

- Modular device, form factor: 19" 9U eurorack
- 2 switches (uplink controllers) with Hot Standby 1:1
- Up to 16 GPON modules (128 GPON ports)
- Up to 8192 ONT connection
- Switching capacity: 680 Gbps
- Low power consumption
- 2 separate power supplies



Multi-service access and aggregation node MA4000-PX is dedicated for access networks based on GPON technology. The OLT allows operators to construct scalable, fault tolerant "last mile" networks meeting high safety requirements in either urban or rural areas. MA4000-PX controls customer equipment, traffic switching and access to transport networks.

A core element of MA4000-PX is a scalable Ethernet L2+ switch PP4X that interacts with optical access modules PLC8 to connect customer devices via GPON technology.

The modules are installed in a standard 19" 9U eurorack. The 9U case has two slots for PP4X switch circuit control modules and 16 slots for linear PCL8 modules (GPON). A single system can have one or two PP4X central switch control modules.

Installation of two modules improves fault tolerance on account of switch redundancy and widens bandwidth of the system due to the distribution of data streams among stacked modules. The modules interact via 10 Gbps interfaces.

#### Types of modules

- PP4X: switching and control module
- PLC8: 8 × GPON 2.5 Gbps interface module
- The quantity of interface modules: up to 16
- Bus type and bandwidth: 34 × 10GBASE-KX (XAUI), 680 Gbps

#### Management and monitoring

- Single management interface via CLI (Telnet, SSH, serial), SNMP
- Processing of configuration data of all modules
- Support for RADIUS, TACACS+

### Technical features

General features	
Modules	up to 16 PLC8 modules up to 2 PP4X modules
Physical specifications and environmental parameters	
Number of power supply inputs	2
Power supply voltage	36..72V
Power consumption of full chassis	no more than 850 W
Power consumption of empty chassis	no more than 35 W
Power consumption of PP4X	no more than 70 W
Power consumption of PLC8 without SFP	no more than 30 W
Power consumption of PLC8 with SFP	no more than 40 W
Power consumption of fan panel	no more than 18 W
Weight of full chassis	no more than 25 kg
Dimensions (HxWxD)	480 x 400 x 350 mm
Ambient operating temperature	from -10 <sup>0</sup> to +45 °C
Ambient operating humidity	up to 80%

## Features and capabilities

Aggregation switch functions with the following capabilities:

- MAC address learning /aging
- MAC address limiting
- Processing of unknown MAC addresses
- Broadband traffic limiting
- Multicast traffic limiting
- Number of multicast groups — 1024
- Support for Q-in-Q in compliance with IEEE 802.1ad
- STP, RSTP, MSTP
- Static routing
- Port isolation, port isolation within the same VLAN
- LAG and LACP (including interfaces of PP4X module)
- Port mirroring, VLAN mirroring
- QoS: 802.1p, DSCP, WRR
- IGMP/MLD Fast Leave
- IGMP/MLD Proxy
- IGMP/MLD Snooping
- IGMP/MLD Querier
- DHCPv4 Snooping
- IPv4 Source guard
- DHCPv4/DHCPv6 Relay Agent (Option 82, IP helper)
- LLDP (802.1ab)

- PPPoE Intermediate agent
- Displaying of ONT services utilization

### Standards compliance

- IEEE 802.3 10BASE-T Ethernet
- IEEE 802.3u 100BASE-T Fast Ethernet
- IEEE 802.3ab 1000BASE-T Gigabit Ethernet
- IEEE 802.3z Fiber Gigabit Ethernet
- ANSI/IEEE 802.3 NWay auto-negotiation
- IEEE 802.3x Full Duplex and flow control
- IEEE 802.3ad Link aggregation
- IEEE 802.1p Protocol for Traffic Prioritization
- IEEE 802.1Q Virtual LANs
- IEEE 802.1ad Provider Bridges (QinQ)
- IEEE 802.1v VLAN Classification by Protocol and Port
- IEEE 802.3ac VLAN tagging
- IEEE 802.1d MAC bridges
- IEEE 802.1w Rapid Reconfiguration of Spanning Tree
- IEEE 802.1s Multiple Spanning Trees
- IEEE 802.1x Port Based Network Access Control
- ITU-T G.988 GPON
- ITU-T G.984x GPON

## Management and switch module PP4X

Central switch module PP4X is the main platform element performing management and diagnostics of periphery modules, switching and aggregation of traffic.

The installation of two PP4X modules improves fault tolerance on account of switch redundancy and widens bandwidth of the system due to the distribution of data streams among stacked modules.

The module interaction is performed via two 10 Gbps interfaces distributing the load and ensuring redundancy.

### CPU

- 2 cores
- Core frequency — 1000 MHz
- RAM - DDR2 SDRAM 512 MB 800 MHz
- Non-volatile memory — 2 GB NAND Flash

### Ethernet switch

- Bandwidth — 480 Gbps
- MAC address table — 32K entries
- Support for up to 4K VLANs according to 802.1Q
- Quality of Service
- 8 priority output queues per port
- Quantity of ports — 24 ports, up to 10 Gbps per port

### Interfaces

- USB (compatible with USB 2.0)
- SATA II (SSD connection is available)

### Network interfaces

- External connections:
  - 4 × 10GBASE-X (SFP+)/1000BASE-X (SFP)
  - 2 × 10/100/1000BASE-T/1000BASE-X (SFP)
- Interface modules connection:
  - 16 × 10G XAUI (10GBASE-KX4)
- Central switch modules connection:
  - 2 × 10G XAUI (10GBASE-KX4)
- Optical transceivers — 1G SFP, 10G SFP+ (Copper Direct Attach connection is available)
- Console port — RS-232

### Port modes

- Duplex/half-duplex mode 10/100/1000 Mbps for electric ports
- Duplex mode for 1/10 Gbps for optical ports

### Management and monitoring

- Interaction with external control and monitoring systems via Telnet, SSH, SNMP
- Access rights limiting: by password, IP address, MAC address, privilege level
- Support for RADIUS, TACACS+
- Collection of alarm data on interface modules and the whole device. Generation of notification and alarm messages for monitoring systems.
- Device temperature control, fan system management
- Software update management for all device modules

## Optical access module PLC8

PLC8 module is intended to provide broadband access to the data network via GPON technology with data rate up to 2.5 Gbps downlink. The module is designed for a last mile connection and allows connecting up to 512 end users (ONT). The support of RSSI provides measuring of optical line parameters.

### Network interfaces

- Connection with the central switching module:
  - 2 x 10G XAU1 (10GBASE-KX4)
- PON:
  - 8 ports of 2.5/1.25 Gbps GPON (SFP)

### Port modes

- Duplex/half-duplex 10/100/1000 Mbps for electric ports
- Duplex mode 1/10 Gbps for optical ports

### Processor

- 1 core
- Core frequency — 800 MHz
- RAM - DDR2 SDRAM 256 MB 800 MHz
- Non-volatile memory — 2 x 32 MB Serial Flash

### Ethernet switch

- Switch bandwidth — 128 Gbps
- MAC address table — 16K entries
- Support for up to 4K VLANs according to 802.1Q
- Quality of Service

### SFP PON parameters<sup>1</sup>

- Transmission medium — optical cable SMF — 9/125, G.652
- Split ratio — up to 1:64

- Received Signal Strength Indication (RSSI)
- DDM support (parameters output to CLI):
  - Digital RSSI
  - Module Temperature
  - Supply Voltage
  - Laser Bias Current
  - Tx Optical Power Output

### Class B+:

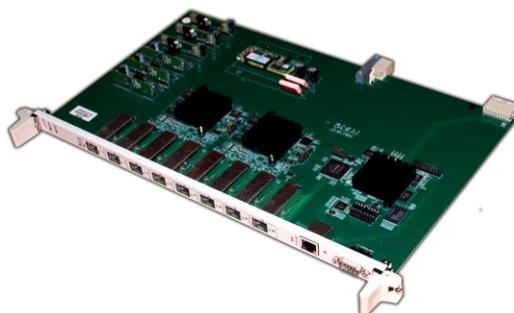
- Compliance with ITU-T G.984.2, FSAN Class B+, SFF-8472
- Maximum operating distance: 20 km
- Transmitter: 1490nm DFB Laser
  - Data rate: 2488 Mbps
  - Average launch power: +1.5..+5 dBm
  - Spectral line width: -20 dB 1.0 nm
- Receiver: 1310nm APD/TIA
  - Data rate: 1244 Mbps
  - Receiver sensitivity: -28 dBm
  - Receiver optical overload: -8 dBm

### Class C++:

- Compliance with ITU-T G.984.2, FSAN Class C++, SFF-8472
- Maximum operating distance: 40 km
- Transmitter: 1490nm DFB Laser
  - Data rate: 2488 Mbps
  - Average launch output: +7..+10 dBm
  - Spectral line width: -20 dB 1.0 nm
- Receiver: 1310nm APD/TIA
  - Data rate: 1244 Mbps
  - Average launch output: -32 dBm
  - Receiver optical overload: -12 dBm
  - Receiver Burst Mode Dynamic Range: 20 dB



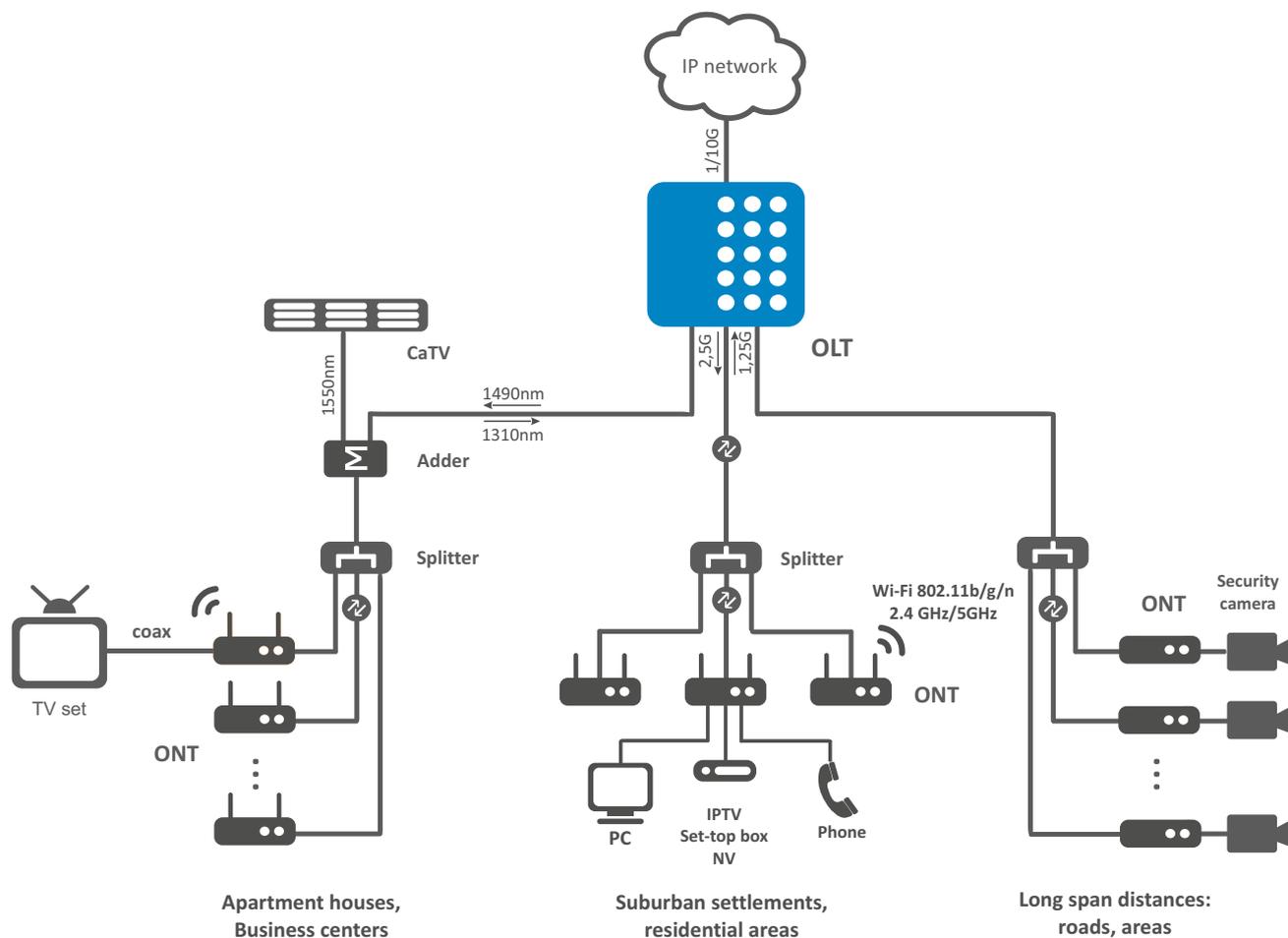
Management and switch module PP4X



Optical access module PLC8

<sup>1</sup> defined upon request

### Use case



### Ordering information

Name	Description
<b>MA4000-PX chassis</b>	OLT MA4000-PX, main chassis
<b>PP4X</b>	Ethernet switch PP4X, 2 ports 10/100/1000BASE-T/1000Base-X (SFP), 4 ports 10GBASE-X (SFP+)/1000BASE-X (SFP), L2+
<b>PLC8</b>	Optical Line Module OLT GPON, 8 ports SFP-xPON
<b>Power modules</b>	
<b>UEP2-3 frame</b>	19" frame, 3U, enables installation of up to 3 MP800 modules, 48V or 60V <sup>1</sup>
<b>MP800</b>	Power supply module, 13A, 48V, 48V or 60V <sup>1</sup>
<b>Relating software</b>	
<b>EMS-MA4000</b>	EMS-MA4000 option of Eltex.EMS system for Eltex network elements management and monitoring: 1 network element — MA4000-PX

<sup>1</sup>defined upon request

### Contact us

+7 (383) 274 10 01  
+7 (383) 274 48 48

eltex@eltex-co.ru

www.eltex-co.ru

### About Eltex

**Eltex** company is a leading Russian developer and manufacturer of telecommunication equipment with 30 years of history. Integrity of solutions and seamless integration capability into Customer infrastructure is a priority area of company development.