

IMPORTANT PRODUCT INFORMATION

READ THIS INFORMATION FIRST

Product: PACSystems™ RX7i CPUs with Firmware Version 1.50

IC698CPE010-BB (300 MHz)

IC698CPE020-BB (700 MHz)

This document contains information that is not available in any other publication; therefore, we recommend that you read and save it for future reference. This document discusses the features of the PACSystems RX7i CPU version 1.50.

New CPU Features and Enhancements

Release 1.50 of the RX7i CPUs provides the following new features and enhancements:

- Support for the Programmable Coprocessor Module (PCM).
- Support for the Communications Coprocessor Module (CMM).
- Support for the DLAN module and DATA_INIT_DLAN function block.
- Expanded bulk (%W) reference table memory.
- Increased performance of the CALL function block.

Version Identification

Hardware Identification

The following table shows the revision level of the circuit boards used in this release of the RX7i CPUs.

Catalog Number	Circuit Board ID
IC698CPE010-BB (CPU)	VMIVME-007633-000 Rev. F
IC698CPE020-BB (CPU)	VMIVME-007633-001 Rev. F
IC698CPE010/020-BB (Ethernet)	EX8A1_F2_R03

Firmware Identification

Firmware ID	Version
CPU Primary	1.50 Build 51A2
CPU Boot	1.0 Build 21B2
Ethernet TCP	1.50 Build 49A1
Ethernet Boot	1.50 Build 46A1

CPU Programmable Parts:

Part ID	Revision
Memory PLC	5/19/03
Interrupt PLD	5/11/02
FPGA	6/18/03
MCU	11/03/03
BIOS	1.04

Ethernet Programmable Parts:

Part ID	Revision
PLD	6006_U6_PLD_A.jed

Updates

To upgrade an RX7i CPU to firmware version 1.50, you must purchase the appropriate field upgrade kits or download them at no charge from the web at

<http://www.geindustrial.com/cwc/gefanuc/support/ControllersIO/psrx7i-u.htm>.

IC698CPE010: 44A752252-G01

IC698CPE020: 44A752255-G01

Product Documentation

PACSystems RX7i CPU Reference Manual, GFK-2222

PACSystems RX7i Installation Manual, GFK-2223

TCP/IP Ethernet Communications for the PACSystems RX7i, GFK-2224

Station Manager for the PACSystems RX7i, GFK-2225

PACSystems RX7i User's Guide to Integration of VME Modules, GFK-2235

PACSystems RX7i C Toolkit User's Guide, GFK-2259

CIMPLICITY® Machine Edition Getting Started, GFK-1868

Logic Developer – PLC Programming Software Getting Started, GFK-1918

Datasheet, PACSystems RX7i CPUs, GFK-2226

Datasheet, PACSystems RX7i E-net Module, GFK-2227

Datasheet, PACSystems RX7i Racks, GFK-2236

Datasheet, PACSystems RX7i Power Supplies, GFK-2237

Datasheet, Series 90-70 Fan Assembly Datasheet, GFK-0637

Important Product Information, PACSystems RX7i CPUs, GFK-2244B (this document)

Important Product Information, PACSystems RX7i Ethernet Module, GFK-2266

Important Product Information, PACSystems RX7i C Toolkit, GFK-2260

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CPU Functional Compatibility

Subject	Description
Programmer Version Requirements	CIMPLICITY Machine Edition Logic Developer 4.0 or later must be used to configure and program the RX7i. CIMPLICITY Machine Edition 4.0 LD PLC SP3 Special 2 or later must be used for Release 1.50 new features.
C Toolkit Compatibility	The C Toolkit for PACSystems is distributed with CIMPLICITY Machine Edition Logic Developer 4.0 or greater. Toolkit build 21A2 or later is required for use with the RX7i. Please note: The Series 90-70 Toolkit (IC641SWP709/719) is not compatible with PACSystems RX7i.
Series 90-70 Module Compatibility	<p>The following Series 90-70 modules are supported by the PACSystems RX7i:</p> <ul style="list-style-type: none"> Discrete Input Modules (IC697MDL240/241/250-254/640/651-654/671) Discrete Output Modules (IC697MDL340/341/350/740/750/752/753/940) Analog I/O Modules (IC697ALG230/320/440/441) Genius Bus Controller (IC697BEM731) High Speed Counter (IC697HSC700) Bus Transmitter Module (IC697BEM713) Bus Receiver Module (IC697BEM711) <i>in Series 90-70 Expansion Rack only.</i> Programmable Coprocessor Module (IC697PCM711). For details, see "CPU Operational Notes" on page 11. Communications Coprocessor Module (IC697CMM711). For details, see "CPU Operational Notes" on page 11. DLAN Module (IC697BEM763). For details, see "CPU Operational Notes" on page 11. <p>All other Series 90-70 modules are not currently supported.</p>
BTM/BRM Module Version Requirements	Any BTM (IC697BEM713) used must be at least version H, hardware rev R08 or greater. Any BRM (IC697BEM711) used must be at least version M, hardware rev R13 or greater.
GBC Module Version Requirements	Any Genius Bus Controller (IC697BEM731) used must be revision 5.8 or greater. To obtain this revision of the GBC, you must order upgrade kit 44A751619-G01.
HSC Module Version Requirements	Any High Speed Counter (IC697HSC700) used must be version F, firmware version 1.20 or greater.
ALG Module Version Requirements	<p>Analog module requirements are as follows:</p> <ul style="list-style-type: none"> IC697ALG230 used must be version F or greater. IC697ALG320 used must be version D or greater. IC697ALG440 used must be version D or greater. IC697ALG441 used must be version C or greater.
Series 90-70 Expansion Rack Compatibility	Series 90-70 expansion racks are supported by the PACSystems RX7i. PACSystems RX7i CPUs and the RX7i Ethernet Module do not operate in a Series 90-70 Rack.
Series 90-70 Main Rack Compatibility	Series 90-70 Main Racks cannot be used in a PACSystems RX7i system. PACSystems RX7i CPUs and the RX7i Ethernet Module do not operate in a Series 90-70 Rack.

Subject	Description
Single Width I/O Module Compatibility	<p>The following additional single width I/O modules are supported by the PACSystems RX7i :</p> <ul style="list-style-type: none"> Analog Input, 64 Channel, 16 bit resolution, Voltage (IC697VAL264) Analog Input, 12 bit, 32 Channel single-ended or 16 Channel Differential (IC697VAL132) Analog Output, 32 Channel, 12 bit (IC697VAL301) Digital Input, 64 Point (IC697VDD100) Relay Output, 64 Point (IC697VDR151) Digital Output, 64 Point (IC697VDQ120) Eight Channel RTD/Strain Bridge (IC697VRD008)
Insulating Strips for High Voltage Modules	<p>An insulator strip is required on a high voltage module that is installed to the immediate right of a module with a metal faceplate. Insulating strips should be installed on the following modules that have versions earlier than:</p> <ul style="list-style-type: none"> IC697MDL240D IC697MDL241D IC697MDL250G IC697MDL251E IC697MDL640E IC697MDL340G IC697MDL341E IC697MDL350F <p>Note: Current versions of these modules are shipped with the insulators installed. The strip is visible on the back of the printed wiring assembly.</p> <p>The RX7i rack is shipped with an Insulator Kit that includes enough parts to update three Series 90-70 I/O modules.</p>

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Ethernet Functional Compatibility

Subject	Description
RX7i Does Not Support SRTP Client (“Channels”)	The Ethernet Interface does not support the SRTP Client operation (“SRTP Channels”) that was provided in the Series 90-70 Ethernet Interface (IC697CMM742).
SRTP and EGD Performance Differs from Series 90-70	SRTP and EGD performance in the RX7i differs slightly from the Series 90-70. Each RX7i Ethernet Interface supports a greater number of SRTP connections and EGD exchanges. Please also note that the RX7i currently has several SRTP and EGD operational restrictions when compared to the Series 90-70. When migrating Series 90-70 Ethernet applications to the RX7i, please carefully read the “Ethernet Operational Notes” section on page 17.
Series 90-70 LAN Interface Module (IC697CMM742) Not Supported by RX7i	Please note that the Series 90-70 LAN Interface Module (IC697CMM742) is not supported by the RX7i and should not be placed in an RX7i rack. The RX7i CPU contains an embedded Ethernet Interface. If additional Ethernet Interfaces are required, the RX7i Ethernet Module (IC698ETM001) should be used.

CPU Problems Resolved by this Revision of Product

Subject	Description
TOD Clock After Power Cycle	The TOD clock is now updated to match the CPU’s internal real time clock on power down as well as power up. This will prevent obvious “jumps” in the TOD clock time on power up.
Transition Contacts Used on %S11	Once triggered, a transition contact used on %S11 (OVR_PRE) will only pass power for one sweep, instead of multiple sweeps.
Battery Fault Reporting	The battery fault has been changed so that it does not recur after being cleared. This behavior is similar to the Series 90-70 CPU. This will make it easier to clear the fault locating references when the battery is missing.
Forces at Password Level 2	Users are no longer allowed to toggle forces when passwords are set at level 2.
DOIO Function Block Called from Interrupt Block	A module whose inputs or outputs are scanned in an interrupt block using a DOIO function block can now be included in the normal IO scan.
BUS_RD/WR BYTE Function Block Calls With SINGLE_WORD Access Type	When the VME memory region interface type is set for SINGLE_WORD and a byte sized READ or WRITE is executed by the logic (BUS_RD_BYTE length 1, BUS_WRT_BYTE length 1), the CPU now correctly executes a byte sized read or write.
Fault Generated During Power Cycle of Expansion Rack Containing GBC	Power cycling an expansion Rack containing a GBC will no longer generate informational faults indicating “Non-critical CPU software event” with error code 269. These faults were nuisance faults.
Power-up Mode with Battery and Flash	Previously, if the CPU was configured to load configuration and logic from flash and was power cycled while in Run mode with I/O enabled, the CPU would power up in Run mode with I/O disabled. In release 1.50, the CPU will power up in Run mode with I/O disabled, if no battery is present. If a battery is present, the CPU will power up in Run mode with I/O enabled.
Transition Bits on %S1-%S8	Transition bits on %S1-%S8 now operate correctly. Previously, transition bits for these status bits remained on for multiple sweeps.
Load of Logic through ETM	When the programmer is connected to the PLC through an ETM module, loads of logic containing blocks greater than 8K will no longer cause the programmer to disconnect and the CPU to log a loss of module fault on the ETM module.
Modbus RTU Protocol Write and Read of Large Word Reference Addresses	Writes and reads of word reference table addresses larger than 16385 are now completed correctly.

Ethernet Problems Resolved by this Revision of Product

Subject	Description
Station Manager Parameters Need not be Entered in Uppercase	For the CHSOSW command, the pl_parity, pl_flow_control, and time_sync parameters values no longer need to be in UPPER CASE and enclosed in double quotes (" ").
Reference Table Web Page Display Problems	Display of byte or word values in bit memory on the Reference Table web page have been corrected. The display of signed decimal values in bit memory is now correct when the value is negative. For example: The word 0x817A starting at %M1 (%M16 thru %M1) is correctly displayed as 33146 in unsigned format and -32390 in signed format.
Reference Table Web Page Display Limitation	The Reference Table web page no longer incorrectly limits the maximum viewable address in several cases.
Pressing Ethernet Restart During Firmware Upgrade	Pressing the Ethernet Restart pushbutton during firmware upgrade will correctly cause the firmware upgrade to fail. The upgrade process will need to be restarted.
Web Server Browser Restriction	When using Netscape version 4.0 on a PC with Windows 95 O.S., the reference table web page will now appear correctly.
IO Fault Table Web Page Display Problem	The IO Fault Table web page will display each fault and the time last cleared correctly.
Web Server and FTP Server Connection Configuration Validation	The programmer will now enforce the restriction that the total number of web server and FTP connections does not exceed 16.
Double Push of Ethernet Restart Pushbutton	If the user presses the Ethernet restart pushbutton twice, very rapidly, the Ethernet Interface will restart and regain communication with the CPU.
IO and PLC Fault Table Web Page Display Problems	The IO and PLC Fault Table web pages will display the correct value for the year. In addition, the PLC mode will be updated correctly.
Invalid Gateway In BOOTP Command	An error message is now generated when an invalid gateway is specified for the BOOTP Station Manager command. The command is rejected. The user should reissue the command with the correct gateway value.
TCP Connections on RX7i Server if Client is Lost	If an SRTP client with open connections to a RX7i server is power cycled or reset, the server's TCP connection will no longer remain open for a long time (until the server's TCP keep-alive timer expires) once the client is restarted and attempts to reopen the communication.
Max Web Connections	The default for the maximum number of web server connections Ethernet configuration parameter is now correctly set to 2.
Station Manager DIR and RENAME Commands	The Station Manager command DIR now functions correctly when a specific filename is used as a parameter. In addition, the RENAME command no longer generates an error message.
Exception When Store is Aborted by Programmer	The Ethernet Interface no longer logs the following exception when Programmer aborts a store sequence: Entry = 02H, Events 2-6 = 0006H 0000H 0000H 0002H 1017H, scode = 8006001fH This error was a nuisance exception log event that did not affect Ethernet performance.
Restart Reason Logged After Quick Powercycle	Following a quick powercycle, the Ethernet Interface will now properly set the restart reason to indicate a CPU commanded reset occurred. The restart reason value (as displayed in exception log Event 1, Entry 3) was previously set to unknown reason code ffH. This error does not affect Ethernet operation. (Please note: This problem is fixed in Release 1.50 Ethernet Boot firmware and cannot be corrected by upgrading from Release 1.00 to Release 1.50 Ethernet Primary firmware.)
EGD Exchange Status After Store of Hardware Configuration	The EGD status words for both Produced and Consumed exchanges are now not updated after a store of hardware configuration when the CPU is still in Stop I/O Disabled mode. This means that the reference table containing the EGD status words will not go unequal after the store of hardware configuration.

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Subject	Description
EGD Consumed Exchange on First Scan	EGD Consumed Exchanges are now written into reference memory on the first scan of the PLC.
EGD Status in Stop Mode	EGD Status on produced exchanges will now get updated correctly, even when the PLC is in stop mode.
EGD Consumer Exchanges After Store of Configuration with I/O Enabled	Storing a hardware configuration containing consumed EGD exchanges which also configures the CPU to Stop mode with I/O enabled will now cause the PLC to begin consuming EGD exchanges. Previously, exchanges would be produced, but not consumed, if the CPU was previously in Stop I/O disabled mode.
EGD Production in Stop Mode I/O Enabled	EGD exchanges are now produced when the PLC is in Stop Mode I/O enabled.

CPU Restrictions and Open Issues

Subject	Description
Ethernet Disconnect During Word for Word Change	If the Ethernet connection is broken during a word-for-word change, the programmer may not allow a subsequent word-for-word change after reconnecting due to the fact that it thinks another programmer is currently attached. If this occurs, you should go offline and then back online again.
Power Cycle During Large Run Mode Store, Word-for-Word Change or Online Edit Session Problem	If a power cycle occurs during a run mode store, word-for-word change or online edit change of a large program, the CPU may power up with memory corrupted. The user will need to clear the CPU faults and store again.
Modbus Station Address Configuration with Message Mode	When a port is configured for message mode during run mode, it will automatically switch to Modbus protocol during stop mode. However, there is currently no way to configure a Modbus Station Address in this mode. The default address is 1.
3rd Party Modules Operating as VME Masters	Third party modules operating as VME masters have not been tested with the RX7i. Users interested in integrating this type of functionality should contact technical support.
GBC May Default Its Outputs 250ms Later Than Expected	For this version of the RX7i CPU, an additional 250 ms is added to the timer that the Genius Bus Controllers use for detecting CPU failures. The resulting formula is: (2 x the CPU's configured watchdog timer) + 250 ms with a maximum value of 3 seconds. The maximum setting for this GBC's timer is capped at 3 seconds. Therefore, in certain cases of RX7i CPU failure, the GBCs may default their outputs up to 250ms later when compared to the same scenario with a 90-70 CPU.
Store of Hardware Configuration with Multiple GBCs	Storing a hardware configuration containing two or more GBCs twice may cause one GBC to fail configuration. Clearing the hardware configuration between stores will prevent this fault from being generated.
Simultaneous Clears, Loads and Stores Not Supported	Currently, the RX7i does not support multiple programmers changing CPU contents at the same time. The programming software may generate an error during the operation.
Power Cycle During Online Edit	If the user stores a folder to flash that is configured to power up from flash and then subsequently power is cycled in the middle of a Online Edit session, the programmer will still indicate that the Online Edit session is in progress after the power cycle. The user should cancel the Online Edit session to continue.

Subject	Description																																				
Fault Reporting With Analog Expanders	<p>For fault reporting when an analog expander is used in a Series 90-70 Expansion Rack, a special case exists when the ALG230 base module is in slot 2 and an expander module is present in slot 9. In this case, if any expander module loses communication with the base module, then the fault reports for all 16 channels for that expander display the slot number as 0. The circuit number will be a value from 9 to 120, as shown in the following table. The I/O reference address for each channel is displayed as blank.</p> <table border="1"> <thead> <tr> <th>SLOT</th> <th>EXPANDER</th> <th>CIRCUIT NUMBERS</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>1</td> <td>9-24</td> </tr> <tr> <td>4</td> <td>2</td> <td>25-40</td> </tr> <tr> <td>5</td> <td>3</td> <td>41-56</td> </tr> <tr> <td>6</td> <td>4</td> <td>57-72</td> </tr> <tr> <td>7</td> <td>5</td> <td>73-88</td> </tr> <tr> <td>8</td> <td>6</td> <td>89-104</td> </tr> <tr> <td>9</td> <td>7</td> <td>105-120</td> </tr> </tbody> </table> <p>For fault reporting when an analog expander is used in a PACSystems RX7i rack, a special case exists when the base is in slot 4 and an expander is present in slot 11. In this case, the slot number for a faulty expander is always displayed as slot 2, and the circuit number will display according to the slot used for the expander, as shown in the following table. The I/O reference address for each channel is displayed as blank.</p> <table border="1"> <thead> <tr> <th>SLOT</th> <th>CIRCUIT NUMBERS</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>25-40</td> </tr> <tr> <td>7</td> <td>41-56</td> </tr> <tr> <td>8</td> <td>57-72</td> </tr> <tr> <td>9</td> <td>73-88</td> </tr> <tr> <td>11</td> <td>105-120</td> </tr> </tbody> </table>	SLOT	EXPANDER	CIRCUIT NUMBERS	3	1	9-24	4	2	25-40	5	3	41-56	6	4	57-72	7	5	73-88	8	6	89-104	9	7	105-120	SLOT	CIRCUIT NUMBERS	6	25-40	7	41-56	8	57-72	9	73-88	11	105-120
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Power Cycle During Write to Flash	If the CPU is power cycled during the process of writing to flash, and is configured to power up from flash, a fault will be generated on power up.																																				
Hardware Configuration Not Equal After Changing Target Name	If the user stores a hardware configuration to flash which indicates that "Logic/Config Power up Source" is set to "Always Flash" or "Conditional Flash" and then subsequently changes the name of the target in the programming software, the hardware configuration will go Not Equal and will not Verify as equal.																																				
PLC and IO Fault Tables May Need to be Cleared Twice to Clear Faulted State	Both PLC and IO fault tables need to be cleared to take the CPU out of Stop/Fault mode. If one of the tables contains a recurring fault, the order in which the tables is cleared may be significant. If the CPU is still in Stop/Fault mode after both tables are cleared, try clearing the fault tables again.																																				
VME Modules Using Program Type AM Codes	<p>When Block Transfers are enabled with a VME memory region that uses one of the program type AM Codes, the Rx7i CPU sometimes generates block transfer (BLT & MBLT) cycles to access the associated VME memory. Therefore, if you have a VME memory region configured to use one of the program type AM Codes (AM Codes 3Ah, 3Eh, 0Ah, or 0Eh), be sure to follow at least one of these two rules:</p> <p>a) The memory region's Interface Type parameter must <u>not</u> be set to "Qword Access (64-bit)", and the VME Block Transfer parameter must be set to "Disabled".</p> <p>-OR-</p> <p>b) The system may not contain any "program" and "data" VME memory regions with overlapping VME addresses. (If more than one VME module were to respond to a BLT or MBLT cycle, a system error could result.)</p>																																				
Hardware Revision	The hardware revision, as displayed by the programmer, is always reported as 4 (Rev. D), regardless of the actual hardware revision. Users should check the label on the board to determine the actual hardware revision.																																				

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Subject	Description
Setting Force On/Off by Storing Initial Value	Once a force on or force off has been stored to the PLC, the user cannot switch from force on to force off or vice-versa directly by downloading initial values. The user can turn off the force by doing a download, and then change the force on or off by another download.
Interrupt Block for Disabled Interrupt	If an interrupt block for an 90-70 HSC interrupt is downloaded to a PLC and preset interrupts have been disabled and if system configuration mismatch fault action is set to fatal, the PLC will go to Stop fault mode. The user can clear the fault table and then go to Run mode. This differs from the Series 90-70, which would let the user go directly to Run mode in this instance.
Storing Large Numbers of Blocks to Flash	Currently, storing logic with approximately 200 blocks or more to flash may fail, due to the programmer timing out.
CMM Comm_req Restriction	Due to an issue in the CMM firmware, the SNP COMM_REQ Read System Memory (7202) executed on a CMM module does not execute correctly for lengths greater than 760 words. Incorrect data is written to the SNP Master. Users should not use lengths greater than 760 words.
Number of Active Programs Returned as Zero	The SNP request Return Controller Type and ID currently returns the number of active programs as zero.
Use of BOOL Array PSB Parameter	Currently, if a user creates a PSB with a BOOL parameter with length greater than one, and then uses an element of that BOOL array as a parameter to a function block that expects a non-boolean value (such as MOVE_INT), the PLC will generate a CPU soft alarm.
Over Sweep Condition in Constant Sweep Mode	When the PLC is configured for Constant Sweep mode, a consistent over sweep condition can cause the programmer to lose communications with the PLC. The user must insure that when Constant Sweep mode is configured, sufficient buffer is allowed to communications to occur with the programmer.
Mode Transition with Scan Set > 1	When a scan set greater than one has been configured and stored, an attempt to go from Run Mode I/O Disabled to Stop Mode I/O Enabled should be rejected. Instead, the PLC will transition to Stop Mode I/O Disabled.
%T Reference Table Not Cleared	If no logic is currently stored in the PLC, the %T reference memory is not cleared on a stop to run transition.
Serial I/O Failure at 115K During Heavy Interrupt Load	Rare data corruption errors have been seen on serial communications when running at 115K under heavy interrupt load on the PLC. Under heavy load applications, users should restrict serial communications to 57K or lower.
Fault Contacts on Modules in Expansion Rack	When an expansion rack powers up, the slot fault contacts will prematurely indicate that the modules in the expansion rack are not faulted <i>before</i> they complete their power up. Use I/O point fault contacts to verify validity of the I/O.
Fault Contacts on Remote I/O Station	If multiple faults exist in a Series 90-70 Remote I/O Station and one of them is corrected, a FAULT contact that uses the Remote I/O Station's module reference will incorrectly indicate that no faults exist at the Remote I/O Station.
BIT_SEQ Function Block DIR Parameter	The BIT_SEQ Function Block should require the user to flow BOOLEAN logic into the DIR parameter, but currently does not. If no DIR parameter is present, the BIT_SEQ will increment by default.

Ethernet 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. 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 "wka_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 <i>TCP/IP Ethernet Communications for the PACSystems RX7i</i> , GFK-2224, for details.
Reporting of Duplicate IP Address	The RX7i does not log an exception or a fault in the PLC Fault Table when it detects a duplicate IP address on the network.
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. The PING 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 PLC Fault Table entries when a single error condition occurs. Under repetitive error conditions, the exception log and/or PLC 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.
Reduced EGD Consumption with Large Numbers of Produced Exchanges	When large numbers of EGD exchanges are produced at a rapid rate, some consumed EGD exchanges may exhibit lower rates of consumption than expected. To better balance produced and consumed EGD exchange performance, reduce the number or frequency of the produced exchanges configured at this Ethernet Interface.
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 90-70 SRTP Servers to RX7i may need to lengthen SRTP timeout parameters.
IO Fault Table Web Page Display Problem	The I/O Fault Table web page displays wrong values for various parameters such as I/O Bus, and Bus Point.
IO Fault Table Web Page Restriction	The I/O Fault Table web page does not currently support the field of 'fault description'.
PLC Fault Table Last Update Date and Time	The PLC Fault Table web page does not display the correct data for the PLC date and time field. The date and time displayed are the PCs local date and time, not the PLCs date and time.
Spurious Ethernet Failure Error	On rare occasions, the error "Module hardware fault" may be reported on the Ethernet daughterboard in the station manager log. This fault is a nuisance fault and may be ignored.
Web Server Failure Under Heavy Load	After several hours of heavy load on the web server, the web server may fail to return pages and may cause a LAN system-software fault to be logged. The web server will resume serving pages when the load is reduced.
Pushing Ethernet Restart Button Multiple Times	Pushing the Ethernet Restart button multiple times rapidly without letting the Ethernet module complete the restart may cause the PLC to go lights out. The user should power cycle the CPU to recover.
Reference Table Web Page Restriction	Switching between displaying bit memory and word memory may generate errors. Refreshing the page may correct the display when going to word memory. When going to bit memory, selecting a %SB memory range will correct the display.

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Subject	Description
Reference Table Web Page Restriction	After the user selects a user defined table, if the user then tries to go back to the pre-defined table of %R1-%R60, an error message may be displayed stating "An error was detected when trying to retrieve setting from PC cookie".
Fault Table Web Page Restriction	On both the I/O and PLC Fault Table web pages, the PLC program name is not currently displayed in the area provided.
Reference Table Web Page Format	When using Netscape 4.7 to view the reference table web page, the size of the columns is incorrect. The first column is much wider than the others.
Javascript Error	The following Javascript error has been seen when accessing the I/O and PLC Fault Table web pages using Internet Explorer: " 'self.document.reform.log_textbox' is null or not an object"

CPU Operational Notes

Subject	Description
Only One BTM Allowed in Main Rack	Only one BTM is allowed in the main rack. Multiple BTMs in the main rack will result in undefined operation.
Logic Executed in Row Major Instead of Column Major	Logic execution in PACSystems RX7i is performed in row major order (similar to the Series 90-30) instead of column major (similar to the Series 90-70). This means that some complicated rungs may execute slightly differently on PACSystems RX7i and Series 90-70. For specific examples, see the programming software on-line help.
Upgrading Firmware with Modules in Rack	The process of upgrading the CPU firmware with the WinLoader utility may fail when multiple IO modules are in the main, remote or expansion racks, due to the time it takes to power cycle the rack system. If the upgrade process fails, move the CPU to a rack without IO modules and restart the upgrade process.
NaN Handled Differently Than in 90-70	The PACSystems RX7i CPU may return slightly different values for Not A Number as compared to Series 90-70 CPUs. In these exception cases (e.g., 0.0/0.0), power flow out of the function block is identical to Series 90-70 operation and the computed value is still Not A Number.
PID Algorithm Improved	<p>The PID algorithm used in PACSystems RX7i has been improved and therefore PID will function slightly differently on PACSystems RX7i than on the Series 90-70. The differences are:</p> <p>The elapsed time is computed in 100 μS instead of 10 mS units. This smoothes the output characteristic, eliminating periodic adjustments that occurred when the remainder accumulated to 10mS.</p> <p>Also, previous non-linear behavior when the integral gain is changed from some value to 1 repeat/second was eliminated.</p>
Service Request 13 Command Block Must Contain Zero	When the Service Request function block is used to invoke Service Request #13, the first word of the command block is required to contain a zero. On the Series 90-70, this value was ignored. Please note: the parameter to the service request needs to be the address of the location containing the zero.
Changing IP Address of Ethernet Interface While Connected	Storing a hardware configuration with a new IP address to the RX7i while connected via Ethernet will succeed, then immediately disconnect because the RX7i is now using a different IP address than the Programmer. You must enter a new IP address in the Target Properties in the CME Inspector window before reconnecting.

Subject	Description
Stack Allocation for Folders Converted from Series 90-70 Must be Increased	Series 90-70 folders are converted to PACSystems RX7i with the same stack allocation. PACSystems RX7i uses more stack space than the Series 90-70, so some folders may not run after conversion. To increase the stack space, right click the _MAIN block and select Properties. Stack Size is listed at the bottom of the Properties page. The default stack size in new PACSystems RX7i folders is 64KB. Folders with a large number of nested calls may need more stack space. As a general rule, the stack for the converted PACSystems RX7i folder should be set to approximately three times the stack size of the Series 90-70 version of the folder. A diagnostic fault will be displayed if the folder runs out of stack space.
SNP Not Supported	The serial ports on the RX7i do not support SNP. Programming software can connect to the RX7i over Ethernet.
Duplicate Station Address for Modbus Will Conflict with Other Nodes	The default serial protocol for the RX7i is Modbus RTU. The default Station Address is 1. If the PLC is added to a multi-drop network, care must be taken that the PLC is configured with a unique Station Address. Nodes with duplicate Station Addresses on the same network will not work correctly.
FST_EXE No Longer Represented by %S121	<p>The PACSystems RX7i implementation of FST_EXE is different from the Series 90-70 implementation. FST_EXE is no longer stored in %S (%S121) memory. Instead, it is stored in a local memory that is not accessible to the user. You can reference FST_EXE only by using its name (similar to referencing a symbolic variable).</p> <p>The FST_EXE system variable can be accessed (read) in the logic of any block. Just as in the Series 90-70, PSB blocks and C blocks inherit the FST_EXE value of their calling block. Again, as in the Series 90-70, FST_EXE cannot be written.</p>
Format for Fault Locating References Changed	<p>Compared to the Series 90-70 CPU, syntax for the fault locating references has changed as follows:</p> <ul style="list-style-type: none"> #RACK_00r is now #RACK_000r. #SLOT_rss is now #SLOT_0rss. #BUS_rssb is now #BUS_0rssb. #M_rssbmm is now #M_rssbmmm (adds support for 256 modules). <p>Existence of old style (Series 90-70) fault locating references will cause errors to be generated during logic validation. The error generated will have the following format: "Error 9618: Invalid reference type for operand [LD Block, '_MAIN': Rung 7]"</p>
Slot Restrictions for Analog Expander Module in RX7i Rack	<p>The following restrictions apply to Analog Expansion Modules in a PACSystems RX7i rack:</p> <ul style="list-style-type: none"> The base module must be in a slot no lower than Slot 4. The expander module must be in a slot no higher than Slot 11. No expander module may be in a slot lower than the base module. <p>Because of these restrictions, and because the 90-70 modules occupy two slots in the PACSystems RX7i rack, a maximum of three expanders are possible. (Base in Slot 4, Expanders in Slots 6, 8, and 10 or Base in Slot 5, Expanders in Slots 7, 9, and 11.) Please note that these restrictions do not apply to Analog Expansion Modules in Series 90-70 Expansion Racks.</p>
Genius Bus Controller Restrictions	<p>The following restrictions apply to GBCs in PACSystems RX7i:</p> <ul style="list-style-type: none"> ■ The minimum CPU sweep time will be gated by the time it takes the GBC to refresh its outputs and collect its inputs + 500µs. To obtain a smaller sweep time, use the SUSIO function block or place the GBCs in a scan set that has non-default characteristics. ■ If a %W reference address is used for status or return data, it must be in the range %W00001 - %W65536. ■ Any Genius Bus Controller (IC697BEM731) used must be revision 5.8 or greater. (To obtain this revision of the GBC, you must order upgrade kit 44A751619-G01.)

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Subject	Description
<p>Communication Coprocessor Module Restrictions</p>	<p>PACSystems RX7i version 1.50 or later supports IC697CMM711, version 4.20 or later. You must ensure that you are using the correct firmware version of the CMM because PACSystems does not support version checking for this module. (The module's firmware version can be found on a label attached to the module's EEPROM.)</p> <p>PACSystems does not support the following for an IC697CMM711:</p> <ul style="list-style-type: none"> ■ Connecting CIMPLICITY Machine Edition to the CPU through the IC697CMM711 module serial ports. ■ Access to %W offsets greater than 65535 of %W. ■ Symbolic memory. ■ WAIT mode COMMREQs. ■ Permanent datagrams. ■ Firmware version checking. <p>The following restrictions apply when using the IC697CMM711 with PACSystems:</p> <ul style="list-style-type: none"> ■ %W memory is partially supported. Only offsets 0—65535 of %W (formally known as BULK MEMORY) can be accessed via the CMM. ■ The Program Name is currently always LDPROG1 for PACSystems. ■ Reads and writes beyond currently configured reference table limits will report a minor code error of 90 (REF_OUT_OF_RANGE) instead of F4 (INVALID_PARAMETER) as reported on the Series 90-70. ■ In case of ERROR NACK, the Control Program number, privilege level and other piggyback status data will be set to 0. ■ PACSystems CPUs return the major/minor type of the 90-70 CPX935 (major type 12, minor type 35) to the CMM scratch pad memory when communicating with a CMM. ■ Control Program Number – will be returned as 01 in PACS instead of FF as reported on the Series 90-70. <p>Note: For details on operation of the IC697CMM711, refer to the Serial Communications for PACSystems and Series 90 User's Manual, GFK-0582.</p>

Subject	Description
Programmable Coprocessor Module Restrictions	<p>PACSystems RX7i CPU release 1.50 or later supports IC697PCM711, version 4.05 or later. You must ensure that you are using the correct firmware version of the PCM because PACSystems does not support version checking for this module. (The module's firmware version can be found on a label attached to the EEPROM.)</p> <p>PACSystems does not support the following for IC697PCM711:</p> <ul style="list-style-type: none"> ■ Connecting CIMPLICITY Machine Edition to the CPU through the IC697PCM711 module serial ports. ■ Access to %W offsets greater than 65535. ■ Symbolic memory. ■ WAIT mode COMMREQs. ■ The following C functions are not supported: <ul style="list-style-type: none"> chk_genius_bus chk_genius_device get_cpu_type_rev get_memtype_sizes get_one_rackfault get_rack_slot_faults ■ The C function write_dev will not write to read only reference tables (transitions, overrides and read only %S, %SA, %SB and %SC bits.) The call will fail at run time and return an error code. ■ Firmware version checking. <p>The following restrictions apply when using the IC697PCM711 with PACSystems:</p> <ul style="list-style-type: none"> ■ %W memory (formally known as BULK MEMORY) partially supported. Only offsets 0-65535 of %W can be accessed via the PCM. ■ The Program Name is currently always LDPROG1 for PACSystems. ■ In case of ERROR NACK, the Control Program number, privilege level and other piggy status data will be set to 0. ■ VME addresses need to be updated to use the PACSystems addressing scheme. ■ PACSystems CPUs return the major/minor type of the Series 90-70 CPX935 (major type 12, minor type 35) to the PCM scratch pad memory when communicating with a PCM. <p>Note: For details on operation of the IC697PCM711, refer to Programmable Coprocessor Module and Support Software, GFK-0255.</p>

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Subject	Description
<p>PCM (to CPU) Communications Timeout</p>	<p>The PCM has a default backplane communications timeout value of 5 seconds. After the PCM has sent a request to the CPU, the PCM applies this timeout while waiting on a response back from the CPU. In most cases, the CPU will respond well within the 5-second timeout; however, in certain instances the CPU can take longer than 5 seconds to respond. These cases are limited to LOADs or STOREs of program and/or configuration -especially if blocks in the program are larger than 8 KBytes. Folders containing EXE blocks (again with *.EXE files >8 KBytes) are most likely to cause problems. To ensure that the PCMs do not observe backplane timeouts, a file must be loaded (using termf) to the PCM. The file must be a binary file named CPU.ENV. The contents of this file are as below (all values are specified in hexadecimal):</p> <p>Once the binary file CPU.ENV (below) is created, use termf to load CPU.ENV to the PCM. Then execute a soft reset of the PCM. After executing the soft reset, the PCM's backplane communications timeout should be 10 seconds.</p> <p>Note: A copy of the above CPU.ENV file can be obtained from http://www.geindustrial.com/cwc/gefanuc/support/ControllersIO/s9070-d.htm.</p> <p style="text-align: center;">CAUTION</p> <p>The CPU.ENV file will not be used when a hard reset is performed on the PCM. With the CPU.ENV file resident in the PCM, a soft reset must be performed after every hard reset of the PCM. Be aware that it is possible to issue a soft reset COMMREQ from the Ladder Diagram application; therefore, the application can be modified to handle the required reset of PCMs after a power cycle of the PLC system.</p>

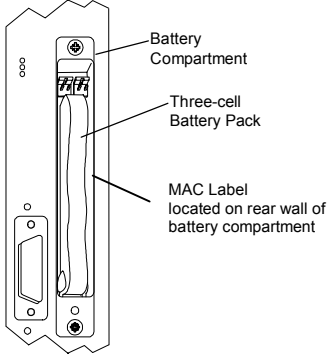
File Offset	Data															
0000	4C	5A	01	01	00	00	00	00-00	00	00	00	01	00	00	00	LZ
0010	00	00	00	00	00	00	00	00-00	00	43	50	55	4C	49	4E CPU LIN
0020	4B	2E	43	4F	44	00	2D	62-00	36	34	00	2D	74	00	32	K . C O D . - b . 6 4 . - t . 2
0030	30	30	00	00	43	50	55	4C-49	4E	4B	2E	44	43	42	00	00 . . CPU LINK . DCB .
0040	00	4E	55	4C	4C	3A	00	4E-55	4C	4C	3A	00	4E	55	4C	. NULL : . NULL : . NULL
0050	4C	3A	00	00	00	00	00	00-00	00	00	00	00	00	00	00	L :
0060	00	00	00	00	00	00	00	00-00	00	00	00	00	00	00	00
0070	00	00	00	00	00	00	00	00-00	00	00	00	00	00	00	00

<p>DLAN/DLAN+ (Drives Local Area Network) Interface Restrictions</p>	<p>PACSystems RX7i release 1.50 or later supports the DLAN Interface module, IC697BEM763, version 4.20 or later. You must ensure that you are using the correct firmware version of the DLAN Interface because PACSystems does not support version checking for this module. (The module's firmware version can be found on a label attached to the EEPROM.)</p> <p>PACSystems does not support the following for an IC697BEM763:</p> <ul style="list-style-type: none"> ■ Connecting CIMPLICITY Machine Edition to the CPU through the IC697BEM763 module serial ports. ■ %W memory. ■ Symbolic memory. ■ WAIT mode COMMREQs. ■ Firmware version checking. <p>Note: The DLAN Interface module is a limited availability, specialty system. If you have a DLAN system, refer to the DLAN/DLAN+ Interface Module User's Manual, GFK-0729 for details.</p>
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Subject	Description
Backplane Comm window Setting and Genius Redundancy	When using Genius Redundancy, do not set the backplane communications window timer to 0. Also be sure to allow enough time for the backplane communications window to run when using Constant Sweep mode. Ample backplane communications window time must be available for the GBCs to exchange information about Genius devices that are lost and added.
Expansion Rack ID	Series 90-70 expansion racks are shipped with the rack ID strapped for rack 0 (the main rack). If the rack jumper is not changed the PLC CPU will not recognize the rack at all and may not properly identify the error.
Expansion Rack Cable	Connection and disconnection of an expansion rack cable while the CPU is running should not be attempted. This will cause the PLC to go to the STOP/HALT state.
Expansion Rack Power	Expansion racks should be powered up at the same time the main rack is powered up or they should be powered up after the main rack has completed its power up initialization. Do not power up an expansion rack while the PLC CPU is running power-up diagnostics.
Timer Operation	<p>Care should be taken when timers (ONDTR, TMR, and OFDTR) are used in program blocks that are NOT called every sweep. The timers accumulate time across calls to the sub-block unless they are reset. This means that they function like timers operating in a program with a much slower sweep than the timers in the main program block. For program blocks that are inactive for large periods of time, the timers should be programmed in such a manner as to account for this catch up feature.</p> <p>Related to this are timers that are skipped because of the use of the JUMP instruction. Timers that are skipped will NOT catch up and will therefore not accumulate time in the same manner as if they were executed every sweep.</p>
Constant Sweep	Constant Sweep time, when used, should be set at least 10 milliseconds greater than the normal sweep time to avoid any over-sweep conditions when monitoring or performing on-line changes with the programmer. Window completion faults will occur if the constant sweep setting is not high enough.
Large Number of COMM_REQs Sent to Module in One Sweep Causes Faults	A large number of COMM_REQs (typically greater than 8) sent to a given board in the same sweep may cause Module Software faults to be logged in the PLC fault table. The fault group is MOD_OTHR_SOFTWR (16t, 10h) and the error code is COMMREQ_MB_FULL_START (2). When this occurs, the "FT" output of the function block will also be set. To prevent this situation, COMM_REQs issued to a given board should be spread across multiple sweeps so that only a limited number (typically 8 or less) of COMM_REQs are sent to a given board in each sweep. In addition, the FT output parameter should be checked for errors. If the FT output is set (meaning an error has been detected), the COMM_REQ could be re-issued by the application logic.
C Block Standard Math Functions Do Not Set errno	In C Blocks, standard math functions (e.g. sqrt, pow, asin, acos) do not set errno to the correct value and do not return the correct value if an invalid input is provided.
Loss of VDD100 or VAL132 After Multiple Power Cycles	<p>In rare instances, a VDD100 or VAL132 module may not configure after power has cycled repeatedly in a very brief period of time. A Loss of IO Module fault will be generated.</p> <p>In extremely rare instances, this may also cause other modules to fail to configure, without generating additional loss of module faults. These additional failures may cause communication with the Ethernet Interface to fail.</p> <p>The user can recover from either of these cases by turning off power for at least 5 seconds and then restoring power. This will provide sufficient "off-time" to ensure that all modules can powerup properly.</p>

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Ethernet Operational Notes

<i>Subject</i>	<i>Description</i>
MAC address	<p>A label on the rear wall inside the CPU's battery compartment identifies the MAC address assigned to the CPU's embedded Ethernet Interface. The label is visible when the battery is removed from its compartment. (The battery does not need to be disconnected to temporarily remove it from the compartment.)</p>  <p>The diagram shows a vertical battery compartment. At the top, there is a circular opening labeled 'Battery Compartment'. Below it is a 'Three-cell Battery Pack'. On the rear wall of the compartment, there is a small rectangular label labeled 'MAC Label located on rear wall of battery compartment'.</p>
Configuration of IP Address is Required Before Using Ethernet Communications	<p>The Ethernet Interface within the CPU module cannot operate on a network until a valid IP address is configured. The necessary 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:</p> <ul style="list-style-type: none"> ■ Connect a serial terminal to the Station Manager port of the PACSystems RX7i . Then use the CHSOSW command to enter the desired IP address. For details, see Station Manager for the PACSystems RX7i, 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 the 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. <p>Once a temporary IP address has been set up, the Ethernet Interface can be accessed over the network (such as by the CIMPLICITY ME programming software). The programmer should then be used to configure the proper IP address for the Ethernet Interface.</p>

<i>Subject</i>	<i>Description</i>
Proper IP Addressing is Always Essential	<p>The PACSystems RX7i CPU's embedded 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 RX7i and other nodes on the network. Refer to TCP/IP Ethernet Communications for the PACSystems RX7i, GFK-2224 for important information on IP addressing. When storing a new HW configuration to the RX7i, be sure that the HW configuration contains the proper Ethernet addressing data (IP Address, Subnet Mask, and Gateway IP Address) for the RX7i.</p> <p>Note: CIMPPLICITY ME 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 CME Inspector window. Storing a HW Configuration whose Ethernet addressing data contains an IP Address that is different from the RX7i target IP address will change the IP address used by the target RX7i 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 CME Inspector window to use the new IP address. To regain communication at the former IP address, use the manual corrective action described above.</p> <p>Storing a HW Configuration containing default (0.0.0.0) or incorrect Ethernet addressing data to the PACSystems RX7i will result in loss of the Programmer connection and will require manual corrective action as described above.</p>
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 RX7i 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 RX7i Ethernet modules will continually reset.
Reporting of Duplicate IP Address	The PACSystems RX7i does not log an exception or a fault in the PLC Fault Table when it detects a duplicate IP address on the network.
EGD Performance Information	Users requiring detailed EGD performance information should contact their Application Engineer and request the EGD Performance Application Note for the RX7i (Marketing Bulletin number H-06-03-01).
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.

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<i>Subject</i>	<i>Description</i>
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.
Series 90-70 Datagrams are Not Supported	Series 90-70 datagrams are not supported. This means that Series 90-70 - format variable list requests from Host Comm Toolkit applications will fail. (Series 90-30 – format datagrams are supported, but cannot access %P or %L memory in the RX7i.)
AUP Parameter Should Not be Changed	The Advanced User Parameter "wsnd_buf" should not be changed by the user. Changing the value of this parameter may cause the LAN led to go out and the Ethernet Interface to drop connection.
Heavy Load Can Block Station Manager	As explained in TCP/IP Communications for PACSystems RX7i Station Manager Manual, GFK-2225, Chapter 1, a heavy EGD and/or SRTP load can block Station Manager operation.
Web Server Browser Restrictions	Internet Explorer version 4.0 running on Windows 98 will give an error when the reference table web page is accessed. Web Server operation has been verified with Internet Explorer version 5.0