A PACSystems RX3i Ethernet NIU I/O Station

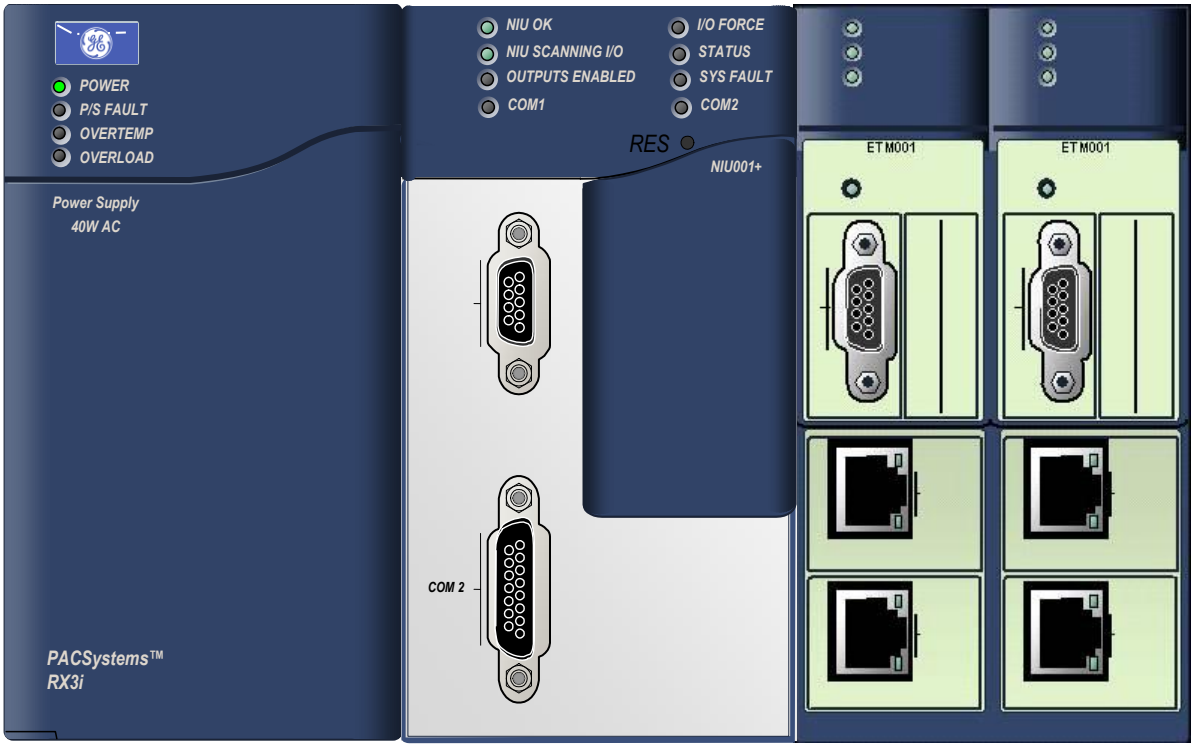
A PACSystems RX3i Ethernet NIU I/O Station consists of:

- an RX3i power supply, IC695PSxxxx
- an RX3i Ethernet NIU, IC695NIU001 (NIU001 Classic or NIU001 Plus)

  Note: The NIU001 Classic and NIU001 Plus are interchangeable. An application created for an NIU001 PLUS can be used with an NIU001 Classic and vice versa.
- one or more RX3i Ethernet Interface modules, IC695ETM001, which interface the I/O Station and Ethernet NIU to the Ethernet network and to the controller.
- an RX3i Universal Backplane (IC695CHS0xx)
- Proprietary application software
- PACSystems RX3i and/or Series 90-30 modules, as appropriate for the application.

The system may also include optional Series 90-30 expansion backplanes.

In an RX3i I/O Station, the Ethernet NIU functions like a PLC CPU, controlling the activities of the modules in the station.



The PACSystems RX3i Ethernet NIU

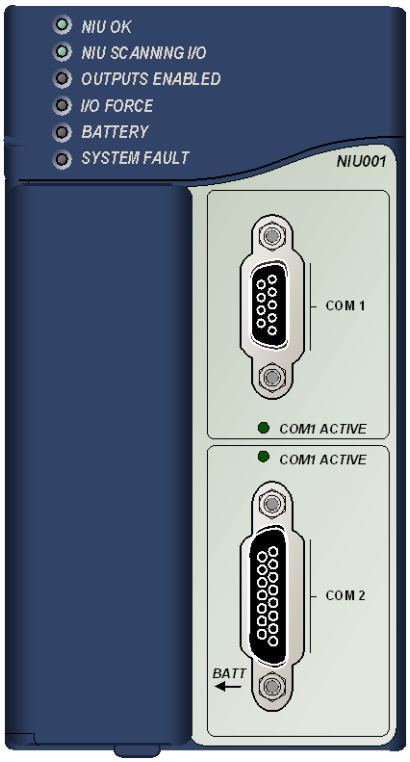
The Ethernet NIU (IC695NIU001) makes it possible to use PACSystems RX3i and Series 90-30 I/O modules remotely on an Ethernet network. Once set up by configuration, data exchange is completely automatic. System control can be provided by any GE Intelligent Platforms master device capable of exchanging Ethernet Global Data.

The Ethernet NIU automatically provides the controller with status information in each exchange. The application program logic in the controller can monitor this status data, and issue appropriate commands to the Ethernet NIU.

The PACSystems Ethernet NIU is compatible with the same types of modules, backplanes, and other equipment as a PACSystems RX3i CPU. For a list of compatible products, see the *PACSystems RX3i Hardware and Installation Manual,* GFK-2314.

The Ethernet NIU can access one block of program logic called the Local Logic Block, which can be up to 20K bytes in size. The Proficy programming software automatically includes the proprietary logic blocks needed for the Ethernet NIU application.

NIU Classic



NIU Plus

Ethernet NIU Features

- 20Kbytes of optional local logic. Supports all languages except C programming.
- 10 Mbytes of built-in flash memory for local user data storage.
- Battery-backed calendar clock *(NIU Plus).*
- Battery-backed calendar clock and fault tables *(NIU Classic).*
- In-system upgradeable firmware.
- RS-485 serial port and an RS-232 serial port.
- Data exchange using Ethernet Global Data (EGD)
- TCP/IP communication services using SRTP
- Supports operation with redundant controllers and redundant (dual) LANs
- Fault Reporting to controller(s)
- Remote COMMREQ Execution

NIU001 PLUS versus NIU001 Classic Comparison

Feature	***NIU001 Classic***	***NIU001 PLUS***
Processor	Intel Celeron 300 MHz	Intel Atom 510, 1.1 GHz
Real Time Clock Battery	Not supported	IC690ACC001
Memory Backup and Real Time Clock Battery	IC698ACC701	Not supported
Embedded communications	RS-232, RS-485	RS-232, RS-485
Power requirements	+3.3 VDC: 1.25 Amps nominal +5 VDC: 1.0 Amps nominal	+3.3 VDC: 0.52 Amps nominal +5 VDC: 0.95 Amps nominal
Performance	Same as CPU310. For performance data, refer to the *PACSystems CPU Reference Manual,* GFK-2222.	The processor has been upgraded from a 300MHz Celeron to a 1.3GHz Atom processor. There have been many associated changes to the performance For additional information, see page 1-6.
Boolean execution speed, typical	0.181 ms per 1000 Boolean instructions	0.072 ms per 1000 Boolean instructions
Battery and switch locations	See page 1-8 for details.	See page 1-7 for details.

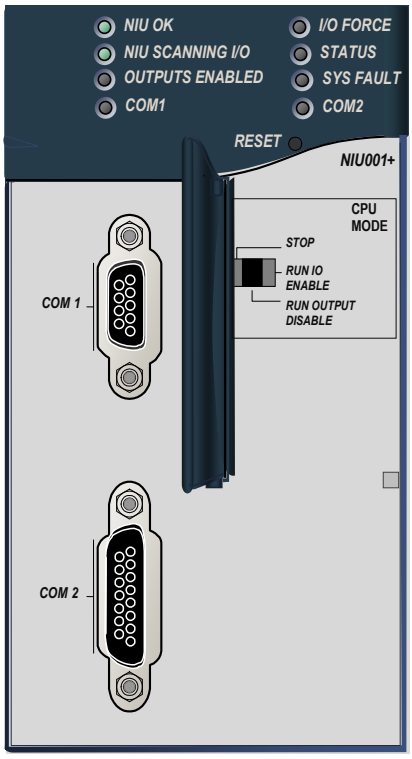
IC695NIU001 Plus Performance Differences Compared to IC695NIU001 Classic

The IC695NIU001 Plus has a different processor than was used on the IC695NIU001 Classic and performs differently for different types of operations.

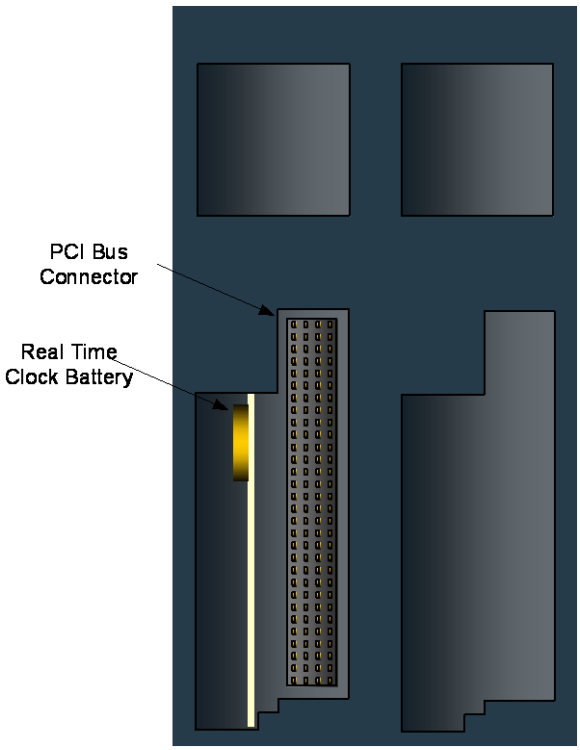
- Some function blocks will run faster and some will run slower on the NIU001 Plus. Overall it is expected that most applications will run faster with the NIU001 Plus, but some specific projects may be slightly slower when using the new hardware. For function block performance data, refer to the *PACSystems CPU Reference Manual,* GFK-2222R or later.
- Access to Series 90-30 backplane modules is approximately 25% slower compared to the IC695NIU001 Classic. For example the IC694DSM324 sweep impact is about 350 microseconds greater in the main rack and about 250 microseconds greater in an expansion rack when using the IC695NIU001 Plus compared to the IC695NIU001 Classic.
- EGD performance is different on the IC695NIU001 Plus when compared to the IC695NIU001 Classic. In general consumed data exchanges with more than 31 bytes contribute less sweep time impact and data exchanges with a size less than that contribute slightly greater sweep impact. All produced exchanges on the IC695NIU001 Plus have a slightly greater sweep impact compared to the IC695NIU001 Classic. For additional EGD sweep impact information, refer to the *PACSystems CPU Reference Manual,* GFK-2222R or later.

NIU Plus Battery and Switch Locations

Front View



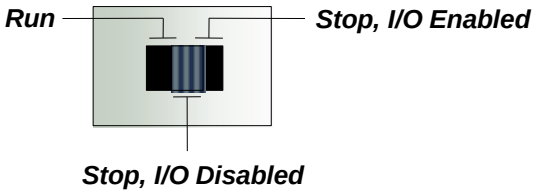
Rear View



Switches

The Ethernet NIU Plus has two switches. The Reset switch is not used. The three-position Run/Stop switch, labeled A-B-C, is located behind the protective door, as shown above.

Unlike the Run/Stop switch on a CPU module, on an Ethernet NIU the use of this switch is disabled by default. If the switch is to be used to control the Run or Stop mode operation of the NIU, clear faults, and/or prevent writing to program memory or configuration, its functionality must be enabled on the Settings Tab of the Ethernet NIU configuration in the folder, and stored to the ENIU.



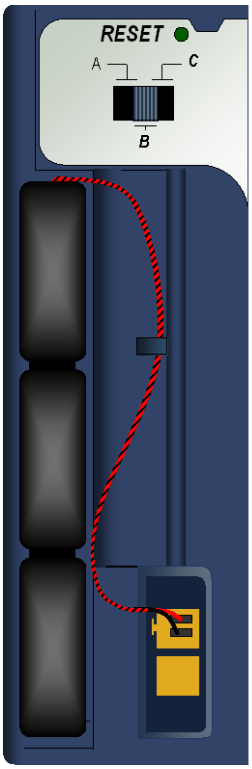
Real Time Clock Battery

The NIU Plus is shipped with a real time clock (RTC) battery (IC690ACC001) installed, with a pull-tab on the battery. The pull-tab should be removed before installing the module.

The RTC battery has an estimated life 5 years. Battery must be replaced every 5 years on a regular maintenance schedule.

NIU Classic Battery and Switch Locations

Memory and RTC Backup Battery



A three cell lithium battery pack (IC698ACC701) is installed as shown at right. The battery maintains data memory when power is removed and operates the calendar clock. Program and initial values are always loaded from flash when the Ethernet NIU powers up. When replacing the battery, be sure to install a new battery before disconnecting the old one.

If a new battery is installed when no battery is currently installed, the new battery must be installed while the NIU has power. Otherwise, the NIU may not power up. If that happens, remove the battery, power-cycle the NIU, then reinstall the battery.

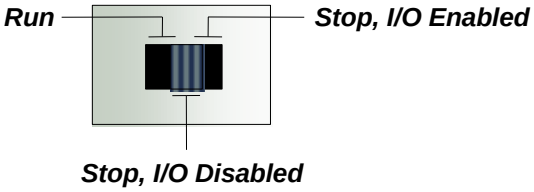
Disposal of lithium batteries must be done in accordance with federal, state, and local regulations. Be sure to consult with the appropriate regulatory agencies before disposing of batteries.

To avoid loss of RAM memory contents, routine maintenance procedures should include scheduled replacement of the Ethernet NIU's lithium battery pack. For information on estimating battery life, refer to the *PACSystems CPU Reference Manual,* GFK-2222.

Switches

The Ethernet NIU has two switches that are located in the battery area behind the protective door, as shown above. The Reset switch is not used.

The three-position switch labeled A-B-C is the Run/Stop switch. Unlike the Run/Stop on a CPU module, on an Ethernet NIU the use of this switch is disabled by default. If the switch is to be used to control the Run or Stop mode operation of the NIU, clear faults, and/or prevent writing to program memory or configuration, its functionality must be enabled on the Settings Tab of the Ethernet NIU configuration in the folder, and stored to the ENIU.



Specifications for IC695NIU001 PLUS

Real Time Clock battery	ICC690ACC001. Estimated life is 5 years. Battery must be replaced every 5 years on a regular maintenance schedule. Note: The module is shipped with a pull-tab on the battery. The pull-tab should be removed before installing the module.
Power requirements	+3.3 VDC: 0.52 Amps nominal +5 VDC: 0.95 Amps nominal
Operating Temperature	0°C to 60°C (32°F to 140°F)
Floating point	Yes
Boolean execution speed, typical	0.072 ms per 1000 Boolean instructions
Serial Protocols supported	Modbus RTU Slave, SNP, Serial I/O, Modbus RTU Master by application "C" block
Backplane	Dual backplane bus support: RX3i PCI and 90-30-style serial
PCI compatibility	System designed to be electrically compliant with PCI 2.2 standard
Ports	RS-232 Serial Port
	RS-485 Serial Port External isolation recommended. (For details, see *RS-485 Port Isolator, IC690ACC903,* GFK-1663.)

Specifications for IC695NIU001 Classic

Battery: Memory retention	IC698ACC701. For estimated battery life under various conditions, refer to the *PACSystems NIU Reference Manual,* GFK-2222.
Power requirements	+3.3 VDC: 1.25 Amps nominal +5 VDC: 1.0 Amps nominal
Operating Temperature	0°C to 60°C (32°F to 140°F)
Floating point	Yes
Boolean execution speed, typical	0.18 ms per 1000 Boolean instructions
Serial Protocols supported	Modbus RTU Slave, SNP, Serial I/O, Modbus RTU Master via Serial I/O and C block.
Backplane	Dual backplane bus support: RX3i PCI and 90-30-style serial
PCI compatibility	System designed to be electrically compliant with PCI 2.2 standard
Ports	RS-232 Serial Port
	RS-485 Serial Port External isolation recommended. (For details, see *RS-485 Port Isolator, IC690ACC903,* GFK-1663.)

For environmental specifications and compliance to standards (for example, FCC or European Union Directives), refer to the *PACSystems RX3i Hardware and Installation Manual,* GFK-2314.