Allen-Bradley

ControlLogix Controllers, Revision 18

ControlLogix Controllers Catalog Numbers 1756-L73, 1756-L75

IMPORTANT After upgrading the firmware on your module, we strongly recommend that you **retest your application offline before going online.**

About This Publication

This publication describes anomalies (corrected and known), and restrictions for ControlLogix controllers, revision 18.

Cat. No.	Major and Minor Firmware Revision No.
1756-L73	18.12
1756-L75	

Compatible Versions of Software

To use firmware revision 18.12, these minimum software versions are required.

Software	Required Version
RSLinx Classic	2.56 (CPR 9, SR2)[1]
RSLinx Enterprise	5.21(CPR 9, SR2)
RSLogix 5000	18.00 (CPR 9, SR2)
RSNetWorx for ControlNet	10.00 (CPR 9, SR2)
RSNetWorx for DeviceNet	
RSNetWorx for EtherNet/IP	

(1) RSLinx Classic communication software, version 2.56, is the minimum required version. However, we recommend that you use version 2.57, when available, for optimal performance.

Before You Begin

Before you upgrade your firmware, consider the following.

IMPORTANT Loss of communication or power during a controller firmware flash upgrade may result in the controller rejecting the new firmware. If the controller firmware upgrade fails due to the conditions described, these corrective actions may be required:

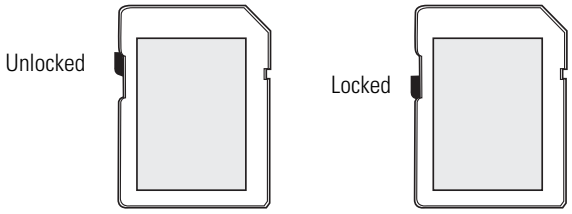
- Cycle controller power and successfully complete the flash upgrade.
- If a nonrecoverable fault occurs, then return the controller for factory repair.

Before Updating 1756-L7*x* Controllers

Before you begin updating your 1756-L7*x* controller, check the status of your Secure Digital (SD) card.

If your SD card is	Then
Unlocked	You can successfully update the firmware to the intended revision.
Locked and the Load Image option is set to On Power Up	You should unlock the SD card before beginning the update. If the card is locked when you attempt to update the firmware, the update fails and the controller reverts to the firmware revision already stored on the SD card.

Figure 1 - SD Card - Unlocked and Locked



Corrected Anomalies

This table describes anomalies corrected with firmware revision 18.12.

Table 1 - Corrected Anomalies with Firmware Revision 18.12

Corrected Anomaly	Description
Displacement between Actual Positions on Produced and Consumed Axes	When a 1756-L7*x* controller is configured for rotary operation and produces axes that other controllers consume, the consumed actual position was not tracking the consumed commanded position and manifested itself via two anomalous behaviors. The actual position appeared to have a small constant displacement in comparison to commanded position and would also exceed the expected unwind value. **IMPORTANT** This anomaly occurs only when the 1756-L7*x* producing the axes is configured for rotary operation. You could work around this anomaly in one of the following ways: • If the produced axes were commanded axes, and it was acceptable in your application, you could reference the consumed axes' Commanded Position. • If the produced axes were virtual axes, you could reference the consumed axes' Commanded Position. This option would work for all applications. Lgx00111591, Lgx00111473

Known Anomalies

This table describes known anomalies that have been identified with firmware revision 18.12.

Table 2 - Known Anomalies with Firmware Revision 18.12

Known Anomaly	Description
Shutdown Fault Overrides Drive State Change	A Shutdown fault action issued by the controller overrides the drive state change only when the drive state change is reported as Disable. Lgx00109658, Lgx00106420
Executing a Motion Axis Home (MAH) Instruction Results in Unexpected Movement	In an application where the Homing Sequence attribute of the Homing Configuration is set to 'Active Unidirectional Home with Switch' and the Home Switch bit is active (that is, the Home Switch is closed if normally open, or open if normally closed), then executing a Motion Axis Home (MAH) instruction results in a move that is inversely-proportional to the commanded position value. For example, if the commanded position was specified as -2 before the MAH instruction was executed, then the motor moves to +2. This anomaly may occur when the Home Direction attribute is set to forward or reverse. In addition, it may also occur when the Home Switch bit is set to be normally open or normally closed. To keep this anomaly from occurring, program to test for the state of the home input before initiating a home command. If the state is active and true or inactive and true, use a Motion Access Jog (MAJ) instruction to move the axis off the switch or wait to initiate the home command until the switch is no longer active. Once the home input is no longer active, the MAH instruction can be executed successfully. Lgx00109660, Lgx00108517
A Certain Homing Configuration and Execution of a Motion Axis Home (MAH) Instruction Causes Unexpected Motor Movement	With the home switch active and the homing configuration set to 'Active Reverse Bidirectional Home', either with or without the marker, then executing a Motion Axis Home (MAH) instruction causes the motor to move in the opposite direction at the return speed you defined. The move continues until the switch is deactivated and the marker is found. Once the switch is deactivated and the marker is found, the MAH instruction is identified as complete. To keep this anomaly from occurring, program to test for the state of the home input before initiating a home command. If the state is active and true or inactive and true, use a Motion Access Jog (MAJ) instruction to move the axis off the switch or wait to initiate the home command until the switch is no longer active. Once the home input is no longer active, the MAH instruction can be executed successfully. Lgx00109661, Lgx00108519
Executing a Motion Axis Move (MAM) or Motion Coordinated Linear Move (MCLM) Instruction Can Cause a Major Nonrecoverable Fault	If a Motion Axis Move (MAM) or Motion Coordinated Linear Move (MCLM) instruction is executed on a Coordinate System that contains the source axes configured in a Motion Coordinated Transform (MCT) instruction that is also being executed (that is, while the target axes are moving and the transformations are active), then a Major Nonrecoverable Fault (MNRF) occurs. To work around this anomaly, set the Transform Dimension of the Coordinate System that contains the source axes to a value >0. This keeps the MNRF from occurring. Lgx00109662, Lgx00108920
Break in Connection between Controller and CIP-enabled Device Causes Invalid Data	In an application that uses CIP motion, you can enable certain tags to monitor the performance of a connection between a ControlLogix controller and a CIP-enabled device, such as a Kinetix 6500 Single Axis Ethernet Drive. For example, the following tag is one through which you can monitor connection status: [Device Name]:S.LostControllerToDriveTransmissions If the physical connection between the controller and the device breaks, for example, because a 1756-EN2T module is disconnected from the network, the data in tags that are enabled to monitor connection status is no longer updated. When you physically reconnect the controller to the device, the data resumes updating in the enabled tags. However, the data in those tags is invalid. Follow these steps to work around this anomaly. 1. Physically reconnect the controller to the device. 2. Cycle power to the controller's chassis or redownload the program from RSLogix 5000 programming software to the controller. Lgx00111385, Lgx00110902

Table 2 - Known Anomalies with Firmware Revision 18.12

Known Anomaly	Description
CIP Axes Continue Moving after Losing CST Master	CIP axes do not stop, as expected, after losing the CST master in an application with these conditions: • A ControlLogix SynchLink module, that is, 1756-SYNCH module, is the CST master in the chassis that contains the controller that is commanding CIP motion. • CIP axes are running. • Precision Time Protocol (PTP) remains synchronized despite the loss of the CST master. **IMPORTANT**: If the CST master is the same module as the PTP master, CIP axes stop as expected. Also, regardless of conditions, any time the CST master is lost, SERCOS and analog axes stop as expected. Lgx00110467, Lgx00109725
Add-On Instruction Stops a Master Control Reset (MCR) Zone from Working	A Master Control Reset (MCR) zone does not work properly after an Add-On Instruction is added. You can work around this anomaly so that the MCR zone works properly. Remove the Add-On Instruction from the MCR zone by repositioning it before or after the MCR zone and by adding to its own conditional logic. For more information about this anomaly, see the Technical Note titled MCR Zones Containing AOI's May Not Scan Rungs as False in Certain Firmware Revisions #68915, in the Technical Support Knowledgebase (available at http://www.rockwellautomation.com/knowledgebase/). Lgx00111328, Lgx00110876
PI Function Block Stops Executing	PI function block appears to stop executing as the output does not change and no instruction faults are logged. If the PI instruction is being used in Linear mode, this floating-point equation is used to calculate the ITerm. $$Kp \times Wld \times \frac{WldInput + WldInput_{n-1}}{2} \times DeltaT + ITerm_{n-1}$$ Due to the use of the single-precision floating point values, it may be possible, depending on the values of WLD and KP, for the ITerm value to be small enough, less than 0.0000001, to be lost when adding to the $ITerm_{n-1}$. For more information regarding the PI instruction, see the Logix5000 Controllers Process Control and Drives Instructions User Manual, publication 1756-RM006. Lgx00070832
Buffer Timeout Changes Do Not Take Effect as Expected	Changes made to the Buffer Timeout value for FactoryTalk Alarms and Events subscribers do not take effect until the existing buffer has been deleted. The FactoryTalk Alarms and Events alarm buffer (stored in Logix controller memory) is designed to persist through power cycles. If you change the Buffer Timeout value (via the Communication Setup dialog box in FactoryTalk View SE software), the controller does not use the new timeout value until the existing buffer is deleted and then recreated. To force recreation of this buffer, you can do one of the following: • Re-download the project to the controller. • Disconnect the FactoryTalk Alarms and Events subscriber and leave it disconnected until the existing timeout expires. Lgx00069461
Unsuccessful MSG Execution Causes Issues	Unsuccessful MSG execution results in subsequent unsuccessful messages in master/slave controller configurations. When a DF-1 serial connection is used between a master and slave controller, a MSG instruction is not successfully executed and an in-polling sequence error occurs if the master station address is not listed in the poll node list. However, with this anomaly, after the in-polling sequence error, subsequent MSG instructions are also unsuccessful. To workaround this anomaly, change the master controller's station address to a different value or re-execute the unsuccessful MSG instruction in Master Transmit mode and use the Between Station Polls parameter. Lgx00083882, Lgx00082610

Table 2 - Known Anomalies with Firmware Revision 18.12

Known Anomaly	Description
Absolute Feedback Offset Results in Feedback Fault	If you issue an Absolute Feedback Offset it results in a Feedback Fault. If you issue an Absolute Feedback Offset via an SSV instruction on the 1756-M02AS module, the result is a feedback fault. The feedback fault occurs regardless of whether feedback is on or off. Lgx00076298
Motion Axis Move (MAM) May Overshoot Endpoint	Under some rare occurrences, if a Motion Axis Move (MAM) instruction with Merge Enabled is activated during the deceleration segment of an active MAM instruction then the new MAM instruction **may** overshoot its programmed endpoint. The occurrence of the overshoot depends on these factors: • The original MAM instruction's remaining travel distance at the time of the merge and the new MAM instruction's remaining travel distance. • The relationship of the decel jerk of the new MAM instruction to the decel jerk of the original MAM instruction. • If the original MAM instruction is decelerating. Typically, the overshoot does not occur. If **either** of these conditions exist, you will avoid the overshoot. • The new MAM instruction is programmed with Merge Disabled. If there is no other motion active at the time of the merge, then the Merge Disable results in the same operation as the Merge Enable. • The new MAM instruction has a slightly higher jerk (in Units/sec3) than the original MAM instruction. You should note, though, lower value of jerk in% of time results in higher value of jerk (in Units/sec3). Lgx00078822
Execution of Motion Group Shutdown Reset (MGSR) and Motion Group Shutdown (MGSD) Result in Error	If a Motion Group Shutdown Reset (MGSR) instruction is executed while a Motion Group Shutdown (MGSD) is still executing, motion error #7, that is, Shutdown State Error, results. The purpose of an MGSR instruction is to bring an axis group out of the shutdown state. However, when the scenario described in the previous paragraph exists, the MGSR instruction is not executed because the shutdown procedure, initiated by the MGSD instruction, has precedence. Thus, the MGSR instruction generates motion error #7 because the shutdown procedure has not completed. The shutdown procedure must complete before any attempt to reset the shutdown. Lgx00095484
Disabling One CIP Axis in a Multi-axis System Causes Error	With any coordinated move in a system that uses two or more CIP axes, if one axis is disabled by using a Motion Servo Off (MSF) instruction, any remaining CIP axes will generate an Excessive Velocity Error, that is, Drive Error S55. Important: This anomaly affects **only** CIP axes. Lgx00105360
DriveEnableStatus Bit Set Incorrectly	Only in a program that is configured with Stop mode set to Fast Disable, the axis status bit 'DriveEnableStatus' is set to **true** for one coarse update after a Motion Group Stop (MGS) instruction transitions to the Process Complete (.PC) state. The axis status bit **should be false** when the MGS instruction transitions to the .PC state but **remains true**. You may need to delay initiation of other motion instructions until the enable status has cleared. Lgx00106782
Command Update Delay Offset Does Not Affect CIP Axis	The Command Update Delay Offset feature is typically used with generic SERCOS drives that have different dynamic responses. The feature aligns the command position for each drive to compensate for the different dynamic responses. The Command Delay Compensation Offset parameter for each drive is adjusted as needed. However, the Command Update Delay Offset feature does not affect a CIP axis. An SSV instruction of 'CommandUpdateDelayOffset' on a CIP axis is accepted but has no effect on the Command Delay Compensation Offset feature. Even though the axis attributes can be modified, the instruction execution does not alter the command position of a CIP axis. Lgx00107320

Table 2 - Known Anomalies with Firmware Revision 18.12

Known Anomaly	Description
.ACCEL and .DECEL Motion Status Bits Operate Differently	In RSLogix 5000 programming software, version 18.00 and Logix controller, firmware revision 18.11, the .ACCEL and .DECEL Motion status bits operate differently than in RSLogix 5000 programming software, version 17.*x* because the axis status bits of the consumed axis are recalculated instead of reusing the axis status bits of the producer axis. Lgx00107454
Real Time Axis Attribute VelocityFeedback Can Contain Incorrect Value	**IMPORTANT** This anomaly occurs only in SERCOS applications that use Kinetix SERCOS drives and linear motors. Under certain conditions, it is possible that the Real Time Axis attribute VelocityFeedback contains an incorrect value. The inaccuracy is the result of incorrect scaling of that attribute. Your program will have an incorrect value for the VelocityFeedback attribute if you follow these steps. 1. While offline, you write your RSLogix 5000 program and, as part of that program, the VelocityFeedback attribute is selected. 2. You save the program and download it to the controller. 3. You go online. The VelocityFeedback attribute value is incorrect because that attribute was enabled before the program was saved, downloaded and put online. Workaround - To avoid this anomaly, do not enable the VelocityFeedback attribute until the RSLogix 5000 program is online. Lgx00107793

Restrictions

This table describes restrictions that have been identified with firmware revisions 18.12.

Restrictions with Firmware Revision 18.12

Restriction	Description
Firmware Upgrade to Multiple Modules	Do not upgrade the firmware for more than one module at a time through the USB port of the controller. Lgx00105374
Optimal External Access Tag Attributes Use	Use RSLinx Classic communication software, version 2.56 or later(1), and RSLinx Enterprise communication software, version 5.21 or later, for best results with the new External Access tag attributes provided with RSLogix 5000 programming software, version 18, and controller firmware revision 18.11. Using earlier versions of RSLinx Classic and RSLinx Enterprise software may result in anomalous behavior from the data servers with the External Access options Read Only and None. For more information about tag data access attributes, see the Logix5000 Controllers I/O and Tag Data Programming Manual, publication 1756-PM004. Lgx00103263
Update EtherNet/IP Modules' Firmware Revision	With the use of the CIP Sync time synchronization feature, made available with controller firmware revision 18.*x*, if one of the ControlLogix EtherNet/IP modules listed below is used in the controller's chassis, we recommend that you update the firmware of **all** your EtherNet/IP modules in the chassis to major revision 3.*x*. This restriction applies to these ControlLogix EtherNet/IP modules: • 1756-EN2T • 1756-EN2TF • 1756-EN2TR • 1756-EN3TR If the ControlLogix EtherNet/IP modules in the chassis with the controller are not all at major revision 3.*x*, then system may change the time master and/or reductions in synchronization accuracy and system performance may result.

(1) RSLinx Classic communication software, version 2.56, is the minimum required version. However, we recommend that you use version 2.57, when available, for optimal performance.

Install the Controller Revision

To download the latest ControlLogix controllers firmware revision, go to http://www.rockwellautomation.com/support/downloads and click your desired revision. Then, use the ControlFlash utility to upgrade your controller.

Alternatively, if you have installed RSLogix 5000 programming software, version 16, and related firmware, you may not need to complete the tasks described. The AutoFlash feature of RSLogix 5000 programming software detects if your controller firmware needs upgraded upon a program download to the controller. If a firmware upgrade is necessary, AutoFlash will initiate an update.

After you have completed your firmware upgrade, you should complete these steps to verify that the upgrade was successful.

1. Cycle power to the controller.
2. Go online with the controller and view controller properties.
3. Verify that the firmware revision listed matches the firmware to which you intended to upgrade.
4. If the controller's firmware is not correct, initiate another firmware upgrade.

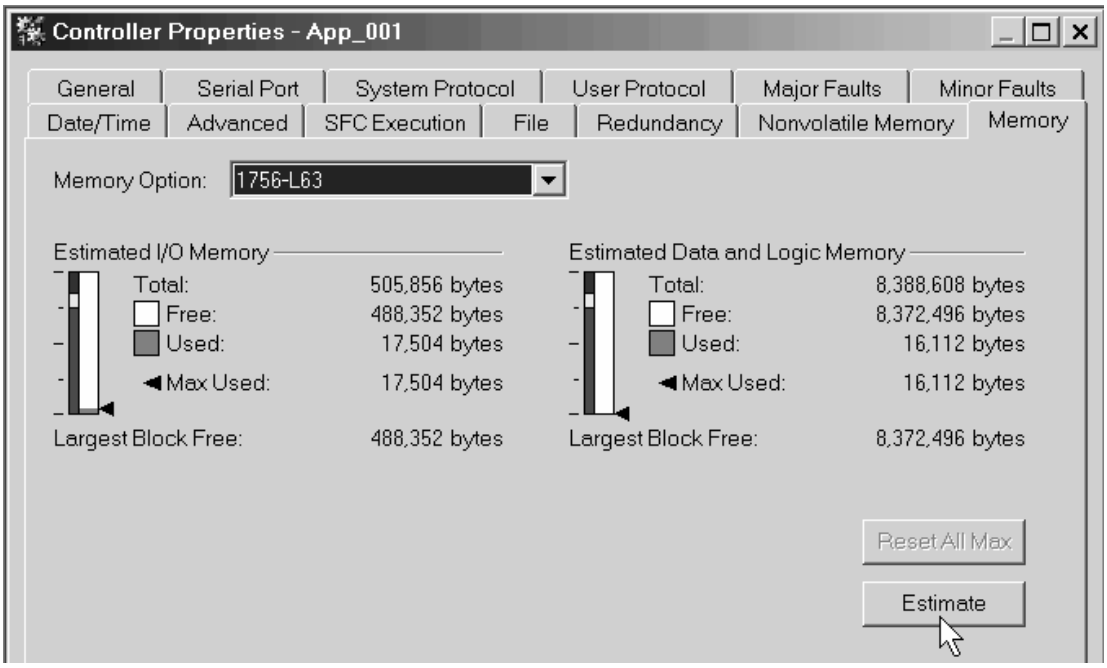
For more information about errors when completing a ControlFlash upgrade, see the ControlFlash Firmware Upgrade Kit Quick Start, publication 1756-QS105.

Additional Memory Requirements

This firmware revision may require more memory than previous revisions (for example, 10.*x*, 11.*x*). To estimate additional memory requirements for your application, you can either use the memory estimation tool provided with RSLogix 5000 programming software or the tables provided in these release notes.

Use the Estimate Tool

To estimate the amount of memory required by your application, convert the project to the controller revision desired and use the Estimate tool available in the Memory tab of the Controller Properties.



IMPORTANT When used with a 1756-L7*x* controller, the RSLogix 5000 programming software Estimate Memory tool does not provide exact memory requirement values.

You must add 1.3 KBper user task in your program to the **Max Used:** values that the Estimate Tool provides, to get an exact value.

Keep in mind, your program can contain a maximum of 32 user tasks.

Estimate Based on Application Components

If you do not have the desired version of RSLogix 5000 programming software, use this table to estimate the additional memory that your project may require.

If you are upgrading your system through multiple firmware revisions, add all components your application uses for each of the revisions you upgrade through. For example, if you are upgrading from revision 15.*x* to revision 18.*x*, total your application components for revisions 15.*x* to 16.*x*, 16.*x* to 17.*x*, and 17.*x* to 18.*x*.

Table 3 - Additional Memory Requirements per Application Component

If you upgrade from revision (add all that apply)	Then add the following memory requirements to your project		Which comes from this type of memory	
	Component	**Increase/Decrease Per Instance**	**I/O**	**Data and Logic**
17.*x* to 18.*x*	Program	+ 8 bytes		✓
	Equipment Phase	+ 20 bytes		✓
	Add-On Instruction	+ 12 bytes		✓
	Each tag In addition, if you use a tag of the types listed below, increase the memory as indicated for each instance:	+ 4 bytes		✓
	Produced tag	+ 36 bytes + (24 bytes • number of consumers)	✓	
	Consumed tag	+ 24 bytes	✓	
	Data Access Control	+ 4 bytes per symbol		✓
	Tag that uses ALARM_ANALOG data type	- 20 bytes		✓
	Tag that uses ALARM_DIGITAL data type	+ 28 bytes		✓
	Tag that uses MOTION_GROUP data type	+ 76		✓
	Tag that uses AXIS_SERVO_DRIVE or AXIS_GENERIC_DRIVE data type	+ 786 bytes		✓
	Tag that uses AXIS data type other than AXIS_SERVO_DRIVE or AXIS_GENERIC_DRIVE	+ 818 bytes		✓
	Tag that uses COORDINATE_SYSTEM data type with no transform dimensions	+ 40 bytes		✓
	Tag that uses COORDINATE_SYSTEM data type with transform dimensions	+ 100 bytes		✓
	Module input connection	+ 20 bytes		✓
	Module output connection	+ 24 bytes		✓
	Safety controller	- 8 bytes		✓
	Safety partner	- 8 bytes		✓

Table 3 - Additional Memory Requirements per Application Component

If you upgrade from revision (add all that apply)	Then add the following memory requirements to your project		Which comes from this type of memory	
	Component	**Increase/Decrease Per Instance**	**I/O**	**Data and Logic**
17.*x* to 18.*x*	For each controller (> 1K bytes change):			
	1756-L6*x*, 1756-L6*x*S, 1756-L63XT	+ 16728 bytes		✓
	1768-L4*x*, 1768-L4*x*S	+ 14448 bytes		✓
	1769-L2*x*	+ 35084 bytes	✓	
	1769-L31	+ 14740 bytes	✓	
	1769-L32C, 1756-L35CR	+ 35400 bytes	✓	
	1769-L32E, 1756-L35E	+ 35036 bytes	✓	
	1789-L10, 1789-L30, 1789-L60	+ 4992	✓	
	PowerFlex 700S 2	+ 55340 bytes	✓	
16.*x* to 17.*x*	Task	+ 4 bytes		✓
	Program	+ 4 bytes		✓
	Equipment Phase	+ 8 bytes		✓
	LD Routine	+ 12 bytes		✓
	FBD Routine	- 8 bytes		✓
	SFC Routine	+ 28 bytes		✓
	ST Routine	+ 4 bytes		✓
	Add-On Instruction	- 12 bytes		✓
	If you use a tag of the types listed below, increase the memory as indicated for each instance:			
	Produced Tag	+ [4 bytes + (4 bytes • number of consumers)]	✓	
	Consumed Tag	+ 8 bytes	✓	
	Tag that uses MESSAGE data type	+ 4 bytes		✓
	Tag that uses ALARM_ANALOG data type	- 64 bytes		✓
	Tag that uses ALARM_DIGITAL data type	- 28 bytes		✓
	Tag that uses AXIS_SERVO_DRIVE or AXIS_GENERIC_DRIVE data type	- 34 bytes (2 bytes x number of output cam execution targets)		✓
	Tag that uses AXIS data type other than AXIS_SERVO_DRIVE or AXIS_GENERIC_DRIVE	- 52 bytes (2 bytes x number of output cam execution targets)		✓
	Tag that uses COORDINATE_SYSTEM data type of 2 dimensions with 2 transform dimensions	+ 20 bytes		✓
	Tag that uses COORDINATE_SYSTEM data type of 3 dimensions with 3 transform dimensions	+ 108 bytes		✓

Table 3 - Additional Memory Requirements per Application Component

If you upgrade from revision (add all that apply)	Then add the following memory requirements to your project		Which comes from this type of memory	
	Component	**Increase/Decrease Per Instance**	**I/O**	**Data and Logic**
15.*x* to 16.*x*	If you use a tag of the types listed below, increase the memory as indicated for each instance:			
	Tag that uses ALARM_ANALOG data type (with no associated tag references)	+ 16 bytes		✓
	Tag that uses ALARM_DIGITAL data type (with no associated tag references)	+ 4 bytes		✓
	Tag that uses ALARM_ANALOG data type (if associated tags are configured for the ALARM_ANALOG tag)	+ 22 bytes + (9 x the number of configured, associated tags) + (3 x the sum of the bytes used by the data type of each of the configured associated tags) For example, an analog alarm moved to V16.03 with two Associated Tags – one DINT (4 bytes) and one STRING (88 bytes) would need to add: 22 + 9(2) + 3(92) = 316 bytes		✓
	Tag that uses the COORDINATE_SYSTEM data type	+ 132 bytes		✓
14.*x* to 15.*x*	Input module	+ 4 bytes	✓	
	If you use a tag of the types listed below, increase the memory as indicated for each instance:			
	Produced tag	+ 12 bytes	✓	
	Consumed tag	+ 4 bytes	✓	
	Tag that uses COORDINATE_SYSTEM data type	+ 748 bytes		✓
	Tag the uses any AXIS data type	+ 800 bytes		✓
	Task	+ 20 bytes		✓
	Program or equipment phase	+ 24 bytes		✓
	Routine	+ 4 bytes		✓
	Serial port	+ 1120 bytes		✓
	Project	+ 4012 bytes		✓

Table 3 - Additional Memory Requirements per Application Component

If you upgrade from revision (add all that apply)	Then add the following memory requirements to your project		Which comes from this type of memory	
	Component	**Increase/Decrease Per Instance**	**I/O**	**Data and Logic**
13.*x* to 14.*x*	If you use a tag of the types listed below, increase the memory as indicated for each instance:			
	Tag that uses the COORDINATE SYSTEM data type	+ 60 bytes		✓
	Tag that uses any AXIS data type	+ 4 bytes		✓
12.*x* to 13.*x*	Program	+ 12 bytes		✓
	Task	+ 4 bytes		✓
	User-defined data type	+ 4 bytes		✓
	I/O module	+ 16 bytes	✓ (8 bytes)	✓ (8 bytes)
	If you use a tag of the types listed below, increase the memory as indicated for each instance:			
	Produced tag	+ 8 bytes	✓	
	Consumed tag	+ 8 bytes	✓	
11.*x* to 12.*x*	I/O module with a comm format = Rack Optimization	+ 90 bytes		✓
	I/O module with a comm format = something other than Rack Optimization (such as a direct connection)	+ 144 bytes		✓
	CompactLogix 1769 I/O module	+ 170 bytes		✓
	Bridge module with a comm format = None	+ 160 bytes		✓
	Bridge module with a comm format = Rack Optimization	+ 220 bytes		✓
10.*x* to 11.*x*	User-defined data type • Number of user-defined data types in the controller organizer > Data Types folder > User-Defined folder • **Not** the use of that data type in tags	+ 128 bytes		✓
	Indirect address (using a tag as the subscript for an array in an instruction, such as an Array_A[Tag_B]). This memory change applies only if the array does the following: • Uses a structure as its data type • Does **not** use one of these data types: CONTROL, COUNTER, PID, or TIMER • Has only one dimension (such as UDT_1[5])	- 60 bytes		✓
9.*x* to 10.*x*	Program	+ 12 bytes		✓
	Routine	+ 16 bytes		✓

Table 3 - Additional Memory Requirements per Application Component

If you upgrade from revision (add all that apply)	Then add the following memory requirements to your project				Which comes from this type of memory	
	Component			**Increase/Decrease Per Instance**	**I/O**	**Data and Logic**
8.*x* to 9.*x*	If you use a tag of the types listed below, increase the memory as indicated for each instance:					
	Tag that uses the MESSAGE data type			+ 376 bytes		✓
7.*x* to 8.*x*	Project			+ 1050 bytes	✓	
	Tag			+ 0.55 bytes		✓
	Message that transfers more than 500 bytes of data and targets 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* to 7.*x*	If you use a tag of the types listed below, increase the memory as indicated for each instance:					
	Base tag			+ 24 bytes		✓
	Alias tag			+ 16 bytes		✓
	Produced tag	DINT	4	+ 12 bytes	✓	
		REAL	4	+ 12 bytes	✓	
	Consumed tag	DINT	4	+ 12 bytes		
		REAL	4	+ 12 bytes		
	Routine			+ 68 bytes		✓
5.*x* to 6.*x*	Routine			+ 116 bytes		✓

Additional Resources

These documents contain additional information.

Resource	Description
Logix5000 Controllers Common Procedures Reference Manual, publication 1756-PM001	Contains information specific to procedures related to programming your controller.
ControlLogix Controllers Revision 16 Release Notes, publication 1756-RN016	Describes anomalies and enhancements related to controller revision 16.
ControlLogix Controllers, Revision 17 Release Notes, publication 1756-RN017	Describes anomalies and enhancements related to controller revision 17.
Add-On Instruction Programming Manual, publication 1756-PM010	Explains Add-On Instructions and related features.
GuardLogix Controller Systems User Manual, publication 1756-RM093	Provides information specific to the use of GuardLogix controllers and safety program elements.
Logix5000 Controllers I/O and Tag Data Programming Manual, publication 1756-PM004	Explains I/O and tag data. It also includes information about using the Data Access Control and External Access features.
Produced and Consumed Tags Programming Manual, publication 1756-PM011	Explains produced and consumed tags and includes information about RPI Limitations and Negotiated Default features.
Logix5000 Controllers Execution Time and Memory Use Reference Manual, publication 1756-RM087	Provides calculations of execution times and memory use for Logix5000 controllers.
Logix5000 Controllers Process Control and Drives Instructions Reference Manual, publication 1756-RM006	Contains information specific to the PI instruction.
ControlFlash Firmware Upgrade Kit Quick Start, publication 1756-QS105	Contains informations about upgrading firmware and related error messages.

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