Secure Router Manual

SG-5100

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OUT OF THE BOX

This Quick Start Guide covers the first time connection procedures for the Netgate SG-5100 Secure Router and also provides information needed to stay up and running.

GETTING STARTED

Use the following steps to configure the TNSR Secure Router.

1. To configure the Network Interfaces and gaining access to the Internet, follow the instructions provided in the Zero-to-Ping documentation.

   Note: Not all steps in the Zero-to-Ping documentation will be necessary for every configuration scenario.

2. Once the Host OS is capable of reaching the Internet, check for updates (Updating TNSR) before proceeding. This ensures the security and integrity of the router before TNSR interfaces are exposed to the Internet.

3. Finally, configure the TNSR instance to meet the specific use case. The topics are listed on the left column of the TNSR Documentation site. There are also TNSR Configuration Example Recipes that might be of assistance when configuring TNSR.

INPUT AND OUTPUT PORTS

2.1 Rear Side

2.2 Network Ports

Port Label	CentOS Label	TNSR Label	Port Type	Port Speed
IGB0	enp3s0	GigabitEthernet3/0/0	RJ-45	1 Gbps
IGB1	enp4s0	GigabitEthernet4/0/0	RJ-45	1 Gbps
IX0	enp6s0f0	TenGigabitEthernet6/0/0	RJ-45	1 Gbps
IX1	enp6s0f1	TenGigabitEthernet6/0/1	RJ-45	1 Gbps
IX2	enp8s0f0	TenGigabitEthernet8/0/0	RJ-45	1 Gbps
IX3	enp8s0f1	TenGigabitEthernet8/0/1	RJ-45	1 Gbps

Note: Intel C3000-based (Denverton) platforms using the SoC's Intel X5333 network controllers utilize Intel's ixgbe driver, not the igb driver, so the TNSR Label reports these ports as *TenGigabitEthernet* rather than *GigabitEthernet*.

Default Host OS Interface is **eno1**. The Host OS Interface is one network interface that is only available to the host OS and not available in TNSR. Though technically optional, we strongly recommend having one for accessing and updating the host OS.

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

2.3 Other Ports and Indicators

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

2.4 Front Side

1. Receessed Reset Button
2. Power Button
3. Power (12VDC with threaded locking connector)

Center Pin Positive

Note: The power button on the SG-5100 has been programmed to perform a graceful shutdown when depressed.

SAFETY AND LEGAL

Contents

- *Safety and Legal*
    - *Safety Notices*
    - *Electrical Safety Information*
    - *FCC Compliance*
    - *Industry Canada*
    - *CE Marking*
    - *RoHS/WEEE Compliance Statement*
    - *Declaration of Conformity*
    - *Disputes*
    - *Applicable Law*
    - *Site Policies, Modification, and Severability*
    - *Miscellaneous*
    - *Limited Warranty*

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 CE Marking

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

3.6 RoHS/WEEE Compliance Statement

3.6.1 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.

3.6.2 Deutsch

Die Europäische Richtlinie 2002/96/EC verlangt, dass technische Ausrüstung, die direkt am Gerät und/oder an der Verpackung mit diesem Symbol versehen ist, nicht zusammen mit unsortiertem Gemeindeabfall entsorgt werden darf. Das Symbol weist darauf hin, dass das Produkt von regulärem Haushaltmüll getrennt entsorgt werden sollte. Es liegt in Ihrer Verantwortung, dieses Gerät und andere elektrische und elektronische Geräte über die dafür zuständigen und von der Regierung oder örtlichen Behörden dazu bestimmten Sammelstellen zu entsorgen. Ordnungsgemäßes Entsorgen und Recyceln trägt dazu bei, potentielle negative Folgen für Umwelt und die menschliche Gesundheit zu vermeiden. Wenn Sie weitere Informationen zur Entsorgung Ihrer Altgeräte benötigen, wenden Sie sich bitte an die örtlichen Behörden oder städtischen Entsorgungsdienste oder an den Händler, bei dem Sie das Produkt erworben haben.

3.6.3 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.

3.6.4 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 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.

3.6.5 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.

3.7 Declaration of Conformity

3.7.1 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 rnice 1999/5/ES.

3.7.2 Dansk [Danish]

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

3.7.3 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.

3.7.4 English

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

3.7.5 Eesti [Estonian]

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

3.7.6 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.

3.7.7 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)

3.7.8 Ελληνικ**H [Greek]**

ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ NETGATE ΔΗΛΩΝΕΙ ΟΤΙ NETGATE device, ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙ-ΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1995/5/ΕΚ.

3.7.9 Magyar [Hungarian]

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

3.7.10 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.

3.7.11 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.

3.7.12 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 tajiem noteikumiem.

3.7.13 Lietuviškai [Lithuanian]

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

3.7.14 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.

3.7.15 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.

3.7.16 Slovensky [Slovak]

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

3.7.17 Svenska [Swedish]

Härmed intygar NETGATE att denna NETGATE device, står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

3.7.18 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.

3.7.19 Polski [Polish]

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

3.7.20 Português [Portuguese]

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

3.7.21 Română [Romanian]

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

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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.

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3.12 Limited Warranty

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DISCLAIMERS, EXCLUSIONS, OR LIMITATIONS MAY NOT APPLY TO YOU, AND YOU MIGHT HAVE ADDITIONAL RIGHTS.

CONNECTING TO CONSOLE PORT

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 Netgate appliance console through the serial interface. Microsoft Windows no longer includes HyperTerminal in Versions 7 and up. PuTTY is free and can be downloaded from:

http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

### 4.1.2 Configuring Serial Terminal Emulator

PuTTY must be configured to communicate with the Netgate 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:
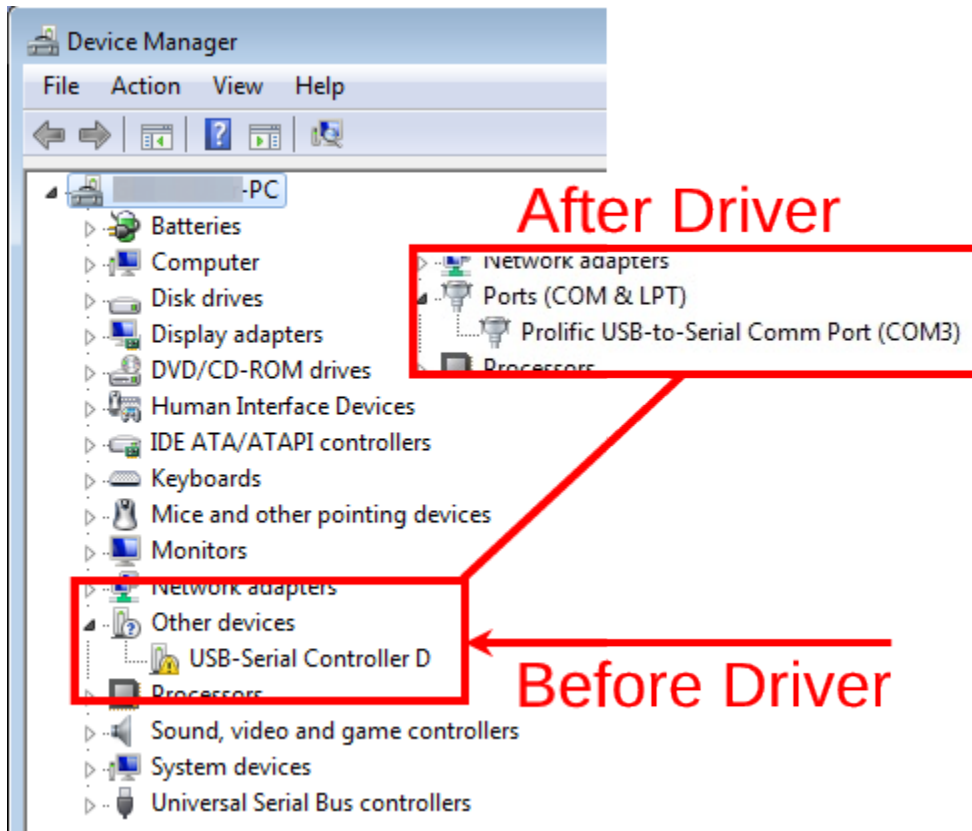
Note: The first time you connect your computer to the SG-5100, it may take up to 3 minutes for the driver to install. It should install automatically for Windows 7 and above.

Open PuTTY and locate the **Session** display as shown below. For the **Connection type**, select **Serial**. 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.
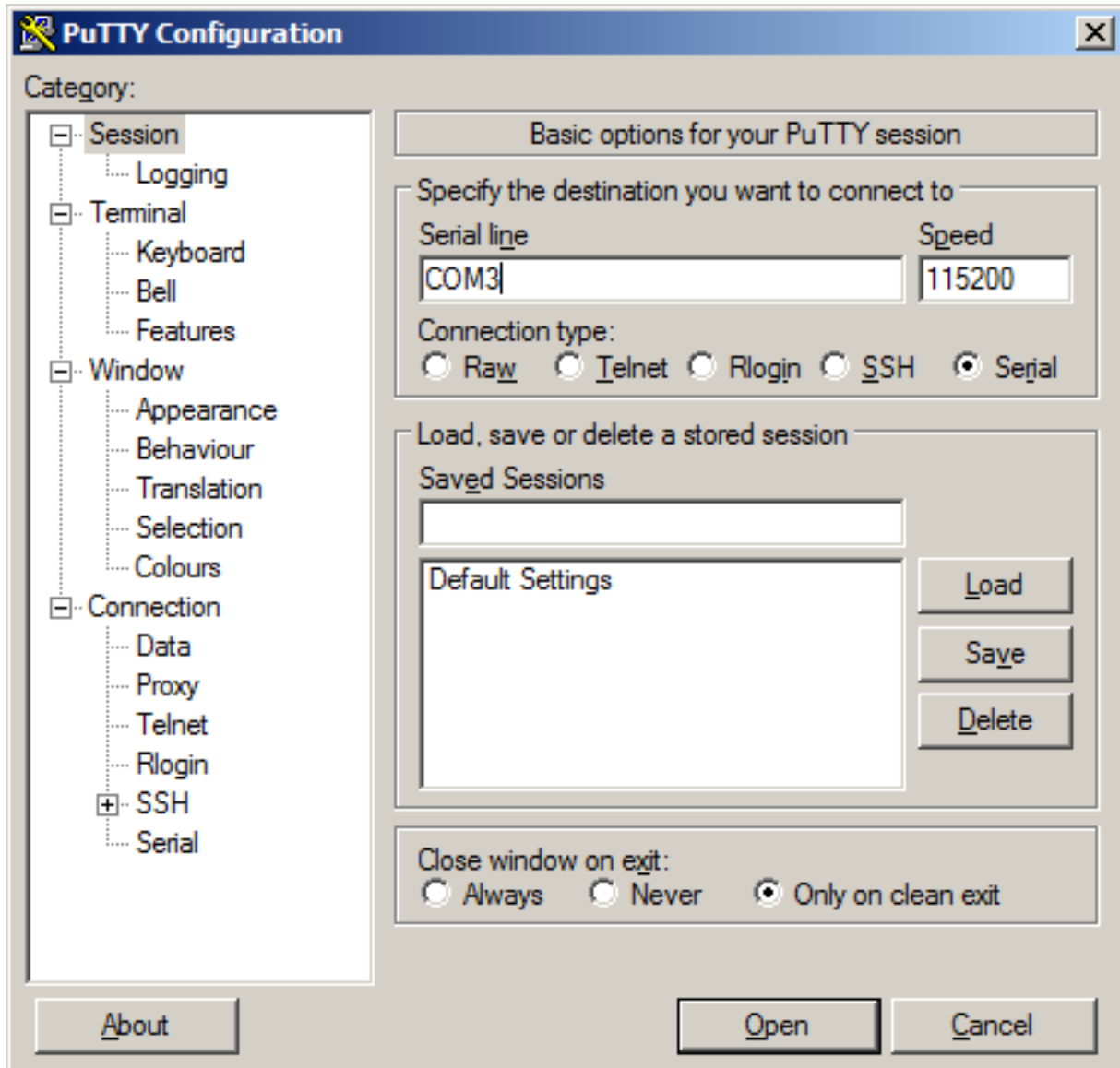
Select **Open** and the console screen will be displayed.

4.2 Advanced Configuration

A Prolific PL2303 USB-to-UART bridge is used to provide access to the serial port that acts as a system console. This is exposed via a USB Mini-b (5-pin) port on the front of the case. There are several steps required to access the system console via this port.

4.2.1 Install the Driver

Install an appropriate PL2303 USB to UART Bridge VCP (virtual COM port) driver on the workstation used to connect with the system if needed. There are drivers available for Windows, Mac OS X, and Linux available in the Download Software section of the Prolific Website.

Note: Recent versions of FreeBSD and many Linux distributions include this driver and will not require manual installation.

4.2.2 Connect a USB Cable

Next, locate an appropriate USB cable. The type of cable required for the serial console 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.

Attach the USB cable between a workstation and the system. Gently push the Mini-B plug end into the console port on the system and connect the USB type A plug into an available USB port on the workstation.


Tip: Be certain to gently push in the Mini-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 **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. COM1), that value is what would be used as the port in the terminal program.
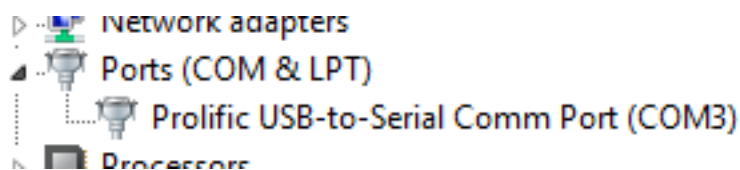
Mac OS X

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

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
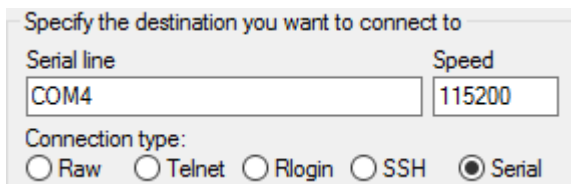>
> **Parity** none
>
> **Stop bits** 1
>
> **Flow Control** Off or XON/OFF. Hardware flow control (RTS/CTS) **must** be disabled.

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:

- Linux Example:

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.usbserial 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.usbserial 115200
```

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

4.2.5 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.

Garbled Serial Output

If the serial output apears 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")

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.

ADDITIONAL RESOURCES

5.1 Professional Services

Support does not cover more complex tasks such as network design and conversion from other firewalls. These items are offered as professional services and can be purchased and scheduled accordingly.

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

5.2 Netgate Training

Netgate training offers training courses for increasing your knowledge of Netgate 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/

5.3 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/

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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.

Enterprise Support is included with an active software subscription, for more information view our Netgate Global Support page.

See also:

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