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

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 Carrier Board for phyCORE-PXA270 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 cable¹
- 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.

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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_new_J3D.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 preinstalled 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.

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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 folder¹.
- 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 cable².
- 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.
- Create a new HyperTerminal session, indicate the correct COM setting for your system and set the parameters as follows: Bits per second = 115200; Data bits = 8; Parity = None; Stop bits = 1; Flow control = None.

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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.



COM2 Properties		?:	×
Pot Settings			1
Bts per second:	115200	•	
<u>D</u> ata bits:	8	•	
Party:	None	•	
Stop bits:	1	*	
Bow control:	None	*	
		Restore Defaults	
0	к	Cencel 6010	

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

- Use the Windows Start button to open the Microsoft MS Command Prompt: *Start/Programs/Accessories/Command Prompt.*
- The following window should appear:



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 Change directory to the folder that contains the PHYTEC WinCE files, i.e. C:\PHYBasic\pC-PXA270\WinCE\JFlash_MM.



 Start the Jflash program by typing prog_new_J3D.bat at the command prompt. Press <Enter> to start download of the eBoot (EBOOT_J3D.nb0)¹ binary to the Flash.

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

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¹: For all phyCORE-PXA270 units shipped prior to March 2006 the **eBoot** file name was **eboot.nb0**. phyCORE-PXA270 SBC modules built in March 2006 or later are populated with an Intel J3 embeded Flash device and require use of a different **eBoot** file. The file name has been changed to **eboot_J3D.nb0**. Make sure the correct **prog_new_J3D.bat** batch file is used.



Command Prompt



Please 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. •

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 The JFlash utility will automatically recognize the Flash type installed on the phyCPRE-PXA270. Enter "y" to skip programming of the last 64 percent of the image area.

Command Prompt _ O X C:\PHYBasic\pC-PXA270\JF1ash_MM>prog_new_J3D.bat C:\PHYBasic\pC-PXA270\JFlash_MM>jflashmm_bulbcx_EB00T_J3D.nb0_P_0_PAR JFLASH Version 5.01.003 COPYRIGHT (C) 2000 - 2003 Intel Corporation modified by PHYTEC 1 PLATFORM SELECTION: PXA27x Processor= Development System= Mainstone 1.00.002 Data Version= ACT: 0111 1001001001100101 00000001001 1 EXP: MMMM 1001001001100101 00000001001 1 PXA27x revision ?? Found flash type: 28F128J3A The last 75 percent of image file is all zeros Would you like to save time by not programming that area? [y/n]: y

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

Command Prompt	_ 🗆 🗙
	-
Found flash type: 28F128J3A	
The last 75 percent of image file is all zeros	
Would you like to save time by not programming that area? [y/n]: y	
Erasing block at address 0	
Starting programming	
Using BUFFER programming mode	
Writing flash at hex address fd00, 96.61% 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	
Verity erfor at address = 0 exp_dat = eau003te act_dat = tttttttt	
Ketrying	
Verity erfor at address - 6 exp_dat - ea0003te act_dat - tttttttt	
retrying Harifu array at address : 0 ave dat : es000256 act dat : ffffffff	
Patruina	
nerging uarifu arrar at address : 0 avo dat : as000036a act dat : ffffffff	
Detruino	
verify error at address = 0 exp dat = ea00003fe act dat = ffffffff	
vering error de doureou - o exp_dat - edouosie dot_dat - inititit	
C:\PHYBasic\pC-PXA270\JFlash MM>_	
	-

The **eBoot** loader has now been successfully downloaded and resides in the phyCORE-PXA270 on-board Flash memory from address 0 to 0x40000.

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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 settings¹. 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 window². The following window should now appear:

DHCP Server		_ _ X
Welcome to the DHCP Server V1.5.3	- Service	Install
모		<u>R</u> emove <u>S</u> tart
Written by Uwe A. Ruttkamp	Status:	Stop Running

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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 12 VDC power adapter to the power socket X1 on the Carrier Board¹. Verify proper execution of the **eBoot** loader by looking at the HyperTerminal window messages.

XScele - HyperTen	utudi Ali						
	James Fob						
Microsoft Hir 2005 12:27:1	idows CE Et	thernet Boot	loader Com	won Libr	ary Vers	ion 1.1 Bu	ilt Nov 25
Microsoft His nt Platform P	xdows CE Et Auilt Nar I	thernet Boot 15 2006	loader 1.7	for the	Intel M	ainstoneII	Developme
Press (ENTER)	to launch	image stor	ed in flas	h or ISP	RCE1 to	cancel.	
Initiating is	age launch	in 2 secon	ds.				
Cannected 0:08-85	ANSIW	115200 8-9+1	SCROL 0	US MUM	Capture	Print echo	

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

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- Press <SPACE> to cancel auto launch of any WinCE image that might already be installed.
- The HyperTerminal window should now show the following messages and ask for a selection:



 Enter D as your selection from the *Ethernet Boot Loader Configuration* menu in HyperTerm.

😤 XStale - HyperTeminal	2 21
Ele Edit New Gal Transfer Bob	
이번 이상 이전 대	
INFO: NRC address: 0-50-C2-52-90-F6 Svstem ready! Preparing for download INFO: Vsing device name: 'MRINSINGISS' InitOMCP():: Calling ProcessOMCP() ProcessOMCP()::DMCP_INIT Got Response from DMCP server. IP address: 192.168.3.191 ProcessOMCP()::DMCP IP Address Resolved as 192.168.3.191 ProcessOMCP()::DMCP IP Address Resolved as 192.168.3.191 No AMP response from DMCP server. IP address: 192.168.3.191 No AMP response from DMCP server. IP address: 192.168.3.191 No AMP response from DMCP server. IP address: 192.168.3.191 Honor Mathematical For If to Server Science	-
Canvected dots:33 Antilav 115200 8-8-1 SCR01. ICAPS Mater Copture Print othe	1

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• 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 Device	×
Enter Device Name:	ОК
MAINSTN39158	Cancel
Or <u>S</u> elect From the List	Reset devices to
MAINSTN39158	automatically put names on the
_	list.

Select NK_J3D.bin in the following window and click Open. The WinCE image is located on the Tools CD in:
 C:\pC-PXA270\WinCE\JFlash_MM\NK_J3D.bin.

Open					<u>? x</u>
Look jn:	DIRash_MM		•	• 🗈 💣 📼 •	
Ny Recent Documents Dealtop	Source DMLbin Nk.bin Nk.J00.bin u-boot270.b u-boot_102	in bin			
My Decuments					
Ny Computer					
My Network Places	File pame: Files of type:	NK_J3D.bin NK Images ("bin)	_	•	Qpen Cancel

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eBoot will first erase the flash and then write the WinCE Image to Flash. The dowload process takes approximately 1 minute. The status is displayed in the Hyperterminal window.

Nicole - HyperTerminal	, DX
Ele Edit Vew Cell Transfer Holp	
Dial of St c(2) of	
	1.0
Sent 000TML to 255.255.255	- 12
Sent BUUIN to 230.235.235.235	
Sent BOUNE to 233,233,233,235	
Sent BOOTHE to 259,259,255	
Sent BOOTNE to 255,255,255,255	
Sent BOOTNE to 255.255.255.255	
Sent BOOTNE to 255.255.255.255	
Sent BUUINE to 259,255,255,255 Sent BOUTNE to 255,255,255	
Locked Dam Link 1	
Src IP 192,168,3,191 Port 0000 Dest IP 192,168,3,1 Port 0438	
EthDown::TFTPD_DPEN::boot.bin	
-EbootSendBootmefindNaitForTftp	
CEWVarifyHewary input range 903004001548008	
Distance Distance charactering physical range i existence	
FLHMI BODFOCS	
	4414
<pre>#M###################################</pre>	
THE FLATHERSDORED, 154BUS)	
INFU: FlashErase: erasing flash bCS00000 to DE00FFFF. Flease wait	
Cannected 0:03:34 AMEBV 1:15200 8-14-1 SCR01. 04PS MUM Capture Print ecto	

• When complete, the following will appear:

📲 XScele - HyperTerminal 📃 🗖 🗴
Ele Edit New On Transfer Bolt
미분 비칭 석점 값
INFO: FlashFrite: writing to flash INFO: FlashFrite: flash programmed successfully! Download successfully! Download successfully Download successfully Download successfully Download successfully Download successfully Download successfully Download successfully
Canvected 0:05:32 AMEBW 1:15200 8-9-1 SCROLL CAPS MUM Cepture Print echo

• After a successful download, the WinCE 5.0 desktop will be displayed on Sharp LCD screen.

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PHYTEC

Congratulations! You have successfully downloaded the WinCE image to the phyCORE-PXA270 over Ethernet. Before you use the LCD / Touch Panel you need to run the calibration application.

- Connect a USB mouse to the phyCORE-PXA270 Carrier Board.
- Click on the Start button and select Run...
- Type *caltouch* using the virtual keyboard. Click **OK**.
- The touch panel calibration screen will appear. Carefully press and briefly hold a stylus on the center of the target. Repeat the target moves around the screen. Follow the instructions on the screen taping the LCD within 30 seconds to save the calibration settings.
- Click on the Start button and select Run...
- Type *flushreg* using the virtual keyboard. Click **OK** to start.



- Click on **Flush** in the *FlushReg* window.
- Close the dialog by clicking on **Done**.

For additional information on using the phyCORE-PXA270 Development Kit with Windows CE operating system refer to the WinCE Kit QuickStart Instructions L-675e. PHYTEC also offers a WinCE 5.0 BSP. For more information please contact PHYTEC or your local representative.

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