IMPORTANT PRODUCT INFORMATION

READ THIS INFORMATION FIRST

Product: Upgrade Kit for PACSystems™ RX7i CPUs

IC698CPE010-CD (300 MHz), Firmware Version 1.63
IC698CPE020-CD (700 MHz), Firmware Version 1.63

This document contains information that is not available in any other publication; therefore, we recommend that you read and save it for future reference.

Release 1.63 of the RX7i CPUs resolves the following issues:

In previous releases, if a BOOL array parameter with an index other than 0 (e.g., boolArrayPsbParam[16]) is used as the argument to the IN parameter of a BIT_SET_WORD, BIT_SET_DWORD, BIT_CLR_WORD, or BIT_CLR_DWORD function, a PLC Software fault will be logged and the PLC will go to STOP HALT mode.

In previous releases, if a negative value (signed INT) is inadvertently assigned to the Proportional Gain (ref+5) of a PID loop in manual mode the CPU will go to STOP HALT mode when a zero is subsequently written to the %ref+5 register. In the 1.63 release, the PID function will fault, but the CPU will not go to STOP HALT.

In previous releases, Data flow out of a non-Boolean parameter (e.g, data flow out of a MOVE_WORD function) and into a PSB Boolean array parameter will give an incorrect result. The value in the data flow will be copied incorrectly into the PSB.

Version Identification

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

Firmware Identification	
Firmware ID	**Version**
CPU Primary	1.63 Build 32A2
CPU Boot	1.00 Build 21B2
Ethernet TCP	1.60 Build 13A2
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

The older hardware versions IC698CPE010/020-Ax and IC698CPE010/020-Bx cannot be upgraded to the new hardware version Cx.

IC698CPE010/020-AA, IC698CPE010/020-BA, IC698CPE010/020-BB, IC698CPE010/020-CC, and IC698CPE010/020-CD modules are field upgradeable to version 1.63 primary firmware using the firmware upgrade utility.

You may download the appropriate field upgrade kits at no charge from the web at http://www.geindustrial.com/cwc/gefanuc/support/ControllersIO/psrx7i-u.htm.

IC698CPE010: 44A752252-G05

IC698CPE020: 44A752255-G05

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-2244G (this document)

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

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

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. Machine Edition 4.0 LD PLC SP3 Special 2 or later must be used for features introduced in release 1.50. It is preferred to use Machine Edition Logic Developer 5.0 or later.
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	The following Series 90-70 modules are supported by the PACSystems RX7i: 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 (IC697BEM713/731) Bus Receiver Module (IC697BEM711) *in Series 90-70 Expansion Rack only.* Programmable Coprocessor Module (IC697PCM711). For details, see the "CPU Operational Notes" section on page 11. Communications Coprocessor Module (IC697CMM711) For details, see the "CPU Operational Notes" section on page 11. DLAN Module (IC697BEM763 For details, see the "CPU Operational Notes" section on page 11.
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	Analog module requirements are as follows: 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.
Single Width I/O Module Compatibility	The following additional single width I/O modules are supported by the PACSystems RX7i: 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)

Subject	Description
Insulating Strips for High Voltage Modules	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: IC697MDL240**D** IC697MDL241**D** IC697MDL250**G** IC697MDL251**E** IC697MDL640**E** IC697MDL340**G** IC697MDL341**E** IC697MDL350**F** **Note:** Current versions of these modules are shipped with the insulators installed. The strip is visible on the back of the printed wiring assembly. The RX7i rack is shipped with an Insulator Kit that includes enough parts to update three Series 90-70 I/O modules.
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 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 Modules (IC697CMM741 and IC697CMM742) not Supported by RX7i	Please note that the Series 90-70 LAN Interface Modules (IC697CMM741 and IC697CMM742) are 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 (1.63)

Subject	Description
BOOL array parameter passed to BIT_SET_WORD halts PLC	IIn previous releases, if a BOOL array parameter with an index other than 0 (e.g., boolArrayPsbParam[16]) is used as the argument to the IN parameter of a BIT_SET_WORD, BIT_SET_DWORD, BIT_CLR_WORD, or BIT_CLR_DWORD function, a PLC Software fault will be logged and the PLC will go to STOP HALT mode
PID ISA function causes faults when changing proportional gain to invalid value	In previous releases, if a negative value (signed INT) is inadvertently assigned to the Proportional Gain (ref+5) of a PID loop in manual mode the CPU will go to STOP HALT mode when a zero is subsequently written to the %ref+5 register. In the 1.63 release, the PID function will fault, but the CPU will not go to STOP HALT.
Data flow not functioning for PSB Boolean parameter	In previous releases, Data flow out of a non-boolean parameter (e.g, data flow out of a MOVE_WORD function) and into a PSB boolean array parameter will give an incorrect result. The value in the data flow will be copied incorrectly into the PSB.

Ethernet Problems Resolved by this Revision (1.63)

None

New CPU Features and Enhancements

None

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. To recover from this condition, 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 an 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	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.

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

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.

SLOT	CIRCUIT NUMBERS
6	25-40
7	41-56
8	57-72
9	73-88
11	105-120

Subject	Description
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 are 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	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: 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". -OR- 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.)
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.
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.

Subject	Description
Interrupt Block for Disabled Interrupt	If an interrupt block for a 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.
Cannot Clear Fault Tables When Memory is Protected	If the switch on the PLC is configured for memory protection, and is in the "memory protect" position, you are not allowed to clear the fault tables.
Service Request 24 Generates Faults	When Service Request 24 (Reset Smart Module) is executed, unexpected faults may be logged in the fault table. Please note that, because this service request resets a module, faults associated with resetting the module are expected
RAND_MAX and rand() Function Incompatible	In the C Toolkit, the RAND_MAX system variable is defined as a 32-bit integer. However, the rand() function returns a 16-bit integer. By definition, rand() should return an integer between 0 and RAND_MAX.
Run Mode Store Changing Block to PSB Causes Fatal Fault	If the user changes a non-PSB in logic into a PSB while the PLC is running and then attempts to do a Run Mode Store, the CPU will generate a Fatal Fault and halt.
Load or Store of Logic Containing Large Numbers of Blocks or Symbols Causes Disconnect	If the user attempts to load or store logic containing large numbers of blocks (>120) and/or large numbers of symbols to or from the PLC, the CPU will disconnect and not reconnect with the programmer until the connection times out. In some cases, the user will need to power cycle with the battery disconnected in order to reconnect. Although this is a PLC problem, the behavior is only seen when using CIMPLICITY Machine Edition version 4.00 SP4 Special 1 or later.
Commreq Writing to %SC Writes to %SB	A commreq initiated to read and write to %SC memory using Bit Mode (Decimal 28) will incorrectly access %SB memory instead. Reading and writing %SC memory with a Commreq should be avoided.
Canceling Download Causes Disconnect	If a download from the programmer is cancelled between the times that some files have been stored but no program files were yet stored, the PLC will disconnect and not reconnect. The user can power cycle the PLC to regain connection.
Service Request 7 Accepts Invalid Day of Week Parameter	If an invalid day of the week is passed as a parameter to Service Request 7 in the unpacked BCD 2 or 4 digit year formats, the service request will incorrectly pass power.

Subject	Description
Genius Redundancy with Faulted or Missing Module	If a GBC is configured for either Redundant Controller External or Dual Bus External mode, incorrect data will be scanned from redundant devices that are not connected, powered off, or failed. Both the scanned input data and associated point fault information (fault contacts) are incorrect.
	This problem can be avoided by either:
	1) Configuring the GBC Redundancy mode as None.
	2) Configuring the Genius devices as non-redundant (Redundancy = No).
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 *before* 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 "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 the PACSystems RX7i,* 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.

Subject	Description
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. 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.
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.
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"
SNTP Errors Logged	In very rare instances, the Ethernet interface may log SNTP server errors even though SNTP is not currently enabled.
Ethernet Exceptions Logged When Passwords Enabled	When password protection is enabled for levels 2 - 4, the Ethernet interface logs two exception events at powerup or restart. The exceptions are Event = 2, Entry 2 = 0030H and Event 8, Entry 2 = 000bH
Ethernet Port Labels Do Not Match	The Ethernet interface identifies the Ethernet ports as "Port 1" and "Port 2", instead of "Port 1A" and "Port 1B"as labeled on CPU and ETM hardware modules.
EGD Status Not Updated as in Series 90	1. With a configured timeout value, an EGD consumed exchange reports timeout status only once; timeout status is not updated as in Series 90. 2. Without a configured timeout value, an EGD consumed exchange does not report "no new data" status, as in Series 90, but instead maintains the last consumption status value.
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.

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	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:
	The elapsed time is computed in 100 µS instead of 10 mS units. This smooths the output characteristic, eliminating periodic adjustments that occurred when the remainder accumulated to 10mS.
	Also, previous non-linear behavior when the integral gain is changed from some value to 1 repeat/second was eliminated.
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.
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	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).
	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.

Subject	*Description*

Format for Fault Locating References Changed	Compared to the Series 90-70 CPU, syntax for the fault locating references has changed as follows:
	  #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).
	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]"

Slot Restrictions for Analog Expander Module in RX7i Rack	The following restrictions apply to Analog Expansion Modules in a PACSystems RX7i rack:
	  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.
	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.

Genius Bus Controller Restrictions	The following restrictions apply to GBCs in PACSystems RX7i: ■ 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.)

Subject	Description
Communication Coprocessor Module Restrictions	PACSystems RX7i CPUs with firmware versions 1.50 or later support IC697CMM711 modules with firmware versions 4.20 or later. You must ensure that you are using the correct firmware version of the CMM because the CPU cannot check the CMM's firmware version. (The module's firmware version can be found on a label attached to the module's EEPROM.) PACSystems **does not** support the following for an IC697CMM711: ■ Connecting to CIMPLICITY Machine Edition to the CPU through the CMM's serial ports. ■ Access to Symbolic variables memory. ■ WAIT mode COMMREQs. ■ Permanent datagrams. The following restrictions apply when using the IC697CMM711 with PACSystems: ■ Access to %W memory references is partially supported. Only offsets 0—-65535 of %W 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 PACSystems instead of FF as reported on the Series 90-70. ■ If your RX7i application program needs to access the dual port memory of a CMM, use the BUS READ and WRITE functions. When accessing the CMM, set the Region parameter on the function block to 1. (For the CMM, region 1 is predefined to be the module's entire dual port memory.) **Note:** For details on operation of the IC697CMM711, refer to the *Serial Communications User's Manual,* GFK-0582.

Subject	*Description*
Programmable Coprocessor Module Restrictions	PACSystems RX7i CPUs with firmware versions 1.50 or later support IC697PCM711 modules with firmware versions 4.05 or later. You must ensure that you are using the correct firmware version of the PCM because the CPU cannot check the PCM's firmware version. (The module's firmware version can be found on a label attached to the EEPROM.) PACSystems does not support the following for IC697PCM711: ■ Connecting CIMPLICITY Machine Edition to the CPU through the IC697PCM711 module's serial ports. ■ Access to Symbolic variables. ■ WAIT mode COMMREQs. ■ The following C functions are not supported: 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 (%S references, transition bits, and override bits). If this is attempted, the call will fail at run time and return an error code. The following restrictions apply when using the IC697PCM711 with PACSystems: ■ %W 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 piggyback status data will be set to 0. ■ If an application program running on the PCM accesses the VME bus, the VME addresses being used by that program must be updated to agree with the PACSystems RX7i VME addressing assignments. PACSystems RX7i VME address assignments are described in the *PACSystems RX7i User's Guide to Integration of VME Modules,* GFK-2235. ■ 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. ■ If your RX7i application program needs to access the PCM's dual port memory, use the BUS READ and WRITE functions. When accessing the PCM, set the Region parameter on the function block to 1. (For the PCM, region 1 is predefined to be the module's entire dual port memory.) **Note:** For details on operation of the IC697PCM711, refer to the *Programmable Coprocessor Module and Support Software User's Manual,* GFK-0255.

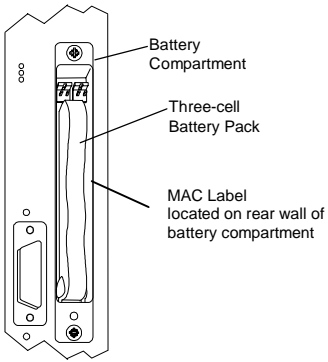| Subject	Description
PCM (to CPU) Communications Timeout	The PCM has a default backplane communications timeout value of 5 seconds. After the PCM has sent a request to the CPU, the PCM applies this timeout while waiting on a response back from the CPU. In most cases, the CPU will respond well within 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):
	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.
	Note: A copy of the above CPU.ENV file can be obtained from http://www.geindustrial.com/cwc/gefanuc/support/ControllersIO/s9070-d.htm.
	CAUTION
	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.

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	..........C P U L I N
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 . .C P U L I N K . D C B .
0040	00	4E	55	4C	4C	3A	00	4E-55	4C	4C	3A	00	4E	55	4C	. N U L L: . N U L L : . N U L
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	. . . .

Subject	Description
DLAN/DLAN+ (Drives Local Area Network) Interface Restrictions	PACSystems RX7i CPUs with firmware versions 1.50 or later support DLAN Interface, IC697BEM763 modules with firmware versions 3.00 or later. You must ensure that you are using a valid version of the DLAN firmware because the CPU cannot check the DLAN's firmware version. (The module's firmware version can be found on a label attached to the EEPROM.)
	■ If your RX7i application program needs to access the DLAN's dual port memory, use the BUS READ and WRITE functions. When accessing a DLAN module, set the Region parameter on the function block to 1. (For the DLAN module, region 1 is predefined to be the module's entire dual port memory.)
	■ The DLAN is only supported in the main RX7i rack. It is not supported in expansion racks.
	Note: The DLAN Interface module is a specialty module with limited availability. If you have a DLAN system, refer to the *DLAN/DLAN+ Interface Module User's Manual,* GFK-0729 for details.

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	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.

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. |
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	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.

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.

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. |

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Ethernet Operational Notes

Subject	Description
MAC address	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.)
Configuration of IP Address is Required Before Using Ethernet Communications	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: ■ 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. 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.

Subject	Description
Proper IP Addressing is Always Essential	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.
	Note: CIMPLICITY 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.
	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.
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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Subject	Description
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