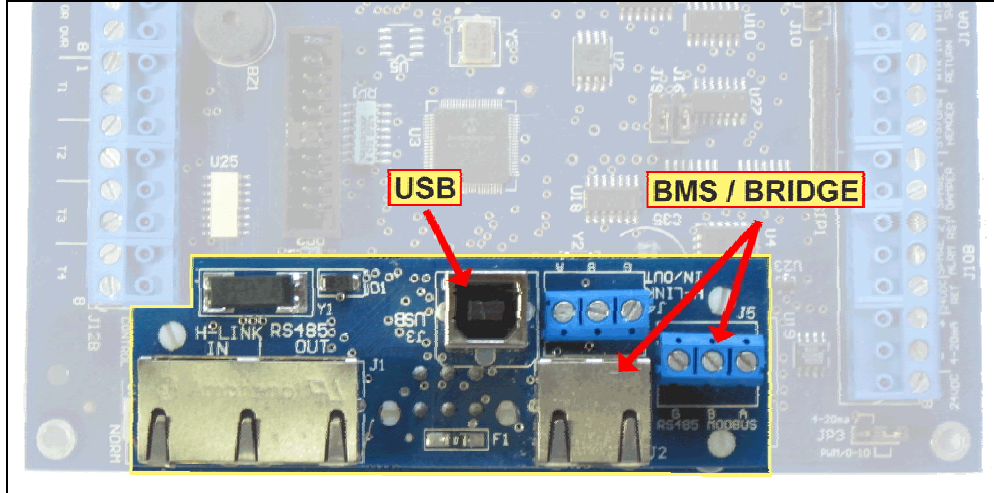


## I) Updating Firmware using a computer and USB Cable *HeatNet Boards with plug-in Communication Ports.*



**Figure 1: Plug-in USB communications port.**

The following HeatNet controls require a plug-in communications board (Figure 1) to provide the communications and USB ports:

- R1.x versions on the KHNHNET/KNHLNK control boards.
- KN2, KN4, and rAy control boards.



**Figure 2: USB Type-A to Type-B cable**

**Note: Firmware updates are done using the Modbus/USB port. The port is often used by Building Management Systems (BMS) and BACnet or LonWorks bridges. In order to do a firmware update, any other connections to the port must be removed.**

The USB port on this board is powered from the attached USB cable so whenever a computer is plugged in, the USB port will be available. The following steps are required to update the firmware:

- 1) Remove any connections to the BMS/BRIDGE ports (see Figure 1).
- 2) Connect the computer to the control using a Type-A to Type-B USB cable (see Figure 2).
- 3) If the control is already in the firmware update (bootloader mode), go to step 5. In the firmware update mode, when powered, the control will “boot” to a blank screen.
- 4) Under the “ADVANCED->SYSTEM” menu, select “LOAD FIRMWARE”. Select “YES” twice.
- 5) Start the “HeatNet Firmware Update” Program.

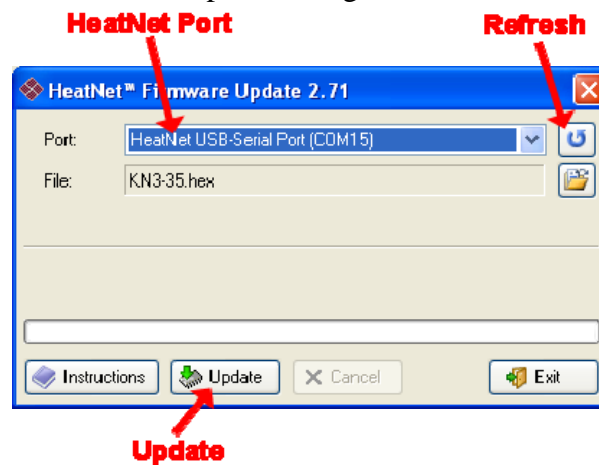


Figure 3: HeatNet Firmware Update

- 6) Select the correct port. The port must indicate that it is a HeatNet port. If a HeatNet port is not available, Try unplugging and re-plugging the USB cable and press the “Refresh” button. If you cannot get a HeatNet port to show up in the list after several attempts, please contact Technical Support.
- 7) Press the “Update” button.



Figure 4: HeatNet Firmware Update - Starting Update

- 8) Reset the control by turning the power off/on. The update should start within 15 seconds (see Figure 5). If it does not try repeating the power off/on several times. If it still does not start the update, please contact Technical Support.

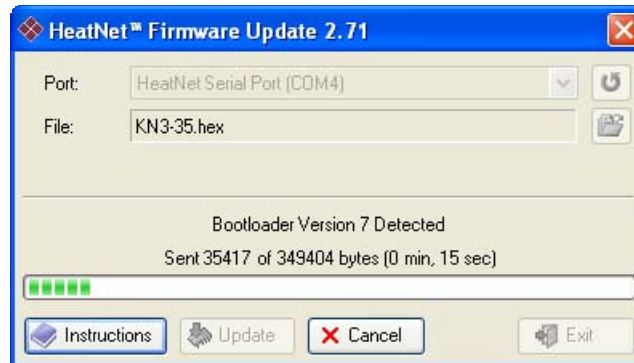


Figure 5: HeatNet Firmware Update - Updating

## HeatNet Boards with built-in Communication Ports

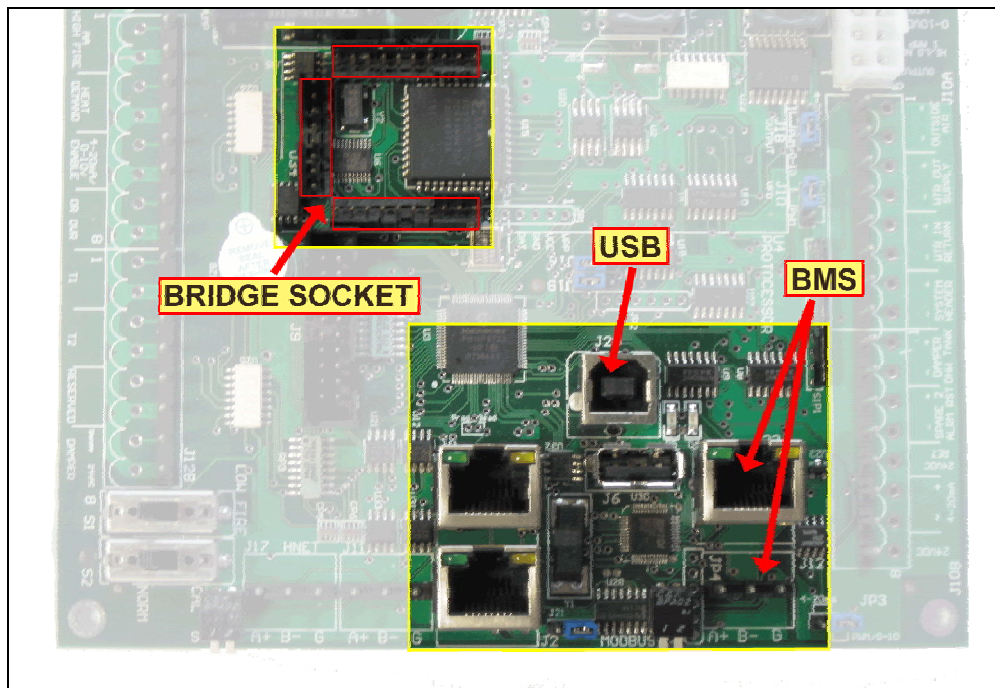


Figure 6: Built-in USB communications port.

The following HeatNet controls have built-in (Figure 6) communications and USB ports:

- R2.x version of the KHNHNET/KNHLNK control boards.

**Note: Firmware updates are done using the Modbus/USB port. The port is often used by Building Management Systems (BMS) and BACnet or LonWorks bridges.**

**In order to do a firmware update, any other connections to the port must be removed.**

The USB port on this board is powered from the control board. If the board loses power, the USB port will “disappear”. The drivers have two components, the USB port, and a serial port “wrapper” around the USB port. If the serial port is open by any program and the board is power cycled, the computer operating system will automatically remove the USB port. When this happens, the serial port must be closed and re-opened to re-establish the serial-USB connection. This changes the sequence of events required to get the update started on a board with built-in communications ports. The required steps are listed below:

- 1) Remove any connections to the BMS ports (see Figure 6).
- 2) Remove any BACnet or LonWorks bridges installed in the “bridge” socket (see Figure 6). **TO PREVENT POSSIBLE DAMAGE TO THE BRIDGE, TURN OFF POWER BEFORE REMOVING OR RE-INSTALLING.**
- 3) Connect the computer to the control using a USB cable (Type A to Type B).
- 4) Start the “HeatNet Firmware Update” Program.
- 5) If the control is already in the firmware update (bootloader) mode, go to step 3. In the firmware update mode, when powered, the control will “boot” to a blank screen.
- 6) Under the “ADVANCED->SYSTEM” menu, select “LOAD FIRMWARE”. Select “YES” twice. If prompted for the “SOURCE”, select “USB CABLE”.
- 7) Repeat the following sequence until a HeatNet port can be selected. If the computer cannot detect a HeatNet port after several attempts, please contact Technical Support.
  - a. If the HeatNet Firmware update program is in the “Starting Update” state (Figure 4) press cancel.
  - b. Power cycle the control. If the computer has sound, wait for the “sound” indicating that a USB device has been installed otherwise, wait about 10 seconds.
  - c. Press the “Refresh” button (Figure 3).
  - d. Select the port (Figure 3). The port must indicate that it is a HeatNet port.
- 8) Press the “Update” button. The download should begin automatically within 15 seconds. If it does not, try steps 7 a few more times. If the update still does not start, please contact Technical Support.

## II) Updating Firmware using a USB Flash Drive

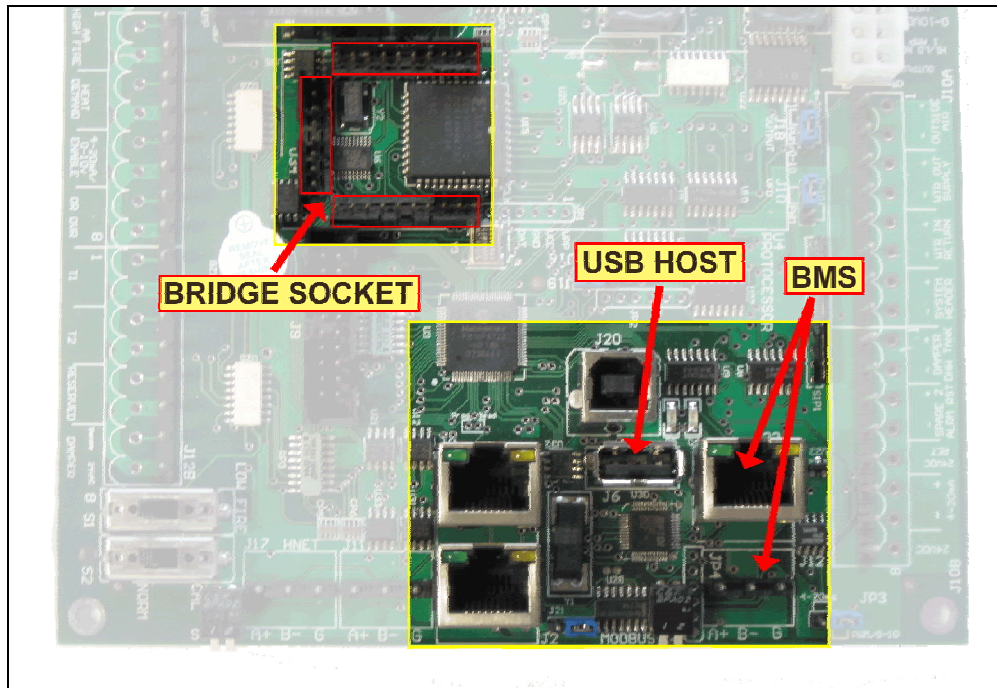


Figure 7: Built-in USB Host communications port.

HeatNet controls with built-in communication ports (Figure 7) have a USB host port. The host port can be used to update the firmware from a USB flash drive that containing the firmware (.hex) files.

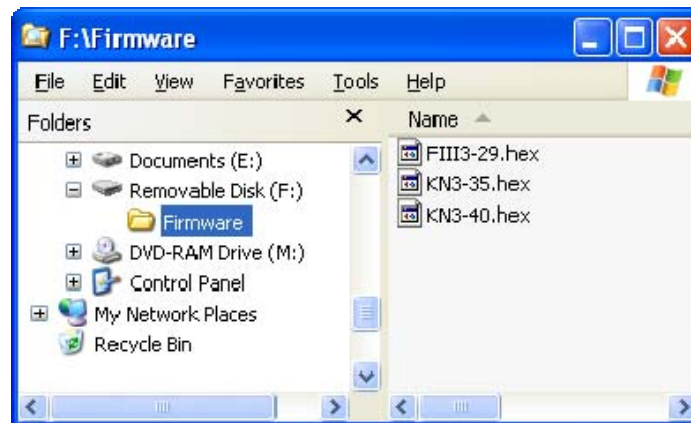


Figure 8: USB Flash Drive

The embedded computer on the control has very limited resources (code and memory space). For this reason, the following strict requirements must be met to help ensure compatibility with the USB flash drive and its file structure:

- Only official “USB Certified” flash drives are fully supported.
- The drive must be formatted as FAT-16 or FAT-32 and have a 512-byte sector. Most flash drives have a 512-byte sector.
- There must be a root sub-directory called “Firmware” that contains less than 10 .hex files that follow an <8 character filename>.hex naming convention. The “Firmware” directory should have no subdirectories and should not contain any other file types. You can have any number of other directories and files elsewhere on the drive.

The best way to know for sure if your drive will work is to test it on a working control before trying it at a job site. If you have trouble finding a drive that works, please contact technical support and we will recommend one. SanDisk is a brand that almost always seems to work with the HeatNet hardware.





**Figure 9: Flash Drive Directory Structure**

In addition to a board with a built-in USB Host port, Flash Drive updates are only available on boards with firmware support:

- 1) KN Series version 3.33 (or greater).
- 2) FIII Series version 3.27 (or greater).

**Note: Firmware updates are done using the Modbus/USB port. The port is often used by Building Management Systems (BMS) and BACnet or LonWorks bridges. In order to do a firmware update, any other connections to the port must be removed.**

The following steps are required to update the firmware. **DO NOT POWER CYCLE THE CONTROL AT ANY TIME AFTER STEP 4 IN THIS SEQUENCE.** If a reset occurs after step 4, but before the new firmware is completely loaded, the control will automatically try to load the firmware again up to 3 times. After the third failure, the control will automatically put itself in “bootloader” mode and it will be necessary to use the “HeatNet Firmware Update” application and a USB cable to update the firmware. For this reason, we recommend that you always bring a laptop with the “HeatNet Firmware Update” application installed and USB cable as a backup.

- 1) Remove any connections to the BMS ports.
- 2) Remove any bridges installed in the “Bridge” socket. **TO PREVENT POSSIBLE DAMAGE TO THE BRIDGE, TURN OFF POWER BEFORE REMOVING OR RE-INSTALLING.**
- 3) Under the “ADVANCED->SYSTEM” menu, select “LOAD FIRMWARE”. Select “YES” twice. If prompted for the “SOURCE”, select “USB DRIVE”.
- 4) If there is a USB cable plugged into the control, remove it. Press “Select” to continue.
- 5) When prompted, insert the USB drive. Press select to continue.
- 6) When prompted, choose a file by using the “Up” and “Down” keys. Press select to continue.
- 7) The control will display: “LOADING:” followed by the number of bytes that have been loaded. At this point, the firmware is being moved from the flash drive into an on board “flash memory” chip. **AT THIS POINT, DO NOT REMOVE THE FLASH DRIVE OR POWER CYCLE THE BOILER UNTIL STEPS 8 - 10 ARE COMPLETE AND THE NEW FIRMWARE IS RUNNING.**
- 8) When the file is completely loaded, the control will start to beep rapidly. This indicates the current firmware is being erased. 
- 9) After the current firmware is erased, the control will begin to emit an alternating series of “chirps” followed by a short silence. This indicates that the new firmware is being loaded. 
- 10) After the new firmware is completely loaded, the control will automatically reset and start running the new firmware.