



Ethernet Extender with serial support

DDW-226

High Speed Ethernet extension over copper

The DDW-226 is an Industrial Ethernet SHDSL extender with support for redundant rings. The redundant protocol can be used either on the SHDSL interface or on the Ethernet interface. Our unique FRNT (Fast Recovery of Network Topology) technology is the fastest protocol on the market to re-configure a network in the event of any failure of a link or hardware. Also included in the DDW-226 is a RS-232 serial adapter and a 10-port Virtual Com port re-director software. The unit supports TCP client, TCP server and UDP protocol modes allowing it to be used in a wide variety of applications.

The DDW-226 allows the cables of existing serial networks to be reused to create an Ethernet network while still allowing the legacy serial device to function on the new network. The DDW-226 Ethernet Extender is the ideal solution for extending your Ethernet network over copper cables where in the past the only option would have been fibre. At shorter range the transfer rate will be as fast as 5.7 Mbit/s in both directions. Transmission distances up to 15 km are possible, however at a reduced data rate. The SHDSL transmission technology makes the DDW-226 perfect for the re-use of existing copper cable installations from older communications networks. The Ethernet Extender supports two SHDSL interfaces and can therefore be used to create a daisy chain or ring network.

The DDW-226 uses the Westermo WeOS operating system already employed in our range of RedFox industrial Routing Switches. Using WeOS provides the DDW-226 with all the advanced switching and routing functionality supported by the Redfox. These functions include VLAN support, Layer 3 switching, Static Routing, Firewall functions, IGMP Snooping, VPN support and SNMP V3.

Configuration and diagnostics

Configuration of the unit is kept to a minimum for ease of use. The units are preconfigured for daisy-chain application, which implies that a simple installation can be made with no software configuration at all. For further configuration a built in web interface is provided so that only a computer with a standard web browser is required alternatively the CLI can be used for advanced settings or fine tuning of the network.

There are also comprehensive web screen and CLI diagnostics for both the SHDSL transmission interfaces and Ethernet switch which makes it possible to view statistics and monitor diagnostic information.

The units also support SNMP allowing them to be managed as part of the overall network infrastructure.

Harsh industrial environment

The units are well prepared for use in harsh industrial environments. Total galvanic isolation and transient protection are standard for all interfaces. The line interfaces are also equipped with extensive protection against over-currents and voltage suppression.

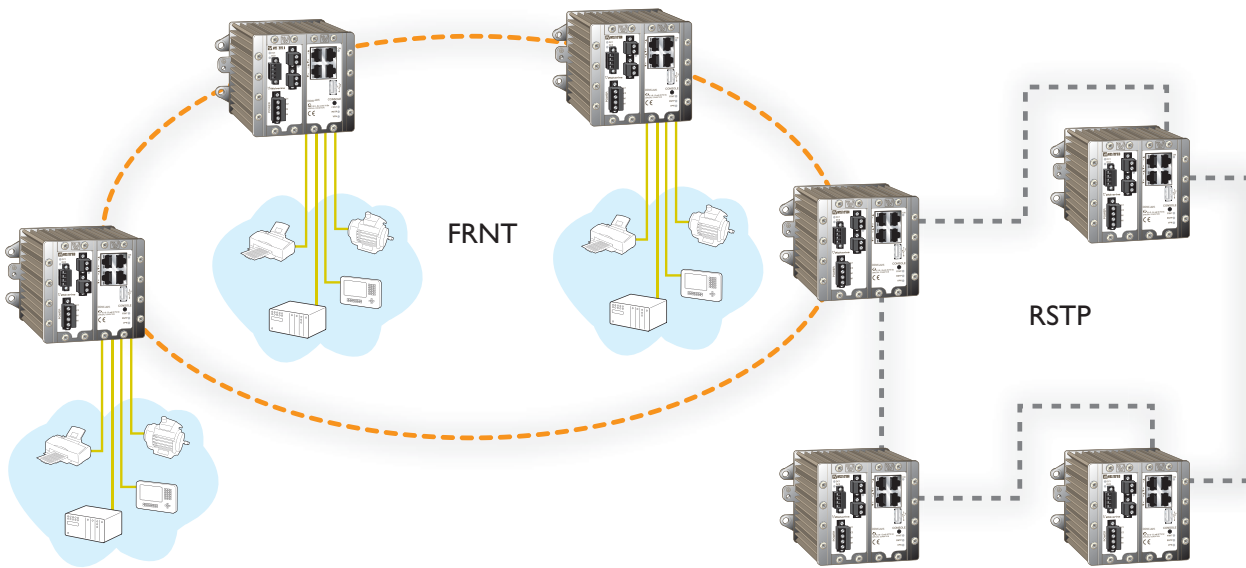
The DIN mounted metal case of the unit makes it robust and allows for the surrounding air temperature to be between -40 to 70°C. To allow for uninterrupted communication the units are supplied with redundant power inputs that can be powered from two separate supplies and handle an operating voltage range of 16 – 60VDC.

Approvals

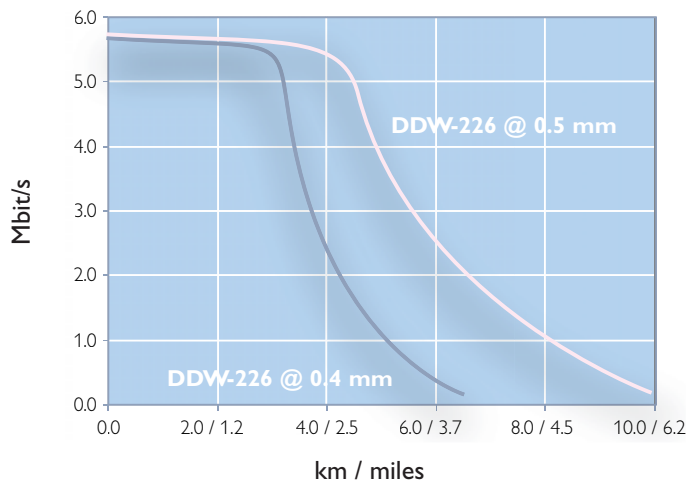
The construction of the units has gone through extensive testing and approvals both by Westermo and accredited test houses. The DDW-226 has approvals for industrial and railway use as well as in explosive environments.



Application

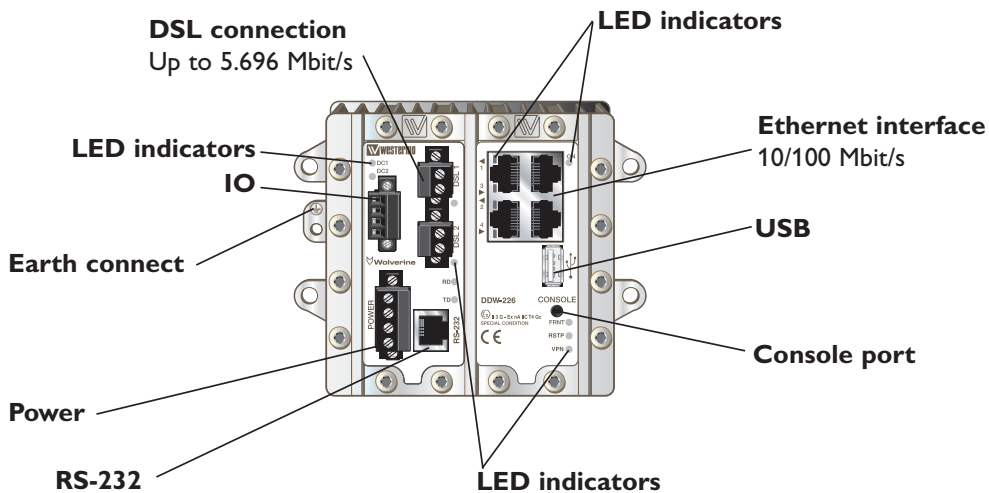


Speed versus distance



Distance is tested without noise.

Interfaces



Technical Data

| Power | |
|----------------------------------|---|
| Rated voltage | 20 to 48 VDC |
| Operating voltage | 16 to 60 VDC |
| Rated current | 330 mA @ 20 VDC 150 mA @ 48 VDC |
| Rated frequency | DC |
| Inrush current, I ² t | 1.5 A ² s |
| Startup current* | 400 mA |
| Polarity | Reverse polarity protected |
| Redundant power input | Yes |
| Isolation to | All other |
| Connection | Detachable screw terminal |
| Connector size | 0.2 – 2.5 mm ² (AWG 24 – 12) |
| Shielded cable | Not required |

* If external supply is used it must meet specified inrush current.

| Console | |
|--------------------------|---|
| Electrical specification | TTL-level |
| Data rate | 115.2 kbit/s |
| Data format | 8 data bits, none parity, 1 stop bit, no flow control |
| Circuit type | SELV |
| Isolation to | All other except USB |
| Galvanic connection to | USB |
| Connection | 2.5 mm jack, use Westermo cable 1211-2027 |

| USB | |
|--------------------------|-----------------------------------|
| Electrical specification | USB 2.0 host interface |
| Data rate | Up to 12 Mbit/s (full-speed mode) |
| Circuit type | SELV |
| Maximum supply current | 500 mA |
| Isolation to | All other except Console |
| Galvanic connection to | Console |
| Connection | USB receptacle connector type A |
| Conductive housing | Yes |

| I/O / Relay output | |
|-------------------------|---|
| Connect resistance | 30 Ω |
| Isolation to | All other |
| Connection | Detachable screw terminal |
| Connector size | 0.2 – 2.5 mm ² (AWG 24 – 12) |
| Maximum voltage/current | 60 VDC / 80 mA |

| I/O / Digital input | |
|---------------------|---|
| Voltage levels | Logic one >12V, Logic zero <1V |
| Isolation to | All other |
| Connection | Detachable screw terminal |
| Connector size | 0.2 – 2.5 mm ² (AWG 24 – 12) |

| Ethernet TX | |
|--------------------------|---|
| Electrical specification | IEEE std 802.3. 2005 Edition |
| Data rate | 10 Mbit/s or 100 Mbit/s, manual or auto |
| Duplex | Full or half, manual or auto |
| Circuit type | TNV-1 |
| Transmission range | Up to 150 m (492 ft) with CAT5e cable or better |
| Isolation to | All other |
| Connection | RJ-45 auto MDI/MDI-X |
| Shielded cable | Not required, except when installed in Railway applications as signalling and telecommunications apparatus and located close to rails.* |
| Conductive housing | Yes |
| Number of ports | 4 |

* To minimise the risk of interference, a shielded cable is recommended when the cable is located inside 3 m boundary or the cable is longer than 30 m and inside 10 m boundary to the rails and connected to this port.

| SHDSL | |
|--------------------------|--|
| Electrical specification | ITU-T G.991.2 Annex B |
| Data rate | 192 kbit/s to 5696 kbit/s |
| Protocol | EFM according to IEEE 802.3-2005 |
| Transmission range | According to ITU-T G.991.2 depending on line quality |
| Isolation to | All other |
| Connection | Detachable screw terminal |
| Connector size | 0.2 – 2.5 mm ² (AWG 24 – 12) |
| Shielded cable | Not required |
| Number of ports | 2 |

| RS-232 | |
|--------------------------|--|
| Electrical specification | EIA RS-232 |
| Data rate | 300 bit/s – 115.2 kbit/s |
| Data format | 7 or 8 data bits, odd/even/none parity, 1 or 2 stop bits |
| Protocol | Transparent, optimised by packing algorithm |
| Circuit type | SELV |
| Transmission range | 15 m / 49 ft |
| Isolation to | Power, DSL, Ethernet |
| Galvanic connection to | USB, Console |
| Connection | RJ-45 |
| Shielded cable | Not required |
| Conductive housing | Yes |

Protocols and Functionality

| | |
|---|--|
| 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) |
| 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 <ul style="list-style-type: none"> • OSPFv2 • RIPv1/v2 VRRP Firewall, NAT, Port Forwarding IPSec VPN |
| Manageability | Management tools <ul style="list-style-type: none"> • 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 HDLSL/SHDSL MIB (hdl2ShdslSpanConfTable, hdl2ShdslSpanStatusTable, hdl2ShdslInventoryTable and hdl2ShdslSpanConfProfileTable). Read-only support. WESTERMO PRIVATE MIB |

Type tests and environmental conditions

| Phenomena | Test | Description | Test levels |
|--------------------------------|----------------|-------------------------------------|---|
| ESD | EN 61000-4-2 | Enclosure contact | ± 6 kV |
| | | Enclosure air | ± 8 kV |
| RF field AM modulated | IEC 61000-4-3 | Enclosure | 10 V/m 80% AM (1 kHz), 80 – 1000 MHz 20 V/m 80% AM (1 kHz), 800 – 1000 MHz 10 V/m 80% AM (1 kHz), 1400 – 2100 MHz 5 V/m 80% AM (1 kHz), 2100 – 2500 MHz 1 V/m 80% AM (1 kHz), 2500 – 2700 MHz |
| Fast transient | EN 61000-4-4 | Signal ports | ± 2 kV |
| | | Power ports | ± 2 kV |
| Surge | EN 61000-4-5 | Signal ports unbalanced | ± 2 kV line to earth, ± 2 kV line to line |
| | | Signal ports balanced | ± 2 kV line to earth, ± 1 kV line to line |
| | | Power ports | ± 2 kV line to earth, ± 1 kV line to line |
| RF conducted | EN 61000-4-6 | Signal ports | 10 V 80% AM (1 kHz), 0.15 – 80 MHz |
| | | Power ports | 10 V 80% AM (1 kHz), 0.15 – 80 MHz |
| Power frequency magnetic field | EN 61000-4-8 | Enclosure | 300 A/m |
| Pulse magnetic field | EN 61000-4-9 | Enclosure | 300 A/m |
| Mains freq. 50 Hz | EN 61000-4-16 | Signal ports | 100 V 50 Hz line to earth |
| Mains freq. 50 Hz | SS 436 15 03 | Signal ports | 250 V 50 Hz line to line |
| Voltage dips and interruption | EN 61000-4-29 | DC power ports | 10 & 100 ms, interruption 10 ms, 30% reduction 10 ms, 60% reduction +20% above & -20% below rated voltage |
| Radiated emission | EN 55022 | Enclosure | Class A and Class B |
| | EN 55016-2-3 | Enclosure | Class A and Class B |
| | FCC part 15 | Enclosure | Class A and Class B |
| Conducted emission | EN 55022 | DC power ports | Class A and Class B |
| Dielectric strength | EN 60950 | Signal port to other isolated ports | 1500 Vrms 50 Hz 1 min |
| | | Power port to other isolated ports | 1500 Vrms 50 Hz 1 min |
| Temperature | | Operating | -40 to +70°C |
| | | Storage & Transport | -40 to +85°C |
| | | Maximum surface temperature | 135°C (temperature class T4) |
| Humidity | | Operating | 5 to 95% relative humidity |
| | | Storage & Transport | 5 to 95% relative humidity |
| Altitude | | Operating | 2 000 m / 70 kPa |
| Reliability prediction (MTBF) | MIL-HDBK-217F | Operating | 700 000 hours @ 25°C |
| Service life | | Operating | 10 year |
| Vibration | IEC 60068-2-6 | Operating | 7.5 mm, 5 – 8 Hz |
| | | | 2 g, 8 – 500 Hz |
| Shock | IEC 60068-2-27 | Operating | 15 g, 11 ms |
| Enclosure | UL 94 | Aluminium/Zink | Flammability class V-0 |
| Dimension W x H x D | | | 134 x 105 x 122 mm |
| Weight | | | 1.5 kg |
| Degree of protection | IEC 529 | Enclosure | IP 40 |
| Cooling | | | Convection |
| Mounting | | | Horizontal on 35 mm DIN-rail or wall-mounted |

Approvals

