



### CONTENTS

About this Bulletin .....	1
Conquest Firmware Types and Upgrade Methods.....	1
Upgrading Conquest Firmware .....	2
Build R1.7.0.9 (February 2024) .....	3
Build R1.6.0.11 (June 2022) .....	3
Build R1.6.0.4 (December 2021).....	4
Build R1.5.0.4 (June 2020).....	4
Build R1.3.0.3 (May 2019).....	5
Build R1.3.0.0 (February 2019) .....	5
Build R1.2.0.9 (April 2018).....	6
Build R1.1.0.14 (September 2017).....	7
Build R1.1.0.9 (June 2017).....	8
Build R1.1.0.6 (April 2017).....	8
Build R1.1.0.2 (February 2017) .....	8
Build E1.0.0.31 (January 2017).....	9
Build E1.0.0.20 (September 2016) .....	9
Build E1.0.0.10 (June 2016) .....	9
Build E1.0.0.1 (April 2016) .....	10
Build E0.1.0.26 (December 2015) .....	10
Build E0.1.0.23 (October 2015) .....	10

### ABOUT THIS BULLETIN

This technical bulletin lists the history of the firmware (after the initial release) for KMC Conquest controllers and instructions for upgrading the firmware.

### CONQUEST FIRMWARE TYPES AND UPGRADE METHODS

Firmware in Conquest controllers can be upgraded using a physical connection (with an HTO-1105 Kit) or remotely over the network (with software or web pages). A zipped firmware file (downloaded from the KMC Controls web site) contains **two different (“Over-The-Network” or “HTO-1105\_Kit”) versions of firmware for each Conquest model**. Use the correct firmware version for the chosen method:

- Use **KMC Connect** (ver. 1.0.1.9 or later) or **TotalControl** (ver. 4.0 or later) to upgrade the firmware in controllers remotely (after installation on a network or using a BAC-5051AE router as a service tool). Multiple controllers of the same model can be upgraded simultaneously. For this method, use the **over-the-network** version of the model-specific firmware. **See the “Updating firmware” topic in the software help system for more information.** (To use this method, firmware version E0.1.0.23 or later must already be installed in the controller—for earlier versions of installed firmware, use the latest version of the HTO-1105 kit instead.)
- For **Ethernet-enabled “E” models**, a controller’s firmware can be upgraded through that controller’s configuration web pages using the **over-the-network** version of the model-specific firmware. See the [Conquest Ethernet Controller Configuration Web Pages Application Guide](#) for more information.
- The **HTO-1105 Firmware Upgrade Kit** and the **Firmware Upgrade Tool (software)** require a physical connection to the controller with a ribbon cable. For this method, use the standard **HTO-1105** version of the model-specific firmware. See illustrations in [Upgrading Conquest Firmware on page 2](#) and the HTO-1105 documentation.

# UPGRADING CONQUEST FIRMWARE

To download from KMC Controls and **install the correct firmware file onto the computer:**

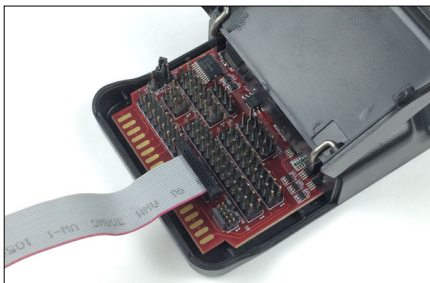
1. Go to a [KMC Conquest controller](https://kmcccontrols.com) product page on [kmcccontrols.com](https://kmcccontrols.com).
2. Log in to see and download the latest zipped firmware file.

**NOTE:** All KMC Conquest **controller** product pages have the same zipped download file.

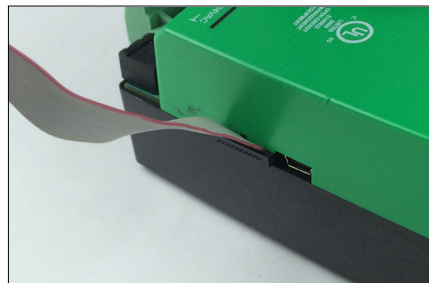
3. Within the zipped file, find and extract the “**Over-The-Network**” or the “**HTO-1105\_Kit**” EXE file of the **relevant model** controller. (See [Conquest Firmware Types and Upgrade Methods on page 1.](#))
4. Double-click the **EXE** file.
5. Click **Yes** to allow Windows to install the program.
6. Click **OK** on the Firmware License dialog box.
7. Click **Unzip** in the WinZip Self-Extractor dialog box.
8. Click **OK** after files are unzipped.
9. Proceed with using an over-the-network method or using the HTO-1105 kit to **download the firmware from the computer into the controller.**

**NOTE:** For more information about using the HTO-1105, see the [Flash Programming Pod and Firmware Upgrade Tool Software Manual](#) PDF file or Help system. For BAC-9300 and BAC-5900 series controllers, temporarily remove the cover and plug the ribbon cable into the 20-pin connector on the left side of the circuit board with the ribbon extending **away** from the board. See the illustrations below.

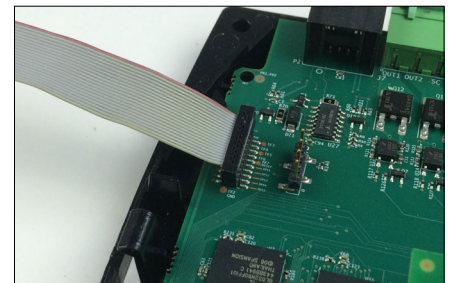
**NOTE:** When using the **HTO-1105 kit**, **temporarily removing** the controller’s **J9 watchdog jumper** from its pins during the firmware upgrade process is recommended to prevent timing errors. The location of the jumper on the BAC-9000 series is on the outside of its cover near the Room Sensor port. The location of the jumper on the BAC-5900 and BAC-9300 series is on the lower part of the board under the cover, near the Ethernet or MS/TP connectors. Reinstall the jumper (on the center and one of the outside pins) for normal operation. When upgrading with the **over-the-network method**, temporarily removing the jumper is **not** necessary.



Ribbon Cable to 20-Pin Connector on Programming Pod



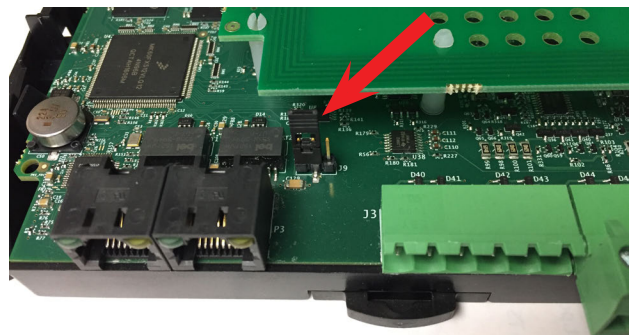
Ribbon Cable to Connector on BAC-90xx



Ribbon Cable to Connector on BAC-93xx or BAC-59xx Board



Watchdog Jumper on BAC-9001CE (Outside Cover)



Watchdog Jumper on BAC-9311CE Board (Under Cover)

## BUILD R1.7.0.9 (FEBRUARY 2024)

### New Features

- Added the AFMS Return Air Damper Pressure Assist application.
- Added configuration web pages to BAC-5901CE-AFMS and BAC-9311CE-AFMS.
- Added support for AFMS pressure assist objects on web pages.
- Added support for property list, message text, and message text config properties.

### Changes/Fixes

- Fixed an issue with leaking memory when reading the Locked Object list, which locked up communication when backing up and restoring .BND files.
- Enabled BACnet Backup and Restore on boards that have locked objects.
- Notification priorities now restore correctly after a cold start.
- Fixed a read\_fw\_property bug that caused Backup and Restore to fail.
- Fixed a bug that allowed the IP Recovery page to come up even on the Default IP address.
- If a device has an address other than the default, connecting to the device using the default—within 35 seconds of booting up—will now display the configured IP address.
- Minimum on/off time now only sets if a change in present value occurred as a result of a relinquish default write, rather than always setting when relinquish default is written.
- When relinquish default writes occur with a null priority array, minimum on/off times are now observed, rather than ignored (which caused a change in present value).
- A monitored object's increment is now used when the Trendlog Client COV increment is null, rather than the Trendlog Client COV always sending notifications for a null increment.
- Fixed how null values are written to the Trendlog Client COV increment.
- Fixed a bug that occasionally caused duplicate **Reset Session Timeout** buttons to display on web pages.
- Fixed an issue with writing Digital Sensor files.
- Limited the configuration web pages use of a browser's cache, ensuring that accurate data is displayed.

## BUILD R1.6.0.11 (JUNE 2022)

### New Features

- Added support for BAC-5901-AFMS and BAC-9311-AFMS controllers.

### Changes/Fixes

- COV (Change of Value) subscriptions are now limited to 200 maximum for 2 MB models and 500 maximum for 4 MB models.
- Objects are now limited to 16 COV subscriptions maximum. (If more are needed, distribute COV subscriptions over additional objects.)
- Various bug fixes and performance enhancements.

## **BUILD R1.6.0.4 (DECEMBER 2021)**

### **New Features**

- Added user activity detection to keep a web page session open if user activity is detected.

### **Changes/Fixes**

- Corrected an issue in which changing IP properties did not always result in a permanent property change.
- Internal change of value properties, such as trend logs, can now be set to properties other than present value.
- Enhanced EnOcean wireless support.
- Improved performance and stability.

## **BUILD R1.5.0.4 (JUNE 2020)**

### **New Features**

- Added support for HPO-9007 series wireless gateways for use with STW-6010, STW-6014, and THW-1102 sensors.
- Added support for the future Conquest BAC-190000 series FlexStat room sensors/controllers.
- Expanded support for NetSensor error codes and error menu.

### **Changes/Fixes**

- Default NetSensor configuration files now include Humidity Offset and CO<sub>2</sub> Offset.
- Default Configurations (Restore slots) now have Digital Sensor objects DS2–DS8 disabled.
- Updated application files.
- Fixed object creation. Now only the maximum number of each type of object supported by that model of controller is allowed to be created.
- Models (BAC-9xxx) not supporting CAN-590x modules no longer reporting comm failure in AO9 and AO10 reliability property.
- Improved performance and stability.
- On Ethernet models, enhanced security of configuration web pages and changed the help page link to direct the user to [kmccontrols.com](http://kmccontrols.com).

## BUILD R1.3.0.3 (MAY 2019)

### Changes/Fixes

**NOTE:** If you are using an **HPO-9001** NetSensor distribution module and multiple NetSensors on a single controller, do **NOT** upgrade that controller to this firmware version until **after** you have upgraded to **KMC Connect ver. 1.0.11.7** (or later) or **TotalControl ver. 4.0.5.6** (or later) software. You will need that software to re-enable NetSensors 2 and higher.

- NetSensor objects 2 through 8 in controllers are now disabled by default to enhance communication speed. **IF only one** NetSensor is connected to a controller (without any HPO-9001 distribution module), **no action is required**. **IF using an HPO-9001 with multiple NetSensors**, however, the upgrade will cause **"NO COMM"** errors on the displays of those NetSensors **until the respective NetSensor objects are re-enabled**. To re-enable the needed NetSensor objects, start KMC Connect ver. 1.0.11.6 (or later) or TotalControl ver. 4.0.5.6 (or later), open a needed NetSensor object, check the **Enabled** box in the Settings section of the General tab, and click **Save Changes**. Repeat for each needed NetSensor object.
- Fixed problems with creating or editing MSV objects. A user could not enter or change the MSV's state text or other properties.
- Fixed problems with restoring a BND file to a controller. The restore process would time out.
- CAN-5901 and CAN-5902 I/O expansion modules were blinking the EIO communication status LED only when **transmitting** data (status, output refreshes, and input configuration writes) and not when receiving traffic. CAN-5902s (which only have inputs) would blink the LED less. Now both transmitting and receiving traffic on both types of modules trigger the LED blinks.
- Added additional NetSensor error codes. **No action is required for occasional error codes**. If codes occur frequently or continuously, contact KMC Technical Support if the issue cannot be resolved.
- Made other miscellaneous performance enhancements.

## BUILD R1.3.0.0 (FEBRUARY 2019)

### Changes/Fixes

- Enhanced support of the HPO-9001 NetSensor distribution board.
- Made NetSensor communication and update improvements.
- Over-the-network firmware upgrading now checks to make sure the firmware that is being downloaded is actually for the specific model of this board (verifies customer ID and model).
- Fixed the NFC Erase function.
- Changed how Niagara Compatibility Mode is processed to improve performance. Old code checked **every** property on every property read to see if was supported **and** affected by Niagara Compatibility before deciding to process as normal. New code only runs the Niagara Compatibility process for EventState and StatusFlags properties.
- Fixed an issue where Active COV subscriptions for devices on the same network as the controller would not appear in the device's Active-COV-Subscriptions property.
- Changed some aspects of Control Basic processing to increase performance.
- Made other minor performance enhancements.

## BUILD R1.2.0.9 (APRIL 2018)

### New Features

- Added support for the **expanded memory in BAC-5900 series** general purpose controllers (which started shipping in May 2018). Memory went from 2 to 4 MBs and supported a larger maximum number of objects (e.g., from 42 to 106 physical/virtual inputs, see the chart below). Configuration allows creation and deletion of objects.

BAC-5900 SERIES OBJECTS	MAXIMUM # (OLD 2 MB)	MAXIMUM # (NEW 4 MB)
<b>Inputs and Outputs</b>		
Analog, binary, or accumulator input	42	106
Analog or binary output	40	40
<b>Values</b>		
Analog value	120	300
Binary value	80	300
Multi-state value	40	100
<b>Program and Control</b>		
Program (Control Basic)	10	30
PID loop	10	50
<b>Schedules</b>		
Schedule	2	20
Calendar	1	10
<b>Logs</b>		
Trend log	20	40
Trend log multiple	4	20
<b>Alarms and Events</b>		
Notification class	5	20
Event enrollment	40	100
<b>Tables</b>		
Input tables	4	20
Control Basic tables	4	20

- Added support for the new **CAN-5902 expansion module** with 16 inputs (and no outputs). Up to four CAN-5901/5902 I/O expansion modules can be added to provide up to 74 physical (Room Sensor port and terminal block) inputs and up to 40 outputs.
- Added new **Control Basic ISSTRING key word** used to see if a value is a string. This can be used to test a remote read of a string property returning a NAN (Not A Number) the first time a read is attempted. If this value is then written to a string property, it can cause the program to halt. (Using this feature requires KMC Connect ver. 1.0.10.4, TotalControl ver. 4.0.4.4, or KMC Converge ver. 4.3.1.36 or later.)
- Added **Niagara Compatibility mode**:
  - In Niagara Compatibility mode, when the controller receives a BACnet write with a non-NULL value and no priority, it will write the value to the relinquish default only. It will not write to priority 16.
  - In Niagara Compatibility mode, a write with a value of NULL and no priority will be acknowledged (Simple ACK) and the controller will drop the write (relinquish default will remain unchanged). Nothing will happen with priority 16.



- In Niagara Compatibility mode, if a user wants to write to or relinquish priority 16, the writes must specify priority 16.

## Changes/Fixes

- On Ethernet models web pages, updated colors, style, and error handling. Previously, if a web page was not there, the connection timed out. Now an error is reported, and error pages link back to the index. Also fixed submit button issues.
- For expansion modules, fixed accumulators that were not accumulating and some input bias resistor settings that were being configured incorrectly.
- Fixed a problem with integer division that caused the result to always be 0.
- For COV notification and subscriptions, fixed Control Basic COV notification issue where COV increment was always treated as 0.
- Changed the Control Basic task watchdog from 10 to 60 seconds, allowing more time to complete running or enter a wait state before the controller will be reset because the program timed out. A wait statement can be used to reset the count (0:00:00 will allow other programs to run and get back to this one as soon as possible).
- Made NetSensor communication improvements.
- Made other minor performance enhancements.

## BUILD R1.1.0.14 (SEPTEMBER 2017)

### New Features

- Changing the base application now clears passwords to their factory defaults.
- Ready LED now blinks in a pattern while (re)starting or accessing NFC. After controller start or restart, the green Ready LED shows three rapid flashes, a pause, three rapid flashes, a pause, then is on solid until boot-up is complete. Then, during normal operation, the Ready LED has a one-second blink rate. When the controller is accessing NFC, the Ready LED shows a rapid flash.
- STE-9xxx NetSensor model information is now reported in the Detected Sensor field of the NetSensor object (for NetSensors that were programmed in the factory with firmware versions 5.0.0.1 and later). On prior versions, "Unknown" is displayed.

### Changes/Fixes

Various performance enhancements and bug fixes, including fixing the following issues:

- STE-9xxx NetSensor sometimes momentarily showed extreme temperature readings.
- Rolling back firmware to a previous version (using the over-the-network upgrade process) could render the controller inoperative. (See the **Rolling Back KMC Conquest Firmware Technical Bulletin** for more information.) Firmware version R1.1.0.14 fixes the problem for **future** firmware versions. (Future versions will be able to roll back to R1.1.0.14 or anything in between.) However, rolling back to any version prior to R1.1.0.14 may still (but is less likely now) render the controller inoperative. (Generally speaking, all KMC Conquest controllers should have the most recent firmware available and not be rolled back even if their firmware is not the same as firmware in other controllers on the network.)
- Controllers with the on-board pressure sensor could sometimes become unresponsive after a system restart.
- BACnet backup was failing if NFC was disabled.
- BACnet restore was not correctly restoring the Device Object configuration.

## BUILD R1.1.0.9 (JUNE 2017)

### Changes/Fixes

- Various bug fixes and performance enhancements.

## BUILD R1.1.0.6 (APRIL 2017)

### New Features

- Demand control ventilation (**DCV**) is available when an economizer is enabled in BAC-93xx HPU or RTU applications and an STE-93x1/95x1 NetSensor is connected to the Room Sensor port. DCV is disabled by default (under **CO<sub>2</sub>** in the NetSensor **System** menu or BV29).
- CO<sub>2</sub> Setpoint (800 ppm default)—the value at which DCV control of the economizer damper position begins (under **CO** in the NetSensor **Setpoint** menu or AV59).
- CO<sub>2</sub> Range (200 ppm default)—proportionally controls the economizer damper position for a given CO<sub>2</sub> reading above the setpoint (under **CORA** in the NetSensor **Setpoint** menu or AV58). At the bottom of the range, the damper is at the minimum position (assuming there is no other demand on the economizer). At the top of the range, the damper opens to the maximum value. For example, with the defaults and no other ventilation demand, the damper position would be at its minimum for a CO<sub>2</sub> reading of 800 ppm and at its maximum for a CO<sub>2</sub> reading of 1000 ppm or higher.
- For the BAC-9311, a variable-speed fan output (AO10) was added to RTU applications with AV35 as FAN\_MAXIMUM and AV36 as FAN\_MINIMUM.

### Changes/Fixes

- BAC-9311 RTU application—added a CO<sub>2</sub> sequence and a variable speed fan and configured the objects LOOP5, LOOP6, LOOP7, AV33, AV34, AV35, AV36, AV37, AV58, AV59, and BV29.
- BAC-9311 HPU application—added a CO<sub>2</sub> sequence and configured objects LOOP6, LOOP7, AV58, AV59, and BV29.
- BAC-9301 RTU and HPU applications—added a CO<sub>2</sub> sequence and configured objects LOOP6, LOOP7, AV58, AV59, and BV29.
- BAC-9301 4-Pipe FCU application—added a routine to use BI6 for Fan Status and configure BI6 for Fan.
- BAC-9301 2-Pipe FCU application—added a routine to use BI7 for Fan Status and configure BI7 for Fan.
- Fixed AV6 object name in BAC-9300 series RTU and HPU applications.
- Various bug fixes and performance enhancements.

## BUILD R1.1.0.2 (FEBRUARY 2017)

### New Features

- BTL approved.

### Changes/Fixes

- Updated the applications.
- Various bug fixes and performance enhancements.



## **BUILD E1.0.0.31 (JANUARY 2017)**

### **New Features (on Internal Configuration Web Pages for Ethernet Models Only)**

- Added an Ethernet MAC address field to the page.
- Added web page inactivity timeout timer and button to restart the timer. The button appears (in the upper right corner) and flashes two minutes before the end of the timeout period. The timeout period is one hour after last logging in, clicking a Save or Refresh button, or selecting a different page.
- On page login, the controller checks for firmware upgrade (initiated via the web page) that is waiting for a commit, and, if true, prompts for a commit update. It also checks for a committed firmware update pending, and, if true, prompts to restart the controller.

### **New Features (for All Models)**

- Added the ability to disable/enable NFC via a proprietary property in the Device object (using KMC Connect, Converge, or TotalControl). Disabling NFC prevents the reading and updating of configuration data in the controller through NFC. NFC should only be disabled after the controller has been installed.
- Align\_Intervals and Interval\_Offset properties are now available for Trend Log and Trend Log Multiple objects. Align Intervals adjusts the point sampling time to the next “even” clock interval. Interval Offset provides manual adjustment of the sampling time interval (by hundredths of a second).

### **Changes/Fixes**

- On Ethernet models, fixed issues with upgrading firmware via the internal Firmware web page.
- Fixed issue with creating BI/BO objects that caused the controller to reset.
- Fixed issue with a controller reporting that an object already exists when re-attempting to create object after a create object failed.
- BAC-9001 and BAC-9311 metric applications now have Flow Sensor units of Pascals instead of Inches of Water.
- Updated the applications.

## **BUILD E1.0.0.20 (SEPTEMBER 2016)**

### **Changes/Fixes**

- Updated the applications.
- Changed “Available Fan Spds” from MSV4 to MSV11 to match new applications for BAC-9301x FCU.
- Various bug fixes and performance enhancements.

## **BUILD E1.0.0.10 (JUNE 2016)**

### **New Features**

- Added enhanced web configuration pages to Conquest Ethernet-enabled “E” models, which can now be configured with an HTML5-compatible web browser. (The default controller IP address is 192.168.1.251.) See the [Conquest Ethernet Controller Configuration Web Pages Application Guide](#) for more information.

### **Changes/Fixes**

- Various bug fixes and performance enhancements.

## **BUILD E1.0.0.1 (APRIL 2016)**

### **Changes/Fixes**

- Increased the maximum number of Event Enrollment objects.
- Enabled Trend log data to persist through a restart.
- Added support for ninth analog input on BAC-9311s.
- Various bug fixes and performance enhancements.

## **BUILD E0.1.0.26 (DECEMBER 2015)**

### **Changes/Fixes**

- Fixed IP configuration issues for Ethernet models when using KMC Connect Lite.
- Various bug fixes and performance enhancements.

## **BUILD E0.1.0.23 (OCTOBER 2015)**

### **New Features**

- Enabled firmware upgrades over the network.

### **Changes/Fixes**

- Various bug fixes and performance enhancements.