

1769 CompactLogix Packaged Controllers, Revision 17

Catalog Numbers 1769-L23E-QB1B, 1769-L23E-QBFC1B, 1769-L23-QBFC1B

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About This Publication

This publication describes enhancements and anomalies for CompactLogix™ controllers, revision 17.

About Publication 1769-RN012

These firmware release notes, publication 1769-RN012, provide information specific to all minor revisions of major revision 17 for all CompactLogix™ packaged controllers.

Compatible Versions of Software

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

Software	Required Version
RSLinX™ Classic	2.54 (CPR 9, SR 1)
RSLinX Enterprise	5.17 (CPR 9, SR 1)
RSLogix™ 5000	17.00 (CPR 9, SR 1)
RSNetWorx™ for ControlNet	9.00 (CPR 9, SR 1)
RSNetWorx for DeviceNet	
RSNetWorx for EtherNet/IP	

Before You Begin

Consider this information before upgrading your packaged controller firmware.

Avoid Interrupting the Firmware Upgrade

IMPORTANT

When upgrading your packaged controller firmware, it is **extremely** important to allow the upgrade to complete without interruption.

If you interrupt the firmware upgrade either in the software or by disturbing the physical media, you may render the packaged controller inoperable.

During an upgrade of the CompactLogix firmware, the ControlFLASH™ utility displays various progress dialog boxes. The progress dialog boxes contain these status statements:

- Transmitting block . . .
- Polling for power-up . . .

It is crucial that you do not interrupt the firmware upgrade while these progress statements are displayed. Once the Update Status dialog box indicates that the firmware upgrade is complete, you may adjust your controller's network connection, make changes using controller-related software, or cycle controller power.

For more information about upgrading your CompactLogix packaged controller firmware, see information posted at <http://www.rockwellautomation.com/knowledgebase/>.

Avoid a Loss of Communication during the Firmware Upgrade

IMPORTANT

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

- Cycle controller power with the battery disconnected for 2 . . . 3 minutes, then successfully complete the flash upgrade.
 - If a nonrecoverable fault occurs, contact Rockwell Automation Technical Support for a ticket number and return the controller for factory repair.
-

Use the End Cap Properly

Verify that your CompactLogix packaged-controller end cap is attached and locked before upgrading your firmware. Failure to attach and lock the end cap may result in a failure of the upgrade.

System Preparations Required before Upgrading

The following preliminary actions are required before upgrading your packaged 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

This enhancement is provided with revision 17.012.

Table 1 - Enhancements With Revision 17.012

Firmware Revision	Cat No.	Description
17.012	1769-L23E-QB1B, 1769-L23E-QBFC1B	Support for Series B controllers.

This enhancement is provided with revision 17.05.

Table 2 - Enhancements With Revision 17.05

Firmware Revision	Enhancement	Description
17.05	False Execution Time of Add-On Instructions Improved	<p>With previous revisions, the false execution time of an Add-On Instruction was dependent on the number of parameters (input, output, and inout) configured for the instruction. The more parameters configured, the longer the false execution time of the Add-On Instruction.</p> <p>With this revision, the false execution time of an Add-On Instruction is now constant if a scan false routine is not created. To determine the false execution time of Add-On Instructions based on your controller, reference the values published in the Logix5000™ Controllers Execution Time and Memory Use Reference Manual, publication 1756-RM087.</p> <p style="text-align: right;">Lgx00101630, Lgx00091647, Lgx00085092</p>

Corrected Anomalies

These anomalies have been corrected in previous firmware revisions.

Table 3 - Anomalies Corrected in Previous Firmware Revisions

Firmware Revision	Description
17.07	<p>Under certain power-cycling conditions, when the on and off times of the controller are typically 10 seconds or less, the controller can power up with no program loaded. The controller will be in one of two states.</p> <ul style="list-style-type: none"> The OK and DCHO status indicators will be green and the others will be off. The OK status indicator will be blinking red, the DCHO status indicator will be green, and the others will be off. <p>The controller will have logged a Type 1 Code 60 major recoverable fault. When attempts are made to upload debug information from the controller, no information can be uploaded.</p> <p>To recover, redownload the application.</p> <p style="text-align: right;">Lgx00112776, Lgx00112878, Lgx00112879</p>

Table 3 - Anomalies Corrected in Previous Firmware Revisions (continued)

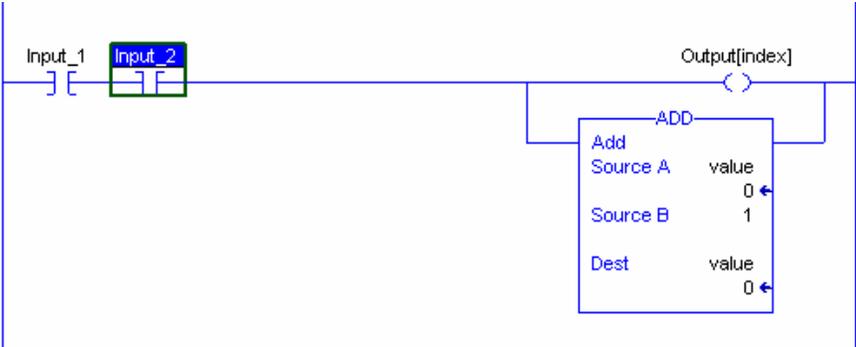
Firmware Revision	Description
17.05	<p>Online edits result in major nonrecoverable faults (MNRFs). Causes of this anomaly include:</p> <ul style="list-style-type: none"> • a controller that was or is near its limits in memory. • doing many online edits (tag additions and deletions) without downloading again. • using RSLinx Enterprise software (CPR9). <p>When this anomaly occurs, the controller generates a major nonrecoverable fault during an online edit (tag additions and deletions). I/O goes to their configured safe state, and the user application is cleared from memory. At this point, a Code 1 Type 60 or 61 major fault will be logged in the controller. This requires you to download the application again.</p> <p>When online edits are made to a controller, RSLinx Enterprise software (CPR9) monitors them. When a large number of edits are made to a controller, RSLinx Enterprise software (CPR9) re-optimizes communication to the controller.</p> <p>Two anomalies in RSLinx Enterprise software (CPR9) are aggravating factors to this controller anomaly:</p> <ul style="list-style-type: none"> • The algorithm used to determine if communication re-optimization is needed causes communication re-optimization to occur too often. • When the communication re-optimizations occur, the connections to the controller should close. However, these connections do not close. This causes the controller to orphan all information related tags on scan by RSLinx Enterprise software (CPR9). <p>You must upgrade your controller firmware and apply RSLinx Enterprise patches. The RSLinx Enterprise patches reduce the likelihood of the controller faulting and remove the excessive memory consumption. The firmware upgrade eliminates the controller major nonrecoverable faults caused by this anomaly.</p> <p>These RSLinx Enterprise patches are on the Rockwell Automation Knowledgebase, http://www.rockwellautomation.com/knowledgebase:</p> <ul style="list-style-type: none"> • RSLinx Enterprise software version 5.00 CPR9, ID number 65818 • RSLinx Enterprise software version 5.17 CPR9 SR1, ID number 65819 • RSLinx Enterprise software version 5.20 CPR9 SR2, ID number 65820 <p style="text-align: right;">Lgx00096513</p>
	<p>Fault handlers can be defined at the controller and program scope levels. These fault handlers are typically used to handle major recoverable faults that can occur during runtime execution of an application due to programming errors. A typical example of this would be handling indirect addressing that has gone out of range; MyTag[index], where index is larger than the size of the array.</p> <p>Faults can also be handled by the controller during pre-scan of the controller program on the transition to Run mode. Again, for example, the handling of indirect addressing that has gone out of range.</p> <p>There is an anomaly when these methods attempt to handle a fault.</p> <p>These are the possible ways the anomaly can manifest itself:</p> <ul style="list-style-type: none"> • The controller will experience a major non-recoverable fault. I/O goes to their configured safe state, and the user application is cleared from memory. At this point, a Code 1 Type 60 or 61 major recoverable fault will be logged in the controller. This requires you to redownload the application. • Tag data corruption. • Online saving or uploading failures. • Anomalous program execution. <p>For example, if a rung is being scanned false and there is an instruction that has false execution, the fault handler executes so the remainder of the rung will scan true. In the example below, the OTE instruction has an index out of range. After returning from the fault handler, the ADD instruction will execute, even though the rung input conditions are false.</p>  <p style="text-align: right;">Lgx00106482, Lgx00104782, Lgx00097014</p>

Table 3 - Anomalies Corrected in Previous Firmware Revisions (continued)

Firmware Revision	Description
17.04	<p>Outputs remotely located via a network may not go to their predefined PROGRAM mode state on a change out of RUN mode.</p> <p>When a controller changes from RUN mode to a non-RUN mode state, that is to PROGRAM mode or a recoverable faulted state, the controller's outputs may not transition to their predefined PROGRAM mode state.</p> <p>Any of the following transitions from RUN mode to a non-RUN mode may cause this anomaly to occur:</p> <ul style="list-style-type: none"> • The key switch on the controller is turned from RUN mode to PROGRAM mode. • A remote command is sent to the controller to change from RUN mode to PROGRAM mode • The controller detects a major recoverable fault that causes an operating mode change from RUN mode to a faulted mode. <p>If your experience a major nonrecoverable fault on your controller, the controller's outputs will transition to their predefined fault mode state.</p> <p style="text-align: right;">Lgx00099405</p> <hr/> <p>The CONNECTION_STATUS.RunMode indication in a Produced tag may not indicate correctly.</p> <p>When using Produced/Consumed tags with CONNECTION_STATUS, the CONNECTION_STATUS.RunMode indication in the producing controller may not indicate correctly if it is not in RUN mode. The CONNECTION_STATUS.RunMode indication in the Consuming controller will indicate correctly.</p> <p style="text-align: right;">Lgx00099405</p>
17.03	<p>A motion group-synchronization error occurs in applications that use a virtual axis. The error displays after controller power is cycled and motion instructions are executed.</p> <p>This anomaly may be observed in 1769-L2x applications where a virtual axis is used and a motion instruction is carried out either by the program or by a Motion Direct Command.</p> <p>This anomaly may occur with these actions:</p> <ol style="list-style-type: none"> 1. The 1769-L2x controller is set as the Coordinated System Time (CST) master. 2. Controller power is cycled. 3. Any motion instruction is executed via programming or a Motion Direct Command. <p>When the motion instruction attempts to execute, an error displays indicating that the 'Motion Group is not in the Synchronized State (err 19D or 0013H)'. Upon further troubleshooting, if the CST master property of the controller is unchecked and applied, then checked and applied, motion instructions can be executed properly.</p> <p>This firmware revision corrects this anomaly by synchronizing the CST upon powerup if the controller is set to be the CST master.</p> <p style="text-align: right;">Lgx00093619</p>

Known Anomalies

This table lists known anomalies of packaged controllers at any revision of 17 firmware. The left column identifies the catalog numbers affected.

Table 4 - Known Anomalies with Firmware Revision 17.02...17.012

Cat. No.	Anomaly	Description
1769-L23E-QB1B, 1769-L23E-QBFC1	Use of the packaged controller within Ethernet connection limits, but at or near maximum limits, may result in No Buffer Memory, error code 0x301.	<p>If you use your packaged controller at, or very near, the maximum Ethernet connection limits with produced/consumed tags, you may experience over-connection limit errors.</p> <p>This anomaly will be experienced only if your configured RPI rates are not binary multiples of 2 ms. This is because the CompactLogix packaged controllers round the RPI down to the nearest binary multiple to make connections (for example, setting an RPI of 100 ms results in the packaged controller sending data at 64 ms).</p> <p>If you experience this anomalous behavior, adjust the RPI of controllers consuming data from the CompactLogix packaged controller until the RPI rates are within the capabilities of the packaged controller. In addition, determine which communication module has exceeded the connection limit and adjust its RPI accordingly.</p> <p style="text-align: right;">Lgx00087882</p>

Table 4 - Known Anomalies with Firmware Revision 17.02...17.012 (continued)

Cat. No.	Anomaly	Description
1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1	Clearing a fault results in program loss.	After clearing a fault due to a missing I/O module and cycling power to the CompactLogix controller, the program is lost from controller memory and no fault is logged.
	Carry Status flag not set as expected.	When certain values are converted from a floating-point number to an integer, the Carry Status flag (S:C) is not set as expected for the value being converted. Lgx00074175
	The Modular Multivariable Control (MMC) instruction may not use the second or third control variable (CV).	The Modular Multivariable Control (MMC) instruction may not use the second or third control variable (CV) parameters to achieve the process variable (PV) setpoint when certain limits are specified for the CV. In applications where the MMC function block is used to control one PV through manipulation of up to three CVs, only the first CV is manipulated by the instruction if the CVxEUMax, CVEUMin, CVxHLimit, and CVxLLimit input parameters for the first CV are set at conflicting values. These input parameters conflict when the CVxHLimit or CVxLLimit keeps the CV clamped at a value inside the range specified with the CVxEUMax and CVxEUMin parameters. If the CV does not extend outside the CVxEUMax and CVxEUMin parameters, the second and third CVs of the MMC instruction are not used to manipulate the PV. Lgx00100721, Lgx00091924
	Using an SSV instruction to set the WallClockTime causes a fault.	Setting the WallClockTime to an invalid value by using an SSV instruction results in a Major Nonrecoverable Fault (MNRF). Lgx00097399
1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1	Use of a FIND instruction results in a major recoverable fault (MRF)	Attempts to use the FIND instruction to search a large string of characters results in a MRF. If you attempt to use the ASCII FIND instruction to search a source-data string of 32,767 characters, or more, a major fault Type 4 Code 51 results. Lgx00094007
	Use of STOD instruction when upgrading from revision 16 cause a scan time increase.	Use of an STOD instruction and a program upgrade from revision 16 to revision 17 results in the program-scan time increasing. When an STOD is used in an application that has been upgraded from revision 16 to revision 17, the program scan time dramatically increases due to an anomaly correction made to the STOD instruction in revision 17. Lgx00102980
	Use of a FFU instruction in an SFC program results in a major nonrecoverable fault (MNRF).	Use of an FFU instruction in a SFC program results in a major nonrecoverable fault (MNRF) when the last scan of the SFC is configured to Auto Reset. Lgx00096621
	Partial import of a project developed and run on a SoftLogix™ controller causes fault.	Completing a partial import of a project developed and run on a SoftLogix controller causes a Major Nonrecoverable Fault if certain instructions are used in the program. A Major Nonrecoverable Fault occurs on the controller when a program is developed and run on a SoftLogix controller, and then a partial import online is completed to a Logix5000 controller while the Logix5000 controller is in Run mode (online). A Major Nonrecoverable Fault occurs if the imported project contains these instructions: <ul style="list-style-type: none"> • Coordinated Control (CC) • Internal Model Control (IMC) • Modular Multivariable Control (MMC) The Major Nonrecoverable Fault occurs after the partial import is completed and the edits to the program are finalized. Lgx00103562

Table 4 - Known Anomalies with Firmware Revision 17.02...17.012 (continued)

Cat. No.	Anomaly	Description
1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1	Using a SFC Reset (SFR) to a step that is not the initial step cause the program to stay at the reset step.	<p>When an SFC Reset (SFR) instruction that is executed specifies a target step that is not the initial step, and the step is anywhere below (but outside) a simultaneous branch, the chart will no longer execute. The chart will remain in the step it was reset to, and attempts to progress via a Transition, Force, or Step Through are unsuccessful.</p> <p>To begin executing the chart again, you must execute an SFR instruction to the initial step or to a step above the first simultaneous branch.</p> <p style="text-align: right;">Lgx00099805</p>
	Interrupted service communication during a connection closure causes a fault.	<p>Depending on the structure of your program, if your service communication is interrupted for longer than 300 ms (as determined by the System Overhead Time Slice setting) and a connection is in the process of closing, a major nonrecoverable fault (MNRf) may result. The connection that is closing could be a connection used for I/O, a message instruction, a forward open, and so on.</p> <p style="text-align: right;">Lgx00101330</p>
	An invalid Process Variable (PV) used by a Proportional Integral Derivative (PID) instruction results in a control loss of the PV.	<p>When an invalid Process Variable (PV) value, for example a positive infinity (INF) or not a number (NaN), is used by the Proportional Integral Derivative (PID) instruction, the PID instruction becomes stuck and control of the PV is lost.</p> <p>To reset the instruction and recover control, you have to access the Data array of the PID instruction and clear any values that are invalid. The PID instruction would then begin to control the PV.</p> <p style="text-align: right;">Lgx00082890</p>

Restrictions

This restriction applies to the use of CompactLogix controllers at all minor revisions of firmware revision 17.

Restriction	Description
Attempting a firmware upgrade without the packaged controller end cap attached does not complete.	When upgrading your packaged controller firmware, verify that your end cap is properly attached and locked. If you attempt to upgrade without the end cap attached, your firmware upgrade may not complete successfully. Lgx00085396

Known Issues

These sections describe known issues associated with this packaged controller firmware revision that may affect the use of your packaged controller.

Controller Bridging via Serial Ports (1769-L23-QBFC1B packaged controller only)

With a 1769-L23-QBFC1B packaged controller, you cannot bridge from one serial port to the other. However, you can bridge from either serial port to DeviceNet network via the 1769-SDN scanner.

VA Task Overlap (all 1769 CompactLogix packaged controllers)

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 packaged 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 RSLogix 5000 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.

Cycle Power to Clear a Major Fault Related to 1769 I/O (all CompactLogix packaged controllers)

If a 1769 I/O fault occurs, you must cycle power to the CompactLogix packaged controller after clearing the major fault. I/O communication is 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 packaged controller should be power cycled.

Fault/Program Action Feature Not Enabled (all CompactLogix packaged controllers)

The embedded I/O and expansion I/O modules used with the packaged controller cannot be set with fault or program state outputs. The CompactLogix packaged controller does not support the ability to trigger the Fault/Program Action features, even though you can configure these options in RSLogix 5000 software via the Module Properties dialog box.

If a local I/O module loses communication with the packaged controller, or, the packaged controller is placed in Program mode, the local I/O modules turn their outputs off - regardless of the configuration specified in the Fault/Program Action tab.

In addition, RSLogix 5000 software generates configuration tags for embedded I/O and expansion I/O when you add the controller or expansion modules to the I/O configuration tree. Some of these tags define configuration (C) data type members that may include attributes for alternate outputs (that is, Fault or Program output states).

Since the CompactLogix system does not provide support for local modules to use the alternate outputs, do not configure the attributes or tags listed below.

Table 5 - Attributes and Tags To Avoid

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

Lgx00086275

Install the Controller Revision

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

Alternatively, if you have installed RSLogix 5000 software, version 17, and related firmware, you may not need to complete the tasks described. The AutoFlash feature of RSLogix 5000 software, version 17, detects if your packaged controller firmware needs upgraded upon a program download to the packaged 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 packaged controller.

2. Go online with the packaged controller and view packaged controller properties.
3. Verify that the firmware revision listed matches the firmware to which you intended to upgrade.
4. If the packaged 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 Resources

These documents contain additional information related to products from Rockwell Automation.

Resource	Description
CompactLogix Packaged Controllers Quick Start and User Manual, publication IASIMP-QS010	Provides procedures for using your CompactLogix packaged controller as well as additional reference information.
CompactLogix Controllers Selection Guide, publication 1769-SG001	Provides specifications and other information related to the selection of CompactLogix controllers.
Compact I/O™ Selection Guide, publication 1769-SG002	Provides information about calculating the number of expansion I/O that can be used with your packaged controller.
Rockwell Automation Technical Support Knowledgebase, http://www.rockwellautomation.com/knowledgebase/	Contains technical notes and other information related to upgrading your packaged controller's firmware.
CompactLogix Packaged Controllers Installation Instructions, publication 1769-IN082	Contains complete instructions for installing your CompactLogix packaged controller.
Logix5000 Controllers Common Procedures Reference Manual, publication 1756-PM001	Lists related Logix5000 publications.
ControlFLASH Firmware Upgrade Kit Quick Start, publication 1756-QS105	Contains information about firmware upgrades, installation instructions, and error messages.

You can view or download Rockwell Automation publications at <http://www.rockwellautomation.com/literature>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation 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://www.rockwellautomation.com/support>, you can find technical manuals, 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. You can also visit our Knowledgebase at <http://www.rockwellautomation.com/knowledgebase> for FAQs, technical information, support chat and forums, software updates, and to sign up for product notification updates.

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

Installation Assistance

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

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

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

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

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

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