

Fast Ethernet Simplex Transceivers for POF Inhouse LAN

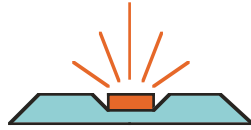
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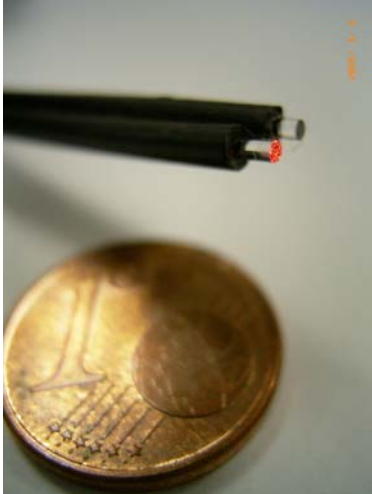
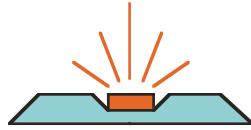
www.diemount.com

FGT 5.4.1 Meeting, Zürich, March 8th, 2005

March 2005

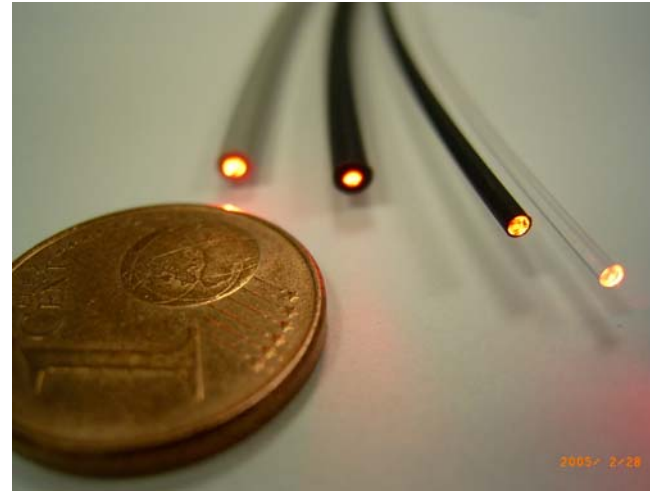


- 1. Why POF simplex data transmission?**
- 2. Types of bidirectional simplex POF systems**
 - Half duplex systems
 - Wavelength division multiplex (WDM) systems
 - Directivity multiplex (DM) systems
- 3. DieMount Fast Ethernet Simplex POF transceivers**
 - Available components
 - Simplex transceiver design
 - System integration
- 4. Simplex POF installation**
 - Installation with grey cable POF (TCV-1000)
 - Installation with bare fiber POF
- 5. DieMount starter kits**



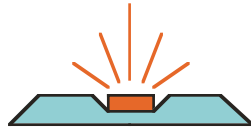
Duplex POF:

- 0.50 €/m
- 2.2x4.4mm cross section
- ugly black colour in private flat
- preferred bending direction
- risk to mix up Tx and Rx channel

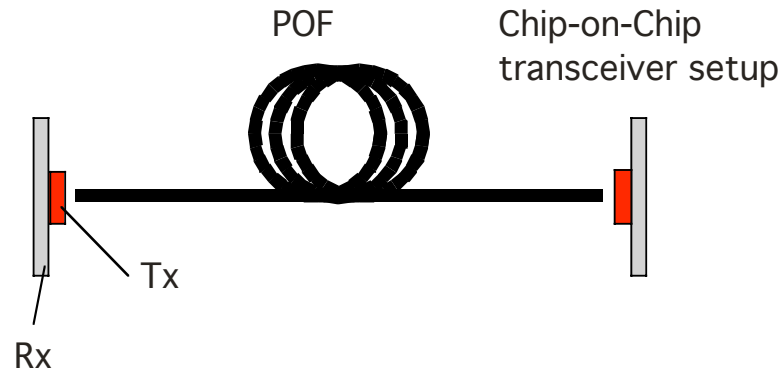


Simplex POF:

- 0.11 €/m (bare POF) to 0.3 €/m
(grey TCV-1000)
- 1.0x1.0mm to 2.2x2.2mm cross section
- friendly grey or even “invisible”
- no preferred bending direction
- no risk to mix up Tx and Rx channel

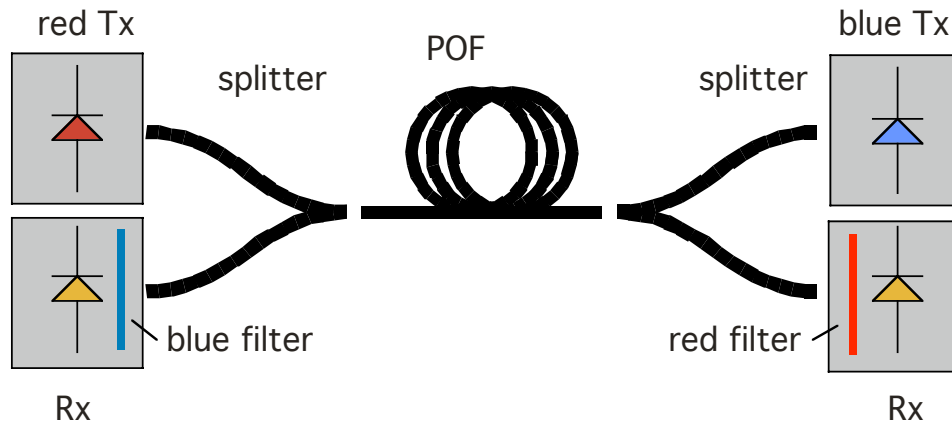


Types of bidirectional simplex POF systems I



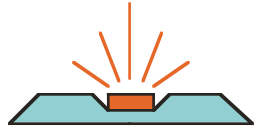
Chip-on-Chip technology:

- Due to electrical cross talk **half duplex** operation feasible only.

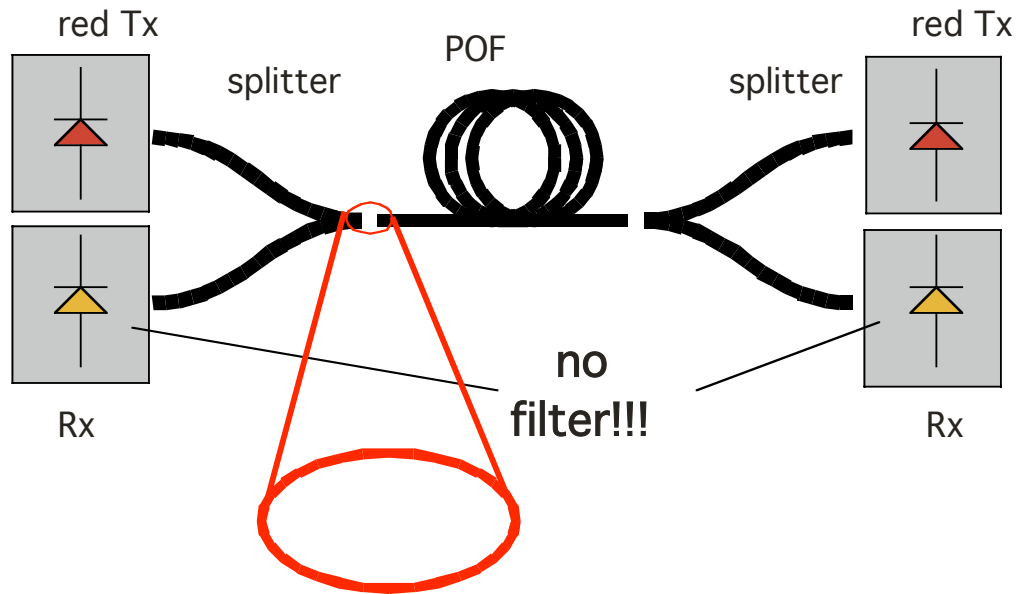


WDM technology:

- Full duplex operation feasible
- 2 types Tx, 2 types Rx, 2 types transceiver boards, 2 types media converters necessary
- blue LED new, not approved technology

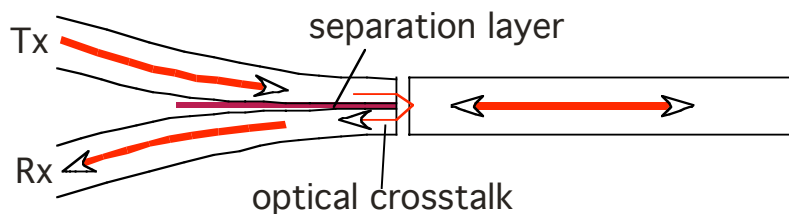


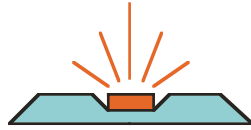
Types of bidirectional simplex POF systems II



Directivity multiplex (DM) technology:

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



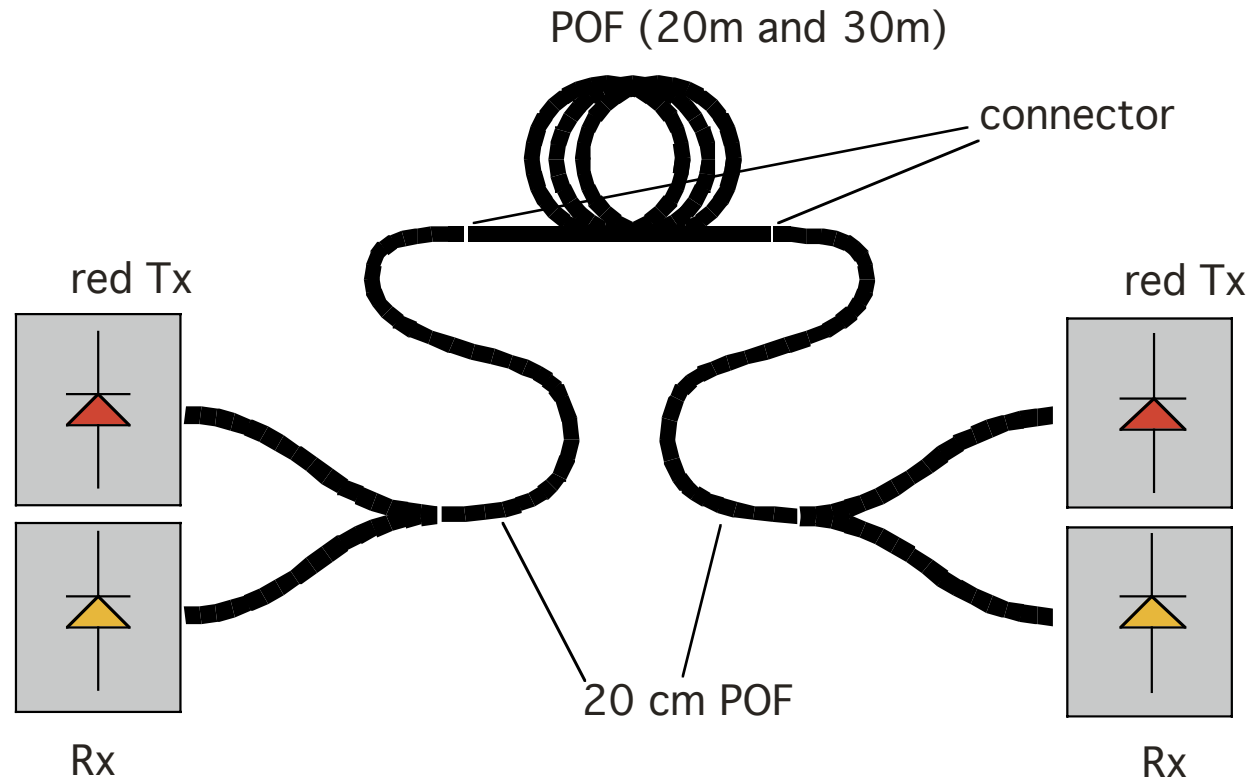
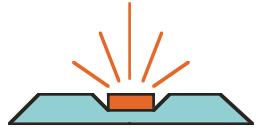


Example: Power budget and cross talk of DM systems

Tx (650nm) average:	-3 dBm
insertion loss 1st splitter:	4.5 dB
40m POF	8dB
insertion loss 2nd splitter:	4.5dB
received power:	-20 dBm
Rx sensitivity:	-24dBm
system margin:	4dB
crosstalk (splitter crosstalk >40 dB):	$-3\text{dBm} - 40\text{dB} =$ $-43\text{ dBm} < -20\text{ dBm} - 6\text{ dB} = -26\text{ dBm}$

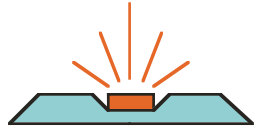
Criterion according to T. Mizoguchi (POF03 conference) met.

This system is limited by power budget!

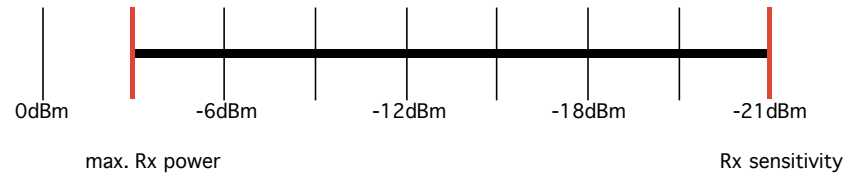


Due to crosstalk limitation the above DM system operates well with 20m POF length, but not with 30m length.

Anti reflection connectors will increase transmission distance!



Duplex Receiver



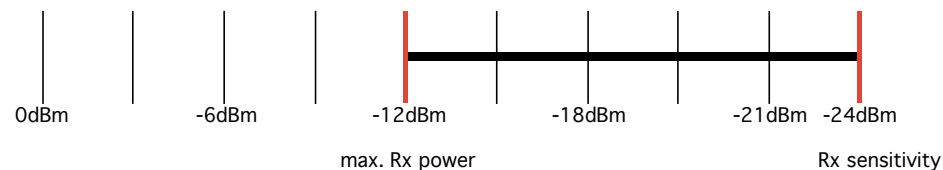
Due to:

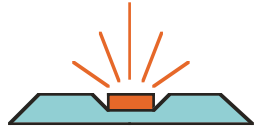
- relaxed saturation requirements (-12dBm instead of -3dBm) and
- reduced dispersion compensation

simplex receivers may have increased receiver sensitivity.

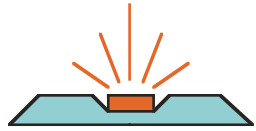
➡ **~3dB gain versus duplex receiver**

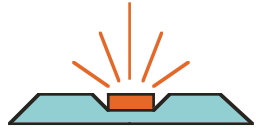
Simplex Receiver



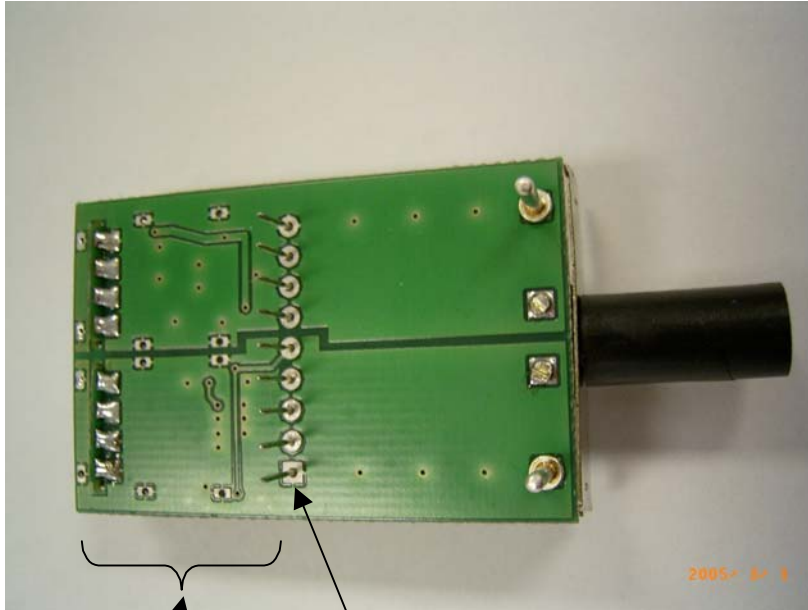


- 1x9 electrical interface (standard interface in nearly all Fast Ethernet network modules)
- Space for splitter length
- Mechanically robust front
- Low cost assembly feasible



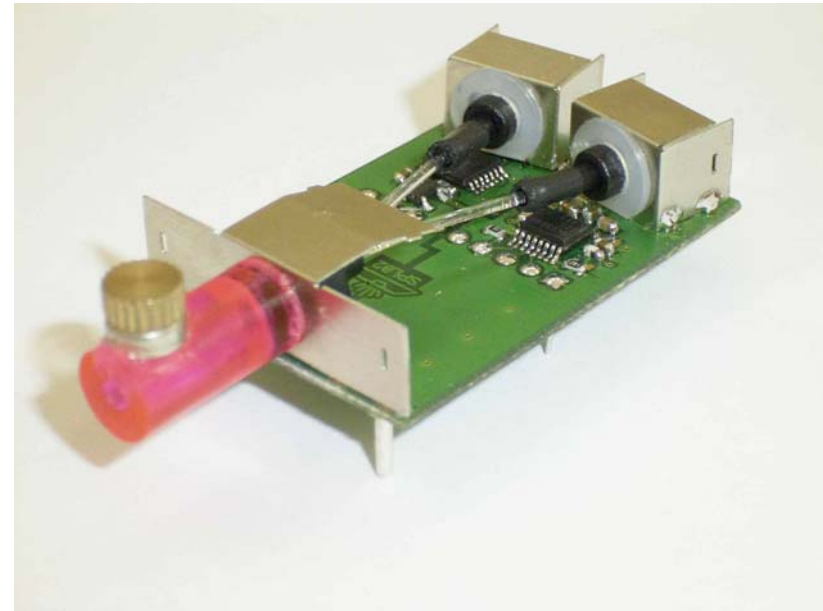


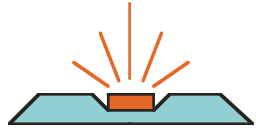
New simplex transceiver design



protrusion

1x9 pin line





Protrusion area



March 2005

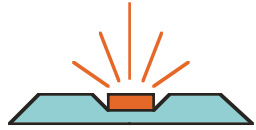


type of operation	wavelength [nm]	Transmission distance [m]		
		lab conditions	quality test	guarantee
duplex	650	95	70	50
duplex (Tx@15 mA)	470	—	120	—
duplex (Tx@40 mA)	470	150		
simplex (DM)	650	50	40	30
simplex (DM)	470	100	80	—
simplex (WDM)	650/470	50	40	30

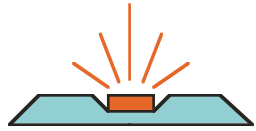
Background colour red or blue: available products.

Simplex cable POF installation I

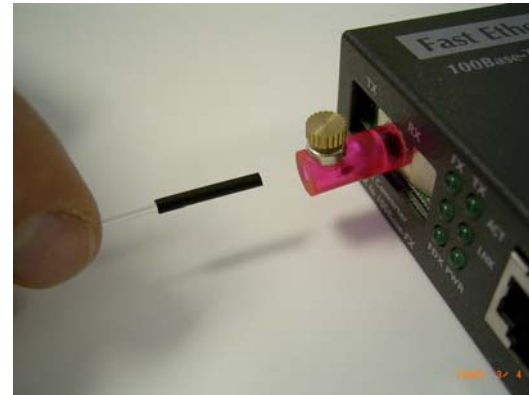
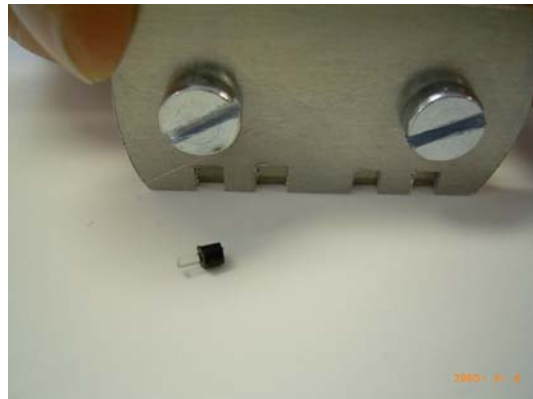
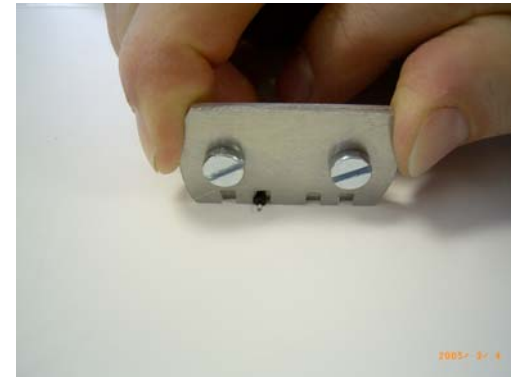


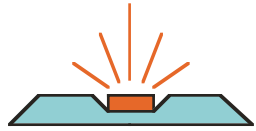


At critical points the fiber is protected by miniflex cables.
The miniflex cable can be fixed by nearly all means.



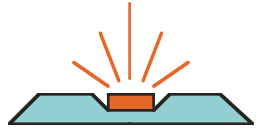
Simplex bare POF installation I



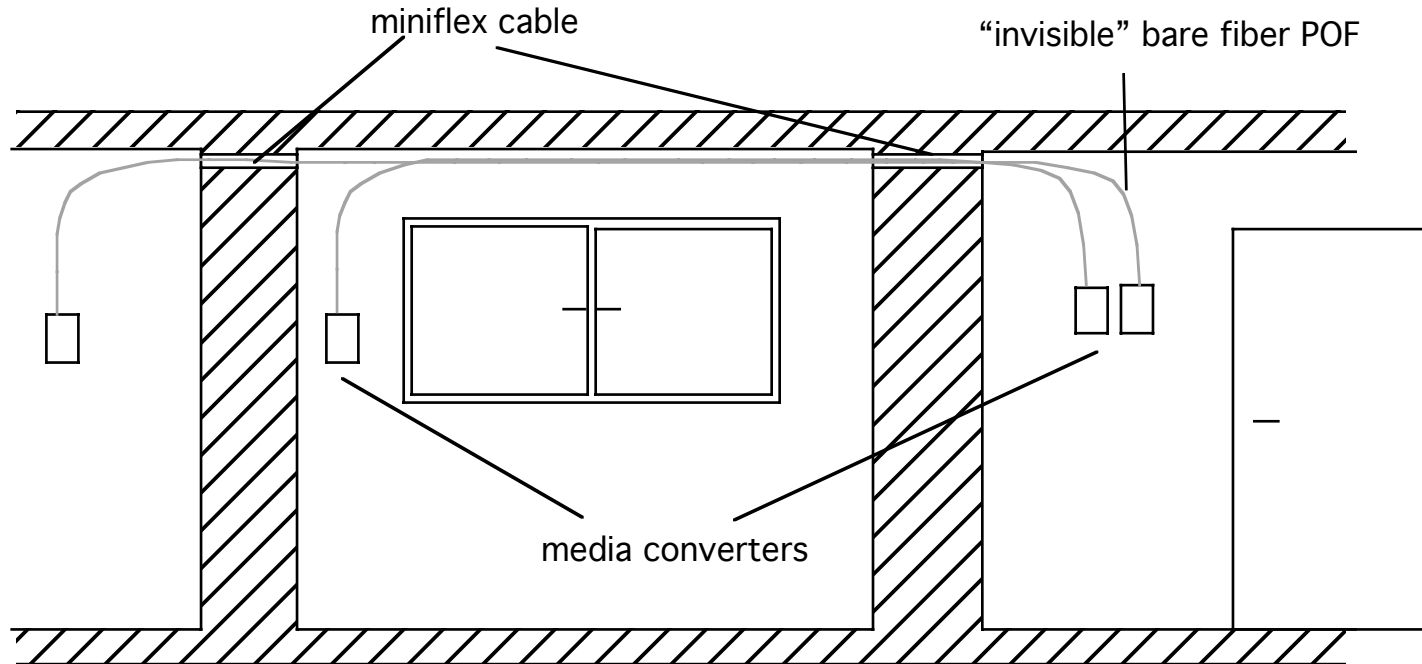


Simplex bare POF installation II



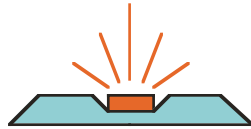


Simplex bare POF installation III

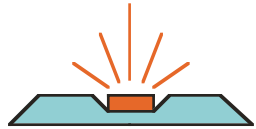


Bare POF installations are:

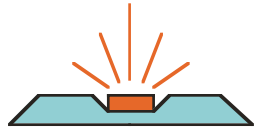
- nearly as invisible as WLAN
- installation effort very low (feasible in every furnished flat within some 10 minutes)
- future proof due to extremely low cable investment (0.11 €/m bare POF)



Sample
kit price
199,- €



Sample
kit price
199,- €



Starter Kit Simplex Bare Fiber



Sample
kit price
199,- €