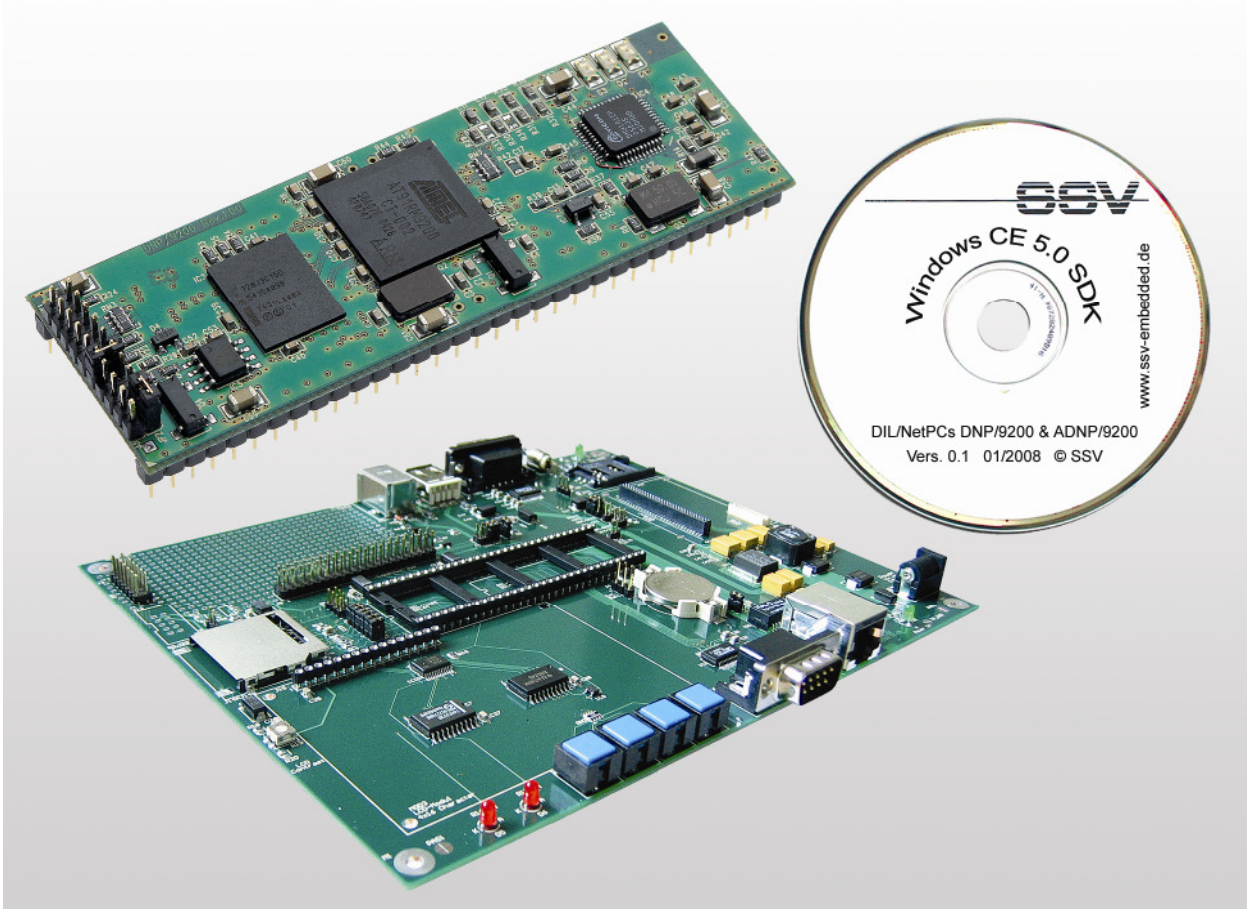
DNP/SK23-WCE
Windows CE Starter Kit

First Steps



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Document Revision: 1.0
Date: 2008-01-24

CONTENT

1 INTRODUCTION

The DIL/NetPC DNP/9200 Starter Kit contains everything you need to get started with your Atmel AT91RM9200 ARM9-based embedded networking application. The Starter Kit includes a DNP/9200 module with a preinstalled U-Boot boot loader and Windows CE, the Evaluation Board DNP/EVA9, 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.

For using the DNP/SK23 Windows CE Starter Kit you need a PC-based development system. The minimal configuration for this system is a Windows XP-based PC with a free COM port (COM1, COM2 or USB-based COMx) for the RS232 serial link and a 10/100 Mbps LAN interface with TCP/IP support for an Ethernet link to Windows CE.

The RS232 serial link allows the communication with the DNP/9200 U-Boot boot loader. This software component supports the download of a new Windows CE image file to the DNP/9200 Flash memory. The Ethernet link is necessary for Telnet-based user communication, FTP-based file transfers and HTTP-based web access to the Windows CE embedded servers.

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
italic	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 DIL/NetPC DNP/9200 comes with a preinstalled U-Boot boot loader and a Windows CE operating system. The DNP/9200 Windows CE consists of two main components within one image file: 1. the Windows CE kernel and 2. the root file system (Windows CE file system).

The DNP/9200 U-Boot boot loader allows the downloading of new Windows CE kernel versions and root file systems to the DNP/9200 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/9200.

- DIL/NetPC DNP/9200 with Atmel AT91RM9200, 16 MByte Flash and 32 MByte SDRAM
- U-Boot boot loader and Windows CE preinstalled in Flash memory
- Evaluation Board DNP/EVA9
- Null modem cable
- Ethernet LAN cross-over cable
- 110 VAC or 230 VAC to 5 VDC international power supply
- CD-ROM with SDK, TFTP server and FTP client software
- Printed hardware reference and user manuals
- HTTP (web) server setup sample
- FTP server setup sample
- Telnet server setup sample (Windows CE Telnet service)

2 GETTING STARTED

2.1 Serial Link between DNP/EVA9 and PC

Setup the serial link between the Evaluation Board DNP/EVA9 and your PC. Use a null modem cable for this connection.

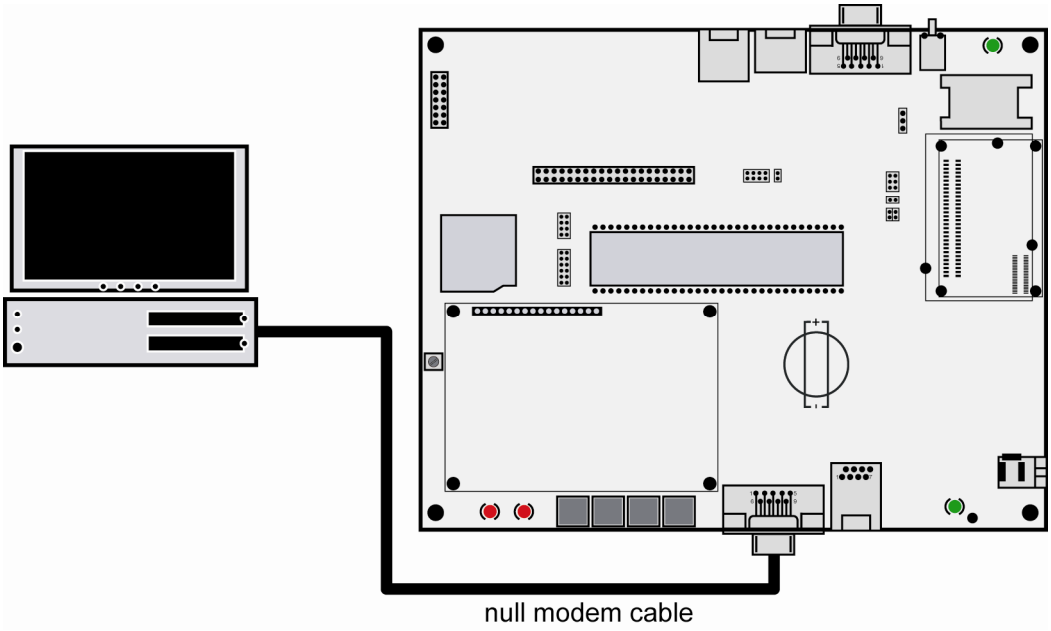

Figure 1: Serial link between Evaluation Board and PC

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/EVA9 and PC

Setup the Ethernet LAN link between the Evaluation Board DNP/EVA9 and your PC. Use an Ethernet cross-over cable or a switch-based infrastructure for the first LAN connection.

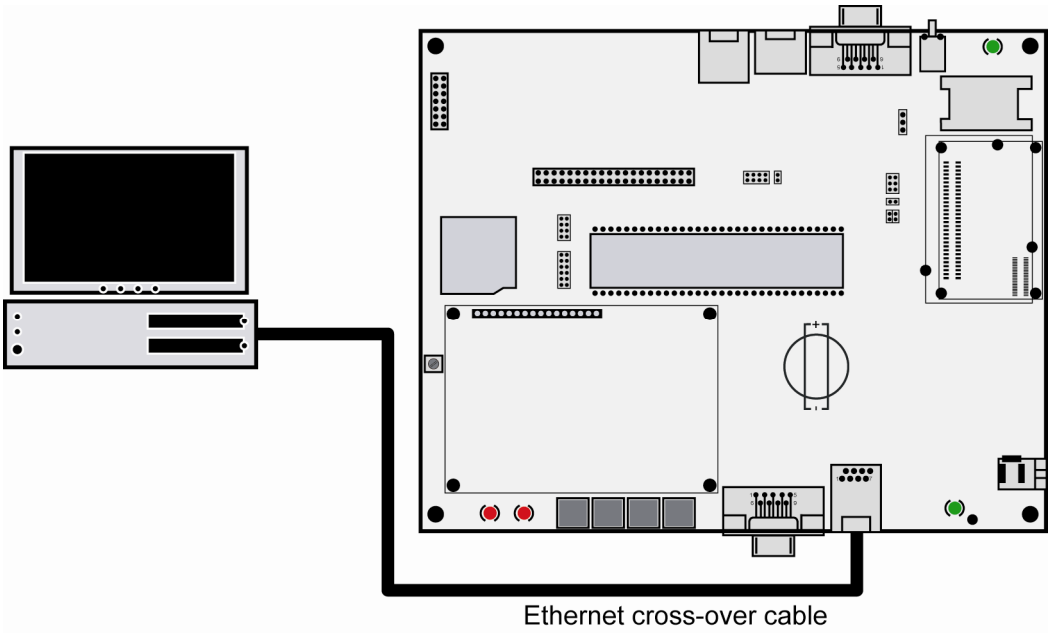

Figure 2: Ethernet link between Evaluation Board and PC

Please note: The DNP/9200 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.

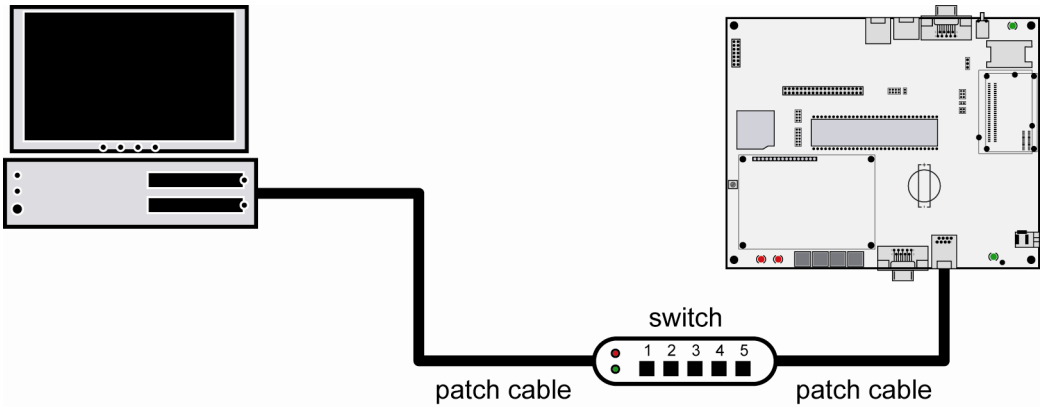

Figure 3: Switch-based Ethernet link between Evaluation Board and PC

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/EVA9.

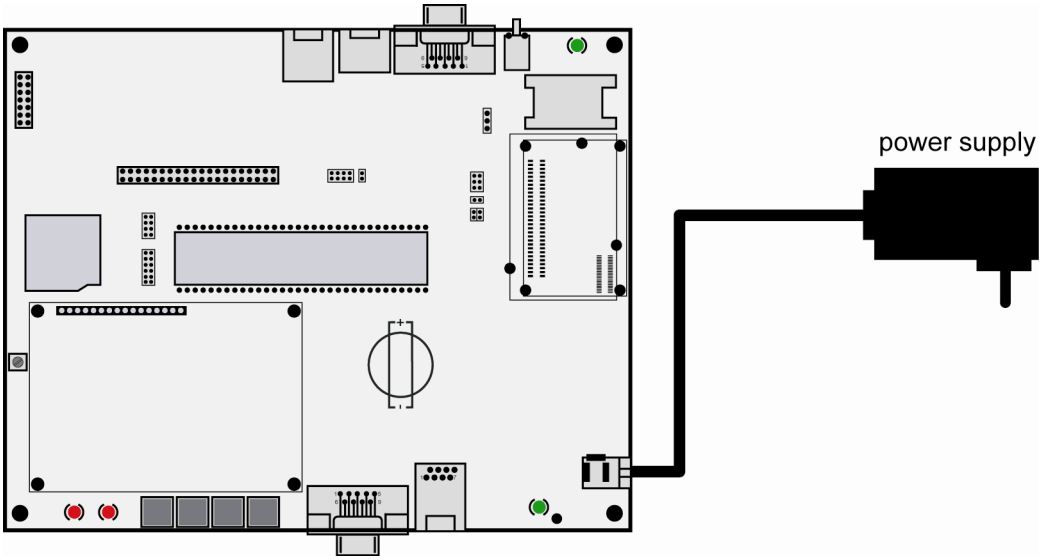

Figure 4: Power supply for the Evaluation Board

CAUTION: Providing the DNP/EVA9 with a voltage higher than the regular 5 VDC ±10% could resolve in damaged board components!

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

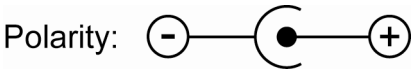

Figure 5: Polarity of the power connector

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 or a similar simple terminal emulation program.

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/9200 with RCM enabled

After power-up the DIL/NetPC DNP/9200 starts an automatic boot process from the on-board Flash memory chip. This process consists of two steps:

1. The DNP/9200 runs the U-Boot boot loader program. This software shows a wait message over the DNP/9200 COM1 serial interface if the RCM jumper is available (RCM enabled). Please see the **DIL/NetPC DNP/9200 Hardware Reference Manual** for details. It is possible to interrupt the boot process and switch to the U-boot command line interface (U-Boot CLI). Just hit a key of your terminal emulation program.

2. Without interruption the U-Boot boot loader starts the Windows CE image after the wait period from the DNP/9200 Flash memory.

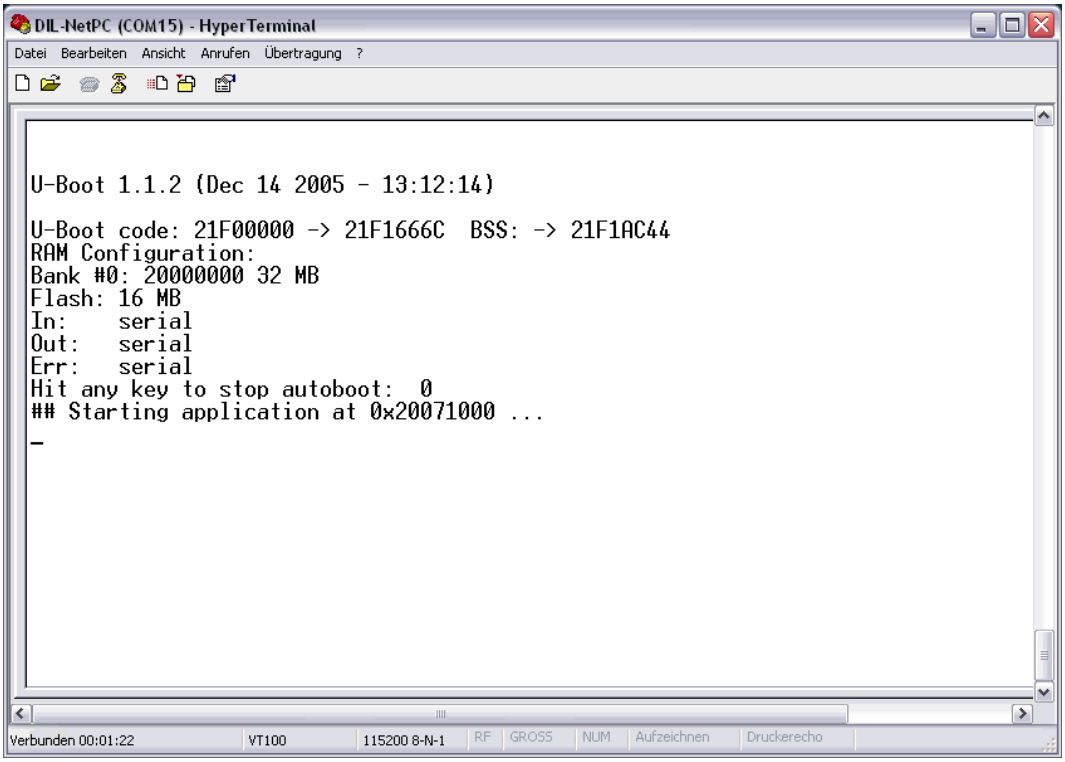

Figure 8: Booting process after the U-Boot boot delay

Without the RCM jumper (RCM disabled) there is no wait time and absolutely no output to the DNP/9200 serial interface COM1. The port is free for application usage.

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

2.6 Checking the 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.

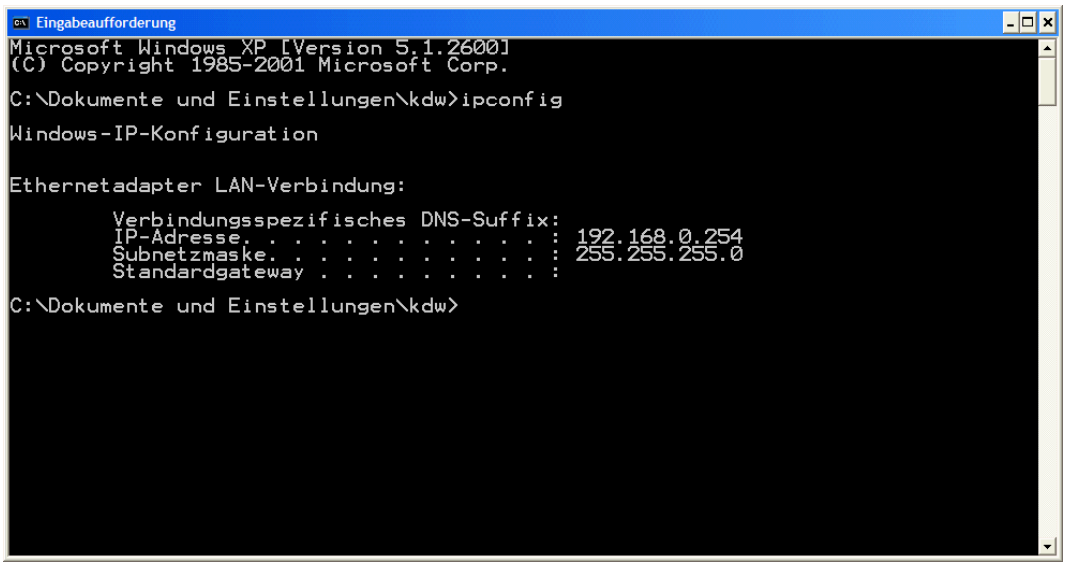

Figure 9: Windows-PC IP address check with *ipconfig*

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

2.7 Checking the Ethernet-based TCP/IP Communication

Check the Ethernet-based TCP/IP communication between the DNP/9200 and the PC with a simple *ping* command.

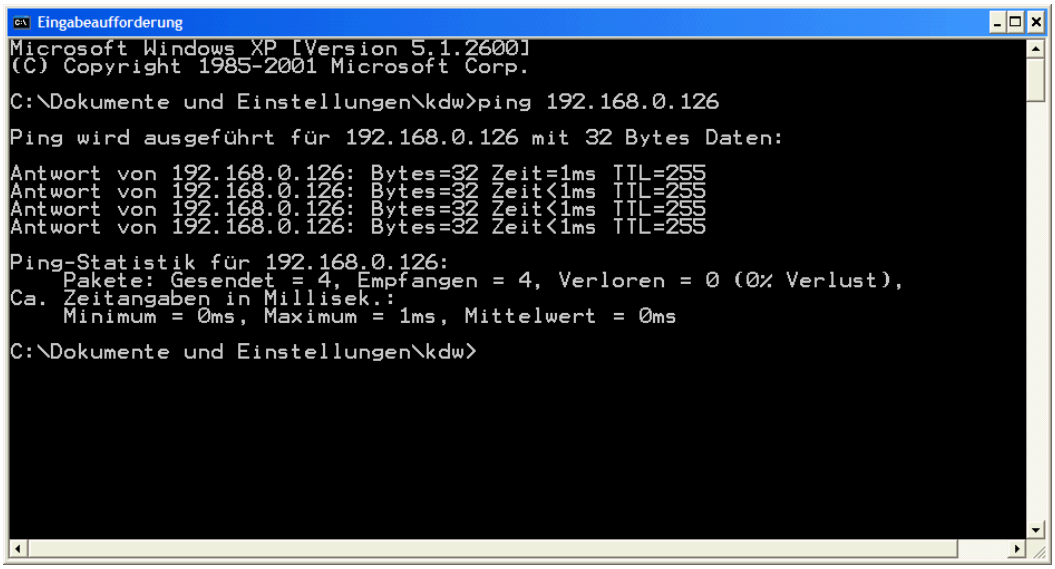

Figure 10: Windows-PC TCP/IP communication check with *ping*

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.

2.8 Using a Telnet Connection

Run a Telnet client program on your PC with the IP address of the DIL/NetPC DNP/9200. You can use a Telnet session with the Windows CE Telnet service for entering commands on the Windows CE command line interface (CLI).

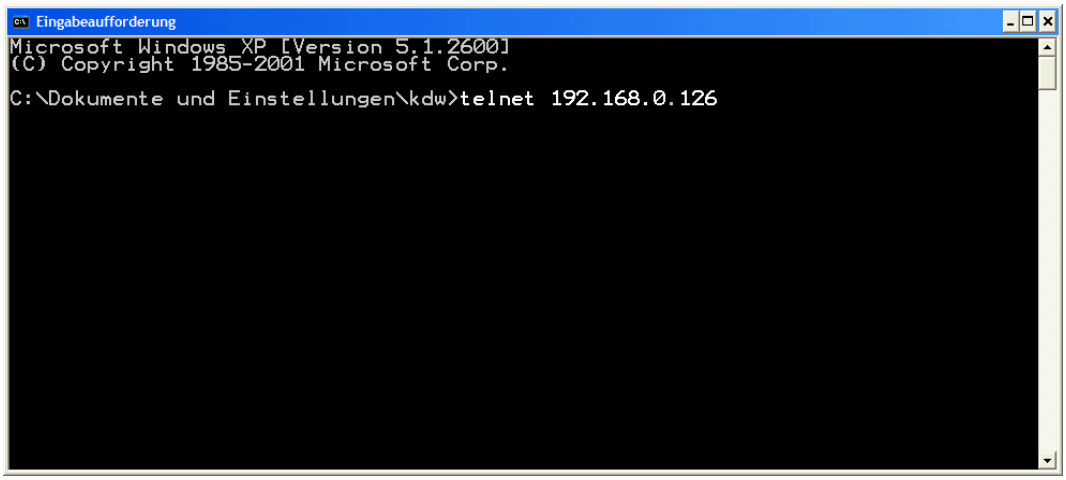

Figure 11: Run the Windows telnet client program

Please use the CLI also for the user access to the Windows CE file system. This CLI offers commands for directory change, file copy, file delete and more.

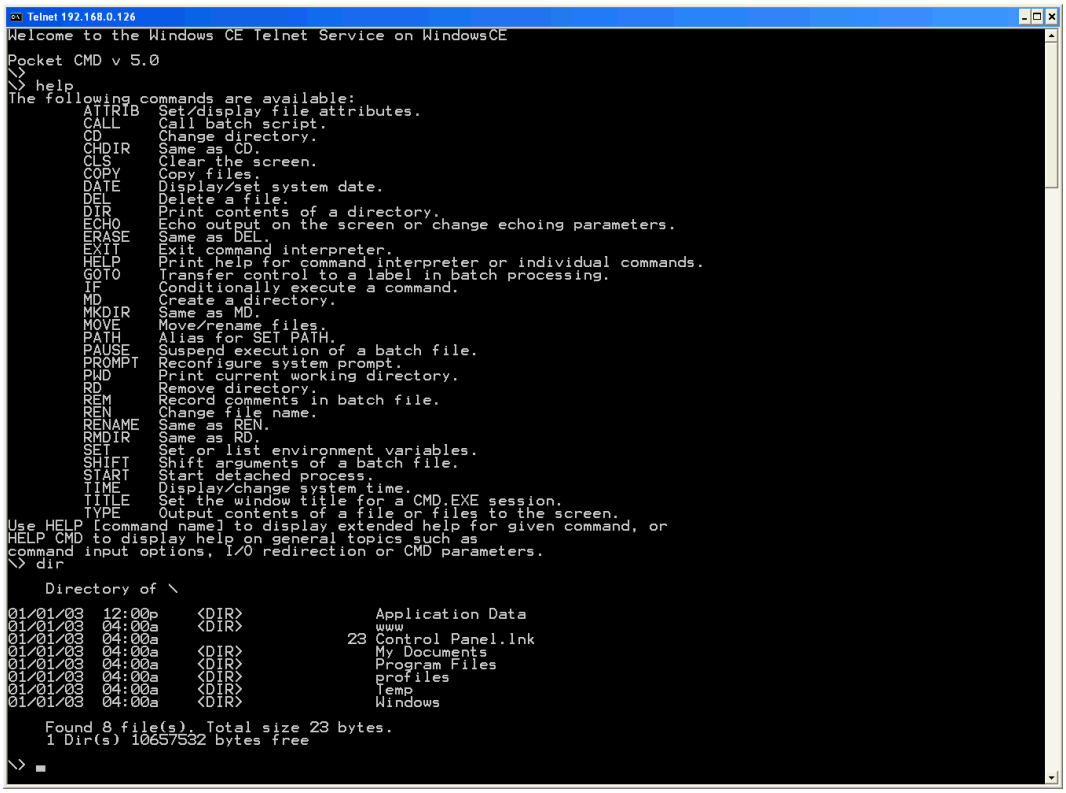

Figure 12: Using Pocket CMD commands within a Telnet client window

2.9 Checking the Embedded Web Server

The DIL/NetPC DNP/9200 default Windows CE configuration comes with a preinstalled embedded web server (also called **HTTP server**). The object storage space (HTML pages, pictures, CGI programs, Java Applets …) for this web server is located within the Windows CE file system.

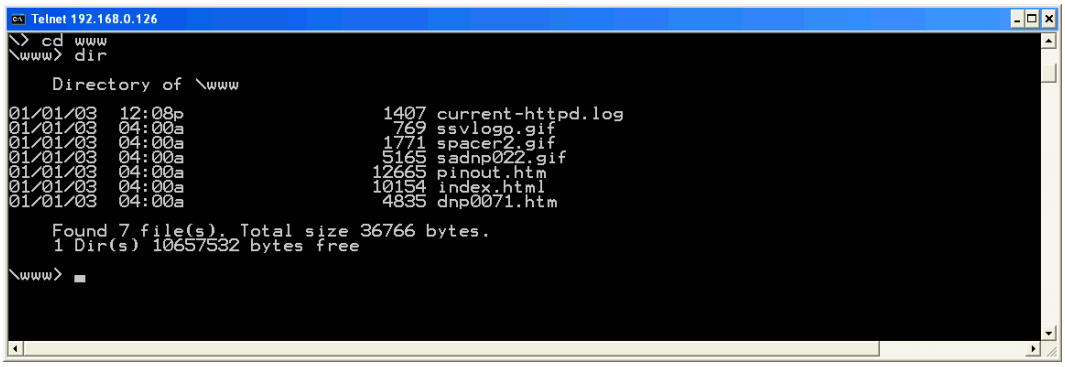

Figure 13: The files within the directory \www

Run your PC web browser and access the HTML file `index.html`. Use the following URL within the browser address field:

`http://192.168.0.126/index.html`

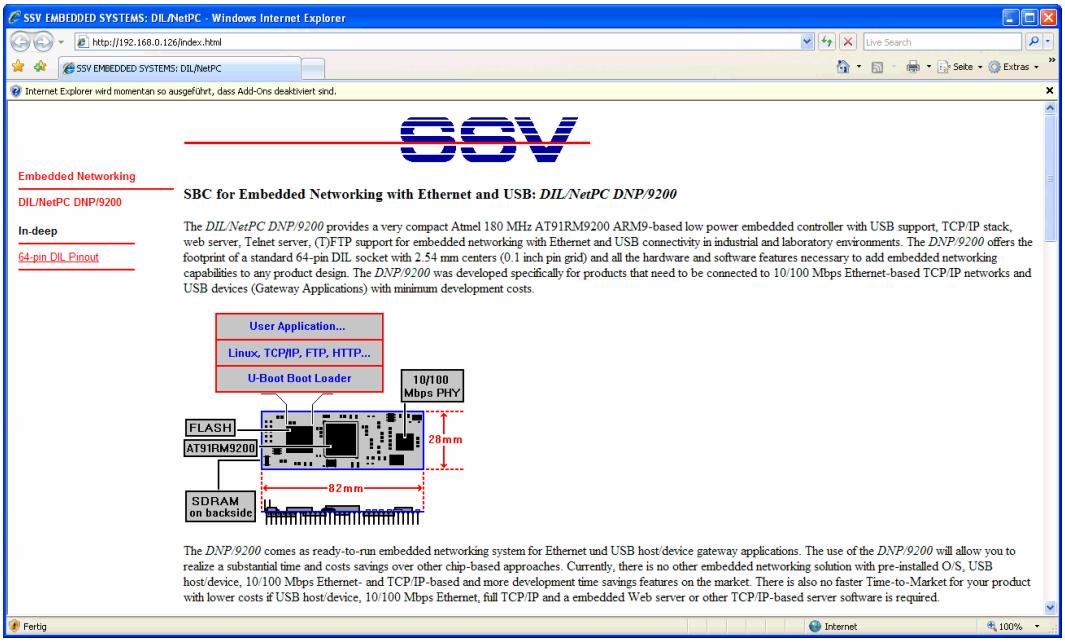

Figure 14: Check the embedded web server with the Internet Explorer

2.10 Checking the FTP Server

First install the FileZilla FTP client on your PC. The installation file for this FTP client is a part of the DNP/9200 Windows CE Starter Kit CD-ROM.

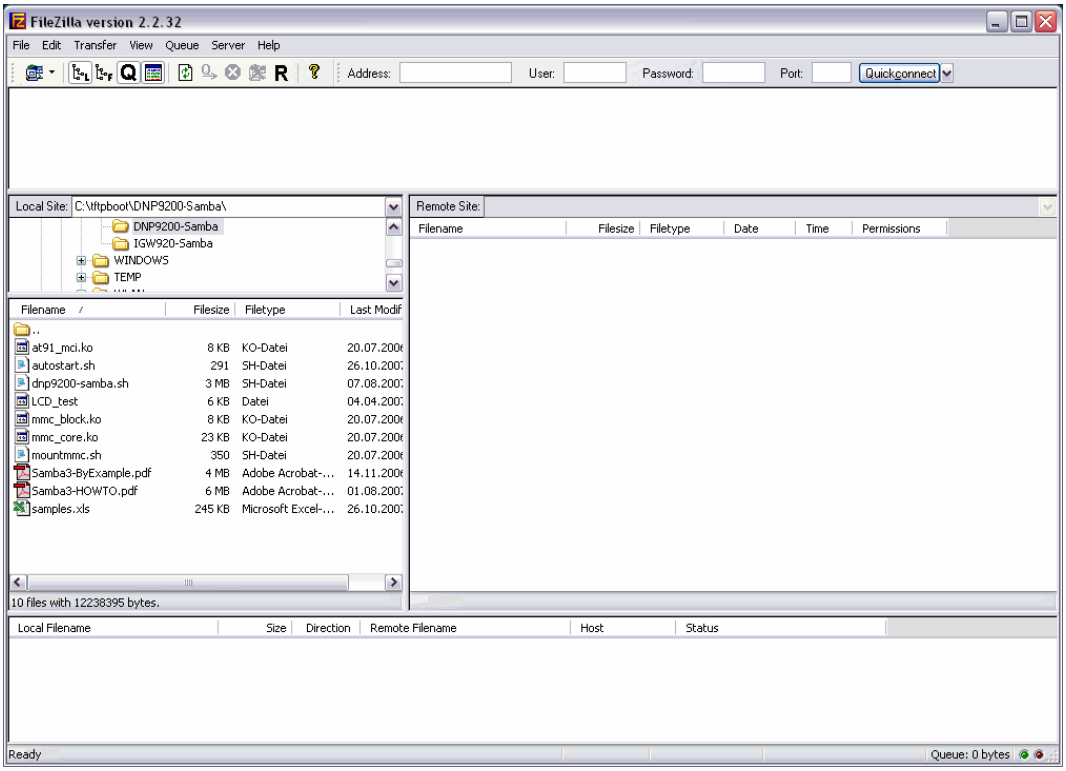

Figure 15: The user interface of the FileZilla FTP client

Then run FileZilla and select the menu item **Edit => Settings**. Set on the **Connection** window the default password for anonymous login to your e-mail address and click on OK.

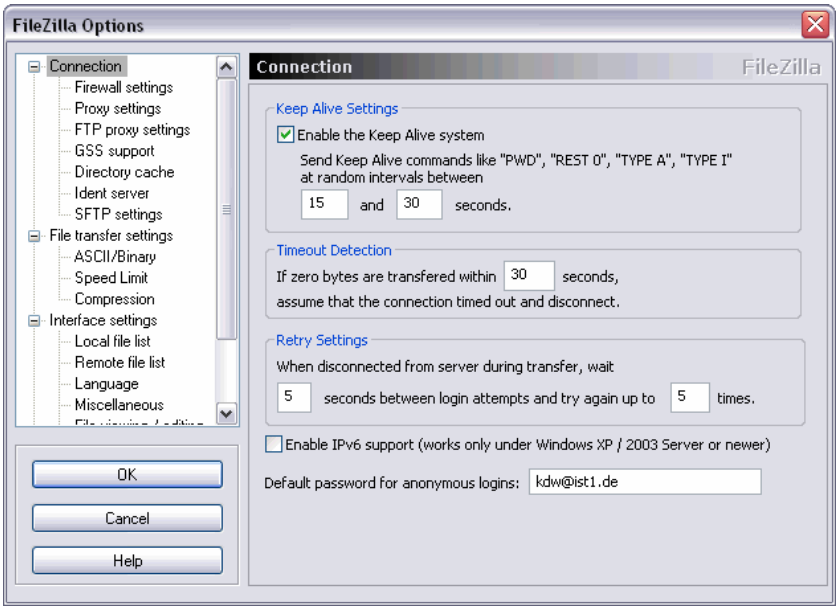

Figure 16: First time configuration for the FileZilla FTP client

Enter the IP address `192.168.0.126` within the FileZilla address field and click on the **Quickconnect** button. Do not enter a user name and password. These items are supplied by FileZilla for anonymous FTP sessions.

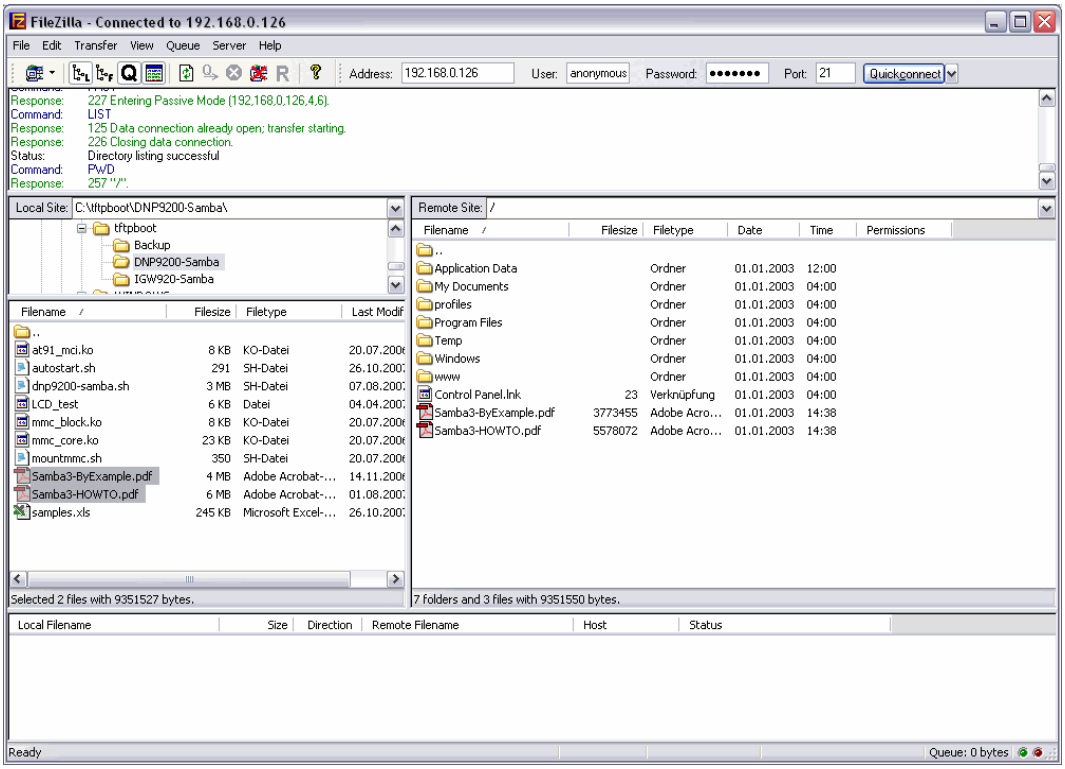

Figure 17: FTP-based file transfers between Remote Site and Local Site window

After a successful connection to the FTP server FileZilla offers a Remote Site window with the DNP/9200 file system. It is now possible to transfer files between the Local Site window and the Remote Site window. Just use drag-n-drop for these FTP-based file transfers.

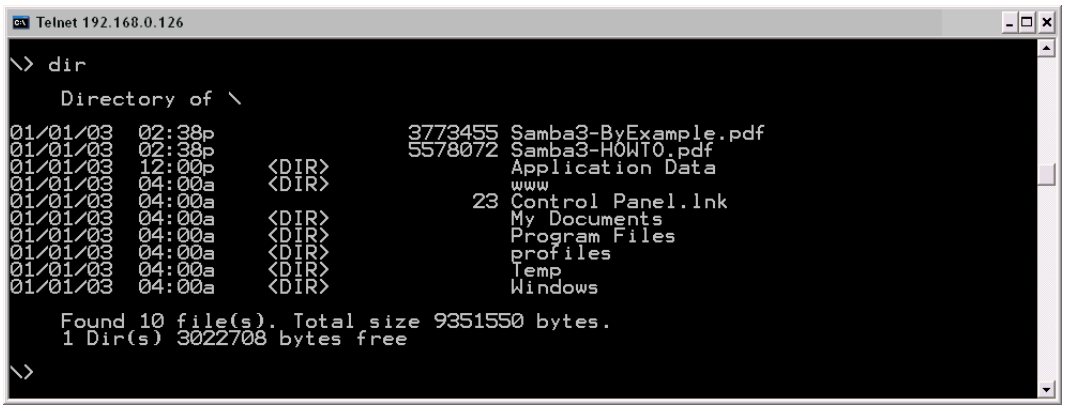

Figure 18: The new files within the DNP/9200 Windows CE file system

3 U-BOOT COMMAND OVERVIEW

The user interface to U-Boot consists of a **command line interpreter** (CLI), much like a simple 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/9200.

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 POCKET CMD 5.0 COMMAND OVERVIEW

The Windows CE Telnet service offers a **command line interpreter** (CLI) called **Pocket CMD v 5.0**. This user interface allows you to communicate with the DNP/9200 Windows CE shell. The following table shows the available commands.

Command	Function
ATTRIB	Set/display file attributes
CALL	Call batch script
CD	Change directory
CHDIR	Same as CD
CLS	Clear the screen
COPY	Copy files
DATE	Display/set system date
DEL	Delete a file
DIR	Print contents of a directory
ECHO	Echo output on the screen or change echoing parameters
ERASE	Same as DEL
EXIT	Exit command interpreter
HELP	Print help for command interpreter or individual commands
GOTO	Transfer control to a label in batch processing
IF	Conditionally execute a command
MD	Create a directory
MKDIR	Same as MD
MOVE	Move/rename files
PATH	Alias for SET PATH
PAUSE	Suspend execution of a batch file
PROMPT	Reconfigure system prompt
PWD	Print current working directory
RD	Remove directory
REM	Record comments in batch file
REN	Change file name
RENAME	Same as REN
RMDIR	Same as RD
SET	Set or list environment variables
SHIFT	Shift arguments of a batch file
START	Start detached process
TIME	Display/change system time
TITLE	Set the window title for a CMD.EXE session
TYPE	Output contents of a file or files to the screen

Table 4: Windows CE Pocket CMD v 5.0 command overview

5 HELPFUL LITERATURE

- Atmel AT91RM9200 data sheet summary
- Atmel AT91RM9200 user guide
- ARM ARM926EJ-S technical reference manual
- ARM ARM9EJ-S technical reference manual
- DIL/NetPC DNP/9200 hardware reference manual (SSV Starter Kit item)
- Evaluation Board DNP/EVA9 hardware reference manual (SSV Starter Kit item)

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Support: www.ssv-comm.de/forum

For actual information about the DNP/SK23-WCE visit us at www.dilnetpc.com.

DOCUMENT HISTORY

Revision	Date	Remarks	Name
1.0	2008-01-24	first version	WBU