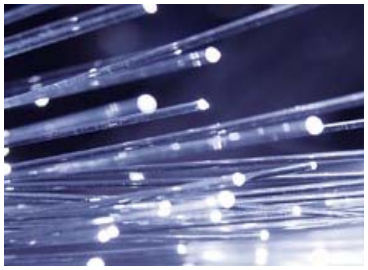
Simply POF:
High-End Connectivity with Plastic Optical Fiber

White Paper

POF—a high-speed, reliable optical fiber that can be easily and quickly installed with just a pair of scissors.



Plastic Optic Fiber, or POF as it is widely known, offers affordable, high-end connectivity for office and home networks. With speeds of 250 Mbps (and Gigabit just around the corner), POF is a superior alternative to copper used in traditional networks.

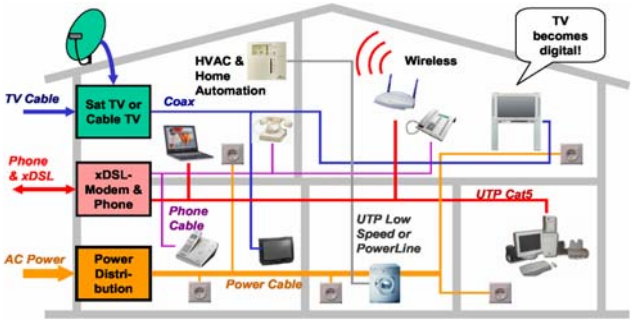
The advantages to professional installers and amateur do-it-yourself users are numerous. The discrete 2mm x 4.5mm duplex cable is easily concealed under carpets or inside walls. While it's very lightweight and can be cut with a pair scissors, POF is robust enough to survive even the most novice installer. Troubleshooting is a snap as POF uses 650nm red light to transfer data from one device to another. A quick glance inside the cable will indicate connectivity to the network—a red light seen by the human eye means the network is connected; no red light means no connection. It's that simple.

POF is completely safe. Because it's a light-based solution, there is no EMI (electro-magnetic interference) so it won't interfere with other electrical equipment. Even a beloved pet biting through the POF would not be harmed.

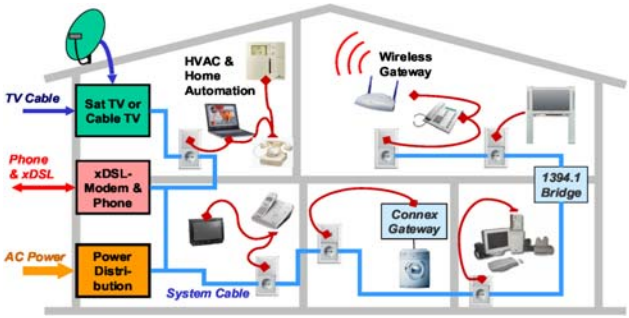
Already used in millions of cars worldwide to drive entertainment and information networks, POF has proven reliability even in the most rugged environments.

POF in the Home

As our offices and homes become overrun with networks, the need to simplify is more important than ever before. Imagine replacing all of the separate networks in your home—each of which requires a dedicated phone, TV, or Internet wall plate scattered throughout the house—with a single, flexible network that serves all areas and allows the functionality of a particular space or room to change.



A Typical Home with Multiple Networks



A Home with IEEE 1394 and POF

The combination of POF with the IEEE 1394 standard (also called FireWire or i-LINK) offers the installer and home user a technically simple, low-cost, elegant solution for a home network. Voice, internet, TV, (AV and DV) can be transferred from room to room, or within a room over a single duplex POF cable.

The architect or home builder can simplify the design process with a 1394 network while the installer benefits from the ease of installation and lower costs. POF with 1394 gives you the power to configure your space today and then change it tomorrow with little or no added cost.

Top 10 Reasons to Choose POF for Your Office or Home

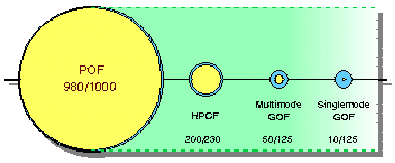
1. ***Garden Hose Connectivity:*** *Can be installed by a professional or do-it-yourself installer using basic tools and inexpensive plastic connectors, like those from Electronic Links, Molex and Comoss.*
2. ***Single Outlet for All Media/Data:*** *POF with IEEE 1394 simplifies all media and data to a single wall outlet and a single duplex supply cable.*
3. ***Simple Design:*** *Ideal for architects and office/home designers as one cable supplies all media needs. Point-to-point links currently are 50m for 250 Mbps and 100m for 100 Mbps with support for low-cost repeaters that extend links and daisy chains from room to room.*
4. ***High Bandwidth***
5. ***Triple Play Services:*** *Ensures stable video performance of IP-TV.*
6. ***HDTV/Video Streaming:*** *Perfect medium to stream video or HDTV from a home gateway or central video home server to several rooms.*
7. ***Media Center Connectivity:*** *Easy to connect the home office PC with the TV-client in the living room.*
8. ***Multi-Room Audio Systems:*** *Just right for Multi-Room Audio Systems based on IP or IEEE 1394 POF.*
9. ***Analog Audio & Video:*** *Already used for analog video surveillance systems.*
10. ***Cost effective:*** *POF, connectors, and fiber optic transceivers are low-cost consumer parts—ideal for installers who save on cable costs and install and testing time, and reduce workplace risks by using a safe, easy to use, and easy to transport material.*

How POF Works

POF typically uses PMMA (acrylic)[1], a general-purpose resin, as the core material, and fluorinated polymers for the clad material. In large-diameter fibers, the core comprises 96% of the cross section to allow the transmission of light. Although quartz fiber is widely used for infrastructures and fiber to the home, POF has been called the "consumer" optical fiber. This is because of the low costs for POF, associated optical links, connectors, and installation.

Characteristics of POF[2]

POF has a much larger diameter than other fiber. The fiber diameter of most POF in use today is 1000µm, with a core diameter of 980µm. This large diameter enables transmission even if the ends of the fiber are slightly soiled or damaged, or if the light axis is slightly off center. Therefore, parts such as optical connectors can be made inexpensively and installation work is simplified.



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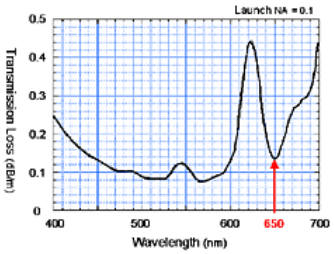

Low transmission loss is one benefit of POF.

A 650nm (red) LED, RCLED, or VCSEL typically is used as the light source for POF optical transceiver modules. A visible red light, 650nm not only allows the user to easily see if the fiber is active, it provides excellent transmission as demonstrated by its low transmission loss.

The Digital-Light Bridge

A fiber optic transceiver FOT is used to move seamlessly from an electronic (LVDS/CML/LVPECL) high-speed (250 Mbps to 1.25 Gbps) signal on a circuit board to an optical signal in POF. Companies that design FOTs, such as Firecomms, Hamamatsu and Toshiba, offer completely integrated devices that encapsulate the light source (RCLED/LED/ VCSEL), driver IC, photodetector, TIA and limiting amplifier in a single transmit FOT and on the receiver. The elegance of this solution is the seamless transfer of data from digital logic to light and bridging back to on-board digital once again. The designer of devices, like set-top box, TV, DVD, must only add the PCB footprint of the FOT and run the logic bus to the FOTs to establish the link.

POF and IEEE 1394

The high performance serial bus according to IEEE 1394a[3] and its extension IEEE 1394b[4] offers outstanding features to meet the demands of a multiple purpose network. These include:

- High available bandwidth of up to 400 Mbps (1394a) and 800 Mbps (1394b)
- Quality of Service (QoS) for multimedia real time data streams (that is, bandwidth can be allocated and is guaranteed going forward)
- Highly reliable asynchronous data transport for control purposes and burst file transfers
- Optional content protection for digital multimedia streams
- Network flexibility and extensibility, especially the ability to hot-plug user devices and self manage the network topology
- True peer-to-peer capability, that is no supervisor nodes are needed
- Independence of hardware platforms and openness to implement higher layer communication protocols
- Available on most PCs, and widely used in consumer devices such as digital recorders and TVs, set top boxes, audio devices, and game consoles
- IEEE 1394b[4] has introduced optical media like POF[5][6] and Glass Optical Fiber (GOF)[7], which provide perfect isolation and allow higher distances between nodes

For these reasons the IEEE 1394b bus is an optimum choice for implementing a home network with optional connections to other established communication technologies[8]. As a first step, a 1394 bus provides a logical interconnect between two end devices arbitrarily located within the building. One of the most elegant solutions consists of copper wires for electrical power and two POF cores

for data transport. Used for all fixed electrical installation within the walls and cable raceways, this solution makes a data path available at any main power point. Distribution modules or data plugs (called 1394 repeater nodes) are provided with at least two optical ports for continuing the bus to daisy chain to the next node (room or second or subsequent point within a room). The third port to be used is either another optical port for the distribution module or a standard IEEE 1394 copper socket for the data plug. The latter is the end point for connecting consumer electronic devices, such as personal computers, and digital TVs.

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