Gearlinx User Quick Start Guide v1.2

NR4400 Series
Duckfone Series
ZERO

http://www.gearlinx.com

Email: support@gearlinx.com

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Welcome

Thank you for purchasing our Gearlinx solution! We hope you enjoy using our products as much as we loved creating them!

Gearlinx™ is a team of leading forces, that builds and delivers technology that powers the world's connectivity. We understand the unique challenges and opportunity to keep networks operationally resilient and available for everyone, everywhere. Our platforms are a fresh approach to providing a holistic view of the network, to enable organizations to manage network and operational resilience in a unified way.

Everything we do challenges old networking paradigms. We approach networking and the edge differently. We live for the edge. The way we do it is by making remote access and edge compute easy. We give you the flexibility and control at scale. We make it simple and give you secure network application superpowers. We hope this guide assists you on your Gearlinx journey.

Gearlinx R&D Hardware & Software Engineering Leadership

CHAPTER 1

NR4400 Series Product

NR4416
NR4416-4G
NR4448
NR4448-4G

1.0 Get to know your NR4400 Network Resilience Platform

"Network Resilience is critical to running a business. No network, no business."

Gearlinx

1.1 Introduction to the NR4400

Gearlinx™ NR4400 Network Resilience as a Service™ platform is an enterprise Total Out-of-Band™ management solution designed and optimized for ensuring business continuity in high density, mission-critical data centers, colocations, and enterprise edge networks. The NR4400 is accessed and managed through ZERO, our Operational Resilience as a Service™ cloud platform, and was built with an API-First approach for tight integration with existing DevOps and NetOps tools used within an organization.

The NR4400 is the ideal platform to deploy, manage, and remediate network infrastructure while ZERO delivers a centralized view that provides complete control of your network. The NR4400 allows IT staff to access and manage their critical infrastructure by providing a separate and secure management plane that supports out-of-band management, containers, advanced automation applications, edge compute, mass configuration changes, software updates, and more.

The Operational Resilience as a Service ™ subscription allows your business to move away from a heavy CAPEX model to a more flexible OPEX consumption model, saving your business significant money while ensuring business agility. Operational improvements and life cycle management are achieved through ZERO which provides device management and deployment, centralized alerting, warranty information, serial numbers, and subscription status.

Every day is a good day when you save time, money, and have no network disruptions. Start today and experience operational simplicity with the NR4400 Network Resilience Platform.

1.2 NR4400 Models

The NR4400 currently ships with the following product models:

Part Number	Serial Ports	1GbE RJ45	1GbE/10GbE SFP/SFP+	Global Cellular 4G LTE	Power Input
NR4416	16	2	2	-	Dual AC
NR4416-4G	16	2	2	Yes	Dual AC
NR4448	48	2	2	-	Dual AC
NR4448-4G	48	2	2	Yes	Dual AC

NR4448:

1.3 Before you Begin Installing the NR4400

Before you begin installing the NR4400 device ensure you have the following accessories or parts included with your delivery:

- What's included by default in every NR4400 shipment:
  - Rack mounting kit (2 x rack ears and 8 x rack screws)
    - You will need a small Philips head screwdriver to attach the screws
  - 2 x straight through 2m Ethernet cables
  - 1 x adapter DB9F to RJ45 straight serial
- What is ordered separately or as an add-on:
  - At least one (1) power cord; but ideally two (2)
    - These are sold separately as an accessory. You can purchase them from Gearlinx (part number 444000) or from your favourite power cable vendor.
    - You can power an NR4400 with only one power cord. The reason there are two (2) power ports is to provide redundancy of power in the event of a power issue. When using both power ports it is recommended you power them from different outlets or power sources to improve redundancy.
  - Duckfone
    - A Duckfone can be purchased separately or bundled with an NR4400. A Duckfone provides cellular connectivity (primary or failover) to your NR4400
    - If using a Duckfone you will need an active data plan and at least one(1) SIM card. Theis can be purchased directly from Gearlinx or from your favourite mobile provider.

1.4 Rack Mounting NR4400

You can mount the NR4400 on any standard size, 19-inch (about 49 cm) wide rack. The NR4400 requires 1 rack unit (RU) of space, which is 1.75 inches (44.45 mm) high.

To install the NR4400 into a 19-inch standard chassis:

Step 1. Place one of the supplied rack ears on the side of the NR4400 so that the four rack holes align with the rack ears and use the supplied screws to secure the ear to the side of the NR4400.
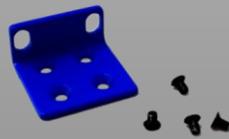
Step 2. Repeat Step 1 for the other side of the NR4400.
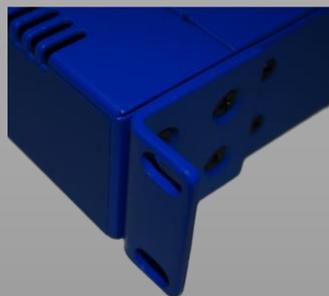
Step 3. Once both brackets are secured the NR4400 is ready to be installed into a standard 19-inch rack.

1.5 NR4400 Front (serial facing) Panel
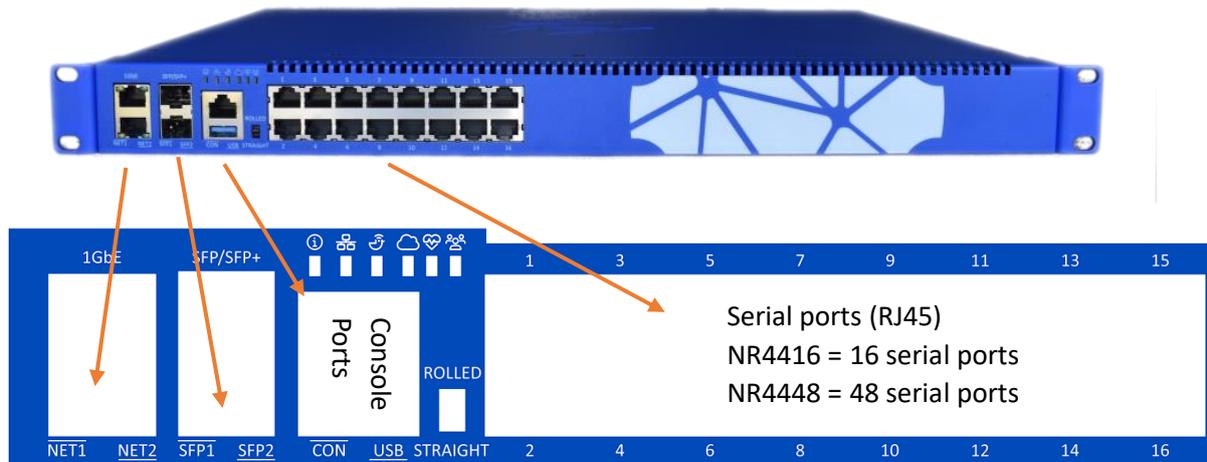
The "Front" or "Serial Facing" panel of the NR4400 is dominated by RJ45 serial ports. The picture above is of an NR4416 where you can clearly see 16 serial ports.

To the left of the serial ports is a switch. This rolled/straight switch only applies to the console port serial port. All other serial ports are software selectable.

A full description of the LEDs and Icons on this panel is in the next Section.

1.5.1 Front Panel Icon and LED Behavior

|		
	Solid Yellow	Starting to boot
	Flashing Yellow	Starting services
	Solid Green	Finished the startup sequence and ready
	Solid Red	No link on NET1
	Flashing Red	Link on NET1, waiting for IP address assignment
	Solid Green	NET1 has IP address
	Off	No link on NET3 (Duckfone not inserted)
	Flashing Yellow	Link on NET3 and attempting to connect with Duckfone
	Solid Red	SIM error
	Solid White	Not registered on a network yet
	Other	Green = 3G, Blue = LTE, Purple = 5G
	Off	Connection to ZERO disabled
	Flashing White	Registration & synchronization with ZERO in progress
	Flashing Red	Failed registration with ZERO
	Solid Yellow	Registered with ZERO, failed synchronization
	Flashing Yellow	Synchronized, but error processing response from ZERO
	Flashing Green	Synchronized, online and operational. Testing Connection
	Solid Green	All tests remain passed, fully operational in ZERO
	Heartbeat	CPU activity (faster the heartbeat = higher the workload)
	Off	No user connected to any serial port
	Solid Green	At least one user connected to at least one serial port

1.6 NR4400 Rear (power facing) Panel
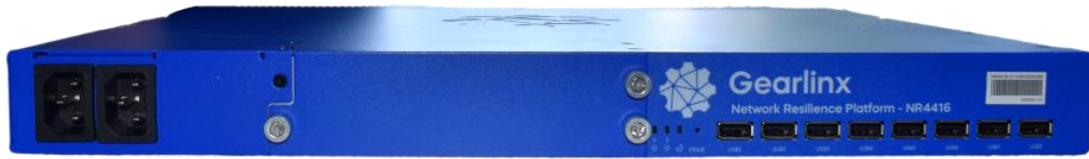
1.7 Labels

The NR4400 products have 2 labels. The main label is found underneath and includes the device MAC address, Serial number, unique password as shown in the example below.

1.8 Configuring your NR4400

1.8.1 The Easy Way

> When a NR4400 device is taken out of the box, its NET1 port will be configured to request an address via DHCP.

Assuming this local network is connected to the Internet the NR4400 will automatically connect to Gearlinx ZERO. Alternatively, if you are using a Duckfone and it is preinstalled with a SIM and has a valid Internet connection it will provide an alternate path for the NR4400 device to connect to ZERO.

The most common and recommended way to configure your NR4400 series product is to log on to your ZERO account and configure the unit via the cloud. Gearlinx products are designed to be managed via ZERO.

You can log into ZERO here:

zero.gearlinx.com

1.8.2 For Advanced Users – hostname.local

If not using ZERO or your local network does not hand out a DHCP address the NR4400 will use an IPv4 Link Local Address (169.254.0.0/16).

Once the NR4400 has either acquired a DHCP lease, or selected an IPv4 Link Local address, it will advertise its hostname using Multicast DNS (mDNS). This means that it will be accessible on the local network via **hostname.local**, where:

"hostname" is the devices model (eg. NR4416) followed by a dash "-" and then its serial number.

> **For example:**
>
> An NR4416 with a Serial number of 0110923000066 would be found via:
>
> nr4416-0110923000066.local

Gearlinx devices also support IPv6. If DHCPv6 or SLAAC is operational on the network, then the device will acquire and IPv6 address via either protocol, and advertise that via mDNS, or it will advertise its link local IPv6 address.

You can then configure your NR4400 series product a few different ways: via the local web UI, via a secure shell connection or via the console port, all of which are described separately below.

1.8.3 Local Web UI

You can use an internet browser that is connected to the NR4400 network by typing in:

https://hostname.local as detailed in the section above.

or if you know the "IP" address (for illustration only, in this example: 192.168.1.84):

Open a web browser and type:

> **EXAMPLE 1: (IP not known)**
>
> Product: NR4416
>
> Serial Number: 0110923000066
>
> https://NR4416-0110923000066.local
>
>
> **EXAMPLE 2: (IP known: in this example 192.168.1.84)**
>
> https://192.168.1.84

The default username is "admin". The default password is printed on the NR4400 label on the base of the unit as shown in Section 1.7 above. Username and password are case sensitive.

1.8.4 Secure Shell

You can initiate a shell session (ssh on Linux or Putty on Windows).

Hostname: IP address of the NR4400 (or hostname.local per above)

Port:22

Example command on Linux:

ssh admin@hostname.local

In the below command line example, for illustration value, we assume the IP of the NR is: 192.168.1.84:

use the password on the bottom of the NR4400

```
matt@minotaur-prosper:~$ ssh admin@192.168.1.84
The authenticity of host '192.168.1.84 (192.168.1.84)' can't be established.
RSA key fingerprint is SHA256:T1U8rVjnglEa8D7EB2XVBo9MYUxNtyk0RB0QHt4Zxo0.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.1.84' (RSA) to the list of known hosts.
Password:

Network addresses:
net1:    State: up        192.168.1.84/24
net3:    State: down      169.254.255.253/30

d4:c3:b0:01:03:92 NR4416-d4c3b0010392
Enter ? to view help.

Access menu:

  [ 1] System / Shell
  [ 2] System / CLI
  [ 3] System / Logs
  [ 4] > Serial ports
  [ 5] Quit

Please enter a selection or filter [1]: 1

Entering System / Shell
#
```

1.8.5 NR Console Port

You can connect to the NR4400 via its Console Port. You can use a standard ethernet cable RJ45. Configure your connection with the following parameters:

- 115200 bits per second
- 8 data bits
- No parity
- 1 Stop bit
- No flow control

Like the UI and SSH sections above your username is: Admin and your password is the password found on the bottom of the NR4400 device.

1.9 Restoring Factory Default

The erase button (on the power face) uses a button pattern to trigger a config erase/reset to factory default. You will need a paperclip or something small and firm that can fit in the erase hole. To perform the factory reset you follow these 4 steps in quick succession:

- Depress the button for a second
- release it for a second
- depress it again for a further second
- release

The unit will then immediately begin its factory reset routine, wiping all cryptographic keys and data and returning its memory and state to factory default.

CHAPTER 2

Duckfone

Duckfone 4

2.0 Get to know your Duckfone

2.1 Introduction to the Duckfone

The Duckfone has a very similar experience to the NR4400 above. One of the key differences with the Duckfone from a software feature perspective is it doesn't support running virtual machines or containers. It has much lower "horsepower" and than an NR product.

Its primary role is to get things connected to the internet.

2.2 Duckfone Models

The Duckfone-4-GLB is (currently) the only model of Duckfone. This is an LTE (Cat 4) global cellular gateway.

2.3 Before you Begin Installing the Duckfone

In the Duckfone kit box you should have received 2 x LTE antennas. Attach the antennas to the Main and AUX antenna ports. A GPS antenna (not provided by default) is not needed for normal operation.

The Duckfone is a cellular gateway solution and requires an active cellular SIM card (not supplied) for proper operation. Before using the Duckfone please purchase a SIM and ensure any relevant specific information is known to you (such as if you need to configure the SIM with a custom APN).

Many SIMs will work out of the box with the Duckfone.

2.3.1 Common Installation Problems

Three of the most common problems that customers run into while installing a Duckfone are:

- Having an active SIM with available data
- Do I need a special APN for my SIM
- Have I installed the Duckfone in a location where I have a reliable and strong connection to the carrier I am connecting with

2.4 Power over Ethernet on the Duckfone

The Duckfone must be powered over Ethernet (not supplied by default). We recommend an active (auto-sensing) POE injector that supports a minimum of 30W. Check that your PoE adapter complies with IEEE802.3at standards or higher.

Beware of the quality and compliance to standards of many POE injectors on the market. We recommend you source your POE injector from a reputable manufacturer that has a proven record of meeting compliance requirements and manufacture their equipment to these standards.

2.5 Duckfone Front (serial facing, POE) Panel
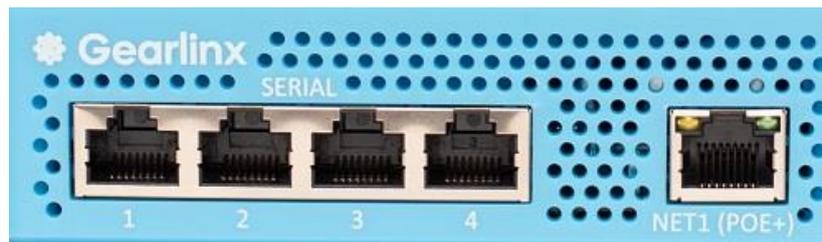
The Duckfone-4 is equipped with:

- 4 x "cisco straight" RJ45 serial ports
    - These ports are typically used to connect to devices you wish to remotely manage or monitor
- 1 x POE+ RJ45 ethernet port

2.6 Duckfone Rear (antenna facing) Panel

The Duckfone-4 rear panel includes:

- 2 x cellular antenna SMA connectors (main and AUX)
- 1 x GPS SMA connector
- 2 x SIM slots
- 1 x factory erase button
- Signal LEDS as described in the next section

2.6.1 Rear Panel Icon and LED Behavior

Power	Solid Green	Device is powered
	Solid Yellow	Starting to boot
	Flashing Yellow	Starting services
	Flashing Red	SIM error
	Flashing White	Not registered on a network (yet)
	Green	Connected on 3G
	Blue	Connected on 4G/LTE
	Purple	Connected on 5G
	Flashing (Green, Blue, Purple)	3G/4G/5G registered on network but no connection
Signal	Signal	1-5 bars depending on quality and strength of connection

2.7 Configuring your Duckfone

2.7.1 The Easy Way

> When a Duckfone device is taken out of the box, its NET1 port will be configured in passthrough and attempt to hand the cellular connection to a waiting device via DHCP.

Assuming you have a working SIM/cellular connection the Duckfone will automatically connect to Gearlinx ZERO.

The most common and recommended way to configure your Duckfone product is to log on to your ZERO account and configure the unit via the cloud. Gearlinx products are designed to be managed via ZERO.

You can log into ZERO here:

zero.gearlinx.com

2.7.2 For Advanced Users – hostname.local

If not using ZERO or don't have a working SIM you can plug your Duckfone's ethernet/LAN data connection to a PC and configure it locally.

The Duckfone will advertise its hostname using Multicast DNS (mDNS). This means that it will be accessible on the local network via **hostname.local**, where:

"hostname" is the devices model (eg. Duckfone-4) followed by a dash "-" and then its serial number.

> **For example:**
>
> A Duckfone-4 with a Serial number of 0111223001051 would be found via:
>
> duckfone-4-0111223001051.local

Gearlinx devices also support IPv6. If DHCPv6 or SLAAC is operational on the network, then the device will acquire and IPv6 address via either protocol, and advertise that via mDNS, or it will advertise its link local IPv6 address.

Alternatively you can attempt to reach the Duckfone via:

- 192.168.100.1

You can then configure your Duckfone a few different ways: via the local web UI, via a secure shell connection or via the console port, all of which are described separately below.

1.8.3 Local Web UI

You can use an internet browser that is connected to the Duckfone network by typing in:

https://hostname.local as detailed in the section above.

or if you know the "IP" address (for illustration only, in this example: 192.168.100.1):

Open a web browser and type:

> **EXAMPLE 1: (IP not known)**
>
> Product: Duckfone-4
>
> Serial Number: 0111223001051
>
> https:// duckfone-4-0111223001051.local
>
> **EXAMPLE 2: (IP known: in this example 192.168.100.1)**
>
> https://192.168.100.1

The default username is "admin". The default password is printed on the Duckfone label on the base label of the unit. Username and password are case sensitive.

1.8.4 Secure Shell

You can initiate a shell session (ssh on Linux or Putty on Windows).

Hostname: IP address of the Duckfone (or hostname.local per above)

Port:22

Example command on Linux:

- ssh admin@hostname.local

In the below command line example, for illustration value, we assume the IP of the Duckfone is: 192.168.1.84:

use the password on the bottom of the Duckfone

```
matt@minotaur-prosper:~$ ssh admin@192.168.1.84
The authenticity of host '192.168.1.84 (192.168.1.84)' can't be established.
RSA key fingerprint is SHA256:T1U8rVjnglEa8D7EB2XVBo9MYUxNtyk0RB0QHt4Zxo0.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.1.84' (RSA) to the list of known hosts.
Password:

Network addresses:
net1:    State: up        192.168.1.84/24
net3:    State: down      169.254.255.253/30

d4:c3:b0:01:03:92 NR4416-d4c3b0010392
Enter ? to view help.

Access menu:

  [ 1] System / Shell
  [ 2] System / CLI
  [ 3] System / Logs
  [ 4] > Serial ports
  [ 5] Quit

Please enter a selection or filter [1]: 1

Entering System / Shell
#
```

1.9 Restoring Factory Default

The erase button (on the power face) uses a button pattern to trigger a config erase/reset to factory default. You will need a paperclip or something small and firm that can fit in the erase hole. To perform the factory reset you follow these 4 steps in quick succession:

- Depress the button for a second
- release it for a second
- depress it again for a further second
- release

The unit will then immediately begin its factory reset routine, wiping all cryptographic keys and data and returning its memory and state to factory default.

3.0 Still need help?

3.1 User Interface Manual

As our user interface, set of commands and features constantly evolve, we do not list them in this User Guide. Instead you can find our User Manual online on our main website (www.gearlinx.com) under "Resources"->"User Interface Manual".

3.2 Knowledge Base

Our main website (www.gearlinx.com) has a rich, constantly growing, and updated "Knowledge Base" of articles found under the top menu "Resources" -> "Knowledge Base". There is search feature to assist in narrowing helpful articles.

3.3 Partners

If you purchased our products from one of our value-added partners, many of them are trained and familiar with our products. Please reach out to the partner you purchased from for support.

3.4 Contact Gearlinx Technical Support Directly

We have technical support staff in two major time-zones: The US/Americas and in Australia/Asia.

Call: +1 866 720 3090

You can email our technical support team at: support@gearlinx.com

3.5 Reconnect with the Gearlinx Sales Team

Our Sales team are vested in your success and include Sales Engineers that are intimately familiar with all our products. If you're having trouble getting answers, please contact your assigned Sales team member or Sales Engineer to escalate your issue.

Sales Email: sales@gearlinx.com