

***GROOV BOX***  
**USER'S GUIDE FOR**  
**GROOV-AT1**

# **GROOV BOX USER'S GUIDE FOR GROOV-AT1**

**Form 2077-160331—March 2016**

**OPTO 22**  
**Automation made simple.**

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*groov* Box User's Guide for GROOV AT1  
Form 2077-160331—March 2016

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# 1: Welcome

*groov* is Opto 22's web-based operator interface system that is *simple*, *mobile*, and *connects easily* to almost any automation system or device.

**Simple:** *groov* requires only a web browser to build mobile interfaces. It puts ready-made gadgets at your fingertips and requires no programming. Using tags from the built-in Data Simulator, you can test project ideas without connecting to a live machine or system. *groov* makes it simple to build, deploy, and view effective, scalable operator interfaces.

**Mobile:** Get the free *groov* View app for Android or iOS to view your *groov* interface on your iPhone, iPad, or Android phone or tablet. If you want to use a different brand device, from a smartphone to a web-enabled big-screen TV, just view your *groov* interface using a web browser. *groov* can augment existing human-machine interfaces (HMIs) and SCADA systems by making specific data available to authorized users at any time and in any location. Using event notification, selected personnel can be alerted anywhere by email or text message about system events based on one or more conditions.

**Connects easily:** You can connect *groov* to Modbus/TCP devices and Opto 22 SNAP PAC controllers directly, or to devices from other manufacturers through an OPC UA (Unified Architecture) server. *groov* brings key data from process control, OEM machines, manufacturing and building systems, and the Internet of Things (IoT) into the hands of those who need it.



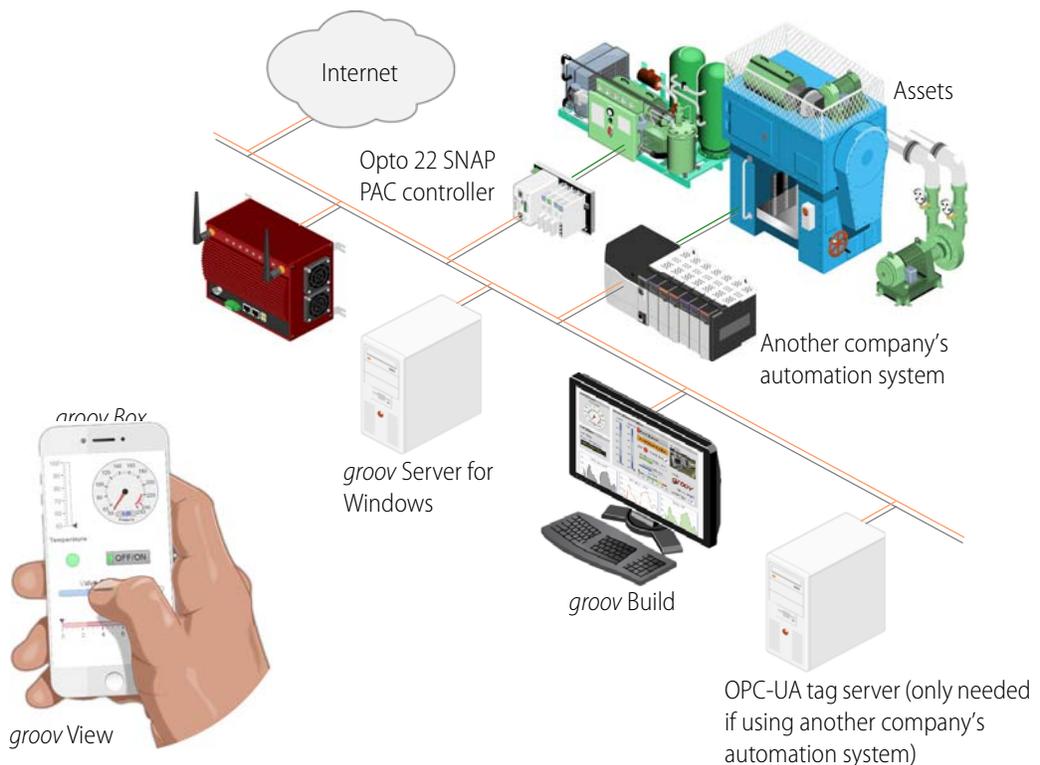
When connected to an OPC UA server, you can monitor and control PLCs and PACs such as Allen-Bradley ControlLogix and CompactLogix, Siemens SIMATIC S7, Schneider Electric Modicon, GE PACSystems, and many more. In addition you can use *groov* with databases, SNMP devices, weather stations, OPC DA servers, or any device or system supported by your OPC UA server. The KEPServerEX communication platform from Kepware Technologies is recommended by Opto 22 and tested to work with *groov*. (For more information about OPC UA, go to [opcfoundation.org/UA](http://opcfoundation.org/UA).)

## Choose Your *groov*

*groov* is available as either the standalone *groov* Box hardware appliance or the PC-based *groov* Server for Windows software.

**groov Box** is an industrially hardened appliance that comes preloaded with *groov* software, including *groov* Build for building operator interfaces, *groov* View for using the interfaces you've built, and *groov* Admin for administering the Box itself. The *groov* Box communicates over a standard Ethernet network or wireless LAN (local area network), or both.

**groov Server for Windows** includes *groov* software (*groov* Build for building operator interfaces and *groov* View for using them) and is ready for installation on a Microsoft® Windows® PC. Once installed, *groov* Server runs as a service on your computer. For more information on *groov* Server, see [form 2078](#), the *groov* Server for Windows User's Guide.



Whether you store and serve *groov* software on a *groov* Box or on a computer using *groov* Server for Windows, an operator interface you develop with *groov* can be viewed on almost any mobile device or computer.

## About this Guide

This user's guide shows you how to install and set up your *groov* Box, part number **GROOV-AT1**. (If your *groov* Box is the newer model with part number GROOV-AR1, see form 2104, the [groov Box User's Guide for GROOV-AR1](#), instead of this guide.)

This guide also shows you how to use the *groov* Admin software. *groov* Admin provides the tools to update *groov*, set up wired and wireless networking, and more.

For information about building and viewing *groov* interfaces, see form 2027, the [groov User's Guide](#).

Additional resources for *groov* are available on [groov.com](#).

## System Requirements

To build operator interfaces with *groov* you'll need:

- Any computer with a modern web browser. This does not have to be a Windows PC.
- One or more of the following:
  - A Modbus device that communicates over Ethernet
  - An Opto 22 SNAP PAC System (SNAP PAC S-series, R-series, with firmware R9.2a or newer or SoftPAC, running a PAC Control strategy)
  - Any OPC UA-compatible automation system or equipment, plus an OPC UA server and drivers for your equipment.

*groov* and KEPServerEX: If you are building a *groov* interface for an OPC UA-compatible system and don't already have an OPC UA server installed, the KEPServerEX communication platform from Kepware Technologies is recommended by Opto 22 and tested to work with *groov*. For more information, see [www.kepware.com/Products/products\\_OPCServers.asp](http://www.kepware.com/Products/products_OPCServers.asp) and [www.kepware.com/Support\\_Center/doc\\_auto\\_tag.asp](http://www.kepware.com/Support_Center/doc_auto_tag.asp)

## A Note on Browsers

Thanks to technologies such as HTML5, SVG, and CSS3, web browsers are now fairly similar. Our browser-based *groov* View and *groov* Build work reliably on a large number of device/OS/browser combinations, including HDTVs, smartphones and tablets of many shapes and sizes, and computers. We've found Firefox, Chrome, Safari, and Internet Explorer 10 or newer to be generally reliable. If one browser is causing problems for you, however, try another one and let us know what issues you've seen. For Product Support, see [page 6](#).

## groov Box Communications

groov uses standard computer networks and protocols. The unit communicates with computer networks over a standard 10/100/1000 Mbps Ethernet network or over an 802.11b, g, or n wireless LAN (local area network), or over both.

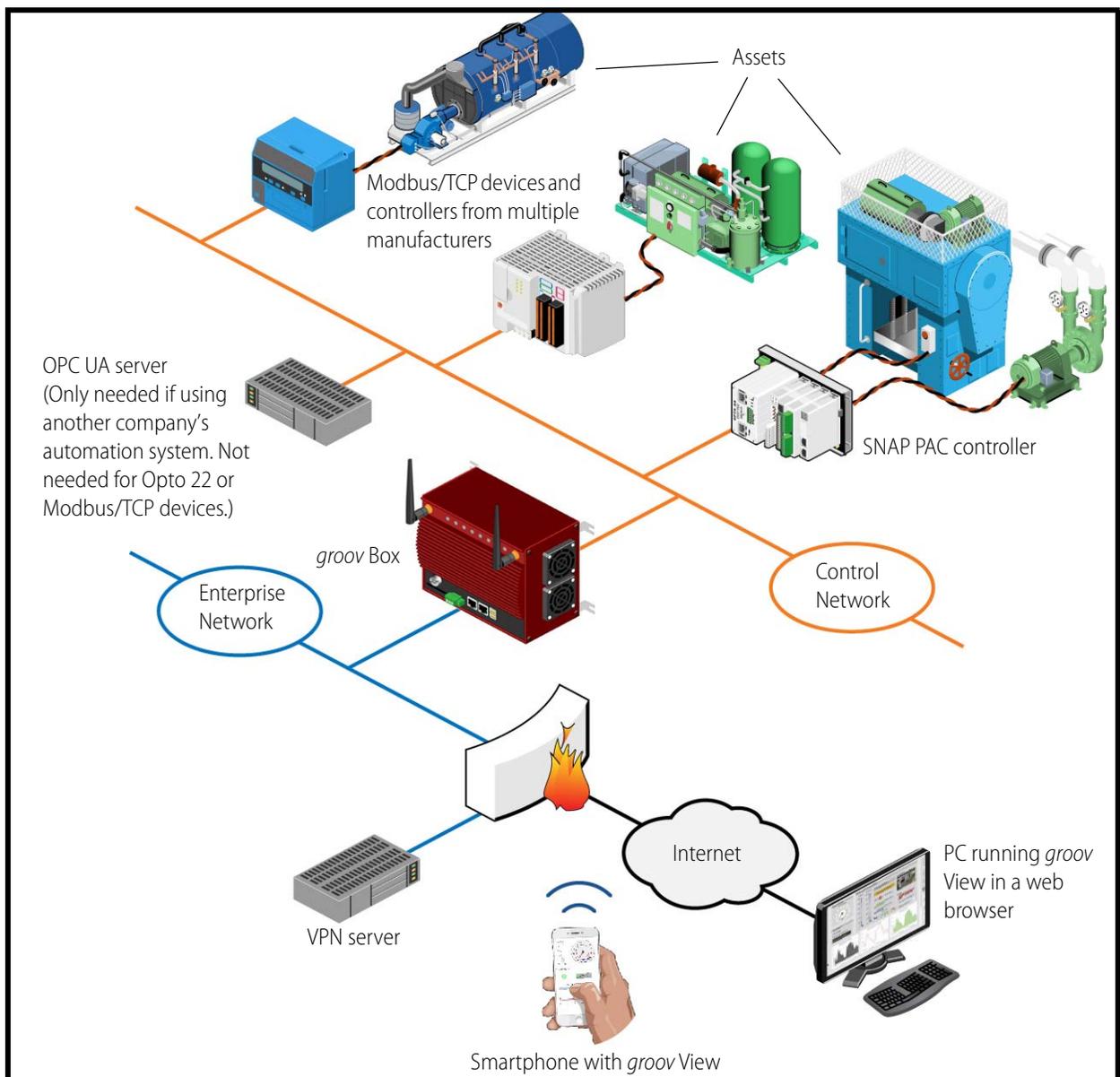
With two independent wired Ethernet network interfaces plus an independent wireless interface, the unit gives you the flexibility to monitor devices in hard-to-reach areas and to set up networking suited to your business.



## System Architecture

When you first set up *groov*, the PC you use must reside on the same network (broadcast domain) as the *groov* Box. In a quick and easy setup, the development PC and smartphone or tablet running View all reside within the same domain as *groov*. The controller can also be on the same network, or it can be on a separate control network as shown here. For more information, see form 2161, the [Guide to Networking groov](#).

The following illustration shows *groov* connected to control systems from other manufacturers as well as a SNAP PAC controller. When accessing *groov* outside *groov*'s network on the Internet, a VPN (Virtual Private Network) connection is recommended for security. The HTTPS (HTTP plus TLS/SSL) in your browser shows that all data exchanged between your browser and *groov* is encrypted.



## What's In This Guide

Here's what is in this user's guide:

**Chapter 1: Welcome** introduces this user's guide and *groov*.

**Chapter 2: Getting Started** describes how to get *groov* up and running quickly.

**Chapter 3: Using *groov* Admin** describes how to use *groov* Admin to back up and restore *groov*, manage the network connections, access system information, and more.

**Chapter 4: Using an SSL Certificate** describes using an SSL certificate that is digitally signed either by a certificate authority (CA) or self-signed.

**Chapter 5: Maintenance and Troubleshooting** provides troubleshooting information and answers questions you might have about *groov*.

**Appendix A: Specifications and Dimensions** provides technical specifications and *groov* Box dimensions.

**Appendix B: Connectors, Indicators, and LEDs** describes connector names and what the status and activity LEDs mean.

## Product Support

If you have any questions about *groov*, you can call, fax, or e-mail Opto 22 Product Support.

<b>Phone:</b>	800-TEK-OPTO (800-835-6786 toll-free in the U.S. and Canada) 951-695-3080 Monday through Friday, 7 a.m. to 5 p.m. Pacific Time	<i>NOTE: Email messages and phone calls to Opto 22 Product Support are grouped together and answered in the order received.</i>
<b>Fax:</b>	951-695-3017	
<b>Email:</b>	<a href="mailto:support@opto22.com">support@opto22.com</a>	
<b>Opto 22 website:</b>	<a href="http://www.opto22.com">www.opto22.com</a>	

When calling for technical support, be prepared to provide the following information about your system to the Product Support engineer:

- *groov* version and *groov* Admin version. Click the System Information icon (see [page 36](#)).
- A description of your system equipment:
  - Computer type, speed, memory, and operating system
  - If used, Modbus/TCP device manufacturer and model
  - If used, SNAP PAC controller model and firmware version
  - If used, OPC UA server type and configuration
- A description of the network
- Specific error messages or other diagnostic indications

## 2: Getting Started

In this chapter you'll find instructions on how to install the *groov* Box and set up the *groov* Admin software.

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### What You Will Need

In order to set up your *groov* Box and do the activities in this chapter you will need a computer with a web browser on the same network you'll use for the *groov* Box. For the best experience, we recommend Chrome, Firefox, or Internet Explorer 10 or newer.

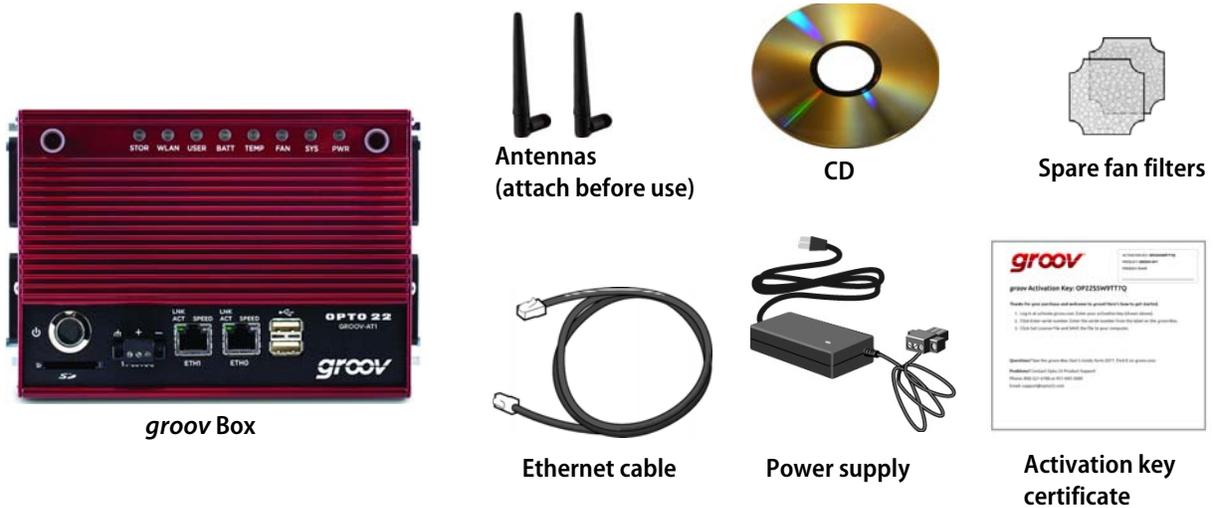
### In the Box

These items are included in the box:

- *groov Quick Start*, form 2063
- *groov* Box
- 2 extra fan filters
- *groov* Box wireless antennas

## STEP 1: GET TO KNOW THE GROOV BOX

- *groov* CD that includes the *groov* User's Guide (form 2027), the *groov* Quick Start (form 2063), *groov* Box User's Guide (form 2077), and the *groov* Find utility
- Ethernet cable
- Power supply unit
- Activation key certificate



## Step 1: Get To Know the *groov* Box

To set up the *groov* Box, you'll use the *groov* Box components shown below. Make sure to peel the label from the Activation Key certificate and affix it to the top of the *groov* Box.



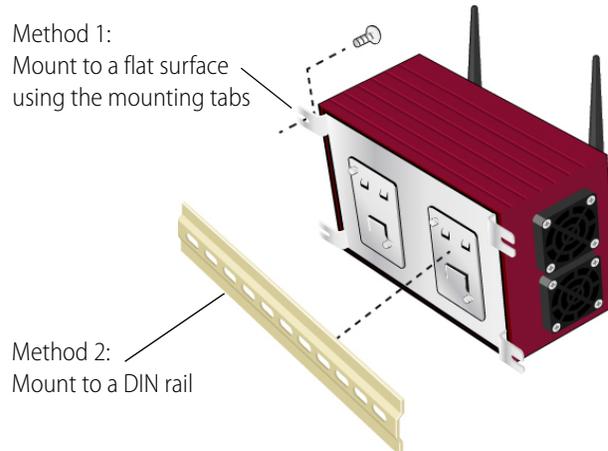
## Step 2: Choose a Location

Locate a suitable wall or panel near a standard 120VAC or 240VAC wall outlet and the wired Ethernet network(s) your computer is on. If your controller, Modbus/TCP device, or OPC UA server is on a different network than your computer, connect ETH0 to your computer's network and ETH1 to the other network. (Also see [page 59](#).)

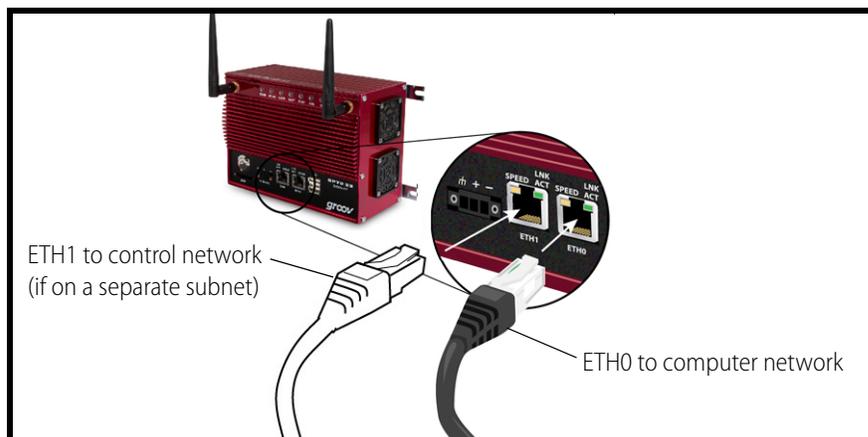
Allow room around the front, top, and sides of the *groov* Box. Air needs to flow freely through the fans on the sides, and you need to be able to see the information on the top.

## Step 3: Mount the *groov* Box

You can mount the *groov* Box on a flat surface using the four mounting tabs, or you can mount it on a DIN rail using the DIN rail clips provided on the back of the *groov* Box. Use #8 screws with the mounting tabs. If there will be vibration at the *groov* Box installation site, make sure to use the mounting tabs for a secure installation.



## Step 4: Connect to the Network



- a. Connect an Ethernet cable from ETH0 to your computer’s network.

*NOTE: Opto 22 recommends connecting ETH0 to a network with DHCP and DNS services. If you do not have these services, you’ll need to manually configure networking. See “Troubleshooting” on page 57.*

- b. The two independent Ethernet connectors (ETH0 and ETH1) have separate IP addresses that can be used to segment a control system’s network from the enterprise LAN. If your controller, ModbusTCP device, or OPC UA server is on a different network than your computer, connect ETH0 to your computer’s network and ETH1 to the other network.

If you are using both ETH0 and ETH1, make sure they have IP addresses on different subnets. In some situations, this may require configuring a static IP address. Otherwise there may be communication errors. For more information, see “Assigning a Static IP Address” on page 22.

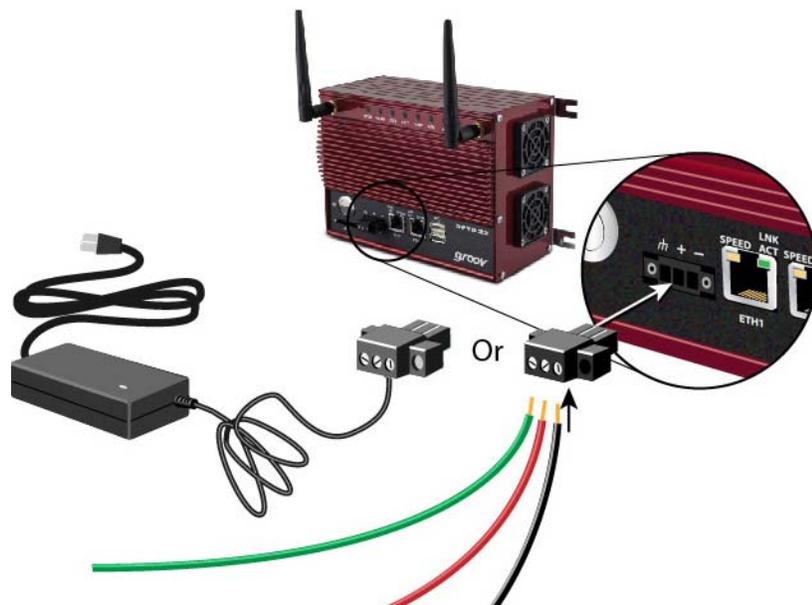
For detailed information on setting up your network and setting up communications over the Internet, see form 1796, the *Guide to Networking Opto 22 Products*.

## Step 5: Connect the Power Supply

Your *groov* Box requires a power supply with an output of 14-36 VDC, 24 VDC @ 1 amp. You can use the power supply that comes with the *groov* Box, or provide your own. In either case, we recommend using a UPS (uninterruptible power supply) for backup power and surge protection.

**If you are using the power supply that came with the *groov* Box, do the following:**

Plug the small connector on the power supply into the terminal marked 14–36 VDC, tighten the screws. Plug the other end into a standard 120 or 240 VAC outlet. The LED marked PWR will light solid green.



**If you are using your own power supply, do the following:**

- a. With the power supply off or unplugged, connect the + (positive) lead from the power supply (normally red) to the + (positive) terminal on the power connector.

**CAUTION:** Reversing wire polarity may cause damage to your groov Box. This damage is not covered by Opto 22's warranty. If you are not certain about the polarity of the wires on your power supply, check with a meter.

- b. Connect the COM wire from the power supply (normally black) to the – (negative) terminal on the power connector.
- c. Connect a lead from a known earth/chassis ground to the (ground) terminal on the power connector.

## Step 6: Turn on the *groov* Box

Briefly press and release the On/Off button. **Wait** until the SYS LED has stopped blinking and is solid green. Also, take a look at the LNK ACT light for ETH0. If the cable is properly connected, the LNK ACT light should be on or blinking.

*NOTE: Always wait until the SYS LED has stopped blinking before you try to log into groov. Otherwise, you may not be able to use the hostname to log in. If this happens, see [page 58](#).*

## Step 7: Activate the *groov* Box and Get the License File

You'll need the activation key printed on the certificate included with your *groov* Box.

- a. Open a web browser (Firefox or Chrome recommended). Go to [activate.groov.com](http://activate.groov.com).

- b. Log in using your email address and your My.Opto22 password.  
You may have set up your free My.Opto22 account when you purchased your *groov* Box. If you don't have a My.Opto22 account, enter your email address and other information, and the account will be created.
- c. Follow the on-screen instructions to activate your *groov* Box and download the license file.  
When asked to enter the serial number, you'll find it on the label on the top of the device.



## Step 8: Open *groov*

You can open *groov* using just your web browser. Or, if you have a Windows computer, you can use *groov* Find (see below). If your network does not have DNS, use *groov* Find.

### Using your web browser:

- a. On your computer, open Firefox or Chrome, or Internet Explorer 10 or newer.
- b. Enter `https://` and your *groov* Box's hostname as the URL. The hostname is printed on top of the *groov* Box.

For example, if the hostname is `opto-01-ab-c2`, you type  
`https://opto-01-ab-c2`



Make sure you type `https`. The **s** indicates it is a secure connection.

*NOTE: If you've assigned a static IP address to the groov Box, use the IP address instead of the hostname to open groov.*

- c. Accept the security warning. Your *groov* data is protected by the Secure Socket Layer 256-bit encryption, so you can safely accept the warning.



### For Chrome:

- Click "Advanced" to expand the initial screen.
- Click "Proceed to <hostname> (unsafe)."

 **For Firefox:**

- Expand “I Understand the Risks.”
- Click Add Exception to open the Add Security Exception dialog box.
- Select “Permanently store this exception.”
- Click Confirm Security Exception.

 **For Internet Explorer 10:** Click “Continue to this website (not recommended).”

 **For Safari:** Click Continue.

The **Welcome to groov** window opens in your web browser. Now go to [“Step 9: Install the License File” on page 14](#)

### Using *groov* Find:

If you are using a Windows computer, you can use *groov* Find to locate the *groov* Boxes on your network. If your network does not have DNS, you must use *groov* Find.

- a. Insert the *groov* CD in your CD-ROM drive, then click the link to copy the Find application file to your computer.
- b. Open the Find application file.

A message might appear asking if you want Find to be allowed to make changes to your computer. If it does, click Yes.

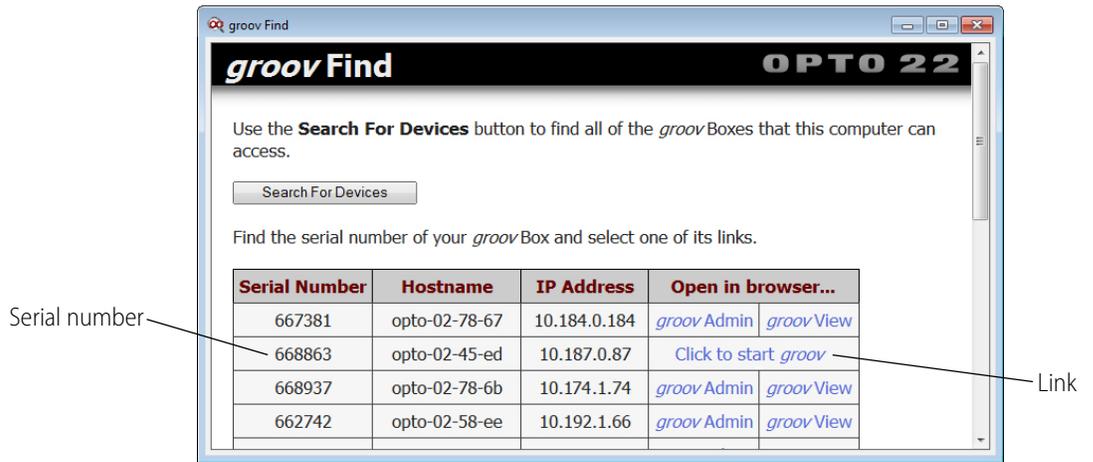
*NOTE: If you are using a Windows account that does not have Administrator privileges (such as Guest), a User Account Control dialog box will appear asking for the credentials of an administrator account. To proceed, enter the Administrator User Name and Password. If you do not have this information, contact your IT department.*

*groov* Find opens and automatically searches for *groov* Boxes on the network.

- c. Find the serial number on the top of the *groov* Box.



- d. Locate the matching serial number in Find.



If you do not see the serial number right away, wait 60 seconds and click Search for Devices again.

- e. Click the link "Click to start groov."
 

When your browser connects to groov for the first time, the browser will display a security warning.
- f. Accept the security warning. Your groov data is protected by the Secure Socket Layer 256-bit encryption, so you can safely accept the warning.

 **For Chrome:** Click "Proceed anyway."

 **For Firefox:**

- Expand "I Understand the Risks."
- Click Add Exception to open the Add Security Exception dialog box.
- Select "Permanently store this exception."
- Click Confirm Security Exception.

 **For Internet Explorer 10:** Click "Continue to this website (not recommended)."

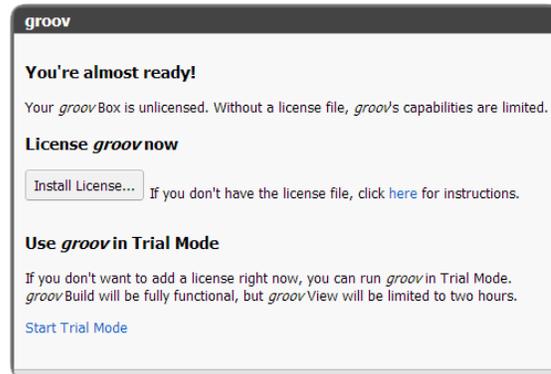
 **For Safari:** Click Continue.

The **Welcome to groov** window opens in your web browser.

## Step 9: Install the License File

Make sure to install your license file. Without an installed license, groov will only work for two hours.

- a. When prompted to add a license file to *groov*, click Install License.



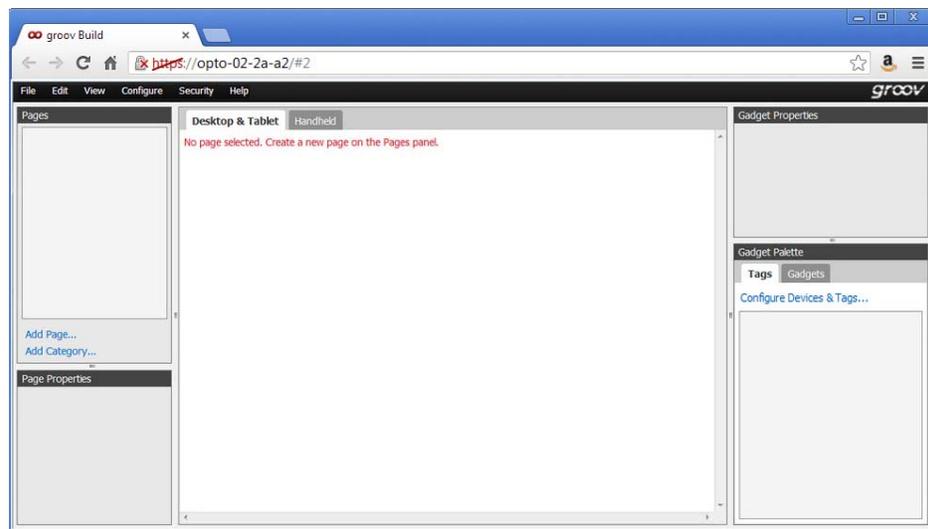
- b. Browse to the license file, then click Open.

## Step 10: Create New Usernames and Passwords

Follow the on-screen instructions to create usernames and passwords for *groov* Admin and for *groov* Build. If the security warning appears once more, accept the warning again.

**CAUTION: There is no password recovery option.** Write down your Username and Password, and keep it in a safe place. You will need this information each time you log in. If you lose your login information, you will have to reset the *groov* Box back to factory defaults, which will erase your project.

After you have completed the instructions in **welcome to groov**, *groov* Build opens in your web browser. For information on using *groov* Build, see form 2027, the *groov* User's Guide.





## 3: Using *groov* Admin

Using *groov* Admin you can back up and restore your projects and project settings, update firmware, set up wired and wireless networking, and more.

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Setting the System Time.....	38

### Opening *groov* Admin

You can open *groov* Admin in three ways:

- From *groov* Build—see below
- Using the *groov* Admin URL—[page 17](#)
- From *groov* Find (only on a Windows computer)—[page 18](#)

#### Open *groov* Admin from *groov* Build

In *groov* Build, choose Configure > *groov* Admin. To log in, see [page 20](#).

#### Open *groov* Admin using the URL

1. In your web browser, enter `https://hostname:10000`



2. Locate the serial number on the bottom of the *groov* Box.



3. Locate the matching serial number in Find.

Serial Number	Hostname	IP Address	Open in browser...	
2147483647	opto-00-9d-73	10.192.1.228	<a href="#">groov Admin</a>	<a href="#">groov View</a>
1396322356	opto-00-d2-dc	10.192.0.235	<a href="#">groov Admin</a>	<a href="#">groov View</a>
6684736	opto-02-45-ef	10.192.54.122	<a href="#">groov Admin</a>	<a href="#">groov View</a>
700821	opto-03-55-57	10.192.1.45	<a href="#">Click to start groov</a>	

4. Click the *groov* Admin link. (If it isn't there, click the link "Click to start *groov*" to start the initial setup on the *groov* Box. See "Step 8. Open *groov*" on page 14.)

A security warning appears in your web browser.

5. Accept the security warning (if you need help, see the next section).
6. Log in (see [page 20](#)).

## Accepting the Security Warning

*groov* uses the TLS/SSL (Transport Layer Security/Secure Sockets Layer) to protect your data by encrypting data exchanged between your browser and the *groov* Box. When a device attempts to access *groov*, your browser will issue a security warning unless the appropriate SSL security certificate is installed on the device.

If your computer resides in the same domain as the *groov* Box, you can safely accept the warning because your data is protected by the 256-bit encryption. However, if you want to avoid seeing the security warning, you can install the self-signed certificate on your computer and other devices that access *groov*. See "Using a Self-Signed Certificate" on page 42.

If your computer or other device will access *groov* from outside *groov*'s network or over the Internet, Opto 22 strongly recommends you obtain an SSL Certificate from a third-party company that is authorized to confirm your user's ID. See ["Using a CA-Signed Certificate on \*groov\* Box" on page 50.](#)

To accept the security warning, see the section below for your browser.

### For Chrome

- Click "Advanced" to expand the initial screen.
- Click "Proceed to <hostname> (unsafe)."

### For Firefox

1. Expand "I Understand the Risks."
2. Click Add Exception to open the Add Security Exception dialog box.
3. Select Permanently store this exception.
4. Click Confirm Security Exception.

### For Safari

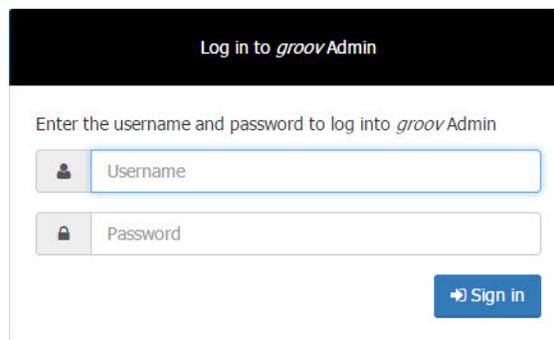
Click Continue.

### For Internet Explorer

Click "Continue to this website (not recommended)."

## Logging in

**CAUTION: There is no password recovery option.** Write down your Username and Password, and keep it in a safe place. You will need this information each time you log in. If you lose your login information, you will have to reset the *groov* Box back to factory defaults, which will erase your project.

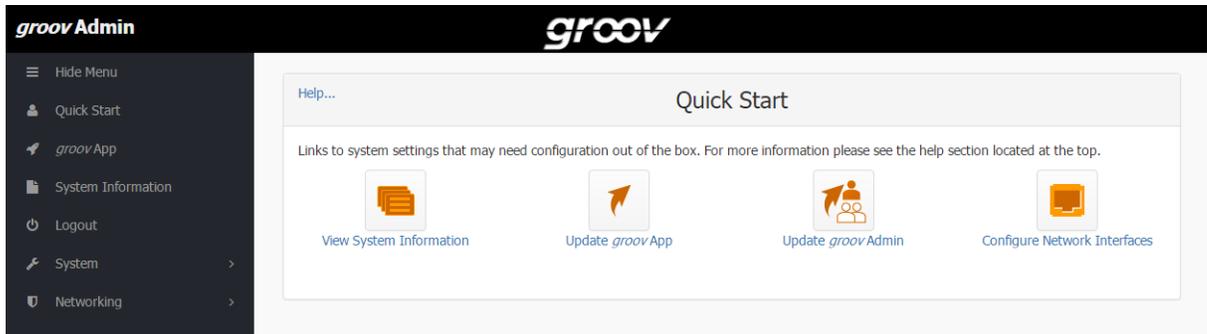


1. Enter the *groov* Admin account Username and Password.
2. Click Sign in to open *groov* Admin.

*NOTE: There is a session timer of 10 minutes. If you don't do anything for 10 minutes, you will be logged out and have to log in again.*

## Quick Start menu

*groov* Admin opens at the Quick Start menu.



The quick start buttons take you directly to some of the more common actions in *groov* Admin.



### View System Information

Check system information and see usage statistics. [“Checking System Information” on page 36.](#)



### Update *groov* App

Update *groov* Build and View. See [“Updating \*groov\* App \(Build and View\)” on page 28.](#)



### Update *groov* Admin

Update *groov* Admin itself with the latest version. See [“Updating \*groov\* Admin” on page 32.](#)



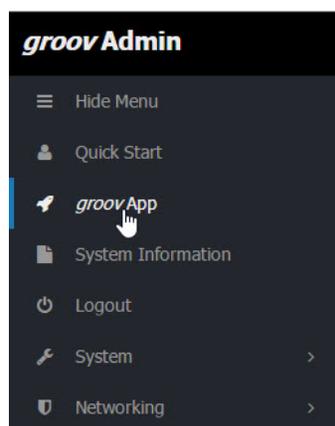
### Configure Network Interfaces

Configure IP settings for the wired and optional wireless Ethernet interfaces: ETH0, ETH1, and WLAN0. See [“Configuring Network Connections” on page 22.](#)

To return to the Quick Start menu, in the left navigation bar, click Quick Start.

## Opening *groov* View and Build from *groov* Admin

To go to *groov* View or *groov* Build, in the left navigation bar, click *groov* App.



Your *groov* project opens in *groov* View. For *groov* Build, in View click the gear icon in the upper right and choose Switch to *groov* Build.

For information on using *groov* Build and View, see [form 2027](#), the *groov* User’s Guide.

## Configuring Network Connections

*groov* is designed to work with a network that has a Dynamic Host Configuration Protocol (DHCP) server and a Domain Name Server (DNS). If your network has DHCP and DNS, you do not need to assign an IP address to the *groov* Box; you just plug it in and the IP address is assigned automatically. This is the recommended method for setting up the *groov* Box.

However, if you need to customize your network connections for *groov* after the initial setup, *groov* Admin provides the tools to do that.

This section includes the following topics:

- [“Assigning a Static IP Address” on page 22](#)
- [“Changing the Hostname, DNS Servers, or IPv4 Gateway” on page 23](#)
- [“Configuring ETH1 for the Control Network” on page 24](#)
- [“Configuring Wireless Communications” on page 25](#)

To set up your network, see form 2161, the [Guide to Networking \*groov\*](#). This guide provides detailed information on how to make your *groov* network more secure. It also describes how to directly communicate with *groov* over the Internet using a virtual private network (VPN) or with port forwarding (PF). A VPN is recommended because it is more secure.

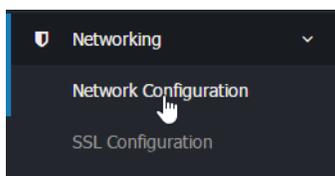
### Assigning a Static IP Address

If you do not have a DHCP server, you’ll need to configure a static address to either ETH0 or ETH1. Otherwise there may be communication errors.

*NOTE: If you are using a laptop computer to assign a static IP address, make sure you disable Windows’ Internet Connection Sharing (ICS). If you don’t, the laptop will act like a DHCP server and assign a dynamic address.*

You’ll need to get the following networking information from your IT department:

- **IPv4 address**—A unique, fixed (static) IP address.  
For example: 172.18.234.1
  - **Netmask**—Identifies the subnetwork.  
For example: 255.255.225.0
  - **Gateway** (optional)— Identifies the route to the Internet.  
For example: 172.18.1.1
1. In the left navigation bar choose Networking > Network Configuration, or click the Configure Network Interfaces button in Quick Start.



OR:



- Click the wired Ethernet connection you want to configure.

*NOTE: Use ETH0 as the main network connection. Only use ETH1 if you have segmented networks.*

Name	Type	MAC Address	IPv4 Address	Netmask	IP Configuration	Link Status
ETH0	Ethernet	00:A0:3D:00:D2:DC	10.192.0.235	255.255.192.0	From DHCP	Up
ETH1	Ethernet	00:A0:3D:00:D2:DD	None	None	From DHCP	Down
WLAN0	Wireless Ethernet	Unknown	None	None	Disabled	No adapter found

**Edit Interface**

**Boot Time Interface Parameters**

Name: ETH0

Disabled  
 From DHCP  
 Static configuration

IPv4 Address:  Static IP address  
 Netmask:

Save

- Select Static configuration. Enter the static IP Address and Netmask.
- Click Save.

## Changing the Hostname, DNS Servers, or IPv4 Gateway

In order to identify the *groov* Box more easily on the network, you might want to change the hostname from the default. And, depending on your network setup, you might need to change the DNS Servers or IPv4 Gateway.

*NOTE: Keep in mind that any changes to this interface may make your system inaccessible via your current wired or wireless connection. Be sure to write down the new hostname or other changes.*

- In the left navigation bar choose Networking > Network Configuration, or click the Configure Network Interfaces button in Quick Start.

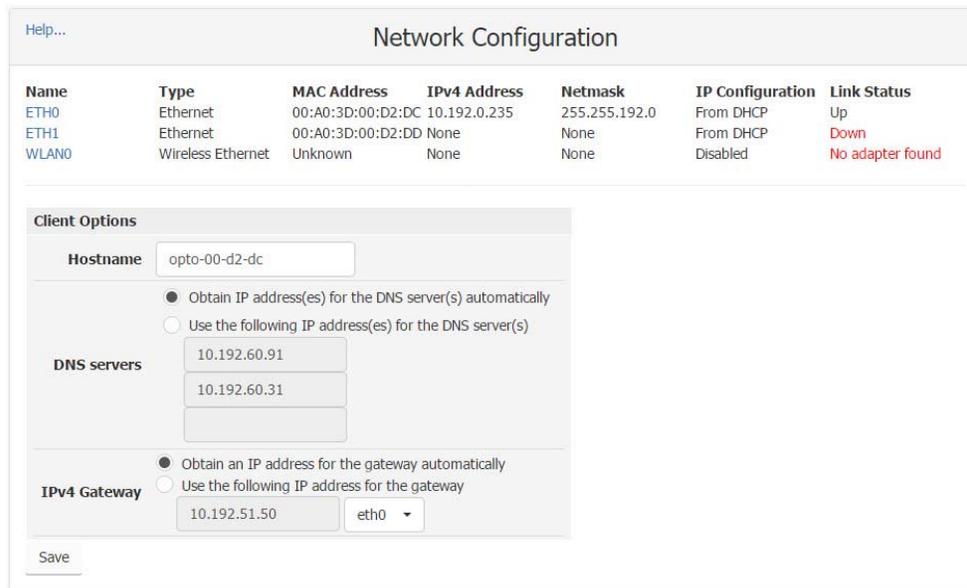
Networking

- Network Configuration
- SSL Configuration

OR:

[Configure Network Interfaces](#)

The Network Configuration page opens.



2. In the Client Options are, change the hostname, DNS servers, or IPv4 Gateway as necessary.

*NOTE 1: A hostname cannot have spaces or special characters.*

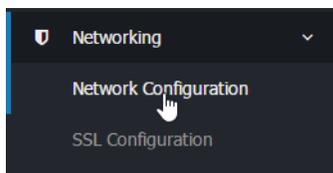
*NOTE 2: Any changes to this interface may make your system inaccessible via your current wired or wireless connection. Be sure to write down the new hostname or other changes.*

3. Click Save.

## Configuring ETH1 for the Control Network

If your computer is on a different network than the control network, you need to configure ETH1 by assigning it an IP address and subnet appropriate for the control network.

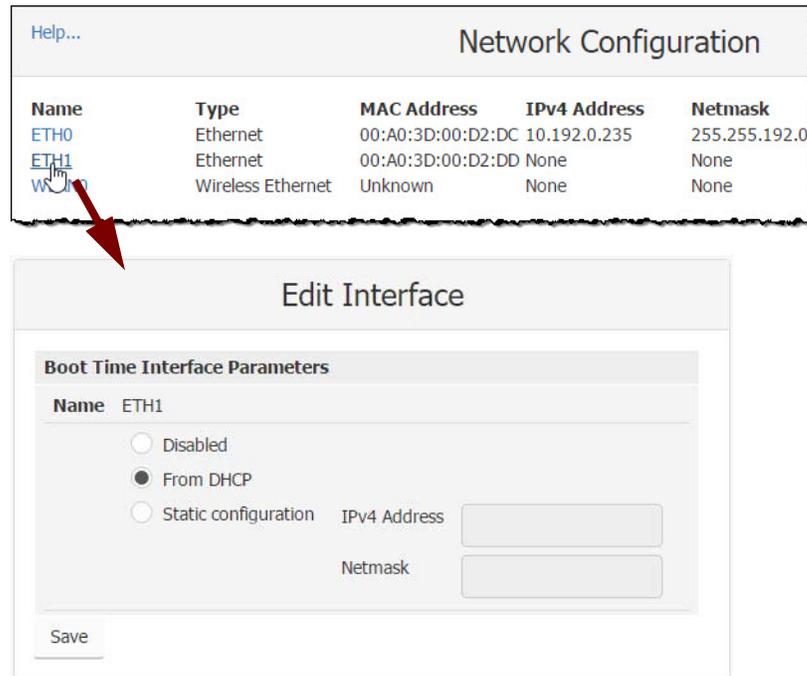
1. In the left navigation bar choose Networking > Network Configuration, or click the Configure Network Interfaces button in Quick Start.



OR:



- Click ETH1.



- If the network has DNS and DHCP, select “From DHCP.” If it doesn’t, enter a static IP Address and Netmask.

*NOTE: If you are using static addresses, ETH1 must be on a different subnet than ETH0.*

- Click Save.

## Configuring Wireless Communications

You can configure the *groov* Box to connect to a wireless network through an access point using the 802.11b, 802.11g, and 802.11n protocols.

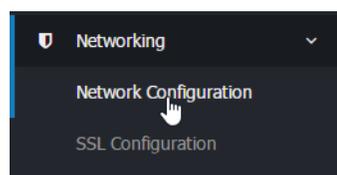
Before you begin, get the following information from your IT Department:

**SSID**—Name of the wireless network access point you want the *groov* Box to join

**Security**—Encryption type (WPA or WPA2), network key input type (hex or ASCII), and password

**Password**—To access the wireless network

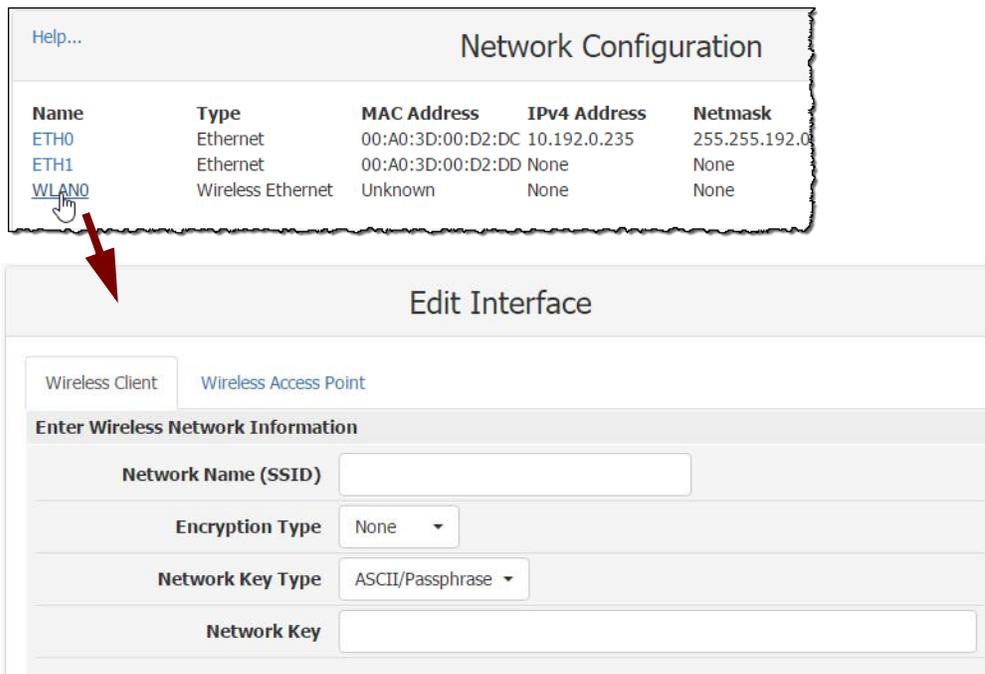
- With the *groov* Box connected via ETH0, in *groov* Admin’s left navigation bar choose Networking > Network Configuration, or click the Configure Network Interfaces button in Quick Start.



OR:



- Click WLAN0.



- Enter the Network Name (SSID).

The SSID is a text string from 1 to 32 characters used to uniquely identify the wireless network. This should match the SSID of the access point you want to connect to.

*NOTE: If the SSID contains one or more spaces, enclose the SSID with quotation marks. For example, enter "Opto 22" instead of Opto 22.*

- Select the Encryption Type.

This is the type of encryption used to encrypt any packet sent or received between the access point and the groov Box.

- **None**—No encryption used.
- **WEP64**—Use WEP encryption with a 5 digit ASCII or 10 digit hexadecimal key. WEP has been deprecated by IEEE and should not be used in new installations.
- **WEP128**—Use WEP encryption with a 13 digit ASCII or 26 digit hexadecimal key.

*NOTE: WEP is not secure and has been deprecated by the Institute of Electrical and Electronics Engineers (IEEE). Do not use WEP in new installations unless it is the only option available. Use WPA or WPA2 instead.*

- **WPA**—Use TKIP encryption (RC4) with an 8 to 63 digit ASCII or 64 digit hexadecimal key.
- **WPA2**—Use CCMP encryption (AES) with an 8 to 63 digit ASCII or 64 digit hexadecimal key.

- Choose the Network Key Type.

Select ASCII or Hexadecimal keys. Typically, WEP uses hexadecimal keys and WPA uses ASCII keys.

6. Enter the Network Key.  
Use the key for the Encryption Type selected above. This is a write-only field.
7. Scroll down to the Boot Time Interface Parameters section.

8. Select From DHCP.  
If the wireless network does not have a DHCP server, assign a static IP address and netmask.
9. Click Save.  
Wait till you see the following message.

### **Network Configuration**

Restarting network services. Please wait...Finished

[← Back](#)

Congratulations. You're connected!

10. If ETH0 and WLAN are on the same subnet, disconnect the cable from ETH0.  
You need to disable ETH0 because the *groov* Box will continue to communicate over ETH0 as long as it is connected on the same subnet and enabled.

*NOTE: If you are using a control network and an enterprise network, and ETH0 is on a different subnet, you can leave it connected.*

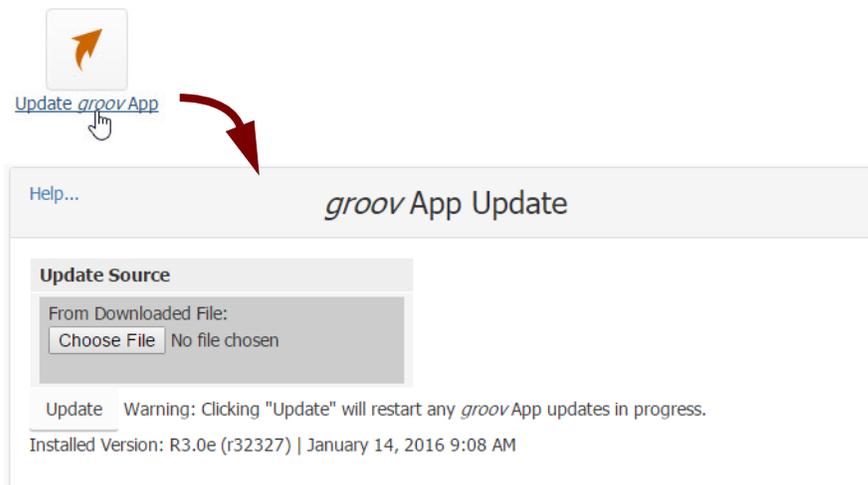
- a. In the Network Configuration page, click ETH0.

- b. Select Disabled, then click Save.
- c. Click the Back button, and notice that in the Network Configuration page, ETH0 is disabled (Down) and WLAN0 is enabled (Up).

Network Configuration						
Name	Type	MAC Address	IPv4 Address	Netmask	IP Configuration	Link Status
ETH0	Ethernet	00:A0:3D:00:D2:DC	10.192.0.235	255.255.192.0	From DHCP	Down
ETH1	Ethernet	00:A0:3D:00:D2:DD	None	None	From DHCP	Down
WLAN0	Wireless Ethernet	Unknown	None	None	Disabled	Up

## Updating *groov* App (Build and View)

1. Before updating *groov*, back up your project using *groov* Build (see form 2027, the *groov* User's Guide) or *groov* Admin (see [page 29](#)).
2. Make sure the *groov* Box is activated. See "[Step 7: Activate the groov Box and Get the License File](#)" on [page 11](#).
3. Go to [manage.groov.com](http://manage.groov.com) and follow directions to download the latest *groov*App update file and save it to your computer.
4. Open *groov* Admin.
5. Click Quick Start and then the Update *groov* App button.



6. Click Choose File, navigate to the update file you downloaded, and then click Open.
7. Click Update.

Wait while the application is installed and restarted automatically, which may take several minutes. When the operation is complete, a success message appears.



## Backing Up *groov*

During backup, project components are saved to a file on your computer or a USB flash drive. You should back up *groov* frequently. There is no automatic backup.

To restore *groov* from the backup file, see [“Restoring groov” on page 31](#).

**IMPORTANT:** *Your groov project files are not encrypted or masked in any way. This means that most of the project information in them (except for the groov User passwords) can be read, including the following:*

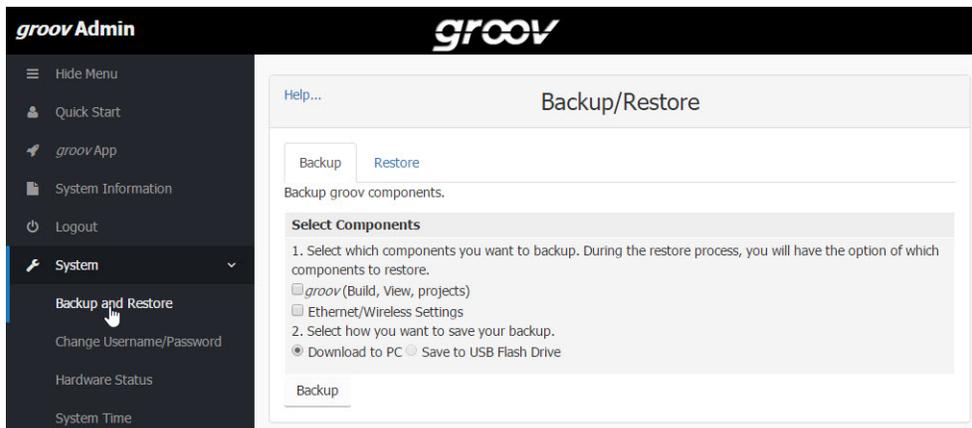
- *SMTP account info (including password)*
- *User email accounts (does not include the groov User passwords, which are securely encrypted before being stored)*
- *Device addresses*
- *Tag address information (PAC tag names, Modbus addresses, OPC node-id, etc.)*

*Opto 22 recommends that you secure your backup files using file- or disk-based encryption provided either by the operating system or other software/hardware.*

*Also, be aware that if you send project files to Opto 22, our personnel will have access to the information listed above.*

### Follow these steps to back up *groov*:

1. In the left navigation bar, choose System > Backup and Restore.



2. Click the Backup tab.
3. Select the components you want to back up.

**groov (Build, View, projects)** saves the *groov* App (Build and View) and your project.

**Ethernet/Wireless Settings** saves any settings you've configured for ETH0, ETH1, and the wireless network, including IP, Subnet, Gateway, Hostname, SSID, Wireless Network Key, etc.

4. Do one of the following:
  - Select Download to PC.
  - Insert a USB drive into a USB slot on the front of the *groov* Box. (The option is not available until you insert the USB drive. If necessary, refresh the page.) Select Save to USB Flash Drive. Click Backup.



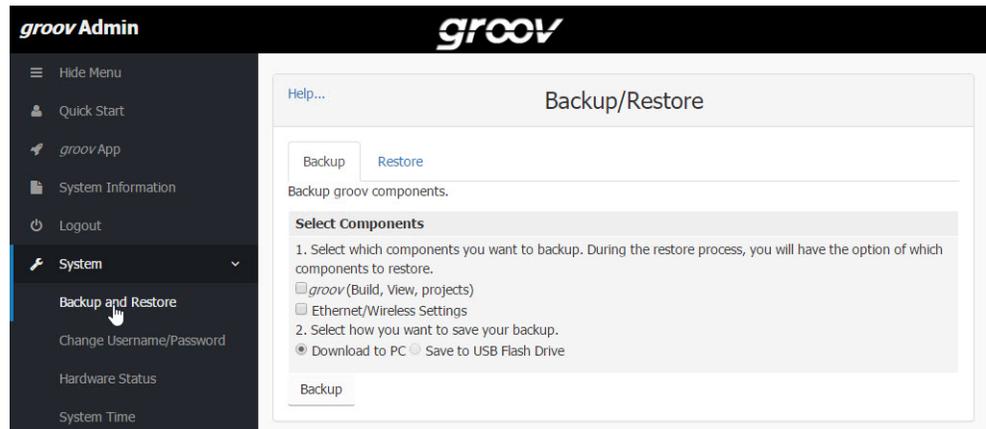
5. If saving to the PC, save the file (don't open it). The backup file is downloaded to the Downloads directory on your PC.

If saving to a USB flash drive, the file is downloaded to your USB drive. Wait for it to finish before removing the USB drive.

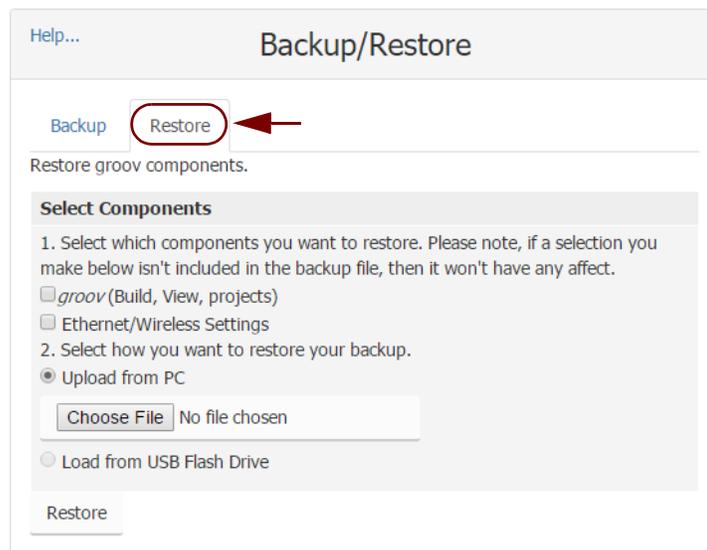
## Restoring *groov*

Use the following instructions to restore *groov* components from a backup file saved on a computer or USB flash drive (see “Backing Up *groov*” on page 29).

1. In the menu tree, click System, and then click Backup and Restore.



2. Click the Restore tab.



3. Select the components you want to restore. If you choose a component that isn't included in the backup file, it won't be restored.

**groov (Build, View, projects)** restores the *groov* software and the project you built in *groov*.

**Ethernet/Wireless Settings** restores any settings you've configured for ETH0, ETH1, and the wireless network, including IP, Subnet, Gateway, Hostname, SSID, Wireless Network Key, etc.

4. Do one of the following:
  - To restore from your PC, select Upload from PC, then click Choose File and locate your backup file.

- To restore from a USB flash drive, insert the drive with the backup file into a slot on the front of the *groov* Box. (The option is not available until you insert the USB drive. If necessary, refresh the page.) Click Load from USB Flash Drive, then click the browse button and select your backup file.



5. Click Restore, and then wait while the files are uploaded.

## Updating *groov* Admin

When you update *groov* Admin, all of your configuration settings are kept.

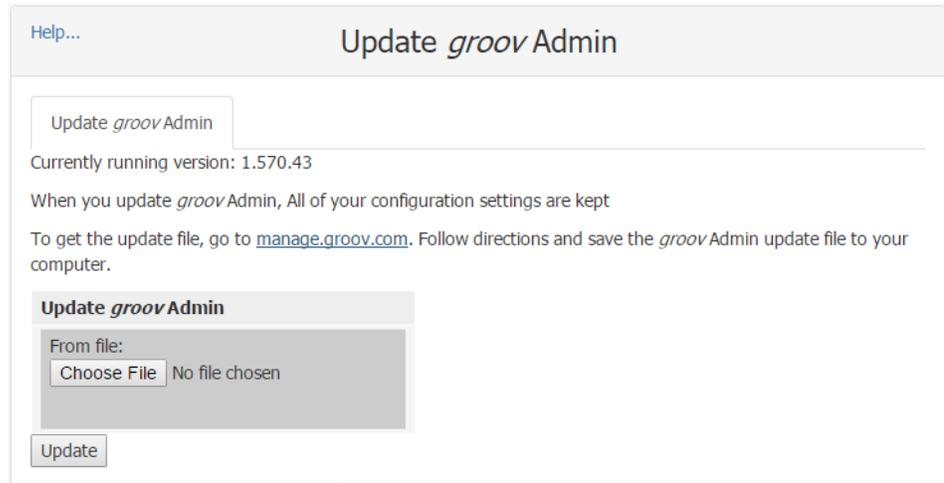
1. Go to [manage.groov.com](http://manage.groov.com) and follow directions to download and save the latest *groov* Admin update file to your computer.

*IMPORTANT: If you have a GROOV-AT1 or GROOV-AT1-SNAP groov Box running groov Admin R1.570.40 or lower, first download and install groov Admin version R1.570.41. After you install 41, you can download and install the most recent version.*

2. If the Quick Start menu is not open, in the left navigation bar, click Quick Start.



3. Click Update *groov* Admin.



4. Click Choose File and locate the update file you downloaded. Highlight the file, and click Open.
5. Click Update.

The application file is downloaded and installed. **The update process may take several minutes.** It may not look like anything is happening, but it is. Be patient and don't click away from this page until you see the success message:

## Update *groov* Admin

Updating *groov* Admin... Success.



**System restart required for updates to take affect. [Click here to restart now.](#)**

[← Back](#)

*NOTE: Your *groov* Box must be restarted for the update to take effect. While the *groov* Box is restarting, all of your users will be disconnected, and you will not be able to continue working in *groov*.*

6. When the success message appears, click "Click here to restart now" or click Back to restart later. (To restart later, see "[Restarting the \*groov\* Box,](#)" below.)

During the restart, you'll notice the LED lights on the *groov* Box go off and then come back on. You and your users will be able to use *groov* View and *groov* Build once the *groov* Box has fully restarted and the SYS LED has stopped flashing.

## Restarting the *groov* Box

While the *groov* Box is restarting, all users are disconnected, and you won't be able to continue working in *groov* Build. The *groov* Box must be restarted in order for updates to take effect.

To restart the *groov* Box, do one of the following:

**After updating *groov* Admin,** click the message "Click here to restart now."

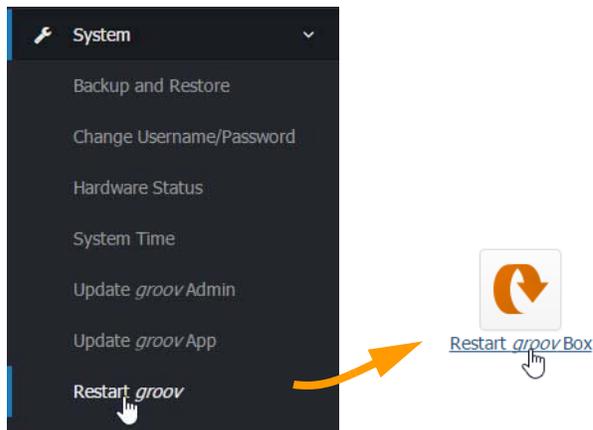
## Update *groov* Admin

Updating *groov* Admin...  Success.

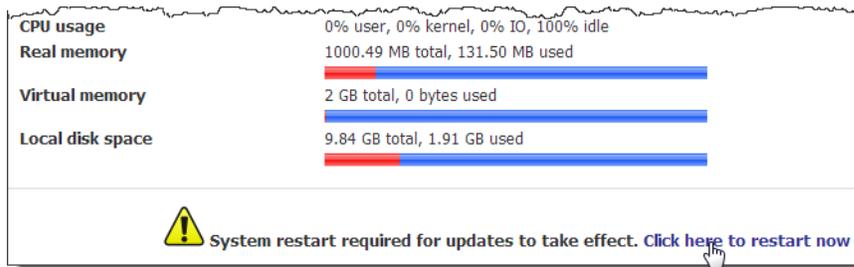
 System restart required for updates to take affect. [Click here to restart now.](#)

[← Back](#)

In the left navigation bar, choose System > Restart *groov* and then click the Restart *groov* Box button.



If you've updated but not restarted the Box, click System Information, and then click "Click here to restart now."



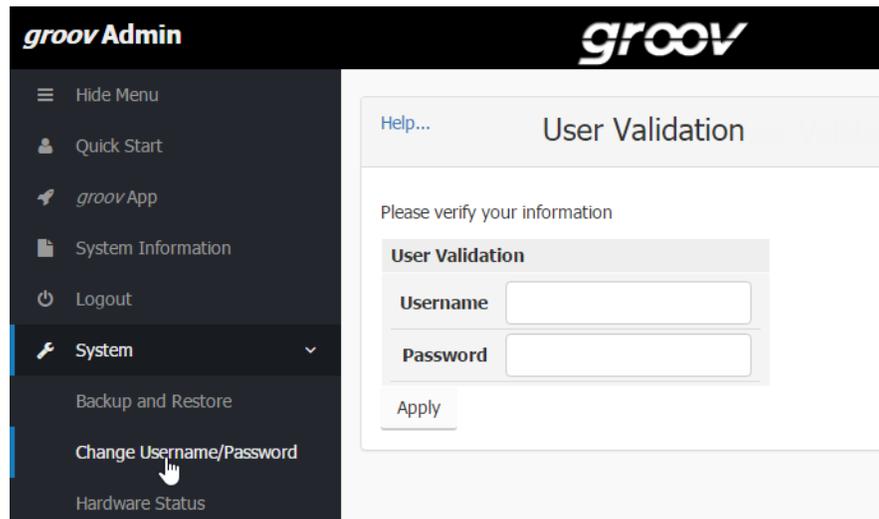
**Hardware restart:** Press the On/Off button briefly and wait for the *groov* Box to turn off. Then briefly press the On/Off button again to power it back up.

During a restart, you'll notice that the LED lights on the *groov* Box go off and then come back on. You and your users will be able to use *groov* View and *groov* Build once the *groov* Box has fully restarted and the SYS LED has stopped flashing.

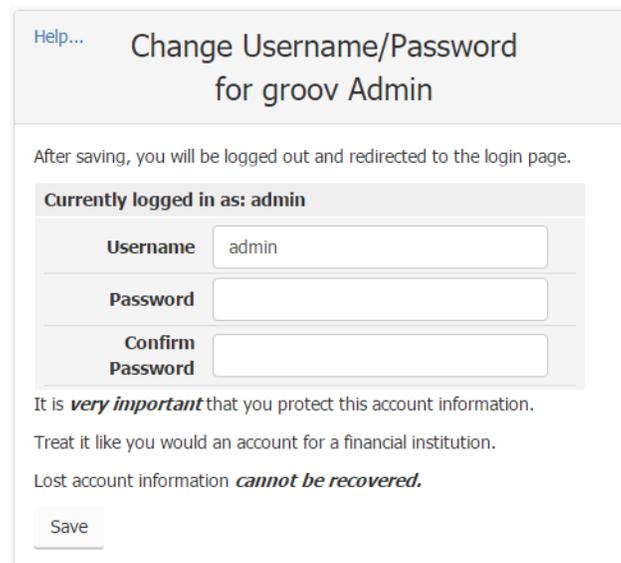
## Changing Username and Password

For groov Admin there is only one user; you cannot add more than one username. However, you can change the username or password for the *groov* Admin user. This change does not affect any usernames or passwords in *groov* Build.

1. In the left navigation bar, choose System > Change Username/Password.



2. Enter your current username and password to verify your identity and click Apply.



3. Enter the new username and the password in both boxes.

**CAUTION:** Write down your new Username and Password, and keep it in a safe place. You will need this information each time you log in. If you lose your login information, you will have to restore the *groov* Box back to factory defaults, erasing your project. There is no password recovery option.

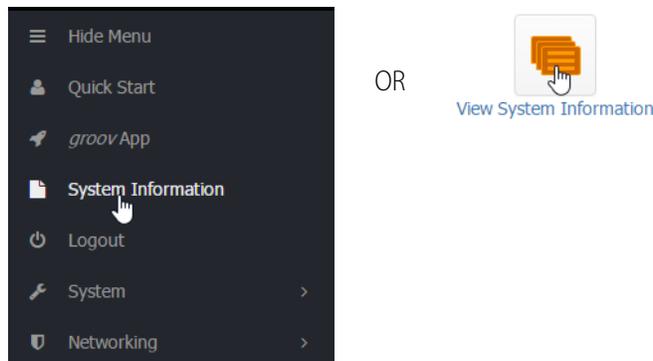
4. Click Save.

The login dialog box appears.

5. Log in using the new username and password.

## Checking System Information

In the left navigation bar, choose System Information in the menu tree, or click the System Information icon in Quick Start.



The following information is provided.

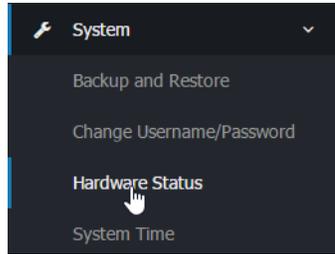
### System Information

<b>System Hostname</b>	opto-02-80-b2.opto22.com
<b>Activation key</b>	VMM9KGWR7B3Q
<b>groov Serial Number</b>	668880
<b>groov Part Number</b>	GROOV-AT1
<b>groov Image Version</b>	45
<b>groov Admin Version</b>	1.570.43
<b>groov App Version</b>	R2.1c (r19913)   March 17, 2014 4:12 PM
<b>Hardware Date</b>	September 1, 2011
<b>Time on System</b>	Wed Mar 30 16:31:12 2016
<b>System Uptime</b>	0 hours, 10 minutes
<b>CPU Load Averages</b>	0.02 (1 min) 0.17 (5 mins) 0.16 (15 mins)
<b>CPU Usage</b>	0% user, 0% kernel, 0% IO, 100% idle
<b>Real Memory</b>	997.29 MB total, 84.04 MB used
<b>Local Disk Space</b>	19.69 GB total, 3.84 GB used

OPTO 22

## Checking Hardware Status

1. To check the status of the internal components in the *groov* Box, in the left navigation bar, choose System > Hardware Status.



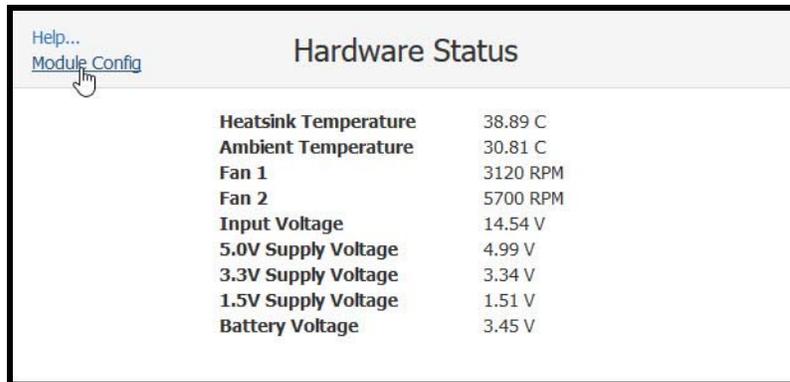
The following information is provided:

Hardware Status	
Heatsink Temperature	38.89 C
Ambient Temperature	30.81 C
Fan 1	3120 RPM
Fan 2	5700 RPM
Input Voltage	14.54 V
5.0V Supply Voltage	4.99 V
3.3V Supply Voltage	3.34 V
1.5V Supply Voltage	1.51 V
Battery Voltage	3.45 V

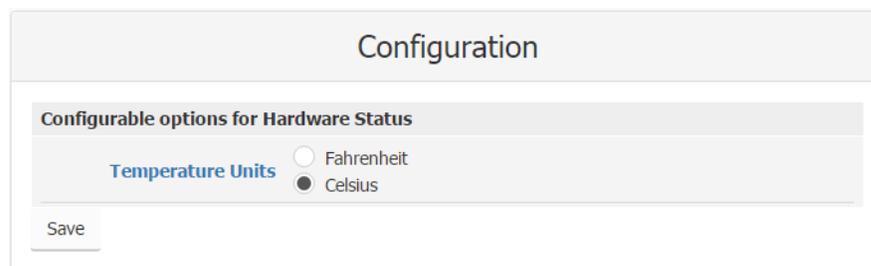
If any value is out of range, it is displayed in red and a message appears. Here are the values:

Heatsink Temperature:	Temperature of the internal PCB located near the battery
Ambient Temperature:	Temperature of the internal PCB located near the power supply
Fan 1:	Fan speed in revolutions per minute. If either of these values is 0, call Opto 22 for a fan replacement.
Fan 2:	
Input Voltage:	Main power supply for the <i>groov</i> Box
5.0V Supply Voltage:	Internal power supplies
3.3V Supply Voltage:	
1.5V Supply Voltage:	
Battery Voltage:	Voltage of the battery that maintains the date and time

- To change the temperature units (Fahrenheit or Celsius) shown in Hardware Status, click Module Config under Help on the left-hand side.



3. Select either Fahrenheit or Celsius.

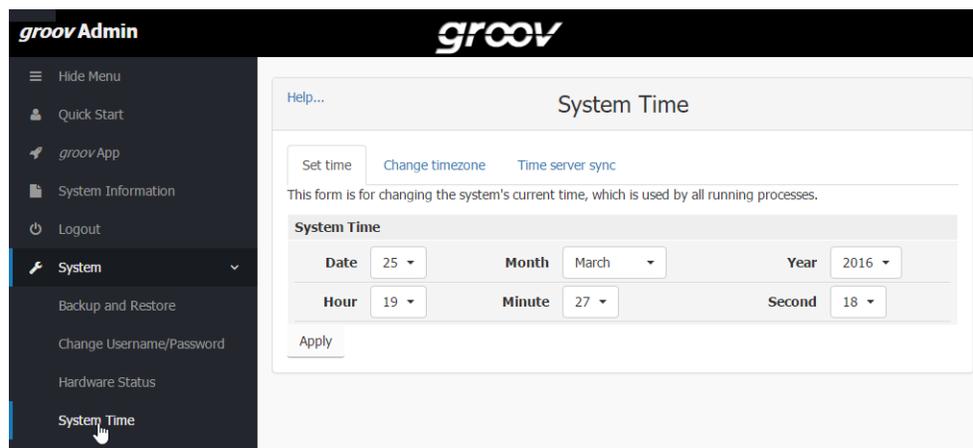


4. Click Save.

## Setting the System Time

You can set the time and time zone used by the *groov* Box. You can also set the Box to synchronize with a specific time server.

1. In the left navigation bar, choose System > System Time.



2. Set the time and date and then click Apply.

- To change the time zone from the default of UTC (Coordinated Universal Time), click the Change timezone tab.

The screenshot shows the 'System Time' configuration page with the 'Change timezone' tab selected. The 'Time Zone' section contains a dropdown menu labeled 'Change timezone to' with 'UTC (UTC)' selected. A 'Save' button is located below the dropdown.

- In the drop-down list, select a time zone, and then click Save.
- To set up the groov Box to automatically synchronize the time with a remote server, click the Time server sync tab.

Synchronization uses the Unix time protocol or NTP, depending on the remote system.

The screenshot shows the 'System Time' configuration page with the 'Time server sync' tab selected. The page contains a text box for 'Timeserver hostnames or addresses (separated by spaces)' with the value '0.us.pool.ntp.org 1.us.pool.ntp.org'. Below this is a radio button group for 'Synchronize once per day?' with 'Yes' selected. A 'Sync and Apply' button is at the bottom.

- Enter the hostnames or addresses of the time server(s). Separate servers by a space.
- Click Yes next to "Synchronize once per day."
- Click Sync and Apply.



# 4: Using an SSL Certificate

*groov* uses an SSL certificate to encrypt communications and prove *groov*'s identity to client browsers. An SSL certificate contains the server name, the name of the organization that controls the server, and digital signatures of organizations that vouch for the authenticity of the certificate. The certificate is digitally signed either by a *certificate authority* (CA) or it is *self-signed*.

The default certificate type (a self-signed certificate) and configuration will cause your web browser to issue an untrusted site warning when accessing *groov*. To avoid the warning you can install the self-signed certificate in all the browser certificate stores used to access *groov*. However, whether or not the certificate is installed in the certificate stores, communication is always encrypted.

Here's a comparison of the certificate types:

	Self-Signed Certificate (default)	Self-Signed Certificate installed on all browser certificate stores	CA-Signed Certificate
Best Use	For one or two <i>groovs</i> and a small set of client browsers that remain pretty much the same, and users who trust that your certificate is valid	Same as default, plus it avoids seeing the untrusted site warning from the browser	Use with a system with many <i>groovs</i> , or the set of browsers that will access <i>groovs</i> is unknown or changes frequently, or users who will not trust your self-signed certificate
Cost	Free	Free	Public CA-signed certificates cost anywhere from \$9 to \$100 or more per year
Ease of Configuration	Easiest configuration	Must install in the browser certificate store for every browser that accesses the server	More complex initial configuration because a certificate authority signature must be obtained
Untrusted Site Warning	Browser raises untrusted site warning. (But communication is still encrypted.)	No untrusted site warning from browser	No untrusted site warning from browser. Trusted by all major browsers.
Trust Level	Trusted by those to whom the <i>groov</i> administrator has demonstrated the validity of the certificate (e.g. by providing the <a href="#">certificate thumbprints</a> ).	Trusted by those who trust the <i>groov</i> administrator enough to install or let him or her install the certificate in their browser certificate store	Trusted by everyone

If you are using a **self-signed certificate**, see ["Using a Self-Signed Certificate" on page 42](#).

If you are using a **CA-signed certificate**, see ["Using a CA-Signed Certificate on \*groov\* Box" on page 50](#).

## Using a Self-Signed Certificate

A self-signed certificate encrypts communications, but does not include a digital signature from a commercial CA. It is free and easy to configure, but if you want to avoid having your users see an untrusted site warning every time they use *groov*, you must install the self-signed certificate in the browser certificate store for every browser that will access *groov*. This type of certificate is a good solution for a small set of *groovs* and a small set of client browsers that you can configure.

Follow these steps to create and install a self-signed certificate:

[“Step 1: Create a Self-Signed Certificate and Private Key” on page 42](#)

[“Step 2: Add the Self-Signed Certificate to a Browser Trust Store on a Computer” on page 46](#)

[“Step 3: Install an SSL Certificate on Mobile Devices” on page 49](#)

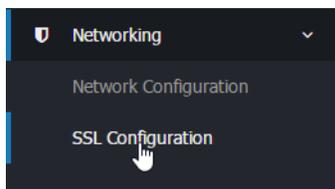
### Step 1: Create a Self-Signed Certificate and Private Key

Follow the steps below to generate the following components required to configure self-signed certificate SSL communication. The self-signed certificate is automatically installed on the *groov* Box.

- **Private Key:** This must be kept secret and never shared. Keep a copy of it in a safe and secure place. There is also a **Public Key** included in the signed certificate. You will not handle the public key using *groov* Admin.
- **Signed Certificate:** Contains identification information, the public key, and a digital signature. Identification information includes the server name and the name of the organization that controls the server. The self-signed certificate is digitally signed by the Private Key to establish authenticity. The Certificate is automatically installed on the *groov* Box.

To generate a private key and self-signed certificate:

1. In *groov* Admin, select Networking > SSL Configuration.



2. Click the Create certificate tab.
3. Fill in the Create SSL key form as follows:

**Server name:** Enter the [fully qualified domain name](#) (or *hostname*) of this *groov* Box that client browsers will use to access *groov*. (See also, [“Changing the Hostname, DNS Servers, or IPv4 Gateway” on page 23.](#)) The server name may contain letters a–z (case insensitive), digits 0–9, or a hyphen (-). No other characters are allowed. The server name must not start with a hyphen.

For example, if the URL you will use to access *groov* in client browsers is <https://process1.acme.com>, then you enter `process1.acme.com`

If you have multiple *groovs* with fully qualified hostnames all with the same domain, another option is to create a self-signed wildcard certificate. For example, if you have two *groovs* with the hostnames `groov1.foo.com` and `groov2.foo.com`, you can create a certificate that has the hostname `*.foo.com`. The same private key and certificate are then installed on all the *groovs*.

**Server name:** Enter the hostname of this *groov* Box that client browsers will use to access *groov*. (See also, “[Changing the Hostname, DNS Servers, or IPv4 Gateway](#)” on page 23.) The server name may contain letters a–z (case insensitive), digits 0–9, or a hyphen (-). No other characters are allowed. The server name must not start with a hyphen.

For example, if the URL client browsers will use to access this *groov* Box is:

<https://process1.acme.com>, enter `process1.acme.com`

If the URL client browsers will use to access this *groov* Box is:

<https://mobilehmi>, enter `mobilehmi`

**Email address:** (optional) Enter the email address of the person responsible for administering this certificate.

**Department:** Use this field to differentiate between divisions within an organization. For example, you might enter “Engineering” or “Manufacturing.” If applicable, you can enter the DBA (doing business as) name in this field.

**Organization:** The legally registered name of your business. This business must be the legally registered owner of the domain name.

**City or Locality:** Name of the city or locality where your organization is located. Spell out the name of the city or locality. Do not abbreviate.

**State:** Full name of the state, province, region, territory where your organization is located. Do not abbreviate.

**Country code:** The two-letter International Organization for Standardization (ISO-) format country code for the country in which your organization is legally registered. [Click here for a complete list of ISO country codes.](#)

**RSA key size:** Both the public key and the private key. The recommended key size is 2048 bits. Avoid key sizes smaller than 2048 bits.

**Days before expiry:** Enter the number of days before the self-signed certificate is expired and has to be replaced. It’s up to the *groov* Administrator how many days to enter. For example, if you want the certificate to be valid for 10 years, enter 3650.

4. Click Create Now.

*groov* Admin creates the new private key and self-signed certificate. *groov* Admin also creates a certificate signing request (CSR) to use if you want to obtain a CA-signed certificate (see “[Using a CA-Signed Certificate on groov Box](#)” on page 50).



It might take some time, but eventually you should see the security warning. (The security warning appears because the new certificate that was just installed on the *groov* Box is not trusted by the browser.)

- Accept the security warning as described below.

 **For Chrome:** Click “Proceed anyway.”

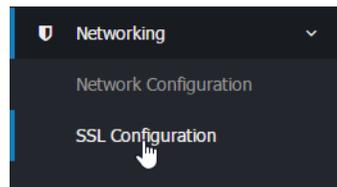
 **For Firefox:**

- Expand “I Understand the Risks.”
- Click Add Exception to open the Add Security Exception dialog box.
- Select “Permanently store this exception.”
- Click Confirm Security Exception.

 **For Internet Explorer 10:** Click “Continue to this website (not recommended).”

 For Safari: Click Continue.

- When *groov* Admin returns, select Networking > SSL Configuration.



- Click the Current Certificate tab, then select “PEM format.”



Help... **SSL Encryption**

Current certificate [Create certificate](#) [Upload certificate](#)

This section shows the details of the current *groov* Admin SSL certificate, and allows it to be downloaded so that it can be accepted by your browser.

Details of current certificate			
<b>Authority name</b>	opto-00-d2-dc	<b>Organization</b>	groov on opto-00-d2-dc
<b>Issuer name</b>	opto-00-d2-dc	<b>Issuer organization</b>	groov on opto-00-d2-dc
<b>Valid until</b>	Mar 24 20:27:52 2046 GMT	<b>Certificate type</b>	Self-signed
<b>Download certificate</b>	<a href="#">PEM format</a>   <a href="#">PKCS12 format</a>   <a href="#">CSR</a>		



The certificate’s text appears.

```

-----BEGIN CERTIFICATE-----
MIIEBTCCAu2gAwIBAgIJAMz8yixPBBGyMA0GCSqGSIb3DQEBCwUAMIGYMQswCQYD
VQQGEwJVUzELMAkGA1UECAwCQ0ExETAPBgNVBACMCFRlbWVjdWxhMSEwHwYDVQK
DBHPUFRPIDIyIG9uIG9wdG8tMDAtZDItZGMxDDAKBgNVBAsMA0VuzEwMBQGA1UE
AwNMTkyLjE2OC4wLjEwNDEgMB4GCSqGSIb3DQEJARYRZHNjYXJyQG9wdHAYMi5j
b20wHhcNMTUwMjEwMjEzNTU3WhcNNDUwMjEwMjEzNTU3WjCBMDELMAkGA1UEBHM
CzAJBgNVBAGMAkNBMRewDwYDVQQHDAhUZW11Y3VsYTEhMB8GA1UECgwYU29tMIIB
TyAyMiBvbiBvcHRvLTAwLWQyLWRjMQwwCgYDVQQLDANFbmcxPjAUBG9wBAMMDTE5
Mi4xNjguMC4xMDQxIDAeBgkqhkiG9w0BCQEWEWRzY2FyckBvcHRwMjIuY29tMIIB
IjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEApmVmd+ATfSBegut+qy0C20QP
HJspbae+OP1mK18LRSXGmOkC1+U12qMF7vVpokFD21Xmg/ytBOCfcjPuxriGCh5
3RF7mdF4RBaZ0TnF7Y3cqdBtQ087UPUfAsv6EXyLXA3qlFMnnspl+Jrh8l/dNwN/
twIS0rgrDf1j3ugGdV0e4wzZ+SGqoYiIVkASUzV5a3+2SCfojRYxmvvSnfew9Lg4
GWUJMTHW0qmpCwXgBOIasXzyvxxwIO4zqzEygBVhnl1tjCgSxhnm/8607s61Rh7Fd
Zt11vEj8X/T/oDceFp7Na48fKUGgjo7ubcYEWiAnWpLbA/8LdfW4mDoSok2bhQID
AQAbolAwTjAdBgNVHQ4EFgQUb+2Tvx3Rpg3b9ZB1hwrZiIitutsWHwYDVR0jBBgw
FoAUB+2Tvx3Rpg3b9ZB1hwrZiIitutsWDAYDVR0TBAUwAwEB/zANBgkqhkiG9w0B
AQsFAAOCAQEAA71G7qjadOdWHldBwA0VMu85uHzI+NUDLQDVoyJQ2+TVEOgC4m+x
p2wuf/c4+RAvTOeNzxYGvt2iVCmH1vyZWW0VJ3OIXSfgdgkLjN7xioYW58jttq0G
g4xGAsN1opxG4Nut9ubjYLSjibF71iGzu4d5/PLhQDHqAUlWHk+sHyQDiWASgeh0
Spft39SKnNgBLBASwRCnmasqylTYwh1D9AHWKAZVI3h0xCv1qxhKhjRKRWA5bqrG
c5fm0eXf3cGe/XYaDn9iWdt/7fHnJZ7ACncXQVXxjTdF81Z2Ca9ge2y4E/+ox0Yj
Cg801mjL70Bjs96jP9YbWJO+BOGbkhtjw==
-----END CERTIFICATE-----

```

- Copy the certificate text and paste it to a file named `<server name>.cer` (where `<server name>` is replaced by the server name value you entered on the Create SSL key form.)

## Step 2: Add the Self-Signed Certificate to a Browser Trust Store on a Computer

To prevent the untrusted site warning in browsers, the self-signed certificate must be added to the trust store for each browser used to access *groov*. This section describes how to add a self-signed certificate on a computer. [Step 3](#) describes how add a self-signed certificate on a mobile device.

See the section below for the client computer's operating system.

["Windows" on page 46](#)

["OS X" on page 48](#)

### Windows

#### Internet Explorer & Chrome

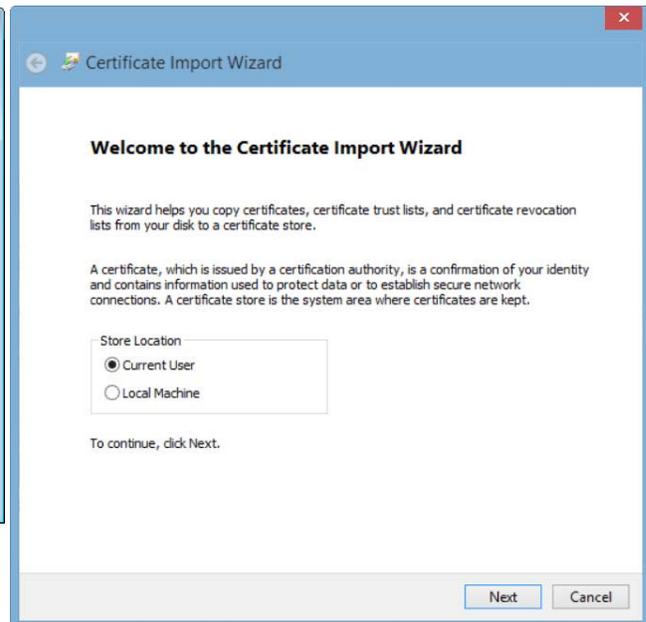
- In Windows file explorer, locate the `<server name>.cer` file you created in the previous step.
- Right-click on the file and choose Install Certificate.

The Certificate Import Wizard appears.

Windows 7



Windows 8



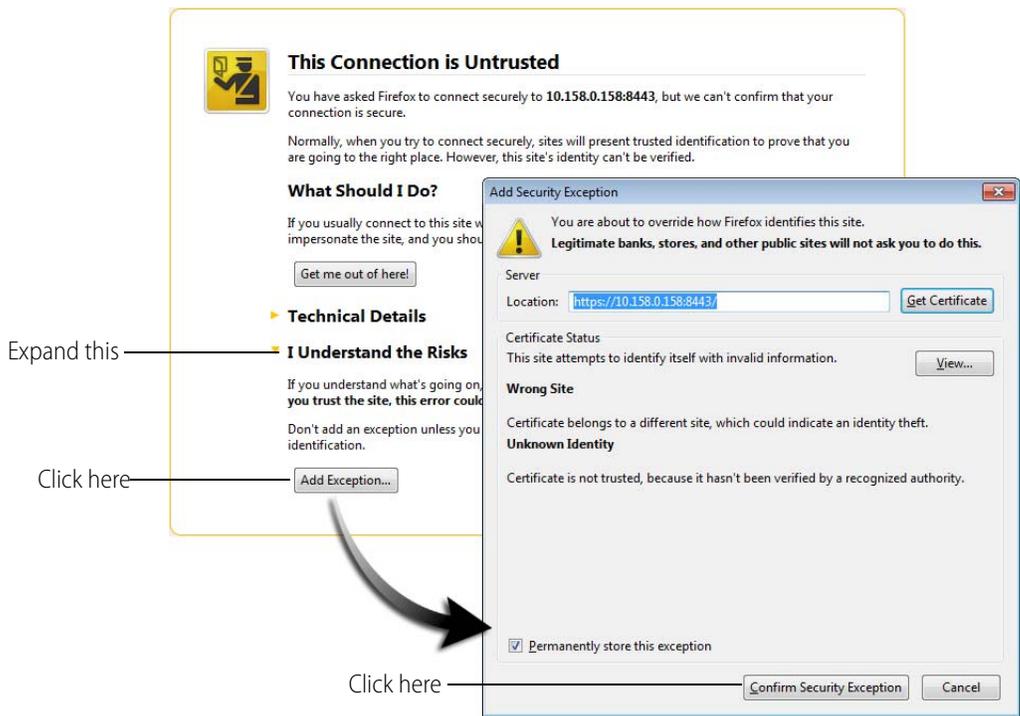
3. (Windows 8 only) If you are administrator of local machine, choose the Local Machine certificate store so this certificate will be trusted by all user accounts. Otherwise it will only be trusted by the current user account.
4. Click Next.
5. Select "Place all certificates in the following store."
6. Click Browse to open the Select Certificate Store dialog box.
7. Select Trusted Root Certification Authorities, and then click OK.
8. Click Next.
9. Click Finish.
10. A security warning alerts you that certificate installation is a risk if you don't trust the certificate.
11. Click Yes to affirm that you trust the self-signed certificate.
12. To verify the certificate was installed correctly, open Internet Explorer or Chrome and enter the hostname specified on the certificate. If the browser does not generate an untrusted site warning, the certificate was installed correctly.

### Firefox

The self-signed certificate is added to the certificate store by adding a security exception. Firefox will present several warnings about creating a security exception for a self-signed certificate, but because you created and control the private key and certificate and installed the private key on the server, you can trust the certificate identifies your server.

1. Open Firefox and enter `https://<server name>`  
A warning appears that says, "This Connection is Untrusted."
2. Expand "I Understand the Risks."
3. Click Add Exception to open the Add Security Exception dialog box.
4. Select "Permanently store this exception."

5. Click Confirm Security Exception.

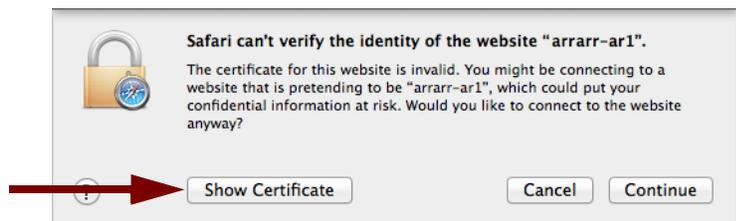


6. To verify the certificate was installed correctly, open Firefox and enter the hostname specified on the certificate. If the browser does not generate an untrusted site warning, the certificate was installed correctly.

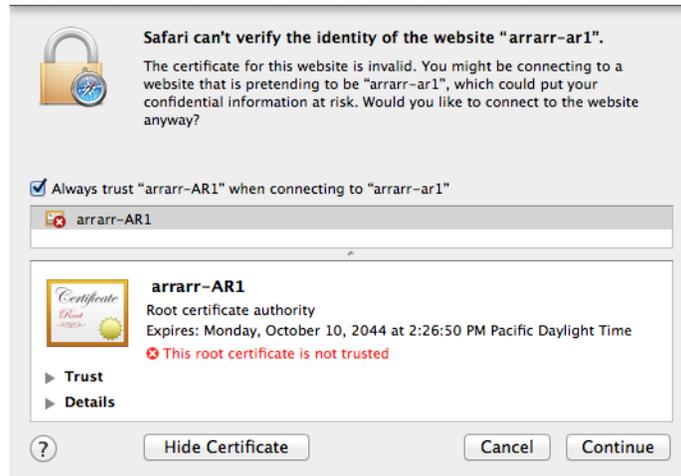
## OS X

### Safari and Chrome

1. Open Safari and enter https://<server name> to open this dialog box:



2. Click Show Certificate to reveal the full details:



3. If the certificate looks good to you, check the “Always trust <server name> when connecting to <server name>” and click Continue. You will be asked to provide your password to authorize the addition of this certificate to your keychain, after which the browser and the Hosted Projects window will accept the SSL certificate as valid.
4. To verify the certificate was installed correctly, open a browser and enter the hostname specified on the certificate. If the browser does not generate an untrusted site warning, the certificate was installed correctly.

### Step 3: Install an SSL Certificate on Mobile Devices

When you open the operator interface in a browser on a smart phone or tablet a security warning will appear unless you have installed a self-signed SSL certificate. See the section below for the device’s operating system.

- “iOS Devices” on page 49
- “Android Devices” on page 50

#### iOS Devices

1. Email the <server name>.cer file you created previously (see “Step 1: Create a Self-Signed Certificate and Private Key” on page 42) to an email account accessible from iOS.
2. On the iOS device, open the email message containing <server name>.cer.
3. Tap on <server name>.cer
4. A message appears, “The authenticity of <server name> cannot be verified...”
5. Click Install.
6. Click Install Now.
7. Click Done.
8. To verify the certificate was installed correctly, open a browser and enter the hostname specified on the certificate. If the browser does not generate an untrusted site warning, the certificate was installed correctly.

### Android Devices

1. Email the `<server name>.cer` file you created previously (see “[Step 1: Create a Self-Signed Certificate and Private Key](#)” on page 42) to an email account accessible from Android.
2. On the Android device, open the email and click the `<server name>.cer` file to install the certificate.
3. When prompted for a certificate name, type in a name. Make sure “Credential use:” is set to “VPN and apps.”
4. Click OK.
5. To verify the certificate was installed correctly, open a browser and enter the hostname specified on the certificate. If the browser does not generate an untrusted site warning, the certificate was installed correctly.

## Using a CA-Signed Certificate on *groov* Box

Follow these steps to create a certificate signing request (CSR) and install a CA-signed certificate:

“[Step 1: Create a CSR](#)” (see page 50)

“[Step 2: Obtain a CA-Signed Certificate](#)” (see page 52)

“[Step 3: Install the CA-Signed Certificate on \*groov\* Box](#)” (see page 53)

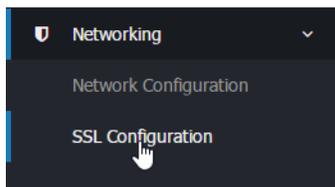
### Step 1: Create a CSR

*IMPORTANT: This procedure will create and install a new private key on the *groov* box.*

Follow the steps below to generate a certificate signing request (CSR).

You will send the CSR to the Certificate Authority (CA) of your choice. The CA verifies the identification information and signs the CSR, which then becomes a CA-signed Certificate.

1. In *groov* Admin, select Networking > SSL Configuration.



2. Click the Create certificate tab.
3. Fill in the Create SSL key form as follows:

**Server name:** Enter the fully qualified hostname of this *groov* Box that client browsers will use to access *groov* (i.e. the hostname and domain name, such as `mobilehmi.mydomain.com`.) The server name may contain letters a–z (case insensitive), digits 0–9, or a hyphen (-). No other characters are allowed. The server name must not start with a hyphen.

For example, if the URL you will use to access *groov* in client browsers is <https://process1.acme.com>, then you enter `process1.acme.com`

If the URL client browsers will use to access this *groov* Box is:

<https://mobilehmi.mydomain.com>, enter `mobilehmi.mydomain.com`

See also, “Changing the Hostname, DNS Servers, or IPv4 Gateway” on page 23.

**Email address:** (optional) Enter the email address of the person responsible for administering this certificate.

**Department:** Use this field to differentiate between divisions within an organization. For example, you might enter “Engineering” or “Manufacturing.” If applicable, you can enter the DBA (doing business as) name in this field.

**Organization:** The legally registered name of your business. This business must be the legally registered owner of the domain name.

**City or Locality:** Name of the city/locality in which your organization is registered/located. Spell out the name of the city/locality. Do not abbreviate.

**State:** Full name of the state, province, region, territory where your organization is located. Do not abbreviate.

**Country code:** The two-letter International Organization for Standardization (ISO-) format country code for the country in which your organization is legally registered. [Click here for a complete list of ISO country codes.](#)

**RSA key size:** Both the public key and the private key. The recommended key size is 2048 bits. Avoid key sizes smaller than 2048 bits.

**Days before expiry:** This does not affect a CA-signed certificate, so you can leave this blank.

4. Click Create Now.

*groov* Admin creates a certificate signing request in addition to a new private key and self-signed certificate (which is automatically installed).

*groov* Admin initially displays all of these together.

5. Select the Current Certificate tab, then click the CSR hyperlink at the bottom of the dialog box.

Help... **SSL Encryption**

Current certificate | Create certificate | Upload certificate

This section shows the details of the current *groov* Admin SSL certificate, and allows it to be downloaded so that it can be accepted by your browser.

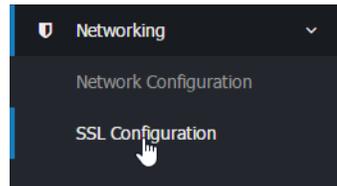
Details of current certificate			
<b>Authority name</b>	opto-00-d2-dc	<b>Organization</b>	groov on opto-00-d2-dc
<b>Issuer name</b>	opto-00-d2-dc	<b>Issuer organization</b>	groov on opto-00-d2-dc
<b>Valid until</b>	Mar 24 20:27:52 2046 GMT	<b>Certificate type</b>	Self-signed
<b>Download certificate</b>	PEM format   PKCS12 format   CSR		



3. Finish the transaction with the certificate authority and receive your new SSL certificate.

### Step 3: Install the CA-Signed Certificate on *groov* Box

1. In *groov* Admin, select Networking > SSL Configuration.



2. Click the Upload certificate tab on the SSL Encryption page.

 A screenshot of the 'SSL Encryption' page in the groov Admin interface. The page has a light gray header with 'Help...' on the left and 'SSL Encryption' in the center. Below the header, there are three tabs: 'Current certificate', 'Create certificate', and 'Upload certificate'. A red arrow points to the 'Upload certificate' tab. Below the tabs, there is a text area for 'Private key text' and a 'Choose File' button. Below that, there is a section for 'Certificate text' with a radio button selected for 'Combined with private key' and another 'Choose File' button. At the bottom, there is a section for 'Chained certificate text' with radio buttons for 'No chained certificate' (selected) and 'Entered below ..', and a third 'Choose File' button. A 'Save' button is at the bottom left of the form.

3. Under "Private key text" click Browse and specify the `<server name>.key` file created previously. See "Step 1: Create a Self-Signed Certificate and Private Key" on page 42.

**IMPORTANT:** Make sure you keep the Private Key private. If it is compromised, security is no longer guaranteed.

4. Under "Certificate text" click "Entered below," then click Browse and specify the file containing the signed certificate that was obtained from the CA.
5. If your CA used intermediate CA certificates, they should all be contained in a single file. (If you are not sure if your CA used intermediate CA certificates, ask your CA.)

**For example**, if you obtained your signed certificate from [StartSSL™](#), the certificate was downloaded to a file named *sub.class1.server.ca.pem*.

- a. Under "Chained certificate text," select "Entered below."
  - b. Click Browse and specify the file containing all the intermediate CA certificates in the certificate chain between your certificate and the root CA certificate. For a StartSSL class 1 free certificate this is *sub.class1.server.ca.pem*.
6. Click Save to complete the process.

The browser pauses for a few seconds while the certificates are applied to the *groov* box. When the certificates have been installed successfully, a confirmation message appears.

7. To verify the certificate was installed correctly, use a browser to access the *groov* Box using the hostname specified on the certificate. If the browser does not generate an untrusted site warning, the certificate was installed correctly.

# 5: Maintenance and Troubleshooting

## Maintenance

### Turning the *groov* Box On and Off



#### Turning the Box on

1. Check to make sure the PWR LED is on. This means that the *groov* Box is receiving power.
2. Briefly press the On/Off button. Wait until the SYS LED has stopped blinking and is solid green.

**CAUTION:** If you press the button for longer than four seconds, the *groov* Box will be restored to default settings. Your project will be erased.

**NOTE:** Always wait until the SYS LED has stopped blinking before you try to log into *groov*. Otherwise, you may not be able to use the hostname to log in. If this happens, see [page 58](#).

#### Turning the Box off

With the *groov* Box on, briefly press the On/Off button. The SYS LED will blink orange and then turn off. The PWR button will remain on as long as there is power from the power supply. Always allow the *groov* Box to turn off completely before removing power.

**CAUTION:** If you press the button for longer than four seconds, the *groov* Box will be restored to default settings. Your project will be erased.

## Resetting the *groov* Box to factory defaults

Restoring the *groov* Box restores the default network settings and erases all user data, including your project. When the process is complete, the Box will send out a DHCP request on ETH0, and you will be able to connect using the default hostname.

**CAUTION:** *When the groov Box is restored to factory default settings, your project will be erased.*

1. Check to see that the *groov* Box is turned off, but the PWR LED is on.
2. Press and hold the On/Off button for at least four seconds and until the STOR LED is blinking orange. Then release the button.

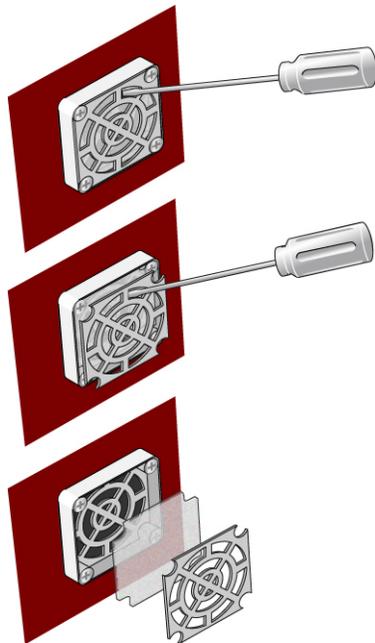
Both the SYS LED and STOR LED will be blinking orange at this point. When both the SYS LED and STOR LED stop blinking orange, the procedure is finished.

3. Briefly press the On/Off button to turn off the *groov* Box, then briefly press it again to turn the *groov* Box back on so that you can log in.

## Maintaining the fan filters

Be sure you check and clean the fan filters periodically and replace them when necessary. How often you do this will depend on the installation environment. If the fan filters on the *groov* Box become clogged, they can be re-used. A pair of extra filters is also provided.

1. Pry off the outer cover using a small utensil around the outer edge.
2. Remove the old filter.
3. Rinse and pat dry the old filter, or replace it with a new one.
4. Using your fingers, snap the outer cover back into place.



## Troubleshooting

### The *groov* Box is not receiving power

- Make sure you are using either the power supply that came with *groov* Box or else a power supply with the appropriate specifications. See "[Appendix A: Specifications and Dimensions](#)" on [page 61](#).
- Check that the power supply is securely attached to the *groov* Box and the power supply is receiving power.

### The *groov* Box is connected to the Ethernet network but not working

- Make sure the *groov* Box has been turned on, the PWR LED is lit and not blinking, and the LNK ACT LED for the connected Ethernet interfaces are lit. (See "[LEDs](#)" on [page 64](#).)
- Make sure you've typed the URL accurately and included the "s": `https://` plus the *groov* Box hostname or IP address. Check the label on the top of the *groov* Box, where the hostname should be written.  
URL examples:
  - `https://Opto-06-51-f2`
  - `https://192.168.11.2`
- If you cannot connect to *groov* on the network, make sure the Ethernet cable is connected to ETH0, which must be used for initial setup and configuration. After that, either ETH0 or ETH1 may be used.
- Make sure that the *groov* Box and the computer are connected to the same network. If you still can't reach the Box, your network is set up differently. That's OK. Find out the following information about your network and your computer:
  - Does your network have a DHCP server?
  - Does your network have a DNS server?
  - Does your computer have more than one network interface card (NIC)?

See the next questions for more answers.

### DHCP (dynamic host configuration protocol) server

A DHCP server automatically assigns IP addresses to devices on the network, which is what the *groov* Box expects. If you have no DHCP, work with your IT Department to choose a static IPv4 address for the *groov* Box. To assign the fixed IP address, you'll need:

- a Windows PC on the same network subnet as the *groov* Box
- *groov* Find utility (on the CD that came with the *groov* Box)
- to assign the static IP address to the Box. See "[Assigning a Static IP Address](#)" on [page 22](#).

Once you've assigned the static IP address, open your web browser and for the URL enter `https://` plus the IP address you assigned to *groov*. For example: `https://182.154.1.68`

## DNS (domain name server)

A DNS (domain name server) keeps track of the unique hostname for each device on the network, so you can find it by name even if its IP address changes. If your network has no DNS, you won't be able to access the *groov* Box using its hostname, but you can access it using its IP address.

To determine the IP address, you'll need:

- a Windows PC on the same network subnet as the *groov* Box
- *groov* Find utility (on the CD that came with the *groov* Box). See "[Open \*groov\* Admin using \*groov\* Find \(Windows only\)](#)" on page 18.

Once you've found your *groov* Box in *groov* Find, click the link to set up the Box. Also make a note of the IP address shown, so later you can use it in your web browser instead of the hostname: for the URL enter https:// plus the Box's IP address. For example: https://192.168.1.54

## Computer with more than one NIC

**A:** More than one NIC can cause a problem when you're trying to communicate with *groov* using your browser and the *groov* Box's hostname.

Each NIC communicates on a separate network subnet. You may have one network subnet set up for your computers and a second one set up for your control system, for example (this is a pretty common scenario, and in fact we recommend it for security).

Make sure you're trying to reach the *groov* Box using the NIC for the network subnet it is on. You could unplug the Ethernet cable from your controller network NIC to force the PC to look for the *groov* Box on the computer network. Then try again using your browser and the *groov* Box's hostname.

If your control system and your computers are on separate network subnets, you'll need to set up ETH1 on the *groov* Box in order to reach your control system. See the next question.

## Controller, Modbus device, or OPC UA server can't be found

Are your control system and your computers on separate network subnets? We recommend this setup for security reasons, and the *groov* Box is designed to work this way. Here's what to do so *groov* can find your controller:

1. Plug the control network into ETH1 on the *groov* Box. (Remember, your computer network is plugged into ETH0. The two Ethernet network interfaces on the Box are independent, so that keeps the two network subnets separate.)
2. Follow the steps in "[Configuring ETH1 for the Control Network](#)" on page 24 to configure the ETH1 connection.
3. Now try configuring your controller or tag server again. This time *groov* should be able to find it.

## Cannot log into the *groov* Box using the hostname

When starting a *groov* Box, always wait until the SYS LED has stopped blinking before you try to access *groov*. Otherwise, you might not be able to log in using the hostname. If this happens, try one of the following methods to log in:

**Method 1:** Open *groov* Find and locate the IP address of the *groov* you want to log into. Log into *groov* using the IP address. After some time passes, you should be able to log in again using the hostname.

**Method 2:** Open a command prompt and enter `ipconfig /flushdns`. Then log into *groov* using the hostname.

## Considerations for locating the *groov* Box

The *groov* Box is an industrial appliance made to operate in tough environments, so it doesn't have to be pampered. Make sure you check the specs for temperature and humidity, and then place it where you can connect it to both your company computer network and your control network. (You will use separate connectors on the *groov* Box for these two networks to keep them physically separated—better for security.)

If you're using the wireless LAN, choose a location where the signal is constant and strong. Wireless networks can be unreliable unless carefully designed and periodically checked.

The Box can be DIN-rail mounted (DIN clips are built into the back) or mounted on a wall or equipment using the four exterior mounting tabs. Make sure there's space on both sides of the box so air can flow freely through the fans.

If you're a machine builder or OEM and including *groov* in your machine, the same basic ideas apply: check specs, check security, and mount where there's room for the Box to breathe. Also, make sure you have network access to the Box for updates.

## Using external Wi-Fi antennas

If you want, you can use external wireless antennas instead of the two that are provided. The connector is a reverse SMA.

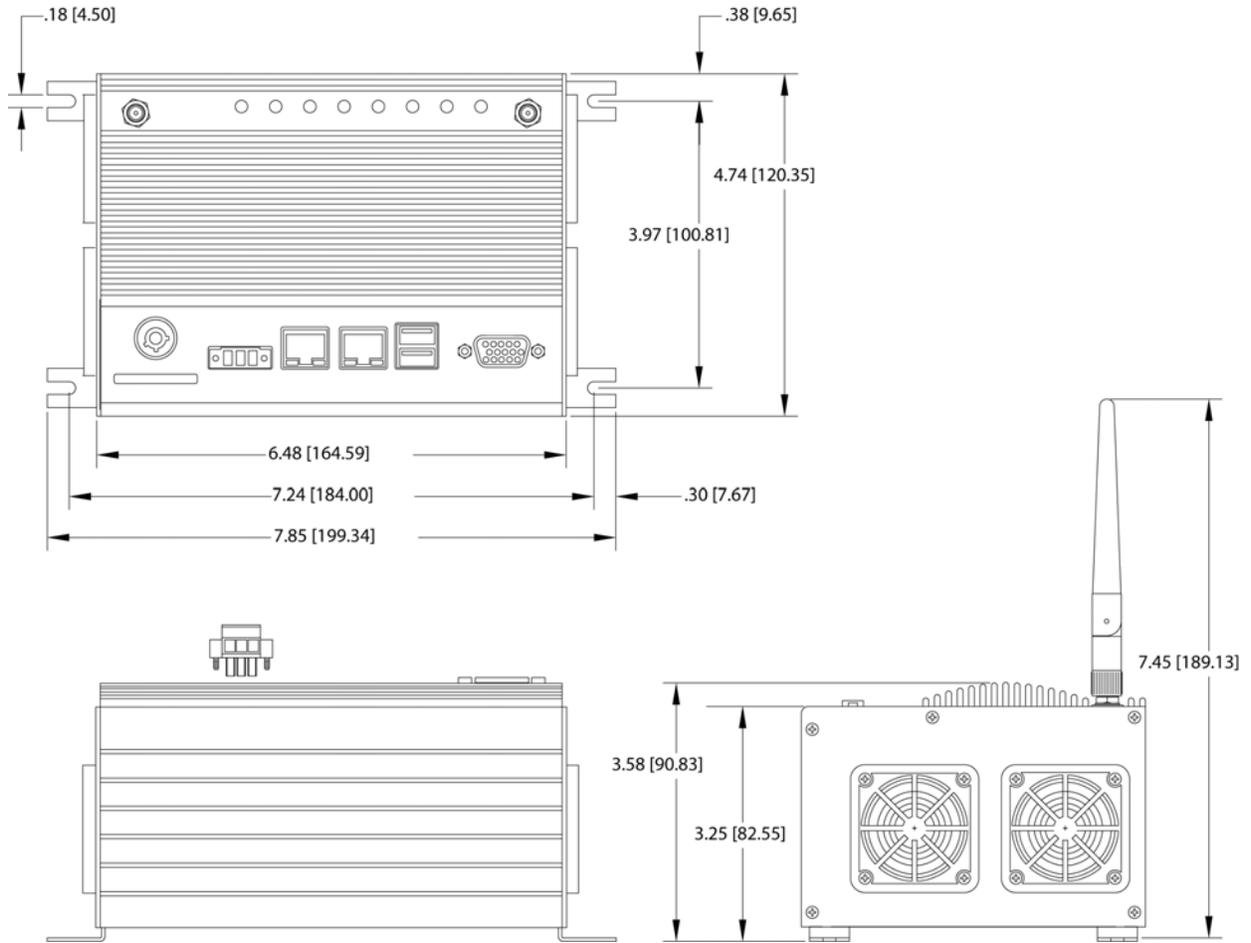


# A: Specifications and Dimensions

## Specifications

Ethernet Communication (wired)	Two independent 10/100/1000 Mbps RJ-45 connectors, each with a separate IP address (separate subnets)
Ethernet Comm (wireless)	802.11 b/g/n
Security (wireless)	WEP (64-bit and 128-bit) WPA PSK (also known as WPA Personal) WPA2 PSK (also known as WPA2 Personal)
Antenna Connector	Reverse polarity SMA (RP-SMA or RSMA)
Power Consumption	14-36 VDC, 24 VDC @ 1 amp (Power supply included; input 100-240 VAC. Use international adapter if needed.)
Enclosure	Sturdy metal case
USB	USB 2.0 (two)
Indicators	Ethernet interfaces (2): Link/Activity and Speed System: STOR, WLAN, USER, BATT, TEMP, FAN, SYS, & PWR
Operating Temperature	0 to 50 °C (32 to 122° F)
Storage Temperature	-20 to 60 °C (-4 to 140° F)
Operating Humidity	10% to 90% relative humidity, non-condensing
Storage Humidity	5% to 95% relative humidity, non-condensing
Agency Approvals	CE, RoHS, DFARS Wireless: U.S., FCC Part 15 Subpart C; Canada, IC RSS-210
Warranty	30 months

# Dimensions



# B: Connectors, Indicators, and LEDs

## Connectors and Indicators



## LEDS

The *groov* Box's LEDs use color and blinking to show status information.

LED	What it shows	Color	What it means
STOR	Hard drive activity	Blinking green	Activity on hard drive
		Blinking orange	Hard drive is being restored to factory defaults
WLAN	Wireless network connection status and network activity	Off	<i>groov</i> Box is disconnected from the wireless LAN.
		Green	<i>groov</i> Box is connected to the wireless network
		Blinking green	Wireless LAN activity
USER	Not used	n/a	n/a
BATT	Battery status	Green	Battery 90% Charged
		Blinking green	Battery charging
		Red	Outside voltage range. BIOS may be corrupted. Contact Product Support.
TEMP	Temperature status	Green	Temperature OK
		Red	Temperature outside operating range
FAN	Fan status	Green	Fans are operating properly
		Red	One or both fans have failed
SYS	<i>groov</i> Box status	Off	<i>groov</i> Box is turned off
		Green	<i>groov</i> Box is turned on
		Blinking green	<i>groov</i> Box is booting up
		Blinking orange	<i>groov</i> Box is shutting down
PWR	Power to Box	Off	No input power
		Green	Good input power
		Red	Input power outside normal range
SPEED	Ethernet link speed	Off	10 Mbps
		Green	100 Mbps
		Orange	1000 Mbps
LINK ACT	Ethernet network activity	Off	No Ethernet link
		Green	There is an Ethernet link, but no activity
		Blinking green	There is a link and activity

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