

# Powerline Communications Technology

## Residential versus Commercial

The Telkonet iWire System has a substantially different architecture from the residential powerline communications (PLC) solution, which is intended primarily for the single family residential market and where small peer-to-peer networks are the norm. The Telkonet iWire System™ is a robust system for commercial applications, scalable to hundreds of users. It is intended for large installations, such as hotels and apartment complexes, that demand a high degree of reliability and service-management features.

### The Telkonet iWire System Architecture

The Telkonet iWire System architecture utilizes the same chipset as the residential PLC solution. The design and physical construction of the residential PLC solution using this chipset protects the transmitted signals over the powerline from most noise interferences. The principal noise sources include brush motors, fluorescent and halogen lamps, switching power supplies, dimmer switches, and amateur band radio transmitters. When a noise source presents itself, the PLC system, utilizing orthogonal frequency division multiplexing (OFDM), withdraws from the frequency bands being affected and the system continues to operate at a slightly reduced speed. The PLC chipset solution occupies the band from about 4.5 to 21 MHz. Over the band, software filters are applied to control the power spectral density (PSD) of the signal, as well as applying 30 dB notches required to avoid interference with amateur radio operators.

### Telkonet's Enhancements to the PLC Solution

Telkonet has enhanced the residential PLC solution, incorporating significant software and hardware modifications to meet the stringent demands of commercial market

applications. As a result, the Telkonet iWire System delivers improved performance for data transmission, interference protection and reach than that of a residential PLC solution.

The major modification in the commercial architecture was driven by the need to have a central point of control for inserting the high-speed Internet/telephony into the system of the Telkonet iBridges™. A powerful Telkonet Gateway was developed to facilitate this need, and software was developed to provide Telkonet Gateway-to-Telkonet iBridge communications only, which provides complete isolation between Telkonet iBridges, except through the Telkonet Gateway. In summary, the Telkonet Gateway manages all the traffic to the Telkonet iBridges, unlike a residential PLC solution, where all nodes communicate with each other.

The second modification was an enhancement to the driver power and receiver sensitivity to improve bandwidth throughput performance for commercial use.

The third modification was the development of a proprietary software enhancement to double the Telkonet's system's reach, ensuring that the data signal strength remains strong and consistent. With a broader operating reach, the Telkonet iWire System can reach a broad expanse of building configurations in the commercial sector.

In summary, all of these modifications, that have been incorporated in the Telkonet iWire System have substantially improved the performance for data transmission, noise interference and reach.

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[www.telkonet.com](http://www.telkonet.com)

### Telkonet Headquarters

20374 Seneca Meadows Parkway  
Germantown, Maryland 20876-7004 U.S.A.  
Phone: 240.912.1800  
Toll-Free: 866.375.6276  
Fax: 240.912.1839  
[sales@telkonet.com](mailto:sales@telkonet.com)