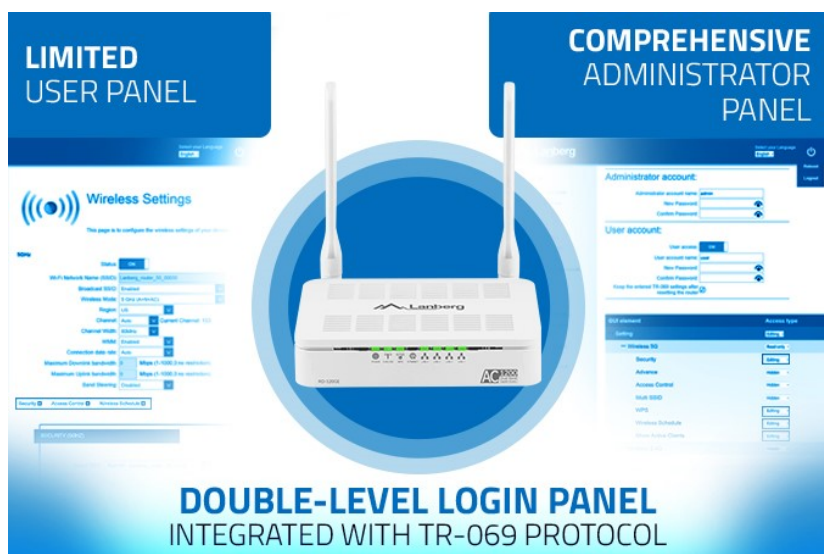




ROUTER MENU WITH **DOUBLE-LEVEL ACCESS PANEL** DESIGNED FOR COMPREHENSIVE AND FLEXIBLE USER MANAGEMENT FOR **ISP**



Along with the 2nd firmware version, the routers have been fitted with a double access panel:

- 1) the administrator panel with all options available including the ISP-limited features,
- 2) the user panel with access only to certain features, approved by the administrator.

This software gives the administrator / ISP the right to decide which features the user should see and which not. By logging in to the router from the administrator panel, on a specially prepared intuitive website, it is easy to set which pages, subpages and modal windows are to be modified, and which to read or completely hidden from view.

Moreover, adequately configured **TR-069** with the 2nd version of the software allows ISPs to save the settings and automatically download them from the operator's server (ACS) in case the customer intentionally or accidentally restores the router to the factory settings. Due to the specially designed function, the reset button does not change the TR-069 settings introduced by the administrator. After the reset, the router reconnects to the ISP, based on previously entered data, and re-downloads all the initial settings (including the access restrictions). The class that allows you to manage double access in the TR-069 tree is called InternetGatewayDevice.DeviceConfig.

QUICK STABLE CONNECTION CERTAINTY



Due to the use of the popular and efficient AC1200 technology and solutions that increase the effective range and stability of the Wi-Fi network, as well as, facilitate the configuration and management – Lanberg's router RO-120GE guarantees extremely fast and stable Internet connection.

This is an ideal proposition not only for Internet service providers (ISPs), but for every home or institutional user, who is looking for high-end solutions in the field of Wi-Fi network solutions.

COMPLETE AND FULLY-CUSTOMIZABLE ACCESS



This particular device provides comprehensive and powerful tools for monitoring activity, webpage filtering and granting access. Due to that, users can easily perform the following configurations using a flexible, intuitive and easy-to-use menu:

- Filtering user access using an IP / MAC address at the Wi-Fi level and given Ethernet ports,
- Filtering Webpages based on name / URL and keywords,
- Setting a Wi-Fi operation schedule and parental controls.

PRIMARILY HARDWARE VALUE ADDED

The router is equipped with an efficient switching and management chip: RTL8367 responsible for efficient processing of traffic on an Ethernet, and 2 wireless units: RTL8197FS and RTL8812BRH allowing a steady, fast and stable Wi-Fi network signal for 2 parallel transmission bands: 2.4 GHz and 5 GHz.

In addition, NAT supports hardware acceleration embedded in the chip, and mobile users can enjoy targeted Wi-Fi transmission due to beamforming technology. The memory of the device is 8 MB SPI Flash-EPROM and 64 MB of DDR2 operating memory.



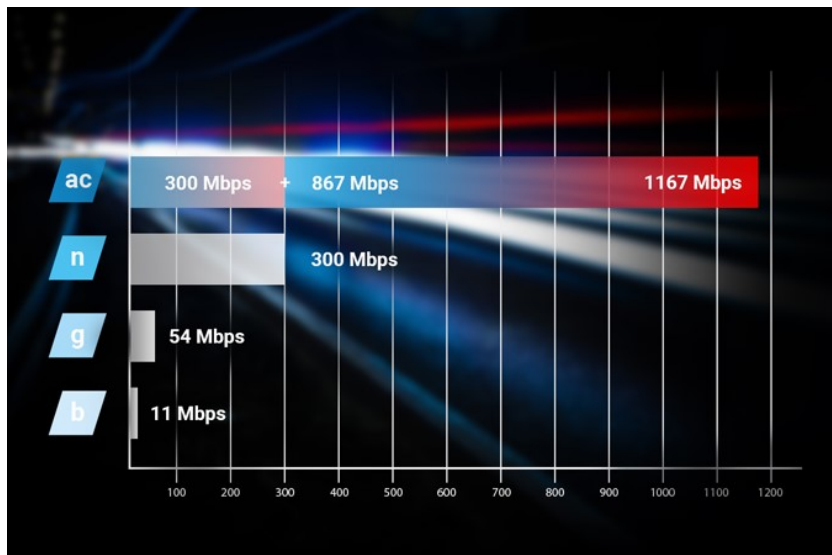
RO-120GE ROUTER OFFERS

- Total transfer speed up to 1200 Mbps due to: **AC1200** Wi-Fi class,
- Highest and most commonly used security standards for network's optimal protection,
- Beamforming technology – formation of a focused beam for client devices,
- MIMO technology – use of multiple Tx-Rx antennas, to increase the diversification, multiplexing and network bandwidth gain,
- 5 different operation modes: Router, AP, Range Extender, WISP, Client,
- Hardware NAT, Secure WPS (version 2.0),
- Isolation of clients within Wi-Fi network,
- Easy to set up and manage work and access control list schedules,
- Parental control, table based access both to Wi-Fi and Ethernet connection.



FAST AC1200 WI-FI

The use of the 802.11.ac standard allows you to achieve a two-way transfer speed of up to 1200 Mbps, which translates into smooth experience of streaming movies in Full HD 1080p quality (or better) or uninterrupted online gaming with some of the most graphically demanding titles available on the market.



High bandwidth is not an issue anymore, hence AC wireless networking standard delivers up 3 times better transfer speeds, than what previous generation N had to offer.

- **AC standard:** up to 867 Mbps,
- **N standard:** up to 300 Mbps.

HARDWARE NAT

Due to the use of Hardware NAT, address translation receives hardware support that has a direct impact on bandwidth, noticeably increasing it, to the expected value, as opposed to similar software solutions.

From now on, the difference between the transmission of data devices in the local area network (LAN) and the devices behind the network gateway (with hardware NAT enabled) becomes almost inexistent to the user for both scenarios: normal router operation mode with or without the use of VLANs.

FLEXIBILITY AND VERSATILITY IN ONE = 5 DIFFERENT OPERATING MODES

From the very beginning, Lanberg's router has the ability to operate in as many as 5 commonly used modes. Depending on the demand, it can adopt the classical mode of **Wi-Fi Router or Access Point (AP)**, and can also act as **WISP**, **Signal Extender** and **Client** by receiving the source (Internet) signal via radio transmission instead of the classic Ethernet interface.

20/40 MHZ AUTO-BANDWIDTH SWITCHING

This function is an intelligent solution that increases the stability of Wi-Fi network for N mode. The operation of 2.4GHz wireless network with a channel width of 40 MHz allows you to increase the fixed transfer rate, at the expense of signal susceptibility to interference and reduction of "free" channels for other networks. When there are many other wireless networks nearby the router, they can interfere with each other, which can lead to more frequent packet loss and associated retransmissions, and most importantly - to the drops in performance and the transfers of Wi-Fi networks.

Lanberg's router scans the surroundings in terms of mutual and disruptive Wi-Fi networks and detects the situation itself, thus automatically changing the frequency from 40 to 20 MHz. The network remains stable and more resistant to possible interference.

DUAL-BAND TRANSMISSION

This particular router achieves a total speed of up to 1200Mbps due to the use of both wireless bands. For more demanding users - 5 GHz band reaching up to 867 Mbps and standard 2.4 GHz with available bandwidth up to 300 Mbps.

Such solution gives full freedom to the user, allowing you to connect demanding client devices on the 5 GHz band and less relevant equipment on 2.4 GHz. This solution provides flexibility and does not limit the user – it supports older devices utilizing an older wireless network standard type **(b/g/n)** or the new Wi-Fi standard **(ac)**, guaranteeing that even after connecting multiple demanding devices with well-chosen wireless network frequency will not cause a significant decrease in the value of the transfer, which this networking equipment requires.



NETWORK SCHEDULE AND PARENTAL CONTROL

Easy to use and configure wireless network schedule allows you to accurately determine the time of Wi-Fi being operation and to create detailed network schedules. The function is useful in places or at times where there is no need for continuous operation of the network, thus providing an additional layer of protection.

Additionally, Lanberg's router is equipped with **Parental control**, which enables detailed management of the user's access time the Internet, which is very useful when taking parents with children into consideration. By using this feature, device administrators, including parents, no longer have to worry about enforcing rules regarding the time frame of wireless network. From now on, the whole process is focused only on creating the right entry, and the rest will be done by the router. Your personal intervention in limiting Internet access will no longer be necessary - router will do it for you.

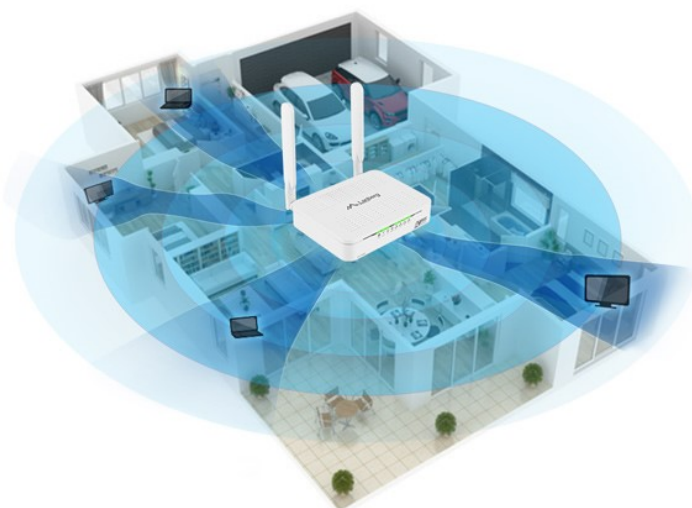
EASIER AND SAFER DEVICE(S) CONFIGURATION WITH WPS 2.0

With the implementation of the WPS button, the user gains the ability to easily and quickly connect any devices to the router using the WPS function. You no longer have to configure each device repeatedly and enter complicated passwords to connect those devices to the router.

Version 2.0 provides an increased level of security, thereby significantly reducing the chances of success of the "brute-force attack". While striving to increase security, the manufacturer left PIN availability only on the web configuration page, making it impossible to physically obtain a default password from the router's label.

STABLE NETWORK WITH BEAMFORMING

Beamforming technology allows focused transmission of a wireless signal (Wi-Fi) that creates data beams focused strictly on the receiving devices. The router's antennas automatically detect the direction of the received signal and then form the wave beam in such a way that the transmission is directed as much as possible to the receiving device.

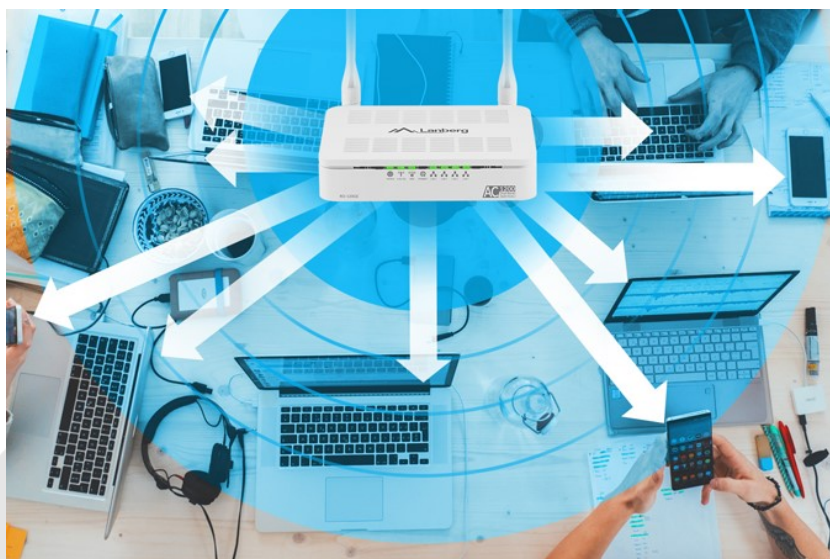


This technology allows you to increase the strength, infiltration and stability of the signal compared to current, ordinary transmissions, while maintaining the same environmental conditions as optical obstacles. In practice, the user gains much more stable, focused Wi-Fi connection with increased efficiency and usability.

POWERFUL 2T2R - MIMO

With the use of MIMO technology, the user gains only benefits, due to the increased bandwidth of a wireless network based on multi-antenna transmission, both on the transmitting side and on the receiving side:

- Increased signal reliability due to increased resistance to fading,
- Increased signal-to-noise ratio (SNR) resulting from a collective reception - a radio signal is received by all receiving antennas,
- Increased bandwidth of radio connection as a result of data streams being divided into sub-streams, which in turn leads to a multiplexing gain.



MULTIPLE WIRELESS + GUEST NETWORKS

The user is given the opportunity to create up to four different, additional and independent wireless networks for 2.4 GHz and 5 GHz bands. Each of them can have its own encryption mode with a separate password and name - all options are exactly the same as for configuring the main wireless network.

In order to meet the users' expectations, the manufacturer provided the possibility to create links for separate, logically separated virtual networks – VLAN - for each of the four additional Wi-Fi networks.

Lastly, Wi-Fi client isolation feature allows convenient separation of devices connected wirelessly, providing an additional level of protection and reducing the risk of attack on other computers connected to the same Wi-Fi network.

CONTENTS OF THE PACKAGE

- Broadband wireless router: RO-120GE,
- Quick guide,
- 1.5 m 8-wire patch cord,
- Power supply: AC 100 ~ 240 V, 50 / 60 Hz, 0.4 A, DC 12 V, 1.0 A.

SPECIFICATION

Chipset		Realtek: RTL8367, RTL8197FS, RTL8812BRH	
CPU model		MIPS 24Kc V8.5	
Operating system; SDK		Linux 3.10.90; Realtek SDK 4.4.7 2001 build	
The amount and type of device memory		8 MB SPI FLASH - EPROM	
The amount and type of operating memory		64 MB DDR2	
Ethernet interface	Quantity; speed; WAN port type	1 x RJ-45 port; 1000 Mb/s; auto: MDI-MDIX + negotiation	
	Quantity; speed; type of LAN ports	4 x RJ-45 port; 1000 Mb/s; auto: MDI-MDIX + negotiation	
	Data transfer rate	10BASE-T (Ethernet): 10 Mb/s (half-duplex); 20 Mb/s (full duplex); 100BASE-TX (Fast Ethernet): 100 Mb/s (half-duplex); 200 Mb/s (full duplex); 1000BASE-T (Gigabit Ethernet): 1000 Mb/s (half-duplex); 2000 Mb/s (full duplex);	
	Total switching bandwidth	10.0 Gb/s (8.0 LAN, 2.0 WAN)	
	Compatible network cables	TIA/EIA-568-A or TIA/EIA-568-B: 10BASE-T (Ethernet): 100 Ω UTP / 150 Ω STP; category 3 or higher; ≤ 100 m; 100BASE-TX (Fast Ethernet): 100 Ω UTP / 150 Ω STP; category 5e or higher; ≤ 100 m; 1000BASE-T (Gigabit Ethernet): 100 Ω UTP / 150 Ω STP; category 5e or higher; ≤ 100 m;	
	Standards	IEEE 802.1d: STP; IEEE 802.1p; IEEE 802.1q: VLAN; IEEE 802.1s: MSTP; IEEE 802.1w: RSTP; IEEE 802.1x; IEEE 802.3ab: 1000BASE-T; IEEE 802.3az: Green Ethernet; IEEE 802.3i: 10BASE-T; IEEE 802.3u: 100BASE-TX; IEEE 802.3x: Flow control;	
Wi-Fi interface	Type, speed; modulation – 2.4 GHz	IEEE 802.11b: up to 11 Mb/s; DSSS (CCK [DBPSK + DQPSK]); IEEE 802.11g: up to 54 Mb/s; DSSS (CCK [DBPSK + DQPSK]) + OFDM (BPSK + QPSK + QAM-16 + QAM-64); IEEE 802.11n: up to 300 Mb/s; OFDM (BPSK + QPSK + QAM-16 + QAM-64);	
	Radio power (E.I.R.P.) – 2.4 GHz	IEEE 802.11b: 19.76 dBm IEEE 802.11g: 19.90 dBm IEEE 802.11n 20 MHz: 19.89 dBm IEEE 802.11n 40 MHz: 19.93 dBm	
	Type, speed; modulation – 5 GHz	IEEE 802.11a: up to 54 Mb/s; OFDM (BPSK + QPSK + QAM-16 + QAM-64); IEEE 802.11n: up to 300 Mb/s; OFDM (BPSK + QPSK + QAM-16 + QAM-64); IEEE 802.11ac: up to 867 Mb/s; OFDM(QAM-256);	
	Radio power (E.I.R.P.) – 5 GHz	802.11a: 22.97 dBm 802.11n 20 MHz: 22.97 dBm 802.11n 40 MHz: 22.97 dBm 802.11ac 20 MHz: 22.97 dBm 802.11ac 40 MHz: 22.97 dBm 802.11ac 80 MHz: 22.97 dBm	
	Antennas – 2.4 GHz	Quantity, type, type, streams	2 x antenna; external, fixed, dipole; MIMO; 2T2R;
		Return loss	< -10 dB
		VSWR	< 1.5
		Energy gain	5 ± 1 dBi
		Impedance	50 Ω
		Cable diameter	1.13 mm
Efficiency		> 70 %	
Operating channels		USA (FCC): 11 channels: 2.412 GHz ~ 2.462 GHz; Europa (ETSI): 13 channels: 2.412 GHz ~ 2.472 GHz;	

PRODUCT CARD



Wi-Fi interface	Antennas – 5 GHz	Quantity, type, type, streams	2 x antenna; external, fixed, dipole; MIMO; 2T2R;
		Return loss	< -10 dB
		VSWR	< 1.7
		Energy gain	5 ± 1 dBi
		Impedance	50 Ω
		Connector type; cable diameter	I-PEX; 1.37 mm
		Efficiency	> 70 %
		Operating channels	USA (FCC): 45 channels: 5.180 GHz ~ 5.825 GHz; Europa (ETSI): 35 channels: 5.180 GHz ~ 5.560 GHz, 5.580 GHz, 5.660 GHz ~ 5.825 GHz;
	Security		WPS 2.0; WPS-PBC; WPS-PIN; 64/128-bit WEP; WPA/WPA2; WPA2 PSK (TKIP & AES); MAC address filtering; Broadcasting the wireless network name (SSID); RADIUS client; Isolation of connected clients in the Wi-Fi network;
	Internet interface (WAN) modes		Frame aggregation (A-MPDU [BA] + A-MSDU); Asynchronous energy saving method (U-APSD); CCX; Beamforming; 2x2 MIMO; IAPP; Short Guard Interval [400ns]; LDPC; STBC; Low latency immediate Block Acknowledgement (BA); IEEE 802.11a; IEEE 802.11b; IEEE 802.11e; IEEE 802.11g; IEEE 802.11h (DFS + TPC); IEEE 802.11i; IEEE 802.11k; IEEE 802.11n; IEEE 802.11w (Management frame protection); IEEE 802.11ac;
Router modes		Router; Access Point (AP); Client; Bridge; Repeater; WISP;	
Internet interface (WAN) modes		DHCP; Static IP address; PPPoE; PPTP; L2TP;	
Management		Web page: locally, remotely; CWMP (TR-069); SNMP v1/v2/v2c; Telnet*;	
Functions	LANBERG_FW_RO_120GE_V3_01R_180625_1400		Aggregation of Wi-Fi frames; Automatic bandwidth switching (20/40 MHz); Automatic channel selection + Bluetooth coexistence support; Auto-restart; Band Steering (5/2.4 GHz); Bandwidth control; Beacon interval; Beamforming; Broadcast storm control; Control of additional sideband channel; CSMA/CA-ACK; DDNS; DHCP server; DHCPv6; DMZ; Domain / URL filtering; EAP-MD5; EAP-PEAP; EAP-TLS; EAP-TTLS; Fragmentation threshold; Guest network; Hardware NAT; IAPP; ICMP Broadcast protection; ICMP Redirect protection; IEEE 802.1q; VLAN – Ethernet + Wi-Fi (only WAN-LAN); IEEE 802.1x EAP (Extensible Authentication Protocol); IGMP proxy v1/v2/v3 (+ on the physical interface); IGMP v1/v2 + MLD v1/v2 snooping; IP filtering; IPTV; IPv6 Neighbor Discovery; IPv6 tunnel through IPv4 (6in4); Isolation of connected clients in the Wi-Fi network; LAN & Wi-Fi client list; LAN IPv6; LDPC; Limitation of Wi-Fi output power; Limiting the bandwidth of downloading/uploading; MAC address cloning (WAN Ethernet); Management frame protection (MFP); MIB II; Multiple wireless networks (Multi SSID); NDP (Neighbor Discovery Protocol); NTP client; Parental control; PBC function; Port filtering; Port forwarding; Preamble length control; Preventing DoS attacks (ICMP Smurf, IP Land, IP Spoof, IP Teardrop, Per-Source IP Flood: FIN + ICMP + SYN + UDP, PingOfDeath, Port scanning TCP/UDP, TCP scanning, TCP SynWithData, UDP Bomb, UDP EchChargen, Whole System Flood: FIN + ICMP + SYN + UDP); Protection of B/G mode of the wireless network; QoS; RADIUS per (physical/virtual) Wi-Fi network; Remote syslog; RIP (Routing Information Protocol) v1/v2; Router's own domain name; RTS threshold; Schedule for network access; Short Guard Interval; SNMP trap; SPI (Stateful Packet Inspection); Static DHCP leases; Static routing; STBC; STP; Support of IPSec, PPTP, L2PT packets (VPN Pass-through); Syslog; TFTP (Trivial File Transfer Protocol); UPnP; Virtual networks (VAP) – 4; Wi-Fi Multimedia (WMM, WMM-SA client mode, WMM-APSD); Wi-Fi time schedule; WPS 2.0; WPS-PBC; WPS-PIN
	LANBERG_FW_RO_120GE_V3_02R_190131_1800		Band-steering; Double-login panel (administrator & user); Information about signal strength and uptime of Wi-Fi clients; Mini-schedule of router reset (daily, weekly); Modification of existing VLAN entries; Port forwarding in ranges; Manual modification of the MCS index; Table of active connections per port (MAC and speed); Maintenance the entered TR-069 data after resetting the router to the factory settings; Managing a two-level panel through TR-069 (including changing administrator and user credentials); Change of activation of the reset button after a specified time (6s, 15s, 30s)
Power supply type		External adapter	
Power - AC	Voltage		100 ~ 240 V
	Frequency		50 / 60 Hz
	Current		0.4 A
	Power consumption		8.5 W
Power - DC	Voltage		12 V
	Frequency		50 / 60 Hz
	Current		1.0 A

Cooling	Passive
LED indicators	Power; Internet; Wi-Fi (2.4 GHz + 5 GHz); WPS; LAN (1-4);
Buttons	Power; Reset (on the bottom of the device); WPS; Wi-Fi;
Storage temperature	-5 ~ 70 °C
Storage humidity	10% ~ 90% non-condensing
Operating temperature	0 ~ 40 °C
Operating humidity	10% ~ 90% non-condensing
Dimensions (Length x Width x Height)	140 x 107 x 30 mm

* By default, no changes are applied, that restrict access to this type of services. There may be a situation in which the appropriate requirement of the distributor for a given country may be implemented appropriate security or a dedicated password. In order to get access, please contact the Lanberg distributor in your country.