

README: SNAP PAC CONTROLLERS AND BRAINS FIRMWARE

August 28, 2024.

This document describes the new features, enhancements, and bug fixes delivered in each version of firmware for the following Opto 22 products:

R-series Controllers	S-series Controllers	SoftPAC
SNAP-PAC-R1	SNAP-PAC-S1	SoftPAC software-based controller
SNAP-PAC-R1-FM	SNAP-PAC-S1-FM	PAC-SIM software-based controller simulator
SNAP-PAC-R1-W	SNAP-PAC-S1-W	
SNAP-PAC-R1-B	SNAP-PAC-S2	
SNAP-PAC-R2	SNAP-PAC-S2-W	
SNAP-PAC-R2-FM		
SNAP-PAC-R2-W		

Ethernet Brains	Serial Brains	G4EB2 Brains
SNAP-PAC-EB1	SNAP-PAC-SB1	G4EB2
SNAP-PAC-EB1-FM	SNAP-PAC-SB2	G4D32EB2
SNAP-PAC-EB1-W		G4D32EB2-UPG
SNAP-PAC-EB2		
SNAP-PAC-EB2-FM		
SNAP-PAC-EB2-W		

Selecting the Correct Version of PAC Manager to Install Firmware

To install firmware, use the most recent release of PAC Manager (you can [download the latest version](#) from the Opto 22 website). Older versions of PAC Manager cannot install certain levels of firmware on controllers and brains shipped after certain dates or with certain versions of firmware currently installed on them. The following sections explain which versions of PAC Manager can install which versions of firmware for the indicated hardware.

SNAP-PAC-R1 Controllers

Some SNAP-PAC-R1 controllers shipped after August 26, 2024 have new hardware requiring PAC firmware R10.5g (or higher) and new bootloader firmware. On these controllers:

- You cannot install firmware lower than R10.5g.
- To update the firmware, use PAC Manager R10.5c or higher.

To determine whether your SNAP-PAC-R1 controller is this version:

- If you can easily view the hardware, look for the label on top of the controller. If the label indicates “GEN2”, then your controller requires firmware version R10.5g (or higher), and you must use PAC Manager R10.5c (or higher) to update firmware.
- If you cannot easily view the hardware, use PAC Manager to check the `Installed RAM` value:
 - a. In PAC Manager, click **Tools > Inspect**, or click the **Inspect** button.

- b. In the Inspect Opto 22 Device window, enter the IP address for the SNAP-PAC-R1 controller, or select it from the Device Name list.
- c. Look for `Installed Ram`. If the value is:
 - **268435456**, then your controller requires firmware version R10.5g (or higher), and you must use PAC Manager R10.5c (or higher) to update firmware.
 - **33554432**, then your controller may be updated with other versions of firmware. See below for additional requirements.

For SNAP R-series controllers shipped after February 22, 2022: These controllers shipped with new Ethernet components, PAC firmware R10.4d (or higher), and new bootloader firmware:

- You cannot install firmware lower than R10.4d on these controllers.
- To update firmware on these controllers, use PAC Manager R10.4c or higher.

For SNAP R-series controllers shipped after April 2, 2018: Some controllers shipped with new flash components, PAC firmware R9.5g (or higher), and new bootloader firmware. PAC firmware version R9.5f (or lower) is *not* compatible with the new component. If you inadvertently install firmware R9.5f or lower on this controller, you can recover by using the Failsafe Bootloader Mode to install firmware R9.5g or higher.

- For more information about the new flash component, review [KB87213](#).
- To learn more about Failsafe Bootloader Mode, review "Replacing Damaged Firmware" in the [PAC Manager User's Guide](#) (form 1704).

To install PAC firmware R9.2c or higher on the following controllers, use PAC Manager R10.4c (or higher), which is installed by PAC Project 10.4003 (or higher):

- SNAP-PAC-R1
- SNAP-PAC-R1-FM
- SNAP-PAC-R1-B
- SNAP-PAC-R2
- SNAP-PAC-R2-FM

Wireless versions are not affected by this issue. For more information, review [KB82101](#).

SNAP PAC S-series Controllers

For SNAP S-series controllers shipped after February 22, 2022: These controllers shipped with new Ethernet components, PAC firmware R10.4d (or higher), and new bootloader firmware:

- You cannot install firmware lower than R10.4d on these controllers.
- To update firmware on these controllers, use PAC Manager R10.4c (or higher).

For SNAP S-series controllers shipped after April 2, 2018: Some controllers shipped with new flash components, PAC firmware R9.5g (or higher), and new bootloader firmware. PAC firmware version R9.5f (or lower) is *not* compatible with the new component. If you inadvertently install firmware R9.5f (or lower) on this controller, you can recover by using the Failsafe Bootloader Mode to install firmware R9.5g (or higher).

- For more information about the new flash component, review [KB87213](#).
- To learn more about Failsafe Bootloader Mode, review "Replacing Damaged Firmware" in the [PAC Manager User's Guide](#) (form 1704).

SNAP PAC Ethernet and Serial Brains

For EB and SB brains shipped after April 2, 2018: Some brains shipped with new flash components, PAC firmware R9.5g (or higher), and new bootloader firmware. PAC firmware version R9.5f (or lower) is *not* compatible with the new component. If you inadvertently install firmware R9.5f (or lower) on this brain, you can recover by using the Failsafe Bootloader Mode to install firmware R9.5g (or higher).

- For more information about the new flash component, review [KB87213](#).

- To learn more about Failsafe Bootloader Mode, review "Replacing Damaged Firmware" in the [PAC Manager User's Guide](#) (form 1704).

SoftPAC

For SoftPAC firmware version R9.4c (or lower): To upgrade to firmware version R9.5a (or higher), you must install SoftPAC from the PAC Project installation file to update SoftPAC Monitor, then you can update the firmware. For instructions, see [KB86020](#).

KB Numbers

A number with the prefix "KB" (for example, KB49909) refers to a Knowledge Base article published by Opto 22. KB articles provide additional information about a feature or bug. To find a particular KB article, click the hyperlink in this document, or go to our website, <http://www.opto22.com>, and in the **Search** box, type "KB" and the KB article number. Note that if a number doesn't have "KB" as its prefix, an article wasn't available on our website when this readme was published.

VERSION R10.5g

August 26, 2024. Updated: August 28, 2024.

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware" on page 1](#).

New Features

PAC-R, PAC-S

This firmware release adds support for the following features delivered in earlier releases of PAC Control software:

- Uploading and downloading persistent and initialize-on-download (non-volatile) variable values to a file on your computer (added in PAC Control 10.5a).
- The new PAC Control command Move Module to Numeric Table (added in PAC Control 10.4a).

If your PAC Control strategy uses *groov* EPIC I/O units, you can now use the following features delivered in earlier releases of *groov* EPIC firmware:

- The ON Totalization or OFF Totalization feature of *groov* **digital** I/O modules (added in *groov* EPIC 3.5.0).
- New commands to read, write, and clear 64-bit integer accumulated energy values provided by the *groov* RIO EMU (GRV-R7-11VAPM-3) and the GRV-IVAPM-3 module (added in *groov* EPIC 3.3.0).

Enhancements

PAC-R, PAC-S

This firmware release adds support for the following enhancements delivered in PAC Control R10.5a:

- Set the output of a PID loop to be a digital output configured with the TPO feature. Previously, you could do this only through PAC Manager and the Ethernet/IP Configurator.
- The following new commands:
 - Get I/O Unit Scratch Pad Integer 64 Element
 - Get I/O Unit Scratch Pad Integer 64 Table
 - Set I/O Unit Scratch Pad Integer 64 Element

- Set I/O Unit Scratch Pad Integer 64 Table
- These commands make it more convenient to read or write to 64-bit scratchpad registers. For more information about these commands, review the [PAC Control Command Reference](#) (form 1701).
- For SNAP analog input modules, you can now set a simple moving average (SMA) when you configure a channel.
 - The controller now supports more options in the Server Information table of PAC Control email commands. For a list of these options, review the [PAC Control Command Reference](#) (form 1701).
 - SSL is now supported for TCP communication handles. You can specify additional parameters to the following commands to indicate the controller is ready to establish TCP connections encrypted with SSL:
 - Open Outgoing Communication
 - Listen For Incoming Communication
 - Accept Incoming Communication
 - You can now do the following actions through COM handles:
 - Create a new directory (without having to open a file)
 - Get the current working directory
 - Change to a different directory
 - Delete a directory
 - If your PAC Control strategy uses *groov* RIO EMU (GRV-R7-I1VAPM-3) modules or *groov* EPIC I/O units with GRV-IVAPM-3 modules, you can now use the Get Counter command to read energy accumulation values on those modules.

Bug Fixes

PAC-S

[KB89935](#) "Wrong Object Type" errors after initial synchronization of the backup redundant controller in SNAP-PAC-ROK system

PAC-R, PAC-S

[KB90305](#) Controller unresponsive after attempting to communicate with unreachable Ethernet device

PAC-R, PAC-S

- [KB87393](#) "Send Email with Attachment" command in PAC Control changes the filename of the attachment
- [KB89551](#) "Definition Unknown" or Other Errors When Host/Listener Port is 22002
- [KB89582](#) Concurrent use of the same COM handle by more than one task may cause control engine to reset
- [KB90152](#) If subroutines nest to 16 deep, you see -72 (nesting too deep) error
- [KB90189](#) *groov* RIO I/O unit reconfigured after power cycle or strategy download; output channels change values
- [KB90591](#) Open connection is closed after Accept Incoming Communication command
- [KB90620](#) If PAC Control strategy contains HTTP Get/Post commands with SSL, over time, the PAC controller/control engine becomes unresponsive
- [KB90786](#) Generate N Pulses with N set to 0 starts a TPO when using *groov* I/O

PAC-S, PAC-R, PAC-EB, G4EB2

[KB90835](#) When using SNMP, incorrect value written to Scratch Pad bits section

VERSION R10.4e

October 3, 2023.

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

Enhancements

PAC-S, PAC-R, SOFTPAC

You can now toggle Nagle's algorithm with the new TCP_NODELAY option. Add the option to the connect string of the TCP communication handle; see [PAC Control User's Guide](#) (form 1700).

Fixed Bugs

PAC-S

[KB90513](#) Redundant system may switch controllers unnecessarily

PAC-S, PAC-R

[KB90177](#) PAC controllers don't automatically load PAC Control strategy from microSD card

PAC-S, PAC-R, SOFTPAC

- [KB90127](#) PAC Display/PAC Control may appear unresponsive while accessing simulated I/O
- [KB90689](#) I/O unit incorrectly reports communication enabled after power cycle
- [KB90702](#) Clear All Latches command may cause processor/controller reset
- [KB90750](#) Clear All Latches command may cause -95 Info message

PAC-R, PAC-EB, PAC-SB

[KB90735](#) PID output may not be set to forced output value

SoftPAC

- [KB90130](#) Send Communication Handle Command returns incorrect status code when sending file to an FTP server
- [KB90139](#) Sending multiple files in quick succession to a remote FTP server may cause issues
- [KB90140](#) When attempting to access a file retrieved from an FTP server, you may see -408 or -417 errors
- [KB90141](#) Content of local copy of file retrieved multiple times from a remote FTP server may be incorrect
- [KB90142](#) SoftPAC deletes local file if file with same name on remote FTP server doesn't exist

VERSION R10.4d

February 24, 2022.

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

Fixed Bugs

PAC-S

[KB90098](#) "Move Numeric Table to I/O Unit" command doesn't work correctly on serial B3000 analog I/O units

PAC-S with SNAP-PAC-ROK

[KB89808](#) Errors in message queue of backup controller after first sync [KB90062](#) Backup controller may not qualify in a timely manner

PAC-S, PAC-R

- [KB89588](#) Reading values of variables using REST API may return a -60 Empty Stack error
- [KB89623](#) PAC Control command "Is I/O Unit Ready?" may cause chart to freeze or host port to lose communication
- [KB89902](#) Using a value of zero with the "Set Year" command sets the controller to a date in 2136
- [KB90011](#) "Is I/O Unit Ready?" command causes Mystic protocol I/O unit to become unresponsive
- [KB90047](#) Time zone change that is set for 5th week may change prematurely

PAC-S, PAC-R, SOFTPAC

- [KB89740](#) Random characters appear at end of user messages
- [KB89971](#) SNAP PAC controller may show retry errors on local I/O unit

PAC-S, PAC-R, PAC-EB, G4EB2

[KB89995](#) Buffer overflow vulnerability in FTP server on SNAP PAC controllers and brains

SoftPAC

- [KB88831](#) PAC Control "Open Outgoing Communication" command does not create directory; returns -417 error
- [KB89735](#) Control engine resets on first attempt to communicate with an alternate host task
- [KB89813](#) SoftPAC: Strategy not stored to permanent storage
- [KB90096](#) SoftPAC: FTP dir command may return incorrect entries

VERSION R10.4c

February 11, 2021. Document update: February 16, 2021.

Before installing firmware, review "[Selecting the Correct Version of PAC Manager to Install Firmware](#)", starting on [page 1](#).

New Features

PAC-S, PAC-R, SOFTPAC

Support for the Get I/O Unit Module States command (which requires PAC Control 10.3a) has been added, as well as support for the following commands (which require PAC Control 10.3d):

- Shift String Table Elements
- Get & Clear Digital I/O Unit Latches
- Get & Clear Digital-64 I/O Unit Latches
- Get Digital I/O Unit Latches
- Get Digital-64 I/O Unit Latches

- Get All Module States
- IVAL Get All Module States
- Get Module States
- Set Module States from MOMO Masks
- Get Module Counters
- Get & Clear Module Counters
- Get Module Off-Latches
- Get Module On-Latches
- Get & Clear Module Off-Latches
- Get & Clear Module On-Latches

To learn more about these commands, review the [PAC Control Command Reference](#) (form 1701).

Enhancements

PAC-S, PAC-R, SOFTPAC

- You can now configure thermistors on GRV-R7-MM1001-10 modules.
- PID loop names are now included in the PID memory map area when PID loops are configured.

To learn more about these enhancements, review the [OptoMMP Protocol Guide](#) (form 1465).

Fixed Bugs

PAC-S

[KB89132](#) Enabling Communication to Unresponsive mistic I/O Unit May Cause Controller to Stop Responding

PAC-S with SNAP-PAC-ROK

- [KB82299](#) Variables Configured to 'Initialize On Download' Don't Sync on Redundant Systems
- [KB82408](#) Redundant Table Fails to Initialize Using a Download-After-Strategy File
- [KB89161](#) Redundant Variable Values not Maintained on Download
- [KB89414](#) Redundant System I/O may not be Re-enabled after I/O Power Cycle

PAC-S, PAC-R

- [KB53389](#) Downloading and Starting an ioControl Strategy with PIDs on Ethernet-based I/O units May Cause Outputs to Spike
- [KB88964](#) Send Communication Handle Command Fails (-52 error) When Ethernet Cable Unplugged
- [KB89137](#) PAC Controller HTTP Status Return Code Incorrect
- [KB89363](#) PAC Control: "Reset" Option on mistic PID has No Effect
- [KB89219](#) Treck Heap-Based Overflow Vulnerability in the HTTP Server Module

PAC-S, PAC-R, SOFTPAC

- [KB89147](#) Subroutine Variable with Same Name and Type as Global Variable May Cause Control Engine Reset
- [KB89217](#) PAC Control Set I/O Unit Configured Flag Command Ignored for Certain I/O Unit Types
- [KB89370](#) Control Engine Host Communication Unresponsive Related to Strategy Download
- [KB89381](#) Control Engine May Reset When Inspecting Variables and Stepping Through Subroutines
- [KB89408](#) Serial Communication Handle Parameter String With Spaces Prevents Communication
- [KB89418](#) PAC Control: Some 32 Bits Commands Don't Copy Bit for Bit

PAC-S, PAC-R, PAC-EB, G4EB2

[KB89186](#) Buffer Overrun Vulnerability In EtherNet/IP Stack

PAC-S, PAC-R, PAC-EB, G4EB2, PAC-SB

[KB89184](#) Processing SNMP Requests While Sending SNMP Traps May Cause Device To Reset

VERSION R10.3b

July 7, 2020

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

Fixed Bugs**PAC-S**

- [KB88738](#) Enable Communication to [All] I/O Unit[s] Commands Reset all Mystic PID Parameters
- [KB88944](#) Mystic PIDs Reconfigured when Communication to I/O Unit Re-enabled
- [KB88956](#) Possible Erratic Behavior when Running PAC Control Strategy with Mystic I/O

PAC-S with SNAP-PAC-ROK

- [KB88811](#) SNAP-PAC-ROK system: Backup Redundant Controller May Become Unresponsive
- [KB88854](#) SNAP PAC Controller in Redundant System May Reset When Viewing Errors in Message Queue
- [KB88905](#) S1 or S2 controller in a Redundant System Shows "non-qualified" When Using Persistent Timer Variables

PAC-S, PAC-R

[KB89052](#) REST API Calls are Unresponsive

PAC-S, PAC-R, SOFTPAC

- [KB88835](#) Flag Lock/Unlock May Cause Controller to Reset
- [KB88945](#) Read Number from I/O Unit Memory Map Command with GRV-EPIC-PR1 I/O Unit Results in -56 error
- [KB88970](#) PAC Control Command Move Numeric Table To I/O Unit Ex May Move Wrong Number of Points

PAC-S, PAC-R, PAC-EB, G4EB2

[KB88981](#) Security Vulnerabilities in Treck TCP/IP Software

SOFTPAC

[KB89073](#) If RIO Channels Changed from One Supported Combination to Another Supported Combination, Errors May Be Reported

VERSION R10.3a

May 4, 2020.

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

This version of firmware was delivered only on the groov EPIC processor (GRV-EPIC- PR1). You can find the list of fixes in the GRV-EPIC-PR1 Firmware Readme, under the PAC Control Engine section.

VERSION R10.0h

November 7, 2019.

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

Fixed Bugs

PAC-S

- [KB80935](#) Move Numeric Table to I/O Unit and related [Ex] command do not update the backup controller
- [KB88239](#) Move I/O Unit to Table command behaves differently between R9.5 and R10.0 and newer
- [KB88189](#) Digital outputs do not work properly in Redundancy systems

PAC-S, PAC-R

- [KB85948](#) Persistent Variable data is not preserved when strategy updated from a microSD card
- [KB88085](#) Possible -25 (Port not locked) errors in the controller's message queue
- [KB88176](#) Control engine resets when downloading online changes
- [KB88287](#) Digital output pulsing may cause controller reset
- [KB88606](#) Strategy loaded from SD card will not autorun

PAC-S, PAC-R, SOFTPAC

- [KB88104](#) Setting groov Digital TPO to Zero Percent Doesn't Stop Pulsing
- [KB88083](#) "Is I/O Unit Ready?" command always shows groov I/O as ready
- [KB88148](#) PAC Control Calculate Strategy CRC command may return wrong value
- [KB88174](#) Float values that are NaN incorrectly evaluated as true
- [KB88190](#) Erratic behavior when running PAC Control strategy
- [KB88214](#) Controller running strategy with subroutines may reset
- [KB88217](#) Background downloads may cause unexpected strategy behavior
- [KB88229](#) PID mode in IVAL tab may be incorrect
- [KB88265](#) Controller returns Status Code of -443 or -20 for HTTP Status Code of 204
- [KB88377](#) Certain PID loop options on groov EPIC I/O units may not work
- [KB88418](#) Cannot enable communication to groov I/O unit
- [KB88530](#) SNAP I/O Watchdog not working
- [KB88588](#) Inaccurate readings from groov digital inputs configured with frequency feature
- [KB88647](#) PID loops configured for Auto mode may start in Manual mode (or vice versa)

PAC-R, PAC-EB

[KB88142](#) SNAP-AOVA-8 channels cannot be set via EtherNet/IP

PAC-S, PAC-R, PAC-EB, PAC-SB, G4EB2

[KB88294](#) FTP sessions won't open; FTP server is inaccessible

VERSION R10.0g

April 16, 2019.

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware"](#), starting on [page 1](#).

This version of firmware was delivered only on the *groov* EPIC processor (GRV-EPIC- PR1). You can find the list of fixes in the [GRV-EPIC-PR1 Firmware Readme](#), under the PAC Control Engine section.

VERSION R10.0f

February 27, 2019. Updated March 7, 2019.

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware"](#), starting on [page 1](#).

Enhancements

PAC-S, PAC-R

The auto-run flag has been moved from battery-backed RAM to EEPROM, to ensure that it won't be affected if the battery used to power NVRAM fails. This enhancement may be especially important for PAC controllers that are located in remote areas.

PAC-S, PAC-R, SOFTPAC

If you are setting up a single time zone on a controller, you no longer need to supply the month, day of week, and week number it takes effect. A single time zone takes effect immediately.

Fixed Bugs

PAC-S

- [KB87127](#) When Switching to Redundancy Option Kit Backup Controller, the Backup Controller May Post Errors or Reset
- [KB87961](#) Redundant system controller host task may become inaccessible
- [KB88064](#) Storing strategy with mistic I/O to flash causes reset after power cycle

PAC-S, PAC-R

- [KB87168](#) FTP command redirecting output of a "Dir" command to a specified local file or table returns null at end of each line
- [KB87867](#) Ethernet communications slowdown

PAC-S, PAC-R, SOFTPAC

- [KB86484](#) Controller may stop responding after user stops strategy
- [KB87872](#) In PAC Control, configuring groov EPIC as an I/O unit with both IP addresses configured may cause strategy download to fail
- [KB87878](#) Control Engine doesn't enable communication to secondary addresses using redundant networks after power cycle
- [KB87882](#) Downloading a strategy with 50 or more PIDs fails with a -62 (stack full) error
- [KB87945](#) Open communication handles may not be closed when strategy is stopped
- [KB88054](#) For some EPIC channel features, configuration fails with "Point Mismatch" errors

- [KB88071](#) PAC Control Message Queue is filled with -8612 (Old Response to New Command) errors

PAC-S, PAC-R, PAC-EB, PAC-SB, SOFTPAC

[KB87965](#) PAC Control Ramp Analog Output command doesn't work or affects wrong point

VERSION R10.0e

February 14, 2019. Readme updated: February 21, 2019

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

This version of firmware was delivered only on the groov EPIC processor (GRV-EPIC- PR1). You can find the list of fixes in the [GRV-EPIC-PR1 Firmware Readme](#), under the PAC Control Engine section.

VERSION R10.0d

October 31, 2018. Readme updated: March 14, 2019.

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

New Feature

PAC-S, PAC-R, SOFTPAC

You can now use any SNAP PAC S- or R-series control engine (as well as SoftPAC) to configure and enable *groov* EPIC I/O units in a PAC Control strategy.

Enhancement

PAC-S, PAC-R, SOFTPAC

The Send Email and Send Email With Attachments commands now provide the option to ignore certain SSL errors when the strategy attempts to send an email. Implement this option only after carefully reviewing whether the need to send the email outweighs the risk of ignoring certain SSL errors. Review the descriptions of the Send Email and Send Email With Attachments commands for an explanation of how to implement this option.

Fixed Bugs

PAC-S, PAC-R, SOFTPAC

- [KB86290](#) Some SNAP-AIRTD-8U point types are classified as outputs by the control engine
- [KB86306](#) In iPAC and aPAC, digital output points may be categorized as analog input points.
- [KB87749](#) PID not configured after running EnableCommunicationToPidLoop instruction

PAC-S, PAC-R

- [KB85574](#) -2104 Communication Error when communicating with a server that has a SAN security certificate
- [KB86413](#) POSTs to the SNAP PAC REST API may fail.
- [KB86434](#) SNAP PAC REST API: Controller should display a message after an SSL certificate is updated.

- [KB86863](#) SNAP PAC RESTful API intermittently fails to read data.
- [KB87306](#) Using the same COM handle in multiple charts may cause the controller to reset
- [KB87596](#) Communication to I/O units becomes disabled even if the redundant network connection is functional
- [KB87634](#) Controller may reset if a strategy with subroutines is running and you download changes made in Online mode

PAC-S

[KB86186](#) mistic PID values set from the Debugger Inspect dialog box are overwritten if the scan rate is changed.

VERSION R9.5h

September 17, 2018.

Fixed Bugs

PAC-S, PAC-R

- [KB87734](#) Storing strategy to flash sometimes fails.
- [KB87323](#) PAC Control REST API and NodeRED may incorrectly display negative analog values as NaN

VERSION R9.5G

April 13, 2018. Readme updated April 16, 2018.

Before installing firmware, review "[Selecting the Correct Version of PAC Manager to Install Firmware](#)", starting on [page 1](#).

Fixed Bugs

PAC-S

- [KB86980](#) In redundant systems, controller resets itself when initializing a SNAP- AIMA-iH or SNAP-AOA-23-iH module.
- [KB87004](#) In redundant systems, the "I/O Unit Ready?" condition always evaluates as False.
- [KB87154](#) Controller may become unresponsive or reset when when two charts use the same communication handle in a subroutine at the same time.

PAC-S, PAC-R

- [KB84288](#) Incorrect free space shown for microSDHC cards on SNAP PAC controllers.
- [KB87059](#) Controller may reset when activity through PAC REST API is high.

VERSION R9.5f

October 5, 2017

Before installing firmware, review "[Selecting the Correct Version of PAC Manager to Install Firmware](#)", starting on [page 1](#).

Fixed Bugs

PAC-S

[KB86959](#) mistic and SB-series serial brains go offline when used on the same serial port.

PAC-EB

[KB86926](#) Implicit EtherNet/IP messages contain 0 for attributes of some analog modules.

VERSION R9.5e

August 2, 2017. Readme updated August 4, 2017

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

About SoftPAC:

- To use the Update Firmware option in SoftPAC requires SoftPAC R9.3b or higher.
- To upgrade SoftPAC from firmware version R9.4c (SoftPAC-R9.4c.bin) or lower to firmware version R9.5a or higher, you must install SoftPAC from the PAC Project installation file. For details, see [KB86020](#), Cannot use “Update Firmware” option to upgrade to R9.5a.

Enhancement

PAC-S, PAC-R

When you add or change API administrator credentials or keys in the SNAP PAC RESTful API (on the <IP address>/admin/cred and <IP address>/admin/keys pages), a new “Changes saved” message is displayed. Previously, there was no visual indication that the input was successfully processed.

Fixed Bugs

PAC-S

- [KB86791](#) SNAP PAC Redundancy Kit: Redundant controllers switch continuously and report “impaired” I/O unit.
- [KB86825](#) Redundant systems may log -539, -29, or -534 errors to the controller’s Message Queue.

PAC-S, PAC-R

- [KB85814](#) RESTful API: POSTing to a GET-only endpoint acts like a GET.
- [KB85823](#) RESTful API: Out-of-range float values appear as 0 or “inf” instead of returning an error.
- [KB85826](#) RESTful API returns an analog point’s value even though the wrong request is sent.
- [KB86038](#) RESTful API stops working if the control engine’s default host port is turned off or is changed from 22001.
- [KB86046](#) The RESTful API may return an error in response to a valid request.
- [KB86047](#) SNAP PAC RESTful API: Invalid request returns unexpected results and doesn’t give an error code.
- [KB86081](#) Using a string or negative value for the table index in a RESTful request returns the whole table.
- [KB86171](#) RESTful API and FTP interfaces may stop responding. (Other firmware functions may be affected.)

- [KB86259](#) SNAP PAC RESTful API: The value in a 1-element table may be returned as a key-value pair instead of as an array.
- [KB86799](#) SNAP PAC RESTful API: Controller resets if you write one or more spaces (instead of a JSON payload) to a variable.

PAC-S, PAC-R, SOFTPAC

- [KB80082](#) UDP responses may contain characters from more than one UDP message.
- [KB84519](#) PAC Control commands that use SSL/TLS may return HTTP Status (like 202) in the "Put Status In" variable.
- [KB84890](#) The condition "I/O Unit Ready?" puts errors in the message queue.
- [KB84979](#) -39 error (Timeout on Receive) should not close UDP communication handles.
- [KB84981](#) UDP comm handles may lose data when packets are too large or sent too quickly.
- [KB85736](#) groov erratically displays yellow triangle with exclamation point (communication timeout).
- [KB85795](#) Host Task stops processing commands if you stop strategy while in Debug mode.
- [KB86390](#) Read Numeric Table From I/O Unit Memory Map: Elements 300–599 are a duplicate of elements 0–299.
- [KB86409](#) Convert Float to String command doesn't properly handle NaNs.
- [KB86474](#) Passing negative numbers to GenerateReverseCrc16OnTable32 can cause the controller to reset.
- [KB86565](#) Performance issue when looping on "Accept Incoming Communication" command without an available connection.
- [KB86572](#) "get.src" and "get.scrport" Comm handle commands may return incorrect data when using UDP.
- [KB86630](#) Examining a local pointer within a subroutine causes hardware controllers to reset and software controllers to log an error.
- [KB86644](#) SNAP PAC HTTPS server occasionally misses a request.

SOFTPAC

- [KB84980](#) UDP broadcast fails with -444 error message.
- [KB85373](#) Unable to open UDP communication handle (-437 error).

VERSION R9.5d

November 15, 2016

Before installing firmware, review "[Selecting the Correct Version of PAC Manager to Install Firmware](#)", starting on [page 1](#).

NOTE: To upgrade SoftPAC firmware to R9.5a (or higher), see [KB86020](#), Cannot use "Update Firmware" option to upgrade to R9.5a.

Enhancement

PAC-R, PAC-EB, PAC-SB

Provided OptoMMP read/write access to EtherNET/IP assembly images.

Fixed Bugs

PAC-S, PAC-R

- [KB85807](#) POSTs to REST API may return a -8 error code when the JSON string includes whitespace.
- [KB85817](#) In groov, OPC UA byte array shows data type error.
- [KB86071](#) REST API does not return -Infinity values as strings.
- [KB86090](#) After prolonged, continuous powerup, controller may lose communication via host port.
- [KB86142](#) Stopping a strategy while a chart holds a lock on a flag variable can make the controller unresponsive.
- [KB86240](#) REST API: Errors when reading or writing to tags may cause controller to reset.
- [KB86249](#) Controller acting as Modbus Slave won't accept TCP connection requests from Master.

PAC-S

- [KB86257](#) Cannot enable communication to mistic brain with quadrature digital input module configured.
- [KB86329](#) Can't change state of output points on Mistic I/O units after power interruption.

SOFTPAC

- [KB86206](#) Unable to communicate to MMP port via UDP.
- [KB86212](#) Multiple charts heavily accessing the same communications handle can cause a -16 Bus Error.

VERSION R9.5c

September 2, 2016. Updated September 9, 2016

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware"](#), starting on [page 1](#).

NOTE: To upgrade SoftPAC firmware to R9.5a (or higher), see [KB86020](#), Cannot use "Update Firmware" option to upgrade to R9.5a.

Fixed Bugs

PAC-R, PAC-EB, PAC-SB

[KB84561](#) Firmware needs to support PAC Manager in calibrating analog points that have negative scaling.

PAC-S, PAC-R

- [KB86193](#) REST API sometimes incorrectly returns "Operation failed" or "Object not found" error.
- [KB86150](#) Unexpected results when changing PID parameters in PAC Control Debug mode.

VERSION R9.5b

August 18, 2016. Updated August 23, 2016

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware"](#), starting on [page 1](#).

Fixed Bugs

PAC-R, PAC-EB, PAC-SB

- [KB86139](#) SNAP PAC thermocouple modules running under R9.5a firmware may prematurely display high out-of-range value.
- [KB85797](#) Opening an FTP Comm Handle in PAC Control uses incorrect default timeout.

PAC-S, PAC-R

[KB86078](#) Clearing configured breakpoints should also clear "Break On" flag.

VERSION R9.5a

July 21, 2016

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware"](#), starting on [page 1](#).

New Features

PAC-S, PAC-R

- Added an HTTP/HTTPS server and a RESTful API (representational state transfer application programming interface) to the PAC, so you can now securely access (using HTTPS) your PAC Control strategy data using the programming language of your choice. This addition makes it easy for developers to create custom programs and implement Internet of Things (IoT) applications.
- Added SSL security at the control engine level for use in a TCP comm handle.

PAC-R, PAC-EB, PAC-SB

- Added support for the new SNAP-AIRTD-8U analog input module. This module has 8 points individually configurable for a variety of behaviors, including a fixed temperature range for nickel, platinum, or copper RTD inputs; a fixed range in ohms; or two types of auto-ranging where the module scrolls within a range (in ohms) and chooses the best resolution.
- In the Status Write Area of the memory map, added an out-of-range indicator for SNAP I/O modules that return a 32-bit value, such as the SNAP-AIRATE-HFi and SNAP-AIRTD-8U. The default value is -2,147,483,648. You can change this value if it is a valid value for your application.

Enhancements

PAC-S, PAC-R, SOFTPAC

- Added the ability to set breakpoints inside OptoScript blocks.
- Added nested subroutines: a subroutine can now be called from a chart or from another subroutine. Calls may not be recursive. See details in Chapter 12 of the [PAC Control User's Guide](#) (form 1700).

PAC-S, PAC-R

- Added Equifax and DigiCert root certificates to the firmware image, so you do not need to add them individually.
- Added support for loading DER format as well as PEM format CA (Certificate Authority) security certificates.
- Added configuration options for choosing the HTTP server listen port and HTTPS or HTTP. These options are used for the REST API.

- FTP now supports the SIZE command.

PAC-R, PAC-EB, PAC-SB

- Added offset, gain, and filter weight as analog input point configuration parameters.
- Added higher resolution resistance value from a SNAP-AIR400K-8 analog input module.

Fixed Bugs**PAC-R**

[KB85723](#) On a SNAP high-density digital (HDD) output module, a point that was turned off is on, or vice versa

PAC-S, PAC-R

- [KB85888](#) -2104 error when sending email from a PAC Control strategy
- [KB84812](#) Analog minimum value request in PAC Display or OptoOPCServer returns maximum value

PAC-S, PAC-R, SOFTPAC

[KB84276](#) PAC Control "Convert IP Address String to Integer 32" command may return an invalid value

PAC-S, PAC-R, SOFTPAC, PAC-EB, G4EB2

[KB85914](#) Modbus/TCP Report Slave ID (0x11) does not return any data

PAC-R, PAC-EB, PAC-SB

- [KB83828](#) SNAP analog module loses custom scaling configuration
- [KB85078](#) SNAP-AIMV-4 module with point configured as +/- 75 mV shows incorrect default scaling

VERSION R9.4c

December 10, 2015

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware"](#), starting on [page 1](#).

New Feature**PAC-R, PAC-EB, PAC-SB**

To support the SNAP-AIRATE-HFi module, PAC Manager now includes a new field, "Out Of Range Value (32-Bit)," in the Status Write area of the memory map. Its address is 0xF03802B0. The default value of -2147483648 is returned when the input is outside of the module's input range. (For the SNAP-AIRATE-HFi module, the default value is also returned when a field signal is disconnected.)

Enhancements**PAC-EB, PAC-SB**

SNAP HART modules limit the number of preambles to a value from 5 to 20. SNAP brains now enforce this limit in the memory map.

PAC-EB

The Nagle algorithm has been disabled on OptoMMP TCP server sockets. This improves response time when successive requests are sent to the OptoMMP port (2001) without waiting for each response.

Fixed Bugs

PAC-S

[KB84885](#) mystic I/O is not enabled after watchdog timeout

PAC-S, PAC-R

- [KB84431](#) Files written by a strategy to a microSD card have a created date of January 1, 2012
- [KB84522](#) Controller may refuse communication requests after FTP server closes connection due to inactivity
- [KB84704](#) Controller may reset if email attachment is sent from microSD card
- [KB84731](#) Controller connection to secure server may fail
- [KB84898](#) Handshake failure sending email to SMTP server using SSL certificate with specific algorithm
- [KB84906](#) Controller resets when doing secure SMTP over PPP
- [KB85083](#) Cannot create file on microSD card (error code -417) PAC-S, PAC-R, SOFTPAC
- [KB83266](#) Full FTP directory may not be returned by the controller
- [KB84196](#) COM handle "get.srcport" command returns the source IP address instead of its port
- [KB84345](#) Flowchart hangs when trying to access offline HART SNAP I/O
- [KB84472](#) Persistent strings are cleared when strategy is updated
- [KB84474](#) Some time zone changes not working correctly
- [KB84519](#) 202 error returned after doing multiple HTTP or Send Email commands
- [KB84528](#) A strategy with a very long name may make variables lose their persistence
- [KB84583](#) Cannot access SNAP PAC controller
- [KB84588](#) Spaces in file COM handle connect string make files inaccessible
- [KB84608](#) HART preambles set to very high value
- [KB84702](#) Strategy download may fail
- [KB84711](#) Opening a communication handle may cause a controller reset (or bus error) if value is malformed
- [KB84719](#) Controller host port may become unresponsive
- [KB84757](#) Unpack String incorrectly stores 8-, 16-, and 24-bit values into Int32
- [KB84791](#) Heavy use of a file COM handle by multiple charts may cause the controller to reset
- [KB84858](#) Controller ignores mystic PID output enable options
- [KB85038](#) Persistent variables aren't retained when using background downloading
- [KB84951](#) Set Time Zone Configuration is not saved to battery-backed RAM
- [KB85301](#) Inspect window shows incorrect data for 64-bit integer tables in subroutines

PAC-R, PAC-EB, PAC-SB, G4EB2

[KB84577](#) OptoMMP memory map Digital Point Write Turn On/Off areas write with any value

PAC-R, PAC-EB, PAC-SB

- [KB80394](#) 'Get Frequency' command slow to detect 0 Hz
- [KB82058](#) Host-fed PID Velocity Type B, ISA, Parallel, and Interacting algorithms do not calculate D or P terms

- [KB83813](#) Unusually large change in PID Output or Integral KB84243 Custom-scaled SNAP I/O modules may be reset to defaults
- [KB84300](#) Controllers & brains stop returning frequency every 72 minutes

PAC-R, PAC-EB, G4EB2

[KB85035](#) Large data stream sizes cause corruption and/or reset

SOFTPAC

[KB85276](#) Get Control Engine Address command returns 0.0.0.0

VERSION R9.4b

January 19, 2015

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

Enhancements**PAC-S, PAC-R, SOFTPAC, PAC-EB**

Added support for the SNAP-AOVA-8 multifunction voltage/current analog output module.

PAC-S, PAC-R, PAC-EB, G4EB2

The number of concurrent Modbus/TCP connections increased from 2 to 8.

Fixed Bugs**PAC-S, PAC-R, SOFTPAC, PAC-EB**

[KB81195](#) Event Messages greater than 0 are not copied to 'Message N: Text of Most Recent Message' field.

PAC-S, PAC-R, PAC-EB, G4EB2

[KB81322](#) Sending binary data in event message may produce unexpected output.

PAC-R, PAC-EB, PAC-SB

[KB83881](#) Analog module point configuration not stored to flash correctly with I/O Unit Import/Copy Utility.

PAC-S, PAC-R

- [KB83987](#) Loading a strategy from microSD to controller flash memory may fail.
- [KB84076](#) Filenames longer than 31 characters on microSD card are displayed incorrectly.
- [KB83970](#) Append to file on microSD card overwrites file instead.
- [KB83998](#) Controller with microSD card inserted may fail to configure I/O on a restarted I/O unit.
- [KB83999](#) More than the maximum 31 host connections may cause controller to become unresponsive.
- [KB84092](#) Timeout error (-39) occasionally returned on SNAP PAC serial ports.

PAC-EB, PAC-SB

[KB84051](#) SNAP PAC brain continuously resets on powerup.

PAC-R, PAC-EB

- [KB84102](#) Controller or brain resets when streaming over WLAN interface.
- [KB84134](#) Serial communication module in rack position 15 may drop a packet.
- [KB83796](#) Adding message to queue with blank description causes problem with error queue.
- [KB83798](#) Improperly formed Ethernet connection string may prevent opening a connection to the host port.
- [KB84262](#) Using SNMP, only the first 4 points of an analog module are accessible.

PAC-S, PAC-R, SOFTPAC

- [KB83821](#) Long name passed to "Get Pointer From Name" can cause controller reset.
- [KB83964](#) Email time stamp puts seconds in place of minutes.
- [KB83984](#) 'setpos' command ignores the right-most character of the command.
- [KB84085](#) Unpack String command may fail without error if source string data is too short.
- [KB83981](#) Pack String/Unpack String commands may return incorrect or no data.
- [KB84137](#) Set Time Zone command may set the zone incorrectly.
- [KB84196](#) COM handle "get.srcport" command returns the source IP address instead of its port.

PAC-S

- [KB84020](#) Controller becomes unresponsive when the value of a serial PID is changed while inspecting the PID in Debug mode.
- [KB84166](#) Chart or host task using command Synchronize Clock SNTP may become unresponsive.

SOFTPAC

- [KB84017](#) Invalid Memory Map Address error when using SoftPAC as a Generic MMP Device with a redundant controller.
- [KB84041](#) SoftPAC Scratch Pad doesn't work with PAC Display.

VERSION R9.4a

June 26, 2014. Updated August 25, 2017

Before installing firmware, review "[Selecting the Correct Version of PAC Manager to Install Firmware](#)", starting on [page 1](#).

Enhancements**PAC-S, PAC-R**

- Added support for microSDHC cards (32GB or less). MicroSDHC card support requires boot loader version R6.1a or newer. MicroSDHC card support is compatible with the following hardware:
 - SNAP-PAC-R1, SNAP-PAC-R2, SNAP-PAC-R1-W, SNAP-PAC-R2-W: All hardware versions that include a microSD card slot.
 - SNAP-PAC-S1, SNAP-PAC-S2, SNAP-PAC-S1-W, SNAP-PAC-S2-W: Hardware version 6/24/2014 or newer.
- Added support for the FAT32 file system and long file names on micro SD and SDHC cards. Requires boot loader version R6.1a or newer.

PAC-S, PAC-R, SOFTPAC, PAC-EB

Support has been added for HART® SNAP I/O modules SNAP-AIMA-iH and SNAP-AOA- 23-iH, including nine new commands.

Fixed Bugs**PAC-S**

- [KB82601](#) Strategy in microSD card does not run if named the same as controller strategy.
- [KB80831](#) Controller configured for strategy Background Download may reset during strategy "switch" or "switch and run."

PAC-S, PAC-R

[KB82163](#) Controller secured with SSD may reboot during startup.

PAC-S, PAC-R, SOFTPAC

- [KB82868](#) During the "initialize I/O unit" phase (just after clicking run), the "cancel" button doesn't work.
- [KB81888](#) Ethernet sessions unexpectedly closed.
- [KB83610](#) Communication to mistic I/O units erroneously disabled by error in PAC Control.
- [KB83648](#) Move Table to I/O Unit does not set digital output IVALS for 4-channel modules on disabled I/O unit.
- [KB83675](#) COM handle value can be changed while the handle is open.
- [KB83708](#) EOM terminator is ignored when receiving strings via UDP.
- [KB83727](#) Nagle's algorithm is enabled in TCP/IP communication handles.
- [KB83888](#) Controller may return a "Dictionary Full" error when memory is low.

PAC-R

[KB59170](#) Requesting 127 Modbus TCP holding registers causes incorrect data display.

VERSION R9.3e

February 25, 2014

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware"](#), starting on [page 1](#).

Enhancements**PAC-S, PAC-R, SOFTPAC**

- Added the ability to send an email with no user account name from within the strategy.
- Added configurable timeouts to the Send Email commands.
- Added the "size" command to the FTP driver.
- Added support to HTTP Post From String Table for a 4-pass post transaction using "Expect: 100-continue".

PAC-EB, PAC-SB

Added option to prevent period/duty cycle updates while pulse generator is running.

Fixed Bugs

PAC-S, PAC-R, SOFTPAC

- [KB53128](#) An I/O unit returns unexpected results from analog and digital I/O in PAC Control.
- [KB82768](#) Reading from a file on the controller opened for writing may fail.
- [KB83036](#) Email messages sent from controllers are missing the date field.
- [KB83110](#) Performing a background download while running a strategy with subroutines may cause the controller to reset.
- [KB83162](#) Server SSL certificates are not verified by the controller.
- [KB83255](#) I/O is not enabled on redundant systems under certain conditions.
- [KB83266](#) Full FTP directory may not be returned by the controller.
- [KB83280](#) Digital Counter on B3000 / B3000-B is cleared whenever communication from controller to brain is enabled.
- [KB83303](#) Controller may reset when performing SNTP sync.
- [KB83323](#) Using On-Pulse or Off-Pulse as watchdog may fail.
- [KB83329](#) I/O unit Watchdog, once enabled, won't disable.
- [KB83346](#) Opening FTP sessions in multiple charts may cause controller to reset.
- [KB83568](#) Control engine resets

PAC-EB, PAC-SB

- [KB82443](#) SNAP-AIRTD Generic Input resistance (ohm) measurement needs additional calculations.
- [KB82705](#) I/O unit and I/O points power up with default settings when the I/O unit is reset.
- [KB83163](#) Controller or brain continuously resets after saving large user files to flash.
- [KB83595](#) Modbus/TCP unsupported function codes return erroneous packets.

VERSION R9.3d

September 25, 2013

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

The changes in version R9.3d apply only to SoftPAC and PAC Sim.

New Features

SOFTPAC

Added support for the following modules:

- SNAP-AIRATE-HFi Analog Rate Input Module
- SNAP-AOD-29-HF Dual-Channel Time-Proportional Digital Output Module

Enhancements

SOFTPAC

- Added the ability to configure the timeouts for email connect, transmit, and receive.
- A new option has been added to the User Name element of the server information table of the Send Email and Send Email with Attachments commands. A separate User Account name and From name can

be specified by separating them with a colon. This allows you to configure either name to be blank, or to have different User Account and From names.

Fixed Bugs

SOFTPAC

- [KB82632](#) PC reboot causes SoftPAC or PAC Sim to lose autorun, persistent variables, and time zone.
- [KB83285](#) SoftPAC host port may become unresponsive.
- [KB83675](#) It is possible to change the value of a COM handle while it is open.

VERSION R9.3c

July 24, 2013

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

New Feature

Added support for the SNAP-AIR400K-8 thermistor module.

Fixed Bugs

PAC-S, PAC-R, SOFTPAC

- [KB82866](#) Transmit Pointer Table command posts -29 error for persistent string
- [KB83008](#) Controller may reset under special circumstances
- [KB83110](#) Performing a background download in PAC Control while running a strategy with subroutines may cause the controller to reset
- [KB83012](#) PAC Control strategy may not stop until the STOP button is pressed twice
- [KB83042](#) Get I/O Unit As Binary Value may return wrong data when using background downloads with Mystic I/O
- [83048](#) The Set Communication Handle Value command can be called while the com handle is still open, which could result in a variety of errors.

SOFTPAC

[KB83047](#) SoftPAC: Send Communication Handle Command returns "not implemented" error with RMDIR

PAC-R, PAC-EB, PAC-SB, G4EB2

- [KB80559](#) Expanded digital event reaction fails if trigger #1 uses scratch pad bits
- [KB81182](#) Event Message Email Client does not include the date field in the header
- [KB82682](#) Pulse commands may stop working

VERSION R9.3b

March 26, 2013

Before installing firmware, review [“Selecting the Correct Version of PAC Manager to Install Firmware”](#), starting on [page 1](#).

Enhancement

SOFTPAC

Support has been added to SoftPAC to allow the user to update SoftPAC firmware when firmware updates become available.

Bug Fixes

PAC-R, PAC-S SOFTPAC

- [KB82046](#) Using a literal string for URL with HTTP POST or HTTP GET commands may cause reset
- [KB82417](#) Mystic PID loop may not be properly initialized
- [KB82439](#) Controller does not enable G4D32RS I/O units
- [KB82463](#) 'Move Numeric Table to I/O Unit' may not set all output points correctly
- [KB82464](#) Cannot enable I/O Unit and error -93 appears in queue
- [KB82469](#) Persistent string table data lost with strategy download.
- [KB82480](#) HTTP Get command returns -20 error on second and subsequent calls.
- [KB82492](#) 'Write Numeric Table to I/O Unit Memory Map' command returns -3 error
- [KB82631](#) Repeated 'Start Continuous Square Wave' commands immediately restart the square wave
- [KB82643](#) Background downloading may cause unexpected behavior from controller
- [KB82662](#) PID loop 'Enable Communication' option does not work correctly
- [KB82765](#) 'Move Table to I/O Unit' Turns off G4EB2 Input IVALs

PAC-R, PAC-SB, PAC-EB

- [KB82016](#) SNAP-AITM-4i displays intermittent or continual QNAN data.
- [KB82420](#) Unexpected count value read from SNAP-SCM-SSI

SOFTPAC

- [KB82126](#) Cannot FTP file from host to client PC with SNAP PAC Sim.
- [KB82533](#) HttpGet command returns error -443
- [KB82633](#) SoftPAC may crash if a large string table is viewed in Debug mode

VERSION R9.3a

Internal Release Only

VERSION R9.2c

September 19, 2012

Before installing firmware, review ["Selecting the Correct Version of PAC Manager to Install Firmware"](#), starting on [page 1](#).

Enhancements

PAC-R, PAC-S

- The Get Control Engine Address command now returns the address of the interface on which the request is received, whether that is the primary address, the secondary address, or the wireless address. Previously it returned the primary address.
- A message is now added to the queue if the strategy is cleared on bootup due to a CRC error.

Bug Fixes

PAC-S

- [KB82012](#) Redundant system cannot start up without arbiter.
- [KB82014](#) Serial I/O units on same controller port may time out.
- [KB82167](#) Some analog/digital commands ignore disabled point state.

PAC-R

[KB82101](#) Updating to firmware 9.2c or newer fails on SNAP-PAC-R controllers. This has been fixed with PAC Manager R9.2d. If PAC Manager detects this problem, it automatically downloads a smaller "bridge" kernel, and then downloads the 9.2c kernel, all without user intervention.

PAC-R, PAC-S

- [KB81888](#) Ethernet sessions unexpectedly closed.
- [KB81902](#) PIDs not enabled on redundant systems.
- [KB81903](#) Multiple clients opening and closing sessions may cause delayed response to new sessions.
- [KB81908](#) 'Send Email With Attachments' command result code may be incorrect.
- [KB81913](#) 'Enable I/O Unit' overwrites replicated MMP PID tuning parameters on Redundant Systems
- [KB81916](#) Multiple tasks opening and closing serial COM handle may cause reset or chart lockup.
- [KB81962](#) HTTP commands may return wrong error when connection fails.
- [KB81979](#) Problems with NTP Time & Date commands.
- [KB81997](#) Controller sync of Time/Date may cause reset.
- [KB82001](#) 'Move Numeric Table to I/O Unit' may cause controller reset.
- [KB82006](#) FTP communication handles do not support DNS.
- [KB82012](#) Redundant system cannot start up without arbiter.
- [KB82023](#) 'HTTP Get' command incorrectly returns HTTP error 400.
- [KB82028](#) Communication handle timeout problems.
- [KB82046](#) Passing string literal for URL in HTTP Post/Get commands may cause reset.
- [KB82086](#) The 'Get Time & Date' command always returns 0 ms.
- [KB82146](#) 'Receive N Characters' returns -39 if number of characters is negative.
- [KB82147](#) 'Enable/Disable I/O Unit Causing Current Error' may cause bus error.
- [KB82157](#) 'Move Numeric Table To I/O Unit' only writes to position 0, high-density digital module.
- [KB82176](#) Passing string table element to subroutine with string tables may cause unexpected results.
- [KB82177](#) Setting controller FTP Username and Password may cause remote FTP connection to fail.
- [KB82178](#) Serial B3000 Event/Reaction scanning enabled only on first strategy run.
- [KB82227](#) Multiple 'Synchronize Clock SNTP' commands may fail.
- [KB82226](#) Wrong status code from 'Synchronize Clock SNTP' command.

PAC-R, PAC-EB, PAC-SB, G4EB2

- [KB82016](#) SNAP-AITM-4i displays intermittent or continual QNAN data
- [KB82221](#) SNAP Module Resets Causes Re-Config Storm

PAC-R, PAC-S, SOFTPAC

[KB82257](#) Down Timers May Fail To Expire.

SOFTPAC

- [KB82106](#) SNAP PAC Sim may return error -59.
- [KB82134](#) 'Synchronize Clock SNTP' does not work on SNAP PAC Sim.
- [KB82244](#) SNAP PAC Sim may transmit or display unexpected 32 or 64-bit values.

VERSION R9.2b

Internal Release

VERSION R9.2a

Dec 1, 2011

Enhancements**G4EB2, PAC-R, PAC-S**

Added support for G4EB2 brains (including part numbers G4D32EB2 and G4D32EB2- UPG).

PAC-R, PAC-S, PAC-EB

Added support for the SNAP-SCM-CAN2B serial communication module, which connects to a Controller Area Network (CAN).

PAC-R, PAC-S, PAC-EB, PAC-SB

- Added support for the SNAP-IDC-32D high-density digital input module.
- Added support for SNAP-OMR6-A and SNAP-OMR6-C mechanical relay output modules.

PAC-R, PAC-S

- Added Simple Network Time Protocol (SNTP) and time zone support for new time / time zone / date commands in PAC Control. Using those commands, you can set or get time zone information for the controller, get the controller's time zone offset from UTC (in minutes), synchronize the controller's clock with an external NTP server, convert a date and time to an NTP timestamp, and convert an NTP timestamp to a date and time.
- Added support for a new bit manipulation command in PAC Control. Using this command you can copy a bit from an integer variable or integer table element to an integer variable or integer table element without affecting any other destination bits nor changing the source variable.

SOFTPAC

When starting PAC-Sim, it displayed a message that included the number of hours it will run, but the screen was static. The new sign-on screen states the time of day when the Simulator will time out.

Bug Fixes

PAC-R, PAC-S

- [KB81309](#) Emails not sent from controller and -50 error returned.
- [KB81351](#) Controller resets when table references negative index.
- [KB81450](#) Very small floating-point values are set to zero by controller.
- [KB81517](#) Chart count out of sync with actual number of running tasks on a controller.
- [KB81553](#) 'Receive Numeric Table' may cause a -95 info message.
- [KB81674](#) Problems with controllers communicating to Profibus-DP slaves.
- [KB81707](#) Cannot connect with Listen and Accept Incoming Communication commands.
- [KB81787](#) Expired Up Timer not detected.
- [KB81790](#) SNAP PAC Simulator should return -36 for Send Email commands.
- [KB81791](#) 'Transmit Receive String' command may time out prematurely.
- [KB81792](#) 'Get Numeric Table' and 'Get String Table' may cause -95 error.
- [KB81800](#) 'Send Email' commands require password.

PAC-S

- [KB81645](#) Redundant system I/O units don't re-enable if they are rebooted.
- [KB81706](#) Redundant systems sometimes transition to backup controller frequently.

PAC-R, PAC-EB

- [KB80773](#) Digital Events-Expanded triggers continuously without trigger being set.

PAC-SB

[KB81397](#) Communication problems to SNAP-PAC-SB brains when updating firmware.

VERSION R9.1d

Dec 1, 2011

PAC-S, PAC-R

Enhancements

The Get Control Engine Address command now returns the address of the controller interface on which the request was made. Previously only the primary interface address was returned. One advantage is that this allows an app to dynamically adjust its timeout settings, based on whether it is connected via a wired or a wireless connection.

For the Get Chart Status command, which determines the current status of a specified chart, bit 17 returns a 1 if a chart is in the process of starting or is currently running. It returns a 0 if a chart is not in the process of starting.

Bug Fixes

- [KB81275](#) Point type not displayed correctly in iPAC and aPAC.
- [KB81302](#) Problems with Ethernet communications after restoring controller Configuration Data from microSD card.
- [KB81349](#) Assigning Chr(x) to a table element does not work.
- [KB81355](#) Controller bus error or hardware reset when inspecting local subroutine variables.

- [KB81375](#) Chart appears to hang if 'Open Outgoing Communication' is sent to a disconnected device.
- [KB81387](#) SendCommunicationHandle command 'get.src' always returns zero.
- [KB81398](#) Controller sometimes reports error -11 when sending email.
- [KB81403](#) 'Move I/O Unit to Numeric Table' and 'Move I/O Unit to Numeric Table Ex' commands do not write to table if I/O unit is offline.
- [KB81405](#) controller communication problem with background downloading and persistent string access.
- [KB81410](#) Serial port's baud rate not changed
- [KB81439](#) 'Get Date & Time' incorrectly returns -3 error.
- [KB81451](#) An Up Timer is not working as expected.
- [KB81420](#) Get Chart Status returns error message -5.
- [KB81446](#) Writing numeric tables to a controller's microSD card is very slow.
- [KB81510](#) Blinking red STAT LED and error -63 when downloading .cdf file from microSD card.
- [KB81518](#) Task count out of sync with actual running tasks.
- [KB81520](#) Error can leave some tags in an unknown or unexpected state

PAC-S

Bug Fix

[KB81397](#) Communication problems to SNAP-PAC-SB brains when updating firmware.

PAC-S, PAC-R, PAC-SB

Bug Fix

[KB81514](#) Controller or brain becomes unresponsive after communication on RS-485 serial link.

PAC-S, PAC-R, PAC-EB (wireless versions only)

Bug Fix

[KB81303](#) Wireless brains and controllers may intermittently lose communication.

PAC-R, PAC-EB, PAC-SB

Enhancement

Support has been added for the SNAP-IDC-32DN module.

Bug Fixes

- [KB81390](#) SNAP-PAC-SB Brains may drop packets at 230.4 kBd.
- [KB81443](#) Modbus/TCP, IO4AB, and SNMP 4-channel data may be old.

VERSION R9.1c

Oct 13, 2011

Internal Release

VERSION R9.1b

Jul 8, 2011

PAC-S, PAC-R

New Features

The following PAC Control commands have been added. Note that these commands require PAC Project 9.1 which has not yet been released.

- HTTP Get
- HTTP Post from String Table
- HTTP Post Calculate String Table Length
- Trim String
- Get & Restart Timer
- Get Date & Time
- Send Email*
- Send Email with Attachments*

* Both Send Email and Send Email with Attachments allow you to send an authenticated email from within a strategy.

Enhancements

- The Get Controller Command now returns the address of the interface on which the request is received. Previously it always returned the controller's primary address.
- Ethernet communication handles (TCP) will now accept the command get.src. The return value is the IP address from which the connection originates.
- The Point Mismatch error message (-35) now specifies in the Object field of the error message the point name, board name, module number, and point number. Previously only the point name was specified.

Bug Fixes

- [KB81184](#) Slower strategy performance.
- [KB81189](#) NULL pointer passed to command causes controller problems.
- [KB81190](#) Possible bus error (-16) or controller problems on I/O initialization.
- [KB81199](#) Calling a subroutine may cause controller problems due to string tables
- [KB81230](#) Command 'Get Pointer From Name' does not work with tables.
- [KB81234](#) 'Call Chart' command may cause chart to suspend.
- [KB81251](#) 'Move Numeric Table to Numeric Table' command always writes to index 0.
- [KB81276](#) I/O units with redundant Ethernet link are disabled if primary controller connection is interrupted.
- [KB81279](#) I/O unit disabled if SetAnalogTpoPeriod sent to disabled Snap-AOD-29 point.

PAC-R, PAC-S

Enhancement

Asymmetric RTS/CTS flow control for serial ports has been added.

Bug Fixes

- [KB81232](#) Dead or missing controller battery can cause controller problems.

- [KB81269](#), [KB81270](#) Multiple charts using 'Copy Numeric Table to Numeric Table' to copy between tables of different types may cause strategy deadlock.

PAC-EB, PAC-SB, PAC-SRA

Enhancement

Added support for hardware date codes 3/10/2011 and later. Hardware date codes 3/10/2011 and later are not compatible with previous firmware versions.

VERSION R9.1a

Jan 11, 2011

PAC-S, PAC-R

Bug Fixes

- [KB81188](#) 'Stack Not Empty' (-95) in error queue.
- [KB81803](#) Strategies with FTP communication handles may become unreachable via Ethernet

New Features

- Added an easy-to-use HTTP client.
- Added an easy-to-use SMTP client.
- DNS can now be used to open COM handles.
- A timer's value can now be retrieved and the timer re-started simultaneously, with a single command.
- New string manipulation words have been added to do things such as trim white space from the beginning or end of a string, do a reverse character search on a string, tokenize a string, etc.
- The controller will now start if any Ethernet interface is configured, Eth1, Eth2, or wireless. Previously, the controller would continuously Boot-P, waiting for an IP address to be assigned, until the primary Ethernet interface was configured.
- The new HTTP and SMTP clients support the use of hostnames in addition to IP addresses.
- The RAM file system store-to-flash and load-from-flash commands have been enhanced to support sub-directories and file compression.

PAC-R, PAC-EB

Bug Fix

[KB81078](#) SNAP PAC EB brains may reset with repeated writes to a microSD card.

New Features

- Support added for the SNAP-AITM-4i module.
- Support added for the new SNAP-AIRTD-1K module.

VERSION R9.0c

Jan 11, 2011

Bug Fixes

PAC-S, PAC-R

- [KB81093](#) Slower strategy, error -539 reported by wireless controller when WAP cycles power.
- [KB81115](#) Controller serial ports are always set to Parity=None.
- [KB81135](#) Controller FTP transfers a maximum of 1167 characters.
- [KB81153](#) Modified strategy downloaded from flash may cause controller problems.
- [KB81173](#) 'Wrong Object Type' error returned when assigning value to pointer table.
- [KB81174](#) Setting a string table element from Debug mode may cause unexpected controller behavior.

VERSION R9.0b

Sep 17, 2010

New Feature

- Added code to blink the STAT LED green / orange on the backup of a redundant controller pair when the strategy is running, to allow the user to easily see which controller is backup and which is active.

On a redundant system, when the strategy is running, the backup controller's STAT LED blinks green / amber, (the active controller has a solid green LED, as always), so you can see at a glance which controller is which.

- Added the ClearConfiguredFlag command to allow the user to force configuration commands to be sent to I/O units.

Bug Fixes

PAC-S

[KB81053](#) Backup redundant controller may not be established.

PAC-S, PAC-R

- [KB81004](#) Possible 'Wrong object type' reported to message queue for subroutine variable.
- [KB81008](#) VELOCITY C PID does not calculate Term_P and Term_D.
- [KB81054](#) Strategy does not autorun from the microSD card.
- [KB81055](#) 'Store microSD to flash and Restart Device' command fails.
- [KB81058](#) File in controller's MicroSD card root directory cannot be deleted.
- [KB81064](#) Reading the available memory on a microSD card on older SNAP PACs causes problems.
- [KB81074](#) Online change in strategy with alternate host tasks may cause controller problems.
- [KB81075](#) Controller may reset when making an online change
- [KB81083](#) Error -95 returned from subroutine with a Case or IF statement.

PAC-S, PAC-R, SOFTPAC

[KB81002](#) PAC Simulator appears to run strategy, but logic is not executing.

PAC-R, PAC-SB, PAC-EB

[KB81008](#) Host fed Velocity C PID does not calculate Term_P.

VERSION R9.0a

Jun 15, 2010

New Features

PAC-S, PAC-R

Support has been added for controller-level redundancy. For information on controller redundancy, system requirements, and how to obtain a SNAP PAC Redundancy Option Kit, see the [SNAP PAC Redundancy Option Data Sheet](#) (form 1901).

The following analog simulation commands have been added:

- IVAL Set Analog Filter Value
- IVAL Set Analog Min Value
- IVAL Set Analog Max Value

Bug Fixes

PAC-S, PAC-R

[KB80857](#) MoveNumTableToNumTable command returns -29 with Int64 tables.

VERSION R8.5e

January 14, 2011

Enhancements

PAC-S, PAC-R

- A strategy can now be loaded from the SD card in a running redundant system.
- Once a wireless unit is commissioned and wireless communication is enabled, the address for port 0 can be cleared.

Bug Fixes

PAC-S, PAC-R

- [KB81040](#) PAC Display cannot read digital TPO output point's period and percentage from Mystic brains.
- [KB81084](#) Subroutines from Case or IF statement may have unexpected results.
- [KB81094](#) FTP Communication Handle timeout is not applied.
- [KB81135](#) Controller FTP transfers a maximum of 1167 character.
- [KB81153](#) Modified strategy downloaded from flash may cause controller problems.
- [KB81173](#) 'Wrong Object Type' error returned when assigning value to pointer table.

VERSION R8.5d

July 21, 2010

Bug Fixes

PAC-S, PAC-R

[KB81004](#) Possible "Wrong object type" reported to message queue for subroutine variables.

PAC-R, PAC-EB, PAC-SB

[KB81007](#) Snap-AIRTD-10 readings are incorrect.

VERSION R8.5c

May 5, 2010

Bug Fixes

The following problems have been fixed:

PAC-S, PAC-R

- [KB80928](#) Strategy from microSD card does not Autorun.
- [KB80896](#) Strategy on microSD card with Comment (Single Line) command stops executing.
- [KB80884](#) Incorrect results from various string commands.
- [KB80817](#) Possible problems downloading large strategy to controller with R8.5a.
- [KB80790](#) MoveNumericTableToIOUnit command may cause incorrect points to flash LEDs.
- [KB80743](#) High latency network (modems) may cause controller to I/O unit communication problems.
- [KB80730](#) STAT LED remains turned off if Scanner flag used to stop strategy.
- [KB80728](#) Inserting microSD chip may cause controller to Reset.
- [KB80687](#) Controller in background download mode fails to autorun strategy on inserted microSD card.
- [KB80678](#) Increased ARP cache size on controllers helps decrease number of ARP broadcasts.
- [KB80664](#) Controllers talking to Ethernet I/O units on high-latency networks may randomly become unresponsive.
- [KB80621](#) Opening a UDP connection too soon in a strategy may return error -443.
- [KB80569](#) SNAP PAC devices receiving long 802.1Q VLAN broadcasts may have communication failures.

PAC-S

[KB80623](#) Serial brains cannot communicate simultaneously via the controller and another application using Ethernet Pass-Through mode.

PAC-R

- [KB80574](#) Downloading a large Ethernet/IP configuration file may reset a brain. (Ethernet/IP is used with Opto 22's IO4AB products.)
- [KB80480](#) Points 4 through 7 on a Snap-AICTD-8 always report °C.

SOFTPAC

[KB80380](#) Inspection window may display incorrect SNAP PAC Sim IP address.

VERSION R8.5b

Internal Release

VERSION R8.5a

Sep 14, 2009

New Features and Enhancements

PAC-S, PAC-R, PAC-EB

New Wireless+Wired controllers and brains have been introduced:

- SNAP-PAC-S1-W, SNAP-PAC-S2-W
- SNAP-PAC-R1-W, SNAP-PAC-R2-W
- SNAP-PAC-EB1-W, SNAP-PAC-EB2-W

These Wired+Wireless devices support wireless local area networking (WLAN, also known as Wi-Fi or wireless Ethernet), as well as wired Ethernet.

PAC-S, PAC-R

Three new analog simulation commands have been added:

- IVAL Set Analog Filter Value
- IVAL Set Analog Min Value
- IVAL Set Analog Max Value

PAC-R, PAC-EB, PAC-SB

The PAC brains also have the following enhancements:

- Event Messages that do mem map copies now have UDP as an option.
- Event Messages that do mem map copies can now handle > 4 bytes.
- Higher frequency pulsed output generation is now allowed.
- A memory map location was added to display the number of bytes free on the microSD card.
- The SNAP-AILC module is now supported for use with EtherNet/IP, which is used with Opto 22's IO4AB products.
- The SNAP-AITM8D module is now supported.

Bug Fixes

The following problems have been corrected:

PAC-S, PAC-R

- [KB80397](#) Changing a point's state should cancel pulse, square wave, and TPO commands.
- [KB80473](#) The IVAL Set Frequency command doesn't work with the mistic brains.
- [KB80558](#) "Dictionary full error" from online changes to strategies with subroutines.
- [KB80594](#) Controller unresponsive after burning SSD strategy to flash memory.
- [KB80602](#) Repeated Listen for Incoming Communication on port 502 prevents connection to controller.
- [KB80626](#) Problems with Ethernet IP multicast address algorithm for implicit connections and multiple interfaces.
- [KB80629](#) Controllers accessing Ethernet brains via high-latency radio network may reset.

PAC-S, PAC-R, PAC-EB

- [KB80617](#) Event messages with string plug-ins are truncated.
- [KB80625](#) Ethernet IP multicast address algorithm for implicit connections is not correct.

PAC-R, PAC-EB, PAC-SB

[KB80589](#) Quadrature counter point B stays at 0 counts regardless of input.

PAC-EB

[KB80597](#) FTP 'ls' or 'dir' command causes brain to reboot.

VERSION R8.4a

Mar 6, 2009

New Feature**PAC-S, PAC-R**

SNAP PAC controllers manufactured in November 2008 and later have a microSD card slot in the top of the controller's case. Cards up to 2 GB capacity with the microSD logo can be used in this slot. Using the microSD card with FTP, you can read the card at 380 kB/s and write to it at 231 kB/s.

You can use the microSD cards to do the following things:

- To store data or files, which you can access using commands or an FTP client.
- To update firmware on the controller or on a serial communication module on the controller's rack.
- To boot the controller from firmware on the microSD card rather than from the firmware in the controller, for example to test new firmware.
- To update, run, or test new strategies. This is useful if the controller is not on the network, if PAC Control isn't available, or if you want to test a new strategy without erasing the existing one.

Bug Fix**PAC-S, PAC-R**

The following problem has been corrected:

[KB80503](#) Controllers report incorrect values for some I/O combinations in 'Inspect I/O Unit'

VERSION R8.3a

Dec 1, 2008

New Features**PAC-S, PAC-R, PAC-EB**

EtherNet/IP protocol server for UCMM unconnected, Class 3 connected messaging (Explicit messaging) and Class 1 connected messaging (I/O, Implicit messaging). (Ethernet/IP is used with Opto 22's IO4AB products.)

PAC-R, PAC-EB, PAC-SB

Support for SNAP-IAC-K-16 and SNAP-IDC-HT-16 modules.

Bugs Fixes

The following problems have been corrected:

PAC-S

- [KB80313](#) Slow baud rates affect communication between SNAP-PAC-S controllers and serial I/O units.
- [KB80316](#) Local I/O Unit not enabled when using SNAP-UP1-M64 as Generic OptoMMP Device.
- [KB80365](#) Writing to Mystic PID output has no effect on the analog output.
- [KB80427](#) Mystic I/O unit is disabled after flash is cleared and PID is inspected

PAC-S, PAC-EB

[KB80177](#) Some SNMP initial traps not sent as expected.

PAC-S, PAC-R

[KB80357](#) Disabled I/O unit incorrectly reported as enabled.

PAC-S, PAC-R, PAC-EB

[KB80336](#) Event message emails may include extra characters.

PAC-S, PAC-R, PAC-EB, PAC-SB

[KB80377](#) Problems storing older Image file to PAC Brain with newer firmware.

PAC-R, PAC-EB, PAC-SB

- [KB80328](#) Point features not stored after power cycle on SNAP PAC I/O unit.
- [KB80374](#) 'Get & Restart Period' command returns zero for period measurement.

PAC-R, PAC-EB

- [KB80367](#) Disabled I/O unit not reported in point's Inspect window.
- [KB80241](#) Cannot send data out serial module port via SNMP.

VERSION R8.2a

Jun 25, 2008

New Features

Review the PAC Project 8.2 Release Notes for more detail.

PAC-S, PAC-R

- controller firmware support for Interrupt charts for mystic serial brains. An Interrupt chart handles interrupts from mystic serial brains specially wired to a SNAP PAC S-series controller for critical events requiring immediate action.
- controller firmware support for the mystic ASCII protocol for serial I/O communication so that a SNAP PAC S-series controller can talk to all I/O units on that port in the mystic ASCII mode.
- controller firmware support for Secure Strategy Distribution which allows strategies to be downloaded and stored in a secure manner using encryption.

PAC-R2, PAC-EB2, PAC-SB2

The following digital point feature types have been added: On Totalizer, OffTotalizer, TPO, and Pulse Generation.

Bugs Fixes

The following problems have been corrected:

PAC-S, PAC-R, PAC-EB, PAC-SB

- [KB60473](#) Rollover problem with 'Seconds since powerup' after 49.71 days
- [KB80010](#) Plugins yielding binary data truncate data after '00' sequence

PAC-S, PAC-R, PAC-EB

- [KB59290](#) Unexpected SNMP cold start traps from Ethernet Devices
- [KB80025](#) 'Always Bootp/DHCP on Powerup' does not work
- [KB80041](#) Excessive I/O unit timeouts possible if communication bursts overwhelm Ethernet network
- [KB80171](#) SNMP community settings for Read or Write permissions may behave incorrectly
- [KB80281](#) TPO period incorrectly set for SNAP-AOD-29

PAC-R, PAC-EB, PAC-SB

- [KB80013](#) Possible momentary off pulse if digital output is already on
- [KB80117](#) Changing the PID setpoint may cause a jump in the PID output

PAC-S, PAC-R

- [KB54622](#) TransmitPtrTable and ReceivePtrTable commands may return corrupt data when used with Int64 vars
- [KB54982](#) Problems with very high/low controller error queue values and GetErrorCodeOfCurrentError()
- [KB60359](#) 'Convert # to Hex String' command pads extra 0's in front of Integer 64 value
- [KB60697](#) Disabled I/O units are not detected by 'Error on I/O Unit?' command
- [KB60930](#) Ethernet I/O units disabled if watchdogs are configured
- [KB62241](#) Possible 'Invalid address' errors, or no response from I/O unit
- [KB80073](#) Interrupting a strategy download may result in a controller -9 timeout
- [KB80103](#) controller port 22001 may become unresponsive if bootup is interrupted
- [KB80123](#) Copy Date to String commands may cause unexpected controller behavior
- [KB80260](#) 'Set Analog Offset' command limits offset values

PAC-R, PAC-EB

- [KB54782](#) (R1 and EB1 only)– Analog TPO Period setting is not stored to flash on Ethernet devices
- [KB60572](#) SNMP v2 traps may cause a management system crash

PAC-S

- [KB60378](#) 'Move Numeric Table to I/O Unit' command does not work with mistic I/O Units
- [KB61524](#) Persistent variables lost on power cycle when using 'Background' download option on SNAP PAC
- [KB80216](#) mistic digital input IVALs not cleared by the 'Clear Counter' command
- [KB80232](#) Some 'Move Table to I/O Unit' commands don't work as expected with mistic I/O
- [KB80248](#) Some SNAP-PAC-S1/S2 controllers may reset on power-up
- [KB80275](#) mistic brain totalizer rates truncated by 'Set Analog Totalizer Rate' command

- [KB80280](#) Long timeouts and incorrect PID references in controller error queue
- [KB80282](#) mistic digital input with 'Period' feature always displays 0

VERSION R8.1a

Oct 12, 2007

IMPORTANT: Before installing version R8.1a firmware on a SNAP-PAC-S1, first install the special boot loader update firmware S8.0g.

To download the S8.0g bootloader and for detailed instructions, see OptoKB [KB59233](#) <<https://www.opto22.com/support/resources-tools/knowledgebase/kb59233>> on the Opto 22 website.

New Features

- Support for new S2 controller, SB1 & SB2 brains
- Support for the SNAP-AIMA-8, SNAP-AIV-8, and SNAP-AICTD-8 eight-channel analog input modules
- Support for inverted scaling on analog input points on Ethernet brains.
- Support for Background Download feature, which is the ability to download a strategy while the current one keeps on running.
- Added the Flag Lock Flag Unlock commands, which allow you to craft a strategy to give a task exclusive access to one or more objects--such as a tables, integers, or I/O units--until the task is complete.
- PAC brains now do more mistic-like features, including Digital/Analog Totalizing, Frequency/Period measurement.
- When communicating with I/O Units, retries are now logged in the message queue with an informational message: -539 "I/O error; performing retry" which could help in troubleshooting communication issues.
- Expanded Digital Event including support for high-density digital modules and latches
- New "appe:<localfile>,<remotefile>" option for FTP communication handles. This option is similar to send but appends to the end of the remote file.
- New "mkdir" and "cd" options for FTP communication handles. This is useful when using folders and subfolders on the remote FTP server.
- The Move Numeric Table to Numeric Table command now supports copying Integer 32 Tables to Float or Pointer Tables, and Float or Pointer Tables to Integer 32 Tables. Pointer tables can also be used for either the "from" or "to" side of the copy.
- Added "SECONDS since powerup" to status read at address F030 0160. This improves upon the "Milliseconds Since Powerup" value at address F030 010C because it will take 1000 times longer to roll over to 0.
- Added the Digital Feature Scan Interval (msec) feature at address 0xF038 0294. See the [OptoMMP Protocol Guide](#) (form 1465) for details.
- Added watchdog support for high-density digital points.
- Improved the handling of disabled I/O units for commands that have no IVAL to return. Remaining retries are now skipped, and an informational message is posted in the queue.

Bug Fixes

PAC-R1, PAC-EB1

[KB59458](#) 'Ramp Analog Output' command may not work correctly.

PAC-R, PAC-EB

[KB58962](#) Load cell modules may need reconfiguration if used without PAC Control.

PAC-R

[KB57299](#) SNAP-PAC-R unit watchdog timers sometimes time out unexpectedly.

PAC-R, PAC-S1

- [KB58160](#) Accessing a NULL pointer may cause a Stack Overflow, Bad Quality data.
- [KB57195](#) Repeated use of 'Set TPO Percent' PAC Control command, keeps output point turned on.
- [KB58048](#) Unexpected PID output values possible when setpoint is set from I/O point.
- [KB57840](#) PAC Control or ioControl hex string-to-number commands may give incorrect results.

PAC-R, PAC-S

- [KB56323](#) Repeated use of FTP communication handles could cause problems.
- [KB59514](#) Applications may not connect to Ultimate controller's host port.

VERSION S8.0g

Internal release only

PAC-S1 only

[KB59233](#) Updated bootloader available for SNAP-PAC-S1.

VERSION R8.0f

Limited Release Only Sep 17, 2007

Bug Fixes

PAC-R1 only

[KB59249](#) Inspecting the SNAP PAC controller error queue when an error references an I/O point may cause problems.

PAC-R, PAC-EB

[KB58676](#) -Unexpected behavior from analog modules if rack voltage is low..

PAC-S1 only

[KB57916](#) Mystic I/O units going offline may affect operation of other mystic I/O units connected to SNAP-PAC-S1.

PAC-S1, PAC-R

- [KB58578](#) 'Move I/O Unit to Numeric Table' PAC Control command causes intermittent error -3
- [KB58310](#) PAC Display project and OptoOPCServer clients using 64-bit integer tables may have unexpected results.

VERSION R8.0e

Jul 3, 2007

Bug Fixes

PAC-R, PAC-EB

[KB54532](#) Setting point's filter weight may cause filtered value to go to -1.#INF.

PAC-R, PAC-S

[KB58101](#) Watchdogs do not work if higher density modules are configured.

VERSION R8.0d

Internal release only

Bug Fixes

PAC-R, PAC-S

[KB57605](#) Incorrect on/off states returned for standard SNAP digital modules in rack positions 8 - 15.

[KB57617](#) 'Set Analog Filter Weight' command may disable I/O unit.

VERSION R8.0c

May 15, 2007

Bug Fixes

PAC-R, PAC-EB

- [KB54562](#) Unexpected 'Ramp Analog Output' PAC Control/ioControl command response if ramp endpoints are out of range.
- [KB57251](#) Limited communication watchdog operation on SNAP-PAC digital outputs.

PAC-R, PAC-S

[KB57162](#) Possible intermittent TCP communication through Outgoing PPP on SNAP PAC and Ultimate control engines.

PAC-S

[KB56949](#) DTR signal on SNAP-PAC-S1 port 0 is asserted at power-up.

PAC-EB

[KB57271](#) Event messaging on SNAP-PAC-EB2.

VERSION R8.0B

Apr 20, 2007

Bug Fixes

PAC-S, PAC-R

- [KB56600](#) ioControl / PAC Control 'Move Numeric Table to I/O Unit' command attempts to write to disabled I/O units.
- [KB56657](#) An intense burst of Ethernet broadcast traffic may cause multiple controllers to stop communicating.
- [KB56666](#) Multiple PAC Control/ioControl communication file handles running simultaneously in multiple charts.
- [KB56787](#) MoveIoUnitToNumTable PAC Control/ioControl command may write to wrong table index.
- [KB56793](#) IVAL not cleared with 'Get & Clear On-Latch' or 'Get & Clear Off?Latch' commands
- [KB57034](#) Simultaneous connection requests for the same TCP port on ENET1 and ENET2 may affect SNAP-PAC-S1 operation.

PAC-S

[KB56419](#) 'Set Mistic PID P Term' with SNAP-PAC-S1 and Mistic I/O units, affects PIDs.

PAC-R

[KB56439](#) Modbus/TCP writes to digital outputs on SNAP-PAC-R2 are unsuccessful.

VERSION R8.0a

March 1, 2007

Enhancement

Support has been added for the SNAP-AITM-8 thermocouple input module.

New Features

- There are new get.to/set.to options for setting and getting the timeout values for "ser:" and "tcp:" communication handles.
- You can now set up an FTP username and password for greater security when sending files via FTP to and from an Opto 22 controller or brain that has file capability. The username and password can be set up in the Network Security dialog box either in a configuration file or in Inspect mode.
- Expanded support for 64 high-speed digital I/O points on SNAP-PAC-R1.

Bug Fixes

[KB55814](#) I/O unit may go offline when PIDs are inspected from ioControl Debug mode.

PAC-S, PAC-R

- [KB51181](#) Config EEPROM 'Set' button in PAC Control / ioControl Debug mode disables I/O unit.
- [KB51806](#) Paused, expired uptimers and the 'Timer Expired?' ioControl command.

- [KB51848](#) Ethernet I/O analog point IVALs not displayed in I/O Unit inspection window.
- [KB53147](#) Potential problem using FTP communication handles, reports an error -408.
- [KB53614](#) Data streaming synchronization to multiple hosts modified in SNAP PAC and Ultimate I/O controllers.
- [KB54363](#) Inconsistent results from ioControl 'Generate Reverse CRC-16 on Table (32 bit)' command.
- [KB54505](#) Open communication handle left after ioControl subroutine exits, may affect controller behavior.
- [KB54846](#) Default gateway configuration on primary port may affect secondary port communication on PAC controllers.
- [KB54853](#) Reading or writing to numeric I/O unit scratchpad may return -29 error.
- [KB54940](#) Illegal pointer assignments in ioControl subroutines may cause controller lockup.
- [KB55154](#) ioControl command 'Set End-of-Message Terminator' cannot return error.
- [KB55166](#) 'Set End-of-Message Terminator' may cause problems if set to null when used with ioControl file comm handles.
- [KB55168](#) No data waiting for 'Receive String Table' immediately expires timeout in ioControl.
- [KB55848](#) Serial port on SNAP-PAC controllers may return errors including -52.
- [KB55977](#) Receiving data with multiple EOM characters via a serial communication handle yields unexpected results.
- [KB56192](#) Null pointers assigned to any I/O point may eventually cause a controller reset.
- [KB56283](#) 'Generate Reverse CRC-16 On Table (32-bit)' command returns wrong value.

PAC-S

- [KB51837](#) ARE-enabled SNAP-PAC-S1 redundant ports cannot re-enable SNAP-PAC-R1.
- [KB55182](#) 'IVAL Set I/O Unit from MOMO Masks' ioControl command not setting disabled serial I/O unit.
- [KB55091](#) 'Set I/O Unit from MOMO Masks' ioControl command affecting input IVALs on SNAP-PAC-S1 to serial I/O unit.
- [KB55236](#) SNAP-PAC-S1 in peer-to-peer network may reset if controller is stopped.
- [KB55187](#) Invalid serial port value in communication handle command successful on SNAP-PAC-S1.
- [KB55825](#) Scratch pad not stored to SNAP-PAC-S1 flash EPROM.
- [KB56017](#) mistic PIDs become unresponsive on re-download of large ioControl strategy.

PAC-R

- [KB52576](#) Unexpected results if SNAP-AITM type module or SNAP-AIRTD is reconfigured with a different Point Type.
- [KB55161](#) SNAP-PAC-R1 may report incorrect digital or quadrature counts.

VERSIONS R7.1h AND EARLIER

For enhancements and bug fixes previous to R8.0a, see:

<https://www.opto22.com/support/resources-tools/documents/rm-snap-legacy-firmware-readme>