# OPTICAL NETWORK FOR HOME AND OFFICE

## PRODUCTS AND SYSTEMS / INTERNATIONAL

**homefibre**

# THE NETWORK IS THE KEY TO THE DIGITAL FUTURE HOME

## CONNECTIVITY REDEFINED



Josef Faller
Managing Director

New digital services such as IP-TV, HD & UHD TV, online games, HD video telephony or 3D TV and Augmented Reality are forcing their way into the market. As a result of the massive expansion of the access networks with high bandwidths (FTTH, VDSL, etc.), system providers are increasingly offering higher quality services. In addition, personal digital content such as videos, photos, music and data are being stored at home and transmitted to several appliances. In the field of home automation, energy management and safety, systems and applications are more and more networked with PC, smart phones, tablets, voice-controlled intelligent personal assistant services and touch screens.

In the ideal network fix wired applications and mobile devices are used in an optimized way. Free frequencies are a limited resource and should only be occupied with mobile applications. Services with high bandwidth demand work best when linked to a wired network.

In order to ensure a long-term, consistent and issue free functionality of an integrated network, a stable and reliable infrastructure and transmission technology is required in the home. It should be widely available and offer the highest possible number of connection possibilities. For us at Homefibre, the ideal solution is an optical data backbone.

Together with its cooperation partners, Homefibre has set itself the goal of offering innovative products and system solutions, as well as technical support for the planning and installation, that deliver environmentally safe and reliable digital home networking.

With the Polymer Optical Fibre (POF) we use a proven technology that is ideally suited to a new and innovative infrastructure which satisfies these demands.

# ALL-IP

# APPLICATIONS AND SERVICES

Digital applications and services will be networked and connected more and more. Today IP-based Internet services are combined with an increasing number also from home internal sources (NAS).

**Smart Home - App Control**

( heating, climatisation, energy, shutter, light etc...)

**AAL**
(Ambient Assisted Living)

**Safety & Security**

**ISP**

**IP-TV**

**SAT>IP**
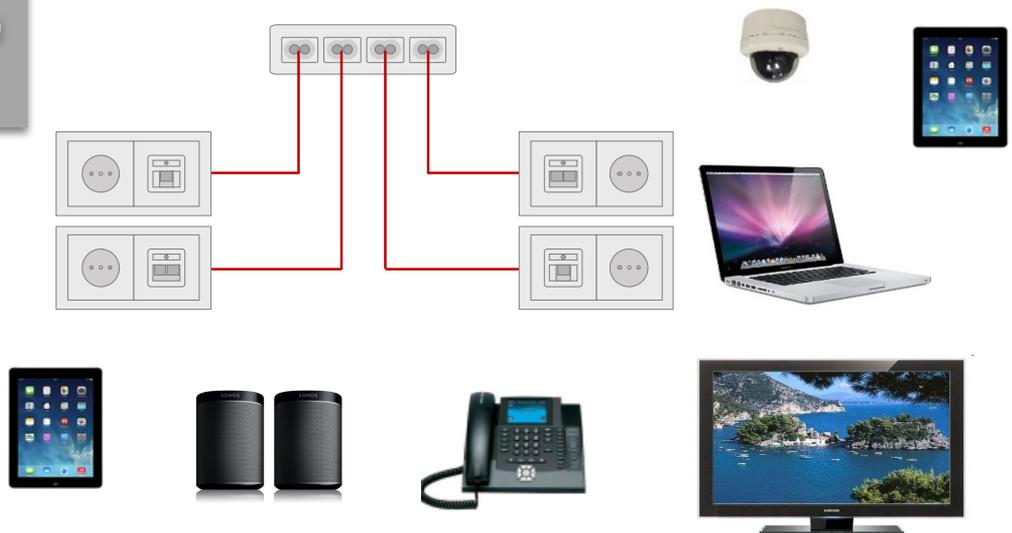
| VIDEO & AUDIO | GAMING & TELEPHONY | SMART HOME & SECURITY |
|---|---|---|
| BANDWIDTH | RELIABILITY | SECURITY |
| High Definition Video Streaming and other video services e.g. HDMI over IP need a high and reliable bandwidth. Music and radio can also be streamed via the internet and/or from an internal home audio server. Loudspeakers and other audio clients today are a capable of the IP technology as well and need to be connected to the home network. | For gaming and telephony the latency has to be constant and as small as possible. There is nothing worse than not being able to respond to the other person on the call or to react to the moves of the other players in an online game. | Due to security reasons devices like security cameras or door bells should be connected to a wired network. Smart home devices are more and more connected over wireless technologies. Also, it's common to use mobile devices for the controlling of smart home applications. These devices need an optimized WiFi coverage and fix installed devices e.g. touch panels should be hooked to a wired network. |

# THE OPTICAL IN-HOUSE BROADBAND NETWORK

With the concept of optical in-house broadband cabling, Homefibre offers a future-proof and easy installation infrastructure solution which enables the integration of computer, multimedia and home automation systems in an ideal way via Ethernet and IP (Internet protocol).

The optical cable which is made of Polymer Optical Fibre (POF) has been successfully used in the automotive sector and in the industry for many years. The POF cable is robust and can be easily installed and connected. It can be installed separately or drawn into a conduit together with the electrical installation. Every plug socket in the house can thus be inexpensively equipped with a data interface. It is also available for a data connection in all splitter boxes.

All IP-based automation systems in the house can be linked via the optical cable and integrated into one system with computers and multimedia devices.

The benefits of the Homefibre system are:

*   **reliable** and **stable** data transmission
*   **unaffected** by electromagnetic interference
*   **radiation**-**free:** no electromagnetic smog via the leads
*   **simple** and **variable** installation
*   **low power** consumption of the components
*   **lightning protected data link** due to galvanic isolated POF cable
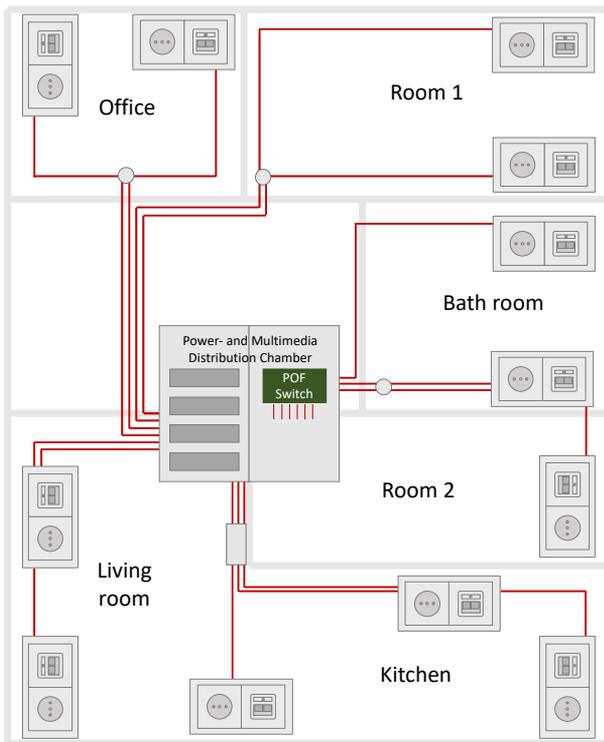






| **USER INSTALLATION** | **FOR RETROFITTING** | **FOR NEW BUILDINGS** |
| --- | --- | --- |
| EASY | FLEXIBLE | FUTURE-PROOF |
| Thanks to its simple handling the POF cable can even be installed by non-experts.<br><br>The small cable diameter allows the cable to be placed and concealed behind the skirting board or under the carpet. | The POF cable can be easily integrated into the existing electrical installation without cutting channels or drilling.<br><br>Flush-mounting plug sockets, flush-mounting switches or plug socket adapters serve as interfaces between your device and the network and can be installed as standard in your home. | In order to minimize the installation costs of a full-size home network, it is sufficient to lay an inexpensive POF cable together with the electrical cables during the initial installation. A safe optical data port can thus be prepared at each main plug socket.<br><br>With the flush-mounted optical media switches from Homefibre, the connection is converted into a standard Ethernet port with two RJ45 interfaces or a one RJ45 interface and WiFi access. |
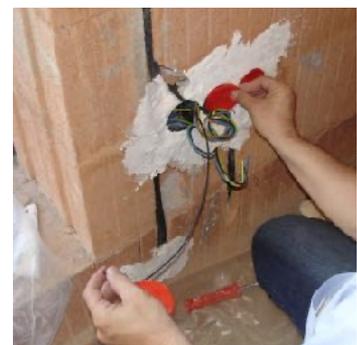
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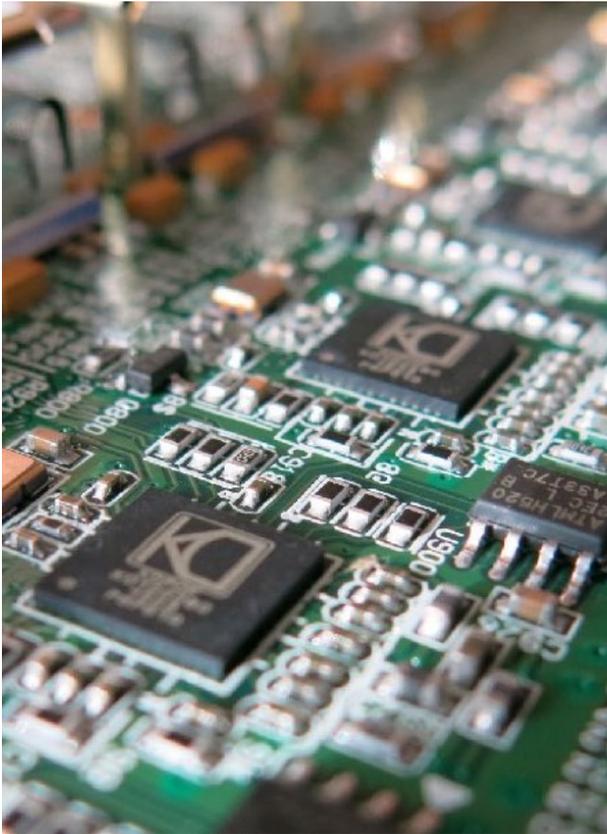
# THE TECHNOLOGY

For the optical transmission, electric signals are converted into optical signals, transmitted by light and then converted back into an electric signal by a media converter. Nowadays, red light with a wavelength of 650 nm is used for the transmission.

With the availability of Gigabit transmission over Polymer Optical Fibre (POF) the installation of powerful networks becomes much easier.

The Gigabit system components are compatible with all common devices using the international standard IEEE 802.3ab. The Gigabit technology by KDPOF makes it is possible, to transmit data with 1 Gbps over 50 m POF cable. An adaptive smaller bit rate is used for the transmission up to 80 m.

The Gigabit system components are backwards compatible to 100 Mbps components so that both device generations can be mixed in a system. In this case a transmission rate of 100 Mbps will be used by the Gigabit devices for these transmission paths.

Homefibre offers a wide range of optical media converters and optical POF switches for the installation of a network. The integration of WiFi is also possible with our innovative products.

| THE OPTICAL TRANSMISSION | TRANSMITTER AND RECEIVER | CABLE AND COMPONENTS |
|---|---|---|
| RADIATION-FREE | RELIABLE AND STABLE | LOW POWER CONSUMPTION |
| The optical transmission is unaffected by electromagnetic interference and does not conduct electricity. As a result the cable can be installed together with the electrical installation, which significantly reduces two important factors: cost and time. | The optical interfaces consist of transmitters and receivers. With the POF cable a reliable and stable connection for both transmission directions is established. | The POF cable is sturdy, has a small diameter and is very low in weight. The typical cable rating is approx. 15 dBm to 18 dBm per km. Approx. -7 dBm are measured directly at the connection. |
| The optical transmission can be tested by measuring the light intensity in dBm at both ends of the optical cable. | The optical transmission uses visible- and for human eyes safe- red light with RC-LED (Resonant Cavity Light-Emitting Diode) offering easy checking for the functionality of the connections. | The optical cable can be connected to the optical interfaces of the system components without plugs (e.g. Optolock) or with an easily fitted plug (e.g. SMI connectors) The receivers can process a signal down to -24 dBm. |

30 / 50 / 70 / 80 / 90 m POF cable
RHEE 4002 (Class A4a.2)

OMS 1021                    OMS 1021
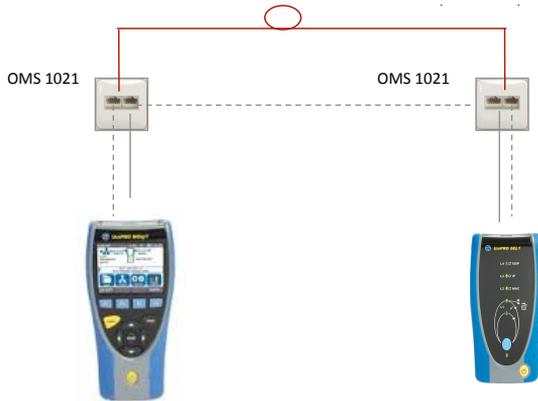
Test setup RFC2544 and SLA-tick test

# QUALITY AND COMPATIBILITY

At homefibre digital networks, products and applications are tested comprehensively in different scenarios. These tests follow international standards and procedures (e.g. RFC2544).

In these tests we verify the maximum transmission rates based on different packet sizes in data transmission.

Beside standardized test procedures we also implement the comparison of other network solutions and testing in different network scenarios and with different applications to ensure quality and compatibility.

We know that in the end only the real quality of the data and transmission connection is what counts.

| 50 METER | 60 METER | 80 METER |
|---|---|---|
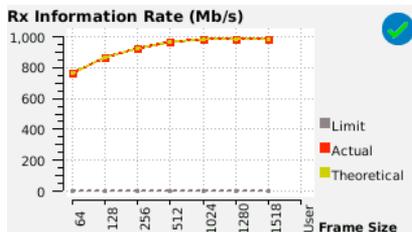






Test Nr: OMS1021_DV_TEST 001
Optical power: approx. -12.6 dBm
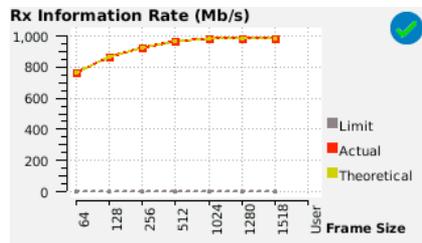
Test Nr: OMS1021_DV_TEST 008
Optical power: approx. -14.9 dBm
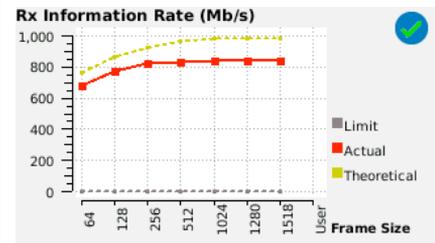
Test Nr: OMS1021_DV_TEST 014
Optical power: approx. -17.9 dBm

NOTE: The performance with Adaptive Bit Rate (ABR) depends on several parameters (e.g. cable attenuation, LED source power, LED receiver sensitivity, operating temperature).







| STANDARDIZING | INTEGRATED NETWORK | ONE NETWORK FOR ALL |
|---|---|---|

The POF home network is based on international standards and specifications.

**IEC 60793-2-40:**
  Optical fibres -Part 2-40

**ls, Transmission and Multiplexing (ATTM);**

**ETSI TS 105 175-1 V2.0.0** (2011-10):
  Access, Terminals, Transmission and Multiplexing (ATTM); Plastic Optical Fibre Syst. Spec. for 100 Mbps and 1 Gbps

**ISO 11801:**
  Information Technology - Generic Cabling for Customers Premises

**IEC 60825 series:**
  Safety of laser products

**DIN EN 50173:**
  Dimensions and broadcasting requirements

**IEEE 1000Base-RHx (working group)**

The optical network components are integrated in the electrical installation. Wall outlets and network access points are available everywhere in the home. Devices can be linked to the network at several points as required in each room.

This results in reliability because the risk of damage of scattered devices, cables or connections is reduced immensly.

The POF cable is available everywhere in the electrical installation.

This allows to link new IP applications easily, fast and safely to the network.

For example an in-wall distribution box enables to integrate a switch with sensor interfaces or security cameras to the network at any time.

Transmission rate in Mbps — Packet size in Byte

— Max. Transmission Rate Gigabit   — Max. Transmission Rate 100 Mbps
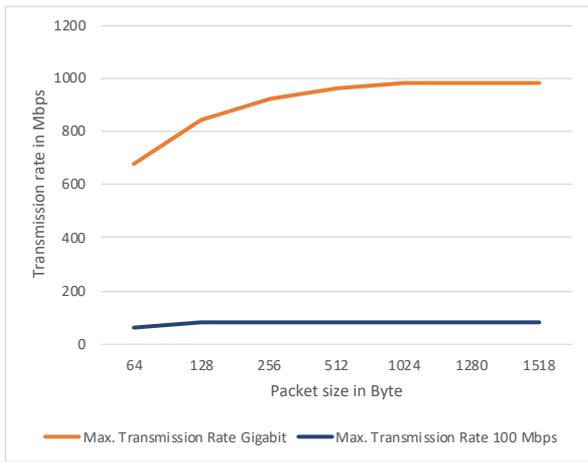
# COMPATIBILITY

Although many end devices in the consumer sector are still equipped with 100 Mbps interfaces, Gigabit Ethernet transmission is also largely standard in the home network.

Many Homefibre network components are therefore available in a 100 Mbps and Gigabit version, with focus on full compatibility of the components in the overall system.

For both technologies the same POF fibre is used.

Gigabit 4+1 Port Switch

1 Gbps 2 x RJ45 network socket ①

100 Mbps 2 x RJ45 network socket ②

② 100 Mbps WLAN Access Point

① 1 Gbps 2 x RJ45 network socket
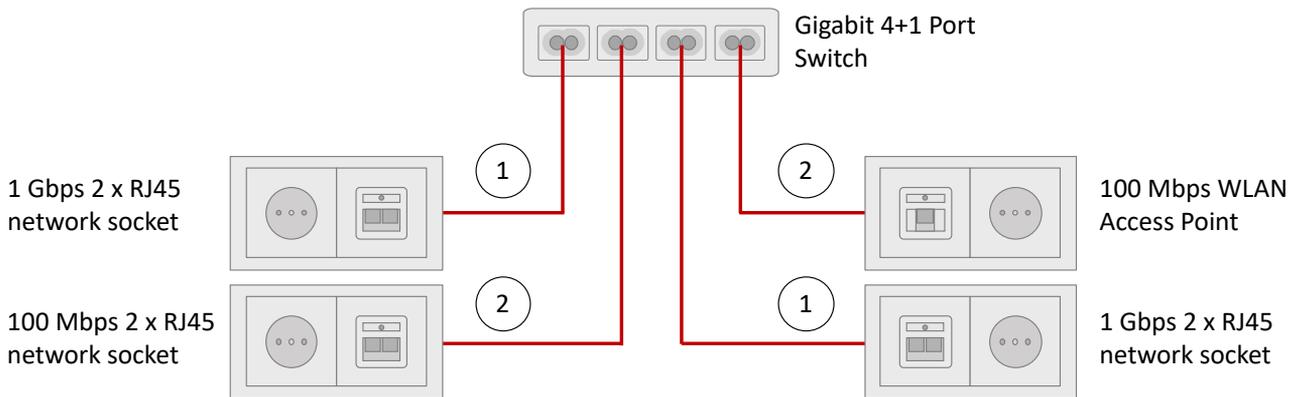
**Gigabit Ethernet**

① 1 Gbps Ethernet transmission
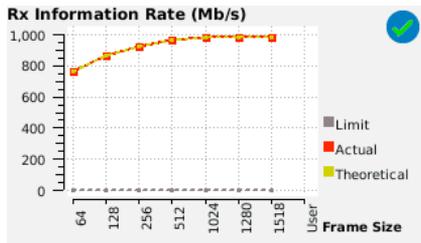


**Fast Ethernet**

② 100 Mbps Ethernet transmission
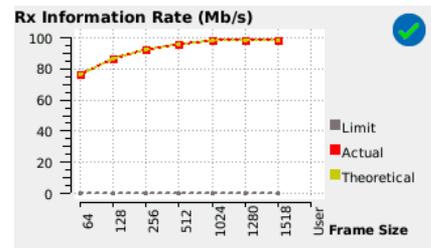


| COST- AND DEMAND ORIENTED | SYSTEM UPGRADE | MIXED SYSTEM |
|---|---|---|
| If only certain Gigabit routes are required in a system installation, you can run some routes with 100 Mbps components and only where required with 1 Gbps components.<br>The central Gigabit switch is fully backward compatible to all 100 Mbps devices. | If upgrades are required for an existing 100 Mbps system, these can also be done without great effort. Only the respective network components need to be replaced. The cable is used as usual. A full Gigabit transmission rate is possible up to 50 m cable distance. For longer cables, ABR technology (Automatic Bitrate Reduction) enables transmission at a reduced information rate (e.g. approx. 700 Mbps over 70 m). | Please note that you need a Gigabit network component at both ends of the transmission path for Gigabit transmission. If a Fast Ethernet (100 Mbps) and a Gigabit component are used together, the two network components agree on the transmission with 100 Mbps.<br>Usually, the central switch is a Gigabit switch. |

# THE SYSTEM
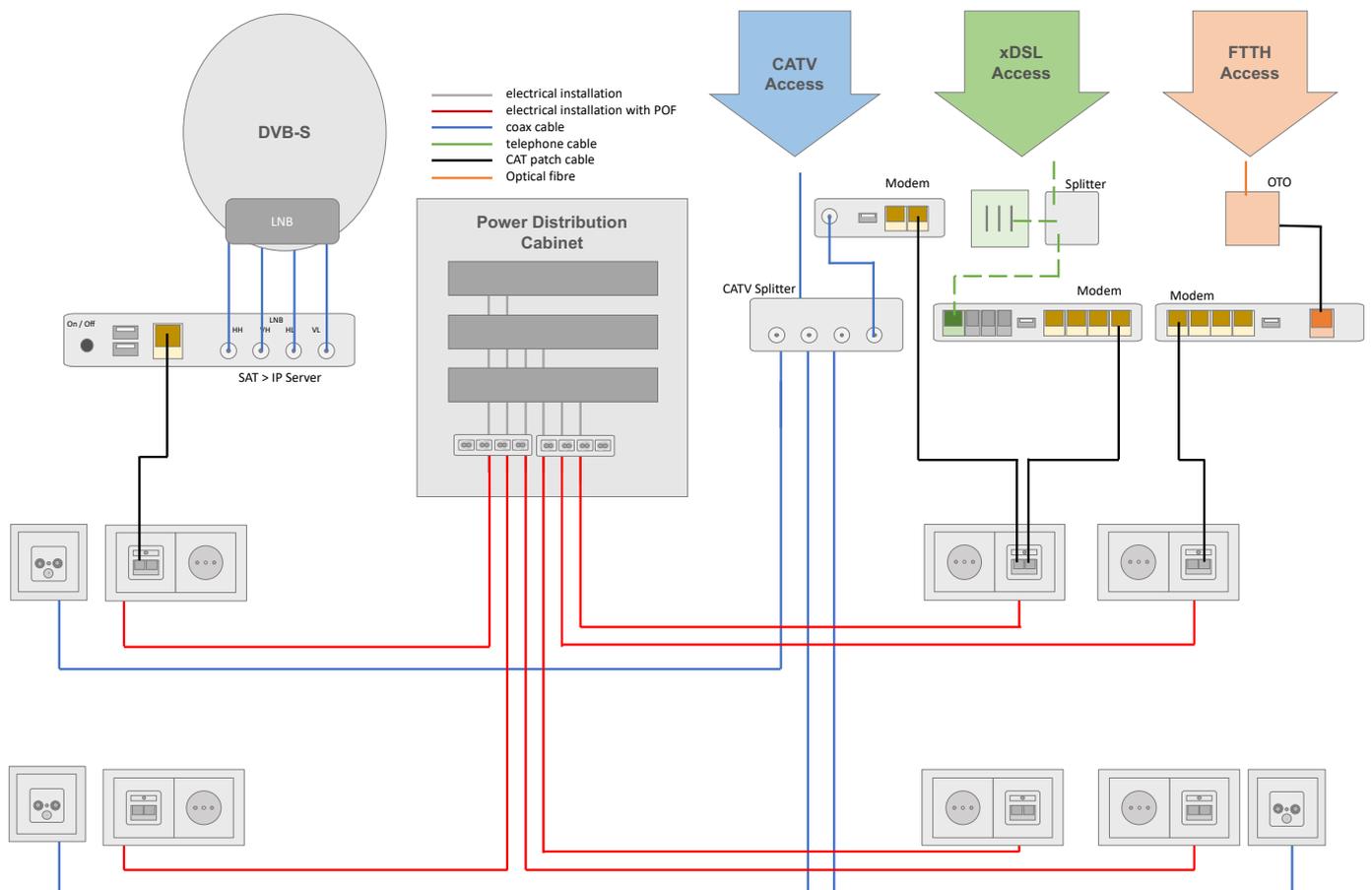


A POF network is installed as a structured cable installation. The optical core network provides higher availability and flexibility in realizing an innovative network infrastructure. In combination with the electrical installation it is a data backbone for all IP applications. It results in a star-tree structure, in which - based on your demand - different network applications and services can be integrated in every part of your home.

The central switch is either placed close to the power distribution cabinet or inside the electrical distribution cabinet. The access (e.g. Modem, Router, SAT>IP Server, etc…)

can be connected to the network everywhere in the house.

The thin POF cable (2.2 / 4.4) mm can be used for retrofit with little space and the network components can be placed in a distribution cabinet.

The interfaces for the network devices are common RJ45 ports or WiFi access points.

Through the star structure the connection to the internet can be established with every access point in the house. The wired network offers the highest possible

bandwidth for each data port independent of the direct distance to the router.

The network can be established as a Fast Ethernet network, a Gigabit Ethernet network, or as a combination of both options depending on the demand.

*IP = Internet Protocol over Ethernet

# APPLICATION: INTEGRATED IP NETWORK
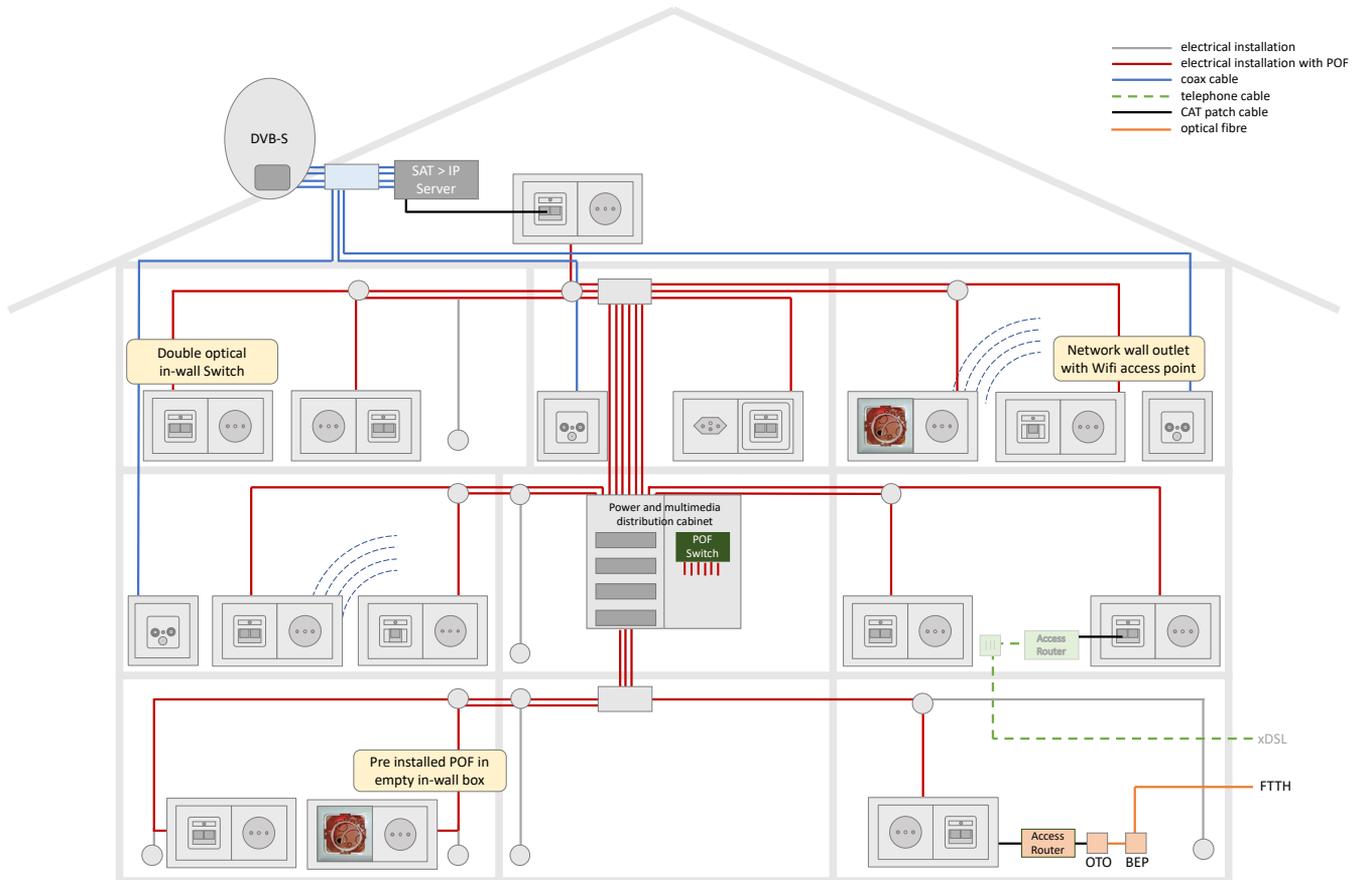


The draft above shows a house with combined POF and electrical installation. The main parts of the power sockets are wired with a POF cable. In this way multiple network interfaces can be prepared for further use. This is one of the big advantages of a Homefibre system.

A data socket or a WiFi access point is installed where it is needed. In other power sockets the wire will be "parked" invisibly behind a power socket or visibly with a low-cost optical network multimedia interface (SMI-Interface).

Additional POF cable can also be placed at the junction boxes. This gives the possibility to add additional devices e.g. switches, sensors, cameras, components for smart homes, etc. at any given time and without any extra effort.

IP-TV, Internet television or internet streaming services are received via the access router (modem).

Also satellite TV can be transmitted over the POF network and the WiFi access points via SAT>IP in the whole house.

The combination of optical wired backbone and WiFi grants an optimized network coverage in the whole house. Smaller WiFi clusters help to reduce the intensity of electromagnetic fields and improve the performance for WiFi access. Smaller WiFi clusters can also be switched on or off depending on personal preferences of the user.

# APPLICATION SCENARIOS / EXAMPLES

## Simple point to point solution
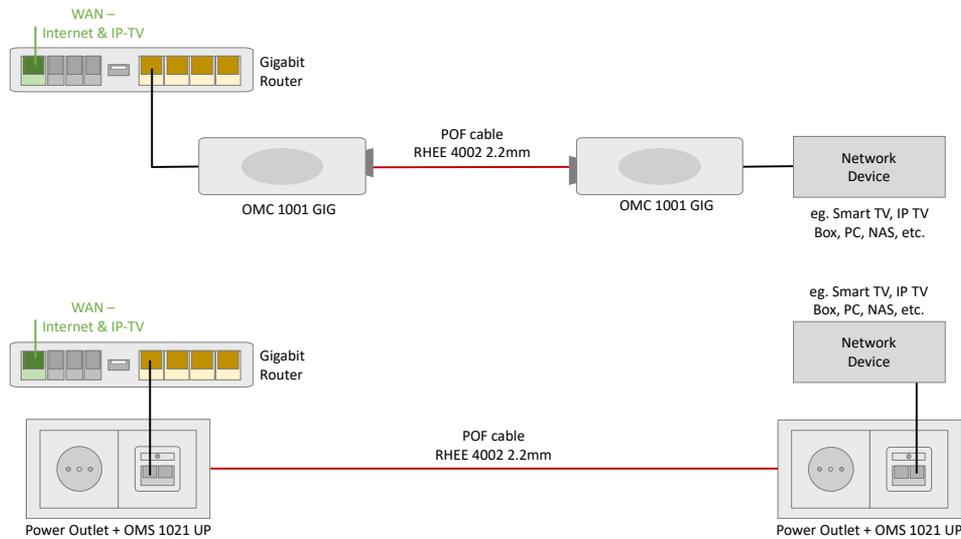


In the first example a simple point to point connection with an OMC 1001 GIG media converter set is used to connect the computer with the router of the internet service provider so that the internet services can be used.

As you can see in the second example it is also possible to install a point to point link with two wall outlet switches OMS 1021 UP-GIG or OMS 121 UP.

## Easy home network solution
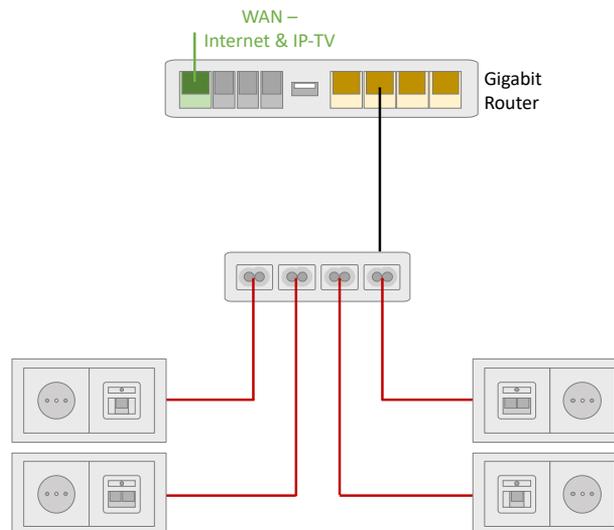


This example shows a typical solution for a POF home network with four POF connections. Gigabit data outlets (OMS 1021 UP-GIG) and 100 Mbps WiFi access points (OMA 111 A2 WLAN) can be used in any combination. All components are compatible with each other.

# APPLICATION SCENARIOS / EXAMPLES

Gigabit 4+1 Port Switch
OMS 1014 ACT-GIG

Gigabit 4+1 Port Switch
OMS 1014 ACT-GIG

Gigabit 4+1 Port Switch
OMS 1014 ACT-GIG

Power outlet +
OMS 1021 UP

Power outlet +
OMS 1021 UP

Power outlet +
OMS 1021 UP

Power outlet +
OMS 1021 UP

Power outlet +
OMS 1021 UP

Power outlet +
OMS 1021 UP

Gigabit 4+1 Port Switch
OMS 1014 ACT-GIG

Gigabit 4+1 Port Switch
OMS 1014 ACT-GIG
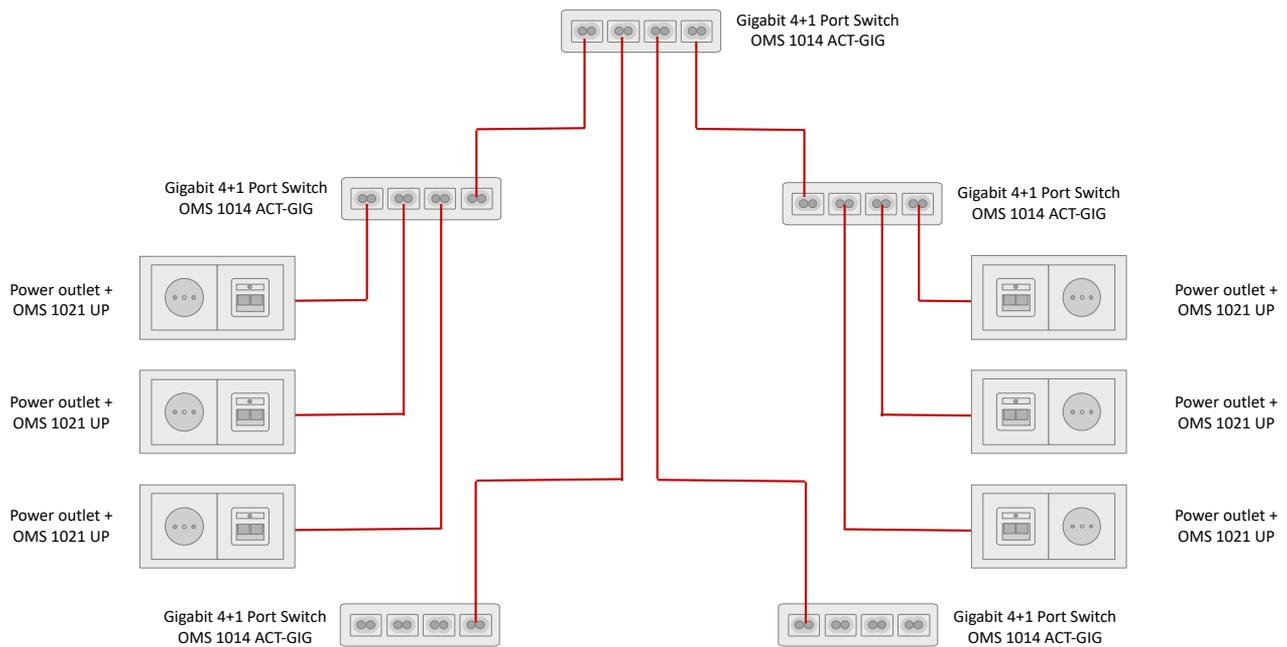
In most cases a switch is not enough for offices and hotels due to the fact that a lot more network connections are required. With the Homefibre switches it is possible to use multiple switches in a row, called cascading, which gives you the opportunity to provide many additional interfaces and longer transmission distances.

## Advanced network solutions

Main Power
Distribution
Cabinet

Multimedia
Distribution
Cabinet
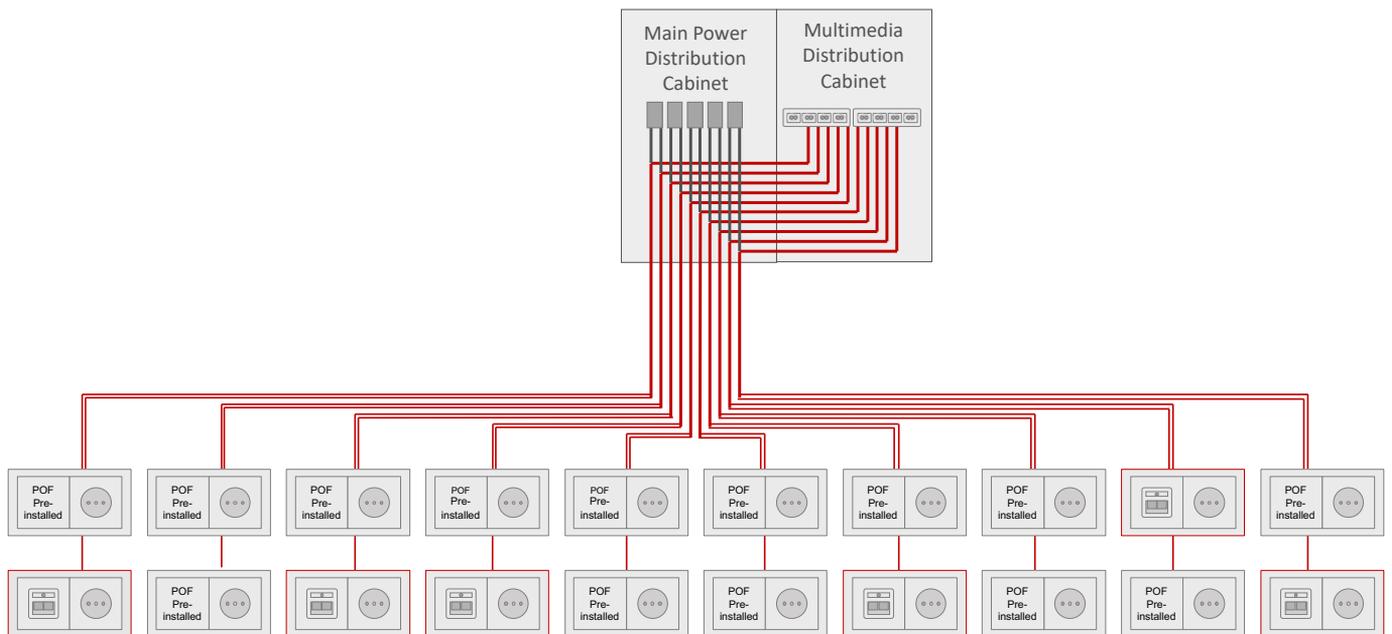
POF Pre-installed

This advanced network architecture shows multiple power outlets pre-installed with POF fibre, some equipped with active data outlets. This wiring system allows flexible installation of WiFi clusters and/or LAN data outlets. The Gigabit POF cable is available everywhere.

The network can be adapted to the requirement of the user. Depending on the number of active data outlets, switches with related number of POF ports can be installed.

# THE OPTICAL CABLE

The Polymer Optical Fibre, also called POF, is approved and has been used in industry and the automotive industry as well as for lightning issues and more. The POF cable is a duplex cable with two fibres, which means that one fibre is used for transmitting and the other fibre is used for receiving optical signals. This increases the transmission length and raises transmission quality and bandwidth. The optical cable may be placed next to electrical wires due to their galvanic non-conduciveness and independency to electromagnetic fields.

The Homefibre system uses the well approved Step Index fibre (SI-fibre) for the core fibre. This high quality fibre is made of PMMA (Polmethyl-Metharcrylate) which has shown the best specifications for the transmission of visible red light signals.

With "OPTOHOME", a brand by Mitsubishi Rayon, an innovative optical fibre for home and office networks was developed. This product was optimized to high robustness and a long life expectancy. Additionally we also offer a fire retardant cable.

## ADVANTAGES

- easy installation
- simple bonding
- small diameter, light weight
- sturdy, safe and free from radiation
- visible light for visual proof of function
- galvanically non-conducting, no lightning issues

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| ATTTENUATION | MULTIMODE TRANSMISSION |
|---|---|
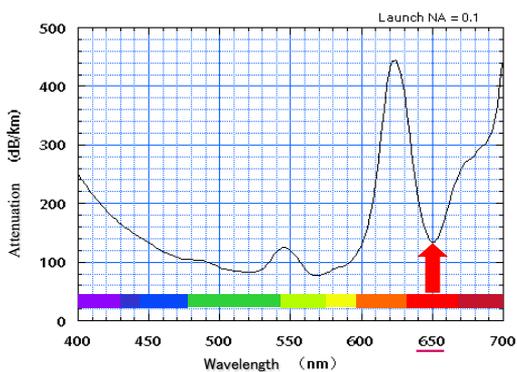
For the Datalight system a wavelength of 650 nm is used. The optical fibre shows a minimum of attenuation at this wavelength. The colors blue, green and yellow might be used in future to optimize the maximum data rate.
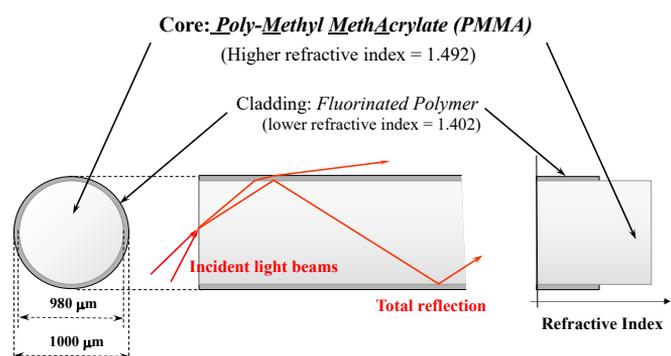
POF is a multimode fibre. The light is reflected on the cladding and is transmitted through the PMMA core. The core diameter of 1mm improves the easy installation. Cutting and plugging are the only two steps necessary to enable transmission.

| POF CABLE - FIRE RETARDANT (UL VW-1) WITH POF-UNICUT | POF CABLE REEL | INSTALLATION FLEX TUBE WITH POF AND YE (KOBER) |
|---|---|---|
| **GHV 4002-G-20 CUT**  20 m bundle<br>**GHV 4002-G-30 CUT**  30 m bundle<br>**GHV 4002-G-40 CUT**  40 m bundle<br>**GHV 4002-G-50 CUT**  50 m bundle<br>**GHV 4002-G-70 CUT**  70 m bundle<br>**GHV 4002-G-100 CUT**  100 m bundle | **GHV 4002-G-500**  500 m reel<br>**GHV 4002-G-1000**  1,000 m reel | **FMP 20+3XYE1.5+POF 2.2**<br>pre-wired installation flex tube<br>diameter 20 mm |
| cladding: Polyvinylchloride cladding<br>core diameter: 980 µm<br>numerical Aperture: 0.5<br>outer diameter: 2 x 2.2 mm<br>jacketing: grey<br>fire retardant UL VW-1<br>transmission length: 100 Mbps / 80m *<br>          1 Gbps up to  50 m *<br>with ABR:    around 400 Mbps at 80 m<br>operating temperature: -40 ºC to 85 ºC | cladding: double Polyethylen cladding<br>core diameter: 980 µm<br>numerical Aperture: 0.5<br>outer diameter: 2 x 2.2 mm<br>jacketing: grey<br>Fire retardant UL VW-1<br>transmission length: 100 Mbps / 80 m *<br>          1 Gbps up to 50 m *<br>with ABR:    around 400 Mbps at 80 m<br>operating temperature: -40 ºC to 85 ºC | **BENEFITS**<br>• quick and cost saving network wiring combined with electrical installation<br>• customized designs available on request (e.g. YE 1.5 + 2 x POF; coax cable + POF, etc...)<br>• parameter POF cable: see RHEE 4002 or GHV 4002 |
| delivery unit:<br>20 m, 30 m, 40 m, 50 m, 70 m, 100 m bundle | delivery unit:<br>500 m or 1,000 m reel | delivery unit:<br>50 m bundle |
| *ABR = Adaptive Bit Rate*<br>*\* with Homefibre media converters* | *ABR = Adaptive Bit Rate*<br>*\* with Homefibre media converters* | |

# THE OPTICAL SWITCH

Switches are used to connect computer networking devices by using "packet switching" to receive, process and forward data to the terminal device.

The Homefibre optical media switches also include the media converter function. The electrical signal of any copper network is transformed to an optical signal to be then transmitted over the plastic optical fibre (POF).

In a typical home network the switches are used to distribute the network access to the different locations along to the electrical installations. So it is possible to provide a great amount of network connections with gigabit speed.

In home networks, various multimedia devices are usually placed in a multimedia distribution cabinet at a central point. In houses or apartment complexes, multimedia distribution boxes can be installed on several floors and the connections to the individual rooms can be made from these.

In larger and more professional networks, large network cabinets are usually used instead of multimedia distribution cabinets. The 12+4 port Smart Switch is suitable for installation in 19 inch network cabinets. This can be used without further configuration, but also offers extensive configuration options via web interface or console.



| POF 12+4 PORT SMART SWITCH 1 GBPS - GIGABIT ETHERNET | NETWORK RACK |
|---|---|

**OMS 1412 RS-GIG**
- 12 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)
- 2 x RJ45 interface (1 Gbps)
- 2 x SFP+ interface   (10 Gbps)
- 
**FUNCTIONS**
- IEEE 802.3 Ethernet
- IEEE 802.3u Fast Ethernet
- IEEE 802.3ab Gigabit Ethernet
- Store and Forward Switching
- 10K MAC address table
- managed via webinterface
        and console / SSH



In this network rack some POF 12+4 port switches are connected together and so they provide many network connections in the different rooms of this hotel.

# SWITCHES FOR POWER AND MULTIMEDIA DISTRIBUTION CABINET

WAN –
Internet & IP-TV

Gigabit
Router

Gigabit 4+1 Port Switch
OMS 1014 ACT-GIG

Gigabit 2+3 Port Switch
OMC 2003 ACT-GIG

WAN –
Internet & IP-TV

Gigabit
Router

Gigabit 4+1 Port Switch
OMS 1014 ACT-GIG

Gigabit 4+1 Port Switch
OMS 1014 ACT-GIG
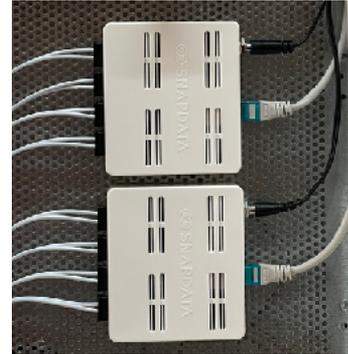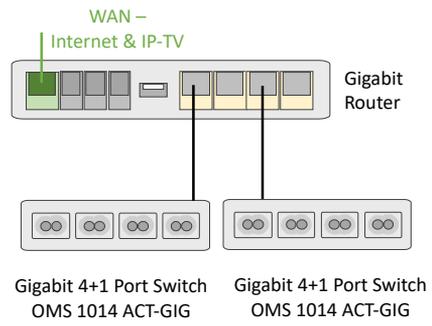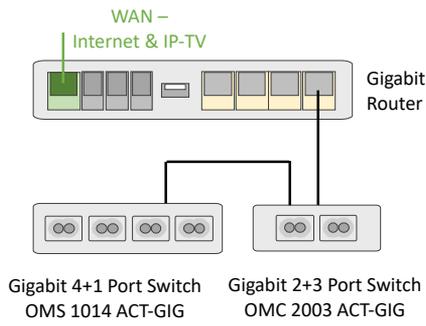
The small network switches are perfect for space-saving installation in smaller power and multimedia distribution cabinets. Depending on the number of necessary connections, several switches can be combined. Either by daisy chaining several switches or by connecting several switches in parallel to the router.

| POF 4+1 PORT SWITCH<br>1 GBPS - GIGABIT ETHERNET | 6+2 PORT GIGABIT SWITCH KIT<br>OMS 1026 RR-GIG ALTERNATIVE | POF 3+1 PORT SWITCH<br>100 MBPS - FAST ETHERNET |
|---|---|---|
| **OMS 1014 ACT-GIG**<br>• 4 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)<br>• 1 x RJ45 interface (1 Gbps) | **OMS 1026 RR-GIG**<br>• 6 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)<br>• 2 x RJ45 interface (1 Gbps) | **OMS 113-FC**<br>• 3 x POF port with OPTOLOCK™<br>• interface for 2.2 mm POF (100 Mbps)<br>• 1 x RJ45 interface (100 Mbps) |
| **FUNCTIONS**<br>• IEEE 802.3 Ethernet<br>• IEEE 802.3u Fast Ethernet<br>• IEEE 802.3ab Gigabit Ethernet<br>• Store and Forward Switching<br>• 8K MAC address table | **SET INCL.**<br>• OMS 1014 ACT-GIG<br>• OMC 2003 ACT-GIG<br>• 2 x CAT 5e patch cable<br>• Quickguide | **FUNCTIONS**<br>• IEEE 802.3 Ethernet<br>• IEEE 802.3u Fast Ethernet<br>• Store and Forward Switching<br>• 1K MAC address table |
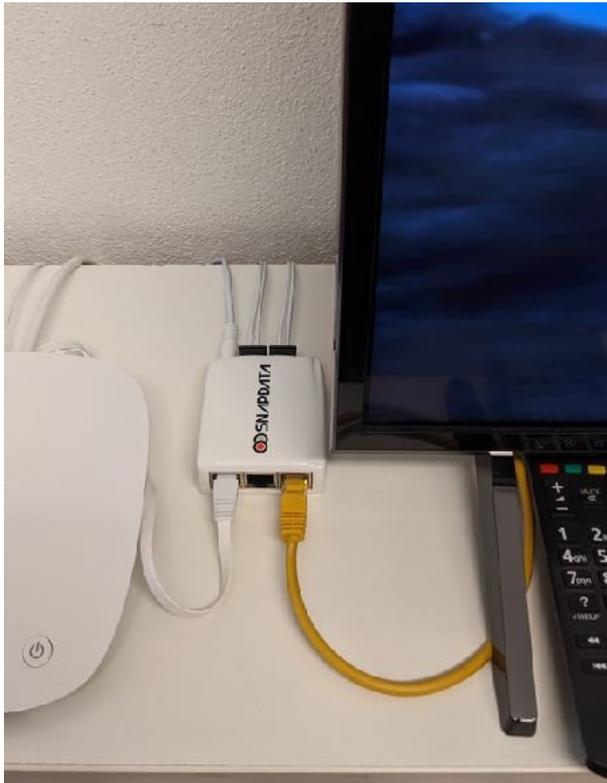
# MULTICAST & IGMP-SNOOPING

The Internet Group Management Protocol (IGMP) is a network protocol of the Internet Protocol family and is used to organise multicast groups. It manages and optimises multicast IP data streams such as IP TV, HDMI over IP or similar applications in the network that make the same content available to several end devices. IGMP snooping ensures that not every device in the network is flooded with multicast data streams, thus reducing the load on end devices with slower connections in the network. This function is usually activated by default on routers.

This function plays an important role in ensuring stability, particularly in installations with daisy chained connections and in networks with high data rates and many multicast data streams. In such networks, IGMP snooping should be available on all switches in the core network.

Smart switches such as the POF 4+3 Port Smart Switch or the POF 12+4 Port Smart Switch can be configured to meet these requirements.

The PLUS version of our 2+3 port media converter also has integrated IGMP snooping and is therefore also ideal for networks with increased multicast traffic.

| POF 2+3 PORT MEDIA CONVERTER PLUS 1 GBPS - GIGABIT ETHERNET | POF 4+3 PORT SMART SWITCH 1 GBPS - GIGABIT ETHERNET | MULTIMEDIA DISTRIBUTION CABINET |
|---|---|---|

 

**OMC 2003 ACT-GIG PLUS**
- 2 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)
- 3 x RJ45 interface (1 Gbps)

**FUNKTIONEN**
- can be powered by USB cable
- IEEE 802.3 Ethernet
- IEEE 802.3u Fast Ethernet
- IEEE 802.3ab Gigabit Ethernet
- IGMP-snooping

Includes:
- 1 x OMC 2003 ACT-GIG PLUS
- 1 x power supply
- 1 x USB cable
- 1 x user manual

**OMS 1034 FUS-GIG**
- 4 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)
- 2 x RJ45 interface (1 Gbps)
- 1 x SFP interface (1 Gbps)

**FUNKTIONEN**
- IEEE 802.3 Ethernet
- IEEE 802.3u Fast Ethernet
- IEEE 802.3ab Gigabit Ethernet
- Store and Forward Switching
- 10K MAC Adress table
- IGMP-Snooping pre-configured

- managed via webinterface and console / SSH

# APPLICATION SCENARIOS / EXAMPLES

## Multicast in a network without IGMP-Snooping
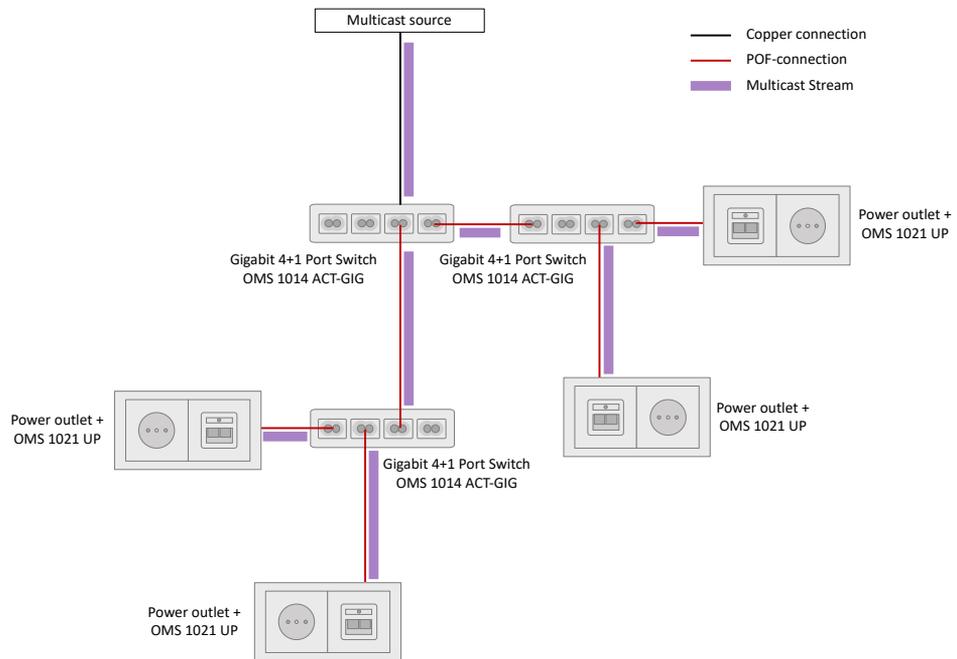


Multicast transmits a data stream that can be received by any device in the network. The advantage is that a separate stream does not have to be transmitted for each additional device in order to make the same content available. Unfortunately, multicast is permanently distributed throughout the network without IGMP snooping. This can quickly lead to problems, especially for devices such as televisions or TV boxes, which usually only have 100 Mbit/s connections.

## Multicast in a network with  IGMP-Snooping
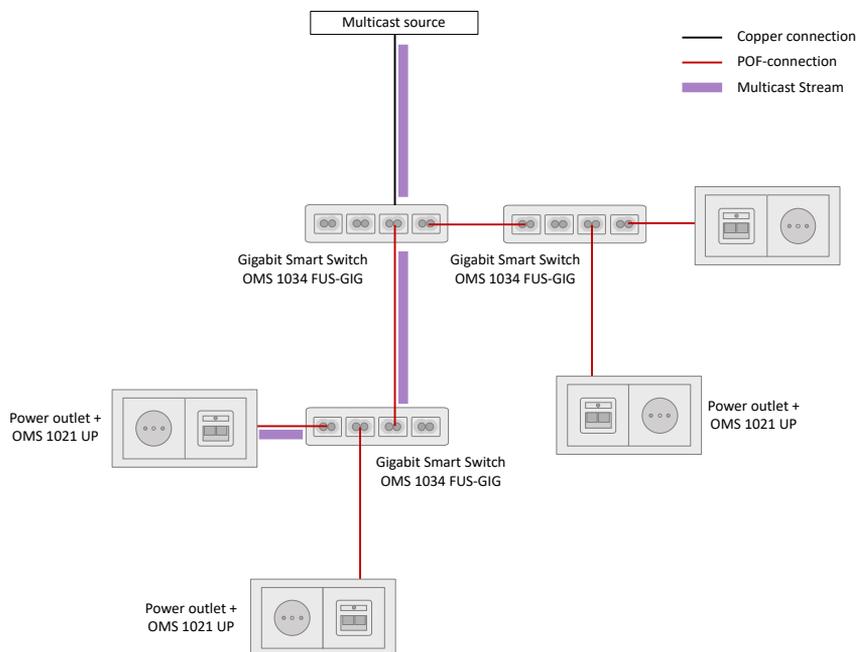


With IGMP snooping, the multicast data stream is delivered to the device currently receiving it. The rest of the network remains free of this data stream. This is made possible by a type of booking service. The devices register with the respective switch for a multicast. The switch reports this to the router and the multicast is then made available precisely for this end device.

# NETWORK SOCKETS & WIFI ACCESS POINTS
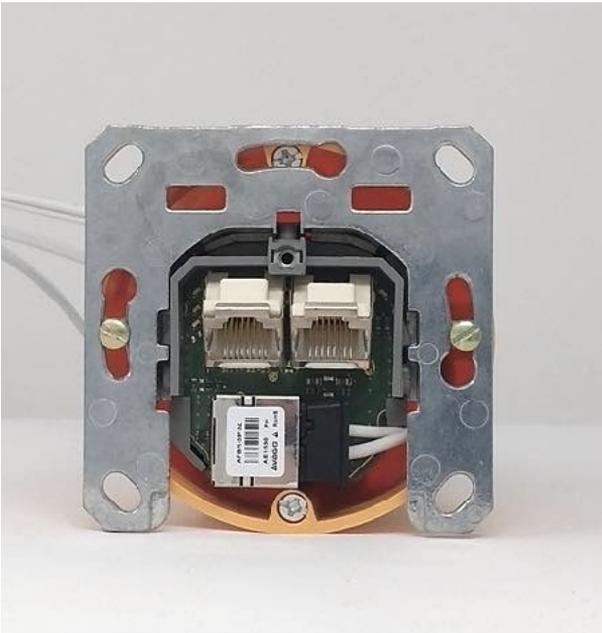
The network sockets are flush-mounted switches which provide two standard RJ45 network interfaces for all kinds of networking devices in different locations.

For mobile devices a flush-mounted optical media WiFi access point is also available. With the access points it is also possible to connect devices without need for a cable.

To provide standard RJ45 connections and electromagnetic fields it is necessary to convert the electrical signals into optical signals. Therefore the active flush-mounted devices and WiFi access points include a media converter function and integrated power supply (100 V - 240 V AC).

All our devices are build with the focus of long durability, energy efficiency and proper temperature management.

The flush-mounted devices are suitable for standard flush-mounted sockets. We also offer adapted solutions for different countries (e.g. Switzerland).

Standardized
POF Gigabit transmission

connector DIN UAE 8/8 suitable for the majority of European outlets, frames and plates

45° RJ45 interface for safe connection with patch cords

optimized temperature management due to metal frame concept

optical clamped Broadcom interface

Compact and stable housing for flush-mounting, supported by stable metal frame

clamped (100-240) V AC interface for integrated power supply

Adaptive Bit Rate (ABR) allows distances up to 80 m *

* with POF cable category A4a.2 e.g. Mitsubishi RHEE 4002

| POF NETWORK SOCKET<br>2 x RJ45 FLUSH-MOUNTED<br>1 GBPS - GIGABIT ETHERNET | OMS 1021 GIG-AP-KIT<br>2 X RJ45 SURFACE-MOUNTED KIT<br>1 GBPS - GIGABIT ETHERNET | POF WIFI ACCESS POINT<br>1 x RJ45 FLUSH-MOUNTED<br>100 MBPS - FAST ETHERNET |
|---|---|---|

**OMS 1021 UP**

- 1 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)
- 2 x RJ45 interface (1 Gbps)

**FUNCTIONS**

- IEEE 802.3 Ethernet
- IEEE 802.3u Fast Ethernet
- IEEE 802.3ab Gigabit Ethernet
- suitable for standard flush-mounted sockets
- UAE cover plates available from multiple well-known manufacturers

**OMS 1021 GIG-AP-KIT**

- 1 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)
- 2 x RJ45 interface (1 Gbps)

**SET INCL.**

- OMS 1021 UP-GIG
- suitable surface box and center plate
- assembling material
- Quickguide
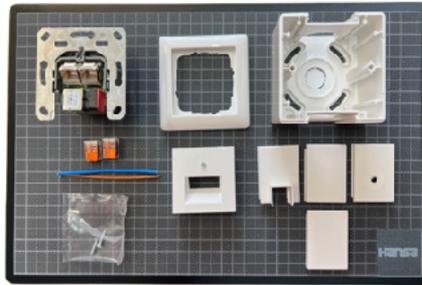


**OMA 111 A2 WLAN**

- 1 x POF port OPTOLOCK™ interface for 2.2 mm POF (100 Mbps)
- 1 x RJ45 interface (100 Mbps)
- 2 x 2 MiMo WiFi antenna (300 Mbps)

**FUNCTIONS**

- IEEE 802.3 Ethernet
- IEEE 802.3u Fast Ethernet
- IEEE 802.11n 300 Mbps WiFi 4
- suitable for standard flush-mounted sockets
- UAE cover plates available from multiple well-known manufacturers

**INSTALLATION EXAMPLES**

| MOUNTED IN MAIN POWER SOCKET | IN SURFACE MOUNT FRAME | IN SURFACE CABLE CHANNEL |
|---|---|---|
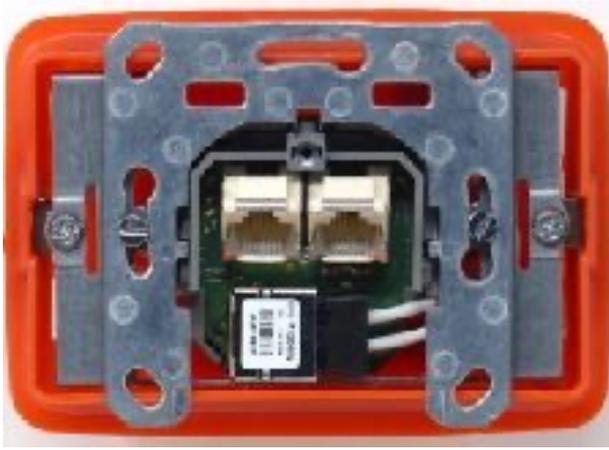
# COUNTRY SPECIFIC SOLUTIONS:
# ITALY

Italien installations are using a different shape of flush-mounting bones and outlets.

To adapt our wall outlets to this shape we offer an adapter system provided by Albrecht Jung GmbH & Co KG.

The adapter system can be ordered from us or directly at them. The necessary order information details are listed in the table below.

  

| ADAPTER WALL FRAME - SOLUTION FOR ITALY | CENTER PLATE FOR ADAPTER FRAME - SOLUTION FOR ITALY | CENTER PLATE FOR ADAPTER FRAME - SOLUTION FOR ITALY |
|---|---|---|
| **JUNG LSP981 AL-LIT** | **JUNG LS 969-2** | **JUNG LS 969-1** |
| With the adapter wall frame the German wall outlets can be used in an Italian in wall installation. | suitable for the adapter wall frame | suitable for the adapter wall frame |
| • dimensions: 115 mm x 119 mm x 10 mm<br>• weight: 70 g<br>• incl. manual | • dimensions: 50 mm x 50 mm x 13 mm<br>• weight: 18 g<br>• 1 x RJ45 interface<br>  (for OMA111A2 WLAN) | • dimensions: 50 mm x 50 mm x 13 mm<br>• weight: 16 g<br>• 2 x RJ45 interfaces<br>  (for OMS 1021 UP-GIG) |

## INSTALLATION EXAMPLE FOR ITALY

| STEP 1:<br>INSTALL ADAPTER FRAME | STEP 2:<br>INSTALL GERMAN WALL-OUTLET | STEP 3:<br>INSTALL WALL FRAME AND CENTER PLATE |
|---|---|---|
|  |  |  |
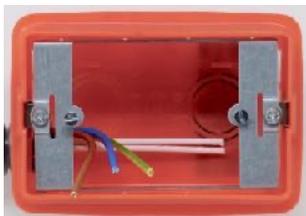
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# COUNTRY SPECIFIC SOLUTIONS:

# SWITZERLAND





| POF NETWORK SOCKET<br>2 x RJ45 FLUSH-MOUNTED<br>1 GBPS - GIGABIT ETHERNET<br>SWISS VERSION | POF WIFI ACCESS POINT<br>1 x RJ45 FLUSH-MOUNTED<br>100 MBPS - FAST ETHERNET<br>SWISS VERSION |
|---|---|

**OMS 1021 UP-CH**

- 1 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)
- 2 x RJ45 interface (1 Gbps)
- inclusive intermediate frame CH and standard center plate UAE 8/8 rw

**FUNCTIONS**

- IEEE 802.3 Ethernet
- IEEE 802.3u Fast Ethernet
- IEEE 802.3ab Gigabit Ethernet
- suitable for standard flush-mounted sockets in Switzerland
- UAE cover plates available from multiple well-known manufacturers

**OMA 111 A2 WLAN-CH**

- 1 x POF port with OPTOLOCK™ interface for 2.2 mm POF (100 Mbps)
- 1 x RJ45 interface (100 Mbps)
- 2 x 2 MiMo WiFi antenna (300 Mbps)
- inclusive intermediate frame CH and standard center plate UAE 8 rw

**FUNCTIONS**

- IEEE 802.3 Ethernet
- IEEE 802.3u Fast Ethernet
- IEEE 802.11n 300 Mbps WiFi
- suitable for standard flush-mounted sockets
- UAE cover plates available from multiple well-known manufacturers

## INSTALLATION EXAMPLES FOR SWITZERLAND

| MOUNTED IN MAIN POWER SOCKET | IN SURFACE MOUNT FRAME | IN SURFACE CABLE CHANNEL |
|---|---|---|

# MEDIA CONVERTERS AND KITS

Media converters convert electrical signals into optical signals and vice versa. With the media converter it is possible to connect a single networking device to the POF network via the standard RJ45 interface.

With the desktop media converter it is easy to set up a point-to-point connection. Therefore the media converter kits include all necessary components.

Beside the point-to-point connection it is also possible to combine the media converter with switches / network sockets. Also multiple common network segments can be connected with an optical link.

Power supply via plug power supply and USB cable. It is also possible to power the media converter via the USB port of a notebook.

| **POINT-TO-POINT CONNECTION** | **CONNECTION TO A NETWORK** |
|---|---|
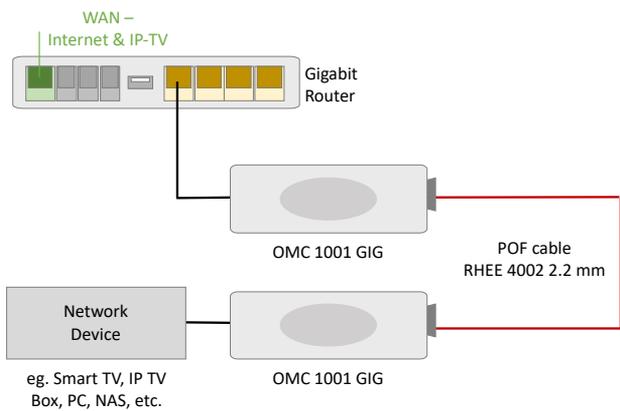


With a media converter set, a network device is connected to the router in this example. The cable, which is only 2.2mm thin, allows it to be laid with electrical installations or along baseboards / under carpets.
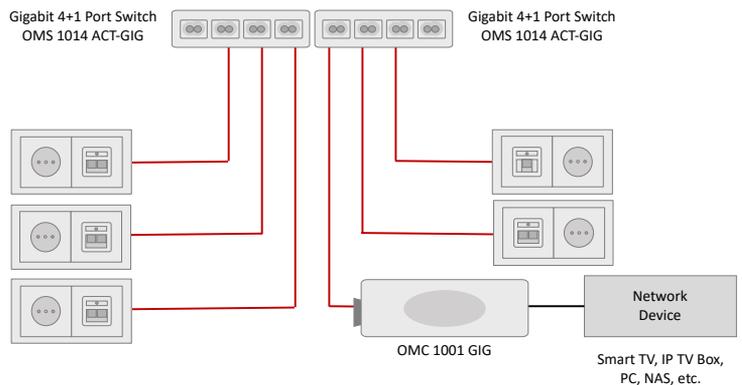
A media converter is used to establish a connection between a POF switch and a network device.

| POF MEDIA CONVERTER<br>100 MBPS - FAST ETHERNET | POF MEDIA CONVERTER KIT<br>100 MBPS - FAST ETHERNET | SAMPLE APPLICATION |
|---|---|---|
| **MCE 301-FC**<br>• 1 x POF port with OPTOLOCK™ interface for 2.2 mm POF (100 Mbps)<br>• 1 x RJ45 interface (100 Mbps)<br><br>**FUNCTIONS**<br>• can be powered by USB cable<br>• IEEE 802.3 Ethernet<br>• IEEE 802.3u Fast Ethernet<br><br>includes:<br>• 1 x MCE 301-FC<br>• 1 x CAT 5e patch cable<br>• 1 x power supply<br>• 1 x USB cable<br>• 1 x user manual | **MCE 301-FC - 30 SI**<br>• incl. 30 m GHV cable bundle<br><br><br>**SET INCL.**<br>• 2 x MCE 301-FC<br>• 2 x power supply<br>• 2 x USB cable<br>• 1 x POF cable bundle<br>• 1 x POF-Unicut<br>• 2 x CAT 5e patch cable<br>• 1 x user manual |  |



| POF MEDIA CONVERTER<br>1 GBPS - GIGABIT ETHERNET | POF MEDIA CONVERTER KIT<br>1 GBPS - GIGABIT ETHERNET | SAMPLE APPLICATION |
|---|---|---|
| **OMC 1001 GIG**<br>• 1 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps)<br>• 1 x RJ45 interface (1 Gbps)<br><br>**FUNCTIONS**<br>• Can be powered by USB cable<br>• IEEE 802.3 Ethernet<br>• IEEE 802.3u Fast Ethernet<br>• IEEE 802.3ab Gigabit Ethernet<br><br>includes:<br>• 1 x OMC 1001 GIG<br>• 1 x CAT 5e patch cable<br>• 1 x power supply<br>• 1 x USB cable<br>• 1 x user manual | **OMC 1001 GIG - 20 SI** (incl. 20 m POF)<br>**OMC 1001 GIG - 30 SI** (incl. 30 m POF)<br>**OMC 1001 GIG - 40 SI** (incl. 40 m POF)<br>**OMC 1001 GIG - 50 SI** (incl. 50 m POF)<br><br>**SET INCL.**<br>• 2 x OMC 1001 GIG<br>• 2 x power supply<br>• 2 x USB cable<br>• 1 x POF cable bundle<br>• 1 x POF-Unicut<br>• 2 x CAT 5e patch cable<br>• 1 x user manual |  |
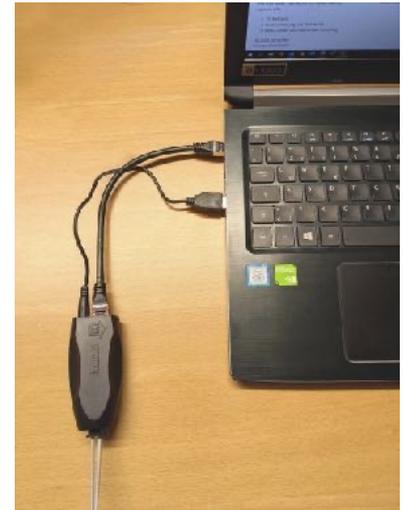
# MEDIA CONVERTER WITH SWITCHING TECHNOLOGY
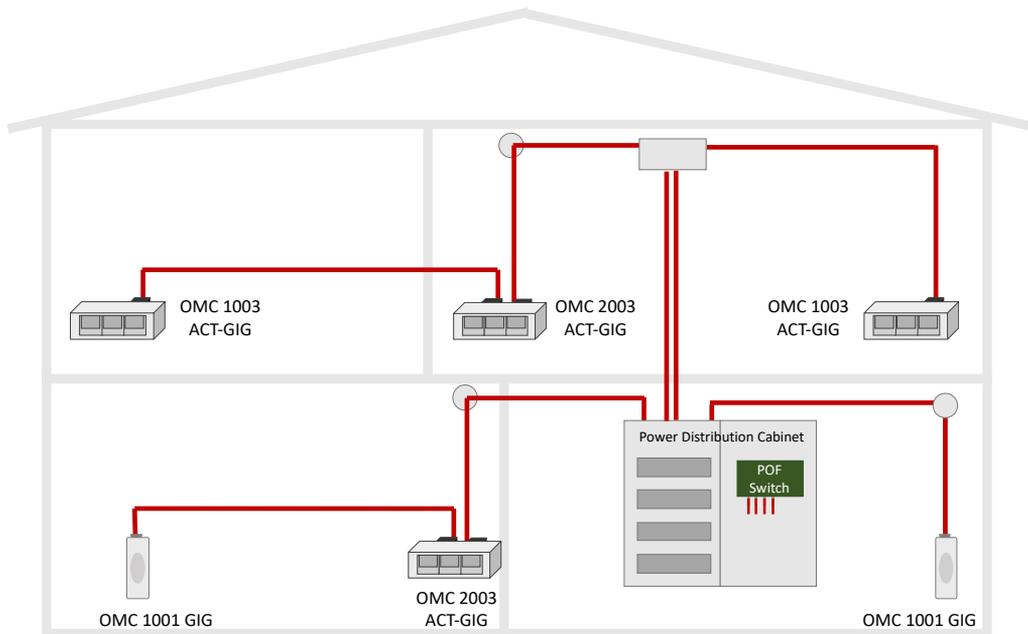


These devices offer the possibility to integrate several devices simultaneously into a POF network. The ports are interconnected like a typical switch.

The version with two POF ports offers the possibility not to let your POF network end at this point, but to continue to an additional segment.

| POF 2+3 PORT MEDIA CONVERTER 1 GBPS - GIGABIT ETHERNET | POF 1+3 PORT MEDIA CONVERTER 1 GBPS - GIGABIT ETHERNET | SAMPLE APPLICATION |
|---|---|---|
| **OMC 2003 ACT-GIG** <br> • 2 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps) <br> • 3 x RJ45 interface (1 Gbps) <br><br> **FUNCTIONS** <br> • Can be powered by USB cable <br> • IEEE 802.3 Ethernet <br> • IEEE 802.3u Fast Ethernet <br> • IEEE 802.3ab Gigabit Ethernet <br><br> includes: <br> • 1 x OMC 2003 ACT-GIG <br> • 1 x power supply <br> • 1 x USB cable <br> • 1 x user manual | **OMC 1003 ACT-GIG** <br> • 1 x POF port connector less / Broadcom for 2.2 mm POF (1 Gbps) <br> • 3 x RJ45 interface (1 Gbps) <br><br> **FUNCTIONS** <br> • Can be powered by USB cable <br> • IEEE 802.3 Ethernet <br> • IEEE 802.3u Fast Ethernet <br> • IEEE 802.3ab Gigabit Ethernet <br><br> includes: <br> • 1 x OMC 2003 ACT-GIG <br> • 1 x power supply <br> • 1 x USB cable <br> • 1 x user manual |  |

# DIN RAIL MOUNTED MEDIA CONVERTER



**Power Distribution**

Modem

REG Media
Converter

**Multimedia Distribution**

REG Media
Converter

POF cable
RHEE 4002 2.2 mm
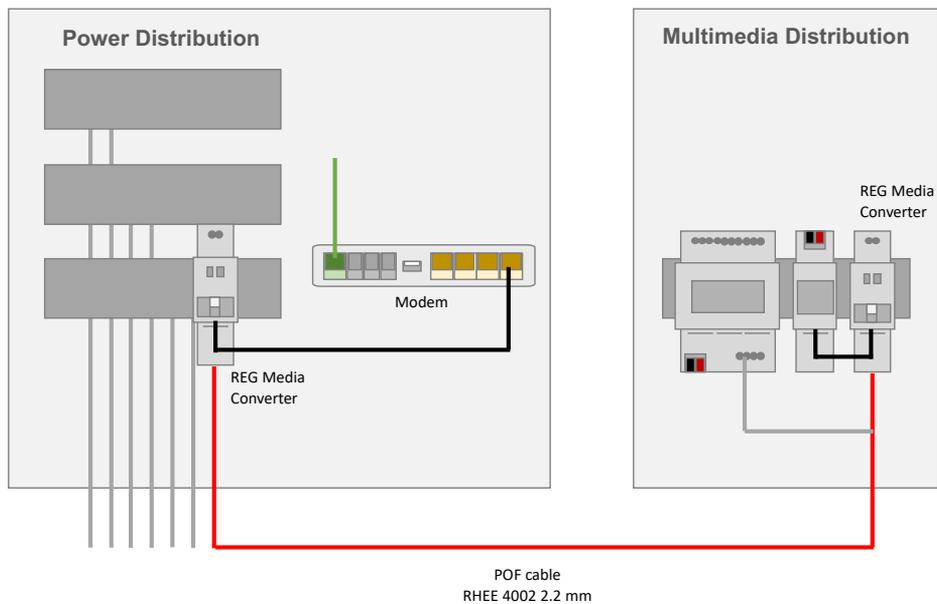
For Smart Home applications or for the combination with the electrical installation, media converters for DIN rail mounting are preferred.

These can be used in distribution cabinets and offer a standardized RJ45 network connection for smart home controls, for example.







| POF DIN RAIL MOUNTED MEDIA CONVERTER 100 MBPS - FAST ETHERNET | POF DIN RAIL MOUNTED MEDIA CONVERTER 1 GBPS - GIGABIT ETHERNET | INSTALLATION EXAMPLE |
|---|---|---|
| **OMC 100 REG**<br><br>• 1 x POF port with OPTOLOCK™ interface for 2.2 mm POF (100 Mbps)<br>• 1 x RJ45 interface (100 Mbps)<br><br>**FUNCTIONS**<br><br>• for DIN rail mounting<br>• IEEE 802.3 Ethernet<br>• IEEE 802.3u Fast Ethernet | **OMC 1000 REG-GIG**<br><br>• 1 x POF port connector less interface for 2.2 mm POF (1 Gbps)<br>• 1 x RJ45 interface (1 Gbps)<br><br>**FUNCTIONS**<br><br>• for DIN rail mounting<br>• IEEE 802.3 Ethernet<br>• IEEE 802.3u Fast Ethernet<br>• IEEE 802.3ab Gigabit Ethernet | |

# SMI ADAPTER

A passive POF interface (connector) offers a low-cost optical interface. This kind of interface can be used to change a connected link e.g. in combination with a media converter. Often times a mounting frame is also used so that the pre-installed cable can be easily spotted by the future tenant. If necessary, the mounting frame can be replaced by a flush-mounted switch or WiFi access point.



| MOUNTING FRAME FOR KEYSTONE MODULS | POF OL-SMI KEYSTONE - SMI INTERFACE MODULE | POF SMI PATCHCABLE 1.5M |
|---|---|---|
| **KMK MA-UP RW ;** 105 313 03<br>mounting frame for 1 or 2 Keystone modules<br>dimensions: 70 mm x 70 mm x 17 mm | **POF OL-SMI KS**<br>color: black<br><br><br>connector with 1 x Optolock interface and SMI Interface for POF cable 2.2 mm<br>attenuation: approx. 2.5 dBm | **POF SMI PC 1.5m**<br>POF SMI Connector with 1.5 m POF cable for connection between e.g Media Converter and optical data outlet<br><br>core diameter: 1 mm<br>outside diameter: 2.2 mm |

| PLUG-ON OL-SMI KEYSTONE MODULE | FIX THE KEYSTONE MODULE WITH THE MOUNTING FRAME | POF SMI INTERFACE WITH COVER |
|---|---|---|
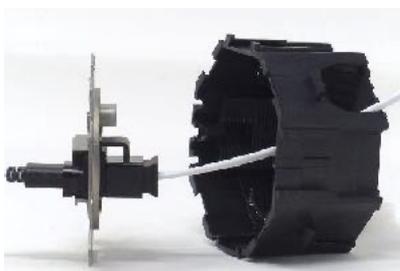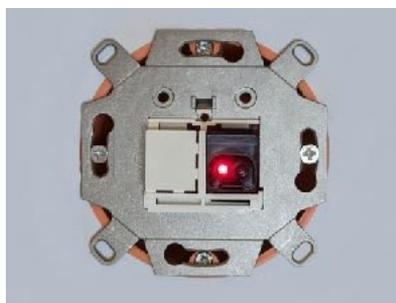
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# PASSIVE PRE-INSTALLATION WITH SMI INTERFACE



4 + 1 port POF Gigabit Switch
With 4 x POF Gigabit Ports

Power plug and
SMI Connector

Power plug and
SMI Connector

Power plug and
SMI Connector

Power plug and
SMI Connector

4 + 1 Port POF Gigabit Switch
With 4 x POF Gigabit Ports

Power plug and
2 x SMI connector

Power plug and
1 x SMI connector

POF media converter
1 x SMI; 1 x RJ45
OMC 1001 GIG

POF media converter
2 x SMI; 3 x RJ45
OMC 2003 ACT

POF media converter
1 x SMI; 3 x RJ45
OMC 1003 ACT

In order to make network connections retrofittable for the future, it is also possible to carry out a passive pre-installation. It offers the possibility of flexibly installing a network and expanding it as required.

Already installed SMI connections can be activated by a media converter or replaced by a network socket with RJ45 connections or with Wifi.
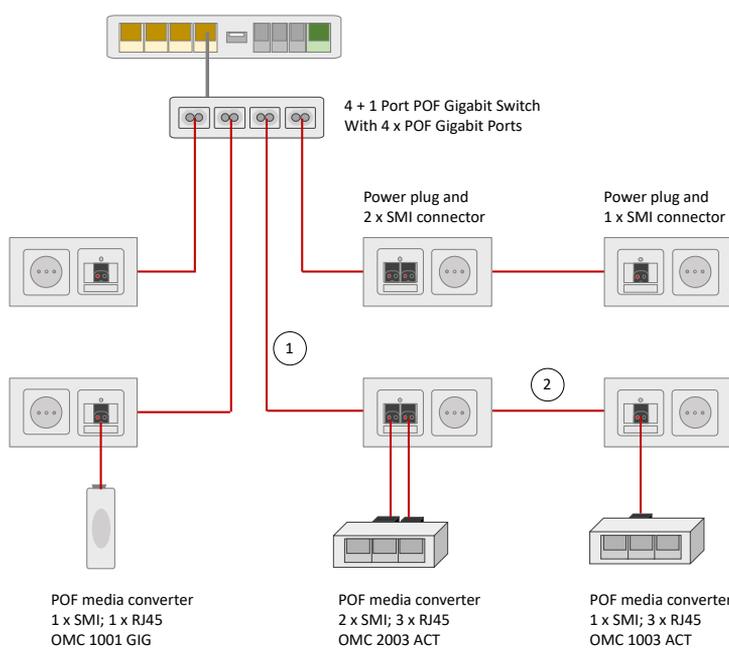
In daisy chain installation two outlets can be activated using a media converter with 2 x POF interfaces. In this case each link can have the following distances:

**1**

Switch to SMI

Link length up to 35 m

**2**

SMI to SMI

Link length up to 20 m

| **SINGLE SMI CONNECTION WITH MEDIA CONVERTER** | **DOUBLE SMI CONNECTION WITH MEDIA CONVERTER** | **REPLACE SMI INTERFACE WITH NETWORK SOCKET** |
|---|---|---|
|  |  |  |
| On the SMI interface any type of media converter or switch can be used with the POF SMI patch cable. | For Diasychain the 2 POF Port Media converter is used. | Through clever installation, the SMI interface can be exchanged at any time with a network socket with RJ45 connections or Wifi. |

# COUNTRY SPECIFIC SMI KEYSTONE SOLUTIONS

## SMI KEYSTONES FOR ITALY

| SMI KEYSTONE<br>BTICINO MATIX | SMI KEYSTONE<br>BTICINO LIVING | SMI KEYSTONE<br>BTICINO MAGIC |
|---|---|---|
| TYPE: FANTON KEYSTONE 23927 | TYPE: FANTON KEYSTONE 23932 | TYPE: FANTON KEYSTONE |
|  |  |  |

| SMI KEYSTONE<br>GEWISS | SMI KEYSTONE<br>VIMAR PLANA | SMI KEYSTONE<br>VIMAR EIKON |
|---|---|---|
| TYPE: FANTOM KEYSTONE 23937 | TYPE: FANTOM KEYSTONE 23939 | TYPE: FANTOM KEYSTONE 23915 |
|  |  |  |
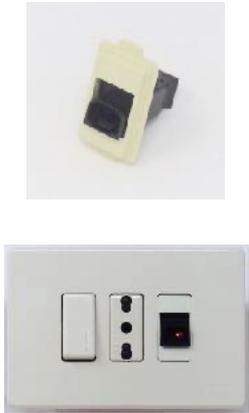
## SMI KEYSTONES FOR US-VERSION



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# WALL- AND CENTER PLATES

The flush-mounted devices are manufactured in compliance with international standards; hence all frames and plates are available from all leading manufactures. Active wall outlets like switches and WiFi-Access Points are designed for DIN UAE specification, which is available of almost all European manufactures.

Due to our close cooperation with Rutenbeck it is possible to offer the standard frames and covers as listed below.



| **WALL PLATE** | **STANDARD CENTER PLATE WITH LABELING FIELD - 1 x RJ45 PLUG** | **STANDARD CENTER PLATE WITH LABELING FIELD - 2 x RJ45 PLUGS** |
|---|---|---|
| **AP RW ;** 100 100 51<br>color: similar RAL 9010; pure white | **ZST UAE 8 RW ;** 130 100 52<br>color: similar RAL 9010; pure white | **ZST UAE 8/8 RW ;** 130 100 53<br>color: similar RAL 9010; pure white |
| dimensions: 80 mm x 80 mm x 5 mm<br>weight: 12 g | dimensions: 50 mm x 50 mm x 13 mm<br>weight: 6 g<br>1 x RJ45 interface (e.g. OMA 111 A2 WLAN) | dimensions: 50 m x 50 mm x 13 mm<br>weight: 6 g<br>2 x RJ45 interfaces (OMS 1021 UP-GIG) |



| **SURFACE MOUNTED HOUSING** | **INTERMEDIATE FRAME CH** | **CENTER PLATE FOR KEYSTONE MOUNTING FRAME** |
|---|---|---|
| **UAE-6APG RW;** 135 115 03<br>color: similar RAL 9010; pure white | **ADAPTER FRAME SWISS**<br>color: similar RAL 9010; pure white | **ZST UM-MA 2 RW;** 139 100 03<br>center plate for 2 modules, pure white |
| dimensions: 80 mm x 80 mm x 46 mm<br>weight: 93 g | dimension: 60 mm x 60 mm<br>weight: 3 g<br>for Swiss modified version | dimension: 50 mm x 50 mm<br>weight: 6 g<br>for Keystone |

# TOOLS

The thin POF cable can be installed in one conduit together with the electrical wiring, behind the skirting board or under the carpet. This method offers cost savings, less installation work and maximum safety and efficiency. A safe broadband port can thus be created at any main plug socket in your home or office within a minimum of time.

To guarantee the best POF connection, a clean and smooth cut of the cable ends is essential. Different cutting tools are available.

For optical quality and function control of POF links we offer optical measurement tools.

The tools described here simplify the installation and testing of the optical POF network.

| POF CUTTER | POF CONNECTING TOOL | POF OPTICAL POWER METER |
|---|---|---|
|  |  |  |

| **POF-UNICUT**<br>simple cutting tool for POF cable | **POF 600 004-2-3**<br>tool with cutting system and stripping aid<br>length: 190 mm<br>weight: 505 g<br>material: special tool steel | **OPM 650**<br>photodetector: 2.2 mm POF interface<br>wavelength: 650 nm<br>metering range: -35 dBm up to +10 dBm<br>operating temperature: -10 °C to +50 °C<br>dimensions: 165 mm x 80 mm x 50 mm |
| **FUNCTIONS**<br>• Tool for clean cutting of the POF-cable and easy installation of the connector less ports and POF-transceiver. | **FUNCTIONS**<br>• with cutting system for cutting and stripping off 2.2 mm POF cable<br>• stripping free of damage, exact adjustment of cable<br>• exact cut surface by special cutting system<br>• no polishing of cut surface necessary, immediate subsequent treatment possible<br>• bronzed with two-component handle bars | **FUNCTIONS**<br>• optical power measurement<br>• storage and uploading of up to 1,000 measurements to the PC<br>• evaluation software supports test reporting |

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# CONNECTORS

With a connector it is possible to lengthen the connection or in case of damage of the cable to cut the damaged part and connect the ends with it.

Note: The use of connectors decreases the maximum transmission length.

| POF CONNECTOR 2.2 MM | POF CONNECTOR 1.5 MM / 2.2 MM | POF OL-OL KEYSTONE - CONNECTOR MODULE |
|---|---|---|
| **POF-VB 2.2 MM**<br>color: grey | **POF-VB 1.5 / 2.2**<br>color: black | **POF OLOL KS**<br>color: black |
| connector-less connector for POF cabe 2.2 mm<br>attenuation: approx. 2.5 dBm | connector-less connector for pof cable 1.5 mm to 2.2 mm<br>attenuation: approx. 2.5 dBm | connector with 2 x Optolock interfaces for POF cable 2.2 mm<br>attenuation: approx. 2.5 dBm |

## ACCESSORIES

Our switches are made for placement on desks. With the accessories they can be used in many different ways.

For example it is possible to install the POF 6+2 port switch in a 19" rack or place them in the multimedia distribution cabinet.

The Switch Mounting can be used for all kinds of smaller devices which should be installed on a hole plate in a multimedia distribution cabinet or on DIN rail.
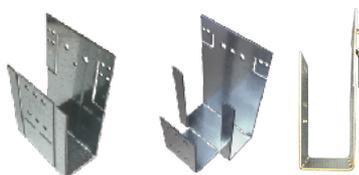


| 19" RACK SHELF | SWITCH MOUNTING FOR MULTIMEDIA DISTRIBUTION CABINET | PRE-INSTALLATION IN MULTIMEDIA DISTRIBUTION |
|---|---|---|
| **19" RACK**<br>for up to 2 x OMS 126 RR or<br>  2 x OMS 1026 RR-GIG<br>dimensions: 48.3 cm x 12 cm x 4.5 cm (1U)<br><br>weight: 472 g<br>color: galvanized | **HOS2**<br>for up to 2 x Optical Media Switches<br>dimensions: 22.5 cm x 7 cm x 0.1 cm (raw)<br>  11 cm x 7 cm x 6.5 cm (bended)<br><br>weight: 90 g<br>color: galvanized | The POF cables are parked in the multimedia distribution cabinet. For example with Wago clamps. To activate the optical fibre connections, the parked cables are connected to an active POF network component eg. POF Switch or POF media converter. |
| • rack Shelf for the installation of max. 2 x POF 6+2 Port Switches in 19" rack<br>• incl. mounting screws | • mounting solution for optical media switches in an multimedia distribution cabinet<br>• rail mounting possible<br>• mounting on mounting plate possible | |







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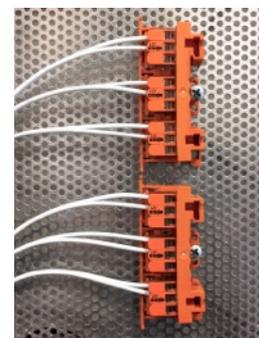
# NOTES

# SPECIFICATION - OPTICAL CABLE

| PARAMETER | RHEE 4002 | GHV 4002 |
|---|---|---|
| Fibre | | |
| Core Material | Polymethyl-Metharcrylate Resin (PMMA) | |
| Cladding | Flourinated Polymer | |
| Core Refractive Index | 1.49 | |
| Refractive Index Profile | Step Index | |
| Numerical Aperture (NA) | 0.5 | |
| Core diameter in µm | Min. 920 / typ. 980 / Max. 1040 | |
| Diameter with Cladding in µm | Min. 940 / typ. 1000 / Max. 1060 | |
| Jacket | | |
| Material | Polyethylene, double jacketing | Polyvinylchloride |
| Color | white | grey |
| Dimension in mm | Minor Achse - Min. 2.13 / typ. 2.2 / Max. 2.27 <br> Major Achse - Min. 4.3 / typ. 4.4 / Max. 4.5 | |
| Fibre identification | One fibre of the duplex cable has the following indication in pink: "ESKA OPTOHOME MITSUBISHI RAYON" | One fibre of the duplex cable has the following indication in pink: "MITSUBISHI Chemical AWM 5238 80C VW-1 GHV 4002" |
| Weight | approx. 7.5 g/m | approx. 11 g/m |
| Bundle <br><br> Reel | 20 m, 30 m, 40 m, 50 m, 70 m, 100 m <br> 500 m, 1,000 m | 20 m, 30 m, 40 m, 50 m, 70 m, 100 m <br> 500 m, 1,000 m |
| Characteristics | low cost, no light leakage on bendings | fire retardant, UL VW-1 |
| Mechanics | | |
| Operating temperature | -55 °C to +70 °C (in dry climate) max. 60 °C (up to 95 % humidity) | -40 °C to +85 °C (in dry climate) max. 75 °C (up to 95 % humidity) |
| Transmission losses | 170 dB/km (at 650 nm) | |
| Minimum bend radius | Loss </= 0.5 dB 25 mm @100 % transmission (quarter bending) | |
| Tensile strength | Tensile force @ 5 % elongation: 140 N | |
| Compression (at 50kg weight) | 0.4 dB increasing of attenuation | |
| Standard | IEC 60793-2-40   Optical fibres -Part 2-40 | |

# SPECIFICATION - FAST ETHERNET MEDIA CONVERTER

| Device | MCE 301-FC | OMC 100 REG |
|---|---|---|
| Standard | IEEE 802.3, IEEE 802.3u, IEEE 802.3x | IEEE 802.3, IEEE 802.3u |
| QoS | | |
| Accreditation | FCC Part 15 Class B, EN 55022 Class B | FCC Part 15 Class B, EN 55022 Class B |
| Optical network interface | 1 x OPTOLOCK interface | 1 x OPTOLOCK interface |
| Information rate optical interface | 100 Mbps | 100 Mbps |
| Wavelength | 650 nm | 650 nm |
| Optical Gigabit input sensitivity | | |
| Optical Gigabit transmission distance | | |
| Backward compatibility | | |
| Optical 100 Mbps input sensitivity | -23 dBm | -23 dBm |
| Optical 100 Mbps transmission distance | typ. 80 m [1] | typ. 80 m [1] |
| Network interface | 1 x RJ45 | 1 x RJ45 |
| Information rate network interface | 100 Mbps | 100 Mbps |
| Network interface transmission distance | 100 m | 100 m |
| Additional network interface | | |
| Additional network interface transmission distance | | |
| Information rate additional network interface | | |
| Power supply | 5 V DC 0.4 A ext. power supply; (100 - 240) V AC (50 - 60) Hz | (8 - 24) V DC ext. power supply; not included! |
| Power consumption typ. | 0.9 W | 0.9 W |
| Operation temperature | 0 °C to +45 °C | -5 °C to +45 °C |
| Protecting Class DIN EN 60529 | IP20 | IP20 |
| Protecting Class DIN EN 61140 | II | II |
| Dimensions (WxHxD) in mm | 40 x 93,5 x 25,2 | 70 x 90 x 18 |
| Application | home and office networks | include smart home devices, DIN rail mounting devices |

[1] with recommended POF cable: SI faser, NA: 0.5; Cat. A4a.2
(z.B. Mitsubishi Optohome RHEE 4002, GHV 4002)

# SPECIFICATION - GIGABIT MEDIA CONVERTER

| Device | OMC 1001 GIG | OMC 1000 REG-GIG |
|---|---|---|
| Standard | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab |
| QoS | | |
| Accreditation | FCC Part 15 Class B, EN 55022 Class B | FCC Part 15 Class B, EN 55022 Class B |
| Optical network interface | 1 x POF connector less Broadcom | 1 x POF connector less Broadcom |
| Information rate optical interface | 1 Gbps | 1 Gbps |
| Wavelength | 650 nm | 650 nm |
| Optical Gigabit input sensitivity | -16.5 dBm | -16.5 dBm |
| Optical Gigabit transmission distance | typ. 50 m [1] up to 80 m with ABR [2] | typ. 50 m [1] up to 80 m with ABR [2] |
| Backward compatibility | Yes | Yes |
| Optical 100 Mbps input sensitivity | -23 dBm | -23 dBm |
| Optical 100 Mbps transmission distance | typ. 80 m [1] | typ. 80 m [1] |
| Network interface | 1 x RJ45 | 1 x RJ45 |
| Information rate network interface | 1 Gbps | 1 Gbps |
| Network interface transmission distance | 100 m | 100 m |
| Additional network interface | | |
| Additional network interface transmission distance | | |
| Information rate additional network interface | | |
| Power supply | 5 V DC 1.2 A ext. power supply; (100 - 240) V AC (50 - 60) Hz | (8 - 52) V DC ext. power supply; not included! |
| Power consumption typ. | 1.3 W | 1.9 W |
| Operation temperature | 0 °C to +45 °C | -5 °C to +45 °C |
| Protecting Class DIN EN 60529 | IP20 | IP20 |
| Protecting Class DIN EN 61140 | II | II |
| Dimensions (WxHxD) in mm | 35 x 90 x 18 | 70 x 90 x 18 |
| Application | home and office networks | include smart home devices, DIN rail mounting devices |

[1] with recommended POF cable: SI faser, NA: 0.5; Cat. A4a.2
(z.B. Mitsubishi Optohome RHEE 4002, GHV 4002)

[2] ABR means Adaptive Bit Rate. The reduction of the information rate is used for guarantee error free transmission if the signal strength is low or the length of the cable is above 50 m

# SPECIFICATION - MEDIA CONVERTER WITH SWITCHING FUNCTION

| Device | OMC 1003 ACT-GIG | OMC 2003 ACT-GIG |
|---|---|---|
| Standard | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab |
| QoS | | |
| Accreditation | FCC Part 15 Class B, EN 55022 Class B | FCC Part 15 Class B, EN 55022 Class B |
| Optical network interface | 1 x  POF connector less Broadcom | 2 x POF connector less Broadcom |
| Information rate optical interface | 1 Gbps | 1 Gbps |
| Wavelength | 650 nm | 650 nm |
| Optical Gigabit input sensitivity | -16.5 dBm | -16.5 dBm |
| Optical Gigabit transmission distance | typ. 50 m [1] | typ. 50 m [1] |
| Backward compatibility | Yes | Yes |
| Optical 100 Mbps input sensitivity | -23 dBm | -23 dBm |
| Optical 100 Mbps transmission distance | typ. 80 m [1] | typ. 80 m [1] |
| Network interface | 3 x RJ45 | 3 x RJ45 |
| Information rate network interface | 1 Gbps | 1 Gbps |
| Network interface transmission distance | 100 m | 100 m |
| Additional network interface | | |
| Additional network interface transmission distance | | |
| Information rate additional network interface | | |
| Power supply | 5 V DC 1.2 A ext. power supply; (100 - 240) V AC (50 - 60) Hz | 5 V DC 1.2 A ext. power supply; (100 - 240) V AC (50 - 60) Hz |
| Power consumption typ. | 2.8 W | 3 W |
| Operation temperature | 0 °C to +45 °C | 0 °C to +45 °C |
| Protecting Class DIN EN 60529 | IP20 | IP20 |
| Protecting Class DIN EN 61140 | II | II |
| Dimensions (WxHxD) in mm | 66 x 90 x 25 | 66 x 90 x 25 |
| Application | home and office networks | home and office networks |

[1] with recommended POF cable: SI faser, NA: 0.5; Cat. A4a.2
(z.B. Mitsubishi Optohome RHEE 4002, GHV 4002)

# SPECIFICATION - FAST ETHERNET SWITCH

| Device | OMS 113-FC |
|---|---|
| Standard | IEEE 802.3, IEEE 802.3u |
| QoS | |
| Accreditation | FCC Part 15 Class B, EN 55022 Class B |
| Optical network interface | 3 x OPTOLOCK interface |
| Information rate optical interfaces | 100 Mbps |
| Wavelength | 650 nm |
| Optical Gigabit input sensitivity | |
| Optical Gigabit transmission distance | |
| Backward compatibility | |
| Optical 100 Mbps input sensitivity | -23 dBm |
| Optical 100 Mbps transmission distance | typ. 80 m [1] |
| Network interface | 1 x RJ45 |
| Information rate network interface | 100 Mbps |
| Network interface transmission distance | 100 m |
| Additional network interface | |
| Additional network interface transmission distance | |
| Information rate additional network interface | |
| Power supply | 5 V DC 2 A ext. power supply; (100 - 240) V AC (50 - 60) Hz |
| Power consumption typ. | |
| Operation temperature | 0 °C to +50 °C |
| Protecting Class DIN EN 60529 | IP20 |
| Protecting Class DIN EN 61140 | II |
| Dimensions (WxHxD) in mm | |
| Application | small home and office networks |

[1] with recommended POF cable: SI faser, NA: 0.5; Cat. A4a.2
(z.B. Mitsubishi Optohome RHEE 4002, GHV 4002)

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# SPECIFICATION - GIGABIT SWITCH

| Device | OMS 1041 ACT-GIG | OMS 1026 RR-GIG |
|---|---|---|
| Standard | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab |
| QoS | | |
| Accreditation | FCC Part 15 Class B, EN 55022 Class B | FCC Part 15 Class B, EN 55022 Class B |
| Optical network interface | 4 x POF connector less Broadcom | 6 x POF connector less Broadcom |
| Information rate optical interfaces | 1 Gbps | 1 Gbps |
| Wavelength | 650 nm | 650 nm |
| Optical Gigabit input sensitivity | -16.5 dBm | -16.5 dBm |
| Optical Gigabit transmission distance | typ. 50 m [1] up to 80 m with ABR [2] | typ. 50 m [1] up to 80 m with ABR [2] |
| Backward compatibility | Yes | Yes |
| Optical 100 Mbps input sensitivity | -23 dBm | -23 dBm |
| Optical 100 Mbps transmission distance | typ. 80 m [1] | typ. 80 m [1] |
| Network interface | 1 x RJ45 | 2 x RJ45 |
| Information rate network interface | 1 Gbps | 1 Gbps |
| Network interface transmission distance | 100 m | 100 m |
| Additional network interface | | |
| Additional network interface transmission distance | | |
| Information rate additional network interface | | |
| Power supply | 12 V DC 0.5 A ext. power supply; (100-240) V AC  (50-60) Hz | 5 V DC 3 A ext. power supply; (100-240) V AC (50-60) Hz |
| Power consumption typ. | 6 W | 10 W |
| Operation temperature | 0 °C to +42 °C | 0 °C to +42 °C |
| Protecting Class DIN EN 60529 | IP20 | IP20 |
| Protecting Class DIN EN 61140 | II | II |
| Dimensions (WxHxD) in mm | 90 x 80 x 24.5 | 196 x 30 x 124 |
| Application | small home and office networks | home and office networks |

[1] with recommended POF cable: SI faser, NA: 0.5; Cat. A4a.2
(z.B. Mitsubishi Optohome RHEE 4002, GHV 4002)

[2] ABR means Adaptive Bit Rate. The reduction of the information rate is used for guarantee error
free transmission if the signal strength is low or the length of the cable is above 50 m

# SPECIFICATION - GIGABIT SMART SWITCH

| Device | OMS 1034 FUS-GIG | OMS 1412 RS-GIG |
|---|---|---|
| Standard | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab |
| QoS | Web configuration, console | Web configuration, console |
| Accreditation | CE conform, RoHS compliant | FCC Part 15 Class B, EN 55022 Class B |
| Optical network interface | 4 x POF connector less Broadcom | 12 x POF connector less Broadcom |
| Information rate optical interfaces | 1 Gbps | 1 Gbps |
| Wavelength | 650 nm | 650 nm |
| Optical Gigabit input sensitivity | -16.5 dBm | -16.5 dBm |
| Optical Gigabit transmission distance | typ. 50 m [1] up to 80 m with ABR [2] | typ. 50 m [1] up to 80 m with ABR [2] |
| Backward compatibility | Yes | Yes |
| Optical 100 Mbps input sensitivity | -23 dBm | -23 dBm |
| Optical 100 Mbps transmission distance | typ. 80 m [1] | typ. 80 m [1] |
| Network interface | 2 x RJ45 | 2 x RJ45 |
| Information rate network interface | 1 Gbps | 1 Gbps |
| Network interface transmission distance | 100 m | 100 m |
| Additional network interface | 1 x SFP | 2 x SFP+ |
| Additional network interface transmission distance | 1 Gbps | 10 Gbps |
| Information rate additional network interface | 100 m / 1 km | 100 m / 1 km |
| Power supply | 12 V DC 2 A ext. power supply; (100-240) V AC (50-60) Hz | 12 V DC 3 A ext. power supply; (100-240) V AC (50-60) Hz |
| Power consumption typ. | Max. 20 W | 15 W |
| Operation temperature | 0 °C to +45 °C | 0 °C to +42 °C |
| Protecting Class DIN EN 60529 | IP20 | IP20 |
| Protecting Class DIN EN 61140 | II | II |
| Dimensions (WxHxD) in mm | 125 x 150 x 25 | 440 x 45 x 210 (19" Switch, 1U) |
| Application | small home and office networks | complexe networks |

[1] with recommended POF cable: SI faser, NA: 0.5; Cat. A4a.2
(z.B. Mitsubishi Optohome RHEE 4002, GHV 4002)

[2] ABR means Adaptive Bit Rate. The reduction of the information rate is used for guarantee error free transmission if the signal strength is low or the length of the cable is above 50 m

# SPECIFICATION - NETWORK SOCKETS

| Device | OMS 121 UP (CH) | OMS 1021 UP-GIG (CH) |
|---|---|---|
| Standard | IEEE 802.3, IEEE 802.3u | IEEE 802.3, IEEE 802.3u, IEEE 802.3ab |
| QoS | | |
| Accreditation | FCC Part 15 Class B, EN 55022 Class B | FCC Part 15 Class B, EN 55022 Class B |
| Optical network interface | 1 x OPTOLOCK interface | 1 x POF connector less Broadcom |
| Information rate optical interface | 100 Mbps | 1 Gbps |
| Wavelength | 650 nm | 650 nm |
| Optical Gigabit input sensitivity | | -16.5 dBm |
| Optical Gigabit transmission distance | | typ. 50 m [1] up to 80 m with ABR [2] |
| Backward compatibility | | Yes |
| Optical 100 Mbps input sensitivity | -23 dBm | -23 dBm |
| Optical 100 Mbps transmission distance | typ. 80 m [1] | typ. 80 m [1] |
| Network interface | 2 x RJ45 | 2 x RJ45 |
| Information rate network interface | 100 Mbps | 1 Gbps |
| Network interface transmission distance | 100 m | 100 m |
| Additional network interface | | |
| Additional network interface transmission distance | | |
| Information rate additional network interface | | |
| Power supply | integrated power supply; (100 - 240) V AC (50 - 60) Hz | integrated power supply; (100 - 240) V AC (50 - 60) Hz |
| Power consumption typ. | 0.9 W | 2.8 W |
| Operation temperature | -5 °C to +45 °C | 0 °C to +45 °C |
| Protecting Class DIN EN 60529 | IP20 | IP20 |
| Protecting Class DIN EN 61140 | II | II |
| Dimensions (WxHxD) in mm | fits to DIN Flush-mounting boxes | fits to DIN Flush-mounting boxes |
| Application | home and office networks | home, office and complex networks |

[1] with recommended POF cable: SI faser, NA: 0.5; Cat. A4a.2
(z.B. Mitsubishi Optohome RHEE 4002, GHV 4002)

[2] ABR means Adaptive Bit Rate. The reduction of the information rate is used for guarantee error free transmission if the signal strength is low or the length of the cable is above 50 m

# SPECIFICATION - WIFI ACCESS POINT

| Device | OMA 111 A2 WLAN (CH) |
|---|---|
| Standard | IEEE 802.3, IEEE 802.3u, IEEE 802.11n |
| QoS | Web configuration |
| Accreditation | FCC Part 15 Class B, EN 55022 Class B |
| Optical network interface | 1 x OPTOLOCK interface |
| Information rate optical interface | 100 Mbps |
| Wavelength | 650 nm |
| Optical Gigabit input sensitivity | |
| Optical Gigabit transmission distance | |
| Backward compatibility | |
| Optical 100 Mbps input sensitivity | -23 dBm |
| Optical 100 Mbps transmission distance | typ. 80 m [1] |
| Network interface | 1 x RJ45 |
| Information rate network interface | 100 Mbps |
| Network interface transmission distance | 100 m |
| Additional network interface | 1 x WiFi antenna 2.4 GHz |
| Additional network interface transmission distance | Very good: typ. (5 - 10) m Accaptable: typ. (10 - 20) m |
| Information rate additional network interface | 300 Mbps (WiFi 4) |
| Power supply | integrated power supply; (100 - 240) V AC (50 - 60) Hz |
| Power consumption typ. | < 3.9 W |
| Operation temperature | -5 °C  to +35 °C |
| Protecting Class DIN EN 60529 | IP20 |
| Protecting Class DIN EN 61140 | II |
| Dimensions (WxHxD) in mm | fits to DIN flush-mounting boxes |
| Application | home networks with small number of clients |

[1] with recommended POF cable: SI faser, NA: 0.5; Cat. A4a.2
(z.B. Mitsubishi Optohome RHEE 4002, GHV 4002)

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# NOTES

# homefibre

**homefibre digital network gmbh**

Fratresstrasse 20

9800 Spittal /Drau

Austria

**Contact us:**

E-Mail: welcome@homefibre.at

Phone: +43 4762 35391

Fax: +43 4762 42780

**More Information:**

Web: www.homefibre.at

Webshop: www.homefibre24.at

Your local partner: