phyCORE®-XScale/PXA270 Development Kit (KPCM-027) Loading eBoot and a WinCE Image (Adeneo)

This Application Note provides instructions on how to start-up the phyCORE-PXA270 (part # PCM-027-251EXMGRI), mounted on the PHYTEC Carrier Board (PCM-990-P3), and how to download the **eBoot** boot loader and a **WinCE** binary image.

Please refer to the phyCORE-PXA270 and phyCORE-PXA270 Carrier Board 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 PHYTEC hardware components are included in the phyCORE-PXA270 Development Kit (part # KPCM-027-LCDTP) and are necessary for completing the instructions in this Application Note:

- phyCORE-PXA270 (part # PCM-027-251EXMGRI)
- Carrier Board for phyCORE-PXA270 (PCM-990-P3)
- Interface Expansion Board (PCM-985)
- LPT–JTAG Adapter (JA-001-PXA)
- AC adapter supplying 12 VDC, 3.3A, center positive
- Parallel cable
- RS-232 null-modem cable
- Cross-over Ethernet cable[1]
- Host-PC running Microsoft Windows

All PHYTEC hardware components are included in the phyCORE-PXA270 LCD/Touch Panel Development Kit (part # KPCM-027-LCDTP).

[1]: You may also use a straight Ethernet cable connected to a hub to establish network connection between the phyCORE-PXA270 hardware and the host-PC.

1.2 Software Description and Requirements

This Application Note for the phyCORE-PXA270 requires a Windows host PC, the use of a terminal program on the host-PC, such as HyperTerminal, together with other tools provided on the PHYTEC Tool CD:

- This Application Note for the phyCORE-PXA270 requires the use of a DHCP server such as the one included on the Tool CD (***pC-PXA270\WinCE\DHCP Server\dhcpsrv.exe***).

- The **JFlash** (*jflash.exe*) utility, and associated ***prog_Adeneo.bat*** batch file, required to download the **eBoot** boot loader. These tools can be found in the ***pC-PXA270\WinCE\JFlash_MM*** folder on the included the Tools CD**.**

- The **eBoot** boot loader used for downloading the WinCE image should be pre-installed on the phyCORE-PXA270. This loader enables easy download of WindowsCE images via Ethernet. This boot loader resides 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** loader that is installed on the target hardware. **eShell** is included in the ***pC-PXA270\WinCE\JFlash_MM*** folder on the phyCORE-PXA270 Tools CD.

2 Getting Started

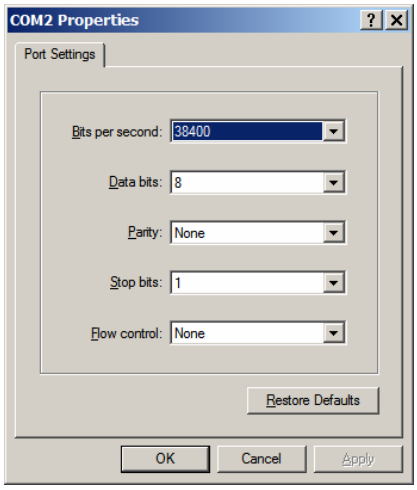
2.1 Interfacing the phyCORE-PXA270 to a Host-PC

- Copy the **pC-PXA270** folder from the included Tools CD to your PC. In this Application Note we will use the **PHYBasic** main folder[1]. The remainder of this application note assumes that the **pC-PXA270** folder was copied to target PC in the following path: ***C:\PHYBasic\pC-PXA270***.
- Connect the JTAG adapter's 20-pin flat-band cable to the pin connector X29 on the Carrier 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 Carrier Board to the host-PC using a cross-over Ethernet cable[2].
- Connect the included RS-232 null-modem cable to an available COM port on your Windows PC and DB-9 (P1) of the phyCORE Carrier Board.
- Connect the included 12 VDC power adapter to socket X1 on the Carrier Board.

1 : Future phyCORE-PXA270 Kits will come with an automatic installation wizard using the same PHYBasic folder structure.

2 : You may also use a straight Ethernet cable connected to a hub to establish network connection between the phyCORE-PXA270 hardware and the host-PC.

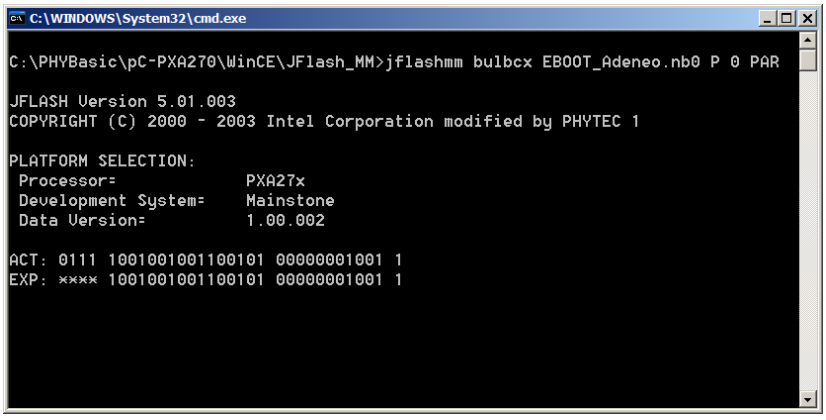
- Create a new HyperTerminal session, indicate the correct COM setting for your system and set the parameters as follows: Bits per second = 38400; Data bits = 8; Parity = None; Stop bits = 1; Flow control = None.



Note: If **eBoot** is already installed on your phyCORE-PXA270, skip the following section and continue with section **2.3** and **2.4** for loading the WinCE image.

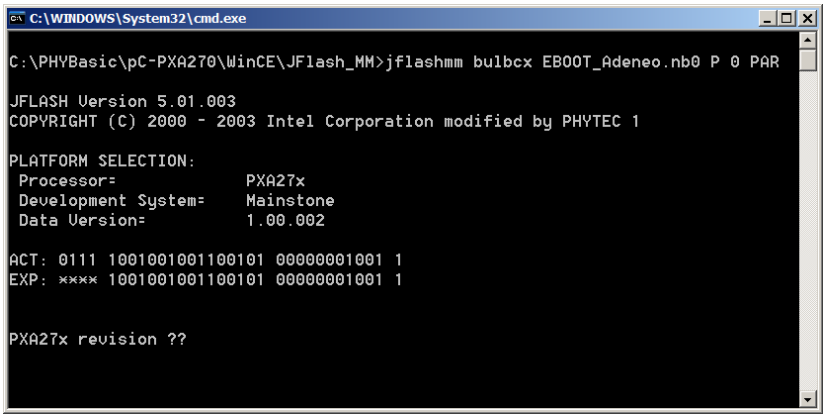
2.2 Downloading eBoot

- Browse to and open (double click) the file ***prog_Adeneo.bat*** located in: ***C:\PHYBasic\pC-PXA270\WinCE\JFlash_MM.***



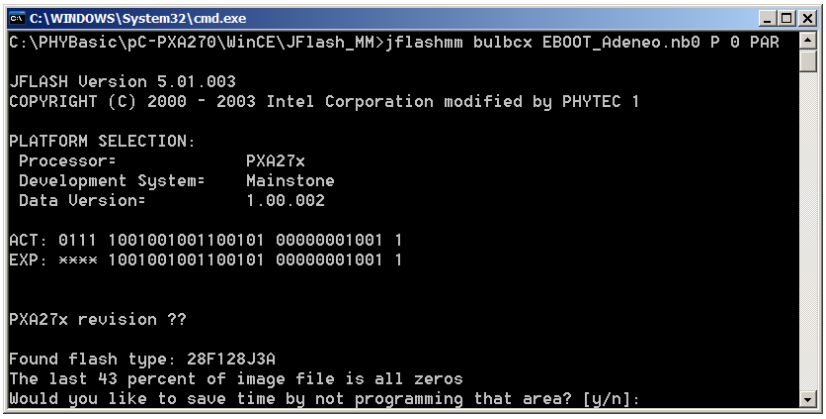
- The batch file will invoke the **JFlash** program and show hardware recognition within the MS Command Prompt window.

- Check to make sure that the **ACT** (Actual) and **EXP** (Expected) values of the recognized PXA270 device are the same and then press <Enter>.

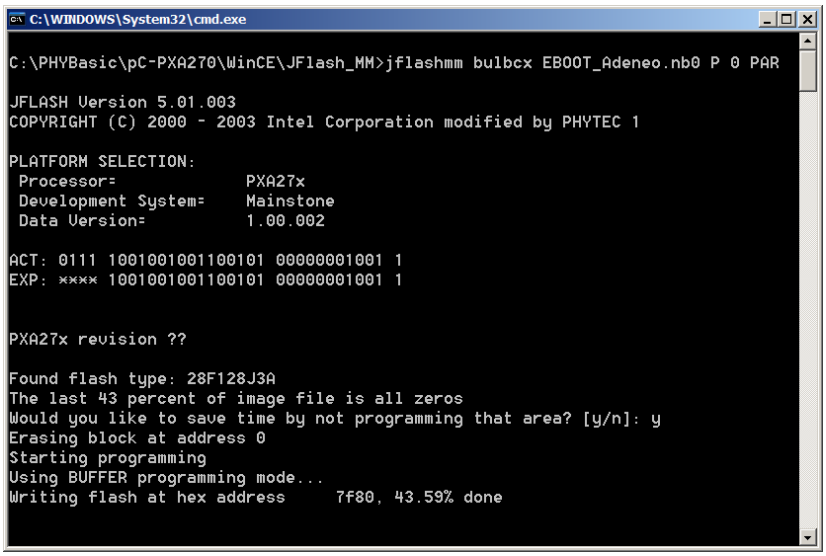


- Press <Enter> again.

- The **JFlash** utility will automatically recognize the Flash type installed on the phyCORE-PXA270. Enter "y" to skip programming of the last 43 percent of the image area.



- **eBoot** download will take approximately 2-3 minutes, when complete the command window will close.



- Upon successful download of the **eBoot** loader, you may see several verify errors. These errors may be caused by possible timing issues with the **JFlash** utility and may be ignored. The command prompt window will close automatically when the download is complete.

The **eBoot** loader has now been successfully downloaded and resides in the phyCORE-PXA270 on-board Flash memory.

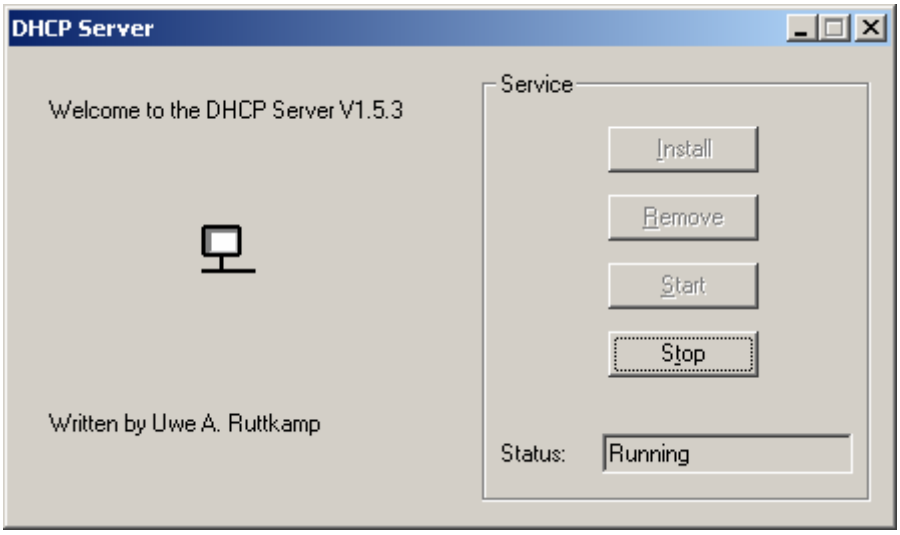
2.3 Configuring the DHCP Server

Downloading the WinCE image via Ethernet from a Windows host-PC to the phyCORE-PXA270 / Carrier Board combination (also referred to as target hardware) requires installation and activation of a DHCP server on the host PC.

- Open the **dhcpsrv.ini** configuration settings file in a text editor ***(C:\pC-PXA270\WinCE\DHCP Server\dhcpsrv.ini)***. Change the IP address to match your network settings[1]. For example:

  IPPOOL_1=192.168.3.2-200; the IP pool from which the target IP address is taken from
  IPBIND_1=192.168.3.1; bind to the IP of your HOST-PC

- See the **readme.txt** in the same directory for more information on setting up your DHCP server. Save the changes and close the ***dhcpsrv.ini*** file.
- Start the DHCP server by executing the ***dhcpsrv.exe*** located in the ***pC-PXA270\WinCE\DHCP Server*** folder. Click the ***Install*** button in the DHCP server window[2]. The following window should now appear:

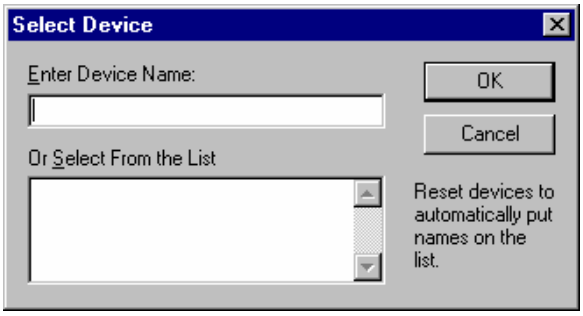


1 : Contact your network administrator for more information on your network settings and IP address options.

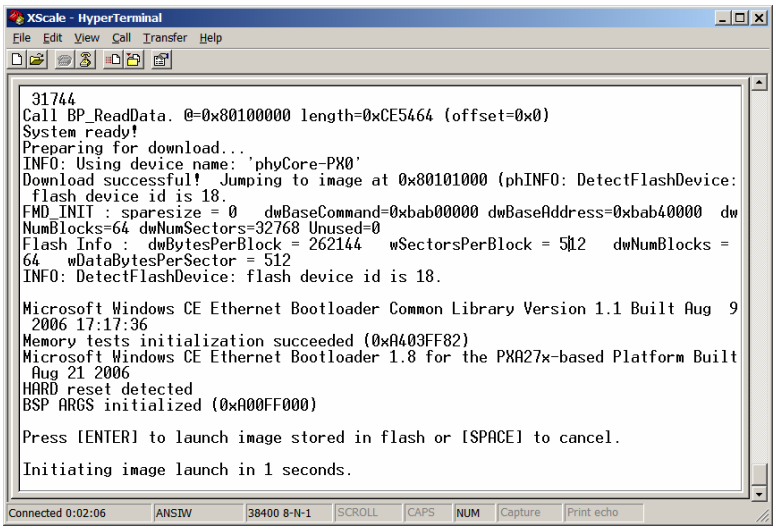
2 : The ***Install*** button is only active the first time you start this DHCP server.

2.4 Downloading the WinCE Image

- Start **eShell** by double-clicking on the ***eshell.exe*** located in: ***C:\pC-PXA270\WinCE\JFlash_MM.***
- The *Select Device* dialog box will appear on the screen.



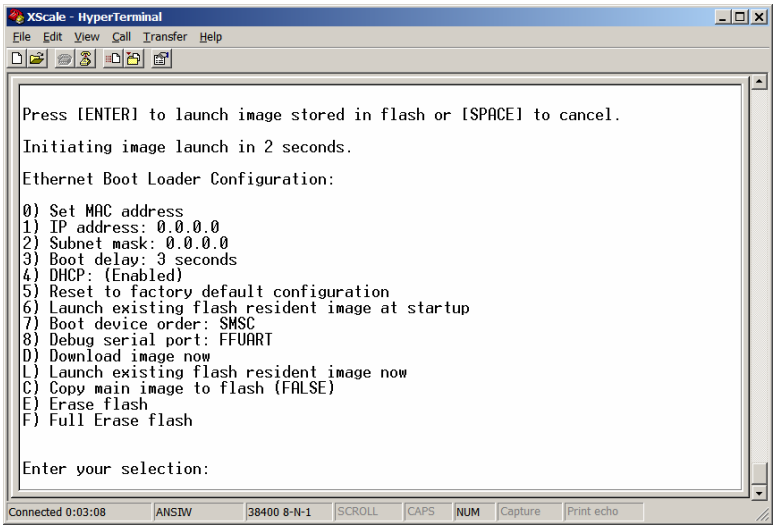
- Open the HyperTerminal session created in *section 2.1*.
- Reset the phyCORE-PXA270 module by disconnecting and re-connecting the power adapter to the power socket X1 on the Carrier Board[1]. Verify proper execution of the **eBoot** loader by looking at the HyperTerminal window messages.



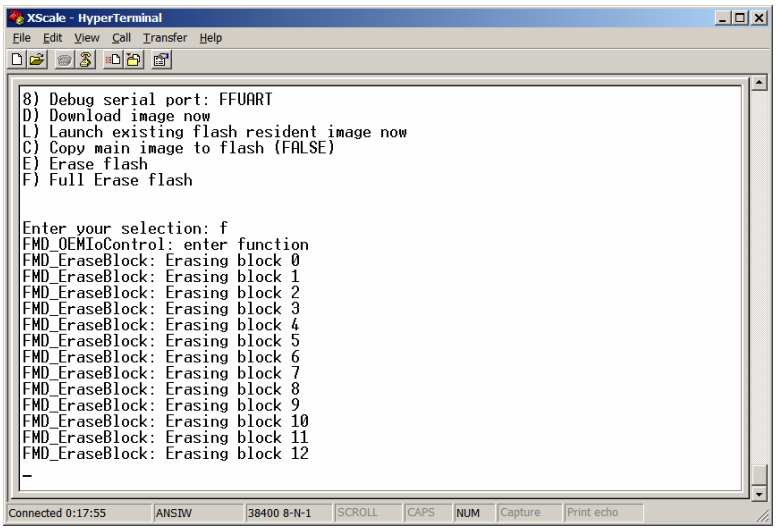
- Press <SPACE> to cancel auto launch of any WinCE image that might already be installed and enter the Boot Loader Configuration menu.

1: It is recommended to wait about 10 seconds between disconnecting the power adapter and reconnecting it.

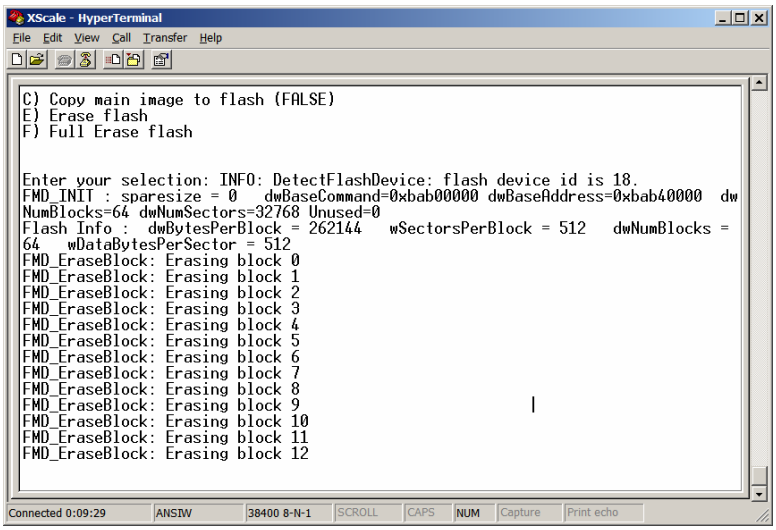
- The HyperTerminal window should now show the following messages and ask for a selection:

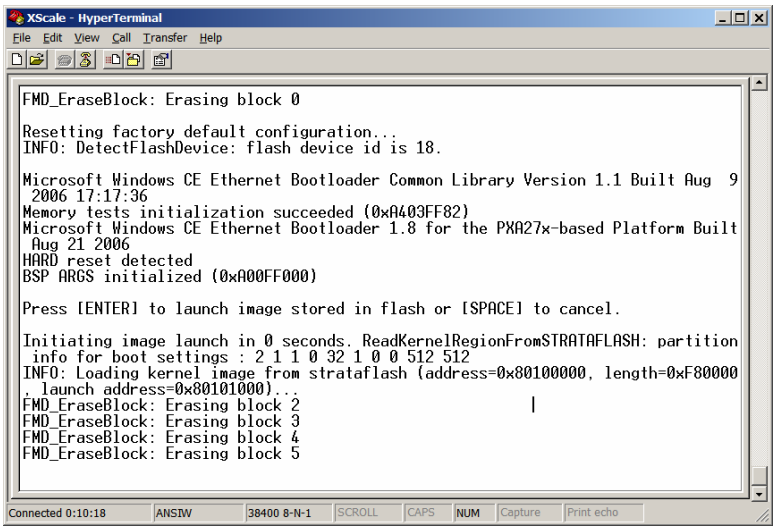


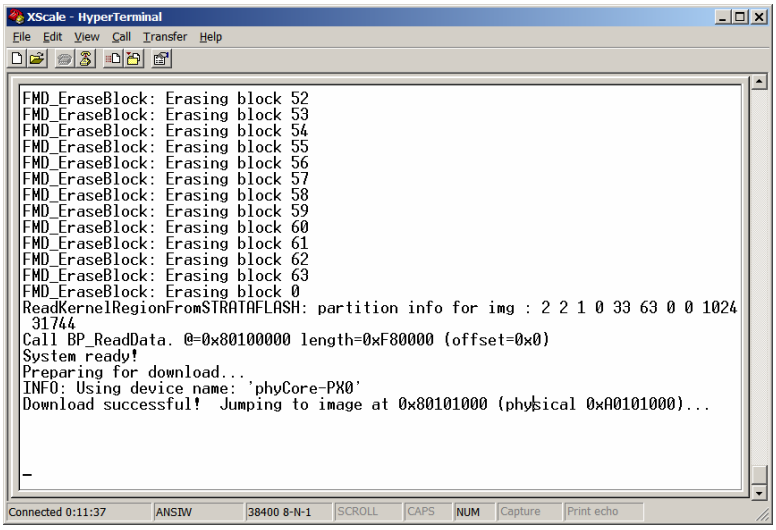
- At the *Enter your selection:* line type in "**F**" for “F) Full Erase flash”. This will take a couple minutes to complete.



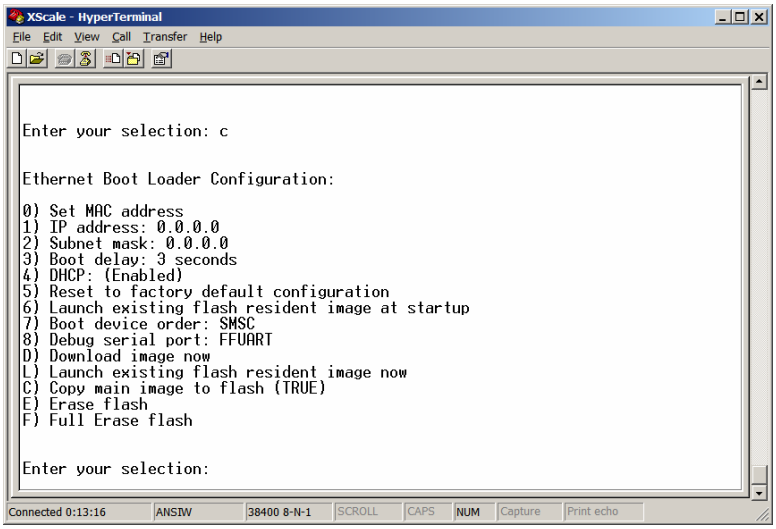
- After **eBoot** completes the Full Erase, reset the board by disconnecting and re-connecting power. Wait until the boot loader has finished the Flash formatting process. Several “FMD_EraseBlock:” messages will display in the HyperTe rminal window as **eBoot** formats the Flash memory blocks for the WinCE image and Flash space for file and application storage. This process will take approximately 2 minutes, during which the following messages will appear in the HyperTerminal window:



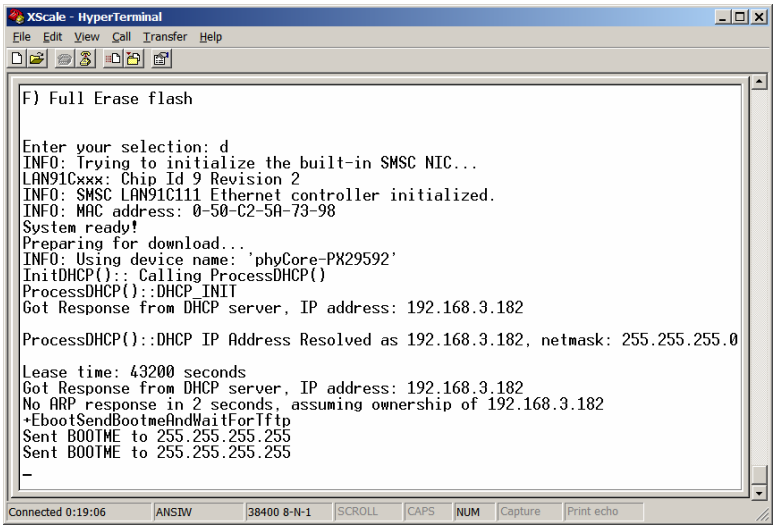




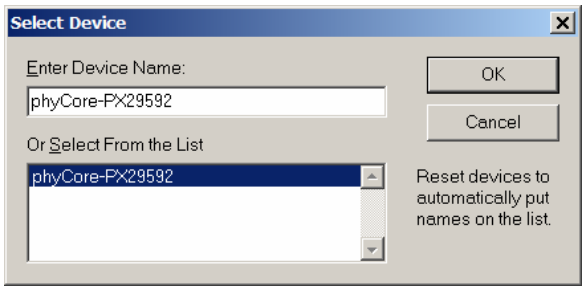
- When the Flash formatting is complete you will see “Download successful! Jumping to image at 0x801000 (physical 0xA0101000)…)”.
- Reset the phyCORE-PXA270 module by disconnecting and re-connecting power and press <SPACE> to enter the Boot Loader Configuration menu.
- At the *Enter your selection:* line type in "**C**" to change the Boot Loader Configuration to show "C) Copy main image to flash (True)".



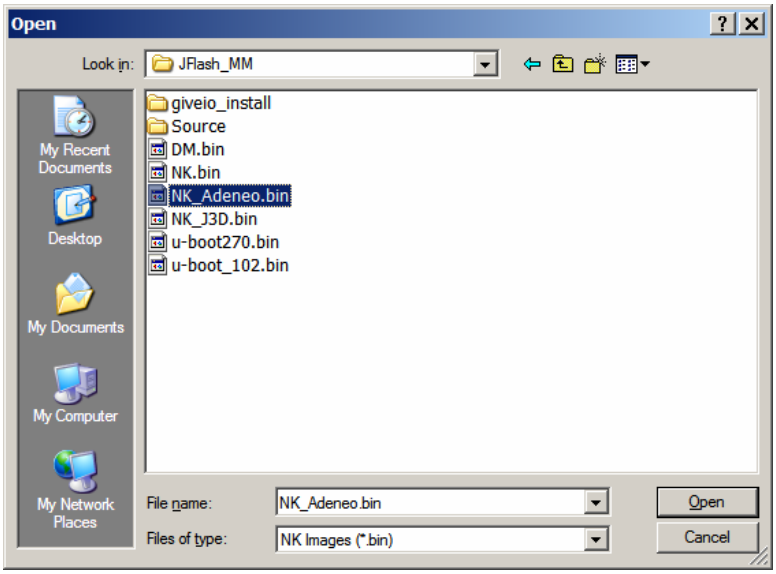
- Enter **D** to “Download image now”.



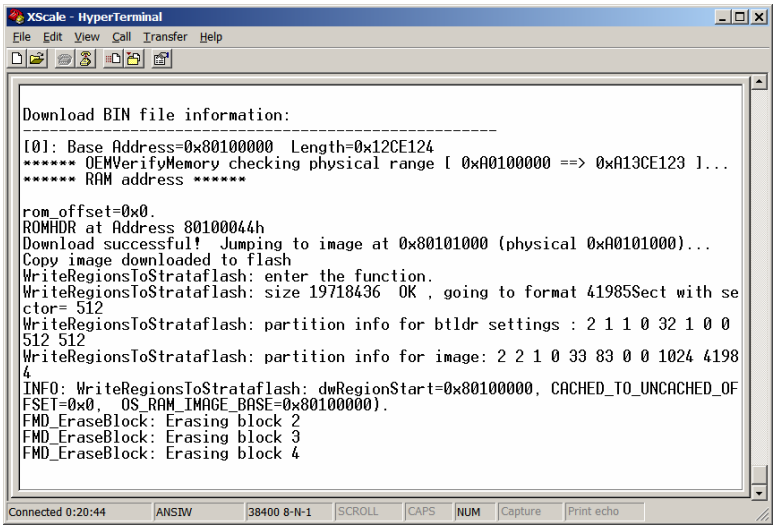
- Switch back to the "Select Device" dialog box in your **eShell** window. The name of the new module detected by the software will now appear in the dialog window. This may take several seconds to appear. Select the new name and confirm with the **OK** button.



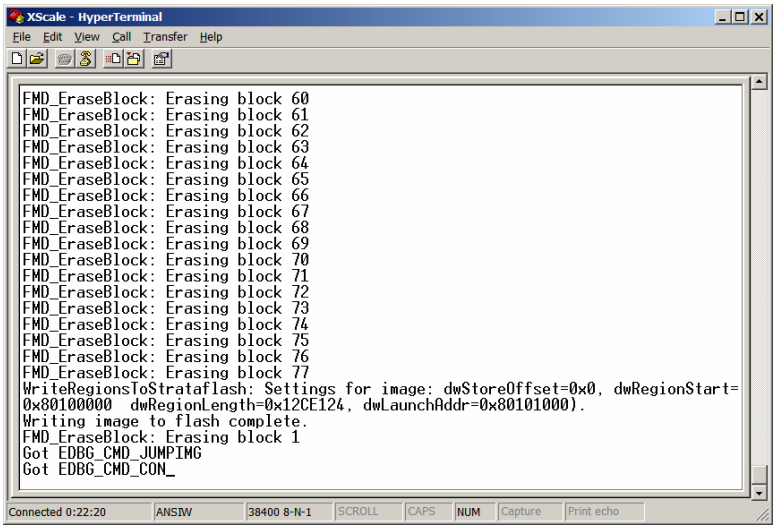
- Select ***NK_Adeneo.bin*** in the following window and click **Open**. The WinCE image is located in:
  C:\PHYBasic\pC-PXA270\WinCE\JFlash_MM



- **eBoot** will display several "FMD_EraseBlock:" messages while writing the WinCE image to memory. The dowload process takes approximately 2 minutes. The status is displayed in the HyperTerminal window.



- When complete, the following will appear:



- The "Got EDBG_CMD_CON" message will be displayed in HyperTerminal as shown above. It will then take about 2-3 minutes to finish reformatting the Flash and boot up. Once this is complete the WinCE 5.0 desktop will be displayed on the Sharp LCD screen mounted on the back of the phyCORE-PXA270 Carrier Board. The WinCE 5.0 boot procedure will only take this long after the initial image download. Subsequent start up will only take 15 to 20 seconds.

Congratulations! You have successfully downloaded the WinCE demo image to the phyCORE-PXA270 over Ethernet. PHYTEC also offers Full Adeneo WinCE 5.0 BSP as source or binary. *For more information please contact PHYTEC or your local PHYTEC representative.*