PACSystems* RX3i

IC695ETM001

Ethernet Interface Module
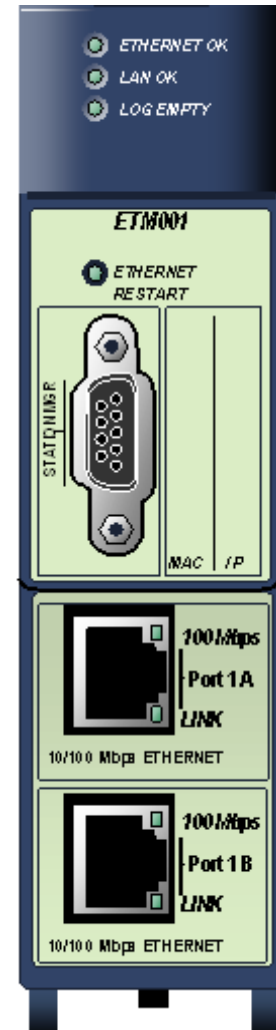
The Ethernet Interface Module, IC695ETM001, connects a PACSystems* RX3i controller to an Ethernet network. It enables the RX3i controller to communicate with other PACSystems equipment and with Series 90 and VersaMax controllers. The Ethernet Interface provides TCP/IP communications with other control systems, host computers running the Host Communications Toolkit or programmer software, and computers running the TCP/IP version of the programming software. These communications use the SRTP, Modbus TCP, and Ethernet Global Data (EGD) protocols over a four-layer TCP/IP (Internet) stack.

Features of the RX3i Ethernet Interface include:

- Full programming and configuration services. Firmware upgrades from the RX3i CPU using the WinLoader software utility, which is supplied with updates to the Ethernet Interface software.

- Periodic data exchange using Ethernet Global Data (EGD).

- EGD Commands to read and write controller and EGD exchange memory over the network.

- TCP/IP communication services using SRTP.

- Support for SRTP Channels, Modbus/TCP Server, and Modbus/TCP Client

- Built-in Station Manager for on-line supervisory access to the Ethernet Interface. Dedicated Station Manager port.

- Two auto-sensing 10Base T / 100Base TX RJ-45 shielded twisted-pair Ethernet ports for direct connection to either a 10BaseT or 100BaseTX IEEE 802.3 network without an external transceiver. There is only one interface to the network (only one Ethernet MAC address and only one IP address).

- Internal network switch with Auto negotiate, Sense, Speed, and crossover detection.

- Recessed Ethernet Restart pushbutton to manually restart the Ethernet firmware without power cycling the system.

- LEDs: Ethernet OK, LAN OK, Log Empty, individual port activity and speed LEDs.

- Configurable stand-alone Redundant IP addressing, which allows a single IP address to be assigned to corresponding Ethernet modules in two different controllers. The Redundant IP address is configured in addition to the normal unique IP address of each Ethernet module. Under application logic control, only the Ethernet module in the active unit can use the Redundant IP address.

- Time synchronization to SNTP Time Server on Ethernet network (when used with Release 5.00 or later CPU module).

Specifications

Ethernet processor speed	200 MHz
Connectors	- Station Manager (RS-232) Port: 9-pin female D-connector - Two 10BaseT / 100BaseTX Ports: 8-pin female shielded RJ-45
LAN	IEEE 802.2 Logical Link Control Class I IEEE 802.3 CSMA/CD Medium Access Control 10/100 Mbps
Number of IP addresses	One
Number of Ethernet Port Connectors	Two, both are 10BaseT / 100BaseTX with auto-sensing RJ-45 connection.
Embedded Ethernet Switch	Yes – Allows daisy chaining of Ethernet nodes.
Serial Port	Station Manager Port: RS-232 DCE, 1200 - 115200 bps.

Refer to the PACSystems RX3i System Manual, GFK-2314, for product standards and general specifications.

For additional information about the Ethernet Interface Module, refer to the following publications:

▪ *TCP/IP Ethernet Communications for PACSystems*, GFK-2224
▪ *PACSystems TCP/IP Communications, Station Manager Manua*l, GFK-2225

Release History

Catalog Number	*Firmware Version*	*Date*
IC695ETM001-EK	6.10	Sep. 2011
IC695ETM001-EJ	6.00	Sep. 2009
IC695ETM001-EH	5.51	Jan. 2009
IC695ETM001-DG	5.50	May 2008
IC695ETM001-DF	5.01	Dec. 2007
IC695ETM001-DE	5.00	Aug. 2007
IC695ETM001-CD	3.81	May 2006
IC695ETM001-CC	3.60	Nov. 2005
IC695ETM001-AB	3.00	Apr. 2005
IC695ETM001-AA	2.51 (initial release)	Aug 2004

Important Product Information for this Release

Firmware release 6.10 resolves several issues that caused the ETM001 to lose communication with remote devices. These failures were indicated by the Ethernet OK LED displaying the blink code 2-5. For details, see "Problems Resolved by Firmware Release 6.10" on page 4.

Updates

The IC695ETM001 is field upgradeable using the firmware upgrade utility. To upgrade an existing ETM001 to firmware

version 6.10, you will need the upgrade kit 44A753032-G09, which can be downloaded from http://www.ge-ip.com/support.

Functional Compatibility

Subject	Description
Hot Swap requires CPU firmware 2.51	Do *not* remove or insert the IC695ETM001 while powered unless the CPU is running firmware release 2.51 or higher. This firmware is available in upgrade kit 44A7522290-G01.
SRTP and EGD Performance Differs from Series 90*-30	SRTP and EGD performance in the RX3i differs slightly from the Series 90-30. Each RX3i Ethernet Interface supports a greater number of SRTP connections and EGD exchanges. The RX3i currently has several SRTP and EGD operational restrictions compared to the Series 90-30. When migrating Series 90-30 Ethernet applications to the RX3i, please carefully read the *Ethernet Operational Notes.*
Series 90-30 LAN Interface Module (IC693CMM321) Not Supported by RX3i	The Series 90-30 LAN Interface Module (IC693CMM321) is not supported by the RX3i and should not be placed in an RX3i rack. (Series 90-30 CPUs with embedded LAN Interface, IC693CPU364 and IC693CPU374, like any Series 90-30 CPU, should not be placed in an RX3i rack.)
Modbus/TCP Support	Release 3.60 of the PACSystems Ethernet Interface adds Modbus/TCP Client Channels capability. It supports Modbus Conformance Class 0 function codes 3 and 16, Conformance Class 1 function codes 1, 2, 4, 5, 6, and 7, and Conformance Class 2 function codes 15, 22, 23, and 24. PACSystems Ethernet supports 32 client connections shared between all client protocols. For example, if 16 client connections are used for SRTP channels, there are 16 client connections available for Modbus/TCP channels. Any given channel can be assigned to only one protocol at a time.
Programmer Version Requirements	Proficy* Machine Edition Logic Developer 5.8 or later must be used to perform Run-mode Store of EGD exchanges. Proficy Machine Edition Logic Developer 5.7 or later must be used for Release 5.00 new features. Proficy Machine Edition Logic Developer 5.5 Service Pack 2 or later must be used for Release 4.00 new features. Proficy Machine Edition Logic Developer 5.0 Service Pack 3 or later must be used to program the RX3i CPU for Modbus/TCP Server operation.
CIMPLICITY* Plant Edition Version Requirements	CIMPLICITY Plant Edition 6.1 Service Pack 1a with Update 040204_s90tcp_6101or Service Pack 2 or later must be used for Ethernet communications with PACSystems Ethernet Interfaces.

Problems Resolved by Firmware Release 6.10

Subject	Description
Internal system event causing Blink Code 2-5/Event 3H Issue	Previous versions exhibit an error condition where the Ethernet module could display a blink code 2-5 error. (The Ethernet OK LED displays the repeating pattern: 2 blinks, a short pause, 5 blinks, and a long pause.) This condition occurs in a 10 minute window after a 3 month period (3 months after a reset and/or power cycle).
	Failures could occur outside this 10 minute window, but are much less likely. The quantity of TCP traffic (Modbus/SRTP/SNTP) during the 10 minute window influences the likelihood of the issue occurring.
	Please note that blink code 2-5 is a general error. Ethernet firmware 6.10 corrects several underlying issues that caused the blink code.
Modbus query with exception causing Blink Code (2-5) / Event 3H Issue	When the ETM module is communicating with Proficy Machine Edition and it receives a Remote Modbus client request with exception, the Ethernet module displays a 2-5 blink code. (The Ethernet OK LED displays the repeating pattern: 2 blinks, a short pause, 5 blinks, and a long pause.).
	This problem has been resolved in Ethernet firmware version 6.10 (and later)
Multiple ARP frames observed on Network	In previous versions, after a 3 month period (3 months after a reset and/or power cycle), there is a 10 minute window where it is possible for each packet sent by the Ethernet Module to be preceded with an ARP packet. This problem has been resolved in Ethernet firmware version 6.10 (and later)

Restrictions and Open Issues

Subject	Description
Number of SRTP requests tallied may vary	When running multiple SRTP client channels, the number of requests, as reported by the client and the server, may differ between the connections.
SRTP connections remain open after IP address changed	The Ethernet Interface does not terminate all open SRTP connections before changing its IP address. If the local IP address has changed, any existing open TCP connections are unable to normally terminate. This can leave SRTP connections open until their underlying TCP connections time out. If quicker recovery of the SRTP connection is needed, modify the "wkal_idle" Advanced User Parameter to reduce the TCP keep-alive timer to the desired maximum time for holding open the broken connection. Refer to *TCP/IP Ethernet Communications for PACSystems*, GFK-2224, for details.
REPP does not save results of aborted PING	The Station Manager REPP command does not retain the results of a PING that is aborted due to error. Results are reported when the PING is aborted, but subsequent REPP commands give the results of the last successfully terminated PING.
Multiple LOG EVENTS	The Ethernet Interface sometimes generates multiple exception log events and Controller Fault Table entries when a single error condition occurs. Under repetitive error conditions, the exception log and/or Controller Fault Table can be completely filled with repetitive error messages.
Intermittent SNTP loss of synchronization	Under moderately heavy EGD traffic load, the Ethernet Interface may occasionally lose synchronization with its SNTP time server and generate exception log event 29, entry 2=bH.
SRTP communication delays	Average latency of communications on SRTP channels may vary considerably due to TCP retransmissions. SRTP client applications should be designed to take this variance into account. In particular, SRTP client applications migrating from Series 90 SRTP servers to PACSystems may need to lengthen SRTP timeout parameters.

Subject	Description
Spurious 'Ethernet Failure' error	On rare occasions, the error "Module hardware fault" may be reported on the Ethernet daughterboard. The corresponding fault in the exception log is Event = 1, followed by text "Ethernet failure". This fault is a nuisance fault and may be ignored.
Spurious Ethernet fault	In rare instances, after power cycle, the Ethernet Interface may log the following fault, Event = 28H, Entry 2 = 000eH. This fault can be safely ignored.
Unexpected EGD COMMREQ status	EGD Commands may return COMMREQ Status 9590H (= internal error) instead of the expected B190H (= Can't locate remote node) when unable to locate a remote device on the network.
Very heavy EGD production/consumption at server may cause EGD command timeouts	Very heavy EGD production and/or consumption at a server device may cause EGD command timeout errors when another device attempts to send EGD commands to that server. If EGD commands must preempt normal production, you may set the "gcmd_pri" Advanced User Parameter to 2 (see GFK-2224, Appendix A). Note that by doing so, EGD exchange production may be delayed.
SRTP server errors can cause timeouts at channel client	The SRTP Server in the PACSystems Ethernet Interface can encounter various errors if a remote Series 90 client takes down an SRTP connection and then establishes a new connection. This can cause unexpected channel timeout errors 0190H or 0290H at the client. The SRTP server errors in the Ethernet exception log are identified as Event = 2; Entry 2 may be 001cH, or 0021H.
EGD command range failure can write partial data to controller bit memory	When an EGD Command attempts a write operation to a bit-mode reference memory range (%I, %Q; %T, %M, %SA, %SB, %SC) where the amount of data to be written exceeds the configured size of that reference memory, the command will return failure status but partial data may be written into the reference memory. The amount of partial data written depends upon the starting bit memory location and the data length as follows: ▪ If data starts on a byte boundary (location = (8*n) + 1), no partial data is written. ▪ If data does not start on a byte boundary (location = (8*n)+1) and data exceeds the configured reference memory by 8 or more bits, partial data is written from the starting location to the next byte boundary after the starting location. ▪ If data does not start on a byte boundary (location = (8*n)+1) and data exceeds the configured reference memory by less than 8 bits, partial data is written from the stating location to the end of configured reference memory. For a Write PLC Memory command, this can occur when writing data into the target PLC. For Read PLC Memory or Read Exchange commands, this can occur when writing data received from the target controller into the local CPU memory. The logic application must not use any data returned to the local CPU if the EGD command status indicates failure. To avoid writing partial data to the local or remote PLC, be sure bit memory data transfers do not exceed the configured reference memory sizes at the appropriate PLC.
Do not operate with CPU in incorrect slot	The operation of the Ethernet interface is disrupted if the RX3i CPU is placed in a slot other than the one in which it is configured. Various Ethernet exception log events may occur, such as (Entry = 2, Entry 2 = 30 or 35 or 39 or 1e or 1f) or (Entry = 8, Entry 2 = b).
No CPU fault logged when Ethernet interface in fatal blink code	The CPU does not log any Controller or I/O Faults when the Ethernet Interface has a fatal blink code. The application should monitor the LAN interface OK status bit to detect loss of module.
EGD I/O has unexpected variability under heavy load	EGD I/O has intermittent unexpected variability under heavy load. For a Produced Exchange, EGD samples may occasionally be delayed by as much as a production period or more.
Clear of large hardware configurations may cause log event 08/20	A Log event 08/20 may occur when very large hardware configurations are cleared and transfers are active on other Server connections. This log event can be safely ignored.

Subject	Description
Reset pushbutton	Reset pushbutton action is different from other PACSystems Ethernet products. On the RX3i Ethernet module, the state of the pushbutton when the module powers up can change the behavior of the Restart pushbutton. Under normal operation, a pushbutton press produces a rising-edge signal that triggers a module restart. However, if the pushbutton is pressed when power is activated (either by pressing the pushbutton before turning power on or by continuing to hold the pushbutton in after a restart), the functionality of the pushbutton is inverted. When the pushbutton is later released, an "incorrect" rising-edge is detected, which triggers an inappropriate module restart. This does not occur on other PACSystems Ethernet products.
COMMREQ Status Word value of 0x54A0 occasionally returned for EGD commands	Occasionally a COMMREQ Status Word value of 0x54A0 is returned after COMMREQs for Ethernet Global Data commands when the previously-transferred command has experienced retries in the network. Executing the COMMREQ again results in successful transfer of the command.
Modbus/TCP channel aborted during power-cycle	After powering up an RX3i running Modbus/TCP client channels, the establish connection occasionally fails because the server rejects the "open" request from the client. The connection will then succeed if the application retries the open when it sees a 0x9690 or 0xAA90 response to an open request or to the first write request.
Controller response timeout errors (8/08) in Ethernet exception log under extremely heavy SRTP traffic	Under extremely heavy SRTP traffic conditions, the Ethernet Interface may log an event in the Ethernet exception log (Event 8, Entry 2 = 08H) indicating an overload condition. This error terminates the SRTP connection. If this event appears, either the traffic load should be reduced, or the application should use an alternate communications method to verify that critical data transfers were not lost due to the overload.
SRTP channel transfers may take up to 20 seconds after power cycle	When SRTP communications are interrupted by a power cycle, the Ethernet interface may require up to 20 seconds to reestablish TCP connection used for SRTP communications.
"rmdir" Station Manager command does not work for multi-level directory path	The "rmdir" Station Manager command does not operate properly with a multi-level directory path. Instead, first change to the parent directory, then delete the target directory without specifying a path. For example, the "rmdir dir1/dir2" results in "RMDIR Failed, dir1/dir2 does not exist". Instead, first do "cd dir1" and then "rmdir dir2".
Intermittent Ethernet log event 8H/15H after power cycle	When starting after a power cycle, the Ethernet Interface may intermittently log an exception (entry 8H, Entry 2 = 15H, Entry 3 = 0000H, Entry 4 = 00aaH). This exception is benign and may be ignored.
Intermittent Modbus/TCP Server log events when using "killms" Station Manager command	When using the "killms" Station Manager command to manually terminate an active Modbus/TCP server connection, the following Modbus/TCP errors may occur in the Ethernet exception log: Event 2fH, Entry 2 = 209H, 212H, 21bH, or 221H. These errors may be ignored.
Module intermittently unresponsive after reset	Intermittently, when the module is restarted by using the pushbutton or Station Manager command, the module will blink its OK LED for 5 minutes before completing the restart. After the restart is complete the module fails to communicate with the CPU module. The remedy is to power-cycle the PLC.
A890 Commreq status after multiple Modbus open command attempts	When using a Commreq to open a Modbus/TCP Channel to a remote server, if the initial Commreq returned an AA90 status, then future Open Commands may return A890 status. This indicates that local networking resources have been consumed and are not available for further connection attempts. If this occurs, the application must wait at least 60 seconds before making the next connection attempt. This will allow networking resources to be released and made available for the next Modbus Open Command.

Subject	Description
Modbus/TCP request packets	The Modbus/TCP server expects to receive each Modbus/TCP request in a separate TCP packet. If multiple requests are sent in a single packet, the server may or may not send a response to each request. If responses are sent to the client, they will be sent in separate TCP packets.
EGD production delayed after RMS of EGD	When a produced EGD exchange is added or modified by a Run-mode Store, the exchange will not be produced until one production period of time has elapsed after the completion of the run-mode store.
Station Manager PING commands	When initiating ICMP echo requests from the PLC via the Station Manager's PING command, the operation occasionally fails and an exception is logged (Event eH, Entry 2 = 6H).
Station Manager "referr" tally	The EGD Station Manager "referr" tally may be incremented twice when an exchange timeout occurs. Exchange status word reporting works correctly and is not affected.
"wkal_idle" AUP parameter should not allow zero	Zero is allowed for the "wkal_idle" (TCP keepalive timer) but it is an invalid value.
TCP connection may timeout early if the timeout is set above 10 minutes	If the TCP connection timeout is set higher than 10 minutes, the connection may timeout before the configured value. The connection timeout is derived from three AUP parameters: wkal_idle + (wkal_cnt + 1) * wkal_intvl.

Ethernet Operational Notes

Subject	Description
Configuration of IP Address is required before using Ethernet communications	The Ethernet Interface cannot operate on a network until a valid IP address is configured. The Ethernet addressing information must be configured prior to actual network operation, or to recover from inadvertent changes to the Ethernet addressing data at the Ethernet Interface. Use one of the following methods to initially assign an IP address: ▪ Connect a serial terminal to the Interface's Station Manager port. Then use the CHSOSW command to enter the desired IP address. For details, see PACSystems TCP/IP Communications Station Manager Manual, GFK-2225. ▪ Temporarily assign an IP address to the module using the SetIP tool over the Ethernet network. For details, see *TCP/IP Ethernet Communications for PACSystems*, GFK-2224. ▪ The Ethernet Interface automatically obtains a temporary IP Address from a BOOTP server on the network. For details, see *TCP/IP Ethernet Communications for PACSystems,* GFK-2224. Once a temporary IP address has been set up, the Ethernet Interface can be accessed over the network (by the Machine Edition programming software). The programmer should then be used to configure the proper IP address for the Ethernet Interface.

Subject	*Description*
Proper IP addressing is always essential	The PACSystems Ethernet Interface must be configured with the correct IP Address for proper operation in a TCP/IP Ethernet network. Use of incorrect IP addresses can disrupt network operation for the PACSystems and other nodes on the network. Refer to *TCP/IP Ethernet Communications for PACSystems,* GFK-2224 for important information on IP addressing. When storing a new HW configuration to the RX3i, be sure that the HW configuration contains the proper Ethernet addressing data (IP Address, Subnet Mask, and Gateway IP Address) for the RX3i.
	Note: Machine Edition programming software maintains the target IP address (used to connect the programmer to the target) independent of the contents of the HW Configuration for that target. The target IP address is set in the Target Properties in the Machine Edition Inspector window. Storing a HW Configuration whose Ethernet addressing data contains an IP Address that is different from the RX3i target IP address will change the IP address used by the target RX3i as soon as the Store operation is completed; this will break the Programmer connection. Before attempting to reconnect the Programmer, you must change the target IP address in the Target Properties in the Machine Edition Inspector window to use the new IP address. To regain communication at the former IP address, use the manual corrective action described above.
	Storing a HW Configuration containing default (0.0.0.0) or incorrect Ethernet addressing data to the PACSystems RX3i will result in loss of the Programmer connection and will require manual corrective action as described above.
Default IP address (0.0.0.0) attempts to set IP address via BOOTP	The default IP address value (0.0.0.0), whether obtained from HW Configuration or backup configuration, causes the Ethernet Interface to request a temporary IP address from a BOOTP server device on the network.
LAN must be tree, not ring	The two Ethernet network ports on the PACSystems RX3i Ethernet Interface must not be connected, directly or indirectly, to the same network device. The hub or switch connections in an Ethernet network must form a tree and not a ring; otherwise duplication of packets and network overload may result. In this situation, the RX3i Ethernet modules will continually reset.
Reporting of duplicate IP address	The PACSystems RX3i does not log an exception or a fault in the Controller Fault Table when it detects a duplicate IP address on the network.
Multiple zero period EGD exchanges may not produce similar numbers of samples	If more than one EGD produced exchange is configured for a production period of zero, the exchanges may not produce similar numbers of samples. Due to the way that scheduling occurs when multiple exchanges are scheduled "as fast as possible", some zero period exchanges may produce significantly more samples than others. For more consistent EGD production, configure the produced EGD exchanges with non-zero production periods.
Changing IP address while SRTP connection open may generate log events	Open SRTP Server connections established with a remote SRTP client are not terminated as expected when the RX7i's IP address is changed (typically by storing a new HW Configuration to the RX7i). A Series 90 SRTP client ("SRTP channels") reports either a 9690H or 0190H status; the SRTP connection may remain open until the connection is terminated as a result of a client timeout. Please refer to *Open Ethernet Problems,* Internal Problem ID Code CR-1434 for more information.
Series 90-30 datagram restrictions	Series 90-30 – format datagrams are supported, but cannot access %P or %L memory.
Advanced User Parameter should not be changed	The Advanced User Parameter "wsnd_buf" should not be changed. Changing this value may cause the LAN LED to go out and the Ethernet Interface to drop connection.
Heavy load can block Station Manager	As explained in *PACSystems TCP/IP Station Manager Manual*, GFK-2225, Chapter 1, a heavy EGD and/or SRTP load can block Station Manager operation.

Subject	Description
One-time delay of EGD Production (and possibly Consumption) if more than 24 SRTP Server connections are started simultaneously	If more than 24 SRTP Server connections are established simultaneously, EGD Production may be briefly delayed for each connection after the 24th when the connections are first made after power is applied. If EGD consume acceleration has been disabled, then EGD Consumption is also delayed. The delay only occurs once when the SRTP Server connection is established for the first time after Powerup. No delay is experienced for the first 24 SRTP Server connections.
Very Heavy EGD production/consumption at server may cause EGD command timeouts	Very heavy EGD production and/or consumption at a server device may cause EGD command timeout errors when another device attempts to send EGD commands to that server. If EGD commands must preempt normal production, you may set the "gcmd_pri" Advanced User Parameter to 2 (see GFK-2224, Appendix A). Note that by doing so, EGD exchange production may be delayed.
Advanced User Parameter name change	Beginning with Release 2.00, the following Advanced User Parameters have been renamed to match the Ethernet hardware port identification: "lduplex1" is changed to "lduplex1a" (Ethernet Port 1A duplex state) "lduplex2" is changed to "lduplex1b" (Ethernet Port 1B duplex state) "lspeed1" is changed to "lspeed1a" (Ethernet Port 1A network speed) "lspeed2" is changed to "lspeed1b" (Ethernet Port 1B network speed) The old parameter names are no longer supported; use of an obsolete parameter name will result in a configuration processing error and an Ethernet exception (Entry = 2, Entry 2 = 06). Existing AUP files using the obsolete parameter names will have to be changed to use the new parameter names.
SRTP Application Timeouts must accommodate network connection overhead	The application timeouts within SRTP Channels also include the time needed to establish and maintain the underlying network and STRP connection. Examples are establishing the TCP connection for a new channel, establishing communication with the remote device, and TCP retransmissions during Channel operations. If the time needed for TCP connection establishment or maintenance exceeds the user-specified channel application timeout values, an application timeout will occur. Channel application timeouts are temporary errors; the channel continues to run.
Client Channels TCP resource management	There is a period of time that the OS Network stack hangs onto the TCP resources associated with a connection after it is closed. This "TCP Linger Period" applies to the initiator of the close, usually the client side. . Once the TCP Linger Period expires (60 seconds in the current OS implementation), the TCP resources are released. Application developers using client channels need to be aware of this behavior when designing logic. There are a finite number of TCP resources allocated to client channels, and if channel connections are brought up and down so fast that these resources are depleted, the application may have to wait until a TCP resource frees up to establish another client channel A COMMREQ Status of 0xA890 is returned if no TCP resources are currently available; the application should wait then try again. SRTP Client Channels provides features that help the user preserve TCP connections. These include a "period time" where one can establish an SRTP Channel and specify the channel to run at a given interval, or run as fast a possible. One can also specify a number of iterations, or run forever. Additionally, SRTP Channels allows re-tasking of an active channel to the same remote device, where the parameters of an active channel, such as channel command type (Read/Write), number of repetitions, time periods, and memory addresses can be changed. SRTP Channels also allows re-tasking of an active channel to a different remote device (changing the remote device's IP address, etc.). However, re-tasking to a different remote device does not conserve TCP connections, or save on the time it takes to create a channel.

Subject	Description
Client Channels and Redundant IP	In a Redundancy System, Client Channel COMMREQs can only be initiated from the unit that owns the Redundant IP address. Therefore, the user application logic should use Bit 6 in the LAN Interface Status bit area, "Redundant IP Active" as part of their enabling logic that drives a client channel COMMREQ.
Idle Modbus/TCP connection between a Series 90 and a PACSystems may be prematurely terminated	An idle Modbus/TCP connection between a Series 90 controller and the PACSystems Ethernet Interface may be prematurely terminated. There is an incompatibility between the TCP "Keep-Alive" timer values on the PACSystems Ethernet Interfaces and Series 90 Ethernet Interfaces. The default value of the keep-alive timer for the Series 90 modules is set to a much higher value than for the PACSystems. To keep TCP connections open between a Series 90 Ethernet Interface and a PACSystems Ethernet Interface, the Series 90 Interface Advanced User Parameter wkal_time should be set to the value 750 to match that of PACSystems. With this change, TCP connections remain open indefinitely. This also applies to SRTP Client Channels that have infrequent traffic and can be resolved by using the same technique.
Attempt to open 17 or more Modbus server connections may appear successful	If more than the maximum 16 supported Modbus Server Connections are attempted, the TCP connection may succeed, but no data may be subsequently transferred.
SRTP Connections Remain Open After IP Address Changed	The Ethernet Interface does not terminate all open SRTP connections before changing its IP address. Once the local IP address has changed, any existing open TCP connections are unable to normally terminate. This can leave SRTP connections open until their underlying TCP connections time out. If quicker recovery of the SRTP connection is needed, modify the "wkal_idle" Advanced User Parameter to reduce the TCP keep alive timer down to the desired maximum time for holding open the broken connection. Refer to *TCP/IP Ethernet Communications for PACSystems,* GFK-2224, for details.
RX3i CPU Time Used for Produced EGD Timestamps	Changing the Ethernet interface time via the CHTIME command does not affect the timestamp value within EGD exchanges produced from this Ethernet interface. The EGD timestamp value reflects the current CPU time. In Series 90-70 products and the Series 90-30 CPU364, EGD timestamps are taken from the Ethernet interface and do reflect CHTIME modifications.
ENIU Stale Data During Run Mode Store of EGD	In a large PPS system running 20 ENIUs, when a Run-mode Store is performed that deletes the EGD exchanges for 10 of the ENIUs, the other ENIUs will see the status on their exchanges indicate consumption timeouts during the RMS. At the completion of the RMS, the exchanges operate normally.

Installation in Hazardous Locations

The following information is for products bearing the UL marking for Hazardous Locations:

- WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;

- WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS LOCATIONS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND

- WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 HAZARDOUS LOCATIONS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS LOCATIONS ONLY

- The tightening torque range for the control terminals is 9.6-11.5 in. lb. Use only wire rated for 90°C. Be sure to observe any additional ratings that are provided with the modules.

- Batteries: Replace Battery with Matsushita Part No. BR2477A Only. Use of another battery may present a risk of fire or explosion. "Caution, Battery may explode if mistreated. Do not recharge, disassemble or dispose of in fire." The correct battery type is available as Accessory Kit IC698ACC701.