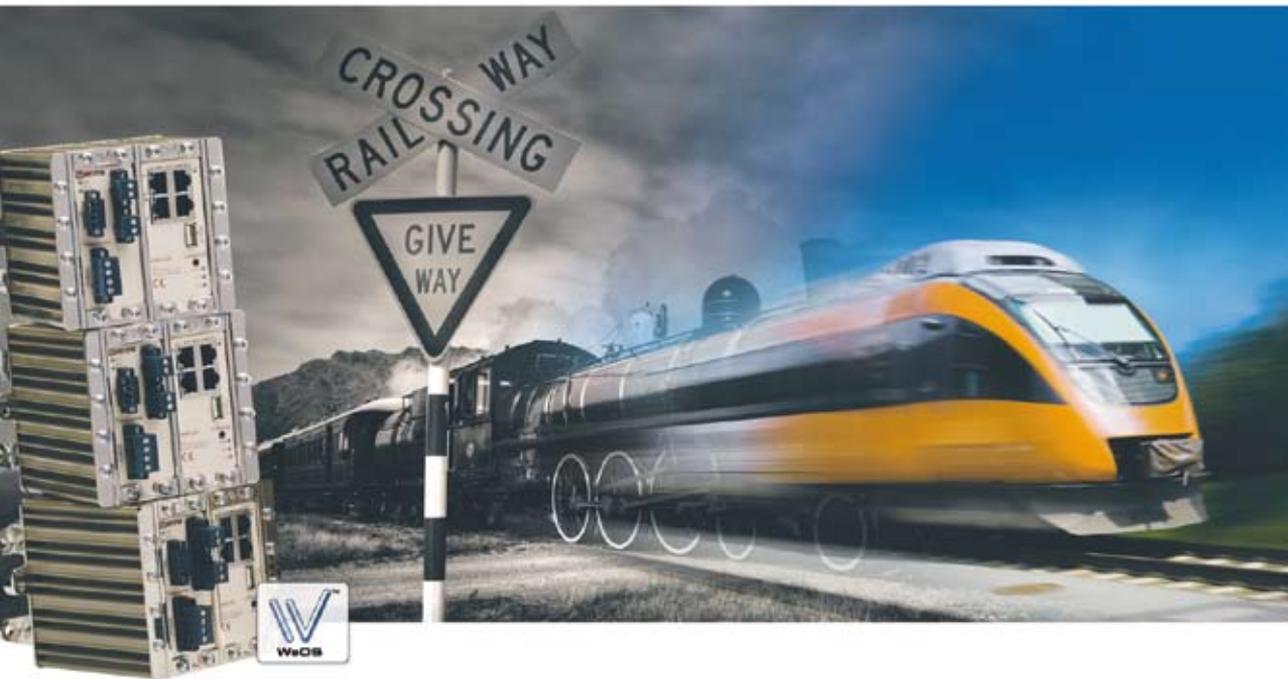




Solutions for Railway Applications



35 years at the leading edge of industrial data communications

Westermo Teleindustri AB
SE-640 40 Stora Sundby
Sweden
Phone: +46 (0)16 42 80 00
Fax: +46 (0)16 42 80 01
www.westermo.com
info@westermo.se

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



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



Westermo – A Worldwide Proven Track Record

Westermo have many years experience in both data communication technologies and railway applications both trackside and onboard the rolling stock. Our real expertise is in developing products that can function in the harshest environments and meeting the toughest approval specifications.

Westermo is familiar with mission critical applications in many industries and has therefore developed products and techniques that meet the many specific needs of the rail industry. 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 trackside.

Westermo are used to developing products to meet industry standards and we have particular focus on two for rail applications.

Trackside Applications

The critical standard for trackside systems is EN-50121-4 Electromagnetic compatibility. Emission and immunity of the signaling and telecommunication apparatus on railway applications.

Lynx, Wolverine, Viper, TD-23 and TD-36 all meet this standard.

On-Board

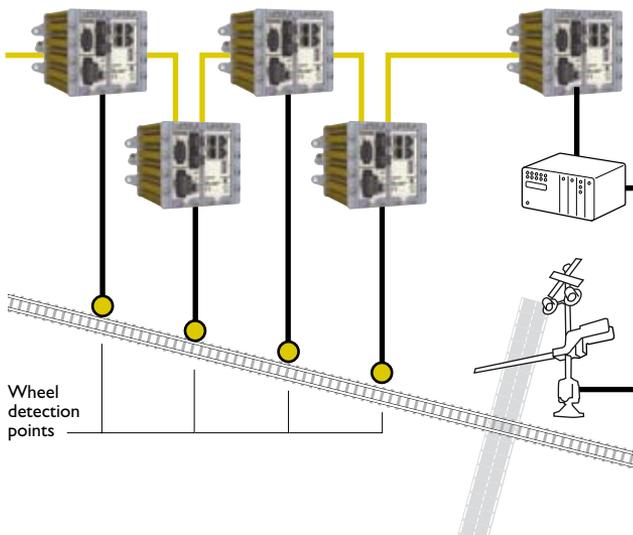
EN 50155 is a special onboard standard for electronic equipment that encompasses not just EMC requirements but also shock, vibration extended temperature range and humidity. The Westermo Viper series meets this standard.



**A Worldwide Proven
Track Record**

WeOS solutions for the Transport sector

Road and trackside applications need data communication networks with an extremely high availability. The cost that is associated with maintenance quite often exceeds the product price. To ensure high availability and maintainability there are high demands on parameters such as EMC compatibility, MTBF and easy network upgrades. Westermo hardware combined with the WeOS software encompasses all of these aspects to make the perfect products for the transport industry.



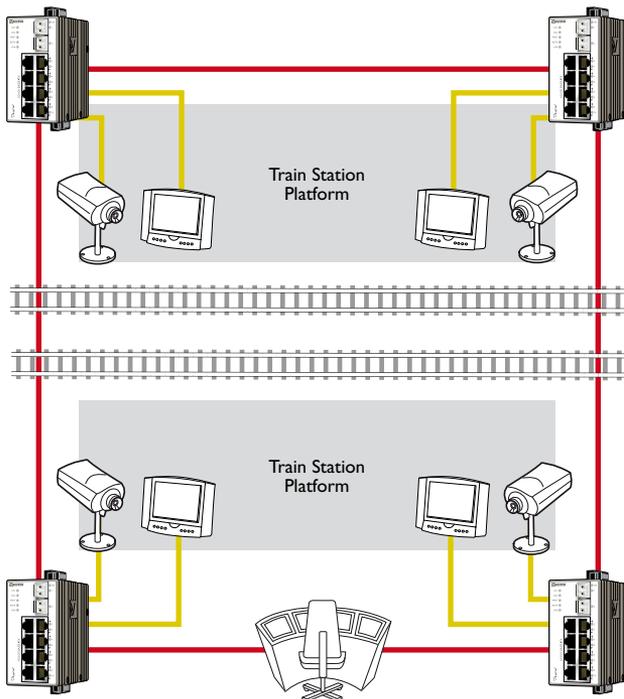
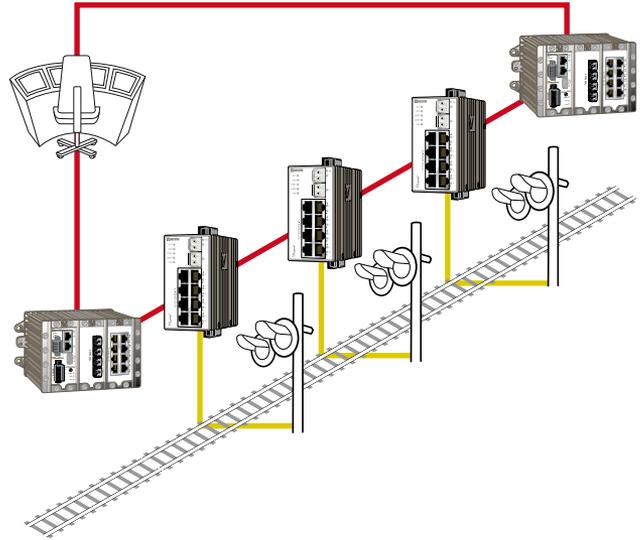
Alarms/Traps/Monitoring

With the WeOS enabled Wolverine, Lynx and RedFox, Westermo offers perfect solutions for migrating existing systems to IP and being able to make a flexible choice between copper and fibre runs.

The additional benefits that IP networks offer is being able to do monitoring on various parameters. Alarms or SNMP traps can be sent before there is a network failure mode. This increases the availability of legacy systems.

Dynamic Routing

In railway signalling, two different migrations take place at the same time. Apart from the migration from legacy IIP systems, Ethernet systems now also have the capability to replace large parts of existing SDH systems (Synchronous Digital Hierarchy). In case of an increased density of trackside equipment, no additional SDH nodes are needed since Industrial Ethernet equipment is able to offer the needed availability, using either layer 2 redundancy and/or layer 3 static or dynamic routing. Whichever need you have, from simple 25 year-old FSK serial technology up to complex routing across different media, Westermo has it all to support you in offering a complete solution for complex and demanding environments.



IGMP Snooping

Long distance transmission of IP Video over existing backbone systems makes it possible to selectively monitor trackside cameras without draining the system's bandwidth when cameras are not monitored.

In the same way, it is possible to 'broadcast' a single stream over the network and make it available to an unlimited amount of users, using only the single stream to each network node. With the implementation of IGMP Snooping and redundancy protocols supported in WeOS, Westermo is able to offer a IP CCTV and IP Broadcasting solution based on any kind of media.

Whether it is copper, fibre, or inter-station transmission over SDH (Synchronous Digital Hierarchy) backbones, WeOS offers all the protocols needed to build and manage the network solution.



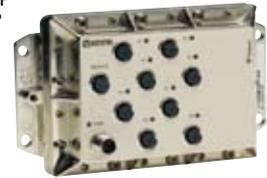
A product range to meet every demand

Westermo provides a full range of data communication solutions for such demanding applications as railways, aeronautics, defence, water treatment, substation automation, roads and tunnels. The staff at Westermo can provide the highest levels of service and technical support to help our customers to choose, configure and install the best solution for each specific application requirement. Our knowledge goes far beyond our own product range; we have a unique competence regarding your environment whether it is on a train, in an aeroplane, on the seabed or in a substation. To ensure a close relationship with the customer, Westermo has a local presence in more than 35 countries. The Westermo product line includes more than one thousand different types and versions of our modems, switches, routers, time servers and converters.

Viper series – Ultra slim M12 switch

The Viper-series is a family of three 8 port switches with real-time properties for critical applications. The IP 65 sealed metal case and rugged M12 front connectors makes it robust and allows for the surrounding air temperature to be between -40 to +70°C (-40°F to +158°F). There are no sensitive or fragile components, hardening the product against shock and vibration making these units suitable for rolling stock usage. The power supply operates over a wide input range from 24 to 110 VDC.

- ⌘ 10/100BaseT rugged M12 connectors
- ⌘ <20 ms FRNT ring redundancy
- ⌘ SNMP, VLAN, QoS, IGMP Snooping, HoL, STP/RSTP
- ⌘ Made easy configuration and comprehensive diagnostic
- ⌘ EN 50155 approved
- ⌘ Extended temperature range (-40°C to +70°C)
- ⌘ 24 to 110VDC power input
- ⌘ MTBF >800 000 hours
- ⌘ IP 65 robust ultra slim metal housing



DDW-120 Ethernet Extender

The DDW-120 is a part of the Wolverine series – A plug-and-play Ethernet Extender that utilises SHDSL technology on twisted pair cables to establish a high-speed remote connection between two Ethernet networks. At shorter ranges the data rate will be as high as 15.3 Mbit/s. The distance can be up to 15 km (9.3 mi) at lower data rates. This unit can be used together with the DDW-22x.

- ⌘ Up to 15.3 Mbit/s data transmission
- ⌘ Up to 15 km (9.3 mi) on twisted pair
- ⌘ LFF (Link Fault Forward)
- ⌘ Redundant power input (10 – 60VDC)
- ⌘ Wide temperature range (-40°C to +70°C)
- ⌘ Galvanic isolation and transient protection



DDW-22x Ethernet Extenders

Our Wolverine series of Ethernet extenders, allow cost effective Ethernet networks to be created over long distances at high data rates.

The DDW-22x uses the Westermo WeOS operating system, already employed in our range of Redfox industrial Routing Switches. Using WeOS provides the DDW-225 and DDW-226 with all the advanced switching and routing functionality supported by the Redfox and Lynx+. These functions include OSPF, RIP, IPsec VPN, Firewall, NAT, VLAN and SNMP V3.

- ⌘ Up to 5.7 Mbit/s over old cables
- ⌘ Redundant ring on the SHDSL interface
- ⌘ Advanced Diagnostics
- ⌘ VLAN support and IGMP Snooping
- ⌘ VPN support and SNMP/v3
- ⌘ Static and dynamic routing and Firewall
- ⌘ Extended temperature range (-40°C to +70°C)



Lynx Series – Compact high performance switch

Lynx+ is an Ethernet switch with an enhanced set of functions for advanced layer 2 switching as well as layer 3 routing. Static and dynamic routing is possible and the most widely used routing protocols, OSPFv2 and RIPv1/v2 are supported. Lynx+ has a wide range of Layer 3 network features for improved security such as VRRP, NAT, Port Forward, Firewall, IPsec VPN etc.

- ⌘ OSPF/RIP dynamic routing
- ⌘ VRRP/NAT redundant static routing
- ⌘ 2 x Gbit and 8 x Fast Ethernet ports
- ⌘ Flexible transceiver config
- ⌘ <20 ms ring redundancy
- ⌘ Firewall, IPsec VPN, SNMPv3, VLAN, IGMP Snooping, QoS, HoL, STP/RSTP
- ⌘ Made easy configuration and comprehensive diagnostic (Web and CLI)
- ⌘ Extended temperature range (-40°C to +70°C), (-40°F to 158°F)



RedFox Industrial Routing Switch for enterprise applications

For the most demanding applications, we offer our high end series of Ethernet Switches, RedFox Industrial. RedFox Industrial is available in six different designs. With its powerful hardware and high processing power, combined with up to 8 Gb ports and our extensive transceiver selection, the RedFox is unbeatable when it comes to delivering flexible high-speed Ethernet.

- ⌘ OSPF/RIP dynamic routing
- ⌘ VRRP/NAT
- ⌘ Up to 18 port (8 Gbit)
- ⌘ Flexible transceiver config
- ⌘ <20 ms ring redundancy
- ⌘ Firewall, IPsec VPN, SNMPv3, VLAN, IGMP Snooping, QoS, HoL, STP/RSTP
- ⌘ Made easy configuration and comprehensive diagnostic (Web and CLI)
- ⌘ Extended temperature range -40°C to +70°C



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°C to +70°C)
- ⌘ 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





Enhanced onboard Metro information system

The Tyne and Wear Metro system connecting Newcastle, Sunderland and surrounding communities in north east England was Britain's first modern urban mass transit system.

An important part of the £350m Metro:All Change modernisation programme which is now underway was the selection and installation of a customer information system in the 90-strong Metrocar train fleet.

This was to provide more clearly audible pre-recorded announcements and the same message will be displayed in carriages to aid hearing impaired passengers.

The selection of the CIS was based on criteria gained from discussions with interested parties from all sections of society, particularly people who would benefit from an improved and much enhanced travelling experience including those who are blind, partially sighted and deaf or hard of hearing. For the onboard communications elements of the system, Nexus, the public body which owns and manages Metro, together with Interallia chose the SDW-550, a 5 port unmanaged Ethernet switch from industrial data communications specialist Westermo.

This is a vital component in the onboard communications network providing a pathway between the CIS and the CCTV systems to facilitate the sharing of data.

The reason for choosing the SDW-550 was because of its high industrial specification and the fact that it worked perfectly even when connected into CAT3 cable.

The SDW-550 is a 'plug & play' DIN rail mounted 5 port unmanaged industrial Ethernet switch with 5 10/100 Mbit TX (copper) ports.

The switch is tri-galvanically isolated with up to 2.8Kv isolation between interfaces and the power side, and a 1.5Kv between interfaces with a wide 9.6V to 57.6V DC input power range with polarity protection as well as being able to accept power from two sources.

With extended temperature range supported as standard, the SDW-550 is a basic switch designed to be used in the harshest of environments.



SDW-500- series

The SDW-500-series is a range of unmanaged industrial Ethernet switches with a flexible combination of TX- and FX- 10/100 Mbit/s ports.

- ⚙️ 10/100BaseT plug-and-play Ethernet switch
- ⚙️ Flexible transceiver configuration
- ⚙️ Auto negotiation or manual DIP-switch port configuration
- ⚙️ Transparent to large frames (VLAN/QoS)
- ⚙️ Extended temperature range (-25 to +70°C), (-13°F to +158°F)
- ⚙️ 10 to 60 VDC redundant power input
- ⚙️ Galvanic isolation and transient protection

IndustrialIT
enabled



SDW-550



SDW-550



Cooling the Tube Programme

Extracting heat from the London Underground Network is a huge and ongoing engineering challenge, especially on the deep tunnel lines. To meet this need TfL established a dedicated programme team to provide a variety of solutions including mid tunnel ventilation and cooling, station cooling and regenerative braking on vehicles.

Keeping the Tube's customers cool involves utilising current technologies as well as making best use of more traditional approaches.

Firstco were approached by Mansell Construction Services Ltd to design the control system that would control the cooling fans and dampers to be installed at four Mid-tunnel Ventilation Shafts (MTVSs) on the Victoria line, thus doubling the air flow through these tunnel sections. The control system consists of a network of Programmable Logic Controllers (PLCs) that interfaces to a Central Cooling System (CCS), providing operators with real time monitoring and performance trending. This control system architecture required the designing of an industrially robust network to cope with the harsh underground environment.

In 2009 Westermo were approached by Firstco to supply much of the industrially hardened networking equipment used to connect the Central Cooling System to the PLC equipment used to provide the control and monitoring functionality within the four MTVSs.

In order to obtain the reliability and performance required from the network it was decided at an early stage to adopt ADSL as the communications technology as PSTN circuits already existed, that could be easily migrated over to an ADSL service. By using the Westermo DR-250 ADSL Router IP traffic could be transferred at rates of up to 8Mbit, broadband speed. This high bandwidth, 'always on' connection enables engineers and operators to make informed decisions based on alarms indicating fault conditions generating from the shaft and station plant.

Additionally a data historian was utilised to provide real time data logging and archiving functionality generating performance reports for the client.



DR-250

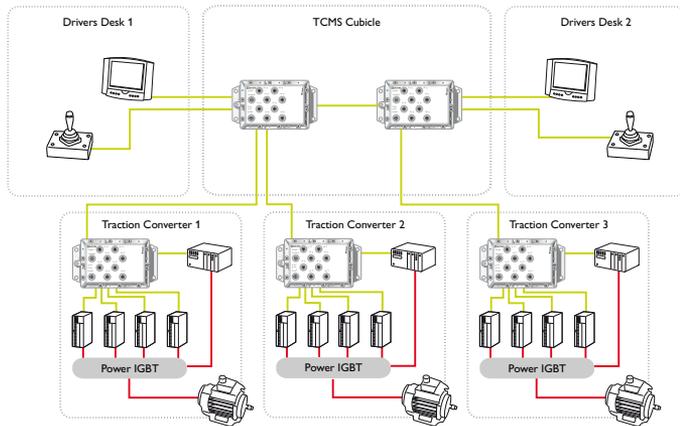
The DR-250 is a ADSL 2/2+ Router with features such as firewall, data encryption, VPN tunnels and supports routing protocols such as: BGP, VRRP, OSPF, and RIP2. The device has a serial RS-232 port and four 10/100BaseT ports.

- ⌘ ADSL / ADSL2 / ADSL2+ Compatibility
- ⌘ VRRP+, BGP, OSPF, RIP2, GRE, L2TP routing protocols
- ⌘ 10/100 BaseT Ethernet switch
- ⌘ Integrated RS-232 terminal server port
- ⌘ SNMP management protocol
- ⌘ Firewall, IPsec VPN, DES, AES, SSL, SSH
- ⌘ Made easy configuration and comprehensive diagnostic
- ⌘ Extended temperature range (-20°C to +55°C), (-4°F to +131°F)
- ⌘ 10 to 28 VDC power input



Locomotive propulsion and control network

Westermo has supplied the ultra robust M12 switch platform, Viper, to be used in a electric locomotives ordered by the Chinese Ministry of Railways. The project scope is for more than 500 locomotives into which 2500 Viper switches will be installed. The first locomotive was completed in December 2008 and the project is estimated to be completed by August 2012. The Viper series fulfilled the customer’s demands for a robust switch that could cope with continual engine vibration and surge levels of up to 8.4 kV. The easy wall mount and the slim design of the housing (W 175 x H 100 x D 50 mm) were other advantages that made the customer choose the Viper. Most importantly the Viper meets the EN 50155 standard for rolling stock applications.



Ultra Slim M12 Switch

The Viper-series is a family of three 8 port switches with real-time properties for critical applications. The IP 65 sealed metal case and rugged M12 front connectors makes it robust and allows for the surrounding air temperature to be between -40 to +70°C (-40°F to +158°F).

- ⌘ 10/100BaseT rugged M12 connectors
- ⌘ <20 ms FRNT ring redundancy on large networks
- ⌘ SNMP, VLAN, QoS, IGMP Snooping, HoL, STP/RSTP
- ⌘ Made easy configuration and comprehensive diagnostic
- ⌘ EN 50155 approved for rolling stock
- ⌘ Extended temperature range (-40°C to +70°C), (-40°F to +158°F)
- ⌘ 24 to 110VDC power input
- ⌘ MTBF >800 000 hours
- ⌘ IP 65 robust ultra slim metal housing



Technology designed to take a beating

We regularly test our products to ensure quality at all times and that safety is always an important consideration in our product design and production. Westermo products are certified and approved by some of the most trusted sources across the globe for product compliance. This is a small selection of approvals and standards that we work with:

II 3G EEx nA IIT5 The ATEX directive describes what equipment is allowed in an environment with a potentially explosive atmosphere. Even though the EU originally developed the directive, it is now being applied all over the world.

Class 1, Division 2 is the equivalent to the Ex classification we have in accordance with the ATEX directive, but for the US and Canadian market. Westermo has obtained the Class 1, Division 2 certification through an independent third party approval company FM Approvals.

DNV The leading international provider of services for managing risks, Det Norske Veritas (DNV), has

approved Westermo units for marine usage according to DNV Standard for Certification 2.4:2006 (covers the requirements in IACS UR E10:2006). The approval by the independent third party proves Westermo compliance according to national and international standards.

IndustrialIT The Industrial IT initiative is a program of approvals designed by ABB. From lower level certification which provides easy deployment of simpler components, to higher levels of information enabled processor based products, Industrial IT helps customers integrate ABB and technology partner equipment.





H E A D O F F I C E

Sweden

Westermo Teleindustri AB
SE-640 40 Stora Sundby, Sweden
Phone: +46 (0)16 42 80 00
Fax: +46 (0)16 42 80 01
info@westermo.se
www.westermo.com

S U B S I D I A R I E S

Sweden

Westermo Data Communications AB
Svalgängen 1, Vallbyinstitutet
SE-724 81 Västerås, Sweden
Phone: +46 (0)16 42 80 00
Fax: +46 (0)21 35 18 50
info.sverige@westermo.se
www.westermo.se

United Kingdom

Westermo Data Communications Ltd
Talisman Business Centre
Duncan Road, Park Gate, Southampton. SO31 7GA
Phone: +44(0)1489 580 585
Fax: +44(0)1489 580 586
sales@westermo.co.uk
www.westermo.co.uk

Germany

Westermo Data Communications GmbH
Goethe Strasse 67
DE-68753 Waghäusel, Germany
Tel: +49(0)7254 95400-0
Fax: +49(0)7254-95400-9
info@westermo.de
www.westermo.de

France

Westermo Data Communications S.A.R.L.
Bat. A, 9 Chemin de Chilly
FR-91160 Champlan, France
Tél : +33 1 69 10 21 00
Fax : +33 1 69 10 21 01
infos@westermo.fr
www.westermo.fr

Singapore

Westermo Data Communications Pte Ltd
2 Soon Wing Road #08-05
Soon Wing Industrial Building
Singapore 347893
Phone +65 6743 9801
Fax +65 6745 0670
sales@westermo.com.sg
www.westermo.com