README: Brain and Controller Firmware R9.2a

March 9, 2012

This readme applies to the following Opto 22 products:

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G4EB2 brain (G4EB2)
G4D32EB2 brain (G4EB2)
G4D32EB2-UPG brain (G4EB2)
SNAP-PAC-R1 controller (PAC-R)
SNAP-PAC-R1-W controller (PAC-R)
SNAP-PAC-R2 controller (PAC-R)
SNAP-PAC-R2-W controller (PAC-R)
SNAP-PAC-S1 controller (PAC-S)
SNAP-PAC-S1-W controller (PAC-S)
SNAP-PAC-S2 controller (PAC-S)
SNAP-PAC-S2-W controller (PAC-S)
SNAP-PAC-EB1 brain (PAC-EB)
SNAP-PAC-EB1-W brain (PAC-EB)
SNAP-PAC-EB2 brain (PAC-EB)
SNAP-PAC-EB2-W brain (PAC-EB)
SNAP-PAC-SB1 brain (PAC-SB)
SNAP-PAC-SB2 brain (PAC-SB)
SNAP-PAC-SIM control engine (PAC-SIM)
SNAP-PAC-SRA arbiter (PAC-SRA)
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KB numbers: A number with the prefix "KB" next to an item in this readme, such as KB49909, refers to a Knowledge Base article published by Opto 22. A KB article provides additional information about a feature or bug. To find a particular KB article, go to the Opto 22 website, http://www.opto22.com, and enter the KB number in the search engine.

NOTE: If a referenced KB article has a hyperlink, you can click on it and go directly to the article. However, if a referenced KB article does not have a hyperlink, the article was not yet available when this readme was published.

Install version R9.2a firmware whether or not you will use controller-level redundancy. At one time, there was one version of firmware for systems with controller-level redundancy and another version for systems without redundancy. Starting with R9.1b, there is no such distinction.

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.

Bug Fixes

[PAC-R, PAC-S]

KB81309 If PAC Controller lacks a DNS (Domain Name Server), the comm handle open command returns an error with that information.

KB81450 Very small single-precision floating-point values, such as values below the IEEE-supported range of 1.18 x 10-38, were set to a value of zero by the controller's FPU. Note: This fix does not apply to redundant variables with very small values. Also, math operations will likely cause the values to be set to zero.

KB81787 Firmware 9.1d and above handles up-timer assignment correctly.

KB81791 Transmit / Receive String does not time out prematurely.

KB81792 "Get Numeric Table" and "Get String Table" no longer cause -95 error.

KB81800 "Send Email" commands can allow a blank password.

KB81919 Multiple tasks opening and closing serial COM handles no longer cause a chart to hang or a controller to reset.

[PAC-S]

KB81645 I/O on a redundant system is now reenabled after brain reboots.

KB81706 Redundant systems were fixed to avoid frequent failovers.

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

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.

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 Control engine communication problem with background downloading and persistent string access.

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.

[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]

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 Low density SNAP-PAC digital data is 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 PAC Control 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.

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 SNAP PAC control engine 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, 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 SNAP PAC controller may reset when making an online change

KB81083 Error -95 returned from PAC Control subroutine with a Case or IF statement.

[PAC-S, PAC-R, PAC-SIM]

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
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[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 form 1901, the SNAP PAC Redundancy Option Data Sheet.

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
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[PAC-S, PAC-R]

KB80857 MoveNumTableToNumTable command returns -29 with Int64 tables.

Version R8.5e
January 14, 2011

Enhancements
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[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
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[PAC-S, PAC-R]

KB81040 PAC Display cannot read digital TPO output point's period and percentage
from Mistic 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 PAC Control strategy from microSD card does not Autorun.

KB80896 Strategy on microSD card with Comment (Single Line) command stops executing.

KB80884 Incorrect results from various PAC Control string commands.

KB80817 Possible problems downloading large strategy to SNAP PAC controller with R8.5a.

KB80790 MoveNumericTableToIOUnit command may cause incorrect points to flash LEDs.

KB80743 High latency network (modems) may cause SNAP PAC controller to I/O unit communication problems.

KB80730 Control engine STAT LED remains turned off if Scanner flag used to stop strategy.

KB80728 Inserting microSD chip may cause SNAP-PAC Controller to Reset.

KB80687 Controller in backgound download mode fails to autorun strategy on inserted microSD card.

KB80678 Increased ARP cache size on SNAP PAC controllers helps decrease number of ARP broadcasts.

KB80664 Controllers talking to Ethernet I/O units on high-latency networks may randomly lock up.

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 control engine 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.

[PAC-SIM]

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
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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 PAC Control command doesn't work with the mistic brains.

KB80558 "Dictionary full error" from online changes to strategies with subroutines.

KB80594 PAC 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.

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Version R8.4a
Mar 6, 2009

New Feature
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[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 PAC Control 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 PAC Control 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
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[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
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[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
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The following problems have been corrected:

[PAC-S]

KB80313 SNAP-PAC-S serial ports having trouble communicating at slower baud rates on half-duplex links.

KB80316 Local I/O Unit not enabled when using SNAP-UP1-M64 as Generic OptoMMP Device.

KB80365 Writing to Mistic PID output has no effect on the analog output.

KB80427 Mistic 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 in PAC Control.

[PAC-S, PAC-R, PAC-EB]

KB80336 SNAP PAC 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

See the PAC Project 8.2 Release Notes for more detail.

[PAC-S, PAC-R]

Control engine firmware support for Interrupt charts for mistic serial brains. An Interrupt chart handles interrupts from mistic serial brains specially wired to a SNAP PAC S-series controller for critical events requiring immediate action.

Control engine firmware support for the mistic 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 mistic ASCII mode.

Control engine 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, Off Totalizer, TPO, and Pulse Generation.

Bugs Fixes
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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

[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?' PAC Control command

KB60930 Ethernet I/O units disabled if watchdogs are configured in PAC Control

KB62241 Possible 'Invalid address' errors, or no response from I/O unit

KB80073 Interrupting a strategy download may result in a control engine -9 timeout

KB80103 Control engine port 22001 may become unresponsive if bootup is interrupted

KB80123 Copy Date to String commands may cause unexpected control engine behavior

KB80260 'Set Analog Offset' PAC Control 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' PAC Control 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 mistic digital input IVALs not cleared by the 'Clear Counter' command

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 <http://www.opto22.com/site/downloads/drilldown.aspx?aid=3405> 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 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 in such a way 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 - A problem has been corrected where ramping didn't always work if called more than once. For example, the command may have had no effect, or it may have ramped up to a smaller number than expected.

[PAC-R, PAC-EB]

KB58962 – A problem has been corrected where load cell configurations were lost when power cycled to the I/O rack.

[PAC-R]

KB57299 - A problem has been corrected where watchdog timers configured on points local to the controller (like a SNAP-PAC-R or an Ultimate I/O unit), may have timed out even though the controller was accessing its own I/O points.

[PAC-R, PAC-S1]

KB58160 - A problem has been corrected where if a NULL pointer variable was requested from a control engine strategy by a PAC Display project or an OPC client, a recoverable error (a Stack Overflow error) may have occurred.

KB57195 – A problem has been corrected where changing the TPO percentage on an output point resulted in the TPO cycle restarting immediately, using the new percentage.

KB58048 - A problem has been corrected where if the source for a PID setpoint was an I/O point, and the destination for the output was set to Host, the PID output gave unexpected results.

KB57840 – A problem has been corrected where the following PAC Control commands could incorrectly convert a string's numeric value:

Convert Hex String to Number
Convert IEEE Hex String to Number
Convert Mistic I/O Hex to Float

This was more likely to occur if the string's prior length was longer than the length of the string passed to the command.

[PAC-R, PAC-S]

KB56323 A problem has been corrected where repeated use of FTP communication handles by Ultimate or SNAP PAC controllers could cause problems. Eventually, error 222 was reported by the controller when trying to access a file. Cycling power to the controller corrected the problem.

KB59514 A problem has been corrected where attempts by applications to connect to Ultimate I/O controllers on host port 22001 were not successful and received a -10038 Timeout while connecting to device message. Applications attempting to connect on the host port included, ioDisplay, ioTerminal, ioControl Debugger, and OPC Clients. The controller could, however, be pinged, and inspected with ioManager.

Version S8.0g
Internal release only

[PAC-S1 only]

KB59233 – An updated bootloader (loader) for the SNAP-PAC-S1 is available for controllers with loaders prior to version R3.1c. The update is not required, but

is recommended for your next maintenance opportunity. Bootloader update kernel version S8.0g evaluates the installed SNAP-PAC-S1 bootloader and updates it to version R3.1c, if necessary.

To download the S8.0g bootloader and for detailed instructions, see [OptoKB KB59233](http://www.opto22.com/site/downloads/drilldown.aspx?aid=3405) <http://www.opto22.com/site/downloads/drilldown.aspx?aid=3405> on the Opto 22 website.

Version R8.0f
Limited Release Only
Sep 17, 2007

Bug Fixes

[PAC-R1 only]

• KB59249 – A problem has been corrected where the controller would reset when an error queue was "viewed" and there was an error that referenced an I/O point.

[PAC-R, PAC-EB]

• KB58676 - A problem has been corrected where resetting SNAP analog modules sometimes caused unexpected behaviors on some Ethernet brain features. Analog modules sometimes reset if there is insufficient voltage, or if the module is unplugged from the rack. They display an "invalid float value" such as -1.#QNAN, -1.#QNAN0, or -nan.

  If one of these invalid float values was used as the input to a PID loop, the output option for when the input is out of range may not have been applied since the PID loop did not recognize the invalid float value as an out-of-range value.

[PAC-S1 only]

• KB57916 - When multiple serial mistic I/O units are configured, and one is taken off line (or turned off), this no longer causes other I/O units to go offline as well.

[PAC-S1, PAC-R]

• KB58578 - A problem has been corrected where when using the Move I/O Unit to Numeric Table command in a PAC Control strategy, a possible "-3 Buffer overrun or invalid length error" message was sometimes posted to the control engine message queue.

• KB58310 - A problem has been corrected where some 64-bit integer table element bit values in PAC Display projects or OptoOPCServer clients may have unexpected results.

• KB58879 - Diagnostic-info generation in spurious interrupt handler can cause call stack overrun.

Version R8.0e
Jul 3, 2007

Bug Fixes

[PAC-R, PAC-EB]
- (KB54532) Corrected a problem where setting a point's filter weight, for example, by using the Set Analog Filter Weight command, could cause a point's filtered value to get stuck at QNAN, 0xf80000000 (infinity) in certain situations.

[PAC-R, PAC-S]
- (KB58101) Corrected a problem where watchdogs do not work if any higher density modules (such as the SNAP-IAC-16) are configured.

Version R8.0d
Internal release only

Bug Fixes

[PAC-R, PAC-S]
- (KB57605) A problem has been corrected where bank read and write commands on I/O units using standard (4 channel) digital modules returned incorrect data when modules were installed in positions 8 through 15.

- (KB57617) A problem has been corrected where the Set Analog Filter Weight command had no affect.

Version R8.0c
May 15, 2007

Bug Fixes

PAC-R, PAC-EB

- (KB54562) Corrected a problem with the PAC Control Ramp Analog Output command; if the ramp's endpoints were set outside the range of the analog output module, the analog output did not function correctly. The next Move command to the output caused the output to ramp to the position of the prior Ramp Analog Output command.

- (KB57251) Corrected a problem where only communication watchdogs configured on digital output points in the first position of a mounting rack would work. Watchdogs on digital output points in any other position on the rack would not respond.

PAC-R, PAC-S

- (KB57162) Corrected a problem whee outgoing TCP communications through PPP sometimes failed with some Outgoing PPP configurations. For example, if Specify Local IP Address was enabled for outgoing PPP and Set Default Gateway to PPP was not enabled for outgoing PPP, if the remote server negotiated an IP

address that was not on the same subnet as that specified by Local IP Address
for PPP Interface and Local subnet mask for PPP Interface, then packets
destined for the remote device on the specified subnet could be dropped.

PAC-S

- (KB56949) A problem has been corrected where the DTR signal on the SNAP-PAC-
  S1's serial Port 0 was asserted at power up. As a result, if a modem was
  connected to this port, the data received by the control engine was sometimes
  incomplete.

PAC-EB

- (KB57271) EB2 only. A problem has been corrected where event messaging did not
  work on the SNAP-PAC-EB2. This included streaming, e-mail, serial module,
  SNMP, and MemMap Copy Destination.

Version R8.0b
Apr 20, 2007

Bug Fixes

PAC-S, PAC-R

- (KB56600) A problem has been corrected where if the PAC Control and ioControl
  Move Numeric Table To I/O Unit command was sent to an Ethernet-based I/O unit,
  the controller performed a write to the unit's analog points, even if the unit
  was disabled. If the I/O unit was online, this could cause the unit's analog
  output values to change unexpectedly.

- (KB56657) A problem has been corrected where multiple controllers could stop
  communicating after an intense burst of general broadcast traffic on the
  Ethernet network. Disconnecting and reconnecting the Ethernet cables attached
  to the units restored communication to them.

- (KB56666) A problem has been corrected where two or more ioControl
  communication file handles used in different charts at the same time could
  cause unexpected results, including a controller reset.

- (KB56787) A problem has been corrected where the PAC Control
  MoveIoUnitToNumTable script command read the state of all of the modules and
  points, but then attempted write to the wrong index locations in the
  destination table, possibly resulting in lost data.

- (KB56793) A problem has been corrected where if the Get & Clear On-Latch or
  Get & Clear Off-Latch PAC Control commands were used with a standard digital
  input point, the corresponding IVAL could not be cleared once the latch was
  set.

- (KB57034) A problem has been corrected where if two or more Ethernet
  interfaces (such as a computer and another SNAP-PAC control engine)
  simultaneously attempt to connect to the same TCP port (such as the Host Task
  on TCP port 22001, or OptoMMP on TCP port 2001), the device could reset.

<u>PAC-S</u>

- (KB56419) A problem has been corrected where when the PAC Control Set Mistic PID P Term command was used to set the gain on a Mistic I/O unit's PID loop, the input variable was also set. This could cause unexpected PID results.

<u>PAC-R</u>

- (KB56439) A problem has been corrected where attempts by Modbus/TCP protocol devices and applications to write to digital output points configured on SNAP-PAC-R2 I/O units were unsuccessful even though their states could be read.

Version R8.0a
March 1, 2007

New Features

- (KB56085) There are new get.to/set.to options for setting and getting the timeout values for "ser:" and "tcp:" communication handles.

- (KB53048) 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.

- (KB56073) A hardware change to the SNAP-PAC-R1 unit increases support from 32 to 64 high-speed digital I/O points. The high-speed digital I/O features include:
  · high-speed counting
  · quadrature counting
  · on-pulse and off-pulse measurement
  · TPO
  · pulse generation
  On a 16-position rack such as the SNAP-M64, any position on the rack can support a digital module. Prior to the design change, you could only install a digital module in the first 8 positions of the mounting rack.

  SNAP-PAC-R1 firmware has an auto-detect feature to determine if the I/O unit hardware supports 32 or 64 points of digital I/O. This allows newer firmware to run on any the SNAP-PAC-R1 hardware version.

Bug Fixes

(KB55814) A problem has been corrected where if you clicked on the PIDs folder under an I/O unit, the PIDs wouldn't display, and the I/O unit would go offline.

<u>PAC-S, PAC-R</u>

- (KB51181) A problem has been corrected where the Config EEPROM 'Set' button in PAC Control Debug mode disabled the I/O unit.

- (KB51806) A problem has been corrected where a paused, expired uptimer in PAC Control, evaluated false when used with the conditional command Timer Expired?. Since the timer time had expired, this command should evaluate true.

- (KB51848) A problem has been corrected where writing a table to an Ethernet I/O unit was updating only the IVALs, even if the I/O unit and all its points were enabled.

- (KB53147) A problem has been corrected where PAC Control commands used to transfer data with a FTP communication handle sometimes failed. Using the Send Communication Handle command sometimes returned error -408. Resetting the control engine might temporarily clear the error.

- (KB53614) A problem has been corrected where if the streaming feature was configured to send to multiple stream clients, the synchronization code (an integer whose value is changed each time data is streamed) was incremented between each host instead of after transmitting to all hosts. With this behavior, the client could not detect if stream packets were dropped.

- (KB54363) A problem has been corrected where the ioControl command Generate Reverse CRC-16 on Table (32 bit) might not work when used with SNAP-PAC or Ultimate I/O units.

- (KB54505) A problem has been corrected that resulted when a communication handle in a subroutine was not closed before the subroutine was exited. For each local communication handle opened, but not closed, in a subroutine, an item was left on the data stack. This could eventually result in erratic controller behavior; in some cases, it could cause the controller to reset.

- (KB54846) A problem has been corrected where if a default gateway was configured on the primary Ethernet interface, the secondary interface for communication could not communicate via the secondary interface, even after the secondary interface was reenabled.

- (KB54853) A problem has been corrected where when attempting to read a numeric scratchpad element (for example using GetIoUnitScratchPadInt32Element), or to write a table to numeric scratchpad elements while in a subroutine, a -29 error would be generated, and the value(s) would not be read or written.

- (KB54940) A problem has been corrected where if a pointer table was passed into a subroutine and an element was changed to point to a subroutine variable, the control engine sometimes locked up when the table element was accessed.

- (KB55154) A problem has been corrected where the command Set End-of-Message Terminator did not report an error code (-52) when the communication handle connection was not open.

- (KB55166) A problem has been corrected where the command Set End-of-Message Terminator sometimes caused problems when used with file communication handles if it was set to 0x00 (null). For example, if it was used with the Receive String Table command, the command failed and reported error -44.

- (KB55168) A problem has been corrected where if the command Receive String Table command was used with a communication handle that had no data waiting, the command did not wait for the configured timeout period to expire.

- (KB55848) A problem has been corrected where if an I/O unit was not configured with an address of 0 through 3, the RS-485 serial port on SNAP-PAC-S1, SNAP-PAC-R1, and SNAP-PAC-R2 controllers may not have been properly initialized to communicate to serial I/O units. The serial port alternated between being properly initialized and not being properly initialized.

- (KB55977) A problem has been corrected with receiving data on via a serial communication handle when there are multiple EOM characters in the receive buffer.

- (KB56192) A problem has been corrected where un-initialized (NULL) Pointers to any type of point (Analog/Digital or Input/Output) could cause a reset following a failed assignment.

- (KB56283) A problem with the command Calc CRC on Table has been corrected.

PAC-S

- (KB51837) A problem has been corrected where a SNAP-PAC-R1 I/O unit could not be re-enabled after both the primary and secondary Ethernet ports on a SNAP-PAC-S1 were disabled, and then re-enabled.

- (KB55182) A problem has been corrected where the command IVAL Set I/O Unit from MOMO Masks did not set the IVALs to the specified mask values on a disabled, serial I/O unit.

- (KB55091) A problem has been corrected where Input module IVALs were changed when the ioControl command Set I/O Unit from MOMO Masks was used with a SNAP-PAC-S1 and a serial I/O unit. Digital inputs with IVALs previously in the ON state, were changed to the OFF state. Their corresponding XVALs indicated they were actually ON.

- (KB55236) A problem has been corrected where in a peer-to-peer network with a SNAP-PAC-S1, if the SNAP-PAC-S1 was intentionally stopped, the controller would sometimes reset. If the controller reset from ioControl debug mode, a timeout message would appear.

- (KB55187) A problem has been corrected where a communication handle with a reference to an invalid serial port returned a successful status code when used with a communication handle command on a SNAP-PAC-S1 controller.

- (KB55825) A problem has been corrected where Scratch pad information was not stored to the flash EPROM when instructed to, such as when Store configuration to flash was selected from ioManager or PAC Manager.

- (KB56017) A problem has been corrected where, if the watchdog was enabled on a Mistic I/O unit, that unit might not be fully initialized if the I/O unit returned a watchdog error during configuration. The only way to recover was to cycle power to the I/O unit, which would clear the watchdog error.

<u>PAC-R</u>

- (KB52576) A problem has been corrected where if a point on a SNAP-AIRTD or SNAP-AITM type module was configured as an RTD or thermocouple Point Type, respectively, subsequent point reconfigurations of the same point could produce invalid readings.

- (KB55161) A problem has been corrected where digital inputs configured as counters or quadrature counters on SNAP-PAC-R1s sometimes reported the wrong counter value. The counter value might have temporarily (for one digital scan period) reflected a value that was too high by up to 255 counts.

Versions R7.1h and Earlier

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

http://www.opto22.com/documents/RM_ALL_ENET_fw_71h.pdf