<table>
<thead>
<tr>
<th>1</th>
<th>Out of the Box</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>How-To Guides</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>References</td>
<td>42</td>
</tr>
</tbody>
</table>
This Quick Start Guide covers the first time connection procedures for the Netgate® 3100 Firewall Appliance and will provide the information needed to keep the appliance up and running.

Tip: Before getting started, we recommend downloading the PDF version of the Product Manual and the PDF version of the pfSense Documentation in case you lose Internet access.
1.1 Getting Started

The basic firewall configuration begins with connecting the Netgate® appliance to the Internet. The Netgate appliance should be unplugged at this time.

Connect one end of an Ethernet cable to the WAN port (shown in the Input and Output Ports section) of the Netgate appliance. The other end of the same cable should be inserted into a port of the Cable or DSL modem. The modem provided by the ISP should have multiple LAN ports. Any port should work.

Next, connect one end of a second Ethernet cable to the LAN port (shown in the Input and Output Ports section) of the Netgate appliance. Connect the other end to the computer.
1.2 Initial Configuration

Plug the power cable into the power port (shown in the Input and Output Ports section) to turn on the Netgate® Firewall. Allow 4 or 5 minutes to boot up completely.

Warning: If your DSL or Cable Modem has a default IP Address of 192.168.1.1, please disconnect the Ethernet cable from the WAN port on your Netgate 3100 Security Gateway before proceeding. You will need to change the default IP Address of the device during a later step in the configuration.

1. From the computer, log into the Web Interface
   Open a web browser (Google Chrome in this example) and type in 192.168.1.1 on the address bar. Press Enter.

   ![Fig. 1: Enter the Default LAN IP Address]

2. A warning message may appear. If this message or similar message is encountered, it is safe to proceed. Click the Advanced Button and then click Proceed to 192.168.1.1 (unsafe) to continue.

3. At the Sign In page, enter the default pfSense® Plus username and password and click Next.
   - Default Username: admin
   - Default Password: pfsense

1.2.1 The Setup Wizard

The following steps will step through the Setup Wizard for the initial configuration of the firewall.

Note: Ignore the warning to reset the ‘admin’ account password. One of the steps in the Setup Wizard is to change the default password.

1. Click Next to start the Setup Wizard.
2. Click Next after you have read the information on Netgate Global Support.
3. On the General Information page, use the following as a guide to configure the firewall.
   - Hostname: Any desired name can be entered. For the purposes of this guide, the default hostname pfsense is used.
Your connection is not private

Attackers might be trying to steal your information from 192.168.1.1 (for example, passwords, messages, or credit cards). Learn more

NETERR_CERT_AUTHORITY_INVALID

- Help improve Safe Browsing by sending some system information and page content to Google.
  - Privacy policy

Fig. 2: Click Advanced and then Proceed to 192.168.1.1 (unsafe)

![Webpage screenshot showing warning and options to proceed]

Fig. 3: Click Next
Domain: The default localdomain is used for the purposes of this tutorial.

DNS Servers: For purposes of this setup guide, use the Google public DNS servers (8.8.8.8 and 8.8.4.4).

![Wizard / pfSense Plus Setup / General Information](Image)

Fig. 4: Type in the DNS Server information and Click Next

4. Use the following information for the Time Server Information page.

   **Time Server Hostname:** Use the default time server address.

   **Timezone:** Select the time zone for the location of the firewall. For this guide, the Timezone will be set to America/Chicago for US Central time.

5. The WAN interface is the Public IP address the network will use to communicate with the Internet. Use the following information for the WAN configuration page.

   **DHCP** is the default and is the most common type of interface for home cable modems.

   **Default settings** for the other items on this page should be acceptable for normal home users.

6. Configuring LAN IP Address & Subnet Mask. The default LAN IP address of 192.168.1.1 and subnet mask of 24 is usually sufficient.

   **Tip:** If your DSL or Cable Modem has a default IP Address of 192.168.1.1, change the IP Address of your Netgate 3100 Security Gateway to a different subnet, such as 192.168.2.1 with a subnet mask of 24 to avoid an IP Address conflict.

7. Change the **Admin Password**. Enter the same password in both fields.

8. Click **Reload** to save the configuration.
Fig. 5: Change the Timezone and Click Next

Fig. 6: Default Settings Should Be Acceptable. Click Next
9. After a few seconds, a message will indicate the Setup Wizard has completed. To proceed to the pfSense® Plus dashboard, click **Finish**.

10. A final notification screen will appear with the **Copyright and Trademark Notices**. Read and click **Accept** to continue to the dashboard.

If you unplugged the Ethernet cable at the beginning of this configuration, reconnect it to the WAN port now.

This completes the basic configuration for the Netgate appliance.
1.3 pfSense Plus Overview

This page provides an overview of the pfSense® Plus dashboard and navigation. It also provides information on how to perform frequent tasks such as backing up the pfSense® Plus software and connecting to the Netgate firewall console.

1.3.1 The Dashboard

pfSense® Plus software is highly configurable, all of which can be done through the dashboard. This orientation will help to navigate and further configure the firewall.

Section 1 shows important system information such as the model, Serial Number, and Netgate Device ID for this Netgate firewall.

Section 2 identifies what version of pfSense® Plus software is installed, and if an update is available.

Section 3 describes Netgate Service and Support.

Section 4 shows the various menu headings. Each menu heading has drop-down options for a wide range of configuration choices.
1.3.2 Re-running the Setup Wizard

To re-run the Setup Wizard, navigate to **System -> Setup Wizard**.

![Setup Wizard](image)

Fig. 9: Re-run the Setup Wizard

1.3.3 Backup and Restore

It is important to backup the firewall configuration prior to updating or making any configuration changes. From the menu at the top of the page, browse to **Diagnostics > Backup/Restore**.

Click **Download configuration as XML** and save a copy of the firewall configuration to the computer connected to the Netgate firewall.

This backup (or any backup) can be restored from the same screen by choosing the backed up file under **Restore Configuration**.

**Note:** Auto Config Backup is a built-in service located at **Services -> Auto Config Backup**. This service will save up to 100 encrypted backup files automatically, any time a change to the configuration has been made. Visit the Auto Config Backup page for more information.
Fig. 10: Backup & Restore

Fig. 11: Click Download configuration as XML
Connecting to the Console

There are times when accessing the console is required. Perhaps GUI console access has been locked out, or the password has been lost or forgotten.

See also:

Connecting to the Console Port  Connect to the console. Cable is required.

Tip:   To learn more about getting the most out of your Netgate appliance, sign up for a pfSense Plus Training course or browse our extensive Resource Library.

1.4 Input and Output Ports

1.4.1 Rear Side

Routed Ethernet

<table>
<thead>
<tr>
<th>Interface Name</th>
<th>Port Name</th>
<th>Port Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAN</td>
<td>mvneta2</td>
<td>RJ-45</td>
</tr>
<tr>
<td>OPT1</td>
<td>mvneta0</td>
<td>RJ-45</td>
</tr>
</tbody>
</table>

Table 1: RJ-45 LEDs Configuration

<table>
<thead>
<tr>
<th>LED Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left LED only green</td>
<td>Flashes with <strong>1Gb</strong> traffic, solid with link.</td>
</tr>
<tr>
<td>Both LEDs green</td>
<td>Both flash with <strong>100Mb</strong> traffic, solid with link.</td>
</tr>
<tr>
<td>Right LED only green</td>
<td>Flashes with <strong>10Mb</strong> traffic, solid with link.</td>
</tr>
</tbody>
</table>
Switched Ethernet

<table>
<thead>
<tr>
<th>Interface Name</th>
<th>Port Name</th>
<th>Port Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN1</td>
<td>mvneta1</td>
<td>RJ-45</td>
</tr>
<tr>
<td>LAN2</td>
<td>mvneta1</td>
<td>RJ-45</td>
</tr>
<tr>
<td>LAN3</td>
<td>mvneta1</td>
<td>RJ-45</td>
</tr>
<tr>
<td>LAN4</td>
<td>mvneta1</td>
<td>RJ-45</td>
</tr>
</tbody>
</table>

Table 2: RJ-45 LEDs Configuration

<table>
<thead>
<tr>
<th>LED Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both LEDs green</td>
<td>Left Flashes with 1Gb traffic, solid with link.</td>
</tr>
<tr>
<td>Left LED only green</td>
<td>Left flashes with 100Mb traffic, solid with link.</td>
</tr>
<tr>
<td>Right LED only green</td>
<td>Left Flashes with 10Mb traffic, solid with link.</td>
</tr>
</tbody>
</table>

**Note:** Prior to pfSense® software version 2.4.3, the switched Ethernet ports on the SG-3100 did not support auto MDI-X and required crossover cable unless the client-side connection supported auto MDI-X. This was resolved with 2.4.3 and later versions and a crossover cable is no longer required.

**Warning:** The LAN ports do not support the Spanning Tree Protocol (STP). Two or more ports connected to another Layer 2 switch, or connected to 2 or more different interconnected switches, could create a flooding loop between the switches. This can cause the router to stop functioning until the loop is resolved.

Other Ports

1. Power
   - 12VDC 3.33A with threaded locking connector
   - Power Consumption 5W (idle)
2. Recessed Reset Button (performs a hard reset, immediately turning the system off)
3. USB 3.0
4. Micro SIM
5. Console (Mini-USB)

**Warning:** A hard reset of the system could cause data corruption and should be avoided. Halt or reboot the system through the console menu or the webConfigurator to avoid data corruption.
1.4.2 Front Side

<table>
<thead>
<tr>
<th>LED Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot Process</td>
<td>The sequence, circle -&gt; square -&gt; diamond, quickly flashes blue.</td>
</tr>
<tr>
<td>Boot Completed</td>
<td>The diamond slowly flashes blue.</td>
</tr>
<tr>
<td>Update is Available</td>
<td>The square slowly flashes orange.</td>
</tr>
</tbody>
</table>

1.5 Hardware Specifications
# Security Gateway Manual SG-3100

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>ARM v7 Cortex-A9 @ 1.6 GHz with NEON SIMD and FPU</td>
</tr>
<tr>
<td><strong>CPU Cores</strong></td>
<td>Dual Core</td>
</tr>
<tr>
<td><strong>Networking</strong></td>
<td>Two 1 Gigabit Ethernet Ports, configured as dual WAN or one WAN one LAN plus four-port 1 Gbps Marvell 88E6141 switch, uplinked at 2.5 Gbps to the third port on the SoC for LAN.</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>8 GB eMMC Flash onboard, upgradable to 32 GB M.2 SATA SSD</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>2 GB DDR4L</td>
</tr>
</tbody>
</table>
| **Expansion**   | 2x M.2 ‘B’ key sockets (SSD, LTE)  
1x M.2 ‘E’ key socket (2230 form factor) for WiFi / Bluetooth  
1x miniPCIe (WiFi)  
microSIM |
| **Console Port**| MiniUSB (console cable included)                                                                                                                                 |
| **USB Ports**   | 1x 3.0 port                                                                                                                                |
| **LED**         | 3 user-controllable full-color RGB LEDs                                                                                                 |
| **Enclosure**   | Desktop 1.56” tall x 7” deep x 8” wide                                                                                                  |
| **Form Factor** | Standard mini-ITX 170mm x 170mm                                                                                                          |
| **Cooling**     | Passive (no fan)                                                                                                                           |

Environmental  
32°F (0°C) to 149°F (65°C)  
Certifications  
FCC, CE, RoHS, UL, IEC-60950
1.6 Safety and Legal

1.6.1 Safety Notices

1. Read, follow, and keep these instructions.
2. Heed all warnings.
3. Only use attachments/accessories specified by the manufacturer.

**Warning:** Do not use this product in location that can be submerged by water.

**Warning:** Do not use this product during an electrical storm to avoid electrical shock.

1.6.2 Electrical Safety Information

1. Compliance is required with respect to voltage, frequency, and current requirements indicated on the manufacturer’s label. Connection to a different power source than those specified may result in improper operation, damage to the equipment or pose a fire hazard if the limitations are not followed.
2. There are no operator serviceable parts inside this equipment. Service should be provided only by a qualified service technician.
3. This equipment is provided with a detachable power cord which has an integral safety ground wire intended for connection to a grounded safety outlet.
   a) Do not substitute the power cord with one that is not the provided approved type. If a 3 prong plug is provided, never use an adapter plug to connect to a 2-wire outlet as this will defeat the continuity of the grounding wire.
   b) The equipment requires the use of the ground wire as a part of the safety certification, modification or misuse can provide a shock hazard that can result in serious injury or death.
   c) Contact a qualified electrician or the manufacturer if there are questions about the installation prior to connecting the equipment.
   d) Protective grounding/earthing is provided by Listed AC adapter. Building installation shall provide appropriate short-circuit backup protection.
   e) Protective bonding must be installed in accordance with local national wiring rules and regulations.

1.6.3 FCC Compliance

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment.

1.6.4 Industry Canada

This Class B digital apparatus complies with Canadian ICES-3(B). Cet appareil numérique de la classe B est conforme à la norme NMB-3(B) Canada.

1.6.5 Australia and New Zealand

This is a AMC Compliance level 2 product. This product is suitable for domestic environments.

1.6.6 CE Marking

CE marking on this product represents the product is in compliance with all directives that are applicable to it.

1.6.7 RoHS/WEEE Compliance Statement

English

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.

Deutsch

Español

La Directiva 2002/96/CE de la UE exige que los equipos que lleven este símbolo en el propio aparato y/o en su embalaje no deben eliminarse junto con otros residuos urbanos no seleccionados. El símbolo indica que el producto en cuestión debe separarse de los residuos domésticos convencionales con vistas a su eliminación. Es responsabilidad suya desechar este y cualesquiera otros aparatos eléctricos y electrónicos a través de los puntos de recogida que ponen a su disposición el gobierno y las autoridades locales. Al desechar y reciclar correctamente estos aparatos estará contribuyendo a evitar posibles consecuencias negativas para el medio ambiente y la salud de las personas. Si desea obtener información más detallada sobre la eliminación segura de su aparato usado, consulte a las autoridades locales, al servicio de recogida y eliminación de residuos de su zona o pregunte en la tienda donde adquirió el producto.

Français

La directive européenne 2002/96/CE exige que l’équipement sur lequel est apposé ce symbole sur le produit et/ou son emballage ne soit pas jeté avec les autres ordures ménagères. Ce symbole indique que le produit doit être éliminé dans un circuit distinct de celui pour les déchets des ménages. Il est de votre responsabilité de jeter ce matériel ainsi que tout autre matériel électrique ou électronique par les moyens de collecte indiqués par le gouvernement et les pouvoirs publics des collectivités territoriales. L’élimination et le recyclage en bonne et due forme ont pour but de lutter contre l’impact néfaste potentiel de ce type de produits sur l’environnement et la santé publique. Pour plus d’informations sur le mode d’élimination de votre ancien équipement, veuillez prendre contact avec les pouvoirs publics locaux, le service de traitement des déchets, ou l’endroit où vous avez acheté le produit.

Italiano

La direttiva europea 2002/96/EC richiede che le apparecchiature contrassegnate con questo simbolo sul prodotto e/o sull’imballaggio non siano smaltite insieme ai rifiuti urbani non differenziati. Il simbolo indica che questo prodotto non deve essere smaltito insieme ai normali rifiuti domestici. È responsabilità del proprietario smaltire sia questi prodotti sia le altre apparecchiature elettriche ed elettroniche mediante le specifiche strutture di raccolta indicate dal governo o dagli enti pubblici locali. Il corretto smaltimento ed il riciclaggio aiuteranno a prevenire conseguenze potenzialmente negative per l’ambiente e per la salute dell’essere umano. Per ricevere informazioni più dettagliate circa lo smaltimento delle vecchie apparecchiature in Vostro possesso, Vi invitiamo a contattare gli enti pubblici di competenza, il servizio di smaltimento rifiuti o il negozio nel quale avete acquistato il prodotto.

1.6.8 Declaration of Conformity

Česky[Czech]

NETGATE tímto prohla uje, e tento NETGATE device, je ve shod se základními po adavky a dal ími p íslu n mi ustanoveními sm nce 1999/5/ES.

Dansk [Danish]

Undertegnede NETGATE erklærer herved, at følgende udstyr NETGATE device, overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Hereby, NETGATE, declares that this NETGATE device, is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
1.6.9 Disputes

ANY DISPUTE OR CLAIM RELATING IN ANY WAY TO YOUR USE OF ANY PRODUCTS/SERVICES, OR TO ANY PRODUCTS OR SERVICES SOLD OR DISTRIBUTED BY RCL OR ESF WILL BE RESOLVED BY BINDING ARBITRATION IN AUSTIN, TEXAS, RATHER THAN IN COURT. The Federal Arbitration Act and federal arbitration law apply to this agreement.

THERE IS NO JUDGE OR JURY IN ARBITRATION, AND COURT REVIEW OF AN ARBITRATION AWARD IS LIMITED. HOWEVER, AN ARBITRATOR CAN AWARD ON AN INDIVIDUAL BASIS THE SAME DAMAGES AND RELIEF AS A COURT (INCLUDING INJUNCTIVE AND DECLARATORY RELIEF OR STATUTORY DAMAGES), AND MUST FOLLOW THE TERMS OF THESE TERMS AND CONDITIONS OF USE AS A COURT WOULD.

To begin an arbitration proceeding, you must send a letter requesting arbitration and describing your claim to the following:

Rubicon Communications LLC
Attn.: Legal Dept.
4616 West Howard Lane, Suite 900
Austin, Texas 78728
legal@netgate.com

The arbitration will be conducted by the American Arbitration Association (AAA) under its rules. The AAA’s rules are available at www.adr.org. Payment of all filing, administration and arbitrator fees will be governed by the AAA’s rules.

We each agree that any dispute resolution proceedings will be conducted only on an individual basis and not in a class, consolidated or representative action. We also both agree that you or we may bring suit in court to enjoin infringement or other misuse of intellectual property rights.
1.6.10 Applicable Law

By using any Products/Services, you agree that the Federal Arbitration Act, applicable federal law, and the laws of the state of Texas, without regard to principles of conflict of laws, will govern these terms and conditions of use and any dispute of any sort that might arise between you and RCL and/or ESF. Any claim or cause of action concerning these terms and conditions or use of the RCL and/or ESF website must be brought within one (1) year after the claim or cause of action arises. Exclusive jurisdiction and venue for any dispute or claim arising out of or relating to the parties’ relationship, these terms and conditions, or the RCL and/or ESF website, shall be with the arbitrator and/or courts located in Austin, Texas. The judgment of the arbitrator may be enforced by the courts located in Austin, Texas, or any other court having jurisdiction over you.

1.6.11 Site Policies, Modification, and Severability

Please review our other policies, such as our pricing policy, posted on our websites. These policies also govern your use of Products/Services. We reserve the right to make changes to our site, policies, service terms, and these terms and conditions of use at any time.

1.6.12 Miscellaneous

If any provision of these terms and conditions of use, or our terms and conditions of sale, are held to be invalid, void or unenforceable, the invalid, void or unenforceable provision shall be modified to the minimum extent necessary in order to render it valid or enforceable and in keeping with the intent of these terms and conditions. If such modification is not possible, the invalid or unenforceable provision shall be severed, and the remaining terms and conditions shall be enforced as written. Headings are for reference purposes only and in no way define, limit, construe or describe the scope or extent of such section. Our failure to act with respect to a breach by you or others does not waive our right to act with respect to subsequent or similar breaches. These terms and conditions set forth the entire understanding and agreement between us with respect to the subject matter hereof, and supersede any prior oral or written agreement pertaining thereto, except as noted above with respect to any conflict between these terms and conditions and our reseller agreement, if the latter is applicable to you.

1.6.13 Limited Warranty

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THE PRODUCTS/SERVICES AND ALL INFORMATION, CONTENT, MATERIALS, PRODUCTS (INCLUDING SOFTWARE) AND OTHER SERVICES INCLUDED ON OR OTHERWISE MADE AVAILABLE TO YOU THROUGH THE PRODUCTS/SERVICES ARE PROVIDED BY US ON AN “AS IS” AND “AS AVAILABLE” BASIS, UNLESS OTHERWISE SPECIFIED IN WRITING. WE MAKE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, AS TO THE OPERATION OF THE PRODUCTS/SERVICES, OR THE INFORMATION, CONTENT, MATERIALS, PRODUCTS (INCLUDING SOFTWARE) OR OTHER SERVICES INCLUDED ON OR OTHERWISE MADE AVAILABLE TO YOU THROUGH THE PRODUCTS/SERVICES, UNLESS OTHERWISE SPECIFIED IN WRITING. YOU EXPRESSLY AGREE THAT YOUR USE OF THE PRODUCTS/SERVICES IS AT YOUR SOLE RISK.

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2.1 Connecting to the Console Port

There are times when directly accessing the console is required. Perhaps webGUI or SSH access has been locked out, or the password has been lost or forgotten. This guide shows how to regain access directly through the console.

2.1.1 Install the Driver

A Silicon Labs CP210x USB-to-UART Bridge driver is used to provide access to the console, which is exposed via the Mini-USB port on the appliance.

If needed, install an appropriate Silicon Labs CP210x USB to UART Bridge driver on the workstation used to connect with the system.

Windows

There are drivers available for Windows available for download.

Mac OSX

There are drivers available for Mac OSX available for download.

For Mac, choose the Macintosh OSX download.

Linux

There are drivers available for Linux available for download.

FreeBSD

Recent versions of FreeBSD include this driver and will not require manual installation.

2.1.2 Connect a USB Cable

Next, locate an appropriate USB cable that has a Mini-USB connector on one end and a regular USB Type A plug on the other end. These cables are commonly used with smaller USB peripherals such as GPS units, cameras, and so on.

Gently push the Mini-USB plug end into the console port on the appliance and connect the USB Type A plug into an available USB port on the workstation.

Tip: Be certain to gently push in the Mini-USB connector on the system side completely. With most cables there will be a tangible “click”, “snap”, or similar indication when the cable is fully engaged.
2.1.3 Locate the Console Port Device

The appropriate console port device that the workstation assigned as the serial port must be located before attempting to connect to the console.

**Note:** Even if the serial port was assigned in the BIOS, the workstation’s OS may remap it to a different COM Port.

Windows

To locate the device name on Windows, open **Device Manager** and expand the section for **Ports (COM & LPT)**. Look for an entry with a title such as **Silicon Labs CP210x USB to UART Bridge**. If there is a label in the name that contains “COMX” where X is a decimal digit (e.g. **COM3**), that value is what would be used as the port in the terminal program.

Mac OSX

The device associated with the system console is likely to show up as **/dev/cu.SLAB_USBtoUART**.

Linux

The device associated with the system console is likely to show up as **/dev/ttyUSB0**. Look for messages about the device attaching in the system log files or by running **dmesg**.

**Note:** If the device does not appear in **/dev/**, see the note above in the driver section about manually loading the Linux
driver and then try again.

FreeBSD

The device associated with the system console is likely to show up as /dev/cuaU0. Look for messages about the device attaching in the system log files or by running dmesg.

2.1.4 Launch a Terminal Program

Use a terminal program to connect to the system console port. Some choices of terminal programs:

Windows

For Windows it is recommended to run PuTTY in Windows or SecureCRT. An example of how to configure PuTTY is below.

**Warning:** Do not use Hyperterminal.

Mac OSX

For Mac OSX it is recommended to run screen, or cu. An example of how to configure screen is below.

Linux

For Linux it is recommended to run screen, PuTTY in Linux, minicom, or dterm. An example of how to configure Putty and screen is below.

FreeBSD

For FreeBSD it is recommended to run screen or cu. An example of how to configure screen is below.

Client-Specific Examples

**PuTTY in Windows**

Open PuTTY and select Session under Category on the left hand side. Next, set the **Connection type** to Serial. Then, set **Serial line** to the console port that was located above, in Locate the Console Port Device, and the **Speed** to 115200 bits per second.

Click the **Open** button and the console screen will be displayed.

**PuTTY in Linux**

Open PuTTY from a terminal by typing **sudo putty**. Next, set the **Connection type** to Serial. Then, set **Serial line** to /dev/ttyUSB0 and the **Speed** to 115200 bits per second.

Click the **Open** button and the console screen will be displayed.
Fig. 1: An example of using PuTTY in Windows.
GNU screen

In many cases screen may be invoked simply by using the proper command line, where `<console-port>` is the console port that was located above.

```bash
sudo screen <console-port> 115200
```

If portions of the text are unreadable but appear to be properly formatted, the most likely culprit is a character encoding mismatch in the terminal. Adding the `-U` parameter to the `screen` command line arguments forces it to use UTF-8 for character encoding:

```bash
date
```

Terminal Settings

The settings to use within the terminal program are:

- **Speed** 115200 baud, the speed of the BIOS
- **Data bits** 8
- **Parity** none
- **Stop bits** 1
- **Flow Control** Off or XON/OFF. Hardware flow control (RTS/CTS) must be **disabled**.
2.1.5 Troubleshooting

No Serial Output

If there is no output at all, check the following items:

- Ensure the cable is correctly attached and fully inserted
- Ensure the terminal program is using the correct port
- Ensure the terminal program is configured for the correct speed. The default BIOS speed is 115200, and many other modern operating systems use that speed as well. Some older operating systems or custom configurations may use slower speeds such as 9600 or 38400.
- Ensure the operating system is configured for the proper console (e.g. ttyS1 in Linux). Consult the various operating install guides on this site for further information.

PuTTY has issues with line drawing

PuTTY generally handles most cases OK but can have issues with line drawing characters on certain platforms. These settings seem to work best (tested on Windows):

- Window Columns x Rows = 80x24
- Window > Appearance Font = Courier New 10pt or Consolas 10pt
- Window > Translation Remote Character Set = Use font encoding or UTF-8
- Window > Translation Handling of line drawing characters = Use font in both ANSI and OEM modes or Use Unicode line drawing code points
- Window > Colours Indicate bolded text by changing = The colour

Garbled Serial Output

If the serial output appears to be garbled, binary, or random characters check the following items:

- Ensure the terminal program is configured for the correct speed. (See No Serial Output)
- Ensure the terminal program is configured for the proper character encoding, such as UTF-8 or Latin-1, depending on the operating system. (See GNU Screen)

Serial Output Stops After the BIOS

If serial output is shown for the BIOS but stops afterward, check the following items:

- Ensure the terminal program is configured for the correct speed for the installed operating system. (See No Serial Output)
- Ensure the installed operating system is configured to activate the serial console.
- Ensure the installed operating system is configured for the proper console (e.g. ttyS1 in Linux). Consult the various operating install guides on this site for further information.
- If booting from a USB flash drive, ensure that the drive was written correctly and contains a bootable operating system image.
2.2 Reinstalling pfSense Plus Software

1. Please open a support ticket to request access to the factory firmware by selecting Firmware Access as the General Problem and then select Netgate 3100 for the platform. Make sure to include the serial number in the ticket to expedite access.

Once the ticket is processed, the latest stable version of the firmware will be attached to the ticket, with a name such as:

pfSense-plus-SG-3100-recover-21.05.2-RELEASE-armv7.img.gz

Note: pfSense® Plus is preinstalled on Netgate appliances, which is optimally tuned for our hardware and contains some features that cannot be found elsewhere, such as the AWS VPC Wizard.

2. Write the image to a USB memstick. Locating the image and writing it to a USB memstick is covered in detail under Writing Flash Drives.

3. Connect to the console port of the Netgate device.

4. Insert the memstick into the USB port and boot the system.

Tip: Best practice is to turn off the system, insert the USB memstick, ensure you have console access, and reboot the system. You will need to interrupt the boot process very soon after initial boot.

5. When prompted, press any key to stop the autoboot process.

6. Type run recovery at the Marvell>> prompt and press Enter.

7. Select the destination device and confirm by typing y and Enter.
DBG: Calling spi_flash_probe from env_relocate_spec()
SF: Probing bus 0 cs 0 @ 20000000Hz mode 3
SF: Detected NZSQ128 with page size 64 MiB, total 16 MiB
PCI-e 0: Detected No Link.
PCI-e 1: Detected No Link.
USB2.0 0: Host Mode
USB3.0 1: Host Mode

Map: Code: 0x7fedc000:0x7f975a8
      BSS: 0x7f0ef600
      Stack: 0x7f4cbf20
      Heap: 0x7f4ccc000:0x7fedc000
      U-Boot Environment: 0x00100000:0x00110000 (SPI)

Board configuration detected:
Net:
<table>
<thead>
<tr>
<th>port</th>
<th>Interface</th>
<th>PHY address</th>
</tr>
</thead>
<tbody>
<tr>
<td>egiga0</td>
<td>RGMII</td>
<td>0x00</td>
</tr>
<tr>
<td>egiga1</td>
<td>RGMII</td>
<td>0x01</td>
</tr>
<tr>
<td>egiga2</td>
<td>SGMII</td>
<td>In-Band</td>
</tr>
</tbody>
</table>

egiga0 [PRIME], egiga1, egiga2
Hit any key to stop autoboot: 0
Marvell>> run recovery

Welcome to pfSense 2.4.4-RELEASE (Patch 3)...

Netgate SG-3100 firmware recovery
Serial: [ ]

This will install the standard firmware and will erase all the existing contents of the destination device permanently.

eMMC device: mmc0d0

M.2 device: ada0

Type the name of the destination device (mmc0d0,ada0) or type enter to install on mmc0d0: ada0
Note: The onboard eMMC flash memory is always mmcsd0. If a M.2 SATA drive is installed in either slot, it will be ada0.

Warning: Only one M.2 SATA slot can be populated with a storage device. Two M.2 SATA drives installed simultaneously are not supported.

8. Once the install has completed, remove the memstick and press any key to reboot.

Note: For information on restoring from a previously saved configuration, go to Backup and Restore.

2.3 M.2 SATA Installation

The SG-3100 has built-in onboard eMMC storage. Optionally, a M.2 SATA drive could be installed as an upgrade or to bypass the onboard eMMC flash memory.

Note: The SG-3100 does not support NVMe drives.

Warning: Before proceeding:

1. Backup your configuration file, if possible.
2. Unplug the system for at least 60 seconds to ensure all phantom power has dissipated.
3. Anti-static protection must be used throughout this procedure.
4. Any hardware damage incurred during this procedure is **not covered** by the hardware warranty.

The SG-3100 has two slots capable of installing M.2 SATA drives, J10 and J11. The J10 connector is for a 2280 (22mm x 80mm) M.2 SATA only. The 80mm standoff cannot be moved. The J11 connector is for a 2242 (22mm x 42mm) M.2 SATA drive, or it can be used for a cellular card in conjunction with a microSIM card. The 42mm standoff is also permanent and cannot be moved.

**Note:** For more information on Cellular Configuration in pfSense® Plus software, please visit the pfSense Documentation page.

![Fig. 3: SG-3100 M.2 SATA Locations](image)

**Warning:** Before proceeding:
1. Backup your configuration file, if possible.
2. Unplug the system for at least 60 seconds to ensure all phantom power has dissipated.
3. Anti-static protection must be used throughout this procedure.
4. Any hardware damage incurred during this procedure is **not covered** by the hardware warranty.

**Note:** pfSense® Plus must be reinstalled on the M.2 SATA drive. By default, the M.2 SATA drive will then be the first drive recognized by pfSense® Plus software.

For purposes of this installation, the **J11** M.2 SATA slot will be used with a 2242 M.2 SATA Drive. Procedures for installing the 2280 M.2 SATA Drive in the J10 slot are similar.

1. Turn the system over carefully to avoid scratching the top of the system. Remove the four **T10 Torx** screws as indicated below.

![Fig. 4: Removing the SG-3100 Case Screws](image)

2. Turn system upright and carefully remove the cover. Set the cover off to the side and keep it upright so the top is not scratched. Identify where the M.2 SATA drive slot is located and remove the screw from the standoff.
3. After the screw has been removed, insert the M.2 SATA drive into the slot at about a 30° angle.

**Warning:** The M.2 SATA card is keyed. Do not force it into the slot.

4. Gently push down the M.2 SATA card and replace the screw into the standoff.
5. Place the cover back on and turn the SG-3100 over. Replace the four **T10 Torx** case screws. Be careful not to crossthread the screws.
Fig. 5: M.2 SATA Location and Screw

Fig. 6: M.2 SATA Location and Screw Close-up
Fig. 7: Insert the M.2 SATA Drive at about a 30° Angle

Fig. 8: The M.2 SATA Drive Installed
6. Reinstall the pfSense® Plus software on the new M.2 SATA drive.
7. Restore your configuration backup if you have one.

2.4 Configuring the Switch Ports

This optional guide shows the steps required to configure the 4 switched Ethernet ports as discrete ports.

The following attributes are used in this configuration guide but can be changed to suit your particular requirements:

- SG-3100 Ethernet Port: LAN4
- IP Address Assignment: 192.168.100.1/24
- VLAN Tag: 4084 (VLAN tags should be 4081-4084 for LAN Ports 1-4)

Note: When connecting to the webConfigurator, be sure you are NOT connected to the port you are going to configure or you will lose connectivity during this procedure.

1. Open the pfSense® Plus WebGUI and log in.
2. From the menu, navigate to Interfaces > Assignments.
3. Go to the VLANs sub-menu.
4. In the lower right-hand corner of the screen, click + Add.
5. Choose `mvnet1 (MAC Address) - lan` from the Parent Interface drop-down menu.

6. Set the VLAN Tag to 4084. Type `Lan port 4` as the Description. Click Save.

Note: 4084 in is used as an example in this guide. The value for the tags must be unique for each VLAN and must be between 1 and 4094. Avoid using values that are already in use. Best practice is not to use 1.

7. Go to the Interface Assignments sub-menu.
8. Ensure Available network ports: is correct. It is VLAN 4084 on mvnet1 - lan (Lan port 4) in this example. Click on + Add.

9. Click on OPT2. This is the Interface that matches the new VLAN being created.
10. Check the **Enable Interface** check-box.

11. Change the **IPv4 Configuration Type** from None to **Static IPv4**.

12. Scroll down and make the IPv4 Address **192.168.100.1/24** (in this example).

13. Click **Save**.

14. Click **Apply Changes**.

15. Go to **Interfaces -> Switches**.
16. Go to the **VLANs** sub-menu. Click in the **Enable 802.1q VLAN mode** check-box and click **Save**.

17. You will notice that the table changes. Click **+ Add Tag**.
18. Type 4084 for the VLAN Tag and 4 for Member(s). This represents LAN4 (port 4) and tagged should be unchecked.

19. Click + Add Member to add the LAN Uplink, 5. This member should be tagged as shown.

20. Click Save.

21. Click on beside VLAN group 0.
22. Click **Delete** beside Member(s) 4. This will remove LAN4 from this VLAN group.

<table>
<thead>
<tr>
<th>Description</th>
<th>Default System VLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Member(s)</strong></td>
<td>![Delete button]</td>
</tr>
<tr>
<td>1</td>
<td>![Delete button]</td>
</tr>
<tr>
<td>2</td>
<td>![Delete button]</td>
</tr>
<tr>
<td>3</td>
<td>![Delete button]</td>
</tr>
<tr>
<td>4</td>
<td>![Delete button]</td>
</tr>
<tr>
<td>5</td>
<td>![Delete button]</td>
</tr>
</tbody>
</table>

23. Click **Save**.

24. Go to the **Ports** sub-menu.

25. Click on **Port VID 1** beside LAN4. Backspace through 1 and insert 4084, the new VLAN ID.

26. Click **Save**.

This completes the configuration of a discrete port on the SG-3100.

You will need to create the appropriate firewall rules because by default, all traffic is blocked. Go to **Firewall > Rules** and then the **OPT2** sub-menu (in this example) to configure the firewall rules.

You should also enable DHCP if necessary, by going to **Services > DHCP Server > OPT2** (for the example above).
3.1 Additional Resources

3.1.1 Netgate Training

Netgate training offers training courses for increasing your knowledge of pfSense® Plus products and services. Whether you need to maintain or improve the security skills of your staff or offer highly specialized support and improve your customer satisfaction; Netgate training has got you covered.

https://www.netgate.com/training

3.1.2 Resource Library

To learn more about how to use your Netgate appliance and for other helpful resources, make sure to browse our Resource Library.

https://www.netgate.com/resources

3.1.3 Professional Services

Support does not cover more complex tasks such as CARP configuration for redundancy on multiple firewalls or circuits, network design, and conversion from other firewalls to pfSense® Plus software. These items are offered as professional services and can be purchased and scheduled accordingly.

https://www.netgate.com/our-services/professional-services.html

3.1.4 Community Options

If you elected not to get a paid support plan, you can find help from the active and knowledgeable pfSense community on our forums.

https://forum.netgate.com/
3.2 Warranty and Support

- One year manufacturer’s warranty.
- Please contact Netgate for warranty information or view our Product Lifecycle page.
- All Specifications subject to change without notice

For support information, view our support plans.

See also:

For more information on how to use pfSense® Plus software, see the pfSense Documentation and Resource Library.