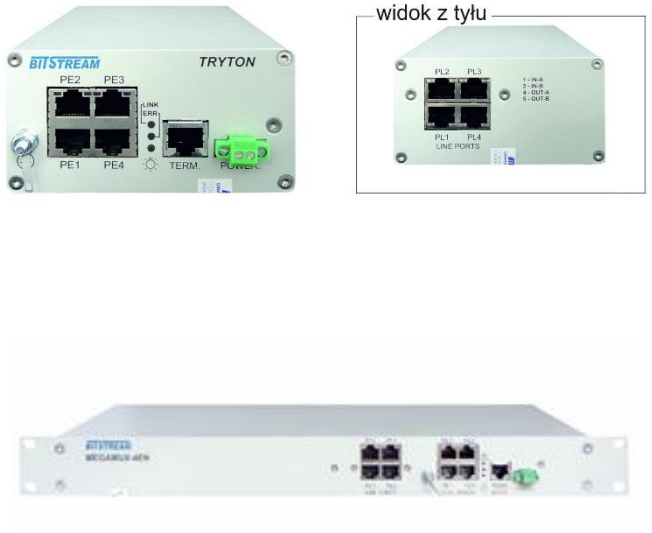

TRYTON Ethernet over 4xE1 (G.703/G.704) channel Inverse Multiplexer/Concentrator

- Connects Fast Ethernet LANs over up to four E1 line (8192 kbps)
- Framed (G.704) and unframed E1 interfaces (selectable)
- Two working modes:
- Multiplexer: bridges two LANs over E1 channels
- Concentrator: collects traffic from different LANs connected by 1-4 E1 channels
- Built-in 4-port Ethernet switch with an array of 1000 MAC addresses
- IEEE 802.1q support. Possibility of defining up to 15 VLAN networks (full range VID) in order to create independent transmission channels
- Possibility of limiting bandwidth of the Ethernet ports
- Automatic E1 channel failure detection, removal and addition of E1 channel, smooth adjustment of Ethernet bandwidth
- Two synchronization modes: internal or external clock
- Local and remote loopbacks on E1 interfaces
- SNMP, WWW, TELNET, management, SNTP, Syslog support

Description of the device

Functionality

TRYTON device is an Ethernet over E1 inverse multiplexer/concentrator with four E1 (G.703/G.704 2048kbit/s) interfaces. It allows connection of Ethernet network using one to four E1 channels aggregating their band. **TRYTON** device is able to operate in two working modes:

- **Inverse multiplexer:** Device divides Ethernet stream into 4 E1 channels and then, in the second device, different E1 channels are multiplexed into one channel, where the main stream of Ethernet packages is restored
- **Concentrator:** Device collect traffic from different LANs connected by nxE1 lines (n from 1 to 4).

TRYTON device supports framed and unframed E1 transmission. In framed E1 transmission mode User can insert Ethernet traffic into selected timeslots with optional use of CRC-4 cyclic redundancy check.

Transmission channel created by multiplexed E1 lines may be divided into independent transmission channels through the virtual VLAN mechanism. Up to 16 independent VLANs are supported (full range VID: 0-4095). VLAN tag/untag options, per-port basis.

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. **TRYTON** provides wide range of diagnostic options, including: local and remote E1 loops, E1 and Ethernet transmission statistics, ES, SES, UAS thresholds according to G.826.

Device management is carried out out-of-band using dedicated Ethernet port or in the band through any Ethernet port. Remote software update is supported to allow further functionality improving **TRYTON** device is powered from DC voltage from 12 to 60V power supply or from an external adapter in case of AC voltage. Total power consumption does not exceed 6W. Device is also avaible in 1U 19' chassis as **MEGAMUX-4EN** and as **TRYTON-R** in rack-card version suitable for mounting in RCK-ANY-02 rack shelf. (Up to eight TRYTON-R rack-cards can be installed within one 3U rack shelf).

MULTIPLEXER WORKING MODE:

In multiplexer mode by using 4 E1 channels, it is possible to obtain the maximum throughput of 8.192 Mbit/s for Ethernet packages. The malfunction of a single E1 channel, regardless of a direction, causes its automatic switch off and no loss of packages. In case the line is back in operation, such a condition is automatically detected by the device and the transmission in the channel is restored. **TRYTON** tolerates maximum 50ms delay variance between E1 channels, allowing to transmit particular E1 through varius transmission paths.
A standard application is presented in the drawing below.

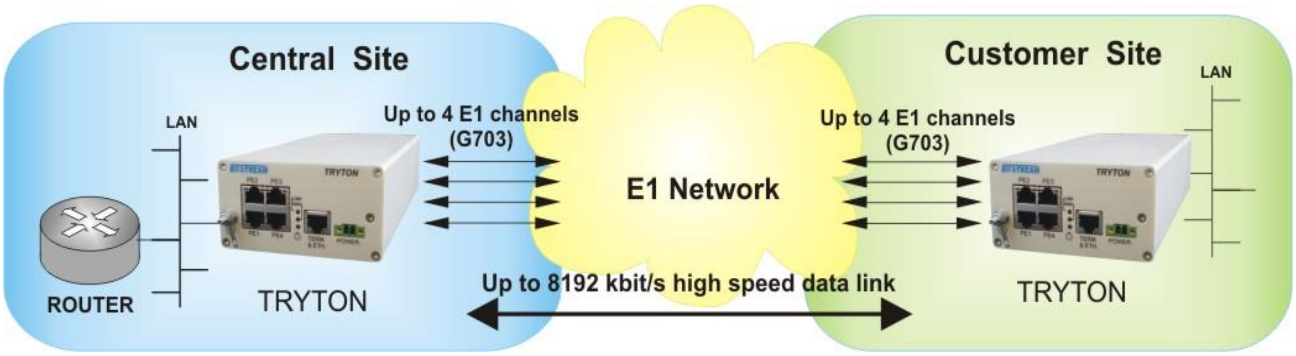

Fig. 1. Example application connecting two using modems.

CONCENTRATOR WORKING MODE:

TRYRON can be also used to collect traffic from different LANs connected by nx E1 lines (n from 1 to 4). **TRYTON** working as a concentrator can distribute traffic according to:

- **MAC addresses**: Ethernet transmission is directed according to MAC table. Point to multipoint (each customer site is connected to central site without communication between particular customer sites) and multipoint to multipoint options are available (with communication between customer sites)
- **VLAN IDs**: Each VLAN is mapped into specific E1 interface. User can connect trunk link to device and then distribute particular VLANs between selected E1 interfaces.
- **Ethernet ports numbers**: Each Ethernet port is mapped into specific E1 interface

A standard application is presented in the drawing below:

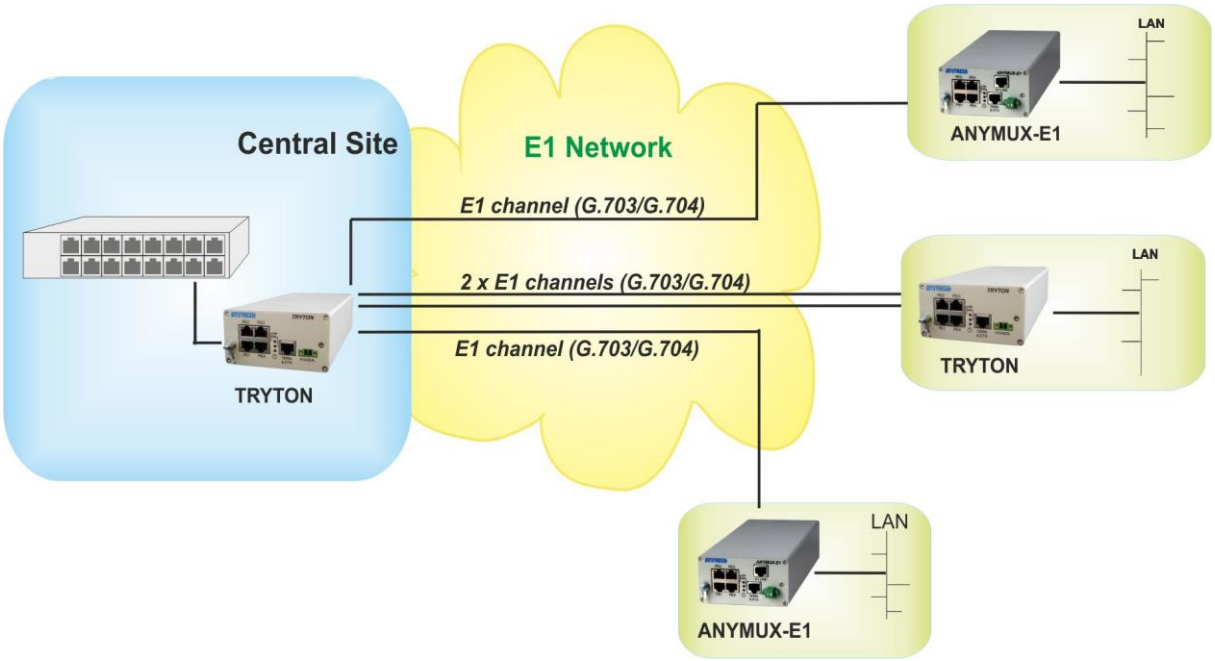

Fig. 2. Example application connecting ANYMUX-E1 and TRYTON.

Technical specifications

Supported transmission standards

- IEEE 802.3 10Base-T Ethernet
- IEEE 802.3u 100Base-TX Fast Ethernet
- IEEE 802.1q VLAN
- ITU-T G.703
- ITU-T G.704

Supported protocols

- Function „autocrossover" MDI/MDIX
- Full/half duplex
- Flow control function
- Linear code HDB-3

Supported standards, recommendations and directives EMC Security*:

- PN-EN 55011:2012 - - Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
- *PN-EN 55022:2010/AC:2011 - Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement*
- *PN-EN 55024:2011/A1:2015-08* – Electromagnetic compatibility (EMC) - Information technology equipment immunity characteristics - Limits and methods of measurement
- *PN-EN 60950-1:2007/A2:2014-05- Information technology equipment*–Safety– Part 1: General requirements
- *EMC 2004/108/WE* – Electromagnetic Compatibility Directive
- *LVD 2006/95/WE* – Low Voltage Directive
- 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

*- list of supported standards may vary with the development of the device

Line interface 2048 kbit/s

- Framed and unframed, G.703 and G.704 compliance
- 2048 kbit/s ± 50 ppm binary throughput
- 120 Ohm E1 impedance
- Line code HDB-3
- Clock: internal or external
- Types of connectors: RJ-45

Ethernet port

- Baud rate 100/10Mbit/s
- Flow control function
- Autocrossover function MDI, MDI-X
- Support for VLAN, IEEE 802.1q
- Connection state signalling
- 4x RJ-45 connector

Multiplexation

- Number of E1 channels: 4
- Maximum delay difference between E1 channels of up to 50 ms
- HDLC encapsulation

Management

- SNMP, Telnet
- HTTP protocol and web browser as a management application
- SMTP -send e-mail message in case of failure
- Out of band, by dedicated Ethernet port or in the band through any Ethernet port, RS232 console
- Implementation of G826 statistics for E1 interfaces

Dimension

- Housing: 483 x 170 x 44 mm (MEGAMUX-4EN)
- Housing: 103x230x53mm (TRYTON)
- Weight < 1kg

Environmental requirements

- Operating temperatures: +5° do +45°C

Power supply

- Supply voltage range 12 to 60V DC
- Optional l power supply, 230VAC/48VDC
- Up to 6W power consumption

Code

TRYTON-(X)

Available Versions:
Without symbol – Standalone version.
R* – In rack card version for mounting in RCK-ANY-02 rack shelf

* - Up to eight ANYMUX-E1-R racks-cards can be installed

Additional accessories:

- **ZAS-ANYMUX-01** Power supply 230V AC(DC) / 48V DC 0,5A, 0 +50^{O}C
- **RCK-ANY-02** Rack shelf for eight TRYTON-R rack cards

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