phyCORE®-XScale/PXA255 Development Kit (KPCM-022) Loading a WinCE Image

This Application Note provides instructions on how to start-up the phyCORE-PXA255 (part # PCM-022-xxx), mounted on the PHYTEC Development Board (PCM-990), and how to download the **eBoot** bootloader program and a WinCE binary image.

Please refer to the phyCORE-PXA255 and Development Board for phyCORE-PXA255 Hardware Manual for specific information on such board-level features as jumper configuration, memory mapping, and pinout.

1 System Description

1.1 Hardware Description

The following hardware is necessary for start-up of the phyCORE-PXA255:

- phyCORE-PXA255 (part # PCM-022-200E)
- Development Board for phyCORE-PXA255 (PCM-990)
- Interface Expansion Board (PCM-985)
- LPT–JTAG Adapter (JA-001-PXA)
- AC adapter supplying 12 VDC, 3.3A, center positive
- Parallel cable
- Cross-over Ethernet cable[1]
- Host-PC running Microsoft Windows

All PHYTEC hardware components are included in the phyCORE-PXA255 Basic Development Kit (part # KPCM-022-200E-B).

[1]: You may also use a straight Ethernet cable connected to a hub to establish network connection between the phyCORE-PXA255 hardware and the host-PC.

1.2 Software Description and Requirements

- This Application Note for the phyCORE-PXA255 requires the use of a DHCP server such as the one included on the Tools CD (***pC-PXA255\WinCE\DHCP Server\dhcpsrv.exe***). The DHCP server can also be downloaded at http://ruttkamp.gmxhome.de/dhcpsrv/dhcpsrv.htm

- The **Jflash** (*jflash.exe*) utility, and associated *prog.bat* batch file, required to download the eBoot bootloader. These tools are found on the included the Tools CD (***pC-PXA255\WinCE*).**

- The Bootloader used for downloading the WinCE Image is the pre-installed **eBoot** tool, enabling download of WindowsCE images via Ethernet. This Bootloader will be installed in the on-board Flash memory from address 0 to 0x40000.

- The Microsoft Windows CE Debug Shell, **eshell**, is a tool for downloading WinCE images with the help of the eBoot utility that will be installed on the target hardware. eShell is included in the phyCORE-PXA255 Tools CD (***pC-PXA255\WinCE)***.

2 Getting Started

2.1 Interfacing the phyCORE-PXA255 to a Host-PC

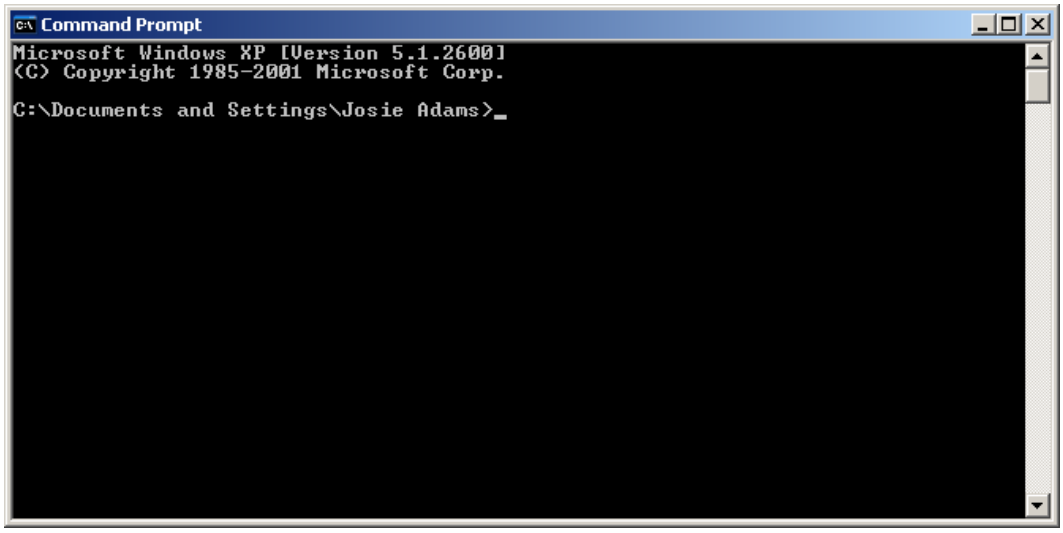
- Copy the folder **pC-PXA255** from the included Tools CD to the root of your PC.
- Connect the JTAG adpater's 20-pin flat-band cable to the pin connector X29 on the Development Board. Please make sure that pin 1 on the connector mates with pin 1 (which is marked red) on the cable.
- Connect the JTAG adapter to the LPT interface on your PC using a parallel cable.
- Connect the RJ-45 socket at X23 on the Development Board to the host-PC using a cross-over Ethernet cable[1].
- Connect the included 12 VDC power adapter to the power socket X1 on the Development Board.

[1]: You may also use a straight Ethernet cable connected to a hub to establish network connection between the phyCORE-PXA255 hardware and the host-PC.

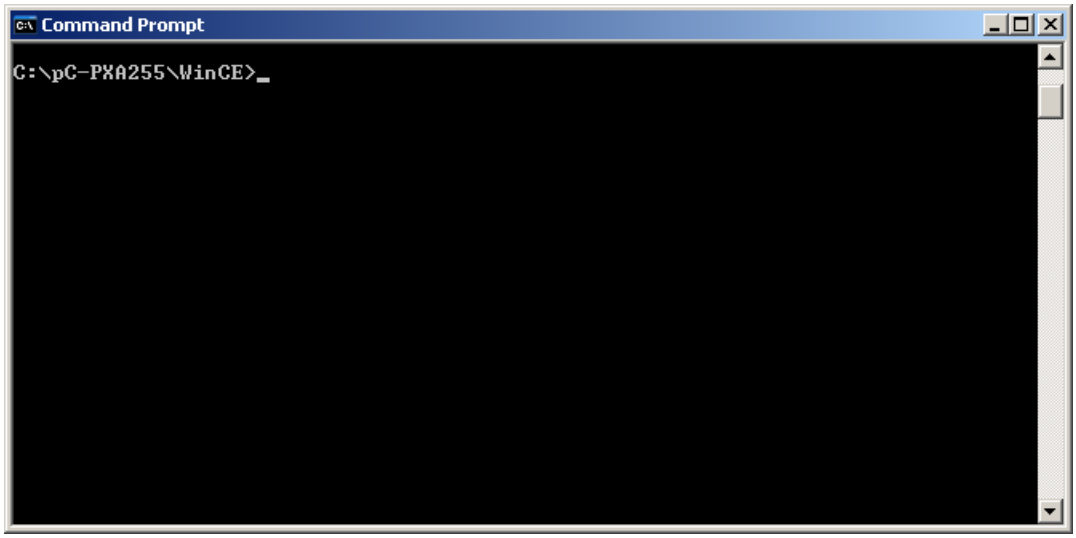
2.2 Downloading eBoot

- Use the Windows Start button to open the Microsoft MS Command Prompt:
  Start/Programs/accessories/Command Prompt.

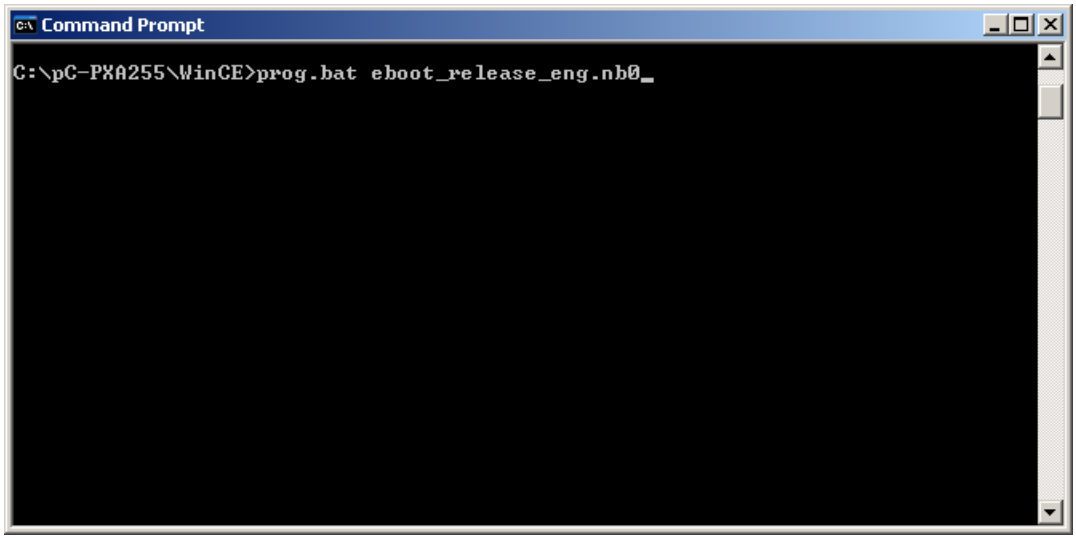
- The following window should appear:



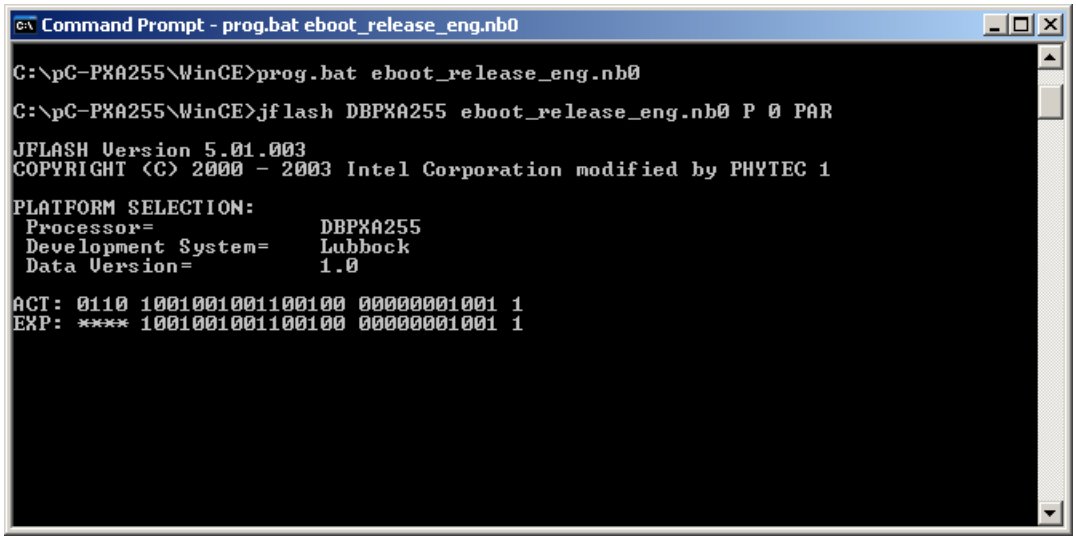
- Change directory to ***C:\pC-PXA255\WinCE***.



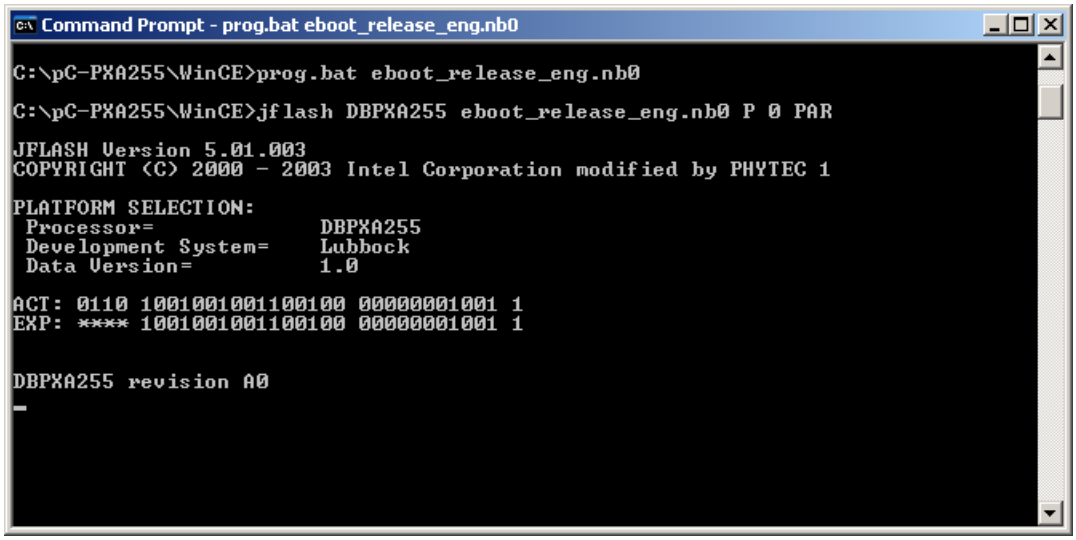
- Start the **Jflash** program, which will load **eboot**, by typing ***prog.bat eboot_release_eng.nb0*** at the command prompt and then pressing <Enter>.



- The batch file will invoke the **JFlash** program and show hardware recognition within the MS Command Prompt window. Please check to make sure that the **ACT** (Actual) and **EXP** (Expected) values of the recognized PXCA255 device are the same and then press <Enter>.



- After pressing <Enter>, the *DBPXA255 revision A0* should invoke in the MS Command Prompt window as below. Again press <Enter>.



- The **JFlash** utility will recognize the Flash for programming the eBoot. Enter "y" to skip programming the last 64 percent of the image area.

```
Command Prompt - prog.bat eboot_release_eng.nb0

C:\pC-PXA255\WinCE>prog.bat eboot_release_eng.nb0

C:\pC-PXA255\WinCE>jflash DBPXA255 eboot_release_eng.nb0 P 0 PAR

JFLASH Version 5.01.003
COPYRIGHT (C) 2000 - 2003 Intel Corporation modified by PHYTEC 1

PLATFORM SELECTION:
 Processor=              DBPXA255
 Development System=     Lubbock
 Data Version=           1.0

ACT: 0110 1001001001100100 00000001001 1
EXP: **** 1001001001100100 00000001001 1


DBPXA255 revision A0

Found flash type: 28F128K3
The last 64 percent of image file is all zeros
Would you like to save time by not programming that area? [y/n]:
```

- Upon successful download of the eBoot, you should see the following errors. These errors may be caused by possible timing issues with the JFlash and may be ignored.

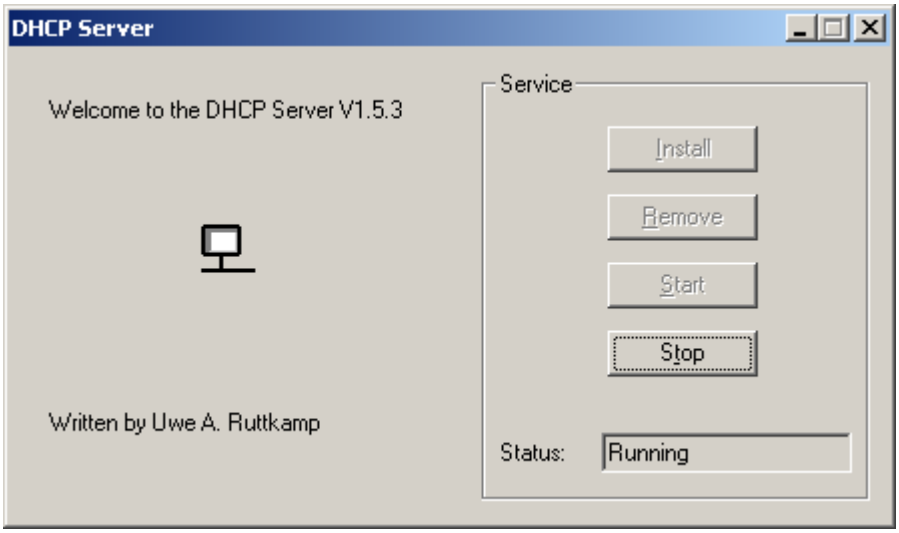
```
Command Prompt
Would you like to save time by not programming that area? [y/n]: y
Unlocking block at address 0
Erasing block at address 0
Starting programming
Using WORD programming mode...
Writing flash at hex address    17160, 98.72% done
Programming done
Starting Verify
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff
Retrying....
verify error at address = 0 exp_dat = ea0003fe act_dat = ffffffff

C:\pC-PXA255\WinCE>
```

The **eBoot** utilty has now been successfully downloaded and resides in the phyCORE-PXA255 on-board Flash memory from address 0 to 0x40000. You are now ready to download the WinCE image.

2.3 Configuring the DHCP Server

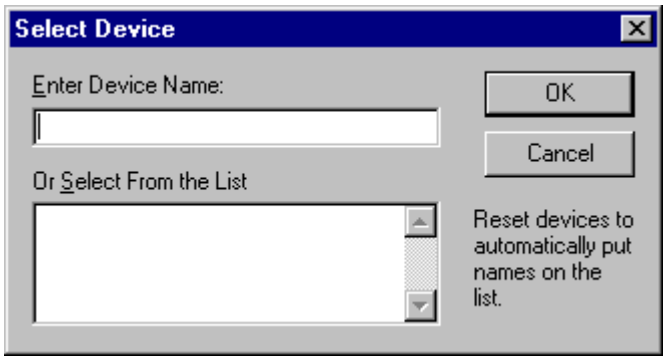
Downloading the WinCE image via Ethernet from a Windows host-PC to the phyCORE-PXA255/Development Board combination (also referred to as target hardware) requires installation and activation of a DHCP server.

- Open the **dhcpsrv.ini** configuration settings file ***(C:\pC-PXA255\WinCE\DHCP Server\dhcpsrv.ini)***. Change the IP address to match your network settings. See the **readme.txt** in the same directory for more information on setting up your DHCP server.
- Install the DHCP server by starting the *dhcpsrv.exe* from the Tools CD ***(pC-PXA255\WinCE\DHCP Server\dhcpsrv.exe)***. Click the ***Install*** button in the DHCP server window. The following window should now appear:

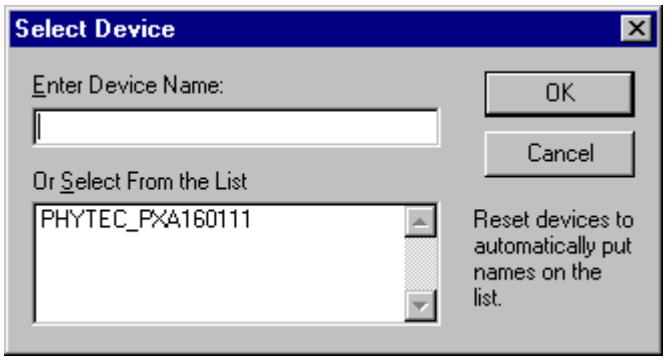


2.4 Downloading the WinCE Image

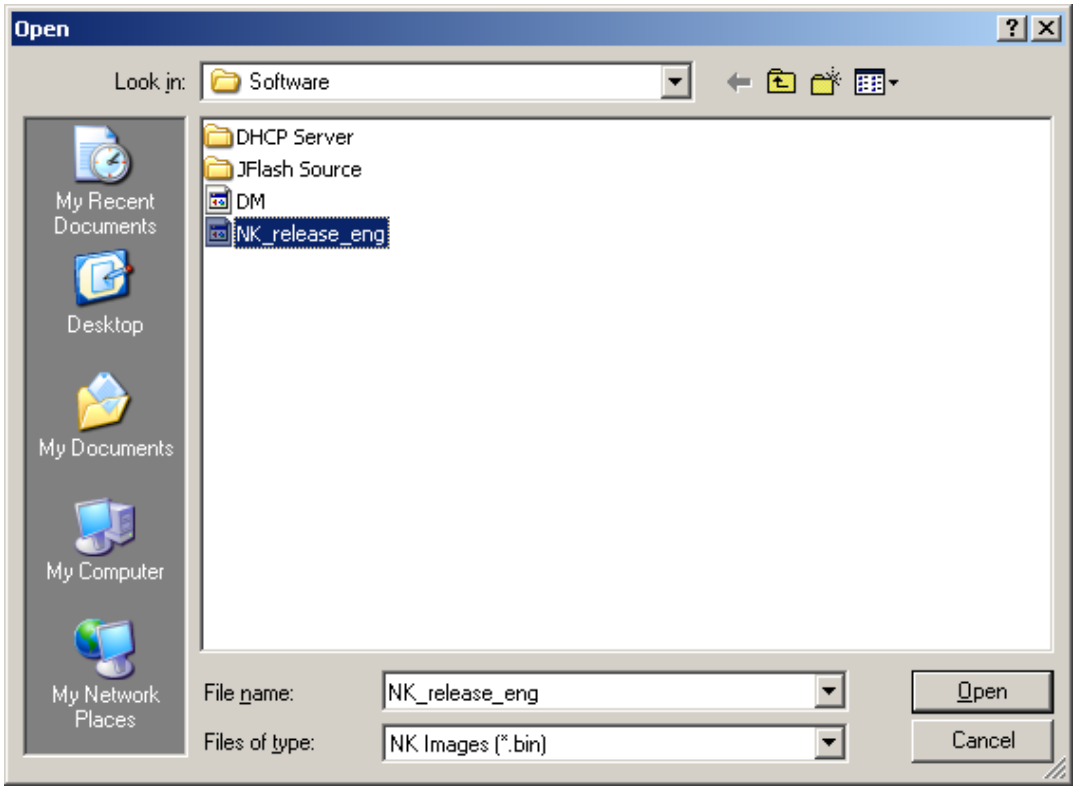
- Start **eShell** by double clicking on the ***eshell.exe*** found in: ***C:\ pC-PXA255\WinCE***
- The "Select Device" dialog box will appear on the screen.



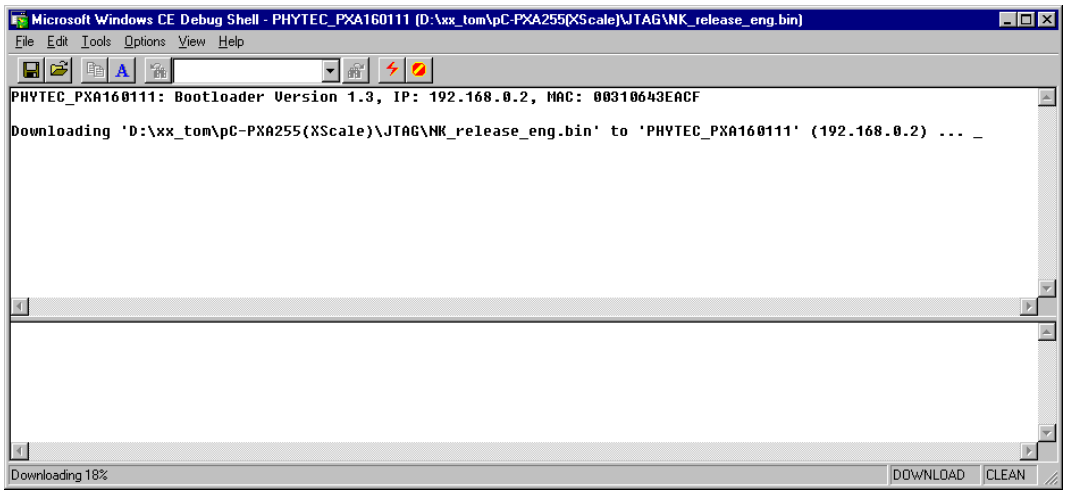
- Reset the module by pushing the reset button (S2) on the Development Board. The name of the new module detected by the software will now appear in the dialog window. Select the new name and confirm with the "OK" button.



- Select ***NK_release_eng.bin*** in the following window and click *Open*. The WinCE image is located on the Tools CD in: ***C:\ pC-PXA255\WinCE\NK_release_eng.bin***.



- The Microsoft Windows CE Debug Shell will display the download progress as below. The download process takes about one minute. Upon completion of the download, eShell will display the status as "done!".



- After a successful download, you should see a large hash mark, for calibration, in the middle of the phyCORE-PXA255 Sharp LCD screen. After calibrating the LCD WinCE will start on the screen.

Now you have successfully downloaded the WinCE image to the phyCORE-PXA255 over Ethernet.