RedFox
Industrial Routing Switch
RFI-10-F4G-T4G

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

Complex industrial networks

For mission critical applications our unique FRNT technology is the fastest protocol on the market for re-configuring large networks in the event of link or hardware failure. Gbit support on ring as well as drop ports along with bandwidth control techniques like VLANs and IGMP snooping allow RedFox to be optimised to perform with even the most bandwidth hungry applications such as video.

Advanced routing functions and firewall settings allow the RedFox to segregate networks and ensure that mission critical industrial networks are protected. The RedFox is also able to provide secure remote access to these networks across insecure connections by acting as a VPN endpoint.

Harsh industrial environment

Only industrial grade components are used which gives the RedFox an MTBF of 600 000 hours. The RedFox is designed without fragile or sensitive components to ensure the PCBs can withstand significant shock and vibration testing. In addition to this, the hardware is designed and tested to dissipate heat so effectively that the operating temperature specification of –40 to +70°C is achieved with no internal fans.

The isolated power supply has an operating voltage range spanning from 16 VDC to 60 VDC and can be fed from two separate supplies of differing voltages making RedFox easy to power in the industrial environment as well as providing yet another level of resilience to the user.

Approvals

The construction of the units has gone through extensive testing and approvals both by Westermo and approved test houses. The RedFox has approvals for industrial as well as trackside applications.

Technical Data

Power and CPU	
Rated voltage	20 to 48 VDC
Operating voltage	16 to 60 VDC
Rated current	340 mA @ 24 VDC 150 mA @ 60 VDC
Rated frequency	DC
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

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 only 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
Connection	USB receptacle connector type A
Conductive housing	Yes

IO / 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
IO / 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)

10/100 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 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 tel-ecommunications apparatus and located close to rails*
Conductive housing	Yes
Number of ports	2

* **NOTE!** Railway installation close to the rails.

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

The cable shield should be properly connected (360°) to an earthing point within 1 m from this port. This earthing point should have a low impedance connection to the conductive enclosure of the apparatus cabinet, or similar, where the unit is built-in. This conductive enclosure should be
connected to the earthing system of an installation and may be directly connected to the protective earth.

Gigabit Ethernet TX	
Electrical specification	IEEE std 802.3. 2005 Edition
Data rate	10, 100 or 1000 Mbit/s
Duplex	Full or half, manual or auto
Circuit type	TNV-1
Transmisson range	Up to 150 m 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 assignalling and tel-ecommunications apparatus and located closeto rails*
Conductive housing	Yes
Number of ports	4

Gigabit SFP	
Rated current	300 mA @ 24 VDC (with mounted transceivers)
Optical/Electrical specification	IEEE std 802.3. 2005 Edition
Data rate	100 or 1000 Mbit/s*
Duplex	Full or half, manual or auto
Transmission range	Depending on transceiver
Connection	SFP slot holding fibre transceiver or copper transceiver
Number of ports	4

* 100 Mbit/s or 1000 Mbit/s transceiver supported.

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
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
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 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
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 61000-6-4	Enclosure	Class A
	FCC part 15	Enclosure	Class A
Conducted emission	EN 55022	DC power ports	Class B
Dielectric strength	EN 60950	Signal port to other isolated ports	1.5 kVrms 50 Hz 1 min
		Power port to other isolated ports	1.5 kVrms 50 Hz 1 min
Temperature		Operating	–40 to +70°C (all models*)
		Storage & Transport	–40 to +85°C (all models)
Humidity		Operating	5 to 95% relative humidity
		Storage & Transport	5 to 95% relative humidity
Altitude		Operating	2 000 m / 70 kPa
Service life		Operating	10 year
Vibration	IEC 60068-2-6	Operating	7.5 mm, 5 – 8 Hz 2 g, 8 – 500 Hz (Wall-mounted or DIN-rail mounted using TH 35-15 according to EN 60175)
Shock	IEC 60068-2-27	Operating	15 g, 11 ms (Wall-mounter or DIN-rail mounted using TH 35-15 according to EN 60175)
Enclosure	UL 94	Aluminium / Zink	Flammability class V-0 (all models)

* Note: RFI10-F4G-T4G and RFI18-F4G-T4G needs forced airflow to handle operating temperature above +60°C. This can be acheived using an external fan or similar. Without forced airflow maximum operating temperature is +60°C.

Approvals

CE