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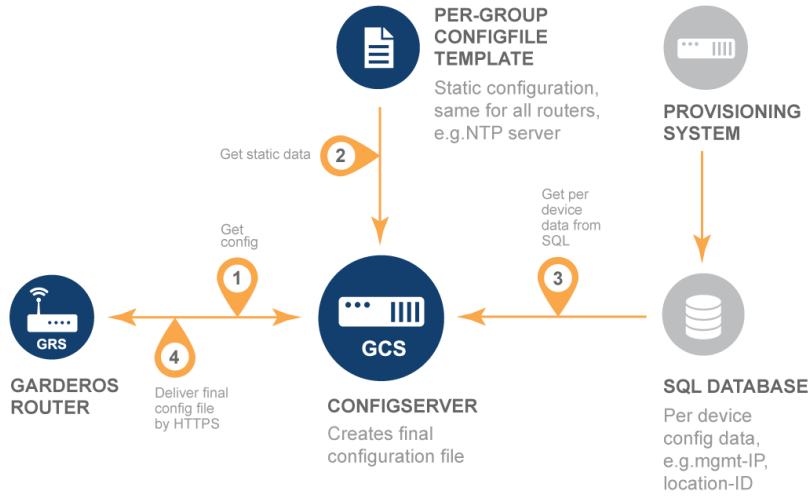
DATA SHEET | **R-7700 Series** Robust Multifunctional Router

Application and project description

Garderos routers provide cyber-secure and reliable data connectivity for large-scale router networks in telecommunications and utility networks, as well as intelligent traffic systems. The Garderos R-7700 Series routers provide 2 LAN ports and a wide range of WAN interfaces such as: xDSL, Public Cellular and Private LTE. Configurations such as dual wireless WAN or alternatively xDSL with failover to wireless WAN are possible. Local WiFi access is optionally possible. Due to their high processing power, the R-7700 series routers can also host virtualized container applications.

Fig. 1: Garderos R-7700 multifunctional routers.



Key features

- Wide range of WAN interfaces
- Central administration
- Scalable up to 10,000 routers with one server
- Routers periodically query server for new firmware or configuration
- Hardware and software watchdogs for highest availability
- Standard interfaces in GCS for easy integration with 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	80,5x111x116mm / 80,5x111x122mm
	Weight	~0.45kg / ~0.70kg (with xDSL)
	Ingress protection	IP40
	IEC protection class	3
Temperature range		Depends on router model (see “Ordering Information”).
Overheating protection	Ambient temperature	CPU off > 100°C
		CPU on < 80°C
Interfaces on casing	Power connector	Phoenix 2 pin
	Ethernet connector	2x RJ-45; additional 1x RJ-45 (optional)
	DSL connector	1x RJ-45
		(depends on router model)
	Serial connector	1x RJ-45 console/data
		1x D-Sub 9 (female) data (optional)
	WWAN antenna connector	up to 4x SMA (female)
	GPS antenna connector	1x SMA (female) (optional)
	WLAN antenna connector	up to 4x RP-SMA (female)
	I/O connector	Phoenix 4-pin PCB clamp (optional)
	SIM card slot	2x Mini-SIM (thermoresistant) or
		1x Mini-SIM + 1x MFF-SIM chip (optional)
Power supply	Input voltage	12-60 VDC (9,6VDC - 72VDC tolerance)
	Power consumption	~4-15W
Serial interface	RS-232 (console)	1x
	RS-485 half duplex (data)	1x
	RS-232 (data)	1x (optional)
Digital I/O	Input / Output	1x/1x or 2x/0x (optional)
WAN	DSL	ADSL2+ Annex A, B, J, VDSL2, PTM/ATM, Vectoring
	Ethernet	(see LAN)
WWAN	Technology	4G/5G RedCap [1)], 2G/3G/4G [2)], 4G [3)], 2G/4G [4)]
	Passive GPS	yes [1,2)]
	Dual WWAN	yes
LAN	Ethernet	2x 10/100/1000 Base-T + 1x 10/100/1000 Base-T (optional)
	Autosensing	yes
	Auto-MDIx	yes
WLAN	Supported standards	802.11ac a/b/g/n
	Dual WLAN	yes
Other features	Hardware watchdog	Monitors "heartbeats" from router O/S. Restarts router in case of software problems.
	Cryptographic hardware accelerator	md5, sha1, sha512, aes, des, 3des
Certifications	Criteria for EMC	IEC 61850-3
	Vibration resistant	EN 60068-2-6:2008
	Shock resistant	EN 60068-2-27:2009
Regulations		RoHS, REACH, CE, FCC [2,4)]

[1)] 4G/5G RedCap Module (CAT 4, global variant)	5G SA RedCap	n1/n2/n3/n5/n7/n8/n12/n13/n14/n18/n20/n25/n26/n28/n30/n38/n40/n41/n48/n66/n70/n71/n77/n78/n79
	LTE	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B30, B34, B38, B39, B40, B41, B42, B43, B48, B66, B70, B71
[2)] 2G/3G/4G Module (CAT 4, 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	850/900/1800/1900
[3)] 4G Module (CAT 4, European variant*)	LTE	B3, B7, B20, B31, B72
[4)] 2G/4G Module (CAT-M1, European variant*)	LTE	B1, B2, B3, B4, B5, B8, B12, B13, B14, B18, B19, B20, B25, B26, B27, B28, B31, B66, B72, B85
	EDGE/GPRS/GSM	850/900/1800/1900

***other variants available**

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SOFTWARE FEATURES

Common
- IPv4
- IPv6
- IPv4/IPv6 dual stack
- Multiple IP addresses per interface
- IPv6 prefix delegation

WWAN *)
- PPP over WWAN [4)]
- Dual WAN (Cellular, Ethernet, VLAN)
- Dual WWAN
- Configurable WWAN network selection [1,2,3,4)]
- Configurable WWAN band selection [1,2,3,4)]
- Multiple APN [1,2,3)]
- Intelligent APN selection [1,2,3)]
- WWAN IPv4 [1,2,3,4)]
- WWAN IPv6 [1,2,3)]
- WWAN dual stack [1,2,3)]
- IPv6 prefix delegation [3)]
- Dual SIM [1,2,3,4)]
- Modem firmware update [1,2,3)]
- XCAL debugging [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
- WPA, WPA2 and WPA3
- 802.11i (EAP)

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

Ethernet
- Configurable link speed
- IP assignment static IP, DHCP, IPv6 SLAAC, PD
- Port mirroring
- 802.1x

Local loop
- Local loop interface
- IP assignment static IP, PD

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
- 802.1x

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, packet filter, connection tracking, bridge filter)
- MAC address filter, Invalid-packet-filter
- NAT (IPv4, IPv6, PAT, 1-to-1, SNAT, port forwarding)
- Synchronous Routing
- Configurable MTU
- Path MTU discovery
- TCP MSS adjustment
- Diffserv (set DSCP bits)
- QoS packet prioritization
- Reverse path filter

VPN
GRE
- GRE, GRE IPv6, GRE TAP, GRE TAP IPv6
- Configurable MTU and MTU inherit
- NHRP dynamic tunnel management

mGRE
- Configurable MTU and MTU inherit
- NHRP dynamic tunnel management
- NHRP IPv6

IPsec
- IPsec IPv4, IPv6
- IKEv1, IKEv2
- Authentication: PSK, public key, RSA, ECDSA and EdDSA certificate
- Tunnel and transport mode
- VTI (virtual tunnel interface)
- Encryption AES, AES192, AES256, CCM+GCM, DES, 3DES
- RSA keys up to 8192 bits, elliptic curves
- VPN gateway

L2TP
- Unmanaged L2TPv3 tunnel
- VLAN tagged L2TPv3 tunnel

OpenVPN
- PSK, user and certificate authentication
- OpenVPN Layer 2 and 3
- Bridging OpenVPN Layer 2 Tunnel
- Encryption algorithms AES, AES192, AES256, CCM+GCM, Blowfish, DES, 3DES

MIP
- Mobile IP foreign agent

Router management
- RS-232 management console
- Authentication by TACACS+, RADIUS, password file and public key
- Administrator roles
- Command line interface (CLI)
- Remote configuration file download (HTTP/HTTPS)
- Trigger based configuration selection
- OCSP
- Authentication by HTTP basic auth and certificate
- 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)
- Static DHCP (MAC)
- DNS server and proxy
- DynDNS client
- EST (Enrollment over Secure Transport)
- Ethernet port security (sticky MAC detection)
- Hotspot portal
- IPv6 SLAAC daemon
- LLDP
- NMEA [1,2)]
- NTP client, server, MD5, local time source
- SCEP (Simple Certificate Enrolment Protocol)
- SNMPv2 and SNMPv3, monitoring and traps
- SNTP (Simple NTP)
- SSH client, server
- Syslog local, remote, persistent in flash
- Telnet client, server

Other functions
- Configurable LEDs (also project based)
- Hardware and software watchdogs
- LXC virtualization, busybox and Alpine (project based)
- State monitor (ping, interface state, I/O, IPv6-RS, RX-TX, script)
- Reset to factory defaults
- Customer defined factory defaults
- Security hardening (switch off unsecure features)
- Encrypted configuration
- Serial-to-network proxy (ser2net), IPv4/IPv6, TCP/UDP
- Serial modes: Console, Off and Script
- Scripting interface

*) Prerequisite is a suitable interface.
Please see “Hardware Features”.

ORDERING INFORMATION

Garderos model number: _____ *) Wide casing 80,5x111x116mm, required! **) Wide casing 80,5x111x116mm, required depending on options! +) Options: - 2x Input - 1x Input, 1x Output (NO) - 1x Input, 1x Ouput (NC)	**Ethernet (10/100/1000 Base-T)**	**Ethernet (10/100/1000 Base-T); optional**	**RS-232 (console)**	**RS-232 (data); optional** **)	**Digital I/O; optional** **) +)	**WLAN (802.11ac a/b/g/n)**	**xDSL** *)	**4G/5G Module 2G/3G/4G Module 4G Module 2G/4G Module**	**Maximum operating temperature range** (The temperature range may differ depending on the router variant)
R-7701 (2xLAN/WLAN)	2	1	1	1	1	1			-25°C to +70°C
R-7703 (2xLAN/2xWLAN)	2		1	1	1	2			-25°C to +70°C
R-7707 (2xLAN)	2	1	1	1	1				-40°C to +75°C
R-7711 (2xLAN/xDSL/WLAN)	2		1	1	1	1	1		-25°C to +60°C at 12-24VDC -25°C to +50°C at 60VDC
R-7717 (2xLAN/xDSL)	2		1	1	1		1		-35°C to +60°C at 12-24VDC -35°C to +50°C at 60VDC
R-7722 (2xLAN/4G or 5G/WLAN)	2	1	1	1	1	1		1	-25°C to +70°C
R-7728 (2xLAN/4G or 5G)	2	1	1	1	1			1	-40°C to +75°C
R-7758 (2xLAN/4Gor 5G/4G or 5G)	2	1	1	1	1			2	-40°C to +75°C
R-7762 (2xLAN/xDSL/4G or 5G/WLAN)	2		1	1	1	1	1	1	-25°C to +60°C at 12-24VDC -25°C to +50°C at 60VDC
R-7768 (2xLAN/xDSL/4G or 5G)	2		1	1	1		1	1	-35°C to +60°C at 12-24VDC -35°C to +50°C at 60VDC

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