Ethernet Switching Unit (1U ESU)

EN 50155
EN 45545
IEC 61375-3-4

MODULE FUNCTIONS

The Trainnet® Ethernet Switching Unit (1U ESU) is an Ethernet switch used to build Ethernet Consist Networks (ECN). It can also be used to create an Ethernet train bus in the case of a fixed trainset with no need for automatic inauguration.

The Trainnet® 1U ESU module implements the ECN link layer function of the IEC 61375-3-4 Train Communications Network Standard. The Ethernet technology's large bandwidth (typically 100 Mb/s) is particularly suitable for data intensive systems like video surveillance or Passenger Information Systems.

KEY FEATURES

The Trainnet® 1U ESU has 15 Ethernet ports which can have different properties. Three port technologies are available:
→ 10/100 Mbit/s Full Duplex Ethernet port with auto MDI/MDIX M12 connectors
→ 10/100 Mbit/s Full Duplex Ethernet port with auto MDI/MDIX M12 connectors and Power-over-Ethernet (PoE).
→ 1 Gbit/s optical fiber SFP port for larger bandwidth (single fibre, multimode fibre or copper cables) The PoE functionality provides power to cameras, intercoms and other low-power equipment *via*

the Ethernet cable, thus simplifying and reducing train cabling. The PoE power supply module (PSE) is used to provide 48 V DC from different train battery voltages to 1U ESU modules. Up to three power supplies (PSE) can be used together with two ESU modules in one 3U 19" rack to provide a standalone switch with a total of up to 30 ports including 24 ports with PoE.

The Ethernet ports are located on module's front panel and communication to the gateway is done *via* one of the Ethernet ports. The device also supports link aggregation to provide redunancy and increased data transfer capabilities. Port mirroring can be used to copy packet data seen on a switch port to another port for diagnostics and monitoring purposes. The car can also be equipped with two redundant Trainnet® 1U ESU modules to increase system reliability. If the principal module fails, the secondary module takes over the functionality.

The 1U ESU provides connectivity to the consist network switches in a ring configuration (allows redundancy), or by connecting ports directly to end devices. The switch provides services such as Dynamic Host

Configuration Protocol (DHCP) in order to assign IP addresses to end devices automatically. The management processor provides also VLAN configurations Layer 3 switching. It enables diagnostic functions such as the identification of faulty cables and PoE monitoring.
It features a non-blocking (QoS Layer 2) switching architecture.

OPTIONS

Port combinations (2 options available to meet different technical requirements)**:**
→ 12 x 10/100 with PoE + 1 x 10/100 + 2 x SFP (ESU1906A)
→ 15 x SFP (ESU2250A)

FEATURE SUMMARY

The features of the 1U ESU module also include: Configuration from ESN through CPG/CPS and backplane serial link, single configuration database for the whole train (LLDP based switch identity), Link Layer Discovery Protocol (LLDP), Rapid Spanning Tree Protocol (RSTP), Link Aggregation Control Protocol, Virtual LANs, Internet Groupe Management Protocol (IGMP), rate limiting, port monitoring, port RMON statistics counters, PHY configuration port enable/disable, PoE control and statistics, and process data export.

TECHNICAL SPECIFICATIONS

Dimensions (W x H x D)
84 TE x 1 U x 160 mm

Weight
550 g

Input Power
5 V DC ± 5 % (4 A max., 1.5 to 2.5 A typ.)

Temperature Range (operational)
-40 ºC...+70 ºC

MTBF (40 ºC ambient temperature)
550 000 h (ESU1906A)
640 000 h (ESU2250A)

Ethernet Interfaces
ESU1906A
12 x 10/100 Mbit/s with PoE, M12
1 x 10/100 Mbit/s, M12
2 x 1 Gbit/s available in SFP module slot
ESU2250A
15 x 1 Gbit/s available in SFP module slot

Switching Buffer Memory
2 Mbits

Management CPU
Blackfin DSP, 500 MHz, 100 Mbit/s Ethernet

Flash Memory
8 MB

RAM
16 MB