

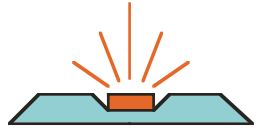
A product family for simplex POF home networks

Hans Kragl

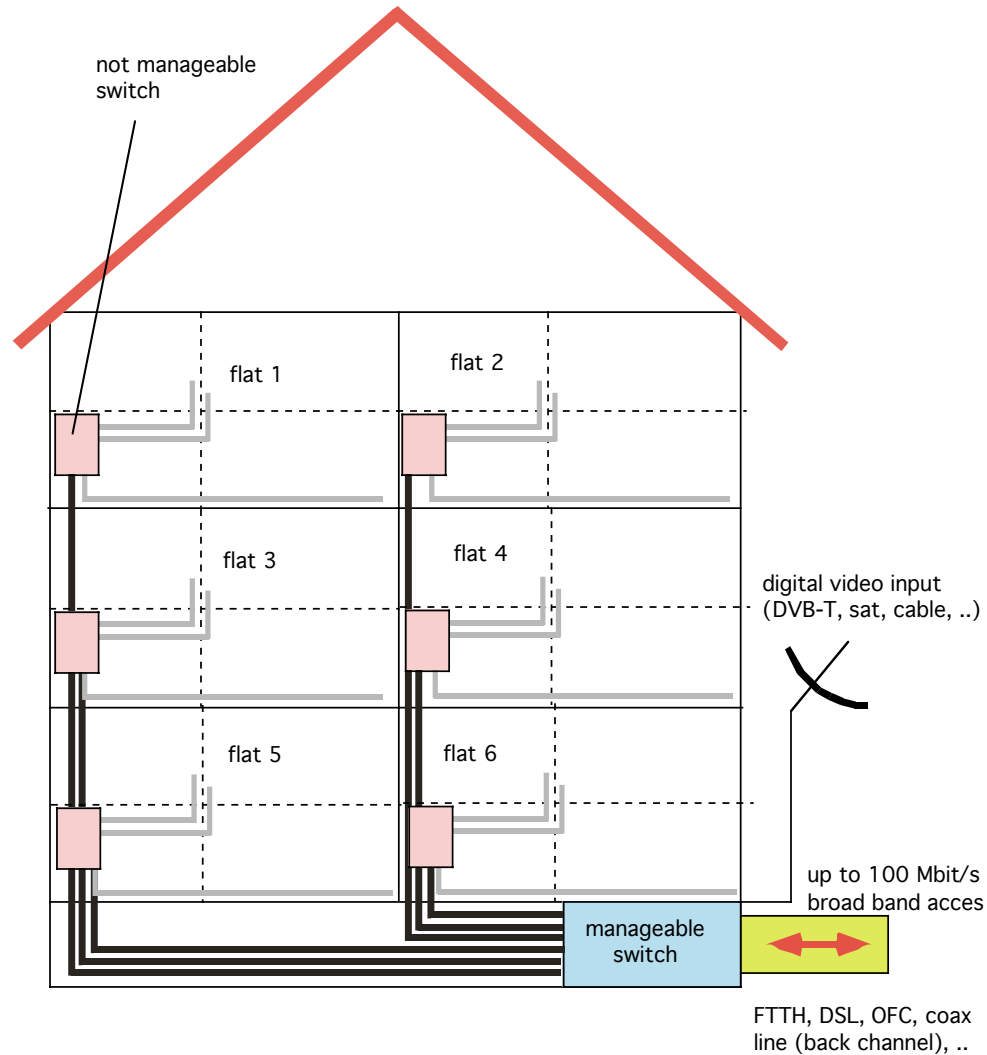
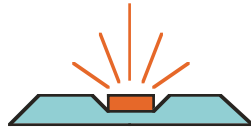
DieMount GmbH
Giesserweg 3
38855 Wernigerode

www.diemount.com

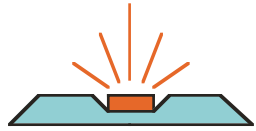
FGT 5.4.1 Meeting, Oldenburg, May 12th, 2006



- 1. Triple play at home: suitable local telecom infrastructure**
- 2. Installation conditions for home networks**
- 3. POF cable options**
- 4. POF network components**
- 5. POF installation options**
- 6. Proposal for local POF infrastructure**



- **Public network connection up to 100 Mbit/s**
- **Services: Tripleplay**
 - data (internet)
 - phone (VoIP)
 - IPTV
 - digital TV fed in locally to the LAN (DVB-T, DVB-S, DVB-C)
- **House net manageable due to data security requirements (extension up to 70 m)**
- **Home (flat) net not manageable (extension up to 30 m)**



Installation conditions



bare brickwork



refurbished flat



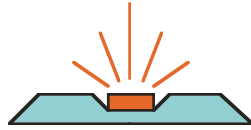
occupied flat (standard)



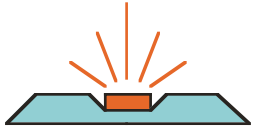
Königszimmer,
Schloss
Wernigerode

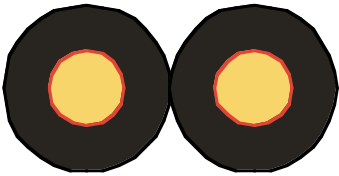
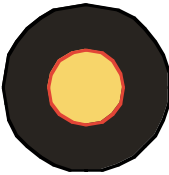



high quality interior

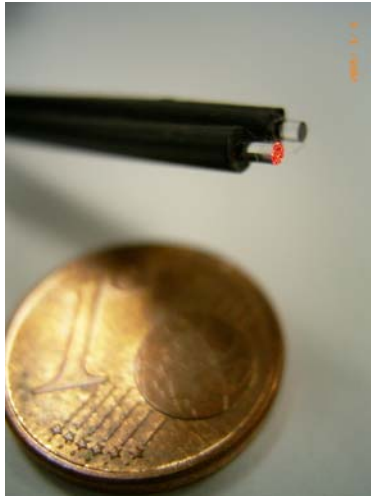
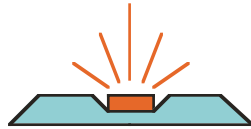
May 2006



<i>installation site:</i>	<i>done by:</i>	<i>suitable medium:</i>
bare brickwork	professional electrician	CAT5/6/7, coax, POF
refurbished flat	professional/amateur electrician	CAT5/6/7 (?), POF
occupied flat	amateur/professional electrician	POF
high quality interior	professional electrician	POF

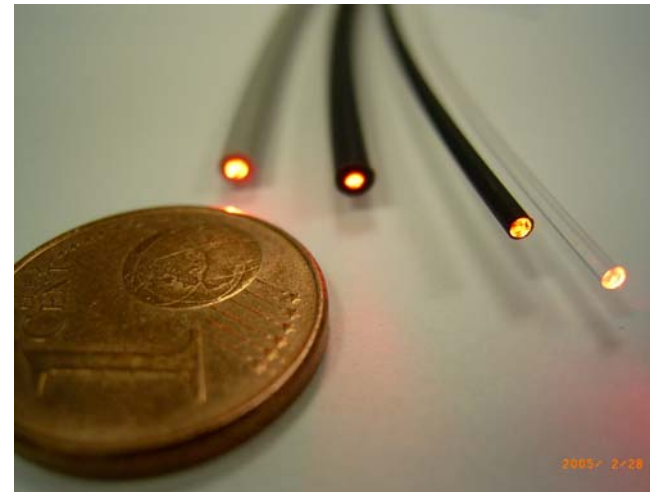


	cross section	cable material	types (e.g.)	prices @1km
	4.4mmx 2.2mm	PE or PVC	TC-1000W, TCV-1000W	0,37 - 0,50 €/m
	2.2mmø	PE or PVC	TC-1000, TCV-1000, P322EWT	0,11 - 0,30 €/m
	1.25mmø		TC-1000 1.25	0,37 €/m
	1mmø		DB-1000, P310011	0,08 - 0,12 €/m
	2mmx 1mm	PE	TC-500W	0,60 €/m



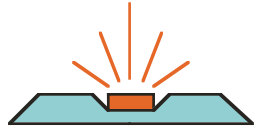
Duplex POF:

- 0.37 to 0.50 €/m
- PE or **PVC** cable material
- 2.2x4.4mm cross section
- PE each colour, PVC grey
- preferred bending direction
- risk to mix up Tx and Rx channel



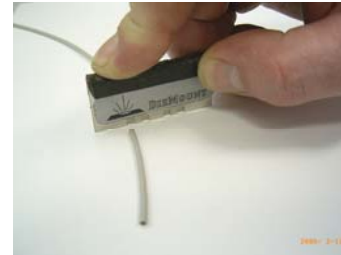
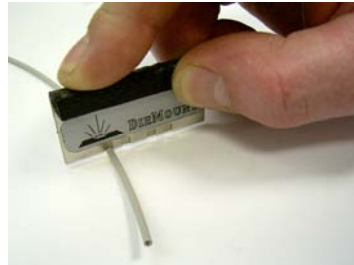
Simplex POF:

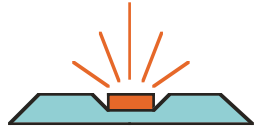
- 0.08 €/m (bare POF) to 0.3 €/m
- PE, **PVC**, PA cable material
- 1.0x1.0mm to 2.2x2.2mm cross section
- each colour and **“invisible” transparent**
- no preferred bending direction
- no risk to mix up Tx and Rx channel



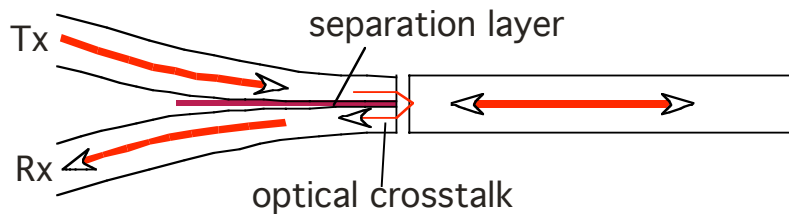
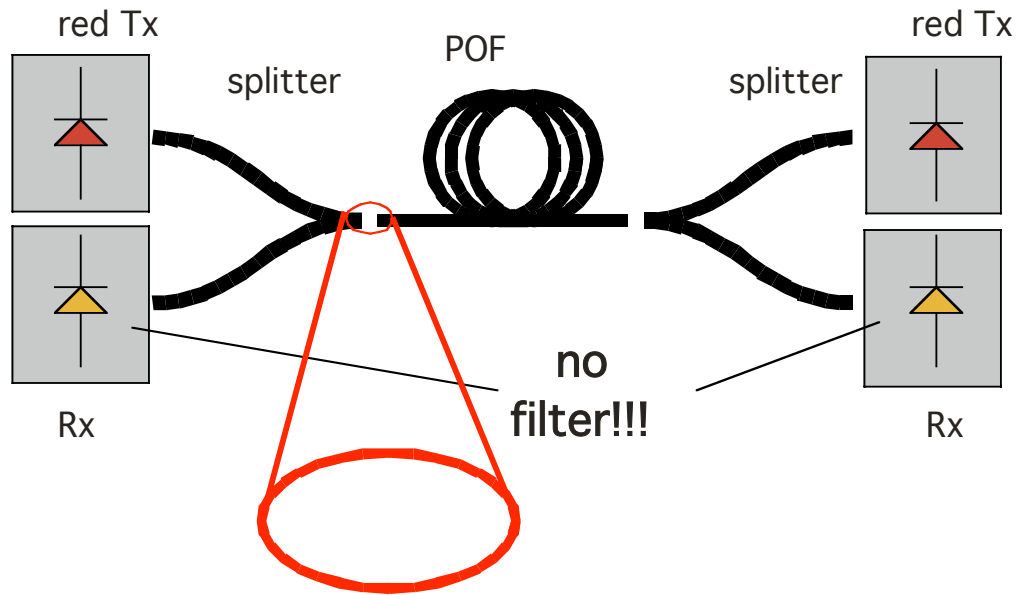
Connector free connection to POF transceiver:

- available for duplex and simplex POF,
- no connector needed,
- cut POF endface (not polished) is **only 0.3dB/endface worse, if PVC POF cable (e.g. TCV-1000) is used.**



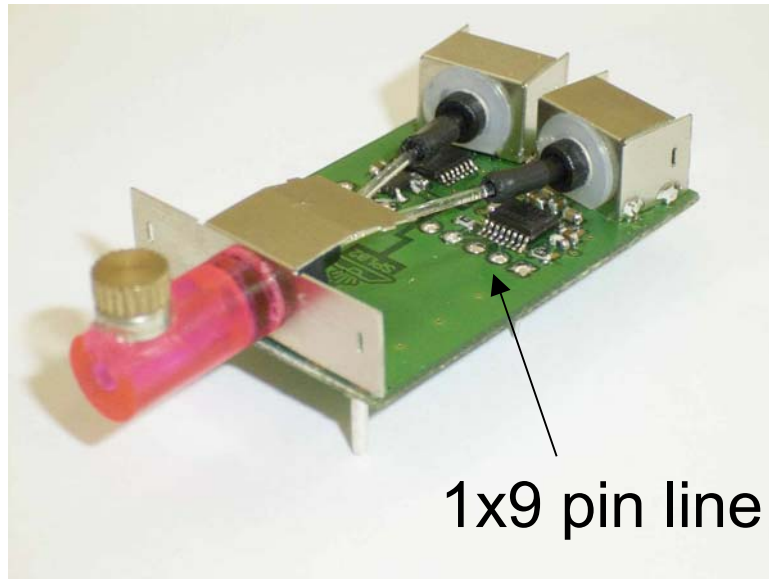
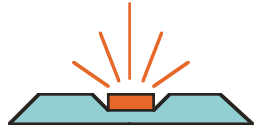


Transceiver for simplex POF systems



Directivity multiplex (DM) technology:

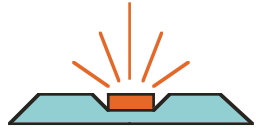
- Full duplex operation feasible
- 1 type of transceiver only
- established red LED components
- Low crosstalk splitters (>40dB crosstalk attenuation) required



Simplex transceiver
DieMount 2005

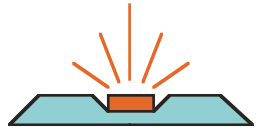


Optical simplex
transceiver unit
DieMount 2006

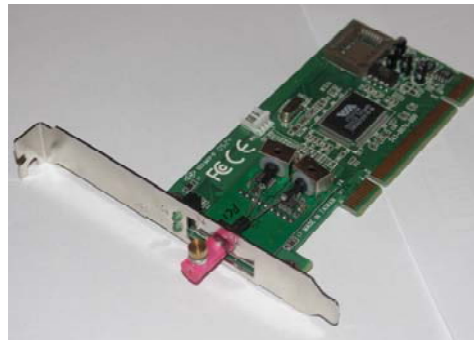
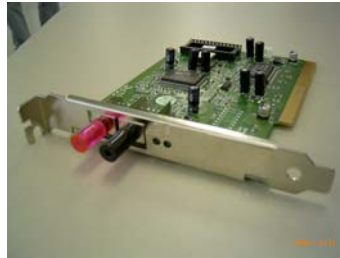


type of operation	wavelength [nm]	Transmission distance [m]		
		lab conditions	quality test	guarantee
duplex	650	95	70	50
duplex (Tx@15 mA)	470	–	120	–
duplex (Tx@40 mA)	470	150		
simplex (DM)	650	50	40	30
simplex (DM)	470	100	70	–
simplex (WDM)	650/470	50	40	30

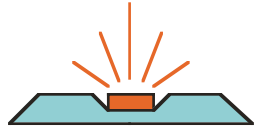
Background colour red or blue: available products.



Typical POF network products



- Media converters, PCI-cards, switch combinations in cooperation with Wamin Optocomm, Taiwan

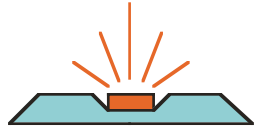


Home application needs specially adapted products at

- the network switching node and
- the network end node

Reasons:

- available network products stem from computer LAN applications and don't fit to private home
- small volumes make components too expensive for home applications

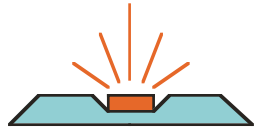


gut drauf[®] - Hersteller für Elektrotechnik



Media converter may utilize the available power supply. They can be designed as:

- component comprising power plug, or
- installation outlet.



78cm x 57cm x 14cm

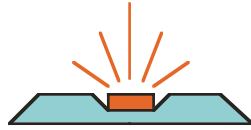


Typically necessary components in a home installation are:

- DSL-Splitter, ISDN-NTBA, DSL-Router
- electrical switch, media converters, (in future: optical switch)
- “a lot of” wall power supplies

All these components fit into a very flat (about 10cm depth) wall cupboard designed for home application.





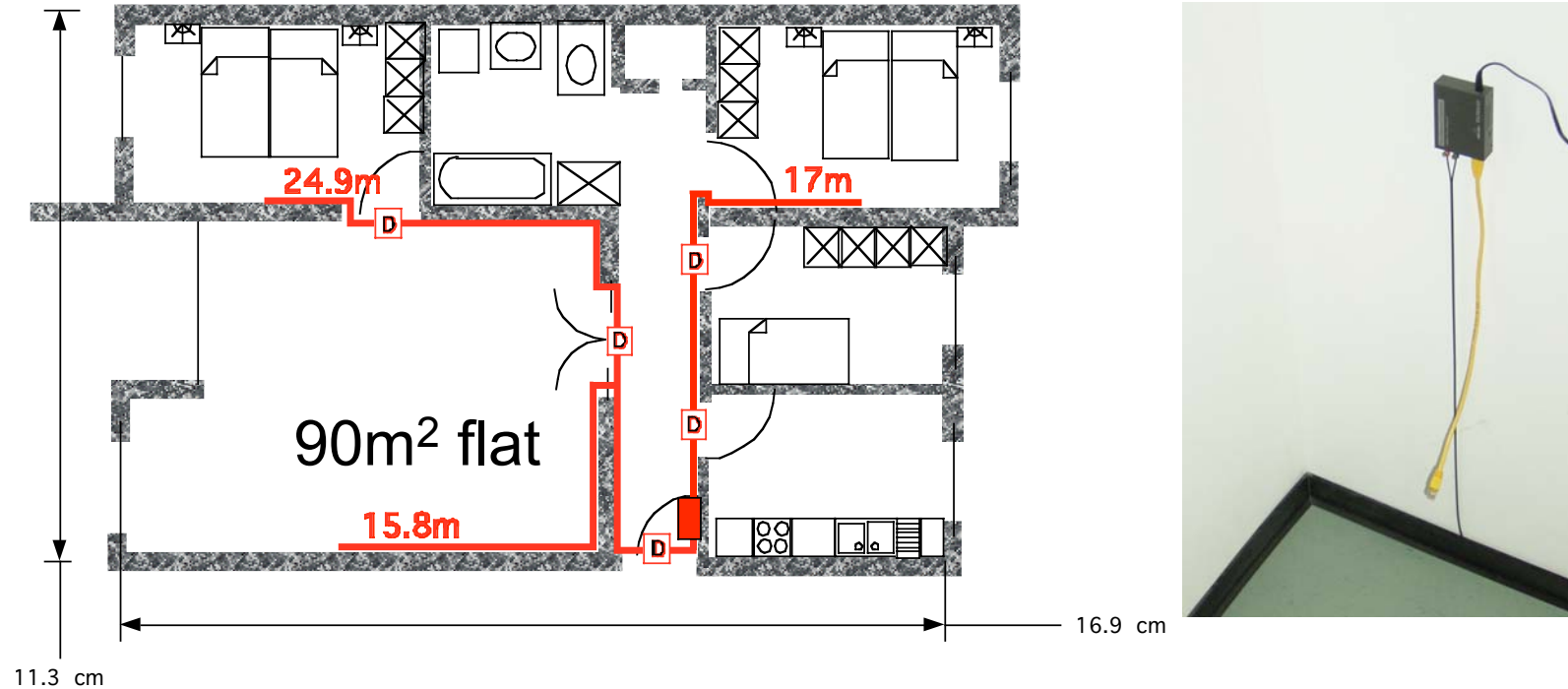
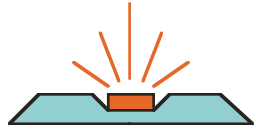
POF fed end comprising WLAN access points offers:

- POF transmits the data signal through walls and radio frequency absorbing ceilings,
- the user is free to move without cable,
- radio frequency power can be reduced to minimum,
- no mutual interference with neighbouring access points and correspondingly no bandwidth reduction,
- reduced risk of unauthorized LAN interception.

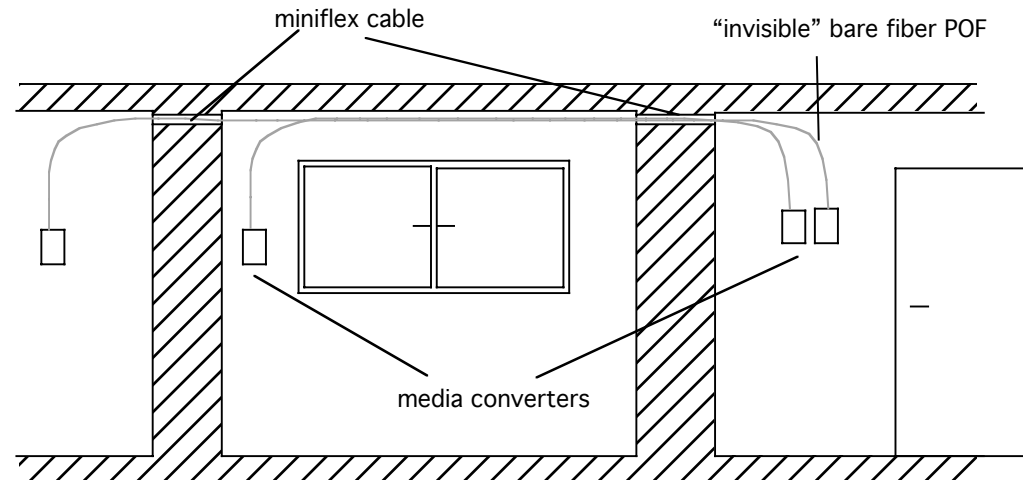
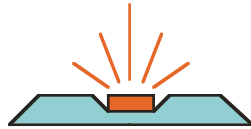
**All options
available:**

- ductwork installation**
 - cable slit installation**
 - CAT5/6/7, coax, POF**
- all types no problem**

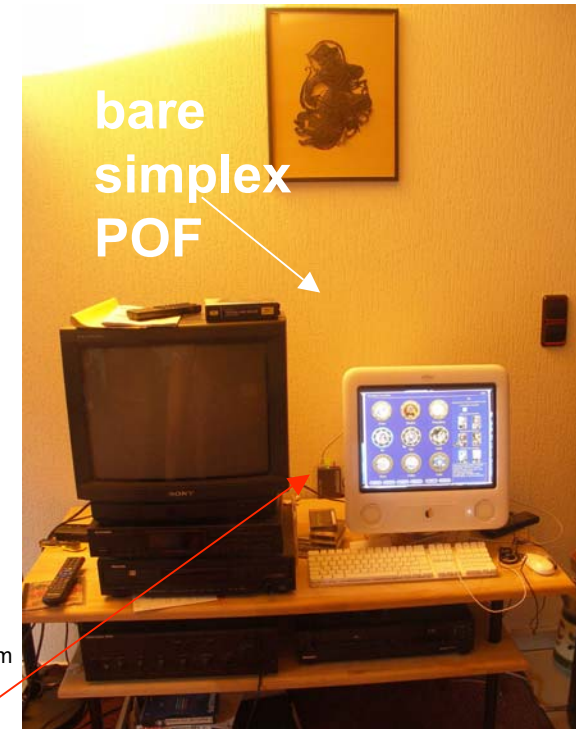
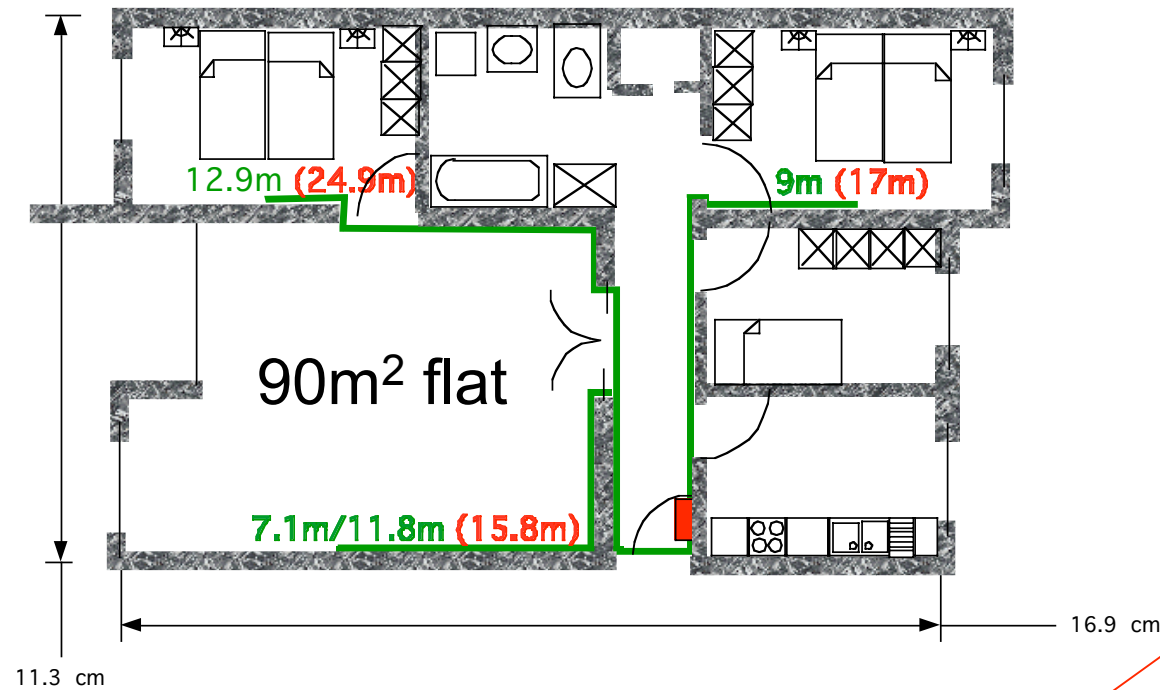
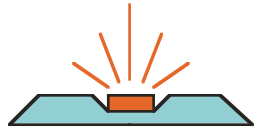




- **POF is hidden behind skirting board on floor level.**
- **Around door cable trip adds 4m transmission distance. E.g., 3 doors increase cable length by 12m.**
- **The installation must be done carefully and with high effort to be really invisible.**

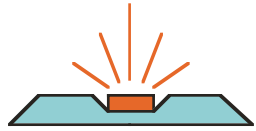


- **POF is installed above eye height and should be as invisible as possible, i.e. simplex POF (white) and bare fiber POF preferred.**
- **No around door cable trip necessary; the cable length is reduced.**
- **Small 3-4mm wall holes reduce cable length further.**
- **Bare fiber POF is protected at critical parts by miniflex cables.**

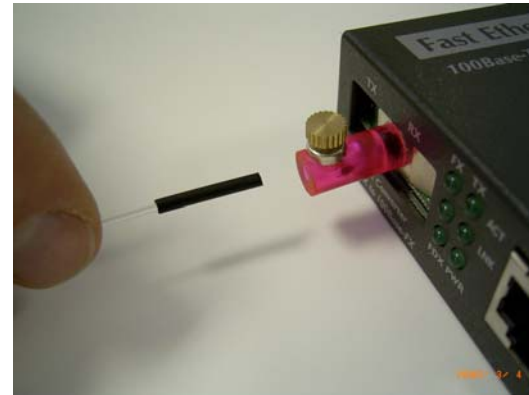
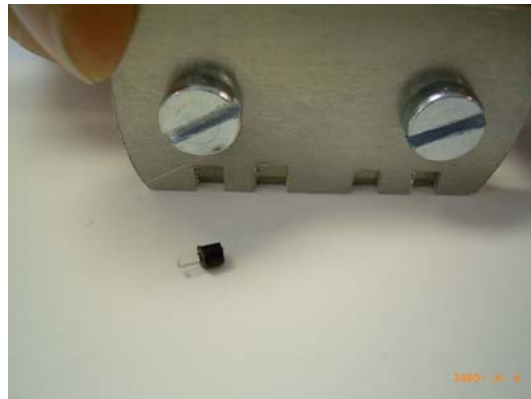
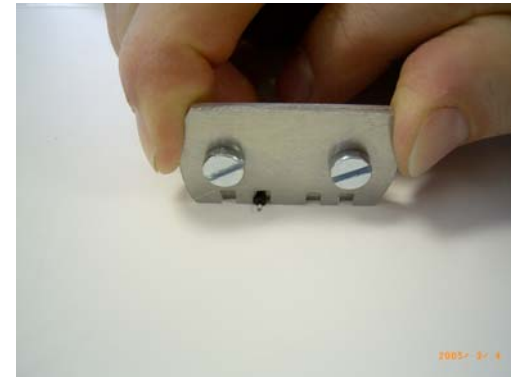
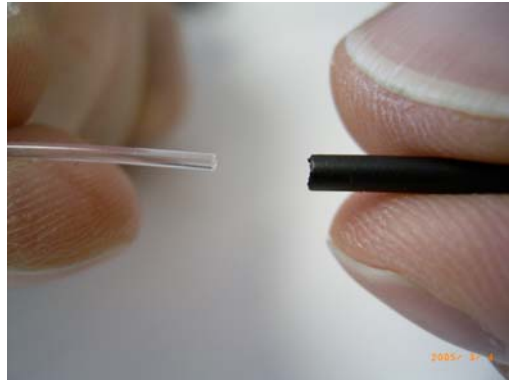


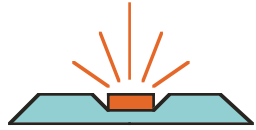
media converter

- **For the 90sqm reference flat the cable lengths can be reduced by ceiling level installation up to factor 2.**

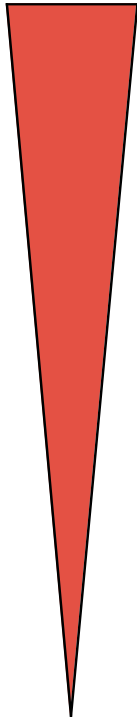


Simplex bare POF termination





highly building invasive



CAT5/6/7

coax

POF duplex

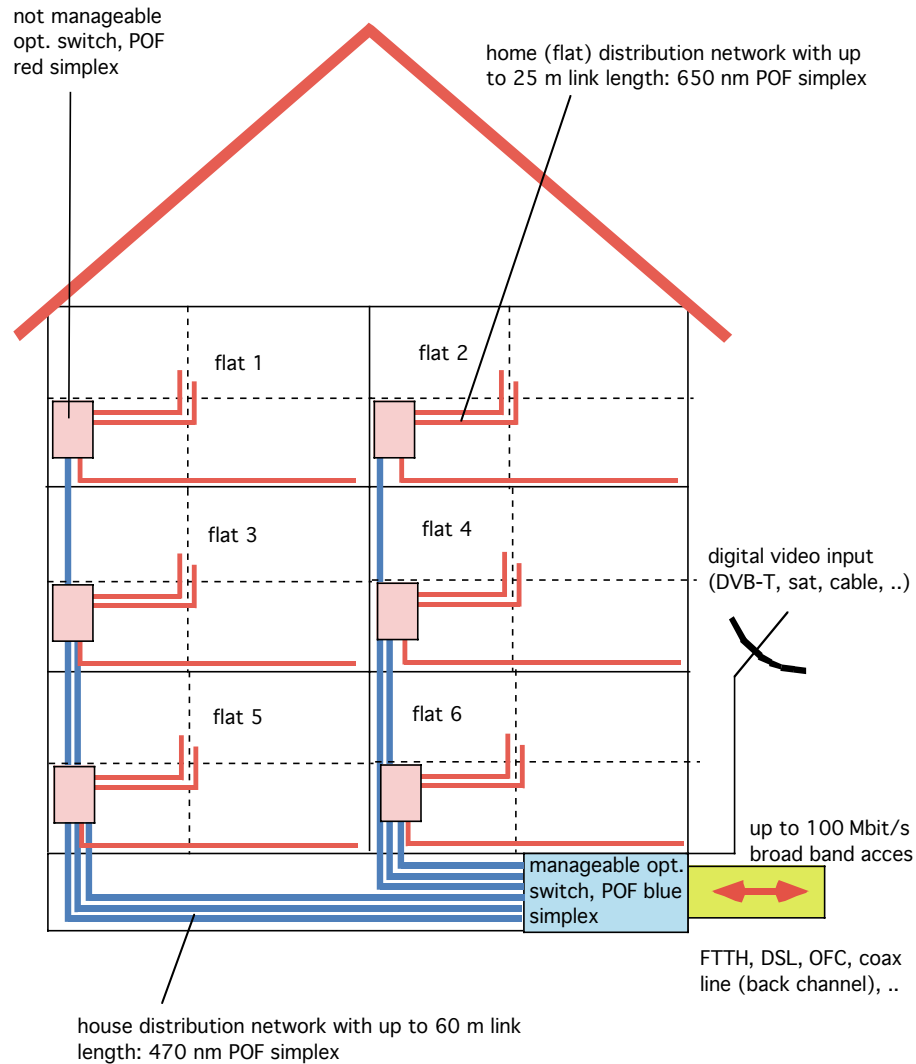
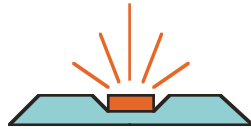
POF simplex 2.2mm

POF simplex 1.25mm

POF simplex 1mm bare fiber or 0.5mm duplex

WLAN

not building invasive



- **Public network connection up to 100 Mbit/s**
- **Services: Tripleplay**
 - data (internet)
 - phone (VoIP)
 - IPTV
 - digital TV fed in locally to the LAN (DVB-T, DVB-S, DVB-C)
- **House net manageable due to data security requirements (extension up to 70 m)**
- **Home (flat) net not manageable (extension up to 30 m)**