GARDEROS.

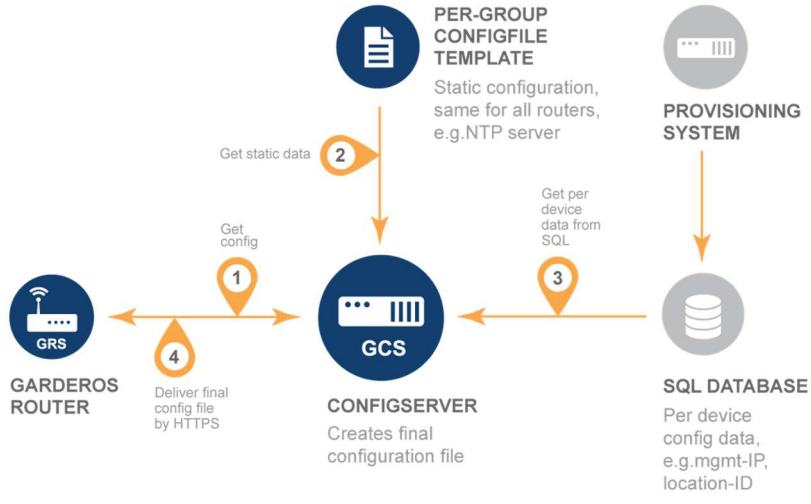
DATA SHEET | **R-7700 Series** Robust Multifunctional Router

## 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

# GARDEROS.

## HARDWARE FEATURES

| | | |
|---|---|---|
| **Casing** | Material | Diecast aluminum |
| | 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 |
| | 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 |
| **Overheating protection** | Ambient temperature | off CPU >100°C<br>on CPU < 80°C |
| **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** | xDSL | ADSL2+ Annex A, B, J, VDSL2, PTM/ATM, Vectoring |
| | Ethernet (see LAN) | |
| **WWAN** | Technology | 2G/3G/4G [1], 4G/5G [2], 4G [3], 2G/4G [4] |
| | Passive GPS/A-GPS | Yes (optional) [1, 2] |
| | Dual WWAN | |
| **LAN** | Ethernet | 2x 10/100/1000Base-T, opt. 1x 10/100/1000Base-T |
| | Autosensing | |
| | Auto-MDIx | |
| **WLAN** | Supported standards | 802.11ac a/b/g/n |
| | Dual WLAN | |
| **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, 4] | |

**[1] 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** 850/900/1800/1900MHz

**[2] 4G/5G Module (5G RedCap, LTE Cat4)**
**5G 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 -FDD** B1/B2/B3/B4/B5/B7/B8/B12/B13/B14/B17/B18/B19/B20/B25/B26/B28/B30/B66/B70/B71
**LTE -TDD** B34/B38/B39/B40/B41/B42/B43/B48

**[3] 4G Module (CAT 4, European variant*)**
**LTE/LTE450** B3, B7, B20, B31, B72

**[4] 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, B72, B85
**EDGE/GPRS/GSM** 850/900/1800/1900MHz

***other variants available**

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## SOFTWARE FEATURES

**Operating system**
- Garderos Router Software (GRS) Rel. 3.8

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

**WWAN** *)
- PPP over WWAN 4)
- Dual WAN (WWAN, Ethernet, VLAN) 1, 2, 3, 4)
- Dual WWAN (WWAN, WWAN) 1, 2, 3, 4)
- 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, 4)
- 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, 3)
- XCAL debugging 3)

**WLAN** *)
- 802.11ac a/b/g/n
- AP and client
- 8x SSID (2,4GHz) + 8x SSID (5,5GHz)
- WPA, WPA2, 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 SLACC, 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 and ECDSA certificate
- Tunnel and transport mode
- VTI (Virtual Tunnel Interface)
- Encryption algorithms AES, AES192, AES256, CCM+GCM, DES, 3DES
- RSA key length up to 8192 bit, 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

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
- 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 (Enrolment over Secure Transport)
- Ethernet port security (sticky MAC detection)
- Hotspot portal
- IPv6 SLAAC daemon
- LLDP
- MQTT (I/O control) *)
- 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 LED (also project based)
- Hardware and software watchdogs
- LXC virtualization, busybox and Alpine (project based)
- Status monitor (ping, interface status, IPv6-RS, RX-TX, script)
- Reset to factory defaults
- Customer defined factory defaults
- Security hardening (switch off unsecure features)
- Encrypted configuration
- Secure Boot
- Serial-to-network proxy (ser2net), IPv4/IPv6, TCP/UDP
- 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) Please see “Hardware Features”.

# ORDERING INFORMATION

| Garderos model number: | 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 *) | 2G/3G/4G Module 1) 4G/5G Module 2) 4G Module 3) 2G/4G Module 4) | 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<br>-25°C to +50°C at 60VDC |
| R-7717 (2xLAN/xDSL) | 2 | | 1 | 1 | 1 | | 1 | | -35°C to +60°C at 12-24VDC<br>-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<br>-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<br>-35°C to +50°C at 60VDC |

[1, 2, 3, 4] Please see “Hardware Features”.

*) 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)

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