ControlLogix ControlNet Interface Module

Catalog Numbers 1756-CNB and 1756-CNBR

Use These Release Notes

These release notes describe changes in version 5.50 (series D) of the
ControlLogix ControlNet Interface Module, catalog numbers
1756-CNB and 1756-CNBR.

Use these notes with your ControlNet Communication Modules in
Logix5000 Control Systems user manual, publication CNET-UM001.

Corrected Anomalies

This section describes anomalies corrected in recent firmware
revisions.

Anomalies Corrected in Version 5.50

With version 5.50, we corrected these anomalies:

- It is possible that an illegal ControlNet network schedule can
  be imposed on a network after downloading a project to a
  Logix Controller. After the download, the illegal schedule may
  require a 1756-CNB on the network to transmit more data in a
  single NUT than ControlNet specifications allow.

  Revision 5.50 will fail the module when an illegal schedule is
  detected; however, a more descriptive message will be

scrolled across the 1756-CNB display. The display will scroll "FAULT: Rev 5.50 Build 010 SCHEDULE LIMIT REACHED, INHIBIT CONNECTIONS, RESET MODULE THEN RESCHEDULE". This message indicates the steps you need to take to recover from this condition. Some of the connections through this 1756-CNB have to be inhibited so that the 1756-CNB can be reset and rejoin the network without again detecting the problem and faulting. Once the connections are inhibited, the 1756-CNB can be safely reset and the network rescheduled. Once the network is rescheduled to a valid configuration, the connections can be uninhibited. The project should then be saved to avoid the problem in the future.

- 1756-CNB Assert during network disruption (e.g., cable break or power cycle)

  – When a 1756-CNB goes lonely, the module could assert when messages are received from the backplane. This version includes a fix that properly handles this backplane traffic.

  – Module may assert in **smacisr.c** during ControlNet network disruption - After a network disruption, the module now waits for the communications chip to reset before allowing traffic to be received. We corrected this anomaly.

  – Module may assert in **icn_ucmm.c** during ControlNet network disruption - If a retry to an unconnected request is received at the same time the original reply is being sent, the module may assert. We corrected this anomaly.

- When operating with a fully loaded schedule, the 1756-CNB may delay in sending scheduled data by one network interval. We modified the firmware revision to more efficiently guarantee data delivery according to the network schedule.

- UCMM Server Count - The number of UCMM servers being displayed on the 1756-CNB does not match the number of servers being used. The number of UCMM servers was not being decremented when they timed out leaving the count out of sync with the number actually being used.

- NET ERR Display - 1756-CNB(R)'s with firmware revisions greater than 5.39.10 may permanently display NET ERROR after either a major network disruption or a complete system power cycle. While in this state no communication is possible for any device on the same network.

- Controller Major Fault due to power-up timing - If you used a 1756-CNB(R) module with firmware revision 5.45.10, enabled 'Major Fault on connection loss', and cycled power to the system, the controller experienced a major fault. Changes in the power-up procedure of the 1756-CNB after version 5.39.10 may delay the establishment of connections and cause the controller to major fault after a power cycle. This version significantly shortens the power-up time of the 1756-CNB so that connections can get established before the controller major faults.

- Multiple products coming on line together - If a 1756-CNB(R) and 1407-CGCM module were power cycled together on the same ControlNet network, occasionally the CGCM would not complete going on line to ControlNet and would become effectively deaf to any network traffic. The problem was that the initializing 1756-CNB was broadcasting a reply message instead of sending it specifically to the requested node. The reply is no longer broadcast.

- Powering up a 1756-CNB as low node on a network that is running unconfigured network parameters would cause the 1756-CNB to permanently display NET ERR and also permanently disable the network. The 1756-CNB now correctly goes through the network attachment sequence without disrupting other nodes.

Anomalies Corrected in Version 5.45

With version 5.45, we corrected this anomaly:

After 497 days of uninterrupted module operation, an internal counter that tracks unscheduled message connection time-outs rolls over. When the rollover occurs, the ControlNet module no longer manages connections as expected, and the module's unconnected buffers eventually become unavailable. You must cycle power or reset the module to restart the counter. The firmware now properly handles the rollover condition.

Anomalies Corrected in Version 5.44

With version 5.44, we corrected these anomalies:

- In certain circumstances where module utilization exceeds 90% and large amounts of unscheduled traffic exists, the network experiences dropped connections. We modified module operation to guarantee proper scheduled connection management.

- In circumstances where module utilization exceeds 90%, the module could incorrectly send scheduled traffic. We modified module operation to guarantee proper scheduled traffic integrity.

- Rarely, an anomaly could occur where the last two bytes of a full 510 byte scheduled MAC frame may be overwritten. A 510 byte MAC frame is the absolute largest achievable scheduled communication from a node in any one Network Update Time (NUT). Refer to Tech Note #G91952649 in Rockwell Automation's Knowledgebase at http://domino.automation.rockwell.com/applications/kb/RAKB.nsf/.

- Under certain timing conditions, the 1756-CNB module delays forwarding scheduled data by one Actual Packet Interval (API). We modified the module to handle this condition.

Anomalies Corrected in Version 5.38.40

This version of firmware corrected anomalies related to ControlLogix Redundancy systems. Refer to the ControlLogix Redundancy System Release Notes, publication 1756-RN582, for more information on these fixes.

Anomalies Corrected in Version 5.37

This version of firmware corrected an anomaly where, on rare occasions, scheduled data connections timed out or scheduled data were sent on the wrong ControlNet network update time (NUT). On very rare occasions, this condition could persist for a few NUT times and potentially result in a connection timeout. Connections would then automatically be re-established by the controller.

The connection timeout and automatic reconnection process yields a connection loss of approximately 3 seconds. During this time, affected I/O connections use their fault states.

Anomalies Corrected in Version 5.36

This version of firmware corrected several System Redundancy related issues with the 1756-CNB and 1756-CNBR. For more information, refer to the ControlLogix System Redundancy Release Notes, publication 1756-RN582, available through the Literature Library at http://www.rockwellautomation.com/literature.

Anomalies Corrected in Version 5.32

With version 5.32, we corrected these anomalies:

- We improved the tolerance of the 1756-CNB module to handle delayed 'ACK' messages from third party devices.

- The 1756-CNB module now verifies the node address when doing forward open signature checks.

- We corrected the problem of long recovery times for connections after multiple connection interruptions.

- We corrected the ASSERT in redunob.c error. This typically occurs when the module is in a rack containing a large number of controller, 1756-CNB, or 1756-DNB modules.

- We corrected the problem of the module stuck in 'NET ERR' state.

- We corrected the ASSERT in smacdrvr.c line 2042 error.

Anomalies Corrected in Version 5.27

With version 5.27, we corrected these anomalies:

- Accessing a 1756-CNB module as a PLC-5 processor from RSView caused a redlight and exception handlers ASSERT error.

- A 1756-CNB keeper ASSERT error was intermittently seen at node 1 at powerup. The workaround prior to this repair was to change the 1756-CNB node address to something other than one.

- An ASSERT in txlist.c error was intermittently seen on a two-node network when a cable was broken.

- A 1784-PCICS module and a single-media 1756-CNB failed to form a two-node network.

- RSNetWorx would display 'On-Line/Off-Line Mismatch' window continuously even after saving the latest edits successfully.

- A correction was made to the manner in which the CPU utilization was calculated. Previous values were 'high' by as much as 10% in the 10% CPU utilization range. The error reduced linearly by 1% for each 10% increment in CPU utilization and therefore was 'high' by only 1% in the 90% CPU utilization range.

Enhancements to the Firmware

This section describes enhancements in recent firmware revisions.

Enhancements to Version 5.50

- Firmware ASSERTs display the firmware revision along with the source file and line numbers.

- To provide easier diagnostics for the customer, the 1756-CNB has changed its failure display when it encounters a failed backplane interface ASIC. Instead of displaying a file name and line number, the 1756-CNB scrolls the message "FAILED BACKPLANE INTERFACE ASIC" should a failed backplane interface ASIC be detected.

- We implemented a more efficient method of processing the CPU utilization, resulting in a more accurate value at high utilizations.

Enhancements to Version 5.44

- We provided a more descriptive scrolling message for certain fatal error conditions. These include the setting of the node address to zero in any system or to 99 in a redundant system. Also, not being able to communicate with the backplane ASIC or receiving conflicting data from the backplane ASIC will also produce a scrolling error message.

    For example:

    – ADDRESS SWITCHES = 00, ILLEGAL
      <file name> <line number>
    – ADDRESS SWITCHES = 99, ILLEGAL IN REDUNDANT SYSTEM
      <file name> <line number>
    – TIMED OUT WAITING FOR SRM TO POWER-UP AND RELEASE
      THE BACKPLANE SIGNAL <file name> <line number>

- – UNABLE TO COMMUNICATE WITH CHASSIS BACKPLANE
  <file name> <line number>
- – CONFLICTING RACK SIZE OR SLOT DATA FROM BACKPLANE
  ASIC <file name> <line number>
- – UNABLE TO COMMUNICATE WITH BACKPLANE ASIC
  <file name> <line number>
- – SRM RESPONDING TO BACKPLANE PING BUT NOT
  REDUNDANCY CONNECTION
  <file name> <line number>

Enhancements to Version 5.39

We changed the "n U # #" diagnostic 4-character display to these two displays:

"U c x x" where xx is the number of unconnected client buffers, up to 20, used by the 1756-CNB module. The display is enabled when usage is 80% or greater and turns off when usage drops below 50% of the available buffers.

"U s x x" where xx is the number of unconnected server buffers, up to 20, used by the 1756-CNB module. The display is enabled when usage is 80% or greater and turns off when usage drops below 50% of the available buffers.

Enhancements to Version 5.38.40

- Beginning with this version of the firmware, a sub-minor revision will be added to the revision of the firmware (major rev., minor rev., **sub-minor rev** > i.e., 5.38.40). The sub-minor revision number is added to help better identify and differentiate pre-released products. There should be no change in user behaviors when referencing the firmware revisions of released products. This number is not printed on the product label, however, it is scrolled on the displayed upon module power-up.

TIP
Electronic Keying in RSLogix 5000 keys to the major and minor revisions; the sub-minor revision number cannot be used for keying.

- This version of firmware enhances the rate at which ControlNet network configuration, station status, and error counter information is gathered. With this enhancement, this data will be gathered and updated every 3 seconds to more closely match other system timing such as connection re-establishment.

Enhancements to Version 5.36

This version of the product enhanced the internal RAM memory test to improve memory fault coverage.

Enhancements to Version 5.32

We made these enhancement in version 5.32:

- The 1756-CNBR modules can now be used with the 1756-CNB I/O Configuration entry in RSLogix 5000 under 'compatible' keying.

- This version of the product is ControlNet International 'conformance tested'. All future releases will continue to be CI compliant.

Enhancements to Version 5.27

We made these enhancements in version 5.27:

- We optimized the 1756-CNB(R), version 5.27, for the ControlLogix Redundancy system. Please use this compatibility table when implementing ControlLogix redundancy. Refer to the latest ControlLogix Redundancy Release Notes for the most up to date compatibility chart.

Product	Minimum requirement for redundancy
RSLogix5000	Version 8.52.00
RSLinx	Version 2.30.01
RSNetWorx	Version 3.00.02
1756-CNB(R)	F/W version 5.27
1757-SRM	F/W version 2.15
Logix5555 Processor	F/W version 8.78

- We added the ability to present diagnostic information on the 4-char display on the module. This information can now be displayed:

Display	Description
n C # #	## indicates the total number of open connections Max = 64
n U # #	## indicates the total number of unconnected buffer usage Max = 20
% C # #	## indicates the module's CPU utilization percentage Max = 99%
B x # #	## indicates the number of bandwidth exceeded occurrences since the last module reset Max = 99 Note: This counter display is disabled until the module detects at least one bandwidth exceeded event

Display	Description	
K p # #	Keeper status	
	If # # equals:	The module is:
	Ov	Offline with valid keeper information
	Oi	Offline with invalid keeper information
	Av	An active keeper
	Ai	An active Invalid keeper
	Iv	An inactive valid keeper
	Ii	An inactive invalid keeper

- We added 16-bit minor fault counters internal to the module for these fault conditions (this feature was introduced in version 5.22):

  - Bandwidth exceeded – increments whenever there are no 'receive' buffers available to handle incoming ControlNet data.
  - Network error count – increments whenever a 'lonely' or network mismatch condition is detected.
  - ControlBus receive error count – increments whenever the 1756-CNB module detects a backplane error on the module.
  - ControlBus address error count – increments whenever the 1756-CNB module detects a backplane address error on the module.

  These read-only counters are accessible to ladder programs using CIP generic messaging. These counters are continuous and will rollover from 65,535 to 0. The counts are reset only at module powerup.

The following is an example of how to set up a CIP Generic MSG to display these diagnostic counters. Fields that are not associated with any captions must be configured exactly as shown.
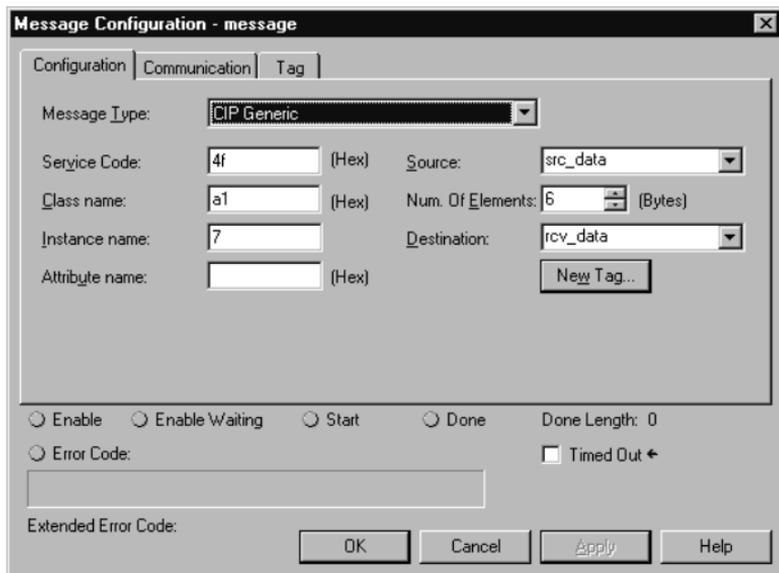
Source Tag configuration: The source tag used in the above MSG instruction must be a User Defined Tag consisting of a DINT and an INT.

This figure shows what that User Defined data type looks like.
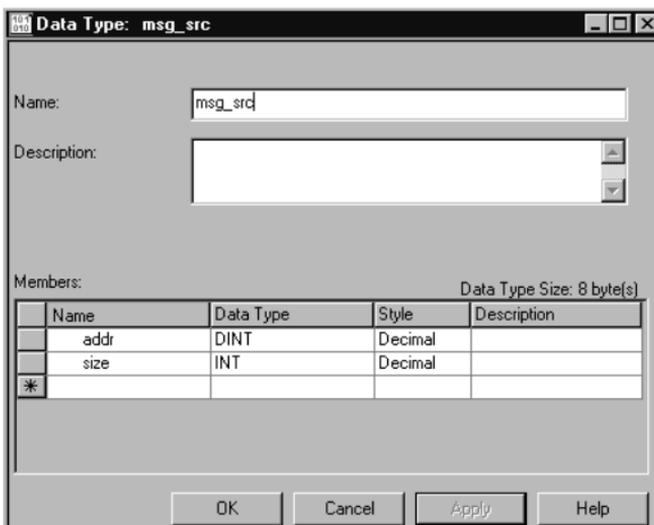
To display diagnostic counter information, the user must put the appropriate value that associates with the address of the diagnostic counter into the DINT portion of the source tag and the value associated with the size of the counter into the INT portion of the source tag. When the message is executed with the appropriate counter configuration, the assigned diagnostic counter value will be written to the destination tag (in the above example: rcv_data).

This table shows the address and size of each of these diagnostic counters.

Address	Size	Counter
00 00 00 0000	02	Bandwidth Exceed
00 00 00 0400	02	Network Error
00 00 00 0600	02	ControlBus Receive Error Count
00 00 00 0800	02	ControlBus Address Error Count

ControlLogix I/O Rack Connection Limitations

When using ControlLogix I/O with a remote ControlNet Adapter (1756-CNB or 1756-CNBR), as many as 5 controllers can create rack optimization connections to the ControlNet Adapter. All subsequent rack connection requests will fail.

It is possible that more than one ControlLogix controller can configure the same remote 1756-CNB module for rack optimization, since each RSLogix 5000 project configures the I/O for only one ControlLogix controller. As many as five ControlLogix controllers can communicate to the same 1756-CNB (or 1756-CNBR) module via a rack optimization connection. If more than five ControlLogix controllers configure the same 1756-CNB module for rack optimization, RSNetWorx for ControlNet software will schedule the network, but only five ControlLogix controllers will communicate to that 1756-CNB module. The RSLogix 5000 project files for the ControlLogix controllers that fail to communicate to that 1756-CNB module will show that 1756-CNB module as faulted, with the message, "16#011a Connection Request Error: Out of Connection Resources."

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using its products. At http://support.rockwellautomation.com, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

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

Installation Assistance

If you experience a problem with a hardware module within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your module up and running:

United States	1.440.646.3223 Monday – Friday, 8am – 5pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

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

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