FlexLogix Controller Revision 13 Release Notes

Cat. No. 1794-L33, 1794-L34

When to Use These Release Notes

These release notes should be used with FlexLogix™ controller firmware **major revision 13, minor revision 33**. Use this firmware with:

Update this:	To this revision or later:
RSLinx software	2.42
RSLogix™ 5000 software	13.0
RSNetWorx ™ for ControlNet ™ software	4.21
RSNetWorx for DeviceNet ™ software	4.21
RSNetWorx for EtherNet/IP software	4.21

What Is In These Release Notes

These release notes provide the following information:

Publication 1794-RN013D-EN-E - September 2005

Before You Update Your System

Before you update your controller to this revision, do the following preliminary actions:

Table 1

If:	Then:
Your controller is close to its limits of memory.	This revision *may* require more memory than previous revisions. • To see what components of your current project require more memory, see page 11. • RSLogix 5000 software revision 13.0 or later lets you estimate the memory requirements of the controller offline. See page 3. To upgrade to this revision, you may have to use a larger FlexLogix controller.
Your controller is connected to a DH-485 network.	Disconnect it from the DH-485 network *before* you update the firmware of the controller. If you update the firmware of a controller while it is connected to a DH-485 network, communication on the network may stop.

Enhancements

The new features for this revision of FlexLogix controllers are listed in Table 2:

Table 2

Enhancement:	Description:
Online Edits of Sequential Function Charts (SFC) and Structured Text (ST)	This revision lets you perform online editing of Sequential Function Chart (SFC) and Structured Text (ST) routines. Like the Function Block Diagrams (FBD), online editing of SFC and ST routines is done at a routine level.

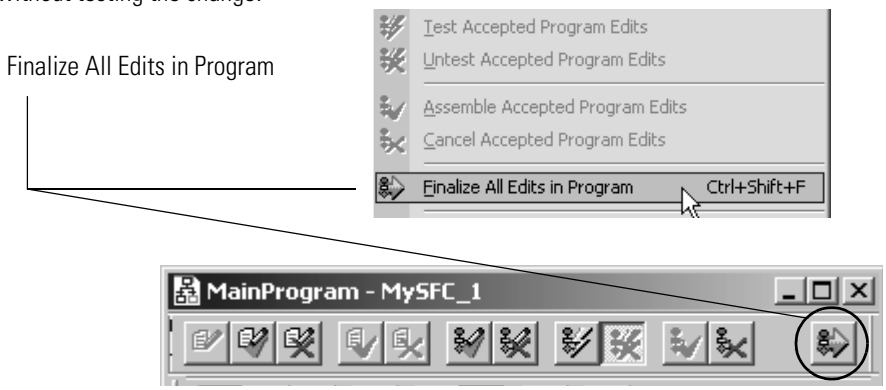
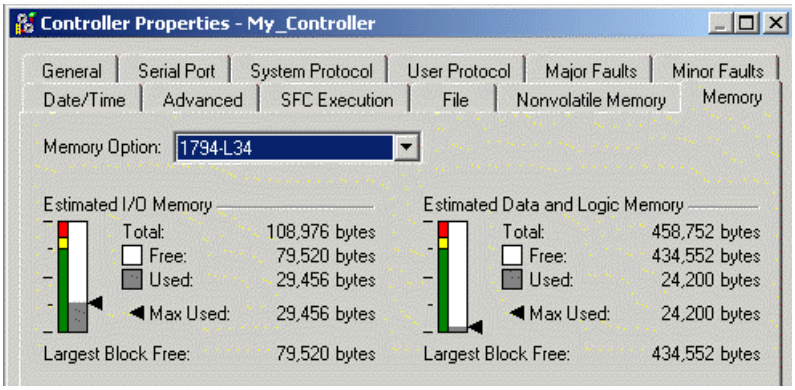
Finalize All Edits in a Program	The *Finalize All Edits in Program* option lets you make an online change to your logic *without* testing the change.
	 
	When you choose *Finalize All Edits in Program:*
	• *All* edits in the program (pending and test), immediately download to the controller and begin execution.
	• The original logic is permanently removed from the controller.
	• Outputs that were in the original logic stay in their last state unless executed by the new logic (or other logic).
	• If your edits include an SFC:
	  • The SFC resets to the initial step.
	  • Stored actions turn off.

Table 2

<table>
<tr><th>Enhancement:</th><th>Description:</th></tr>
<tr><td>Estimate Memory Information Offline
View Memory Information Online</td><td>To estimate how much controller memory your project requires, use the Memory tab of the controller properties dialog box. For each of the memory areas of your controller, it lets you estimate number of bytes of:
free (unused) memory
used memory
largest free contiguous block of memory 

When online with a controller, the Memory tab shows the actual memory usage of the controller. The tab includes a Max Used entry for each type of memory. The Max Used values show the peak of memory usage as communications occur.
<table>
<tr><td>IMPORTANT</td><td>RSLogix 5000 shows estimated I/O and Logic Memory pools for the 1794-L34 controller. However, for the FlexLogix controllers, all memory (i.e., I/O and expansion memory types) are merged into a single memory pool.</td></tr>
</table></td></tr>
<tr><td>Improved Performance of Simple Structured Text Statements</td><td>The controller now executes simple structured text (ST) assignments and comparisons faster than previous revisions.
<table>
<tr><th>For this:</th><th>This is simple:</th><th>This is NOT simple:</th></tr>
<tr><td>assignment</td><td>A := B;</td><td>A := -B;
A := B + C;
A := sin(B);</td></tr>
<tr><td>comparison (=, <, <=, >, >=, <>)</td><td>A > B
A = B</td><td>A > -B
A > (B + C)
A > sin(B)</td></tr>
</table></td></tr>
</table>

Table 2

<table>
<tr><th>Enhancement:</th><th>Description:</th></tr>
<tr><td rowspan="4">For Some Non-Recoverable Faults, the Controller Produces a Major Fault and May Be Able to Log Diagnostic Information.</td><td>If the controller detects a non-recoverable fault that was not caused by its hardware, the controller now responds as follows:</td></tr>
<tr><td>The controller clears the project from memory.</td></tr>
<tr><td>
<table>
<tr><th>Type</th><th>Code</th><th>Cause</th><th>Recovery Method</th></tr>
<tr><td>1</td><td>60</td><td>For a controller with no CompactFlash card installed or no support for a CompactFlash card, the controller:
detected a non-recoverable fault
cleared the project from memory</td><td>1. Clear the fault.
2. Download the project.
3. Change to remote run/run mode.
If the problem persists:
1. Before you cycle power to the controller, record the state of the OK and RS232 LEDs.
2. Contact Rockwell Automation support. See the back of this publication.</td></tr>
</table>
</td></tr>
<tr><td>In previous revisions, the controller would not go to faulted mode or display a fault code for the type of situation described above.</td></tr>
<tr><td>Embedded EDS Support</td><td>FlexLogix controllers now include their electronic data sheet (EDS) file as part of their firmware. This lets RSNetWorx software 5.x or later upload and register the EDS file directly from the controller. In previous revisions, you had to find the file on a CD or a web site and manually install the EDS file.</td></tr>
<tr><td>Consumed Tag Can Trigger Event Tasks</td><td>FlexLogix controllers now support the use of consumed tags to trigger 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
Prior to v13, FlexLogix controllers could only trigger event task via EVENT instructions.</td></tr>
</table>

Changes

The changes for this revision of FlexLogix controllers are listed in Table 3:

Table 3

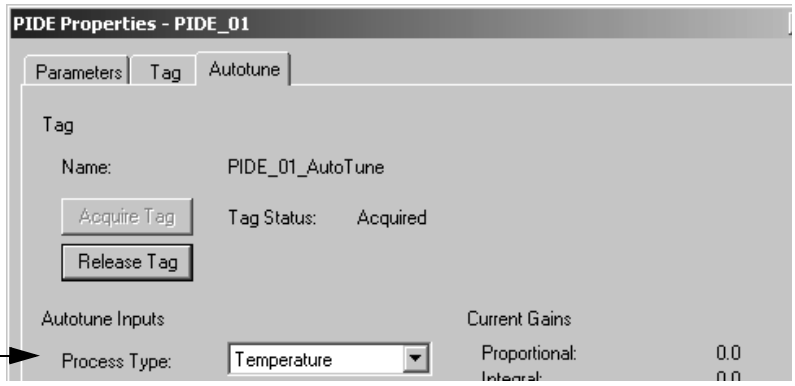
Change:	Description:
In a Message (MSG) Instruction, You *Cannot* Set or Clear Certain Status Bits.	*Do not* set or clear the following members of a Message (MSG) instruction: • EW • ER • DN • ST • Flags **Important**: If your logic currently manipulates any of the above members of a MSG instruction, your controller *may* operate differently when you update to this revision. If you set or clear one of those bits, RSLogix 5000 software displays the change. But the MSG instruction ignores the change and continues to execute based on the internally-stored value of those bits.
For Function Block Instructions That Use Periodic Timing, DeltaT Now Includes the Fractional Portion of the Task's Period.	If your function block instruction uses the periodic timing mode, the controller *no longer* truncates the fractional portion of a task's period to produce the delta time (DeltaT). In *previous* revisions, the controller truncated the fractional portion of the task's period. Lgx00036282
Out-of-Range Subscript No Longer Produces a Fault During Prescan	During prescan, 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. Lgx00040220
AutoTune Now Uses a Non-Integrating Process Model for Temperature Processes	When you autotune an Enhanced PID (PIDE) function block with the Process Type = Temperature, autotune now uses a non-integrating process model to estimate tuning constants. This gives better tuning constants for most application.  In previous revisions, autotune used an integrating process model. Lgx00041638

Table 3

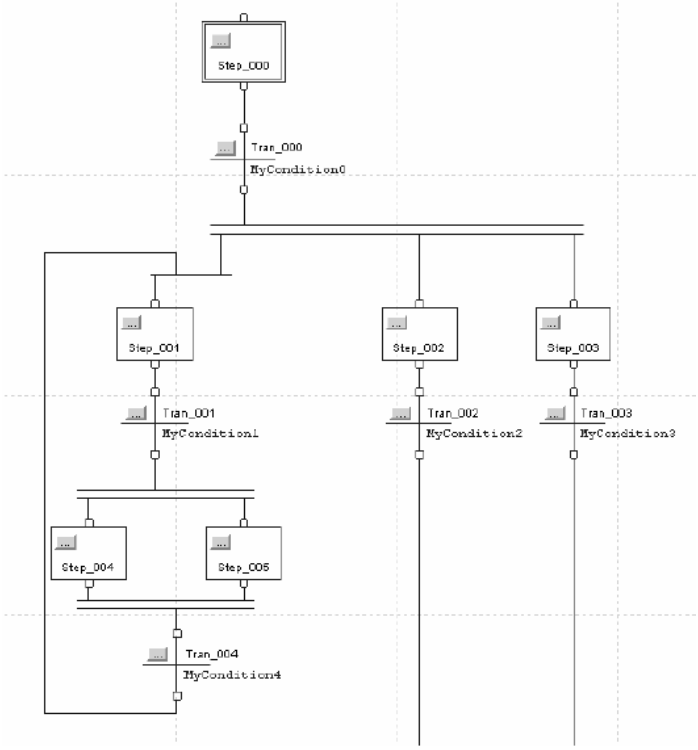
Change:	Description:
You *Must* Place a Label (LBL) Instruction At the Start of a Rung.	If your logic includes a Label (LBL) instruction, make sure the instruction is the first instruction on the rung. If it is *not*, move the LBL instruction to the beginning of the rung. Otherwise, the routine will *not* verify. In *previous* revisions, RSLogix 5000 software let you place the LBL instruction elsewhere on the rung. But the controller always executed the instruction as if it were at the beginning of the rung. Lgx00042691
Reduction in the Prescan Time of Projects with Many Jump to Subroutine (JSR) Instructions	During a prescan, the controller no longer prescans a routine more than once. Once it prescans a routine, the controller does not prescan the routine again during that prescan. In *previous* revisions, the controller would prescan a routine as often as it was called in logic. For projects with many calls to subroutines, this could produce a very long prescan and cause a watchdog timeout fault. Lgx00043977

Corrected Anomalies

The corrected anomalies are organized by the firmware revision that corrected them.

FlexLogix 1794-L33, -L34 Rev. 13.33

MSG Read of User Defined Structure Greater Than 500 Bytes Did Not Return Any Data	A MSG read of a user defined structure that contained more than 500 bytes should have read some data before determining that the structure was too large. Lgx00050774
Large MSG Instructions	This revision of FlexLogix firmware adds more stringent range checks when reading to or writing from tags. This could cause some MSG instructions that worked in previous firmware revisions to not work in this revision of firmware. For example, use a CIP Generic MSG instruction to perform a Get Attribute Single service. The attribute is 4 bytes in length. Assume the destination tag is an INT data type (2 bytes in length). In previous releases of firmware, the MSG instruction places the first 2 bytes of the attribute in the destination tag. In this revision of firmware, the MSG instruction errors because the destination tag is not large enough. To correct this error, change the destination tag to a DINT data type.
Large SLC Typed Write MSG Instructions	This revision of FlexLogix firmware limits the maximum packet size of SLC typed write MSGs to 216 bytes. Previously, these messages had a maximum size of 224 bytes. This could cause some MSG instructions that worked in previous firmware revisions to not work in this revision of firmware. Lgx00052949
Programmatic Change of MSG Status Bits Could Cause the MSG to Appear Remain Active (.EN Set)	If you programmatically reset the .DN or .ER bits of a MSG due to the asynchronous nature of the MSG, the MSG could appear to remain active (.EN set). In fact, the MSG was not active. The MSG required manual intervention to trigger it to execute again. This firmware revision removes the need for manual intervention to trigger the MSG to execute again. Lgx00053112

An SFC Could Execute the Wrong Step	If you had an SFC with nested simultaneous branches, the controller could begin execution at an unexpected step. Following the convergence of a nested simultaneous branch, if the SFC looped back to the initial step of the parent branch, instead of executing that step, the SFC could jump to a step of another path in the nested simultaneous branch. For example:  Execution starts at Step_000. When Tran_000 becomes true, Step_001, Step_002 and Step_003 should become active. However, because the nested simultaneous branch in the left path converged and looped back to its parent step (Step_001), the active steps were actually Step_005, Step_002 and Step_003. Lgx00054785
The File Search Compare (FSC) Instruction Caused a Non-Recoverable Fault	The FSC instruction caused an non-recoverable fault if both these conditions occurred: • a major fault was declared from within the expression of an FSC instruction • the user fault routine cleared the fault When the user fault routine attempted to recover, information previously saved was not properly restored, which resulted in corrupted system registers and a non-recoverable fault. Lgx00055522
CONCAT Instruction Generated Minor Fault When the Length of the Data Equaled the Maximum Characters Allowed for the String	The CONCAT instruction incorrectly generated a minor fault (Type 4, Code 51) when the length of the data was equal to the maximum number of characters allowed for the string data type. Lgx00056558

Quick power cycling or removing and reinserting local input modules could cause controller to fault	When cycling power to or removing and reinserting input modules that use direct connections, a momentary window existed where the module could lose its connection to the controller and reestablish the connection, and the module connection was never properly closed. This only occurred on the Local rails. To clear the fault, you had to power cycle the contoller and redownload the program. Lgx00056671
Controller Might Not Power Up if Powered Up Simultaneously with 1794-VHSC Module	In applications that used the 1794-L34 controller, version 12.x or greater, and a 1794-VHSC module, if the controller and I/O modules were powered up at the same time, occasionally the controller would not power up. In this case, the 1794-VHSC module displayed a solid red on its status indicators. In addition to using FlexLogix firmware review 13.33, you must update your 1794-VHSC firmware to firmware revision F to correct this anomaly. You must return the 1794-VHSC module to Rockwell Automation for a firmware upgrade. The firmware cannot be upgraded in the field. Lgx00056635

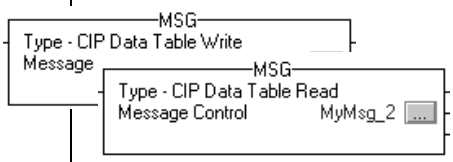
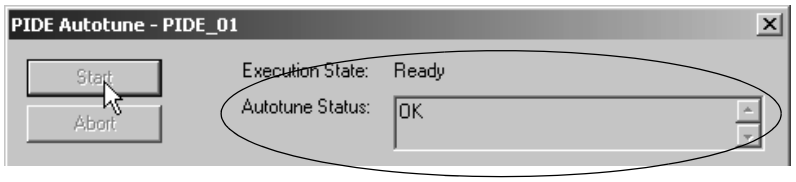
FlexLogix 1794-L33, -L34 Rev. 13.31

Module May Not Have Behaved as Expected During Communication Faults and Program Mode Transitions	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

FlexLogix 1794-L33, -L34 Rev. 13.29

In SFCs Configured for Auto Reset, Stored Actions Were Not Properly Postscanned	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

FlexLogix 1794-L33, -L34 Rev. 13.27

Anomaly:	**Description:**
Large Message (MSG) Instructions Might Have Caused a Non-Recoverable Fault	The following configuration of a Message (MSG) instruction might have produced a non-recoverable fault:  • Message type = CIP Data Table Read or Write • The instruction transferred > 240 bytes. • Communication was through the serial port. When the controller experiences a non-recoverable fault, it clears the project from memory. Lgx00040892
During Power Up, the Controller Erroneously Showed a Red I/O LED.	During power up, the controller sometimes showed a flashing red I/O LED when there was *no* problem Lgx00040151
AutoTune Produced Unnecessary Warnings	When you completed an autotune of an Enhanced PID (PIDE) function block instruction, the Autotune Status field sometimes showed warning messages that were incorrect (did *not* apply).  Lgx00041613
Remote Output Module Momentarily Dropped Its Connection	The following *combination* of circumstances occasionally caused an output module to drop its connection to the controller and then re-establish the connection: • The module was in a remote chassis. • The module used a *Rack Optimization* communication format. • The controller also executed a Message (MSG) instruction that bridged across the backplane of that same remote chassis to another communication module. Occurred most frequently if the MSG instruction was *not* cached. Lgx00043674

Anomaly:	Description:
Rack Optimized Input May Be Momentarily Invalid in a High Priority Task or Trend	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

Restrictions

This revision of FlexLogix controllers has no restrictions.

Additional Memory Requirements

Revision 13.0 or later *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 13 (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)
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* (i.e., 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		✔
11.x or earlier	tag that uses the MOTION_INSTRUCTION data type		4 bytes		✔
	tag for an axis				
	If the data type is:	**And the tag is:**			
	AXIS_CONSUMED	⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒	264 bytes	✔	
	AXIS_SERVO	produced for another controller	264 bytes	✔	
		not produced for another controller	264 bytes		✔
	AXIS_SERVO_DRIVE	produced for another controller	288 bytes	✔	
		not produced for another controller	288 bytes		✔
	AXIS_VIRTUAL	produced for another controller	264 bytes	✔	
		not produced for another controller	264 bytes		✔
	output cam execution targets		648 bytes		✔
	user-defined data type: • number of user-defined data types in the controller organizer ⇒ Data Types folder ⇒ User-Defined folder • *not* the use of that data type in tags		128 bytes		✔
	indirect address (using a tag as the subscript for an array in an instruction, e.g., Array_A[Tag_B]). This memory change applies *only* if the array: • uses a structure as its data type • does *not* use one of these data types: CONTROL, COUNTER, PID, or TIMER • has only one dimension (e.g., UDT_1[5])		(-60 bytes)		✔
10.x or earlier	project for a FlexLogix controller		1200 bytes	✔	
	programs		12 bytes		✔
	routines		16 bytes		✔

Table 4 Additional memory requirements when you convert a project to revision 13 (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)
9.x or earlier	project for a FlexLogix controller			1200 bytes	✔	
	tag that uses the MESSAGE data type			376 bytes		✔
8.x or 9.x	produced or consumed axis			(-21.6K bytes)	✔	
	axis that *is not* produced or consumed			(-21.6K bytes)		✔
8.x or earlier	output cam execution targets			5,404 bytes		✔
	motion group			32 bytes		✔
7.x or earlier	project			1050 bytes	✔	
	tags			0.55 bytes		✔
	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	✔	
6.x or earlier	base tags			24 bytes		✔
	alias tags			16 bytes		✔
	produced and consumed tags	Data type	Bytes per tag			
		DINT	4	12 bytes	✔	
		REAL	4	12 bytes	✔	
				3 x bytes per tag	✔	
				3 x bytes per tag	✔	
6.x	routines			68 bytes		✔
5.x or earlier	routines			116 bytes		✔

(1) In the FlexLogix controllers, 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.

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