

phyCORE®-MPC5200B tiny Development Kit (KPCM-030)

Loading a Linux Image

This Application Note provides instructions on how to write a kernel / root file system image into the flash memory of the phyCORE®-MPC5200B tiny development board.

1 System Description

1.1 Hardware Description

The following hardware is necessary for start-up of the phyCORE-MPC5200-tiny:

- phyCORE-MPC5200B tiny (PCM-030)
- Development Board for MPC5200B tiny
- AC adapter supplying 5
- RS-232 null-modem cable
- cross-over Ethernet cable¹

All PHYTEC hardware components are included in the phyCORE-MPC5200 tiny Development Kit.

¹: You may also use a straight Ethernet cable connected to a hub to establish network connection between the phyCORE-MPC5200 tiny hardware and the host-PC.

1.2 Software Description and Requirements

This Application Note for the phyCORE-MPC5200 tiny requires the use of a terminal program on the host-PC, such as Komport or Minicom for Linux, together with TFTP services. The ip address of your host should be configured with the ip address 192.168.3.10.

Information how to setup the network configuration and tftp services can be found in the QuickStart Instructions (Chapter 2 Getting Started). The terminal program Komport will be installed while executing the setup program on your PHYTEC Linux-PowerPC-Disc. You can find a link on your desktop to start Komport.

The Bootloader used for downloading the Linux kernel is the Universal Bootloader U-Boot. The Bootloader is pre-installed on the phyCORE-MPC5200 tiny.

2 Getting Started

2.1 Connecting the target with the host

The following steps will be done on a Linux host platform. We assume you has configured your host platform and executed the setup program of the Linux-PowerPC-Disc. Information on how to configure the host platform can be found in the *Getting Started* part of your QuickStart.

- Connect the serial cable with the connector P1 on the target and the serial interface COM1 on your host
- Connect the cross-over Ethernet cable with the connector X23 on the target and the right network card of your host.



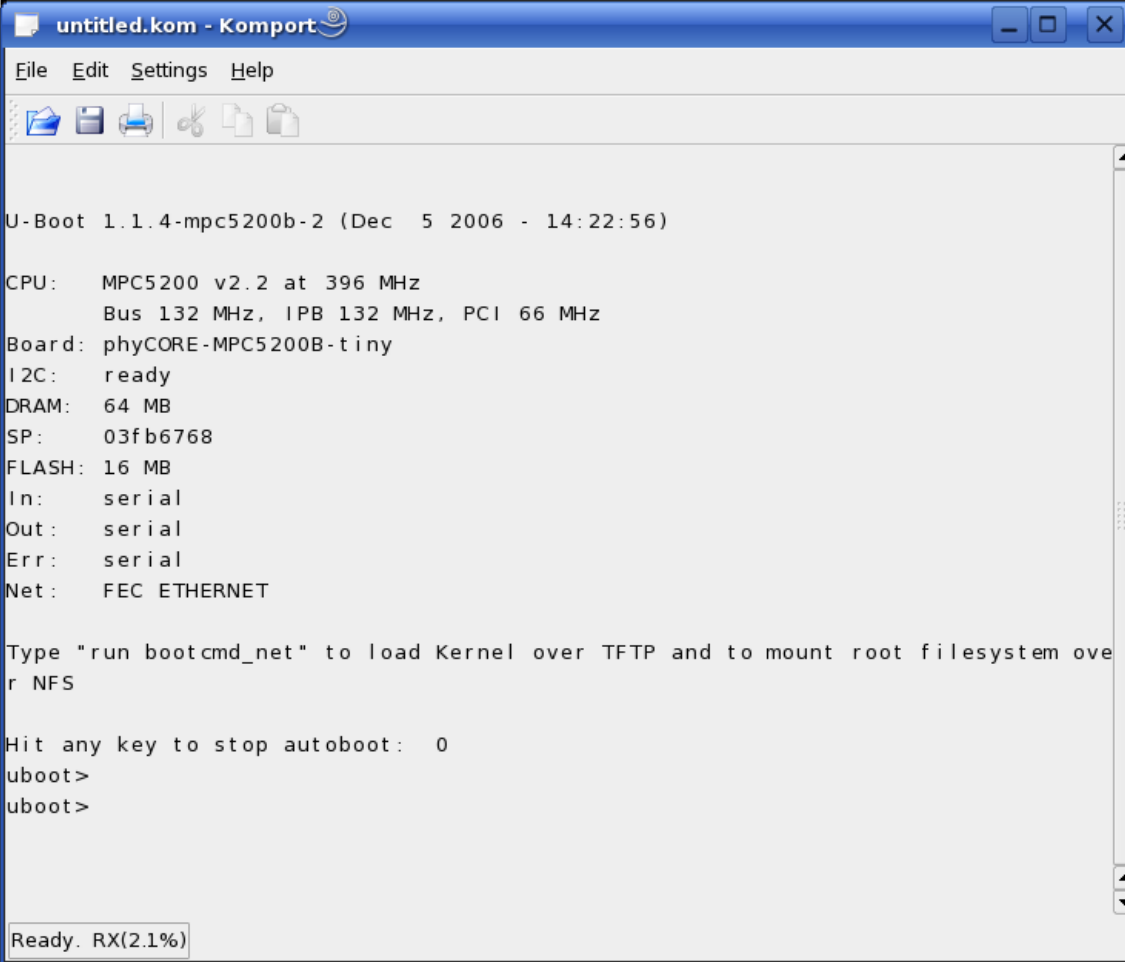
- Click on the *Komport* icon on your desktop

Komport was configured during the setup with the following configuration:

115200 baud, 1 Start bit, 8 data bits, 1 stop bit, no parity and no flow control.

If you want to use another program than Komport for serial communication, you will have to setup this program with these settings.

- Connect the AC adapter with the power supply connector X1 (12V) on your board.



The screenshot shows a terminal window titled "untitled.kom - Komport" with a menu bar (File, Edit, Settings, Help) and a toolbar. The terminal output displays the following information:

```
U-Boot 1.1.4-mpc5200b-2 (Dec 5 2006 - 14:22:56)

CPU:   MPC5200 v2.2 at 396 MHz
       Bus 132 MHz, IPB 132 MHz, PCI 66 MHz
Board: phyCORE-MPC5200B-tiny
I2C:   ready
DRAM:  64 MB
SP:    03fb6768
FLASH: 16 MB
In:    serial
Out:   serial
Err:   serial
Net:   FEC ETHERNET

Type "run bootcmd_net" to load Kernel over TFTP and to mount root filesystem over NFS

Hit any key to stop autoboot:  0
uboot>
uboot>
```

At the bottom of the terminal, a status bar indicates "Ready. RX(2.1%)".

- Press any key to stop autoboot.

The default ip address of the target is 192.168.3.11 and the default server ip is 192.168.3.10. If you want to setup another network configuration, you can use the following commands:

```
setenv ipaddr <target ip>
setenv serverip <server ip>
setenv gateway <gateway ip>
setenv netmask <netmask>
```

2.2 Restore the U-Boot default configuration

If you want to restore to the default configuration you can use the following command to delete the configuration in the EEPROM:

- **eeprom write 0 0 10.**

After pressing the reset button, the default configuration of the bootloader will be used.

Configure the MAC address with the following command:

- **setenv ethaddr <mac-address>**
- Typ **saveenv** to store the settings in the EEPROM

2.3 Writing the Kernel / Root File System into Flash

Before the kernel / root file system can be written into flash, you will have to download the image from a tftp server. This will be done in the command line of the bootloader. First the image will be copied into RAM. Then you will have to erase the part of the FLASH, where you want to copy the Kernel image.

In the default configuration you will find five partitions on the target. The first partition contains a second bootloader for rescue issues, the second partition contains the kernel, the third the root file system, the fourth contains the bootloader and the last contains some free space at the end of the FLASH.

The five partitions have the following address ranges:

0xFF000000 - 0xFF03FFFF U-Boot-Low (256k)
0xFF040000 - 0xFF1FFFFFFF Kernel (1792k)
0xFF200000 - 0xFFEFFFFFFF Root-FS(13312k)
0xFFF00000 - 0xFFF3FFFFFF U-Boot (256k)
0xFFF40000 - 0xFFFFFFFF Space (768k)

In the directory Linux/image on your PHYTEC Linux-PowerPC-Disc you can find a file uImage-pcmXXX-Y. This file is the kernel image. There is another file root-pcmXXX-Y.jffs2. This file contains the root file system.

- Copy the files uImage-pcmXXX-Y and root-pcmXXX-Y.jffs2 into the directory /tftpboot

You can download the kernel / root filesystem from the TFTP – server, erasing the required Flash area and writing the kernel from the RAM into the Flash with one simple command.

Before you can execute this command you have to set the name of your kernel image to the environment variable *uimage* and the name of jffs2-file to the variable *jffs2*.

- Open Komport if is not opened.
- Type the following commands in the u-boot command line to set the environment variables:

```
setenv uimage uImage-pcmXXX-Y
```

```
setenv jffs2 root-pcmXXX-Y.jffs2
```

Then you can start downloading and writing the kernel image into the Flash.

- Type **run prg_kernel**.

```
Hit any key to stop autoboot: 0
uboot>
uboot> setenv uimage uImage-pcm030-4
uboot> run prg_kernel
Using FEC ETHERNET device
TFTP from server 172.16.2.40; our IP address is 172.16.2.41
Filename 'uImage-pcm030-4'.
Load address: 0x400000
Loading: #####
#####
#####
done
Bytes transferred = 976272 (ee590 hex)
..... done
Erased 14 sectors
Copy to Flash... done
uboot> █
```

- Type **run prg_jffs2** to download and write the root file system into the flash.
- Press the RESET button on the target to start your target

The target will start with kernel and root file system you has been written into Flash.