

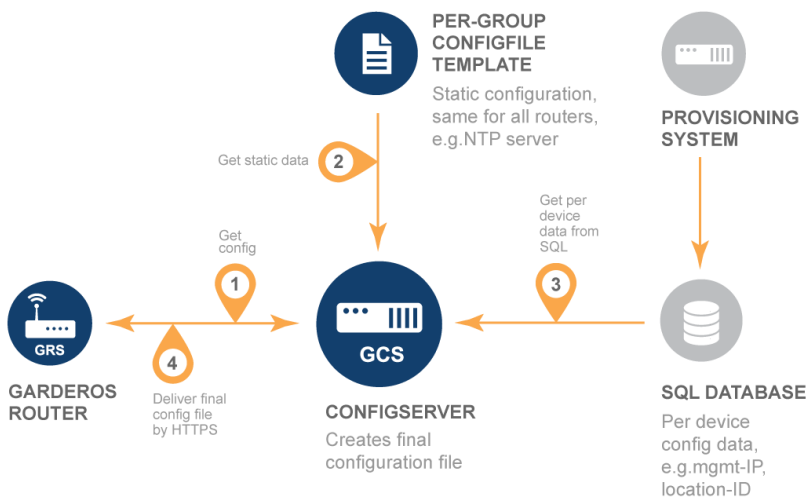


### Application and project description

Secure and reliable connectivity for professional industrial applications in telecommunications, energy supply and traffic surveillance. The multi-functional Garderos R-7600 Series routers are specially manufactured for use in remote, difficult accessible locations with harsh environmental parameters. Optimized single radio router for large scale deployment in smart-grid and smart-meter applications.



### Core functions



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

<b>Casing</b>	Material Dimensions (WxHxD) without / with connectors Weight without Ingress protection IEC protection class Mounting	Diecast aluminium  44,5x110x115mm / 44,5x110x121mm ~0.45kg IP40 3 Integrated DIN rail clip and mounting holes for external DIN rail clip or mounting bracket
<b>Temperature range</b>		Operating temperature range depends on router model. Please see "ordering information".
<b>Interfaces on casing</b>	Power connector Ethernet connector Serial connector I/O connector WWAN antenna connector GPS antenna connector SIM card slot	Phoenix 2 pin 2x RJ-45 1x RJ-45 console/data + 1x D-Sub 9 (Female) data (opt.) Phoenix 4 Pin-Leiterplattenklemme (opt.) up to 2x SMA (Female) 1x SMA (Female) (optional) 1x Mini-SIM (heat resistant) or 1x MFF-SIM chip (optional)
<b>Power supply</b>	Input voltage Power consumption	12-24 VDC (9,6VDC - 28VDC tolerance) ~2-5W
<b>Serial interface</b>	RS-232 (console) RS-485 half-duplex (data) RS-232 (data)	1x 1x 1x (optional)
<b>Digital I/O</b>	Input / Output	1x / 1x (optional); (in Q4/2021)
<b>WAN</b>	Ethernet (siehe LAN)	
<b>WWAN</b>	Technology CDMA EVDO, 1x CDMA RUIIM, non-RUIIM Passive GPS	2G/3G/4G <sup>1,2)</sup> , 2G/4G <sup>3,6)</sup> , 4G <sup>4)</sup> , CDMA <sup>5)</sup> CDMA <sup>5)</sup> CDMA <sup>5)</sup> 2G/3G/4G <sup>1)</sup>
<b>LAN</b>	Ethernet Autosensing Auto-MDIX	2x 10/100 Base-T
<b>Other features</b>	Hardware watchdog	Monitors "heartbeats" from router OS. Restarts router in case of software problems.
<b>Certifications</b>	Criteria for EMI immunity and radiation Vibration resistant Shock resistant	IEC 61000-6-2:2005 EN 60068-2-6:2008 EN 60068-2-27:2009
<b>Regulations</b>	RoHS, CE	

<sup>1)</sup> **2G/3G/4G Module (CAT 4, globale 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

<sup>2)</sup> **2G/3G/4G Module (CAT 4, european variant)**  
LTE B1, B3, B7, B8, B20  
WCDMA B1, B8  
EDGE/GPRS/GSM 900/1800MHz

<sup>3)</sup> **2G/4G Module (CAT 1, european variant)**  
LTE B1, B3, B7, B8, B20  
EDGE/GPRS/GSM 900/1800MHz

<sup>4)</sup> **4G Module (CAT 4, european variant\*)**  
LTE/LTE450 B3, B7, B20, B31, B72

<sup>5)</sup> **CDMA 450MHz Module**  
EV-DO Rev. A, B  
1xRTT  
R-UIM and non R-UIM

<sup>6)</sup> **2G/4G Module (CAT M1, european variant\*)**  
LTE/LTE450 B1, B2, B3, B4, B5, B8, B12, B13, B14, B18 B19, B20, B25, B26, B27, B28, B31, B66, B71, B72, B85  
EDGE/GPRS/GSM 850/900/1800/1900

\*other variants available

## SOFTWARE FEATURES

### Operating system

- Garderos Router Software (GRS) Rel. 3.6

### Common

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

### WWAN \*)

- PPP over WWAN <sup>5, 6)</sup>
- Dual WAN (Cellular, Ethernet, VLAN) <sup>1, 2, 3, 4, 5, 6)</sup>
- Configurable WWAN network selection <sup>1, 2, 3, 4)</sup>
- Configurable WWAN band selection <sup>1, 4)</sup>
- Multiple APN <sup>2, 3, 4)</sup>
- Intelligent APN selection <sup>1, 2, 3, 4)</sup>
- WWAN IPv4 <sup>1, 2, 3, 4, 5, 6)</sup>
- WWAN IPv6 <sup>1, 2, 3, 4, 5, 6)</sup>
- WWAN dual stack <sup>1, 2, 3, 4)</sup>
- IPv6 prefix delegation <sup>2, 3, 4)</sup>
- CDMA RUIIM and non-RUIIM <sup>5)</sup>
- CDMA ESN and MEID authentication <sup>5)</sup>

### Other network interfaces

#### Bridge

- Layer 2 bridge interface
- STP, RSTP
- IP assignment static IP, DHCP, IPv6 SLAAC

#### Ethernet

- Configurable link speed
- IP assignment static IP, DHCP, IPv6 SLAAC, 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), (Packet Filter), (Connection Tracking)
- MAC address filter
- Invalid-packet-filter
- NAT (IPv4, IPv6) and (PAT und 1-to-1)
- Source-NAT (SNAT)
- Port forwarding
- Synchronous Routing
- 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
  - NHRP dynamic tunnel management
- #### mGRE
- mGRE
  - Configurable MTU and MTU inherit
  - NHRP dynamic tunnel management
  - NHRP 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, AES192, AES256, CCM+GCM, DES, 3DES
- 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.41 Mb/s
- Throughput (3des-sha1-modp1024) 10 Mb/s
- Throughput (aes-sha256-modp4096) 23 Mb/s
- VPN gateway
- Min. number of tunnels: 5

#### L2TP

- Unmanaged L2TPv3 tunnel
- VLAN tagged L2TPv3 tunnel

#### Open VPN

- PSK, user and certificate authentication
- Min. number of tunnels: 5
- 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
- Administrator authentication by TACACS+, RADIUS, password file and public key
- Administrator roles
- Command line interface (CLI)
- Remote configuration file download (HTTP/HTTPS)
- OSCP (configuration file download)
- HTTP basic authentication for config-file
- 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)
- Static DHCP (MAC)
- DNS server and proxy
- DynDNS client
- Ethernet port security (sticky MAC detection)
- Hotspot portal
- IPv6 SLAAC daemon
- LLDP
- NMEA <sup>1)</sup>
- NTP client, server
- NTP with MD5 authentication
- SCEP (simple certificate enrollment protocol) *(in Q32021)*
- SNTP (simple NTP)
- SNMPv2 and SNMPv3
- SNMP monitoring and traps
- SSH client, server
- Syslog local, remote, persistent in flash
- Telnet client, server

#### Other functions

- Configurable LED [project based]
- Hardware and software watchdogs
- LXC virtualization [project based]
- Link monitor (ping, RX-TX, IPv6-RS)
- Reset to factory defaults
- Customer specific factory defaults
- Security hardening (switch off unsecure features) [project based]
- Encrypted configuration
- Secure Boot [project based]
- Serial-to-network proxy (ser2net), TCP and UDP
- Serial modes: Console, Off and Script
- Scripting interface
- Open APIs for network integration

\*) Prerequisite is a suitable interface. <sup>1, 2, 3, 4, 5, 6)</sup> Please see "Hardware Features".

## ORDERING INFORMATION

Garderos  
model number:

<sup>1, 2, 3, 4, 5, 6</sup> Please see "Hardware  
Features".

	Ethernet (10/100 Base-T)	RS-232 (console)	RS-232 (data); optional	Digital I/O (1xInput/1xOutput); optional	CDMA 450 Module <sup>5)</sup>	2G/3G/4G Module <sup>1, 2)</sup> 2G/4G Module <sup>3, 6)</sup> 4G Module <sup>4)</sup>	Maximum operating temperature range (The temperature range may differ depending on the router variant)
R-7607 (2xLAN)	2	1	1	1			-25°C to +75°C
R-7628 (2xLAN/4G)	2	1	1	1		1	-25°C to +75°C
R-7677 (2xLAN/CDMA)	2	1	1	1	1		-25°C to +75°C

Garderos GmbH  
Balanstrasse 55  
81541 Munich  
Germany

[www.garderos.com](http://www.garderos.com)  
Email: [info@garderos.com](mailto:info@garderos.com)

T: +49 89 189306-0  
F: +49 89 189306-98

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