



**Subscriber optical terminals**

**ONT NTU-1**

**ONT NTU-1C**

**Administrator manual**

**Firmware version 3.28.5**

**IP address: <http://192.168.1.1>**

**User name: admin**

**Password: kW5i\_1bYC6os**

Document version	Suitable firmware version	Issue date	Content of changes
10.0	3.28.5	21 September 2021	Eleventh issue
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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 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 supply), the maximum distance – 40 meters for NTU-1 and 25 meters for NTU-1C.

***The device supports the following functions:***

- Network functions:
  - bridge mode;
  - QoS;
  - 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.

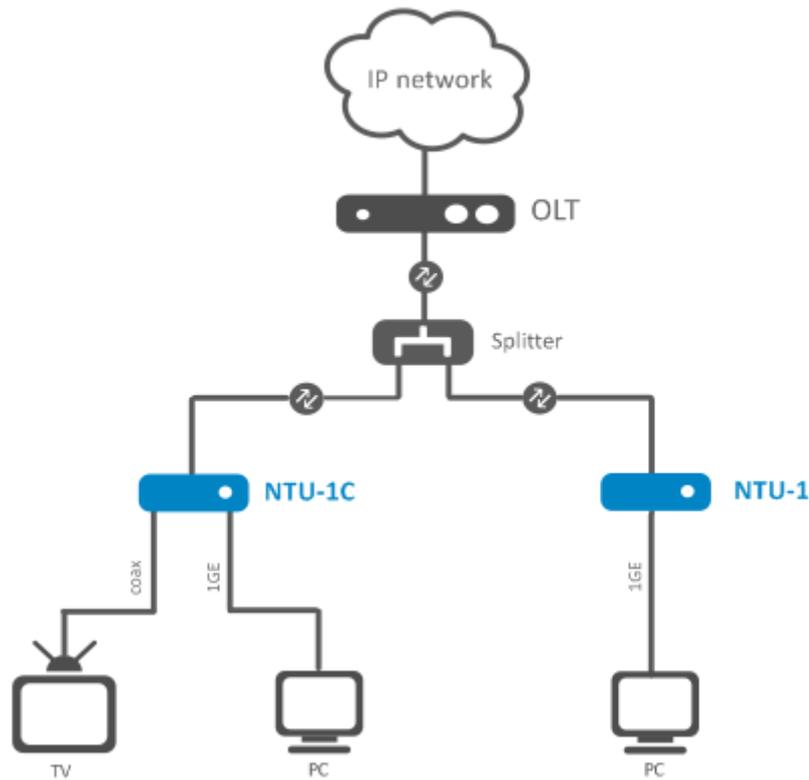


Figure 1 – Connection of NTU-1, NTU-1C

### 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 100BASE-TX Fast Ethernet IEEE 802.3ab 1000BASE-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 AC power adapter;	
	Remote power on the Ethernet-cable UTP CAT-5E	
	NTU-1	NTU-1C
	up to 40 m <sup>1</sup>	up to 25 m <sup>1</sup>
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 series devices are designed as a 112 × 100 × 32 mm desktop device in a plastic housing.

Fig. 2 shows NTU-1 rear panel.

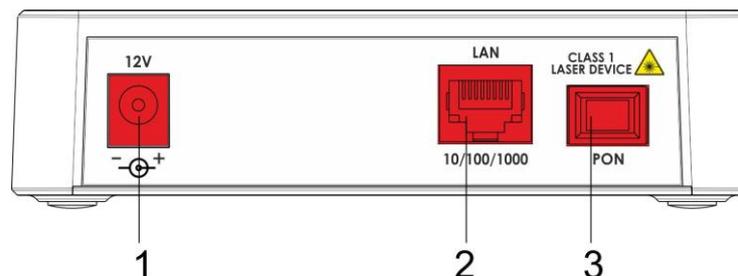


Figure 2 – NTU-1 rear panel

<sup>1</sup> When using GRT-130100A, SSM-1330-1000A PoE injectors

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

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.

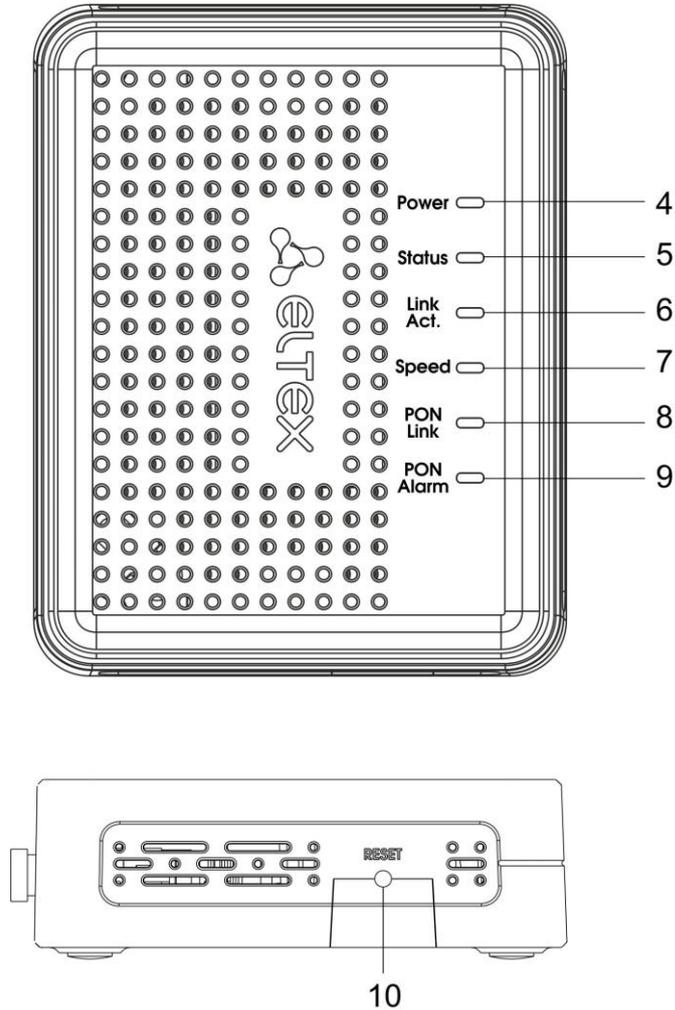


Figure 3 – NTU-1 top and side panel

Controls and LED indicators located on NTU-1 side and top panels are listed below, 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

<b>8</b>	<b>PON Link</b>	Optical interface indicator
<b>9</b>	<b>PON Alarm</b>	Indicator of line network terminal connection status
<b>10</b>	<b>Reset</b>	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.

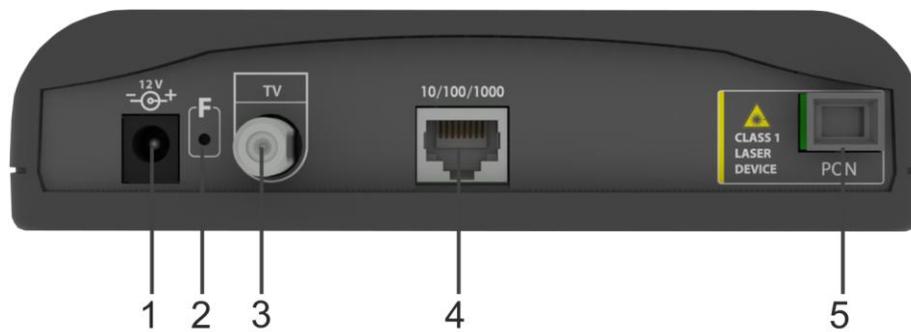


Figure 4 – NTU-1C rear panel

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

Fig. 5 shows NTU-1C top panel.

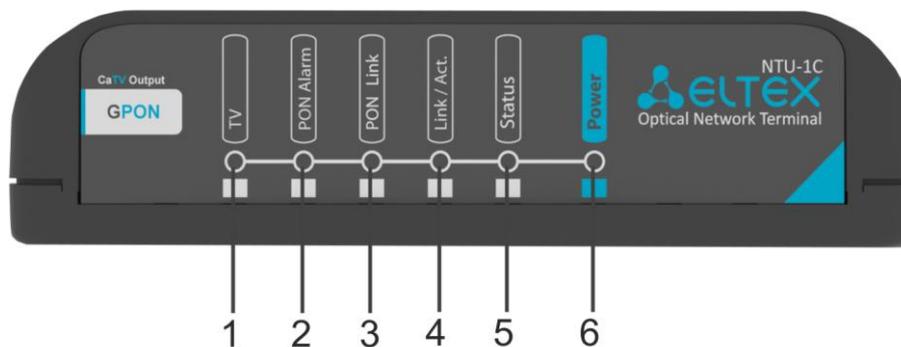


Figure 5 – NTU-1C top panel

Table 6 – Description of LEDs located on the top panel

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

## 2.5 Light Indication

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

Table 7 lists possible statuses of the LEDs.

Table 7 – Light Indication of NTU-1 Status

LED	LED Status	Device Status
<b>Power</b>	off	Device is disconnected from the power source or faulty
<b>Status</b>	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
<b>Link Act.</b>	off	There is no connection to the LAN-port
	green	Established LAN connection
	flashes	Data transmission is in progress
<b>Speed</b>	off	There is no connection to the LAN-port
	orange	Established 1000 Mbps connection
	green	Established 10/100 Mbps connection
<b>PON Link</b>	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
<b>PON Alarm</b>	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-1 Status

LED	LED Status	Device Status
<b>TV</b>	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
<b>Power</b>	off	Device is disconnected from the power source or faulty
<b>Status</b>	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
<b>Link Act.</b>	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
<b>PON Link</b>	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
<b>PON Alarm</b>	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. ADMIN ACCESS

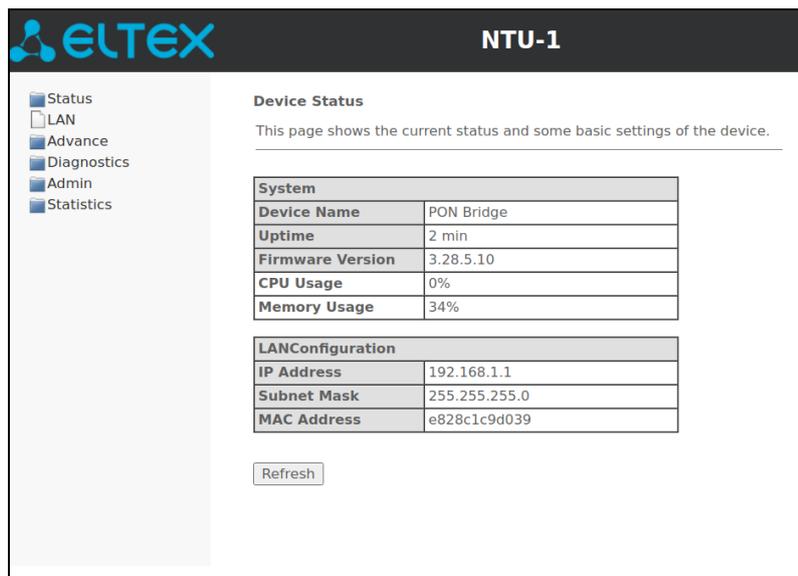
Device configuration requires accessing the device through a web browser, such as Firefox or Google Chrome. To do this, enter the device IP address in the browser address bar (factory settings are *192.168.1.1, subnet mask – 255.255.255.0*).

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

User name: **admin**, password: **kW5i\_1bYC6os**.

In order to prevent unauthorized access to the device, it is recommended to change the password (see section **3.5.4**).

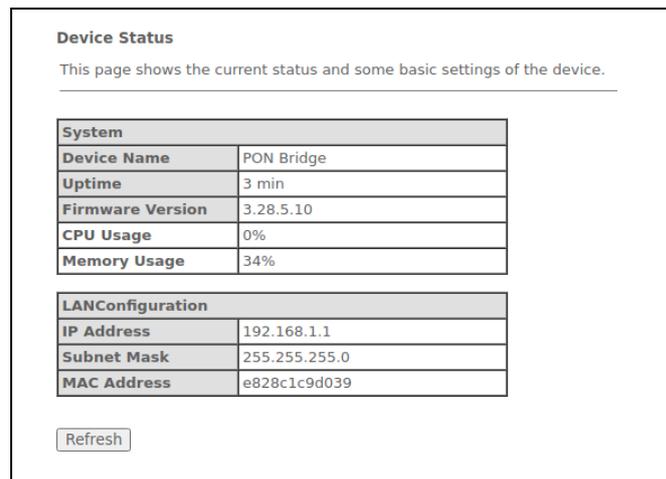
Given below is a general view of the device configuration window. A navigation tree for object settings is in the left pane, while the settings to edit is on the right.



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

##### 3.1.1. The 'Device' submenu. Device General Information

This tab displays the current status and some basic settings of the device.



**System:**

- *Device Name*;
- *Uptime* – 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 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* – a model of the optical module;
- *Temperature* – optical module temperature, °C;
- *Voltage* – power supply voltage, V;
- *Tx Power* – level of transmitted signal (1310 nm), dBm;
- *Rx Power* – level of received signal (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.

**LAN Interface Settings**

This page is used to configure the LAN interface of your Device. Here you may change the setting for IP addresses, subnet mask, etc..

---

**Interface Name:**      **br0**

**IP Address:**           

**Subnet Mask:**        

**IGMP Snooping:**       Disabled    Enabled

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

To accept changes, click the *Apply Changes* button.

### 3.3 The 'Advance' menu. Advanced Settings

#### 3.3.1 The 'ARP Table' submenu. List of learned MAC addresses

The efficiency of ARP operation mostly depends on ARP-cache on each host. The cache contains IP addresses and corresponding hardware addresses. The lifetime of each entry in the cache is 5 minutes from the time the record was created.

**ARP Table**

This table shows a list of learned MAC addresses.

IP Address	MAC Address
192.168.1.2	00-07-e9-5d-2b-07

The table on this tab shows a list of learned MAC addresses with corresponding IP addresses.

Click the *Refresh* button to update the information.

#### 3.3.2 The 'Bridging' submenu. Bridging Configuration

This tab is used to configure the bridge parameters. Here you can change the settings or view the information on the bridge and its attached ports.

### Bridging Configuration

This page is used to configure the bridge parameters. Here you can change the settings or view some information on the bridge and its attached ports.

---

Ageing Time:  (seconds)

802.1d Spanning Tree:  Disabled  Enabled

- *Ageing Time* – lifetime of an entry in MAC table;
- *802.1d Spanning Tree* – turn on (enabled)/off (disabled) STP features to eliminate potential loops in the network topology.

To accept changes, click the *Apply Changes* button.

Click *Show MACs* to view MAC table of the bridge.

### Bridge Forwarding Database

This table shows a list of learned MAC addresses for this bridge.

Port No	MAC Address	Is Local?	Ageing Timer
1	a8-f9-4b-cd-08-f4	yes	---
2	a8-f9-4b-cd-08-f7	yes	---
1	00-07-e9-5d-2b-07	no	0.00

Click the *Refresh* button to update the information, to close the window – click the *Close* button.

### 3.4 The 'Diagnostics' menu. Diagnosis of connections

#### 3.4.1 The 'Ping' submenu. Test the Availability of Network Devices

Use this menu to test the availability of network devices connected to the ONT. The test uses Ping utility.

### Ping Diagnostics

This page is used to send ICMP ECHO\_REQUEST packets to network host. The diagnostic result will then be displayed.

---

Host Address:

To test the availability of the connected device, enter its IP address into the *Host Address* field and click *Go!* button. The output will be displayed at the same page of the web interface. To return to the address entry field, press the *Back* button.

```

PING 192.168.1.2 (192.168.1.2): 56 data bytes

64 bytes from 192.168.1.2: icmp_seq=0
64 bytes from 192.168.1.2: icmp_seq=1
64 bytes from 192.168.1.2: icmp_seq=2

--- ping statistics ---
3 packets transmitted, 3 packets received.

Back
    
```

### 3.5 The 'Admin' menu. Administration Settings

#### 3.5.1 The 'GPON Settings' submenu. Settings GPON-network Access

This tab is used to configure the parameters for access to GPON network.

**GPON Settings**

This page is used to configure the parameters for your GPON network access.

---

**LOID:**

**LOID Password:**

**PLOAM Password:**

**Serial Number:** ELXT12345678

- *LOID*<sup>1</sup> – logical object identifier (user name in GPON network);
- *LOID Password*<sup>1</sup> – 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.

To accept changes, click the *Apply Changes* button.



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

#### 3.5.2 The 'Commit/Reboot' submenu. Commit changes and rebooting the device

This tab is used to apply settings and to reboot the system.

**Commit and Reboot**

This page is used to commit changes to system memory and reboot your system.

---

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

<sup>1</sup> Not supported in the current firmware version

### 3.5.3 The 'Backup/Restore' submenu. Configuration management

**Backup and Restore Settings**

This page allows you to backup current settings to a file or restore the settings from the file which was saved previously. Besides, you could reset the current settings to factory default.

---

**Backup Settings to File:**

**Restore Settings from File:**  No file selected.

**Reset Settings to Default:**

This tab allows you to upload the current device configuration to your PC for backup. To do this, click the *Backup...* button.

To restore previously saved configuration, click *Browse* to select the file needed, then click *Restore*.

Click the *Reset* button to return to the factory settings. The device will reboot and set default parameters.

### 3.5.4 The 'Password' submenu. Access Control Configuration (setting passwords)

Use this tab to change passwords for device access.

**Password Configuration**

This page is used to set the account to access the web server of your Device. Empty user name and password will disable the protection.

---

**User Name:**

**Old Password:**

**New Password:**

**Confirmed Password:**

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 fields will disable the protection.**

To apply and save changes, click the *Apply Changes* button, to cancel – the *Reset* button.

### 3.5.5 The 'Firmware Upgrade' submenu. Firmware Update

The tab allows you to update your device firmware.

**Firmware Upgrade**

This page allows you upgrade the firmware to the newer version. Please note that do not power off the device during the upload because this make the system unbootable.

---

No file selected.

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.**

### 3.6 The 'Statistics' menu

#### 3.6.1 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

Refresh    Reset Statistics

- *Interface* – the name of the network interface;
- *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 the information. In order to clear the statistics and start gathering it from the beginning, click the *Reset Statistic* button.

#### 3.6.2 The 'PON' submenu. PON-interface statistics

The tab shows the statistics of received and sent packets for 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 transmitted unicast packets;
- *Unicast Packets Received* – the number of received unicast packets;
- *Multicast Packets Sent* – the number of transmitted multicast packets;
- *Multicast Packets Received* – the number of received multicast packets;
- *Broadcast Packets Sent* – the number of transmitted broadcast packets;
- *Broadcast Packets Received* – the number of received broadcast packets;
- *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*;
- *Pause Packets Sent* – the number of PAUSE packets transmitted to adjust the speed;
- *Pause Packets Received* – the number of PAUSE packets received to adjust the speed.

## APPENDIX A. POSSIBLE PROBLEMS AND OPTIONS FOR THEIR SOLUTION

<b>Problem</b>	<b>Possible Cause</b>	<b>Solution</b>
Entering the router's IP address (e.g. 192.168.1.1) does not provide 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/>**