

House Cabling the easy way –

The Trend towards Structured Cabling in Residential Buildings

Part 2: Single and Multiple Family Dwellings

The cabling in single and multiple family dwellings is basically identical but differs in a few small details. This article presents and compares the cabling structure of both types of dwellings in an overview. The next articles will deal with the applicable standards, the components to be installed, acceptance measurements and concrete practical applications. Then the complete cabling for a single family home and a multiple family home will be shown by a concrete example - including full material lists.

Of course, there are different solutions for IP networks in residential buildings. Wireless, electrical cables, coaxial cables, data cables ("twisted pair") and fiber optic cables can be found in practice.

Wireless networks are popular with many users because they can be installed quickly. Cables are only used to connect the wireless components (Access Point, WLAN-Router). All the devices in the wireless cell must share the available bandwidth, however, which can soon lead to losses in view of the constantly increasing number of terminal devices and mutual interference with other wireless components.

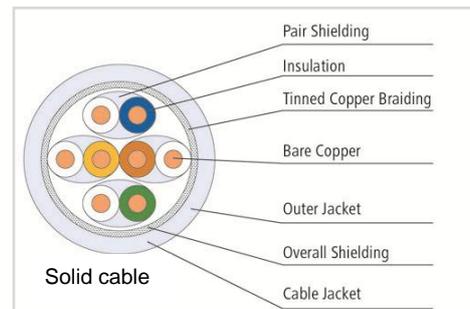
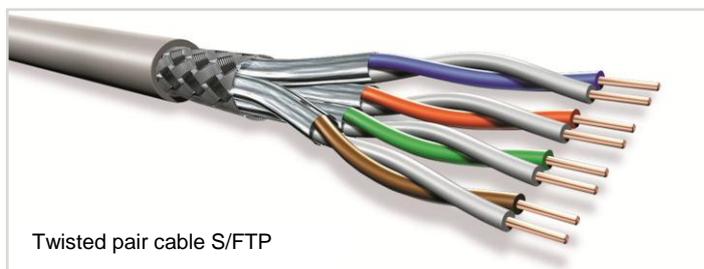
Transmitting data via **electrical cables** is often shunned especially in multiple family dwellings. Users have reservations about the data security because the electrical cables of all apartments are connected with each other via the main electrical distributor. In addition, the electrical cables are not designed for high data speeds. Discussions about reliability, future safety and "electro smog" soon start.

Coaxial cables do not have these problems. Like electrical cables, these are usually already available in existing buildings. However, they are laid as lines rather than in a star network and all living units are therefore connected inseparably with each other. Users often have the same worries about data security as for electrical cables. Besides, Power over Ethernet, the power supply to terminal devices via the data cable, is not designed for coaxial cables!

Twisted pair data cables, which have been proven in office buildings for decades, have none of these problems.

But they should not be used between floors. Compensation currents can flow through the cable shield when the two cable ends are connected to different electrical potentials which is usually the case with cables between floors; in addition, the cables accumulate in rather large cable bundles in multiple family dwellings.

There are no potential problems with **fiber optics** but since they cannot transmit electrical current, they are unsuitable for Power over Ethernet; the same applies for plastic fibres (Plastic Optical Fiber – POF). Also, terminal devices such as PCs, TVs and telephones hardly ever have a fiber optic connection. Special adaptors from fiber optics to conventional connections are necessary.

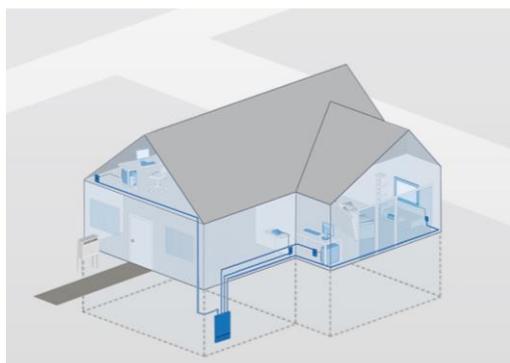


Cabling practice

Twisted pair copper cable inside the living unit and glass fibers for connection by the network provider have proven themselves in practice.

Even when the building is not supplied by glass fibers but by coaxial cables (cable TV) or wireless (satellite, WiMax or LTE) - the cabling in the living quarters remains the same: Here, twisted pair cables are installed which converge at a central point in the apartment. The electronic component (switch, router and/or modem) transfers the connection "outside" and has a glass fibre or coaxial connection.

One-family-house



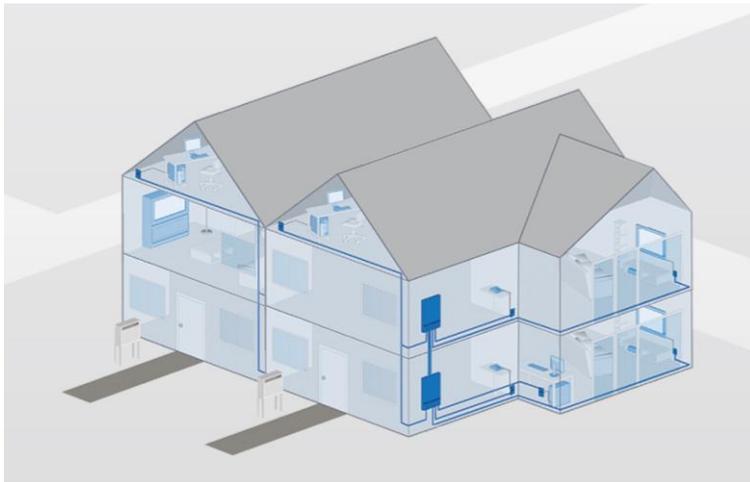
Example of the cabling in a one-family house

The cabling in a one-family house is totally independent of other buildings and living units. The network termination of the network provider is usually in the cellar or under the roof as are the electricity, telephone and cable TV connections. Usually a single glass fibre is fed into the house from the outside. Near to the main house transition point, the electronic components cross over to

copper cabling. Sub-distributors ("secondary apartment distributors") can be installed in addition to the apartment distributor if necessary, for example for separate basement flats or a home office.

Multi-family house

In a multi-family house every apartment must be wired as an independent unit. There is a common house transition point in the building and every apartment is fitted with its own electronics and own apartment distributor. Alternatively, common electronics can be provided, for example, near to the house transition point; the individual apartments then have either additional electronic units for changing over from fiber optics to copper cables or the fiber optics feed directly to the outlets in the apartment rooms.



Example of the cabling in a multi-family house

The next issue will deal with the specifications of how many connections per room must be provided, the corresponding performance classes and the applicable standards.