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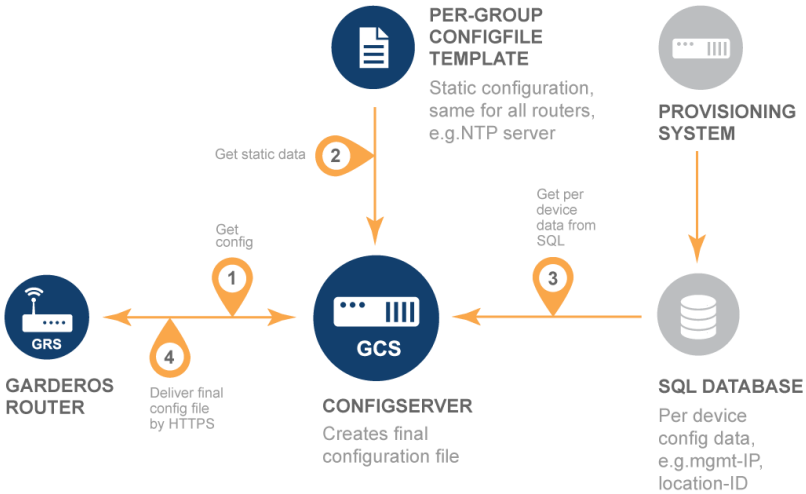
DATA SHEET | **R-7700 Series** Robust Multifunctional Router

Application and project description

Secure and reliable connectivity for professional industrial applications in telecommunications, energy supply and traffic surveillance. The Garderos R-7700 Series routers are specially manufactured for use in remote, difficult accessible locations with harsh environmental parameters. Due to the many uplink variants, the R-7700 Series can be used in a lot of different of applications.



Core functions

- Central administration
- Scalable to several thousand routers with one web server
- Routers periodically check for updates
- Hardware- and configurable software-watchdogs for highest availability
- Standard interfaces for easy integration into existing infrastructure
- “Cyber Security“ by design, secure protocols and functions

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HARDWARE FEATURES

Casing	Material	Diecast aluminium
	Dimensions (WxHxD)	
	without / with connectors	44.5x110x115mm / 44.5x110x121mm
	without / with connectors (xDSL type)	80.5x111x116mm / 80.5x111x121mm
	Weight without / with xDSL	~0.45kg / ~0.70kg
	Ingress protection	IP40
	IEC protection class	3
	Mounting	Integrated DIN rail clip and mounting holes for external DIN rail clip or mounting bracket
Temperature range		Operating temperature range depends on router model. Please see “ordering information”.
Interfaces on casing	Power connector	Phoenix 2 pin
	Serial connector	1x RJ-45 console/data + 1x D-Sub 9 (female) data (optional)
	WWAN antenna connector	up to 4x SMA (female)
	Ethernet connector	2x RJ-45; additional 1x RJ-45 (optional)
	SFP connector	1x SFP cage (optional)
	WLAN antenna connector	up to 2x RP-SMA (female)
	GPS antenna connector	1x SMA (female) (optional)
	SIM card slot	2x Mini-SIM (thermoresistant) or 1x Mini-SIM + 1x MFF-SIM chip (optional)
	DSL connector	1x RJ-45 (depends on router model)
Power supply	Input voltage	12-60 VDC (9,6VDC - 72VDC tolerance)
	Power consumption	~4-15W
Overheating protection	ambient temperature	Off CPU >100°C on CPU < 80°C
Serial interface	RS-232 (console)	1x
	RS-485 half-duplex (data)	1x
	RS-232 (data)	1x (optional)
WAN	xDSL	ADSL2+,VDSL2, PTM/ATM Mode
	Ethernet (see LAN)	
WWAN	Technology	2G/3G[1)], 2G/3G/4G[2),7),9)], CDMA[3)], 4G[4),5)], 3G/4G[6)], 2G/4G[8)]
	CDMA EVDO, 1x	CDMA[3)]
	CDMA RUIM, non-RUIM	CDMA[3)]
	Passive GPS	2G/3G/4G[2),9)]
	Dual WWAN	
LAN	Ethernet	2x 10/100/1000Base-T, add. 1x 10/100/1000Base-T or 1x SFP 1000Base-X (optional)
	Autosensing	
	Auto-MDIx	
WLAN	Supported standards	802.11ac a/b/g/n
Other features	Hardware watchdog	Monitors "heartbeats" from router OS. Restarts router in case of software problems.
Certifications	Criteria for EMI immunity and radiation	IEC 61850-3 (depends on router model)
	Vibration resistant	EN 60068-2-6:2008
	Shock resistant	EN 60068-2-27:2009
Regulations	RoHS, CE, FCC	

1) 2G/3G Module (European variant*)
WCDMA B1, B5, B8
EDGE/GPRS/GSM
850/900/1800/1900MHz

2) 2G/3G/4G Module (European variant*)
LTE B3, B7, B20
WCDMA B1, B5, B8
EDGE/GPRS/GSM 900/1800MHz

3) CDMA 450MHz Module
EV-DO Rev. A, B
1xRTT
R-UIM and non R-UIM

4) 4G Module, PPP Mode
LTE B3, B7, B20, B31

5) 4G Module, QMI Mode
LTE B3, B7, B20, B31

6) 3G/4G Module (CAT6)
LTE B1, B3, B5, B7, B8, B18, B19, B21, B28, B38, B39, B40, B41
WCDMA B1, B5, B6, B8, B9, B19

7) 2G/3G/4G Module (European variant*)
LTE B1, B3, B7, B8, B20
WCDMA B1, B8
EDGE/GPRS/GSM 900/1800MHz

8) 2G/4G Module (CAT1, European variant*)*
LTE B1, B3, B7, B8, B20
EDGE/GPRS/GSM 900/1800MHz

9) 2G/3G/4G Module (CAT4, global variant)
LTE B1, B2, B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B26, B28, B38, B39, B40, B41
WCDMA B1, B2, B4, B5, B6, B8, B19
EDGE/GPRS/GSM 850/900/1800/1900MHz

***other variants available e.g. for NA**

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SOFTWARE FEATURES

Operating system
- Garderos Router Software (GRS) Rel. 3.5

Common
- IPv4
- IPv6
- IPv4/IPv6 dual stack
- IPv6 prefix delegation

WWAN *)
- PPP over WWAN 1), 2), 3), 4)
- Dual WAN (WWAN, Ethernet, VLAN) 1), 2), 3), 4), 5), 6), 7), 8), 9)
- Dual WWAN (WWAN, WWAN) 1), 2), 3), 4), 5), 6), 7), 8), 9)
- Configurable WWAN network selection 1), 2), 4), 5), 6), 7), 8), 9)
- Configurable WWAN band selection 6), 9)
- Multiple APN 5), 7), 8)
- Intelligent APN selection 2), 5), 7), 8), 9)
- IPv6 Prefix Delegation 5), 7), 8)
- CDMA RUIM and non-RUIM 3)
- CDMA ESN and MEID authentication 3)

WLAN *)
- 802.11ac a/b/g/n
- Access point and client mode
- Configurable channel
- Configurable transmit power
- Hidden SSID
- Intracell traffic blocking
- Multiple SSID
- WEP (64 and 128 bit), WPA and WPA2
- 802.1x
- EAP (802.11i, RADIUS authentication, TLS, SIM)

Other network interfaces
Bridge
- Layer 2 bridge interface
- STP, RSTP
- IP assignment static IP, DHCP, IPv6 SLACC

Ethernet
- Configurable link speed
- IP assignment static IP, DHCP, IPv6 SLACC, PD
- Port mirroring

Local loop
- Local loop interface

PPPoE
- IP assignment static IP, PPPoE, IPv6 SLAAC
- PAP and CHAP
- Always on
- Time controlled session termination before provider reconnect

VLAN
- VLAN support (802.1q and priority tagging)
- IP assignment static IP, DHCP, IPv6 SLAAC, PD

Routing
- Static routes (IPv4, IPv6)
- Static policy routing (IPv4, IPv6)
- Static routes to DHCP gateway (IPv4)
- Dynamic routing protocols RIPv2, OSPFv2, OSPFv3, BGPv4
- Filtering for dynamic routing protocols
- Firewall (IPv4, IPv6)
- Firewall (packet filter)
- Firewall (connection tracking)
- MAC address filter
- Invalid-packet-filter
- NAT (IPv4, IPv6)
- NAT (PAT and 1-to-1)
- Source-NAT (SNAT)
- Port forwarding
- Configurable MTU
- Path MTU discovery
- TCP MSS adjustment
- Diffserv (set DSCP bits based on IP-source/destination address and/or ports/protocols)
- QoS packet prioritization (bandwidth reservation based on IP-source/destination address and/or ports/protocols)
- Reverse path filter

VPN
GRE
- GRE
- GRE IPv6
- Configurable MTU and MTU inherit
- GRE TAP
- GRE TAP IPv6

IPsec
- IPsec IPv4, IPv6
- IKEv1, IKEv2
- Authentication: PSK, public key, RSA and ECDSA certificate
- Tunnel and transport mode
- VTI (virtual tunnel interface)
- Encryption algorithms AES, DES, 3DES, AES256
- Phase 1 key length up to 8192 bit
- Phase 1 elliptic curves
- Phase 2 key length up to 6144 bit
- Phase 2 elliptic curves
- Throughput max. 60 Mb/s
- Throughput (3des-sha1-modp1024) 21 Mb/s
- Throughput (aes-sha256-modp4096) 39 Mb/s
- VPN gateway
- Min. number tunnels: 5
- NHRP dynamic tunnel management

L2TP
- Unmanaged L2TPv3 tunnel
- VLAN tagged L2TPv3 tunnel

Open VPN
- PSK, user and certificate authentication
- Min. number tunnels: 5
- OpenVPN Layer 2 and 3
- Bridging OpenVPN Layer 2 Tunnel

MIP
- Mobile IP foreign agent

Router management
- RS-232 management console
- Administrator authentication by TACACS+, RADIUS, password file and public key authentication
- Administrator roles
- Command line interface (CLI)
- Remote configuration file download (HTTP/HTTPS)
- OCSP (configuration file download)
- HTTP basic authentication for config-file download
- Certificate authentication for configuration file download
- Remote software updates
- Central bulk management of routers

Services
- Cronjob
- DHCP server (IPv4+IPv6)
- DHCP relay (IPv4+IPv6)
- DHCP snooping (IPv4)
- DHCP address pools per VLAN/interface
- DHCP secure ARP
- DHCP ARP ping before assigning lease
- DHCP accounting (RADIUS)
- DNS server and proxy
- DynDNS client
- Ethernet port security (sticky MAC detection)
- Hotspot portal
- IPv6 SLAAC daemon
- LLDP
- NMEA 2), 9)
- NTP client, server
- NTP with MD5 authentication
- SNMPv2 and SNMPv3
- SNMP monitoring and traps
- SSH client, server
- Syslog local, remote, persistent in flash
- Telnet client, server

Other functions
- Configurable LED (also project based)
- Hardware and software watchdogs
- LXC virtualization (project based)
- Link monitor (ping)
- Security hardening (switch off unsecure features)
- Encrypted configuration
- Serial-to-network proxy (ser2net)
- Serial modes: Console, Off and Script
- Scripting interface
- Open APIs for network integration

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*) Prerequisite is a suitable interface.
1), 2), 3), 4), 5), 6), 7), 8), 9) Please see “Hardware Features”.

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ORDERING INFORMATION

Garderos model number: [1), 2), 3), 4), 5), 6), 7), 8), 9)] Please see "Hardware Features".	**Ethernet (10/100/1000 Base-T)**	**SFP (1000Base-X); optional**	**RS-232 (console)**	**RS-232 (data); optional**	**WLAN (802.11ac a/b/g/n)**	**xDSL**	**2G/3G/4G Module [2), 7), 9)] 4G Module [4), 5)] 3G/4G Module [6)] 2G/4G Module [8)]**	**CDMA 450 Module [3)]**	**Maximum operating temperature range** (The temperature range may differ depending on the router variant)
R-7701 (2xLAN/WLAN)	2+1 (opt.)	1	1	1	1				-25°C to +70°C
R-7707 (2xLAN)	2+1 (opt.)	1	1	1					-40°C to +75°C
R-7711 (2x LAN/xDSL/WLAN)	2		1	1	1	1			-25°C to +60°C at 12-24VDC -25°C to +50°C at 60VDC
R-7717 (2x LAN/xDSL)	2		1	1		1			-35°C to +60°C at 12-24VDC -35°C to +50°C at 60VDC
R-7722 (2xLAN/4G/WLAN)	2+1 (opt.)	1	1		1		1		-25°C to +70°C
R-7728 (2xLAN/4G)	2+1 (opt.)	1	1	1			1		-40°C to +75°C
R-7731 (2x LAN/xDSL/CDMA/WLAN)	2		1	1	1	1		1	-25°C to +60°C at 12-24VDC -25°C to +50°C at 60VDC
R-7737 (2x LAN/xDSL/CDMA)	2		1	1		1		1	-35°C to +60°C at 12-24VDC -35°C to +50°C at 60VDC
R-7748 (2xLAN/4G/CDMA)	2+1 (opt.)	1	1				1	1	-35°C to +75°C
R-7749 (2xLAN/CDMA/CDMA)	2+1 (opt.)	1	1					2	-35°C to +75°C
R-7758 (2xLAN/4G/4G)	2+1 (opt.)	1	1				2		-40°C to +75°C
R-7762 (2x LAN/xDSL/4G/WLAN)	2		1		1	1	1		-25°C to +60°C at 12-24VDC -25°C to +50°C at 60VDC
R-7768 (2x LAN/xDSL/4G)	2		1	1		1	1		-35°C to +60°C at 12-24VDC -35°C to +50°C at 60VDC
R-7771 (2xLAN/CDMA/WLAN)	2+1 (opt.)	1	1		1			1	-25°C to +70°C
R-7777 (2xLAN/CDMA)	2+1 (opt.)	1	1	1				1	-35°C to +75°C

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