



ControlLogix Controllers Revision 13

Cat. No. 1756-L1, -L1M1, -L1M2, -L1M3, -L55, -L55M12, -L55M13, -L55M14, -L55M16, -L55M22, -L55M23, -L55M24, -L61, -L62, -L63

IMPORTANT

- Do not use this revision of firmware in a redundant controller system (ControlLogix Redundancy system).
- If you have a 1756-L55 controller, you must install a memory board. For more information, see the *ControlLogix Controller and Memory Board Installation Instructions*, publication 1756-IN101.

When to Use These Release Notes

These release notes correspond to the following revisions of the ControlLogix family of controllers:

Controller:	Catalog number:	Revision:
ControlLogix@5550	1756-L1, -L1Mx	13.34
ControlLogix@5555	1756-L55, -L55Mxx	13.34
ControlLogix@5561	1756-L61	13.44
ControlLogix@5562	1756-L62	13.44
ControlLogix@5563	1756-L63	13.44

These release notes include the changes and corrected anomalies of earlier revisions of 13.x firmware.

Compatible Revisions

To use this controller revision, update your system as follows:

Update this:	To this revision or later:
1756-HYD02 module	13.2
1756-M02AE module	13.2
1756-M02AS module	13.6
1756-M03SE module	13.7
1756-M08SE module	13.7
1756-M16SE module	13.7

Update this:	To this revision or later:
RSlinx® software	2.42
RSLogix™ 5000 software	13.0
RSNetWorx™ for ControlNet™ software	4.21
RSNetWorx™ for DeviceNet™ software	4.21
RSNetWorx™ for EtherNet/IP software	4.21

What Is In These Release Notes

These release notes provide the following information:

For information about:	See this section:	On this page:
preliminary actions to take before you use this revision	Before You Update Your System	2
new features for ControlLogix controllers	Enhancements	3
changes to existing features in ControlLogix controllers	Changes	7
restrictions that no longer apply to ControlLogix controllers	Corrected Anomalies	9
restrictions for ControlLogix controllers	Restrictions	17
additional memory required to update to this revision	Additional Memory Requirements	21

Before You Update Your System

Before you update your controller to this revision, do the following preliminary actions:

If:	Then:						
You have a 1756-L55M23 or -L55M24 controller.	<p>See if all three of these conditions apply to the controller:</p> <ul style="list-style-type: none"> • Is the firmware revision of the controller 9.x or earlier? • Does the nonvolatile memory of the controller contain a project? • Is the <i>Load Image</i> property of the nonvolatile memory set to <i>On Power Up</i> or <i>On Corrupt Memory</i>? <p>If you answered yes to <i>all</i> of the questions, do the following <i>before</i> you update the firmware of the controller:</p> <ol style="list-style-type: none"> 1. In the <i>Load Image</i> drop-down list, select <i>User Initiated</i>. 2. Store the project to the nonvolatile memory of the controller. <p>Other Load Image selections cause the update of the controller to fail. (You are able to successfully update the controller the second time.)</p>						
Your controller meets <i>both</i> of these conditions: <ul style="list-style-type: none"> • It has nonvolatile memory. • It is currently at revision 11.x or earlier. 	<p>Take these precautions:</p> <table border="1"> <thead> <tr> <th>If the controller:</th> <th>Then:</th> </tr> </thead> <tbody> <tr> <td><i>does not</i> use a CompactFlash card</td> <td>Save the project to an offline file. When you update the firmware of the controller, you erase the contents of the nonvolatile memory (revision 10.x or later).</td> </tr> <tr> <td>uses a CompactFlash card</td> <td> <p>Either:</p> <ul style="list-style-type: none"> • Remove the CompactFlash card from the controller. • Check the <i>Load Image</i> option of the CompactFlash card. If it is set to <i>On Power Up</i> or <i>On Corrupt Memory</i>, first store the project with the <i>Load Image</i> option set to <i>User Initiated</i>. <p>Otherwise, you may get a major fault when you update the firmware of the controller. This occurs because the <i>On Power Up</i> or <i>On Corrupt Memory</i> options cause the controller to load the project from nonvolatile memory. The firmware mismatch after the load then causes a major fault.</p> </td> </tr> </tbody> </table>	If the controller:	Then:	<i>does not</i> use a CompactFlash card	Save the project to an offline file. When you update the firmware of the controller, you erase the contents of the nonvolatile memory (revision 10.x or later).	uses a CompactFlash card	<p>Either:</p> <ul style="list-style-type: none"> • Remove the CompactFlash card from the controller. • Check the <i>Load Image</i> option of the CompactFlash card. If it is set to <i>On Power Up</i> or <i>On Corrupt Memory</i>, first store the project with the <i>Load Image</i> option set to <i>User Initiated</i>. <p>Otherwise, you may get a major fault when you update the firmware of the controller. This occurs because the <i>On Power Up</i> or <i>On Corrupt Memory</i> options cause the controller to load the project from nonvolatile memory. The firmware mismatch after the load then causes a major fault.</p>
If the controller:	Then:						
<i>does not</i> use a CompactFlash card	Save the project to an offline file. When you update the firmware of the controller, you erase the contents of the nonvolatile memory (revision 10.x or later).						
uses a CompactFlash card	<p>Either:</p> <ul style="list-style-type: none"> • Remove the CompactFlash card from the controller. • Check the <i>Load Image</i> option of the CompactFlash card. If it is set to <i>On Power Up</i> or <i>On Corrupt Memory</i>, first store the project with the <i>Load Image</i> option set to <i>User Initiated</i>. <p>Otherwise, you may get a major fault when you update the firmware of the controller. This occurs because the <i>On Power Up</i> or <i>On Corrupt Memory</i> options cause the controller to load the project from nonvolatile memory. The firmware mismatch after the load then causes a major fault.</p>						

If:	Then:
Your controller is close to its limits of memory.	<p>This revision <i>may</i> require more memory than previous revisions.</p> <ul style="list-style-type: none"> • To see what components of your current project require more memory, see page 21. • RSLogix 5000 software revision 13.0 or later lets you estimate the memory requirements of the controller offline. See page 5. <p>To upgrade to this revision, you may have to add an expansion memory card to the controller or use a larger memory card.</p>
Your controller is connected to a DH-485 network.	Disconnect it from the DH-485 network <i>before</i> you update the firmware of the controller. If you update the firmware of a controller while it is connected to a DH-485 network, communication on the network may stop.

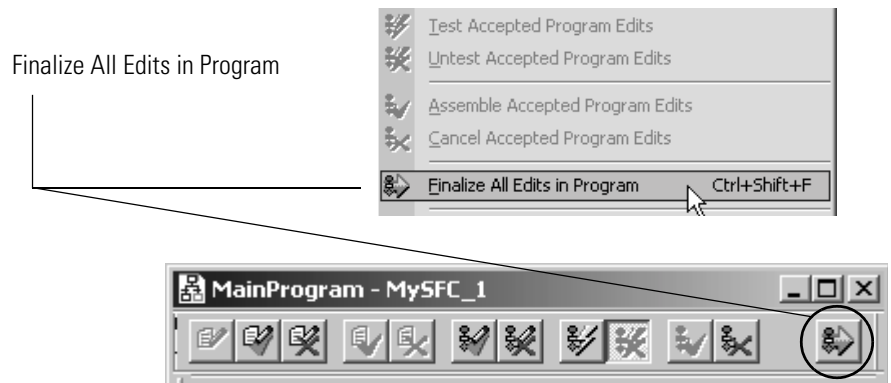
Enhancements

ControlLogix5561, ControlLogix5562, ControlLogix5563 Rev 13.40

Enhancement:	Description
Series B of these controllers: <ul style="list-style-type: none"> • ControlLogix5561 • ControlLogix5562 • ControlLogix5563 	<p>What's new about series B controllers?</p> <p>With Series B controllers, you:</p> <ul style="list-style-type: none"> • get to the CompactFlash card from the front of the controller • have longer battery life <p>See <i>Maintain the Battery of a ControlLogix Series B Controller</i>, publication 1756-AP014, for details.</p> <p>Important: Use <i>only</i> a 1756-BA2 battery in a series B controller.</p> <p>Are there any new precautions?</p> <p>Take these precautions with CompactFlash cards:</p> <ol style="list-style-type: none"> 1. Put the keyswitch in the PROG position before you insert a card. Do this for any card except one that you know is blank. <p>Suppose you insert a card that already has a project that is configured to load on power up. If a power cycle happens before you store another project, the card loads the earlier project and firmware into the controller. It's also possible that the controller starts running the project.</p> 2. Make sure that you hold the CompactFlash latch to the left before you remove the card. If you push the eject button without moving the latch out of the way, it's possible to damage the CompactFlash socket. <p>Which firmware do I use for my series B controllers?</p> <p>You <i>must</i> use revision 13.40 or later firmware for series B controllers.</p> <p>Do I use the same firmware for both series A and series B controllers?</p> <p>Yes. You use the same firmware for series A and series B of ControlLogix5561, ControlLogix5562, ControlLogix5563 controllers.</p>

Revision 13 of ControlLogix controllers contains the following new features:

Enhancement:	Description:
Online Edits of Sequential Function Charts (SFC) and Structured Text (ST)	This revision lets you perform online editing of Sequential Function Chart (SFC) and Structured Text (ST) routines. Like the Function Block Diagrams (FBD), online editing of SFC and ST routines is done at a routine level.
Finalize All Edits in a Program	The <i>Finalize All Edits in Program</i> option lets you make an online change to your logic <i>without</i> testing the change.



When you choose *Finalize All Edits in Program*:

- All edits in the program (pending and test), immediately download to the controller and begin execution.
- The original logic is permanently removed from the controller.
- Outputs that were in the original logic stay in their last state unless executed by the new logic (or other logic).
- If your edits include an SFC:
 - The SFC resets to the initial step.
 - Stored actions turn off.

Motion Calculate Slave Value (MCSV) Instruction	<p>Use the MCSV instruction in the following applications:</p> <ul style="list-style-type: none"> • Position cam: electronic camming between two axes according to a specified cam profile • Time cam: electronic camming of an axis as a function of time, according to a specified cam profile <p>The MCSV instruction returns the slave value within a specified cam profile for a given master value. The master value can be master position or time. Use that information to re-synchronize motion after a fault or to calculate dynamic phase corrections.</p>
---	---

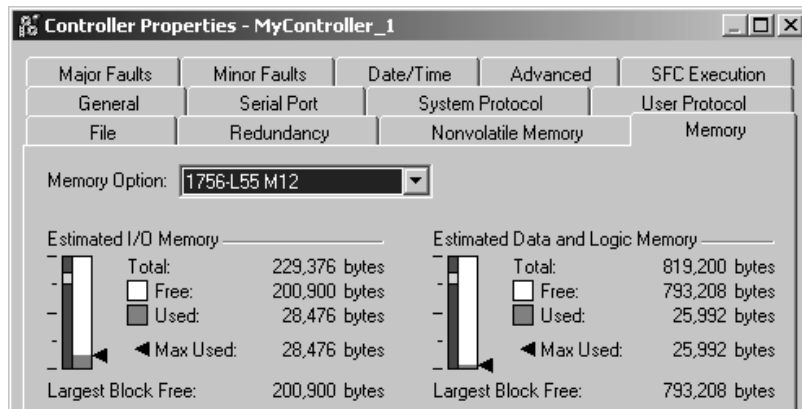
Enhancement:

Estimate Memory Information Offline
View Memory Information Online

Description:

To estimate how much controller memory your project requires, use the *Memory* tab of the controller properties dialog box. For each of the memory areas of your controller, it lets you estimate number of bytes of:

- free (unused) memory
- used memory
- largest free contiguous block of memory



When online with a controller, the *Memory* tab shows the actual memory usage of the controller. The tab includes a *Max Used* entry for each type of memory. The *Max Used* values show the peak of memory usage as communications occur.

Improved Performance of Simple Structured Text Statements

The controller now executes simple structured text (ST) assignments and comparisons faster than previous revisions.

For this:	This is simple:	This is NOT simple:
assignment	A := B;	A := -B; A := B + C; A := sin(B);
comparison (=, <, <=, >, >=, <>)	A > B A = B	A > -B A > (B + C) A > sin(B)

Embedded EDS Support

ControlLogix controllers now include their electronic data sheet (EDS) file as part of their firmware. This lets RSNetWorx software 5.x or later upload and register the EDS file directly from the controller. In *previous* revisions, you had to find the file on a CD or a web site and manually install the EDS file.

Enhancement:	Description:						
For Some Non-Recoverable Faults, the Controller Produces a Major Fault and May Be Able to Log Diagnostic Information.	If the controller detects a non-recoverable fault that was <i>not</i> caused by its hardware, the controller now responds as follows:						
	<table border="1" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">If the controller:</th> <th style="text-align: left;">Then:</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> has a CompactFlash socket <ul style="list-style-type: none"> • ControlLogix5561 • ControlLogix5562 • ControlLogix5563 </td> <td style="vertical-align: top;">The controller clears the project from its memory and produces a major fault (flashing red OK LED)</td> </tr> <tr> <td style="vertical-align: top;"> has <i>no</i> CompactFlash socket <ul style="list-style-type: none"> • ControlLogix5550 • ControlLogix5555 </td> <td style="vertical-align: top;">The controller <i>initially</i> shows a solid red OK LED. After you cycle power to the controller, it produces a major fault (flashing red OK LED).</td> </tr> </tbody> </table>	If the controller:	Then:	has a CompactFlash socket <ul style="list-style-type: none"> • ControlLogix5561 • ControlLogix5562 • ControlLogix5563 	The controller clears the project from its memory and produces a major fault (flashing red OK LED)	has <i>no</i> CompactFlash socket <ul style="list-style-type: none"> • ControlLogix5550 • ControlLogix5555 	The controller <i>initially</i> shows a solid red OK LED. After you cycle power to the controller, it produces a major fault (flashing red OK LED).
If the controller:	Then:						
has a CompactFlash socket <ul style="list-style-type: none"> • ControlLogix5561 • ControlLogix5562 • ControlLogix5563 	The controller clears the project from its memory and produces a major fault (flashing red OK LED)						
has <i>no</i> CompactFlash socket <ul style="list-style-type: none"> • ControlLogix5550 • ControlLogix5555 	The controller <i>initially</i> shows a solid red OK LED. After you cycle power to the controller, it produces a major fault (flashing red OK LED).						

In either case, the controller still clears the project from memory. The fault code that it displays depends on whether you have installed a CompactFlash card in the controller.

Type	Code	Cause	Recovery Method
1	60	For a controller with <i>no</i> CompactFlash card installed, the controller: <ul style="list-style-type: none"> • detected a non-recoverable fault • cleared the project from memory 	<ol style="list-style-type: none"> 1. Clear the fault. 2. Download the project. 3. Change to remote run/run mode. If the problem persists: <ol style="list-style-type: none"> 1. Before you cycle power to the controller, record the state of the OK and RS232 LEDs. 2. Contact Rockwell Automation support. See the back of this publication.
1	61	For a controller with a CompactFlash card installed, the controller: <ul style="list-style-type: none"> • detected a non-recoverable fault • wrote diagnostic information to the CompactFlash card • cleared the project from memory 	<ol style="list-style-type: none"> 1. Clear the fault. 2. Download the project. 3. Change to remote run/run mode. If the problem persists, contact Rockwell Automation support. See the back of this publication.

In *previous* revisions:

- The controller would *not* go to faulted mode or display a fault code for the type of situation described above.
- Controllers with a CompactFlash socket showed a solid red OK LED.

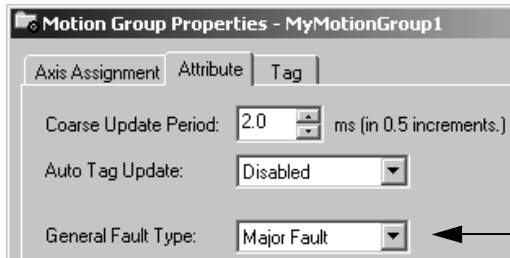
Changes

Changes are organized by the firmware revision in which the change occurred:

ControlLogix5550 Rev 13.27

ControlLogix5555 Rev 13.27

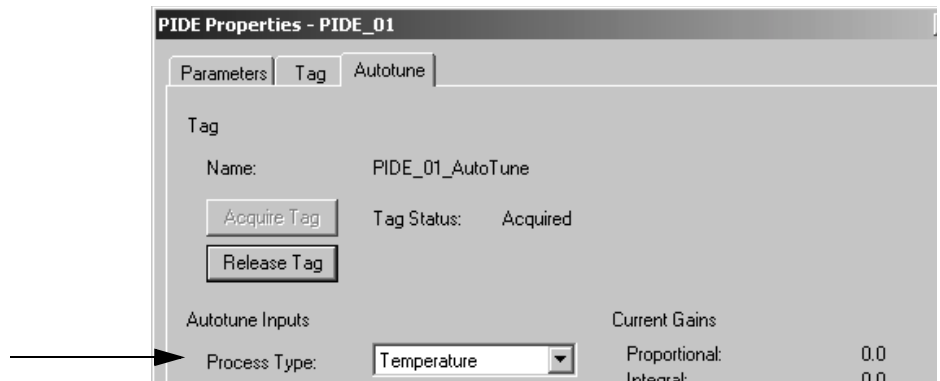
ControlLogix5561, 5562, 5563 Rev 13.28

Change:	Description:
In a Message (MSG) Instruction, You <i>Cannot</i> Set or Clear Certain Status Bits.	<p>Do not set or clear the following members of a Message (MSG) instruction:</p> <ul style="list-style-type: none"> • EW • ER • DN • ST • Flags <p>Important: If your logic currently manipulates any of the above members of a MSG instruction, your controller <i>may</i> operate differently when you update to this revision. If you set or clear one of those bits, RSLogix 5000 software displays the change. But the MSG instruction ignores the change and continues to execute based on the internally-stored value of those bits.</p>
Motion Planner No Longer Waits for Consumed Data to Start Flowing	<p>The motion planner now begins execution immediately, regardless of whether or not it is receiving data via a consumed axis.</p> <p>In previous revisions, a consumed axis caused the motion planner to delay its execution until data started flowing from the producing controller. Under the following <i>combination</i> of circumstances, the motion task of the controller failed to start at all:</p> <ul style="list-style-type: none"> • The system included 2 ControlLogix controllers in the same chassis. • Each controller produced an axis for the other controller. <p style="text-align: right;">Lgx00031365</p>
For Function Block Instructions That Use Periodic Timing, DeltaT Now Includes the Fractional Portion of the Task's Period.	<p>If your function block instruction uses the periodic timing mode, the controller <i>no longer</i> truncates the fractional portion of a task's period to produce the delta time (DeltaT).</p> <p>In <i>previous</i> revisions, the controller truncated the fractional portion of the task's period.</p> <p style="text-align: right;">Lgx00036282</p>
While in Program Mode, a Motion Group Fault No Longer Produces a Major Fault	<p>As an option, you can configure a motion group to produce a <i>major fault</i> any time the group detects a motion fault.</p>  <p>With this revision, a motion group that is configured to produce a major fault produces a major fault <i>only</i> if the controller is in run/remote run mode.</p> <p>In <i>previous</i> revisions, the motion group could produce a major fault while the controller was in program/remote program mode. For example, a store to nonvolatile memory interrupts the execution of the motion planner, which produces a fault.</p> <p style="text-align: right;">Lgx00036957</p>

Change:	Description:
Out-of-Range Subscript No Longer Produces a Fault During Prescan	<p data-bbox="597 289 1463 348">During prescan, the controller automatically clears any faults due to an array subscript that is beyond the range of the array (out of range).</p> <p data-bbox="597 363 1068 390">In <i>previous</i> revisions, this produced a major fault.</p>

Lgx00040220

AutoTune Now Uses a Non-Integrating Process Model for Temperature Processes	<p data-bbox="597 441 1409 531">When you autotune an Enhanced PID (PIDE) function block with the Process Type = Temperature, autotune now uses a non-integrating process model to estimate tuning constants. This gives better tuning constants for most application.</p>
---	---



In previous revisions, autotune used an integrating process model.

Lgx00041638

You <i>Must</i> Place a Label (LBL) Instruction At the Start of a Rung.	<p data-bbox="597 1060 1463 1150">If your logic includes a Label (LBL) instruction, make sure the instruction is the first instruction on the rung. If it is <i>not</i>, move the LBL instruction to the beginning of the rung. Otherwise, the routine will <i>not</i> verify.</p> <p data-bbox="597 1152 1463 1245">In <i>previous</i> revisions, RSLogix 5000 software let you place the LBL instruction elsewhere on the rung. But the controller always executed the instruction as if it were at the beginning of the rung.</p>
---	--

Lgx00042691

Reduction in the Prescan Time of Projects with Many Jump to Subroutine (JSR) Instructions	<p data-bbox="597 1291 1446 1350">During a prescan, the controller no longer prescans a routine more than once. Once it prescans a routine, the controller does not prescan the routine again during that prescan.</p> <p data-bbox="597 1365 1446 1455">In <i>previous</i> revisions, the controller would prescan a routine as often as it was called in logic. For projects with many calls to subroutines, this could produce a very long prescan and cause a watchdog timeout fault.</p>
---	---

Lgx00043977

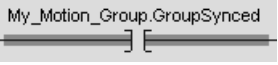
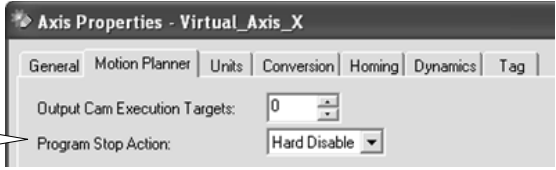
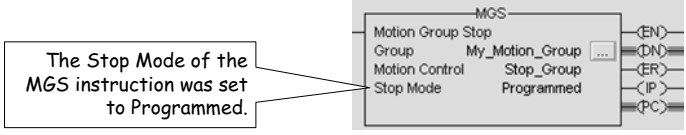
Corrected Anomalies

The corrected anomalies are organized by the firmware revision that corrected them.

ControlLogix5550 Rev 13.34

ControlLogix5555 Rev 13.34

ControlLogix5561, 5562, 5563 Rev 13.44

Corrected anomaly:	Description:
GroupSynched Bit Didn't Reset After a Power Cycle	<p>The GroupSynched bit of the motion group stayed on after a power cycle instead of turning off until the motion group was synchronized again.</p> 
	Lgx00049320
MSG Read of User Defined Structure Greater Than 500 Bytes Did Not Return Any Data	<p>A MSG read of a user defined structure that contained more than 500 bytes should have read some data before determining that the structure was too large.</p>
	Lgx00050774
MGS Instruction with Hard Disable Didn't Stop a Virtual Axis	<p>A Motion Group Stop (MGS) instruction didn't stop a virtual axis under these conditions:</p>  <p>The virtual axis was set to Hard Disable.</p>  <p>The Stop Mode of the MGS instruction was set to Programmed.</p>
	Lgx00050853
Large MSG Instructions	<p>This revision of ControlLogix firmware adds more stringent range checks when reading to or writing from tags. This could cause some MSG instructions that worked in previous firmware revisions to not work in this revision of firmware.</p> <p>For example, use a CIP Generic MSG instruction to perform a Get Attribute Single service. The attribute is 4 bytes in length. Assume the destination tag is an INT data type (2 bytes in length). In previous releases of firmware, the MSG instruction places the first 2 bytes of the attribute in the destination tag. In this revision of firmware, the MSG instruction errors because the destination tag is not large enough. To correct this error, change the destination tag to a DINT data type.</p>
Large SLC Typed Write MSG Instructions	<p>This revision of ControlLogix firmware limits the maximum packet size of SLC typed write MSGs to 216 bytes. Previously, these messages had a maximum size of 224 bytes. This could cause some MSG instructions that worked in previous firmware revisions to not work in this revision of firmware.</p>
	Lgx00052949

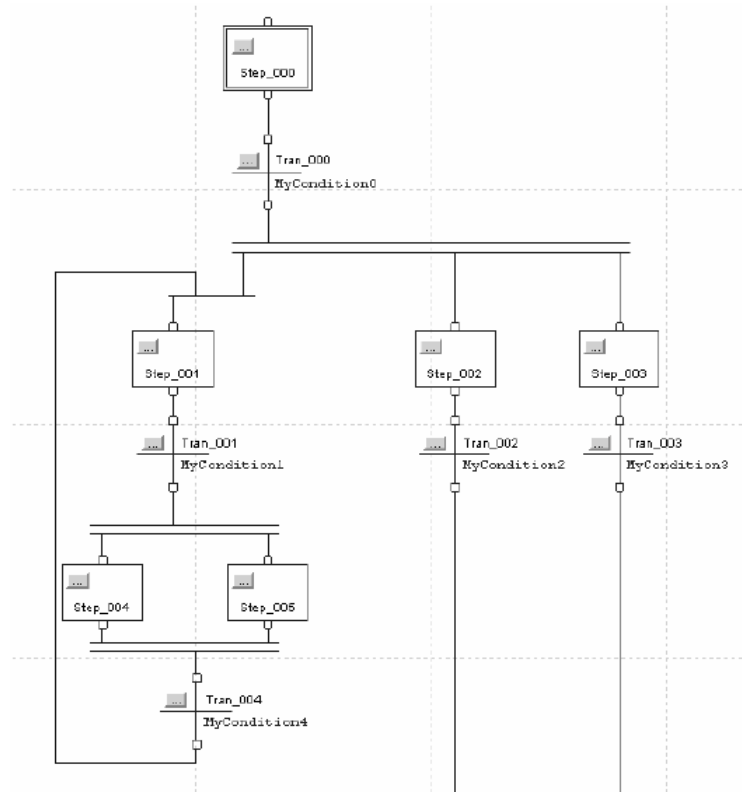
Corrected anomaly:	Description:
Programmatic Change of MSG Status Bits Could Cause the MSG to Appear Remain Active (.EN Set)	If you programmatically reset the .DN or .ER bits of a MSG due to the asynchronous nature of the MSG, the MSG could appear to remain active (.EN set). In fact, the MSG was not active. The MSG required manual intervention to trigger it to execute again. This firmware revision removes the need for manual intervention to trigger the MSG to execute again. Lgx00053112
Unexpected Motion Happened as soon as You Turned on an Axis	An axis moved as soon as you turned it on if you did this sequence of actions: <ol style="list-style-type: none"><li data-bbox="646 533 1295 558">1. You turned off the axis with a Motion Servo Off (MSF) instruction.<li data-bbox="646 577 1295 602">2. You started another move while the MSF was still in process.<li data-bbox="646 621 1325 646">3. You turned the axis back on by a Motion Servo On (MSO) instruction. When this happened: <ul style="list-style-type: none"><li data-bbox="646 705 1463 764">• The axis started the commanded move as soon as you turned it back on by the MSO instruction.<li data-bbox="646 783 1325 808">• You couldn't stop the axis with a Motion Axis Stop (MAS) instruction. This happened because the controller kept the move command that you gave it while it was turning off the axis. The controller did the move the next time you turned that axis back on. Lgx00054654

Corrected anomaly:

An SFC Could Execute the Wrong Step

Description:

If you had an SFC with nested simultaneous branches, the controller could begin execution at an unexpected step. Following the convergence of a nested simultaneous branch, if the SFC looped back to the initial step of the parent branch, instead of executing that step, the SFC could jump to a step of another path in the nested simultaneous branch. For example:



Execution starts at Step_000. When Tran_000 becomes true, Step_001, Step_002 and Step_003 should become active. However, because the nested simultaneous branch in the left path converged and looped back to its parent step (Step_001), the active steps were actually **Step_005**, Step_002 and Step_003.

Lgx00054785

The File Search Compare (FSC) Instruction Caused a Non-Recoverable Fault

The FSC instruction caused a non-recoverable fault if both these conditions occurred:

- a major fault was declared from within the expression of an FSC instruction
- the user fault routine cleared the fault

When the user fault routine attempted to recover, information previously saved was not properly restored, which resulted in corrupted system registers and a non-recoverable fault.

Lgx00055522

CONCAT Instruction Generated Minor Fault When the Length of the Data Equaled the Maximum Characters Allowed for the String

The CONCAT instruction incorrectly generated a minor fault (Type 4, Code 51) when the length of the data was equal to the maximum number of characters allowed for the string data type.

Lgx00056558

Corrected anomaly:

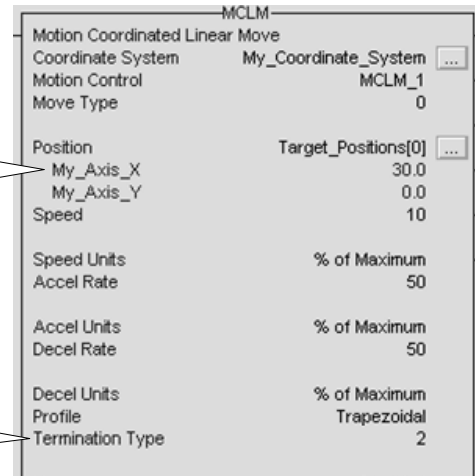
Description:

MCLM Instruction Sometimes Caused an Extra Revolution When an Axis Was Near Its Unwind Position

Sometimes a Motion Coordinated Linear Move (MCLM) instruction moved an axis an extra revolution under these conditions:

The axis was rotary. The move was blending with another MCLM instruction across the unwind position.

Termination Type was 2 or 3.



This happened because of internal round-off in the floating point calculations.

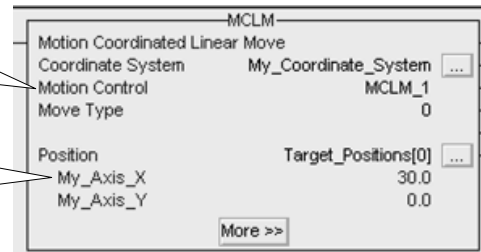
Lgx00057176

MCLM Instruction Moved an Axis That Was Already at the Target Position

A Motion Coordinated Linear Move (MCLM) instruction moved an axis a full revolution under these conditions:

The Move Type was absolute.

An axis was rotary and it was already at the target position.



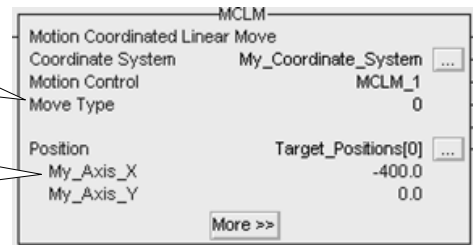
Lgx00057177

MCLM Instruction Did Not Error with a Target Position Less Than -360°

A Motion Coordinated Linear Move (MCLM) instruction did not error under these conditions:

The Move Type was absolute.

An axis was rotary and its target position was less than -360°



Lgx00057179

*ControlLogix5561, 5562, 5563 Rev 13.40***Corrected anomaly:**

Save to CompactFlash Did Not Complete Properly

Description:

Saving a project to CompactFlash did not always complete. The LEDs on the controller would continue to flash until you cycled power.

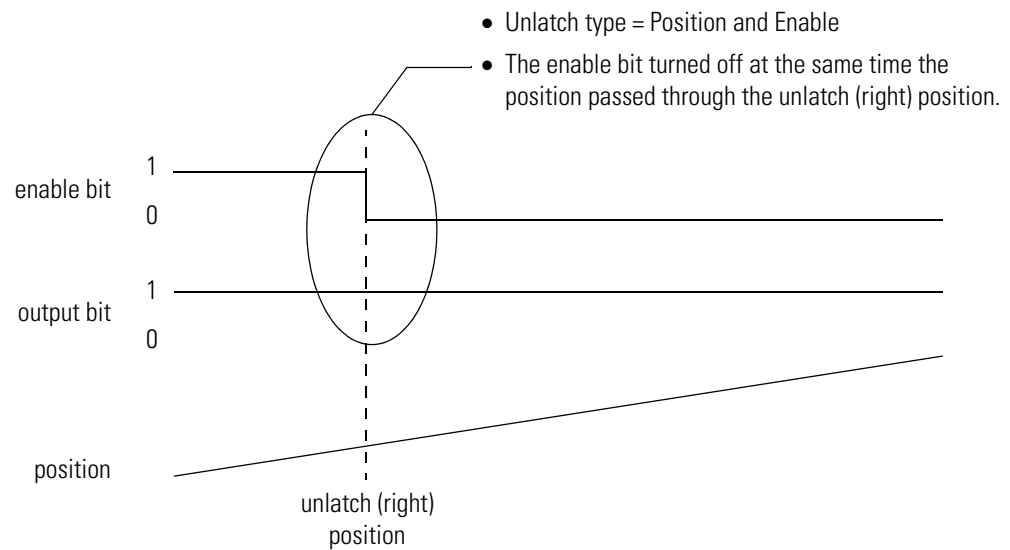
Lgx00047687, Lgx00047577

*ControlLogix5561, 5562, 5563 Rev 13.36***Corrected anomaly:**

MAOC Instruction Left Output Bit On When Enable Bit Turned Off

Description:

Under the following conditions, the Motion Arm Output Cam (MAOC) instruction left the output bit on when the bit should have turned off.



Lgx00048145

Some 1756-L63 Controllers Reported the Wrong Memory Size Information

Some 1756-L63 controllers reported the wrong memory size information. This does not affect most customers. However, if you use the controller in a redundant system, both controllers must report the same information so that the controllers can synchronize.

The controller firmware now checks to make sure the correct memory information is reported.

Lgx00049895

ControlLogix5550 Rev 13.31
ControlLogix5555 Rev 13.31
ControlLogix5561, 5562, 5563 Rev 13.35

Corrected anomaly:	Description:
A Non-Recoverable Fault Occurred When You Attempted to Run More Than 7 Trends	A non-recoverable fault (memory clear) occurred when you attempted to run an 8th trend. This occurred because the controller could not allocate the required system resources.
	Lgx00046058
Certain Conditions Could Generate an Unknown Major Fault When a Motion Axis Fault Occurred	Under these conditions, RSLogix 5000 software displayed an unknown major fault after an axis fault occurred: <ul style="list-style-type: none"> • UID/UIE instruction in an event, periodic, or continuous task • the motion group is configured to trigger major faults in response to axis faults • fault handler routine responds to axis faults and clears the axis fault code • an axis fault occurs while the user task is in the UID section of code
	Lgx00046070
Loss of UID/UIE Behavior if a Fault Routine Executed	The controller uses an internal count to keep track of nesting UID/UIE instructions. When a UID is scanned, the count increments by one; when a UIE is scanned, the count decrements by one. The count is set to zero when a program completes execution. If a fault routine executed when the UID/UIE count was not zero, at the end of the fault routine, the controller set the UID/UIE count back to zero. Control was returned to the program with interrupts enabled when they should still be disabled.
	Lgx00046070
Memory Allocations for HMI OPC Applications Were Made in I/O Memory Rather Than Data and Logic Memory	For HMI OPC applications, memory normally allocated to "Data and Logic" memory was being allocated to "I/O" memory. This could cause the controller to run out of I/O memory where in previous versions it did not. This could also cause messaging and other HMI OPC applications to not respond or time out. This did not affect I/O based connections.
	Lgx00047148
Backplane Errors Caused Loss of Input Data	Errors that occur for certain backplane-noise conditions caused the data being received by the controller to stop flowing into the data table of the controller. The controller did not detect when this happened and the connection status and I/O LED indicators still indicated that everything was working.
	Lgx00047199
Subroutines Invoked from SFC Actions Were Not Properly Postscanned	A subroutine invoked from an SFC action was not properly postscanned when the SFC was configured for automatic reset. Instructions and assignments may not have set their data to postscan values. For example, an Output Energize (OTE) instruction may not have cleared its data during postscan.
	Lgx00047407
In SFCs Configured for Auto Reset, Stored Actions Were Not Properly Postscanned	When an SFC was configured for Automatic Reset and an Action used a stored qualifier (S, SD, SL, DS), when a reset action (R) executed, the action being reset was not postscanned.
	Lgx00047935

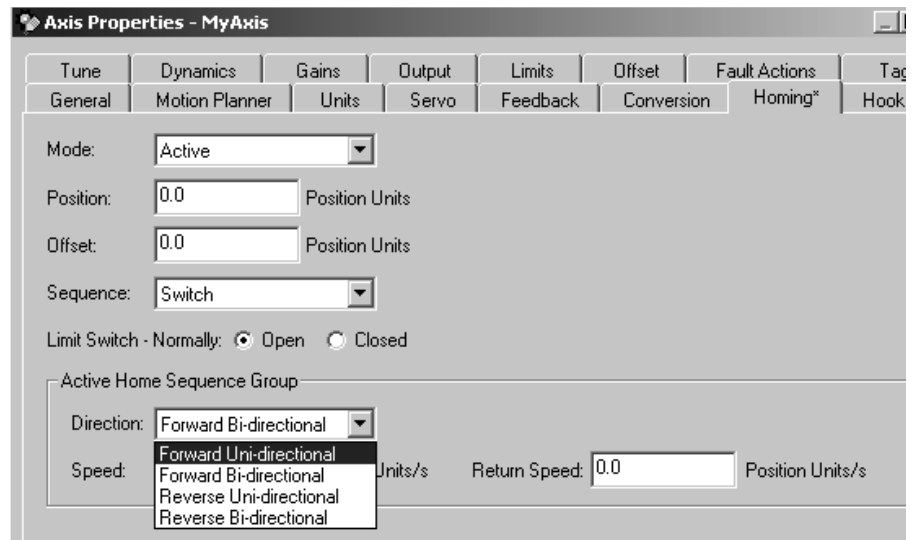
ControlLogix5550 Rev 13.27
ControlLogix5555 Rev 13.27
ControlLogix5561, 5562, 5563 Rev 13.28

Corrected anomaly:**Description:**

Uni-Directional Homing Failed to Complete

A Motion Axis Home (MAH) instruction sometime failed to complete (IP bit remained on) under the following axis configuration:

- Return Speed = 0
- uni-directional homing (forward or reverse)



Lgx00032632

Unconditional MDR Instruction Did Not Re-Execute

A Motion Disarm Registration (MDR) instruction failed to repeatedly execute under the following circumstances:

- You placed the MDR instruction in a structured text routine.
- You did *not* provide any conditions to control the execution of the instruction. (I.e., you programmed it to execute continuously.)

In those circumstances, the EN bit might have been left on after the first execution and the instruction *no* longer executed again.

Important: In structured text, we recommend that you condition the instruction so that it only executes on a transition.

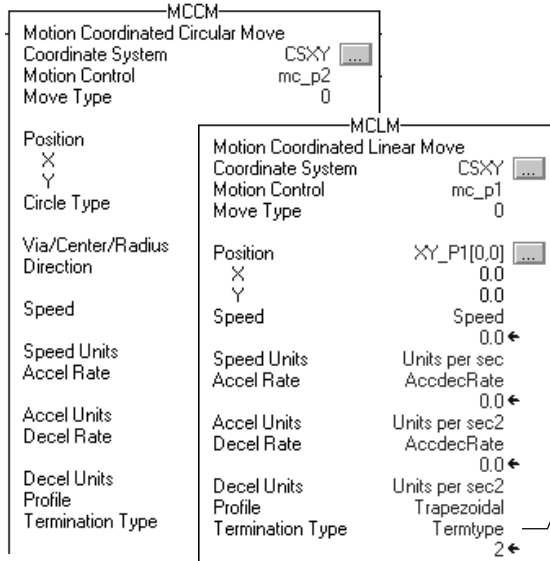
Lgx00037634

Corrected anomaly:

Description:

Blended Moves Produce Smoother, More Accurate Motion

This revision improves the response of the axes when you blend the execution of Motion Coordinated Linear Move (MCLM) and Motion Coordinated Circular Move (MCCM) instructions.



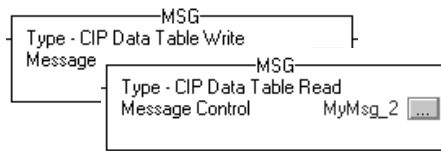
- If the Termination Type = command tolerance (2) or no decel (3), axes change more smoothly and follow the intended path more closely.
- If the Termination Type = command tolerance (2) or no decel (3) and the program path direction is reversed, the instruction will exceed the specified acceleration/deceleration for the MCLM or MCCM instruction.

Termination Type
 0 = actual tolerance
 1 = no settle
 2 = command tolerance
 3 = no decel

Lgx00038048, Lgx00041461

Large Message (MSG) Instructions Might Have Caused a Non-Recoverable Fault

The following configuration of a Message (MSG) instruction might have produced a non-recoverable fault:



- Message type = CIP Data Table Read or Write
- The instruction transferred > 240 bytes.
- Communication was through the serial port.

When the controller experiences a non-recoverable fault, it clears the project from memory.
 Lgx00040892

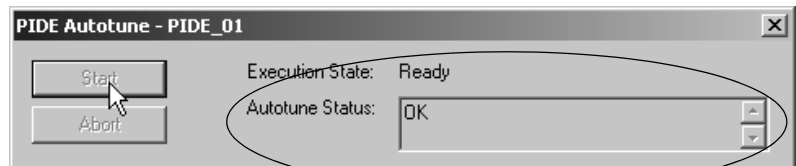
During Power Up, the Controller Erroneously Showed a Red I/O LED.

During power up, the controller sometimes showed a flashing red I/O LED when there was no problem

Lgx00040151

AutoTune Produced Unnecessary Warnings

When you completed an autotune of an Enhanced PID (PIDE) function block instruction, the Autotune Status field sometimes showed warning messages that were incorrect (did not apply).



Lgx00041613

Corrected anomaly:	Description:
Ramp/Soak (RMPS) Instruction Failed to Initialize to the Correct Mode	<p>On download, a Ramp/Soak (RMPS) Instruction now initializes to Operator Manual mode unless some other mode is requested.</p> <p>In <i>previous</i> revisions, the instruction failed to initialize to the correct mode. This lack of initialization could have caused the RMPS instruction to ignore the soak time for the first ramp/soak segment.</p> <p style="text-align: right;">Lgx00043665</p>
Remote Output Module Momentarily Dropped Its Connection	<p>The following <i>combination</i> of circumstances occasionally caused an output module to drop its connection to the controller and then re-establish the connection:</p> <ul style="list-style-type: none"> • The module was in a remote chassis. • The module used a <i>Rack Optimization</i> communication format. • The controller also executed a Message (MSG) instruction that bridged across the backplane of that same remote chassis to another communication module. <p>Occurred most frequently if the MSG instruction was <i>not</i> cached.</p> <p style="text-align: right;">Lgx00043674</p>
Non-recoverable Fault Occurred when Motion Speed Set to Zero	<p>A non-recoverable fault occurred on some motion moves when the speed was set to zero. This occurred because planning calculations divided by 0.</p> <p style="text-align: right;">Lgx00045079</p>

Restrictions

ControlLogix5550 Rev 13.34

ControlLogix5555 Rev 13.34

ControlLogix5561, 5562, 5563 Rev 13.44

Restriction:	Description:
Moving a Full Circle Using the MCCM Instruction	<p>To move a full circle in a 2-axis coordinate system, set the Direction operand of the Motion Coordinate Circular Move (MCCM) instruction to either:</p> <ul style="list-style-type: none"> • 2 (CWF - Clockwise Full) • 3 (CCWF - Counterclockwise Full) <p>Don't try to move a full circle by setting Direction = 0 (CW) or 1 (CCW) and setting the start and end points equal or nearly equal. This may give you a small arc of nearly 0° instead of a full circle of nearly 360°. This happens because of internal round-off in the floating point calculations.</p> <p style="text-align: right;">Lgx00057178</p>

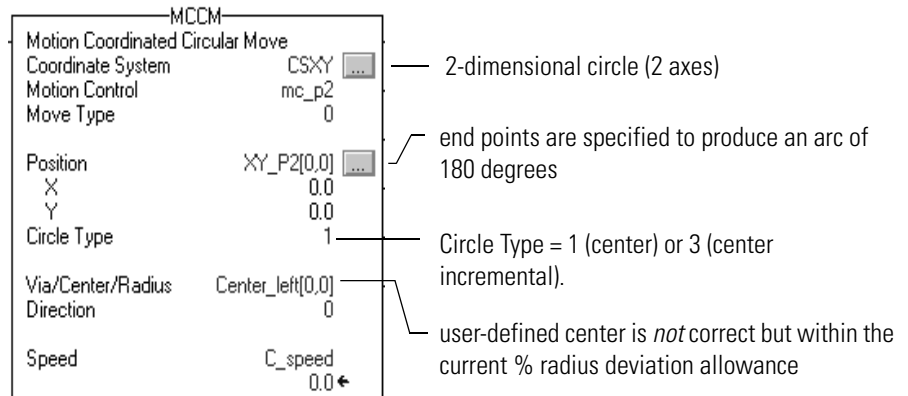
This revision of ControlLogix controllers has the following restrictions:

Restriction:

In Circular Center Programming Mode, a Motion Coordinated Circular Move (MCCM) Instruction May Fail to Reach the Specified End Point of a 180 Degree Arc If the Circle Center Is Miss-Programmed.

Description:

If you configure a Motion Coordinated Circular Move (MCCM) instruction as shown below, the instruction may *not* produce a move to the specified end points.



To work around this restriction, enter the correct circle center.

Lgx00044813

1756-L55M16 controllers—Guidelines for the Size of Routines

You *cannot* download a project that has very large routines to a 1756-L55M16 controller. During the download, RSLogix 5000 software indicates that the controller is out of memory. (While online, you may be able to create a very large routine, but once offline you will be unable to download the project.)

To avoid creating routines that are too large, take these precautions:

- Limit the number of rungs in a routine to less than 2500. (Use a series of smaller routines.)
- If you are entering a large number of rungs in a routine, do this offline.
- As you enter rungs, periodically download the project. If the project successfully downloads, then your routines are within limits.

Restriction:

In a Tag of a User-Defined Data Type, an Instruction May Write Past the End of an Array.

Description:

If you write too much data to an array that is within a user-defined data type, some instructions write beyond the array and into other members of the tag.

Example 1: Instruction Stops at the End of the Array

```

COP
Copy File
Source MyTag_1[0]
Dest MyTag_2[0]
Length 10
  
```

If the length is greater than the number of elements in the destination array...

Program Tags - MainProgram1		
Scope:	MainProgram1	Show: Sh
Tag Name	Type	
[-] MyTag_2	DINT[5]	
[+] MyTag_2[0]	DINT	
[+] MyTag_2[1]	DINT	
[+] MyTag_2[2]	DINT	
[+] MyTag_2[3]	DINT	
[+] MyTag_2[4]	DINT	
[+] MyTag_3	DINT	

...the instruction stops at the end of the array.

Example 2: Instruction Writes Beyond the Array

```

COP
Copy File
Source MyTag_1.A[0]
Dest MyTag_2.A[0]
Length 10
  
```

If the length is greater than the number of elements in the destination array...

Program Tags - MainProgram		
Scope:	MainProgram	Show: Sho
Tag Name	Type	
[-] MyTag_2	My_Data_Type	
[+] MyTag_2.A	DINT[5]	
[+] MyTag_2.B	DINT	
[+] MyTag_2.C	DINT	
[+] MyTag_3	DINT	

...the instruction writes data beyond the end of the array into other members of the tag. Regardless of the length specified for the instruction, it stops writing if it reaches the end of the tag.

The following instructions write beyond the array into other members of the tag:

BSL	FBC	LFL
BSR	FFL	LFU
COP	FFU	SQL
CPS	FLL	SRT
DDT	GSV	SSV

This restriction also applies to *all previous revisions*.

To prevent writing beyond the limits of the destination array, make sure the length operand of the instruction is less than or equal to the number of elements in the array.

Lgx00033747

Restriction:

Blended Path Contour May Deviate Beyond the Confines of the Programmed Path

Description:

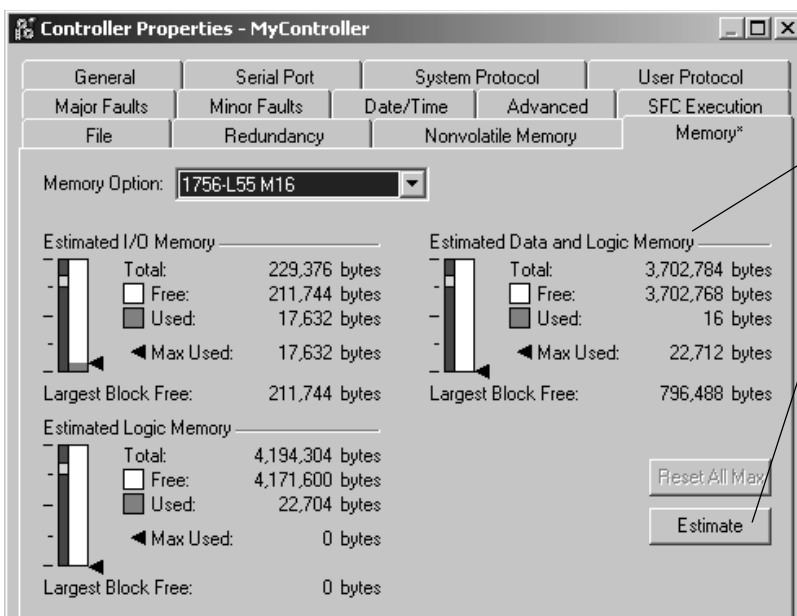
In some very unique circumstances, when either changing velocity profile types or having drastically different acceleration and/or deceleration values on the two moves comprising a blended contour, the resultant blended path contour may deviate beyond the confines of the programmed path.

Lgx00045400

1756-L55M16 controllers—3.5M Byte Limit of Tags

You *cannot* download a project that has more than 3.5M bytes of tags to a 1756-L55M16 controller. During the download, RSLogix 5000 software indicates that the controller is out of memory.

To stay within the 3.5M byte limit, use the Memory tab of the Controller Properties window.:



In general, the data and logic memory represents the 3.5M byte limit for tags.

As you develop your project, periodically go to this tab and click the *Estimate* button.

Keep your used memory within the green area. Once the used memory is in the yellow, the controller *may not* have enough memory for runtime communication.

For a detailed description of how the controller organizes its memory, see *Logix5000 Controllers Common Procedures*, publication 1756-PM001.

Additional Memory Requirements

Revision 13.0 or later *may* require more memory than previous revisions (e.g., 10.x, 11.x). To estimate the additional memory that your project *may* require, use the following table:

Table 1 Additional memory requirements when you convert a project to revision 13 (Sheet 1 of 2)

If you have this firmware revision (add <i>all</i> that apply):	Then add the following memory requirements to your project:		Which comes from this type of memory:		
	Component	Increase per instance	I/O (base)	Data and Logic (expansion)	
12.x or earlier	I/O module with a comm format = <i>Rack Optimization</i>	90 bytes		✓	
	I/O module with a comm format = something other than <i>Rack Optimization</i> (i.e., direct connection)	144 bytes		✓	
	CompactLogix 1769 I/O module	170 bytes		✓	
	bridge module with a comm format = <i>None</i>	160 bytes		✓	
	bridge module with a comm format = <i>Rack Optimization</i>	220 bytes		✓	
11.x or earlier	tag that uses the MOTION_INSTRUCTION data type	4 bytes		✓	
	tag for an axis				
	If the data type is:	And the tag is:			
	AXIS_CONSUMED	⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒	264 bytes	✓	
	AXIS_SERVO	produced for another controller	264 bytes	✓	
		<i>not</i> produced for another controller	264 bytes		✓
	AXIS_SERVO_DRIVE	produced for another controller	288 bytes	✓	
		<i>not</i> produced for another controller	288 bytes		✓
	AXIS_VIRTUAL	produced for another controller	264 bytes	✓	
		<i>not</i> produced for another controller	264 bytes		✓
	output cam execution targets	648 bytes		✓	
	user-defined data type: <ul style="list-style-type: none"> number of user-defined data types in the controller organizer ⇒ Data Types folder ⇒ User-Defined folder <i>not</i> the use of that data type in tags 	128 bytes		✓	
indirect address (using a tag as the subscript for an array in an instruction, e.g., Array_A[Tag_B]). This memory change applies <i>only</i> if the array: <ul style="list-style-type: none"> uses a structure as its data type does <i>not</i> use one of these data types: CONTROL, COUNTER, PID, or TIMER has only one dimension (e.g., UDT_1[5]) 	(-60 bytes)		✓		

Table 1 Additional memory requirements when you convert a project to revision 13 (Sheet 2 of 2)

If you have this firmware revision (add <i>all</i> that apply):	Then add the following memory requirements to your project:			Which comes from this type of memory:		
	Component	Increase per instance	I/O (base)	Data and Logic (expansion)		
10.x or earlier	project for a ControlLogix5555 controller	1200 bytes		✓		
	project for a ControlLogix5563 controller	1200 bytes	✓			
	programs	12 bytes		✓		
	routines	16 bytes		✓		
9.x or earlier	project for a ControlLogix5550 controller	1200 bytes	✓			
	tag that uses the MESSAGE data type	376 bytes		✓		
8.x or 9.x	produced or consumed axis	(-21.6K bytes)	✓			
	axis that <i>is not</i> produced or consumed	(-21.6K bytes)		✓		
8.x or earlier	output cam execution targets	5,404 bytes		✓		
	motion group	32 bytes		✓		
7.x or earlier	project	1050 bytes	✓			
	tags	0.55 bytes		✓		
	messages that: <ul style="list-style-type: none"> • transfer more than 500 bytes of data <i>and</i> • target a controller in the same chassis This memory is allocated only when the MSG instruction is enabled. To estimate, count the number of these messages that are enabled and/or cached at one time.	2000 bytes	✓			
6.x or earlier	base tags	24 bytes			✓	
	alias tags	16 bytes			✓	
	produced and consumed tags	Data type	Bytes per tag			
		DINT	4	12 bytes	✓	
		REAL	4	12 bytes	✓	
				3 x bytes per tag	✓	
		3 x bytes per tag	✓			
6.x	routines	68 bytes			✓	
5.x or earlier	routines	116 bytes			✓	

ControlLogix is a trademark of Rockwell Automation.

ControlNet is a trademark of ControlNet International, Ltd.

DeviceNet is a trademark of the Open DeviceNet Vendor Association.

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using our 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 with a hardware module 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 module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell tests all of our 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:

United States	Contact your distributor. You must provide a Customer Support case number (see 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 return procedure.

www.rockwellautomation.com

Corporate Headquarters

Rockwell Automation, 777 East Wisconsin Avenue, Suite 1400, Milwaukee, WI, 53202-5302 USA, Tel: (1) 414.212.5200, Fax: (1) 414.212.5201

Headquarters for Allen-Bradley Products, Rockwell Software Products and Global Manufacturing Solutions

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

Europe: Rockwell Automation SA/NV, Vorstlaan/Boulevard du Souverain 36-BP 3A/B, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Headquarters for Dodge and Reliance Electric Products

Americas: Rockwell Automation, 6040 Ponders Court, Greenville, SC 29615-4617 USA, Tel: (1) 864.297.4800, Fax: (1) 864.281.2433

Europe: Rockwell Automation, Brühlstraße 22, D-74834 Elztal-Dallau, Germany, Tel: (49) 6261 9410, Fax: (49) 6261 17741

Asia Pacific: Rockwell Automation, 55 Newton Road, #11-01/02 Revenue House, Singapore 307987, Tel: (65) 351 6723, Fax: (65) 355 1733

Publication 1756-RN603F-EN-E - September 2005

Supersedes Publication 1756-RN603E-EN-E - November 2004

PN 957974-44

Copyright © 2005 Rockwell Automation, Inc. All rights reserved. Printed in the U.S.A.