

# TYTAN-16E1



## Description of the device

**TYTAN-8E1/16E1** is a multiplexer of eight or sixteen E1 PDH channels, up to four Gbits/s Ethernet data streams and Ethernet management channel into an optical data stream for transport over fiber optic.

Device is designed for clients with requirements for both classic TDM PDH channels and high speed Ethernet.

Optical path can be realized using one or two line SFP interfaces.

### Line interfaces

Multiplexer is equipped with two SFP line interfaces dedicated for 3,125 Gbit/s transceivers. 2,5Gbit/s and 1,25Gbit/s SFP can be also optionally used on the line interfaces (with limited Ethernet data throughput).

### Physical Ethernet port separation

Three 1Gb/s SFP Ethernet slots and one 4xRJ45 group creates four independent physically isolated Ethernet channels. Four electrical interfaces creates one group with common throughput of 1Gbit/s.

TYTAN-8E1/16E1-ES version has additional separation of four Electrical RJ45 ports, which together creates seven independent Ethernet channels.

## Optical multiplexer 16x E1 G.703 2048kbit/s + 4Gbit/s Ethernet / FO with optical path redundancy

- Connection of four Gigabit Ethernet LANs plus 16 E1 G.703 2048kbit/s lines through a fibre optical link
- Optical path protection
- 4Gbit/s Ethernet data stream throughput using double optical line or 2,2Gbit/s Ethernet data throughput using single optical line
- FEC error correction
- Built-in four GigabitEthernet interfaces (four 10/100/1000 Mbit/s RJ45 electrical ports and three 1000 Mbit/s SFP ports)
- Physical Ethernet port separation
- Redundant power supply, 230V AC and 48V DC

### Protection of connection

While using two SFP optical line interfaces device realise partial optical path protection. If one optical path goes down, Ethernet data stream is redirected to second one, in accordance with particular Ethernet interfaces priorities. E1 channels' protection is carried out continuously, E1 lines are sent simultaneously through both optical line interfaces.

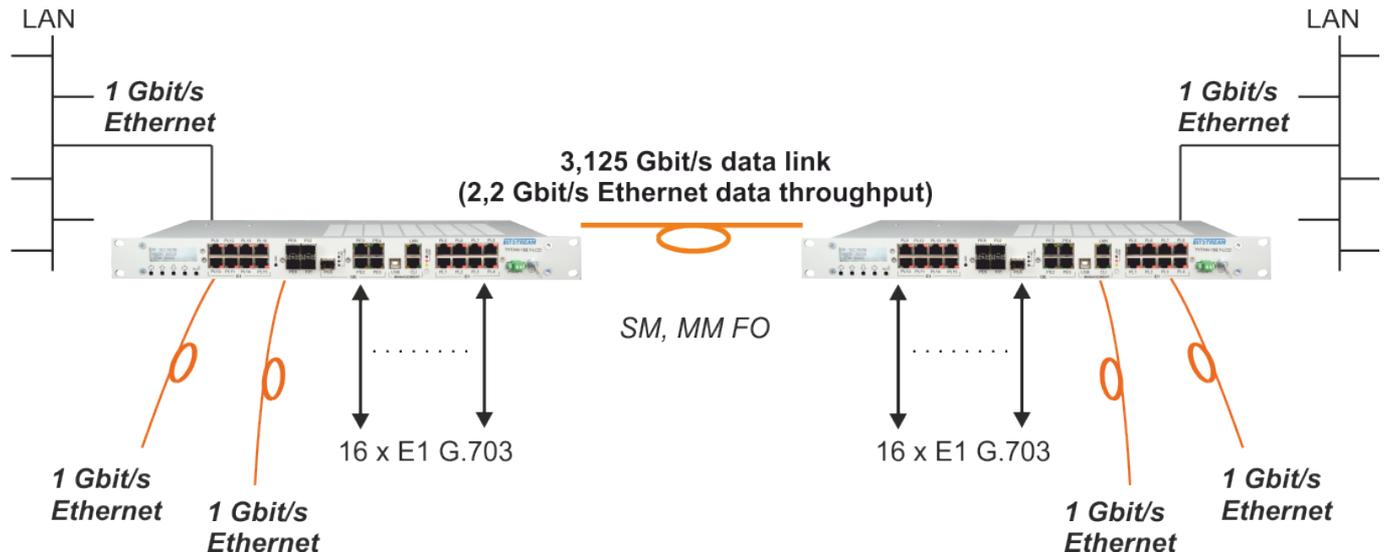
### VLAN, Q-in-Q

Available bandwidth for Ethernet stream can be divided into independent transmission channels by using Virtual Lan Network VLAN, according to 802.1ad.

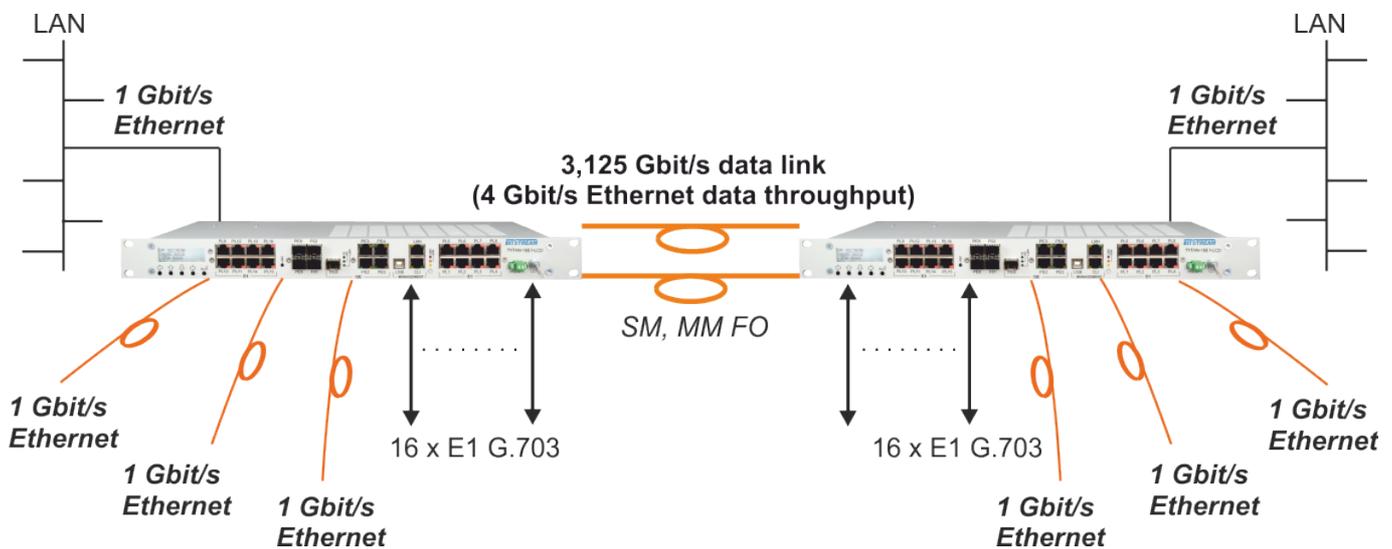
### QoS

Multiplexer TYTAN-8E1/16E1 support 'Best-in-class' Quality of Service (QoS) according to 802.1p. QoS support with four traffic classes, determined by Port, IEEE 802.1p tagged frames, IPv4's Type of Service (TOS) & Differentiated Services (DS), 802.1W VID, Destination MAC address, or Source Mac address.

# TYTAN-16E1



Rys. 1. TYTAN optical multiplexers connected by single optical line (16x E1 + 2,2Gbit/s Ethernet)



Rys. 2. TYTAN optical multiplexers connected by double optical line (16x E1 + 4Gbit/s Ethernet)

## Management

Embedded HTTP server, TELNET server and SNMP agent allows free configuration of the device performance by standard Web browser and continuous monitoring from any management platforms equipped with SNMP client. In addition,

built-in SMTP service daemon allows to notify the operator in case of system failure. Devices' management is carried out out-of-band using dedicated Ethernet port. Remote software update is supported to allow further functionality improving.

## Technical specifications

### Supported standards

- IEEE 802.3 10Base-T Ethernet
- IEEE 802.3u 100Base-TX Fast Ethernet
- IEEE 802.3u 100Base-FX Fast Ethernet Fiber
- IEEE 802.3ab 1000Base-T

- IEEE 802.3z Gigabit Fiber
- IEEE 802.3x Flow Control and Back-pressure
- IEEE 802.1p Class of Service (CoS)
- IEEE 802.1Q VLAN
- IEEE 802.1ad QinQ
- IEEE 802.3az EEE

# TYTAN-16E1

## Supported protocols

SNMP v1, DHCP Client, NTP, SMTP, RMON, HTTP, Telnet, Syslog, SNMP Inform, NTP Client

## Supported standards, recommendations and directives EMC and safety\*:

- EN 55011:2009+A1:2010 - Industrial, scientific and medical equipment– Radio-frequency disturbance characteristics Limits and methods of measurement,
- EN 55024:2010+A1:2015 – Information technology equipment. Immunity characteristics. Limits and methods, of measurement
- EN 60950-1:2006+A2:2013 - Information technology equipment. Safety. General requirements,
- EMC 2004/108/WE – Electromagnetic compatibility,
- LVD 2006/95/WE – Low Voltage Directive,
- EN 60825-1:2014 – Safety of laser products. Equipment classification and requirements.
- IEC 61000-4-2 Electromagnetic compatibility (EMC)- Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test,
- IEC 61000-4-3 Electromagnetic compatibility (EMC)- Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test,
- IEC 61000-4-4 Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test,
- IEC 61000-4-5 Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test,
- IEC 61000-4-6 Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields,
- IEC 61000-4-8 Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test,
- IEC 61000-4-11 Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests,
- IEC 61000-4-12 Electromagnetic compatibility (EMC) – Part 4-12: Testing and measurement techniques – Ring wave immunity test,
- IEC 61000-4-29 Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests.

\*The scope and list of supported standards may vary with the development of the device

## Ethernet interfaces:

- **Ethernet Ports:** 4 x 10/100/1000 Mbit/s RJ45, 3 x 1000Mbit/s SFP (range depends on the SFP modules specification, up to 200km for 100Mbit/s 100BASE-FX)
- **QoS:** Four traffic classes. Quality determined by: Port, IEEE 802.1p tagged frames, IPv4's Type of Service(TOS) & Differentiated Services (DS), IPv6's Traffic Class 802.1Q VID, Destination MAC address, or Source MAC address.
- **VLAN:** Full 64 VLAN IDs, 802.1Q, 802.1QinQ, multiple provider ports.
- **Rate limit:** 'Best-in-Class' per port TCP/IP Ingress Rate Limiting along with independent Storm Protection. 2 Ingress Rate Limiting buckets per port, supporting Rate-based and Priority-based rate limiting.
- **Port Mirroring:** Support for Port Monitoring/Mirroring across available ports.
- **MAC Address Table:** 1024 Entry

## Management:

- SNMP v1, TELNET
- HTTP protocol and web browser as a management application
- Out of band, by dedicated Ethernet port
- Through the RS232 console (RJ45, 9600,N,8,1) – preliminary configuration
- Implementation of G.826 for E1 and optical interfaces

## Power:

- Two power supplies (36-60V DC and 230V AC)
- Power supply redundancy (in case of one power source failing, device is automatically switched to second one)
- Up to 25W power consumption

# TYTAN-16E1

## Physical properties:

- Dimensions 483x170x44mm (1U, 19")
- Weight < 2,5kg

## E1 line interfaces:

- ITU-T G.703, 2048kbit/s
- 2048 kbit/s  $\pm$  50 ppm binary throughput
- 120 Ohm E1 impedance
- Line code HDB-3
- Connectors: 16 x RJ-45 – TYTAN-16E1
- Local and remote loop-backs

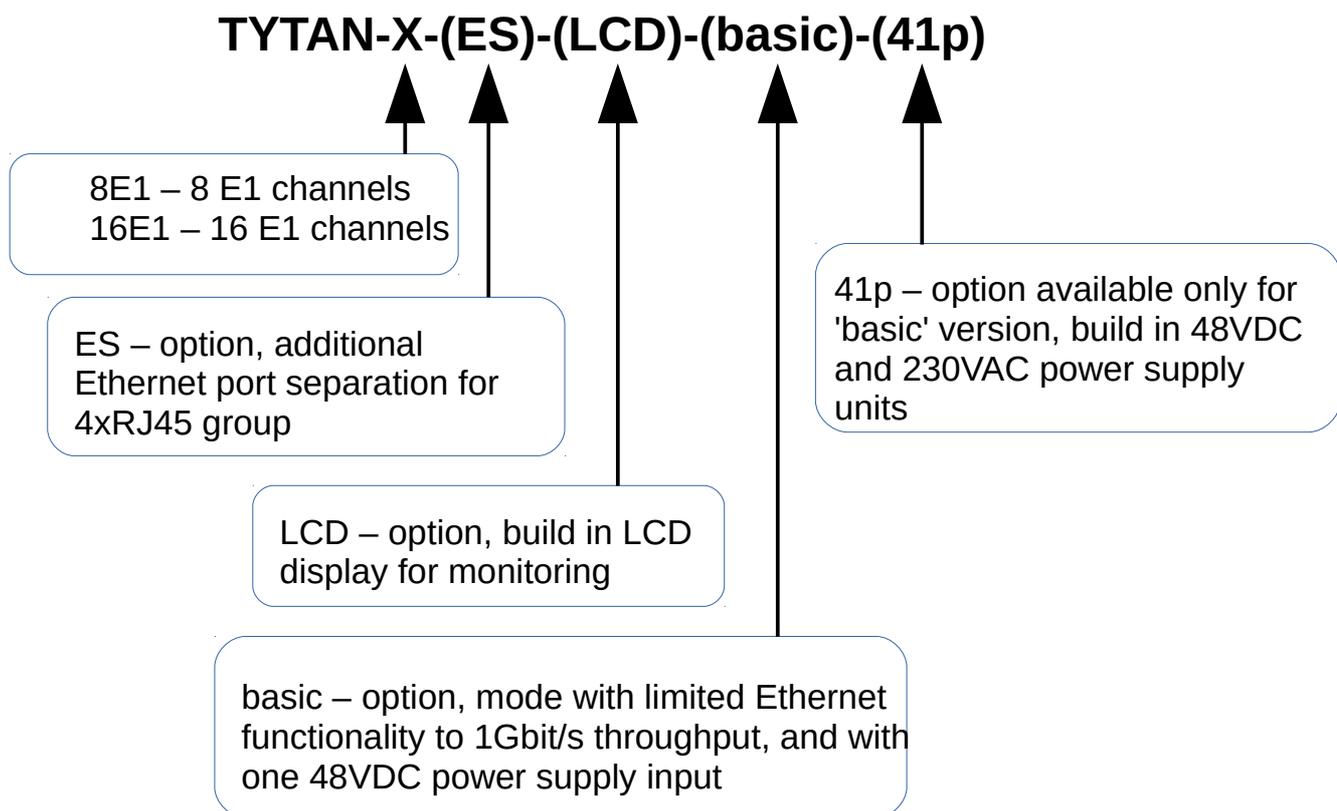
## Optical line interfaces:

- Possibility of use of one or two optical line interfaces
- 3,125 Gbit/s transmission speed (2,5 Gbit/s and 1,25Gbit/s data rate transceivers optionally)
- FEC error correction

## Environmental conditions:

- Operating temperature: +5 to +40°C
- Ambient Relative Humidity: 0 to 80 % (non-condensing),
- IP Rating: IP-30

Code



Examples:

**TYTAN-16E1****TYTAN-8E1****TYTAN-16E1-LCD****TYTAN-8E1-basic****TYTAN-8E1-basic-41p**

Optical multiplexer 16xE1 + 4Gbit/s Ethernet. Power 48VDC + 230VAC.

Optical multiplexer 8xE1 + 4Gbit/s Ethernet. Power 48VDC + 230VAC.

Optical multiplexer 16xE1 + 4Gbit/s Ethernet. Power 48VDC + 230VAC. Build in LCD monitoring module.

Optical multiplexer 8xE1 + 1Gbit/s Ethernet. Power 48VDC.

Optical multiplexer 8xE1 + 1Gbit/s Ethernet. Power 48VDC + 230VAC.

# TYTAN-16E1

## Additional accessories:

- **BTP-8524-S5CD** SFP 1,25G 850nm 550m, 0~70°C
- **BTP-3124-L2CD** SFP 1,25G 1310nm 20km, 0~70°C
- **BTP-3124-L4CD** SFP 1,25G 1310nm 40km, 0~70°C
- **BTP-5524-L4CD** SFP 1,25G 1550nm 40km, 0~70°C
- **BTP-5524-L8CD** SFP 1,25G 1550nm 80km, 0~70°C
- **BTP-5524-12CD** SFP 1,25G 1550nm 120km, 0~70°C
- **BTPB-5324-L4CD** SFP 1,25G 1550nm Tx/ 1310nm Rx, 20km, 0~70°C
- **BTPB-3524-L4CD** SFP 1,25G 1310nm Tx/ 1550nm Rx, 20km, 0~70°C
  
- **BTP-3148-L2CD** SFP 2,5G 1310nm 20km, 0~70°C
- **BTPB-5348-L2CD** SFP 2,5G 1550nm Tx/ 1310nm Rx, 20km, 0~70°C
- **BTPB-3548-L2CD** SFP 2,5G 1310nm Tx/ 1550nm Rx, 20km, 0~70°C
- **BTP-3148-L4CD** SFP 2,5G 1310nm 40km, 0~70°C
- **BTPB-5348-L4CD** SFP 2,5G 1550nm Tx/ 1310nm Rx, 40km, 0~70°C
- **BTPB-3548-L4CD** SFP 2,5G 1310nm Tx/ 1550nm Rx, 40km, 0~70°C
  
- **BTP-313G-L2CD** SFP 3,125G 1310nm 20km, 0~70°C
- **BTPB-533GL-L2CD** SFP 3,125G 1550nm Tx/ 1310nm Rx, 20km, 0~70°C
- **BTPB-353GL-L2CD** SFP 3,125G 1310nm Tx/ 1550nm Rx, 20km, 0~70°C
- **BTP-313G-L4CD** SFP 3,125G 1310nm 40km, 0~70°C
- **BTPB-533GL-L4CD** SFP 3,125G 1550nm Tx/ 1310nm Rx, 40km, 0~70°C
- **BTPB-353GL-L4CD** SFP 3,125G 1310nm Tx/ 1550nm Rx, 40km, 0~70°C
  
- **ZAS- ANYMUX-01** External Power supply 230VAC, 220VDC / 48VDC, 30W