

# LANCOM XS-5116QF

**Managed 10G fiber aggregation switch for mid-sized distributed networks**



This 10G aggregation switch offers future-proof fiber-optics performance and acts as a superordinated instance in distributed networks and provides high-performance 14 SFP+ ports for aggregating access switches and further 2 QSFP+ ports. Professional redundancy functionalities and two hot-swappable power supplies guarantee fail-safe operations. Thanks to the holistic LANCOM network management the device can be configured dynamically and automatically via the LANCOM Management Cloud (LMC) or via cloud-enabled web GUI, and even via cloud-enabled CLI.

- Multi-gigabit aggregation switch with 14x 10G SFP+ downlink ports, thereof 2x multi-Gigabit combo ports (SFP+ or 1G / 2.5G / 5G / 10G nBASE-T); 2x 40G QSFP+ uplink or stacking ports
- Full layer 3 functionality through VRRP, DHCP, static and policy-based dynamic routing via OSPF v2/v3
- Backplane stacking via uplink ports
- 2x hot-swappable PSU for maximum reliability
- Front-to-back airflow for optimal cooling in 19" racks
- Security with configurable access control on all ports as per IEEE 802.1X and access control lists
- Secure remote management through TACACS+, SSH, SSL, and SNMPv3
- Industry standard CLI
- Cloud-managed LAN and switch stacking for quick configuration and convenient management via the LMC
- Limited Lifetime Warranty (LLW) included



# LANCOM XS-5116QF

## Flexible network topologies

The LANCOM XS-5116QF is an ideal aggregation instance for the networking of access switches. Depending on the size of the installation, it integrates into the network topology either at the top level facing the WAN (2-tier design) or at the second level between a core switch and the access switches (3-tier design).

## Maximum performance on all ports

With its fiber-optics and multi-Gigabit Ethernet (mGbE) ports, the LANCOM XS-5116QF offers future-proof port performance for resilient networks that meet the increasing demands occurring from increasingly powerful clients, a growing number of IoT devices, and cloud applications. 14 SFP+ ports (10G), 2 of which can be used as mGbE combo ports, serve as a high-performance distribution instance for establishing switch structures. A powerful uplink featuring 2x QSFP+ ports (40G), which can alternatively be used for stacking, makes the LANCOM XS-5116QF the ideal solution for mid-sized distributed networks with high performance requirements.

## Flexibility thanks to stacking technology

Keep your network flexible with stacking and protect your investment. Stacking makes child's play of expanding your network, as several physical switches combine into a single logical unit for convenient maintenance and management. When you expand your network, the new switch automatically receives a configuration from the stack master and is ready to use within seconds. Furthermore, device or network redundancies can be implemented with stacking for maximum reliability. With the LANCOM XS-5116QF, stack processing with a separate backplane CPU remains independent of network load thanks to the QSFP+ uplink ports.

## Configurable access control

The LANCOM XS-5116QF stops rogue clients from gaining unauthorized access to the network. This is ensured by secured access control on all ports as per IEEE 802.1X (port-based, single, multi, and MAC-based) or by ACLs (access control lists).

## Full layer 3 functionality

The LANCOM XS-5116QF is capable of performing layer 3 tasks such as DHCP server functionality, i.e. IP address management, or the predefinition of network routes across one or more network segments. Thanks to dynamic routing, the switch can also react quickly to network changes. The optimal route for data traffic within the network is thus constantly redefined by the LANCOM XS-5116QF based on the load level. This results in a load reduction on the router, so that these capacities are then additionally available for handling external data traffic and increase the efficiency of the entire network.

## High operational security

The LANCOM XS-5116QF features two integrated hot-swappable PSUs (power supply units). This allows a quick and uninterrupted replacement of defective power supply units. Front-to-back airflow design improves cooling in 19-inch racks and extends the product lifetime. Stacking is a major contribution to highly resilient scenarios.



# LANCOM XS-5116QF

## **Cloud-managed LAN and switch stacking**

With the LANCOM Management Cloud, the XS-5116QF offers quick and easy network integration as well as automatic provision of the configuration across locations with the click of a mouse. Cloud-managed LAN replaces the configuration of individual devices and enables automatic assignment of VLANs to switch ports. Cloud-managed switch stacking also enables convenient management and monitoring of the entire stack. Learn more in the Design guide switch stacking.

## **„IT Security made in Germany“**

As a holder of the "IT Security made in Germany" trust mark, LANCOM is committed to keeping its products free of secret backdoors. This makes the LANCOM switches ideal for operation in sensitive environments and always in accordance with General Data Protection Regulations (GDPR).

## **Secure remote management**

Secure communication protocols such as SSH, SSL and SNMPv3 mean that the LANCOM XS-5116QF is ideal for the professional management of remote networks. The switch also supports the TACACS+ protocol for authentication, authorization and accounting. This optimized solution promises maximum security for multi-site network management and monitoring.

## **Secure Terminal Access**

This function provides access to the command line of the LANCOM switch ("CLI tunneling") directly from the LANCOM Management Cloud—encrypted and without leaving the cloud interface. Be it trace or ping commands for rapid troubleshooting, access to low-level configuration parameters and detailed statistics in the LCOS SX operating system, or secure remote access to third-party devices in the local network via the integrated SSH client—Secure Terminal Access offers expert functions and extensive diagnostic and troubleshooting commands on your devices.

## **Limited Lifetime Warranty (LLW)**

This enterprise switch is covered ex works by the LANCOM Limited Lifetime Warranty. Regardless of the operating time, the replacement service is valid until the End of Life status of the device (max. 10 years). For next-business-day delivery of a replacement device, we recommend LANcare NBD Replacement as well as LANcare Direct Advanced in 24/7 or 10/5 variants. LANcare Direct Advanced also offers technical manufacturer support with guaranteed service and response times.



# LANCOM XS-5116QF

## Security

Secure Shell Protocol (SSH)	SSH for a secure remote configuration
Secure Sockets Layer (SSL)	SSL to encrypt HTTP connections; advanced security for browser-based configuration via web interface
IEEE 802.1X	IEEE 802.1X access control on all ports; RADIUS for authentication, authorization and accounting with e.g. MD5 hashing; guest VLAN; dynamic VLAN assignment
Private VLAN edge	Layer 2 isolation between clients in the same VLAN ("protected ports"); support multiple uplinks
Port security	Locking of MAC addresses to ports; limiting of the number of learned MAC addresses
IP source guard	Blocking access for illegal IP addresses on specific ports
Access-control-lists	Drop or rate limitation of connections based on source and destination MAC addresses, VLAN ID, IP address (IPv4/IPv6), protocol, port, DSCP/IP precedence, TCP/UDP source and destination ports, IEEE 802.1p priority, ICMP packets, IGMP packets, TCP flag. Support of 1023 ACEs (max. rules per list) per ACL and up to 2800 entries in total.
RADIUS/TACACS+	Authentication, authorization and accounting of configuration changes by RADIUS or TACACS+
Storm Control	Multicast/Broadcast/Unicast storm suppression
Isolated Group	Allows certain ports to be designated as protected. All other ports are non-isolated. Traffic between isolated group members is blocked. Traffic can only be sent from isolated group to non-isolated group.
DHCP Snooping	Protection against rogue DHCP servers on the network - Outgoing DHCP-server packets are only allowed on specific ports.
Dynamic ARP Inspection	Dynamic ARP Inspection to prevent man-in-the-middle attacks incl. proxy ARP
ARP Request Poisoning	Protection against ARP Request Poisoning (ARP Spoofing)
IPv6 First Hop	IPv6 First Hop Security by Snooping Guard, DHCPv6 Guard, Source Guard, Prefix Guard
Denial-of-Service	Protection against Denial-of-Service attacks to prevent the loss of important protocol functions

## Performance

Switching technology	Store and forward with latency less than 4 microseconds
MAC addresses	Support of max 32K MAC addresses
Throughput	Max. 440 Gbps on the backplane
Maximum packet processing	327 million packets per second (mpps) at 64-byte packets
VLAN	Port based and IEEE 802.1q tag based VLAN with up to 4,093 VLAN; Supports ingress and egress packet filter in port based VLAN
Jumbo frame support	Jumbo frame support with up to 12288 bytes



# LANCOM XS-5116QF

## Performance

Packet Buffer	4 MB
---------------	------

## Layer 3 features

Number of L3 interfaces	up to 128
Static routing (IPv4/IPv6)	Hardware based static routing (IPv4/IPv6) with a number of 16,000 possible routes
DHCP Server	DHCP Server per VLAN, max. 16 pools
VRRP	Virtual Router Redundancy Protocol
Dynamic routing (IPv4/IPv6)	dynamic routing by OSPFv2 and OSPFv3
Protocol Independent Multicast	PIM-Sparse mode (PIM-SM) and PIM-Dense mode (PIM-DM)
Source specific multicast	Source specific multicast (SSM) for IP

## Layer 2 switching

Spanning Tree Protokoll (STP) / Rapid STP / Multiple STP / PVST	Standard Spanning Tree according to IEEE 802.1d with fast convergence support of IEEE 802.1w (RSTP); using Multiple Spanning Tree instances by default according to IEEE 802.1s (MSTP), PVST with up to 8 instances
Link Aggregation Control Protocol (LACP)	Support of 64 groups containing up to 8 ports each according to IEEE 802.1ax
VLAN	Support for up to 4K VLANs simultaneously (out of 4093 VLAN IDs); matching due to port, IEEE 802.1q tagged VLANs, MAC addresses, IP subnet and Private VLAN Edge function ("protected ports")
Voice VLAN	Voice traffic is automatically assigned to a voice-specific VLAN and treated with appropriate levels of QoS
IGMP multicasts	IGMP v1, v2, v3 to limit bandwidth-intensive multicast traffic to ports with requesters; supports 1024 multicast groups; source-specific multicasting
IGMP querier	Support of multicast domains of snooping switches in the absence of a multicast router
IGMP Snooping	IGMP Snooping to identify multicast groups and prevent unnecessary traffic
IGMP proxy	IGMP proxy to pass IGMP messages through
MLD v1/v2	Multicast Listener Discovery - IPv6 multicast packets are transmitted to interested listeners only
Generic VLAN registration	VLAN registration with GVRP according to IEEE 802.1q for automatic delivery of VLANs in bridged domains
DHCP Relay Agent	Relay of DHCP broadcast request to different LANs
Supported DHCP options	all options listed in RFC2132



# LANCOM XS-5116QF

## Stacking

Stacking Option	Stacking via Uplink ports (2x 40G)
-----------------	------------------------------------

## Interfaces

Ethernet	→ 12 SFP+-Ports 1/10 GBit/s → 2 10GbE-Combo-Ports 1000/2500/5000/10000 MBit/s Ethernet → 2 QSFP+-Ports 40 GBit/s → 16 concurrent Ethernet ports in total
----------	---

Console port	Micro-USB and RJ45 configuration port for command line access
--------------	---

## Management and monitoring

Management	LANconfig, WEBconfig, LANCOM Management Cloud, Industry Standard CLI
Command Line Interface (CLI)	Configuration and status display from the command line with console application and direct connection to console port, via Telnet or SSH
Monitoring	LANmonitor, LANCOM Management Cloud
Remote Monitoring	Integrated RMON software agent supports 4 RMON groups (history, statistics, alarms and events) for enhanced traffic management, monitoring and analysis
Port Mirroring	Traffic can be mirrored from on port to another for investigation with network analyzer or RMON probe. Up to 13 ports can be mirrored to a single mirror port. Single sessions can be selected
Security	Access rights (read/write) can be set up separately, access control list
SNMP	SNMP management via SNMPv1, v2c or v3 with support of traps. User-based security model for SNMPv3 (USM)
Diagnosis	Diagnosis from the switch with PING and cable diagnosis
Firmware update	→ Update via WEBconfig and browser (HTTP/HTTPS) → Update via TFTP, SCP, and LANconfig → Update via LANCOM Management Cloud → Dual firmware image to update during operation
Secure Copy	Securely import and export files
DHCP client	Automatic assignement of the management IP address by DHCP
SNTP	Automatic time settings with Simple Network Time Protocol (SNTP)
s-flow v5	Standard for monitoring of high-speed-networks. Visualization of network use, accounting an analysis to protect your network against dangers

## Hardware

Weight	13.23 lbs (6.0 kg)
--------	--------------------



# LANCOM XS-5116QF

## Hardware

Power supply	Two bays for swappable power supply units (100 – 240 V, 50 – 60 Hz)
Environment	Temperature range 0 – 40° C; humidity 10 – 90%; non-condensing
Housing	Robust metal housing, 19" 1U (442 x 44 x 375 mm > W x H x D) with removable mounting brackets, network connectors on the front
Fans	2
Power consumption (max)	46 W
Power consumption (idle)	28 W
Acoustic noise (typ.)	40 dBa
Heat power (max)	157 BTU/h

## Software

LCOS version	based on LCOS SX 5.20
Lifecycle Management	After discontinuation (End of Sale), the device is subject to the LANCOM Lifecycle Management. Details can be found at: <a href="http://www.lancom-systems.com/lifecycle">www.lancom-systems.com/lifecycle</a>
Anti-backdoor policy	Products from LANCOM are free of hidden access paths (backdoors) and other undesirable features for introducing, extracting or manipulating data. The trust seal "IT Security made in Germany" (ITSMIG) and certification by the German Federal Office for Information Security (BSI) confirm the trustworthiness and the outstanding level of security

## Declarations of conformity\*

Europe/EFTA	CE
North America	FCC/IC
Australia / New Zealand	ACMA
*) Note	The full text of the specific Declaration of Conformity is available at the following Internet address: <a href="http://www.lancom-systems.com/doc">www.lancom-systems.com/doc</a>

## Supported IEEE standards

IEEE 802.1AB	Link Layer Discovery Protocol (LLDP)
IEEE 802.1AB	LLDP-MED
IEEE 802.1ad	Q-in-Q tagging
IEEE 802.1ak	MRP and MVRP - Multiple Registration Protocol and Multiple VLAN Registration Protocol
IEEE 802.1d	MAC Bridging



# LANCOM XS-5116QF

## Supported IEEE standards

IEEE 802.1d	Spanning Tree
IEEE 802.1p	Class of Service
IEEE 802.1q	VLAN
IEEE 802.1s	Multiple Spanning Tree Protocol (MSTP)
IEEE 802.1w	Rapid Spanning Tree Protocol (RSTP)
IEEE 802.1X	Port Based Network Access Control
IEEE 802.3	10Base-T Ethernet
IEEE 802.3ab	1000Base-TX Ethernet
IEEE 802.1ax, incl. 802.3ad	Link Aggregation Control Protocol (LACP)
IEEE 802.3ae	10 Gigabit Ethernet over fiber
IEEE 802.3an	10GBASE-T Ethernet
IEEE 802.3ba, 40G	40GBase-X Ethernet
IEEE 802.3u	100Base-T Ethernet
IEEE 802.3x	Flow Control
IEEE 802.3z	1000Base-X Ethernet
IEEE 802.3ac	VLAN tagging
IEEE 802.3bj-CL91	Forward Error Correction (FEC)
IEEE 802.1ak	Multiple Registration Protocol (MRP)
IEEE 802.1as	Timing and Synchronization for Time-Sensitive LANs
IEEE 802.1Qat	Multiple Stream Reservation Protocol (MSRP)
IEEE 802.1Qav	Forwarding and Queuing Enhancements for Time-Sensitive Streams
IEEE 802.1Qbb	Priority-based Flow control
IEEE 802.1v	Protocol-based VLANs

## Supported RFC standards

RFC 854	Telnet Protocol Specification
---------	-------------------------------





# LANCOM XS-5116QF

## Supported RFC standards

RFC 1213	MIB II
RFC 1493	Bridge MIB
RFC 1534	Interoperation between DHCP and BootP
RFC 2021	Remote Network Monitoring MIB v2 (RMONv2)
RFC 2233	Interface MIB
RFC 2453	Routing Information Protocol - RIPv2
RFC 2460	Internet Protocol Version 6 (IPv6)
RFC 2613	SMON MIB
RFC 2618	RADIUS Authentication Client MIB
RFC 2674	IEEE 802.1p and IEEE 802.1q Bridge MIB
RFC 2737	Entity MIB v2
RFC 2818	Hypertext Transfer Protocol Secure (HTTPS)
RFC 2819	Remote Network Monitoring MIB (RMON)
RFC 2863	Interface Group MIB using SMIv2
RFC 2933	IGMP MIB
RFC 3273	RMON Groups 1,2,3 and 9
RFC 3414	User based Security Model for SNMPv3
RFC 3415	View based Access Control Model for SNMP
RFC 3587	IPv6 Global Unicast Address Format
RFC 3636	IEEE 802.3 MAU MIB
RFC 3973	Protocol Independent Multicast -Dense mode (PIM-DM) (supports both IPv4 and IPv6)
RFC 4251	The Secure Shell Protocol Architecture (SSH)
RFC 4291	IP Version 6 Addressing Architecture
RFC 4443	Internet Control Message Protocol (ICMPv6)
RFC 4541	IGMP Snooping and MLD Snooping



# LANCOM XS-5116QF

## Supported RFC standards

RFC 4541	IGMP- and MLD-Snooping
RFC 4601	Protocol Independent Multicast -Sparse mode (PIM-SM) (supports both IPv4 and IPv6)
RFC 5171	Unidirectional Link Detection Protocol (UDLD)
RFC 5519	Multicast Group Membership Discovery MIB

## Scope of delivery

Manual	Hardware Quick Reference (DE/EN), Installation Guide (DE/EN)
Cable	Serial configuration cable, 1.5m
Cable	Micro-USB configuration cable, 1.0m
Cable	IEC power cord
Power supply	1 hot-swappable power supply
19" brackets	Two 19" brackets for rackmounting
19" rack rails	LANCOM Switch rack mount rails

## Support

Warranty extension	LANCOM Limited Lifetime Warranty – replacement service up to the End of Life status of the device (maximum 10 years). For details, please refer to the service and support conditions at: <a href="http://www.lancom.de/www.lancom-systems.com/support-conditions">www.lancom.de/www.lancom-systems.com/support-conditions</a> and in the LLW info paper at <a href="http://www.lancom-systems.com/infopaper-llw">www.lancom-systems.com/infopaper-llw</a>
Security Updates	Up to the End of Life of the device (see <a href="http://www.lancom-systems.com/product-tables">www.lancom-systems.com/product-tables</a> )
Software Updates	Regular free updates including new features as part of the LANCOM Lifecycle Management ( <a href="http://www.lancom-systems.com/lifecycle">www.lancom-systems.com/lifecycle</a> )
Manufacturer support	For LANcommunity partners up to the End of Life of the device. For end customers with LANcare Direct or LANcare Premium Support during the LANcare validity
LANcare Direct 24/7 Advanced XL	Direct, prioritized 10/5 manufacturer support incl. 24/7 emergency hotline and security updates for the device, NBD advance replacement with delivery of the device on the next business day (24/7/NBD), guaranteed first response times (SLA) of max. 30 minutes for reporting massive operational disruptions by telephone (priority 1) and max. 4 hours for all other concerns (priority 2), term-based for 1, 3, or 5 years (item no. 10785, 10786 or 10787)
LANcare Direct 24/7 XL	Direct, prioritized 10/5 manufacturer support incl. 24/7 emergency hotline and security updates for the device, guaranteed first response times (SLA) of max. 30 minutes for reporting massive operational disruptions by telephone (priority 1) and max. 4 hours for all other concerns (priority 2), term-based for 1, 3, or 5 years (item no. 10761, 10762 or 10763)



# LANCOM XS-5116QF

## Support

LANcare Direct Advanced 10/5 XL	Direct, prioritized 10/5 manufacturer support and security updates for the device, NBD advance replacement with delivery of the device on the next business day (10/5/NBD), guaranteed first response times (SLA) of max. 2 hours for reporting massive operational disruptions by telephone (priority 1) and max. 4 hours for all other concerns (priority 2), term-based for 1, 3, or 5 years (item no. 10773, 10774 or 10775)
LANcare Direct 10/5 XL	Direct, prioritized 10/5 manufacturer support and security updates for the device, guaranteed first response times (SLA) of max. 2 hours for reporting massive operational disruptions by telephone (priority 1) and max. 4 hours for all other concerns (priority 2), term-based for 1, 3, or 5 years (item no. 10749, 10750 oder 10751)
LANcare NBD Replacement XL	Addition of the Limited Lifetime Warranty with NBD advance replacement with delivery of the device on the next business day in case of hardware defect, item no.61323

## LANCOM Management Cloud

LANCOM LMC-C-1Y LMC License	LANCOM LMC-C-1Y License (1 Year), enables the management of one category C device for one year via the LANCOM Management Cloud, item no. 50106
LANCOM LMC-C-3Y LMC License	LANCOM LMC-C-3Y License (3 Years), enables the management of one category C device for three years via the LANCOM Management Cloud, item no. 50107
LANCOM LMC-C-5Y LMC License	LANCOM LMC-C-5Y License (5 Years), enables the management of one category C device for five years via the LANCOM Management Cloud, item no. 50108

## Accessories\*

1000Base-SX SFP transceiver module	LANCOM SFP-SX-LC1, item no. 61556
1000Base-SX SFP transceiver module	LANCOM SFP-SX2-LC1, item no. 60183
1000Base-LX SFP transceiver module	LANCOM SFP-LX-LC1, item no. 61557
1000Base-LX SFP BiDi transceiver module	LANCOM SFP-BiDi1550-SC1, item no. 60201
10GBase-SX SFP transceiver module	LANCOM SFP-SX-LC10, item no. 61485
10GBase-LX SFP transceiver module	LANCOM SFP-LX-LC10, item no. 61497
10GBase-LX SFP transceiver module	LANCOM SFP-LR40-LC10, item no. 60182
10GBase-LX SFP BiDi transceiver module	LANCOM SFP-BiDi1310-LC10, item no. 60202
10G multi gigabit Ethernet copper module	LANCOM SFP-CO10-MG, Art.-Nr.: 60170, max. 4 modules to be used simultaneously due to increased power consumption and associated heat
40GBase-SX SFP transceiver transceiver module	LANCOM SFP-SR-MPO40, Art.-Nr.: 60173
40GBase-LX SFP transceiver module	LANCOM SFP-LR-LC40, Art.-Nr.: 60174



# LANCOM XS-5116QF

## Accessories\*

10G Direct Attach Cable 1m	LANCOM SFP-DAC10-1m, Art.-Nr.: 61495
10G Direct Attach Cable 3m	LANCOM SFP-DAC10-3m, Art.-Nr.: 60175
40G Direct Attach Cable 1m	LANCOM SFP-DAC40-1m, Art.-Nr.: 60176
40G Direct Attach Cable 3m	LANCOM SFP-DAC40-3m, Art.-Nr.: 60177
Power supply (swappable)	LANCOM SPSU-250, item no. 61499 **)
LANCOM Power Cord (UK)	IEC power cord, UK plug, item no. 61650
LANCOM Power Cord (CH)	IEC power cord, CH plug, item no. 61652
LANCOM Power Cord (US)	IEC power cord, US plug, item no. 61651
LANCOM Power Cord (AU)	IEC power cord, AU plug, item no. 61653
*) Note	Support for third-party accessories (SFP and DAC) is excluded and cannot be granted
**) Note	In case of unavailability of the 250W power supply, a 550W power supply can also be enclosed

## Item number(s)

LANCOM XS-5116QF	61859
------------------	-------