This Quick Start Guide covers the first time connection procedures for the Netgate® 5100 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.
Warning: The default IP Address on the LAN subnet on the Netgate firewall is 192.168.1.1/24. The same subnet cannot be used on both WAN and LAN, so if the default IP address on the ISP-supplied modem is also 192.168.1.1/24, disconnect the WAN interface until the LAN interface on the firewall has been renumbered to a different subnet (like 192.168.2.1/24).

1.2 Initial Configuration

Plug the power cable into the power port and press the power button on the back near the power connector (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 IGB0 port on your Netgate 5100 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

NERSEC_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)

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).

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 5100 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 IGB0 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.

![Fig. 8: The pfSense® Plus Dashboard](image)

**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.

![Re-run the 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 Front Side

![Netgate appliance front side](image)

**Ethernet Ports**

<table>
<thead>
<tr>
<th>Interface Name</th>
<th>Port Name</th>
<th>Port Type</th>
<th>Port Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>WAN</td>
<td>IGB0</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>LAN</td>
<td>IGB1</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>OPT1</td>
<td>IX0</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>OPT2</td>
<td>IX1</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>OPT3</td>
<td>IX2</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
<tr>
<td>OPT4</td>
<td>IX3</td>
<td>RJ-45</td>
<td>1 Gbps</td>
</tr>
</tbody>
</table>
Table 1: RJ-45 LEDs Configuration

<table>
<thead>
<tr>
<th>Status LED</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left LED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Link Status)</td>
<td>Solid Amber</td>
<td>Link has been established and there is no activity on this port</td>
</tr>
<tr>
<td></td>
<td>Blinking Amber</td>
<td>Link has been established and there is activity on this port</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No link has been established</td>
</tr>
<tr>
<td>Right LED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Speed)</td>
<td>Solid Green</td>
<td>Operating as a 100 Mbps connection</td>
</tr>
<tr>
<td></td>
<td>Blinking Amber</td>
<td>Operating as a Gigabit connection (1000 Mbps)</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No link has been established</td>
</tr>
</tbody>
</table>

**Note:** All Ethernet ports of the Netgate® appliance support auto-MDIX and are capable of utilizing either straight-through or crossover ethernet cables.

**Warning:** The ix(4) driver used prior to pfSense® Plus 21.02 for ports IX0-IX3 does not support ALTQ traffic shaping directly. Limiters may be used instead, or use tagged VLAN interfaces which can be used with ALTQ traffic shaping.

Other Ports and Indicators

- Console (Mini-USB)
- Status LEDs
- 2x USB 3.0

<table>
<thead>
<tr>
<th>Status LED</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top LED</td>
<td>Blinking Amber</td>
<td>Add-on storage activity (does not show eMMC activity)</td>
</tr>
<tr>
<td>Middle LED</td>
<td>Solid Green</td>
<td>System booted</td>
</tr>
<tr>
<td></td>
<td>Blinking Green</td>
<td>Software update available</td>
</tr>
<tr>
<td></td>
<td>Solid Red</td>
<td>Halted or in the process of booting</td>
</tr>
<tr>
<td></td>
<td>Blinking Red</td>
<td>Running update process</td>
</tr>
<tr>
<td>Bottom LED</td>
<td>Solid Green</td>
<td>Power</td>
</tr>
</tbody>
</table>
1.4.2 Rear Side

1. Recessed Reset Button (performs a reset to factory default)
2. Power Button (powers system on, performs graceful shutdown)
3. Power
   - 12VDC with threaded locking connector
   - Power Consumption 7W (idle)

Center Pin Positive

Note: The power button on the SG-5100 has been programmed to perform a graceful shutdown when depressed. The reset button is only used to reset the system back to factory defaults. It does not respond when pushed while the system is running.

1.5 Safety and Legal

1.5.1 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.
1.5.2 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.

1.5.3 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.

1.5.4 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.
1.5.5 CE Marking

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

1.5.6 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.
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.

1.5.7 Declaration of Conformity

Česky[Czech]

NETGATE tímto prohlašuji, e tento NETGATE device, je ve shodě s základními požadavky a dalšími písemnými ustanoveními smírnice 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.

Nederlands [Dutch]

Hierbij verklaart NETGATE dat het toestel NETGATE device, in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG. Bij deze verklaart NETGATE dat deze NETGATE device, voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.

English

Hereby, NETGATE , declares that this NETGATE device, is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Eesti [Estonian]

Käesolevaga kinnitab NETGATE seeadme NETGATE device, vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

Suomi [Finnish]

NETGATE vakuuttaa täten että NETGATE device, tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen. Français [French] Par la présente NETGATE déclare que l’appareil Netgate, device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Hiermit erklärt Netgate, dass sich diese NETGATE device, in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet”. (BMWi)

Ελληνικά [Greek]

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ NETGATE ΔΗΛΩΝΕΙ ΟΤΙ NETGATE device, ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΟΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.

Magyar [Hungarian]

Alulírott, NETGATE nyilatkozom, hogy a NETGATE device, megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb előírásainak.

Íslenska [Icelandic]

Hér me l sir NETGATE yfir ví a NETGATE device, er í samræmi vi grunnkröfur og a rar kröfur, sem ger ar eru í tilskipun 1999/5/EC.

Italiano [Italian]

Con la presente NETGATE dichiara che questo NETGATE device, è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

Latviski [Latvian]

Ar o NETGATE deklar , ka NETGATE device, atbilst Direkt vas 1999/5/EK b tiskaj m pras b m un citem ar to saist tajiem noteikumiem.

Lietuviškai [Lithuanian]

NETGATE deklaruoja, kad šis NETGATE įrenginys atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.

Malti [Maltese]

Hawnhekk, Netgate, jiddikjara li dan NETGATE device, jikkonforma mal- ti ijiet essenzjali u ma provvedimenti o rajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
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To begin an arbitration proceeding, you must send a letter requesting arbitration and describing your claim to the following:
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.

1.5.9 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.

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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.

1.5.11 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.
1.5.12 Limited Warranty

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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 Prolific PL2303 USB-to-UART Bridge driver is used to provide access to the console, which is exposed via the USB Mini-b (5-pin) port on the appliance.

If needed, install an appropriate Prolific PL2303 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.

Linux
There are drivers available for Linux available for download.

FreeBSD

2.1.2 Connect a USB Cable

Next, locate an appropriate USB cable that has a USB Mini-b (5-pin) 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 USB Mini-b (5-pin) 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 USB Mini-b (5-pin) 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 **Prolific USB-to-Serial Comm Port**. 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.

![Device Manager](image)

**Mac OSX**

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

**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.

**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.

```
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:

```
sudo screen -U <console-port> 115200
```
Fig. 1: An example of using PuTTY in Windows.
Fig. 2: An example of using PuTTY in Linux.

**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 5100 Desktop 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-memstick-serial-21.05.1-RELEASE-amd64.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 an open USB port and boot the system.

5. After a minute the pfSense® Plus loader menu will be displayed with a 3 second timer. Either allow the menu to timeout or press 1 (the default) to continue.

6. Console options are presented for serial console installation. The default option is vt100, which should work for most. Choose the correct console output for your system.

   Please choose the appropriate terminal type for your system.
   Common console types are:
   ansi Standard ANSI terminal
   vt100 VT100 or compatible terminal
   xterm xterm terminal emulator (or compatible)
   cons25w cons25w terminal

7. The installer will automatically launch and several options will be presented. On Netgate appliances, choosing Enter for the default options will complete the installation process.

   Note: Options such as the type of disk partition can be modified through this installation if required.

8. Once the installer is finished, choose No and press Enter to skip going to a shell.

9. The installer will then prompt to Reboot the system. Select Reboot and press Enter. The system will shutdown and reboot.

   Dec 21 22:41:37 Waiting (max 60 seconds) for system process `vnlru` to stop... done
   Waiting (max 60 seconds) for system process `bufdaemon` to stop... done
   Waiting (max 60 seconds) for system process `syncer` to stop... done
   Syncing disks, vnodes remaining... 0 0 done
   All buffers synced.
   Uptime: 5m43s

(continues on next page)
10. Remove the USB drive from the USB port.

**Important:** If the USB drive remains attached, the system will boot into the installer again because by default the system firmware is configured so that a device plugged into the USB port will be booted with a higher priority.

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

### 2.3 M.2 SATA Installation

The XG-5100 Desktop has 8 GB of onboard eMMC storage. Optionally, a M.2 SATA drive can be installed as an upgrade or to bypass the onboard eMMC flash memory.

**Note:** The SG-5100 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.

**Note:** The standoff for the M.2 SATA drive is not populated with a screw. A screw is provided in the original packaging the SG-5100 came in. If the original packaging is not available, a **Standard M3 x 0.5 4mm Long Pan Head Screw** can be used to secure the M.2 SATA drive in place.

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

The M.2 SATA slot is located underneath the a large heatsink/drive carrier, so the entire heatsink must be removed. The standoff is for the 2242 (22mm x 42mm) M.2 SATA drive.

1. Remove 3 screws from both sides of the SG-5100 (6 screws total) as shown below.
2. Turn the system over carefully to avoid scratching the top of the appliance. Remove the 2 screws as indicated below.
3. Remove the cover.
4. Remove the 4 heatsink screws as indicated.
Fig. 3: M.2 SATA Location

Fig. 4: Remove 3 Case Screws from Both Sides
Fig. 5: Remove the Bottom Screws

Fig. 6: Remove the Heatsink Screws
5. Gently lift the heatsink away from the memory as shown and remove it. Be careful of the thermal transfer pad above the memory and connecting the heatsink to the chassis.

6. 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.

7. Gently push down the M.2 SATA card and place the screw into the standoff.

8. Locate the Thermal Pads that came with the SG-5100. There will be two in a plastic bag. This procedure will use the larger one.

9. The Thermal Pad has film on both sides. One side is shiny and is sticky. The shiny side will stick the heatsink. The non-shiny side is “tacky”, but not sticky. The tacky side will go to the M.2 SATA drive.

10. The Thermal Pad will attach to the large aluminum heatsink.

11. Remove the shiny film from the Thermal Pad and stick it to the heatsink as shown. Try to center it on the cutout, but it doesn’t need to be exact.
12. Remove the film from the non-sticky side of the Thermal Pad.

13. Replace the heatsink as shown. Replace the 4 screws securing the heatsink in place.

14. Replace the system cover.
Fig. 9: Insert the M.2 SATA Drive at about a 30° Angle
Fig. 10: Secure the M.2 SATA Drive
Fig. 11: Thermal Pads that come with the SG-5100

Fig. 12: Both Sides of the Thermal Pads
Fig. 13: Thermal Pads that come with the SG-5100
Fig. 14: Stick the Thermal Pad to the Heatsink
Fig. 15: Stick the Thermal Pad to the Heatsink
Fig. 16: Replace the Heatsink
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.