Firmware Release Notes

ControlLogix SynchLink Module

Catalog Number 1756-SYNCH

Use the information in this release note with the following publications:

- 1756-IN575, 1756-SYNCH installation instructions
- 1756-UM521, 1756-SYNCH user manual

to properly operate your ControlLogix SynchLink module.

These release notes describe module and software restrictions and anomalies that exist when using the 1756-SYNCH module, Series A, Firmware Revision 2.18 with RSLogix 5000 version 11 or greater.

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Module Enhancements

Table 1 lists 1756-SYNCH module enhancements. Full descriptions of each enhancement follow in the rest of the section.

Table 1

Enhancement:	Available with Firmware Revision:	Description on:
On Power-Up Module Can Automatically Become Time Master of Local Chassis - Available with Firmware Rev. 2.18 or greater	2.18 or greater	page 3
Module Continues to Use Last Configuration When its Connection to Owner-Controller Closes - Available with Firmware Rev. 2.18 or greater	2.18 or greater	page 4
Module Supports Event Tasks - Available with Firmware Rev. 2.18 or greater	2.18 or greater	page 4
Some Module Configuration Changes Can be Made While Online with RSLogix 5000 - Available with Firmware Rev. 2.10 or greater	2.10 or greater	page 5
Four New Data Bits - Available with Firmware Rev. 2.10 or greater	2.10 or greater	page 5
Module Behavior When Communications are Lost with an Upstream CST Master is Configurable - Available with Firmware Rev. 2.10 or greater	2.10 only	page 6

On Power-Up Module Can Automatically Become Time Master of Local Chassis - Available with Firmware Rev. 2.18 or greater

The definition of *Not Required* has changed in revision 2.18. The new definition is that a slave 1756-SYNCH module can be configured so that it automatically becomes the time master of its local chassis whenever the module powers up and does not have a SynchLink CST master. To use this feature, you must configure the module's *Dependence on SynchLink* selection (as set in RSLogix 5000) for *Not Required* or *Ignored*.

If the module's *Dependence on SynchLink* selection is configured for *Required* and the module powers up without a time master, the module waits until a master appears to begin working.

In previous revisions, if the 1756-SYNCH module powered-up and did not have a time master, the module always waited until a time master appeared to work; this was true regardless of the Dependence on SynchLink selection.

IMPORTANT

The SynchLink CST master will not be present if the slave chassis is powered up before (or without) the CST master chassis. If the slave 1756-SYNCH module becomes the Chassis CST Master without the SynchLink CST master then the slave chassis is running unsynchronized motion. Unsynchronized motion may be acceptable when troubleshooting or performing machine maintenance. When synchronized motion is required the application logic in the slave chassis must check the proper status bit in the slave 1756-SYNCH module.

Once the SynchLink CST master signal resumes you must do the following to become synchronized with the CST master:

- Stop all motion connected to the slave chassis
- Reset the slave 1756-SYNCH module

The 1756-SYNCH module can be reset via application logic or by RSLogix 5000 programming software.

Module Continues to Use Last Configuration When its Connection to Owner-Controller Closes - Available with Firmware Rev. 2.18 or greater

Table 2 describes this enhancement.

Table 2

If the 1756-SYNCH module is used in this scenario:	and the owner-controller closes its connection to the 1756-SYNCH module, such as for one of the following reasons:	The 1756-SYNCH behaves as follows:
• The 1756-SYNCH module is located in a chassis with two ControlLogix controllers. • The 1756-SYNCH module is the time master for the local chassis. • One of the ControlLogix controllers is the 1756-SYNCH module's owner-controller. • The other ControlLogix controller is controlling motion based on the CST set by the 1756-SYNCH module.	• The controller is downloading a new project. • The controller is saving its NVS. • The controller is restoring its NVS. • The controller is removed from the chassis. • The controller is updating the module's firmware.	The module continues to act as time master for the local chassis, operating as directed by its most recent configuration. The 1756-SYNCH module's behavior only changes if the owner-controller reopens the connection to the module and reconfigures the module.

In previous revisions, when the scenario described in Table 2 existed, the module goes inactive and all motion controlled by the second ControlLogix controller stops.

Module Supports Event Tasks - Available with Firmware Rev. 2.18 or greater

RSLogix 5000, version 12 or greater supports Event tasks. The 1756-SYNCH module supports Event tasks with firmware revision 2.18 or greater.

Some Module Configuration Changes Can be Made While Online with RSLogix 5000 - Available with Firmware Rev. 2.10 or greater

You can change any configuration options shown on the Time Mastership tab while the module is online.

Four New Data Bits - Available with Firmware Rev. 2.10 or greater

Four new data bits, described in Table 3, are found in the module's configuration tags. These bits are related to the new configuration options described in the previous section.

Table 3

Bit Name	Description
Local:x:C.ChassisCSTMst	If this bit is set to 1, the module becomes the CST master for its chassis.
Local:x:C.SLCSTMst	If this bit is set to 1, the module becomes the CST master for the entire SynchLink.
Local:x:C.RemainChassisCSTMst	If this bit is set to 1, the module remains Chassis CST master for its chassis even if communications with the SynchLink CST master are lost.
Local:x:C.TempChassisCSTMst	If this bit is set to 1, the module acts as Chassis CST master for its chassis and ignores the SynchLink CST master.

Table 4 explains how the setting this bits corresponds to the configuration options described beginning on page 6.

Table 4

If these bits are set to 1:	It corresponds to this configuration option:
Local:x:C.ChassisCSTMst only	Option 1, described on page 6
Local:x:C.ChassisCSTMst and Local:x:C.RemainChassisCSTMst	Option 2, described on page 7
Local:x:C.ChassisCSTMst and Local:x:C.TempChassisCSTMst	Option 3, described on page 8

These bits are normally configured via the configuration screens in RSLogix 5000. We recommend you use those screens to change this information. If you change any of these bits directly (via the Tag Editor or user programming), you must reset or reconfigure the module via RSLogix 5000 or a message instruction.

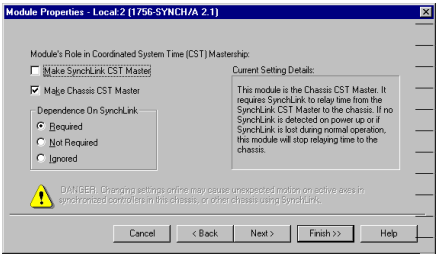
Module Behavior When Communications are Lost with an Upstream CST Master is Configurable - Available with Firmware Rev. 2.10 or greater

You can configure the behavior of a 1756-SYNCH module that loses communications with the SynchLink CST master. In this case, the module depends on the SynchLink fiber optic cable for CST mastership. The 1756-SYNCH module relays the time from the cable to the chassis in which it resides and acts as the Chassis CST master.

For two of the configuration options, if communications are not present when the module powers-up, CST-dependent features will not start operating until the communications to the SynchLink CST master are restored. For all options, you can configure the module's behavior if communications with the SynchLink CST master are broken after the 1756-SYNCH has begun operation.

You can configure the 1756-SYNCH module to behave in one of the following ways:

- The module stops relaying time to the chassis. In this case, the chassis is unsynchronized once communications are lost. The software settings for this option are shown below.

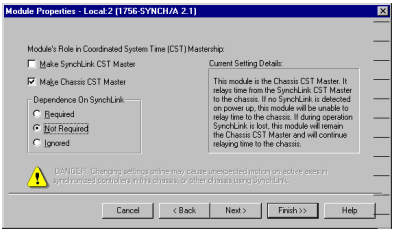


The previous module revision (i.e. 1.17) only offered this option when communications with the CST master are lost.

With this setting, there must be a connection with the CST master when the 1756-SYNCH module powers-up. If there is no connection, the module faults and has no CST time until the connection is made the CST master.

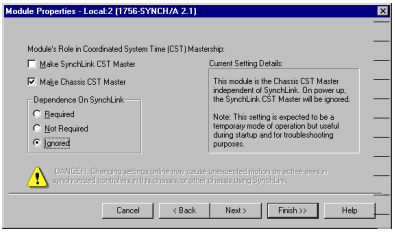
- The module continues to relay time and acts as Chassis CST Master. In this case, you must be aware that this chassis is running unsynchronized motion and you must account for the setting in your application's logic. If communications are resumed over the fiber optic cable, you must do the following to become synchronized with the CST master:
  - Stop all motion connected to this chassis.
  - Reset the 1756-SYNCH module to time relay function

  The software settings for this option are shown below.



The CST does not start in this chassis until a connection is made with the CST master, typically at module power-up. If there is no connection to the CST master at power-up, the module faults and has no CST until the connection is made. This is for **firmware revision 2.10 only**. To see how this works with firmware revision 2.18 or greater, see page 4.

- The module acts as an unsynchronized Chassis CST Master. In this case, the module ignores the SynchLink CST Master at all times, including module power-up. This option is expected to be a temporary mode of operation. The software settings for this option are shown below.



Corrected Anomalies

Table 5 lists corrected 1756-SYNCH module anomalies. Full descriptions of each anomaly follow in the rest of the section.

Table 5

Corrected Anomaly:	Anomaly Type:	Corrected in Firmware Revision:	Description on:
Removed Module May Not Power Up on Return to Chassis - Corrected in Firware Rev. 2.18	Module Anomaly	2.18	page 9
Module Does Not Always Transmit Axes After Communication Format Change - Corrected in Firware Rev. 2.10	Module Anomaly	2.10	page 10
Transmit Axis Faults After Multiple Inhibits or Program Downloads - Corrected in Firware Rev. 2.10	Module Anomaly	2.10	page 10

Table 5

Corrected Anomaly:	Anomaly Type:	Corrected in Firmware Revision:	Description on:
Configuration Allows Invalid Options - Corrected in Firware Rev. 2.10	Software Anomaly	2.10	page 10
Downloading a project which changes the CST master - Corrected in Firware Rev. 2.10	Software Anomaly	2.10	page 11
1756-Synch Apply Button Does Not Apply Changes And Remains Active - Corrected in Firware Rev. 2.10	Software Anomaly	2.10	page 11
Configuration Changes Lost if Not Applied Before Changing Tabs - Corrected in Firware Rev. 2.10	Software Anomaly	2.10	page 11
GroupSynced Bit Properly Checks All Axes in the Controller Motion Planner - Corrected in Firware Rev. 2.10	Controller Anomaly	2.10	page 12

Removed Module May Not Power Up on Return to Chassis - Corrected in Firware Rev. 2.18

If you remove and insert the module under power, the module may not power-up on reinsertion. In this case, the OK LED stays RED. If this problem occurs, you must remove and reinsert the module again.

Module Does Not Always Transmit Axes After Communication Format Change - Corrected in Firware Rev. 2.10

The 1756-SYNCH module transmits axes after communication format changes.

In previous module revisions, if you changed the receive and transmit communications formats on a 1756-SYNCH module and inhibited the module's connection to the controller, the module may have failed to transmit any axes.

Transmit Axis Faults After Multiple Inhibits or Program Downloads - Corrected in Firware Rev. 2.10

The 1756-SYNCH module can transmit and receive 3 or more axes of data and close and reopen its connection to the controller (i.e. via program downloads or inhibiting the module) as often as necessary.

In previous module revisions, if your module transmitted and received 3 or more axes of data, after a random number of instances of inhibiting the SYNCH module connection or multiple program downloads to the controller (causing the connection to close and reopen), the module may have reported "TxAxisFaults" in its input tag.

Configuration Allows Invalid Options - Corrected in Firware Rev. 2.10

RSLogix 5000 (programming software) prevents you from configuring the 1756-SYNCH module to transmit more direct data than it receives.

In previous module revisions, RSLogix 5000 allowed options on the SynchLink Configuration software tab to configure the 1756-SYNCH module to transmit more direct data than it received, even though it was an invalid configuration.

Downloading a project which changes the CST master - Corrected in Firware Rev. 2.10

If you download a project with a 1756-SYNCH module configured to be the CST master to a controller that is already configured as the CST master, RSLogix 5000 makes the appropriate changes so that only one CST master exists.

In previous module revisions, if you downloaded a project such as the one described in the previous project, you may have received no defined CST Master.

1756-Synch Apply Button Does Not Apply Changes And Remains Active - Corrected in Firware Rev. 2.10

Any configuration changes are applied when you use the Apply button in RSLogix 5000 configuration screens. Previously, the Apply button did not always apply configuration changes and remained active after you used it.

Configuration Changes Lost if Not Applied Before Changing Tabs - Corrected in Firware Rev. 2.10

You can make configuration changes on a configuration tab, change to another tab for additional changes and then apply them all at once, or you can applies changes on each tab.

Previously, if you made configuration changes and did not apply them before moving to another software configuration tab, the changes might have been lost.

GroupSynced Bit Properly Checks All Axes in the Controller Motion Planner - Corrected in Firware Rev. 2.10

In RSLogix 5000 version 11, axes consumed from the SynchLink are not included in the GroupSynced check that occurs when the controller runs its motion planner. The exclusion of axes consumed from the SynchLink allows motion to run when the SynchLink CST master is lost. If you use the GroupSynced bit in your application logic, we recommend you may have to add additional checks for axes consumed from SynchLink modules. Use the consumed axis "ModuleFault" bit for these axes.

Prior to RSLogix 5000 version 11, you would not get the GroupSynced bit if any axis was missing, including controlled axes and axes consumed from another source in the chassis (e.g. SynchLink or controller modules).

Existing Anomalies

Table 6 lists existing 1756-SYNCH module anomalies. Full descriptions of each anomaly follow in the rest of the section.

Table 6

Existing Anomaly:	Description on:
SynchLink Multiplier Truncates Values (27300)	page 13
Mixed Data in a Ring Configuration of 5 1756-SYNCH Modules (34082)	page 13
Configuration Changes Made Online Can Cause Connection to Close and Reopen (33753)	page 14
Drive Fault May Appear as Unknown Fault	page 14

SynchLink Multiplier Truncates Values (27300)

The Multiplier on Transmitted Direct Words truncates values after the decimal point and can give misleading results under some circumstances. For example, using a multiplier of 0.95 with a value of 20 yields a result of 18 instead of the expected 19. The reason for this error is that 0.95 is represented by a floating point value (~0.949999). The result of 18.9998 is truncated to 18 instead of rounded to 19.

We recommend you verify your results when using the multiplier function.

Mixed Data in a Ring Configuration of 5 1756-SYNCH Modules (34082)

If the following conditions exist:

- 5 or more 1756-SYNCH modules are connected in a ring or daisy chain configuration
- the modules use any communications format for the receive and transmit ports that include direct data
- the fiber cable connection allows short (i.e. millisecond duration) breaks in communications to the module

a downstream module can receive a mixture of old and new data. Typically, words 0 and 3 receive new data from the previous module, but words 1 and 2 receive old data.

We recommend you make sure all fiber cable connections are secure. For more information on making cable connections, see the SynchLink Design Guide, publication 1756-TD008.

Configuration Changes Made Online Can Cause Connection to Close and Reopen (33753)

If you make configuration changes to the Time Mastership tab while the 1756-SYNCH module is online and use the Apply button in RSLogix 5000 to send those changes to the module, either of the following may occur:

- The software sends the new configuration to the module without breaking the connection between the controller and the module.
- The software inhibits the connection between the controller and the module before sending the new configuration. After the new configuration is sent, the software reopens the connection and module operation resumes with the new configuration. In this case, when the connection is inhibited, the controller does not communicate with the module.

We recommend that you use the OK button when making online configuration changes to the Time Mastership tab.

Drive Fault May Appear as Unknown Fault

If you transmit axis data from a 1756-MO2AE module to a controller in the same chassis and a controller in a remote chassis (via SynchLink), the motion module may cause a fault in both controllers if you tune the module after the project is online. The local controller accurately reports a drive fault, and the remote controller may report an unknown fault. In this case, though, the remote controller is actually experiencing a drive fault as well.

Existing Restrictions

Table 7 lists existing 1756-SYNCH module restrictions. Full descriptions of each restriction follow in the rest of the section.

Table 7

Existing Restriction:	Restriction Type:	Description on:
Online Configuration Changes Only Occur on the Time Mastership Tab	Module Restriction	page 15
SynchLink Module Configured as Time Relay Must Receive Data	Software Restriction	page 16

Online Configuration Changes Only Occur on the Time Mastership Tab

If you want to make configuration changes while the 1756-SYNCH module is online, you can only make changes to the Time Mastership tab. You cannot change the module configuration on other tabs while the module is online.

IMPORTANT

There are no other **module restrictions** on this revision of the 1756-SYNCH module. Because you can use this 1756-SYNCH module revision in the same application as a 1756-SYNCH module revision 1.17, you must remember the module restrictions for revision 1.17, as described in publication 1756-RN579B-EN-P.

To see publication 1756-RN579B-EN-P

1. Visit: *http://support.rockwellautomation.com*
2. Click on Firmware Updates.

SynchLink Module Configured as Time Relay Must Receive Data

If you configure a 1756-SYNCH module to act as the local backplane CST master but not the SynchLink CST master, you must configure the module to receive data.

In other words, in the Receive Port Communications Format, if the module is configured for No Receive Data, then the module is configured not to receive any data, including CST reference data from an upstream node. Given this communications format, the module cannot be configured as the local backplane CST master.

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