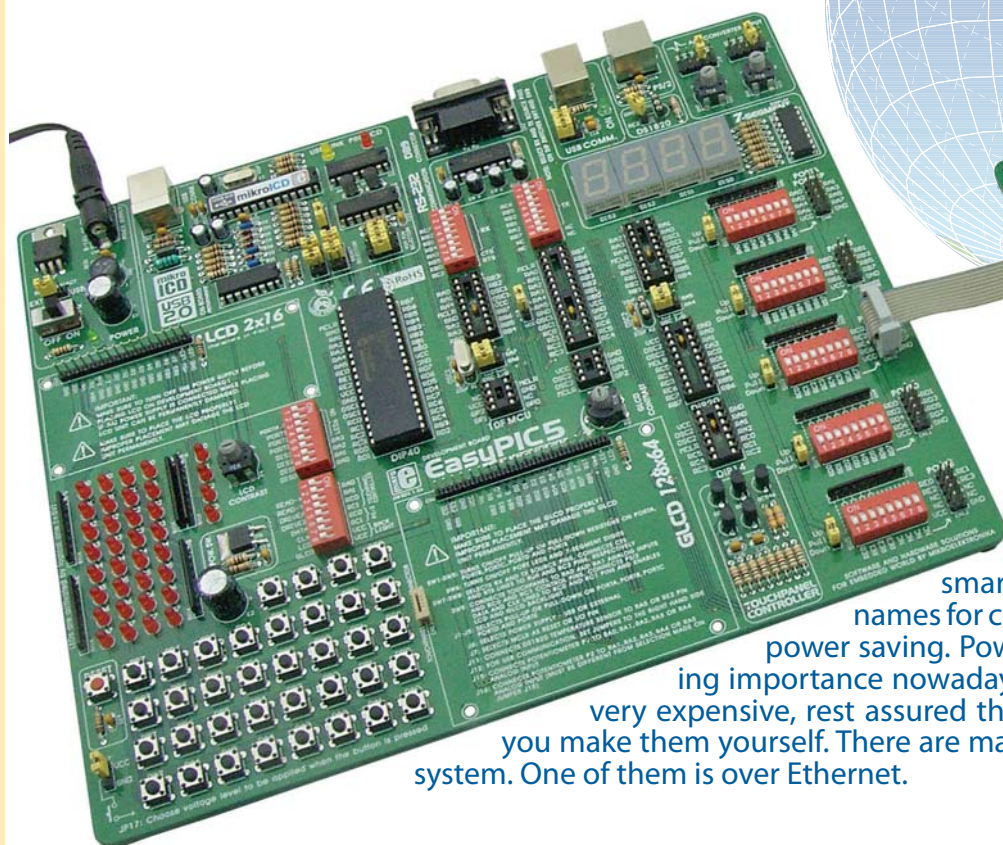


# OK. NOW YOU NEED ... ETHERNET



Serial Ethernet module connected to EasyPIC5 Development System

Home automation, home control, smart or digital home are just different names for comfort, convenience, security and power saving. Power saving systems are of increasing importance nowadays. Even though such systems are very expensive, rest assured that they can also be very cheap if you make them yourself. There are many ways to control a smart home system. One of them is over Ethernet.

By Srdjan Tomic  
MikroElektronika - Software Department

All you need is a PIC18F4520 microcontroller and an ENC28J60 serial Ethernet chip. This chip is a great solution for other microcontroller families as well such as AVR, dsPIC etc. The CviLux CJCBA8HF1Y0 RJ-45 connector is used for connection to the Ethernet network. An LED connected to the microcontroller PORTB.0 simulates a home appliance we want to control.

The *mikroPASCAL for PIC* compiler contains the *SPI\_Ethernet* library that will considerably simplify the process of writing a program for the microcontroller. By using a few routines from this library, it is possible to create the program that will enable electrical appliances in your home to be controlled via a web browser.

It is necessary to perform the following operations within the program:

- Step 1.** Create an html page to run the microcontroller through. Import it in the code as a string.
- Step 2.** Set IP, DNS, Gateway addresses and Subnet mask obtained from your internet provider.

For example, our local network parameters are as follows:

**IP :** 192.168.20.60 (Control System address)  
**DNS :** 192.168.20.1 (Domain Name System address)  
**GATEWAY :** 192.168.20.6 (Gateway address)  
**SUBNET :** 255.255.255.0 (Subnet mask)

- Step 3.** Disable PORTB analogue inputs. The microcontroller pin should be cleared and configured as an output.
- Step 4.** Initialize the SPI module of the PIC18F4520 microcontroller.
- Step 5.** Initialize the Serial Ethernet module chip ENC28J60.
- Step 6.** Write the code within the *Spi\_Ethernet\_userTCP* function that will, after receiving command via web browser, turn on/off the LED connected to the PORTB.0.
- Step 7.** Read received data in an endless loop.

The most important part of the program is the *Spi\_Ethernet\_userTCP* function, processing all received commands

After the web browser "GET" request is received, sent from your computer to the control system IP address, the microcontroller will respond with a web page stored in its memory. This page will then be automatically displayed on the computer screen by the browser.

When the ON command is received, the LED connected to the PORTB.pin0 will be turned on.

Likewise, when the OFF command is received the LED will be turned off. If you have a relay instead of LED, it is possible to control any appliance such as lighting, security system, heating system etc.

The control of any home appliance consists of entering control system IP address in the web browser and specifying the desired commands.



Figure 1. MikroElektronika's Serial Ethernet module with ENC28J60 chip

