

# Gigabit Ethernet Train Backbone Node

KONUENDO NETWORKING



**VDS Rail**  
The onboard networking  
company



The Ethernet Train Backbone Node (ETBN) is used when two or more trains need to be connected together. ETBN has been specially designed to meet the requirements specified by IEC standards for the train Ethernet backbone network.

Double switched backbone lines protected by a bypass relay ensure high levels of fault tolerance also in the case of a power failure. A couple of ETBN can be used together using an active/passive redundant configuration to obtain the maximum level of protection.

A routed port is available to connect the backbone to the consist network. IEC Train inauguration procedure is fully supported. Routing and address translation rules for multiple consist networks interconnections are automatically defined during Train inauguration.

On the consist side, the TTCMP<sup>®</sup> protocol provides automatic device configuration and continuous monitoring giving the customer a way to reduce commissioning and maintenance costs.

Designed to operate in harsh environmental conditions typical of rolling stock applications, the ETBN can be powered from 24 Vdc to 110 Vdc nominal voltage.

Fully EN 50155 compliant, the ETBN provides the highest level of reliability and robustness required by the railway industry.

## Technical specifications

### Management

- Device bypasses for maximum reliability
- Extended RMON counters
- Fallback firmware image for maximum reliability
- IPv4 protocol supported
- In-band (SSH) and out-of-band (console) CLI interface for device management
- In-band and out-of-band firmware upgrade
- Train Topology and Configuration Management Protocol (TTCMP<sup>®</sup>) for automatic device configuration
- RADIUS authentication
- Simple Network Management Protocol (SNMP) v1/v2c/v3

### Layer 2 features

- Five (5) GbE Ethernet ports (4 switched, 1 routed)
- Wire-speed switching
- Auto MDI/MDIX
- Four (4) output hardware queues for each port
- Up to 8192 MAC addresses
- DSCP/802.1p Class of Service
- Ingress/egress rate limiting
- Link Layer Discovery Protocol (LLDP 802.1ab)
- Strict priority or weighted (WRR) scheduler

### Layer 3 features

- Support for IPv4 protocol
- Integrated DNS and DHCP servers
- R-NAT (railway 1:1 NAT)
- Router Redundancy Protocol
- Static routing
- Dynamic routing following train inauguration
- Train-wide standard multicast routing

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## PHYSICAL DATA

<b>System status indicators:</b>	8 LEDs
<b>Gigabit Ethernet connectors:</b>	M12, female, 4-ways, X-coding
<b>Power supply connector:</b>	M12, male, 4-ways, A-coding
<b>Maintenance ports connector:</b>	M12, female, 8-ways, A-coding
<b>Power supply voltage range (insulated):</b>	
24 Vdc nominal	14,4 Vdc ÷ 34 Vdc, according to EN 50155
37,5 Vdc nominal	23 Vdc ÷ 42,5 Vdc, according to IEEE Std 1476-2000
48 Vdc nominal	28 Vdc ÷ 68 Vdc, according to EN 50155
72 Vdc nominal	43 Vdc ÷ 109 Vdc, according to EN 50155
96/110 Vdc nominal	66 Vdc ÷ 154 Vdc, according to EN 50155
<b>Power supply class:</b>	S2, according to EN 50155
<b>Power consumption:</b>	15 W max
<b>Overall dimensions:</b>	207 x 184 x 51 mm
<b>Weight:</b>	2,0 Kg
<b>Operating temperature:</b>	
<b>Standard</b>	-25 ÷ +70 °C (+85 °C for 10 min. according to EN 50155 class OT3 with extended operating temperature ST1)
<b>Optional</b>	-40 ÷ +70 °C (+85 °C for 10 min. according to EN 50155 class OTX with extended operating temperature ST1)
<b>Relative humidity (non-condensing):</b>	0 ÷ 95 %
<b>Storage temperature:</b>	-40°C ÷ +85°C
<b>Degree of protection:</b>	
<b>Standard</b>	IP40
<b>Optional</b>	IP54, IP65

## APPROVALS / COMPLIANCE

<b>EN 50155</b>	Railway Applications (Electronic equipment used on rolling stock)
<b>EN 50121-3-2</b>	Electromagnetic compatibility rolling stock apparatus
<b>IEC 60068-2-1</b>	Environmental testing: Tests - Test Ad: Cold
<b>IEC 60068-2-2</b>	Environmental testing: Tests - Test Bd: Dry heat
<b>EN 60068-2-30</b>	Environmental testing - Test Db variant 2 – Damp heat
<b>EN 61373:2010/AC</b>	Shock & Vibration - Category 1 class B

## APPROVALS / COMPLIANCE

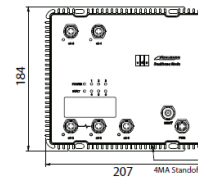
<b>EN 50124-1</b>	Insulation coordination
<b>EN 45545-2</b>	Fire & Safety standard

## INTERNETWORKING STANDARDS

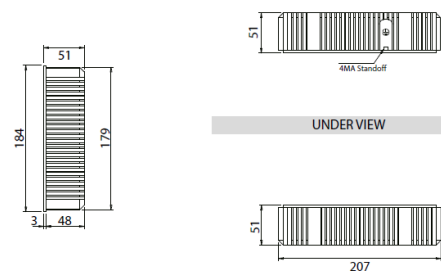
<b>IEEE 802.3ab</b>	Gigabit Ethernet
<b>IEEE 802.1Q</b>	Tagged VLANs
<b>IEEE 802.1D</b>	Spanning Tree Protocol
<b>IEEE 802.1w</b>	Rapid Spanning Tree protocol
<b>IEEE 802.1X</b>	Port-based network access control
<b>IEEE 802.1AB</b>	Link Layer Discovery Protocol (LLDP)
<b>IEEE 802.3ad</b>	Link Aggregation Protocol (LACP)

## Wall Mounting

Dimensions only for reference



FRONT VIEW



SIDE VIEW

TOP VIEW