



LANCOM OAP-54-1 Wireless Bridge Kit

Dual Band Outdoor Bridge Kit for wireless links "out of the box"

- Two LANCOM OAP-54-1 Wireless access points with integrated antenna
- Antenna gain: 2.4 GHz: 13.5 dBi, 5 GHz: 15.5 dBi
- Two LAN-side surge-protection adapters
- Up to 4000 mW EIRP permitted transmission power in the 5 GHz band
- Professional management functions, VLAN and QoS
- Extremely robust IP-66 protective housing
- Temperature range -30°to +70°Celsius
- Mounting material included

LANCOM
Systems

The LANCOM Outdoor Wireless Bridge Kit consists of two LANCOM OAP-54-1 Wireless Access Points with integrated antennas and two LAN-side surge-protection adapters. This kit is ideal for establishing reliable, high-performance point-to-point bridges. The surge-protection adapters protect the local network components from power surges and they are PoE compatible.

Compact and versatile.

The internal wireless LAN module in the LANCOM OAP-54-1 operates at either 2.4 GHz or 5 GHz. Due to the antenna integrated into the lid the access point offers a compact and cost-effective solution for point-to-point bridges. Permitted transmission powers of up to 4000 mW EIRP in the 5 GHz band allow point-to-point wireless links to operate even over several kilometers.

Security and reliability.

LANCOM guarantees you communications with the highest standards of security with an extensive range of encryption and authentication mechanisms. With the aid of Multi-SSID and protocol filters, up to 8 different user groups can each be assigned different levels of security. VLAN technology, matured quality-of-service functions and bandwidth limitation enable the reliable transmission of video and multimedia data streams. The OAC has been designed for environments where the demands on stability and robustness are high. However, the device should not be installed in salt water environments without a suitable protective housing.

Professional management.

LANCOM's WLAN management tools offer real benefits to network administrators for the installation, control and monitoring of access points. Supplied with the product, LANmonitor helps to optimize the alignment of point-to-point links, aids diagnosis, and offers network monitoring. LANCOM WLANmonitor gives you a complete overview of all WLAN networks and clients within range; LANconfig has convenient functions for the remote configuration of APs individually or in groups, and it has functions for managing large-scale projects.

Extensive range of accessories.

The LANCOM OAP-54-1 Bridge Kit is shipped with a full set of accessories including mounting materials, outdoor cables and the appropriate standards-compliant 802.3af PoE adapter. The LANCOM Outdoor Installation Guide provides all the necessary information for professional outdoor planning and installation, as well as the appropriate measures for lightning and surge protection. The external antenna connectors allow different types of LANCOM antennas to be used. See the Antenna Distance Calculator at www.lancom.eu for an initial overview of potential ranges and speeds of data transfer.

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!

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Scope of features: as of LCOS version 7.8x

WLAN	
Frequency band 2.4 GHz or 5 GHz	2400-2483.5 MHz (ISM) or 5150-5825 MHz (depending on country-specific restrictions)
Antenna Gain	13.5 dBi in 2.4 GHz, 15.5 dBi in 5 GHz
HPBW	2.4 GHz: 30°horizontal, 40°vertical 5 GHz: 17.5°horizontal, 15,5°vertical
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, Super A/G with Turbo Mode (108 Mbps), bursting, compression
Data rates 802.11a/ h	54 Mbps to IEEE 802.11a/h (fallback to 48, 36 , 24, 18, 12, 9, 6 Mbps, Automatic Rate Selection), Super A/G with Turbo Mode (108 Mbps), bursting, compression, fully compatible with TPC (adjustable power output) and DFS (automatic channel selection, radar detection) according to ETSI regulations.
Range (outdoor / P2P)	More than 20 km in 5 GHz. See our LANCOM Antenna Distance Calculator under www.lancom.de
Max. radiated power (EIRP), 2.4 GHz band	802.11b/g: Up to 20 dBm / 100 mW EIRP (transmission power control according to TPC or manual settings)
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: -95 dBm @ 1 Mbps, -89 dBm @ 11 Mbps; 802.11g: -90 dBm @ 6 Mbps, -73 dBm @ 54 Mbps
Reception sensitivity 5 GHz	802.11a/h: -88 dBm @ 6 Mbps, -71 dBm @ 54 Mbps;
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 DFS2 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)
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
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)
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)

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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 router	Use of the LAN connector for simultaneous DSL over LAN, IP router, NAT/Reverse NAT (IP masquerading) DHCP server, DHCP client, DHCP relay server, DNS server, PPPoE client (incl. Multi-PPPoE), PPTP client and server, NetBIOS proxy, DynDNS client, NTP, port mapping, policy-based routing based on routing tags, tagging based on firewall rules, dynamic routing with RIPv2, VRRP
WLAN client	Transparent client bridge mode from LANCOM Access Points
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
Quality of Service	
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
Security	
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
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
Password protection	Password-protected configuration access can be set for each interface
Alerts	Alerts via e-mail, SNMP-Traps and SYSLOG
WLAN protocol filters	Limitation of the allowed transfer protocols, source and target addresses on the WLAN interface
Reset Plug	Adjustable reset 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
High availability / redundancy	
FirmSafe	For completely safe software upgrades thanks to two stored firmware versions, incl. test mode for firmware updates
Routing functions	
Router	IP and NetBIOS/IP multi-protocol router
ARP lookup	Packets sent in response to LCOS service requests (e.g. for Telnet, SSH, SNMP, SMTP, HTTP(S), SNMP, etc.) via Ethernet can be routed directly to the requesting station (default) or to a target determined by ARP lookup
Advanced Routing and Forwarding	Separate processing of 8 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
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

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Routing functions	
NetBIOS	NetBIOS/IP proxy
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
COM port server	
COM port forwarding	COM-port server for the DIN interface. For a serial device connected to it, the server manages its own virtual COM port 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
LAN protocols	
IP	ARP, proxy ARP, BOOTP, DHCP, DNS, HTTP, HTTPS, IP, ICMP, NTP/SNTP, NetBIOS, PPPoE (server), RADIUS, RIP-1, RIP-2, RTP, SIP, SNMP, TCP, TFTP, UDP, VRRP, VLAN
Bridge Redundancy	802.1d Spanning Tree and 802.1w Rapid Spanning Tree support for dynamic path selection with redundant layer 2 connections
WAN protocols	
Ethernet	PPPoE, Multi-PPPoE, ML-PPP, PPTP (PAC or PNS) and plain Ethernet (with or without DHCP), RIP-1, RIP-2, VLAN, IP
Interfaces	
LAN	10/100Base-TX, autosensing, auto node hub, PoE compliant with IEEE 802.3af
Serial interface	Serial configuration interface / COM port (10 pin): 9,600 - 115,000 baud
External antenna connectors	Two N connectors(Main and Aux) for external LANCOM AirLancer Extender antennas or for antennas from other vendors. Integrated RF Switch in Main connector. When an external antenna is connected, the internal antenna is automatically disconnected. 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 www.lancom-systems.com
Management	
LANconfig	Configuration program for Microsoft Windows, incl. convenient Setup Wizards. Optional group configuration, simultaneous remote configuration and management of multiple devices over IP connection (HTTPS, HTTP, TFTP). 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
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
WLANmonitor	Monitoring application for Microsoft Windows for the visualization and monitoring of LANCOM WLAN installations, incl. Rogue AP and Rogue Client visualization
Firewall 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)
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
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
User administration	RADIUS user administration for dial-in access (PPP/PPTP). Support for RADSEC (Secure RADIUS) providing 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

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Management	
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
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
SNMP	SNMP management via SNMP V2, 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
CLI	Configuration via command line
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)
Statistics	
Statistics	Extensive Ethernet, IP and DNS statistics; SYSLOG error counter, WLAN statistics
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	Via Power over Ethernet, compliant with IEEE 802.3af, 2 x PoE Injectors supplied
Environment	-30°C to +70°C at 95% max. humidity (non condensing)
Housing	Robust metal housing, IP 66 protection rating, ready for wall and pole mounting, 3 LEDs for status display, please note: device must not be mounted in salt water environments without a suitable protective housing
Power consumption (max)	ca. 9 Watts
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 1.4.1 (incl. DFS 2)
Notifications	Certifications notified in Germany, Belgium, Netherlands, Luxembourg, Austria, Switzerland, UK, Italy, Spain, France, Portugal, Czech Republic, Denmark
Package content	
Manual	Printed User Manual (DE, EN), Quick Installation Guide (DE/EN/FR/ES/IT/PT/NL), LANCOM Outdoor Guide
CD	CD with firmware, management software (LANconfig, LANmonitor, WLANmonitor) and documentation
Cable	Serial configuration cable, 10 pins
Reset plug	Plug for resetting the device via serial interface
Cable	2 x UV-resistant CAT 5 cables with water-resistant screw connectors at one end, 15m
Access Points	2 x OAP-54-1 Wireless
Surge arrestor (LAN cable)	2 x AirLancer Extender SA-LAN surge arrestors for the LAN cable
Mounting Kit	Mounting kit for wall and pole mounting
Power supply unit	Via Power over Ethernet compliant with IEEE 802.3af, two PoE Injectors included
Support	
Warranty	3 years Support via Hotline and Internet KnowledgeBase
Software updates	Regular free updates (LCOS operating system and management tools) via Internet
Options	
Advance Replacement	LANCOM Next Business Day Service Extension OAP, item no. 61412
Warranty Extension	LANCOM 2-Year Warranty Extension OAP, item no. 61415
Public Spot	LANCOM Public Spot Option (authentication and accounting software for hotspots, incl. Voucher printing through Standard PC printer), Item no. 60642.

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Accessories	
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
Antenna cable	AirLancer cable NJ-NP 3m antenna cable extension, item no. 61230
Antenna cable	AirLancer cable NJ-NP 6m antenna cable extension, item no. 61231
Antenna cable	AirLancer cable NJ-NP 9m antenna cable extension, item no. 61232
Documentation	LANCOM LCOS Reference Manual (DE), item no. 61700
*) Note	The Polarization Diversity antennas require 2 cables and surge arrestors
Item numbers	
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