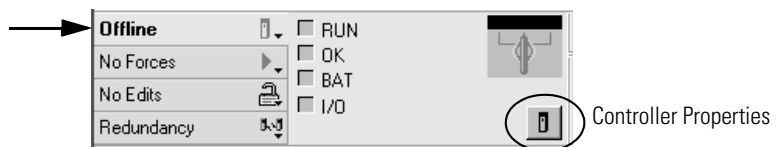
1. Launch RSLogix 5000 programming software and go online with the controller.
2. Verify that the watchdog time is set to a value that corresponds with the requirements of the redundancy firmware revision and your application.

See the section 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 SFC forces from the project.
5. Verify that no changes need to be made to:
  - I/O forces.
  - I/O configuration.

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

6. Save the project.
7. Go offline.

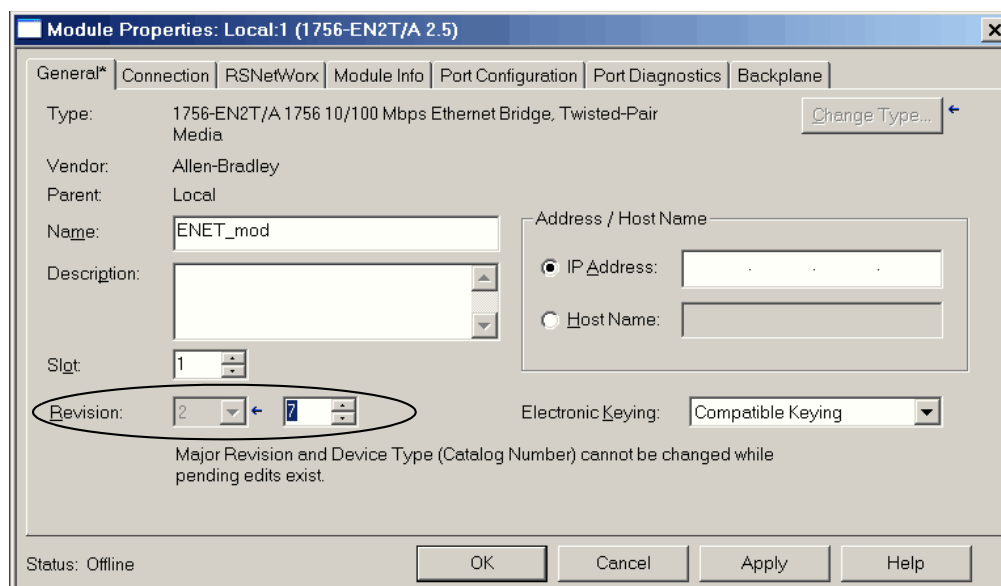


8. Click Controller Properties.
9. Click Change Controller.

|           |                                      |   |
|-----------|--------------------------------------|---|
| Vendor:   | Allen-Bradley                        | <input type="button" value="Change Controller..."/> |
| Type:     | 1756-L63 ControlLogix5563 Controller |   |
| Revision: | 16.52                                |   |

10. Specify the controller revision you are updating to.

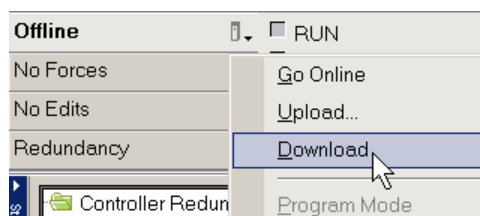
11. If you installed a new controller while upgrading the primary chassis firmware, specify the new controller catalog number.
12. Click OK.
13. Access the Module Properties for each communication module in the chassis and specify the module firmware revision you are upgrading to.

**TIP**

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

14. Save the project.
15. Download the project to the secondary controller.

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



16. After the download is complete, go offline.

You are now ready to lock the system and initiate a locked switchover in order to update the primary chassis. Continue with Lock and Switchover the System for Update on [page 39](#).

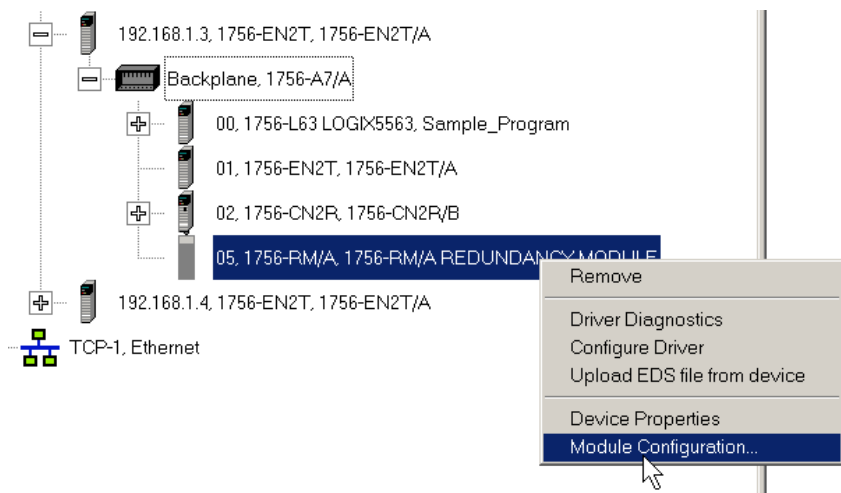
## Lock and Switchover the System for Update

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

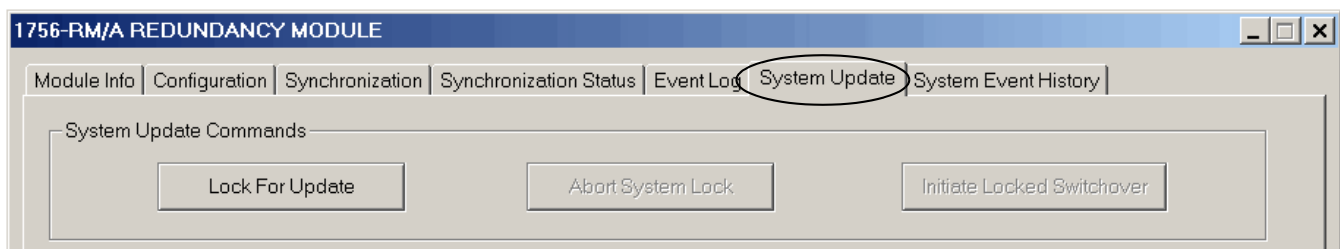
### IMPORTANT

- 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 may result in SFC instructions executing twice.

1. Open the RMCT for the 1756-RM module in the primary chassis.



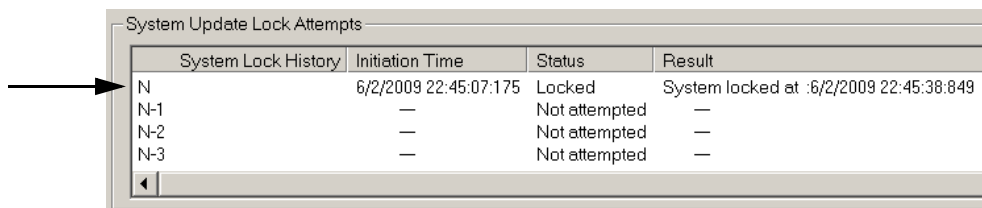
2. Click the System Update tab.



3. Click Lock for Update, then click Yes.

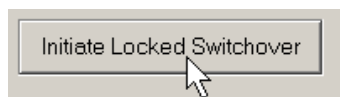
4. Wait for the system to lock.

The System Update Lock Attempts log indicates when the system lock is complete.

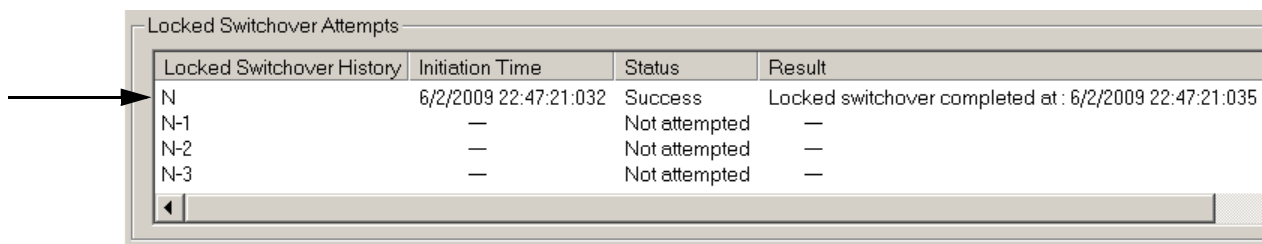


| System Lock History | Initiation Time       | Status        | Result                                  |
|---------------------|-----------------------|---------------|---|
| N                   | 6/2/2009 22:45:07:175 | Locked        | System locked at :6/2/2009 22:45:38:849 |
| N-1                 | —                     | Not attempted | —                                       |
| N-2                 | —                     | Not attempted | —                                       |
| N-3                 | —                     | Not attempted | —                                       |

5. Click Initiate Locked Switchover, then click Yes.

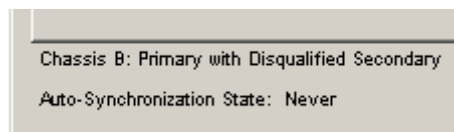


This step results in your secondary chassis assuming control and becoming the primary chassis. When the switchover is complete, the Locked Switchover Attempts log indicates success.



| Locked Switchover History | Initiation Time       | Status        | Result   |
|---------------------------|-----------------------|---------------|--|
| N                         | 6/2/2009 22:47:21:032 | Success       | Locked switchover completed at : 6/2/2009 22:47:21:035 |
| N-1                       | —                     | Not attempted | —  |
| N-2                       | —                     | Not attempted | —  |
| N-3                       | —                     | Not attempted | —  |

In addition to the log, the chassis status indicated in the bottom of the RMCT updates to reflect the switchover.



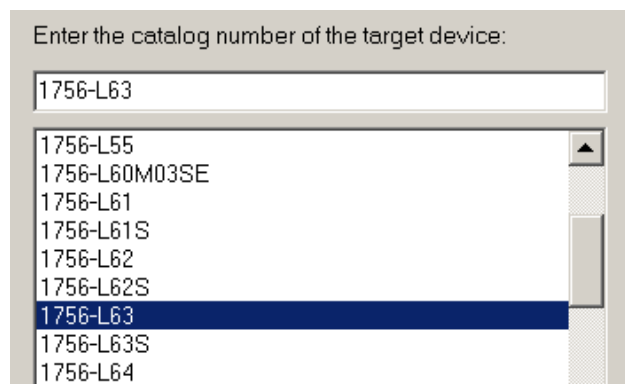
Once your locked switchover is complete, continue by updating the firmware of the modules in the new secondary chassis.



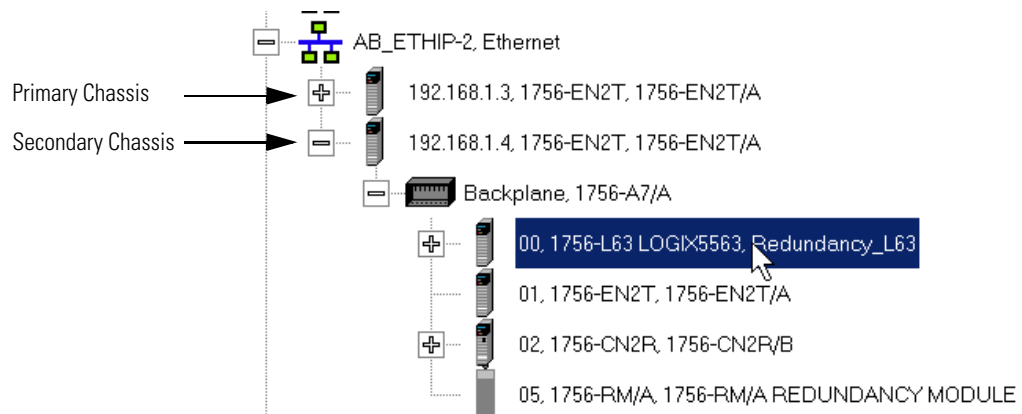
## Update the New Secondary Chassis Firmware

Verify that your chassis have been locked for update and that the locked switchover has completed successfully. Then complete these steps to upgrade the firmware of all of the modules the new secondary chassis, except for the 1756-RM module that has already been updated (see section Update Primary 1756-RM Module Firmware on [page 34](#)).

1. Launch ControlFlash software and click Next.
2. Select the 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 upgrade is complete, the Update status dialog box indicates completion.

Status: Update complete. Please verify this new firmware update before using the target device in its intended application.

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

### IMPORTANT

If you are replacing and upgrading your redundant controllers, verify that the planned secondary controller provides the same, or greater, memory as the primary controller.

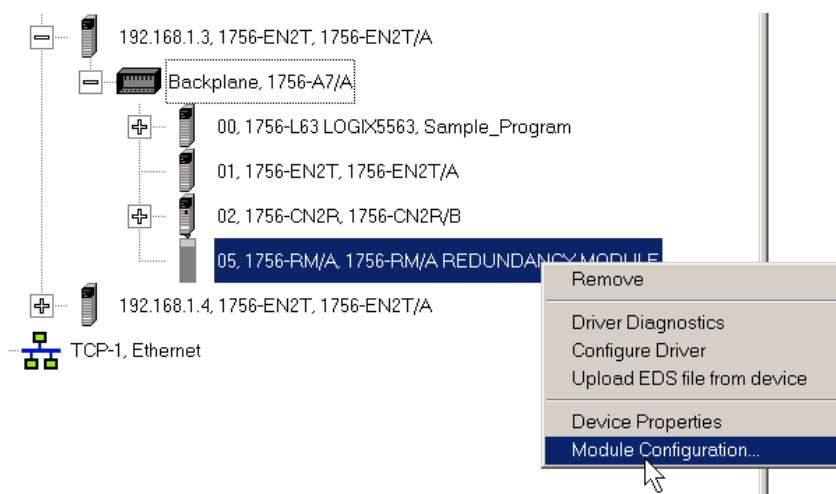
8. Complete steps 2...6 for each module in the new secondary chassis, including the new controller, if applicable.

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

## Synchronize the Redundant Chassis

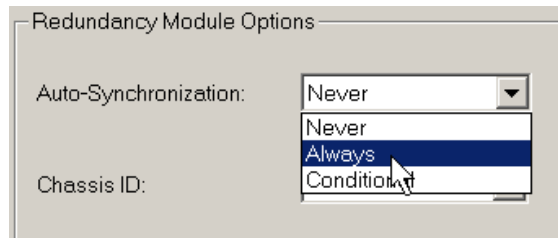
Complete these steps to synchronize the redundant chassis after firmware in both chassis have been upgraded to the same revision.

1. Launch the RMCT for the 1756-RM module in the primary chassis.



2. Click the Configuration tab.

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



4. Click Apply, then click Yes.
5. Set the redundancy module date and time according to your preference.
6. Click OK.
7. Close the RMCT.

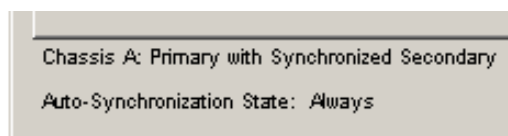
Your redundant system firmware upgrade is now complete.

## Store a Project to Nonvolatile Memory While Your Process is Running

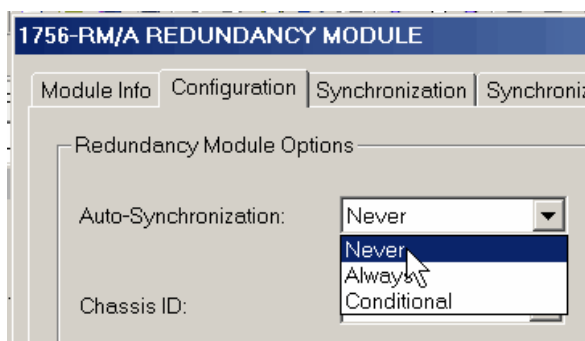
Use this procedure to store an updated project and firmware to the nonvolatile memory of the controller while your process is running.

1. Verify that the redundant chassis are synchronized.

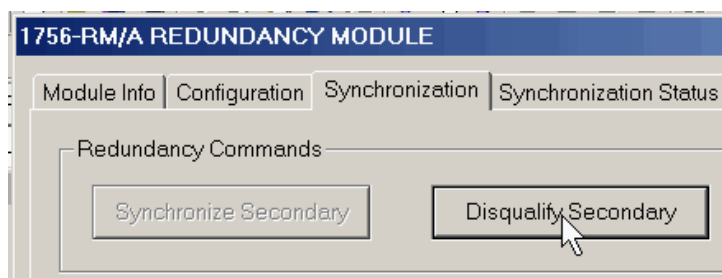
If the redundant chassis are not synchronized, synchronize them before continuing with the next step.



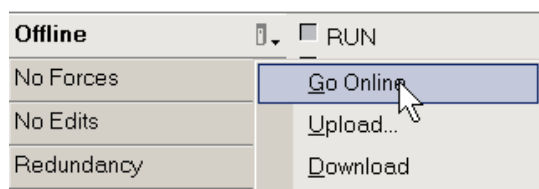
2. In the RMCT, click the Configuration tab and choose Never from the Auto-Qualification pull-down.



3. In the Synchronization tab, click Disqualify Secondary.



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

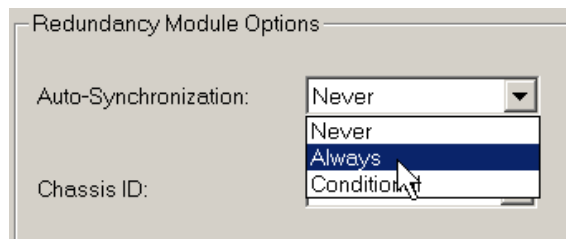


5. Use the steps described in the Logix5000 Controllers Nonvolatile Memory Programming Manual, publication [1756-PM017](#) to store the project.

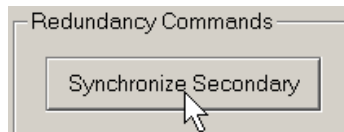
**IMPORTANT**

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

6. In the RMCT, set the Auto-Qualification parameter according to your preference.



7. Synchronize the chassis.



## Additional Resources

These documents contain additional information concerning related Rockwell Automation products.

| Resource  | Description  |
|---|--|
| ControlLogix Enhanced Redundancy System User Manual, publication 1756-UM535   | Not-yet published. This manual will provide design, installation, and troubleshooting information specific to the enhanced redundancy system.                                      |
| ControlLogix Redundancy System User Manual, publication <a href="#">1756-UM523</a>  | Provides design, installation, and troubleshooting information specific to the standard redundancy system.   |
| FactoryTalk Batch PhaseManager User's Guide, publication <a href="#">BATCHX-UM010</a>   | 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.          |
| PhaseManager User Manual, publication <a href="#">LOGIX-UM001</a>   | This manual provides details about using PhaseManager software and includes details about tags associated with the PHASE data type.  |
| Rockwell Automation's Technical Support Knowledgebase, available at <a href="http://www.rockwellautomation.com/knowledgebase/">http://www.rockwellautomation.com/knowledgebase/</a> | Provides details about how to assemble and mount the controller, how to upgrade firmware, and controller technical specifications.   |
| ProcessLogix and ControlLogix System Redundancy Module Installation Instructions, publication <a href="#">1757-IN092</a>  | Contains information on how to install the 1757-SRM, Series B ProcessLogix and ControlLogix System Redundancy Module into the ProcessLogix or ControlLogix Redundant chassis pair. |
| ControlFLASH Firmware Upgrade Kit Quick Start, publication <a href="#">1756-QS105</a>   | Contains information on how to upgrade module firmware.  |
| ControlLogix Controllers User Manual, publication <a href="#">1756-UM001</a>  | Contains information on how to install, configure, program, and operate a ControlLogix system.   |
| Product Certifications website, <a href="http://ab.com">http://ab.com</a>   | Provides declarations of conformity, certificates, and other certification details.  |
| ProcessLogix and ControlLogix System Redundancy Module Installation Instructions, publication <a href="#">1757-IN092</a>  | Contains information on how to install the 1757-SRM, Series B ProcessLogix and ControlLogix System Redundancy Module into the ProcessLogix or ControlLogix Redundant chassis pair. |
| ControlLogix Redundancy System User Manual, publication <a href="#">1756-UM523</a>  | Contains information about ControlLogix redundancy systems and media.  |

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



# Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At <http://support.rockwellautomation.com>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

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

## Installation Assistance

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

|                       |  |
|-----------------------|--|
| United States         | 1.440.646.3434<br>Monday – Friday, 8 a.m. – 5 p.m. EST   |
| Outside United States | Please contact your local Rockwell Automation representative for any technical support issues. |

## New Product Satisfaction Return

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

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

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### Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Publication 1756-RN650C-EN-E - February 2010

Supersedes Publication 1756-RN650C-EN-E - June 2009

PN-67344

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