How to download a new Linux O/S Image File

The DIL/NetPC DNP/9200 U-Boot boot loader offers a set of features for download a new Linux O/S image file to the flash memory. This document describes the download with the help a Ethernet-based TFTP session.

- **1. Step**: Setup a serial link (**RS232 Serial Link**) between the DIL/NetPC DNP/9200 COM1 serial port and a serial port of your PC system. Use a null-modem cable for the physical connection between the COM1 port of the DIL/NetPC DNP/9200 and the PC COM port. For more details about this connection please use the DIL/NetPC DNP/9200 Starter Kit documentation.

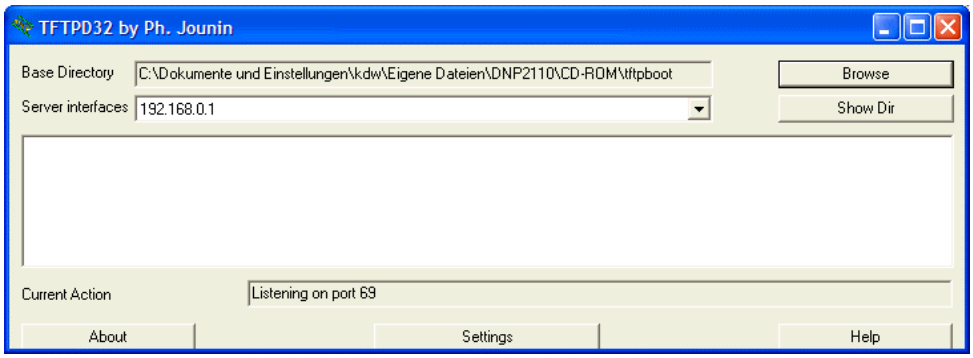
- **2. Step**: Run your terminal emulation program. Microsoft Windows-based PC systems offer *HyperTerminal* for this task. Linux-based systems come with *Minicom*.

- **3. Step**: Set-up a Ethernet link between the DNP/9200 10/100 Mbps Ethernet interface and the Ethernet interface of your PC system. Check the IP address of the PC system (Windows: **`ipconfig`** command; Linux: **`ifconfig`** command). **The default IP address (factory set-up) of the DNP/9200 is 192.168.0.126. Please use 192.168.0.1 for your PC system.**

- **4. Step**: Run a TFTP server program on your PC system. Most Linux-based PCs comes with a pre-installed TFTP server program. Some of these systems starts this TFTP server program at boot time (the TFTP server is a part of the `inetd` service). In all other cases you have to edit one or more configuration files (i.e. SuSE: `/etc/inetd.conf`). See the user documentation of your Linux distribution for details.

  Windows-based PCs don't offer TFTP server programs. Only some special server versions of Microsoft Windows comes with a TFTP server program. For all other Windows-based PCs you find a simple TFTP server program – called `TFTPD32` – within the directory `\TFTP-Server-Win32` of your DIL/NetPC DNP/9200 starter kit CD-ROM. `TFTPD32` is a free, non-commercial product. Please watch the license.

  Make sure that the default Linux O/S image file `\tftpboot\img-dnp9200` of your DNP/9200 starter kit CD-ROM is accessible for your TFTP server. Copy this file to `/tftpboot` of your Linux-based PC or set the base directory name for `TFTPD32` (Browse Function).



- **5. Step**: Set the DNP/9200 RCM jumper for RCM enable. Then power-up your DNP/9200 and interrupt the U-Boot autoboot process. Change to the U-Boot command line interface. Then enter the U-Boot command **tftpboot**. This starts the TFTP download for a new Linux O/S image file to the DNP/9200 RAM.

```
U-Boot>tftpboot
TFTP from server 192.168.0.1; our IP address is 192.168.0.126
Filename 'img-dnp9200'.
Load address: 0x21000000
Loading:   #################################################
           #################################################
           #################################################
           #################################################
           #################################################
           ########################################
done
Bytes transferred = 2603532 (27ba0c hex)
U-Boot>
```

Please note: The text output lines for "**Load address: 0x21000000**" and for "**Bytes transferred =** 2603532 **(27ba0c hex)**" are important. This values a necessary for write the image from the DNP/9200 RAM to the flash memory.

- **6. Step**: Wait until the download process finish's. This download process loads the Linux O/S image file to the DNP/9200 RAM. Please check the Linux O/S image file within the DNP/9200 RAM. Enter the U-Boot command **iminfo** for this test. Go back to the 5. step if there is any error reported by the **iminfo** text output.

```
U-Boot> iminfo

## Checking Image at 21000000 ...
   Image Name:   LINUXIMAGE-DNP9200-SSV20051209
   Image Type:   ARM Linux Multi-File Image (uncompressed)
   Data Size:    2603468 Bytes =  2.5 MB
   Load Address: 20008000
   Entry Point:  20008000
   Contents:
   Image 0:  1053292 Bytes =  1 MB
   Image 1:  1550164 Bytes =  1.5 MB
   Verifying Checksum ... OK
U-Boot>
```

- **7. Step**: You have to choices: 1. Run the Linux O/S image file direct from RAM or 2. copy the Linux O/S image file to the DNP/9200 flash memory. For start the Linux direct from RAM, please enter the U-Boot command **bootm**.

```
U-Boot> bootm

## Booting image at 21000000 ...
   Image Name:   LINUXIMAGE-DNP9200-SSV20051209
   Image Type:   ARM Linux Multi-File Image (uncompressed)
   Data Size:    2603468 Bytes =  2.5 MB
   Load Address: 20008000
   Entry Point:  20008000
   Contents:
   Image 0:  1053292 Bytes =  1 MB
   Image 1:  1550164 Bytes =  1.5 MB
   Verifying Checksum ... OK
OK
Using Ramdisk at 211012b8 - 2127ba0c ... OK

Starting kernel ...

Linux version 2.4.27-vrs1-ssv1 (mha@hareangle-debian) SSV ...
CPU: Arm920Tid(wb) revision 0
:
:
```

- **8. Step**: To copy the Linux O/S image file from RAM to flash memory, please enter first the U-Boot command **erase 1:2-31** and wait until this command finish's. After the **erase** command, please enter **cp.b 0x21000000 0x10040000 0x27ba0c.**

```
U-Boot> erase 1:2-31
Erase Flash Sectors 2-31 in Bank # 1
..................................... done
U-Boot> cp.b 0x21000000 0x10040000 0x27ba0c
Copy to Flash... done
U-Boot>
```

The **erase** command clears a flash memory area for the new Linux O/S image file. "1" is the bank number, "2-31" are sector numbers for this command. "erase 1:2-31" clear in the flash memory bank# 1 the sectors# 2 until 31.

The **cp.b** (Copy Memory Byte) command copy the Linux O/S image file from RAM to flash memory. This command needs three parameters: **source address**, **target address** and **byte count**. The source address was given by the TFTP command (5. step). In this sample, the value was "**Load address: 0x21000000**". The target address for the DNP/9200 is **0x10040000**. The byte count was also given by the TFTP command (5. step). In this sample, the value was "**Bytes transferred = 2603532 (27ba0c hex)**".

Please note: If your PC system is using a IP address other then 192.168.0.1, please see *mHT9200-06.pdf: How to change the U-Boot IP Addresses* for details.

That is all.

Appendix: U-Boot Command Overview for the Linux O/S Image File Update

Command	Function
tftpboot	Download a Linux O/S image file with TFTP to the DNP/9200 RAM
iminfo	Check the Linux O/S image file within the RAM
bootm	Run the Linux O/S image file direct from RAM

Table 1: Command Overview – Load Linux O/S image file and run it direct from RAM

Command	Function
tftpboot	Download a Linux O/S image file with TFTP to the DNP/9200 RAM
iminfo	Check the Linux O/S image file within the RAM
erase n:ss-es	Erase flash area in bank# „n“ from start sector “ss” to end sector “es”.
cp.b source target count	Copy bytes from “source” address to “target” address, “count” specifies the byte count for this command.

Table 2: Command Overview – Load Linux O/S image file to the DNP/9200 flash

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