Data Transmission Over Power Lines and Applications

**Host PC – Brain of the project**
Implemented our custom DTOPL management software in Delphi which has the following functionalities:
- Handling Serial I/O communication
- Implementing our custom communication multi-packet protocol
- Implementing Home Automation
- Implementing Security
- Providing connectivity with the web interface

**Ariane AC-MIO RS-232**

**Description**
Reliable power line communication in high attenuation and noisy electrical environments
- Very robust narrowband FSK modulation technique over 262 Khz frequency
- Flexible, multifunctional interface (parallel, serial)
- Bit rate 2544 bps

**Operation**

**Ariane Reliability**
We have tested Ariane reliability by adding these noise sources to the power line network and the result that we got confirmed a 100% reliability of sent/received packets at 750 bps which is the speed that most home automation systems use.

**Home automation using PIC**
One of the applications of DTOPL is home automation. A main advantage is the non-necessity to run new wires through the entire house or building in order to control the existing electrical appliances.
In our project, we chose to show the control of four 12V fans through a microcontroller (PIC16F84). We emphasized on how to deal and analyze the data coming from the power line communication protocol in order to turn on and turn off the respective AC system.
To put in a nutshell, the circuit we realized takes its instructions from the power line data, and chooses which of the four fans to turn on, and this at each different data packet received.

**DTOPL Management interface**

**Electrical and data signals**

**Design Objectives**
1. Designed a home automation system using regular power lines
2. Enhanced security transmission over Power Lines using RSA encryption
3. Tested Reliability of Ariane modules in response to Noise

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