

# FlexLogix Controller, Revision 16

Catalog Number 1794-L34

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## IMPORTANT

Before updating your controller, we strongly recommend that you review information pertinent to the previous major firmware revision, revision 15, in publication [1794-RN015](#).

Firmware release notes contain material for all minor revisions subsequent to each major revision. If your controller, for example, is at revision 15.3, and not the last minor revision, 15.5, you should view all of the information for revision 15.3...15.5 before updating to revision 16.x.

FlexLogix Controller, Revision 15 Release Notes, publication 1794-RN015, are available at <http://literature.rockwellautomation.com>.

## About This Publication

This publication describes enhancements and anomalies (known and corrected) for the FlexLogix controllers, revision 16.

Information that has been added or changed since the last revision of this publication is indicated by a change bar as shown to the right of this paragraph.

In addition to information specific to the most recent firmware revision, the information from previous minor revisions is retained in these release notes.

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

For example, if you need to upgrade your controller from revision 16.01 to 16.21, all of the information specific to revisions 16.01...16.21 is applicable.

### **About Publication 1756-RN016D**

This revision of the firmware release notes, 1794-RN016D, provides updated information specific to firmware revision 16.21 for the FlexLogix controllers.

### **About Previous Publication Revisions**

Previous revisions of this publication included these controllers and firmware revisions.

<b>Pub. Revision No.</b>	<b>Catalog No.</b>	<b>Major and Minor Revision No.</b>
1794-RN016C	1794-L34	16.20
1794-RN016B	1794-L34	16.02
1794RN016A	1794-L34	16.01

Information specific to previous minor firmware revisions is retained in these release notes and is identified accordingly.

## Compatible Revisions of Software

To use controller revision 16, the following minimum software revision levels are required.

Software	Required Revision Level
RSLinx Classic	2.51
RSLinx Enterprise	4.00
RSLogix 5000	16.00 <sup>(1)</sup>
RSNetWorx for ControlNet	8.00
RSNetWorx for DeviceNet	
RSNetWorx for EtherNet/IP	

<sup>(1)</sup> Note that firmware revision 16.21 is compatible with RSLogix 5000 software, version 16.00. However, many of the corrected anomalies and restrictions described in these release notes are only available when firmware revision 16.21 is used with RSLogix 5000 software, version 16.03.

## Before You Begin

Before you upgrade your firmware, please consider the following.

### Connect Power Supplies

If you use a 1794-PS13 power supply, connect the power supply to the controller before applying ac power to the power supply. This procedure is also recommended if you use any third-party power supply.

### Firmware Upgrades

#### **IMPORTANT**

Loss of communication or power during a controller-firmware flash upgrade may result in the controller's rejection of the new firmware. If the controller firmware upgrade fails due to the conditions described, the following corrective actions may be required:

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

The following preliminary action is required before upgrading your controller firmware.

If	Then
Your controller is connected to a DH-485 network	Disconnect it from the DH-485 network before 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

The following enhancements have been made in previous controller firmware revisions.

### Enhancements Provided with Previous Firmware Revisions

Firmware Revision	Enhancement	Description
16.20	Radio Modem Protocol Support	With this revision, the DF1 Radio Modem protocol, already supported by SLC 500 and MicroLogix products, has been implemented and enabled in the ControlLogix, CompactLogix, FlexLogix, and DriveLogix controllers. Legacy and Logix5000 controllers can be mixed and can support both master and slave and store and forward configurations.
16.01	Add-On Instructions	<p>With version 16 of RSLogix 5000 programming software, you can design and configure sets of commonly used instructions to increase project consistency. Similar to the built-in instructions contained in Logix5000 controllers, these instructions you create are called Add-On Instructions. Add-On Instructions reuse common control algorithms. With Add-On Instructions, you can:</p> <ul style="list-style-type: none"> <li>• ease maintenance by animating logic for a single instance.</li> <li>• protect intellectual property with password-protected instructions.</li> <li>• reduce documentation development time.</li> </ul> <p>For more information about using Add-On Instructions, see the Logix5000 Controllers Common Procedures Programming Manual, publication <a href="#">1756-PM001</a>.</p>
	FactoryTalk Alarms and Events Features	Alarms are now 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.
	Ability to Unicast Producer/Consumer Tags on EtherNet/IP Networks	Revision 16 enables you to use RSLogix 5000 software to set Producer and Consumer tag connections to Unicast. Setting the tags to Unicast decreases the network bandwidth and simplifies Ethernet switch configuration.

## Enhancements Provided with Previous Firmware Revisions

Firmware Revision	Enhancement	Description
16.01	Logix Date Base Changed to be January 1, 1970	<p>The Logix real-time clock operates as a 64-bit binary number that counts microseconds from a fixed date. Prior to revision 16, the base date was January 1, 1972. Recent developments with the Common Industrial Protocol (CIP) specification have resulted in the selection of a different base date of January 1, 1970 by the Open DeviceNet Vendors Association (ODVA). With revision 16, the date base that Logix products use has been changed to bring it into alignment with the CIP specification. Additionally, in support of the changes to the real-time clock, several other GSV attributes were also added: LocalDateTime, TimeZoneString, ApplyDST (daylight savings time), and DSTAdjustment.</p> <p>Generally, the date and time were accessed via the GSV instruction within a Logix program by using the "DateTime" attribute, which breaks down the date and time to its various components (<math>\mu</math>sec, sec, min, hour, day, month, year). Applications that use this attribute to the real-time clock should not be impacted by this change. However, the time was also available in its 64-bit form by using the "CurrentValue" GSV attribute. A GSV to "CurrentValue" of wall clock was changed to the number of microseconds from the new base date. Any applications that interpreted the old 1972 64-bit number may now require a change.</p>
	EtherNet/IP Reduced Heartbeat	<p>The Reduced Heartbeat feature reduces the rate at which heartbeat packets are sent from a device in an I/O connection or a Produced/Consumed connection. This feature preserves bandwidth in EtherNet/IP network installations.</p> <p>The change is automatic and requires no selection. You will notice a reduction in the packets per second used on your EtherNet/IP network for several cases including all input modules and Produce/Consume tags.</p> <hr/> <p><b>IMPORTANT</b> If you upgrade your Logix controller's firmware to revision 16.x, you must also upgrade these adapters' firmware revisions to 2.003:</p> <ul style="list-style-type: none"> <li>• 1734-AENT, POINT I/O EtherNet/IP adapter</li> <li>• 1738-AENT, ArmorPoint I/O EtherNet/IP adapter</li> </ul> <p>Failure to upgrade your EtherNet/IP adapter firmware may impact your application if more than one Logix controller is connected to POINT I/O or ArmorPoint I/O modules.</p> <p>For more information on using the 1734-AENT or 1738-AENT adapters with Logix controllers that have been upgraded to firmware revision 16.x or later, see:</p> <ul style="list-style-type: none"> <li>• POINT I/O EtherNet/IP Adapter Release Notes, publication <a href="#">1734-RN002</a>.</li> <li>• ArmorPoint I/O Release Notes, publication <a href="#">1738-RN002</a>.</li> </ul>

**Enhancements Provided with Previous Firmware Revisions**

<b>Firmware Revision</b>	<b>Enhancement</b>	<b>Description</b>
16.01	System Overhead Time Slice	<p>The System Overhead Time Slice (SOTS) lets you reserve a percentage of the controller processing resources for the handling of communication. Prior to this release, any unused part of the SOTS was used by the controller to resume the continuous task. This firmware revision lets you configure the unused portion of SOTS to either:</p> <ul style="list-style-type: none"><li>• run the continuous task (default/legacy mode), allowing for faster execution of application code.</li><li>• reserve it for communication, providing for more predictable and deterministic continuous task scan time.</li></ul> <p>This enhancement allows the full impact of communication on the continuous task to be determined if time reserved for communication were always fully used.</p>

## Corrected Anomalies

These anomalies have been corrected in controller firmware revision 16.21.

### Anomalies Corrected in Firmware Revision 16.20

Firmware Revision	Anomaly	Description
16.21	Continuous task continues to be scanned in Program mode.	<p>After the Logix controller has been placed into Program mode after being in Run mode (either by using the key switch or by using the RSLogix 5000 software menus), the Continuous Task may continue to be scanned as though it were still in Run mode.</p> <p>This issue occurs only when the System Overhead Time Slice is set to Reserve for System Tasks, eg Communications. This issue is more likely to occur when the System Overhead Time Slice is increased (the higher the percentage, the more likely the occurrence of the issue).</p> <p>When the controller is switched to Program mode and the Continuous Task continues to scan, these system behaviors take place:</p> <ul style="list-style-type: none"> <li>– The RUN status indicator turns off.</li> <li>– The Continuous Task continues to be scanned and logic within the Continuous Task is solved. This behavior is observable in the logic window for the Continuous Task in RSLogix 5000 software.</li> <li>– Any computer terminals online with the controller indicate that the controller is in Program mode.</li> <li>– All Periodic and Event-based tasks are put into Program mode.</li> <li>– All I/O modules are put into and behave as in Program mode. Specifically, on output modules, output values will not update, even though the Continuous Task programming may try to update or change them.</li> <li>– Produced/consumed data continues to transfer.</li> <li>– All out-going communication (messages) are stopped.</li> </ul> <p>The following anomalous behaviors may result (depending on your application):</p> <ul style="list-style-type: none"> <li>• The producing controller may not be identified as being in Program mode.</li> <li>• Unexpected changes in outputs may occur when switched back to Run mode.</li> <li>• Load/Store into nonvolatile memory may not complete successfully.</li> </ul> <p>Lgx00080240</p>

**Anomalies Corrected in Firmware Revision 16.20**

<b>Firmware Revision</b>	<b>Anomaly</b>	<b>Description</b>
16.21	Serial/DF1 connections may timeout unexpectedly.	<p>Serial connections made to the controller may timeout. Timeouts may be noticed in these situations:</p> <ul style="list-style-type: none"> <li>• If the programming terminal connection is made through the controller serial port, the timeout results in a lost connection between RSLogix 5000 software and the controller.</li> <li>• If communication is configured by using the DF1 driver in RSLinx software, the events log may contain notices of errors in the connection with the controller.</li> <li>• Message instructions may error and display error codes 16#203 (Connected timeout) and 16#204 (Unconnected timeout).</li> </ul> <p>Lgx00080320</p>
16.21	The Alarms and Events Buffer times out sooner than expected.	<p>The Alarms and Events Buffer, when configured to use values higher than 72 minutes, may time out sooner than configured to. The early timeout may result in the loss of some Alarm data.</p> <p>Lgx00077990</p>
16.21	Continuous operation of the 1794-L34 controller results in a Major Non-Recoverable Fault.	<p>The 1794-L34 controllers experience a Major Non-Recoverable Fault (MNRF) after approximately 3...6 months of continuous operation.</p> <p>Continuous operation is defined as the controller being powered up. The mode of the controller (Program, Run, Remote) does not matter.</p> <p>This MNRF occurs due to the completion of background diagnostic tests.</p> <p>Lgx00080478</p>

These anomalies have been corrected in previous firmware revisions.

### Anomalies Corrected in Previous Firmware Revisions

Firmware Revision	Anomaly	Description
16.20	Changing the controller mode from Run to Program is unsuccessful.	<p>When the controller mode is changed from Run to Program and an alarm instruction has a delivery state of In Progress, the controller does not change modes.</p> <p>To view the delivery state, open the Alarm Properties dialog and click the Messages tab.</p> <p>This anomaly may occur even when the controller is not connected to a FactoryTalk Alarm server.</p> <p>Lgx00075913</p>
	Simultaneous branches in a sequential function chart may not execute at the same time or in the same scan.	<p>When executing a simultaneous branch, it may take two scans of the routine before all of the simultaneous branches execute. It does not take more than two scans for all simultaneous branches to completely execute.</p> <p>Lgx00075143</p>
	During PreScan, a Major Recoverable Fault, Type 6, Code 1, occurs.	<p>Each task programmed for a Logix controller has a PreScan Watchdog of 5 seconds. You cannot change this setting in RSLogix 5000 software.</p> <p>The fault typically occurs when these elements are present in the program:</p> <ul style="list-style-type: none"> <li>• Add-On Instructions that use PreScan mode.</li> <li>• A large program with many tasks and subroutines where a majority of the application memory is used by the application code and not tags.</li> </ul> <p>Other elements and factors may also cause the fault, however, those listed are the most common.</p> <p>When the fault occurs, the PreScan Watchdog has been exceeded. With this firmware revision, the PreScan Watchdog has been increased to 60 seconds.</p> <p>Lgx00077337</p>
	Use of an ACL with other ASCII Serial Port instructions may result in a Major Non-Recoverable Fault.	<p>If an ACL instruction is executed while other ASCII instructions are active, a Major Non-Recoverable Fault may occur.</p> <p>Lgx00076857</p>
16.20	Add-On Instructions yield unexpected results.	<p>When calling an Add-On Instruction, if the data types of the tags passed into or out of the instruction do not match the parameter definitions, unexpected behavior can result.</p> <p>In the logic of an Add-On Instruction, reading a tag of type INT can also yield incorrect results.</p> <p>Lgx00075524</p>
	Digital alarms (ALMD) may prematurely report an in-alarm state.	<p>The tag InAlarm reports the alarm (InAlarm=1) before the time entered in the MinDurationPRE tag expires.</p> <p>Lgx00075889</p>

**Anomalies Corrected in Previous Firmware Revisions**

<b>Firmware Revision</b>	<b>Anomaly</b>	<b>Description</b>
16.02	PanelView Plus operator terminals utilizing the serial port to communicate with the controller will not establish communication at startup.	When the application on the PanelView Plus operator terminal begins to initialize communication with the controller, the controller responds with packets that exceed the 500-byte packet size. The PanelView Plus operator terminal then stops attempting communication with the controller. When this occurs, data is not updated on the PanelView Plus operator terminal.  Lgx00074400
	Using FFL (FIFO load) or LFL (LIFO load) instructions in the same program as an Add-On Instruction may cause the controller to experience a Major Non-Recoverable Fault.	If an Add-On Instruction is executed after a FFL or LFL instruction in a given program, the internal registers are incorrectly written to and the result is a Major Non-Recoverable Fault. For the fault to occur, all of the following must be true: <ul style="list-style-type: none"> <li>• The Add-On Instruction and FFL and LFL instruction must be in the same program in a Logix application. <p>If the application has two programs defined and the Add-On Instructions is in program A and the FFL or LFL are in program B, no anomaly will be seen.</p> </li> <li>• The FFL/LFL instruction must load a scalar type (SINT, INT, DINT, or REAL). <p>If the source value is a structure, no anomaly will be seen.</p> </li> <li>• The FFL/LFL instruction must be scanned before the Add-On Instruction. <p>If the Add-On Instruction comes first in the code, no anomaly will be seen.</p> </li> </ul> <p>The rung condition does not matter. If the required conditions exist, the fault will occur during PreScan.</p> Lgx00074725
	Extensive use of UID and UIE instructions results in a User-Task Watchdog timeout fault.	If you use extensive amounts of UID and UIE instructions, when the controller is put into Run mode, a Major Recoverable Fault type 6, code 1, Task Watchdog Expired, may be logged. Attempts to clear the fault and return to Run mode are unsuccessful.  Lgx00050393
	Event Task Overlap Counter registers large values after the controller is put into Run mode.	If an application that uses event-based tasks is downloaded to the controller and then the controller is put into Run mode, the overlap counts for event-based tasks may exceed 800,000. This value is a false indication of task overlaps and does not affect the execution of event-based tasks.  Lgx00058132

**Anomalies Corrected in Previous Firmware Revisions**

<b>Firmware Revision</b>	<b>Anomaly</b>	<b>Description</b>
16.02	Changes to RPI are not correlated between all workstations when multiple workstations are connected to the controller.	If you are online with one controller from two or more workstations and you alter the RPI setting for an I/O connection on one workstation, the change in RPI does not register on the other workstations. The change in RPI registers only if the altered RPI program is uploaded from the controller by the other workstations.  Lgx00070714
	Minor faults logged multiple times when certain instructions are used.	The same minor faults, typically a minor math-overflow error, may be logged more than once, depending on the type of instructions used in the program. For example, if in a task the program contained a Multiply instruction that logged a math overflow error as a minor fault, a GSV instruction in the same program will log the same fault when it should not.  Instructions affected include Message BTR, Message BTW, GSV, SSV, UIE, UID, STOD, STOR, STOI, PCMD, PSC, PATT, PDET, PCLF, PPD, and PRNP.  Lgx00028500, Lgx00045361, and Lgx00045365
	LimitsInv and SelectLimitInv are swapped.	In the High/Low Limit (HLL) instruction: <ul style="list-style-type: none"> <li>• LimitsInv parameter is set when the SelectLimit is invalid.</li> <li>• SelectLimitInv parameter is set when the HighLimit and LowLimit parameters are invalid.</li> </ul> Lgx00055977

## Known Anomalies

This table lists known anomalies of controller revisions 16.00...16.21. The leftmost column identifies the catalog numbers affected.

For more information about controller revisions and firmware revisions, see the tables on page 3.

### Known Anomalies for Firmware Revisions 16.00...16.21

Anomaly	Description
Serial-port control structure bit RN inaccurately cleared.	<p>This anomaly occurs when using firmware revision 16.20 or later.</p> <p>If the ACL instruction is used to clear instructions from the ASCII queue, the serial-port control structures' RN bit is cleared (that is, the RN bit is set to zero) although it should not be.</p> <p>Lgx00081063</p>
Use of revision 16 firmware and the controller serial port results in extended program scan times.	<p>If you use firmware at revision 16, including revisions 16.01...16.20, and the controller's serial port, the program scan time may increase. The program scan time increase in revision 16 may be 2...10 times the scan time of the same program with revision 15.</p> <p>This anomaly only occurs when the controller serial port is used and there is no workaround.</p> <p>Lgx00077845</p>
Indirectly addressing an instance tag in an Add-On Instruction results in a Major Non-Recoverable Fault.	<p>When an indirectly-addressed instance tag is used instead of a directly-addressed instance tag within an Add-On Instruction, a Major Non-Recoverable Fault occurs. Typically the major fault occurs during the PreScan of the controller.</p> <p>See the Restrictions section on page 14 for more information about this anomaly.</p> <p>Lgx00077261</p>
PI function block appears to stop executing as the output does not change and no instruction faults are logged.	<p>If the PI instruction is being used in Linear mode, this floating-point equation is used to calculate the ITerm.</p> $K_p \times Wld \times \frac{WldInput + WldInput_{n-1}}{2} \times \Delta T + ITerm_{n-1}$ <p>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<sub>n-1</sub>.</p> <p>For more information regarding the PI instruction, see the Logix5000 Controllers Process Control and Drives Instructions User Manual, publication <a href="#">1756-RM006</a>.</p> <p>Lgx00070832</p>
Changes made to a timeout in the alarms system require a new download of the program to controller.	<p>To verify that the timeout change is used by the controller, you must download the program to the controller after each change to the timeout variable.</p> <p>Lgx00069461</p>

**Known Anomalies for Firmware Revisions 16.00...16.21**

<b>Anomaly</b>	<b>Description</b>
The Slot Status bit for an I/O connection is slow to update if the connection is lost.	<p>When using I/O on an Ethernet network, if the connection to the network is lost at the adapter, the SlotStatusBit for that connection will not register the disconnect for 9 seconds or more.</p> <p>If you require loss-of-connection data more quickly than the 9 seconds, use the GSV instruction to monitor the entry status of the connection as it updates more quickly than the SlotStatusBit.</p> <p>Lgx00072697</p>
When the SFC instruction's Last Scan of Active Steps option is set to Automatic Reset, a Major Non-Recoverable Fault occurs.	<p>A Major Non-Recoverable Fault may occur when these elements are present in the program:</p> <ul style="list-style-type: none"> <li>• Within an SFC, a JSR instruction is used to jump to another SFC, also know as a nested SFC.</li> <li>• One or more of the nested SFC instructions contains Simultaneous Branches.</li> <li>• The Last Scan of Active Steps option (specified in the SFC Execution tab of the controller Properties dialog) is set to Automatic Reset.</li> </ul> <p>To avoid a Major Non-Recoverable Fault when these elements are present, set the Last Scan of Active Steps to Don't Scan or to Programmatic Reset.</p> <p>Lgx00072702</p>
A function block is initiated, either directly or indirectly by an SFC instruction, when the parent step becomes active.	<p>During the first scan of an SFC step, the Step.FS bit is set. In addition, the S:FS bit is set, which allows the logic in any associated actions to easily detect the first scan state. This behavior is useful when a subroutine that is called by multiple actions (actions that may be connected to other steps) is used. The first scan state can be detected without programming a reference to the tag of a specific step.</p> <p>Many function blocks contain internal data that must be initialized before the block can be used. One of the methods a block uses to determine if it should initialize is by evaluating the S:FS bit, which the function block identifies as the first scan following a PreScan.</p> <p>Lgx00071558</p>

**Known Anomalies for Firmware Revisions 16.00...16.21**

<b>Anomaly</b>	<b>Description</b>
An SFC R action continues to post-scan on the specified action.	<p>This anomaly occurs only if the SFC Last Scan of Active Steps option is set to Programmatic Reset or Automatic Reset. When the default, Don't Scan, is set, the anomaly does not occur.</p> <p>The intention of a reset action, type R, is to terminate the execution of another action that was previously stored. When configured as described above, the reset action causes logic to execute a final scan.</p> <p>The reset action does not check to verify that an action is stored before it completes the final scan. As a result, each time the reset action is scanned, the target logic will be scanned one last time.</p> <p>These observable behaviors may result:</p> <ul style="list-style-type: none"> <li>• The timer of the stored action will continue to time even though the action is no longer active.</li> <li>• The logic in the stored action will be executed in the configured mode.</li> <li>• At Automatic Reset, non-retentive outputs are cleared.</li> <li>• At Programmatic Reset, the logic will execute. In this situation, the action logic checks for the final scan condition (action.A = 1 and action.Q = 0) and performs some shutdown operations. This is the code that will be executed.</li> </ul> <p>Lgx00069295</p>

**Restrictions**

These restrictions apply to the use of FlexLogix controllers.

**Restrictions with Firmware Revision 16.00...16.21**

<b>Restriction</b>	<b>Description</b>
No support for the FLEX I/O or FLEX Ex HART modules on the local rail.	FlexLogix controllers do not support the FLEX I/O or FLEX Ex HART modules on the local rail. They can be used only on the ControlNet network with a FLEX I/O ControlNet adapter and a FlexLogix communication card.
All FLEX Ex modules must be used on the local rail.	All FLEX Ex modules must be used on the local rail and cannot be used with a 1794-FLA module.

**Restrictions with Firmware Revision 16.00...16.21**

<b>Restriction</b>	<b>Description</b>
Use of an indirectly-indexed tag within an Add-On Instruction instance tag is not accepted by the RSLogix 5000 program.	<p>In RSLogix 5000 software, version 16.00, if you use an indirectly-indexed array in an instance tag of an Add-On Instruction, anomalous behavior may result.</p> <p>For example, in the instruction call <code>MyAOI (AOIData [ Index ] )</code>, the value <code>[ Index ]</code> selects the <code>AOIData</code> tag element used to call <code>MyAOI</code>. The use of <code>[ Index ]</code> results in anomalous behavior when the program is executed.</p> <p>In RSLogix 5000 software, version 16.03, and controllers firmware revision 16.20, if an indirectly-indexed tag is used in an instance tag, the edit is not accepted by the program. Instead, use a directly-indexed instance tag. For example, instead of using tag <code>MyAOI (AOIData [ Index ] )</code>, use tag <code>MyAOI (AOIData [ 2 ] )</code> or similar so that the exact element of the array is directly-indexed. The program accepts directly-indexed instance tags.</p> <p>You may continue to use indirectly-addressed tags in Add-On Instruction parameters without anomalous behavior in RSLogix 5000 software, versions 16.00 and 16.03.</p> <p>Lgx00077261</p>
Passing a User-defined Data Type (UDT) into an Add-On Instruction results in a Major Recoverable Fault or data memory corruption.	<p>An anomaly occurs when you pass a tag based on a User-defined Data Type (UDT) into an Add-On Instruction, and certain conditions are met that result in a Major Recoverable Fault or data memory corruption.</p> <p>These conditions are required for Major Recoverable Fault or data memory corruption:</p> <ul style="list-style-type: none"> <li>• A one-dimensional array tag that is based on a UDT that is passed into the Add-On Instruction.</li> <li>• The UDT tag contains a member that is a one-dimensional array.</li> <li>• Inside the Add-On Instruction, an operand address that specifies an immediate member of the UDT tag array and a variable element of the member array (for example, <code>array[0].memberArray[x]</code> is used).</li> </ul> <p>Examples:</p> <p><code>UDT array [ 0 ] .memberArray [ x ]</code></p> <p>When the size of the UDT array is smaller than that of the memberArray and the <code>[x]</code> value of the memberArray is larger than the size of the UDT array, a Major Recoverable Fault Code 4 Type 20 occurs.</p> <p><code>UDT array [ 0 ] .memberArray [ x ]</code></p> <p>When the size of the UDT array is bigger than the memberArray and the <code>[x]</code> value is smaller than the size of the UDT Array but larger than the size of the memberArray, the expected fault does not occur and the data is written to a location outside the bounds of the memberArray.</p> <p>Lgx00077270 and Lgx00076136</p>

**Restrictions with Firmware Revision 16.00...16.21**

<b>Restriction</b>	<b>Description</b>
An upload of an Add-On Instruction with a literal boolean input parameter modifies offline image.	<p>When an Add-On Instruction containing a literal value for one of its Boolean input parameters is referenced from a Ladder Diagram routine, an upload of the project will modify the display of the literal value by appending a ".0". Each time the project is downloaded and re-uploaded, another ".0" is appended, so that after the second download/upload sequence, the project file will not verify and can no longer be downloaded without first editing the modified literal value. The edit may be successfully performed either online or offline.</p> <p>Note, however, that when editing online, because the rung is in an unverified state, the "Finalize All Edits in Program" will not operate. In this case, use of the Accept/Test/Assemble sequence of operations will allow the edit to be completed. This condition does not affect the executing image, which will continue execution using the unmodified literal value. To avoid exposure to this problem, replace the literal value with a reference to a tag having the desired value.</p> <p>Lgx00077802</p>

## Install the Firmware Revision

To install the firmware revision, download at <http://support.rockwellautomation.com> and use ControlFlash software to upgrade your controller.

Alternatively, if you have installed RSLogix 5000 version 16 and related firmware, you may not need to complete the tasks described. The AutoFlash feature of RSLogix 5000 version 16 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 the following 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 you intended to upgrade to.
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

Revision 16.0 or later may require more memory than previous revisions (For example: 10.x, 11.x). To estimate the additional memory that your project may require, use the following table.

If you have this firmware revision (add all 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)
16.x or earlier	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		✓

If you have this firmware revision (add all 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)
15.x or earlier	Input module	4 bytes	✓	
	Produced tag	12 bytes	✓	
	Consumed tag	4 bytes	✓	
	Task	20 bytes		✓
	Program or equipment phase	24 bytes		✓
	Routine	4 bytes		✓
	Tag that uses COORDINATE_SYSTEM data type	748 bytes		✓
	Tag the uses any AXIS data type	800 bytes		✓
	Serial Port	1120 bytes		✓
	Project	4012 bytes		✓
14.x or earlier	Tag that uses the COORDINATE SYSTEM data type	60 bytes		✓
	Tag that uses any AXIS data type	4 bytes		✓
13.x or earlier	Program	12 bytes		✓
	Task	4 bytes		✓
	User-defined data type	4 bytes		✓
	I/O module	16 bytes	✓ (8 bytes)	✓ (8 bytes)
	Produced or consumed tag	8 bytes	✓	
12.x or earlier	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		✓

If you have this firmware revision (add all 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)		
11.x or earlier	User-defined data type: <ul style="list-style-type: none"> <li>Number of user-defined data types in the controller organizer &gt; Data Types folder &gt; User-Defined folder</li> <li><b>Not</b> the use of that data type in tags</li> </ul>	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: <ul style="list-style-type: none"> <li>uses a structure as its data type.</li> <li>does <b>not</b> use one of these data types: CONTROL, COUNTER, PID, or TIMER.</li> <li>has only one dimension (such as UDT_1[5]).</li> </ul>	(-60 bytes)		✓		
10.x or earlier	Program	12 bytes		✓		
	Routine	16 bytes		✓		
9.x or earlier	Tag that uses the MESSAGE data type	376 bytes		✓		
7.x or earlier	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 or earlier	Base tag		24 bytes		✓	
	Alias tag		16 bytes		✓	
	Produced or consumed tag	Data type	Bytes per tag			
		DINT	4	12 bytes	✓	
		REAL	4	12 bytes	✓	
6.x	Routine	68 bytes		✓		
5.x or earlier	Routine	116 bytes		✓		

## Additional Resources

The following resources related this release note are also available for more information.

Resource	Description
Logix5000 Controllers Common Procedures Reference Manual, publication <a href="#">1756-PM001</a>	Contains information specific to Add-On Instructions.
ControlLogix Controllers Revision 15 Release Notes, publication <a href="#">1794-RN015</a>	Describes anomalies and enhancements related to controller revision 15.
Logix5000 Process Control and Drives Instructions Reference Manual, publication <a href="#">1756-RM006</a>	Contains information specific to the PI instruction.
ControlFlash Firmware Upgrade Kit Quick Start, publication <a href="#">1756-QS105</a>	Contains informations about firmware upgrades, installation instructions, and error messages.
POINT I/O EtherNet/IP Adapter Release Notes, publication <a href="#">1734-RN002</a>	Further describes the firmware upgrade to 2.003.
ArmorPoint I/O Release Notes, publication <a href="#">1738-RN002</a>	Further describes the firmware upgrade to 2.003.

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

Tech Notes and other resources are available at: <http://www.rockwellautomation.com/knowledgebase>.

**Notes:**



## 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 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 (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 the return procedure.

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