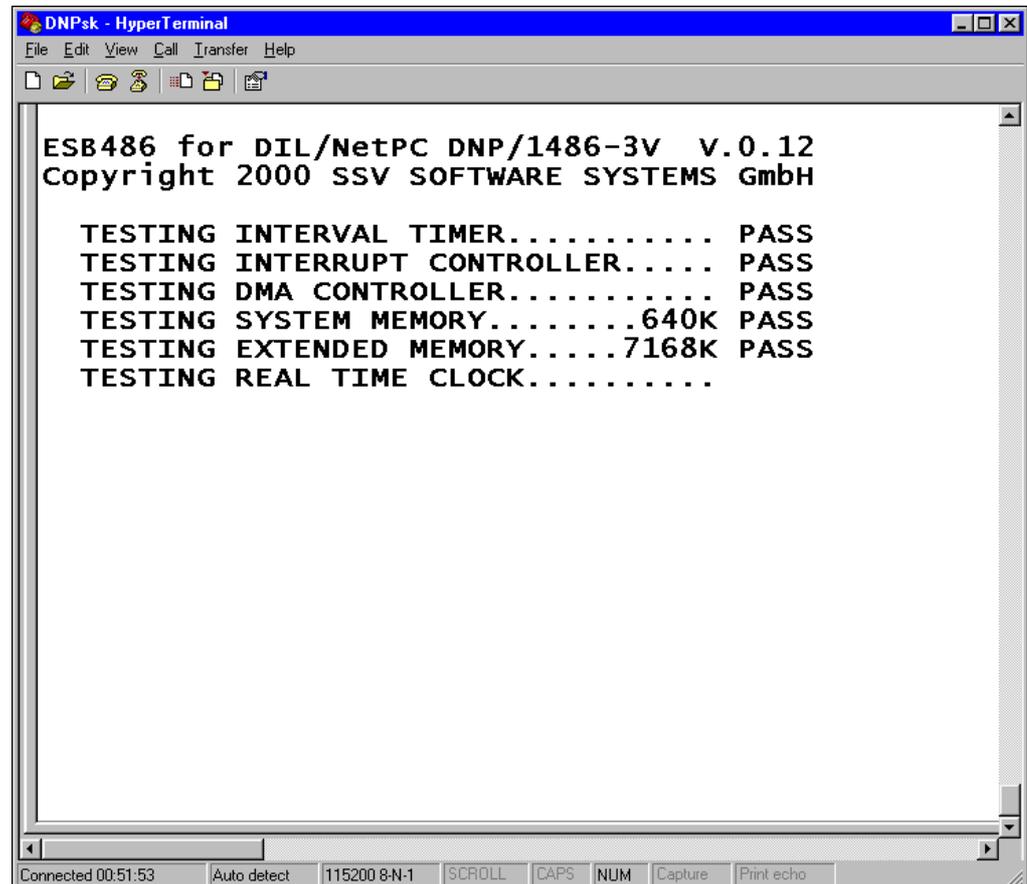


Linux as primary Operating System

The DIL/NetPC DNP/1486-3V BIOS offers the capability to download a x86-Linux binary image via the RS232 interface, to save it into the FLASH memory and to reboot the system automatically after a successful receipt.



```
DNPsk - HyperTerminal
File Edit View Call Transfer Help
ESB486 for DIL/NetPC DNP/1486-3V v.0.12
Copyright 2000 SSV SOFTWARE SYSTEMS GmbH

TESTING INTERVAL TIMER..... PASS
TESTING INTERRUPT CONTROLLER..... PASS
TESTING DMA CONTROLLER..... PASS
TESTING SYSTEM MEMORY.....640K PASS
TESTING EXTENDED MEMORY.....7168K PASS
TESTING REAL TIME CLOCK.....

Connected 00:51:53 Auto detect 115200 8-N-1 SCROLL CAPS NUM Capture Print echo
```

Figure 1: BIOS-reports of the DIL/NetPCs during boot process

To download a Linux binary image you have to invoke the FLASH loader in the DIL/NetPC-BIOS. For this you have to press CTRL+L directly after resetting the DIL/NetPC. This key combination is tested by the BIOS between the output of "TESTING EXTENDED MEMORY..." and "TESTING REAL TIME CLOCK...". Figure 1 shows the details and the BIOS report sequence of the DIL/NetPC. If necessary press on CTRL+L more often than just once.

If the BIOS detects CTRL+L it invokes the FLASH Loader (see Fig. 2). The Download tool offers three options. Choose option 1 to "Download with Y-MODEM" to load a Linux binary image to the DIL/NetPC. In the DIL/NetPC DNP/1486-3V Starter Kit (release November 2000 or later) you will find this image "DNPX.IMG" on the Starterkit CD in the subfolder "\\DNPX\\BIN". This file contains an example for a bootable Linux binary image.

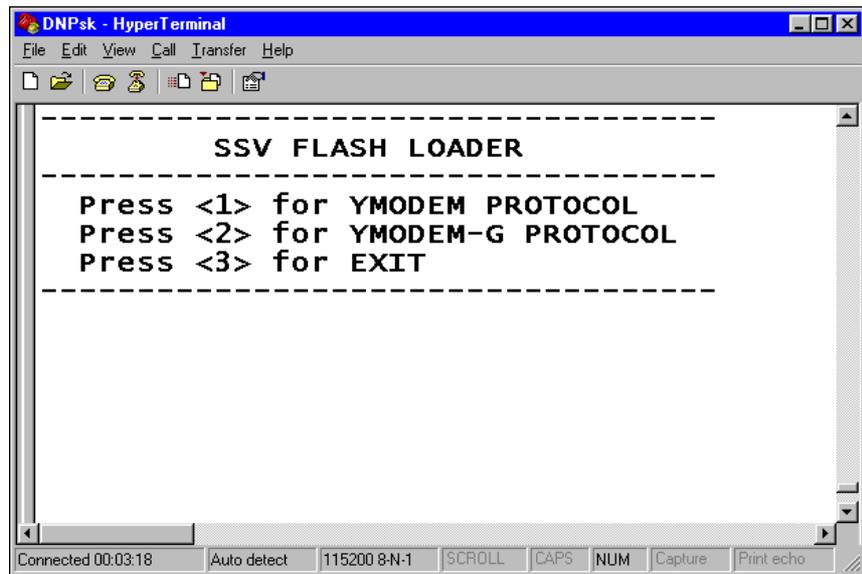


Figure 2: Messages of the DIL/NetPC FLASH Loader

Load the DNPX.IMG or your own Linux binary image via a terminal application with Y-MODEM log in the FLASH memory of your DIL/NetPC. Please ensure that your own Linux binary image for the DIL/NetPC agrees to corresponding guidelines.

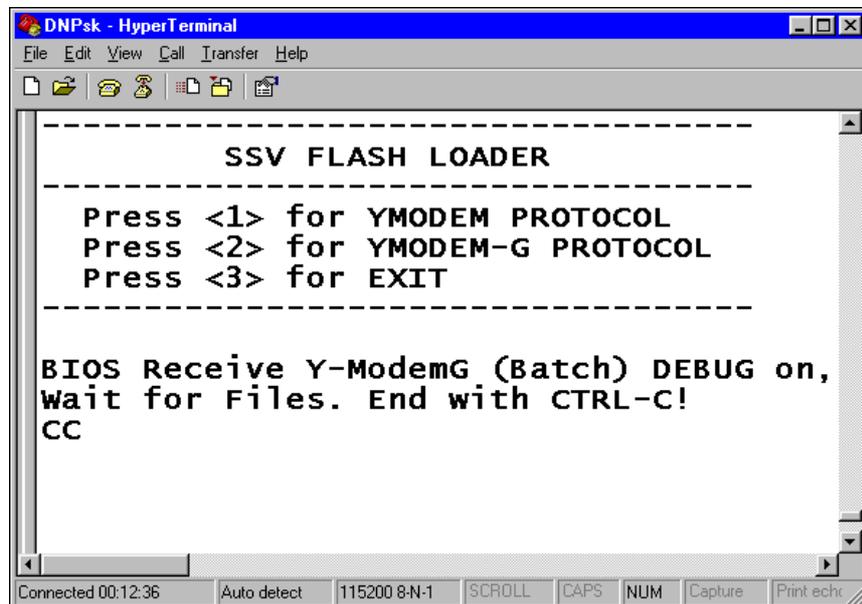


Figure 3: The FLASH Loader waits for the image.

After pressing key “1” the FLASH Loader waits for the file transmission. During this state it is sending ”C” continuously to the console as you can see in fig. 3. With this sign the Y-MODEM log synchronizes the start of a file transmission.

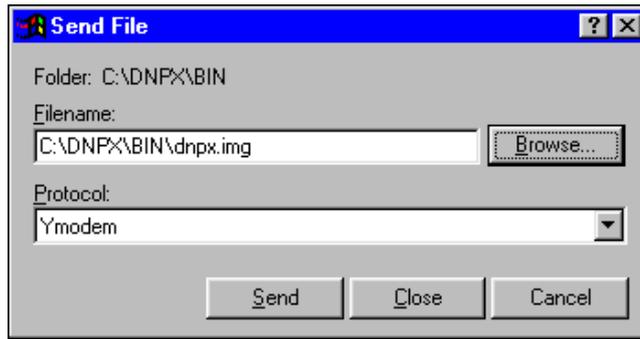


Figure 4: Selection of the Linux binary image

Select the desired Linux binary image in your terminal application and start the transmission with Y-MODEM log. Fig. 4 shows the selection of the Linux binary image DNPX.IMG of the DIL/NetPCs starter kit with the Windows HyperTerminal.

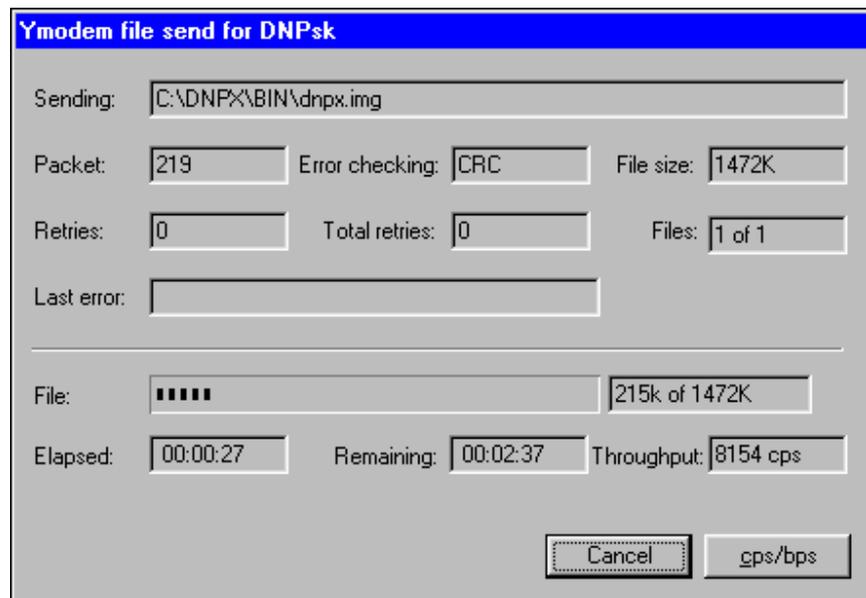
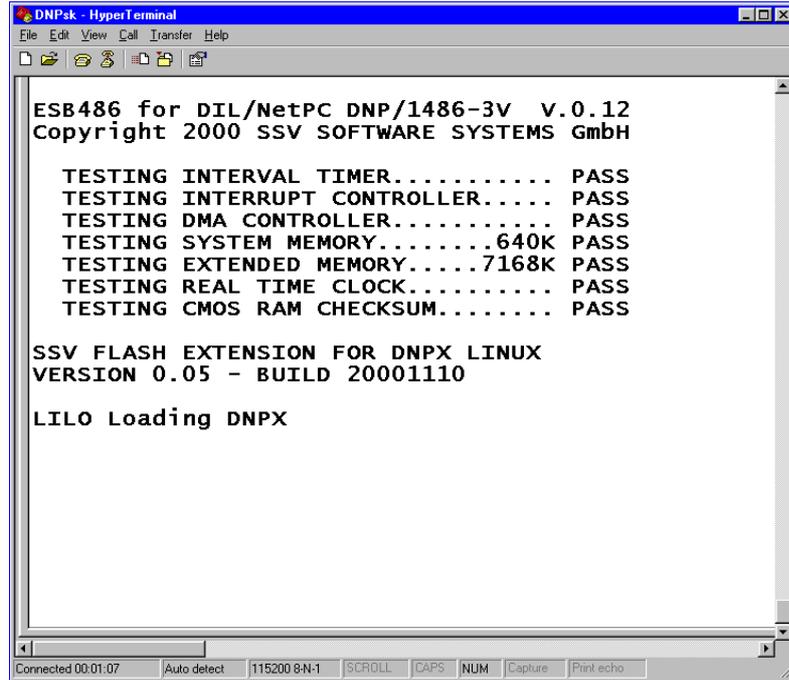


Figure 5: Status of the download progress.

During the download you will see a progress bar that indicates the state of the transmission. Fig. 5 shows an example with Windows HyperTerminal.

Please wait absolutely until the end of file transmission and avoid interruptions. In case of an interruption or failure the DIL/NetPC would not contain any bootable system and the download would have to be repeated. Start the FLASH Loader immediately again if anything has gone wrong.

After the transmission the FLASH Loader returns into its wait state and continues sending "C's" (fig. 3). Terminate the FLASH Loader with pressing on "CTRL" and "C" or the "ESC" key.



```
DNPsk - HyperTerminal
File Edit View Call Transfer Help
ESB486 for DIL/NetPC DNP/1486-3V v.0.12
Copyright 2000 SSV SOFTWARE SYSTEMS GmbH

TESTING INTERVAL TIMER..... PASS
TESTING INTERRUPT CONTROLLER..... PASS
TESTING DMA CONTROLLER..... PASS
TESTING SYSTEM MEMORY.....640K PASS
TESTING EXTENDED MEMORY.....7168K PASS
TESTING REAL TIME CLOCK..... PASS
TESTING CMOS RAM CHECKSUM..... PASS

SSV FLASH EXTENSION FOR DNPX LINUX
VERSION 0.05 - BUILD 20001110

LILo Loading DNPX

Connected 00:01:07 | Auto detect | 115200 8-N-1 | SCROLL CAPS NUM Capture Print echo
```

Figure 6: Booting a new Linux system on the DIL/NetPC.

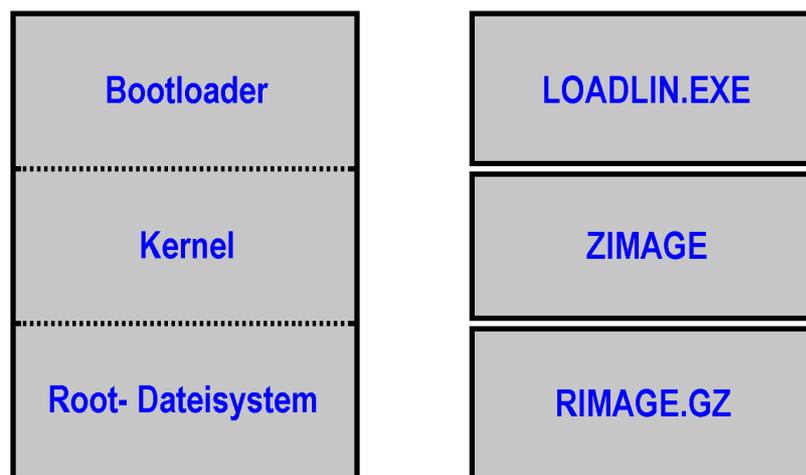
The DIL/NetPC restarts automatically and reruns the BIOS hardware tests. before starting the new binary image file. Fig. 6 shows this process. Please restart the FLASH Loader if you have no running system on your DIL/NetPC.

Structure of a Linux binary image

A Linux binary image is consisting of three basic elements: 1. a bootloader, 2. the specific Linux kernel and 3. the obligatory root filesystem. These elements can appear as one binary image (fig. 7a) or separated in three parts (fig. 7b).

On the CD-ROM of your DIL/NetPC starter kit you will find both variations (release November 2000 or later).

The Linux system with the three components are started by a DOS command. You will find further details to this in the descriptions of your starter kit. During development the parted variant is more useful than the whole image with all components because you are able to change and download the root filesystem without changing the other components. For this version the starter kit contains ROM-DOS.



7a: One binary image

7b: Three binary files

Figure 7: Basic elements of the Linux operating system

During development you should load your application into the DRAM of the DIL/NetPC or mount an external system to your DIL/NetPC to integrate the desired modules and application(s). You ought to create the Linux file system only if you have reached the final version of your Linux kernel and filesystem that contains all required elements.

This final image is then transferred to the DIL/NetPC with the FLASH Loader. If you do this the existing ROM-DOS will be deleted and has to be transferred in the same way as a Linux binary image. You will find the ROM-DOS image (DNPRDOS1.IMG) on the starter kit CD-ROM.

Figures

- Figure 1: BIOS-reports of the DIL/NetPCs during boot process
- Figure 2: Messages of the DIL/NetPC FLASH Loader
- Figure 3: The FLASH Loader waits for the image
- Figure 4: Selection of the Linux binary image
- Figure 5: Status of the download progress
- Figure 6: Booting a new Linux system on the DIL/NetPC
- Figure 7: Basic elements of the Linux operating system

Contact to SSV

SSV Embedded Systems
Heisterbergallee 72
D-30453 Hannover
Tel. +49-(0)511-40000-0
Fax. +49-(0)511-40000-40
Email: sales@ist1.de
Web: www.ssv-embedded.de

Notes to this document (Emblinx4.doc)

Revision	Date		Name
1.00	20.11.2000	First version (not certified).	CMA
1.01	08.12.2000	Error corrections	KDW

This document is certain only for the internal application. The content of this document can change any time without announcement. There is taken over no guarantee for the accuracy of the statements. Copyright © **SSV EMBEDDED SYSTEMS 2000**. All rights reserved.