FlexLogix Controller Revision 12 Release Notes

Catalog Numbers 1794-L33, 1794-L34

When to Use These Release Notes

These release notes should be used with FlexLogix controller firmware **major revision 12, minor revision 28**. Use this firmware with:

Update this:	To this revision or later:
RSLinx® software	2.41
RSLogix™ 5000 software	12.01 (We recommend you upgrade to 12.02.)
RSNetWorx™ for ControlNet™ software	4.11
RSNetWorx for DeviceNet™ software	4.12

What Is In These Release Notes

These release notes provide the following information:

Publication 1794-RN012E-EN-E - September 2004

Before You Update Your System

Before you update your controller or RSLogix 5000 software to this revision, do the following preliminary actions:

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.	This revision *may* require more memory than previous revisions. Before you upgrade to this revision, do the following: 1. Check the amount of unused memory that you have in the controller. To determine your unused memory, see either of the following documents: • Knowledgebase document G19984. To access Rockwell Automation's Knowledgebase, go to www.ab.com. Select *Support*. • *Logix5000 Controllers Common Procedures*, publication 1756-PM001E or later 2. If your controller is close to its limits of memory, see "Additional Memory Requirements" on page 10 to determine how much additional memory you require. 3. For additional information on how the controller organizes its memory, see Knowledgebase document G19984.

Enhancements

The new features contained in this revision of FlexLogix controllers are listed in Table 1:

Table 1

Enhancement:	Description:
Event Tasks	An event task performs a function only when a specific event (trigger) occurs. Whenever the trigger for the event task occurs, the event task: • interrupts any lower priority tasks • executes one time • returns control to where the previous task left off The trigger can be an EVENT instruction
Cache Up to 32 Connections	This revision lets you cache up to 32 connections, regardless of the type of Message (MSG) instruction (block transfer, etc.). *Previous* revisions let you cache up to 16 connections for block-transfer MSGs and 16 connections for other types of MSGs.

Changes

The changes contained in this revision of FlexLogix controllers are listed in Table 2:

Table 2

<table>
<tr><th>Change:</th><th>Description:</th></tr>
<tr><td>During Prescan, Each Task Uses a Watchdog Time of 5 seconds</td><td>During prescan, the controller overrides the specified watchdog time for each task.and uses 5 seconds for the watchdog time. This occurs only during prescan.

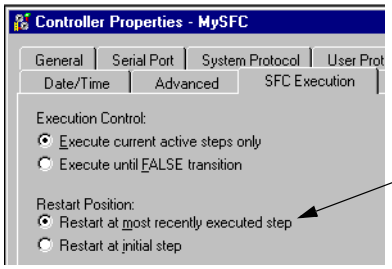
Logix00040009</td></tr>
<tr><td>Out-of-Range Subscript No Longer Produces a Fault During Prescan</td><td>During prescan, if the controller automatically clears any faults due to an array subscript that is beyond the range of the array (out of range).

In previous revisions, this produced a major fault.

Logix00040220</td></tr>
<tr><td>Wind Up High and Low of an Enhanced PID (PIDE) Function Block Act Differently</td><td>In the enhanced PID (PIDE) function block instruction, the wind up inputs now produce the following response from the instruction:
<table>
<tr><th>If this input is on (1):</th><th>Old response:</th><th>New response:</th></tr>
<tr><td>WindupHIn</td><td>output could not increase</td><td>output can not integrate in a positive direction</td></tr>
<tr><td>WindupLIn</td><td>output could not decrease</td><td>output can not integrate in a negative direction</td></tr>
</table></td></tr>
<tr><td>Improvements in How an SFC Restarts After Its Execution is Aborted</td><td>This revision provides better handling of situations where the execution of a sequential function chart (SFC) was aborted due to:

• loss of power
• controller entered the faulted mode (flashing red OK LED)

The changes include the following:

Regardless of this setting, the SFC always restarts at the initial step after a change from faulted mode (flashing red OK LED) to run/remote run mode.

Logix00042264</td></tr>
</table>

Corrected Anomalies

The corrected anomalies are listed in Table 3.

Table 3

Anomaly:	Corrected in this firmware:	Description:
Module May Not Have Behaved as Expected During Communication Faults and Program Mode Transitions	FLexLogix FW 12.28	If the FlexLogix controller was connected to an output module on either the local or extended-local rail via a rack-optimized connection, the module may not have behaved as expected when a communications fault occurred or the FlexLogix controller transitioned to Program Mode. Typically, output modules on the local and extended-local rails are configured to Reset Outputs when a fault occurs or the controller transitions to Program Mode; these settings are the module's default configuration. However, the output module behaved as if configured to Hold Last Outputs when the fault occurred or the FlexLogix controller transitioned to Program Mode. Lgx00050654
In SFCs Configured for Auto Reset, Stored Actions Were Not Properly Postscanned	FlexLogix FW 12.26	When an SFC was configured for Automatic Reset and an Action used a stored qualifier (S, SD, SL, DS), when a reset action (R) executed, the action being reset was not postscanned. Lgx00047935
Rack Optimized Input May Be Momentarily Invalid in a High Priority Task or Trend	FlexLogix FW 12.25	Previously, the controller may have momentarily referenced invalid Rack Optimized input data for I/O modules on the local or local2 rails under the following conditions: • The controller referenced data from at least two, adjacent, local input modules (including combination modules) that were mapped as Rack Optimized. • The module which has an input module to the left of it may exhibit the anomaly. In other words, an input module in slot 0 did not exhibit the anomaly. • A higher priority task than the I/O Update Task (priority 7) referenced the data. This included user tasks with priority of 1-6 and any trends; trends have a priority higher than 1. **IMPORTANT**: Instructions within a periodic task with priority of 7-15 (default periodic task priority is 10) or the continuous task did not exhibit this anomaly. For example, a controller referenced data from input modules in Slot 0 and Slot 1. Both modules were Rack Optimized. A trend on inputs from Slot 1 may have exhibited the anomaly. A task with a priority of 1 may have exhibited the anomaly with inputs from Slot 1. A task with a priority of 10 did not exhibit the anomaly. Lgx00045531

Table 3

Anomaly:	Corrected in this firmware:	Description:
Electronic Keying Not Working Properly with FLEX I/O Modules	FlexLogix FW 12.24	If FLEX I/O modules were configured to use the Compatible Module option in Electronic Keying and a incompatible module was inserted in the module slot, the Electronic Keying feature did not always prevent communication between the new (incompatible) module and the FlexLogix controller. The FlexLogix controller may have maintained its connection to the slot and exchanged data as if the new module were compatible with the configuration for that slot. In this instance, it was possible for inputs and outputs to remain active when they should have been turned OFF. Logix00041825 and Logix00041826

Frequent Access of Memory Statistics Produced Non-Recoverable Fault		The following *combination* of circumstances produced a non-recoverable fault (solid red OK LED):
		• Any of the following attributes were frequently read from the controller:
		  • largest contiguous block of additional free logic memory
		  • largest contiguous block of free I/O memory
		  • largest contiguous block of free data and logic memory
		• Other Message (MSG) instructions were executing.
		When the controller experiences a non-recoverable fault, it clears the project from memory.
		
		Logix00039939

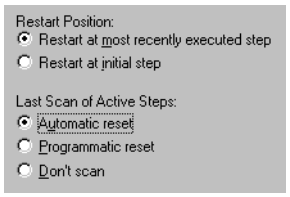
Resetting an SFC Produced a Non-Recoverable Fault		The following combination of circumstances produced a non-recoverable fault (solid red OK LED): • An SFC called another SFC (SFC subroutine). • The SFC subroutine contained a simultaneous branch. • While the last step of the simultaneous branch in the SFC subroutine was executing, an SFC Reset (SFR) instruction reset the calling SFC. • SFC execution for the project was configured as follows:  When the controller experiences a non-recoverable fault, it clears the project from memory. Lgx00042117

Table 3

Anomaly:	Corrected in this firmware:	Description:
During Postscan a RET Instruction Might Have Returned Unexpected Value	FlexLogix FW 12.24	During postscan, a Return (RET) instruction continued to pass return parameters. Under the following combination of circumstances, this might have produced unexpected values. 1. In a sequential function chart (SFC), multiple elements called the same subroutine at the same time and went inactive at the same time (e.g., an action called a subroutine several times, several paths of a simultaneous branch called the same subroutine). 2. The subroutine manipulated tag values and returned the values to the SFC via a RET instruction. 3. The SFC Execution—Last Scan of Active Steps option = Automatic Reset. With the Automatic Reset option, the controller postcans the logic and subroutines of an SFC action when the action goes from active to inactive. • If the SFC calls the subroutine multiple times, the controller postscans the subroutine multiple times. • During postscan, the logic might not manipulate tag values. As a general rule, the postscan executes instructions as if all conditions are false. • Without the manipulation of the values, the RET instruction returned the same value during each postscan. The values were left over from the last normal scan of the subroutine. With this revision, a RET instruction no longer passes return parameters during postscan. Lgx00040384
Controller Ran Out of Memory for New Tags		When memory that was previously used for logic, trends, or RSLinx DDE/OPC communication was freed up, the memory was no longer available for the creation of new tags. For example, stopping a trend frees up memory. But that memory was only available for new logic or trends. If the controller executed a significant number of trends, it no longer had any memory for new tags. Logix00041261
PIDE Function Block Failed to Execute Properly After Import		If you imported a project from a previous revision, the enhanced PID (PIDE) function block instruction might have failed to correctly set the rate-of-change alarms for the process variable (PVROCPosAlarm, PVROCNegAlarm). Under the following combination of circumstance, the enhanced PID (PIDE) function block instruction might have failed to update the control variable: • Timing mode = oversample mode • Logic toggled the EnableIn bit. • You imported the project from a previous revision. Lgx00042169

Table 3

<table>
<tr><th>Anomaly:</th><th>Corrected in this firmware:</th><th>Description:</th></tr>
<tr><td>Controller Fault Handler or Power-Up Handler Produced Unexpected Operations</td><td>FlexLogix FW 12.24</td><td>Under the following sequence of events, the controller might have produced unexpected operation:
1. A project contained a program in either its Controller Fault Handler or Power-Up Handler.
2. The project was downloaded to the controller and executed (controller placed in run mode).
3. The project was taken offline and modified.
4. The offline project was re-downloaded to the controller, but the controller was left in program mode.
5. Either of the following occurred
<table><tr><th>Situation:</th><th>Actions:</th></tr><tr><td>Situation A</td><td>A. The project was stored to nonvolatile memory.
B. The controller was placed in run mode.
C. The project was loaded into the controller from nonvolatile memory.</td></tr><tr><td>Situation B</td><td>Power to the controller turned off and then turned back on.</td></tr></table>In most instances, this produced a non-recoverable fault. When the controller experiences a non-recoverable fault, it clears the project from memory.
Logix00041503</td></tr>
<tr><td>ASCII Read and Write Instructions Produced Non-Recoverable Fault</td><td></td><td>In some instances, ASCII Read (ARD, ARL) or ASCII Write (AWA, AWT) instructions produced a non-recoverable fault (solid red OK LED). This occurred because the controller failed to schedule internal, firmware tasks.

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

Lgx00042246</td></tr>
<tr><td>Enhanced PID (PIDE) Function Block Did Not Integrate When the Output Saturated</td><td></td><td>The enhanced PID (PIDE) function block instruction did not integrate whenever the output saturated at 0%, 100%, or a user-specified limit. This anomaly was only present in earlier revisions of the 12.x of firmware.
The PIDE instruction is now integrates as follows:
<table><tr><th>If the output is at:</th><th>It integrates in a:</th></tr><tr><td>low output limit</td><td>positive direction</td></tr><tr><td>high output limit</td><td>negative direction</td></tr></table>Logix00041603</td></tr>
</table>

Table 3

Anomaly:	Corrected in this firmware:	Description:
In an SFC, a Major Fault Due to an Instruction Produced a Non-Recoverable Fault	FlexLogix FW 12.24	Under the following combination of circumstances, a major fault produced a non-recoverable fault (solid red OK LED): 1. A sequential function chart (SFC) executed an instruction that produced a major fault. The instruction could have been either: • embedded as structured text within the SFC • in a subroutine that the SFC called 2. A fault routine cleared the fault. When the controller experiences a non-recoverable fault, it clears the project from memory. Lgx00038945
Array Subscript That Was Out of Range Produced Non-Recoverable Fault	RSLogix 5000, version 12.01	Under the following *combination* of circumstances, an array subscript produced a non-recoverable fault (solid red OK LED): • A CMP, CPT, FAL, or FSC instruction operated on an array. • A tag identified the subscript of the array (indirect address). • The indirect address used an expression to calculate the value for the array subscript. • The indirect address produced a subscript that was too large for the array. (This produced a major fault.) • The controller contained a fault routine that tried to clear the major fault. When the controller experiences a non-recoverable fault, it clears the project from memory. Logix00038663
LDL2 Instruction Produced Inaccurate Coefficients or Non-Recoverable Fault	FlexLogix FW 12.23	A Second-Order Lead Lag (LDL2) instruction might have produced the following when certain input parameters were = 0: • inaccurate internal coefficients • non-recoverable fault (solid red OK LED) Logix00036816
Enhanced PID (PIDE) Function Block Failed to Clamp Control Variable		When ZCOff = 0 and the error value crossed zero and remained within the ZCDeadband range, ZCDeadbandOn failed to remain =1. This prevented the instruction from clamping the control variable. Logix00030777
Enhanced PID (PIDE) Function Block Failed to Keep Control Variable at Saturation		When a PIDE instruction drove the control variable to one of its limits (saturation), the instruction failed to keep the control variable at saturation long enough. • As soon as the process variable began to change, the PIDE instruction let the control variable leave its limit. • With this revision, the PIDE instruction more accurately keeps the control variable at its full output. Logix00036344
Resetting an SFC Corrupted a Simultaneous Branch		If you reset a sequential function chart (using an SFR instruction) while it was executing the next to last step of a path of a simultaneous branch, that path might have become corrupted. When the simultaneous branch was executed again, the controller might have experienced a non-recoverable fault (solid red OK LED) and cleared the project from its memory. Logix00038637

Table 3

Anomaly:	Corrected in this firmware:	Description:
Controller Could Not Connect to a Toledo Weigh Scale Over a ControlNet Network	FlexLogix FW 12.23	The controller was unable to establish a connection with a Toledo weigh scale over a ControlNet network. • To communicate with the weigh scale, the I/O configuration of the project used the Generic ControlNet Module type. • If the input or output assembly instance = 255, the controller incorrectly encoded the value (16-bit instead of 8=bit). This prevented the controller from connecting to the weigh scale. • RSLogix 5000 software returned a module fault code of 16#0315. Logix00038188
Use of a Third-Party OPC Server Produced a Non-Recoverable Fault		If you monitored data using a third-party OPC server that by-passed RSLinx software, the controller might have experienced a non-recoverable fault (solid red OK LED) and cleared the project from its memory. Logix00037557
Unconnected Messages Over an EtherNet/IP Network Produced a Non-Recoverable Fault		Under the following combination of circumstances, a Message (MSG) instruction might have produced a non-recoverable fault (solid red OK LED): • The MSG was configured as a PLC2, PLC3, PLC5, or SLC type message. • Communication was over an EtherNet/IP network. • The destination device was *not* present. When the controller experiences a non-recoverable fault, it clears the project from memory. Logix00039180
Product Service Advisory— Power Disruptions Cleared Memory	FlexLogix FW 11.24 and FW 12.23	**Important:** This revision corrects the following anomaly only if your controller is currently at 11.x firmware. If power to the controller turned on and then turned off again in less than a second, the controller might have cleared the project from its memory. • If the controller did not have enough time to complete a critical portion of the power-up sequence (less then 1 second), the controller typically cleared its memory. • This might have occurred during brownouts or other situations where power to the controller fluctuated for a short duration. Logix00036366, Logix00036367
Problems on Power-Up or Power Cycling When a 1794-VHSC Exists on the Local DIN Rail	FlexLogix FW 11.25	When using a 1794-VHSC on the local or extended-local rails, the FlexLogix controller experienced the following anomalies after power-up or when power was cycled: • The controller may have lost its current Date and Time. • The controller may have had difficulties establishing connections to the 1794-VHSC or other I/O modules, including RSLogix 5000 reporting a 'module in use' error. The support of the 1794-VHSC on the local or extended-local rails was added in v11, so this anomaly only occurs with firmware v11 revisions up to and including 11.24.

Restrictions

This revision of FlexLogix controllers has no restrictions.

Additional Memory Requirements

Revision 12.x *may* require more memory than previous revisions (e.g., 10.x, 11.x). To estimate the additional memory that your project *may* require, use the following table:

Table 4 Additional memory requirements when you convert a project to revision 12 (Sheet 1 of 2)

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:(1)	
	Component		Increase per instance	I/O (base)	Data and Logic (expansion)
11.x or earlier	tag that uses the MOTION_INSTRUCTION data type		4 bytes		Yes
	tag for an axis				
	If the data type is:	And the tag is:			
	AXIS_CONSUMED	⇒⇒⇒⇒⇒⇒⇒⇒⇒⇒	264 bytes	Yes	
	AXIS_SERVO	produced for another controller	264 bytes	Yes	
		not produced for another controller	264 bytes		Yes
	AXIS_SERVO_DRIVE	produced for another controller	288 bytes	Yes	
		not produced for another controller	288 bytes		Yes
	AXIS_VIRTUAL	produced for another controller	264 bytes	Yes	
		not produced for another controller	264 bytes		Yes
	output cam execution targets		648 bytes		Yes
	user-defined data type: • number of user-defined data types in the controller organizer ⇒Data Types folder ⇒User-Defined folder • *not* the use of that data type in tags		128 bytes		Yes
	indirect address (using a tag as the subscript for an array in an instruction, e.g., Array_A[Tag_B]). This memory change applies *only* if the array: • uses a user-defined data type • has only one dimension (e.g., UDT_1[5])		(-60 bytes)		
10.x or earlier	project for a FlexLogix controller		1200 bytes	Yes	
	programs		12 bytes		Yes
	routines		16 bytes		Yes
9.x or earlier	tag that uses the MESSAGE data type		376 bytes		Yes
8.x or 9.x	produced or consumed axis		(-21.6K bytes)	Yes	
	axis that *is not* produced or consumed		(-21.6K bytes)		Yes

Table 4 Additional memory requirements when you convert a project to revision 12 (Sheet 2 of 2)

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:(1)	
	Component			Increase per instance	I/O (base)	Data and Logic (expansion)
8.x or earlier	output cam execution targets			5,404 bytes		Yes
	motion group			32 bytes		Yes
7.x or earlier	project for a FlexLogix controller			1050 bytes	Yes	
	tags			0.55 bytes		Yes
	messages that: • transfer more than 500 bytes of data *and* • target a controller in the same chassis This memory is allocated only when the MSG instruction is enabled. To estimate, count the number of these messages that are enabled and/or cached at one time.			2000 bytes	Yes	
6.x or earlier	base tags			24 bytes		Yes
	alias tags			16 bytes		Yes
	produced and consumed tags	Data type	Bytes per tag			
		DINT	4	12 bytes	Yes	
		REAL	4	12 bytes	Yes	
				3 x bytes per tag	Yes	
				3 x bytes per tag	Yes	
6.x	routines			68 bytes		Yes
5.x or earlier	routines			116 bytes		Yes

(1) In the FlexLogix controller, the I/O and expansion memory types are merged into a single memory pool.

IMPORTANT

An internal change on FlexLogix controllers resulted in less available memory with major revision 7 as compared to major revision 6.

- The 1794-L33 controller has 34k bytes less memory available.
- The 1794-L34 controller has 96k bytes less memory available.

Subsequent upgrades to new major revisions maintain this internal change.

Connecting 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 is also the recommended installation procedure for any third-party power supply you might use. If you intend to use a 1794-PS1 power supply, you must install a 1 Kohm, 2-watt resistor on the 24V dc side of the power supply.

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