**WHAT IS IT?**

A system that tracks power usage at each outlet and reports the data to a central hub or "base station". The power data is then processed by the host, which displays summaries for the administrator. A monitoring unit is concealed within each outlet box and does not obstruct normal outlet operation. Communication is conducted over the existing power infrastructure.

**WHY DO THIS?**

The fundamental advantage of this system is information. It provides high granularity power data for any connected appliance or device. An informed consumer is better equipped to make smart decisions on power conservation. Power data identifies problem areas and shows rapid feedback to users’ efforts to conserve.

With rising power costs, consumers are seeking inexpensive solutions to lowering their monthly electricity bills.

**OUR GOALS**

- Construct a prototype system that measures data on at least one outlet and sends the data to a PC.
- Design a software interface that displays power data.

**SYSTEM CONCEPTS**

**Power Coupling:**
Voltage levels in home power networks are too high to be measured directly by our integrated circuits (ICs). Coupling logic steps the line voltage and current levels down to a manageable level for processing.

**Power Sensing:**
The coupled power data is acquired by an IC that "senses" the amount of power being drawn by the appliance.

**Transceiver:**
Raw power data is placed into packets for transmission over the power line. The transceiver is responsible for both sending and receiving these packets over the power network.

**Base Station:**
The base station is a storage device (or PC) that stores power data and hosts the software interface.

**Software Interface:**
A simple graphical user interface (GUI) that continuously updates the power usage data for each connected outlet.

**APPLICATIONS**

**Identifying Problem Areas:**
Some appliances may be using more power than you think. This system singles out devices that are expensive to operate.

**Feedback:**
Trying to cut down your electricity bill by X%? This system provides immediate feedback so you don’t have to wait for the monthly bill to come to gauge your success.

**Control:**
A power relay component in each outlet unit allows remote toggling of connected devices.

**Automation:**
With no additional hardware, software can allow outlet control to be automated. Have select devices shut off when you go to sleep, or leave for work.

**Multi-user environments:**
Avoid uncertainty about who used what share of the power bill. Attributing certain devices to a user’s total power usage allows simple division of expenses.

**RESULTS**

- A prototype system was successfully constructed and tested for proof of concept.
- The software interface can display power data for multiple outlets as well as total power.
- The prototype was tested with multiple appliances simultaneously and valid output was obtained.