



## CompactLogix Controllers, Revision 16

Catalog Numbers 1769-L31, 1769-L32C, 1769-L32E, 1769-L35CR, 1769-L35E

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### About This Publication

This publication describes enhancements and anomalies (known and corrected) for the CompactLogix controllers.

When reviewing this publication, note that your controller's minor revision may be different from that of other CompactLogix controllers. The contents of this publication apply to the following controller revision numbers.

Catalog No.	Major and Minor Revision No.
1769-L31	16.20
1769-L32C	
1769-L32E	
1769-L35CR	
1769-L35E	

This release note, 1769-RN016C, is specific to firmware revision 16.20 for all CompactLogix controllers.

The previous revisions of this publication included the following controllers and firmware revisions. The information from previous minor revisions is retained in these release notes

**Firmware Revisions Identified in Publication 1769-RN016B**

Catalog No.	Major and Minor Revision No.
1769-L31	16.04
1769-L32C	
1769-L32E	
1769-L35CR	
1769-L35E	

**Firmware Revisions Identified in Publication 1769-RN016A**

Catalog No.	Major and Minor Revision No.
1769-L31	16.03
1769-L32C	
1769-L32E	
1769-L35CR	
1769-L35E	

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.

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**IMPORTANT**

Before updating your controller, we strongly recommend that you review information related to the most recent previous major firmware revision, revision 15, in publication [1769-RN015](#).

Firmware release notes contain material for all minor revisions subsequent to each major revision. If your controller, for example, is at minor revision 15.3 rather than 15.5, we recommend that you download and read the latest firmware release note to be aware of information pertinent to each of these firmware upgrades before upgrading your controller to the next major revision.

Previous revision release notes, that is, publication [1769-RN015](#), are available at <http://literature.rockwellautomation.com>

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## Compatible Versions of Software

To use this controller revision, the following minimum software versions are required.

Software	Required Version
RSLink Classic	2.51
RSLink 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 16.20 is compatible with RSLogix 5000, version 16.00 software. However, many of the corrected anomalies and restrictions described in these release notes are only available when firmware revision 16.20 is used with RSLogix 5000, version 16.03 software.

# Before You Begin

Before you upgrade your firmware, please consider the following.

**IMPORTANT**

Loss of communications 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.
- Return the controller for factory repair if a nonrecoverable fault occurs.

The following preliminary actions are 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.
Your controller is close to its limits of memory	<div>This revision may require more memory than previous revisions.<ul style="list-style-type: none"><li>• To see what components of your current project require more memory, see page 27.</li><li>• RSLogix 5000 software revision 13.0 or later lets you estimate the memory requirements of the controller offline.</li></ul>To update to this revision, you may have to upgrade to a controller that has more memory.</div>

<b>If</b>	<b>Then</b>
You are attempting to upgrade the firmware on a 1769-L32E or 1769-L35E controller to revision 16.x	<p data-bbox="412 275 1382 338">We recommend that you complete the following tasks before attempting a controller firmware upgrade.</p> <ul data-bbox="412 380 1464 915" style="list-style-type: none"> <li data-bbox="412 380 1464 474">• First, check the status of the MS (module status) LED indicator next to the ethernet port. If it is blinking red before you begin the upgrade, additional action may be required. Contact Rockwell Automation Technical Support for more information.</li> <li data-bbox="412 506 1464 569">• Modify the Port Configuration for the ethernet card so that the Network Configuration Type is set to Static and assign a valid IP address.</li> <li data-bbox="412 600 1464 663">• If RSWho is actively browsing the controller through an ethernet or serial connection, close the RSWho window to stop the browse.</li> <li data-bbox="412 695 1464 758">• If other controllers are messaging to the 1769-L32E or 1769-L35E controller, take the other controllers off the network, or put them in program mode.</li> <li data-bbox="412 789 1464 852">• If there are controllers consuming tags from the 1769-L32E or 1769-L35E controller remove them from the network.</li> <li data-bbox="412 884 1464 915">• If there are HMI devices connected to the controller, disconnect them from the network or shut them down.</li> </ul> <div data-bbox="444 989 1464 1745"> <div data-bbox="444 989 630 1058"><b>IMPORTANT</b></div> <p data-bbox="662 999 1448 1209">If you cannot perform the tasks listed above before attempting a controller firmware upgrade, Ethernet traffic on the controller's ethernet port may cause ControlFlash to timeout during the firmware upgrade. If the timeout condition is not handled properly, you may render the ethernet port on the controller inoperable, requiring you to return the controller to Rockwell Automation for repair.</p> <p data-bbox="662 1241 1448 1377">In the event that a ControlFlash timeout occurs, the software displays an error dialog indicating that the "Target Device failed to report the new revision number," or that the upgrade "Failed to begin update to the target device."</p> <p data-bbox="662 1409 1464 1619">If the error dialogs display, check the MS LED indicator. If the indicator is flashing red, the upgrade is still in progress and should not be interrupted. Do NOT cycle power to the controller while the LED indicator is flashing red. If the upgrade completes, the controller power cycles itself and indicates the upgrade is complete with a solid green MS LED indicator. The time required to complete the upgrade is dependent on the level of Ethernet traffic.</p> <p data-bbox="662 1650 1464 1745">If the controller does not complete the upgrade, the MS LED indicator continues flashing red. In this case, contact Rockwell Automation Services and Support.</p> </div>

## Enhancements

These enhancements have been made in firmware revision 16.20.

### Enhancements Provided with Firmware Revision 16.20

Enhancement	Description
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.

The following enhancements have been made in previous controller revisions.

### Enhancements Provided with Previous Firmware Revisions

Enhancement	Description
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>
Logix5000 Firmware Supervisor	<p>Use of the Logix5000 Firmware Supervisor with ControlLogix controllers and certain I/O modules enables you to program the controller to complete firmware updates by using a GSV or SSV instruction. The controller uses a firmware kit loaded on a CompactFlash card and can complete firmware updates in Program and Run modes.</p> <p>In GuardLogix controllers, this enhancement is available for use with standard I/O modules.</p>
FactoryTalk Alarms and Events	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**

Enhancement	Description
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 version 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 (µsec, 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/> <div data-bbox="591 1178 773 1230"> <b>IMPORTANT</b> </div> <div data-bbox="805 1178 1451 1230"> <p>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> </div> <hr/>

**Enhancements Provided with Previous Firmware Revisions**

<b>Enhancement</b>	<b>Description</b>
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 identified and corrected in controller firmware revision 16.20.

### Anomalies Corrected in Firmware Revision 16.20

Anomaly	Description
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>
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>

The following table contains descriptions of anomalies corrected in previous firmware revisions.

#### Anomalies Corrected in Previous Firmware Revisions

Firmware Revision	Anomaly	Description
16.04	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 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. If the application has two programs defined and the Add-On Instruction is in program A and the FFL or LFL are in program B, no anomaly will be seen.</li> <li>The FFL/LFL instruction must load a scalar type (SINT, INT, DINT, or REAL). If the source value is a structure, no anomaly will be seen.</li> <li>The FFL/LFL instruction must be scanned before the Add-On Instruction. If the Add-On Instruction comes first in the code, no anomaly will be seen.</li> </ul> The rung condition does not matter. If the required conditions exist, the fault will occur during prescan. Lgx00074725
16.03	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
	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

**Anomalies Corrected in Previous Firmware Revisions**

<b>Firmware Revision</b>	<b>Anomaly</b>	<b>Description</b>
16.03	Minor faults logged multiple times when certain instructions are used.	<p>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.</p> <p>Instructions affected include Message BTR, Message BTW, GSV, SSV, UIE, UID, STOD, STOR, STOI, PCMD, PSC, PATT, PDET, PCLF, PPD, and PRNP.</p> <p>Lgx00028500, Lgx00045361, and Lgx00045365</p>
	LimitsInv and SelectLimitInv are swapped.	<p>In the High/Low Limit (HLL) instruction:</p> <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> <p>Lgx00055977</p>
	Processing of denormalized number exceptions causes a Major Non-Recoverable Fault.	<p>A denormalized number is any 32-bit, floating-point value that is less than <math>1.75494210 \times 10^{-38}</math> or greater than <math>-1.75494210 \times 10^{-38}</math>, excluding zero. Denormalized numbers typically occur when very small real numbers are divided by very large real numbers.</p> <p>This anomaly typically occurs when the following sequence takes place.</p> <ol style="list-style-type: none"> <li>1. The controller is handling an exception of a floating-point denormalized number in task A.</li> <li>2. Then task B begins to execute and handles an exception of a floating-point denormalized number.</li> <li>3. And, task B completes as task A begins again.</li> </ol> <p>Lgx00057774</p>

## Known Anomalies

This table lists known anomalies of controller revisions 16.00 . . . 16.20.

For more information about controller revisions and firmware revisions, see the tables on page 2.

### Known Anomalies for Firmware Revisions 16.00 . . . 16.20

Anomaly	Description
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 16.02...16.20, and the controller's serial port, the program scan time may increase. The program scan time increase in revision 16 may be two...ten 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 15 for more information about this anomaly.</p> <p>Lgx00077261</p>
When the non-volatile restore option is set to load On Corrupt Memory, the program may not restore.	<p>This anomaly typically occurs with new controllers or controllers that register a Major NonRecoverable Fault. If the non-volatile restore option is set to load On Corrupt Memory and a corrupt memory condition is detected, the controller program may not be restored.</p> <p>Lgx 00064843</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> $Kp \times Wld \times \frac{WldInput + WldInput_{n-1}}{2} \times DeltaT + ITerm_{n-1}$ <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 . . . 16.20**

<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 known 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 . . . 16.20**

<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>
A 1769-L31 firmware upgrade fails if configured at 38400 bps or higher.	<p>When upgrading firmware on a 1769-L31 controller, if the serial DF1 driver is configured to operate at a baud rate higher than 19200 bps, the upgrade may fail. If a flash upgrade fails, you must cycle power to the controller, reset the baud rate to 19200 bps, and initiate a new flash upgrade.</p> <p>Lgx00070538</p>
Attempts to download a program to a controller following a failed firmware upgrade are successful. (Failure is indicated by the OK status indicator flashing red after the upgrade is complete.)	<p>After a firmware upgrade attempt fails during the upgrade, (for example, the cable is disconnected or communication is interrupted) the controller's OK status indicator flashes red and any user attempts to clear the fault by toggling the controller's keyswitch are unsuccessful.</p> <p>You can download a program to the controller, place the controller in Run mode, and run the program (the RUN status indicator displays run status). The outputs behave as specified by the program. However, when controller power is cycled, the program is lost and the controller properties indicate a firmware revision different from that most recently downloaded to the controller.</p> <p>Lgx00071250</p>

## Restrictions

These restrictions apply to the use of ControlLogix controllers.

### Restrictions with Firmware Revision 16.20

Firmware Revision	Restriction	Description
16.20	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, version 16.00 software, 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, version 16.03 software, 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>

**Restrictions with Firmware Revision 16.20**

<b>Firmware Revision</b>	<b>Restriction</b>	<b>Description</b>
16.20	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>Conditions required for Major Recoverable Fault or data memory corruption include:</p> <ul style="list-style-type: none"> <li>• A one-dimensional array tag that is based on a UDT 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, array[0].memberArray[x]) is used.</li> </ul> <p>Examples:</p> <pre>UDT array[0].memberArray[x]</pre> <p>When the size of the UDT array is smaller than that of the memberArray and the [x] value of the memberArray is larger than the size of the UDT array, a Major Recoverable Fault Code 4 Type 20 occurs.</p> <pre>UDT array[0].memberArray[x]</pre> <p>When the size of the UDT array is bigger than the memberArray and the [x] 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>
16.20	Upload of Add-On Instruction With 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. 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>



## Known Issues

The following are known issues associated with this controller revision.

- With a 1769-L31 controller, you cannot bridge from one serial port to the other. You can bridge from either serial port to DeviceNet network via the 1769-SDN scanner.
- Tasks are the basic scheduling mechanism for executing a program and are created as part of the project and program creation process. In addition to other internal tasks, the CompactLogix controllers have an internal task to provide communication with the 1769 I/O modules. This task executes periodically at the Requested Packet Interval (RPI) selected in the properties of the CompactBus. If the task has not completed before it is time to execute again, a task overlap occurs. This task overlap causes the controller to declare a minor fault of Type = 6 (Task Overlap), Code = 4 (VA task).

You can use various strategies to resolve minor faults due to task watchdog timeout and/or task overlap. For more information, see RSLogix5000 Online Help “Identifying and Managing Tasks”. In the case of a minor fault caused by VA task overlap, increase the RPI until the overlap no longer occurs.

- If a 1769 I/O fault occurs, you must cycle power to the CompactLogix controller after clearing the major fault. I/O communications are not restored until after the power cycle. You should never use the fault handling routine to clear local I/O faults. You should clear local I/O faults manually on a per case basis, and then the controller should be power cycled.
- RSLogix 5000 software creates tags for modules when you add them to the I/O configuration. The 1769 module tags define configuration (C) data type members which may include attributes for alternate outputs. CompactLogix does not enable local modules to use the alternate outputs. Do not configure the attributes listed below:

For Digital Output Modules	For Analog Output Modules
<ul style="list-style-type: none"> <li>• ProgToFaultEn</li> <li>• ProgMode</li> <li>• ProgValue</li> <li>• FaultMode</li> <li>• FaultValue</li> </ul>	<ul style="list-style-type: none"> <li>• CHxProgToFaultEn</li> <li>• CHxProgMode</li> <li>• CHxFaultMode</li> <li>• where CHx = the channel number</li> </ul>

Any 1769 Compact I/O modules used as remote I/O modules in a CompactLogix system do support the Hold Last State and User-defined Safe State features.

## **Hold Last State and User-defined Safe State Not Supported**

When 1769 Compact I/O modules are used as local I/O modules in a CompactLogix system, the local I/O modules do not support the Hold Last State or User-defined Safe State features, even though you can configure these options in the programming software.

- If a local I/O module fails such that its communication to the controller is lost, or if any module is disconnected from the system bus while under power, the controller will go into the fault mode. All outputs turn off when the system bus or any module faults.

## Install the Controller Revision

To install the latest ControlLogix controllers revision, go to <http://support.rockwellautomation.com> to download your revision. Then use the ControlFlash utility to upgrade your controller.

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

Revision 16.00 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 this 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)
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

These documents contain additional information concerning related Rockwell Automation products.

Resource	Description
Logix5000 Controllers Common Procedures Reference Manual, publication <a href="#">1756-PM001</a>	Contains information specific to Add-On Instructions.
CompactLogix Controllers Revision 15 Release Notes, publication <a href="#">1769-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 the Technical Support Knowledgebase, <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 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 its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning, it may need 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](http://www.rockwellautomation.com)**

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