Communicate over the power lines!

PLM-24 is a low cost and easy to build Power Line Modem capable to send and receive serial data over the power lines (mains) at speed up to 2400 bps. **PLM-24** lets you communicate with other devices around the house without running any wires since it uses the wires already available in every house!

PLM-24 is designed as a small module to be used in new or existing designs, the picture above shows a ready built unit. **PLM-24** can easily be interfaced with any PC or microcontroller (MCU) that are able to send and receive serial data at 2400 bps or less. Perfect for use with BASIC Stamp's, SX, PIC, 8051, AVR, 68HC11, COP or standard PC's...

What can it be used for?

PLM-24 can be used to build your own bi-directional home automation system where you can control lights, relays, measure temperature, measure power consumption, query status of switches, turn things on/off or control devices like stereos etc. Since it's bi-directional you can poll your house to see what modules you currently have available or if anyone of them isn't responding you can take proper action.

Or you can use it to send and receive messages or data (files) between personal computers and their devices in a building without the need of cables. Use it as a low speed printer network for all in the building to share or run a speech recognition program on your PC to "talk" with your home!

Combine both together and top it with some **PLM-24** modules that have alarm sensors connected and you will have a security system that is capable to dial up with your PC's modem and play a tune or send an fax or e-mail if something goes wrong or your house is visited by unwanted people.

Picture to the left shows **PLM-24** in relation to a pen.

With **PLM-24** you have the communication medium the rest is up to you! Below is a short list of some doable things just to spark your imagination...
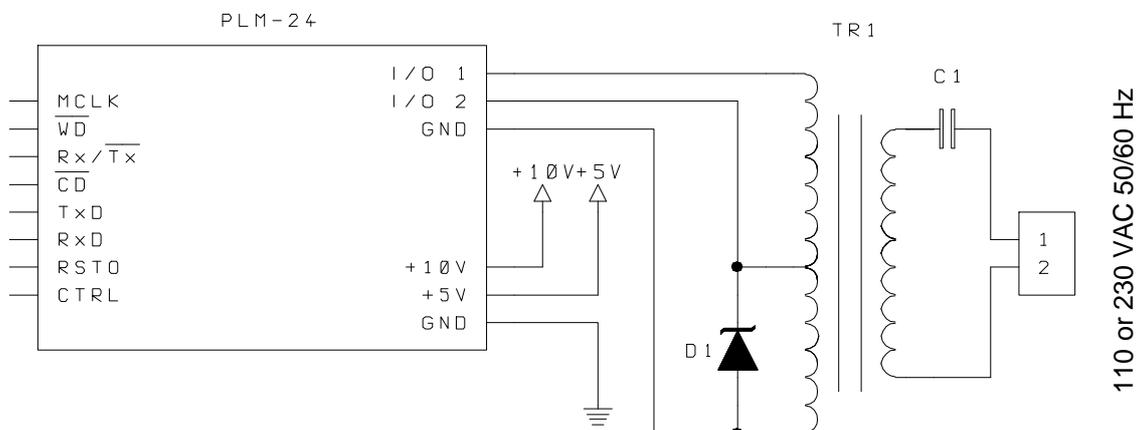
- **Control lights and other devices**
- **Security systems**
- **Energy control and management**
- **Process control**
- **Environmental control**
- **Low speed PC networks**
- **Heating and air condition control**
- **Sprinkler/watering systems**
- **Connect your whole home to Internet**
- **PLM-24 <-> X-10 gateway**
- **Sophisticated HA systems**
- **Help for elderly and disabled people**
- **Chat system for the whole building**
- **Measure temperature in rooms**
- **Small info terminals in rooms**
- **Close blinds if sunlight is to strong**
- **Let your PC control your home**
- **Stage control in home theaters**

Since **PLM-24** is capable of both sending and receiving serial data over the power lines it's possible to implement a protocol that uses checksums or CRC to ensure that received data is correct and if it isn't ask for a re-transmission! The module itself is protocol independent so you can use how simple or complicated protocol you want (send ASCII or binary). Since the environment on the power line isn't very friendly it is wise to implement some way to check for errors and we recommend that you do but it's not necessary.

By being protocol independent the **PLM-24** doesn't limits to any max numbers of power line modems used in your network, it's up to you. You can have as few as two **PLM-24** or by using our free **S.N.A.P** network protocol it will let you have up to 16.7 millions nodes in your HA network!

How do I interface to PLM-24?

PLM-24 needs +5 VDC and +10 VDC to operate and interface to the power line via a coupling network consisting of three parts. One transient diode (D1), one small T1002 coupling transformer (TR1), and one capacitor (C1). The coupling network is sold separately.

The interface to the MCU or PC is very simple and requires minimum 3 I/O lines, RxD (receive data), TxD (transmit data) and Rx/Tx control. The other I/O lines on the module may be used depending on your application. The I/O lines are TTL/CMOS compatible. Below is a short description and they are fully described in the manual along with examples on how to connect it to various MCU.

Name	Direction	Function
MCLK	Output	Master Clock output
WD	Input	Watch Dog
Rx/Tx	Input	Rx/Tx mode select
CD	Output	Carrier Detect
TxD	Input	Transmit data in
RxD	Output	Received data out
RSTO	Output	Reset out
CTRL	Input	Control input

PLM-24 Power Line Modem Kit.

We offer a complete kit that includes everything you need to build the *PLM-24* Power Line Modem. The *PLM-24* kit includes a professional made double-sided, plated through, solder masked and silk screened printed circuit board. All required components, printed manual that contains assembly instructions, part list, complete schematics along with examples on how to interface *PLM-24* to a serial port on a PC and to common MCU's such as BASIC Stamp, PIC and 8051. You don't need any special or expensive development tools to get going!

- Send and receive serial data 110-2400 bps, HDX over the power lines (mains)

- Works over 230 V/ 50 Hz or 110 V/60 Hz

- PLM-24 is protocol independent

- Easy to build and use

- Uses FSK (more immune to noise and other interfering signals than ASK).

- Can co-exist with X-10 equipment and don't false trigger them

- Small module, easy to embed (54 x 38 mm)

- +5V and +10V power supply

- Simple interface to MCU or PC

- Built in watch dog function

- Carrier detection

For ordering information and current price list please visit our web-site at the URL given below or send e-mail to *info@hth.com*.

http://www.hth.com/plm-24/