

wifi-nSTEP ASCOM ALPACA Setup



What is ASCOM ALPACA?

ASCOM has undergone a rapid transformation from Windows-only to a universal technology. Classic **ASCOM** has been a fundamental cornerstone of astronomy innovation on the Windows platform. Now we have **ASCOM Alpaca**, a new way to accomplish the same things but via network connectivity and on any platform, even embedded controllers. Both **Alpaca** and Classic **ASCOM** seamlessly operate in the background of many of the products you are currently using. Both provide *the same universal language* so that any astronomy app/program can connect to any astronomy device which complies with the **ASCOM** standards. **ASCOM** has become essential through simplification and standardization.

Alpaca provides simple point-to-point **universal connectivity within an observatory** between client applications and devices in the same way that **COM** does in classic **ASCOM**. While it is a **network protocol**, **Alpaca's** design purposely does **not** include device-level hardened security measures that would be needed on the open public or campus internet. Instead it is intended to be used within an **isolated protected in-observatory local network**. This keeps coding minimal, implementations lightweight, and management simple.

Simply stated, **Alpaca** and network security are **separate things**. **Alpaca** does the job of providing apps with device access. Since security is an open-ended topic, combining the two could easily cause a device's astronomy functions to be completely drowned out by its internal security provisions. Keeping them separate also eliminates the need to prove to security personnel the "safety" of the implementations within each device in the observatory, an impractical task for manufacturers of the devices and for observatory managers as well. Finally, device level security means that applications have to become more complex in order to manage every device security scenario, thus more complexity and safety testing/certification.

Placing control apps and devices within a secure envelope offloads the need for security to well known trusted network tools and topologies with the strengths needed by the user. A simple home or club observatory can operate behind a common NAT router with appropriate IP whitelisting and port mapping without practical risks of hacking the devices. A multi-tenant shared observatory might

not be a hostile environment, but if a hostile or bumbling tenant were encountered, it could cause trouble for other tenants. Most remote shared facilities eventually find that they need to use VLANs or tenant VPNs to provide isolation and protection.

Also, **Alpaca** is not designed to provide an entertainment system for providing read-only monitoring of devices. Such a facility would need to use a hub of some sort both to protect the devices from high-demand read accesses, as well as to provide the high-security required for public or campus network access. An example hub would be a multi-homed Apache web server with carefully controlled and *cached* back-end access to the observatory net's control system and devices, plus front end high-security access to the public / campus net.

Alpaca compliant devices such as the **wifi-nSTEP** can be network connected and communicate through **ASCOM's** HTTP/REST **Alpaca** protocol. In the ever-evolving field of astro-photography where fast optics and advanced camera devices are essential, maintaining accurate focus is critical. **Wifi-nSTEP's** built-in web server provides full integration into **Alpaca** that enhances the user experience by providing fast, reliable, and precise focusing of your telescope from an **Alpaca dynamic client** as well as control and monitoring from any device with a web browser such as a smart phone or tablet.

(Note the **wifi-nSTEP** retains its capability to directly connect to a **Windows PC** and with **ASCOM clients** through Microsoft's Component Object Model (**COM**) technology as before.)

Alpaca Dynamic Clients are built right into the **ASCOM Platform** and can be created on demand through the **ASCOM Chooser**. These dynamically created clients:

- Will be configured automatically using information from **Alpaca devices** such as the **wifi-nSTEP** that identify themselves over the network using the **Alpaca** discovery protocol.
- Will attempt to "self heal" by rediscovering an **Alpaca device** if its IP address changes.
- Will discover and communicate with **Alpaca devices** using IPv4 and IPv6

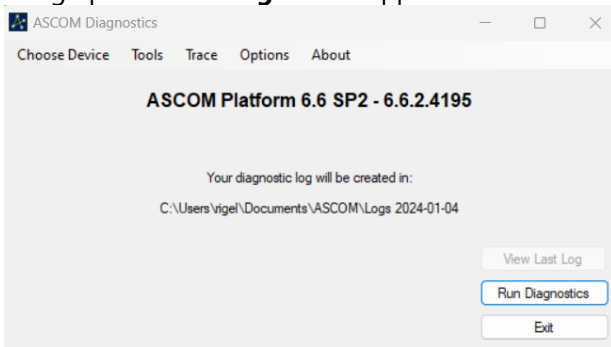
The steps showing how to create and use **Alpaca Dynamic Clients** to communicate with networked **Alpaca** devices like the **wifi-nSTEP** are described on the **Alpaca through the Chooser** web page.

<https://ascom-standards.org/Help/Platform/html/e3870a2f-582a-4ab4-b37f-e9b1c37a2030.htm>

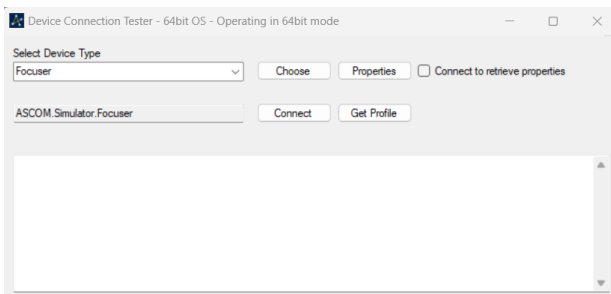
The next section walks through these steps for the **wifi-nSTEP ALPACA** driver.

wifi-nSTEP ASCOM ALPACA Setup

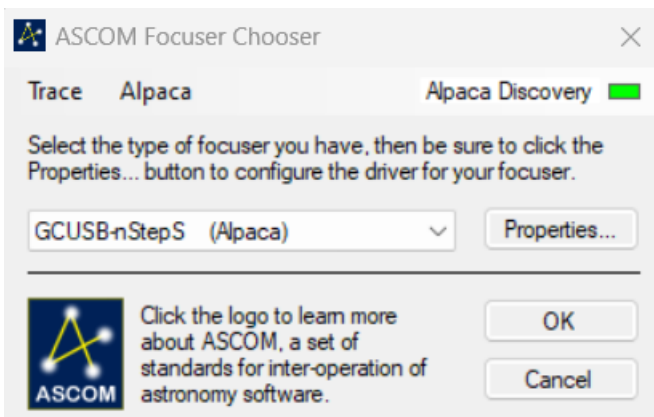
- 1) Bring up **ASCOM Diagnostics** app



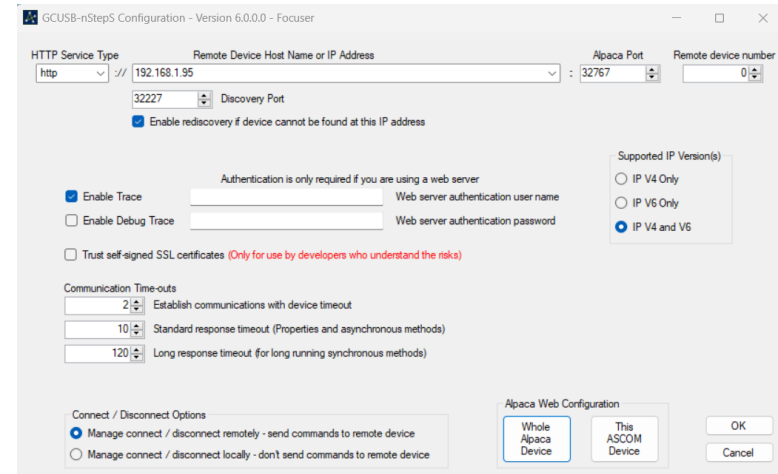
- 2) From **Choose Device** pulldown select **Choose and Connect to Device** and **Device Connection Tester** appears



- 3) From **Select Device Type** pulldown select **Focuser**, press **Choose** and **Ascom Focuser Chooser** screen appears



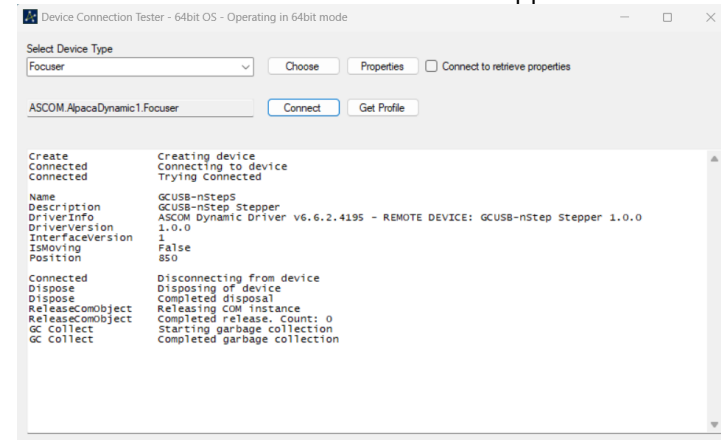
- 4) Under **Alpaca tab**, make sure to **ENABLE DISCOVERY**
- 5) From Pulldown select **GCUSB-nSTEPS (Alpaca)**, Press **Properties** and **GCUSB-nSTEPS Configuration** screen appears.



Check that **Remote Device Host Name or IP Address** is correct for either direct connect to **wifi-nSTEP AP** or your **observatory AP** and configure other driver parameters for your focuser.

If desired, at bottom under **Alpaca Web Configuration** press **This ASCOM Device** to review the **wifi-nSTEP Setup** screen to adjust other parameters. [See following section for full description of wifi-nSTEP Setup screen.](#)

- 6) After checking properties, press **OK** to return to the **ASCOM FOCUSER Chooser** screen. Press **OK** at bottom and **Device Connection Tester** screen reappears.



- 7) Press **Connect** to check **wifi-nSTEP** device connection.

wifi-nSTEP ASCOM ALPACA Setup

wifi-nSTEP Setup

- 1) In your **pc wifi menu**, connect to the **astrogene1000-XXXX** access point using default password **1234567890**
- 2) Go to **SETUP** page **192.168.200.1:32767/setup** in your browser

Astrogene1000 unit setup page

Select focuser type, strongly recommended Absolute
 Relative Absolute

Change Max position, Max Increment and Rate
Enter Max Position :
Enter Max Increment :
Enter Max Rate :

Select stepping type
 Half Wave Full

Select Phase
Forward P0 P1 P2 P0 Default FWD
Reverse P3 P4 P5 P3 Default REV

Select Coils Off/On after move
 Off On

Force set current position
Enter position :

WiFi Access Points Found, wait for list to be filled in
Select one then add the Password below

Force rescan wifi access points
Note: This may take a while, screen will refresh when complete

Enable linking to an external wifi AP
To disable linking to an external wifi AP enter none and none
Enter SID : Password :

Confirmation page will appear then press browser back (-) button
Reboot unit below or unplug/replug to take affect

Get your IP assigned by external wifi AP (if configured and connected)
Press browser back button (-) to return to this page

Configuring the wifi-nSTEP

Select Focuser Type

Relative: Does **NOT** enforce limits on focuser position.

Absolute: **DOES** enforce limits on focuser position – **strongly recommended**

Change Max position, Max Increment and Rate

Enter Max Position: Value is used by the **Absolute Focuser Type**.

Enter Max Increment: Maximum number of “steps” to send to the nSTEP at one time. Generally used to limits the number of “moves” an ASCOM autofocus application can execute during each call to the wifi-nSTEP ASCOM driver.

Enter Max Rate: Sets the duration of a “step”. Valid range is 1-250 ms.

Select Stepping Type

Half Step: Energizes 1 or two coils at a time, doubling step resolution but half the torque.

Wave: Energizes two coils at a time per step normal torque

Full Torque: Highest power mode, two coils always energized.

Select Phase

Forward / Reverse: **Set in factory to P0.** If you desire reverse direction, set to **P3**, often required for SCT/MAK. Also can be used for any possible the phase wirings which allow a user to wire the phases in any order then chose one of 3 normal direction (P0,P1,2P) and 3 reverse settings (P3,P4,P5) settings in software to drive them.

Select Coils Off/On after move

Turning coils **Off** saves power and reduce heating of the stepper motor after a move. Only use **Coils On** to lock stepper after a move with a non-gearhead stepper that may slip lifting heavy after a move.

Set Values

Press to implement above settings.

Force set current position

Enter **position value** and **Press Set new position**. Does **not** move focuser, just sets a new **step count value** for the **current** focuser position.

Connecting to an external wifi AP

Wifi-nSTEP enables its wifi to connect to the external wifi you connect to with your computer and other wifi devices. This has the effect of extending the wifi range for your wifi-nSTEP beyond its 20-30 ft wifi reach.

Wifi Access Points Found

- 1) Within a few seconds, **setup** discovers surrounding wifi access points and adds them to a **pull-down list**.
- 2) Select one of the wifi access points from the **pull-down list** and its **SID** will be populated in the **next step** awaiting entry of **password**.

If necessary, press the gray **Rescan Wifi** to refresh the **pull-down list**.

Enabling connection to an external wifi AP

- 1) Type the **SID** (unless already filled in from **pull-down**) and **Password** of the wifi network you wish the wifi-nSTEP to attach to.
- 2) Press the gray button labeled **"Enter external wifi AP SID and Password"**.
- 3) Confirmation page appears. **Press browser's back (<) button** to return to **setup page**
- 4) Press gray **"Reboot Unit"** button at bottom of page or **unplug/replug** to cause wifi-nSTEP or to reboot.

Get your IP assigned by external wifi AP (if configured and connected)

- 1) In your pc wifi setup screen, connect directly to the **astrogene1000-XXXX** access point.
- 2) Scroll down and press gray button labeled **"Get your assigned IP from external wifi AO (if configured and connected)"**.
- 3) Confirmation page appears with **IP address** your **external wifi AP has assigned** to your wifi-nSTEP
- 4) **WRITE DOWN** that address. If it is **0.0.0.0** it is **NOT** connected.
- 5) **Press your browser's back (<) button** to get back to setup page.

Removing connection to an external wifi AP

- 1) In your pc wifi setup screen, connect directly to the **astrogene1000-XXXX** access point.
- 2) Go to **SETUP** page **192.168.200.1:32767/setup** in your browser
- 3) Scroll down to **"Enable linking to an external wifi AP"**.
- 4) **Blank out both SID and Password**
- 5) Press the gray button labeled **"Enter external wifi AP SID and => 8 Char Password"**.
- 6) Confirmation page appears. **Press your browser's back (<) button** to get back to setup page.
- 7) Press gray **"Reboot Unit"** button at bottom of page or unplug/replug to cause wifi-nSTEP or wifi-nSTEP to reboot.

Confirming IP address assigned by external wifi AP is removed

- 1) In your pc wifi setup screen, connect directly to the **astrogene1000-XXXX** access point
- 2) Go to **SETUP** page **192.168.200.1:32767/setup** in your browser
- 3) Scroll down and press gray button labeled **"Get your assigned IP from external wifi AP (if configured and connected)"**.
- 4) Confirmation page appears with **IP address** of **0.0.0.0**
- 5) **Press your browser's back (<) button** to get back to setup page.

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For more information visit <http://www.rigelsys.com>