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## LANCOM 1821n Wireless

VPN router with ADSL2+ modem and performance WLAN module

- Integrated ADSL2+ modem
- 5 integrated IPsec VPN channels, upgradable to 25, integrated hardware acceleration
- 300-Mbps WLAN as per 802.11a/b/g/n
- Secure WLAN compliant with IEEE 802.11i (WPA2/ AES) and Multi-SSID
- Stateful-inspection firewall with intrusion detection/denial-of-service protection
- Multiple interfaces: ISDN, USB-2.0 port, Ethernet, and serial port

The LANCOM 1821n Wireless provides everything you need for site connectivity: Offering 5 integrated VPN channels, which can be upgraded to 25 by means of a VPN option, it comes with an on-board ADSL2+ modem. The device connects directly to the Internet—no additional modem is required. A range of interfaces, including ISDN, four separable switch ports, serial port and USB-2.0 port, facilitate the connection to PBX systems and network devices; should the device be unattainable via IP, it provides alternative access to the configuration. Load balancing can use up to four WAN connections. Security is provided by high-quality security features such as the stateful-inspection firewall with intrusion detection and protection against denial of services.

And there's more: The new WLAN module works at 300 Mbps and achieves far greater ranges than the product's predecessor. The hugely improved coverage from the integrated MIMO technology allows entire offices to be networked, without requiring additional access points. Multi-SSID enables the definition of multiple user groups, which makes it simple to set up WLAN access for guests, who remain completely separated from the company's internal network.

#### **More Security.**

The integrated firewall with the up-to-date security functions such as stateful inspection, intrusion detection and denial-of-service protection is supplemented by dynamic bandwidth management and comprehensive backup functions, high availability and redundancy over ISDN and VRRP. The integrated VPN gateway meets the IPsec standard, supporting high-security 3-DES or AES encryption. In combination with digital-certificate support and integrated hardware accelerator, optimal security is assured for connections to telecommuters and branch offices. LANCOM also sets standards in the area of wireless LAN security. Our products support a comprehensive range of WLAN security technologies, including IEEE 802.11i (WPA2/AES), 802.1X, WEP64/128/152, ACL or LEPS (LANCOM Enhanced Passphrase Security). Whatever your individual security requirements may be, you can configure your own made-to-measure solution.

#### **More Management.**

The free tool WLANmonitor allows settings for wireless, encryption, or access-control lists to be grouped into partial configurations, which are then transferred to multiple access points in one easy move. WLANmonitor visualizes the structures of the wireless LAN irrespective of physical location and helps with the central monitoring of the entire wireless network. LANCOM WLAN controllers provide the ultimate in management: Every LANCOM access point and LANCOM WLAN router, including those at remote locations, can be remotely configured via VPN from a central site. The practical significance of this becomes clear when rolling-out new WLAN infrastructure.

The WLAN devices merely have to be connected to a network with IP access. Configuration is carried out centrally via the Controller. The benefit: WLANs can be rolled-out at locations where no trained technician is available.

#### **More Reliability for the Future.**

From the earliest days, LANCOM products have been designed for a product life of several years. They are equipped with hardware which is dimensioned for the future. Even reaching back to older product generations, updates to the LANCOM Operating System—LCOS—are available several times a year, free of charge and offering major features. LANCOM offers unbeatable protection of your investment!

#### **More Virtualization.**

Advanced Routing and Forwarding (ARF) from LANCOM is a unique technology for network virtualization. It enables different logical networks, each with their own settings for DHCP, DNS, routing and firewall, to operate on a single device and share the same physical infrastructure. For example, networks in the LAN can be assigned to different VLANs, tagged in the WAN or assigned to different RAS connections. The innovative Tunnel-in-Tunnel technology for VPN allows different networks between LANCOM routers to be completely isolated even over a shared IPsec-VPN connection—even with overlapping IP-address ranges. ARF is suitable for the cross-site separation of logical networks, for example where different applications or service providers work on shared infrastructure. Conflicts can be completely avoided. Incursions from one logical network to another, either intentionally or by accident, are effectively prevented by ARF. In particular for companies located at multiple sites, ARF enables the switch to a purely IP-based infrastructure, so offering considerable potential savings in operations.

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Scope of features: as of LCOS version 8.5x

WLAN	
Frequency band 2.4 GHz or 5 GHz	2400-2483.5 MHz (ISM) or 5150-5825 MHz (depending on country-specific restrictions)
Data rates 802.11b/g	54 Mbps to IEEE 802.11g (fallback to 48, 36, 24, 18, 12, 9, 6 Mbps, Automatic Rate Selection) compatible to IEEE 802.11b (11, 5.5, 2, 1 Mbps, Automatic Rate Selection), 802.11 b/g compatibility mode or pure g or pure b
Data rates 802.11a/h	54 Mbps (fallback to 48, 36, 24, 18, 12, 9, 6 Mbps, Automatic Rate Selection), fully compatible with TPC (adjustable power output) and DFS (automatic channel selection, radar detection) according to ETSI EN 301 893 V.1.5.1., EN 302 502
Data rates 802.11n	300 Mbps according to IEEE 802.11n with MCS15 (Fallback to 6,5 Mbps with MCS0)
Range 802.11a/b/g *	Up to 150 m (up to 30 m in buildings) *
Range 802.11n	Up to 250 m @ 6.5 Mbps (up to 20 m @ 300 Mbps indoor)*
Output power at radio module, 2.4 GHz	802.11b: +19 dBm @ 1 and 2 Mbps, +19 dBm @ 5.5 und 11 Mbps
Output power at radio module, 2.4 GHz	802.11g: +18 dBm @ 6 to 36 Mbps, +17 dBm @ 48 Mbps, +16 dBm @ 54 Mbps 802.11n: +19 dBm @ 6,5/13 Mbps (MCS0/8, 20 MHz), +10 dBm @ 65/130 Mbps (MCS7/15, 20 MHz), +17 dBm @ 15/30 Mbps (MCS0/8, 40 MHz), +10 dBm @ 150/300 Mbps (MCS7/15, 40 MHz)
Output power at radio module, 5 GHz	802.11a/h: +18 dBm @ 6 to 24 Mbps, +17 dBm @ 36 Mbps, +16 dBm @ 48 Mbps, +15 dBm @ 54 Mbps 802.11n: +18 dBm @ 6,5/13 Mbps (MCS0/8, 20 MHz), +10 dBm @ 65/130 Mbps (MCS7/15, 20 MHz), +17 dBm @ 15/30 Mbps (MCS0/8, 40 MHz), +10 dBm @ 150/300 Mbps (MCS7/15, 40 MHz)
Output power at radio module, 2.4 GHz	802.11b: +18 dBm @ 1 and 2 Mbps, +18 dBm @ 5,5 and 11 Mbps 802.11g: +18/19 dBm @ 6 up to 36 Mbps, +18 dBm @ 48 Mbps, +17 dBm @ 54 Mbps 802.11n: +19 dBm @ 6,5 and 13 Mbps (MCS0/8, 20 MHz), +13 dBm @ 65 and 130 Mbps (MCS7/15, 20 MHz), +17 dBm @ 15/30 Mbps (MCS0/8, 40 MHz), +13 dBm @ 150/300 Mbps (MCS7/15, 40 MHz)
Output power at radio module, 5 GHz	802.11a/h: +16 bis +17 dBm @ 6 up to 24 Mbps, +16 bis +17 dBm @ 36 Mbps, +9 up to +15 dBm @ 54 Mbps 802.11n: +14 bis +17 dBm @ 6,5/13 Mbps (MCS0/8, 20 MHz), +5 up to +9 dBm @ 65/130 Mbps (MCS7/15, 20 MHz), +12 up to +16 dBm @ 15/30 Mbps (MCS0/8, 40 MHz), +5 up to +9 dBm @ 150/300 Mbps (MCS7/15, 40 MHz)
Max. radiated power (EIRP), 2.4 GHz band	802.11b/g: Up to 20 dBm / 100 mW EIRP (transmission power control according to TPC)
Max. radiated power (EIRP), 5 GHz band	802.11a/h: Up to 30 dBm / 1000 mW or up to 36 dBm / 4000 mW EIRP (depending on national regulation on channel usage and subject to further obligations such as TPC and DFS)
Minimum transmission power	Transmission power reduction in software in 1 dB steps to min. 0.5 dBm
Receiver sensitivity 2.4 GHz	802.11b: -91 dBm @ 11 Mbps, -96 dBm @ 1 Mbps; 802.11g: -96 dBm @ 6 Mbps, -83 dBm @ 54 Mbps; 802.11n: -96 dBm @ 6,5 Mbps (MCS0, 20 MHz), -79 dBm @ 65 Mbps (MCS7, 20 MHz); -95 dBm @ 13 Mbps (MCS8, 20 MHz), -75 dBm @ 130 Mbps (MCS15, 20 MHz); -90 dBm @ 15 Mbps (MCS0, 40 MHz), -75 dBm @ 150 Mbps (MCS7, 40 MHz); -90 dBm @ 30 Mbps (MCS8, 40 MHz), -71 dBm @ 300 Mbps (MCS15, 40 MHz)
Receiver sensitivity 5 GHz	802.11a/h: -95 dBm @ 6 Mbps, -82 dBm @ 54 Mbps; 802.11n: -95 dBm @ 6,5 Mbps (MCS0, 20 MHz), -77 dBm @ 65 Mbps (MCS7, 20 MHz); -94 dBm @ 13 Mbps (MCS8, 20 MHz), -74 dBm @ 130 Mbps (MCS15, 20 MHz); -91 dBm @ 15 Mbps (MCS0, 40 MHz), -74 dBm @ 150 Mbps (MCS7, 40 MHz); -91 dBm @ 30 Mbps (MCS8, 40 MHz), -70 dBm @ 300 Mbps (MCS15, 40 MHz)
Receiver sensitivity 2.4 GHz	802.11b: -91 dBm @ 11 Mbps, -93 dBm @ 1 Mbps, 802.11g: -94dBm @ 6 Mbps, -80dBm @ 54 Mbps 802.11n: -94 dBm @ 6,5 Mbps (MCS0, 20 MHz), -77 dBm @ 65 Mbps (MCS7, 20 MHz), -94 dBm @ 13 Mbps (MCS8, 20 MHz), -77 dBm @ 130 Mbps (MCS15, 20 MHz), -89 dBm @ 15 Mbps (MCS0, 40 MHz), -73 dBm @ 150 Mbps (MCS7, 40 MHz), -89 dBm @ 30 Mbps (MCS8, 40 MHz), -73 dBm @ 300 Mbps (MCS15, 40 MHz)
Receiver sensitivity 5 GHz	802.11a/h: -94 dBm @ 6 Mbps, -77 dBm @ 54 Mbps 802.11n: -93 dBm @ 6,5 Mbps (MCS0, 20 MHz), -74 dBm @ 65 Mbps (MCS7, 20 MHz), -93 dBm @ 13 Mbps (MCS8, 20 MHz), -74 dBm @ 130 Mbps (MCS15, 20 MHz), -90 dBm @ 15 Mbps (MCS0, 40 MHz), -72 dBm @ 150 Mbps (MCS7, 40 MHz), -90 dBm @ 30 Mbps (MCS8, 40 MHz), -72 dBm @ 300 Mbps (MCS15, 40 MHz)
Radio channels 2.4 GHz	Up to 13 channels, max. 3 non-overlapping (2.4 GHz band)
Radio channels 5 GHz	Up to 26 non-overlapping channels (available channels and further obligations such as automatic DFS dynamic channel selection depending on national regulation)
Roaming	Seamless handover between radio cells, IAPP support with optional restriction to an ARF context, IEEE 802.11d support
WPA2 fast roaming	Pre-authentication and PMK caching for fast roaming
Fast client roaming	With background scanning, moving LANCOM 'client mode' access points pre-authenticate to alternative access points which offer a better signal before Roaming fails
VLAN	VLAN ID definable per interface, WLAN SSID, point-to-point connection and routing context (4094 IDs)
Dynamic VLAN assignment	Dynamic VLAN assignment for target user groups based on MAC addresses, BSSID or SSID by means of external RADIUS server.
Q-in-Q tagging	Support of layered 802.1q VLANs (double tagging)
Multi-SSID	Simultaneous use of up to 8 independent WLAN networks per WLAN interface

WLAN	
IGMP snooping	Support for Internet Group Management Protocol (IGMP) in the WLAN bridge for WLAN SSIDs and LAN interfaces for specific switching of multicast packets (devices with integrated WLAN only). Automated detection of multicast groups. Configurable action for multicast packets without registration. Configuration of static multicast group members per VLAN ID. Configuration of query simulation for multicast membership per VLAN ID
Security	IEEE 802.11i / WPA2 with passphrase or 802.1x and hardware-accelerated AES, closed network, WEP64, WEP128, WEP152, user authentication, 802.1x /EAP, LEPS, WPA1/TKIP
RADIUS server	Integrated RADIUS server for MAC address list management
EAP server	Integrated EAP server for authentication of 802.1x clients via EAP-TLS, EAP-TTLS, PEAP, MSCHAP or MSCHAPv2
Quality of Service	Prioritization according to Wireless Multimedia Extensions (WME, subset of IEEE 802.11e)
U-APSD/WMM Power Save	Extension of power saving according to IEEE 802.11e by Unscheduled Automatic Power Save Delivery (equivalent to WMM Power Save). U-APSD supports the automatic switch of clients to a doze mode. Increased battery lifetime for telephone calls over VoWLAN (Voice over WLAN)
Bandwidth limitation	Maximum transmit and receive rates and an individual VLAN ID can be assigned to each WLAN client (MAC address)
Broken link detection	If the link of a chosen LAN interface breaks down, a WLAN module can be deactivated to let the associated clients search for a new base station
Background scanning	Detection of rogue AP's and the channel information for all WLAN channels during normal AP operation. The Background Scan Time Interval defines the time slots in which an AP or Router searches for a foreign WLAN network in its vicinity. The time interval can be specified in either milliseconds, seconds, minutes, hours or days
Client detection	Rogue WLAN client detection based on probe requests
802.1x supplicant	Authentication of an access point in WLAN client mode at another access point via 802.1x (EAP-TLS, EAP-TTLS and PEAP)
Layer-3 Tunneling	Layer-3 Tunneling in conformity with the CAPWAP standard allows the bridging of WLANs per SSID to a separate IP subnet. Layer-2 packets are encapsulated in Layer-3 tunnels and transported to a LANCOM WLAN controller. By doing this the access point is independent of the present infrastructure of the network. Possible applications are roaming without changing the IP address and compounding SSIDs without using VLANs.
*) Note	The effective distances and transmission rates that can be achieved are depending of the site RF conditions
IEEE 802.11n Features	
MIMO	MIMO technology is a technique which uses multiple transmitters to deliver multiple data streams via different spatial channels. LANCOM uses a 3 x 3 MIMO Configuration where 2 data streams are spread over 3 transmitters. Depending on the existing RF conditions the throughput is doubled with MIMO technology
40 MHz Channels	Two adjacent 20 MHz channels are combined to create a single 40 MHz channel. Depending on the existing RF Conditions channel bonding doubles the throughput.
MAC Aggregation and Block Acknowledgement	MAC Aggregation increase the 802.11 MAC efficiency by combining MAC data frames and sending it out with a single header. The receiver acknowledges the combined MAC frame with a Block Acknowledgement. Depending on existing RF conditions, this technique improves throughput by up to 20%.
Short Guard Interval	The guard interval is the time between OFDM symbols in the air. 802.11n gives the option for a shorter 400 nsec guard interval compared to the legacy 800 nsec guard interval. Under ideal RF conditions this increases the throughput by upto 10%
BFWA*	Support for Broadband Fixed Wireless Access in 5.8 GHz band with up to 4 Watt EIRP for WLAN point-to-point links according to the national regulations of your country, special antennas required
*) Note	The use of BFWA is subject to country specific regulation
WLAN operating modes	
WLAN access point	Infrastructure mode (autonomous operation or managed by LANCOM WLAN Controller)
WLAN bridge	Point-to-multipoint connection of up to 7 Ethernet LANs (mixed operation optional), broken link detection, blind mode, supports VLAN When configuring Pt-to-Pt links, pre-configured names can be used as an alternative to MAC Adresses for creating a link. Rapid spanning-tree protocol to support redundant routes in Ethernet networks
WLAN client	Transparent WLAN client mode for wireless Ethernet extensions, e.g. connecting PCs or printers by Ethernet; up to 64 MAC addresses. Automatic selection of a WLAN profile (max. 8) with individual access parameters depending on signal strength or priority
Firewall	
Stateful inspection firewall	Incoming/Outgoing Traffic inspection based on connection information. Trigger for firewall rules depending on backup status, e.g. simplified rule sets for low-bandwidth backup lines. Limitation of the number of sessions per remote site (ID)
Packet filter	Check based on the header information of an IP packet (IP or MAC source/destination addresses; source/destination ports, DiffServ attribute); remote-site dependant, direction dependant, bandwidth dependant
Extended port forwarding	Network Address Translation (NAT) based on protocol and WAN address, i.e. to make internal webservers accessible from WAN
N:N IP address mapping	N:N IP address mapping for translation of IP addresses or entire networks
Tagging	The firewall marks packets with routing tags, e.g. for policy-based routing
Actions	Forward, drop, reject, block sender address, close destination port, disconnect
Notification	Via e-mail, SYSLOG or SNMP trap

<b>Quality of Service</b>	
Traffic shaping	Dynamic bandwidth management with IP traffic shaping
Bandwidth reservation	Dynamic reservation of minimum and maximum bandwidths, totally or connection based, separate settings for send and receive directions. Setting relative bandwidth limits for QoS in percent
DiffServ/TOS	Priority queuing of packets based on DiffServ/TOS fields
Packet-size control	Automatic packet-size control by fragmentation or Path Maximum Transmission Unit (PMTU) adjustment
Layer 2/Layer 3 tagging	Automatic or fixed translation of layer-2 priority information (802.11p-marked Ethernet frames) to layer-3 DiffServ attributes in routing mode. Translation from layer 3 to layer 2 with automatic recognition of 802.1p-support in the destination device
<b>Security</b>	
Intrusion Prevention	Monitoring and blocking of login attempts and port scans
IP spoofing	Source IP address check on all interfaces: only IP addresses belonging to the defined IP networks are allowed
Access control lists	Filtering of IP or MAC addresses and preset protocols for configuration access and LANCAPI
Denial of Service protection	Protection from fragmentation errors and SYN flooding
General	Detailed settings for handling reassembly, PING, stealth mode and AUTH port
URL blocker	Filtering of unwanted URLs based on DNS hitlists and wildcard filters. Extended functionality with Content Filter Option
Password protection	Password-protected configuration access can be set for each interface
Alerts	Alerts via e-mail, SNMP-Traps and SYSLOG
Authentication mechanisms	EAP-TLS, EAP-TTLS, PEAP, MS-CHAP, MS-CHAPv2 as EAP authentication mechanisms, PAP, CHAP, MS-CHAP and MS-CHAPv2 as PPP authentication mechanisms
Anti-theft	Anti-theft ISDN site verification over B or D channel (self-initiated call back and blocking)
WLAN protocol filters	Limitation of the allowed transfer protocols, source and target addresses on the WLAN interface
Adjustable reset button	Adjustable reset button for 'ignore', 'boot-only' and 'reset-or-boot'
IP redirect	Fixed redirection of any packet received over the WLAN interface to a dedicated target address
<b>High availability / redundancy</b>	
VRRP	VRRP (Virtual Router Redundancy Protocol) for backup in case of failure of a device or remote station. Enables passive standby groups or reciprocal backup between multiple active devices including load balancing and user definable backup priorities
FirmSafe	For completely safe software upgrades thanks to two stored firmware versions, incl. test mode for firmware updates
ISDN backup	In case of failure of the main connection, a backup connection is established over ISDN. Automatic return to the main connection
Analog/GSM modem backup	Optional operation of an analog or GSM modem at the serial interface
Load balancing	Static and dynamic load balancing over up to 4 WAN connections. Channel bundling with Multilink PPP (if supported by network operator)
VPN redundancy	Backup of VPN connections across different hierarchy levels, e.g. in case of failure of a central VPN concentrator and re-routing to multiple distributed remote sites. Any number of VPN remote sites can be defined (the tunnel limit applies only to active connections). Up to 32 alternative remote stations, each with its own routing tag, can be defined per VPN connection. Automatic selection may be sequential, or dependant on the last connection, or random (VPN load balancing)
Line monitoring	Line monitoring with LCP echo monitoring, dead-peer detection and up to 4 addresses for end-to-end monitoring with ICMP polling
<b>VPN</b>	
IPSec over HTTPS	Enables IPSec VPN based on TCP (at port 443 like HTTPS) which can go through firewalls in networks where e. g. port 500 for IKE is blocked. Suitable for client-to-site connections (with LANCOM Advanced VPN Client 2.22 or later) and site-to-site connections (LANCOM VPN gateways or routers with LCOS 8.0 or later). IPSec over HTTPS is based on the NCP VPN Path Finder technology
Number of VPN tunnels	5 IPSec connections active simultaneously (25 with VPN-25 Option), unlimited configurable connections. Configuration of all remote sites via one configuration entry when using the RAS user template or Proadaptive VPN. Max. total sum of concurrently active IPSec and PPTP tunnels: 5 (25 with VPN 25 Option)
Hardware accelerator	Integrated hardware accelerator for 3DES/AES encryption and decryption
1-Click-VPN Client assistant	One click function in LANconfig to create VPN client connections, incl. automatic profile creation for the LANCOM Advanced VPN Client
1-Click-VPN Site-to-Site	Creation of VPN connections between LANCOM routers via drag and drop in LANconfig
IKE	IPSec key exchange with Preshared Key or certificate
Certificates	X.509 digital multi-level certificate support, compatible with Microsoft Server / Enterprise Server and OpenSSL, upload of PKCS#12 files via HTTPS interface and LANconfig. Simultaneous support of multiple certification authorities with the management of up to nine parallel certificate hierarchies as containers (VPN-1 to VPN-9). Simplified addressing of individual certificates by the hierarchy's container name (VPN-1 to VPN-9). Wildcards for certificate checks of parts of the identity in the subject. Secure Key Storage protects a private key (PKCS#12) from theft
Certificate rollout	Automatic creation, rollout and renewal of certificates via SCEP (Simple Certificate Enrollment Protocol) per certificate hierarchy
Certificate revocation lists (CRL)	CRL retrieval via HTTP per certificate hierarchy

<b>VPN</b>	
OCSF Client	Check X.509 certifications by using OCSF (Online Certificate Status Protocol) in real time as an alternative to CRLs
XAUTH	XAUTH client for registering LANCOM routers and access points at XAUTH servers incl. IKE-config mode. XAUTH server enables clients to register via XAUTH at LANCOM routers. Connection of the XAUTH server to RADIUS servers provides the central authentication of VPN-access with user name and password. Authentication of VPN-client access via XAUTH and RADIUS connection additionally by OTP token
RAS user template	Configuration of all VPN client connections in IKE ConfigMode via a single configuration entry
Proadaptive VPN	Automated configuration and dynamic creation of all necessary VPN and routing entries based on a default entry for site-to-site connections. Propagation of dynamically learned routes via RIPv2 if required
Algorithms	3DES (168 bit), AES (128, 192 or 256 bit), Blowfish (128 bit), RSA (128 or -448 bit) and CAST (128 bit). OpenSSL implementation with FIPS-140 certified algorithms. MD-5 or SHA-1 hashes
NAT-Traversal	NAT-Traversal (NAT-T) support for VPN over routes without VPN passthrough
IPCOMP	VPN data compression based on LZS or Deflate compression for higher IPSec throughput
LANCOM Dynamic VPN	Enables VPN connections from or to dynamic IP addresses. The IP address is communicated via ISDN B- or D-channel or with the ICMP or UDP protocol in encrypted form. Dynamic dial-in for remote sites via connection template
Dynamic DNS	Enables the registration of IP addresses with a Dynamic DNS provider in the case that fixed IP addresses are not used for the VPN connection
Specific DNS forwarding	DNS forwarding according to DNS domain, e.g. internal names are translated by proprietary DNS servers in the VPN. External names are translated by Internet DNS servers
<b>VPN throughput (max., AES)</b>	
1416-byte frame size UDP	46 Mbps
256-byte frame size UDP	8 Mbps
IMIX	14 Mbps
<b>Firewall throughput (max.)</b>	
1518-byte frame size UDP	65 Mbps
256-byte frame size UDP	17 Mbps
<b>Content Filter (optional)</b>	
Demo version	Activate the 30-day trial version after free registration under <a href="http://www.lancom.eu/routeroptions">http://www.lancom.eu/routeroptions</a>
URL filter database/rating server	Worldwide, redundant rating servers from IBM Security Solutions for querying URL classifications. Database with over 100 million entries covering about 10 billion web pages. Web crawlers automatically search and classify web sites to provide nearly 150,000 updates per day: They use text classification by optical character recognition, key word searches, classification by word frequency and combinations, web-site comparison of text, images and page elements, object recognition of special characters, symbols, trademarks and prohibited images, recognition of pornography and nudity by analyzing the concentration of skin tones in images, by structure and link analysis, by malware detection in binary files and installation packages
HTTPS filter	Filtering of HTTPS requests.
Categories/category profiles	Filter rules can be defined in each profile by collecting category profiles from 58 categories, for example to restrict Internet access to business purposes only (limiting private use) or by providing protection from content that is harmful to minors or hazardous content (e.g. malware sites). Clearly structured selection due to the grouping of similar categories. Content for each category can be allowed, blocked, or released by override
Override	Each category can be given an optional manual override that allows the user to access blocked content on a case-by-case basis. The override operates for a limited time period by blocking the category or domain, or a combination of both. Optional notification of the administrator in case of overrides
Black-/whitelist	Lists that are manually configured to explicitly allow (whitelist) or block (blacklist) web sites for each profile, independent of the rating server. Wildcards can be used when defining groups of pages or for filtering sub pages
Profiles	Timeframes, blacklists, whitelists and categories are collected into profiles that can be activated separately for content-filter actions. A default profile with standard settings blocks racist, pornographic, criminal, and extremist content as well as anonymous proxies, weapons/military, drugs, SPAM and malware
Time frames	Timeframes can be flexibly defined for control over filtering depending on the time of day or weekday, e.g. to relax controls during break times for private surfing
Flexible firewall action	Activation of the content filter by selecting the required firewall profile that contains content-filter actions. Firewall rules enable the flexible use of your own profiles for different clients, networks or connections to certain servers
Individual display pages (for blocked, error, override)	Response pages displayed by the content filter in case of blocked sites, errors or overrides can be custom designed. Variables enable the inclusion of current information such as the category, URL, and rating-server categorization. Response pages can be issued in any language depending on the language set in the user's web browser
Redirection to external pages	As an alternative to displaying the device's own internal response pages to blockings, errors or overrides, you can redirect to external web servers
License management	Automatic notification of license expiry by e-mail, LANmonitor, SYSLOG or SNMP trap. Activation of license renewal at any time before expiry of the current license (the new licensing period starts immediately after expiry of the current license)
Statistics	Display of the number of checked and blocked web pages by category in LANmonitor. Logging of all content-filter events in LANmonitor; log file created daily, weekly or monthly. Hit list of the most frequently called pages and rating results. Analysis of the connection properties; minimum, maximum and average rating-server response time

<b>Content Filter (optional)</b>	
Notifications	Messaging in case of content-filter events optionally by e-mail, SNMP, SYSLOG or LANmonitor
Wizard for typical configurations	Wizard sets up the content filters for a range of typical scenarios in a few simple steps, including the creation of the necessary firewall rules with the corresponding action
Max. users	Simultaneous checking of HTTP traffic for a maximum of 50 different IP addresses
<b>Routing functions</b>	
Router	IP and NetBIOS/IP multi-protocol router
Advanced Routing and Forwarding	Separate processing of 16 contexts due to virtualization of the routers. Mapping to VLANs and complete independent management and configuration of IP networks in the device, i.e. individual settings for DHCP, DNS, Firewalling, QoS, VLAN, Routing etc. Automatic learning of routing tags for ARF contexts from the routing table
HTTP	HTTP and HTTPS server for configuration by web interface
DNS	DNS client, DNS server, DNS relay, DNS proxy and dynamic DNS client
DHCP	DHCP client, DHCP relay and DHCP server with autodetection. Cluster of several LANCOM DHCP servers per context (ARF network) enables caching of all DNS assignments at each router. DHCP forwarding to multiple (redundant) DHCP servers
NetBIOS	NetBIOS/IP proxy
NTP	NTP client and SNTP server, automatic adjustment for daylight-saving time
Policy-based routing	Policy-based routing based on routing tags. Based on firewall rules, certain data types are marked for specific routing, e.g. to particular remote sites or lines
Dynamic routing	Dynamic routing with RIPv2. Learning and propagating routes; separate settings for LAN and WAN. Extended RIPv2 including HopCount, Poisoned Reverse, Triggered Update for LAN (acc. to RFC 2453) and WAN (acc. to RFC 2091) as well as filter options for propagation of routes. Definition of RIP sources with wildcards
<b>Layer 2 functions</b>	
ARP lookup	Packets sent in response to LCOS service requests (e.g. for Telnet, SSH, SNTP, SMTP, HTTP(S), SNMP, etc.) via Ethernet can be routed directly to the requesting station (default) or to a target determined by ARP lookup
<b>COM port server</b>	
COM port forwarding	COM-port server for DIN and USB interfaces. For multiple serial devices connected to it, the server also manages its own virtual COM ports via Telnet (RFC 2217) for remote maintenance (works with popular virtual COM-port drivers compliant with RFC 2217). Switchable newline conversion and alternative binary mode. TCP keepalive according to RFC 1122 with configurable keepalive interval, retransmission timeout and retries
<b>USB print server</b>	
Print server (USB 2.0)	Host port for connecting USB printers via RAW-IP and LPD; bi-directional data exchange is possible
<b>LAN protocols</b>	
IP	ARP, proxy ARP, BOOTP, LANCAPI, DHCP, DNS, HTTP, HTTPS, IP, ICMP, NTP/SNTP, NetBIOS, PPPoE (server), RADIUS, RIP-1, RIP-2, RTP, SIP, SNMP, TCP, TFTP, UDP, VRRP
Rapid Spanning Tree	802.1d Spanning Tree and 802.1w Rapid Spanning Tree support for dynamic path selection with redundant layer 2 connections
<b>WAN protocols</b>	
ADSL, Ethernet	PPPoE, PPPoA, IPoA, Multi-PPPoE, ML-PPP, PPTP (PAC or PNS) and plain Ethernet (with or without DHCP), RIP-1, RIP-2, VLAN
ISDN	1TR6, DSS1 (Euro-ISDN), PPP, X75, HDLC, ML-PPP, V.110/GSM/HSCSD, CAPI 2.0 via LANCAPI, Stac data compression
<b>Interfaces</b>	
WAN: ADSL2+	ADSL2+ over ISDN compliant with ITU G.992.3, ITU G.992.5 Annex B (ADSL2+) or ADSL2+ over POTS compliant with ITU G.992.3 and ITU G.992.5 Annex A (ADSL2+)
WAN: ADSL	ADSL over ISDN compliant with ITU G.992.1 Annex B (compatible to Deutsche Telekom U-R2 connections) or ADSL over POTS compliant with ITU G.992.1 Annex A
Ethernet ports	4 individual 10/100-Mbps Fast Ethernet ports; up to 3 ports can be switched as additional WAN ports with load balancing. Ethernet ports can be electrically disabled within LCOS configuration
- freely configurable	Each Ethernet port can be freely configured (LAN, DMZ, WAN, monitor port, off). LAN ports can be operated as a switch or separately. Additionally, external DSL modems or termination routers can be operated as a WAN port with load balancing and policy-based routing. DMZ ports can be operated with their own IP address range without NAT
USB 2.0 host port	USB 2.0 full-speed host port for connecting USB printers (USB print server), serial devices (COM port server) or USB data storage (FAT file system); bi-directional data exchange is possible (max. 12 Mbps)
ISDN	ISDN BRI port (S0 bus)
Serial interface	Serial configuration interface / COM port (8 pin Mini-DIN): 9,600 - 115,000 baud, suitable for optional connection of analog/GPRS modems. Supports internal COM port server and allows for transparent asynchronous transmission of serial data via TCP
External antenna connectors	Two reverse SMA connectors for external LANCOM AirLancer Extender antennas or for antennas from other vendors. Please respect the restrictions which apply in your country when setting up an antenna system. For information about calculating the correct antenna setup, please refer to <a href="http://www.lancom-systems.com">www.lancom-systems.com</a>

LCMS (LANCOM Management System)	
LANconfig	Configuration program for Microsoft Windows, incl. convenient Setup Wizards. Optional group configuration, simultaneous remote configuration and management of multiple devices over ISDN dial-in or IP connection (HTTPS, HTTP, TFTP). A tree view of the setting pages like in WEBconfig provides quick access to all settings in the configuration window. Password fields which optionally display the password in plain text and can generate complex passwords. Configuration program properties per project or user. Automatic storage of the current configuration before firmware updates. Exchange of configuration files between similar devices, e.g. for migrating existing configurations to new LANCOM products. Detection and display of the LANCOM managed switches. Extensive application help for LANconfig and parameter help for device configuration. LANCOM QuickFinder as search filter within LANconfig and device configurations that reduces the view to devices with matching properties
LANmonitor	Monitoring application for Microsoft Windows for (remote) surveillance and logging of the status of LANCOM devices and connections, incl. PING diagnosis and TRACE with filters and save to file. Search function within TRACE tasks. Wizards for standard diagnostics. Export of diagnostic files for support purposes (including bootlog, sysinfo and device configuration without passwords). Graphic display of key values (marked with an icon in LANmonitor view) over time as well as table for minimum, maximum and average in a separate window, e. g. for Rx, Tx, CPU load, free memory. Monitoring of the LANCOM managed switches. Flick easily through different search results by LANCOM QuickFinder
WLANmonitor	Monitoring application for Microsoft Windows for the visualization and monitoring of LANCOM WLAN installations, incl. Rogue AP and Rogue Client visualization. LANCOM QuickFinder as search filter that reduces the view to devices with matching properties
Firwall GUI	Graphical user interface for configuring the object-oriented firewall in LANconfig: Tabular presentation with symbols for rapid understanding of objects, choice of symbols for objects, objects for actions/Quality of Service/remote sites/services, default objects for common scenarios, individual object definition (e.g. for user groups)
Automatic software update	Voluntary automatic updates for LCMS. Search online for LCOS updates for devices managed by LANconfig on the myLANCOM download server (myLANCOM account mandatory). Updates can be applied directly after the download or at a later time
Management	
WEBconfig	Integrated web server for the configuration of LANCOM devices via Internet browsers with HTTPS or HTTP. Similar to LANconfig with a system overview, syslog and events display, symbols in the menu tree, quick access with side tabs. WEBconfig also features Wizards for basic configuration, security, Internet access, LAN-LAN coupling. Online help for parameters in LCOS menu tree
Alternative boot configuration	During rollout devices can be preset with project- or customer-specific settings. Up to two boot- and reset-persistent memory spaces can store customized configurations for customer-specific standard settings (memory space '1') or as a rollout configuration (memory space '2'). A further option is the storage of a persistent standard certificate for the authentication of connections during rollouts
Automatic update from USB	Automatic upload of appropriate firmware and configuration files on insertion of USB memory (FAT filesystem) into USB interfaces of LANCOM routers with factory settings. The function can be activated to be used during operation of configured devices. The router checks the files' dates and versions against the current firmware before upload
Device Syslog	Syslog buffer in the RAM (size depending on device memory) to store events for diagnosis. Default set of rules for the event protocol in Syslog. The rules can be modified by the administrator. Display and saving of internal Syslog buffer (events) from LANCOM devices with LANmonitor, display only with WEBconfig
Access rights	Individual access and function rights for up to 16 administrators. Alternative access control on a per parameter basis with TACACS+
User administration	RADIUS user administration for dial-in access (PPP/PPTP and ISDN CLIP). Support for RADSEC (Secure RADIUS) for secure communication with RADIUS servers
Remote maintenance	Remote configuration with Telnet/SSL, SSH (with password or public key), browser (HTTP/HTTPS), TFTP or SNMP, firmware upload via HTTP/HTTPS or TFTP
TACACS+	Support of TACACS+ protocol for authentication, authorization and accounting (AAA) with reliable connections and encrypted payload. Authentication and authorization are separated completely. LANCOM access rights are converted to TACACS+ levels. With TACACS+ access can be granted per parameter, path, command or functionality for LANconfig, WEBconfig or Telnet/SSH. Each access and all changes of configuration are logged. Access verification and logging of SNMP Get and Set requests. WEBconfig supports the access rights of TACACS+ and choice of TACACS+ server at login. LANconfig provides a device login with the TACACS+ request conveyed by the addressed device. Authorization to execute scripts and each command within them by checking the TACACS+ server's database. CRON, action-table and script processing can be diverted to avoid TACACS+ to relieve TACACS+ servers. Redundancy by setting several alternative TACACS+ servers. Configurable option to fall back to local user accounts in case of connection drops to the TACACS+ servers. Compatibility mode to support several free TACACS+ implementations
Remote maintenance of 3rd party devices	A remote configuration for devices behind der LANCOM can be accomplished (after authentication) via tunneling of arbitrary TCP-based protocols, e.g. for HTTP(S) remote maintenance of VoIP phones or printers of the LAN. Additionally, SSH and Telnet client allow to access other devices from a LANCOM device with an interface to the target subnet if the LANCOM device can be reached at its command line interface
ISDN remote maintenance	Remote maintenance over ISDN dial-in with calling-number check
TFTP & HTTP(S) client	For downloading firmware and configuration files from a TFTP, HTTP or HTTPS server with variable file names (wildcards for name, MAC/IP address, serial number), e.g. for roll-out management. Commands for live Telnet session, scripts or CRON jobs. HTTPS Client authentication possible by username and password or by certificate
SSH & Telnet client	SSH-client function compatible to Open SSH under Linux and Unix operating systems for accessing third-party components from a LANCOM router. Also usable when working with SSH to login to the LANCOM device. Support for certificate- and password-based authentication. Generates its own key with sshkeygen. SSH client functions are restricted to administrators with appropriate rights. Telnet client function to login/administer third party devices or other LANCOM devices from command line interface
Basic HTTP(S) file server	HTML pages, images and templates for Public Spot pages, vouchers, information pages of the Content Filter can be stored on a USB memory (FAT file system) in a specific folder as an alternative for the limited internal memory



# LANCOM 1821n Wireless

Scope of features: as of LCOS version 8.5x

Management	
HTTPS Server	Option to choose if an uploaded certificate or the default certificate is used by the HTTPS server
Security	Access rights (read/write) over WAN or (W)LAN can be set up separately (Telnet/SSL, SSH, SNMP, HTTPS/HTTP), access control list
Scripting	Scripting function for batch-programming of all command-line parameters and for transferring (partial) configurations, irrespective of software versions and device types, incl. test mode for parameter changes. Utilization of timed control (CRON) or connection establishment and termination to run scripts for automation. Scripts can send e-mails with various command line outputs as attachments
Load commands	LoadFirmware, LoadConfig and LoadScript can be executed conditionally in case certain requirements are met. For example, the command LoadFirmware could be executed on a daily basis and check each time if the current firmware is up to date or if a new version is available. In addition, LoadFile allows the upload of files including certificates and secured PKCS-12 containers
SNMP	SNMP management via SNMPv2, private MIB exportable by WEBconfig, MIB II
Timed control	Scheduled control of parameters and actions with CRON service
Diagnosis	Extensive LOG and TRACE options, PING and TRACEROUTE for checking connections, LANmonitor status display, internal logging buffer for SYSLOG and firewall events, monitor mode for Ethernet ports
LANCOM WLAN Controller	Supported by all LANCOM WLAN Controller (separate optional hardware equipment for installation, optimization, operating and monitoring of WLAN networks, except for P2P connections)
LANCAPI	Available for all LANCOM routers with integrated ISDN interface. LANCAPI provides CAPI 2.0 features for Microsoft Windows to utilize ISDN channels over the IP network
CAPI Faxmodem	Softmodem for Microsoft Windows that makes use of LANCAPI to send and receive faxes via ISDN
Programmable Rollout Wizard	Allows the programming of a customized wizard to simplify the rollout in projects. Support for customized templates and logos provide a way to generate a brand specific look
SYSINFO	SYSINFO provides additional information. Hash value for the current configuration, time stamp of the last configuration change, a persistent counter of the number of configuration changes and the output of the value CONFIG_STATUS
Statistics	
Statistics	Extensive Ethernet, IP and DNS statistics; SYSLOG error counter
Accounting	Connection time, online time, transfer volumes per station. Snapshot function for regular read-out of values at the end of a billing period. Timed (CRON) command to reset all counters at once
Export	Accounting information exportable via LANmonitor and SYSLOG
Hardware	
Power supply	12 V DC, external power adapter (230 V)
Environment	Temperature range 5–35°C; humidity 0–80%; non-condensing
Housing	Robust synthetic housing, rear connectors, ready for wall mounting, Kensington lock; 210 x 45 x 140 mm (W x H x D)
Fans	None; fanless design without rotating parts, high MTBF
Power consumption (max)	ca. 12 Watt
Declarations of conformity	
CE	EN 301 489-1, EN 301 489-17, EN 60950
2.4 GHz WLAN	ETS 300 328
5 GHz WLAN	EN 301 893 version 1.5.1, EN 302 502 (BFWA)
Notifications	Certifications notified in Germany, Belgium, Netherlands, Luxembourg, Austria, Switzerland, UK, Italy, Spain, France, Portugal, Czech Republic, Denmark, Malta
Package content	
Manual	Printed User Manual (DE, EN) and Installation Guide (DE/EN/FR/ES/IT/PT/NL)
CD/DVD	Data medium with firmware, management software (LANconfig, LANmonitor, WLANmonitor, LANCAPI) and documentation
Cable	Serial configuration cable, 1.5m
Cable	1 Ethernet cable, 3 m
Cable	ADSL cable, 3m
Cable	ISDN cable, 3m
Antennas	Two 3 dBi external dipole dualband antennas, one internal 3dBi dipole dualband antenna
Power supply unit	12 V DC, external power adapter (230 V)
Support	
Warranty	3 years Support via Hotline and Internet KnowledgeBase
Software updates	Regular free updates (LCOS operating system and LANCOM Management System) via Internet

# LANCOM 1821n Wireless

Scope of features: as of LCOS version 8.5x

Options	
VPN	LANCOM VPN-25 Option (25 channels), item no. 60083
LANCOM Content Filter	LANCOM Content Filter +10 user, 1 year subscription
LANCOM Content Filter	LANCOM Content Filter +25 user, 1 year subscription
LANCOM Content Filter	LANCOM Content Filter +10 user, 3 year subscription
LANCOM Content Filter	LANCOM Content Filter +25 user, 3 year subscription
Advance Replacement	LANCOM Next Business Day Service Extension CPE, item no. 61411
Warranty Extension	LANCOM 2-Year Warranty Extension CPE, item no. 61414
Public Spot	LANCOM Public Spot Option (authentication and accounting software for hotspots, incl. Voucher printing through Standard PC printer), Item no. 60642.
Fax Gateway	LANCOM Fax Gateway Option activates 'hardfax' within the router. Supports 2 parallel fax channels with LANCAPI ('fax group 3' without use of CAPI Faxmodem), item no. 61425
Accessories	
LANCOM WLC-4006	LANCOM WLAN Controller for central management of 6 or 12 LANCOM access points and WLAN routers, item no. 61367
LANCOM WLC-4006 (UK)	LANCOM WLAN Controller for central management of 6 or 12 LANCOM access points and WLAN routers, item no. 61368 for UK
LANCOM WLC-4025+	LANCOM WLAN Controller for central management of 25 (opt. up to 100) LANCOM access points and WLAN routers, item no. 61378
LANCOM WLC-4025+ (UK)	LANCOM WLAN Controller for central management of 25 (opt. up to 100) LANCOM access points and WLAN routers, item no. 61379 for UK
LANCOM WLC-4100	LANCOM WLAN Controller for central management of 100 (opt. up to 1000) LANCOM access points and WLAN routers, item no. 61369
LANCOM WLC-4100 (UK)	LANCOM WLAN Controller for central management of 100 (opt. up to 1000) LANCOM access points and WLAN routers, item no. 61377 for UK
External antenna	AirLancer Extender O-30 2.4 GHz outdoor antenna, item no. 60478
External antenna	AirLancer Extender O-70 2.4 GHz outdoor antenna, item no. 60469
External antenna	AirLancer Extender O-9a 5 GHz outdoor antenna, item no. 61220
External antenna	AirLancer Extender O-18a 5 GHz outdoor antenna, item no. 61210
External antenna*	AirLancer Extender O-D80g 2.4 GHz 'dual linear' polarisation diversity outdoor sector antenna, item no. 61221
External antenna*	AirLancer Extender O-D60a 5 GHz 'dual linear' polarisation diversity outdoor sector antenna, item no. 61222
External antenna	AirLancer Extender O-360ag dualband omnidirectional outdoor antenna, item no. 61223
External antenna	AirLancer Extender I-60ag dualband indoor sector antenna, item no. 61214
External antenna	AirLancer Extender I-180 omnidirectional 2.4 GHz indoor antenna, item no. 60914
External antenna*	AirLancer Extender O-D9a 5 GHz 'dual linear' polarisation diversity outdoor antenna, item no. 61224
Antenna cable	AirLancer cable NJ-NP 3m antenna cable extension for connection with LANCOM outdoor antennas, item no. 61230
Antenna cable	AirLancer cable NJ-NP 6m antenna cable extension for connection with LANCOM outdoor antennas, item no. 61231
Antenna cable	AirLancer cable NJ-NP 9m antenna cable extension for connection with LANCOM outdoor antennas, item no. 61232
Surge arrester (antenna cable)	AirLancer Extender SA-5L surge arrester (2.4 and 5 GHz), to be integrated between Access Point and antenna, item no. 61553
Surge arrester (LAN cable)	AirLancer Extender SA-LAN surge arrester (LAN cable), item no. 61213

# LANCOM 1821n Wireless

Scope of features: as of LCOS version 8.5x

Accessories	
Documentation	LANCOM LCOS Reference Manual (DE), item no. 61700
19" Rack Mount	19" rackmount adapter, item no. 61501
Analog modem backup/serial adapter	LANCOM Serial Adapter Kit, item no. 61500
VPN Client Software	LANCOM Advanced VPN Client for Windows XP, Windows Vista, Windows 7, single license, item no. 61600
VPN Client Software	LANCOM Advanced VPN Client for Windows XP, Windows Vista, Windows 7, 10 licenses, item no. 61601
VPN Client Software	LANCOM Advanced VPN Client for Windows XP, Windows Vista, Windows 7, 25 licenses, item no. 61602
VPN Client Software	LANCOM Advanced VPN Client for Mac OS X (10.5 Intel only, 10.6 or higher), single license, item no. 61606
VPN Client Software	LANCOM Advanced VPN Client for Mac OS X (10.5 Intel only, 10.6 or higher), 10 licenses, item no. 61607
*) Note	The Polarization Diversity antennas require 2 cables and surge arrestors
Item numbers	
LANCOM 1821n Wireless (EU)	61380
LANCOM 1821n Wireless (UK)	61381

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