



# Transportation

## Road Transport Applications



# 35 years at the leading edge of industrial data communications

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*Specifications are subject to change without any notice or obligation on the part of the manufacturer, May 2010. © Westermo Teleindustri AB .*

Westermo provides a full range of data communications solutions for demanding applications in the transport, water and energy markets among others. For the past 35 years, we have been at the forefront of technological development and often pushed the limits of what is technically possible.

The staff at Westermo offers the highest possible service to help customers to select, configure and install the best solution for their specific needs. Our knowledge goes far beyond our own product range, regardless of whether the installation is in a substation, water treatment plant or alongside a railway.

In order to provide the best possible support, we have local presence in more than 35 countries through our authorized distributors and own offices.

Since 2008 Westermo has been part of the Beijer Electronics Group, a company with unique knowledge of the HMI and industrial automation business.

## Do you want to learn more?



Do you want to know more about the entire Westermo product range? Order the Product Guide or visit our website: [www.westermo.com](http://www.westermo.com)



On our RedFox website you will find the latest news about our most advanced routing switch. Download data sheets, user guides, watch video tutorials on FRNT, VLAN, IGMP and much more at: [www.redfoxindustrial.com](http://www.redfoxindustrial.com)



# Westermo – A Worldwide Road Network

As road traffic volumes increase worldwide new technologies are being used in traffic management systems to increase both traffic flow and safety. Reliable data communications are vital to keep our ever increasingly busy world moving.

Westermo have many years experience in both data communication technologies and roadside applications. Our real expertise is in developing products that can function in these often harsh environments by meeting the widest temperature specifications and offering high reliability by using only high quality components.

Westermo is familiar with mission critical applications in many industries and has therefore developed products and techniques that solve many of the specific needs of the road market. The patented Westermo FRNT protocol allows for the fastest ring recovery in Ethernet networks – 20 ms for a ring with 200 switches. Our Wolverine range is developed around a technology that allows the creation of Ethernet networks on old installed copper cables that can stretch for tens of kilometres along the roadside.

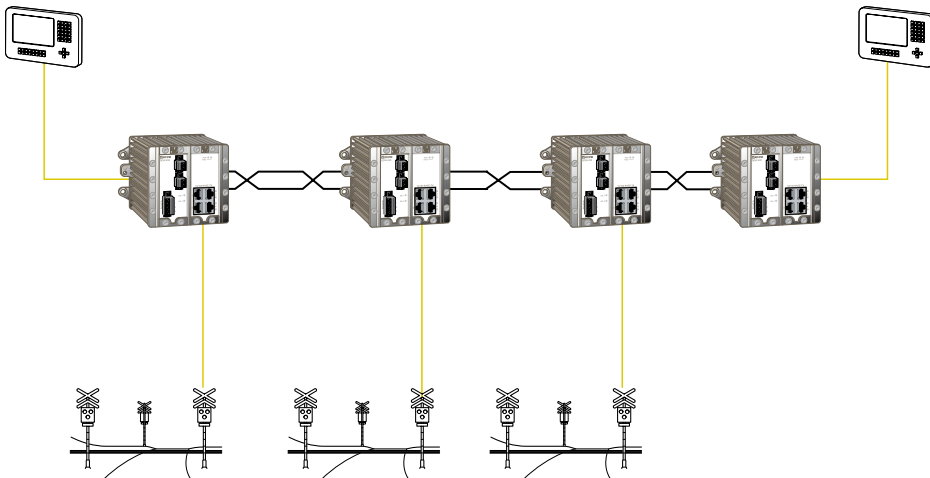


### Wolverine Series

The Wolverine series utilises SHDSL technology on twisted pair cables to establish a high-speed remote connection. Instead of needing to install fibre cable, the SHDSL technology can provide a cost-effective solution by using old or existing cables. Data rates up to 15.3 Mbit/s and an operating distance of up to 15 kilometres (9.3 miles) at lower data rates can be achieved. Depending on which unit you choose, there are also features like a built-in four port switch to provide a complete network solution, redundant ring protocol with the worlds fastest recovery time (FRNT, 20 ms), serial to IP conversion allowing legacy devices on your Ethernet network and much more.



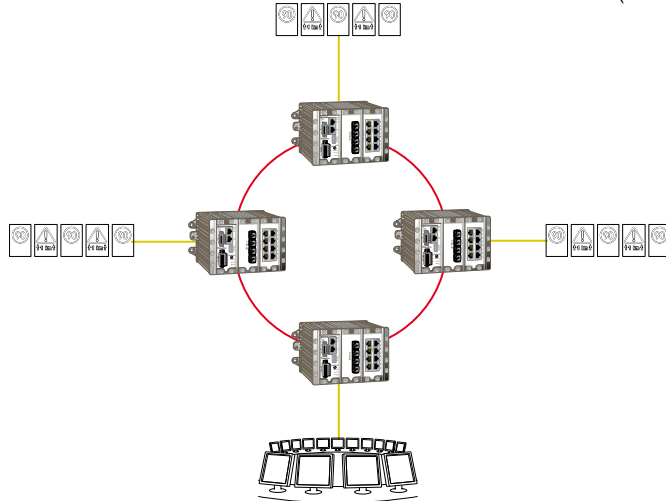
- ⌘ Re-use of old cables
- ⌘ IP40
- ⌘ -40°C to +70°C (-40°F to 158°F)
- ⌘ Transient Blocking Unit



**RedFox Series**

The RedFox is a high performance industrial Ethernet switch with enhanced routing functionality, in a single robust unit. A single RedFox Ethernet Switch allows you to build cost effective, secure and reliable networks that would previously have required several different units. The feature-rich firmware and highly specified hardware provide flexibility and enhanced performance when building complex networks.

- ⌘ Redundant ring on the SHDSL interface
- ⌘ Advanced Diagnostics
- ⌘ VLAN support and IGMP Snooping
- ⌘ VPN support and IGMP/v3
- ⌘ Static Routing and Firewall
- ⌘ -40°C to +70°C (-40°F to 158°F)

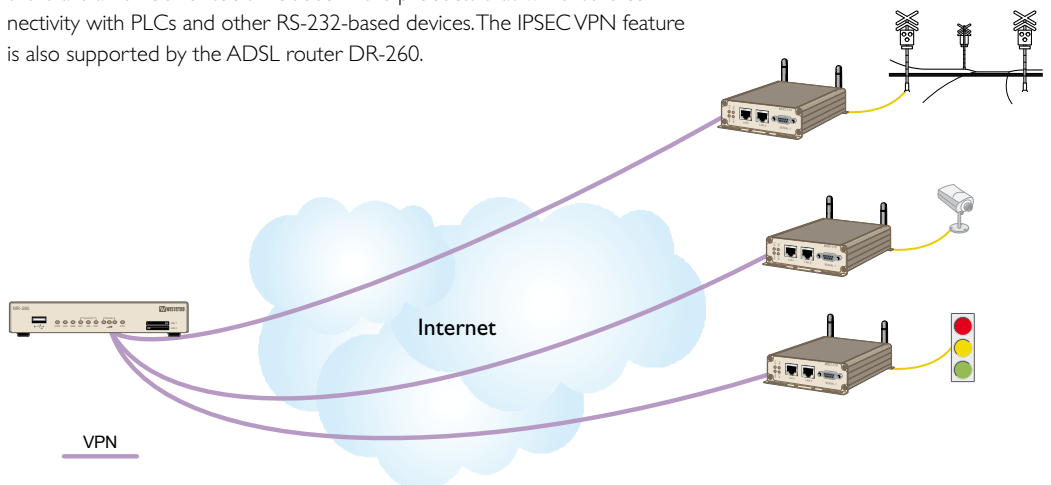


**Secure remote connectivity with VPN over 3G and ADSL**

When the Internet is used as part of the communications infrastructure it is important to ensure the traffic is secure. By using IPSEC encrypted VPNs the data will be secured using the most sophisticated encryption algorithms currently available.

The 3G routers MRD-310 and MR-260 used in this example have support for IPSEC VPN with encryption. To extend the life of legacy equipment there are a number of tools included in the products that will ensure connectivity with PLCs and other RS-232-based devices. The IPSEC VPN feature is also supported by the ADSL router DR-260.

- ⌘ Supports a wide range of wireless standards
- ⌘ Secure communication with VPNs
- ⌘ Wide legacy equipment support with serial ports
- ⌘ Extended temperature range



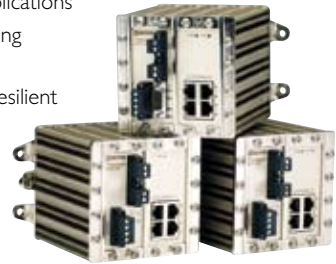


### Wolverine Ethernet Extender

The Wolverine family of Ethernet extenders allows effective Ethernet networks to be created over long distances (up to 15 km) at data rates up to 15.3 Mbit/s. The SHDSL technology makes it possible to reuse many types of pre-existing copper cables which can lead to considerable financial savings. Dependent on cable characteristics, distances up to 15 km (9.3 mi) can be achieved. The Wolverine is powered by the WeOS operating system allowing complex networking functions to be easily configured. For simple applications, no configuration is required making the unit ideal for rapid installation.



- ⌘ Save time and money reusing old cables
- ⌘ Designed for use in harsh industrial applications
- ⌘ Robust for long service life
- ⌘ Secure and resilient networking



### TD-36/TD-36 485 – Telephone modem

The TD-36/TD-36 485 is designed to function reliably within industrial environments and in areas of high level interference. The TD-36 has an RS-232 interface and the TD-36 485 has an RS-232 and RS-422/485 interface supporting terminal data rates up to 115 kbit/s. The TD-36/TD-36 485 are V.34 modems meaning that they can support bidirectional data rates of up to 33.6 kbit/s on the PSTN or leased line side. Fast connect ensures that leased lines can re-establish connections in the range of 5 seconds.



- ⌘ Extended temperature range  $-25^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$  to  $+158^{\circ}\text{F}$ )
- ⌘ Data rate up to 33.6 kbit/s
- ⌘ Terminal rate up to 115.2 kbit/s
- ⌘ V.23 FDX/HDX with multidrop
- ⌘ Transient protection
- ⌘ Tri-galvanic isolation (Interface/line/power)
- ⌘ Remote configuration
- ⌘ EN-50121-4 compliant



## Compact Ethernet Switch

The Lynx family consists of layer 2 and 3 industrial Ethernet switches, powered by the Westermo WeOS network operating system. Lynx is the most compact switch on the market and has the lowest power requirements in this class of switch. Lynx has 8 10/100 Mbit/s ports in addition to 2 ports which can be fitted with Gbit or 100 Mbit SFP transceivers. Lynx DSS has 4 10/100 Mbit/s ports in addition to 2 ports which can be fitted with Gbit or 100 Mbit SFP transceivers. One of the two serial ports is configured for RS-232 the other one can be configured for RS-232 or RS-422/485.



- ⌘ Compact Industrial Ethernet switch design
- ⌘ Designed for use in industrial applications
- ⌘ Robust for long service life
- ⌘ Unique future proof industrial networking solutions



## Industrial Routing Switch

RedFox is designed for industrial application with many functions designed for easy use. The high bandwidth design allows for up to 8 Gbit ports as well as having other ports that can deliver 10/100 Mbit. The RedFox is powered by WeOS (Westermo Operating System) which is our cross platform solution providing strong future proofing and ease of use.



- ⌘ High performance and configurable
- ⌘ Designed for use in harsh industrial applications
- ⌘ Robust for long service life
- ⌘ Unique future proof industrial networking solutions



## Fibre Optic Modems

The ODW series is designed for point-to-point or redundant ring connections between RS-422/485 networks or devices. The ODW is designed for harsh industrial usage as well as road or railway installations meeting industrial level EMC specifications and having a wide operating temperature range.



- ⌘ Converter serial interface – optical fibre
- ⌘ Point-to-point or ring communication via fibre optical network
- ⌘ Serial interface, synchronous or asynchronous mode
- ⌘ Designed for harsh environments





# Traffic Warning System Saves Lives

Throughout the busy Danish road network there are a number of recently installed advanced traffic management solutions that keep the traffic moving freely and above all safely. The Danish Ministry of Traffic have the ultimate responsibility for the roads in Denmark, but many of the safety and automation solutions are designed and installed by companies like Swarco.

Swarco were founded in Austria at the end of the 60's, but have grown to be a global provider of traffic automation solutions. Today the Swarco group consists of more than 60 companies located all over the world. Their core business is to provide modern traffic safety and automation solutions.

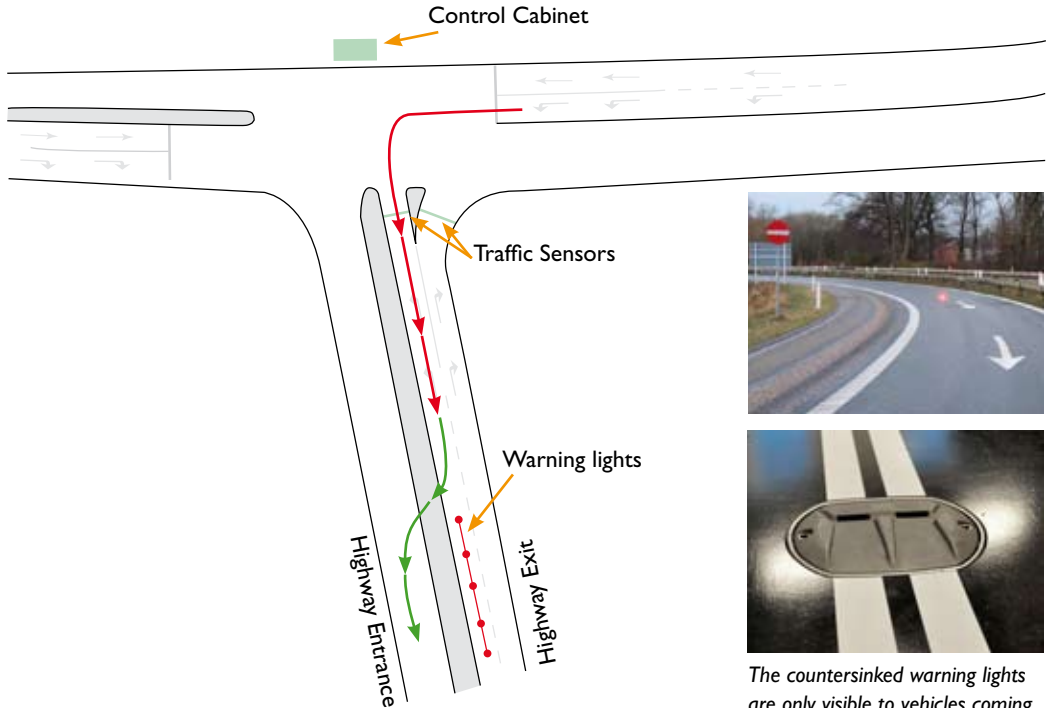
In Denmark, Swarco has specialised in smart solutions for traffic and infrastructure, and are now considered the market leader for intelligent transport systems. Installations can be found all over Denmark on roads, railway and in car parks. The company contribution to society is increased mobility, improved road safety and solutions that have a positive impact on the environment.

One of the many requirements from the Danish Ministry of Traffic was improvement of the safety at several multi-lane highway entries where serious accidents had occurred in the past. Despite numerous warning signs, there were still occasions where drivers have made a wrong turn when entering the highway and ended up driving into the oncoming traffic, particularly at night or in bad weather. A system has been developed to help guide drivers onto the correct lane if possible. At sites where it is not possible to change lane, the flashing lights will get the drivers attention

Manufacturer:  
**swarco** 

Product provider  
**incom**  
*Quality In Communications*





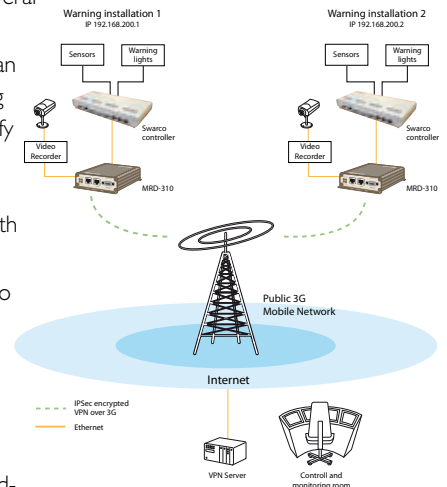
*The countersunk warning lights are only visible to vehicles coming from the “wrong” direction.*

and they will hopefully stop the car. This system has been installed in seven different locations and has already been put to the test on several occasions.

A sensor in the road at the beginning of the highway entry triggers an alarm if a car passes it from the wrong direction. Emergency warning lights in the road are immediately activated and start flashing to notify the “wrong turners” that they are driving in the wrong direction. When the system activates, an alarm could be sent via email and SMS to the control centre where the situation can be monitored with traffic surveillance cameras.

A cabinet at the side of the road holds the control system. A Swarco designed controller, manages all the local control and communications. For remote connectivity, Swarco has chosen the Westermo MRD-310 industrial 3G router. The transparent 3G router provides easy remote access to the controller over a secure IPsec encrypted VPN tunnel. Using the HSUPA (High Speed Uplink Packet Access) protocol, the downlink capacity is up to 7.2 Mbit/s allowing high bandwidth devices like video recorders to be used on the system.

Over a seven month period on the seven sites, four cases of wrong turns have been reported. In three of the cases the vehicles changed lane when the warning system activated and in the final case the situation could be immediately monitored and action taken to minimise the risk to the road users. The seven installations are being tested until 2013, but with these positive outcomes and potentially lives saved, it is likely that this solution will be deployed at many more sites in Denmark.



*The traffic warning systems can easily be monitored and controlled from a central control room using the MRD-310.*

*The MRD-310 is a 3G router that allows a secure IP connection to be established using IPsec encrypted VPN tunnels.*



# Gothenburg Uphill Slope (Road 40, Sweden)

*The Gothenburg uphill slope between Jönköping and Gothenburg has been known to be a stretch of road to avoid during wintry conditions. At wintertime, the slippery uphill road has led to traffic jams and dangerous traffic situations.*

Swedish National Road Administration built a heated third lane at the steepest part of the slope to avoid congestion of the traffic. Alongside of the road there is a fibre backbone that connects control and monitoring equipment such as traffic surveillance cameras, weather equipment and control devices to a control room. Wetenet, a branch organisation of Jönköping Energy, built the data communication solution.



As Swedish National Road Administration required a reliable and robust data communication solution, Patrik Casta, project manager at Wetenet/Jönköping Energy chose the robust Ethernet Switch Lynx from Westermo. The main argument for choosing Lynx was the small format housing with DIN-clip, a wide temperature specification and the high reliability.



## Westermo Quality and Delivery

Westermo design and manufacture robust data communication devices for harsh environments. We supply products that provide the communication infrastructure, derived from proven commercial technology, for control and monitoring systems that are used in mission critical solutions where commercial grade products are not sufficiently resilient.

To ensure the highest quality products, Westermo has a state of the art industrial electronics manufacturing facility in Sweden. To maximise the reliability of the product, testing is carried out at many stages of the manufacturing process.

- ⌘ Manufacturing to IPC-A-610 under ISO9001-2008 QMS
- ⌘ Solder Paste Inspection and Automated Optical Inspection
- ⌘ X-ray examination and PCB testing
- ⌘ Functional testing
- ⌘ Burn-in testing to EN-50155





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