FocusLynx WiFi 802.11 Board

Installation Instructions for the FocusLynx 802.11 Wireless Board.

The FocusLynx Wireless Networking Board (WiFi) is an optional accessory for the FocusLynx focuser control hub. The WiFi Board adds 802.11b wireless networking capability to the FocusLynx Hub in addition to the native RS-232 serial and wired Ethernet connectivity. The WiFi board can be used with the iPhone, iPad, or Android smartphone and tablet FocusLynx app to add wireless focusing for handheld devices.

Installation Video

A detailed installation video describing the installation and configuration of the FocusLynx WiFi Option is available for viewing online:
http://video.optecinc.com/view?q=5144c11735033.flv.

Package Contents

The FocusLynx WiFi Kit (Optec stock no. 19535) should include the following items:

- 802.11b Wireless daughter board with a single 6-pin header along the top edge,
- 2.4 Ghz 802.11b wireless antenna with right-angle swivel micro-connector,
- plastic panel mount sleeve (two may be included but only one is required),
- two Philips head cross-tip 4-40 x 0.25" pan head screws,
- 3/32" Allen hex key.

If any items are missing from the package, contact Optec support (support@optecinc.com) for replacement.

Precautions: Static Sensitive Components

Disconnect all power before attempting any work with the FocusLynx Control Hub. Use a grounding wrist strap (if available) to ensure no static discharge can occur when handling the FocusLynx boards and components. Be sure to ground your tools and work area before proceeding.

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#19535 - FocusLynx 802.11 Wireless Board Installation

Installation Procedure: Step-by-Step

Step 1 – Remove Cover

Remove the FocusLynx Hub top cover. Use the included 3/32" hex key to remove four (4) 4-40 socket cap screws. Push out the round plastic plug on the side of the top cover.

Step 2 – Install WiFi Board

Locate the 6-pin socket and two aluminum standoffs near the center of the board. The 6-pin header on the bottom of the WiFi board should be pressed carefully into the socket. The two standoffs should be lined up under the two mounting holes. Screw the two 4-40 pan-head screws in place to secure the board in place.
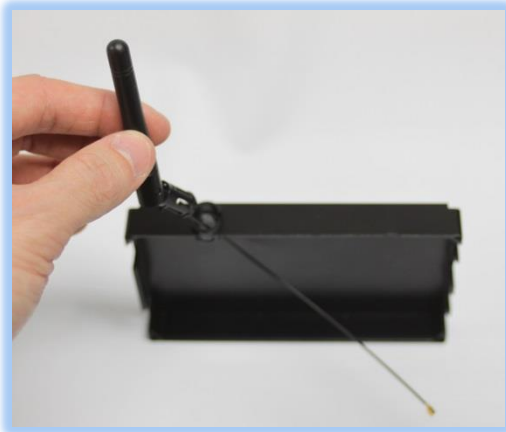
Step 3 – Install Antenna

Open the antenna bag and locate the round (not hex shaped) plastic panel sleeve. Remove the plastic antenna hole plug from the top cover. Insert the round plastic panel sleeve into the top cover hole. Next feed the antenna lead through the sleeve and snap the antenna base into the sleeve. You should be able to rotate the antenna to a suitable orientation.

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Step 4 – Attach Antenna to WiFi Board

Place the top cover with antenna beside the bottom case with main board and WiFi board installed. The end of the antenna lead has a small swivel micro-connector. This connector should be attached to the base on the WiFi board and snap into place. Rotate the antenna lead to be sure it does not come loose and ensure it will not be pinched when re-attaching the cover.
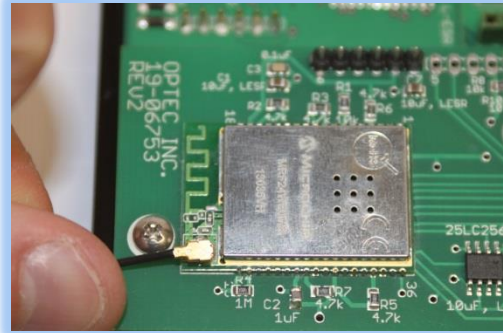

Step 5 – Replace Cover

Carefully replace the top cover without pinching the antenna lead and replace the four 4-40 socket caps holding the case together. The antenna should allow some swivel capability to orient the antenna for good reception. You are now ready to apply power to the FocusLynx Hub.

Step 6 – Confirm WiFi Module Status

Insert the 12VDC power plug into the FocusLynx Hub and connect the USB/Serial cable for RS-232 communications during configuration. Wait a few seconds until the red LED is illuminated indicating the boot cycle has completed. Confirm the presence of the WiFi board by opening FocusLynx Commander, connecting via the USB/Serial connection and clicking *Focusers: Focuser 1 – Setup…*

In the Focuser Hub Setup dialog, click WiFi Setup… Confirm the WiFi Module Status reads "Connected and Functioning Properly". Note the WiFi Firmware Version, IP Address, and Network Name.
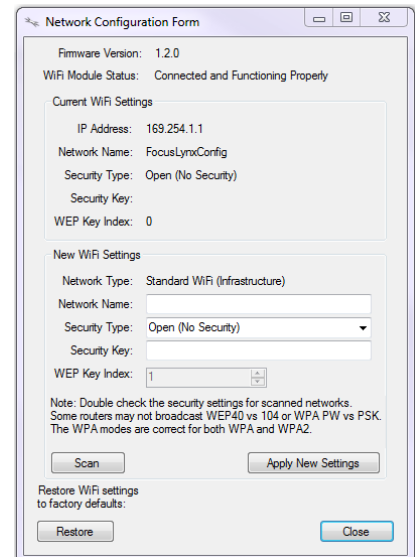
Working with WiFi Networks and Firewalls

Configuring the FocusLynx WiFi board requires an understanding of basic networking principles. In all cases, a valid IP route between the FocusLynx Hub and the control computer or handheld device MUST be available and active. Any firewall rule prohibiting packet transfer between PC, tablet, or smart phone and the FocusLynx hub will cause a communication failure and hours of frustration and misery. Specifically, any firewall rule prohibiting IP traffic on port 9761

must be suspended and an exception may be required. Port 9761 is the IP port used by the FocusLynx WiFi board and is usually open on most networks. However each network is unique and may be locked down securely allowing traffic only through certain standard ports. Seek advice from a networking specialist if your observatory network has tightened security features.

Note that a full description of wireless networking principles and configuration possibilities is beyond the scope of this document. Contact Optec Support (support@optecinc.com) if the steps below do not allow successful communication to the FocusLynx hub via wireless Ethernet connections.

WiFi Configuration Overview

Because the FocusLynx hub has no display or keyboard, an external PC or wireless device must be used to configure the WiFi board. However, the process is fairly straightforward. First, the configuring PC or device should have an active 802.11b wireless NIC to make the initial connection to the WiFi board. The WiFi board defaults to an Ad-Hoc network with the SSID name "FocusLynxConfig".   The configuring PC or device should attach to this WiFi network to perform the configuration. In general, it is not recommended to operate the FocusLynx WiFi hub in Ad-Hoc mode for normal usage. Ad-Hoc networks are decentralized and do not require preexisting infrastructure making them ideal for initial configuration. However, for long-term use, it is highly recommended that you attach to your local WiFi network using a standard 802.11b compatible wireless router and DHCP server. The FocusLynx WiFi first generation boards can only function as a DHCP client. Upgrading to the second generation Optec WiFi board is required if a static IP address is desired. Contact Optec Sales (sales@optecinc.com) for details.

If you are planning to attach the FocusLynx WiFi board to an active WiFi network (recommended), you should have the connection details (SSID, security type, security key or pass phrase, etc.) available when configuring the FocusLynx Hub for connection to that network. Detailed steps are presented below.

WiFi Auto-Configuration Step-by-Step

Step 1 – Connect to FocusLynxConfig network

Windows 7

By default, the WiFi board will operate in an Ad-Hoc mode creating a wireless network with the SSID "FocusLynxConfig".   If configuring through a Windows 7 computer, assuming a wireless NIC is attached you will see the network by clicking the WiFi tray icon or by opening the Control Panel, selecting Network and Sharing Center, and clicking "Connect to a network". You should see a panel similar to the image shown.
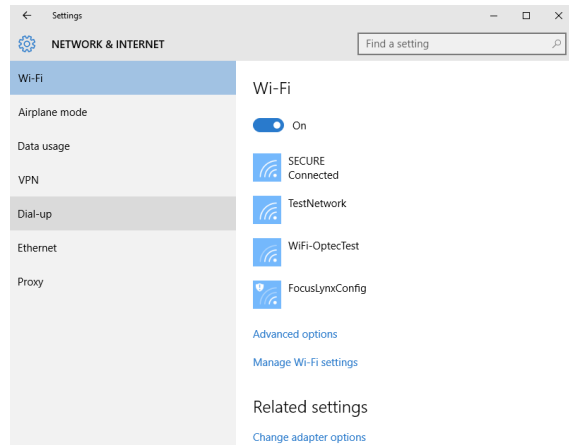
Windows 10

In Windows 10 the process requires additional steps. Microsoft removed AdHoc support by default in Windows 8.1 and Windows 10. To check whether or not your computer will display the FocusLynx Ad-Hoc network, click the Windows icon, Settings, Networks & Internet. You will see a panel similar to the screenshot at left. If FocusLynxConfig is visible, select it and allow some time for the connection to be completed.

If the connection fails or the FocusLynxConfig is not visible, skip down to the WiFi - Manual Configuration

section below.

Android OS or iPhones

Perhaps the easiest way to configure the FocusLynx WiFi is using a smart phone or tablet. Again, to configure you'll need to attach your phone to the FocusLynxConfig Ad-Hoc network first. Be sure the WiFi is turned on and, if you can see the FocusLynxConfig network, simply connect to it. Like Windows 10, some of the later Android OS and iPhone iOS versions do not allow connection to an Ad-Hoc network by default. In this case, we recommend configuring through a PC instead.

However, if an Ad-Hoc connection is successful, proceed to Step 2 to complete the configuration. Otherwise, you will need to skip to WiFi - Manual Configuration below.

Step 2 – Open WiFi webpage

Open your favorite browser and type http://wififocuslynx into the address bar. On Windows networks this is usually sufficient to bring up the default main page. On a non-Windows network without the WINS service functioning, the page will not appear. Instead, try pointing the browser to the default Ad-Hoc IP address – 169.254.1.1 – by typing http://169.254.1.1 directly into the browser address bar. The main page should appear as shown.
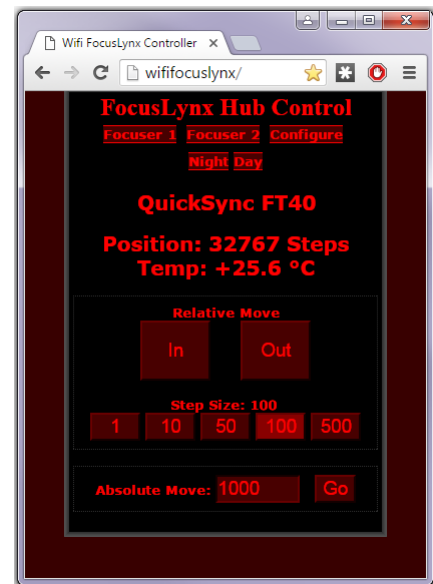
Step 3 – Configure WiFi Network

Click the Configure link and Scan for Wireless Networks. Select your local wireless network from the list and enter any required network key or pass phrase. You will see a "Reconnection In Progress" message

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page detailing the change of networks. At this point, your connection to the Ad Hoc network will drop because the FocusLynx hub is now connecting to your local WiFi network and no longer broadcasting the FocusLynxConfig SSID.

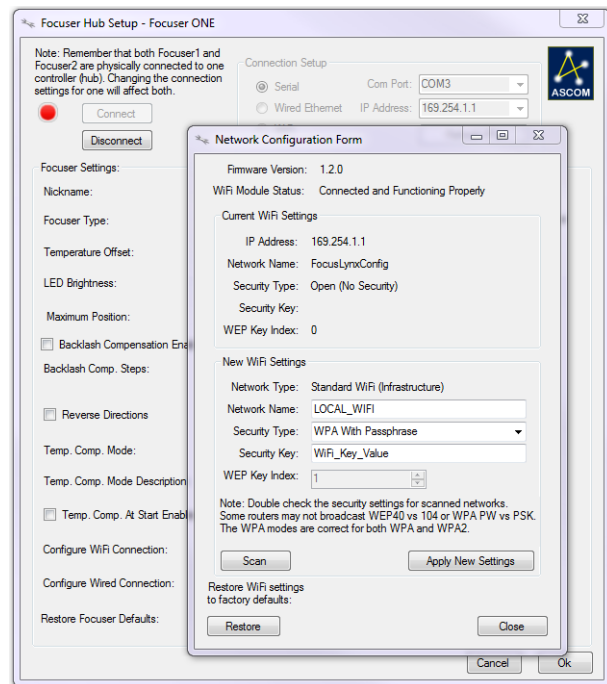### Step 4 – Connect PC to Local WiFi Network

Now connect your PC or device to the same local WiFi network you just connected the FocusLynx hub to and you will have valid route to the device. Test by clicking the Focuser 1 or Focuser 2 link and the In our Out buttons to move the focuser.

At this point your FocusLynx WiFi board is connected to the local WiFi network. The hub will retain these settings after a power cycle and automatically re-connect to the WiFi network whenever it is operational. You may check the WiFi board settings in FocusLynx Commander by connecting via USB/Serial, Wired Ethernet, or WiFi. Select the Connection Setup and click Refresh IP's to automatically search for the assigned IP address. Click WiFi Setup to review the current settings. If for any reason, you need to reset the WiFi settings back to the factory defaults and re-establish the FocusLynxConfig Ad Hoc network, click the Restore button in the lower left of the form.
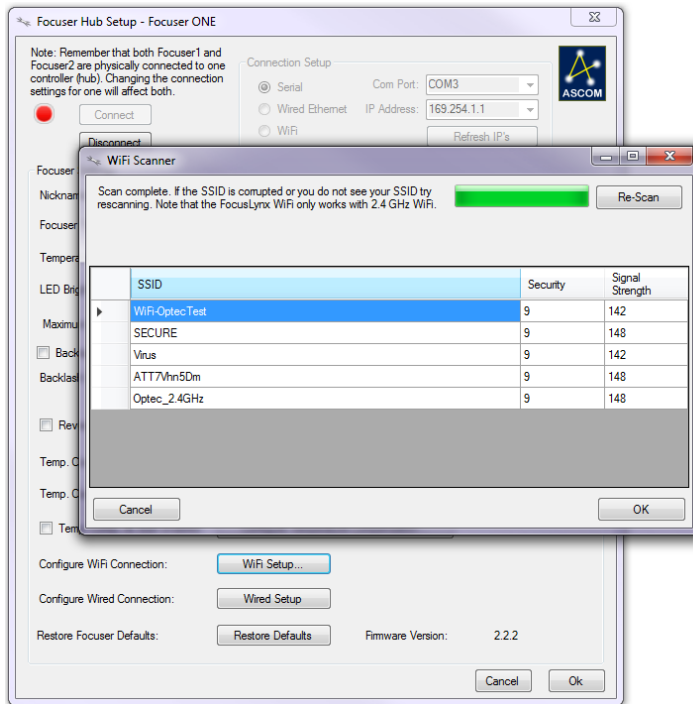
WiFi – Scan Networks

Effective with FocusLynx Commander v2.0.4 and FocusLynx firmware version v2.1.2, a Scan button appears on the Network Configuration Form. Click the Scan button to see all WiFi networks within range. Select the desired local WiFi network and click OK. You will be prompted for the security passphrase if your network requires one.

For nearly all modern routers, the Security Type will be "WPA With Passphrase". Click Apply New Settings and allow a few minutes for the local WiFi DHCP server to assign a new IP address to the FocusLynx WiFi board.

IMPORTANT: Be sure to connect your control PC to the same local WiFi network and re-open the WiFi Setup dialog to review the newly assigned IP Address and wireless settings. The local WiFi DHCP server should have assigned a valid IP address to the FocusLynx WiFi board. If not, check to ensure you have typed in the WiFi network settings properly.

Once the FocusLynx WiFi receives a valid IP address from the local WiFi router, you

may disconnect the Serial connection, click the WiFi radio button and click the "Refresh IP's" button. Allow at least 30 seconds for the local PC to find the FocusLynx WiFi board on the network. Click Connect and you will be able to control the FocusLynx hub using FocusLynx Commander and the ASCOM drivers.

Note, if this step fails, you should ensure that your PC is connected to the same local WiFi network as the FocusLynx WiFi board. If not, a connection cannot be completed and you will see the "None Found" message in the "IP Address:" box for the Focuser Hub Setup dialog box. Re-check all your connections if "None Found" persists. Remember that you can always connect in Serial mode to confirm your WiFi board current settings.
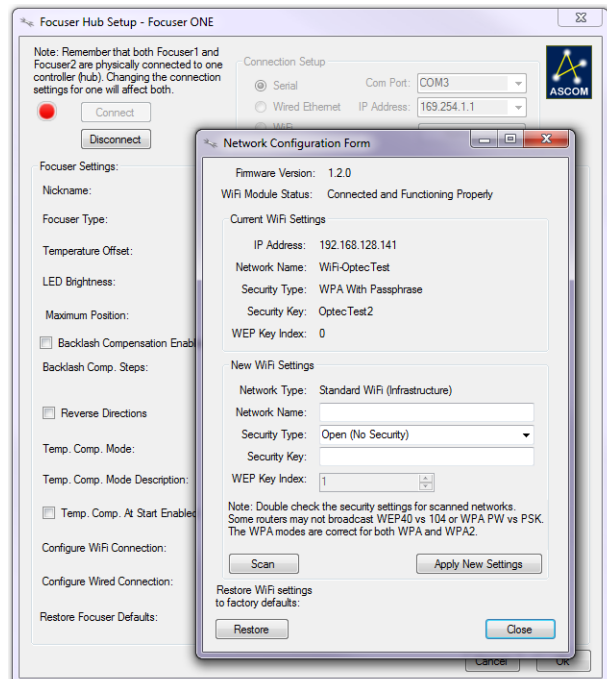
WiFi - Manual Configuration

Advanced Users may prefer to skip the steps above and enter the local WiFi network parameters directly. Connect to the FocusLynx hub via USB/Serial or Wired Ethernet. WiFi can also be used but requires connecting to the Ad-Hoc network first, then switching over to the local WiFi network similar to the steps above. The USB/Serial connection is highly recommended.

Contact Optec Support (support@optecinc.com) for help with the Manual Configuration of FocusLynx Commander and the optional WiFi add-on board.

Upgrades

WiFi Firmware Update

If the FocusLynx WiFi firmware needs to be updated, a PIC chip replacement must be ordered. The PIC chip is provided in a 28-pin DIP (dual in-line package) programmable integrated circuit with the version number marked on top of the PIC chip. As of December 2017, the current version WiFi firmware is WIFI V1.2.0. Contact Optec Sales (sales@optecinc.com) for the latest WiFi firmware version and ordering information.

To perform the upgrade, first unplug all power and cables from the FocusLynx Hub. Remove the top cover from the hub using a 3/32" hex key. The WiFi board will be immediately visible in the center of the board. Note the position of the notch indicating Pin 1 on the existing PIC chip. Gently pry the existing firmware chip up and out of the socket and replace with the new firmware PIC chip. Ensure that Pin 1 is in the same orientation as the original. Re-attach the back cover and cables. Connect to the hub and watch for the firmware version number to appear.

WiFi Webpages Update

Occasionally, the WiFi Webpages may be updated and offered for user upgrade at no cost. The current version can be found by typing http://wififocuslynx/version.htm into the address bar of a browser while the FocusLynx WiFi is turned on and connected. On non-Windows networks, the assigned IP address will need to be typed into the address bar in place of "wififocuslynx". The display page will provide the currently loaded webpage version (V1.0.4 as of December 2017).

To update the webpages, contact Optec support for a new binary file and save it to your desktop or other convenient folder. Type http://wififocuslynx/upload.htm into the browser address bar. You will see a 404: error and link for "MPFS Upload". Click this link Choose File, pointing to the WebpagesWiFi…bin file provided and saved on your desktop. Click "Upload" and wait for file to upload. Click "Site main page" to nagivate to the new main page.

Optec WiFi Second Generation Boards

Available in January 2018, a new second generation WiFi board is available from Optec with increased sensitivity, 802.11g support, and simplified configuration setup through a SoftAP interface. SoftAP stands for "software enabled access point" and is often referred to as a "virtual router". Contact Optec Sales (sales@optecinc.com) for information regarding the Optec WiFi optional board for FocusLynx, FocusBoss II, and Gemini products.

Optec WiFi boards can be differentiated from FocusLynx WiFi boards by the blue color of the WiFi module board has shown below. Firmware for the original FocusLynx WiFi will be V1.x.x while the Optec WiFi boards have firmware versions V2.2.0 and above.

Troubleshooting

Contact Optec Technical Support (support@optecinc.com) with any other issues concerning the FocusLynx WiFi option.