

CTI 2500P-ECC1 Communications Coprocessor Firmware Revision History

Firmware Version 2.25 (12/6/2021)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 – 9.18 and above	V1.9 and above

Issues Resolved:

CTI-65: For all protocols except Camp Server, opening and closing connections more than 995 times caused a system exception.

Firmware Version 2.24 (06/15/2021)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 – 9.18 and above	V1.9 and above

Issues Resolved:

DT-1291: After reconnecting after a lost connection, the first "on change" Camp Client request would fail when the request was initiated. The request appeared to be sent on the old (closed) connection instead of the new connection. The second and subsequent "on change" Camp Client requests would succeed.

DT-1288: Ethernet unicast frames received by a port of the embedded Ethernet switch were erroneously forwarded to the other two switch ports rather than only to the port connected to the device whose MAC address matched the destination MAC address of the Ethernet frame.

DT-1377: After a network problem resulted in a socket error, a client protocol would occasionally hang in a tight loop, causing a system exception. A reset of the module was required to correct the issue.

DT-1308: Requests to write and read DCP for a non-existent drum erroneously returned random data instead of an error code, as required.

CTI-36: During the firmware update process, the product did not display the IP address while waiting on a request to transfer a firmware update file as documented in the user manual and functional specification. *NOTE: The documentation was modified to match the current behavior.*

CTI-47: Changes in the time of day on the host PLC could cause Camp Client, Modbus Client, and Network Data Exchange Subscribe client protocols to error and force the protocols to reset.

CTI-49: Camp Server writes to the host PLC for data points that were also configured for read in any of the other protocols could cause the Camp Server read of these same data points to be blocked until the module was reset. This issue occurred only in a situation where a write to the

host PLC for these data points failed, because the host PLC responses to the ECC1 were excessively delayed (such as when the host PLC user program is compiled after an online edit).

New Features and Improvements:

CTI-30: The module operating system has been updated to comply with Product Security Advisory 2020-10 from Green Hills Software.

DT-1260: The response from the product to TC19 (Read Word Force) was modified to match the Siemens 555 PLC response when the I/O module is not present. *NOTE: This was done to improve internal testing and does not affect the return of the force status.*

DT-1270: Added support for the Alias IP Address feature to the module, enabling it to communicate on two IP subnets.

DT-1386: Extended range of supported Loop and Alarm addresses from 1 -256 to 1-512 for task codes 60, 76, 64 and 79.

DT-1394: Added capability to remotely reset the module via the product web page. Switch 5 (SW5) must be in the closed position to enable this feature.

Firmware Version 2.21 (9/27/2016)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 – 9.06 and above	V1.1 -1.4 and above

Issues Resolved

- 1058:** Event logging semaphore protection was not working properly. This could cause an event logging error if a task that was logging an event was preempted by another task that also needed to log an event.
- 1253:** After a restart, the Open Modbus Client protocol would write a 0 value to the Modbus devices instead of writing the first value read from the Host Controller.

New Features and Improvements:

- 1248:** Added support for task codes 60 and 64 to the CAMP Server protocol. These task codes, which can be used to write parameters to a designated loop or analog alarm, are required by some SCADA/HMI drivers.

Firmware Version 2.19 (8/11/2016)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 – 9.05 and above	V1.1 -1.4 and above

Issues Resolved

- 998:** When the module was restarted using the Reset button, an invalid log event was occasionally written to the event log.
- 1054:** When a firmware update was attempted using a version of the ECC1 Configuration Program that was earlier than the version indicated in the firmware update file, the event log entry text was misleading. The event text was changed to “Incompatible Versions of ECC1 and ECC1 Configuration Program” to clearly indicate the problem.
- 1059:** Although no error was apparent, the Open Modbus Client would occasionally log a large number of “Unknown Connection” errors, causing the log file to fill up.
- 1109:** During firmware update via the Ethernet port, the module would sometimes stop working while downloading the firmware update file (*d00* was displayed on multi-segment display).
- 1112:** A system exception, causing a module reset, occasionally occurred when the Ethernet link between the module and the Host Controller was disconnected and reconnected.
- 1135:** Due to an initialization anomaly, broadcast rate limiting was sometimes set to the default value (10%) rather than the value set by the user.
- 1141:** When a large burst of Ethernet frames was received, some frames were dropped due to insufficient IP stack queue size. Queue size was increased from 32 to 128 frames.

- 1154:** Concurrent disconnect and re-connect of both Ethernet ports links could cause an error to be reported in the event log. The error was caused by the attempt to simultaneously initiate two instances of the duplicate IP check.
- 1238:** Open Modbus Client configured for UDP was not displaying an error code or reporting an error in the Error Code Description web page when a device timeout occurred.

New Features and Improvements:

- 969:** Added the Port Isolation feature, which blocks packet forwarding between the external Ethernet ports of the module when enabled by SW4.
- 1060:** Revised software memory reservations to avoid allocating memory that was not being used.
- 1088:** Improved the method for clearing ARP cache to reduce the time required to reconnect after a connection loss. The ARP cache is now cleared when either Ethernet port's link is disconnected,
- 1120:** Added support for Task Codes 76 and 79 to the CAMP Server protocol manager.
- 1121:** Added error reporting of additional task code errors (0x68 and 0x69) to the CAMP Server statistics Web page.
- 1157:** Added display of network mask in CIDR notation, which allows the user to determine the subnet mask being used.
- 1163:** Removed leading zeroes from IP address display and web pages.

Firmware Version 2.17 (4/7/2015)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 – 8.01 and above	V1.1 -1.4 and above

Issues Resolved

1097: Updated memory timing for DDR2 DRAM to allow more manufacturing flexibility in choosing memory form factors and suppliers. The timing change may result in a slight performance improvement in currently installed products. **NOTE: This firmware component was erroneously not included in the Version 2.15 build.**

NOTE: Issues 1099, 1100, 1102, and 1108 share a common root cause, a timer rollover issue described in a 2500P-ECC1 Technical Advisory published 3/12/2015 on the CTI site.

1099: Publish/Subscribe communications would cease to function after a period of approximately 49.7 days

1100,1102: CAMP Client communications would cease to function after a period of approximately 49.7 days

1108: Modbus TCP would cease updating control data after a period of approximately 49.7 days

NOTE: This firmware revision is believed to resolve the following issue.

1103: CAMP Server reads fail after a few weeks have to reset. An intermittent problem was discovered when a data point is written to the host PLC by one of the configured ECC1 protocols while the same data point is being read by the ECC1 to update the dynamic cache (used to service CAMP SCADA requests).

New Features and Improvements

1116: Improved display of unsupported task codes in CAMP server statistics

Firmware Version 2.15 (1/21/2015)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 – 8.01 and above	V1.1 -1.4 and above

New Features and Improvements

1097: Updated memory timing for DDR2 DRAM to allow more manufacturing flexibility in choosing memory form factors and suppliers. The timing change may result in a slight performance improvement in currently installed products.

Firmware Version 2.14 (1/6/2015)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 – 8.01 and above	V1.1 -1.4 and above

Issues Resolved:

1091: The ECC1 would occasionally fail to write a data value to the Host Controller. This occurred when a request to write a value to a Host Controller data address was received while the ECC1 was in the process reading the data value of the same Host Controller address.

For example, consider an application in which a Modbus Client is writing Holding Registers values to an ECC1 running the Open Modbus server. The Holding Register write requests are being serviced by writing the data values to Host Controller V memory locations associated with the Holding Register addresses. Meanwhile, in order to service potential read requests, the ECC1 is continuously updating all of the Modbus Server Holding Registers in the ECC1 data base by periodically reading the associated V memory locations.in the Host Controller. If a request were received to write a particular Modbus Holding register address while the ECC1 was in the process of updating the same address, the data value would not be written to the Host Controller.

Firmware Version 2.13 (11/5/2014)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 – 8.01 and above	V1.1 -1.4 and above

Issues Resolved:

This firmware update corrects an intermittent timing problem that caused the CAMP Server, Modbus Server, and Network Data Exchange Publisher protocols to drop a connection and then fail to allow the connection to be reestablished until the ECC1 module was reset. After a reset, the problem often took a period of several days to several weeks to re-appear. This behavior occurred more frequently in installations where the ECC1 was exposed to heavier network traffic. This firmware revision resolves the following issues:

993, 1002, 1063, 1065, 1066, 1068:

New Features and Improvements:

1064: Added the capability to log an event in the case when the hardware watchdog timer trips.

Firmware Version 2.11 (7/23/2014)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 - 7.09 and above	V1.1 -1.4 and above

Issues Resolved:

1048: When a Modbus client "read holding registers" request using an enable or one shot trigger was present in the configuration and the enable trigger was OFF (not set), the ECC1 erroneously wrote a value of 0 to all Host Controller data mapped to the request after the module was reset. *NOTE: This is a special case that was not resolved in firmware version 2.10.*

Firmware Version 2.10 (6/27/2014)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 - 7.09 and above	V1.1 -1.4 and above

Issues Resolved:

1045: When the CAMP client attempted to write to a Host Controller address that was mapped to the Modbus server protocol, the value written by the CAMP client was overwritten with the previous value.

1046: The ECC1 introduced a short (approximately 220ms) processing delay every two seconds.

1048: When the ECC1 module was reset, all Host Controller variables mapped to Open Modbus Client read requests were cleared (set to a value of 0 in the host controller). This problem occurred only on the first write after startup and worked correctly thereafter.

1049: A software routine that configured the Ethernet switch wrote to an uninitialized region. *NOTE: This error was discovered by CTI development. It is not known to have caused a field problem.*

1051: After a duplicate IP address was detected, causing the Network Status (NS) LED to turn RED, a subsequent duplicate IP test, initiated by removing and re-inserting the Ethernet cable, did not set the NS LED to GREEN, even though the duplicate IP address problem had been corrected.

1052: When the ECC1 was connected to the Host Controller via an Ethernet switch, unplugging the cable connected to one ECC1 Ethernet port and plugging it into the other port resulted in a long delay (approximately 3 minutes) before communications with the Host Controller resumed.

1055: The connection bits in STW267 of the Host Controller were being updated intermittently when the ECC1 data cache contained no items. This condition occurs when there are no entries in the tag database and no client is communicating with the CAMP server.

Firmware Version 2.08 (3/27/2014)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 - 7.09 and above	V1.1 -1.4 and above

Issues Resolved:

- 966:** The ECC1 module would sometimes reset during the download of a program to the 2500 Series controller.
- 972:** The ECC1 module occasionally took a long time (up to 1 minute) to detect that an Ethernet cable had been disconnected and also took a long time to re-establish connections after the cable was re-inserted.
- 973:** The Modbus Server protocol would occasionally fail to restart after a program was downloaded to the 2500 Series controller.
- 979:** The ECC1 module would not reconnect to the 2500 Series controller after a Fatal Error 103 (Scan Watchdog).
- 991:** The ECC1 module blocked attempts to download a new configuration file when switch 2 was in the closed position.
- 997:** Version 2.05 and 2.07 logged a confusing message "Wrong Reg Size" when attempting to register with a Host controller firmware version 7.05. The message appeared to be an error response but was intended only to identify that a newer version of PLC firmware provided enhanced capabilities.
- 999:** The ECC1 module would occasionally reset when attempting to re-register with the Host controller. A system exception error message was logged.
- 1008:** Situations in which TCP connections were being closed and immediately re-opened were not being handled properly. This problem applies to all protocols supported by the ECC1 module.
- 1015:** The CAMP client conversion was not set properly. *NOTE: This issue occurred only in a CTI test build during development of this version. It was never introduced to the field.*
- 1016:** When the 2500 Series PLC detected consecutive packet storms occurring within 60 seconds, the ECC1 module delayed up to 60 seconds before recognizing the timeout and attempting to reconnect.
- 1018:** The ECC1 module was occasionally not able to re-register with the Host controller after a severe network storm occurred. Error 330 (data points non-existent) was reported.

After disconnecting and reconnecting the Ethernet link to the PLC or resetting module, the ECC1 was able to re-register correctly.

- 1021:** The SD card method could not be used to update firmware if the SD card contained other firmware update files (file extension .FFL) in SD card subdirectories. Error E29 was reported.
- 1022:** The ECC1 module did not attempt to re-send a data cache request after a timeout.
- 1023:** Memory region read/write characteristics were modified to improve consistency between the kernel and application software.
- 1025:** Firmware update failed due to a labeling error in the firmware update file. *NOTE: This issue occurred only in a CTI test build during development of this version. It was never introduced to the field.*
- 1030:** When the Host controller was in Fatal Error mode, the CAMP server protocol returned data for PLC data types other than Status Words, rather than replying with an error code (PLC in Fatal Error). The functional specification required only Status Word data to be returned, since process data may have been corrupted.
- 1034:** Due to a conditional compile error, ECC1 protocols were disabled when the Host Controller was in Program Mode even though “Disable Protocols in Program Mode” option was not selected in the ECC1 configuration.

New Features and Improvements:

- 986:** To aid in correlating multiple event logs with the ECC1 module that generated it, the product serial number is now written to the event log after the log is cleared and during a power-up start.
- 987:** To reduce the time required to collect and send event log/ diagnostic data to CTI product support, a “Display All Statistics” feature has been added to the ECC1 web server. This feature will collect all Web server and Diagnostic Statistic pages in one file, which can be saved and transmitted to CTI.
- 1001:** To improve the ability of the ECC1 module to re-connect in certain situations and to aid in detecting duplicate IP addresses, the ECC1 module now transmits ARP Announcement and ARP Probe messages when the Ethernet link transitions from the unconnected to the connected state. The ARP Announcement updates the TCP/IP stacks of other devices and updates the Ethernet switch to which the ECC1 module is connected. The ARP Probe detects when another device on the local area network is using the same IP address as the ECC1 module.
- 1011:** The previous SD card stack was replaced with a new one that executes faster and is easier to maintain.
- 1020:** The following improvements were made to the event log and diagnostic statistics.
 - Event Log:
 - Added a power-up start event,
 - Preceded the software reset and pushbutton reset with a green character bar to enable quick identification in a large log.
 - TCP/IP Statistics:
 - Updated the “Last Counter Clear” value after module startup.
 - Ethernet Port Statistics:

- Restored the “Last Counter Clear” timestamp after a power-up start,
- Added statistics for unicast packets transmitted and received,
- Added statistics for “Raw 837A” packets transmitted and received.,
- Active Communication Sessions:
 - Corrected presentation problem when multicast is the only CAMP Client protocol.
- Switch Statistics:
 - Added labels to port transmit and receive statistics.
- CAMP Server Statistics:
 - Updated the “Last Counter Clear” value after module startup,
 - Corrected problem where the “Average Response Msecs” displayed “Nan” instead of 0 when first initialized.

1037: When the CAMP server is not enabled to receive multicast traffic, all multicast traffic is now rejected by the Ethernet controller. This eliminates the overhead associated with rejecting multicast messages in software.

Firmware Version 2.07 (6/6/2013)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 and above	V1.1 -1.4 and above

Issues Resolved:

977: The ECC1 Module Status LEDs were not set to the correct state when the Host Controller connection was disrupted. The Active LED was set to the blink state rather than OFF. In the Error Code Descriptions web page incorrectly highlighted errors for configured client protocols.

980: The TCP/IP Stack did not explicitly reject connection requests after the maximum number of connections had been reached.

981: When servicing very high rates of HMI data read requests (in excess of 2000/second), the CAMP Server prevented other configured protocols from running successfully, eventually causing the module to reset. V2.07 firmware assures that protocols other than the CAMP Server are provided the resources necessary to run properly in this situation.

988: Downloading a new configuration to the ECC1 module before it had completed updating the module SD card with configuration data from the previous download caused the update process to fail. V2.07 firmware prevents downloading a new configuration until the previous configuration update process completes.

New Features and Improvements:

982: Added CAMP Server support for Task Code 59

983: Added CAMP Server support for Task Codes 07, 0C, 0E, 05, 09, 19

984: Modified Multi-Segment Display (MSD). The letters “ECC” are displayed, in addition to the module IP address and error information.

Firmware Version 2.05 (3/26/2013)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 and above	V1.1-1.4 and above

Issues Resolved:

910: During periods of very high transaction rates, some Ethernet packets received by the ECC1 were discarded due to lack of buffers. As a result, TCP connections were sometimes forced to re-transmit the request and client applications using UDP sometimes experienced a time-out condition. This issue was resolved by increasing the number of Ethernet and TCP/IP buffers.

911: When the ECC1 module attempted to send a response to a TCP/IP socket that had been closed, the resulting error log text did not clearly describe the error.

916: CAMP Client multicast transmissions were erroneously looped back to the ECC1 module CAMP Server when the server was configured to receive on the multicast address used by the CAMP client. This behavior caused memory addresses in the Host Controller that were referenced in the multicast request to be overwritten with data transmitted by the CAMP client.

919: When the maximum number of outstanding CAMP server UDP requests was reached, the text of the resulting event log entry failed to clearly identify the source of the error.

926: The ECC1 module allowed another configuration file to be transferred to it over Ethernet while the module was still in the process of updating flash memory with configuration data from the previous transfer. This caused an error message (Err 160) to be displayed after the flash update completed. This was corrected by allowing only one download connection.

927: Multiple concurrent downloads of ECC1 configuration files caused corruption of the configuration files, which resulted in a fatal startup error. This was corrected by allowing only one download connection (see issue 926).

928: The text for some event log error messages did not correspond to the error number in the message.

929: During startup, the ECC1 module did not reliably detect that another device on the network was using the same IP address as the module (duplicate IP address).

930: Clicking on the **CLEAR** button in the TCP/IP Statistics web page caused the UDP statistics display to be erased.

931: When the ECC1 module was unable to connect to the Host Controller because the configured Host controller IP address was incorrect, no error code was displayed on the MSD.

933: Certain Tagname Database configurations caused the ECC1 module to supply a value of 0 for tagname data instead of the associated Host Controller data. See related Technical Advisory.

934: Port 1100 (Developer T5) was accessible in the product build, providing a path that could be used to compromise the operation of the ECC1 module.

935: The CAMP Server did not respond to the General Module Command, which reads module information, when it was disabled or when data caching was not active.

936: When the Ethernet Switch Statistics web page was displayed, a stack overrun sometimes occurred when updating the statistics. This caused the module FTP server to fail, preventing the transfer of configuration files over Ethernet.

943: During test of new firmware, the ECC1 module logged numerous errors due to a Modbus Server build problem and premature CAMP server startup. *NOTE: This error occurred only with a CTI test build and was not introduced to the field.*

944: The ECC1_STATUS_WORD was not being updated with status data.

949: The CAMP Client mishandled some connection errors, such as losing a TCP connection just prior to sending a reply to a CAMP client. When this happened, the CAMP Server became unresponsive.

958: When a network storm caused Host Controller to stop listening on the Ethernet port, the ECC1 module sometimes experienced a system exception error.

959: The ECC1 module did not display the correct startup error code on the MSD for some error conditions related to configuration files stored on the SD card.

962: The ECC1 module did not re-register with the Host Controller after the Host Controller encountered a Fatal Error 113 (scan watchdog error) while downloading a user program.

963: The Network Data Exchange publisher allowed only 11 connections instead of the specified 20 connections.

965: During testing of new ECC1 firmware, the firmware failed to register with V7.05 of the 2500-Cxxx firmware. *NOTE: This problem occurred only with a CTI test build and was not introduced to the field.*

967: During testing of new ECC1 firmware, the ECC1 module did not indicate protocol error by flashing the Active LED and displaying the error code on the Multi-Segment Display (MSD) when transaction loads were high. *NOTE: This problem occurred only with a CTI test build and was not introduced to the field.*

968: When attempting to read corrupted configuration files stored on the SD card, the ECC1 module would continually reset.

New Features and Improvements:

915: Implemented User configuration of Broadcast Storm Protection. This was previously fixed at 10% of the network bandwidth.

920: Revised LED and MSD states during ECC1 module startup to clearly identify that the module is in the process of starting up.

939: Reduced time to start up the ECC1 module when using SDHC cards. The amount of time saved increases with the capacity of the SD card (4GB – 5 sec, 8GB – 10 sec, 16GB – 16 sec, 32GB - 25 sec).

946: Added support for TC11 and TC12, used by some HMI terminals to read discrete I/O and control relay addresses.

947: Added a Web page for CAMP Server diagnostic statistics.

955: Added server IP diagnostic statistics to the TCP/IP Statistics Web Page.

Firmware Version 2.03 (1/9/2013)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 and above	V1.1 - V1.3 and above

Issues Resolved:

908: The Network Data Exchange Subscriber protocol Connection Status sometimes failed to reflect a transition from an error state to the good state. Consequently, the Host Controller data mapped to the Connection Status would continue to report a connection error, even though the connection status was good.

914: When flash memory was incorrectly initialized during the manufacturing process, the module would sometimes reset continuously when starting up the application firmware after a firmware update. The application firmware now works no matter what values are stored in flash memory.

New Features and Improvements:

Added new diagnostic statistics to Ethernet Port Statistics web page

Added a web page to display the Ethernet switch statistics

Increased Ethernet transmit and receive buffer descriptors

Firmware Version 2.02 (12/12/2012)

Compatibility Table	
2500-Cxxx Processor Firmware	2500P-ECC1 Configuration Program
V 7.05 and above	V1.1- V1.3 and above

Original Production Release