## OUT OF THE BOX

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This Quick Start Guide covers the first time connection procedures for the Netgate® SG-1000 Desktop Appliance and will provide the information needed to keep the appliance up and running.
The basic firewall configuration begins with connecting the pfSense® appliance to the Internet. Neither the modem nor the pfSense appliance should be powered on at this time.

Establishing a connection to an Internet Service Provider (ISP) starts with connecting one end of an Ethernet cable to the WAN port (shown in the *Input and Output Ports* section) of the pfSense appliance.

**Warning:** The default LAN subnet on the firewall is 192.168.1.0/24. The same subnet **cannot** be used on both WAN and LAN, so if the subnet on the WAN side of the firewall is also 192.168.1.0/24, disconnect the WAN interface until the LAN interface has been renumbered to a different subnet.

The opposite end of the same Ethernet cable should be inserted into the LAN port of the ISP-supplied modem. The modem provided by the ISP might have multiple LAN ports. If so, they are usually numbered. For the purpose of this installation, please select port 1.

The next step is to connect the LAN port (shown in the *Input and Output Ports* section) of the pfSense appliance to the computer which will be used to access the firewall console.

Connect one end of the second Ethernet cable to the LAN port (shown in the *Input and Output Ports* section) of the pfSense appliance. Connect the other end to the network connection on the computer. In order to access the web configurator, the PC network interface must be set to use DHCP, or have a static IP set in the 192.168.1.x subnet with a subnet mask of 255.255.255.0. **Do not use 192.168.1.1, as this is the address of the firewall, and will cause an IP conflict.**

### 1.1 Initial Setup

The next step is to power up the modem and the firewall. Plug in the power supply to the power port (shown in the *Input and Output Ports* section).

Once the modem and pfSense appliance are powered up, the next step is to power up the computer.

Once the pfSense appliance is booted, the attached computer should receive a 192.168.1.x IP address via DHCP from the pfSense appliance.

### 1.2 Logging Into the Web Interface

Browse to https://192.168.1.1 to access the web interface. In some instances, the browser may respond with a message indicating a problem with website security. Below is a typical example in Google Chrome. If this message or similar message is encountered, it is safe to proceed.
At the login page enter the default pfSense password and username:

**Username** admin  
**Password** pfsense

Click **Login** to continue

### 1.3 Wizard

Upon successful login, the following is displayed.
1.4 Configuring Hostname, Domain Name and DNS Servers

For **Hostname**, any desired name can be entered as it does not affect functionality of the firewall. Assigning a hostname to the firewall will allow the GUI to be accessed by hostname as well as IP address.

For the purposes of this guide, use **pfsense** for the hostname. The default hostname, **pfsense**, may be left unchanged.

Once saved in the configuration, the GUI may be accessed by entering http://pfsense as well as http://192.168.1.1

1.5 Domain

If an existing DNS domain is in use within the local network (such as a Microsoft Active Directory domain), use that domain here. This is the domain suffix assigned to DHCP clients, which should match the internal network.

For networks without any internal DNS domains, enter any desired domain name. The default **localdomain** is used for the purposes of this tutorial.

1.7 DNS Servers

The DNS server fields can be left blank if the DNS Resolver is used in non-forwarding mode, which is the default behavior. The settings may also be left blank if the WAN connection is using DHCP, PPTP or PPPoE types of Internet
connections and the ISP automatically assigns DNS server IP addresses. When using a static IP on WAN, DNS server IP addresses must be entered here for name resolution to function if the default DNS Resolver settings are not used.

DNS servers can be specified here even if they differ from the servers assigned by the ISP. Either enter the IP addresses provided by the ISP, or consider using Google public DNS servers (8.8.8.8, 8.8.4.4). Google DNS servers are used for the purpose of this tutorial. Click Next after filling in the fields as appropriate.

1.8 Time Server Configuration

![Time Server Information]

1.9 Time Server Synchronization

Setting time server synchronization is quite simple. We recommend using the default pfSense time server address, which will randomly select an NTP server from a pool.

1.10 Setting Time Zone

Select an appropriate time zone for the location of the firewall. For purposes of this manual, the Timezone setting will be set to America/Chicago for US Central time.

1.11 Configuring Wide Area Network (WAN) Type

The WAN interface type is the next to be configured. The IP address assigned to this section becomes the Public IP address that this network will use to communicate with the Internet.
This depicts the four possible WAN interface types. Static, DHCP, PPPoE and PPTP. One must be selected from the drop-down list.

Further information from the ISP is required to proceed when selecting Static, PPPoE and PPTP such as login name and password or as with static addresses, an IP address, subnet mask and gateway address.

DHCP is the most common type of interface for home cable modems. One dynamic IP address is issued from the ISP DHCP server and will become the public IP address of the network behind this firewall. This address will change periodically at the discretion of the ISP. Select DHCP as shown and proceed to the next section.

### 1.12 MAC Address

If replacing an existing firewall, the WAN MAC address of the old firewall may be entered here, if it can be determined. This can help avoid issues involved in switching out firewalls, such as ARP caches, ISPs locking to single MAC addresses, etc.

If the MAC address of the old firewall cannot be located, the impact is most likely insignificant. Power cycle the ISP router and modem and the new MAC address will usually be able to get online. For some ISPs, it may be necessary to call them when switching devices, or an activation process may be required.

### 1.13 Configuring MTU and MSS

MTU or Maximum Transmission Unit determines the largest protocol data unit that can be passed onwards. A 1500-byte packet is the largest packet size allowed by Ethernet at the network layer and for the most part, the Internet so leaving this field blank allows the system to default to 1500-byte packets. PPPoE is slightly smaller at 1492-bytes. Leave this blank for a basic configuration.
1.14 Configuring DHCP Hostname

Some ISPs specifically require a **DHCP Hostname** entry. Unless the ISP requires the setting, leave it blank.

1.15 Configuring PPPoE and PPTP Interfaces

Information added in these sections is assigned by the ISP. Configure these settings as directed by the ISP.
1.16 Block Private Networks and Bogons

When enabled, all private network traffic originating on the internet is blocked.

Private addresses are reserved for use on internal LANs and blocked from outside traffic so these address ranges may be reused by all private networks.

The following inbound address Ranges are blocked by this firewall rule:

- 10.0.0.1 to 10.255.255.255
- 172.16.0.1 to 172.31.255.254
- 192.168.0.1 to 192.168.255.254
- 127.0.0.0/8
- 100.64.0.0/10
- fc00::/7

Bogons are public IP addresses that have not yet been allocated, so they may typically also be safely blocked as they should not be in active use.

Check Block RFC1918 Private Networks and Block Bogon Networks.

Click Next to continue.
1.17 Configuring LAN IP Address & Subnet Mask

A static IP address of 192.168.1.1 and a subnet mask (CIDR) of 24 was chosen for this installation. If there are no plans to connect this network to any other network via VPN, the 192.168.1.x default is sufficient. Click Next to continue.

Note: If a Virtual Private Network (VPN) is configured to remote locations, choose a private IP address range more obscure than the very common 192.168.1.0/24. IP addresses within the 172.16.0.0/12 RFC1918 private address block are the least frequently used. We recommend selecting a block of addresses between 172.16.x.x and 172.31.x.x for least likelihood of having VPN connectivity difficulties. An example of a conflict would be if the local LAN is set to 192.168.1.x and a remote user is connected to a wireless hotspot using 192.168.1.x (very common), the remote client won’t be able to communicate across the VPN to the local network.

1.18 Change Administrator Password

Select a new Administrator Password and enter it twice, then click Next to continue.
1.19 Save Changes

Click **Reload** to save configuration.

1.20 Basic Firewall Configured

To proceed to the webConfigurator, make the selection as highlighted. The Dashboard display will follow.

1.21 Backing Up and Restoring

At this point, basic LAN and WAN interface configuration is complete. Before proceeding, backup the firewall configuration. From the menu at the top of the page, browse to Diagnostics > Backup/Restore.
Click **Download Configuration** and save a copy of the firewall configuration.

This configuration can be restored from the same screen by choosing the backup file under **Restore configuration**.
1.22 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 pfSense appliance, sign up for a *pfSense Training* course or browse our extensive [Resource Library](#).
CHAPTER TWO

INPUT AND OUTPUT PORTS

Front

- LAN (cpsw1)
- WAN (cpsw0)

Note: Both the WAN and LAN ports of the pfSense® appliance support auto-MDIX and are capable of utilizing either straight-through or crossover ethernet cables.

Back

- Console (Micro-USB)
- USB OTG
- Status LED
- Power

Internal

- Micro-SD card socket (minimum 1GB card recommended)

To install a Micro-SD card:

1. Remove case screw and slide off chassis lid.
2. Gently slide the SD card cover toward the network interface port to unlock it.
3. Raise the lid.
4. Place the Micro-SD card in the socket, contacts down.
5. Gently close the SD card cover.
6. Slide the cover toward the power connector to lock it in place.
Fig. 1: Installing a Micro-SD card in the SG-1000
**Tip:** If the cover will not close gently, check the alignment of the Micro-SD card as it may not be settled completely into the socket in the correct place.
SAFETY AND LEGAL

• Safety Notices
• Electrical Safety Information
• FCC Compliance
• Industry Canada
• Australia and New Zealand
• CE Marking
• RoHS/WEEE Compliance Statement
  – English
  – Deutsch
  – Español
  – Français
  – Italiano
• Declaration of Conformity
  – Česky [Czech]
  – Dansk [Danish]
  – Nederlands [Dutch]
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  – Íslenska [Icelandic]
  – Italiano [Italian]
  – Latviski [Latvian]
  – Lietuviškai [Lithuanian]
3.1 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.

3.2 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.

### 3.3 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.

### 3.4 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.

### 3.5 Australia and New Zealand

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

### 3.6 CE Marking

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

### 3.7 RoHS/WEEE Compliance Statement

#### 3.7.1 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.

3.7.2 Deutsch


3.7.3 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.

3.7.4 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 négatif 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.

3.7.5 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.
3.8 Declaration of Conformity

3.8.1 Česky[Czech]

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

3.8.2 Dansk [Danish]

Undertegnede NETGATE erklærer herved, at følgende udstyr NETGATE device, overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

3.8.3 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.

3.8.4 English

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

3.8.5 Eesti [Estonian]

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

3.8.6 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.

3.8.7 Deutsch [German]

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)

3.8.8 Ελληνικ [Greek]

ΜΕ ΤΗΝ ΠΑΡΟΤΡΥΣΙΑ ΤΗΣ ΝΕΤΓΑΤΕ ΔΗΛΩΝΕΙ ΟΤΙ ΝΕΤΓΑΤΕ device, ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1995/5/ΕΚ.
3.8.9 Magyar [Hungarian]

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

3.8.10 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.

3.8.11 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.

3.8.12 Latviski [Latvian]

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

3.8.13 Lietuviškai [Lithuanian]

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

3.8.14 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.

3.8.15 Norsk [Norwegian]

NETGATE erklærer herved at utstyret NETGATE device, er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.

3.8.16 Slovensky [Slovak]

NETGATE t mto vyhlasuje, e NETGATE device, sp a základné po iadavky a v etky príslu né ustanovienia Smernice 1999/5/ES.

3.8.17 Svenska [Swedish]

Härmed intygar NETGATE att denna NETGATE device, står I överensstämmerse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
3.8.18 Español [Spanish]

Por medio de la presente NETGATE declara que el NETGATE device, cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

3.8.19 Polski [Polish]

Niniejszym, firma NETGATE oświadcza, e produkt serii NETGATE device, spełnia zasadnicze wymagania i inne istotne postanowienia Dyrektywy 1999/5/EC.

3.8.20 Português [Portuguese]

NETGATE declara que este NETGATE device, está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

3.8.21 Română [Romanian]

Prin prezenta, NETGATE declară că acest dispozitiv NETGATE este în conformitate cu cerințele esențiale si alte prevederi relevante ale Directivei 1999/5/CE.

3.9 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.
3.10 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.

3.11 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.

3.12 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.

3.13 Limited Warranty

DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITY

THE PRODUCTS/SERVICES AND ALL INFORMATION, CONTENT, MATERIALS, PRODUCTS (INCLUD-
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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.

4.1 Simple Configuration

Below are the simple instructions for connecting to the console port with Microsoft Windows. If these steps do not work for you or if you’re an operating system other than Windows, then please skip forward to Advanced Configuration.

4.1.1 Serial Terminal Emulation Client

A serial terminal emulation program is required to access the pfSense® appliance console through the serial interface. PuTTY is free and recommended.

4.1.2 Configuring Serial Terminal Emulator

PuTTY must be configured to communicate with the pfSense appliance. In order to do so, you must first know what COM Port your computer has assigned to your serial port. Even if you assigned your serial port to COM1 in the BIOS, Windows may remap it to a different COM Port.

To determine this, you must open Windows Device Manager and view the COM port assignment:
**Note:** The first time you connect your computer to the pfSense appliance, it may take up to 3 minutes for the driver to install. It should install automatically for Windows 7 and above.

Open PuTTY and locate the **Session** display as shown below. Set **Serial line** to the COM Port that is displayed in Windows Device Manager, COM3 for this example, and the **Speed** to 115200 bits per second, the speed of the BIOS in this case. For the **Connection type**, select **Serial**.
Click the **Open** button and the console screen will be displayed.

### 4.2 Advanced Configuration

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

### 4.2.1 Install the Driver

Install an appropriate Silicon Labs CP210x USB to UART Bridge driver on the workstation used to connect with the system if needed. There are drivers available for Windows, Mac OS X, and Linux available for download.
4.2.2 Connect a USB Cable

Next, locate an appropriate USB cable that has a Micro-USB B 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 Micro-USB B 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 Micro-USB B 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.

4.2.3 Locate the Console Port Device

The appropriate device to attach the terminal program to each platform varies by platform and must be located before attempting to connect to the console.

**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. COM1), that value is what would be used as the port in the terminal program.

**Mac OS X**

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.
4.2.4 Launch a Terminal Program

Use a terminal program to connect to the system console port. PuTTY is a popular terminal program that is available on various operating systems. Some other choices of terminal programs:

- Linux: screen, PuTTY, minicom, dterm
- Mac OS X: screen, ZTerm, cu
- Windows: PuTTY, SecureCRT, Do not use Hyperterminal
- FreeBSD: screen, cu

The settings to use within the terminal program are:

- **Speed**: 115200 baud
- **Data bits**: 8
- **Parity**: none
- **Stop bits**: 1
- **Flow Control**: Off or XON/OFF. Hardware flow control (RTS/CTS) must be disabled.

Client-Specific Examples

PuTTY

Launch PuTTY and configure it for a Serial type connection with a speed of **115200** using the port name located previously.

- **Windows Example**:

  ![PuTTY Configuration](image)

- **Linux Example**:

  ![PuTTY Configuration](image)

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

GNU screen

In many cases screen may be invoked simply by using the proper command line:

- Mac OS X
  
  sudo screen /dev/cu.SLAB_USBtoUART 115200

- Linux
  
  sudo screen /dev/ttyUSB0 115200

- FreeBSD
  
  sudo screen /dev/cuaU0 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. For example, on OS X this is commonly required

  sudo screen -U /dev/cu.SLAB_USBtoUART 115200

Adding the -U parameter to the screen command line arguments forces it to use UTF-8 for character encoding.

4.3 Troubleshooting

4.3.1 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.

4.3.2 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” above)
- Ensure the terminal program is configured for the proper character encoding, such as UTF-8 or Latin-1, depending on the operating system. (See the previous entry under “GNU screen”)

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4.3.3 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” above)
- 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.
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 SG-1000 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-netgate-SG-1000-recover-2.4.4-RELEASE-p3-armv6.img.gz`

   **Note:** The pfSense® factory version is the version that is preinstalled on units purchased from Netgate. The factory image is optimally tuned for our hardware and contains some features that cannot be found elsewhere, such as the AWS VPN 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 pfSense device.

4. Insert the memstick in the OTG USB port, using an OTG cable and boot the system.

5. Connect the 5v power to power the system on. The system will boot to the memstick. After the SG-1000 boots to the memstick, you will be prompted to continue.

6. Press `y` to confirm the destination device.

   **Note:** The onboard eMMC flash memory is always mmcsd0.

7. Once the install has completed, remove the memstick, and cycle the power (unplug the SG-1000 and plug it back in) to reboot the SG-1000.

   **Note:** For information on restoring from a previously saved configuration, go to Backup and Restore.
Last login: Mon Oct 23 01:00:35 on ttyu0
FreeBSD 11.1-RELEASE-p2 (uFW) #0 r313908+7eae9364d28(RELENG_2_4): Sun Oct 22 19:59:49 CDT 2017

pfSense

Welcome to pfSense 2.4.1-RELEASE...
Netgate SG-1000 firmware recovery
Serial: 

This will install the standard firmware and will erase all the existing contents of eMMC permanently.
eMMC device: mmcblk0

Are you sure you want to continue ? (y/N) 

recovery storage device.

Shutdown NOW!
#shutdown: [pid 706]
May 16 10:58:05 ufw-recovery shutdown: halt by root:
Stopping cron.
Stopping devd.
Writing entropy file:.
Writing early boot entropy file:.
Terminated.

May 16 10:58:07 ufw-recovery syslogd: exiting on signal 15
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...
Syncing disks, vnodes remaining... 2 1 0 0 done
All buffers synced.
Uptime: 6m18s

The operating system has halted.
Power cycle or reset to reboot.
The following list contains common questions about the SG-1000 asked by customers. The answers cover a wide range of topics.

- How do I restore the firewall OS? (firmware)
- How do I reset to factory defaults?
- Is the CPU temperature too high?
- What should my speed test results be?
- Is booting from USB OTG supported?
- What packages are available?
- Why isn’t “my favorite package” available?
- Why do I see failure messages in the BIOS output while booting?
- The boot environment on eMMC is corrupted and it will not boot from Micro-SD

6.1 How do I restore the firewall OS? (firmware)

Refer to Reinstalling pfSense Software for instructions.

6.2 How do I reset to factory defaults?

There are several methods that can be utilized to reset the configuration back to factory defaults:

1. From the SG-1000 web interface, visit Diagnostics > Factory Defaults
2. From SSH, use menu option 4
3. From the serial console menu, use menu option 4
   - For information about connecting to the serial console, see Connecting to the Console Port

If none of those methods work, reinstall the OS image as described above in How do I restore the firewall OS? (firmware)
Note: Resetting the unit to factory defaults only affects the configuration of the firewall and not the contents of the filesystem, which are only reset by reinstalling the OS.

6.3 Is the CPU temperature too high?

Initial builds of the SG-1000 displayed temperature output from an inaccurate sensor, which could be off by as much as 10.8 C (50 F), high or low. This sensor was not intended to be used by end-users, only for factory and test measurements. We had hoped it would be accurate enough to be useful, but it was not. Due to the unreliable nature of the sensor, the temperature output is not displayed in current builds.

The SG-1000 is passively cooled (no fans) and it will be warm to the touch. The firewall must be placed so it has adequate room for air to flow around the case.

6.4 What should my speed test results be?

We are continually improving the drivers and making other optimizations to increase the speed of the SG-1000. With a basic firewall setup we have shown it can pass around 130Mbit/s. In other conditions, the speed may be higher or lower depending on the firewall configuration, enabled features, environment and testing methods.

6.5 Is booting from USB OTG supported?

Yes, provided that the eMMC contains a pfSense operating system image from December 29th, 2016 or later. After that date, the OS contains an updated U-Boot environment which is capable of booting from the USB OTG port.

If the eMMC is completely blank/empty, the SG-1000 cannot boot from the USB OTG port and must be booted from the SD card socket.

6.6 What packages are available?

Nearly all packages available for pfSense are available for the SG-1000! There are a few packages that are unable to run on the SG-1000, however. These packages either have requirements that exceed the specification of the SG-1000 or they do not currently compile for the architecture used by the SG-1000 (armv6).

As of January 5th, 2016 the list of available packages on an SG-1000 is:

- apcupsd
- arping
- AutoConfigBackup
- Avahi
- aws-wizard
- Backup
- bind
- cellular
- Cron
- darkstat
- FTP_Client_Proxy
- haproxy
- iftop
- iperf
- ipsec-profile-wizard
- LADVD
- Lightsquid
- mailreport
- mtr-nox11
- nmap
- Notes
- nrpe
- nut
- OpenBGPD
- openvpn-client-export
- pfBlockerNG
- Quagga_OSPF
- routed
- RRD_Summary
- Service_Watchdog
- Shellcmd
- siproxd
- softflowd
- squid
- squidGuard
- Status_Traffic_Totals
- sudo
- syslog-ng
- System_Patches
- tftpd
- tinc
- zabbix-agent
- zabbix-proxy
This list is subject to change.

Note: Some of these packages may install but not fully function at this time, as we are still evaluating their usefulness and reliability.

6.7 Why isn’t “my favorite package” available?

Some packages will not compile for the SG-1000 architecture, they exceed the hardware requirements and platform purpose, or they are intended for hardware or uses not possible on the SG-1000.

As of January 5th, 2016 the list of packages that have been excluded from the SG-1000 is:

- blinkled
- freeradius2
- gwled
- LCDproc
- ntopng
- Open-VM-Tools
- snort
- suricata

6.8 Why do I see failure messages in the BIOS output while booting?

The U-Boot environment used by the SG-1000 prints error messages that can look concerning but are quite normal, depending on the components installed in or connected to the SG-1000.

Note that both eMMC and Micro-SD cards are all considered “MMC” as they are Multi-Media Cards. eMMC is embedded on the system board, and Micro-SD cards are a removable type of MMC.

The boot environment might state “bad device” but that only indicates that the device is not bootable, it is not a comment about the status of the hardware component.

The following messages are normal without an Micro-SD card present

```
Card did not respond to voltage select!
*** Warning - MMC init failed, using default environment
** Bad device mmc 0 **
```

- In this case, there is no Micro-SD card present so it could not be initialized or used as a boot device.

The following messages are normal when booting from an SD card without a boot environment on the eMMC

```
Card doesn't support part_switch
MMC partition switch failed
*** Warning - MMC partition switch failed, using default environment
** Unable to read "u-boot.env" from mmc0:1 **
```

The following messages are normal when the boot environment supports booting from the USB OTG port, but there is no bootable media connected to the OTG port
6.9 The boot environment on eMMC is corrupted and it will not boot from Micro-SD

If the boot environment is present on the eMMC but it is broken in some way, the SG-1000 may not be able to boot from a Micro-SD card. In this case, with a bootable Micro-SD card installed, short the “SD BOOT” header using a jumper (not provided). The “SD BOOT” jumper header is located next to the power connector. After reinstalling the operating system, remove the Micro-SD card and the jumper.
7.1 Netgate Training

Netgate training offers training courses for increasing your knowledge of pfSense® 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

7.2 Resource Library

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

https://www.netgate.com/resources

7.3 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®. These items are offered as professional services and can be purchased and scheduled accordingly.

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

7.4 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/
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 software, see the pfSense Documentation and Resource Library.