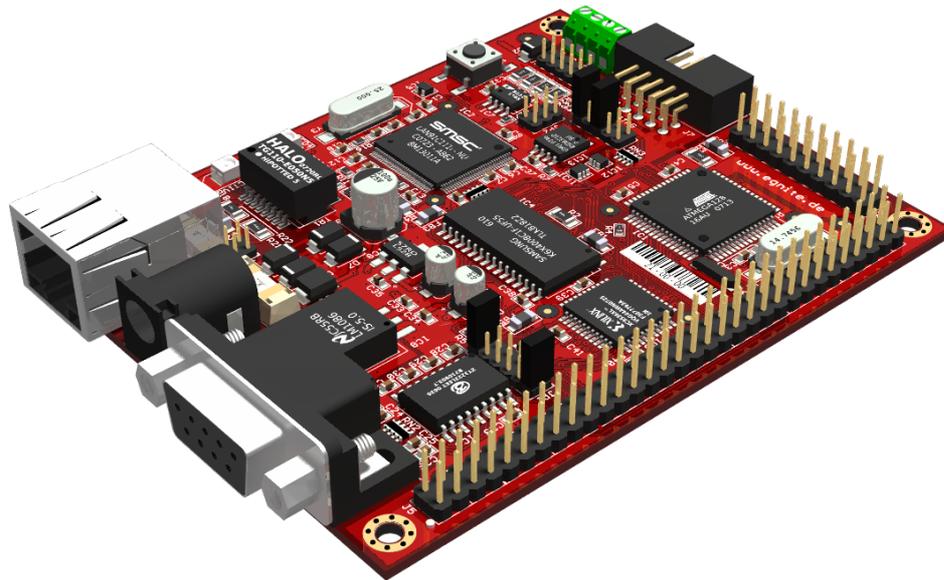# 1 About this document

This brief tutorial will guide you through the very first steps, establishing a serial connection to your Ethernut board and later flashing a program image onto it. For additional information, please visit http://www.egnite.de.

2 What do you need to get started?

From your Ethernut starter kit:

- Ethernut board 2.1
- Serial cable with DB9 connectors
- SP DUO 2 JTAG programming adaptor
- Ethernut software CD

Additional requirements:

- Windows PC with serial COM port and CD drive, connected to a working Ethernet network
- Unregulated power supply unit with 2.1 mm barrel connector, 9-12 V DC, at least 300 mA
- Twisted pair cable connected to your Ethernet network

Warning: The Ethernut board is an electrostatic sensitive device. Before opening the Ethernut board's protective bag, take standard precautions against electrostatic discharge.

3 Step by step instructions

3.1 Set up your hardware

Unpack the board, prevent ESD damage

Remove the Ethernut board from its antistatic bag. Handle the board only by the edges, otherwise the electronic parts can be damaged by electrostatic discharge.

Operate your board on a sheet of paper. Do not operate your Ethernut on its antistatic bag. It is highly conductive and will cause damage to your board if you do. Keep the antistatic bag to store the board if it is not used.

Before shipping the Ethernut board was carefully inspected both visually and electrically. It should be free of scratches and marks.

Connect the power supply unit

Attach the PSU to the barrel power terminal on your Ethernut board, then to the power socket.

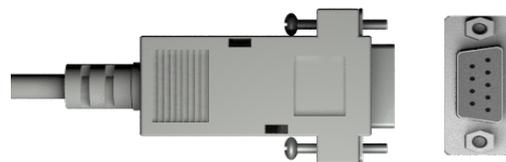Your Ethernut`s red LED (POWER) should light up, indicating that the board is being powered.

3.2 Set up the serial communication

Connect Ethernut`s serial port to the PC

Locate a free serial COM port on your PC and connect the Ethernut board to it using the serial cable from your starter kit.

You will need to know the COM port`s device name (such as COM1) later on.
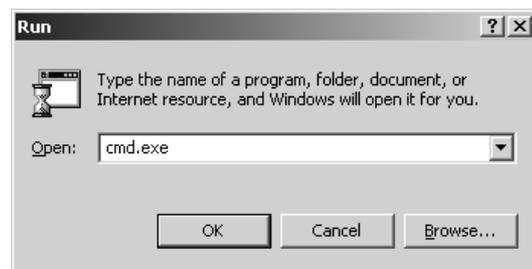
Insert the Ethernut CD and launch the terminal program Tera Term

Insert your Ethernut CD into your PC's CD-ROM drive. If the documentation opens automatically, you can safely ignore and close it.

Open a command line by pressing *Windows* and *R* keys. The Run format dialog should come up.

Input *cmd.exe,* then click *OK* to start the program.

In the following command prompt, type X: to change to the CD-ROM drive, replacing X with the appropriate drive name (i.e. if the CD is in drive D, type *D:*). Press *Enter* to execute the command.
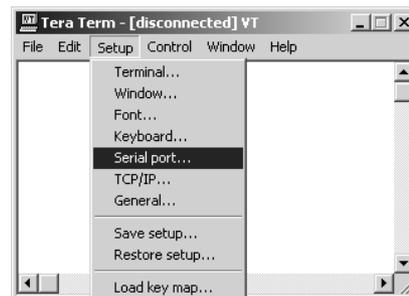
Type *cd \firststeps\win\ethernut21* and press *Enter.* You should now be in your CD's \FirstSteps\win\ethernut21 directory.

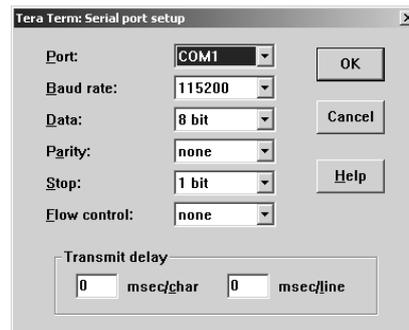Type *ttermpro* and confirm with the *Enter* key to start Tera term.

Set up the serial connection

In the Tera Term main window choose *Setup → Serial Port.*

Choose the COM port your Ethernut is connected to.

Set the Baud rate to *115200*, Data bits to *8*, Parity to *none*, Stop bits to *1*, Flow control to *none* and confirm with *OK.*

Start the preloaded BaseMon firmware on your Ethernut board by pressing its *Reset* button.

Now hold down the *space bar* from your keyboard while in Tera Term's main window until legible output appears. Your board's CPU is alive, RS-232 is actually connected and the port speed has been detected properly.

The output should look similar to ours, showing the hardware to test OK. Since there is no network connection yet, the link failed message can be ignored for now.
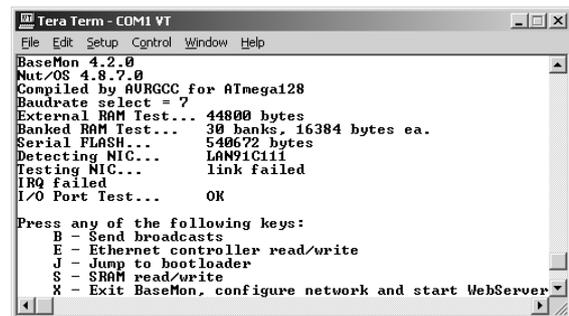
## 3.3 Set up the Ethernet communication

Establish an Ethernet link

Connect your Ethernut board to your network using the twisted pair cable.

Restart it by pressing the *Reset* button. Then hold down the *space bar* while in Tera Term's main window, just as in the previous step.

This time, BaseMon should print OK instead of link failed, signalling that Ethernet magic has successfully negotiated a link.

The yellow Ethernut LED stands for link established, green means network activity.
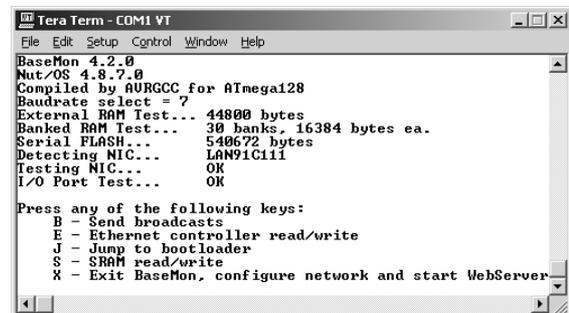
Configure the network and start a simple HTTP server

Press the *X* key.

For MAC address and host name confirm the default values with *Enter.*

Your Ethernut board now needs a unique IP address within your local network.

If your network provides a DHCP service, you can try auto-configuration by giving *0.0.0.0* as Ethernut's IP address.

Without DHCP, you must assign a static IP address. If, for example, your PC is 192.168.0.2 with netmask 255.255.255.0, you can use the same netmask with the IP 192.168.0.3. The address must be currently available, though.

After successful configuration, you can visit your Ethernut's web pages. In order to do this open http://192.168.0.3/ in your browser, replacing *192.168.0.3* with your Ethernut's IP address. If you encounter any problems, verify the configuration and disable any (web-)proxies or firewalls you may have.
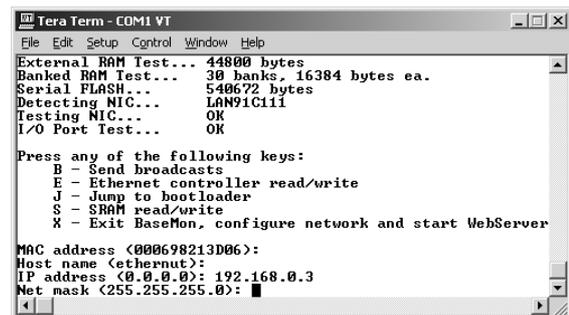
3.4 Flash a new firmware

You will now replace the contents of your Ethernut board's flash memory with a more advanced web server application. Later, after installing our development tools, you may build your own custom images. For now, we will be using an image that has been prepared for this demo and is ready for flashing.

Fetch the programming adaptor supplied with your Ethernut starter kit.

Disconnect power, then push the JTAG connector into your Ethernut's JTAG terminal.

Quit Tera Term, unplug the serial cable from your Ethernut and plug it into the JTAG adaptor.

Now reconnect the power supply to the board.

As you did in step 3.2, bring up a command line and move into the \FirstSteps\win\ethernut21 directory located on the CD.

Start the programming utility AVRDUDE by typing the following command: *AVRDUDE -p m128 -P comX -c stk500v2 -U flash:w:httpserv.bin:*

Replace comX with the name of the COM port and press *Enter*. Flashing will take a few seconds.

After successful completion, Ethernut`s flash memory contains the sample web server application httpserv.bin and BaseMon is gone.

Restart your Ethernut with the *Reset* button. The board still uses the previously configured IP address, so you can look at the advanced web pages by entering the same URL in your browser again.

> *Note:* You can get BaseMon back with AVRDUDE and basemon.bin instead of httpserv.bin. Type *AVRDUDE -p m128 -P comX -c stk500v2 -U flash:w:basemon.bin* and replace X.

At this point you have successfully unboxed and set up your new Ethernut board, experienced how to work with the terminal and took the board for a webserver test-drive. Now that's pretty cool already but you are barely even scratching the surface.

4 Where to get further information?

Itching to dive deeper into the Ethernut ecosystem? Check out these sources to get you started:

http://www.ethernut.de/nutwiki/Ethernut_2.1_B

Screencasts demonstrating Nut/OS software tools

http://www.ethernut.de/en/firmware/nutos.html

Nut/OS summary

http://www.ethernut.de/api/

Nut/OS API reference

http://www.ethernut.de/en/hardware/enut2/

Additional hardware information