



**P.L.C.**  
**PowerLine Communication**

## Definition of PLC

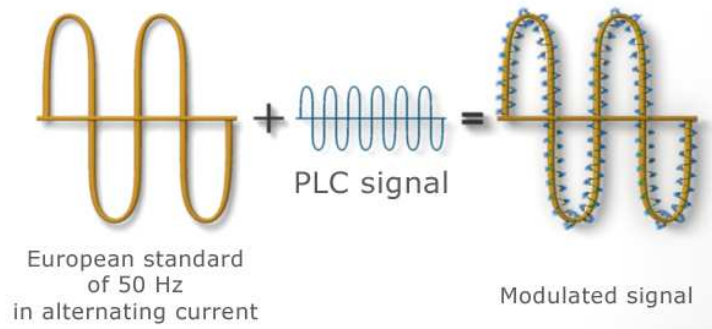
- In French, **CPL** (Courant Porteur en Ligne) ;
- In English, **PLC** (Power Line Communication).

⇒ **Technology which enables the transfer of information through the electrical network of a building.**

## Principle





The technology consists in superimposing two signals of different frequencies:

- A signal of 50 Hz that provides supply to electrical equipment;
- A signal of higher frequency to enable data transfer.



The above diagram shows that by **superimposing these two signals**, we obtain a **modulated signal**. The modulated signal enables the transfer of information without disrupting the transfer of electrical current.

## Advantages

	PLC low speed	PLC high speed
 <b>Reduction in wiring</b>	Utilized on the existing electrical network	Utilized on the existing electrical network
 <b>High performance technology in several applications</b>	Control command for housing or business buildings	sharing of multimedia data
 <b>Standardization</b>	NF EN 50065	in progress
 <b>Distance of communication</b>	several kilometers	a few tens of meters

## History of PLC

⇒ **A technology which is over 50 years old.**

### 1950

The PLC was first seen with the **remote relays**, utilizing a low speed frequency of 10 Hz and a power consumption of 10 kW.

### 1970

The operator of the French Electricity Transmission Network **RTE** opted for low speed **PLC** for **remote transmission**.

### 1975

**EDF** opted for low speed PLC at 175 Hz as a means of remote control for its **PULSADIS** system (a remote control system which helps to activate changing the prices).

### 1978

Low speed PLC made an **appearance in home automation with the X10 technology** (followed by X11-2). This technology is still used in several applications and by very big companies such as DELTA DORE or even LEGRAND with its most recent solution IN ONE by LEGRAND.

### 1985

Low speed PLC was used in **automotive applications** with the introduction of the most widely used protocol in the automobile sector today: **DC-BUS**.

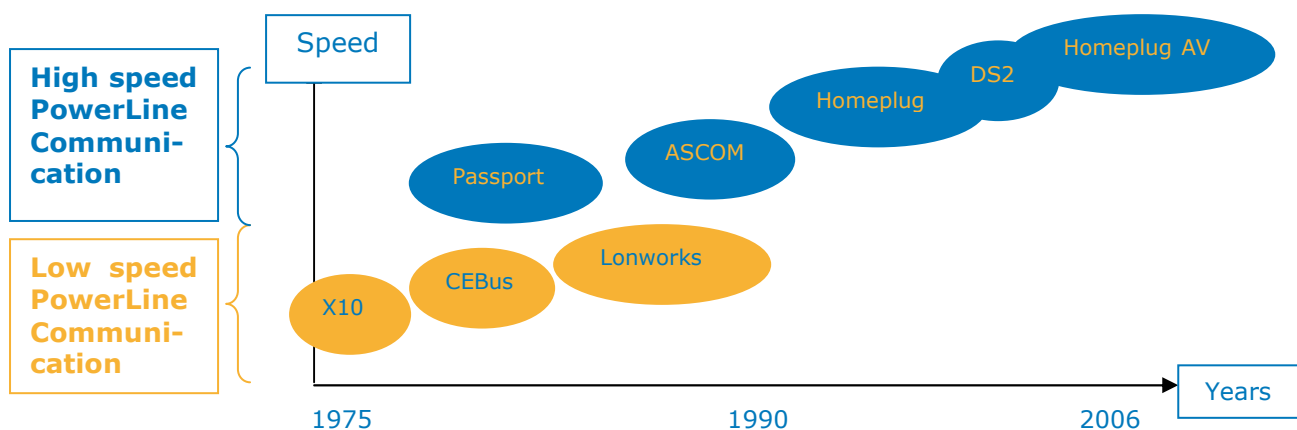
### The 90's

**High speed PLC** comes out of the laboratories. Its applications are completely different. Their objective is the transmission of bulky computer related data called "VDI" (telephony internet television).

### The 20th century

**Millions of high speed PLC modems** were sold all over the world to enlarge the information technology network or to share an internet access.

⇒ **protocols recognised** by the manufacturers



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## PLC Standards

### Low speed: standards

Low speed Power Line Communication has proved itself through several applications and is subjected to standards.

⇒ **3<sup>rd</sup> May, 1989: publication of NF EN 50065-xxxx standards by CENELEC\***

- ⚡ **Bringing together laws related to electromagnetic compatibility;**
- ⚡ **Specifications of the characteristics of low speed PLC.**

Band	Low speed frequencies of PLC signal	Applications
A	9- 95 kHz	Distribution (Reading)
B	95 - 125 kHz	House (baby phone)
C	125 - 140 kHz	Business building X10 - LonWork
D	140 - 148.5 kHz	Industrial

### High speed: standardization in progress

Several protocols that use the high speed Power Line Communication are in the process of being standardized: Home Plug, DS2 and Home Plug AV, etc.

Band	High speed frequencies of PLC signal	Applications
??	1.6 - 10 MHz	Exterior - Desserte
??	10 - 30 MHz	Interior - LANs

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\* European Committee for Electro technical Standardization

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## WIRECOM Technologies and low speed PLC

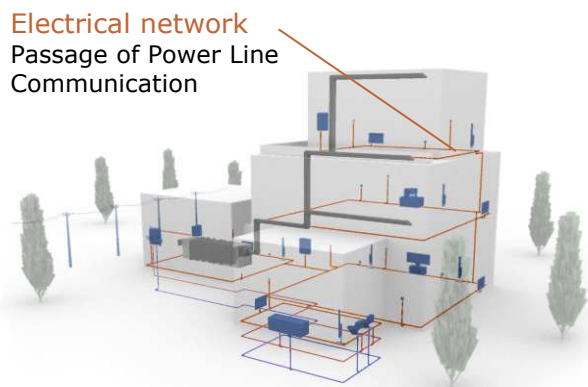
The founders of **WIRECOM Technologies** have adopted **low speed PLC**.

Used advisedly to offer solutions for controlling the demand of energy, the PLC is:

- a reputed technology in the field of BMS;
- a technology with over half a century of expertise;
- standardized since 1989;
- present on all the electrical network of our buildings.

*NB: in particular it enables EDF to carry out remote reading of meters.*

Following seven years of research, the founders learnt how to make highly innovative technologies coexist in order to find a solution that optimizes the infrastructure of the existing networks.



**WIRECOM Technologies** has selected the **LonWorks interface** which is one of the PLC solutions to enable equipment to communicate with each other. The network protocol **LonTalk** is recognised as the European **standard for open systems** within the framework of Building Management Systems: EN16484.

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## Advantages

WIRECOM Technologies equips buildings with a surface area of **several thousands of square meters**.

Thanks to PLC, the WIRECOM Technologies system caters to **all the fields of application** of technical and energy management of buildings.

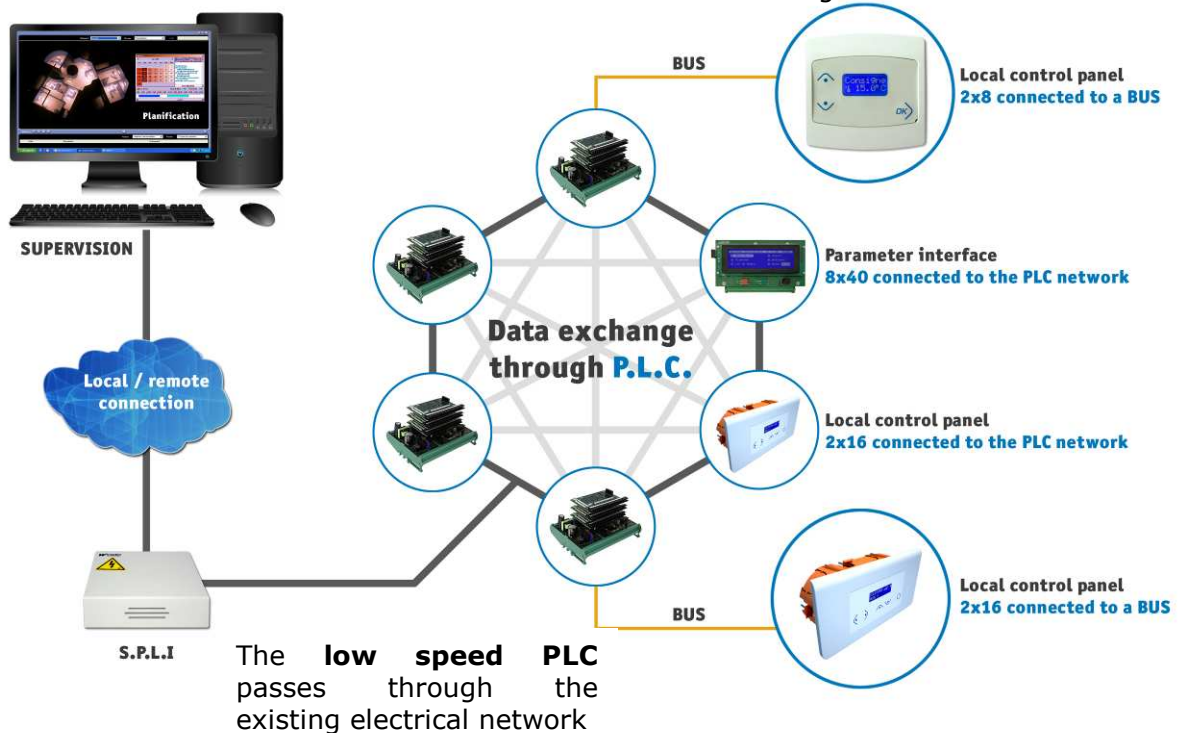
- No additional wiring required (bus);
- Distance of communication of several Kms;
- Best link between data/speed;
- Higher power of calculation ;
- Limited interference at low frequency;
- Mac addresses (manufacturer);
- Interoperability.

## Technical characteristics

- **Mesh** Network;
- Type of communication => **floating**;
- Network of a **neural** or distributed (**intelligent\* nodes**):

**\*The nodes** (integrated circuit cards) communicate with each other through low speed Power Line Communication.

They are autonomous and carry out the functions of regulation.



- Distance => **3 to 5 Km** without repeater, nor router;
- Speed => **5.4 kbps**;
- **Bandwidth C**;
- **Compatible** with **other supporting media** (supply bus, optic fibers, RF waves, twisted pair cabling, etc.).