westermo

Product Guide

Industrial Data Communications

westermo

Robust Industrial Data Communications – Made Easy

Westermo Worldwide...

Produced by:
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Eskilstuna, Sweden

Specifications are subject to change without notice due to continuous product development and improvement.

Westermo was established in the early 1970s. The head office is located 150 km (93.2 miles) southwest of Stockholm in Sweden. Over the past three decades Westermo has grown with sales units being established in Sweden, UK, Germany, France, Singapore, USA and sales partners appointed in over 30 Countries worldwide.

Today the Westermo brand name is synonymous with Robust Industrial Data Communications.

Our 35 years of experience in the industrial marketplace goes far beyond our own products. We understand the problems that can occur in applications installed in the toughest industrial environments and therefore we can offer you the most effective and economical solutions.

All our products are specifically designed to operate reliably in harsh industrial environments and in applications requiring the highest levels of reliability and availability.

Let Westermo be your first choice for robust industrial data communication solutions.

A product range to meet every requirement

Westermo provides a full range of data communication solutions for demanding applications such as railways, aviation, 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 choose, configure and install the best solution for each specific application requirement. Our knowledge goes far beyond our own product range; we have an 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. A selection of our most popular products are represented in this catalogue, but the Westermo product line includes more than a thousand different types and versions of our modems, switches, routers and converters.

Quality

Westermo strives for the highest quality. To this end, we will endevour to supply products, goods and services in a courteous fashion that reflects our commitment to the Quality Policy as summarized below, therefore, we will;

- Understand our customer's requirements and needs as well as relevant regulations, so as to develop, manufacture and offer the right products.
- Give our customers excellent support throughout the entire business process.
- Keep up our never ending commitment for even better quality and effectiveness.

This gives and will continue to give us stability, long term growth and profitability.

Technical support

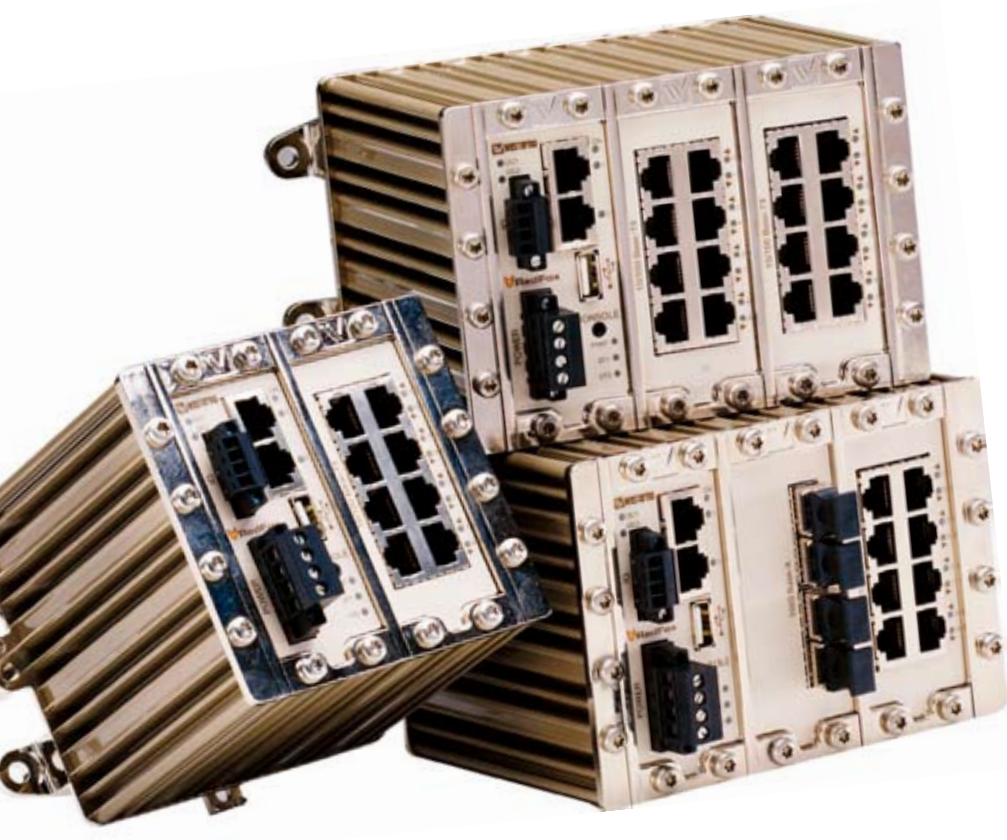
Westermo has always believed in providing the best technical service possible to help you, our customer, get your systems operational. All our subsidiaries employ significant technical support departments that allow us to give free of charge telephone technical support in a number of languages during normal office hours. We also commit many hours to working with other product vendors to produce product application notes that can be downloaded from the web at anytime.

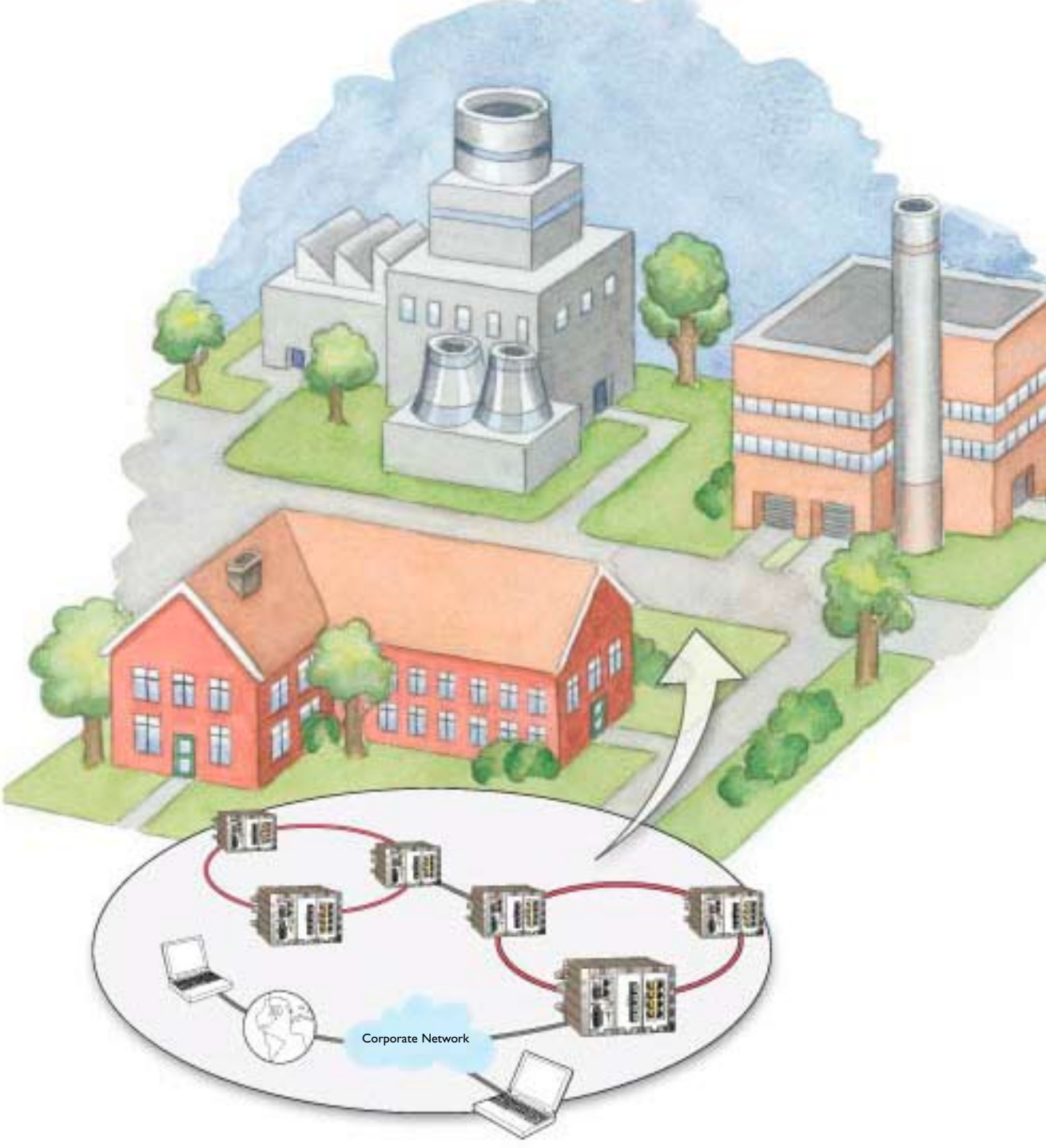
For more information about products and services from Westermo, please visit our website at www.westermo.com..

Contents

Industrial Routing Switches

Industrial networks have particular requirements that make them differ from normal IT networks where high reliability, real-time switching functions and environmental specifications are required. The RedFox has been developed with unique switching functionality like FRNT redundancy protocol, IGMP snooping, VLANs as well as layer 3 routing to meet the latest market requirements.





Ethernet is rapidly becoming the most common communication standard deployed in industrial applications and it has become clear that the next generation of industrial switches must support Layer 3 and routing functionality.
The RedFox routing switch provides static routing, firewall functions and has the ability to act as a VPN client/server. It can be configured with up to eight gigabit ports and meets the most demanding industrial environmental specifications.

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.

Regardless of which RedFox you choose, the units are always delivered with the latest version of WeOS. This means that your RedFox is equipped to meet the requirements of current and future industrial networks.

- *OSPF/RIP - To support dynamic routing and increased availability of the network.*
- *VRRP/NAT - For redundant static routing support and flexibility in remote connections.*
- *Up to 8 x Gbit and 10 x Fast Ethernet ports*
- *Flexible transceiver configuration (multi, single, bi-di) up to 120 km (74.56 mi)*
- *<20 ms FRNT ring redundancy on large networks*
- *Firewall, IPSec VPN, SNMPv3, VLAN, IGMP Snooping, QoS, HoL, STP/RSTP*
- *Made easy configuration and comprehensive diagnostic (Web config and CLI)*
- *Extended temperature range (–40°C to +70°C), (–40°F to 158°F)*
- *16 to 60 VDC isolated redundant power inputs*
- *IP 40 robust metal housing*

Product/Art. no		Description	Connectivity
RFI-10 3641-3110		High performance industrial Ethernet switch with enhanced routing fuctionality. 10 x 10/100BaseT ports. WEB PAGE	10 x 10/100BaseT Digital I/O Console USB
RFI-6-F4G 3641-3210		High performance industrial Ethernet switch with enhanced routing fuctionality. 2 x 10/100BaseT ports and 4 SFP slots with Gbit support WEB PAGE	2 x 10/100BaseT 4 x Gbit SFP slots Digital I/O Console USB
RFI-10-F4G-T4G 3641-3310		High performance industrial Ethernet switch with enhanced routing fuctionality. 2 x 10/100BaseT, 4 x 1000BaseT ports and 4 SFP slots with Gbit support. WEB PAGE	2 x 10/100BaseT 4 x 1000BaseT 4 x Gbit SFP slots Digital I/O Console USB
RFI-18 3641-3100		High performance industrial Ethernet switch with enhanced routing fuctionality. 18 x 10/100BaseT ports. WEB PAGE	18 x 10/100BaseT Digital I/O Console USB
RFI-14-F4G 3641-3200		High performance industrial Ethernet switch with enhanced routing fuctionality. 10 x 10/100BaseT ports and 4 SFP slots with Gbit support. WEB PAGE	10 x 10/100BaseT 4 x Gbit SFP slots Digital I/O Console USB
RFI-18-F4G-T4G 3641-3300		High performance industrial Ethernet switch with enhanced routing fuctionality. 10 x 10/100BaseT, 4 x 1000BaseT ports and 4 SFP slots with Gbit support. WEB PAGE	10 x 10/100BaseT 4 x 1000BaseT 4 x Gbit SFP slots Digital I/O Console USB

* For transceiver selection, see page 38

Standards and functionality

WeOS (Westermo Operating System) delivers an extensive set of functionality including layer-3 (OSPF/RIP, VRRP, firewall, IPsec VPN, NAT, Port Forward etc.), layer-2 (basic switching, VLAN, IGMP snooping, etc.), and higher level services (DHCP, DNS, etc.). Furthermore, WeOS provides easy management via a Web interface, via the Westermo IPConfig tool, and even via a USB stick. To satisfy more advanced customer needs, WeOS provides flexible management via a command line interface (CLI), as well as via SNMP.

Ethernet Technologies

IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseTX and 100Base FX
IEEE 802.3ab for 1000BaseT
IEEE 802.3z for 1000BaseX

SHDSL technologies*

ITU-T G.991.2 (SHDSL)
IEEE 802.3ah (EFM)
Serial Port
RS-232
Serial Over IP (Serial Extender and Virtual Serial Port)

Resiliency and High Availability

Fast Reconfiguration of Network Topology (FRNT)
FRNT Link Health Protocol (FLHP)
IEEE 802.1D Spanning Tree Protocol (STP)
IEEE 802.1w Rapid STP (RSTP)

Layer-2 Switching

IEEE 802.1Q Static VLAN and VLAN Tagging
IEEE 802.3x Flow Control
IGMPv2/v3 snooping
AVT Dynamic VLAN (Westermo Adaptive VLAN Trunking)
Management VLAN (Westermo Management Interface concept)

Layer-2 QoS

IEEE 802.1p Class of Service
Flexible classification VLAN tag, VLAN ID, IP DSCP/ToS, Port ID)

IP Routing, Firewall and VPN

Static IP routing
Dynamic IP routing
- OSPFv2
- RIPv1/v2

VRRP
Firewall, NAT, Port Forwarding
IPsec VPN

* Wolverine series only

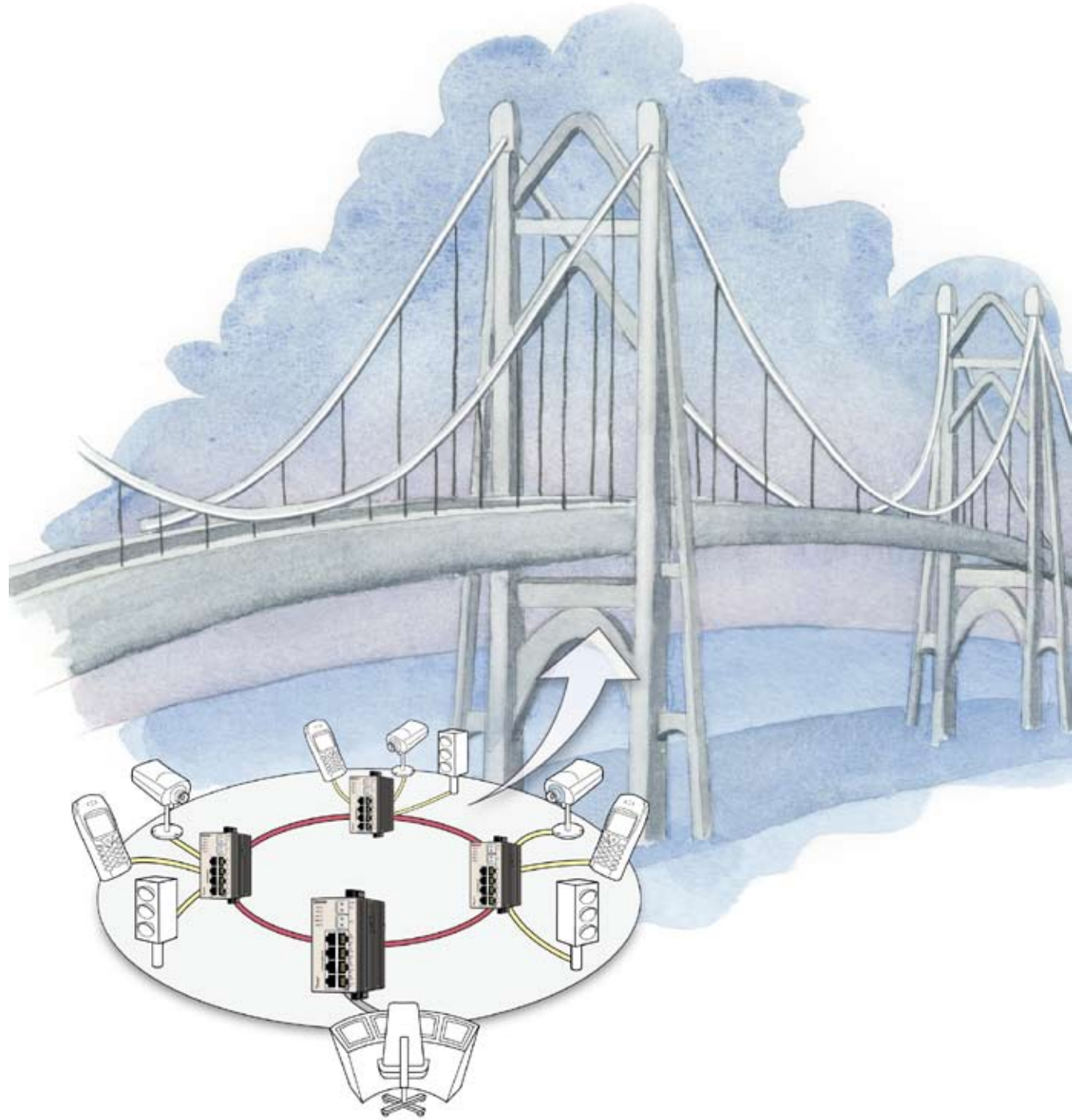
Manageability

Management tools
- Web interface (HTTP and HTTPS)
- Command Line Interface (CLI) via console port and SSHv2
- Westermo IPConfig tool
- SNMPv1/v2c/v3
- Flexible management of configuration and log files
- Secure Copy (SCP) for remote file upload and download
- Local file management via HTTP, FTP, TFTP and SCP
- Load/save files from/to USB memory stick

Syslog (log files and remote syslog server)
Digital I/O
Port Monitoring
SNTP (NTP client)
DHCP client
DHCP server
DDNS
SNMP MIB support
RFC1213 MIB-2
RFC2863 Interface MIB (ifXTable)
RFC2819 RMON MIB (etherStatsTable)
RFC4188 Bridge MIB
RFC4318 RSTP MIB
RFC4363 Q-BRIDGE MIB (dot1qVlan and dot1qVlanStaticTable)
RFC4836 MAU MIB (dot3IfMauBasicGroup and dot3IfMauAutoNegGroup)
RFC4133 Entity MIB (entityPhysical)
RFC3433 Entity Sensor MIB
RFC4319 HDSL2/SHDSL MIB (hdsl2ShdslSpanConfTable, hdsl2ShdslSpanStatusTable, hdsl2ShdslInventoryTable and hdsl2ShdslSpanConfProfileTable). Read-only support.*
WESTERMO PRIVATE MIB

Ethernet Switches

Ethernet in industrial environments must be very reliable as downtime is much less tolerable in the factory than the office. Harsh environments with electrical noise and vibrations require equipment of very highest quality. Westermo offers a wide product range, from unmanaged switches up to the fastest redundant ring switch on the market. Our unique FRNT technology allows for up to 200 switches in the network and a recovery time of less than 20 ms.



Many roadside applications have begun to use Ethernet networks to provide connectivity for roadside equipment such as emergency phones, traffic surveillance cameras and traffic signals. Reliable data communications are vital when building safety critical applications, this makes our products the ideal choice for these often harsh environments.

Lynx, the compact layer 3 managed Ethernet 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.

Our unique FRNT technology is the fastest protocol on the market to re-configure a large network in the event of any link or hardware failure. Lynx also supports STP/RSTP in case of need for standard protocol. STP/RSTP and FRNT can be combined meaning that the Lynx can be integrated with products from other vendors in redundant network solutions. IGMPv2/v3 with stop filter and the unique Westermo protocol 'Fast Reconnect' allow a video stream to reconfigure very fast (20 ms). Advanced functionality for VLANs with support for up to 64 virtual network, combined with Layer 3 Protocols allows unprecedented levels of network security.

- *OSPF/RIP - To support dynamic routing and increased availability of the network.*
- *VRRP/NAT - For redundant static routing support and flexibility in remote connections.*
- *2 x Gbit and 8 x Fast Ethernet ports*
- *Flexible transceiver configuration (multi, single, bi-di) up to 120 km (74.56 mi)*
- *<20 ms FRNT ring redundancy on large networks*
- *Firewall, IPSec VPN, SNMPv3, VLAN, IGMP Snooping, QoS, HoL, STP/RSTP*
- *Made easy configuration and comprehensive diagnostic (Web config and CLI)*
- *Extended temperature range (–40°C to +70°C), (–40°F to 158°F)*
- *19 to 60 VDC isolated redundant power inputs*
- *IP 40 robust metal housing*

Product/Art. no	Description	Connectivity
Lynx 210 3640-0105 	Industrial routing Gigabit switch WEB PAGE	2 x Gbit SFP slots 8 x 10/100BaseT Console port

NOTE! For supported protocols and standards, see page 7

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 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 110 VDC power input*
- *MTBF >800 000 hours*
- *IP 65 robust ultra slim metal housing*

Product/Art. no	Description	Connectivity
Viper 008 3641-0340 	Extremely robust 8-port unmanaged Ethernet switch WEB PAGE	8 x 10/100 Mbit/s M12 Ethernet connectors
Viper 108 3641-0350 	Extremely robust 8-port Ethernet switch with limited manageability. WEB PAGE	8 x 10/100 Mbit/s M12 Ethernet connectors
Viper 408 3641-0360 	Extremely robust managed 8-port Ethernet switch with support for redundant rings. WEB PAGE	8 x 10/100 Mbit/s M12 Ethernet connectors

Unmanaged Ethernet Switch

The SDW is a 5 port switch which can be configured with one or two fibre optic transceivers for either multi- or singlemode cables. The switch is a plug and play unit but also offers the possibility that each port can be configured via DIP-switches. The screen of each TX port is individually isolated to help prevent earth loop problems within the network.

- *10/100BaseT plug-and-play Ethernet switch*
- *Flexible transceiver configuration (multi, single, bi-di) up to 120 km (74.56 mi)*
- *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*

Product/Art. no	Description	Connectivity
SDW-500-series 3644-xxxx 	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. WEB PAGE	3 x 10/100Base T 2 x Optional ports (2 x 10/100Base T, 2 x 100Base FX or one of each)

Ethernet Media Converter

The MCW-211 convert data between Ethernet 10/100BaseT and 100BaseFX. The unit is easy to use and install caused by auto-negotiation of speed and duplex, autocrossover and auto-polarity. The media converter is transparent for large frames (VLAN or QoS). It is also possible to set speed, duplex and flow control via DIP-switches. The FX side supports Far-End-Fault indication. A link fault from either side is forwarded to the other side, Link Fault Forwarding.

- *10/100BaseT to 10/100BaseFX conversion*
- *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*

Product/Art. no	Description	Connectivity
MCW-211 3645-xxxx 	Industrial Ethernet FX to TX media converter. WEB PAGE	10/100BaseT 100BaseFX

Serial Converters

The EDWs allow devices with only a serial port to communicate over an Ethernet network. They can be used either in point-to-point or point-to-multipoint applications.

The EDW-100/120 are supplied with a software utility allowing 2 virtual COM ports to be created on a PC. This software will redirect data, originally sent to a local COM port, to the remote serial interface of the EDW-100/120 meaning no changes are required to legacy applications. This makes it possible for "old" serial devices to communicate on a standard Ethernet network thus removing the need to maintain two different networks.

- *10/100BaseT to RS-232 / RS-422/485 serial conversion*
- *Termination of RS-422/485 and fail safe functionality*
- *Made easy configuration and comprehensive diagnostic*
- *Extended temperature range (–25 to +70°C), (–13°F to +158°F)*
- *10 to 60 VDC redundant power input*
- *Galvanic isolation and transient protection*

Product/Art. no	Description	Connectivity
EDW-100 3616-0020 	Serial to Ethernet converter with RS-232 and RS-422/485 ports. WEB PAGE	10/100BaseT Serial (RS-232) Serial (RS-422/485)
EDW-120 3616-0010 	Serial to Ethernet converter with dual RS-232 ports. WEB PAGE	10/100BaseT 2 x Serial (RS-232)

New product line for industrial applications

i-line

- *Compact DIN-rail mounted aluminum case with IP-31 grade protection*
- *Wide range redundant power input*
- *Wide operating tempareture*
- *Compact 5 and 8-port Ethernet switches*
- *Multimode and single mode Ethernet fibre switches*
- *24 – 48 VDC Gigabit PoE Booster Switches*
- *2-channel Gigabit Ethernet media converters*

The i-line family of Ethernet products are optimized for machine building, building automation, factory automation and CCTV surveillance applications. The new range includes standard and compact Ethernet switches, media converters and Power over Ethernet (PoE) switches.

The Westermo i-line offers industry grade components, easy-to-use features, and reliable and consistent operation. Each device in the range incorporates a configurable relay that triggers an alarm signal for port or power events. The rugged IP-31 rated aluminium alloy enclosure is ideal for heat dissipation and enables a wide operating temperature range.

Product/Art. no.	Description	Connectivity
SDI-541 3625-00xx 	Compact 4-port unmanaged Ethernet switch including 1 multimode or 1 singlemode port WEB PAGE WEB PAGE	4 x 10/100BaseT 1 x MM-SC2 or 1 x SM-SC30
SDI-550 3625-0050 	Compact 5-port unmanaged Ethernet switch WEB PAGE	5 x 10/100BaseT
SDI-862 3625-01xx 	8-port unmanaged Ethernet fibre switch including 2 multimode or singlemode ports WEB PAGE WEB PAGE	6 x 10/100BaseT 2 x MM-SC2 or 2 x SM-SC30
SDI-880 3625-0100 	8-port unmanaged Ethernet switch WEB PAGE	8 x 10/100BaseT
PSI-660G 3626-0100 	24 V Power over Ethernet booster switch including 4 10/100BaseT PoE ports and 2 Gigabit ports WEB PAGE	4 x 10/100BaseT PoE 2 x 10/100/1000BaseT
PSI-1010G 3626-01xx 	24 or 48 V Power over Ethernet booster switch including 8 10/100BaseT PoE ports and 2 Gigabit ports WEB PAGE WEB PAGE	8 x 10/100BaseT PoE 2 x 10/100/1000BaseT

Product/Art. no.	Description	Connectivity
MCI-211G 3624-0001 	Gigabit Ethernet Converter WEB PAGE	1 x Gigabit SFP slot 1 x 10/100/1000BaseT
MCI-422 3624-01xx 	2-channel Ethernet to fibre media converter. Multimode or singlemode. WEB PAGE WEB PAGE	2 x 10/100BaseT 2 x 100 Mbit/s singlemode ports or 2 x 100 Mbit/s SM-SC30
MDI-110-F3 3624-0200 	10-port Managed Fast Ethernet Switch WEB PAGE	7 10/100-TX and 3 RJ-45/ SFP combo ports (10/100 Base-TX, 100Base-FX)
MDI-110-F3G 3624-0210 	10-port Managed Gigabit Switch WEB PAGE	7 10/100-TX and 3 Gigabit RJ-45/SFP combo ports (10/100/1000 Base-TX, 100Base-FX, 1000Base-X)
MDI-112-F4G 3624-0250 	12-port Managed Gigabit Switch WEB PAGE	8 10/100-TX, 2 Gigabit SFP and 2 Gigabit RJ-45/SFP combo ports (10/100/1000 Base-TX, 1000Base-X)
MDI-118-F2G 3624-0260 	18-port Managed Gigabit Switch WEB PAGE	16 10/100-TX and 2 Gigabit RJ-45/SFP combo ports (10/100/1000 Base-TX, 1000Base-X)

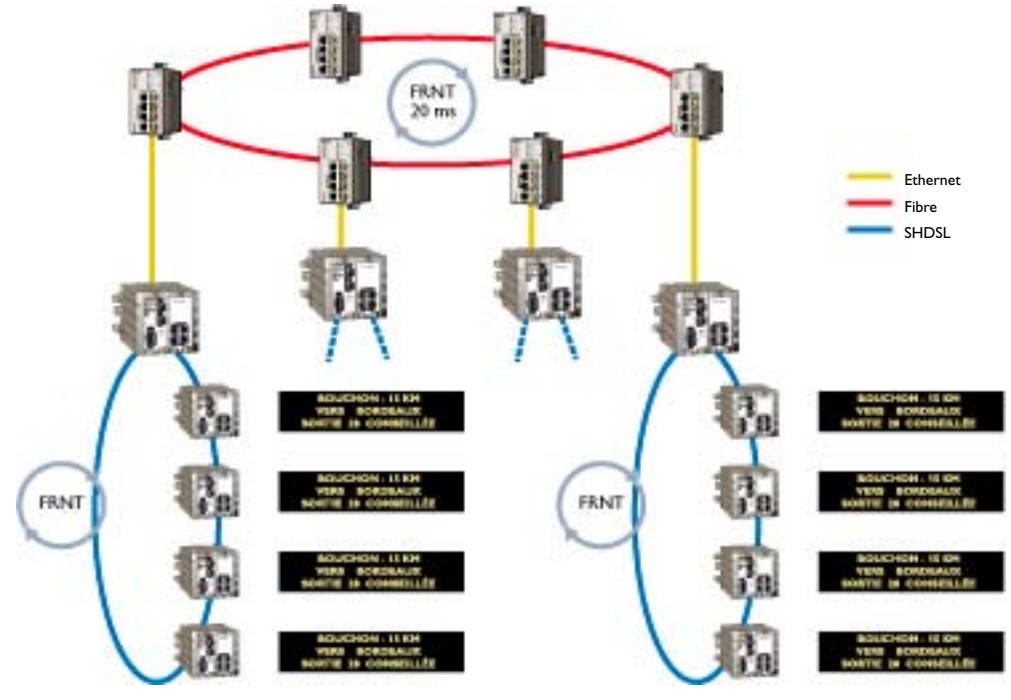
Customer Success Story

Highway tunnel emergency system

The A14 highway links the Paris business district of La Défense with Orgeval. The highway is mainly underground and the total tunnel length is more than 13 km (8.07 mi). Technical supplier SDEL was selected to provide the tunnels with an emergency system. There are eight tunnels in total, and at each tunnel entrance SDEL designed
a message sign and road barrier system to stop the traffic in case of an emergency.

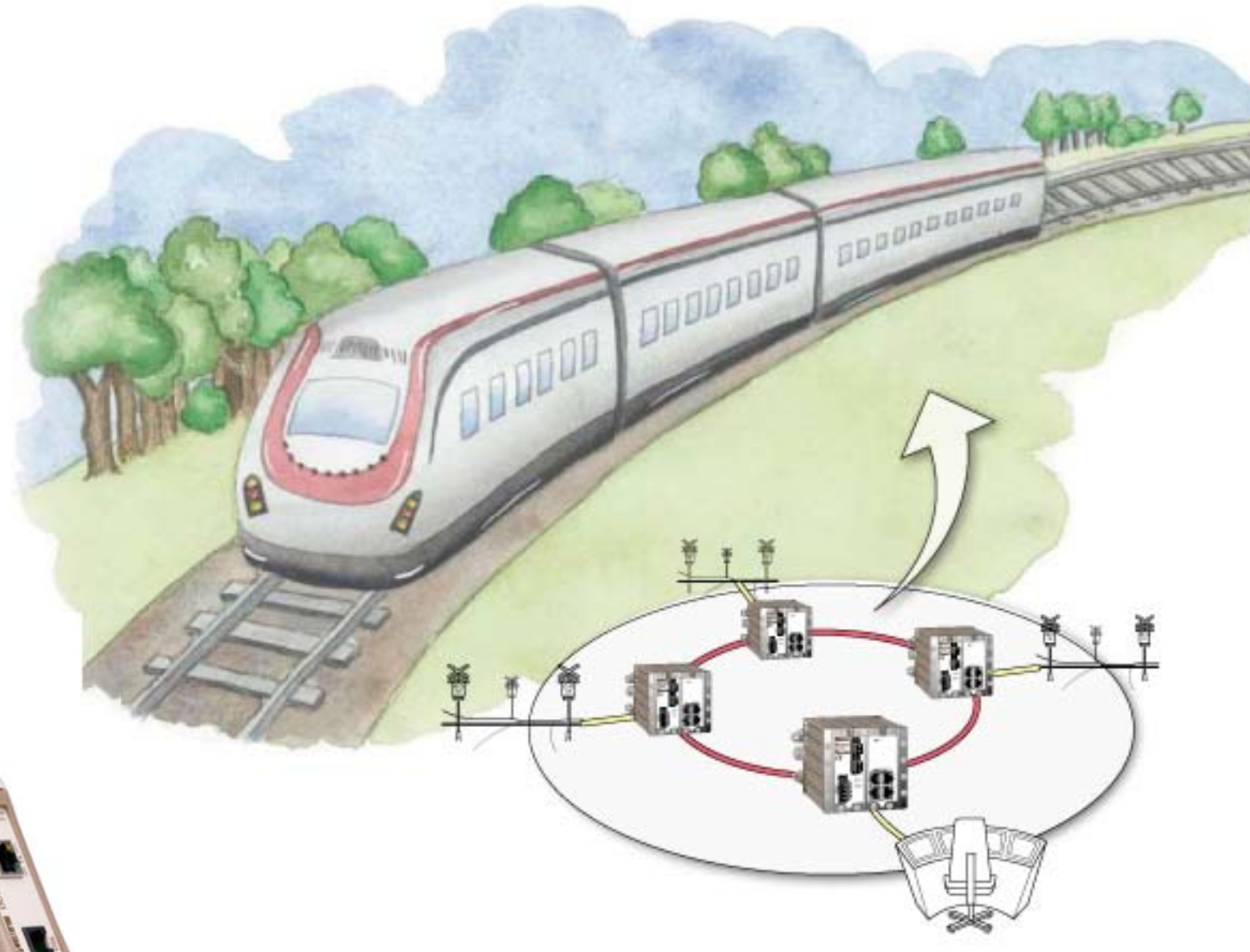
A central redundant fibre network built with Lynx switches provides a backbone for a number of DDW-221 SHDSL sub-networks that control the message signs. The backbone network and the sub-networks all use the Westermo FRNT redundancy protocol. This design delivers a redundant system that provides high availability, reliability, and safety which were the major factors in the customers decision to use the Westermo Lynx and DDW-221.

- **Lynx central redundant fibre network**
- **DDW-221 SHDSL sub-networks**
- **FRNT redundancy protocol**



Ethernet Extenders

Ethernet Extenders allow you to ignore the conventional Ethernet boundaries for copper cable. By design, a standard Ethernet network has a transmission limit of 100 metres (328 ft) over UTP copper cables, our ethernet extender series – the Wolverine, allows you to go much further and on many other kinds of cable. The Wolverine-series utilises SHDSL technology on twisted pair cables to establish a high-speed remote connection between two Ethernet Networks.



Westermo have many years experience in both data communication technologies and railway applications and has therefore developed products and techniques that meet the many specific needs of the rail industry. Our Wolverine range meets the critical standard for trackside systems, EN-50121-4 Electromagnetic compatibility.

Extend your network far beyond the normal limits of Ethernet

Our Wolverine series of Ethernet extenders, allow cost effective Ethernet networks to be created over long distances at high data rates. The SHDSL technology employed makes it possible to reuse many types of pre-existing but redundant cabling, which could lead to great financial savings. Data rates of up to 15.3 Mbit/s have been achieved over shorter distances and at lower data rates over 15 km have been achieved on cables nearly 100 years old.

The DDW-225 and DDW-226 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.

- *G.SHDSL up to 15.3 Mbit/s. Distances up to 15 km (9.3 mi) with extensive line protection.*
- *Built in 10/100BaseT 4 port switch*
- *Serial to IP conversion (RS-232)*
- *<20 ms FRNT ring redundancy on large networks*
- *Transparent for multicast addressing, VLAN and VPN*
- *Made easy configuration and comprehensive diagnostic*
- *Approved for explosive environments (ATEX, Class 1, Div 2)*
- *Extended temperature range (–40 to +70°C), (–40°F to +158°F)*
- *16 to 60 VDC redundant power input with reversed polarity protection*
- *IP 40 robust metal housing*

Product/Art. no	Description	Connectivity
DDW-120 3621-0100 	Plug and play industrial Ethernet extender. Data rates up to 15.3 Mbit/s. Compatible with DDW-22x. WEB PAGE	10/100BaseT DSL connector SHDSL connector
DDW-220 3642-0200 	Plug and play industrial Ethernet extender. Data rates up to 5.7 Mbit/s. Built in switch. WEB PAGE	4 x 10/100BaseT 2 x DSL connectors
DDW-222 3642-0220 	Plug and play industrial Ethernet extender. Data rates up to 5.7 Mbit/s. Bulit in switch and support for redundant rings. Serial interface with serial to IP conversion. WEB PAGE	4 x 10/100BaseT 2 x DSL connectors Serial (RS-232)
DDW-225 3642-0250 	Plug and play industrial Ethernet extender. Data rates up to 5.7 Mbit/s. Bulit in switch and support for redundant rings. * WEB PAGE	4 x 10/100BaseT 2 x DSL connectors Digital I/O USB Console
DDW-226 3642-0240 	Plug and play industrial Ethernet extender. Data rates up to 5.7 Mbit/s. Bulit in switch and support for redundant rings. Serial interface with serial to IP conversion.* WEB PAGE	4 x 10/100BaseT 2 x DSL connectors Digital I/O USB Console

*For supported protocols and standards, see page 7

Customer Success Story

Safety critical railway control system

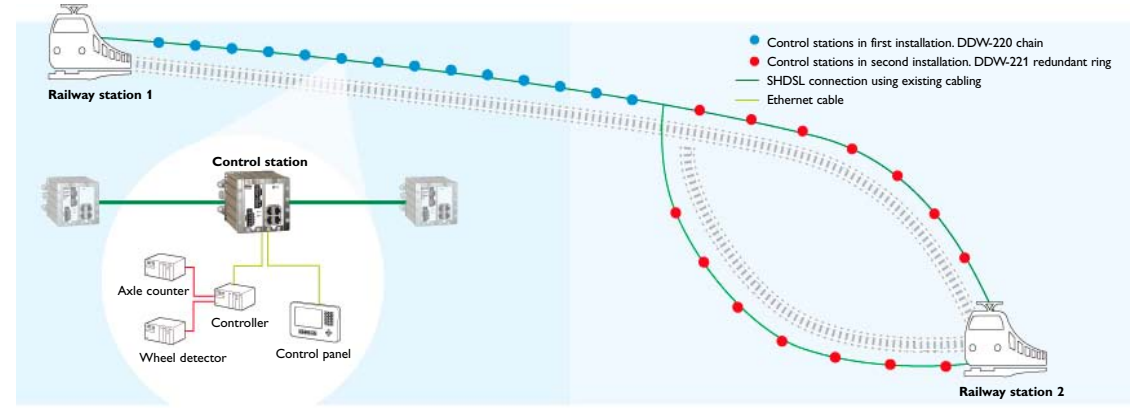
Poland's rail system is one of the largest in Europe, but in terms of quality and safety, there is a need for modernization. One of the companies employed for this is Zaklady KOMBUD Automation, a Polish company that offers overall solutions for railway automation, covering system design, production, implementation and maintenance.

A new safety system covering 100 km (62.1 mi) of railway line in central Poland has been built in two steps. A chain of 15 DDW-220 SHDSL Ethernet extenders connecting to a number of cabinets with traffic control equipment were installed in the first step. In the next step 15 DDW-221s were been added alongside the tracks of the Centralna Magistrala Kolejowa (Central Rail Bus line).

The safety system update on this route has resulted in increased safety on many levels, and by making use of pre-existing cabling, they have been able to keep the cost down. In contrast to previously used devices, the Wolverine-series has several advantages – The wide variation of operating temperature (–40 to +70°C), (–40°F to +158°F) as well as the Transient Blocking Unit on each line interface that provides both over-current and over-voltage protection thus allowing the line to handle indirect lightning strike transients are just some of them.

The railway control system is divided in sections covering about 2 km (1.2 mi) each. At the end of every section there is a control station that monitors the traffic and prevents conflicting movements. This makes ongoing movement of traffic impossible unless the route is proved to be safe. Signalling systems provide information of nearby trains and suggest a safe speed. Axle counters provide accurate information as to whether another train is in the same section. A start and reset detection point is installed in every section, and if the count is evaluated as zero the section is presumed to be clear for a second train. The decision to use pre-existing cabling to provide the data communication in this safety critical application worried the customer at first. Parts of the cables were in bad shape and some of them were up to 30 years old.

Westermo distributor, Tekniska Polska, preformed on-site tests using DDW-220s which were connected to the actual cables and achieved perfect communication. Today this application uses more than 30 Wolverine Ethernet extenders installed over sections 2 to 4 km (1.2 mi to 2.5 mi) in distance.



First installation – completed May 2008: *A chain of 15 DDW-220 link the control stations with SHDSL technology. Existing cabling was used. Distance between control stations 2 to 4 km (1.2 mi to 2.5 mi).* ***Second installation – completed December 2008:*** *A series of DDW-221 in a redundant ring configuration were added to the system to further enhance the robustness of the network.*

Remote Access

The ability to create remote connections to equipment can provide companies great savings both in time and money. Not only this, but improved customer service can also be offered. It is possible to control, monitor, update software or fault find, irrespective of where the equipment is located, by means of a simple remote connection.

Being able to connect to a remote server whilst working from home or using a laptop PC when travelling makes for much more efficient and flexible working conditions for many support engineers.

Pumping stations and waste water facilities are often situated on the outskirts of the community, remotely located from the control centre. Facilities like these need reliable communications for control and monitoring. Westermo provides a wide range of remote access solutions designed to operate in harsh environmental conditions. Our remote access products meet up to many specific requirements of the water and waste water industry.

Industrial 3G HSUPA Routers

The MRD-310 and MRD-330 are two robust HSUPA routers designed to provide remote connectivity across mobile networks. The unit features an on-board two port switch, up to three serial ports, and the possibility to four digital I/O providing the unit with versatile connection options.

The MRD-series supports a wide variety of wireless standards, thus providing connectivity in a vary of applications. Secure connectivity can be achieved using a VPN which creates secure tunnels over insecure networks.

- *Dual-Band UMTS / HSDPA / HSUPA Router*
- *Quad-Band GSM / GPRS / EDGE*
- *Downlink rates up to 7.2 Mbit/s, Uplink rates up to 2 Mbit/s*
- *10/100BaseT Ethernet switch with DHCP server*
- *Serial to IP conversion (RS-232) and digital I/O*
- *Stateful packet inspection Firewall*
- *VPN with IPSec, SSL, PPTP or L2TP encryption*
- *Made easy configuration and comprehensive diagnostic*
- *Extended temperature range (–20°C to +60°C), (–4°F to +140°F)*
- *10 to 60 VDC power input*

Product/Art. no	Description	Connectivity
MRD-310 3623-0001 	Industrial 3G router, built in Ethernet switch and RS-232 serial interface. WEB PAGE	RS-232 2 x 10/100BaseT SIM
MRD-330 3623-0101 	Industrial 3G router, built in Ethernet switch, three RS-232 serial ports and digital I/O. WEB PAGE	3 x RS-232 2 x 10/100BaseT 2 x Digital in 2 x Digital out SIM

HSDPA/3G/GPRS Routers

The MR-series has features such as firewall, data encryption and VPN tunnelling to provide secure data transmission between sites.
The device has a serial RS-232 port and one 10/100BaseT port.
The MR-series supports routing protocols such as BGP, VRRP, OSPF, and RIP2.
The MR-250 supports fast wireless connections using HSDPA with fallback to the best alternative available 3G UMTS/EDGE/GPRS.

- *HSDPA / 3G UMTS / EDGE / GPRS Router*
- *10/100 BaseT Ethernet switch*
- *Integrated RS-232 terminal server port*
- *SNMP management protocol*
- *VRRP, OSPF, BGP, RIP2 redundant protocols*
- *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)*
- *12 to 24 VDC power input*
- *SMS control and notification*

Product/Art. no	Description	Connectivity
MR-200 3622-0101 	GPRS wireless Router. WEB PAGE	RS-232 10/100BaseT 2 x SIM 2 x USB
MR-250 3622-0110 	3G/HSDPA wireless Router. WEB PAGE	RS-232 10/100BaseT 2 x SIM 2 x USB

Falcon – The industrial Broadband router

The Falcon is the world's first VDSL2 router for industrial applications with an integrated Ethernet routing switch designed to provide two-way high-speed secure communication between remote sites enabling economical and reliable connections to equipment such as SCADA, PLCs, RTUs and I/O devices.

In order to enable Ethernet communications, common in the latest industrial I/O devices, the Falcon features an integrated 4 port Layer 3 routing switch. In addition, an RS232 port and the built in device server interface can be used to connect legacy serial devices.

ADSL will remain in use for many years alongside the newer VDSL2 services. The Falcon has therefore been designed to support ADSL, ADSL 2 and ADSL2+ broadband technologies.

With connections being made via the internet, security is critical. The Falcon has a built-in stateful packet inspection firewall and can support IPsec VPN (Virtual Private Networks) tunnels, secured by encryption protocols.

- *VDSL2 with support for up to 100 Mbit/s in both directions*
- *ADSL, ADSL2 and ADSL2+ backwards compatible*
- *IPsec VPN support. Up to 25 tunnels.*
- *OSPF/RIP – To support dynamic routing and increased availability of the network.*
- *VRRP/NAT – For redundant static routing support and flexibility in remote connections.*
- *RS-232 device server and 4 x Fast Ethernet ports*
- *<20 ms FRNT ring redundancy on large networks*
- *Firewall, SNMPv3, VLAN, IGMP Snooping, QoS, HoL, STP/RSTP*
- *Made easy configuration and comprehensive diagnostic (Web config and CLI)*
- *Extended temperature range (–20°C to +60°C)*
- *MTBF 580 000 hours*
- *9 to 60 VDC isolated redundant power inputs*
- *IP 40 robust metal housing*

Product/Art. no.	Description	Connectivity
FDV-206-1D-1S 3660-0100 	Industrial VDSL2/ADSL router with an onboard 4 port Ethernet switch and RS-232 device server. WEB PAGE	4 x 10/100BaseT 1 x RS-232 serial interface DSL-port Console port USB Digital I/O

ADSL 2/2+ Router

ADSL offers high speed access to remote sites over existing analogue telephone lines. The DR-250 has features such as firewall, data encryption and VPN tunnelling to provide secure data transmission between sites.
The device has a serial RS-232 port and four 10/100BaseT ports. The DR-250 supports routing protocols such as: BGP, VRRP, OSPF, and RIP2.

- *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*

Product/Art. no	Description	Connectivity
DR-250 3622-xxxx 	ADSL 2/2+ Router. WEB PAGE	RS-232 4 x 10/100BaseT 2 x SIM 2 x USB

Remote Connection via Telephone Lines

This product group consists of modems that can be connected to the public telephone network. The modems are approved in most European countries and in many countries in other parts of the world.

Westermo modems are designed for industrial applications, which means that there are functions built in to them that are especially useful in industrial systems like for instance PLC connection mode and DIP switch settings. The Westermo products have a watchdog function and are galvanically isolated to give reliable communication in harsh environments. Some of the modems can also be used on 2- or 4-wire leased lines over very long distances.

- *Serial interface (RS-232, RS-422/485) up to 115 kbit/s*
- *2- and 4-wire Leased Line*
- *11 bit data format*
- *High security functions (Watchdog / Password dial-back)*
- *Made easy configuration using DIP-switches and TD-tool*
- *Screw terminal or 9-pin D-sub for fast and flexible connections*
- *Extended temperature range (–25°C to +70°C), (–13°F to +158°F)*
- *Wide power input*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
TDW-33 3619-0001 	V.90 telephone modem with a RS-232 serial connector. WEB PAGE	PSTN Serial (RS-232)
TD-36 3618-xxxx 	V.34 telephone and leased line modem with RS-232 serial interface. WEB PAGE	PSTN Leased Line Serial (RS-232)
TD-36 485 3614-0500 	V.34 telephone and leased line modem with RS-232 and RS-422/485 serial interface. WEB PAGE	PSTN Leased Line Serial (RS-232) Serial (RS-422/485)
TR-36B 3614-0510 	Rack mounted V.34 telephone and leased line modem. WEB PAGE	Connects to rack RV-07B
RV-07B 3130-3010 	19" rack for TR-36B telephone and Leased Line modem. RV-07B can hold up to 16 modems and two power supplies. WEB PAGE	PSTN Leased Line Serial (RS-232) Serial (RS-422/RS-485) Fault relay

GSM / GPRS Modems

The GSM modems provide possibilities to control or monitor equipment with a serial interface from a remote location. The DTR signal could be used to trigger an SMS message or a dial-up connection to a pre-programmed number.
The GDW-11 485 has RS-232, RS-422/485 serial interfaces.

- *GSM 900/1800 modem*
- *GPRS, class B, class 10*
- *Serial interface (RS-232, RS-422/485) up to 115 kbit/s*
- *DTR triggered -dialling and SMS up to 11 data bits*
- *Speed CSD up to 14.4 kbit/s, GPRS up to 85.6 kbit/s*
- *Extended temperature range (–25°C to +50°C), (–13°F to +122°F)*
- *10 to 60 VDC galvanic isolated power input*

Product/Art. no	Description	Connectivity
GDW-11 3615-0001 	GSM/GPRS modem for 800 and 1800 MHz GSM networks. WEB PAGE	Serial (RS-232 D-sub) Serial (RS-232 screw terminal) SIM
GDW-11 485 3615-0030 	GSM/GPRS modem for 800 and 1800 MHz GSM networks. Dual serial support. WEB PAGE	Serial (RS-232 D-sub) Serial (RS-422/485) SIM
GD-01 US 3196-0020 	GSM/GPRS modem for 850 and 1900 MHz GSM networks. Dual serial support. WEB PAGE	Serial (RS-232 D-sub) SIM

Note! The whip aerial EX07 is included in 3615-0001, 3615-0030 and 3196-0020.

ISDN-Adapter

The advantage with ISDN is the data rate as well as the fast connection time, less than 1 second compared with 15 to 25 seconds with an analogue modem.
The IDW-90 also supports the V.90 protocol, which eliminates the need for separate modems for analogue and digital data transfers. This makes it ideal for system suppliers that have installations of both types.

- *Serial interface (RS-232, RS-422/485) up to 230 kbit/s*
- *ISDN data rate up to 128 kbit/s*
- *Analogue data rate up to 33.6 kbit/s (V.34)*
- *High security functions (Watchdog / Password dial-back)*
- *Generic I/O inputs and Relay output*
- *DTR/TX and I/O event trigged dialling*
- *Event trigged SMS-message transmission*
- *10 to 60 VDC power input*

Product/Art. no	Description	Connectivity
IDW-90 3620-0001 	ISDN Terminal adapter with serial support (RS-232 and RS-422/485). WEB PAGE	ISDN Serial (RS-232) Serial (RS-422/485) Digital I/O

Leased Line

Westermo has multidrop modems both for private and for leased lines. Both type of modems can be connected to serial devices with RS-232 or RS-422/485 interfaces.
The V.23 standard which is the only multidrop leased line standard allows speed up to 1200 bit/s on two or four wire. Multidrop applications on private lines can have speeds up to 19200 bit/s but the distances depend on the line quality and the number of drop points on the line.

- *Serial interface (RS-232, RS-422/485)*
- *2- and 4-wire Leased Line*
- *Transmission distance up to 25 km (15.5 mi)*
- *Point-to-point and multidrop applications*
- *Extended temperature range (–25°C to +70°C), (–13°F to +158°F)*
- *Wide power input (AC/DC)*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
TD-23 3193-xxxx 	2- or 4-wire leased line V.23 modem for point-to-point or multidrop applications. WEB PAGE	Leased line Serial RS-422/485 Serial RS-232
TD-29 3193-xxxx 	2- or 4-wire leased line V.23 modem for point-to-point or multidrop applications. Transmission rates up to 19200 bit/s WEB PAGE	Leased line Serial RS-422/485 Serial RS-232
TD-29P 3193-xxxx 	2-wire leased line modem for PROFIBUS DP connections. Multidrop, repeater and point-to-point applications. WEB PAGE	Leased line Serial RS-485

Serial and PSTN Routers

The ED-2xx-series consists of two industrially rated Ethernet routers with different function levels. The ED-200 has a serial interface with both RS-232 and RS-422 connectivity. The ED-210 has a inbuilt PSTN modem and Leased Line interface and can be used as a dial in or dial out router or for point-to-point connection over a Leased Line.

- *Routher with built in 10/100BaseT Ethernet switch*
- *RS-232 or RS-422 serial interface*
- *Integrated V.34 telephone modem*
- *Firewall and SNMP management protocol*
- *Made easy configuration and comprehensive diagnostic*
- *Extended temperature range (–25°C to +70°C), (–13°F to +158°F)*
- *10 to 60 VDC power input*
- *Galvanic isolation and transient protection*

Product/Art. no	Description	Connectivity
ED-200 3609-5010 	Router with RS-232 and RS-422 serial interface. WEB PAGE	4 x 10/100BaseT RS-232 RS-422
ED-210 3609-5001 	Router with an inbuilt V.34 modem and Leased Line interface. WEB PAGE	4 x 10/100BaseT Leased Line PSTN

Wireless Solutions

The RM-series provides reliable and secure high-speed wireless Ethernet connectivity across a broad range of applications in process and automation plants. It is very well suited for connection to PLC's, HMI, DCS, data acquisition, video devices and industrial PC's. The units have an Ethernet port (10/100BaseT) as well as two serial ports (RS-232 and RS-485) and on-board I/O for local and remote link status, or external status transfer.

- *Industrial frequency strengths*
- *Serial interface (RS-232, RS-422/485) up to 115 kbit/s*
- *10/100BaseT Ethernet connection*
- *Bridge/router functions for Ethernet protocols*
- *128-bit AES encryption*
- *Firewall with MAC-address filtering*
- *Made easy configuration and comprehensive diagnostic*
- *Extended temperature range (–40°C to +60°C), (–40°F to +140°F)*
- *10 to 30 VDC power input*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
RM-80 3193-xxxx 	Wireless Ethernet Radio Modem. 869 MHz. (Europe), 76 kbit/s. WEB PAGE	10/100 BaseT Serial (RS-232) Serial (RS-485) Digital I/O
RM-90 3193-xxxx 	Wireless Ethernet Access Point and client. 900 MHz. (US), 200 kbit/s. WEB PAGE	10/100BaseT Serial (RS-232) Serial (RS-485) Digital I/O
RM-240 3193-xxxx 	WLAN access point and client. 2.4 GHz, 802.11b, 11 Mbit/s. WEB PAGE	10/100BaseT Serial (RS-232) Serial (RS-485) Digital I/O

Fibre Optics

Fibre Optic cable has the advantages that it is completely insensitive to electrical and magnetic disturbances. It is therefore ideal to install as a communication media in harsh industrial environments. It also provides benefits such as high data rates over long distances. Depending on choice of transceiver and cable (multimode / singlemode) distances up to 80 km (49.7 mi) can be achieved.

Wind farms are often situated in remote and demanding locations where extreme variations in temperature, moisture and vibration can be an issue. Building a control and monitoring system in this environment can be difficult as wind farms may consist of several hundred turbines spread over large geographic areas.
The Westermo ODW-series can be used to build super fast redundant fibre ring solutions over long distances with a reconfiguration time less than 50 ms. This series of products have been developed for extreme operating conditions, which makes them a perfect choice for this kind of extreme application.

Industrial Fibre Optic Modems

Fibre optic modems are often used in data communication systems to bridge long distances at high data rates. Fibre optic systems are particularly immune to electromagnetic interference and therefore very suitable for harsh industrial environments. Westermo products can transmit data at up to 12 Mbit/s over distances up to 80 km (49.7 mi) depending on the fibre type.

The ODW-series can be used in point-to-point, multidrop and redundant ring installations between devices with serial interfaces.

- *Serial interface (RS-232, RS-422/485) up to 1.5 Mbit/s*
- *Flexible transceiver configuration (multi, single, bi-di) up to 80 km (49.7 mi)*
- *Retiming (no limits regardless of network size)*
- *Point-to-point, multidrop and redundant ring applications*
- *Extended temperature range (–40°C to +70°C), (–40°F to +158°F)*
- *10 to 60 VDC redundant power input*
- *Galvanic isolation between all interfaces*

Product/Art. no		Description	Connectivity
ODW-621 3650-xxxx		Fibre optic modem with RS-232 serial interface. WEB PAGE	SFP slot Serial (RS-232) Status screw terminal
ODW-622 3650-xxxx		Fibre optic modem with RS-232 serial interface and support for redundant rings. WEB PAGE	2 x SFP slots Serial (RS-232) Status screw terminal
ODW-631 3650-xxxx		Fibre optic modem with RS-422/485 serial interface. WEB PAGE	SFP slot Serial (RS-422/485) Status screw terminal
ODW-632 3650-xxxx		Fibre optic modem with RS-422/485 serial interface and support for redundant rings. WEB PAGE	2 x SFP slot Serial (RS-422/485) Status screw terminal
ODW-641 3650-xxxx		Point-to-point fibre optic modem for PROFIBUS-DP networks. WEB PAGE	SFP slot Profibus DP (RS-485) Status screw terminal
ODW-642 3650-xxxx		Point-to-point fibre optic modem for PROFIBUS-DP networks with support for ultra fast redundant rings. WEB PAGE	SFP slot Profibus DP (RS-485) Status screw terminal

Fibre Optic Solutions for LonWorks® Networks

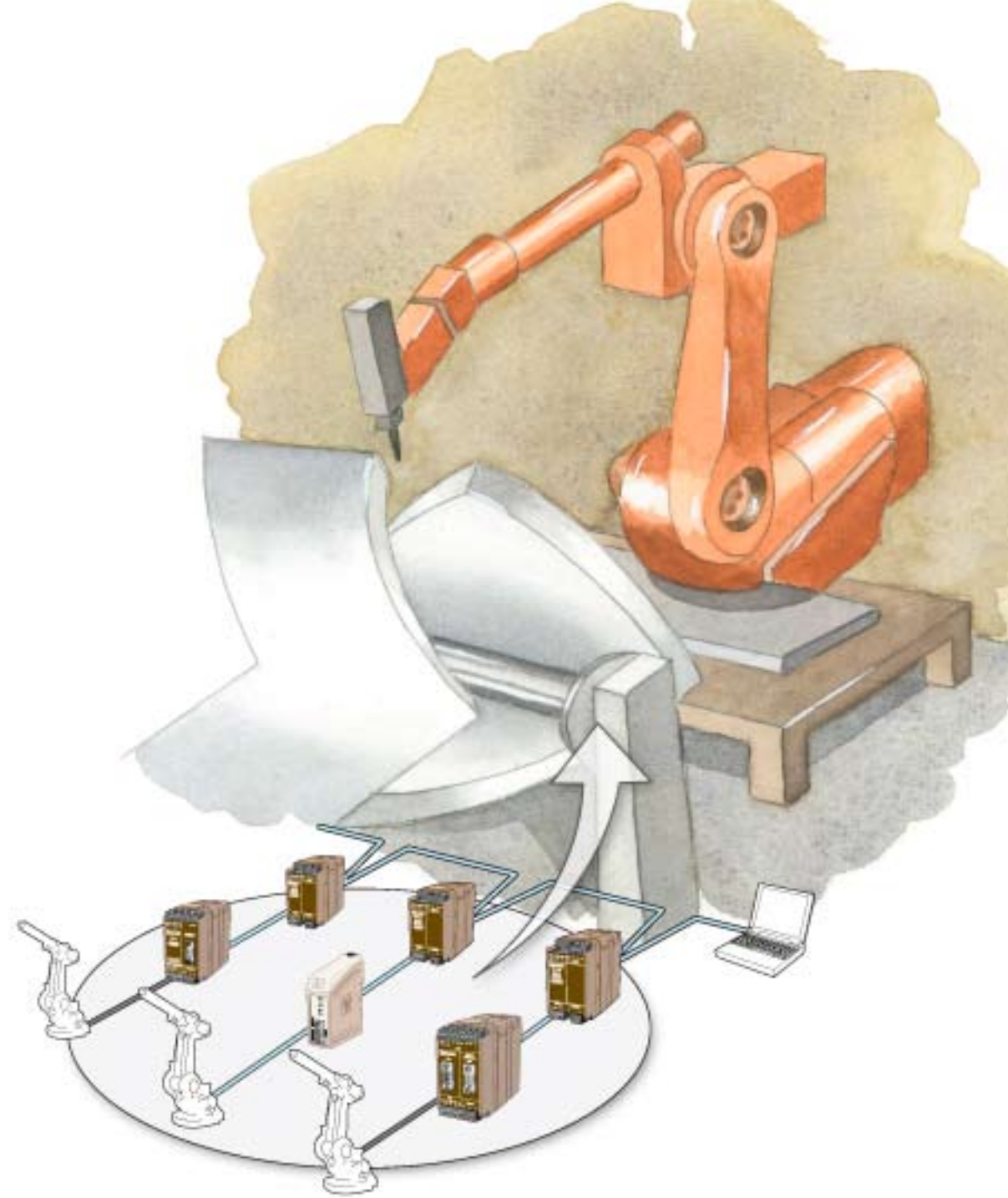
These units are used to extend the transmission range between two or more LonWorks® networks on a single- or multimode fibre optic cable up to distances of 20 km (12.4 mi). It can either be a point-to-point, multidrop or a redundant ring solution. For point-to-point applications the PP-version is used. The modems have an alarm output to indicate if any failure occurs on the fibre optic link.

- *LonWorks®, 78 kbit/s TP/FT-10*
- *Flexible transceiver configuration (multi, single) up to 20 km*
- *Point-to-point, multidrop and redundant ring applications*
- *Transparent repeater functions*
- *Optical signal regenerated*
- *Alarm output indicating fibre failure*
- *Extended temperature range (–40°C to +60°C), (–40°F to +140°F)*
- *10 to 60 VDC redundant power input*

Product/Art. no		Description	Connectivity
LRW-102 PP 3650-xxxx		Fibre optic converter/repeater for LonWorks TP/FT-10 point-to-point applications. WEB PAGE	TP/FT-10 connector SFP slot Status screw terminal
LRW-102 3650-xxxx		Fibre optic converter/repeater for LonWorks TP/FT-10 with support for redundant rings. WEB PAGE	TP/FT-10 connector 2 x SFP slot Status screw terminal
LRW-112 PP 3650-xxxx		Fibre optic router for LonWorks TP/FT-10 point-to-point applications. WEB PAGE	TP/FT-10 connector SFP slot Status screw terminal
LRW-112 3650-xxxx		Fibre optic router for LonWorks TP/FT-10 with support for redundant rings. WEB PAGE	TP/FT-10 connector 2 x SFP slot Status screw terminal

Serial Converters

Despite the dominance of Ethernet in modern industrial networks there is still a vast installed base of legacy serial equipment that is still in use. Whether it be RS-232, RS-422/485, PROFIBUS, M-bus or even 20 mA current loop. Westermo still offers a range of solutions.



When linking legacy serial equipment to a central computer there are often distance limitations and the equipment might also be located in an environment with high electromagnetic interference. Sometimes equipment can have different sorts of serial interfaces. For all these problems Westermo have many tried and tested solutions. Our serial converters, repeaters and isolators will solve most of your needs when building serial networks.

RS-232, Point-to-point

The MD-12 is used in point-to-point applications or as a start and end modem in a multidrop installation with products using W1 technology. Westermo's ±10 mA balanced current loop (W1) transmission technique makes it possible to transmit data up to 18 km (11.2 mi) at low data rates on a 4-wire cable. At shorter ranges transmission rates up to 38.4 kbit/s can be achieved.

- *Serial interface (RS-232/V.24)*
- *Transmission distance up to 18 km (11.2 mi)*
- *Protocol transparent*
- *Transfer status signals*
- *Wide power input (AC/DC)*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
MD-12 3150-xxxx WEB PAGE 	Short haul modem for RS-232 / V.24 interfaces. Power supply option: 207-264 VAC, 103-132 VAC, 12-36 VDC, 36-55 VDC	Serial RS-232 or V.24/V.28 ±10 mA Current Loop

RS-232, Multidrop

Westermo's ±10 mA balanced current loop (W1) transmission technique makes it possible to transmit data up to 18 km (11.2 mi) at low data rates on a 4-wire cable. At shorter ranges transmission rates up to 38.4 kbit/s can be achieved.

The LD-01 is also available in a "by-pass" version. This model ensures that if a modem in the multidrop network should fail that modem will be by-passed, hence not effecting the communications between other units on the network.

- *Serial interface (RS-232/V.24 or RS-422/485)*
- *Multidrop applications*
- *Protocol transparent*
- *Tolerant to high levels of interference*
- *Wide power input (AC/DC)*
- *Galvanic isolation between all interface*

Product/Art. no	Description	Connectivity
LD-01 3154-xxxx WEB PAGE 	Line split unit for multidrop applications. Power supply option: 207-264 VAC, 103-132 VAC, 12-36 VDC, 36-55 VDC	Serial RS-232 ±10 mA Current Loop
LD-02 3156-xxxx WEB PAGE 	Line split unit for multidrop applications. Power supply option: 207-264 VAC, 103-132 VAC, 12-36 VDC, 36-55 VDC	Serial RS-232 Serial RS-422/485 ±10 mA Current Loop

RS-232, Repeater/Isolator

This unit is used to extend distances or to provide galvanic isolation between different equipment in installations where ground potentials may cause problems.

The MD-52 is used together with RS-232 equipment and the RD-48 with RS-422/485.

- *Serial interface (RS-232/V.24)*
- *Screw terminal or 9-pin D-sub for fast and flexible connections*
- *Protocol transparent*
- *Tolerant to high levels of interference*
- *Extended temperature range (DC: –25°C to +70°C), (DC: –13°F to +158°F)*
- *Wide power input (AC/DC)*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
MD-52 3601-xxxx WEB PAGE 	V.24 Isolator to provide galvanic isolation between serial and V.24 interfaces. Power supply option: 207-264 VAC, 103-132 VAC, 12-36 VDC, 36-55 VDC	2 x Serial RS-232/ V.24/V.28

RS-422/485, Repeater/Isolator

According to the standard the RS-422/485 interface is able to support a total of 32 connected devices and a transmission range of up to 1200 meters (4000 ft).

A repeater can be used to extend the range by an extra 1200 metres (4000 ft) or to add another 32 connected devices. Up to 8 repeaters can be used in a single network.

The RD-48 can also allow star networks to be created, provide galvanic isolation between segments and correct termination of the line.

- *Repeater with retiming for high data rates*
- *2-/4-wire conversion*
- *Full termination and failsafe switch selectable*
- *Profibus DP compatible*
- *Tolerant to high levels of interference*
- *Extended temperature range (Temp version –40°C to +70°C), (Temp version –40°F to +158°F)*
- *Wide power input (AC/DC)*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
RD-48 3153-xxxx WEB PAGE 	RS-422/485 Serial Repeater. Power supply option: 85.5-264 VAC, 9.6-57.6 VDC	2 x Serial RS-422/485

Fieldbus Adapter

Serial link between PROFIBUS DP networks. The FD-10 is used to establish a serial link and transfer I/O data between two or more PROFIBUS DP networks. It could be on an existing Ethernet network, dial-up, fibre optic link or even a wireless connection via radio or GSM.

The FD-10 is used when there is a master in each PROFIBUS DP network.

- *Serial interface (RS-232 / RS-485)*
- *Permits connection of a Profibus DP-network*
- *Full termination and failsafe switch*
- *Integrated PROFIBUS DP-slave*
- *Compatible with PROFIBUS DP-standard I/O-Data*
- *Tolerant to high levels of interference*
- *Extended temperature range (Temp version –25°C to +70°C), (Temp version –13°F to +158°F)*
- *10 to 60 VDC power input*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
FD-10 3630-xxxx WEB PAGE 	Industrial DP Fieldbus Adapter.	Profibus DP Serial RS-485 Serial RS-232

20 mA Current Loop Serial Converter

MD-21 is a converter between serial RS-232 and 20 mA current loop.

- *20 mA to RS-232/V.24 serial conversion*
- *Protocol transparent*
- *Active or passive transmitter and receiver*
- *Tolerant to high levels of interference*
- *Wide power input (AC/DC)*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
MD-21 3151-xxxx WEB PAGE 	Current loop converter. Conversion between 20mA and RS-232/V.24. Power supply option: 207-264 VAC, 103-132 VAC, 12-36 VDC, 36-55 VDC.	20 mA current loop Serial (RS-232 D-sub) Serial (RS-232 Screw terminal)

M-Bus Converter

Solutions for M-Bus applications. The AD-01 has several functions, which make it easy to build a complete network. The adapter can be used as a converter from RS-232 to M-Bus, a repeater to make the communication distance longer or to extend the distance between two M-bus networks using any kind of serial RS-232 communications equipment.

- *RS-232/V.24 and M-Bus master and slave interface*
- *Data rate from 300 bit/s up to 9 600 bit/s*
- *Autobaud functionality*
- *Up to 120 M-bus slaves*
- *Tolerant to high levels of interference*
- *207-253 VAC power input*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
AD-01 3612-0001 WEB PAGE 	M-Bus adapter.	Serial RS-232/V.24 (Master) Serial RS-232/V.24 (Slave) M-bus

Fieldbus Converter

Connect serial device to a PROFIBUS DP network. The FD-40 Fieldbus converter allows devices with serial RS-232 or RS-485 interfaces to be integrated into PROFIBUS DP networks. The FD-40 works as a PROFIBUS DP slave module enabling serial data to be transmitted as normal DP process data.

- *Serial interface (RS-232 / RS-485)*
- *Fully compatible with the PROFIBUS DP-standard*
- *Up to 12 Mbit/s*
- *Integrated PROFIBUS DP-slave*
- *Full termination and failsafe switch*
- *Tolerant to high levels of interference*
- *Extended temperature range (Temp version –25°C to +70°C), (Temp version –13°F to +158°F)*
- *10 to 60 VDC power input*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
FD-40 3630-1400 WEB PAGE 	Fieldbus converter. Serial (RS-232/RS-485) to PROFIBUS DP.	Profibus DP Serial RS-485 Serial RS-232

RS-422/485 Serial Converters

The MDW-45 is a serial RS-232 to RS-422/485 interface converter.

The unit can be used in point-to-point and multidrop applications on 2- or 4-wires with data rates up to 100 kbit/s and cable lengths up to 1200 metres (4000 ft).

- *RS-232 to RS-422/485 serial conversion*
- *Point-to-point and multidrop applications*
- *2- and 4-wire Leased Line*
- *Tolerant to high levels of interference*
- *Extended temperature range (MDW-45 –40°C to +70°C) (MDW-45 –40°F to +158°F)*
- *Wide power input*
- *Galvanic isolation between all interfaces*

Product/Art. no	Description	Connectivity
MDW-45 3617-xxxx WEB PAGE 	RS-232 to RS-422/422 serial converter. Power supply option: 9.6-57.6 VDC 85.5-264 VAC/88-300 VDC.	Serial (RS-232) Serial (RS-422/485)
MD-45 3157-xxxx WEB PAGE 	RS-232 to RS-422/422 serial converter. Power supply option: 88-300 VDC/85.5-264 VAC, 9.6-57.6 VDC/10-45 VAC.	Serial (RS-232) Serial (RS-422/485)

Housings

Westermo products come in a series of different enclosures specially designed for harsh and demanding environments. All housings fulfil high grade quality requirements and allow the device to work in an extended temperature range. IP ranges span from IP 40 for the plastic housing up to IP 65 for the most rugged metal housing.

Housings		Description	Products
Plastic house, DIN-mounted		Dimension W x H x D 55 x 100 x 132 mm (2.1 x 3.9 x 5.2 in)	ED-200, ED-210, TD-36, TD-36 485, GD-01 US, TD-23, TD-29, TD-29P, MD-12, LD-01, LD-02, MD-52, RD-48, FD-10, FD-40, MD-21, AD-01, MD-45.
Plastic house, DIN-rail		Dimension W x H x D 35 x 121 x 119 mm (1.37 x 4.76 x 4.68 in)	SDW-500-series, MCW-211, EDW-100, EDW-120, DDW-100, DDW-120, TDW-33, GDW-11, GDW-11 485, IDW-90, ODW-600-series, LRW-1xx-series, MDW-45.
Metal housing, 2-slot, DIN-rail or wall mounted		Dimension W x H x D 134 x 105 x 122 mm (5.27 x 4.13 x 4.80 in)	RFI-6-F4G, RFI-10, RFI-10-F4G, DDW-220, DDW-225, DDW-226..
Metal housing, 3-slot, DIN-rail or wall mounted		Dimension W x H x D 175 x 105 x 122 mm (6.88 x 4.13 x 4.80 in)	RFI-18, RFI-14-F4G, RFI-18-F4G-T4G.
Metal housing, DIN-rail or table top		Dimension W x H x D, 160 x 29 x 128 mm (6.29 x 1.14 x 5.03 in)	MR-200, MR-250.
		Dimension W x H x D 239 x 29 x 154 mm (9.40 x 1.14 x 6.06 in)	DR-250.
Metal housing, DIN-rail or table top		Dimension W x H x D 113 x 33 x 154 mm (4.44 x 1.29 x 6.06 in)	MRD-310.
		Dimension W x H x D 113 x 55 x 154 mm (4.44 x 2.16 x 6.06 in)	MRD-330.
Plastic house, DIN-rail		Dimension W x H x D 35 x 150 x 135 mm (1.37 x 5.90 x 5.31 in)	RM-80, RM-90.
		Dimension W x H x D 30 x 140 x 114 mm (1.18 x 5.51 x 4.48 in)	RM-240.
Metal housing, DIN-rail		Dimension W x H x D 52.5 x 100 x 101 mm (2.07 x 3.93 x 3.97 in)	Lynx-series.
Metal housing, DIN-rail or wall mounted		Dimension W x H x D 175 x 100 x 50 mm (6.88 x 3.93 x 1.96 in)	Viper-series.
19" Rack metal housing		Dimension W x H x D 485 x 135 x 180 mm (19.09 x 5.31 x 7.08 in)	RV-07B.

i-line housings		Description	Products
Metal housing, DIN-rail		Dimension W x H x D 30 x 111.8 x 89 mm (1.18 x 4.40 x 3.50 in)	SDI-500 series.
Metal housing, DIN-rail		Dimension W x H x D 55 x 120 x 108 mm (2.16 x 4.72 x 4.25 in)	SDI-800 series. MCI-211G.
Metal housing, DIN-rail		Dimension W x H x D 66 x 149 x 131.2 mm (2.59 x 5.86 x 5.16 in)	PSI-660G.
Metal housing, DIN-rail		Dimension W x H x D 66 x 149 x 120.5 mm (2.59 x 5.86 x 4.74 in)	PSI-1010G series.
Metal housing, DIN-rail		Dimension W x H x D 55 x 120 x 99 mm (1.18 x 4.72 x 3.89 in)	MCI-422 series.
Metal housing, DIN-rail		Dimension W x H x D 96 x 137 x 129 mm (3.77 x 5.39 x 5.07 in)	MDI-110 series.
Metal housing, DIN-rail		Dimension W x H x D 96 x 137 x 129 mm (3.77 x 5.39 x 5.07 in)	MDI 112.
Metal housing, DIN-rail		Dimension W x H x D 96 x 137 x 129 mm (3.77 x 5.39 x 5.07 in)	MDI-118.

Accessories

Westermo has a range of accessories to match our products. antennas, transceivers, power supplies and more. Contact Westermo back office for more information.

Transceivers

Westermo offer a wide selection of Small Form Pluggable (SFP) transceivers.
The selection of transceivers are available in a variety of models and lengths offering transmission rages from 2 km to 80 km (1.2 mi to 49.7 mi) over fibre.
The CX transceiver allows SFP ports to be used to connect an Ethernet RJ-45 cable.
Contact Westermo for detailed information.

Product/Art. no	Description
Single Mode Transceivers 	Single Mode Transceivers are available in a variety of models. Transmission capacity from 100 Mbit to 1 Gibit and distances from 15 to 120 km (9.3 to 74.5 mi).
Multi Mode Transceivers 	Multi Mode Transceivers are available in a variety of models. Transmission capacity from 100 Mbit to 1 Gibit and distances from 550 m to 60 km (1805 ft to 37.2 mi)..
Bi-directional Transceivers 	Bi-Di Transceivers are available in a variety of models. 100 Mbit transmission capacity and distances from 2 km to 60 km. (1.2 mi to 37.2 mi)
CX Transceiver 	CX transceivers links a SFP port to a copper-based network using a standard RJ-45 connection. 1 Gbit transmission capacity and 100 m (328 ft) distance.

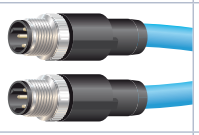
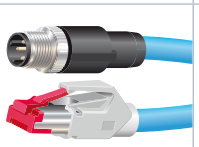
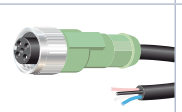
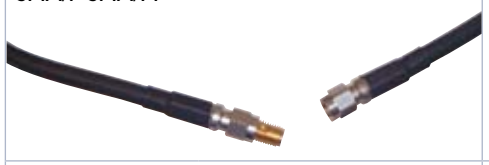
Power Supply / Adapters

Westermo provides a set of industrially approved power supplies complying with many mayor safety approvals. The most common power supply, PS-30, comes in a DIN-mounted housing and can operate in a extended temperature range.

Product/Art. no	Description
PS-20 	Power supply for RV-07B Rated voltage 100 to 240 VAC Operating voltage 90 to 254 VAC
PS-30 	Power supply, DIN mounted Output: DC 24 – 28V / 30 W PSU Input: 85 to 264 VAC, 85 to 375 VDC

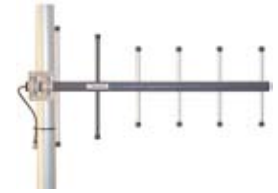
Cables

Special cables for reading diagnostics, antennas, radio, fibre and Ethernet are available in a variety of lengths and jacketing options. Please contact Westermo for further information.

Product/Art. no	Description
Diagnostic cable 1211-2026 	Cable for diagnostic DDW-100 DDW-100 to RS-232
Diagnostic cable 1211-2027 	Cable for diagnostic DDW-120 and RedFox Console port to USB
M12 cables 	M12 – M12. In length, 1 m, 5 m and 15 m (3.28 ft, 16.40 ft and 49.21 ft)
M12-RJ45 cables 	M12 – RJ-45 In length, 1 m, 5 m and 15 m (3.28 ft, 16.40 ft and 49.21 ft)
Power cables 	M12 In length, 1 m and 5 m (3.28 ft and 16.40 ft)
GSM cables **TZC** **SMA/F-SMA/M** 	Cables for antennas. In length, 3 m, 5 m and 10 m (9.84 ft, 16.40 ft and 32.80 ft)
Radio cables **RG213** 	Cables for antennas. In length, 3 m, 5 m, 7 m, 10 m and 15 m (9.84 ft, 22.96 ft, 16.40 ft, 32.80 ft and 49.21 ft)

Antennas / Adapters

Special antennas for radio and GSM are available in a variety of models.
Please contact Westermo for further information.

Product/Art. no	Description
CA-930D **CA-860D** 	DIPOLE, 4 dBi 890 –960 MHz
CA-930Y-series **CA-860Y-series** 	YAGI, 6 dBi, 8 dBi and 10 dBi, 890 –960 MHz YAGI, 6 dBi, 8 dBi and 10 dBi, 830 –890 MHz
EX07 	Whip antenna with magnetic foot, 900/1800 MHz
GS-23/M70EXR 	Low profile antenna
CA-860Q 	Whip antenna with SMA connector, 830 –890 MHz
CA-2400M 	Corner reflector antenna 2.4 GHz, N-connector

Technology designed to take a beating

We regularly test our products to ensure quality at all times and 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:

ATEX 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 have obtained the Class 1, Division 2 certification though 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.

UL approval This safety standard is applicable to Information Technology Equipment and specifies requirements intended to reduce risks of fire, electric shock or injury for the operator and layman who may come into contact with the equipment and, where specifically stated, for a service person. This standard is intended to reduce such risks with respect to installed equipment, whether it consists of a system of interconnected units or independent units, subject to installing, operating and maintaining the equipment in the manner prescribed by the manufacturer.

EN 50155 A number of Westermo units have been tested according the European railway standard EN 50155 (Electronic Equipment Used On Rolling Stock). Performance standards are defined for a railway's operational environment, including shock, vibration, extended temperature range, humidity and many other factors. The standard has been defined so that electronics in rail cars will be able to operate continuously for approximately 250,000 hours.

EN 50121-4 outlines the principles for Electromagnetic compatibility (EMC) behaviour and management process for achieving EMC at the interface between railway infrastructures and trains. The objective of this standard is to specify the EMC emission and immunity requirements for railway products, and for the railway as an installation.

IEC 61850-3 is is an international standard for electrical substation systems. The standard enables integration of all protection, control, measurement and monitoring functions within a substation. It combines the convenience of Ethernet with the performance and security, which is essential in substations today.

In general almost all Westermo products complies with the immunity for industrial environments in accordance with **EN 61000-6-2** and emission for residential, commercial and light industrial environments in accordance with **EN 61000-6-3**. **EN 60950** and **UL 60950** for UL approved products.

Part 15 · Part 15 / 68 · LISTED · TYPE APPROVED PRODUCT DNV · IndustrialIT enabled · FM APPROVED Class 1, Div 2 · lead-free · RoHS 2002/95/EC

EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · EN 61000-6-4 Industrial Emission · 50121-4 Railway Trackside · EN 50155 On Board Rail

Unmanaged Switches

Product	Approvals
SDW-550	Part 15 · TYPE APPROVED PRODUCT DNV · IndustrialIT enabled · LISTED · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
SDW-541	Part 15 · TYPE APPROVED PRODUCT DNV · IndustrialIT enabled · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
SDW-532	
SDI-550	
SDI-541	
SDI-862	
SDI-880	
Viper 008	Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside · EN 50155 On Board Rail

Managed Switches

Product	Approvals
Viper 108	Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · EN 50155 On Board Rail · 50121-4 Railway Trackside
Viper 408	
MDI-110-F3	
MDI-110-F3G	LISTED
MDI-112-F4G	
MDI-118-F2G	

Managed Routing Switches

Product	Approvals
RFI-10	Part 15 · LISTED · TYPE APPROVED PRODUCT DNV · IndustrialIT enabled · 50121-4 Railway Trackside · EN 61000-6-2 Industrial Immunity · EN 61000-6-4 Industrial Emission
RFI-14-F4G	
RFI-18-F4G-T4G	
RFI-18	
RFI-6-F4G	Part 15 · LISTED · IndustrialIT enabled · 50121-4 Railway Trackside · EN 61000-6-2 Industrial Immunity · EN 61000-6-4 Industrial Emission
RFI-10-F4G-T4G	
Lynx+	Part 15 · LISTED · IndustrialIT enabled · TYPE APPROVED PRODUCT DNV · EN 61000-6-2 Industrial Immunity · EN 61000-6-4 Industrial Emission · EN 55022 ITE Emission · 50121-4 Railway Trackside

Power over Ethernet Switches

Product	Approvals
PSI-660G	
PSI-1010G	

FX-TX Converters

Product	Approvals
MCW-211	CE FC Part 15 · TYPE APPROVED PRODUCT DNV · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
MCI-211G	CE FC
MCI-422	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-4 Industrial Emission

Serial Converters

Product	Approvals
EDW-100	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside
EDW-100 Ex	CE FC Part 15 · Ex · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside
EDW-120	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside
EDW-120 Ex	CE FC Part 15 · Ex · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside

Unmanaged Ethernet Extenders

Product	Approvals
DDW-120	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside
DDW-120 Ex	CE FC Part 15 · Ex · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside

Managed Ethernet Extenders

Product	Approvals
DDW-220	CE FC Part 15 · Ex · FM APPROVED Class 1, Div 2 · EN 61000-6-2 Industrial Immunity · EN 61000-6-4 Industrial Emission · 50121-4 Railway Trackside
DDW-222	
DDW-225	CE FC Part 15 · Ex · Industrial IT enabled · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside
DDW-226	CE FC Part 15 · Ex · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside

ADSL /VDSL Routers

Product	Approvals
FDV-206-1D-1S	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · EN 61000-6-4 Industrial Emission · 50121-4 Railway Trackside

ADSL Routers

Product	Approvals
DR-250	CE FC Part 15

Mobile Routers

Product	Approvals
MRD-310	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · EN 61000-6-4 Industrial Emission
MRD-330	

GSM / GPRS Routers

Product	Approvals
MR-200	CE FC Part 15
MR-250	
GDW-11	CE FC Part 15 · 50121-4 Railway Trackside · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
GDW-11 485	
GD-01 US	CE FC Part 15 · c UL us LISTED

Radio Modems

Product	Approvals
RM-80	CE FC Part 15
RM-90	
RM-240	

Telephone and Leased Line Modems

Product	Approvals
TDW-33	CE FC Part 15 / 68 · cULus LISTED · cULus · 50121-4 Railway Trackside · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
TD-36	CE FC Part 15 / 68 · cULus LISTED · 50121-4 Railway Trackside · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
TD-36 485	
TR-36B	CE FC Part 15 · 50121-4 Railway Trackside · EN 61000-6-2 Industrial Immunity · EN 61000-6-4 Industrial Emission
RV-07B	CE FC Part 15

ISDN adapter

Product	Approvals
IDW-90	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside

Leased Line Modems

Product	Approvals
TD-23	CE FC Part 15 · 50121-4 Railway Trackside · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
TD-29	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
TD-29P	

Fibre Optic Modems

Product	Approvals
ODW-621	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside
ODW-622	
ODW-631	
ODW-632	
ODW-641	
ODW-642	CE FC Part 15 · IndustrialIT enabled · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
ODW-621 Ex	CE FC Part 15 · Ex · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside
ODW-622 Ex	
ODW-631 Ex	
ODW-632 Ex	
ODW-641 Ex	
ODW-642 Ex	CE FC Part 15 · Ex · IndustrialIT enabled · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission · 50121-4 Railway Trackside

LonWorks

Product	Approvals
LRW-102PP	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission
LRW-102	
LRW-112PP	
LRW-112	

Short Haul Modems

Product	Approvals
MD-12	CE FC Part 15

Line Split Units

Product	Approvals
LD-01	CE FC Part 15
LD-02	

Repeaters / Isolators

Product	Approvals
MD-52	CE FC Part 15
RD-48	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-4 Industrial Emission

Fieldbus Adapters / Converters

Product	Approvals
FD-10	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-4 Industrial Emission
FD-40	

Current Loop Adapter

Product	Approvals
MD-21	CE FC Part 15

M-bus Converter

Product	Approvals
AD-01	CE FC Part 15 · EN 61000-6-2 Industrial Immunity · EN 61000-6-3 Residential Emission

Serial Converters	
Product	Approvals
MDW-45	CE FC Part 15 Ex EN 61000-6-2 Industrial Immunity EN 61000-6-3 Residential Emission EN 61000-6-4 Industrial Emission 50121-4 Railway Trackside
MD-45	CE FC Part 15 EN 61000-6-2 Industrial Immunity EN 61000-6-3 Residential Emission

Serial Routers	
Product	Approvals
ED-200	CE FC Part 15 EN 61000-6-2 Industrial Immunity EN 61000-6-4 Industrial Emission 50121-4 Railway Trackside
ED-210	

O F F I C E

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