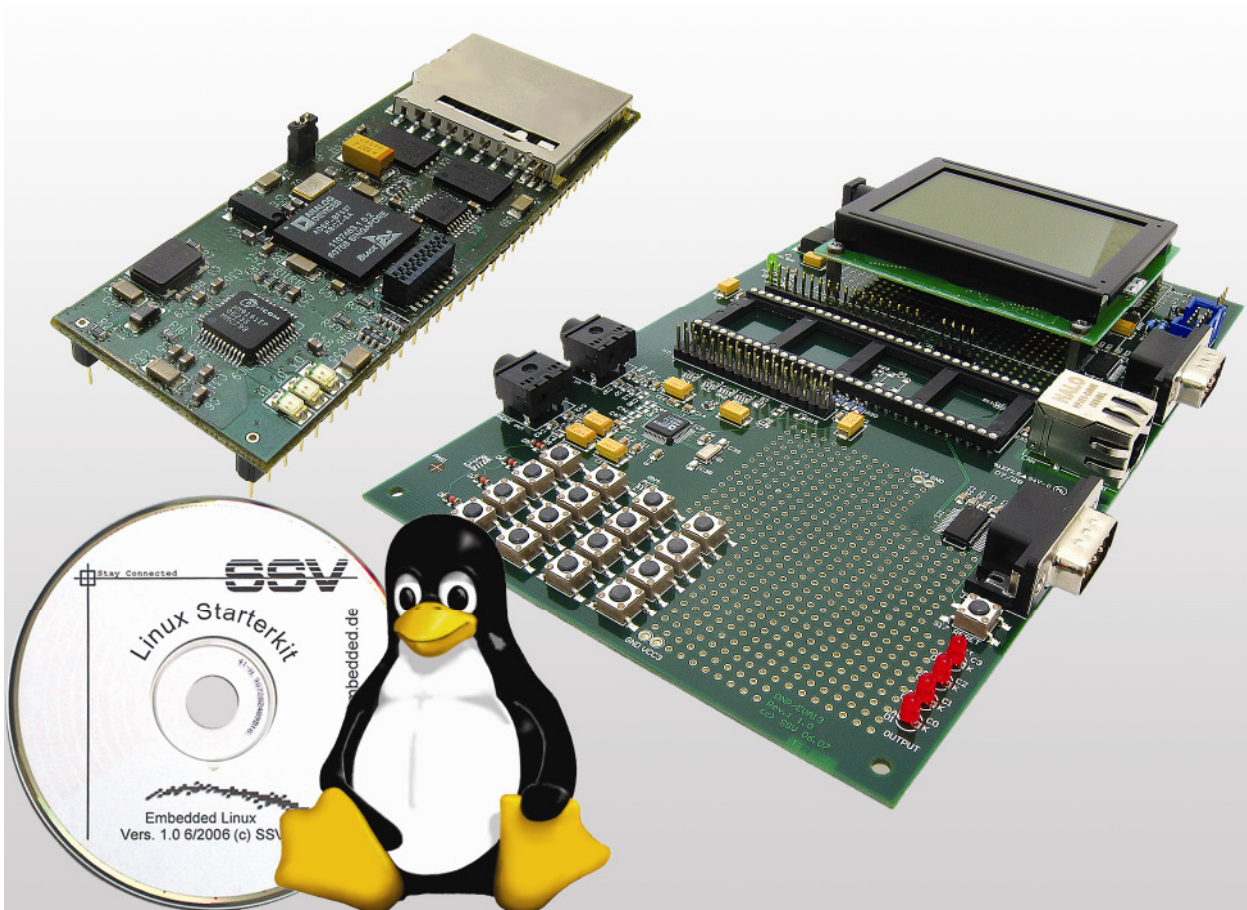


DNP/SK28

Embedded Linux Starter Kit

First Steps



SSV Embedded Systems

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1 INTRODUCTION

The Starter Kit DNP/SK28 contains everything you need to get started with your embedded networking application. The Starter Kit includes a DNP/5370 module with a pre-installed U-Boot boot loader and an embedded Linux, the Evaluation Board DNP/EVA13, power supply, serial interface (null modem) cable, a CD-ROM with software and documentation and a printed user manual for the first steps with the Starter Kit.

The Starter Kit CD-ROM comes with a full GNU cross tool chain for C/C++ software development. The binary files of this pre-build tool chain run on an x86 Linux-based host (SuSE, Red Hat or other) and build executable files for the Analog Devices BF537 Blackfin MCU.

For using the DNP/SK28 Embedded Linux Starter Kit you need a development system. The minimal configuration for this system is a Windows-based PC with the HyperTerminal terminal emulation program and a free COM port (COM1, COM2 or USB-based COMx) for the RS232 serial link between the DNP/5370 and HyperTerminal.

For using the Ethernet link, your PC needs an Ethernet adapter with 10 Mbps or 10/100 Mbps LAN interface. This environment allows web server programming (HTML pages, Java Applets) and Linux shell script programming. For using the GNU C/C++ cross tool chain, it is necessary to run Linux on the development system.

1.1 Safety Guidelines

Please read the following safety guidelines carefully! In case of property or personal damage by not paying attention to this document and/or by incorrect handling, we do not assume liability. In such cases any warranty claim expires.



ATTENTION: Observe precautions for handling – electrostatic sensitive device!

- Discharge yourself before you work with the device, e.g. by touching a heater of metal, to avoid damages.
- Stay grounded while working with the device to avoid damage through electrostatic discharge.

1.2 Conventions

Convention	Usage
bold	Important terms
<i>italic</i>	Filenames, user inputs and command lines
monospace	Pathnames, internet addresses and program code

Table 1: Conventions used in this Document

1.3 Features and Technical Data

The DNP/SK28 comes with a pre-installed U-Boot boot loader and an Embedded Linux operating system. The DNP/5370 Linux consists of two main components: 1. the Linux kernel and 2. the root file system.

The DNP/5370 U-Boot boot loader allows the downloading of new Linux kernel versions and root file systems to the DNP/5370 RAM and Flash. This in-system programming feature can be used by a simple serial and Ethernet link between the development system and the DNP/5370.

- DIL/NetPC DNP/5370 with Analog Devices BF537 Blackfin MCU @ 600 MHz, 3 Mbytes Flash and 32 Mbytes SDRAM
- U-Boot boot loader and Embedded Linux pre-installed in Flash memory
- Evaluation Board DNP/EVA13
- Null modem cable
- 110 VAC or 230 VAC to 5 VDC international power supply
- CD-ROM with user manual and hardware/programmers manuals
- Embedded Linux with source
- GNU cross tool chain for C/C++ software development for Linux-based PCs
- GNU gdb and gdbserver for Ethernet-based remote debugging
- Linux remote login with Telnet
- Web server setup sample
- FTP server setup sample
- Many source code samples

2 GETTING STARTED

2.1 Serial Link between DNP/EVA13 and PC

Setup the serial link between the Evaluation Board DNP/EVA13 and your PC. Use a null modem cable for this connection.

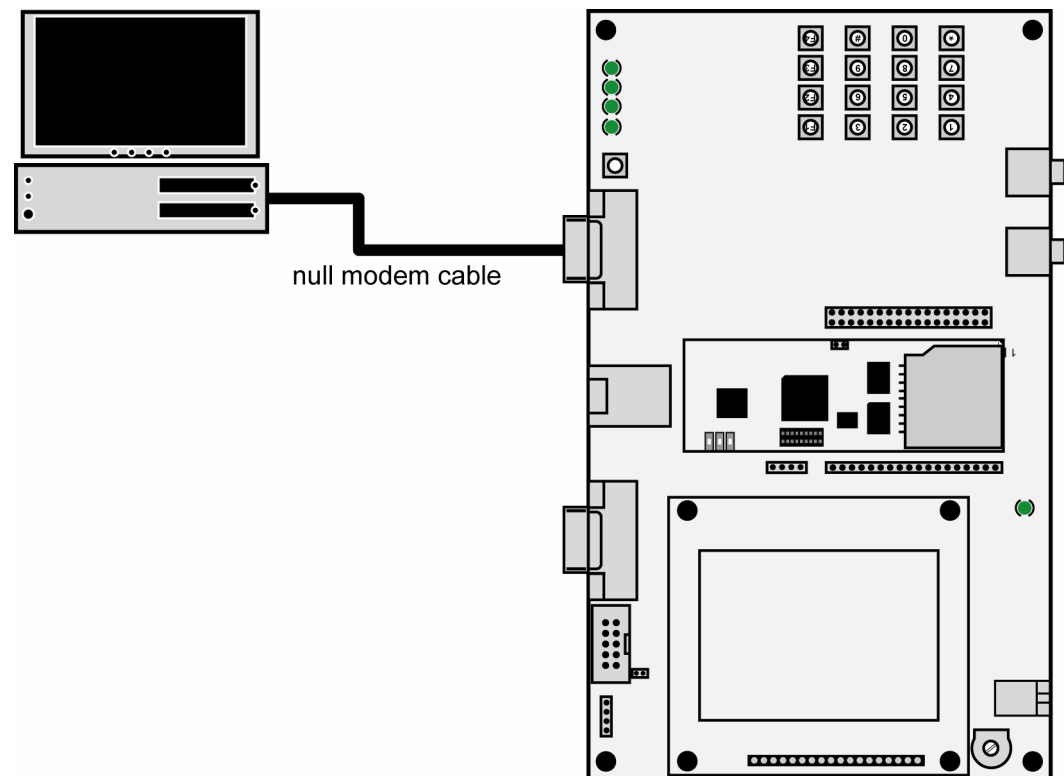


Figure 1: Serial link between Evaluation Board and PC

Connect one end of the null modem cable with an unused COM port of your PC. Make sure that this PC COM port supports 115.200 bps.

2.2 Ethernet Link between DNP/EVA13 and PC

Setup the Ethernet LAN link between the Evaluation Board DNP/EVA13 and your PC. Use an Ethernet cross-over cable or a switch-based infrastructure for the LAN connection.

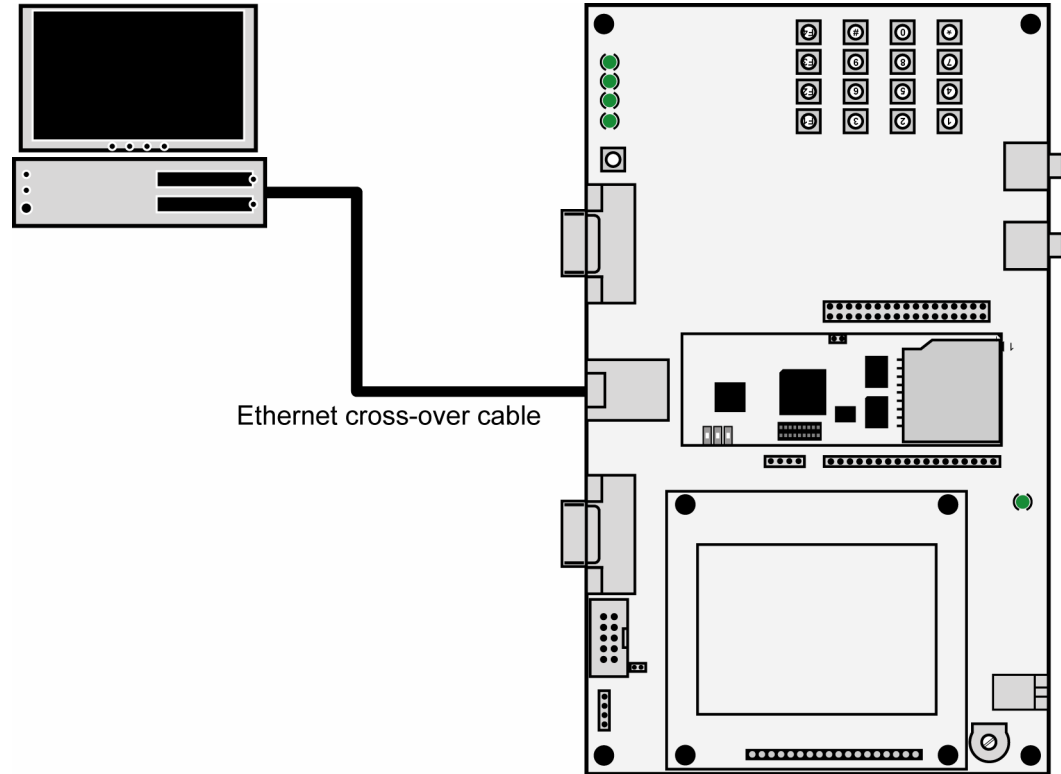


Figure 2: Ethernet link between Evaluation Board and PC



Please note: The DNP/5370 comes with the default IP address **192.168.0.126**. Please make sure that your PC can work with the IP address range **192.168.0.x**.

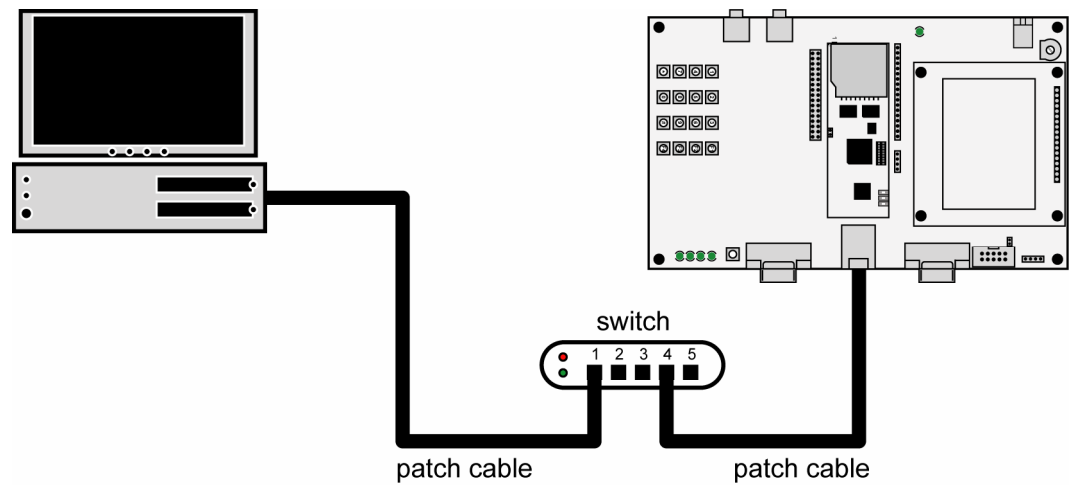


Figure 3: Switch-based Ethernet link between Evaluation Board and PC

2.3 Connecting Power Supply and Power-up the Starter Kit

Connect a 5 VDC power supply with a 5.5 mm x 2.5 mm jack plug to the Evaluation Board DNP/EVA13.

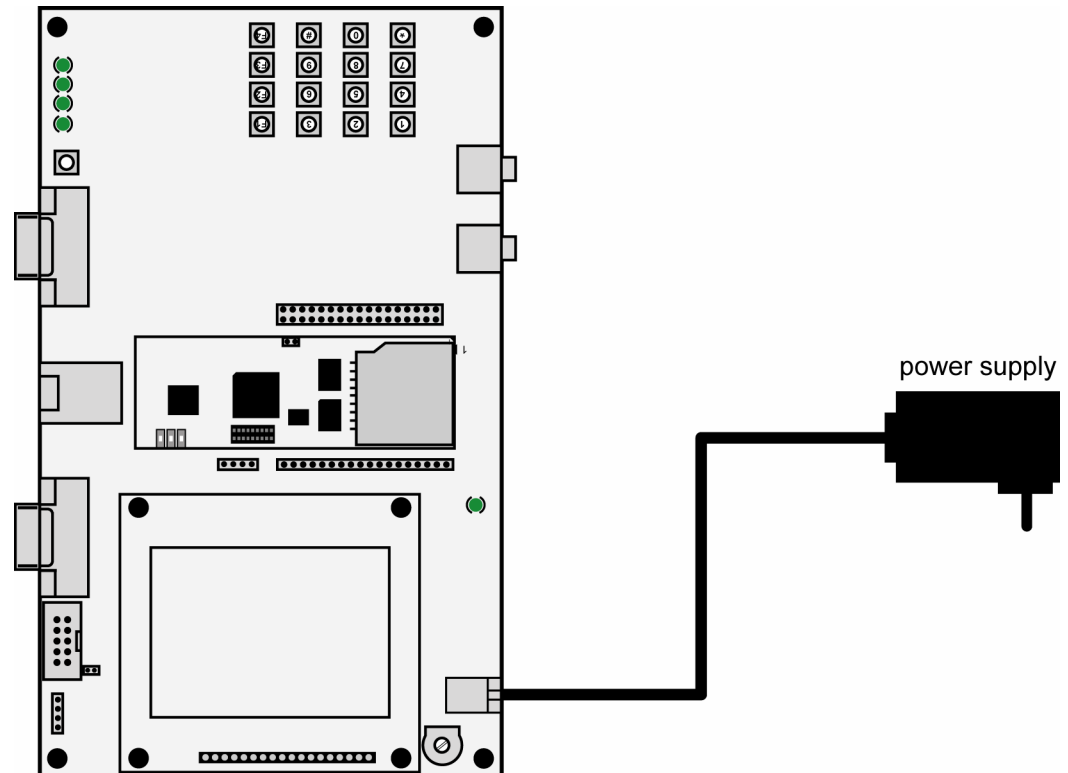


Figure 4: Power supply for the Evaluation Board



CAUTION: Providing the DNP/EVA13 with a voltage higher than the regular 5 VDC $\pm 10\%$ could resolve in damaged board components!

Please pay attention to the polarity of the power connector: the **+** pole is in the center!

Polarity:

Figure 5: Polarity of the power connector

Please note: Make sure that all cable connections are OK. Then power-up the Starter Kit.

2.4 Using Serial Link with Terminal Program

Run *HyperTerminal* on your Windows-PC, *minicom* or a similar simple terminal emulation program on your Linux-based PC.



Figure 6: Direct connection setup with HyperTerminal

Setup a direct connection with the parameters of table 2. Make sure, that the PC COM port supports 115.200 bps.

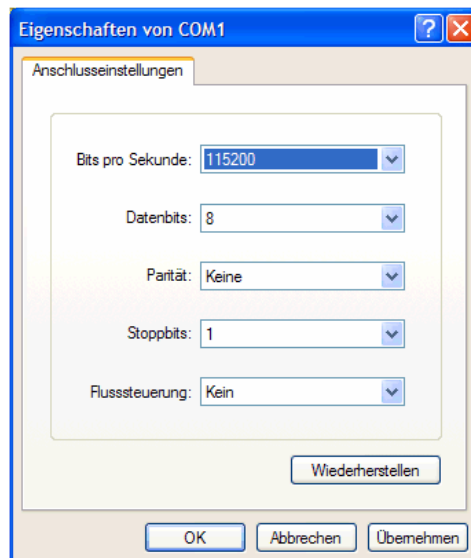


Figure 7: Parameter setup with HyperTerminal

Parameter	Value
Speed	115.200 bps
Data Bits	8
Parity	None
Stop Bits	1
Protocol	No (Xon/Xoff, RTS/CTS or similar)

Table 2: Setup parameters for the serial link

2.5 Power-up DNP/5370 with RCM disabled

After power-up the DIL/NetPC DNP/5370 starts an automatic boot process from the on-board flash memory chip. This process consists of two steps:

1. Directly after power-up, the DNP/5370 runs the U-Boot boot loader program for some milliseconds. U-Boot initializes the hardware components (hardware init). **With RCM disabled** (please see the *DIL/NetPC DNP/5370 hardware reference manual* for details), there is no U-Boot text message output over the DNP/5370 COM1 serial interface and no **boot delay**-based¹ wait period. Direct after the hardware init, the U-Boot boot loader starts the Linux OS image.
2. Linux takes control over the DNP/5370 hardware and runs all necessary processes for coming up to live.

```

Dynamic Power Management Controller Driver v0.1: major=10, minor = 254
Blackfin BF5xx serial driver version 2.00 (DMA mode)
RAMDISK driver initialized: 16 RAM disks of 4096K size 1024 blocksize
Davicom DM9161E: Registered new driver
Davicom DM9131: Registered new driver
PPP generic driver version 2.4.2
Blackfin mac net device registered
uclinux[mtdl]: RAM probe address=0x1b00000 size=0x400000
Creating 1 MTD partitions on "RAM":
0x00000000-0x00400000 : "ROMfs"
uclinux[mtdl]: set ROMfs:EXT2. to be root filesystem
NET: Registered protocol family 2
IP route cache hash table entries: 256 (order: -2, 1024 bytes)
TCP established hash table entries: 1024 (order: 0, 4096 bytes)
TCP bind hash table entries: 1024 (order: 0, 4096 bytes)
TCP: Hash tables configured (established 1024 bind 1024)
TCP reno registered
TCP bic registered
NET: Registered protocol family 1
NET: Registered protocol family 17
VFS: Mounted root (ext2 filesystem).
Freeing unused kernel memory: 56k freed (0x13b000 - 0x148000)
dma_alloc_init: dma_page @ 0x01863000 - 256 pages at 0x01f00000
-
    
```

Figure 8: Linux booting process with HyperTerminal



Please note: The U-Boot environment variable **boot delay** does not influence the DNP/5370 boot process with RCM (Remote Console Mode) disabled.

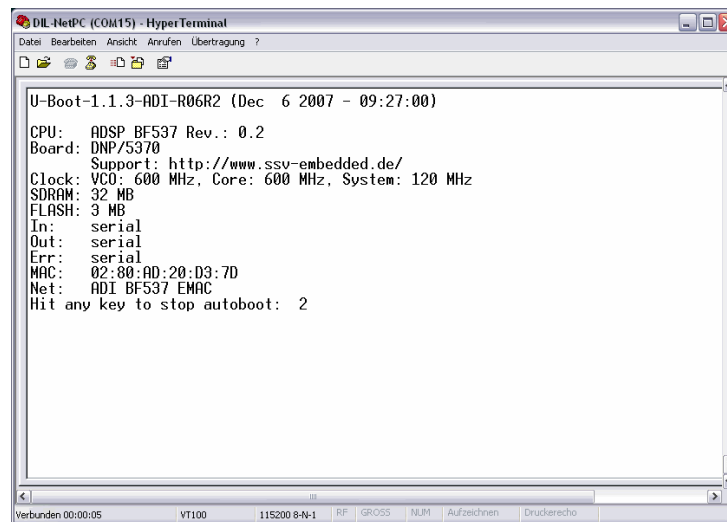
The DNP/5370 Linux supports a serial console. It allows running a Linux-based system in a headless configuration without a monitor or keyboard. Wait until the Linux boot process finishes. Then enter the user name **root**. This user name needs no password. Just hit Enter if the DNP/5370 Linux asks for a password.

¹ “**boot delay**” is a U-Boot environment variable. The value defines a wait time before U-Boot starts the Linux operating system.

2.6 Power-up DNP/5370 with RCM enabled

The DIL/NetPC DNP/5370 boot sequence with RCM enabled is similar to the boot procedure with RCM disabled. Only the first step is different:

1. The DNP/5370 runs the U-Boot boot loader program. There is no output on the serial console, so the serial console may be used by other applications. It is possible to interrupt the boot process and switch to the U-Boot command line interface. Just hit a key of your terminal emulation program.
2. The U-Boot boot loader starts a Linux OS image after the wait period from the DNP/5370 Flash memory.



```

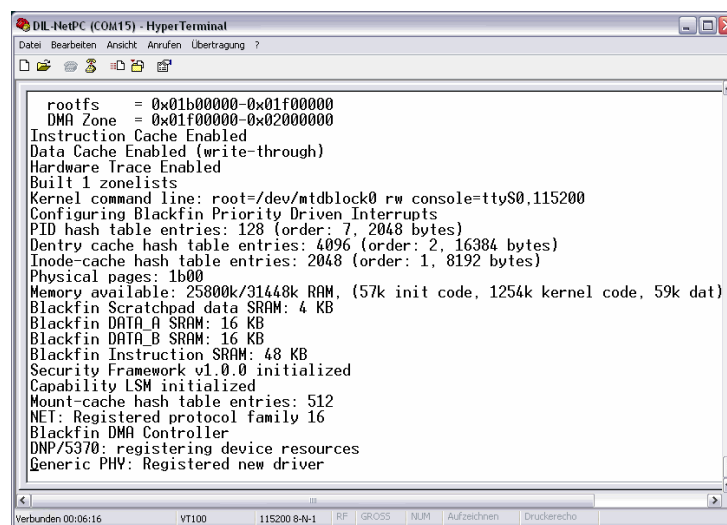
U-Boot-1.1.3-ADI-R06R2 (Dec 6 2007 - 09:27:00)
CPU:  ADSP BF537 Rev.: 0.2
Board: DNP/5370
      Support: http://www.ssv-embedded.de/
Clock: VCO: 600 MHz, Core: 600 MHz, System: 120 MHz
SDRAM: 32 MB
FLASH: 3 MB
In:    serial
Out:   serial
Err:   serial
MAC:   02:80:AD:20:D3:7D
Net:   ADI BF537 EMAC
Hit any key to stop autoboot: 2

```

Figure 9: U-Boot wait message



Please note: The U-Boot command line interface allows you to change the wait time of the first step. Please see the U-Boot environment variable **boot delay** for details.



```

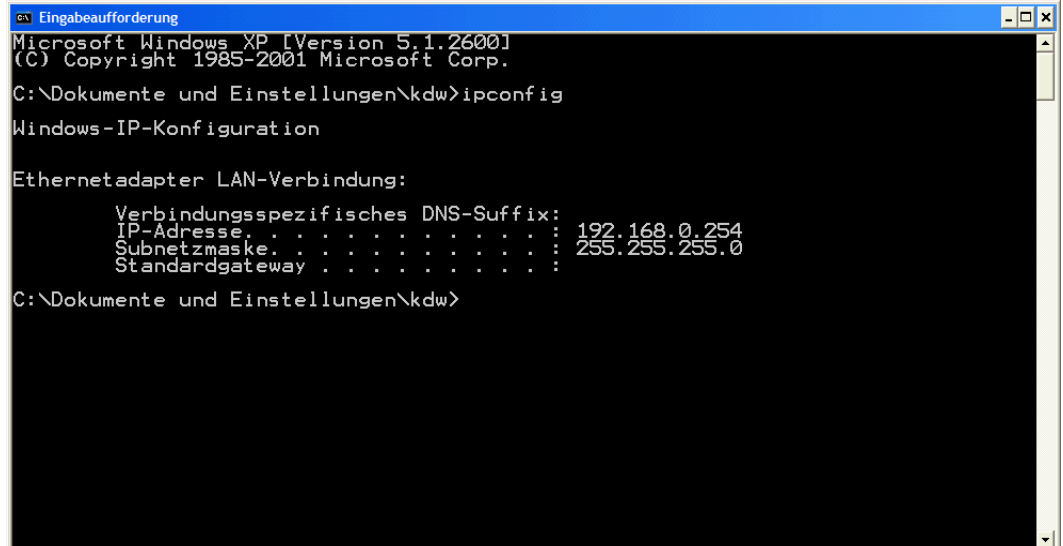
rootfs = 0x01b00000-0x01f00000
DMA Zone = 0x01f00000-0x02000000
Instruction Cache Enabled
Data Cache Enabled (write-through)
Hardware Trace Enabled
Built 1 zonelists
Kernel command line: root=/dev/mtdblock0 rw console=ttyS0,115200
Configuring Blackfin Priority Driven Interrupts
PID hash table entries: 128 (order: 7, 2048 bytes)
Dentry cache hash table entries: 4096 (order: 2, 16384 bytes)
Inode-cache hash table entries: 2048 (order: 1, 8192 bytes)
Physical pages: 1600
Memory available: 25800k/31448k RAM, (57k init code, 1254k kernel code, 59k dat)
Blackfin Scratchpad data SRAM: 4 KB
Blackfin DATA_A SRAM: 16 KB
Blackfin DATA_B SRAM: 16 KB
Blackfin Instruction SRAM: 48 KB
Security Framework v1.0.0 initialized
Capability LSM initialized
Mount-cache hash table entries: 512
NET: Registered protocol family 16
Blackfin DMA Controller
DNP/5370: registering device resources
Generic PHV: Registered new driver

```

Figure 10: Linux booting process after the U-Boot boot delay

2.7 Checking IP Address of PC

Make sure that your PC is using the right IP address for the Ethernet-based TCP/IP communication with the DIL/NetPC. Use 192.168.0.1 or 192.168.0.254 for your PC and 192.168.0.126 for the DNP/5370.



```

Eingabeaufforderung
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\Dokumente und Einstellungen\kdw>ipconfig

Windows-IP-Konfiguration

Ethernetadapter LAN-Verbindung:

    Verbindungsspezifisches DNS-Suffix:
    IP-Adresse. . . . . : 192.168.0.254
    Subnetzmaske. . . . . : 255.255.255.0
    Standardgateway . . . . . :

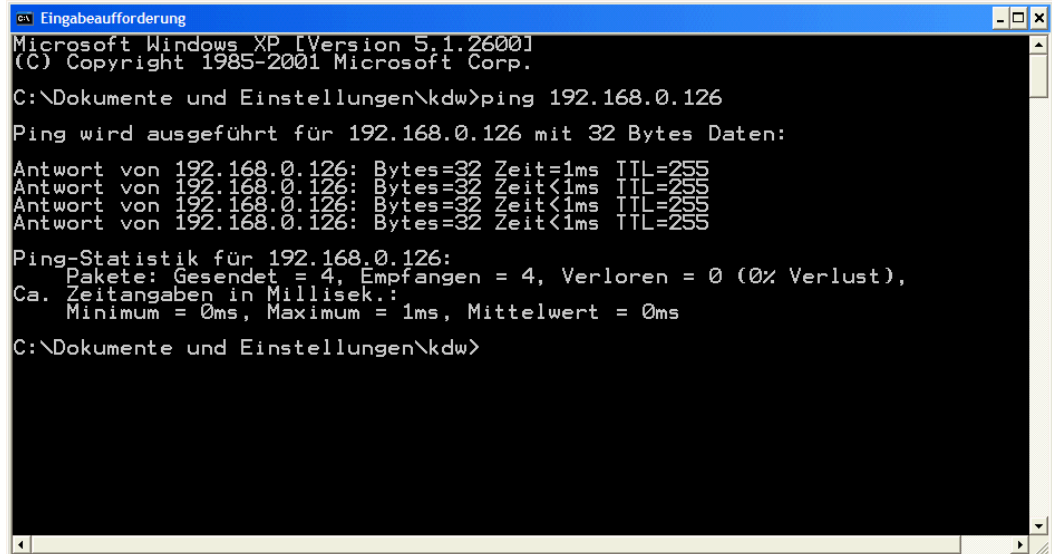
C:\Dokumente und Einstellungen\kdw>
  
```

Figure 11: Windows-PC IP address check with *ipconfig*

Talk to your network administrator if you have problems with the IP address understanding.

2.8 Checking Ethernet-based TCP/IP Communication

Check the Ethernet-based TCP/IP communication between the DNP/5370 and the PC with a simple *ping* command.



```
Eingabeaufforderung
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Dokumente und Einstellungen\kdw>ping 192.168.0.126

Ping wird ausgeführt für 192.168.0.126 mit 32 Bytes Daten:

Antwort von 192.168.0.126: Bytes=32 Zeit=1ms TTL=255
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=255
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=255
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=255

Ping-Statistik für 192.168.0.126:
    Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0 (0% Verlust),
    Ca. Zeitangaben in Millisek.:
        Minimum = 0ms, Maximum = 1ms, Mittelwert = 0ms

C:\Dokumente und Einstellungen\kdw>
```

Figure 12: Windows-PC TCP/IP communication check with *ping*

First check the cable connections and then the IP addresses if your ping does not work. Then check the TCP/IP setup of your PC.

2.9 Using a Telnet Connection

Run a Telnet client program on your PC with the IP address of the DNP/5370. You can use a Telnet session for remote entering Linux commands.

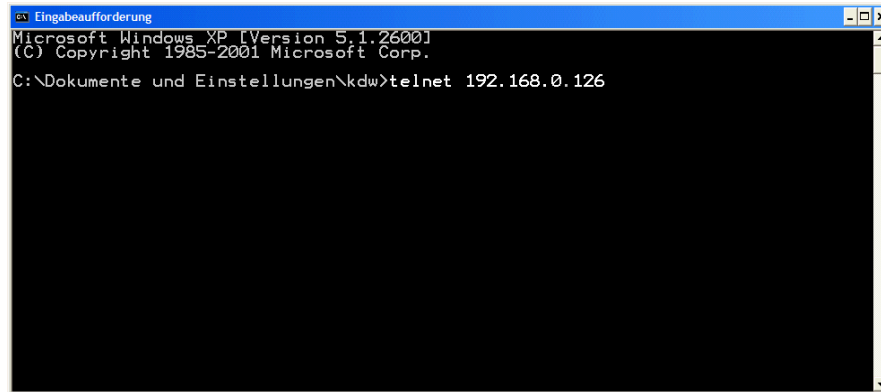


Figure 13: Run the Windows telnet client program

Wait until the DNP/5370 Linux requests a user name. Please enter the user name *root* and the password *root*. Then press Enter.



Please note: The DNP/5370 Linux comes with *BusyBox*. All Linux command line commands are implemented in *BusyBox*. *BusyBox* combines tiny versions of many common UNIX utilities into a single small executable. It provides replacements for most of the utilities you usually find in GNU *fileutils*, *shellutils*, etc. The utilities in *BusyBox* generally have fewer options than their full-featured GNU cousins; however, the options that are included provide the expected functionality and behave very much like their GNU counterparts. *BusyBox* provides a fairly complete environment for any small or embedded system.

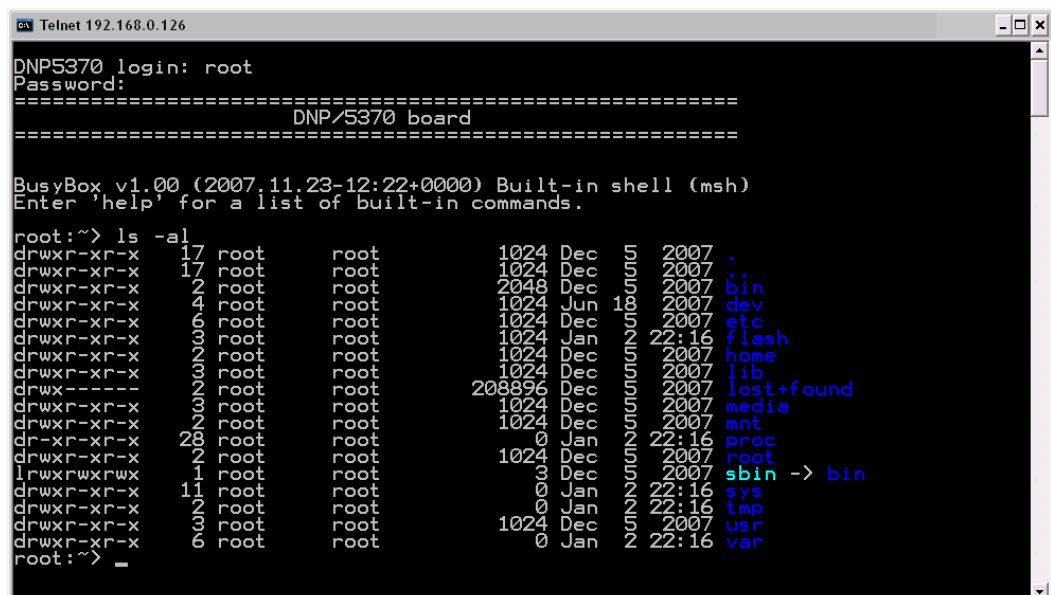


Figure 14: Using Linux commands within a Telnet client window

2.10 Checking Embedded Web Server

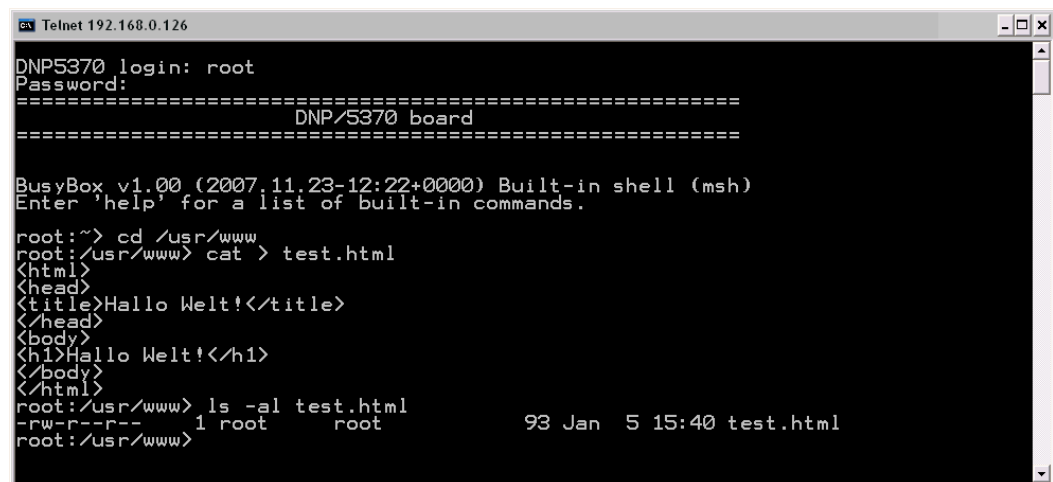
The DNP/5370 default Linux configuration comes with a pre-installed embedded web server. The object storage space (HTML pages, pictures, CGI programs, Java Applets, ...) for this web server is located within the DNP/5370 Flash memory.

Setup a Telnet session with root user rights from your PC to the DNP/5370 (see chapter 2.9 if necessary). Enter the following command lines within this Telnet session:

```
cd /usr/www
mkdir www
cd www
cat > test.html
<html>
<head>
<title>Hallo Welt!</title>
</head>
<body>
<h1>Hallo Welt!</h1>
</body>
</html>
```

CTRL-D (CTRL-D stops the Linux cat command)

These command lines create an HTML file `/usr/www/test.html` within the DNP/5370 RAM disk memory with the German version of “Hello World” (“Hallo Welt!”).



```
Telnet 192.168.0.126
DNP5370 login: root
Password:
=====
DNP/5370 board
=====

BusyBox v1.00 (2007.11.23-12:22+0000) Built-in shell (msh)
Enter 'help' for a list of built-in commands.

root:~> cd /usr/www
root:/usr/www> cat > test.html
<html>
<head>
<title>Hallo Welt!</title>
</head>
<body>
<h1>Hallo Welt!</h1>
</body>
</html>
root:/usr/www> ls -al test.html
-rw-r--r--  1 root  root    93 Jan  5 15:40 test.html
root:/usr/www>
```

Figure 15: Create an HTML file within a Telnet session

Run your PC web browser and access the HTML file `test.html` with your browser. Use the URL `http://192.168.0.126/test.html`. This URL assumes that your DNP/5370 is using the IP address 192.168.0.126 for the Ethernet LAN interface LAN1. Change this IP address if necessary.

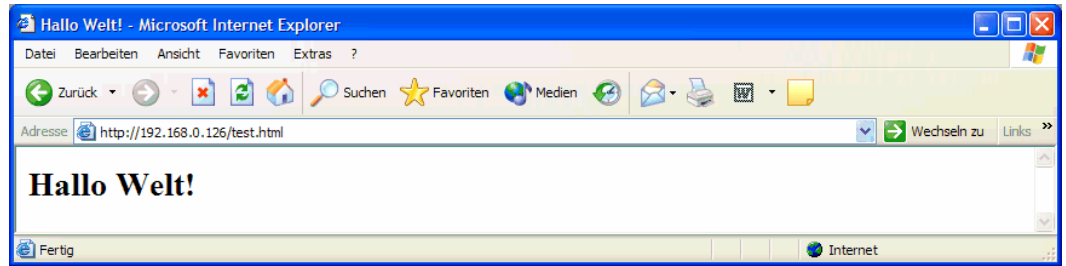


Figure 16: Check the embedded web server with Internet Explorer



Please note: The file `/usr/www/test.html` is stored in the RAM disk memory of the DNP/5370. So if the system is rebooted, the file will be deleted!

2.11 Checking FTP Server

The DIL/NetPC DNP/5370 Linux comes with a pre-installed FTP server. This server allows the file transfer between a PC and the DNP/5370.

Run an FTP client program on your PC. Set the session parameters for your FTP client to IP address **192.168.0.126**, user name **root** and password **root**. The DNP/5370 default directory for the FTP user name root is `/home/root`. This directory is located within the DNP/5370 RAM disk.

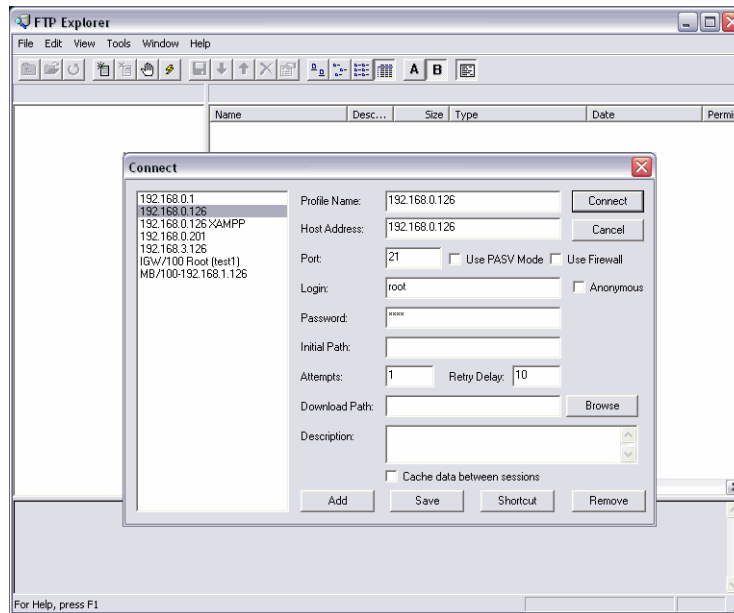


Figure 17: Set the session parameters for an FTP client program

Connect your FTP client with the DNP/5370 FTP server. Change to the directory `/media/mmc` and transfer some files from the PC to the DNP/5370.

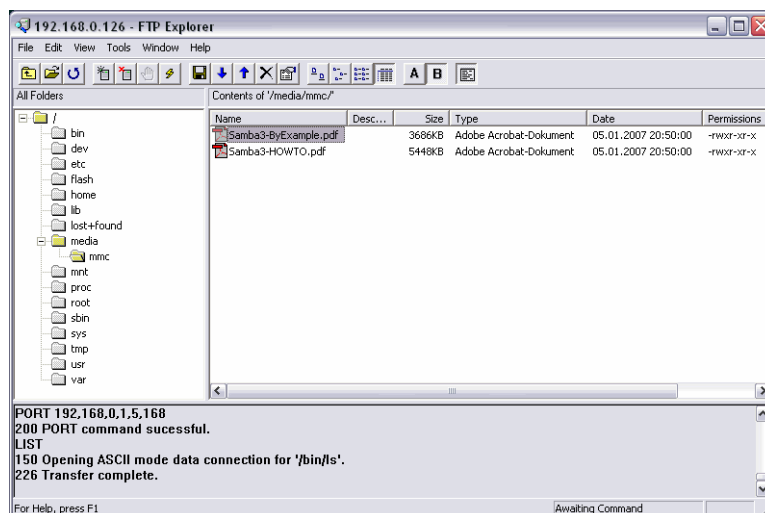
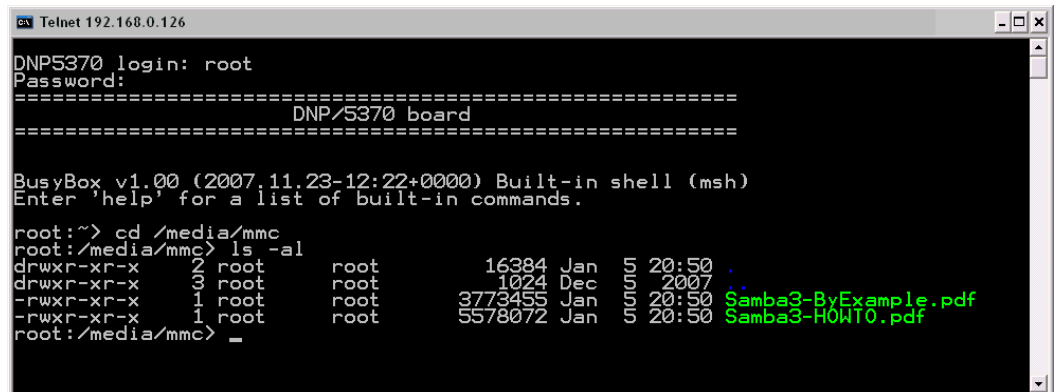


Figure 18: Transfer some files to the DNP/5370

Check the new files with a Telnet session. Change to the DNP/5370 default FTP directory /media/mmc within your Telnet session.



```

Telnet 192.168.0.126
DNP5370 login: root
Password:
=====
DNP/5370 board
=====
BusyBox v1.00 (2007.11.23-12:22+0000) Built-in shell (msh)
Enter 'help' for a list of built-in commands.
root:~> cd /media/mmc
root:/media/mmc> ls -al
drwxr-xr-x  2 root   root    16384 Jan  5 20:50 .
drwxr-xr-x  3 root   root    1024  Dec 2007 ..
-rwxr-xr-x  1 root   root   3773455 Jan  5 20:50 Samba3-ByExample.pdf
-rwxr-xr-x  1 root   root   5578072 Jan  5 20:50 Samba3-HOWTO.pdf
root:/media/mmc> _
    
```

Figure 19: The new files within /media/mmc

2.12 Checking TFTP Client

The DIL/NetPC DNP/5370 Linux offers also a pre-installed TFTP client. This program allows the TFTP-based file transfer between a PC and the DNP/5370.

First run a TFTP server program on your PC system. Linux-based PCs offer a TFTP server as part of the standard networking feature set. For Windows-based PCs please use the free *Win32 TFTP* server program from the Starter Kit CD-ROM (see directory /TFTP-Server-Win32 at the Starter Kit CD-ROM).

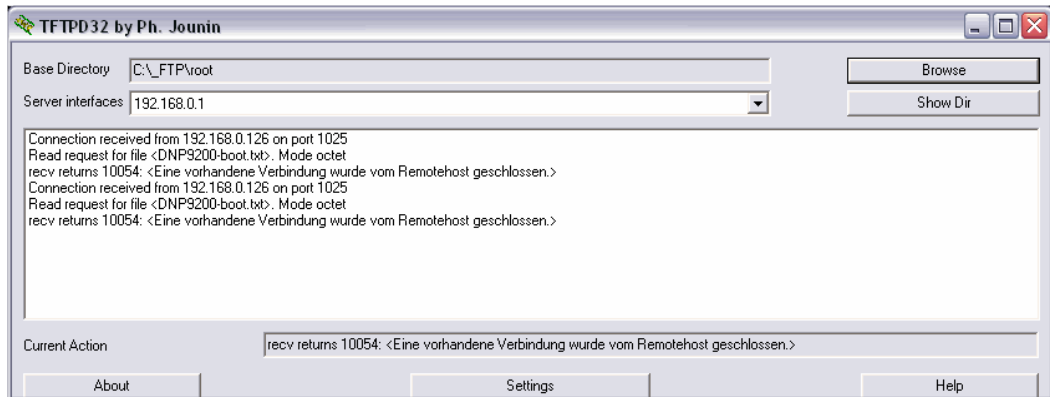


Figure 20: Running the Win32 TFTP server

Figure 20 shows the free Win32 TFTP server in action. This server allows file transfers to and from any DNP/5370 directory.

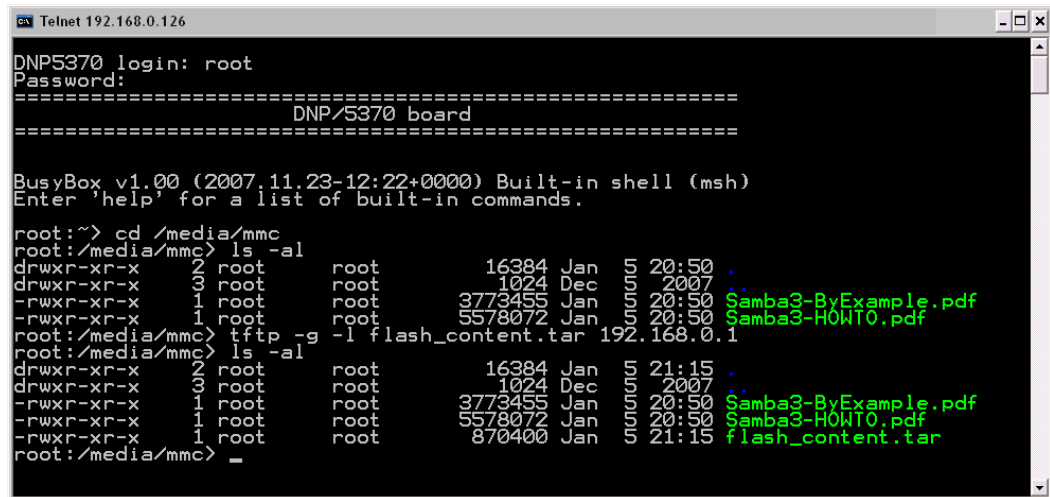


Figure 21: Download with TFTP get command

Enter your get and put commands within a Telnet session. Figure 21 shows a sample for a TFTP get command (getting a file from the PC to the DNP/5370). Here we enter:

```
tftp -g -l flash-content.tar 192.168.0.1
```

flash-content.tar is the filename which is requested from the TFTP server. **192.168.0.1** is the TFTP server IP address.

2.13 Changing Ex Factory IP Address (web-based)

The ex factory value for the default IP address is **192.168.0.126**. The network mask for this address is **255.255.255.0**. You can change the IP address and the network mask over an Ethernet-based LAN link with the DIL/NetPC DNP/5370 IPbyNET feature (see chapter 2.14 for more details) or with a web browser.

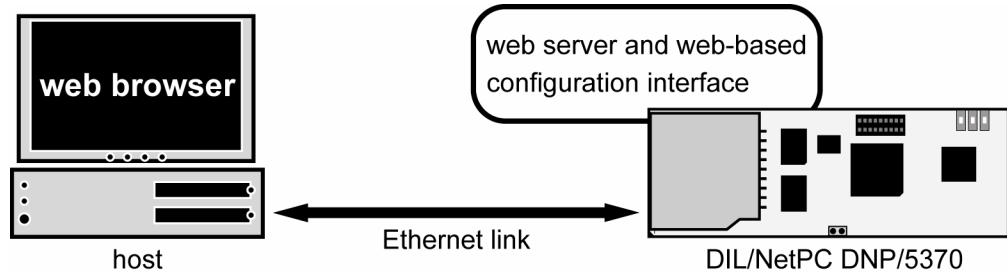


Figure 22: Environment for web-based IP address change

Run a web browser on your PC and enter the URL `http://192.168.0.126` (the ex factory IP address of the DIL/NetPC DNP/5370).



Figure 23: Login screen of the web-based configuration interface

Then enter the login password ***dnp5370*** and click the **Submit** button.



Please note: the DNP/5370 web-based configuration interface allows only one login user at the same time.

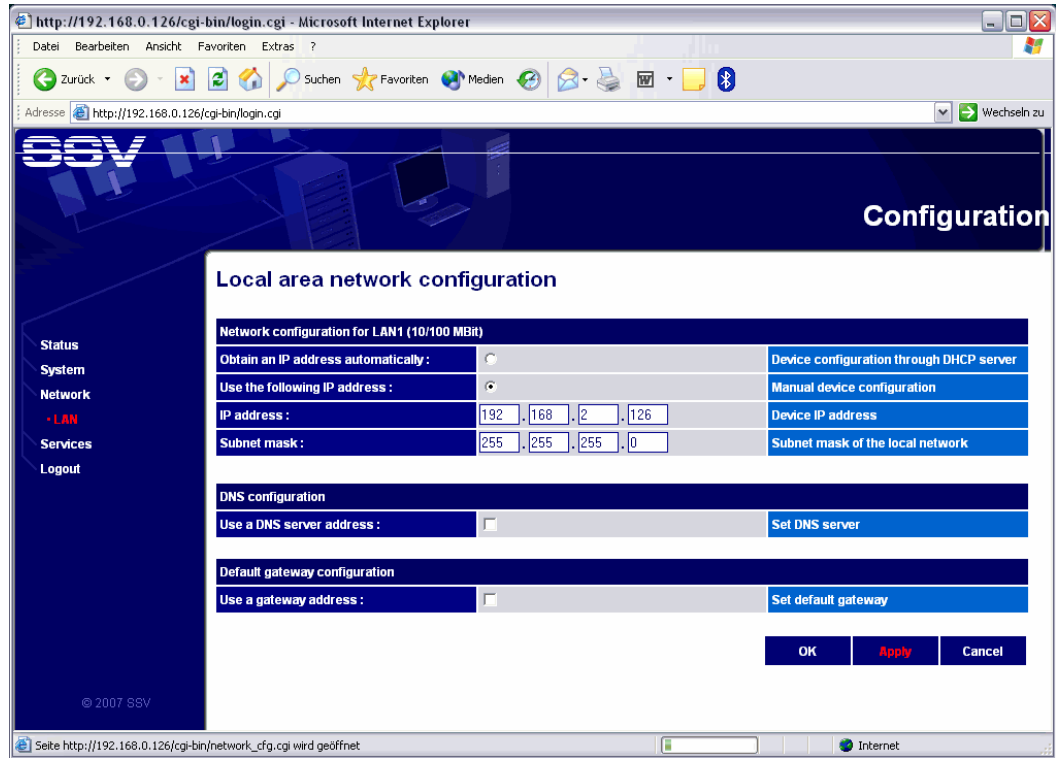


Figure 24: The LAN configuration allows to change the IP address

Click the menu item **Network** and then the sub-menu item **LAN**. Enter the new IP address and the network mask (e.g. the IP address 192.168.2.126). Then click the **Apply** button. Finally close the browser window and check the new IP address with a *ping*.



Figure 25: Checking the new IP address with *ping*



Please note: Do not forget to change the IP address of your PC to 192.168.2.1 or similar.

The LAN configuration screen shown in figure 24 allows also enabling a DHCP mode (obtaining an IP address automatically). In this mode the DIL/NetPC DNP/5370 is automatically assigned an IP address on DHCP-enabled networks. If DHCP does not work (e.g. no DHCP server available), the DNP/5370 takes its default IP address.

2.14 Changing Ex Factory IP Address (IPbyNet)

The ex factory value for the default IP address is **192.168.0.126**. The network mask for this address is **255.255.255.0**. You can change the IP address and the network mask over an Ethernet-based LAN link with a web browser (see chapter 2.13 for more details) or with the DIL/NetPC DNP/5370 IPbyNET feature.

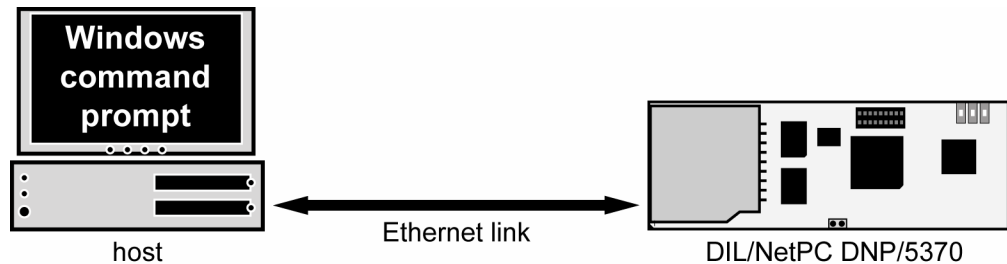


Figure 26: Environment for IP address change with IPbyNet

IPbyNET is a DNP/5370 firmware competent, which checks direct after each boot process the presence of ICMP echo request packets with the MAC address of the DNP/5370 Ethernet LAN interface. If an ICMP packet is available, the IPbyNET firmware extracts the destination IP address from the ICMP echo request packet and sets the DNP/5370 Ethernet LAN interface with this IP address.

```

C:\>ping 192.168.0.126
Ping wird ausgeführt für 192.168.0.126 mit 32 Bytes Daten:
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.126: Bytes=32 Zeit<1ms TTL=64
Ping-Statistik für 192.168.0.126:
    Pakete: Gesendet = 4, Empfangen = 4, Verloren = 0 (0% Verlust),
    Ca. Zeitangaben in Millisek.:
        Minimum = 0ms, Maximum = 0ms, Mittelwert = 0ms
C:\>arp -s 192.168.0.10 02-80-AD-20-D3-7F
C:\>ping -t -w 300 192.168.0.10
Ping wird ausgeführt für 192.168.0.10 mit 32 Bytes Daten:
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Zeitüberschreitung der Anforderung.
Antwort von 192.168.0.10: Bytes=32 Zeit=2ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
Antwort von 192.168.0.10: Bytes=32 Zeit<1ms TTL=64
    
```

Figure 27: Changing the IP address with IPbyNet

Please see the label with the MAC address of the DIL/NetPC DNP/5370 on the top of your DIL/NetPC device to find the MAC address for your DNP/5370. Then run a Windows command prompt and enter the following two command lines:

```

arp -s 192.168.0.10 02-80-AD-20-D3-7F
ping -t -w 300 192.168.0.10
    
```

The first command line creates an ARP table entry for the IP address 192.168.0.10 and the MAC address 02-80-AD-20-D3-7F. The second command line sends an ICMP echo request to the device with the MAC address 02-80-AD-20-D3-7F. This request contains the new IP address 192.168.0.10.

Change the IP address and the MAC address of the two command lines. Use the IP address of your needs and the given MAC address from your DIL/NetPC DNP/5370.

Then reboot the DIL/NetPC DNP/5370. After a few seconds the DIL/NetPC DNP/5370 responds to the *ping* with the new IP address.



Please note: Changing the IP address of your DNP/5370 with IPbyNET resets also the web-based configuration interface settings to factory defaults!

3 U-BOOT COMMAND OVERVIEW

The user interface to U-Boot consists of a **command line interpreter** (CLI), much like a Linux shell prompt. When connected via a serial line you can interactively enter commands and see the results. The following table shows the available U-Boot commands for the DIL/NetPC DNP/5370.

Command	Function
autoscr	run script from memory
base	print or set address offset
bdinfo	print Board Info structure
bootm	boot application image from memory
bootp	boot image via network using BootP/TFTP protocol
bootd	boot default, i.e., run 'bootcmd'
cmp	memory compare
cp	memory copy
crc32	checksum calculation
echo	echo args to console
erase	erase FLASH memory
flinfo	print FLASH memory information
go	start application at address 'addr'
help	print online help
iminfo	print header information for application image
loadb	load binary file over serial line (kermit mode)
loadc	load binary file over serial line (ymodem-c mode)
loadg	load binary file over serial line (ymodem-g mode)
loads	load S-Record file over serial line
loop	infinite loop on address range
md	memory display
mm	memory modify (auto-incrementing)
mtest	simple RAM test
mw	memory write (fill)
nm	memory modify (constant address)
printenv	print environment variables
protect	enable or disable FLASH write protection
rarpboot	boot image via network using RARP/TFTP protocol
reset	perform RESET of the CPU
run	run commands in an environment variable
saveenv	save environment variables to persistent storage
setenv	set environment variables
sleep	delay execution for some time
tftpboot	boot image via network using TFTP protocol and env variables ipaddr and serverip
version	print monitor version
?	alias for 'help'

Table 3: U-Boot command overview

4 DNP/5370 LINUX BOOT MESSAGES

```
U-Boot-1.1.3-ADI-R06R2 (Dec 6 2007 - 09:27:00)

CPU: ADSP BF537 Rev.: 0.2
Board: DNP/5370
      Support: http://www.ssv-embedded.de/
Clock: VCO: 600 MHz, Core: 600 MHz, System: 120 MHz
SDRAM: 32 MB
FLASH: 3 MB
In: serial
Out: serial
Err: serial
MAC: 02:80:AD:20:D3:80
Net: ADI BF537 EMAC
Hit any key to stop autoboot: 0
## Booting image at 20030000 ...
   Image Name: uClinux Kernel and ext2
   Image Type: Blackfin Linux Kernel Image (gzip compressed)
   Data Size: 2664662 Bytes = 2.5 MB
   Load Address: 00001000
   Entry Point: 00001000
   Verifying Checksum ... OK
   Uncompressing Kernel Image ... OK
Starting Kernel at = 1000
Linux version 2.6.16.27-ADI-2006R2SSV (root@colinux) (gcc version 4.1.1 (ADI ↵
06R2)) #4 Wed Dec 5 17:22:48 CET 2007
Blackfin support (C) 2004-2006 Analog Devices, Inc.
Compiled for ADSP-BF537 Rev. 0.2
Blackfin uClinux support by http://blackfin.uclinux.org/
Processor Speed: 600 MHz core clock and 120 Mhz System Clock
Board Memory: 32MB
Kernel Managed Memory: 32MB
Memory map:
  text      = 0x00001000-0x0013aae4
  init      = 0x0013b000-0x00149668
  data      = 0x00149c8c-0x0017eefc
  stack     = 0x0014a000-0x0014c000
  bss       = 0x0017ef00-0x0018ddd8
  available = 0x0018ddd8-0x01b00000
  rootfs    = 0x01b00000-0x01f00000
  DMA Zone  = 0x01f00000-0x02000000
Instruction Cache Enabled
Data Cache Enabled (write-through)
Hardware Trace Enabled
Built 1 zonelists
Kernel command line: root=/dev/mtdblock0 rw console=ttyS0,115200
Configuring Blackfin Priority Driven Interrupts
PID hash table entries: 128 (order: 7, 2048 bytes)
Dentry cache hash table entries: 4096 (order: 2, 16384 bytes)
Inode-cache hash table entries: 2048 (order: 1, 8192 bytes)
Physical pages: 1b00
Memory available: 25800k/31448k RAM, (57k init code, 1254k kernel code, ↵
59k data, 1024k dma)
Blackfin Scratchpad data SRAM: 4 KB
Blackfin DATA_A SRAM: 16 KB
Blackfin DATA_B SRAM: 16 KB
Blackfin Instruction SRAM: 48 KB
Security Framework v1.0.0 initialized
Capability LSM initialized
```



```

Mount-cache hash table entries: 512
NET: Registered protocol family 16
Blackfin DMA Controller
DNP/5370: registering device resources
Generic PHY: Registered new driver
JFFS2 version 2.2. (NAND) (C) 2001-2003 Red Hat, Inc.
io scheduler noop registered
io scheduler anticipatory registered (default)
io scheduler cfq registered
Real Time Clock Driver v1.10e
Dynamic Power Management Controller Driver v0.1: major=10, minor = 254
Blackfin BF5xx serial driver version 2.00 (DMA mode)
RAMDISK driver initialized: 16 RAM disks of 4096K size 1024 blocksize
Davicom DM9161E: Registered new driver
Davicom DM9131: Registered new driver
PPP generic driver version 2.4.2
Blackfin mac net device registered
uclinux[mtd]: RAM probe address=0x1b00000 size=0x400000
Creating 1 MTD partitions on "RAM":
0x00000000-0x00400000 : "ROMfs"
uclinux[mtd]: set ROMfs:EXT2 to be root filesystem
NET: Registered protocol family 2
IP route cache hash table entries: 256 (order: -2, 1024 bytes)
TCP established hash table entries: 1024 (order: 0, 4096 bytes)
TCP bind hash table entries: 1024 (order: 0, 4096 bytes)
TCP: Hash tables configured (established 1024 bind 1024)
TCP reno registered
TCP bic registered
NET: Registered protocol family 1
NET: Registered protocol family 17
VFS: Mounted root (ext2 filesystem).
Freeing unused kernel memory: 56k freed (0x13b000 - 0x148000)
dma_alloc_init: dma_page @ 0x01863000 - 256 pages at 0x01f00000
mtd_dataflash spil.2: AT45DB642x (8448 KBytes)
Creating 1 MTD partitions on "mtd_dataflash":
0x00000000-0x00840000 : "JFFS2 dataflash"
ssvhwa module installed.
JFFS2 write-buffering enabled buffer (1056) erasesize (8448)
Starting Network ...

DNP5370 login:

```

Please note: This symbol “↵” shows that the following line belongs to the previous line.

5 HELPFUL LITERATURE

- Evaluation Board DNP/EVA13 hardware reference manual
- DIL/NetPC DNP/5370 hardware reference manual
- Analog Devices BF537 MCU data sheet
- Analog Devices BF537 MCU hardware reference manual
- Analog Devices BF537 MCU software reference manual

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For actual information about the DNP/SK28 visit us at www.dilnetpc.com.

DOCUMENT HISTORY

Revision	Date	Remarks	Name
1.0	2008-01-14	first version	WBU
1.1	2008-01-21	changed „TFTP server“ into „FTP server“ in chapter 1.3	WBU

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