**SSV**

How to download a new Linux O/S Image File

The DIL/NetPC DNP/2110 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/2110 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/2110 and the PC COM port. For more details about this connection please use the DIL/NetPC DNP/2110 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/2110 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/2110 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/2110 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-dnp2110` of your DNP/2110 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).
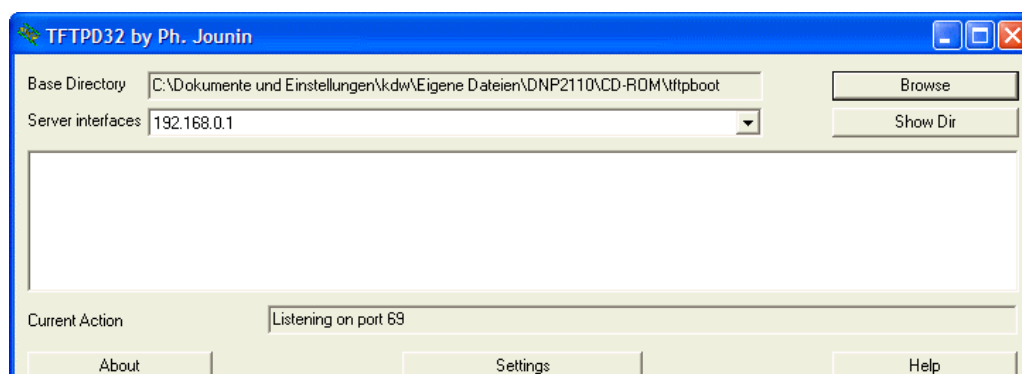
- **5. Step**: Set the DNP/2110 RCM jumper for RCM enable. Then power-up your DNP/2110 and interrupt the U-Boot autoboot process. Change to the U-Boot command line interface. Then enter the U-Boot command **tftpboot**. This starts the TFTP download for a new Linux O/S image file to the DNP/2110 RAM.

```
=>tftpboot

ARP broadcast 1
ARP broadcast 2
TFTP from server 192.168.0.1; our IP address is 192.168.0.126
Filename 'img-dnp2110'.
Load address: 0xa0200000
Loading:    #############################################
            #############################################
            #############################################
            #############################################
            #############################################
            #################################
done
Bytes transferred = 2458956 (25854c hex)
=>
```

Please note: The text output lines for "**Load address: 0xa0200000**" and for "**Bytes transferred = 2458956 (25854c hex)**" are important. This values a necessary for write the image from the DNP/2110 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/2110 RAM. Please check the Linux O/S image file within the DNP/2110 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.

```
=> iminfo

## Checking Image at a0200000 ...
   Image Name:   LINUXIMAGE-DNP2110-SSV20040824
   Image Type:   ARM Linux Multi-File Image (uncompressed)
   Data Size:    2458892 Bytes =  2.3 MB
   Load Address: a0008000

   Entry Point:  a0008000
   Contents:
   Image 0:  1044063 Bytes = 1019.6 kB
   Image 1:  1414816 Bytes =  1.3 MB
   Verifying Checksum ... OK
=>
```

- **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/2110 flash memory. For start the Linux direct from RAM, please enter the U-Boot command **bootm**.

```
=> bootm

## Booting image at a0200000 ...
   Image Name:    LINUXIMAGE-DNP2110-SSV20040824
   Image Type:    ARM Linux Multi-File Image (uncompressed)
   Data Size:     2458892 Bytes =  2.3 MB
   Load Address: a0008000

   Entry Point:  a0008000
   Contents:
   Image 0:  1044063 Bytes = 1019.6 kB
   Image 1:  1414816 Bytes =  1.3 MB
   Verifying Checksum ... OK
   Loading Multi-File Image ... OK
   Using Ramdisk at a02feeac - a045854c ... OK

Starting kernel ...

Linux version 2.4.19-rmk7-pxa2-ssv1 (mha@hareangle-mobile) …
CPU: XScale-PXA255 revision 6
:
:
```

- **8. Step**: To copy the Linux O/S image file from RAM to flash memory, please enter first the U-Boot command **erase 1:2-40** and wait until this command finish's. After the **erase** command, please enter **cp.b 0xa0200000 0x40000 0x25854c.**

```
=> erase 1:2-40

Erase Flash Sectors 2-40 in Bank # 1
..................................... done
=> cp.b 0xa0200000 0x40000 0x25854c

Copy to Flash... done
=>
```

The **erase** command clears a flash memory area for the new Linux O/S image file. "1" is the bank number, "2-40" are sector numbers for this command. "erase 1:2-40" clear in the flash memory bank# 1 the sectors# 2 until 40.

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: 0xa0200000**". The target address for the DNP/2110 is **0x40000**. The byte count was also given by the TFTP command (5. step). In this sample, the value was "**Bytes transferred = 2458956 (25854c hex)**".

Please note: If your PC system is using a IP address other then 192.168.0.1, please see *mHT2110-06.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/2110 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/2110 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/2110 flash