

# Updating the Loader on a SNAP Device

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## About the Loader

All SNAP PAC controllers and brains contain both firmware and a loader. The loader is the more fundamental of these two. It's a small software program that's built into the device and stored in a special area of the flash memory. The loader makes it possible to install new firmware.

## About Loader Updates

While firmware is changed to add new functions to the controller or brain, the loader usually remains static. In rare cases, however, the loader must also be updated to take advantage of new features. For example, use of the Secure Strategy Distribution (SSD) for PAC Control strategies requires a loader version of R4.0b or higher on the controller; the use of certain microSD card functions requires 6.0a or higher; the use of microSDHC cards requires 6.1a or higher.

This technical note shows you how to update the loader on a SNAP PAC controller or brain. If you don't want to update the loader yourself, you can send the controller or brain to us on RMA (return merchandise authorization) and let the Opto 22 Repair Department update it. To arrange for an RMA, call Product Support first—see [“For Help” on page 2](#).

*CAUTION: Normally this procedure will work fine, but there's a chance that something might go wrong during the loader update, leaving the controller unable to boot up. If that happens, the controller won't work and you'll need to send it to us on RMA to restore the loader.*

*If the controller is performing critical functions and you cannot afford downtime, we recommend you update the loader and firmware on a spare controller first, so you can use it as a backup if necessary.*

## Effect of Loader Update on Data in the Device

When you update the loader on a controller or brain, the firmware, user files, Scratch Pad data, and I/O point configurations (PIDs, events & reactions, scaling, and so on) that have been saved to flash memory remain intact. IP address data, a strategy saved to flash memory, and persistent variables are also preserved. Any data in volatile memory is lost.

## Requirements

This technical note applies to SNAP PAC S-series and R-series controllers and SNAP PAC EB and SB brains. In addition to the controller or brain, you need to have the following:

- A computer with a static IP address, plus:
  - For a SNAP PAC controller—Ethernet crossover cable
  - For a SNAP PAC EB brain—standard Ethernet cable
  - For a SNAP PAC SB brain—Ethernet crossover cable via a SNAP PAC controller with no strategy running **or** a serial cable via a PCI-AC48 adapter card
- PAC Manager software (used to assign IP addresses and probably already on your computer; also available for download from our website at [www.opto22.com](http://www.opto22.com))
- New loader file from the [Opto 22 website](#) or Product Support
- (Recommended) Uninterruptible power supply (UPS) for the PC and the controller or brain. It's important to make sure that nothing interrupts the loader update process, so power to the computer and the SNAP-PAC unit must be steady.

## For Help

To obtain a new loader file that is not available on the [Opto 22 website](#), to arrange for an RMA, or to ask questions about updating the loader, please contact Product Support.

**Phone:** 800-TEK-OPTO  
(800-835-6786)  
951-695-3080  
(Hours are Monday  
through Friday,  
7 a.m. to 5 p.m. Pacific  
Time)

*NOTE: Email messages and phone  
calls to Opto 22 Product Support  
are grouped together and  
answered in the order received.*

**Fax:** 951-695-3017

**Email:** [support@opto22.com](mailto:support@opto22.com)

**Opto 22 website:** [www.opto22.com](http://www.opto22.com)

## Determining Current Loader Version

To make sure you need the new loader version, you can determine the current version using PAC Manager. The controller or brain must be on the same network as the PC, and you must know the device's IP address.

1. Choose Start→Programs→Opto 22→PAC Project→PAC Manager.
2. In the main window, click the Inspect icon  or choose Tools→Inspect.
3. In the Inspect window, enter the IP address of the controller or brain, or choose it from the dropdown list. Click Status Read.
4. Read down until you see the loader version.

## Updating the Loader

### Step 1: Attach the Ethernet Cable

1. Make sure you have the following before beginning:
  - The static IP address and subnet of the computer with PAC Manager installed
  - New loader file from the [Opto 22 website](#) or Product Support
  - For an SB brain only, its serial address and settings
2. Attach the PC with PAC Manager to the controller or brain.
  - For a SNAP PAC controller, use a direct connection (not a networked connection) via an Ethernet crossover cable.
  - For a SNAP PAC EB brain, use a direct connection (not a networked connection) via any Ethernet cable.
  - For a SNAP PAC SB brain, connect through the S-series controller (strategy must NOT be running), or connect directly from the PC using a serial cable and a PCI-AC48 adapter card. (For more information on connections, see the *SNAP PAC Brain User's Guide*, form #1690.)

### Step 2: Reset the Controller or Brain in Failsafe Bootloader Mode

*CAUTION: On an S-series controller, do not turn power on while holding down the Reset button. Doing so will turn off the backup battery, losing the contents of battery-backed RAM (persistent variables) and stopping the real-time clock.*

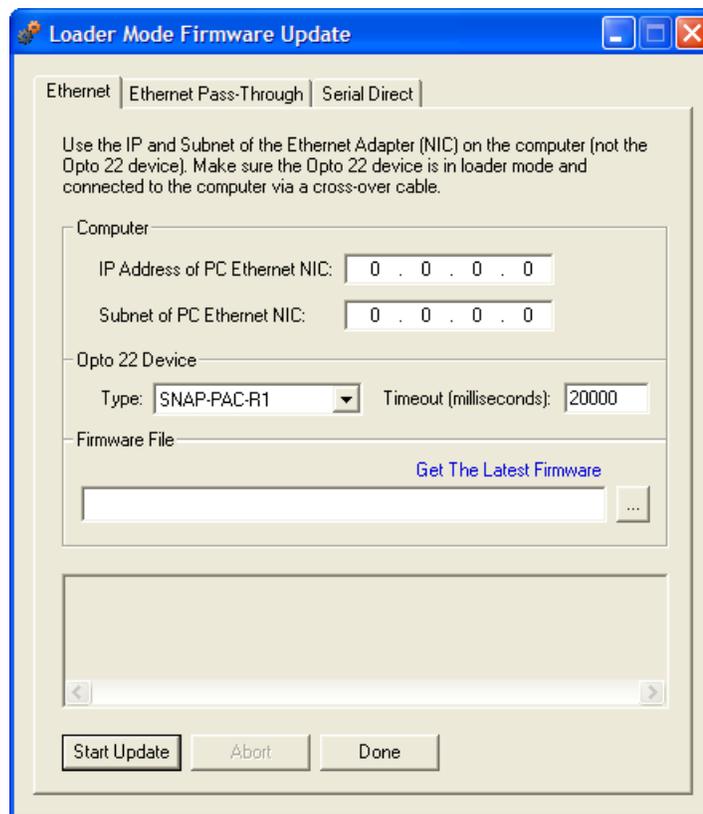
1. If the device has a microSD card installed, remove it.
2. With power on, carefully insert a straightened paperclip or stiff wire into the small hole labeled RESET on the top of the controller or brain.

3. Press and hold down the RESET button just until the STAT LED turns solid green and then starts blinking; then release the button **immediately**.

*CAUTION: Do not hold the RESET button too long! If you hold it down longer than five seconds, the device will enter hardware test mode, which is indicated by the STAT LED blinking orange, rapidly and continuously. Hardware test mode erases all files in RAM and flash memory and resets the IP address. If your device restarts in hardware test mode, cycle power to restore the factory default settings, reset the IP address and subnet mask, and then try again.*

### Step 3: Install the New Loader

1. Choose Start→Programs→Opto 22→PAC Project Software→PAC Manager.
2. In the PAC Manager main window, from the Tools menu, choose Install Firmware via Failsafe Bootloader Mode. Click OK at the message about products it can be used with.



3. Choose one:
  - For a SNAP PAC controller or EB brain, click the Ethernet tab and continue with [step 4](#).
  - For an SB brain, if you're connecting to the brain through the S-series controller, click the Ethernet Pass-Through tab and skip to [step 5](#).

- For an SB brain, if you're connecting serially from the PC to the brain, click the Serial Direct tab and skip to [step 6](#).
- 4. For a controller or EB brain, enter the IP address and subnet *of the PC* (not the controller or brain). Choose the controller's or brain's device type from the drop-down list. Skip to [step 7](#).
- 5. For an SB brain using Ethernet Pass-Through, do the following:
  - In the Controller section, enter the IP address of the controller. Leave the Port at 2001 unless you have changed it. Choose the serial port on the controller that the brain is connected to, and make sure the baud rate matches that on the brain.
  - In the Opto 22 device section, choose the type of SB brain and enter its serial address. Skip to [step 7](#).
- 6. For an SB brain using Serial Direct, do the following:
  - In the Computer section, choose the COM port the brain is connected to. Make sure the baud rate matches that on the brain.
  - In the Opto 22 device section, choose the type of SB brain and enter its serial address. Go on to [step 7](#).
- 7. Click the browse button  and locate the loader file. Make sure you have the correct file for your part number. Double-click the loader's filename.  
The path and filename appear in the Filename field.
- 8. When all the fields are correct, click Start Update.
- 9. If a message appears saying that the Firmware File may not be compatible with the Device Type, click Yes to continue.  
Progress is shown in the lower part of the window. When the process is complete, either repeat from [step 4](#) for another device, or click Done.

## What's Next?

The device now has the new loader installed. If new firmware is also required, follow the steps in the [PAC Manager User's Guide](#) (form #1704) to load it.

**IMPORTANT:** If you are installing new firmware on a controller, archive your strategy to your computer first. Remember that a PAC Control strategy that was saved to flash memory using older firmware will not run after the new firmware is installed. With few exceptions, firmware versions for the controller and the strategy must match to avoid conflicts during strategy operation. For more information, see the [PAC Control User's Guide](#) (form #1700).