



Subscriber optical terminals

ONT NTU-1

ONT NTU-1C

User manual

Firmware version 3.28.5

IP address: <http://192.168.1.1>

User name: user

Password: user

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Firmware version NTU-1(C) 3.28.5			

NOTES AND WARNINGS



The notes contain important information, tips or recommendations on device operation and setup.



Warnings inform of the situations when actions may harm the device or a user, lead to fault operation of the device or data loss.

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1 INTRODUCTION

GPON network belongs to one of the varieties of passive optical PON networks. This is one of the most modern and effective solutions for "last mile", which allows significant savings on cable infrastructure and provides data transmission speed of up to 2.5 Gbps downlink and 1.25 Gbps uplink. The use of GPON-based solutions in access networks makes it possible to provide end users with new IP services together with traditional ones.

The main advantage of GPON is the use of a single line terminal (OLT) for multiple subscriber devices (ONT). OLT is a converter of Gigabit Ethernet and GPON interfaces, which serves to connect the PON network with higher-level data transmission networks. The ONT device is designed to connect customers' equipment to broadband access services. It can be used in residential areas and business centers.

This user manual describes the purpose, main technical specifications, configuration rules and monitoring of **NTU-1, NTU-1C, NTU-1C rev.B and NTU-1C rev.C (hereinafter NTU-1 and NTU-1C respectively)** optical terminals.

2 DEVICE DESCRIPTION

2.1 Purpose

NTU-1, NTU-1C GPON ONT (Gigabit Ethernet Passive Optical Network) devices are high-performance network terminals designed for connection with upstream GPON equipment and providing end user with broadcast access services. GPON connection is established through the PON interface, while Ethernet interface is used for connection of network devices. A distinctive feature of the *NTU-1, NTU-1C* user terminals is that the devices might be powered through the twisted pair cable in an Ethernet network (over distance of up to 40 meters).

The key GPON advantage is the optimal use of bandwidth. The technology is the next step of high-speed Internet connection for homes and offices. Designed to deploy a network inside home or office building, the devices provide reliable connection with high bandwidth over long distances for users living and working in remote apartment buildings and business centers.

NTU-1, NTU-1C devices have the following interfaces:

Table 1 – Interfaces configuration

Model Name	WAN	LAN	FXS	RF	Wi-Fi	USB
<i>NTU-1</i>	1 × GPON	1 × 1Gigabit	-	-	-	-
<i>NTU-1C</i>	1 × GPON	1 × 1Gigabit	-	1	-	-

2.2 Device Specification

The devices have the following interfaces:

- 1 PON SC/APC port for connection to operator's network;
- 1 Ethernet RJ-45 LAN ports 10/100/1000BASE-T for connection of network devices;
- For *NTU-1C* only: 1 RF port for CaTV service provisioning.

The terminal uses an external adapter for 220 V / 12 V power supply. It is also possible to power the device via the Ethernet-cable UTP CAT-5E (when using GRT-120100A power module), the maximum distance – 40 meters for *NTU-1* and 25 meters for *NTU-1C*.

The device supports the following functions:

- Network functions:
 - bridge mode;
 - support for QoS mechanisms;
 - IGMP-snooping.
- Firmware update via web interface, OMCI.
- Remote monitoring, configuration, and setup via OMCI.

Fig.1 shows a diagram of the *NTU-1, NTU-1C* equipment connection.

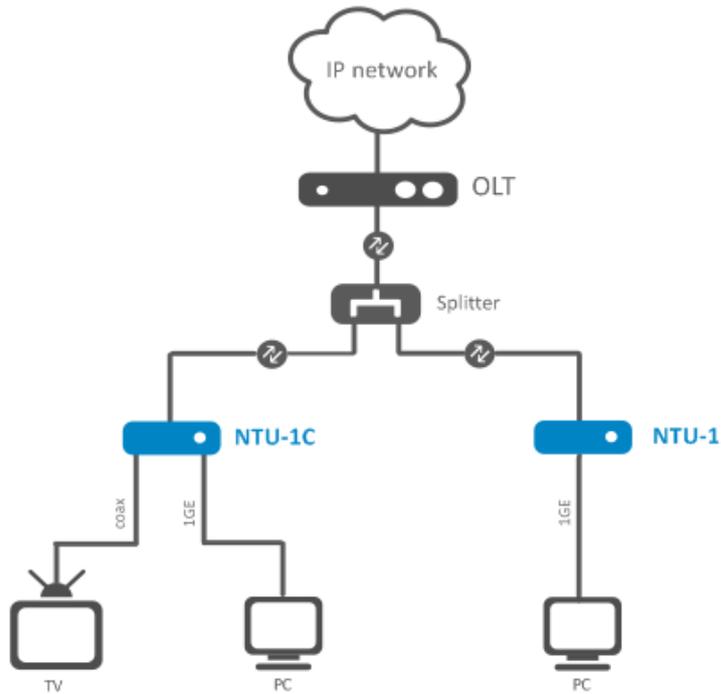


Figure 1 – Connection of NTU-1, NTU-1C

2.3 Key specifications

Table 2 lists key specifications of the terminals.

Table 2 – Key specifications

Parameters of Ethernet LAN Interface

Number of interfaces	1
Socket	RJ-45
Data rate	Auto-negotiation, 10/100/1000 Mbps, duplex/half-duplex
Supported standards	IEEE 802.3i 10BASE-T Ethernet IEEE 802.3u 100 BASE -TX Fast Ethernet IEEE 802.3ab 1000 BASE-T Gigabit Ethernet IEEE 802.3x Flow Control IEEE 802.3 NWay auto-negotiation

Parameters of PON Interface

Number of PON interfaces	1
Supported standards	ITU-T G.984.x Gigabit-capable passive optical networks (GPON) ITU-T G.988 ONU management and control interface (OMCI) specification FSAN Class B+ SFF-8472 IEEE 802.1Q Tagged VLAN IEEE 802.1p Priority Queues IEEE 802.1D Spanning Tree Protocol
Connector type	SC/APC according to ITU-T G.984.2
Transmission medium	fiber optical cable SMF-9/125, G.652
Splitting ratio	up to 1:64
Maximum range of coverage	20 km

Transmitter:	1310 nm
Upstream connection speed	1244 Mbps
Transmitter power	from +0.5 to +5 dBm
Optical spectrum width (RMS)	1 nm
Receiver	1490 nm
Downstream connection speed	2488 Mbps
Receiver sensitivity	-28 dBm
Receiver Optical Overload	-4 dBm

Control

Local control	Web interface
Remote control	OMCI
Firmware update	OMCI, HTTP
Access restriction	By password

General parameters

Power supply	- 12 V DC / 220 V AC power adapter; - Remote power supply over Ethernet-cable UTP CAT-5E:	
	NTU-1 up to 40m ¹	NTU-1C up to 25m ¹
Maximum power consumption	5 W	
Operating temperature range	from +5 to 40 °C	
Relative humidity	up to 80 %	
Dimensions (W × H × D)	NTU-1	112 × 32 × 100 mm
	NTU-1C	160 × 40 × 124 mm
Weight	NTU-1	0.250 kg
	NTU-1C	0.265 kg

2.4 Design

2.4.1 NTU-1

NTU-1 is designed as a 112 × 32 × 100 mm desktop device in a plastic housing.

Fig. 2 shows NTU-1 rear panel.

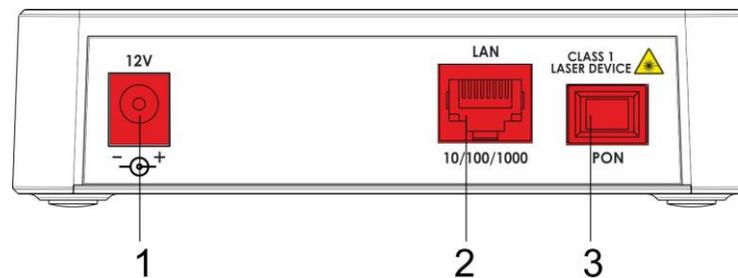


Figure 2 – NTU-1 rear panel

Connectors and controls located on the rear panel of NTU-1 are listed in Table 3.

¹ When using GRT-130100A, SSM-1330-1000A PoE injectors

Table 3 – Description of connectors and control elements located on the rear panel

Rear Panel Element		Description
1	12V	Connector for the power adapter
2	10/100/1000	RJ-45 10/100/1000BASE-T port for network devices connection
3	PON	SC port (socket) for connection to PON network

Fig. 3 shows NTU-1 side and top panels.

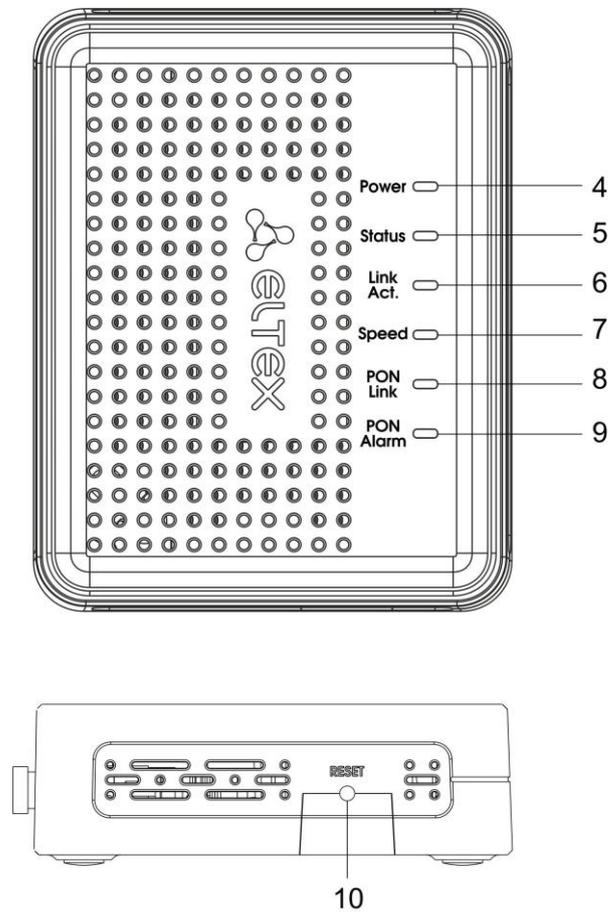


Figure 3 – NTU-1 top and side panels

Control elements and LED indicators located on the NTU-1 side and top panels are listed in Table 4.

Table 4 – Description of LEDs and control elements located on the side and top panels

Panel Element	Description
4	Power Power supply indicator
5	Status Device authentication indicator
6	Link Act. Indicator of the Ethernet port
7	Speed Connection data rate indicator
8	PON Link Optical interface indicator
9	PON Alarm Indicator of line network terminal connection status
10	Reset A functional key that reboots the device and resets it to the factory settings

2.4.2 NTU-1C

NTU-1C series devices are designed as a 160 × 40 × 124 mm desktop device in a plastic housing.

Fig. 4 shows NTU-1C rear panel.

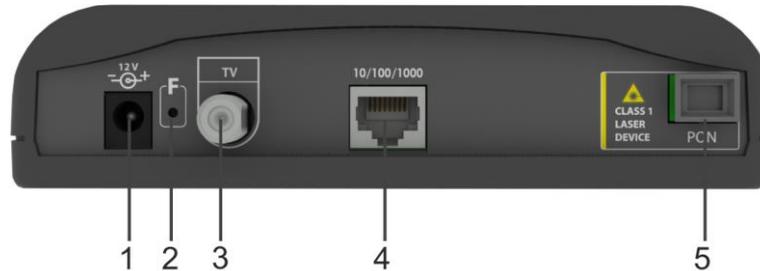


Figure 4 – NTU-1C rear panel

Connectors and control elements located on the rear panel of NTU-1C are listed in Table 5.

Table 5 – Description of connectors and control elements located on the rear panel

Rear panel element		Description
1	12V	Connector for the power adapter
2	F	A functional key that reboots the device and resets it to the factory settings
3	RF port	Port for cable TV connection
4	10/100/1000	RJ-45 10/100/1000BASE-T port for connection of network devices
5	PON	PON SC port (socket) for connection to PON network

Fig. 5 shows NTU-1C top panel.

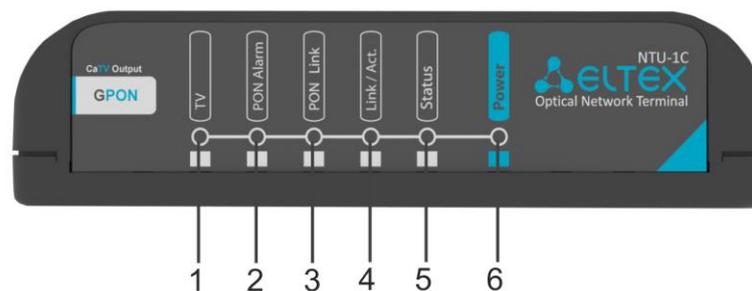


Figure 5 – NTU-1C top panel

Table 6 – Description of LEDs located on the top panel

Top panel element		Description
1	TV	CaTV signal indicator
2	PON Alarm	Indicator of line network terminal connection status
3	PON Link	Optical interface indicator
4	Link/Act.	Ethernet port indicator
5	Status	Device authentication indicator
6	Power	Power supply indicator

2.5 Light Indication

The indicators located on the top panel show the device current status.

Tables 7, 8 list possible statuses of the LEDs.

Table 7 – Light Indication of NTU-1 Status

LED	LED Status	Device Status
Power	off	Device is disconnected from the power source or faulty
Status	off	Device is loading or has default configuration
	orange	Getting configuration by OMCI is in progress
	red	An error occurred while configuration via OMCI
	green	OMCI configuration has been successfully completed, the device operates properly
Link Act.	off	There is no connection to the LAN-port
	green	Established LAN connection
	flashes	Data transmission is in progress
Speed	off	There is no connection to the LAN-port
	orange	Established 1000 Mbps connection
	green	Established 10/100 Mbps connection
PON Link	off	No signal from optical line terminal
	flashes slowly	Device is not registered on optical line terminal
	green	A connection between optical line terminal and the device has been successfully established
PON Alarm	off	A connection between optical line terminal and the device is established
	red	No signal from optical line terminal

Table 8 – Light Indication of NTU-1C Status

LED	LED Status	Device Status
TV	off	RF port is off
	red	CaTV signal power < -10 dBm or > +3 dBm
	orange	CaTV signal power in the range of -10 dBm .. -8 dBm or +2 dBm .. +3 dBm
	green	-8 dBm < CaTV signal power < +2 dBm
Power	off	Device is disconnected from the power source or faulty
Status	off	Device is loading or has default configuration
	orange	Getting configuration by OMCI is in progress
	red	An error occurred while configuration via OMCI
	green	OMCI configuration has been successfully completed, the device operates properly
Link Act.	off	There is no connection to the LAN-port
	green	Established 10/100 Mbps LAN connection
	orange	Established 1000 Mbps LAN connection
	flashes	Data transmission is in progress
PON Link	off	No signal from optical line terminal
	flashes slowly	Device is not registered on optical line terminal
	flashes rapidly	Data transmission is in progress
	green	A connection between optical line terminal and the device has been successfully established
PON Alarm	off	A connection between optical line terminal and the device is established
	red	No signal from optical line terminal

2.6 Reboot and Reset to Factory Settings

To reboot NTU-1, press the *Reset* button once on the device side panel. To reset NTU-1 to factory settings, press the *Reset* button and hold it for 7-10 seconds.

To reboot NTU-1C, press the *F* button once on the device rear panel. To reset NTU-1C to factory settings, press the *F* button and hold it for 7-10 seconds.

By default: IP address LAN – *192.168.1.1*, subnet mask – *255.255.255.0*.

2.7 Delivery Package

The basic delivery package of *NTU-1*, *NTU-1C* includes:

- *NTU-1* or *NTU-1C* optical network terminal;
- 220 V / 12 V power adapter;
- Installation and initial configuration guide.

3 NTU CONFIGURATION THROUGH WEB INTERFACE. USER ACCESS

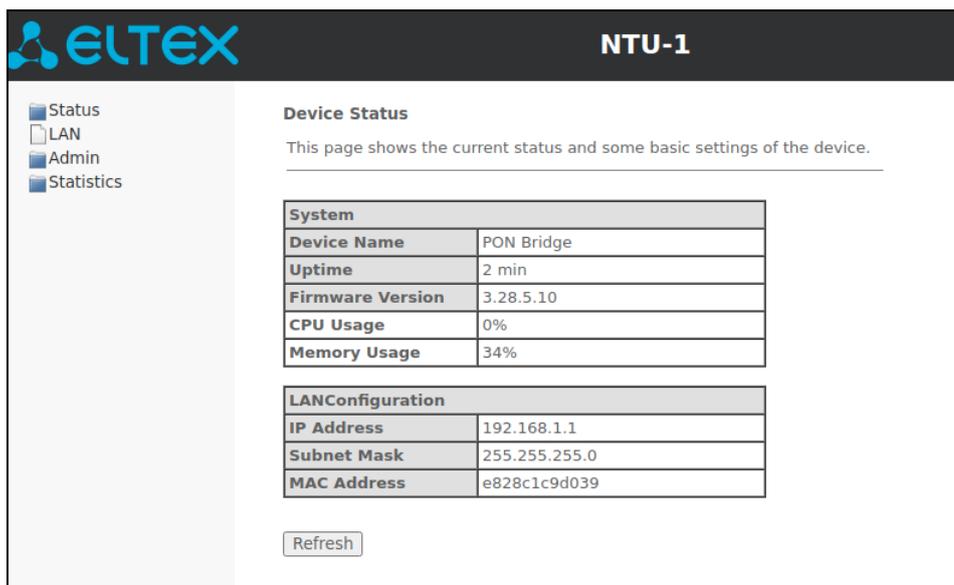
Device configuration requires accessing the device through a web browser, such as Firefox or Google Chrome. Enter the device IP address in the browser address bar to do this (enter *IP – 192.168.1.1* and *subnet mask – 255.255.255.0* if you have factory settings).

When the address is entered, the device requires user to log in.

User name: *user*, password: *user*.

In order to prevent unauthorized access to the device, it is recommended to change the password (see section **3.3.3**).

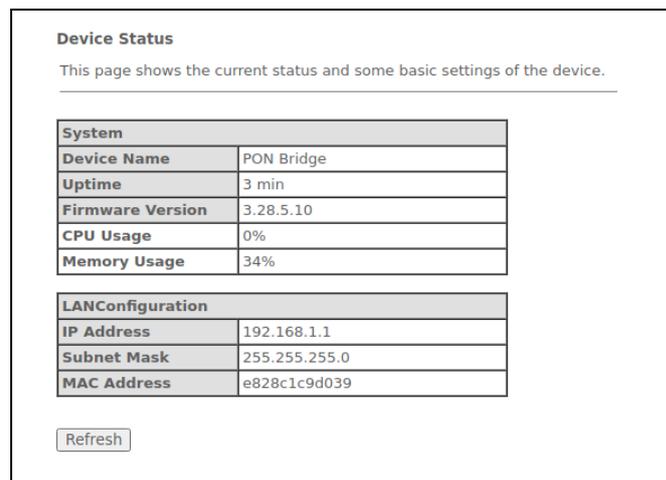
Given below is a general view of the device configuration window. A navigation tree for object settings is on the left pane, while the settings to edit is on the right.



3.1 The 'Status' menu. Information about the device status

3.1.1 The 'Device' submenu. Device General Information

The tab displays the current status and some basic device settings.



System:

- *Device Name*;
- *Uptime* – operation time from the last device reboot;
- *Firmware Version*;
- *CPU Usage* – utilization of CPU in percent;
- *Memory Usage* – utilization of memory in percent.

LAN Configuration:

- *IP Address* – device address in local network;
- *Subnet Mask*;
- *MAC Address* – device’s MAC address.

Click the *Refresh* button to update the information.

3.1.2 The ‘PON’ submenu. Information on the status of the optical module

This tab contains detailed information about PON interface.

PON Status

This page shows the current system status of PON.

Pon Status	
Vendor Name	
Part Number	
Temperature	51.714844 C
Voltage	3.385500 V
Tx Power	2.510059 dBm
Rx Power	-inf dBm
Bias Current	14.664000 mA

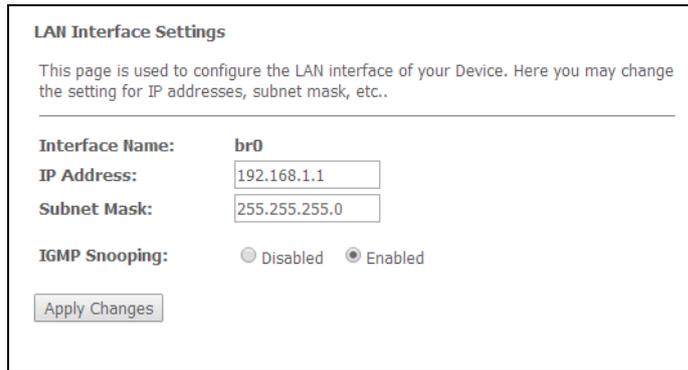
ONU State 01

- *Vendor Name* – optical module manufacturing company;
- *Part Number* – optical module model;
- *Temperature* – optical module temperature, °C;
- *Voltage* – power supply voltage, V;
- *Tx Power* – transmitted signal level (1310 nm), dBm;
- *Rx Power* – received signal level (1490 nm), dBm;
- *Bias Current* – bias current, mA.

Click the *Refresh* button to update the information.

3.2 The 'LAN' menu. LAN Interface Settings

Use this tab to configure basic LAN interface settings (for example, IP-addresses, subnet mask and other parameters).



The screenshot shows the 'LAN Interface Settings' configuration page. It includes a title, a descriptive paragraph, and several fields: 'Interface Name' (br0), 'IP Address' (192.168.1.1), 'Subnet Mask' (255.255.255.0), and 'IGMP Snooping' (radio buttons for Disabled and Enabled, with Enabled selected). An 'Apply Changes' button is at the bottom.

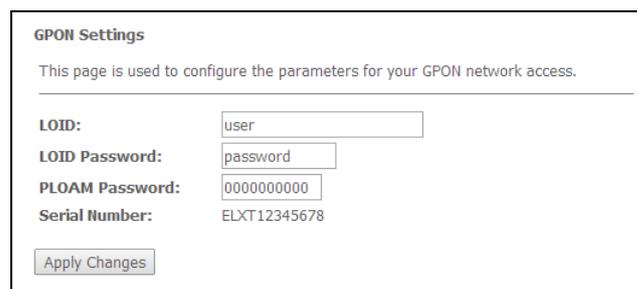
- *Interface Name*;
- *IP Address* – device address in local network;
- *Subnet mask*;
- *IGMP Snooping* – turn on/off (enabled/disabled) IGMP Snooping function to monitor network multicast traffic.

Click the *Apply Changes* button to accept changes.

3.3 The 'Admin' menu. Administration Settings

3.3.1 The 'GPON Settings' submenu. Settings GPON network Access

The tab is used to configure the parameters of the GPON network access.



The screenshot shows the 'GPON Settings' configuration page. It includes a title, a descriptive paragraph, and several fields: 'LOID' (user), 'LOID Password' (password), 'PLOAM Password' (0000000000), and 'Serial Number' (ELXT12345678). An 'Apply Changes' button is at the bottom.

- *LOID*¹ – logical object identifier (user name in GPON network);
- *LOID Password*¹ – password to access for the logical object ID (user password in GPON network);
- *PLOAM Password* – set a password to access the physical layer to operate, manage and carry out other technical maintenance for the device;
- *Serial Number* – device PON serial number.

Click the *Apply Changes* button to accept changes.

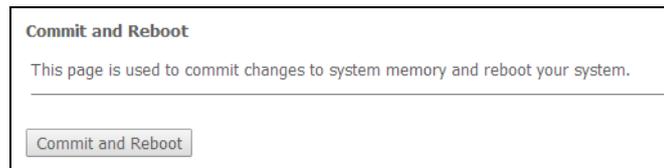


Parameters on this tab are not recommended to be changed. Invalid settings will lead to the loss of connection with line optical terminal!

¹ Not supported in the current firmware version

3.3.2 The 'Commit and Reboot' submenu. Commit changes and rebooting the device

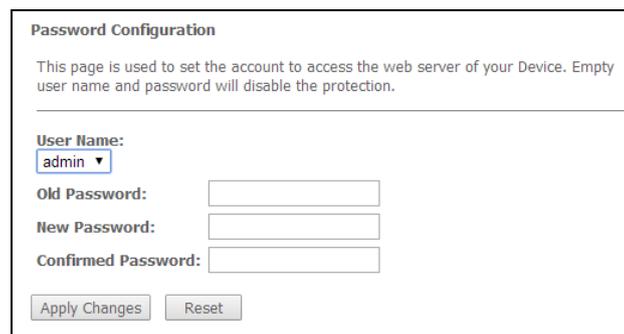
The tab is used to commit changes to system memory and reboot your system.



To commit changes and reboot the device, click *Commit and Reboot* button. The rebooting process takes few minutes to complete.

3.3.3 The 'Password' submenu. Access Control Configuration (password settings)

Use the tab to change device access passwords.



To change the password, select a username, enter the current password to the *Old Password* field, then enter new password to *New Password* and *Confirmed Password* fields.



Empty password field will disable the protection.

Click the *Apply Changes* button to accept and save changes and *Reset* button to cancel.

3.3.4 The 'Firmware Upgrade' submenu. Firmware Update

This tab allows you to update your device firmware.



To update firmware, choose the firmware file: click *Browse* button, then click *Upgrade*. If you select an incorrect file, you can delete it using the *Reset* button.



Do not disconnect the device from the power supply or reboot it while firmware is updating. The firmware update takes few minutes after which the device will be rebooted automatically.

3.4 The 'Statistics' menu

3.4.1 The 'Interface' submenu. Network Interface statistics

This page shows the packet statistics for transmission and reception regarding to network interface.

Interface Statistics

This page shows the packet statistics for transmission and reception regarding to network interface.

Interface	Rx pkt	Rx err	Rx drop	Tx pkt	Tx err	Tx drop
eth0	4385	0	0	1208	0	0
nas0_0	0	0	0	30	0	0

- *Interface* – network interface name;
- *Rx pkt* – received packets;
- *Rx err* – received packets with errors;
- *Rx drop* – dropped incoming packets;
- *Tx pkt* – transmitted packets;
- *Tx err* – transmitted packets with errors;
- *Tx drop* – dropped outgoing packets.

Click the *Refresh* button to update information and click the *Reset Statistic* button to reset statistics.

3.4.2 The 'PON' submenu. PON interface statistics

The tab displays the statistics of received and transmitted packets for the PON interface.

PON Statistics

Bytes Sent	0
Bytes Received	0
Packets Sent	0
Packets Received	0
Unicast Packets Sent	0
Unicast Packets Received	0
Multicast Packets Sent	0
Multicast Packets Received	0
Broadcast Packets Sent	0
Broadcast Packets Received	0
FEC Errors	0
HEC Errors	0
Packets Dropped	0
Pause Packets Sent	0
Pause Packets Received	0

- *Bytes Sent* – the number of bytes transmitted;
- *Bytes Received* – the number of bytes received;
- *Packets Sent* – the number of packets transmitted;
- *Packets Received* – the number of packets received;
- *Unicast Packets Sent* – the number of unicast packets transmitted;
- *Unicast Packets Received* – the number of unicast packets received;
- *Multicast Packets Sent* – the number of multicast packets transmitted;
- *Multicast Packets Received* – the number of multicast packets received;
- *Broadcast Packets Sent* – the number of broadcast packets transmitted;
- *Broadcast Packets Received* – the number of broadcast packets received;
- *FEC Errors* – the number of errors corrected using the FEC (Forward Error Correction);
- *HEC Errors* – the number of errors corrected using the HEC (Header Error Checksum);
- *Packets Dropped* – the number of packets dropped;
- *Pause Packets Sent* – the number of PAUSE packets transmitted to adjust the bit rate;
- *Pause Packets Received* – the number of PAUSE packets received to adjust the bit rate.

APPENDIX A – POSSIBLE PROBLEMS AND OPTIONS FOR THEIR SOLUTION

Problem	Possible Cause	Solution
Entering router's IP address (e.g. 192.168.1.1) could not access to the web interface.	The PC does not belong to the IP subnetwork for connection to the web interface.	In the parameters of Internet connection on your PC, set the address of the subnet 192.168.1.0/24.
	Defective cable.	Check the physical connection by checking LEDs (all LEDs should be on). If the LEDs are off, use another cable. If your computer is switched off, LEDs may also be off.
	Access denied by your firewall.	Disable firewall on your computer.
Forgotten/incorrect password to the web interface of the device.	_____	Reset the router to default settings using the F button on the rear panel of NTU-1C or Reset button for NTU-1. Unfortunately, all changes you made in settings will be lost.

TECHNICAL SUPPORT

For technical assistance in issues related to handling Eltex Ltd. equipment, please, address to Service Center of the company:

<https://eltex-co.com/support/>

You are welcome to visit Eltex official website to get the relevant technical documentation and software:

Official website: **<https://eltex-co.com/>**

Download center: **<https://eltex-co.com/support/downloads/>**