Meriedweg 11
CH-3172 Niederwangen
Switzerland
info@netmodule.com
http://www.netmodule.com
Tel +41 31 985 25 10
Fax +41 31 985 25 11

User Manual
NetBox Wireless Routers



Valid for NetBox Models

- NB1310
- NB2210
- NB2500, NB224x, NB234x, NB254x

Valid for NetBox Software

- 3.3.x.xxx

Document version: 1.1.1
Date published: 4-Jan-10

Overview

Table of Content

1 Introduction

Thank you for purchasing NetBox Wireless Router from NetModule. This chapter gives you an introduction to NetBox Wireless Router. The following chapters describe the installation and the configuration.

1.1 Safety Instructions

The NetBox Wireless Router must be used in compliance with any and all applicable international and national laws and in compliance with any special restrictions regulating the utilization of the communication module in prescribed applications and environments.

To prevent possible injury to health and damage to appliances and to ensure that all the relevant provisions have been complied with, use only the original accessories. Unauthorized modifications or utilization of accessories that have not been approved may result in the termination of the validity of the guarantee.

The NetBox Wireless Routers must not be opened. Only the replacement of the SIM card is permitted.

Voltage at all connectors of the communication module is limited to SELV (Safety Extra Low Voltage) and must not be exceeded.

For use with certified (CSA or equivalent) power supply, which must have a limited and SELV circuit output. The NetBox is designed for indoor use only. Do not expose the communication module to extreme ambient conditions. Protect the communication module against dust, moisture and high temperature.

We remind the users of the duty to observe the restrictions concerning the utilization of radio devices at petrol stations, in chemical plants or in the course of blasting works in which explosives are used. Switch off the communication module when traveling by plane.

When using the communication module in close proximity of personal medical devices, such as cardiac pacemakers or hearing aids, you must proceed with heightened caution.

If it is in the proximity of TV sets, radio receivers and personal computers, NetBox Wireless Router may cause interference.

It is recommended that you should create an approximate copy or backup of all the important settings that are stored in the memory of the device.

You must not work at the antenna installation during a lightning.

Always keep a distance bigger than 40cm from the antenna in order to reduce your exposure to electromagnetic fields below the legal limits. This distance applies to Lambda/4 and Lambda/2 antennas. Bigger distances apply for antennas with higher gain.

Adhere to the instructions documented in this user's manual.

1.2 Declaration of Conformity

NetModule declares that under our own responsability the products NetBox Wireless Routers comply with the relevant standards following the provisions of the Council Directive 1999/5/EC. The signed Declarations of Conformity can be found under the following addresses:

NB1310:
http://www.netmodule.com/store/products/nb1310_conformity_declaration_e.pdf

NB2210:
http://www.netmodule.com/store/products/nb2210_conformity_declaration_e.pdf

NB2500:
http://www.netmodule.com/store/products/nb2500_conformity_declaration_e.pdf

NB2240 and NB2241:
http://www.netmodule.com/store/products/nb224x_conformity_declaration_e.pdf

NB2340 and NB2341:
http://www.netmodule.com/store/products/nb234x_conformity_declaration_e.pdf

NB2541:
http://www.netmodule.com/store/products/nb254x_conformity_declaration_e.pdf

1.3 Waste Disposal

In accordance with the requirements of the counsil directive 2002/96/EC on Waste Electronical and Electronic Equipment (WEEE), ensure that at end-of-life you separate this product from other waste and scrap and deliver it to the WEEE collection system in your country for recycling.

1.4 National Restrictions

This product may be used in all EU countries (and other countries following the EU directive 1999/5/EC) without any limitation except for the countries mentioned below:

1.4.1 France

In case the product is used outdoors, the output power is restricted in some parts of the band. See the table below or check http://www.art-telecom.fr/ for more details.

Frequency Range (MHz)	Power (EIRP)	Restrictions
2400.0-2454	100 mW (20 dBm)	Only for indoor applications
2454–2483.5	10 mW (10 dBm)	If used outdoors
5470-5725		Relevant+ provisions for the implementation of DFS mechanism described in ETSI standard EN 301 893 V1.3.1 and subsequent versions

1.4.2 Italy

This product meets the National Radio Interface and the requirements specified in the National Frequency Allocation Table for Italy. Unless operating within the boundaries of the owner's property, the use of this Wireless LAN product requires a 'general authorization'. Please check with http://www.comunicazioni.it/ for more details.

1.4.3 Latvia

The outdoor usage of the 2.4-GHz band requires an authorization from the Electronic Communications Office. Please check http://www.esd.lv for more details.

1.4.4 Luxemburg

General authorization required for network and service supply.

1.4.5 Norway

Frequency Range	Restrictions
2400.0-2483.5 MHz (WLAN b/g)	This subsection does not apply for the geographical area within a radius of 20 km from the centre of Ny-Ålesund

1.4.6 Russian Federation

Frequency Range (MHz)	Power (EIRP)	Restrictions
2400.0-2483.5	100 mW (20 dBm)	Only for indoor applications
5150-5250	100 mW (20 dBm)	Permitted to use only for indoor applications, closed industrial and warehouse areas, and on board aircraft
5250-5350	100 mW (20 dBm)	1. Permitted to use for local networks of aircraft crew service communications on board aircraft in area of the airport and at all stages of flight. 2. Permitted to use for public wireless access local networks on board aircraft during a flight at the altitude not less than 3000 m
5650-5825	100 mW (20 dBm)	Permitted to use on board aircraft during a flight at the altitude not less than 3000 m

1.4.7 Turkey

Frequency Range	Restriction
5470-5725 MHz	Not implemented

1.5 The NetBox Family

The handling of the different NetBox models is very similar. All models run NetBox Software which adapts itself to the NetBox Hardware. The software will not allow you to configure options the hardware does not offer (e.g. GPS or Digital I/O). The below table shows the hardware varieties:



	NB1310	NB2210	NB2500
2G / 3G	✓	2G	optional
WLAN	optional	-	optional
SIM card sockets	1	1	2
Ethernet ports	1	1	4
Serial ports	-	1	1
GPS receiver	optional	-	optional
Digital inputs / outputs	-	2 / 2	-

Table 1: NetBox Model Overview

The NB2500 is the successor of the earlier models NB2240, NB2241, NB2340, NB2341 and NB2541. What is said about the NB2500 in general also applies for its predecessors. The main difference is that NB2500 realizes the optional features by a software licensing mechanism where as the earlier models were shipped as different hardware.

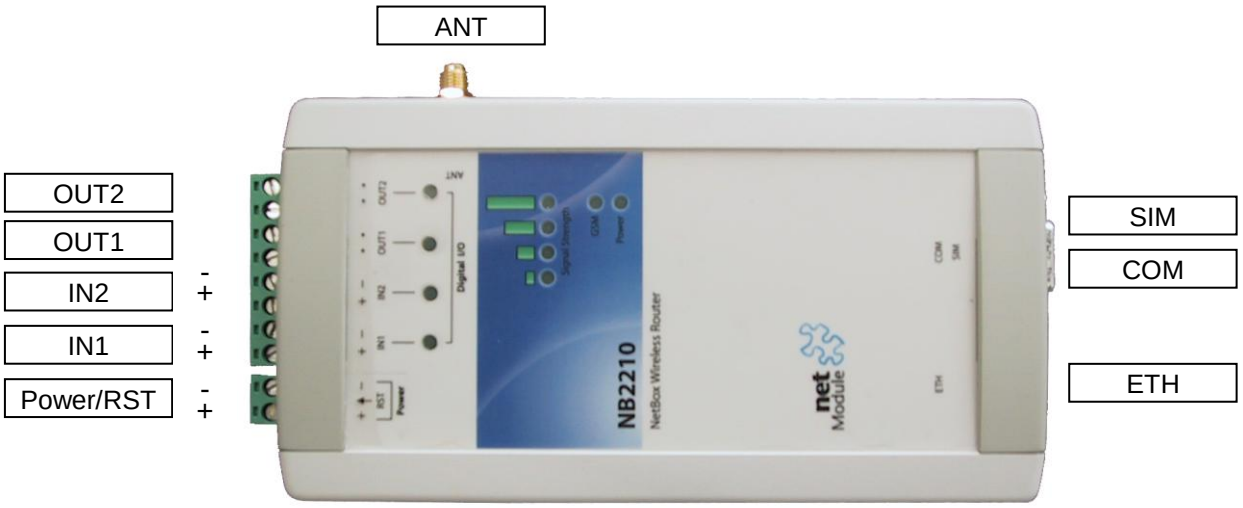
1.6 Product Description NB1310

The following table describes the NB1310 interfaces and status indicators:

Label	Color	State	Function
Reset	-	-	Restart: press this button during run-time Factory reset: press and hold this button for at least 3 seconds during run-time.
Mobile Status	green green	on	A solid light indicates a connected GSM or UMTS network
		blinking	The device is trying to register to a GSM or UMTS network
Ethernet	-	-	Ethernet port For power injection see A.1.1 on page 97
Ethernet Status	green	on	A solid light indicates a connected Ethernet link.
		flashing	A flashing light indicates Ethernet activity.
SIM	-	-	SIM socket for the SIM card.
Power Status	green	on	The device is ready
		off	The device is not powered and/or does not start up
Power	-	-	Voltage feed connector (9-21 VDC) Polarity: ⊖—C—⊕ For power injection via Ethernet see A.1.1 on page 97
UMTS MAIN	-	-	SMA female connector for GSM/UMTS antenna
GPS	-	-	SMA female connector for GPS antenna
WLAN MAIN	-	-	SMA female connector for WLAN antenna 1
WLAN AUX	-	-	SMA female connector for WLAN antenna 2 (for antenna diversity)

Table 2: The NB1310 interfaces and status indicators

1.7 Product Description NB2210



The following table describes the meaning of the status indicators:

Panel	Label	Color	State	Function
Front	Power	green	blinking slowly	This indicates one of the following conditions: • the device is starting up • loading a new configuration • factory reset initiated by Web Manager
			on	The device is ready
			off	The device is not powered and/or does not start up
			blinking fastly	Restart triggered by watchdog
Front	Signal Strength	green	on	1 LED on: weak signal 2 LEDs on: medium signal 3 LEDs on: strong signal 4 LEDs on: very strong signal
			off	No or insufficient signal
			running	Software update
Front	GSM	green	on	Mobile connection is being established
			on	Mobile connection is up
			off	Mobile connection is down
Front	IN1 IN2	green	on	Input set
			off	Input not set
Front	OUT1 OUT2	green	on	Output on
			off	Output off
Bottom	Link	green	on	Physical link
			off	No physical link
Bottom	Activity	orange	on	Data transmission
			off	Not data transmission

Table 3: NB2210 status indicators

Please find the description of each interface in the following table:

Panel	Label	Component Description
Top	RST	Restart: press this button when the status LED is on Factory reset: press and hold this button for at least 5 seconds.
Top	Power	Voltage feed connector (9-28 VDC)
Top	IN1 IN2	Digital inputs 2 optoisolated digital inputs. Please consider the polarity.
Top	OUT1 OUT2	Digital outputs 2 relay outputs
Bottom	ETH	Ethernet port The default IP address is set to 192.168.1.1.
Bottom	COM	RS232, Sub-D 9 port The factory default is 115200 Baud, 8 Data Bits, no parity, 1 Stop Bit.
Bottom	SIM 1	SIM socket
Right	ANT	GSM antenna connector Impedance: 50 Ohm Connector: SMA female

Table 4: NB2210 Physical interfaces

1.8 Product Description NB2500

The front panel has 10 status indicators. In addition there are two SIM card slots and a reset button at the front panel.

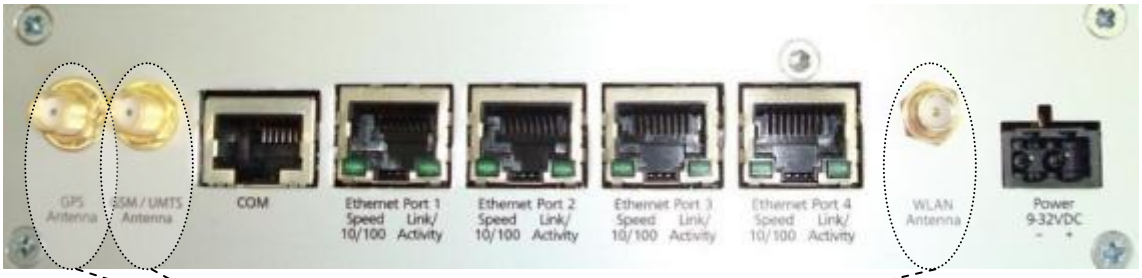
If available on the specific model

The following table describes the components on the front panel:

Panel	Label	Color	State	Function
Front	Power	green	on	The device is powered
			off	Power is missing
Front	Status	green	blinking slowly	This indicates one of the following conditions: • the device is starting up • loading a new configuration • factory reset initiated by Web Manager
			on	The device is ready
			blinking fastly	Restart triggered by watchdog
			off	The device does not start up
Front	Signal Strength	green	on	1 LED on: weak signal 2 LEDs on: medium signal 3 LEDs on: strong signal 4 LEDs on: very strong signal
			off	No or insufficient signal
			running	Software update
Front	Mobile (UMTS / GSM)	green	blinking slowly	Mobile connection is being established
			on	Mobile network connection is up
			off	Mobile network connection is down
Front	WLAN	green	blinking slowly	Mobile connection is being established
			on	WLAN connection is up
			off	WLAN connection is down
Front	VPN	green	on	VPN connection is up
			off	VPN connection is down
Front	GPS	green	on	Service is enabled and valid GPS data is received and transmitted
			off	No GPS data transmitted (not available or service disabled)
Front	Reset	-	-	Restart: press this button when the status LED is on Factory reset: press and hold this button for at least 5 seconds.
Front	SIM 1	-	-	SIM socket 1
Front	SIM 2	-	-	SIM socket 2

Table 5: NB2500 components on the front panel

The back panel has the interfaces described in the table below:



If available on the specific model

Panel	Label	Color	State	Function
Back	GPS Antenna	-	-	GPS antenna connector Impedance: 50 Ohm Connector: SMA female Support for passive GPS antennas only
Back	UMTS / GSM Antenna	-	-	UMTS / GSM antenna connector Impedance: 50 Ohm Connector: SMA female
Back	COM	-	-	RJ45 port (Sub-D 9 on earlier models) RS232 (default) or RS485 (configurable)
Back	Ethernet Ports	-	-	4 port Ethernet switch The default IP address is set to 192.168.1.1.
Back	Power	-	-	Voltage feed connector (9-32 VDC)
Back	Link/Activity (Ethernet Ports)	green	on	Physical link
			off	No physical link
			flashing	Data transmission
Back	Speed 10/100 (Ethernet Ports)	green	on	Data rate 100 MBit/s
			off	Data rate 10 MBit/s

Table 6: NB2500 components on the back panel

1.9 NetBox Software

All NetBox Wireless Routers run NetBox Software (NBSW). NetBox Software offers the following key features:

Interfaces and Connection Management (section 3.1.3 Interfaces**)**

- Dial-out (on demand, permanent)
- Connection Monitoring
- Fallback to backup profile or SIM
- SIM and PIN management
- Automatic or manual network selection

Routing (section 3.1.4 Routing**)**

- Static Routing
- NAPT / Port Forwarding

Security / Firewall (section Firewall**)**

- NAPT / Port Forwarding
- Access Control
- Stateful Inspection Firewall

Virtual Private Networking (VPN) (section 3.1.6 VPN**)**

- OpenVPN Client
- PPTP Server
- IPsec Peer
- Dial-in Server

Services (section 3.1.7 Services **)**

- COM Server (Tunneling of the serial line over IP)
- Modbus-RTU to Modbus-TCP Gateway
- DHCP Server
- DNS Proxy Server
- Dynamic DNS Client
- E-mail Client
- Notification via E-mail und SMS
- SMS Client
- SSH Server
- SNMP Agent
- Telnet Server
- Unstructured Supplementary Service Data (USSD)
- Web Server
- GPS Daemon

System Administration (section 3.1.8 System**)**

- Configuration via Web Manager
- Configuration via Command Line Interface (CLI) accessible via Secure Shell (SSH) and telnet
- Batch configuration with text files
- User admnistration
- Troubleshooting tools
- Over the air software update

1.10 NetBox Application Overview

NetBox is an access router for mobile telecom networks.NetBox can hook up a whole local area network to the mobile telecom network. Certainly NetBox can also be used to attach a single device.

1.10.1 Mobile Internet Access

NetBox can be used for mobile Internet access. Supported services include:

- Universal Mobile Telecommunications System (UMTS), High Speed Packet Access (HSPA) including HSDPA and HSUPA
- General Packet Radio Service (GPRS), Enhanced Data rates for GSM Evolution (EDGE)
- Circuit Switched Data (CSD)

1.10.2 Access to a Remote Network

NetBox can be used to access a remote network. Possible setups are

- Access via public IP address
- Access via NetBox initiated VPN
- Access via CSD Dial-in

1.10.3 Virtual Private Networks (VPN)

NetBox supports various types of VPN technologies. The following components are included:

- OpenVPN client
- IPsec initiator
- PPTP server
- Dial-in server

2 Installation

2.1 Environmental Conditions

The following precaution must be taken before installing NetBox:

- Avoid direct solar radiation.
- Protect the device from humidity, steam and aggressive fluids
- Grant sufficient circulation of air around NetBox.
- For indoor use only
- Temperature range NB2500: -20 °C to +65 °C
- Temperature range NB1310 and NB2210: 0 °C to +55 °C
- Humidity: 0 to 95% (non condensing)
- Altitude up to 4000m
- Mains Voltage Ripple less than ±10% of the nominal voltage
- Overvoltage Category: II
- Pollution Degree: 2

2.2 Installation of the Router

NetBox is designed for mounting to a panel using through holes or to be put on a worktop. Please consider the safety instructions (chapter 1.1) and the environmental conditions (chapter 2.1).

2.2.1 Installation of the SIM Card(s)

The router incorporates two separate SIM card sockets so that if your application demands it, you may install SIM cards for two different networks. If you only use one SIM card insert it in SIM socket 1. Make sure the SIM is suitable for data transmission.

2.2.2 Installation of the UMTS/GSM Antenna

NetBox Wireless Routers will only operate reliably over the GSM network if there is a good signal. For many applications the flexible stub antenna provided will be suitable but in some circumstances it may be necessary to use a remote antenna with an extended cable to allow the antenna itself to be positioned to provide the best possible signal reception. NetModule can supply a range of suitable antennas.

Consider the effects caused by Faraday cages such as large metal surfaces (elevators, machine housings, etc.), close meshed iron constructions.

Fit the antenna or connect the antenna cable to the GSM antenna connector.

2.2.3 Installation of the GPS Antenna

Use active GPS antennas for best signal reception.

2.2.4 Installation of the Local Area Network

Up to four Ethernet devices can directly be connected to the NetBox.

2.2.5 Installation of the Power Supply

NetBox can be powered with the included power supply or another external source supplying between 9 and 32 Volts DC (9-28 Volts DC NB2210). NetBox is for use with certified (CSA or equivalent) power supply, which must have a limited and SELV circuit output.

3 Configuration

NetBox holds different configurations, such as the factory configuration and the user configuration. The user configuration can be modified by the user as follows:

- Using the Web Manager (chapter 3.1)
- Upload a new configuration file using the Web Manager (chapter 3.2.3)
- Using the NetBox Command Line Interface (chapter 3.2)

If you are new to NetBox we recommend configuring it using the NetBox Web Manager. For batch configuration upload configuration files.

3.1 Configuration via the NetBox Web Manager

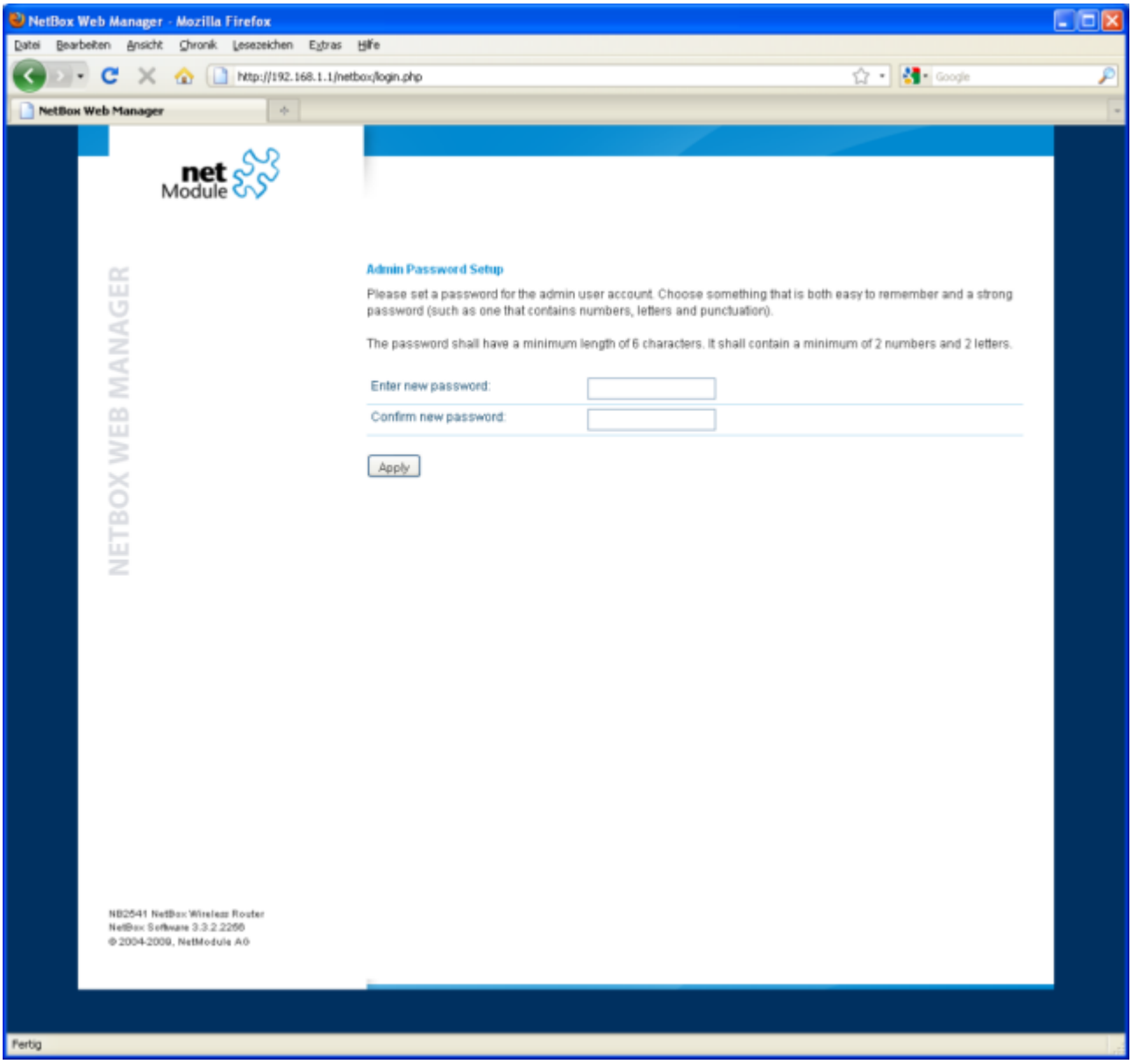
The NetBox Web Manager can always be reached via the Ethernet interface. After the successful setup the Web Manager can also be accessed via the mobile interface. Any web browser supporting javascript may be used. By default the IP address of the Ethernet interface is 192.168.1.1, the webserver runs on port 80.

The minimum configuration steps usually include:

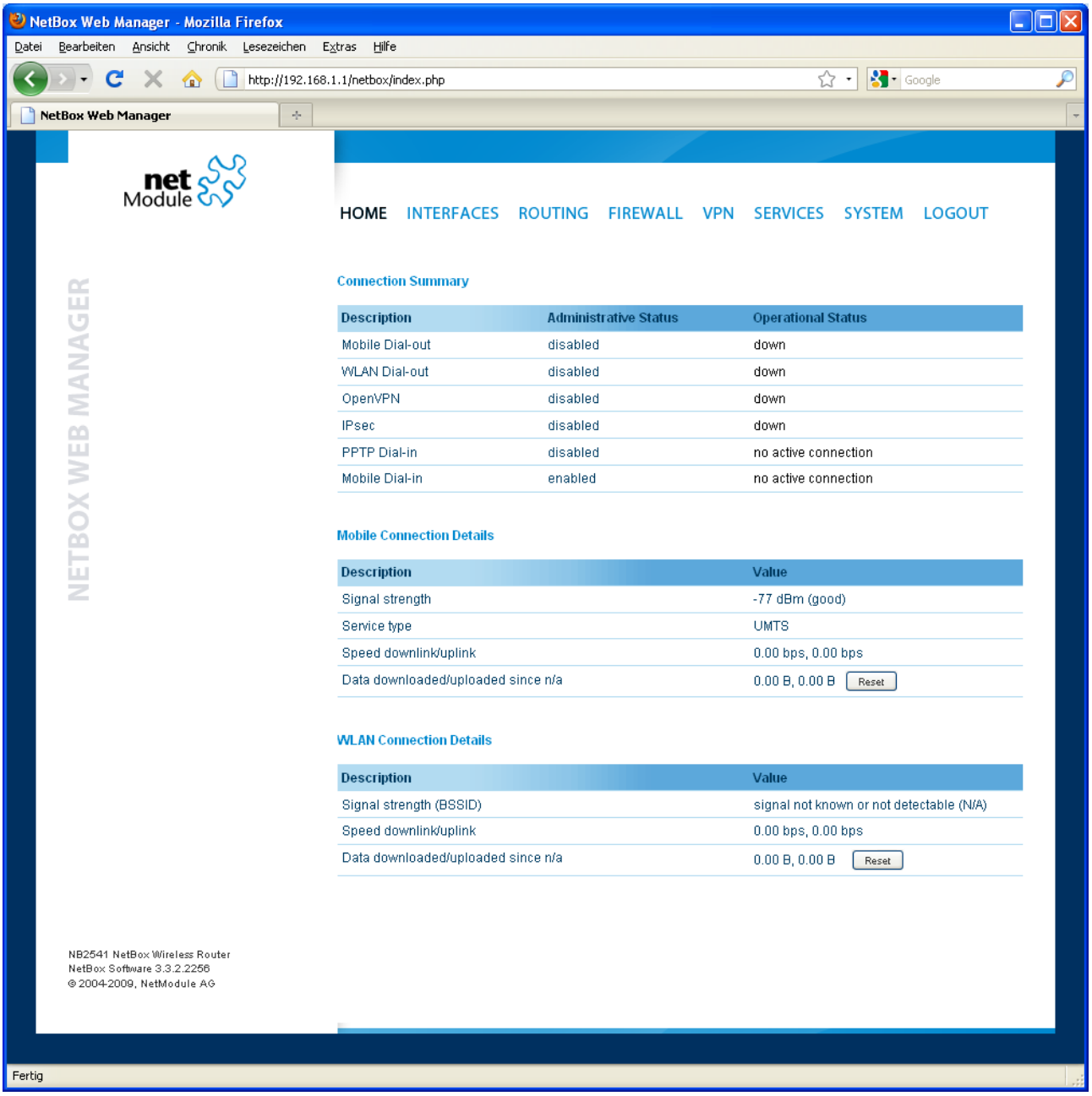
1. defining the admin password
2. entering the PIN code for the SIM card
3. configuring the Access Point Name (APN)
4. start the mobile connection

Step	Description
1.	Please connect the Ethernet interfaces of your computer and the NetBox.
2.	If not yet enabled, please enable the Dynamic Host Configuration Protocol (DHCP) so that your computer can lease an IP address from NetBox. Wait a moment until your PC has received the parameters (IP address, subnet mask, default gateway, DNS server). *How to do using Windows XP:* *Start > Connect To > Show all connections > Local Area Connection > Right Click > Properties > Internet Protocol (TCP/IP) > Properties > Obtain an IP address automatically.* *Alternative:* *Instead of using the DHCP, configure a static IP address on your PC (e.g. 192.168.1.10) so that it is operating in the same subnet as the NetBox.* The factory default IP address is 192.168.1.1 The default subnet mask is 255.255.255.0.
3.	Start a Web Browser on your PC. Type the NetBox IP address in the address bar: http://192.168.1.1
4.	Follow the instructions of the Web Manager to configure the device.

3.1.1 Initial Access to the Web Manager and Password Definition



3.1.2 Home



This page gives you a system overview. It helps you when initially setting up device but also functions as dashboard during normal operation.

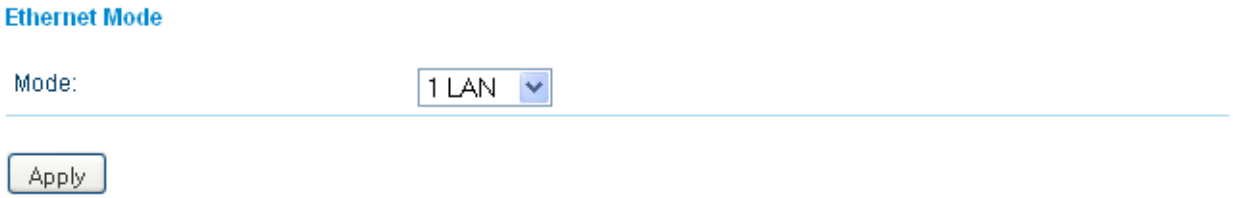
3.1.3 Interfaces

In the section the physical Interfaces of NetBox are configured.

3.1.3.1 Ethernet Interface

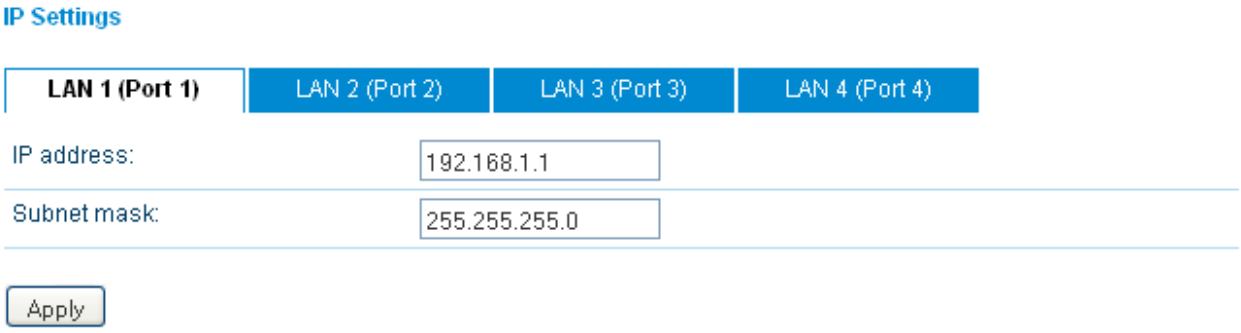
3.1.3.1.1 Ethernet Mode

Choose whether you want to have all Ethernet ports in one LAN (default) or apply a network for every Ethernet port.



3.1.3.1.2 IP Settings

Define the NetBox LAN. Usually the first address within that LAN is assigned to the router. Provide that IP address and net mask in dot-decimal notation or use the defaults.



Depending on the Ethernet mode chosen above one network or four networks can be defined. The factory defaults are as follows:

1 LAN mode

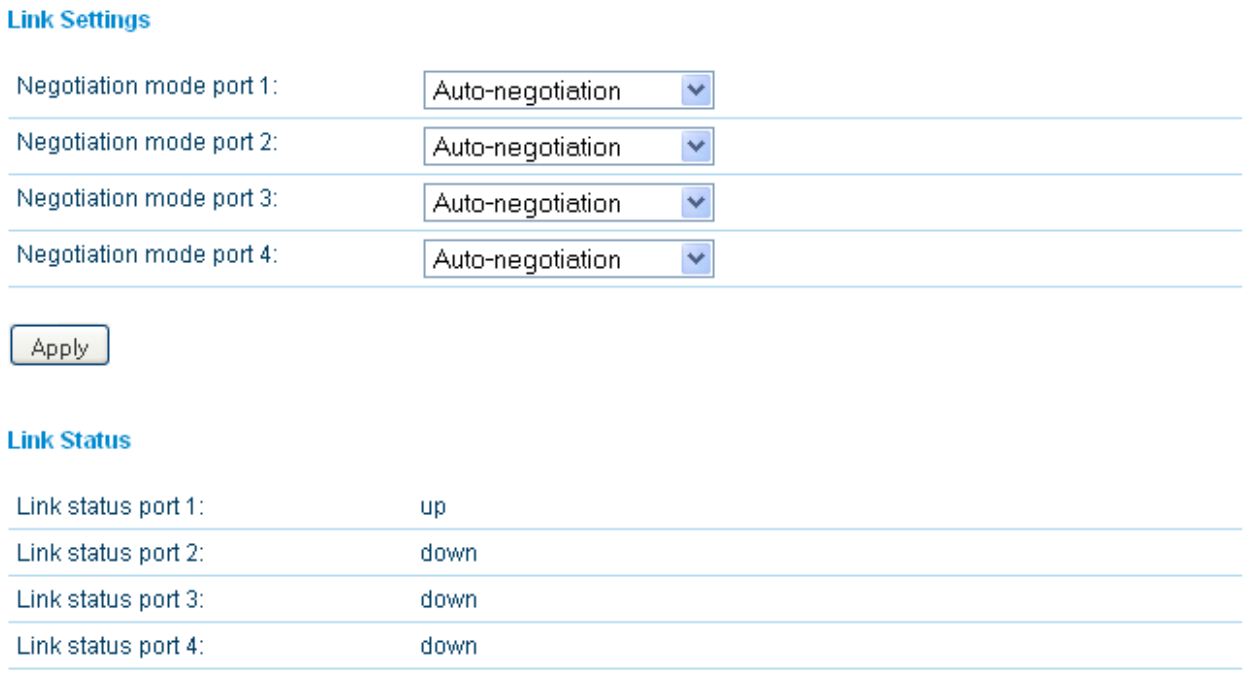
Ports	Network	NetBox IP Address
Port 1, 2, 3, 4	192.168.1.0/24	192.168.1.1

4 LAN mode

Ports	Network	NetBox IP Address
Port 1	192.168.1.0/24	192.168.1.1
Port 2	192.168.2.0/24	192.168.2.1
Port 3	192.168.3.0/24	192.168.3.1
Port 4	192.168.4.0/24	192.168.4.1

3.1.3.1.3 Links Settings

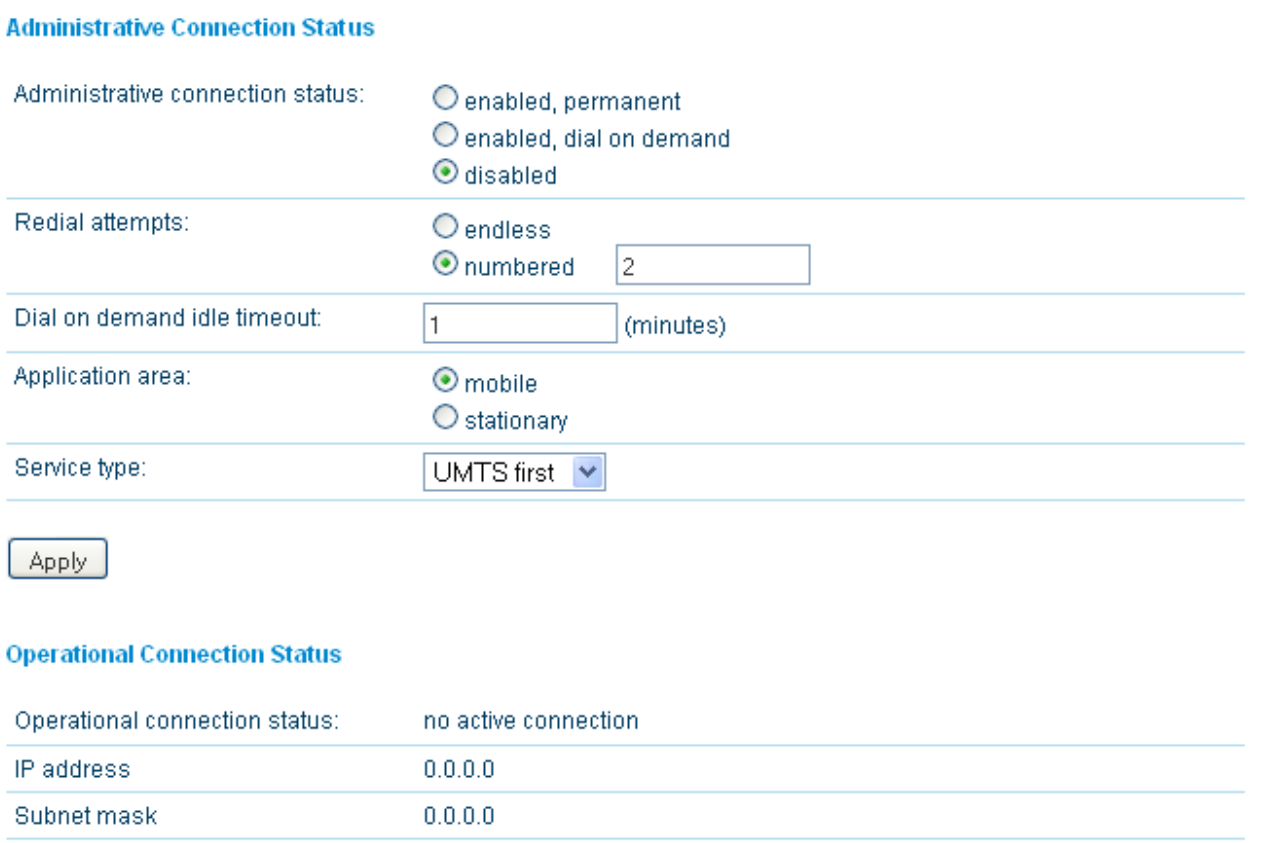
For every Ethernet port the link negotiation can be set. In most cases auto negotiation will work.



3.1.3.2 Mobile Interface

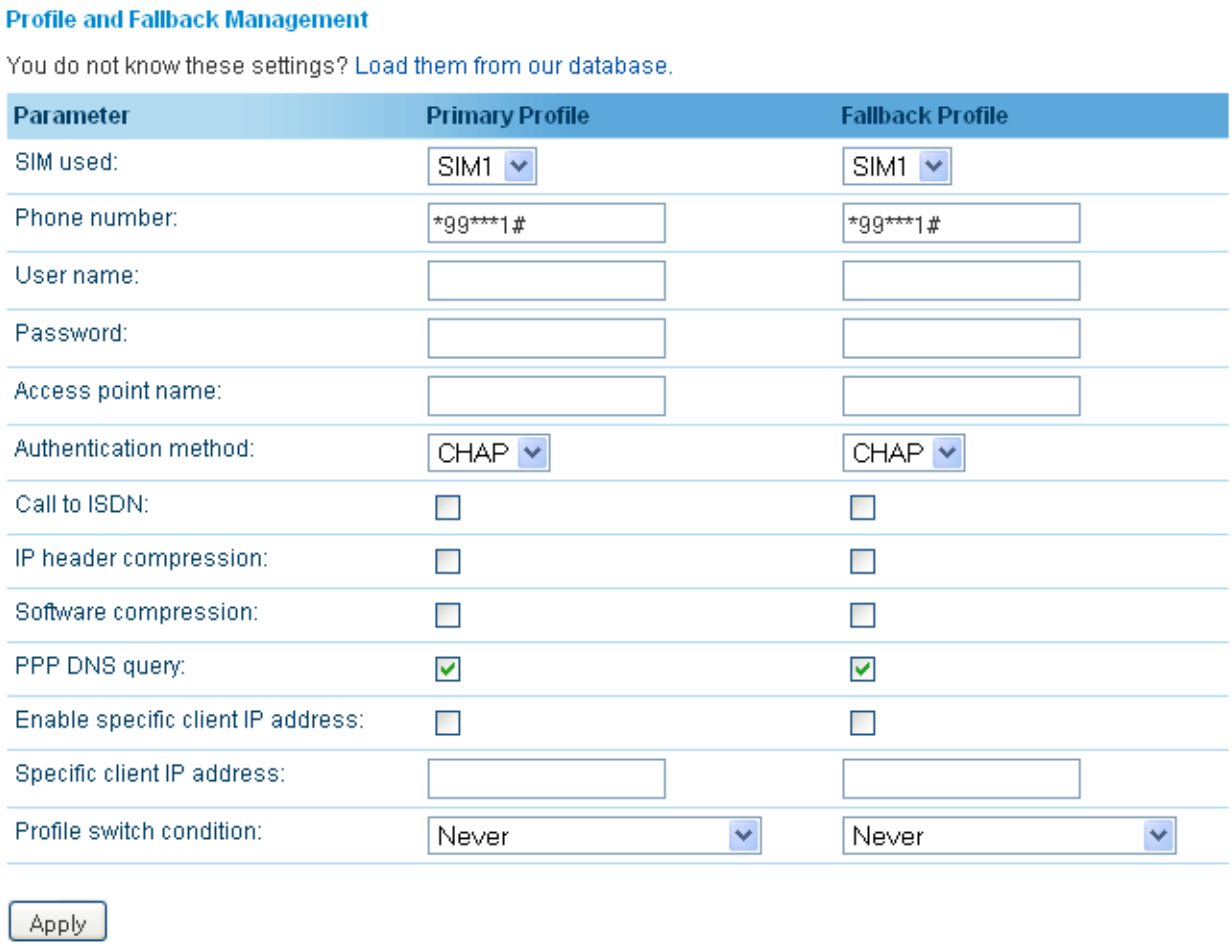
3.1.3.2.1 Administration

After the configuration (e.g. setting the APN), the mobile connection is enabled here. We recommend to use the 'permanent' option. The UMTS/GSM LED is blinking during the connection establishment and goes on as soon as the connection is up. See the troubleshooting section and log files if the connection does not come up.



Parameter	Description
Administrative connection status:	This can be permanent, dial on demand or disabled. The on demand method waits for traffic coming from the LAN going to the WAN. The permanent method keeps up the mobile interface. In case of link loss the connection is reestablished.
Redial attempts:	Number of redialing attempts before switching to the next profile.
Dial on demand idle timeout:	Time in minutes after that an idle connection will be disconnected when working with 'dial on demand'
Opeartional connection status:	Shows whether a connection is up or not.
Application area:	Choose mobile if NetBox is driving around. For stationary installation choose 'stationary'.
Service type:	The preferred service type can be set here.
IP address:	IP address on mobile interface (ppp0) assigned by PPP server
Subnet mask:	Subnet mask on mobile interface (ppp0) assigned by PPP server

3.1.3.2.2 Configuration



Parameter	Description
SIM used:	Specify the SIM card that shall be used for this profile.
Phone number:	Set the phone number that is to dial. This should be *99***1# for packet services (GPRS/UMTS). For ISDN and CSD connections use the phone number to dial.
User Name:	User name (get this information from mobile operator, can be void)
Password:	Password (get this information from mobile operator, can be void)
Access point name:	Access Point Name (get this information from mobile operator or from our APN database)
Authentication method:	Use Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP)
Call to ISDN:	Ckeck this, if the connection is made to an ISDN modem.
IP Header Compression:	Enable or disable Van Jacobson TCP/IP Header Compression for PPP. In order to benefit of this features the mobile operator must support it.
Software Compression:	Enable or disable PPP data compression. In order to benefit of this features the mobile operator must support it.
PPP DNS query:	Specifies whether a DNS request to the provider is made or not
Enable Specific Client IP Address:	Enable or disable fixed IP address on the mobile interface
Specific Client IP Address:	Specify a fixed client IP address on the mobile interface.
Profile switch condition:	Specifies the condition for a profile switch to the other profile.

3.1.3.2.3 Maximum Segment Size (MSS)

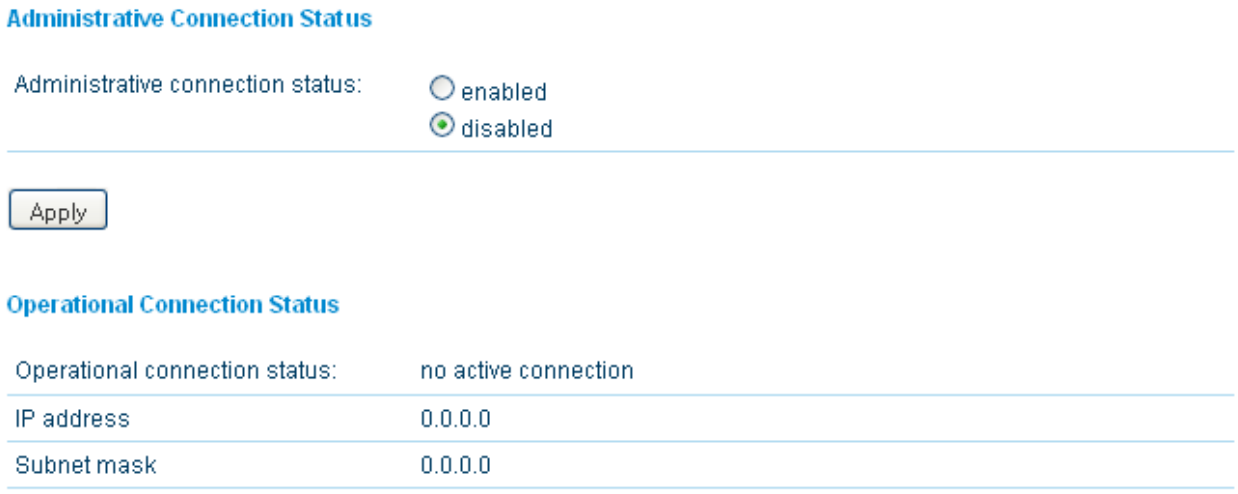
The maximum segment size (MSS) is the largest amount of data, specified in bytes, that a computer or communications device can handle in a single, unfragmented piece. For optimum communications, the number of bytes in the data segment and the headers must not add up to more than the number of bytes in the maximum transmission unit (MTU).

Parameter	Description
MSS adjustment:	The maximum segment size (MSS) for the mobile interface

3.1.3.3 WLAN (NB2541 only)

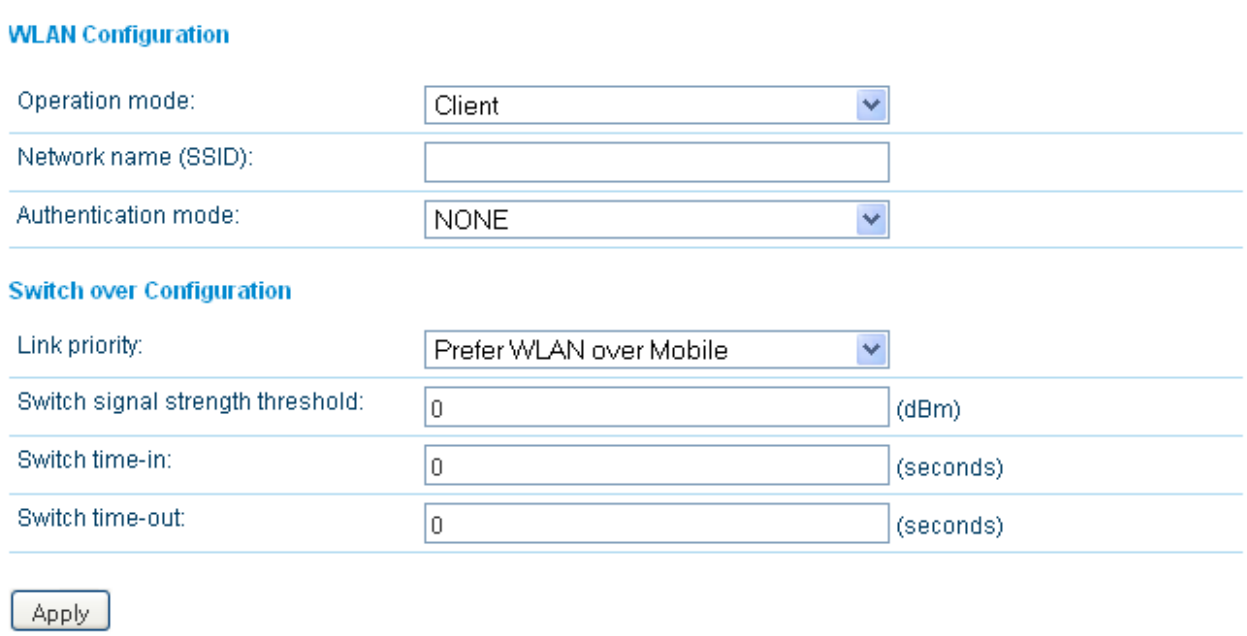
3.1.3.3.1 WLAN Administration

WLAN is enabled or disabled on this page.



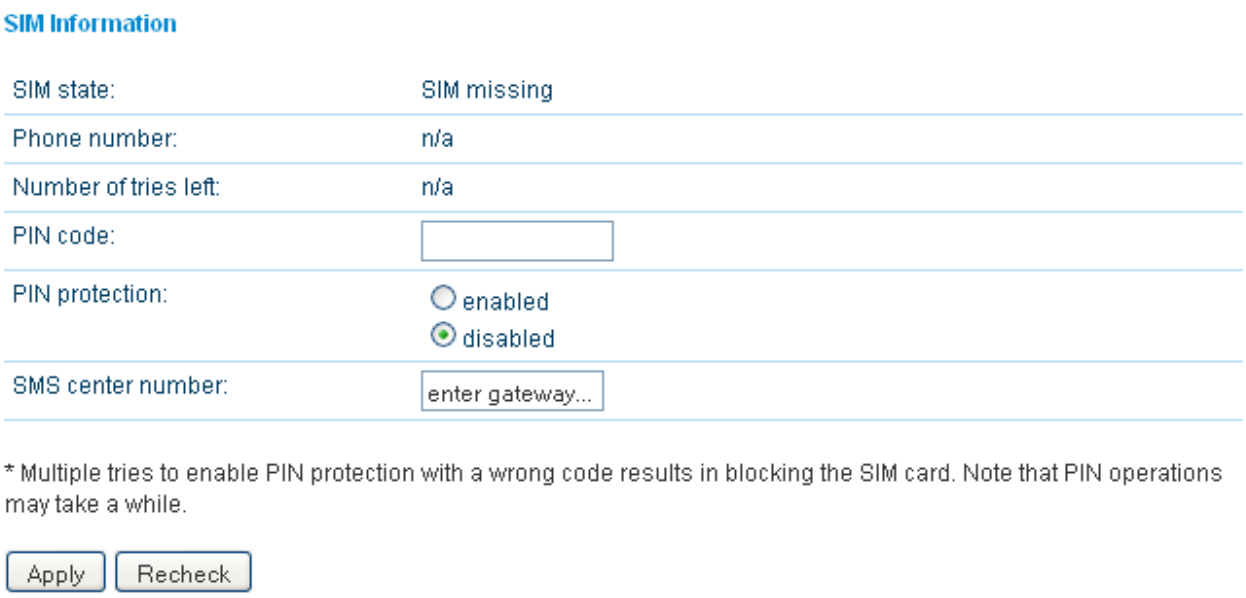
3.1.3.3.2 WLAN Configuration

Currently the WLAN interface can be operated as wlan client only. In this mode it is designed to provide an alternative link to the mobile interface. Between the two, the WLAN interface has the higher priority, if enabled.



3.1.3.4 SIM 1

3.1.3.4.1 SIM and PIN Information

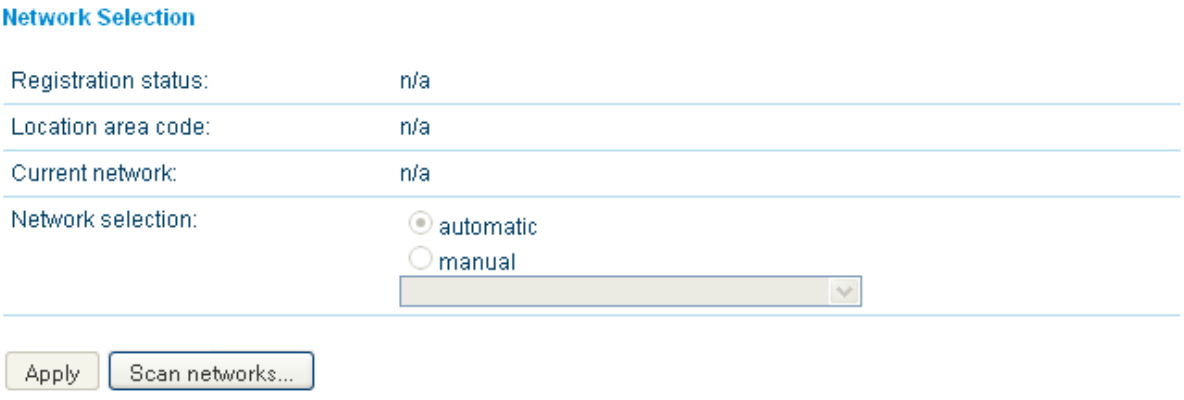


This section lets you store the PIN code. With the correct PIN code deposited you will be able to enable or disable PIN protection.

NetBox can only read SIM cards if the correct PIN code is provided or if PIN protection is disabled. It is not recommended to disable PIN protection since a SIM card thief could misuse an unprotected SIM.

Parameter	Description
PIN code:	The PIN code for the SIM card
PIN protection:	Enable or disable PIN protection
SMS center number:	Number of Short Message Service Centers (SMSCs) for sending Mobile Originating (MO) SMS messages Contact your mobile operator or search the Internet if you do not know the number. A list is found here: http://umtslink.at/sms/smsc_rufnummern.htm

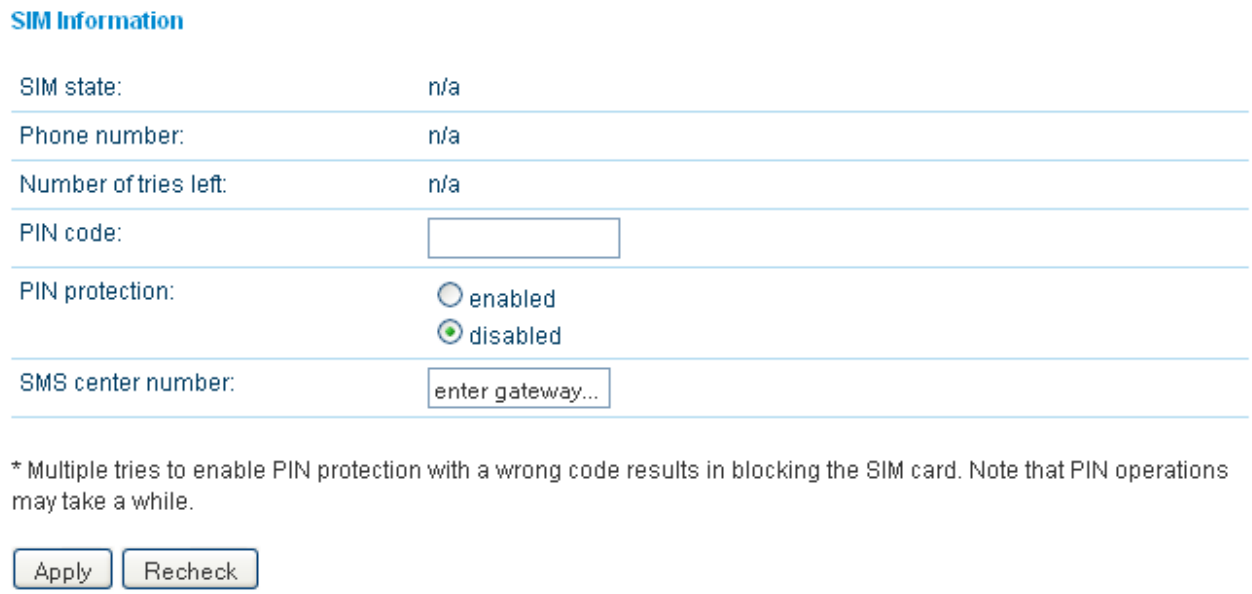
3.1.3.4.2 Network Selection



Parameter	Description
Network selection:	Choose automatic or manual provider network selection. For manual selection, please specify the provider.

3.1.3.5 SIM 2 (not available on NB2210)

3.1.3.5.1 SIM and PIN Information



This section lets you store the PIN code. With the correct PIN code deposited you will be able to enable or disable PIN protection.

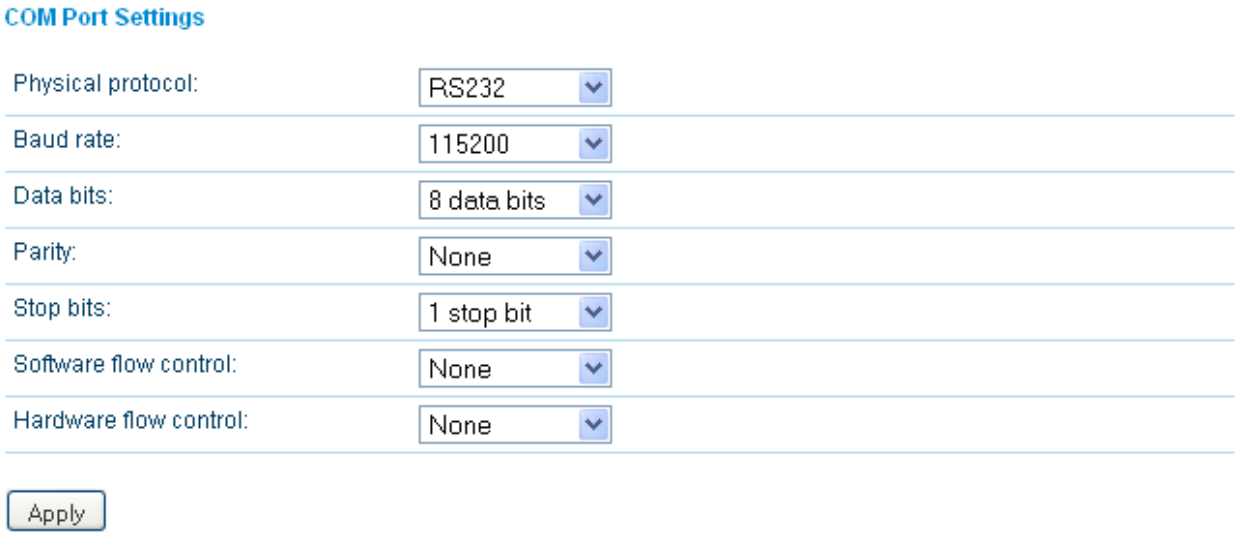
NetBox can only read SIM cards if the correct PIN code is provided or if PIN protection is disabled. It is not recommended to disable PIN protection since a SIM card thief could misuse an unprotected SIM.

Parameter	Description
PIN code:	The PIN code for the SIM card
PIN protection:	Enable or disable PIN protection
SMS center number:	Number of Short Message Service Centers (SMSCs) for sending Mobile Originating (MO) SMS messages Contact your mobile operator or search the Internet if you do not know the number. A list is found here: http://umtslink.at/sms/smsc_rufnummern.htm

3.1.3.5.2 Network Selection

Parameter	Description
Network selection:	Choose automatic or manual provider network selection. For manual selection, please specify the provider e.g. in areas close to the borders.

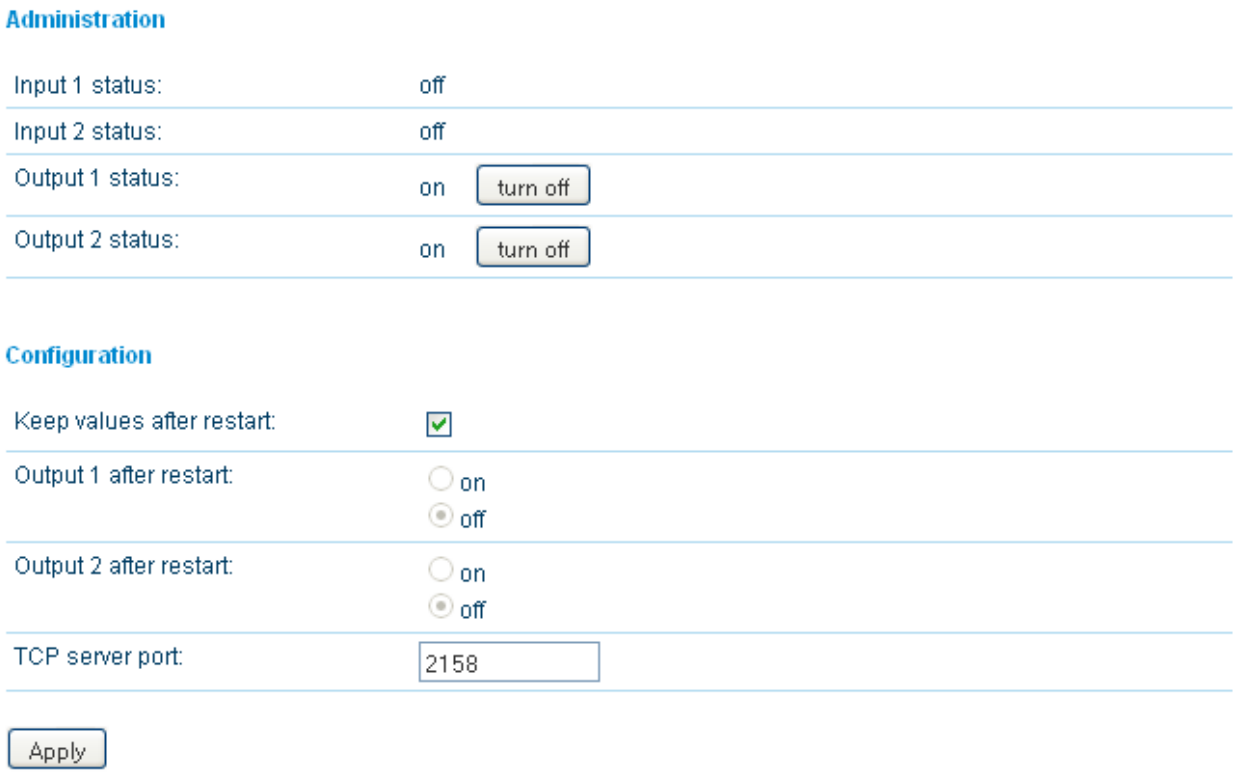
3.1.3.6 COM Port



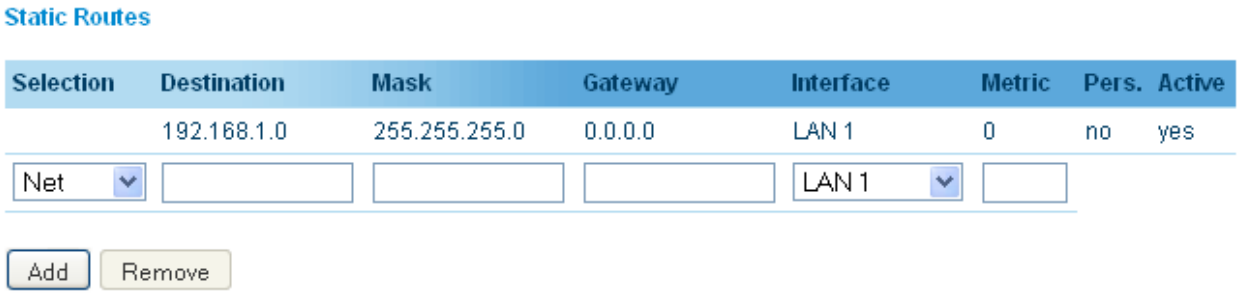
Parameter	Description
Physical protocol:	RS232 or RS485. Consider the pin assignments on page 98.
Baud rate:	This property specifies the baud rate of the COM port
Data bits:	This property specifies the number of data bits contained in each frame.
Parity:	This property specifies the parity used with every frame that is transmitted or received.
Stop bits:	This property specifies the number of stop bits used to indicate the end of a frame.
Software support	In XON/XOFF software flow control, either end can send a stop (XOFF) or start (XON) character to the other end to control the rate of incoming data.
Hardware flow control	In RTS/CTS hardware flow control, the computer and the modem use the RTS and CTS lines respectively to control the flow of data

3.1.3.7 Digital I/O (NB2210 only)

The digital inputs and outputs can be monitored and controlled via the Web Manager or by software. See section 4.2 (Digital I/O Server (NB2210)) for how to control the I/O's by software.



3.1.4 Routing



Static routing is the term used to refer to a manual method that is used to set up routing between networks. Static routing has the advantage of being predictable and simple to set up.

This section lists the routing table and lets the user add and delete routes.

Parameter	Description
Select	To enter network route select “Net”. To enter a route to a host select “Host”.
Destination	the destination network or host. You can provide IP addresses in dotted decimal or host/network names.
Mask	The network's IP address together with its address mask defines a range of IP addresses. For IP subnets, the address mask is referred to as the subnet mask. For host routes, the mask is "all ones" (in dotted decimal 255.255.255.255).
Gateway	Next hop (gateway); the next router which knows how to reach the destination
Interface	Identity of network interface through which a packet will be sent to reach the gateway.
Metric	The 'distance' to the target (usually counted in hops). It is not used by recent kernels, but may be needed by routing daemons.
Persistent	Displays whether a particular route is persistent or not.
Active	Displays whether a particular route is active or not.

3.1.5 Firewall

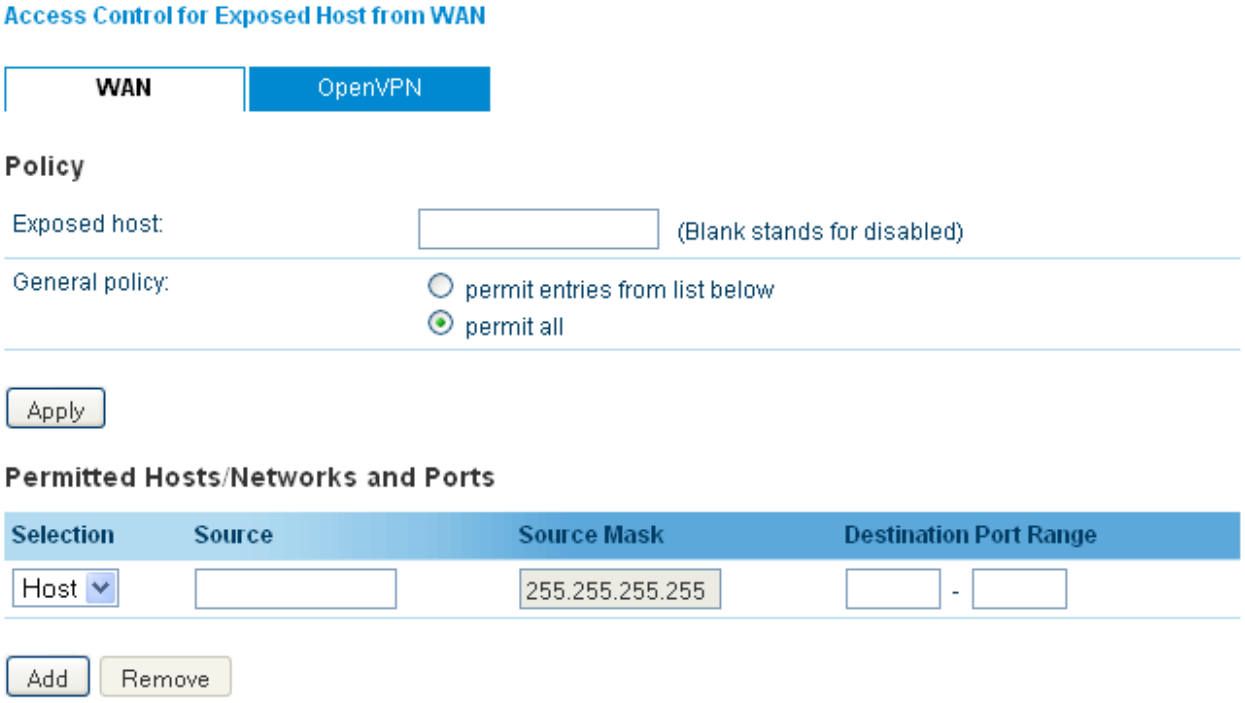
3.1.5.1 Access Control

3.1.5.1.1 Access Control for Local Host

The access from the WAN interface to NetBox itself and its local applications can be managed using this filter.

3.1.5.1.2 Access Control for Exposed Host from WAN and OpenVPN

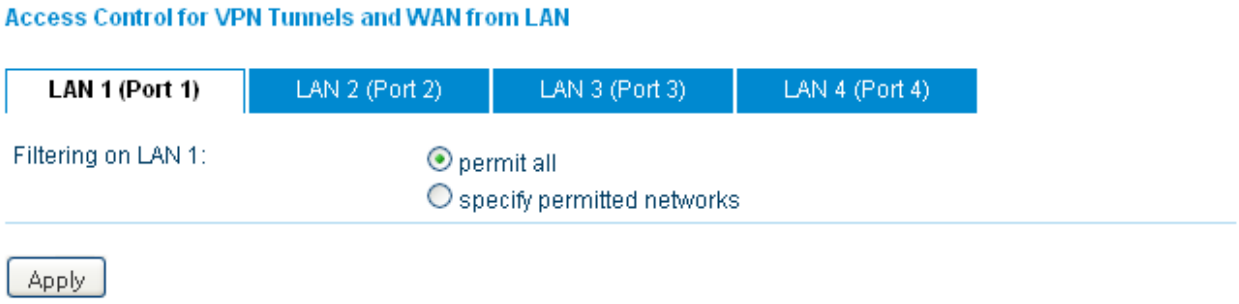
The access from the WAN interface to a defined Exposed Host can be managed using this filter. The same can be done on the second tab for the OpenVPN interface.



Parameter	Description
Exposed host:	Enter the IP Address of the device that is to expose. Leave this field blank to disable the feature.

3.1.5.1.3 Access Control for VPN Tunnels and WAN from LAN

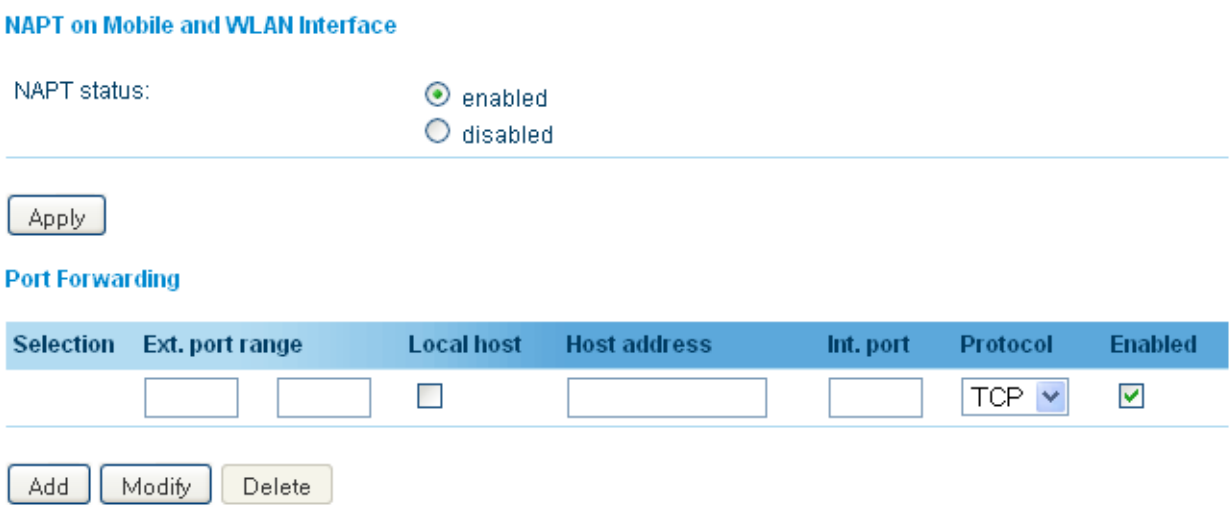
Having the Ethernet ports split into multiple LANs this filter manages the access from any LAN port to any VPN Tunnel. Use the option “specify permitted networks” to permit access to certain networks. Those networks might be any peer networks of a VPN tunnel or the WAN interface to get direct Internet access.



3.1.5.2 NAPT

This page lets you set the options for Network Address and Port Translation (NAPT). NAPT is a feature that translates TCP or UDP communications made between hosts on a private network and hosts on a public network. It allows a single public IP address to be used by many hosts on the private network, which is usually called a Local Area Network or LAN.

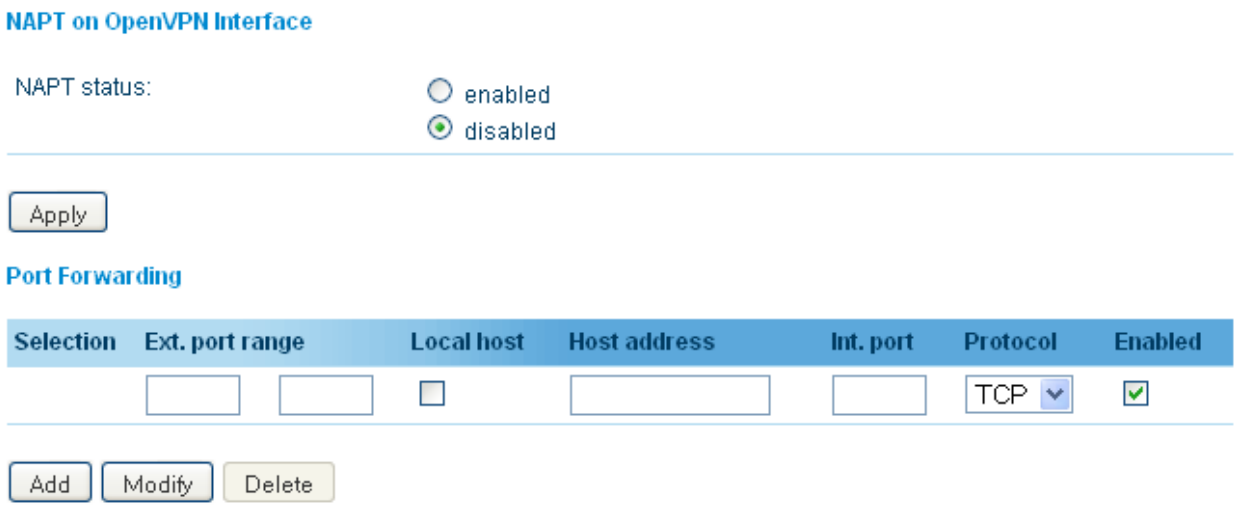
3.1.5.2.1 NAPT on Mobile Interface



Port forwarding is the act of forwarding a network port from one network node to another. This technique can allow an external user to reach a port on a private IP address (inside the LAN) from the outside (Internet).

Parameter	Description
NAPT status	Enable or disable NAPT NAPT needs to be enabled normally (i.e. when using Internet Access). Internet Service Providers will not route your private LAN Addresses.
Service name:	User-defined Name for the NAPT entry
External port:	External IP port (mobile interface)
Local host:	Check this box to forward traffic to local host service (Webserver, SSH, Telnet) To forward traffic to an external host in the LAN provide the host address below.
Host address:	Host to which the traffic will be forwarded
Internal port:	Port to which the traffic will be forwarded
Protocol:	Protocol (UDP or TCP) to which this entry applies.
Enabled:	Enable (Yes) or disable (No) the entry.

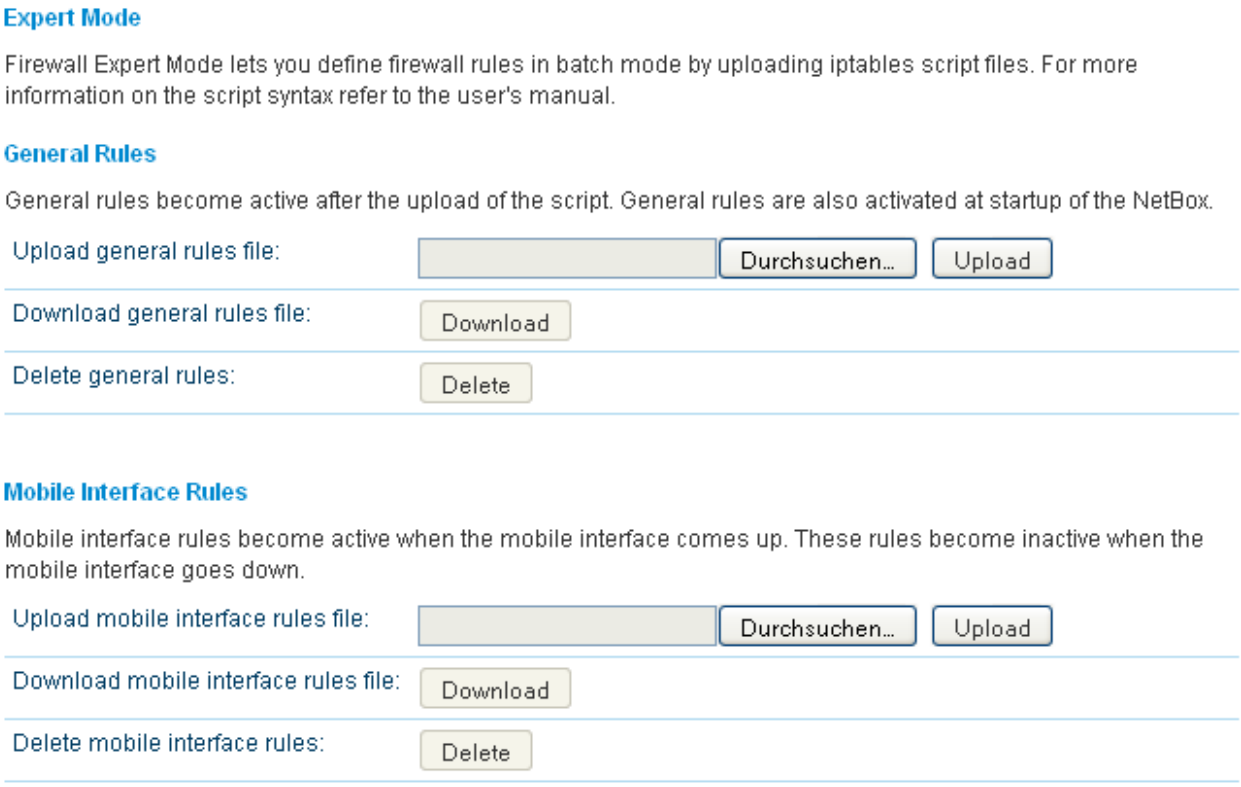
3.1.5.2.2 NAPT on OpenVPN Interrface



Port forwarding is the act of forwarding a network port from one network node to another. This technique can allow an external user to reach a port on a private IP address (inside the LAN) from the outside (Internet).

Parameter	Description
NAPT status	Enable or disable NAPT NAPT needs to be enabled normally (i.e. when using Internet Access). Internet Service Providers will not route your private LAN Addresses.
Service name:	User-defined Name for the NAPT entry
External port:	External IP port (mobile interface)
Local host:	Check this box to forward traffic to local host service (Webserver, SSH, Telnet) To forward traffic to an external host in the LAN provide the host address below.
Host address:	Host to which the traffic will be forwarded
Internal port:	Port to which the traffic will be forwarded
Protocol:	Protocol (UDP or TCP) to which this entry applies.
Enabled:	Enable (Yes) or disable (No) the entry.

3.1.5.3 Expert Mode



Upload text files with firewall rules.

3.1.6 VPN

3.1.6.1 OpenVPN

Install an OpenVPN Server or subscribe to the appropriate service. NetModule provides OpenVPN servers as hardware or as hosted service.

If you have your own OpenVPN server the first step in building an OpenVPN 2.0 configuration is to establish a PKI (public key infrastructure). The PKI consists of:

- a separate certificate (also known as a public key) and private key for the server and each client, and
- a master Certificate Authority (CA) certificate and key which is used to sign each of the server and client certificates.

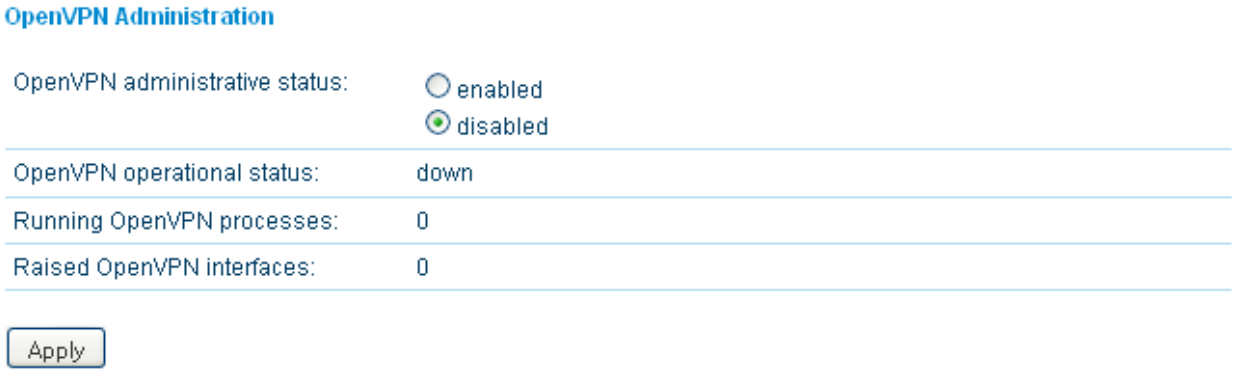
Prepare the OpenVPN certificate files. Use the tools and documentation that come with the OpenVPN software. A Guide to basic RSA Key Management is found under http://openvpn.net/easyrsa.html

For alternative authentication methods see http://openvpn.net/index.php/documentation/howto.html#auth

For more information also see http://openvpn.net/howto.html

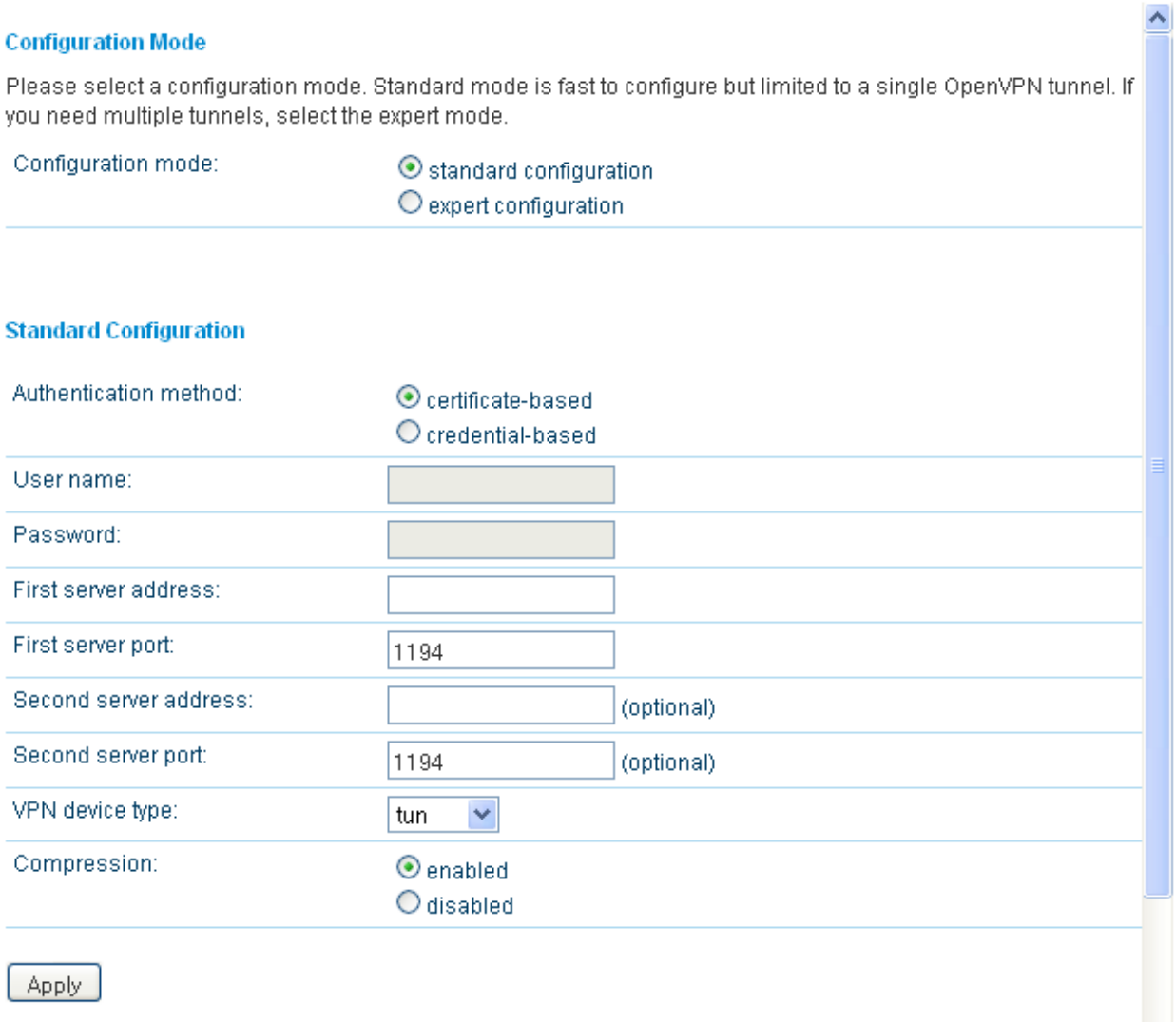
Please make sure that the NetBox system time is correct when working with OpenVPN. Otherwise authentication issues may arise.

3.1.6.1.1 OpenVPN Administration



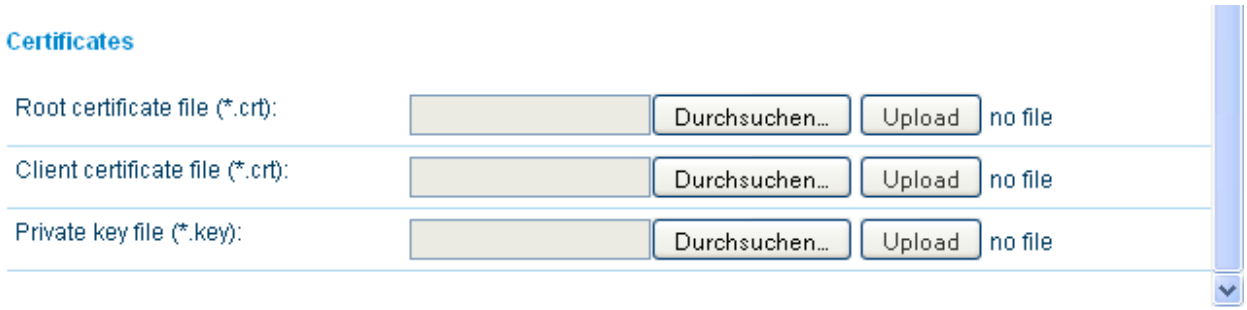
Parameter	Description
OpenVPN administrative status:	Enable or disable OpenVPN. If enabled, OpenVPN client configurations will be started after mobile connection establishment. Server configurations will be started immediately after NetBox startup.

3.1.6.1.2 OpenVPN Configuration (Standard Client Configuration)



Parameter	Description
Configuration mode:	Set the active configuration
Authentication method:	Use certificates or user name / password
First server address	First OpenVPN server address
First server port	First OpenVPN server port, default 1194
Second server address	Second OpenVPN server address (optional)
Second server port	Second OpenVPN server port (optional)
VPN device type	tun or tap
Compression	Enable or disable OpenVPN compression

3.1.6.1.3 OpenVPN Client Certificates



Certificate File	File Type	Description
Root certificate file	*.crt	Master Certificate Authority (CA) certificate and key which is used to sign each of the server and client certificates.
Client certificate file	*.crt	Separate certificate (also known as a public key)
Private key file	*.key	Private key for the server and each client,

Tip:

Use the dial-out connection method “permanent“ in context with OpenVPN.

3.1.6.1.4 OpenVPN Configuration (Client Expert Configuration)

This configuration mode gives you more flexibility. The configuration upload takes a zip file which may include one or more OpenVPN client configurations

Typically such a zip file includes files such as:

- client.conf (The client configuration file, referring to …)
- ca.crt (OpenVPN root certificate file)
- client.crt (OpenVPN client certificate file)
- client.key (OpenVPN private key file)

The name of the configuration file (here client.conf) can be chosen freely but the extension must be .conf. To configure multiple tunnels (i.e. multiple *.conf files each referring to its certificates) you should place all files belonging to a single tunnel/process into a subfolder or make sure that there are no naming conflicts.

If OpenVPN is enabled and the configuration mode is set to “client expert configuration” all configurations (*.conf) will be started after mobile connection establishment.

3.1.6.1.5 OpenVPN Configuration (Server Expert Configuration)

This configuration mode lets you run an OpenVPN server on NetBox. The configuration upload takes a zip file which may include one or more OpenVPN server configurations.

Typically such a zip file includes files such as:

- server.conf (The client configuration file, referring to)
- ca.crt (OpenVPN root certificate file)
- server.crt (OpenVPN client certificate file)
- server.key (OpenVPN private key file)
- dh1024.pem (Diffie hellman parameters)
- A directory (with default name “ccd”) containing client-specific configuration files

To configure multiple server processes (i.e. multiple *.conf files each referring to its certificates) you should place all files belonging to a single tunnel/process into a subfolder or make sure that there are no naming conflicts.

If OpenVPN is enabled and the configuration mode is set to “server expert configuration” all configurations (*.conf) will be started after NetBox startup.

Consider the following points when running OpenVPN without having established a mobile connection:

- Configure a Default Route to the Ethernet Interface / LAN.
- Configure a time server (NTP) and make sure that it is available via the LAN.
- Manually configure a DNS server (on DHCP Server web page!) and make sure that it is available via the LAN.

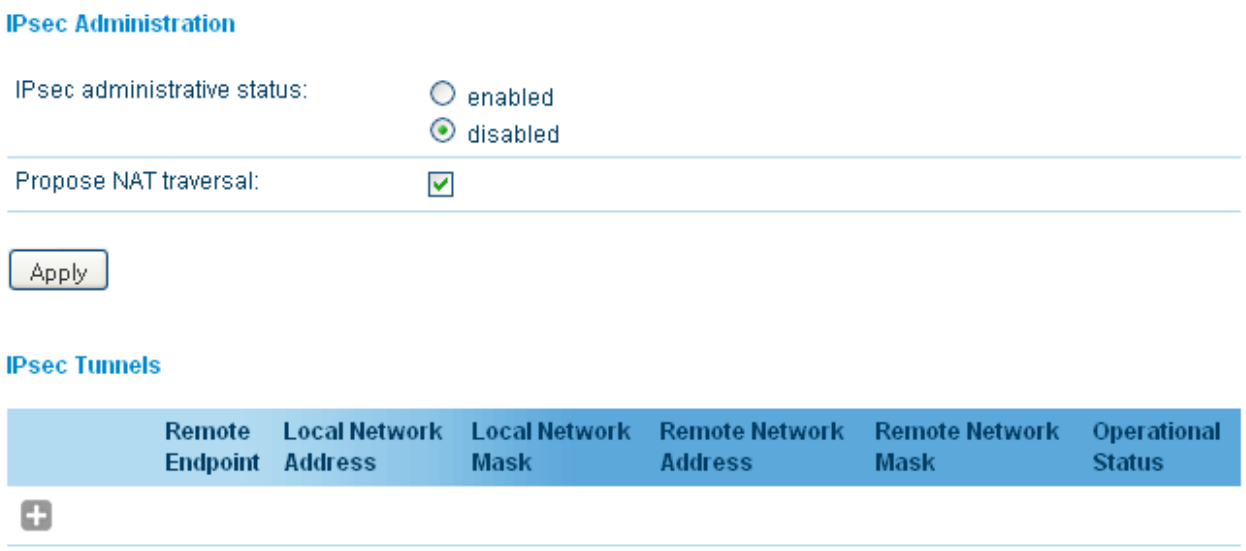
For further information and external OpenVPN documentation please see chapter 3.1.6.1.

3.1.6.2 IPsec

IPsec (IP security) is a suite of protocols for securing Internet Protocol (IP) communications by authenticating and/or encrypting each IP packet in a data stream. IPsec also includes protocols for cryptographic key establishment.

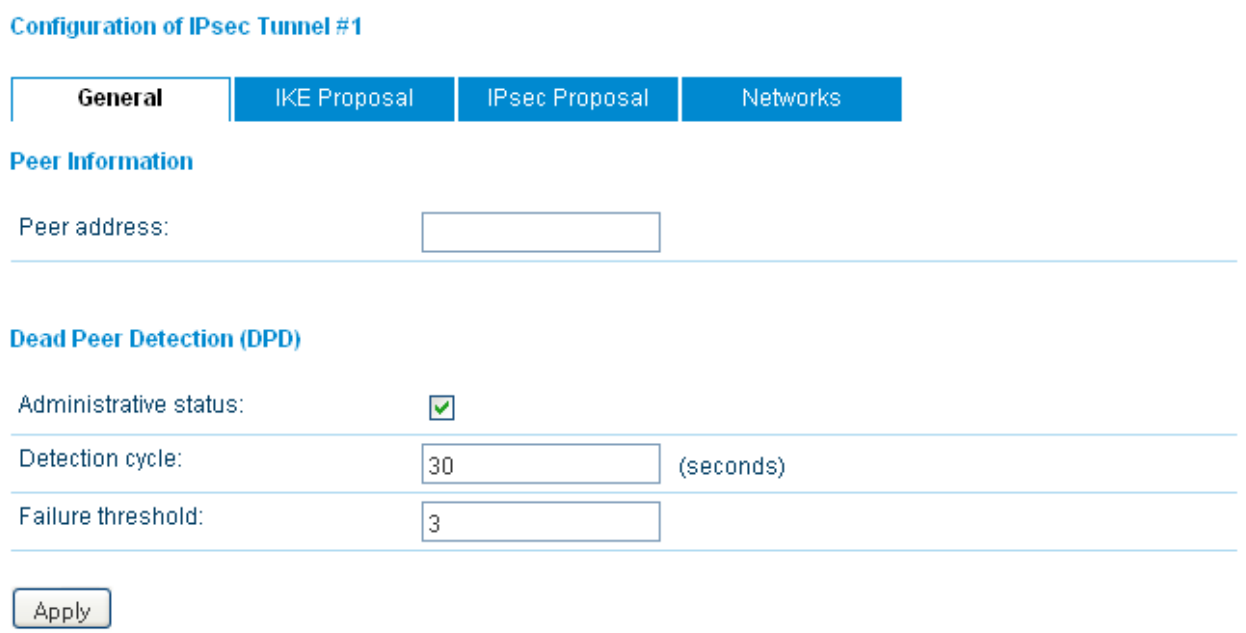
IPsec can be used to create Virtual Private Networks (VPN) and this is the dominant use.

3.1.6.2.1 IPsec Administration



Parameter	Description
IPsec administrative status:	Enable or disable IPsec.

3.1.6.2.2 IPsec Configuration



Configuration of IPsec Tunnel #1

General | **IKE Proposal** | IPsec Proposal | Networks

IKE Authentication Keys

Preshared key (PSK):	
Local ID Type:	Fully Qualified Domain Name (FQDN)
Local ID:	
Peer ID Type:	IP address
Peer ID:	

IKE Proposal (Phase 1)

Negotiation mode:	aggressive
Encryption algorithm:	3DES
Authentication algorithm:	MD5
IKE Diffie-Hellman group:	2 (1024)
SA life time:	86400 (seconds)
Perfect forward secrecy (PFS):	☐

Apply

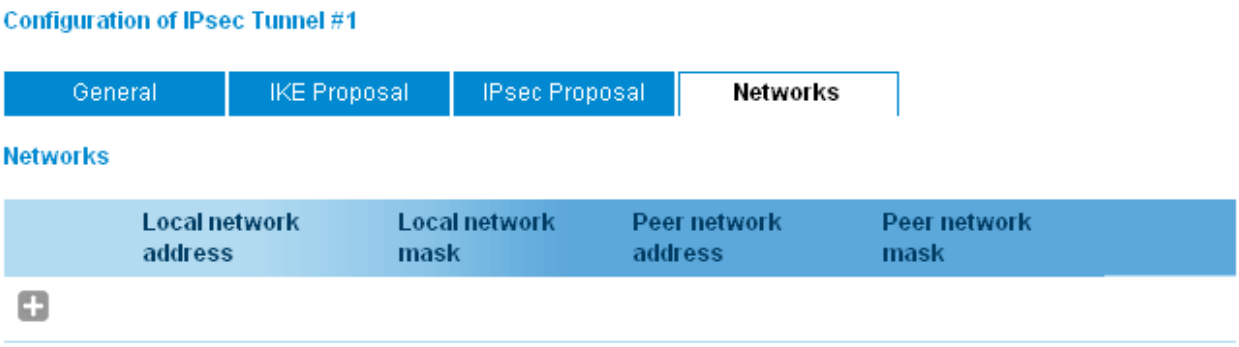
Configuration of IPsec Tunnel #1

General | IKE Proposal | **IPsec Proposal** | Networks

IPsec Proposal (IKE Phase 2)

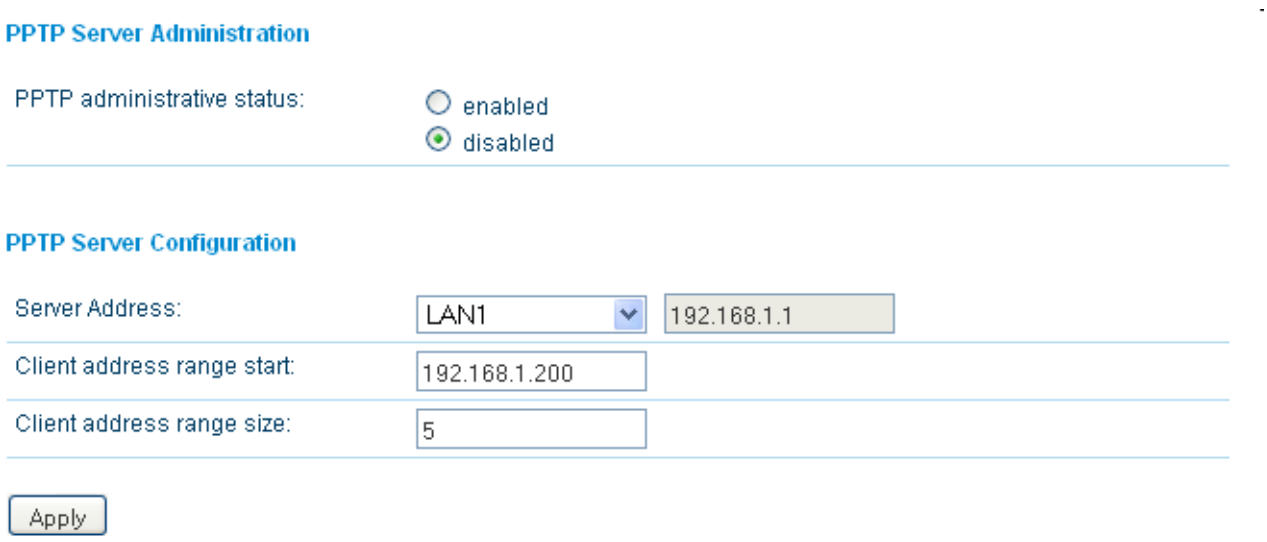
Encapsulation mode:	Tunnel
IPsec protocol:	ESP
Encryption algorithm:	3DES
Authentication algorithm:	MD5
SA life time:	28800 (seconds)

Apply



Parameter	Description
Remote server address:	IP address or host name of IPsec peer / responder / server.
Remote LAN address:	The remote private network. Provide an IP address in dotted decimal notation
Remote LAN subnet mask:	The remote private network. Provide a subnet mask in dotted decimal notation.
NAT Traversal	Enable or disable NAT-Traversal.
Preshared Key (PSK):	The pre-shared key (PSK)
IKE mode:	Choose a negotiation mode. The default is main mode (identity-protection). Aggressive mode is less secure than main mode as it reveals your identity to an eavesdropper. However, *with pre-shared key authentication and dynamic IP addresses aggressive mode is the only choice.*
IKE encryption:	IKE encryption method
IKE hash:	IKE hash method
IKE Diffie-Hellman Group:	IKE Diffie-Hellman Group
Perfect Forward Secrecy (PFS):	Use Perfect Forward Secrecy. This feature increases security as with PFS, penetration of the key-exchange protocol does not compromise keys negotiated earlier.
Local ID:	Local ID
Remote ID:	Remote ID
ESP encryption:	ESP encryption method
ESP hash:	ESP hash method
Status:	Enable or disable Dead Peer Detection.
Detection cycle [sec]:	Set the delay (in seconds) between Dead Peer Dectection (RFC 3706) keepalives (R_U_THERE, R_U_THERE_ACK) that are sent for this connection (default **30** seconds).
Failure count:	The number of unanswered DPD R_U_THERE requests until the IPsec peer is considered dead (Netbox will try to reestablish a dead connection automatically)

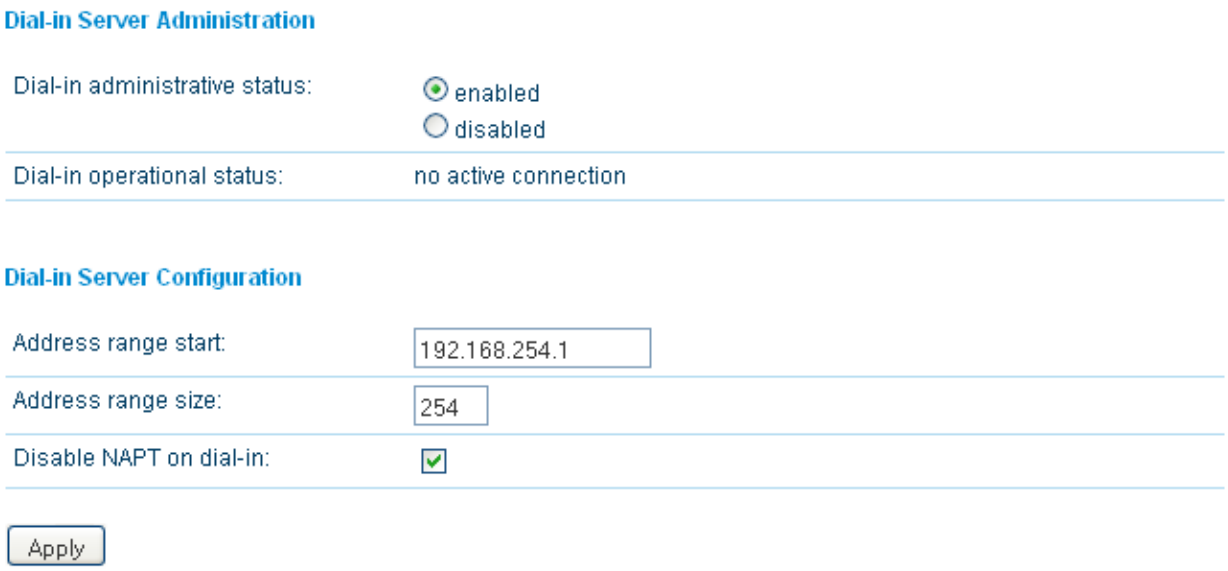
3.1.6.3 PPTP Server



The Point-to-Point Tunneling Protocol (PPTP) is a method for implementing virtual private networks. PPTP is popular because it is easy to configure and it was the first VPN protocol that was supported by Microsoft Dial-up Networking. Users that are allowed to connect to the PPTP server are defined under the section “User Accounts”.

Parameter	Description
PPTP state	Enable/disable PPTP server
PPTP address range start:	Address range start for PPTP server
PPTP address range size:	Address range size for PPTP server

3.1.6.4 Dial-in Server



On this page the Dial-in server of NetBox can be administrated and configured. Users that are allowed to dial-in are defined under the section “User Accounts”.

3.1.6.4.1 Dial-in Server Administration

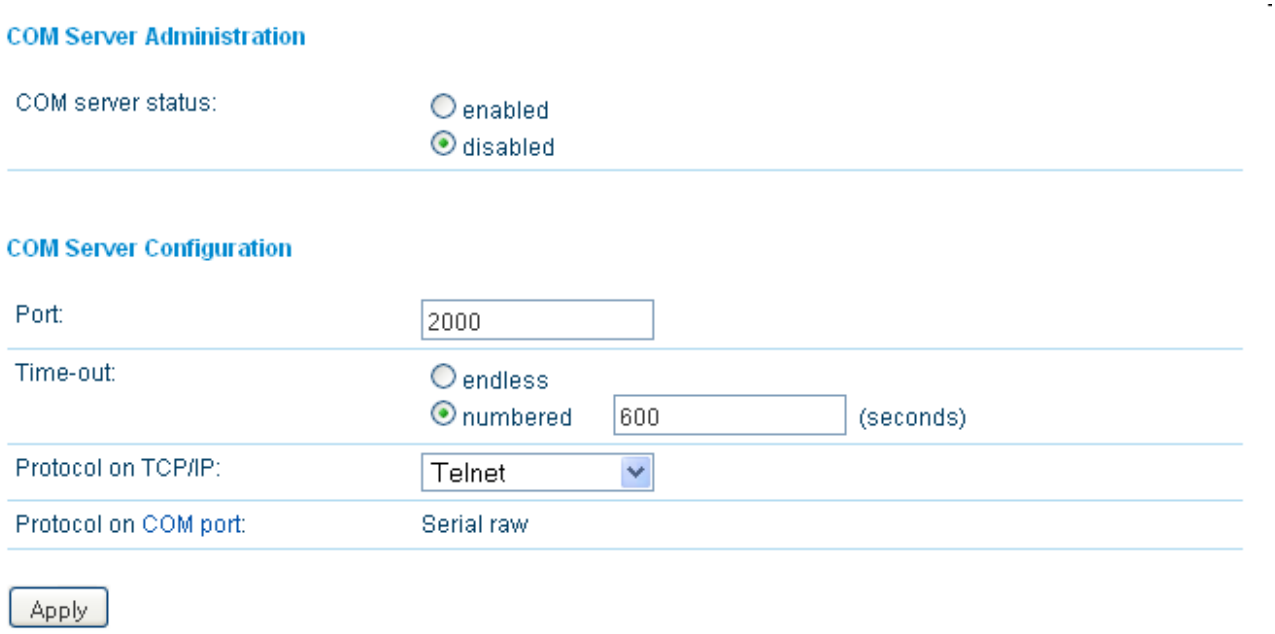
Parameter	Description
Dial-in administrative status:	The Dial-in server can be enabled or disabled. Consequently the device will allow incoming calls or not.
Dial-in operational status:	Shows whether a connection is active or not

3.1.6.4.2 Dial-in Server Configuration

Parameter	Description
Address range start:	Start address of the range for the dial-in server.
Address range size:	Number of addresses that the dial-in server can assign.
Disable NAPT on dial-in	Disable NAPT on dial-in is recommended.

3.1.7 Services

3.1.7.1 COM Server / Gateway



3.1.7.1.1 COM Server Administration

Parameter	Description
COM server status:	The COM server / modbus gateway can be enabled or disabled.

3.1.7.1.2 COM Server Configuration

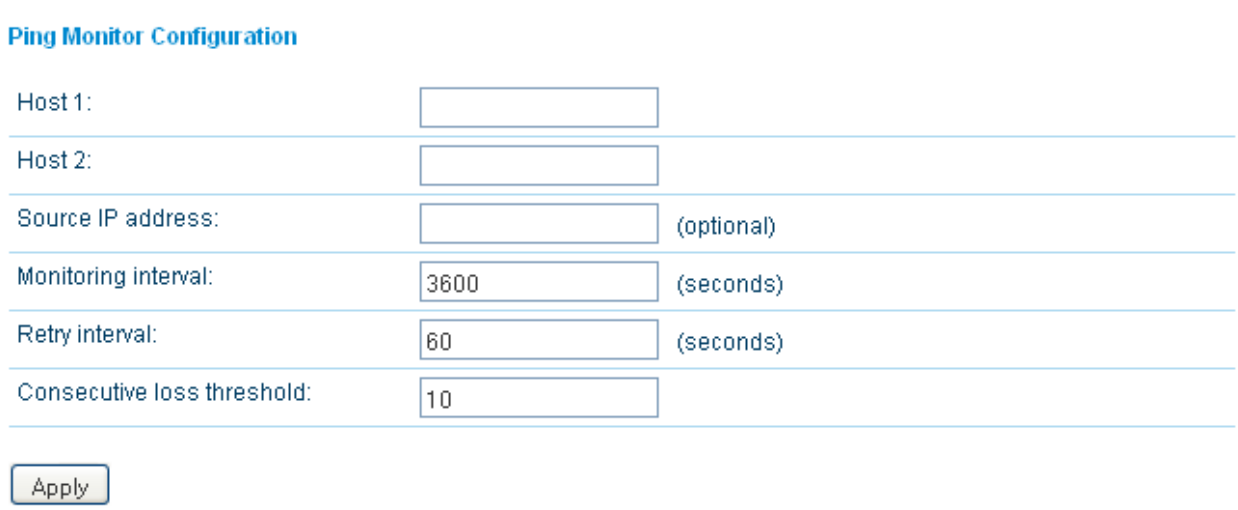
Parameter	Description
Port:	The port that is used by this application.
Protocol on TCP/IP:	“Telnet” or “TCP raw” for COM server applications, “Modbus TCP” for modbus gateway
Protocol on COM port:	The protocol implicitely defined on the COM port.

3.1.7.2 Connection Supervisor

The connection supervisor monitors connectivity and automatically recovers the connections in case of link loss.

First you should check the option “monitor the connection establishment” to make sure that problems during connections establishment are detected and recovered.

Second the active connection should be monitored. If you are running an IPsec or OpenVPN based VPN we recommend to use the protocol integrated monitoring service (IPsec DPD or OpenVPN keep-alive). Else you should configure and enable the ping monitor application.

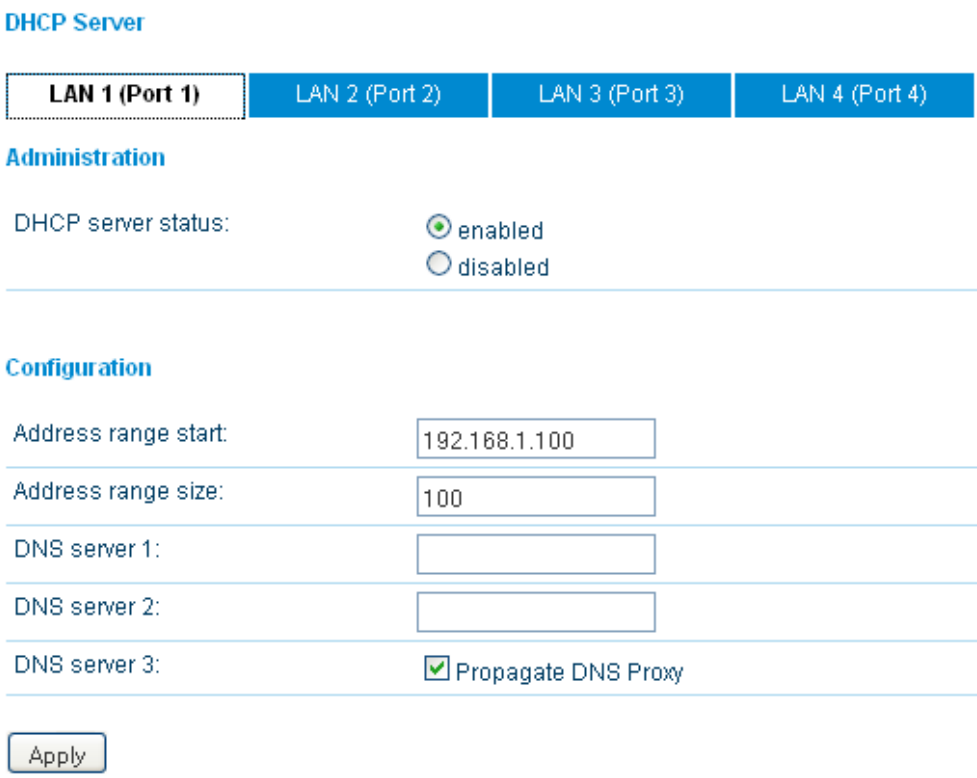


Parameter	Description
Host 1:	Reference host 1 to which IP connectivity is checked by sending probes
Host 2:	Reference host 2 to which IP connectivity is checked by sending probes (optional) The test is considered successful if host 1 or 2 answers.
Source IP address:	Source IP address to be used as source of the ping probes
Monitoring interval:	The time to wait before sending the next probe in case the last probe was successful.
Retry interval:	The time to wait until sending the next probe in case the last probe was unsuccessful.
Consecutive loss threshold	Number of consecutive unsuccessful probes that are required until the next recovery action is initiated.

The recovery actions are:

1. Trying to reestablish a broken connection
2. Restart the internal modem
3. Restart the NetBox

3.1.7.3 DHCP Server



The DHCP server assigns the following information:

1. Any IP address out of the configured range
2. As default gateway the IP address of NetBox is assigned
3. As DNS server the IP address of NetBox is assigned or manually configured DNS servers

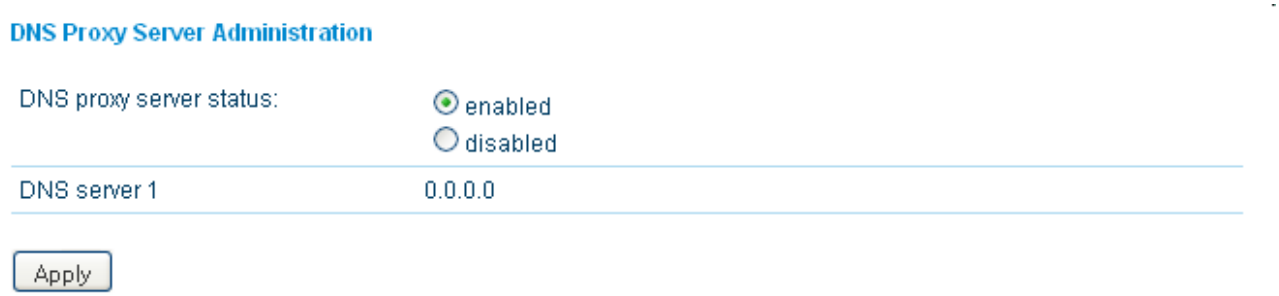
3.1.7.3.1 DHCP Server Administration

Parameter	Description
DHCP server status:	The Dynamic Host Configuration Protocol (DHCP) server can be enabled or disabled. If it is enabled it will answer to DHCP requests of devices in the LAN.

3.1.7.3.2 DHCP Server Configuration

Parameter	Description
Address range start:	Address range start for DHCP server
Address range size:	Address range size for DHCP server
DNS server 1:	Manually configured first DNS server
DNS server 2:	Manually configured second DNS server
DNS server 3:	Propagate DNS proxy server as third DNS server

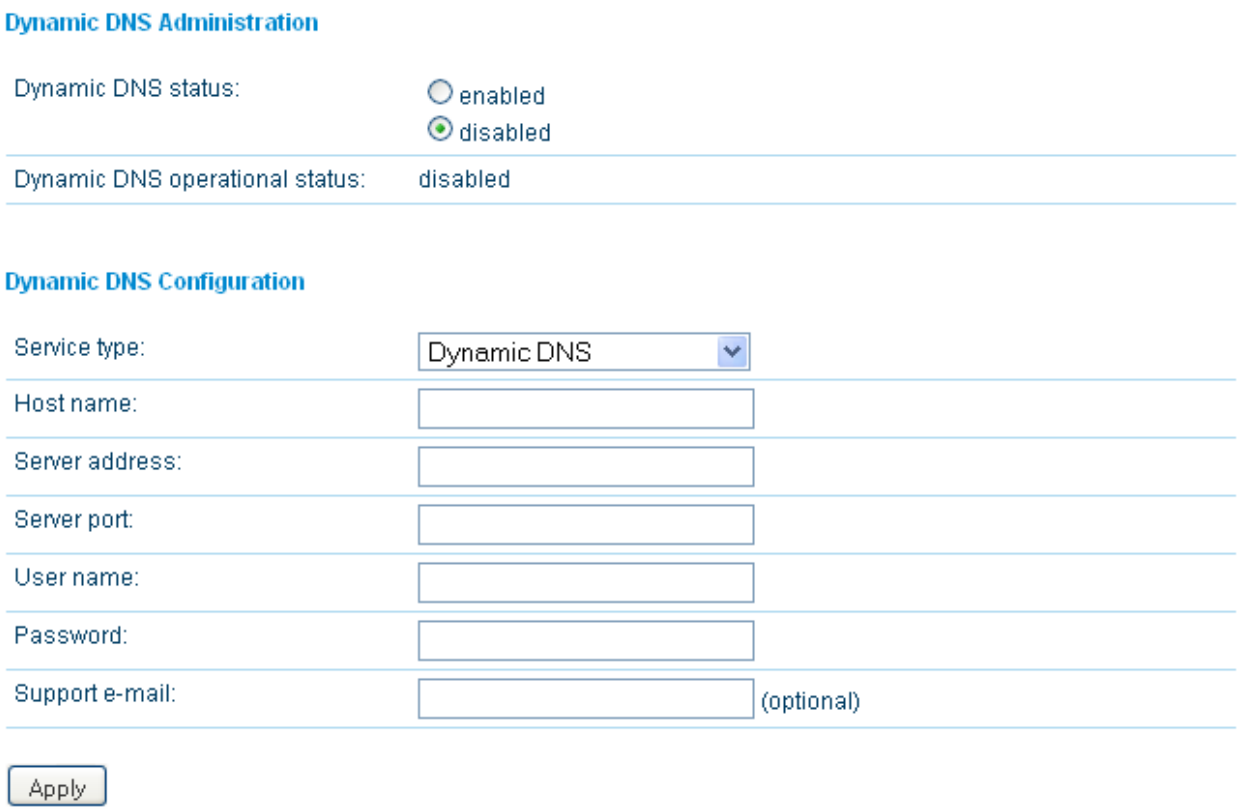
3.1.7.4 DNS Proxy Server



The DNS Proxy enabled NetBox forwards DNS requests to the DNS server provided by the mobile operator. Devices within the NetBox LAN may be configured to use NetBox as DNS server.

Parameter	Description
DNS proxy server status:	Enabled or disabled

3.1.7.5 Dynamic DNS



The Dynamic DNS Client of NetBox is completely compatible to the Dynamic Network Services provided by the organization DynDNS (www.dyndns.com).

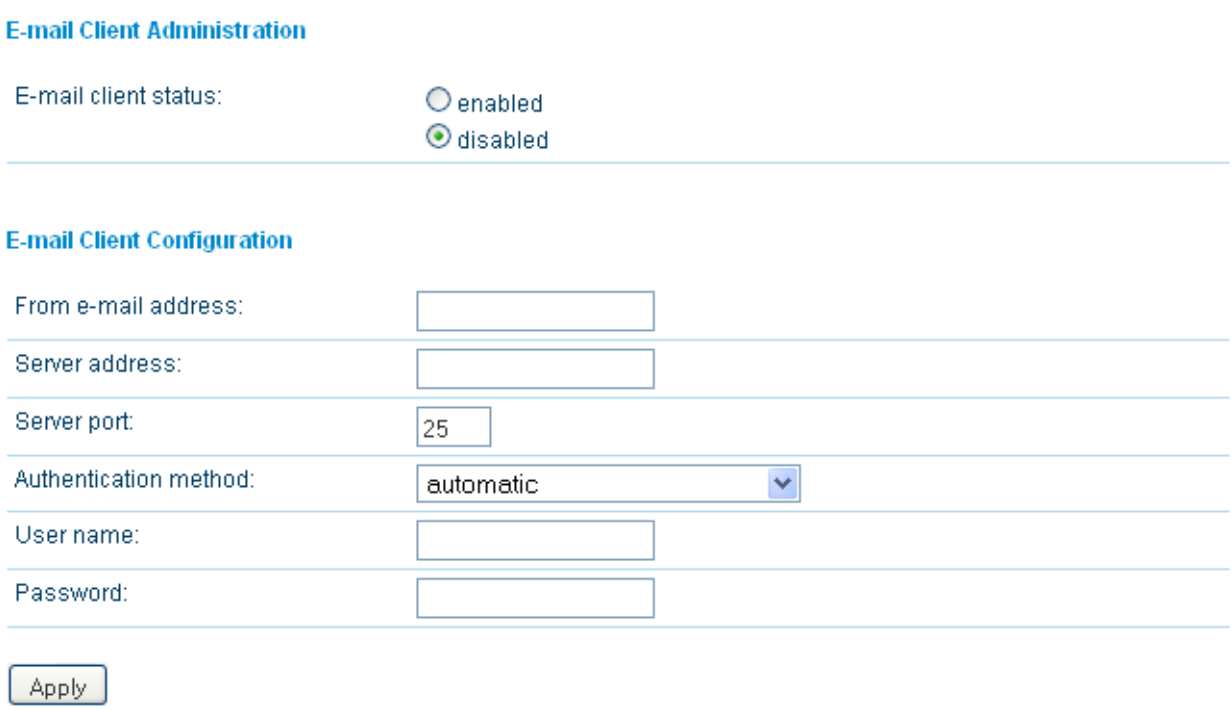
3.1.7.5.1 Dynamic DNS Administration

Parameter	Description
Dynamic DNS status:	Enable or disable the Dynamic DNS Client

3.1.7.5.2 Dynamic DNS Configuration

Parameter	Description
Service type:	DynDNS Service according Dynamic Network Services, Inc. (www.dyndns.com). Please consult www.dyndns.com for more details.
Host name:	URL under which NetBox will be available, e.g. myNetBox.dyndns.org
Server address:	Server IP Address or URL, normally members.dyndns.org
Server port:	TCP Port of the Dynamic DNS Server, e.g. 80 or 8245
User name:	Username
Password:	Password
Support e-mail:	Optional support e-mail address

3.1.7.6 E-mail Client



3.1.7.7 E-Mail Client Administration

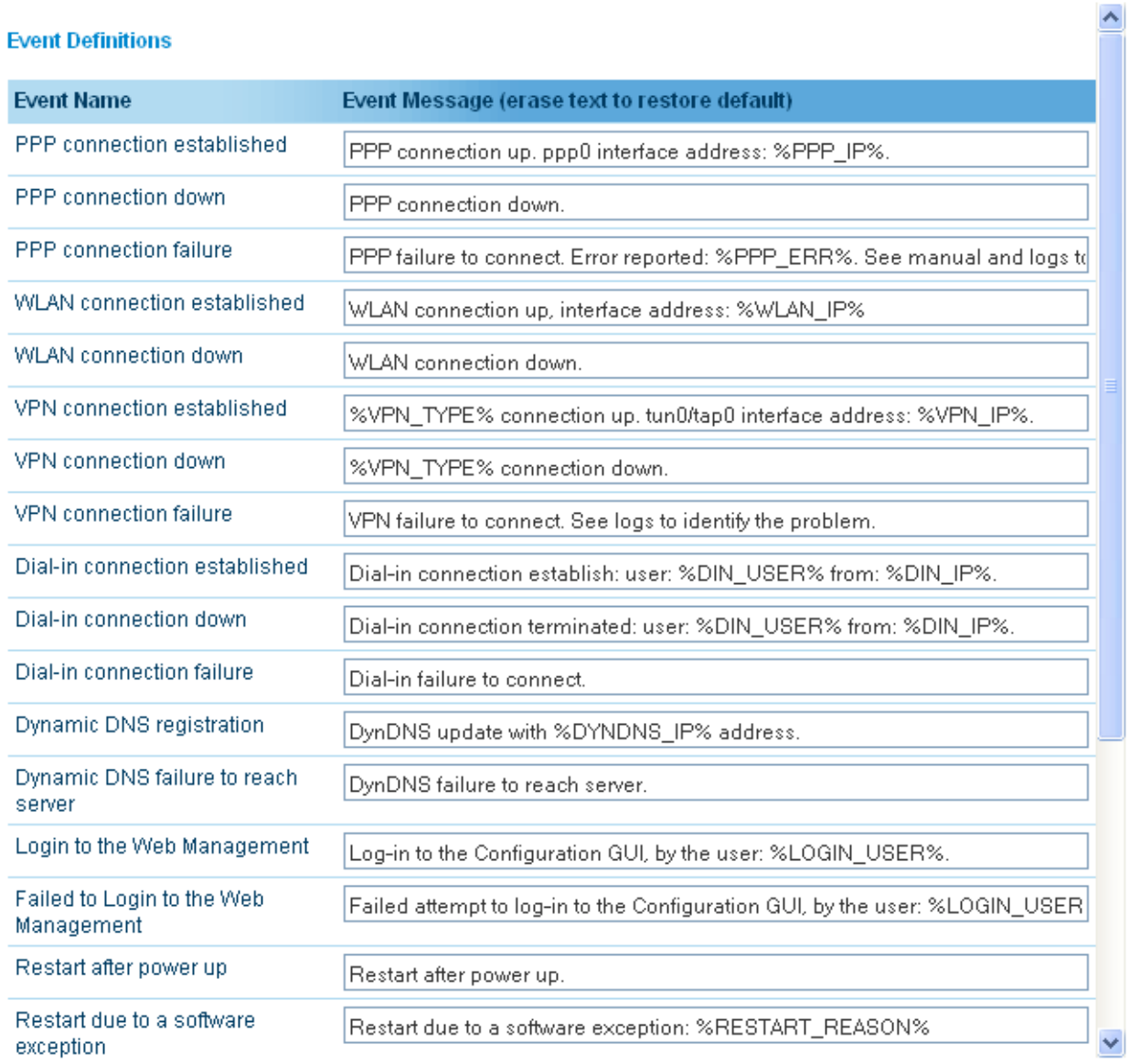
Parameter	Description
E-mail client status:	Sending e-mail can be enabled or disabled. Disabling the e-mail client means that no notification via e-mail will be performed.

3.1.7.8 E-mail Client Configuration

Parameter	Description
From e-mail address:	Sender's e-mail address
Server address:	SMTP server address
Server port:	Default port for SMTP is 25
Authentication required:	If enabled NetBox will logon to SMTP server before sending e-mails.
User name:	User name
Password:	Password

3.1.7.9 Event Manager

3.1.7.9.1 Events



There are several predefined system events. If such an event occurs a notification message to SMS or e-mail recipients if such an events

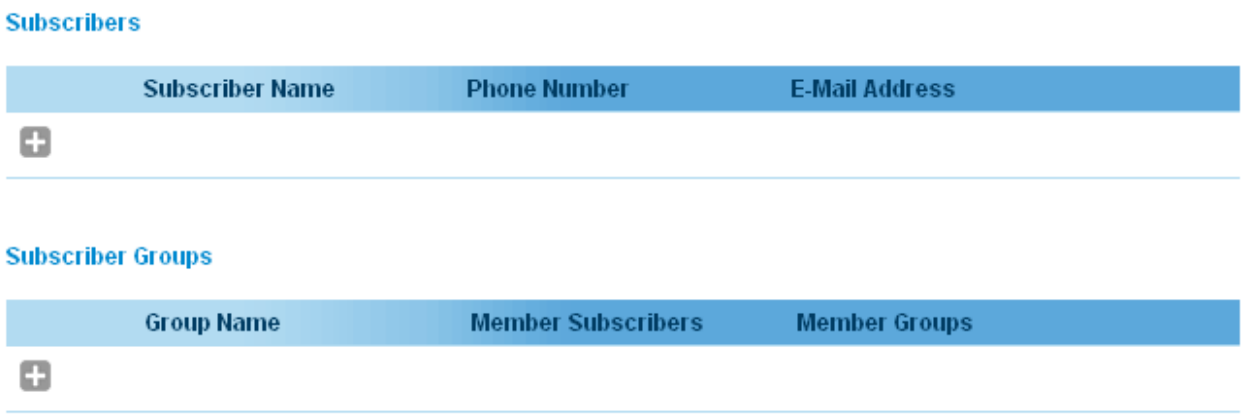
Event	Event Text
PPP connection established	PPP connection up. ppp0 interface address: %PPP_IP%.
PPP connection down	PPP connection down.
PPP connection failure	PPP failure to connect. Error reported: %PPP_ERR%. See manual and logs to identify the problem.
VPN connection established	VPN connection up. tun0/tap0 interface address: %VPN_IP%.
VPN connection down	VPN connection down.
VPN connection failure	VPN failure to connect. See logs to identify the problem.
Dial-in connection established	Dial-in connection establish: user: %DIN_USER% from: %DIN_IP%.
Dial-in connection down	Dial-in connection terminated: user: %DIN_USER% from: %DIN_IP%.
Dial-in connection failure	Dial-in failure to connect.

Dynamic DNS registration	DYNDNS update with %DYNDNS_IP% address.
Dynamic DNS failure to reach server	DynDNS failure to reach server.
Login to the Web Manager	Log-in to the Configuration GUI, by the user: %LOGIN_USER%.
Failed to Login to the Web Manager	Failed attempt to log-in to the Configuration GUI, by the user: %LOGIN_USER%.
Restart after power up	Restart after power up.
Restart due to a software exception	Restart due to a software exception.
Restart due to Web Manager	Restart due to Web Manager.
Startup completed	Startup completed
Arriving UDP Message	%UDP_MESSAGE%
Test Event	This is a test.
GPS reception on	GPS position is available.
GPS reception off	GPS position is not available.
Digital Input 1 on	Input change: IN1 is On.
Digital Input 1 off	Input change: IN1 is Off.
Digital Input 2 on	Input change: IN2 is On.
Digital Input 2 off	Input change: IN2 is Off.
Digital Output 1 on	Output change: OUT1 is On, changed from %DIO_SOURCE%.
Digital Output 1 off	Output change: OUT1 is Off, changed from %DIO_SOURCE%.
Digital Output 2 on	Output change: OUT2 is On, changed from %DIO_SOURCE%.
Digital Output 2 off	Output change: OUT2 is Off, changed from %DIO_SOURCE%.

The following event variables will be replaced within event texts as follows:

Event Variables	Description
%PPP_IP%	The current IP address on the mobile interface (ppp0)
%PPP_ERR%	Error message in case of mobile connection failure
%VPN_IP%	The current address of the OpenVPN interdface
%VPN_TYPE%	IPsec or OpenVPN
%DYNDNS_IP%	The IP address which has been sent to the DNS server
%DIN_USER%	User name which the dial-in connection has been authenticated against
%DIN_IP%	The IP address of the dial-in peer
%LOGIN_USER%	Name of the user who tried to log on to the Web Manager
%DIO_SOURCE%	Source that triggered an output change
%UDP_MESSAGE%	Text message that has been received by the message receiver
%RESTART_REASON%	Reason why a restart happened
%DST_IN1%	Status of digital input 1, possible values include [on, off]
%DST_IN2%	Status of digital input 2, possible values include [on, off]
%DST_OUT1%	Status of digital output 1, possible values include [on, off]
%DST_OUT2%	Status of digital output 2, possible values include [on, off]

3.1.7.9.2 Subscribers



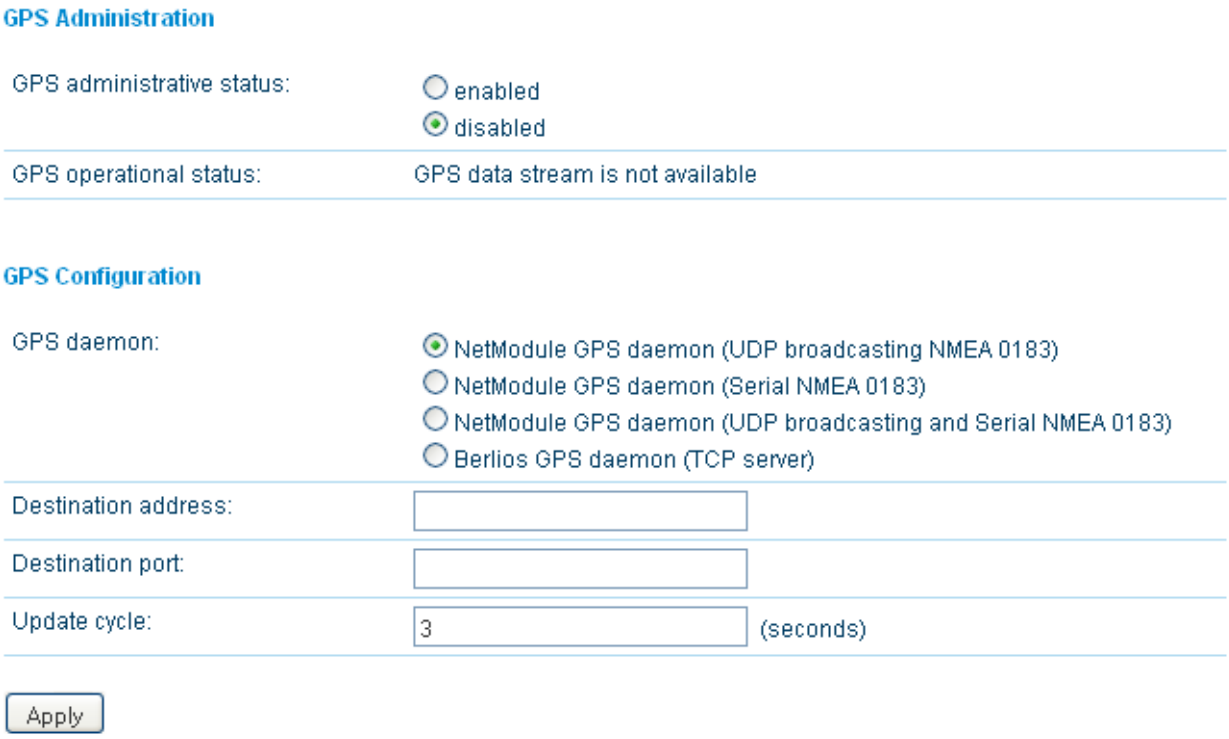
Subscribers are recepients of SMS or e-mail event notifications.

It is possible to create groups and fill them with users and other groups. This mechanism let you send event notifications to multiple destinations/users.

3.1.7.9.3 Event Processor

Notifications can be generated or digital outputs can be set based on the occurrence of several events.

3.1.7.10 GPS



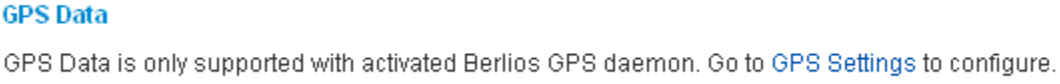
This feature is available on NB2241 and NB2341 only.

If valid GPS data is available (at least 3 satellites available) it will be sent as UDP payload to the configured host. The content of such a data package is separated into two lines. The first line contains GPS data in the GPGGA format; the second line contains GPRMC data.

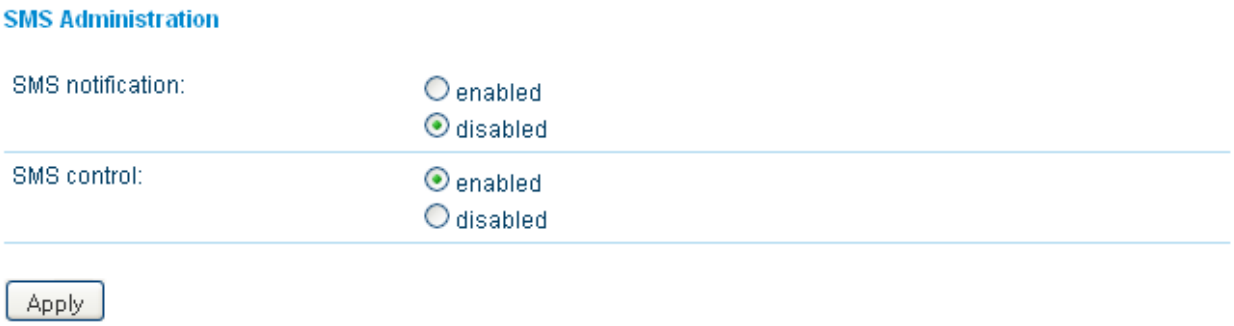
For more information on the GPS data stream see chapter 4.1.

Parameter	Description
GPS status:	Enable or disable GPS data stream
GPS destination host name:	The host where the GPS data will be sent to
GPS destination host name:	The IP port where the GPS data will be sent to
GPS update cycle:	The refresh cycle.

3.1.7.11 GPS Data



3.1.7.12 SMS



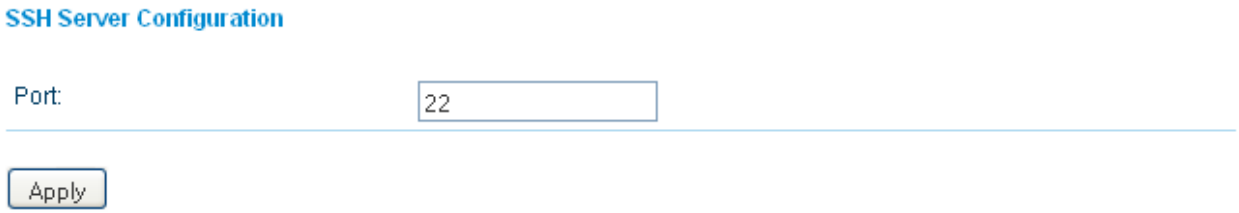
SMS can be used to control NetBox and for event notification.

Parameter	Description
SMS notification:	Sending SMS can be enabled or disabled. Disabling sending SMS means that no notification via SMS will be performed.
SMS control:	Receiving SMS can be enabled or disabled. Disabling receiving SMS means that controlling NetBox via SMS will not be possible.

Send a SMS to the phone number of the SIM that is inserted into your NetBox. Valid commands are listed in the table below:

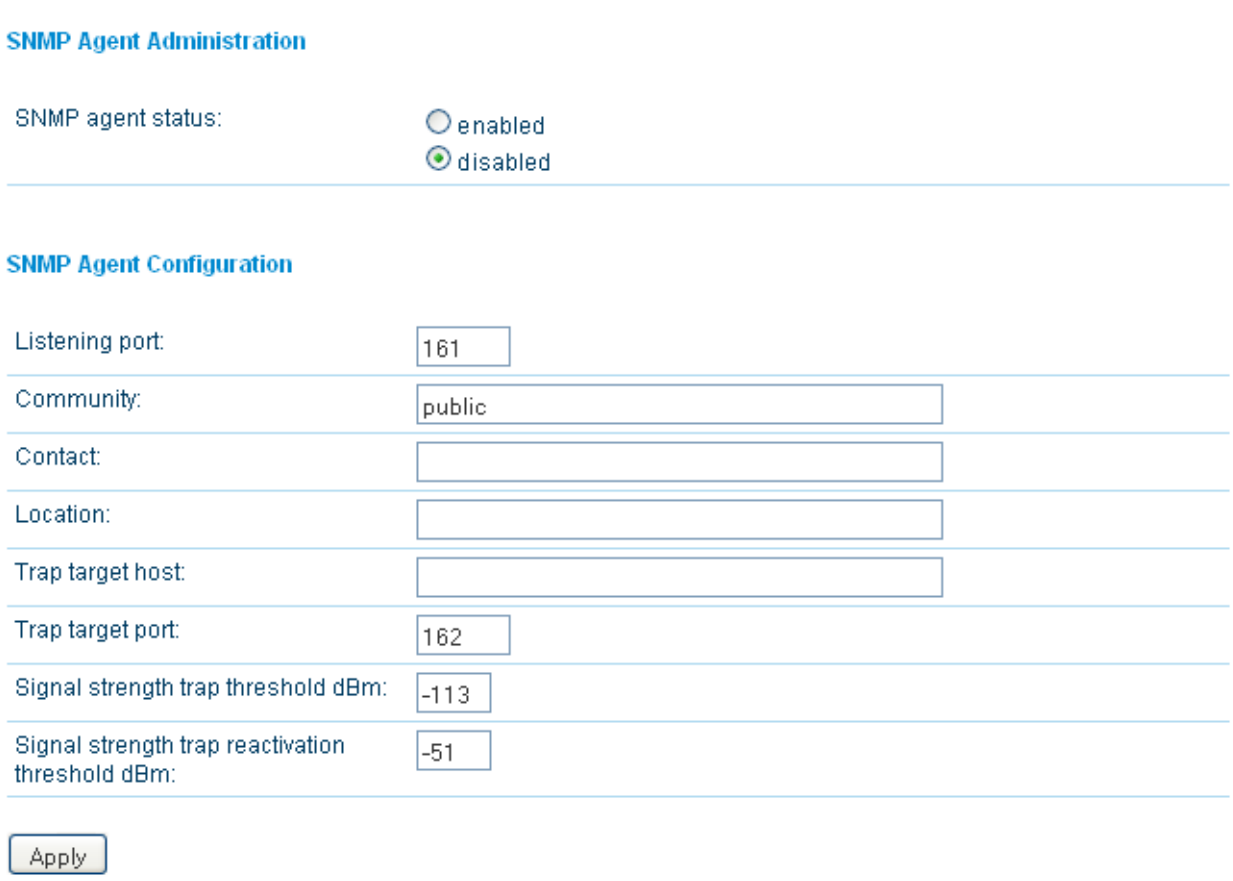
Command	Parameters	Description
status	-	A SMS with the following information will be returned - Signal strength - Mobile connection state (up/down) - current IP address of the mobile (ppp) interface - current IP address of the VPN interface (if enabled)
connect	-	This will initiate a Dial-out connection over GSM and the VPN connection (if enabled) and trigger sending an SMS with the following information: - current IP address of the PPP interface - current IP address of the VPN interface (if enabled) The profile name is an optional parameter.
disconnect	-	terminates all connections on the mobile interface (Dial-out and VPN)
reboot	-	NetBox will be restarted
method	manual	Set administrative status of the mobile connection to disabled
	permanent	Set administrative status of the mobile connection to enabled, permanent.
	dialondemand	Set administrative status of the mobile connection to enabled, dial on demand.
output	1 on	Switch output 1 on
	1 off	Switch output 1 off
	2 on	Switch output 1 on
	2 off	Switch output 2 off

3.1.7.13 SSH Server



Parameter	Description
Port:	SSH server port

3.1.7.14 SNMP Agent



Parameter	Description
SNMP agent status:	Enable or disable the SNMP agent.
Listening Port:	SNMP agent port
Community:	An SNMP community is the group that devices and management stations running SNMP belong to.
Contact:	System maintainer
Location:	Location of the device
Trap target host:	The host where the traps will be sent to

Trap target port:	The port where the traps will be sent to
Signal strength trap threshold dBm:	A trap will be sent, if signal strength goes lower than this.
Signal strength trap reactivation threshold dBm:	No further traps will be sent as long signal strengt his not higher than this.

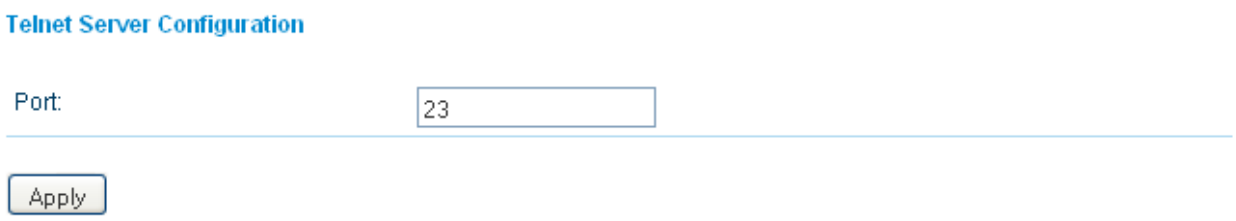
SNMP traps are generated in the following situations, if the SNMP agent is enabled:

- Startup of the NetBox
- Shutdown of the NetBox
- VPN connected
- VPN disconnected
- Signal Strength below „Signal strength trap threshold“

The startup trap is implemented using the standard coldStart & warmStart traps.

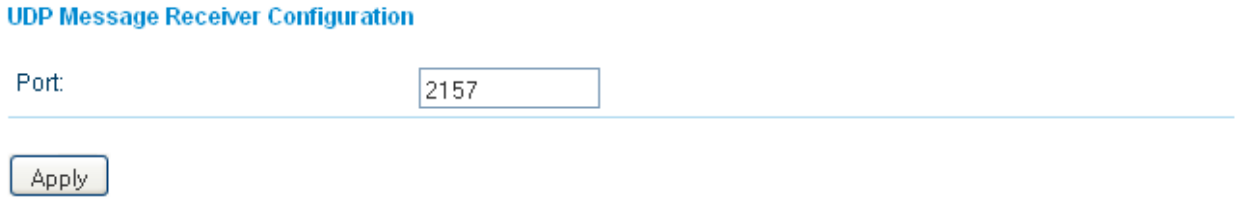
The system-shutdown trap is sent, when the system is rebooted via the reboot function of the web interface or when the watchdog reboots the system.

3.1.7.15 Telnet Server



Parameter	Description
Port:	Telnet server port

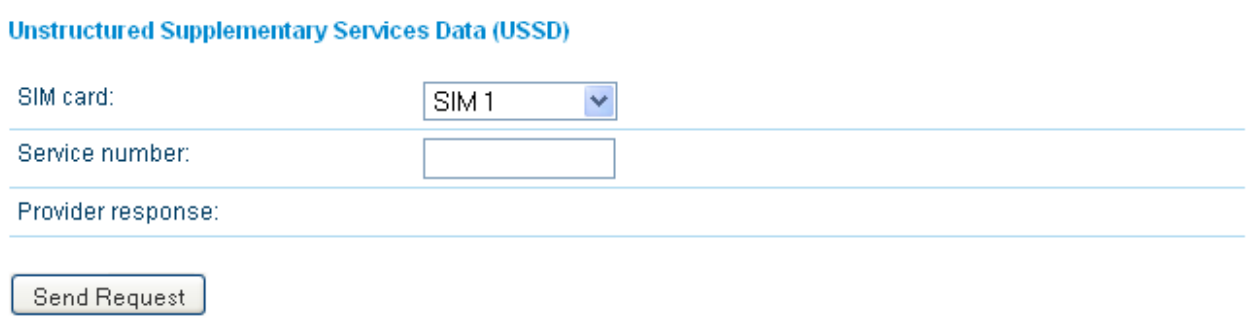
3.1.7.16 UDP Message Receiver



Parameter	Description
Port:	UDP message receiver port

The UPD Message Receiver is a service that listens on the configured port (default 2157) for arriving UDP packets with a string in the payload. If an UPD package is arriving, the event “Arriving UDP Message” is fired (see chapter 3.1.7.9.1 Events). Use the Event Manager (3.1.7.9 Event Manager) to forward the message (UDP payload) to a SMS or E-mail destination.

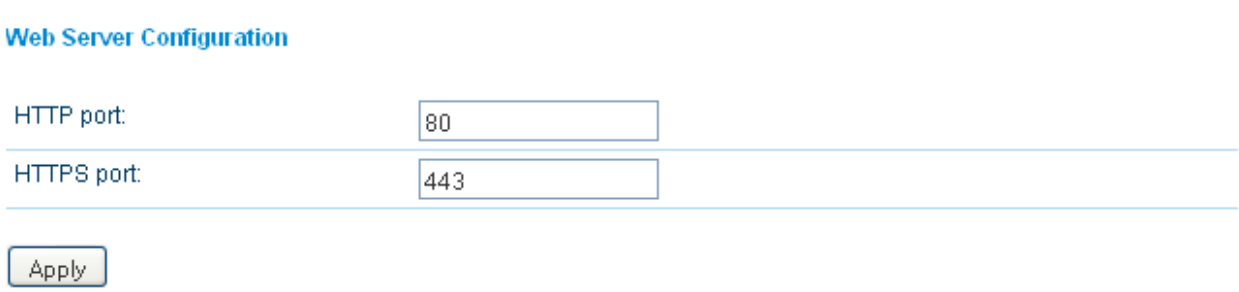
3.1.7.17 Unstructured Supplementary Services Data (USSD)



Unstructured Supplementary Services Data (USSD) is a GSM service that allows high speed interactive communication between the subscribers and applications across a GSM Network. A sample USSD service is the bill status service accessed by dialing *141# or similar numbers in between * and #.

Contact your mobile operator for further information.

3.1.7.18 Web Server

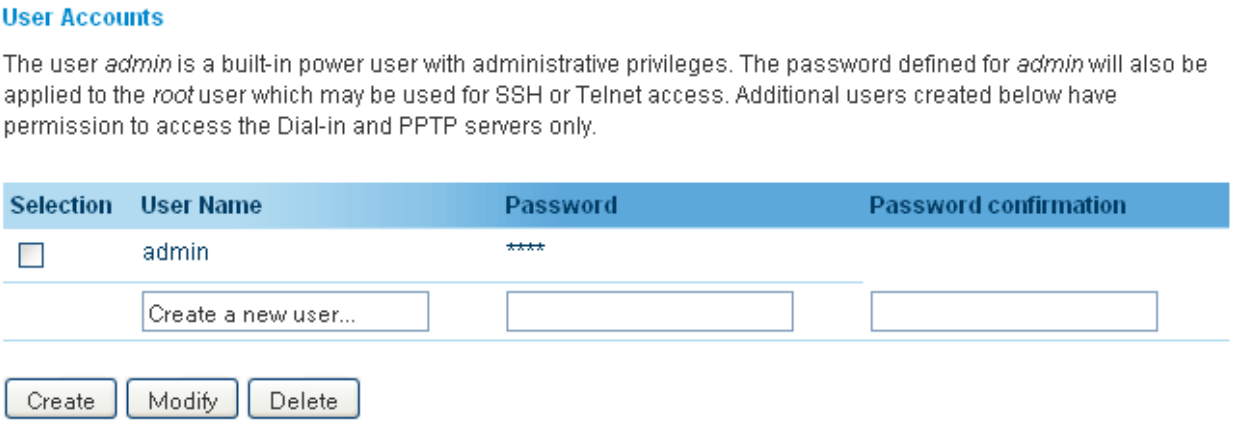


Parameter	Description
HTTP port:	Web server port for http connections
HTTPS port:	Web server port for https connections

3.1.8 System

3.1.8.1 Authentication

3.1.8.2 User Accounts



This page lets you manage the user accounts on the device.

The user **admin** is a built-in power user that has permission to access both the Web Manager and the Dial-in server. Any other user-defined user only has permission for dial-in connections.

Parameter	Description
User name	Define a user name
Enter password:	Define a password
Re-enter password:	Confirm the password

3.1.8.3 File Configuration

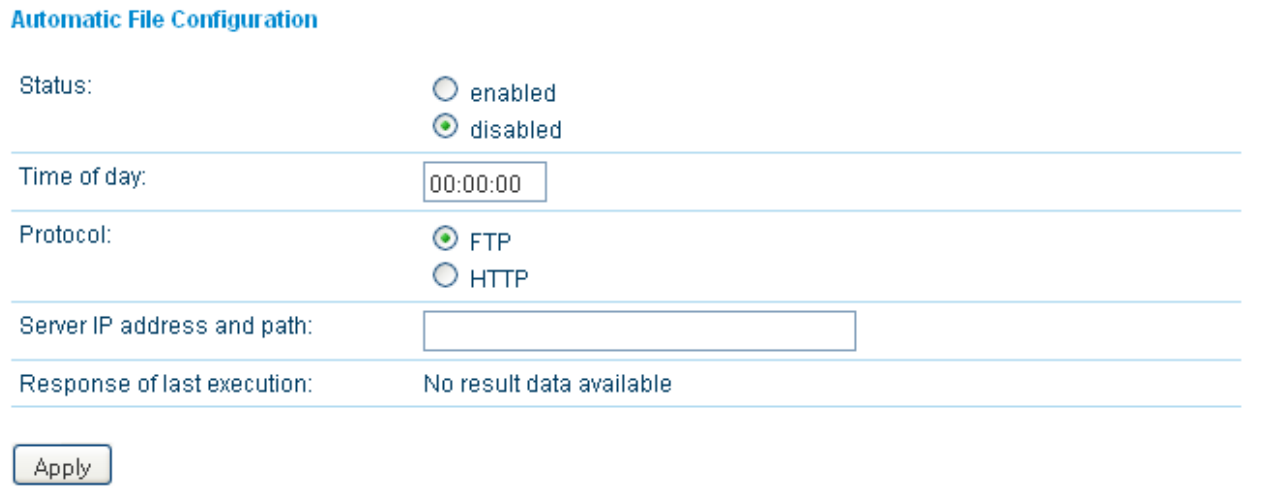
Configuration via the Web Manager becomes tedious for large volumes of devices. NetBox offers automatic and manual file-based configuration.

A **single text file** (*.cfg) or a **zip archive** (*.zip) containing one or more of the following files can be uploaded.

When uploading a zip file, the files included must be named as follows:

- user-config.cfg (the user configuration file)
- ca.crt.credential_mode (OpenVPN root certificate file for credential based authentication)
- ca.crt.certificate_mode (OpenVPN root certificate file for certificate based authentication)
- client.crt.certificate_mode (OpenVPN client certificate file)
- client.key.certificate_mode (OpenVPN private key file)
- templateProfiles (updating provider database)

3.1.8.3.1 Automatic File Configurration

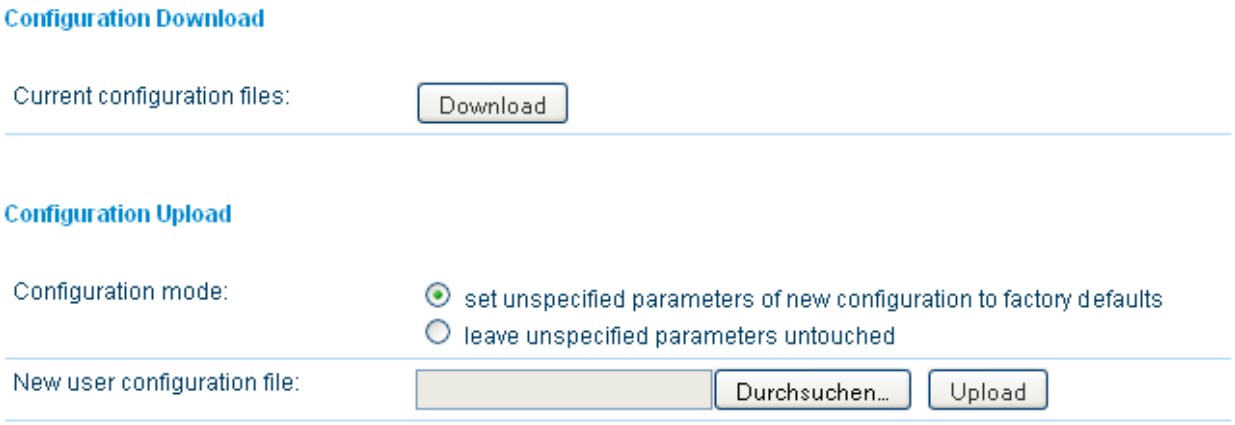


Parameter	Description
Status:	Enable/disable automatic configuration update
Time of day:	Every day at this time NetBox will do a check for updates
Mode;	Update over mobile or Ethernet Interface?
Protocol:	Specify the protocol used to transfer the new user configuration file to NetBox. You will need an appropriate server
Server IP address and path:	The server and directory where the new s configuration file can be downloaded
Last software update:	The result of the last try will be displayed here.

NetBox will only try to download the following files:

- <serialNumber>.cfg
- <serialNumber>.zip

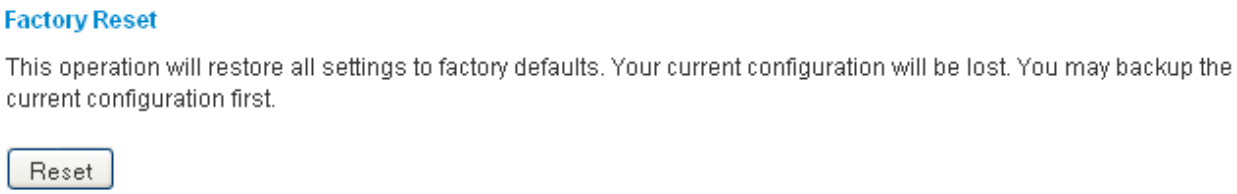
3.1.8.3.2 Manual File Configuration



Parameter	Description
Current configuration files:	Press [Download] will download a zip file name user-config.zip containing • user-config.cfg • ca.crt.credential_mode • ca.crt.certificate_mode • client.crt.certificate_mode • client.key.certificate_mode • templateProfiles if available.
New configuration files:	The following files are acceppted for upload: • *.cfg (max size 100KB) • *.zip (max size 100KB) The zip file may include • user-config.cfg • ca.crt.credential_mode • ca.crt.certificate_mode • client.crt.certificate_mode • client.key.certificate_mode • templateProfiles

For further information see also chapters 3.1.8.3 and 3.2.3.

3.1.8.3.3 Factory reset

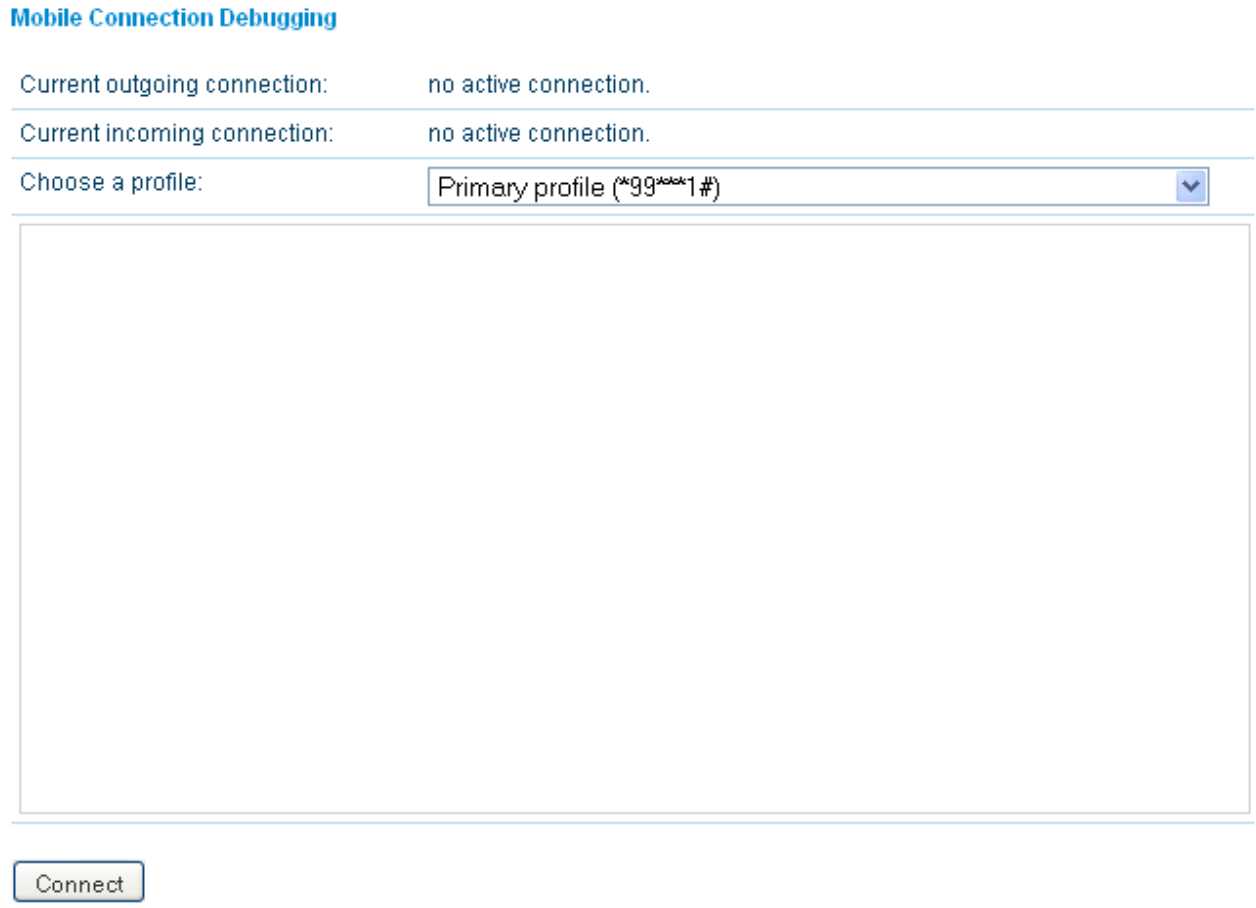


Press [Reset] to set the device to factory default. Your current configuration will be lost.
This action can also be initiated by pressing and holding the Reset button for at least five seconds.

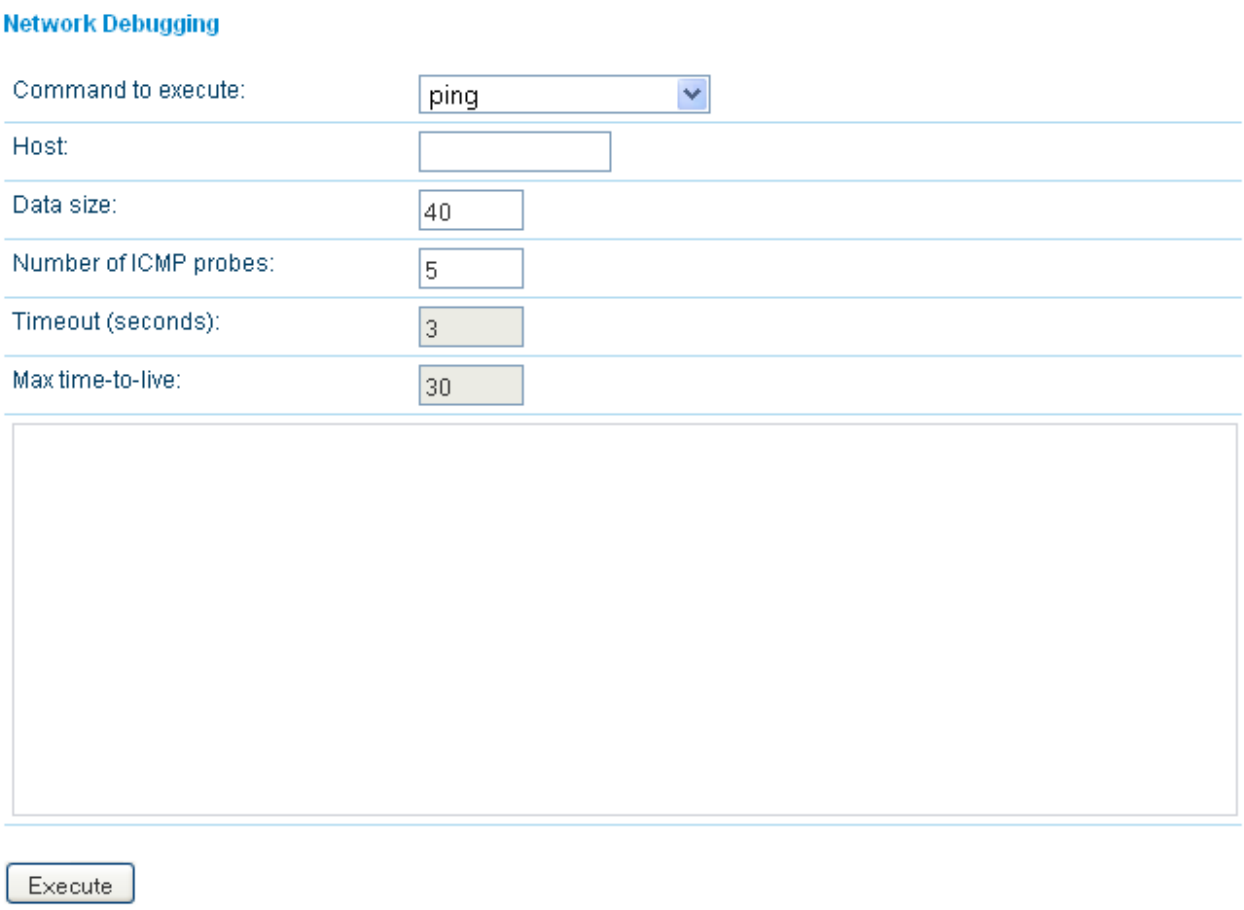
The factory reset will also set the IP address of the Ethernet interface to 192.168.1.1. You will be able to communicate again with the device using the default network parameters.

3.1.8.4 Troubleshooting

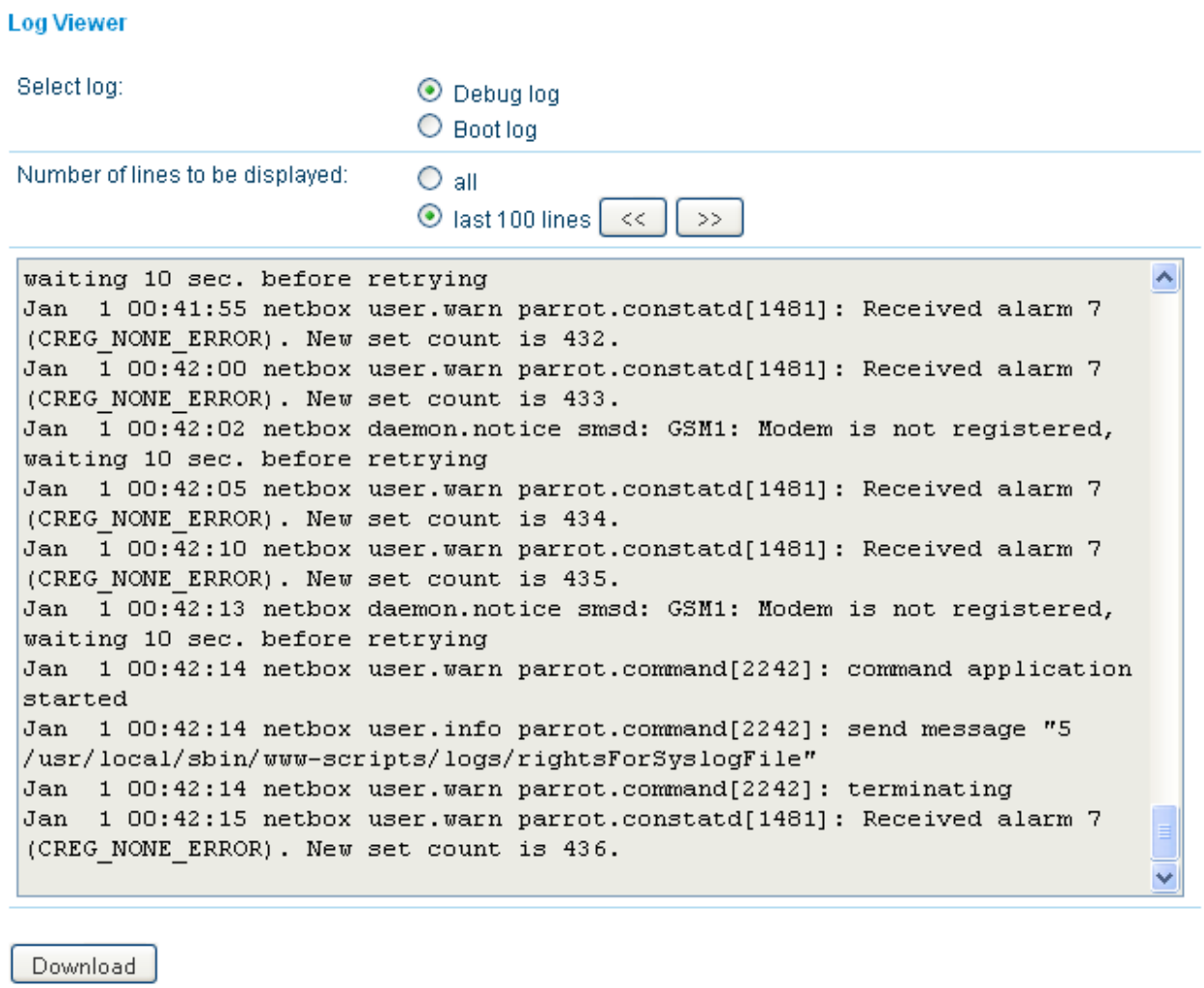
3.1.8.4.1 Mobile Connection Debugging



3.1.8.4.2 Network Debugging

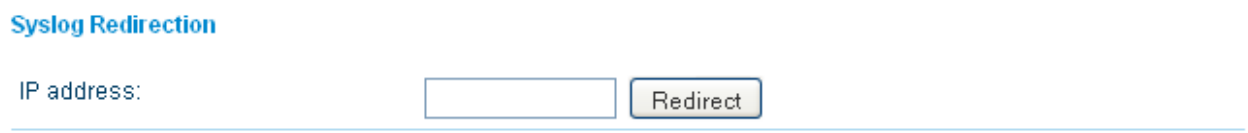


3.1.8.4.3 Log Files



Log files can be viewed a downloaded here. Please provide these files when placing a support request.

3.1.8.4.4 System Log Redirection

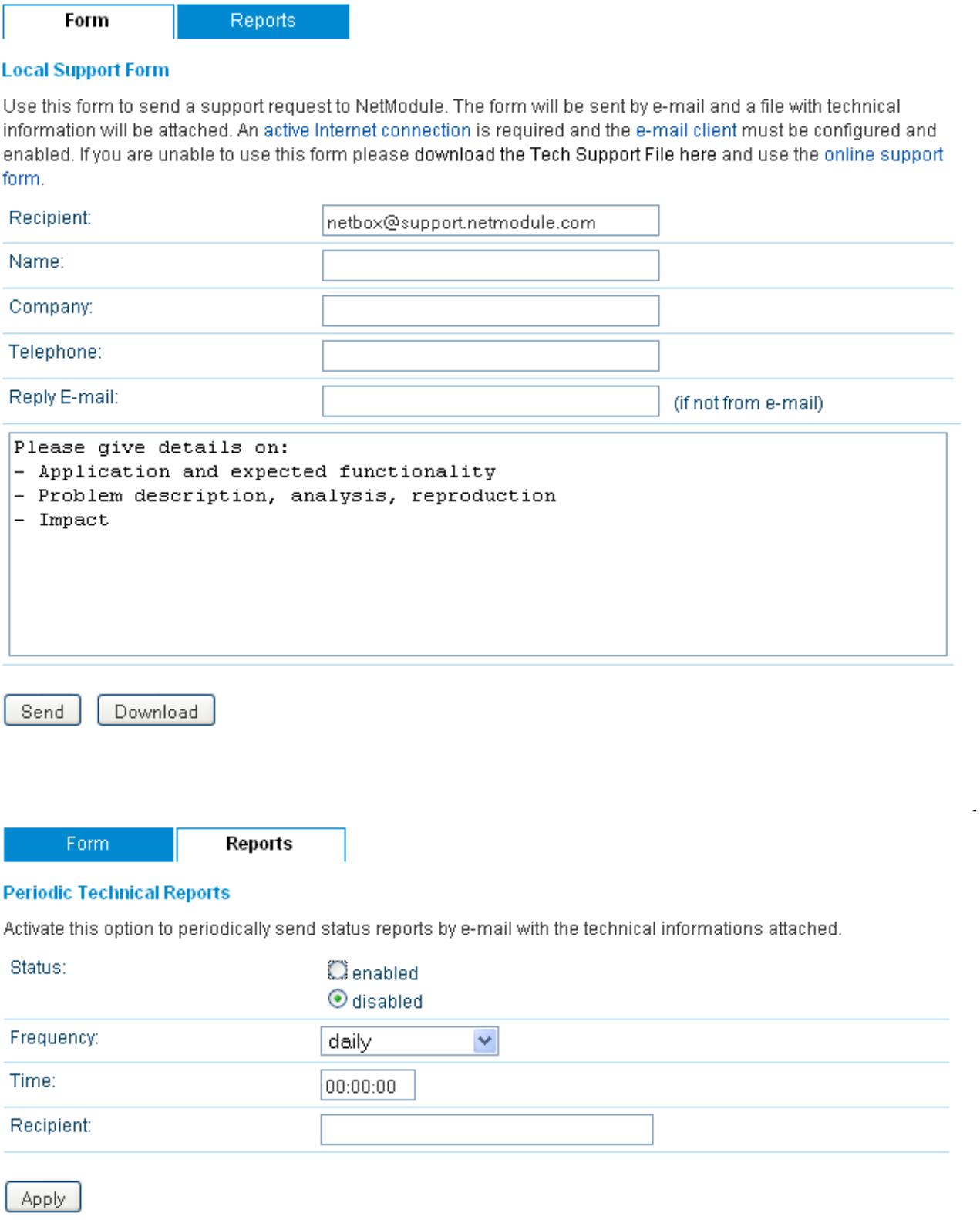


Parameter	Description
IP address:	The host where the syslog messages will be forwarded to. A tiny syslog server is included in TFTP32 which can be downloaded from our website.

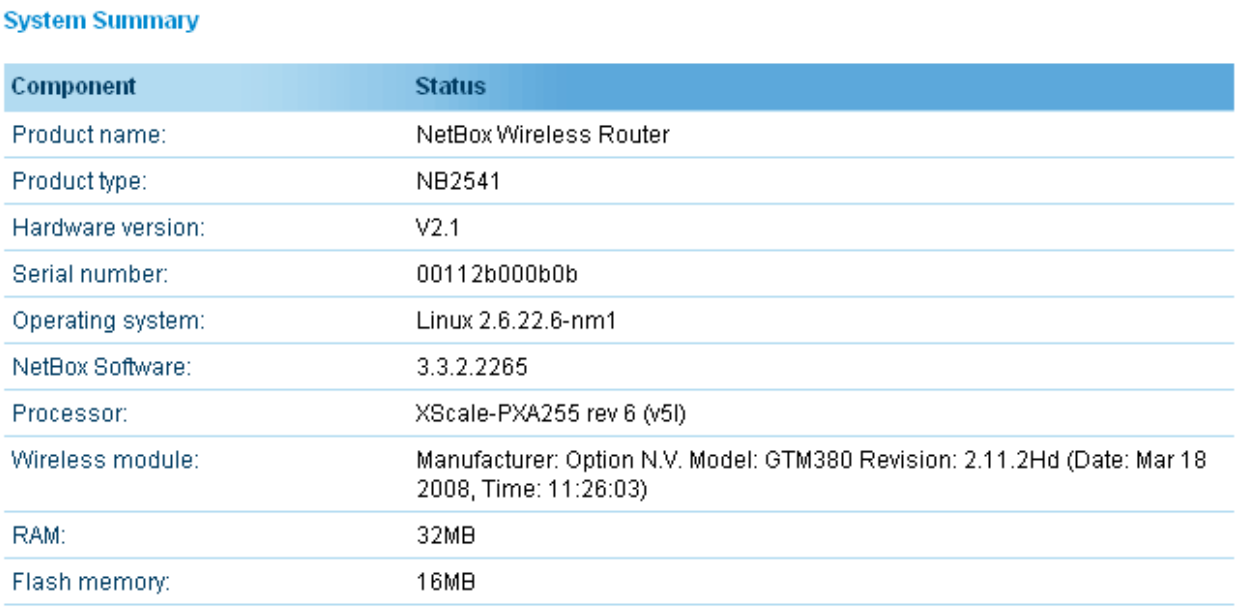
3.1.8.4.5 Restart

Restart

3.1.8.4.6 Tech Support



3.1.8.4.7 System Information:

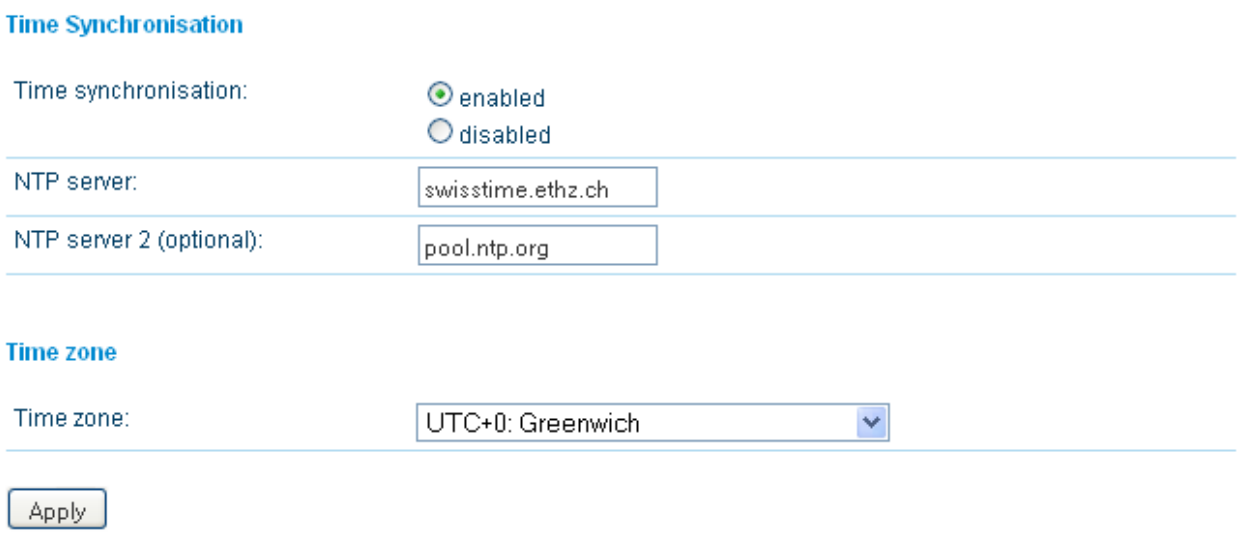


System Summary

Component	Status
Product name:	NetBox Wireless Router
Product type:	NB2541
Hardware version:	V2.1
Serial number:	00112b000b0b
Operating system:	Linux 2.6.22.6-nm1
NetBox Software:	3.3.2.2265
Processor:	XScale-PXA255 rev 6 (v5l)
Wireless module:	Manufacturer: Option N.V. Model: GTM380 Revision: 2.11.2Hd (Date: Mar 18 2008, Time: 11:26:03)
RAM:	32MB
Flash memory:	16MB

Provide this information when placing a support request.

3.1.8.4.8 Time and Region



The Network Time Protocol (NTP) is a protocol for synchronizing the clocks of computer systems over packet-switched, variable-latency data networks. NetBox can synchronize its system time with a NTP server.

If enabled, time synchronisation is done after the mobile interface is up but before starting any VPN connections. Later on time synchronisation is performed every 60 minutes.

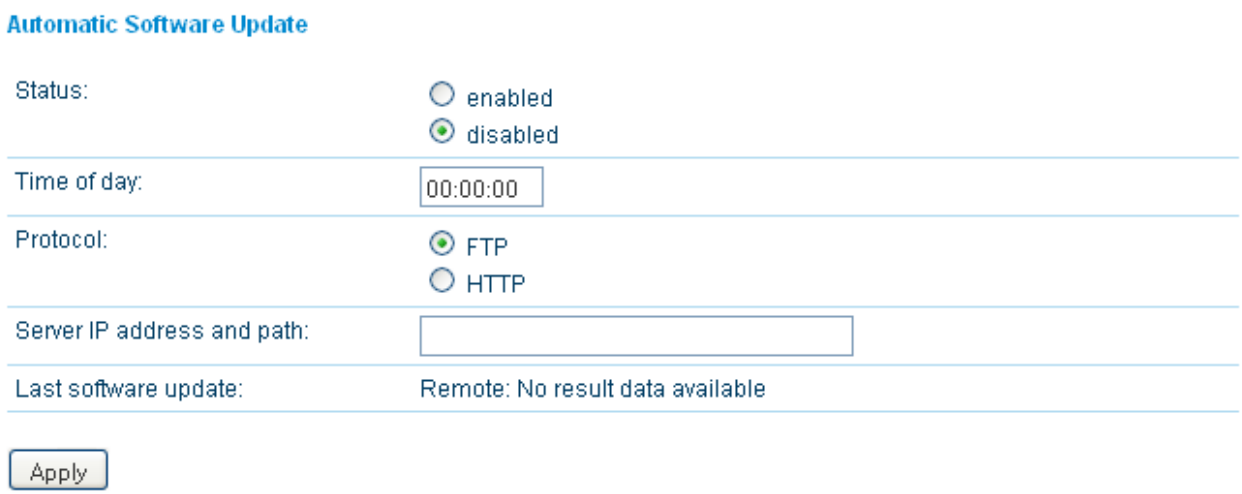
Parameter	Description
NTP state:	Enable/disable time synchronisation
NTP server:	Host name of NTP server
NTP server 2 (optional):	Host name of optional second NTP server
Time zone:	Time zone

3.1.8.5 Software Update

Software upgrade from the last official software release to the current release published on www.netmodule.com is supported. For further details please consult the release note.

Software downgrade is not supported. Software downgrade may lead to loss of configuration and inaccessability of the device.

3.1.8.5.1 Automatic Software Update



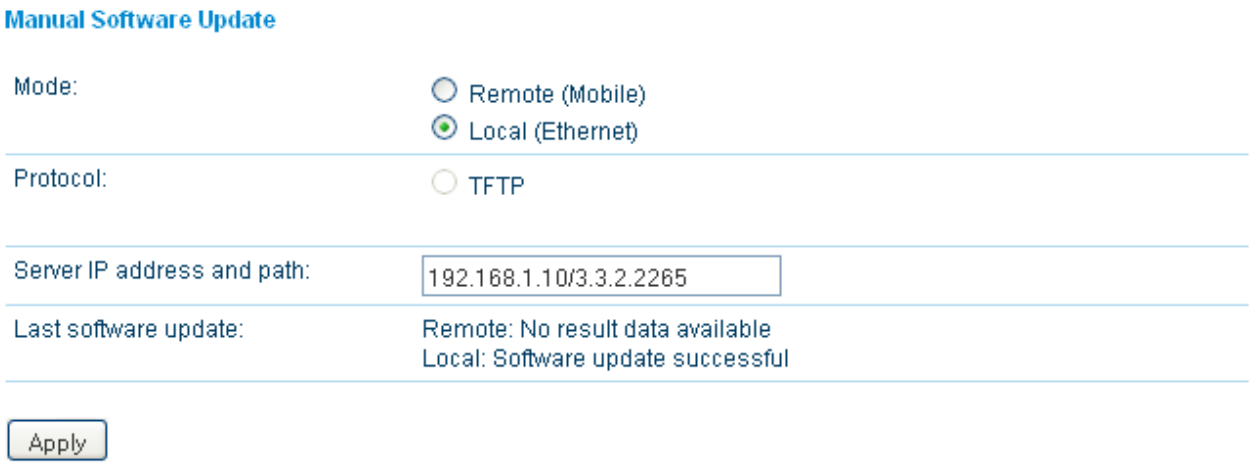
Parameter	Description
Status:	Enable/disable automatic software update
Time of day:	Every day at this time NetBox will do a check for updates
Mode;	Update over mobile or Ethernet Interface?
Protocol:	Specify the protocol used to transfer the new software to NetBox. You will need an appropriate server
Server IP address and path:	The directory where the new software can be downloaded
Last software update:	The result of the last try will be displayed here.

3.1.8.5.2 Manual Software Update

NB1310: The new software image (e.g. NBSW_3.3.2.4542.bin) can be uploaded using the Web Manager.

NB2xxx: The easiest way to update the NetBox Software (NBSW) is to connect NetBox to network with a TFTP server. If you only have a Notebook or a PC available the update process involves the preparation of a TFTP Server

Be aware of any firewall on your PC that may hinder you doing the update! We recommend disabling the firewall on your PC during the update.



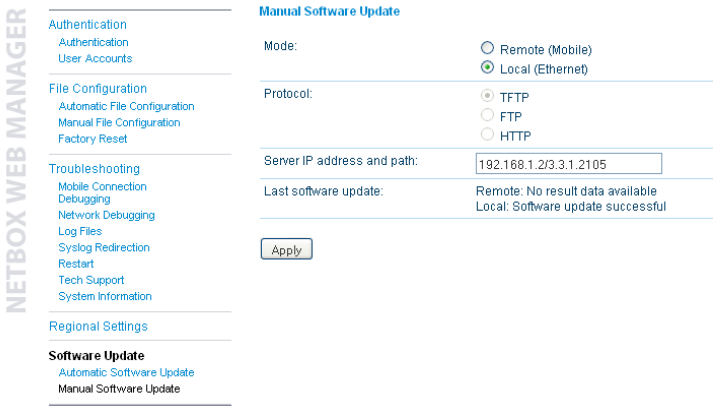
Parameter	Description
Mode:	Update over mobile or Ethernet Interface?
Protocol:	Specify the protocol used to transfer the new software to NetBox. You will need an appropriate server.
Server IP address and path:	Provide a host name and a path to a server which hosts the new software. For local updates (TFTP) this value is limited to 26 characters.
Last software update:	The result of the last try will be displayed here.

Step by Step:

Step	Description
1.	Connect your PC with NetBox using a network cable.
2.	If the IP address has been modified set it back to **192.168.1.1** and the subnet mask to **255.255.255.0** (see also chapter 3.1.3.1). Your PC must operate in the same subnet as NetBox.
3.	Set the IP address of your PC to **192.168.1.2** and the subnet mask to **255.255.255.0**
4.	Download the recommended TFTP server “TFTPD32” from our website, install it on your PC and start it. Configure the TFTP server as follows: - In the dialog „Tftpd32: Settings“ choose the base directory (e.g. „C:\TFTP“). Create a new directory if there is none.

- Unpack the new NBSW to this directory into a subfolder such as 3.3.1.2135

5. On the web page “SYSTEM->Manual Software Update” enter the IP address and path of the TFTP server (**192.168.1.2**) as follows:

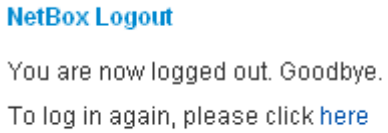


6. Press [Apply] and confirm by pressing [OK].

   Wait until the update is complete. See the progress bar
   Do not unplug the power connector during the update!

7. Check the results of the update. Refreshing the page or even reopening the browser windows may avoid cache problem. In case of success, „Software update successful“ will be displayed, otherwise an error message.

3.1.9 Logout

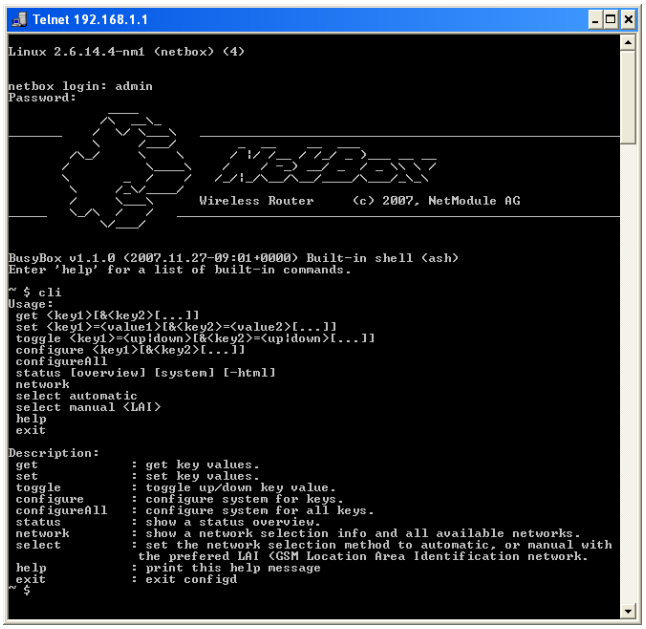


Log out from Web Manager

3.2 Configuration via Command Line Interface (CLI)

The command line interface is accessible after successful login to NetBox via telnet or Secure Shell (SSH). By default the telnet server answers on port 23, the SSH server on port 22.

Logon via SSH with PuTTY



Logon via Telnet via Windows Telnet Client

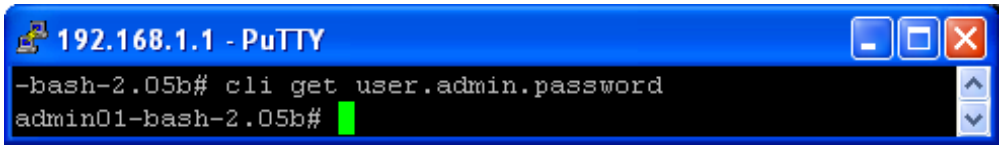
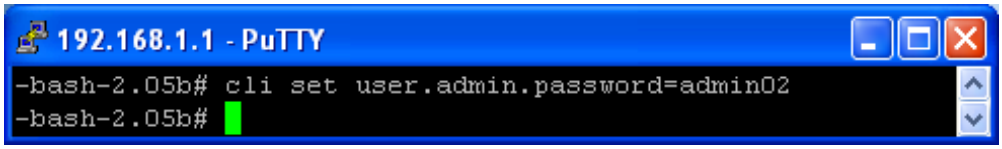
After authentication, type “cli help” into the Shell to learn about the usage of the command line interface. CLI will stop after every call. You have to include ‘cli’ for every new call.

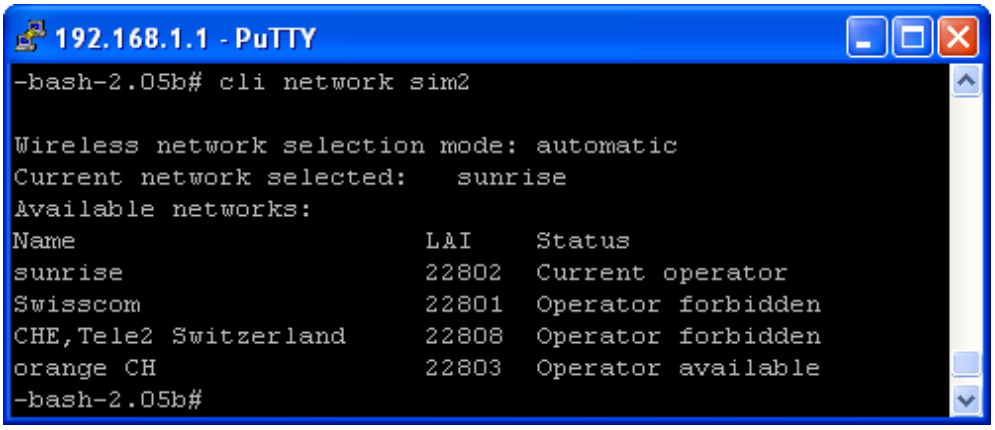
3.2.1 CLI Overview

The Command Line Interface mainly provides functions to read and write values of the NetBox configuration parameters. In addition, the CLI provides functions to query status information.

Command	Return	Description
cli get	string	Read values of one or more specified configuration parameters.
cli set	void	Write values of one or more specified configuration parameters.
cli network	string	Show available networks including Location Area Identities (LAIs)
cli select	void	Select the network provider defined by the supplied Local Area Identity (LAI) or set the network selection method to automatic
cli status	string	Show a status overview of NetBox
cli help	string	Print the cli help message (usage)
Ctrl+C	void	Abort a command. Exit from CLI

3.2.2 CLI Usage

Command	Usage and Return Value
cli get	‘cli get’ is used to read values from configuration parameters. Arguments include all configuration keys as described in chapter 3.2 Usage: cli get <key1>[&<key2>[...]] Example: cli get user.admin.password The return value is the value of the queried parameter.  Note: cli get <invalidKey> returns no error message
cli set	‘cli set’ is used to assign values to configuration parameters. Arguments include all configuration keys as described in chapter 3.2 Usage: set <key1>=<value1>[&<key2>=<value2>[...]] Example: cli set user.admin.password=admin02  ‘cli set’ produces no return value and no error message. To check if the modification took place, use ‘cli get’ Note: cli set <invalidKey>=<correctValue> returns no error message Note: cli set <validKey>=< inCorrectValue> returns no error message, no range check is performed

cli network	‘cli network’ provides mobile network information on the optionally specified SIM card. If no SIM card is specified, the command is applied to SIM1. The information returned includes the Local Area Identity (LAI) Usage: network [sim1/sim2] Example: cli network sim2  Note: The following commands are identical: ‘cli network’ and ‘cli network sim1’
cli select automatic	‘cli select automatic’ sets the network selection mode for the specified SIM card to automatic. Usage: select automatic [sim1/sim2] Note: The following commands are identical: ‘cli select automatic’ and ‘cli select automatic sim1’ Note: The following commands have the same effect: ‘cli select automatic sim1’ and ‘cli set networkselection.mode=automatic’ ‘cli select automatic sim2’ and ‘cli set networkselection.sim2.mode=automatic’
cli select manual	‘cli select manual’ selects the network provider defined by the supplied Local Area Identity (LAI) for the specified SIM card Usage: select manual <LAI> [sim1/sim2] Note: The following commands are identical: ‘cli select manual <lai>’ and ‘cli select manual sim1 <lai>’ Note: The following commands have the same effect: ‘cli select manual <lai> sim1’ and ‘cli set networkselection.network_lai=<lai>’ ‘cli select manual <lai> sim2’ and ‘cli set networkselection.sim2.network_lai=<lai>’

cli status	'cli status' returns both, 'cli status overview' and 'cli status system' concatenated. The option -hml is used to query a HTML version of the status information.
cli status overview	show the status of all interfaces, networks and services.
cli status overview interfaces	show the status of all interfaces
cli status overview interfaces sim_state	show the state of the SIM-Card
cli status overview interfaces pin_state	show the state of the PIN
cli status overview interfaces signal_strength	show the actual signal strength
cli status overview interfaces con_state	show the state of the wireless connection
cli status overview interfaces con_type	show the type of the wireless connection
cli status overview interfaces net_sel_mode	show the mode of the network selection
cli status overview interfaces net_sel_prov	show the current network provider
cli status overview interfaces data_rxtx	show the amount of received and transmitted data
cli status overview interfaces stream_updown	show the actual down- and upstream rates
cli status overview interfaces last_reset	show the last reset date of data counter
cli status overview networks	show the status of all networks
cli status overview networks napt_state_mob	show the state of the NAPT service on the mobile if
cli status overview networks napt_state_ovpn	show the state of the NAPT service on the vpn if
cli status overview networks openvpn_state	show the state of the OpenVPN connection
cli status overview networks ipsec_state	show the state of the IPsec connection
cli status overview networks pptp_state	show the state of the PPTP server
cli status overview services	show the status of all services
cli status overview services dyndns_state	show the state of the Dynamic DNS client
cli status overview services dialin_state	show the state of the Dial-in service
cli status overview services dhcp_state	show the state of the DHCP server
cli status overview services dns_state	show the state of the DNS Proxy server
cli status overview services gps_state	show the state of the GPS signal
cli status overview services keepalive_state	show the state of the Keep-alive service
cli status overview services sms_rec_state	show the state of the SMS receiving service
cli status overview services sms_send_state	show the state of the SMS sending service
cli status overview services email_state	show the state of the E-Mail service
cli status system	show NetBox systems information including hardware and software versions.
cli status system prod_name	show the NetBox product name
cli status system prod_type	show the NetBox product type
cli status system hw_ver	show the NetBox hardware version
cli status system serial	show the NetBox serial number
cli status system os	show the NetBox operating system
cli status system nbsw	show the NetBox software version
cli status system cpu	show the NetBox CPU
cli status system wireless_module	show the NetBox wireless module
cli status system ram	show the amount of RAM installed in the NetBox
cli status system flash	show the amount of flash installed in the NetBox
help	Print the cli help message (usage)

3.2.3 Configuration Parameters of the NetBox

The information in this chapter is needed to configure NetBox via the Command Line Interface or File Configuration. If you are using the Web Manager and its forms to configure NetBox, you may skip this chapter.

A configuration parameter consists of two main parts, its name (latter called key) and its value. The user configuration file contains all parameters. Download this file (user-config.cfg) using the Web Manager to get all parameters listed.

NetModule has defined some types of parameters that are often used. The table below shows the defined parameter types. In addition other types of parameters may exist.

Parameter Type	Allowed characters	Format	Description
email	a-z A-Z 0-9 _-. @ (mandatory)	user@hostname	String must include “@” Second part must be a valid hostname
hostname	a-z A-Z 0-9 _-.		Fully-Qualified Host Name (FQHN) or host name
ipaddress	Numbers and dots	xxx.xxx.xxx.xxx	Decimal dotted notation
netmask	Numbers and dots	xxx.xxx.xxx.xxx	Decimal dotted notation
username	a-z A-Z 0-9 _-. @		
password	All but &, \", \'		
phone number	+ 0-9 * #		
time	0-9, and :	hh:mm:ss	Time, e.g. for automatic software or configuration update

3.2.4 Interfaces related Parameters

3.2.4.1 Ethernet

Parameter	Default Value	Range	Description
network.PrivateInterface.IpAddress	192.168.1.1	ipaddress	IP address Ethernet
network.PrivateInterface.NetMask	255.255.255.0	netmask	Netmask Ethernet

3.2.4.2 Mobile Interface and SIM Cards

Parameter	Default Value	Range	Description
simcard.check.pincode	void	4 digit numeric value	PIN code, e.g. 1234
simcard.pinStatus	0	[0,1]	0 = PIN protection disabled 1 = PIN protection enabled
simcard.sim2.check.pincode	void	4 digit numeric value	PIN code, e.g. 1234
simcard.sim2.pinStatus	0	[0,1]	0 = PIN protection disabled 1 = PIN protection enabled
networkselection.mode	automatic	[automatic,manual]	
networkselection.network_lai	void	numeric value (LAI)	Select the network provider defined by the supplied Local Area Identity (LAI)
networkselection.sim2.mode	automatic	[automatic,manual]	
networkselection.sim2.network_lai	void	numeric value (LAI)	Select the network provider defined by the supplied Local Area Identity (LAI)
dialout.connectionMethod	0	[0..2]	0 = manual only 1 = dial on demand 2 = permanent
dialout.connSetup.redialAttempt	2	[1..4294967296]	Redial attempts
dialout.connSetup.idleTimeout	1	[1..35791394]	Idle timeout in minutes (in case of dial on demand)
dialout.profiles.0.name	void	username	Profile name
dialout.profiles.0.username	void	username	Username
dialout.profiles.0.password	void	password	Password
dialout.profiles.0.phoneNumber	void	phone number	Phone number
dialout.profiles.0.authMethod	void	[chap, pap]	Chap = CHAP Pap = PAP
dialout.profiles.0.apn	void	hostname	Acess Point Name
dialout.profiles.0.IPHC	void	[0,1]	0 = off 1 = enable IP header compression
dialout.profiles.0.IPSC	void	[0,1]	0 = off 1 = enable software compression
dialout.profiles.0.queryDNS=1	void	[0,1]	0 = do not query DNS server 1 = query DNS server
dialout.profiles.0.ESCIP	void	[0,1]	0 = off 1 = enable specific client IP address
dialout.profiles.0.SCAddress	void	ipaddress	Specific client address
dialout.profiles.0.SIM	SIM1	[SIM1,SIM2]	SIM used for primary profile

dialout.profiles.0.ISDN	void	[0,1]	0 = normal call 1 = is ISDN call
dialout.profiles.0.switchCondition	never	[never, redialAt-temptsReached]	Condition for profile switch
dialout.profiles.1.name	void	username	Profile name
dialout.profiles.1.username	void	username	Username
dialout.profiles.1.password	void	password	Password
dialout.profiles.1.phoneNumber	void	phone number	Phone number
dialout.profiles.1.authMethod	void	[chap, pap]	Chap = CHAP Pap = PAP
dialout.profiles.1.apn	void	hostname	Acess Point Name
dialout.profiles.1.IPHC	void	[0,1]	0 = off 1 = enable IP header compres-sion
dialout.profiles.1.IPSC	void	[0,1]	0 = off 1 = enable software compression
dialout.profiles.1.queryDNS=1	void	[0,1]	0 = do not query DNS server 1 = query DNS server
dialout.profiles.1.ESCIP	void	[0,1]	0 = off 1 = enable specific client IP ad-dress
dialout.profiles.1.SCAddress	void	ipaddress	Specific client address
dialout.profiles.1.SIM	SIM2	[SIM1,SIM2]	SIM used for fallback profile
dialout.profiles.1.ISDN	void	[0,1]	0 = normal call 1 = is ISDN call
dialout.profiles.1.switchCondition	never	[never, elpas8h, elaps16h, elaps24h, redialAt-temptsReached]	Condition for profile switch
network.MSS.status	0	[0,1]	0 = disabled 1= enabled
network.MSS.adjustment	1400	[100,1500]	Maximum Segment Size

3.2.4.3 Digital I/O

Parameter	Default Value	Range	Description
digitalIO.receiving.tcpPort	2158	[1 .. 65535]	TCP Port for monitoring
digitalIO.controlOutPut.output1	off	[on,off]	State of output 1
digitalIO.controlOutPut.output2	off	[on,off]	State of output 2
digitalIO.keepOnReboot	1	[0,1]	0 = set values after reboot to digitalIO.afterReboot.output1 digitalIO.afterReboot.output2 1 = restore values after re-boot
digitalIO.afterReboot.output1	off	[on,off]	State of output 1 after reboot
digitalIO.afterReboot.output2	off	[on,off]	State of output 2 after reboot

3.2.5 Routing related Parameters

Parameter		Default Value	Range	Description
static_routes.<l>.interface	with l = [0..20]	void	hostname	
static_routes.<l>.target		void	hostname	
static_routes.<l>.mask		void	netmask	
static_routes.<l>.gateway		void	hostname	
static_routes.<l>.metric		void	[0..32766]	Default is 0.

3.2.6 Firewall related Parameters

3.2.6.1 NAPT on mobile Interface

Parameter		Default Value	Range	Description
napt_mobile.status	with j = [0..49]	1	[0,1]	0 = NAPT off 1 = NAPT on
napt_mobile..<j>.extPort.start		void	[1 .. 65535]	External port range start
napt_mobile..<j>.extPort.end		void	[1 .. 65535]	External por range end
napt_mobile..<j>.intHost		void	ipaddress	
napt_mobile.<j>.intPort		void	[1 .. 65535]	Internal port
napt_mobile.<j>.protocol		TCP	[TCP, UDP]	TCP or UDP
napt_mobile.<j>.status		1	[0,1]	0 = disabled 1= enabled
napt_mobile.<j>.isRedirect		0	[0,1]	0 = redirect to other host 1 = redirect to localhost

3.2.6.2 NAPT on OpenVPN Interface

Parameter		Default Value	Range	Description
napt_openvpn.status	with j = [0..49]	1	[0,1]	0 = NAPT off 1 = NAPT on
napt_openvpn.<j>.extPort		void	[1 .. 65535]	External port range start
napt_openvpn.<j>.intPort		void	[1 .. 65535]	External por range end
napt_openvpn.<j>.intHost		void	ipaddress	
napt_openvpn.<j>.intPort		void	[1 .. 65535]	Internal port
napt_openvpn.<j>.protocol		TCP	[TCP, UDP]	TCP or UDP
napt_openvpn.<j>.status		1	[0,1]	0 = disabled 1= enabled
napt_openvpn.<j>.isRedirect		0	[0,1]	0 = redirect to other host 1 = redirect to localhost

3.2.6.3 Access Control List Local Host

Parameter		Default Value	Range	Description
firewall_local_host.policy		2	[0,1,2]	0 = deny all 1 = permit entries 0 = permit all
firewall_local_host.<j>. target	with j = [0..19]	void	hostname	Source host / net
firewall_local_host.<j>.mask		void	netmask	

3.2.6.4 Access Control List for Exposed Host on Mobile Interface

Parameter		Default Value	Range	Description
firewall_exposed_host_mobile.policy		1	[0,1,2]	0 = deny all 1 = permit entries 0 = permit all
firewall_exposed_host_mobile.host		void	hostname	The exposed host
firewall_exposed_host_mobile.<j>.target	with j = [0..19]	void	hostname	Source host / net
firewall_exposed_host_mobile.<j>.mask		void	netmask	

3.2.6.5 Access Control List for Exposed Host on OpenVPN Interface

Parameter		Default Value	Range	Description
firewall_exposed_host_openvpn.policy		1	[0,1,2]	0 = deny all 1 = permit entries 0 = permit all
firewall_exposed_host_openvpn.host		void	hostname	The exposed host
firewall_exposed_host_openvpn.<j>. target	with j = [0..19]	void	hostname	Source host / net
firewall_exposed_host_openvpn.<j>.mask		void	netmask	

3.2.7 VPN related Parameters

3.2.7.1 OpenVPN

Parameter	Default Value	Range	Description
vpn.status	0	[0,1]	0 = disabled 1= enabled
vpn.mode	0	[0,1]	0 = Standard mode 1= Expert mode
vpn.auth	0	[0,1]	0 = crertificate-based authentication 1= credential-based authentication
vpn.configuration.serverAddress	void	hostname	OpenVPN server FQHN
vpn.configuration.serverPort	void	[1 .. 65535]	OpenVPN server port
vpn.configuration.serverAddress2	void	hostname	2nd OpenVPN server FQHN
vpn.configuration.serverPort2	1194	[1 .. 65535]	2nd OpenVPN server port
vpn.configuration.devType	tun	[tun, tap]	tun = tun device tap = tap device
vpn.configuration.compressionStatus	1	[0,1]	0 = disabled 1= enabled
vpn.configuration.username	void	username	For credential-based authentication
vpn.configuration.password	void	password	For credential-based authentication

3.2.7.2 IPsec Parameters

Parameter	Default Value	Range	Description
ipsec.status	0	[0,1]	0 = disabled 1= enabled
ipsec.remote.serverIp	void	ipaddress	
ipsec.remote.lanAddress	void	Ipaddress	
ipsec.remote.lanMask	255.255.0.0	netmask	
ipsec.ike.psk	void	password	
ipsec.ike.mode	identity-protection	[identity-protection, aggressive]	
ipsec.ike.encryption	3des	3des	
ipsec.ike.hash	md5	[sha1, md5]	
ipsec.ike.dh	modp1024	[modp1024, modp1536]	
ipsec.ike.localId	void	username	
ipsec.ike.remoteId	void	username	
ipsec.esp.encryption	3des	3des	
ipsec.esp.hash	md5	[sha1, md5]	
ipsec.pfs	0	[0,1]	0 = disabled 1= enabled
ipsec.dpd.state	1	[0,1]	0 = disabled 1= enabled
ipsec.dpd.cycle	30	[5.. 120]	In seconds
ipsec.dpd.failureCount	3	[1.. 10]	

3.2.7.3 PPTP Server

Parameter	Default Value	Range	Description
network.PPTP.status	1	[0,1]	0 = disabled 1= enabled
network.PPTP.AddressRangeStart	192.168.1.200	ipaddress	Address range start
network.PPTP.AddressRangeSize	5	[2,254]	Address range size

3.2.7.4 Dial-in Server

Parameter	Default Value	Range	Description
dialin.status	0	[0,1]	0 = Dial-in disabled 1= Dial-in enabled
dialin.configuration.addressRangeStart	192.168.254.1	ipaddress	Address range start
dialin.configuration.addressRangeSize	254	[2..254]	Address range size
dialin.disableNapt	0	[0,1]	0 = off 1= Disable NAPT on Dial-on

3.2.8 Services related Parameters

3.2.8.1 COM Server

Parameter	Default Value	Range	Description
serial_srv.status	void	[0,1]	0 = disabled 1= enabled
serial_srv.opt.protocol	telnet	[raw, telnet, modbus]	
serial_srv.opt.port	2000	[1 .. 65535]	
serial_srv.opt.baud_rate	115200	[300, 1200, 2400, 4800, 9600, 19200, 38400, 115200]	
serial_srv.opt.parity=	void	NONE, ODD, EVEN]	
serial_srv.opt.stopbits=	void	1DATABITS, 2DATABITS]	
serial_srv.opt.databits	8DATABITS	[8DATABITS, 7DATABITS]	
serial_srv.opt.xonxoff	void	[0,1]	0 = disabled 1= enabled
serial_srv.opt.rtscts	void	[0,1]	0 = disabled 1= enabled
serial_srv.opt.phys_proto	RS232	[RS232, RS485]	

3.2.8.2 DNS Proxy Server

Parameter	Default Value	Range	Description
network.DNS.status	1	[0,1]	0 = DNS Proxy off 1 = DNS Proxy on

3.2.8.3 DHCP Server

Parameter	Default Value	Range	Description
network.DHCP.status	1	[0,1]	0 = DHCP server off 1 = DHCP server on
network.DHCPSettings.AddressRangeStart	192.168.1.100	ipaddress	DHCP range start
network.DHCPSettings.AddressRangeSize	100	[1..255]	DHCP range size
network.DHCPSettings.DNSServer	Proxy	hostname	DNS Server 1
network.DHCPSettings.DNSServer0	void	hostname	DNS Server 2
network.DHCPSettings.DNSServer1	void	hostname	DNS Server 3

3.2.8.4 Dynamic DNS

Parameter	Default Value	Range	Description
dyndns.serviceType	dyndns	[dyndns, dyndns-static, dyndns-custom]	dyndns = Dynamic DNS dyndns-static = Static DNS dyndns-custom = Custom DNS
dyndns.hostname	void	hostname	
dyndns.username	void	username	
dyndns.password	void	password	
dyndns.supportEmail	void	e-mail	
dyndns.serverAddress	void	hostname	
dyndns.port	void	[1 .. 65535]	Dynamic DNS Listening Port
dyndns.status	0	[0,1]	0 = disabled 1= enabled

3.2.8.5 SMS Parameters

Parameter	Default Value	Range	Description
sms.receiving.status	1	[0,1]	0 = disabled 1= enabled
sms.sending.status	0	[0,1]	0 = disabled 1= enabled
sms.sending.gateway	void	phone number	SMSC number
sms.sending.sim2.gateway	void	phone number	SMSC number

3.2.8.6 E-Mail Parameters

Parameter	Default Value	Range	Description
email.sending.status	0	[0,1]	0 = disabled 1= enabled
email.sending.smtp.host	void	hostname	
email.sending.smtp.port	void	[1 .. 65535]	
email.sending.smtp.from	void	email	From E-mail Address
email.sending.smtp.authentication	void	[0,1]	0 = disabled 1= enabled
email.sending.smtp.username	void	username	
email.sending.smtp.password	void	password	

3.2.8.7 GPS Parameters

Parameter	Default Value	Range	Description
gps.status	0	[0,1]	0 = Dial-in disabled 1= Dial-in enabled
gps.destination.hostname	void	hostname	
gps.destination.port	void	[1 .. 65535]	
gps.updateCycle	3	[3..∞]	

3.2.8.8 Event Manager

3.2.8.8.1 Events

Parameter	Default Value	Range	Description
events.pppUp.message	void	password	Event Message
events.pppDown.message	void	password	Event Message
events.pppFailure.message	void	password	Event Message
events.vpnUp.message	void	password	Event Message
events.vpnDown.message	void	password	Event Message
events.vpnFailure.message	void	password	Event Message
events.dialInUp.message	void	password	Event Message
events.dialInDown.message	void	password	Event Message
events.dialInFailure.message	void	password	Event Message
events.dyndnsReg.message=	void	password	Event Message
events.dyndnsFailure.message=	void	password	Event Message
events.logInGUI.message=	void	password	Event Message
events.logFailedGUI.message=	void	password	Event Message
events.restartCrash.message=	void	password	Event Message
events.restartWebManagement.message	void	password	Event Message
events.powerUp.message	void	password	Event Message
events.startUpComplete.message	void	password	Event Message
events.digitalInput1_On.message	void	password	Event Message
events.digitalInput2_On.message	void	password	Event Message
events.digitalInput1_Off.message	void	password	Event Message
events.digitalInput2_Off.message	void	password	Event Message
events.digitalOutput1_On.message	void	password	Event Message
events.digitalOutput2_On.message	void	password	Event Message
events.digitalOutput1_Off.message	void	password	Event Message
events.digitalOutput2_Off.message	void	password	Event Message
events.udpMessage.message	void	password	Event Message
events.gpsUp.message	void	password	Event Message
events.gpsDown.message	void	password	Event Message
events.testEvent.message	void	password	Event Message

3.2.8.8.2 Subscribers

Parameter		Default Value	Range	Description
subscriber.<k>.name	with k = [0..19]	void	hostname	Name of subscriber
subscriber.<k>.sms.destination		void	phone number	Phone number for SMS
subscriber.<k>.email.destination		void	email	E-mail address
subscr_grp.<l>.name	with l = [0..9]	void	hostname	Name of group
subscr_grp.<l>.members.users		void	0:1:2:…19	Indices of users in this group
subscr_grp.<l>.members.groups		void	0:1:2:…9	Indices of groups in this group

3.2.8.8.3 Event Processor

Parameter	Default Value	Range	Description

evtProc.sequence		void	0:1:2:…9	
evtProc.<I>. eventName	with I = [0..9]	void	hostname	
evtProc.<I>.action		void	[send, switchOn, switchOff]	Send = send message Switch = switch digital I/O
evtProc.<I>.target		void	u:0…9 g:0…9 o:0…2	Index of subscriber or group or input or output

3.2.8.9 SNMP Agent

Parameter	Default Value	Range	Description
snmp.status	0	[0,1]	0 = Dial-in disabled 1= Dial-in enabled
snmp.port	161	[1 .. 65535]	
snmp.community	public		
snmp.contact	void		
snmp.location	void		
snmp.traphost	void	hostname	
snmp.trapport	162	[1 .. 65535]	
snmp.siglow	-113	[-113 to -51]	Signal strength trap thresh-old dBm
snmp.sighigh	-51	[-113 to -51]	Signal strength trap reactiva-tion threshold dBm:

3.2.8.10 SSH Server

Parameter	Default Value	Range	Description
sshServer.port	22	[1 .. 65535]	

3.2.8.11 Telnet Server

Parameter	Default Value	Range	Description
telnetServer.port	23	[1 .. 65535]	

3.2.8.12 Web Server

Parameter	Default Value	Range	Description
webServer.http.port	80	[1 .. 65535]	
webServer.https.port	443	[1 .. 65535]	

3.2.8.13 UDP Message Receiver

Parameter	Default Value	Range	Description
udpMessage.receiving.udpPort	2157	[1 .. 65535]	

3.2.8.14 Keep-Alive

Not supported anymore in the Web Manager since NBSW 3.3.1.2105

Parameter	Default Value	Range	Description
keepalive.serverIpAddress	ser-vices.netmodule.com	hostname	

keepalive.port	50001	[1 .. 65535]	Server port
keepalive.updateInterval	60	[0..2147483647]	Update interval in seconds
keepalive.identifier	void	hostname	Identifier string
keepalive.status	0	[0,1]	0 = disabled 1= enabled

3.2.9 System related Parameters

3.2.9.1 User Accounts

Parameter		Default Value	Range	Description
user.admin.password		void	password	"not set" = reset admin password
administrator.deviceAccess		1	[0,1]	0 = disabled 1= enabled
user.<k>.name	with k = [0..20]	void	hostname	
user.<k>.password		void	password	

3.2.9.2 Troubleshooting

Parameter	Default Value	Range	Description
logs.redirectSyslogIp	void	ipaddress	
webMgrDbg.status	1	[0,1]	0 = disabled 1= enabled

3.2.9.3 Time Synchronisation

Parameter	Default Value	Range	Description
network.NTP.status	1	[0,1]	0 = disabled 1= enabled
network.NTP.server	swisstime.ethz.ch	hostname	NTP server
network.NTP.server2	void	hostname	Backup NTP server
network.timezone	UTC+2	[UTC-12…. UTC+12]	Time zone

3.2.9.4 Software Update

Parameter	Default Value	Range	Description
swu_man.url		ipaddress	
swu_auto.status	1	[0,1]	0 = disabled 1= enabled
swu_auto.time		time	hh:mm:ss
swu_auto.url		hostname	

3.2.9.5 Configuration Update

Parameter	Default Value	Range	Description
cfg_auto.status	1	[0,1]	0 = disabled 1= enabled
cfg_auto.time	void	time	hh:mm:ss
cfg_auto.url	void	hostname	

4 Software Interfaces

4.1 GPS Server

4.1.1 Berlios GPS Server

This is a TCP server which provides GPS data in various format. Find more information under http://gpsd.berlios.de

4.1.2 NetModule GPS Server

If valid GPS data is available it will be sent as UDP Payload to the configured host. The content is separated into two lines. The first line contains data in the GPGGA format; the second line contains GPRMC data.

4.1.2.1 $GPGGA - Global Positioning System Fix Data

Format: $GPGGA,<time>,<latitude>,<longitude>,<quality>,<satellites>,0,<sealevel>,,*<CS><CR><LF>

Sample Data: $GPGGA,154250,4749.8678,N,00871.8469,E,1,06,0.0,498,M,0.0,M,,*6A <CR><LF>

No.	Name	Data	Description
1	Sentence Identifier	$GPGGA	Global Positioning System Fix Data
2	Time	<time>	UTC of position fix
3	Latitude	<latitude,N/S>	Latitude of fix
4	Longitude	<longitude,E/W>	Longitude of fix
5	Fix Quality	<quality>	0 = Invalid 1 = GPS fix 6 = estimated
6	Number of Satellites	<satellites>	Number of satellites in view
7	Horizontal Dilution of Precision (HDOP)	0.0	Not available (Value = 0)
8	Altitude	<sealevel,M>	Meters above mean sea level
9	Height of geoid above WGS84 ellip-soid	0.0,M	Not available (Value = 0)
10	Time since last DGPS update	blank	No last update
11	DGPS reference station id	blank	No station id
12	Checksum	*<CS>	Used by program to check for transmis-sion errors
13	White spaces	<CR><LF>	Carriage return and line feed

4.1.2.2 $GPRMC - Recommended minimum specific GPS/Transit data

Format:

$GPRMC,<time>,<state>,<latitude>,<longitude>,<speed>,<course>,<date>,0.0,E,<mode>*<CS><CR><LF>

Sample Data: $GPRMC,154250,A,4749.8678,N,00871.8469,E,0.0,0.0,230707,0.0,E,A*1F<CR><LF>

No.	Name	Data	Description
1	Sentence Identifier	$GPRMC	Recommended minimum specific GPS/Transit data
2	Time	<time>	UTC of position fix
3	Data status	<state>	A = Data OK V = navigation receiver warning
4	Latitude	<latitude,N/S>	Latitude of fix
6	Longitude	<longitude,E/W>	Longitude of fix
8	Speed	<speed>	Speed over ground in knots
9	Course	<course>	Track made good in degrees True
10	Date	<date>	UT date
11	Magnetic variation	0.0,E	Not available (Value = 0.0,E)
12	Mode	<mode>	A = autonomic = valid E = estimated N = not valid
13	Checksum	*<CS>	Used by program to check for transmission errors
14	White spaces	<CR><LF>	Carriage return and line feed

4.1.2.3 $PNMID – NetModule Proprietary Sentence

Format: $PNMID,serialnumber*<CS><CR><LF>

Sample Data: $PNMID,0112BFFF2B0*1F<CR><LF>

No.	Name	Data	Description
1	Sentence Identifier	$PNMID	NetModule Proprietary Sentence
2	Serial number	<serialnumber>	NetBox serial number / MAC Address
13	Checksum	*<CS>	Used by program to check for transmission errors
14	White spaces	<CR><LF>	Carriage return and line feed

4.2 Digital I/O Server (NB2210)

To manage digital inputs and outputs via TCP software is required that handles the TCP connection. For test purposes e.g. telnet can be used. The payload contains the states of the four inputs/outputs:

The value 0 represents the state “off”, the value 1 the state “on”.

7							0
0	0	0	0	IN1	IN2	OUT1	OUT2

4.2.1 Monitor the digital inputs and outputs

Every change of digital inputs triggers a message of the above format to be sent. It also contains the valid states of the outputs.

4.2.2 Set digital outputs

To set the states of the digital I/O send the following pattern as ASCII characters

Pattern	Description
00000000	Turn all digital outputs off
00000001	Turn output 2 on, turn output 1 off
00000010	Turn output 1 on, turn output 2 off
00000011	Turn output 1 on, turn output 2 on

4.2.3 Get status of digital inputs and output

To get the states of the digital I/O send the following pattern as ASCII characters

Pattern	Description
00010000	Request a message with all states

4.3 HTTP Service Interface

The HTTP Service Interface is designed to administrate the NetBox with a self-written http client. It is available from NBSW 3.3.2.xxxx.

The HTTP Service Interface consists of four web pages located in the root directory of the NetBox web server:

- login.php (http clients can log in)
- logout.php (http clients can log out)
- upload.php (http clients can upload configuration files)
- download.php (http clients can download log files)
- cli.php (http clients can acces the same functionaltity as provided by the Command Line Interface)

For further documentation regarding the HTTP Service Interface please contact NetModule.

4.3.1 Command Set

General Restrictions:

- When sending parameters within HTTP GET requests, dots (.) within variables must be replaced by colons (:). Example: The key name **user.admin.password** results in **user:admin:password**
- Authentication is required for all commands exept GET /cli.php?status,[parameters]

HTTP Request	Description
GET /cli.php?status,[parameters]	Takes the same parameters as the CLI
GET /cli.php?get,[parameters]	Takes the same parameters as the CLI
GET /cli.php?set,[parameters]	Takes the same parameters as the CLI
GET /cli.php?sw-update,path=<value>	Starts a local software update from a TFTP server
GET /cli.php?reboot	Restarts the NetBox
GET /login.php?usr=<user>,pwd=<password>	Login to the HTTP Service Interface with supplied credentials
GET /logout.php	Logout from the HTTP Service Interface
GET /download.php?file=<fileName>	Download a file • Debug log: file=debuglog • Boot log: file=bootlog
POST /upload.php	Takes a new configuration file as user-config.cfg or a user-config.zip. The content of the file must be the same as provided for the Web Manager.

4.3.2 Responses

HTTP Request	Responses (String)	Description
All HTTP Service Interface Commands	0: device busy	The NetBox is busy. Resend the request later.
All HTTP Service Interface Commands	0: login required	This command requires authentication. Please use login.php first
GET /cli.php?status,[parameters]	<status>	A single or multiline string with the requested status information
GET /cli.php?get,[parameters]	<parameterValue>	The value of the requested configuration parameter
GET /cli.php?set,[parameters]	0: set failed	HTTP transfer is ok, but changing the configuration parameter failed.
	1: set ok	
GET /cli.php?sw-update,path=<value>	1: sw-update started from <path>	Software update started. Afterwards request the Software version with cli.php?status to verifiy whether it was successful or nor not
	0: maximum length of path is 26 characters	
	0: syntax error	Wrong syntax after in sw-update parameters
GET /cli.php?reboot	1: reboot initiated	A restart has been initated
GET /login.php?usr=<user>,pwd=<password>	1: already logged in	
	1: already logged in but supplied credentials do not match	Already logged in but supplied credentials do not match
	1: login ok	Logged in successfully
	0: login failed	Login failed
GET /logout.php	1: logout ok	Logout OK
	1: already logged out	You were not logged in
GET /download.php?file=<fileName>	0: download <fileName> failed	Download failed
POST /upload.php	1: upload ok, files replaced, reconfiguration started	Upload ok, the provided files (e.g. OpenVPN certificates) were updated, the user-config.cfg will be applied
	1: upload ok, files replaced	No user-config.cfg provided but other files were updated (e.g. OpenVPN certificates)
	0: upload failed: <errorMessage>	The upload failed

4.3.3 Examples

HTTP Request	Command	Description
Query the NetBox Firmware Version via HTTP	`GET /cli.php?status,system,nbsw HTTP/1.1`	
Login	`GET /login.php?usr=admin,pwd=<password> HTTP/1.1`	
Set the admin Password	`GET /cli.php?set,user:admin:password=<password> HTTP/1.1`	Remember: The dots (.) must be replaced by colons (:)

Upload new Configuration Files	`POST /upload.php HTTP/1.1`
	`Content-Disposition: form-data; name="UserConfigFile"; filename="user-config.zip"`
	`Content-Type: application/x-zip-compressed`
	`[Media]`
		A zip archive containing one or more of the following files can be uploaded.
		To run OpenVPN in certificate based mode, all certificate files are required.
		• user-config.cfg (the main configuration file)
		• ca.crt.certificate_mode (OpenVPN root certificate file)
		• client.crt.certificate_mode (OpenVPN client certificate file)
		• client.key.certificate_mode (OpenVPN private key file)
		• templateProfiles (updating provider database)

Download Debug Log	`GET /download.php?file=debuglog HTTP/1.1`	
Restart the NetBox	`GET /cli.php?reboot HTTP/1.1`	
Logout	`GET /logout.php HTTP/1.1`	
Start a local software update	`GET /cli.php?sw-update,path=<ipTftp/path> HTTP/1.1`	

5 Troubleshooting

5.1 Error Messages

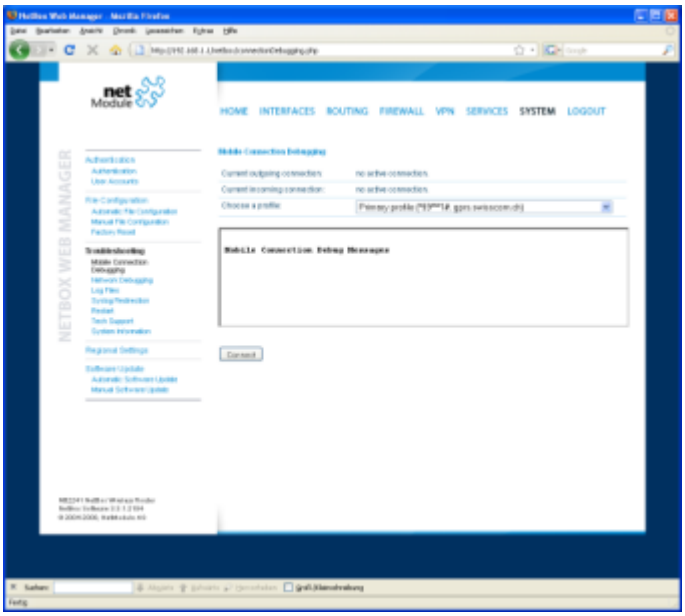
The Web Manager show error messages in the status bar in the footer of a certain web page.

Common error messages are:

Error Message	Problem Solving
SIM missing	Insert a SIM card
PIN code required	Insert the PIN code on the “SIM” page
Connection failed	See the “Debug Log” under Check APN, phone number, username, password

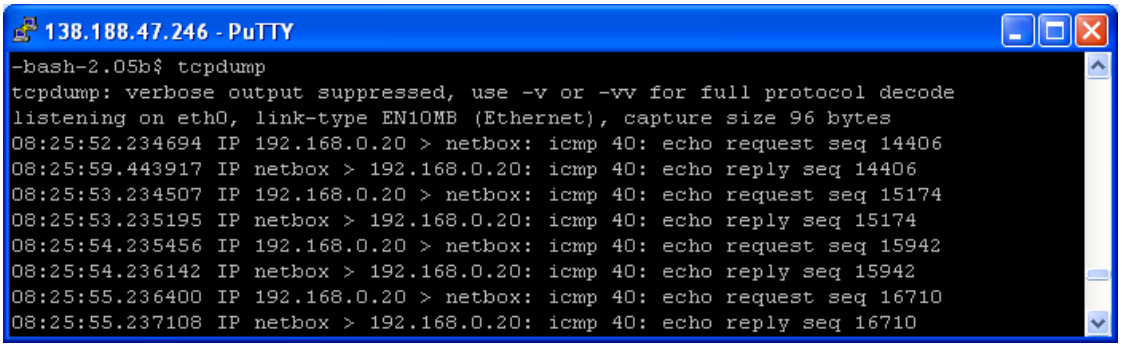
5.2 System Log and Log Files

Find more information about troubleshooting tools on page 63. The Web Manager provides varions debugging tools under SYSTEM/Troubleshooting:



5.3 Network Protocol Analyzer

Via the Linux Shell (bash), the protocol analyzer “tcpdump” is available:



6 Customer Service

6.1 Technical Support

The NetModule AG Website provides technical online support under:

http://www.netmodule.com/en/support

The Website also provides a download area where you can download the newest software and documentation.

For support requests please use the support form:

http://www.netmodule.com/de/support/supportform.aspx

6.2 Feedback

Please send comments about NetBox to:

netbox@support.netmodule.com

A Appendix: Connectors and Cables

A.1 Pin Assignments for the Communication Interfaces

A.1.1 Ethernet Ports

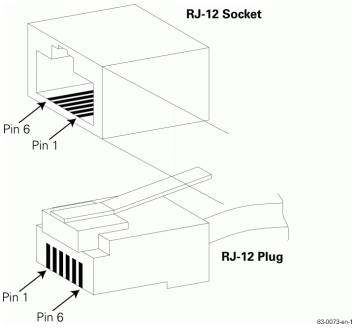


Figure 1: RJ45 Plug

Pin:	Signal: NB2xxx	Signal: NB1310
1	TX+	TX+
2	TX-	TX-
3	RX+	RX+
4	-	Pair 1 for power injection 9-21VDC
5	-	Pair 1 for power injection 9-21VDC
6	RX-	RX-
7	-	Pair 2 for power injection 9-21VDC
8	-	Pair 2 for power injection 9-21VDC

Table 1: Pin assignment Ethernet Interface

NB1310 allows to be feeded through Ethernet. Power can be carried over the spare pairs (RJ45 pin 4/5 & 7/8) only. It is simplified PoE (not compliant with IEEE802.3af standard!). Power feed through data pairs (RJ45 pins 1/2 & 3/6) is not allowed, this can destroy the device.

Required parameters of PoE power injector:
Output voltage: 18-21VDC
Polarity on spare pairs (RJ45 pin 4/5 & 7/8) can be either.
Output current: min 600mA at 18VDC
Required isolation between primary and secondary side 1500VAC.
Estimated maximum distance from power injector to NB1310: about 15 - 30m.

A.1.2 Serial Plug (COM; Sub-D 9pol)

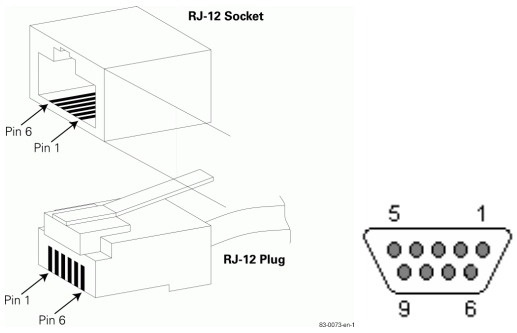


Figure 2: Sub-D 9pol plug female or RJ45

Pin:	RS232 Signal:		RS485 Signal:	
	Sub-D	RJ45	Sub-D	RJ45
1	DCD	RTS	Do not connect	Do not connect
2	RxD	DTR	Do not connect	Do not connect
3	TxD	TXD	Data+ (NB2210, NB224x)	Do not connect
4	DTR	GND	Do not connect	GND
5	GND	GND	GND	GND
6	DSR	RXD	Do not connect	Do not connect
7	RTS	DSR	Do not connect	RxD/TxD-
8	CTS	CTS	Data-	RxD/TxD+
9	RI	n/a	Data+	n/a

Table 2: Pin assignment COM port in RS232 mode

A.1.3 Power Port

Pin:	Signal:
Pin:	Signal:
-	Gnd
+	9 .. 32V DC 9.. 28V DC (NB2210) 9.. 21V DC (NB1310)

Table 3: Pin assignment power plug

Glossary

Abbreviation	Description	Note
APN	Access Point Name / Access Point Node	
CE	Consumer Electronic Label by Consumer Electronic Association CEA	www.ce.org
CS	Coding Scheme	
CSD	Circuit Switched Data	
DHCP	Dynamic Host Configuration Protocol	
DMZ	Demilitarized Zone	
DNS	Domain Name System	
EDGE	Enhanced Data Service for GSM Evolution	
EMC	Electromagnetic compatibility	
EMV	Elektromagnetische Verträglichkeit	
FTP	File Transfer Protocol	
GPRS	General Packet Radio Service	
GSM	Global Packet Radio Service	
GUI	Graphical User Interface	
HSCSD	High Speed Circuit Switched Data	
HSDPA	High-Speed Downlink Packet Access	
HSUPA	High-Speed Uplink Packet Access	
HTML	Hypertext Markup Language	
HW	Hardware	
IP	Internet Protocol	
IPSec	Internet Protocol Security	
ISDN	Integrated Services Digital Network	
ISP	Internet Service Provider	
LAN	Local Area Network	
NAPT	Network Address Port Translation	
NAT	Network Address Translation	
POP	Point of Presence	
POP, POP3	Post Office Protocol, Version 3	
PPP	Point to Point Protocol	
RAS	Remote Access Service	Dial-in Networking PPP
SIM	Subscriber Identity Module	
SW	Software	
TCP	Transmission Control Protocol	
TFTP	Trivial File Transfer Protocol	
UDP	User Datagram Protocol	
UMTS	Universal Mobile Telecommunications System	
URL	Universal Resource Locator	
VPN	Virtual Private Network	

Table 4: Glossary