

phyBOARD-WEGA-AM335x

WEGA-Board_bring_up

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Carrier Board Product No: POB-002



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1. Introduction:

This document is prepared as reference to boot Windows Embedded Compact 7 image on WEGA board. All the three methods, i.e boot from SD-Card, Boot from NAND and Internal EMAC(Ethernet) are documented here.

Visual Studio provides various options for developing applications for Windows Embedded Compact 7, here, reference is provided to code a sample application using Visual Studio 2008 Professional Edition and then deploy on the WEGA board.

1.1. Target Setup:

Before starting with the boot process, first do necessary hardware setup for the WEGA Board i.e establish UART connection between Host Computer and device, select power adapter of +5 volts and 2 amperes to power up WEGA Board.

1.2. Host Setup:

1.2.1 Putty Console:

In order to carry boot operations on WEGA Board we need serial console to get boot messages from device. Here we are using console software known as "**Putty**". Download "**Putty**" from the below link.

http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe

■ Go to the folder where the file is saved and double click on **putty.exe** file to start executing it.

Reputer Configuration		×
Category:		
Session Logging Terminal Keyboard Bell Features Window Appearance Behaviour Translation Selection Colours Connection Data Proxy	Basic options for your PuTTY ses Specify the destination you want to connect to Host Name (or IP address) Connection type: Raw I telnet Rlogin SSH Load, save or delete a stored session Saved Sessions Default Settings Server	Esion Port 22 Serial Load
Telnet Rlogin ■ SSH Serial	Close window on e <u>x</u> it. ○ Always ○ Never ④ Only on cle <u>Open</u>	<u>D</u> elete ⊇ean exit



■ Click on "**Serial**" radio button to use putty as serial console.

🕵 PuTTY Configuration		×
Category:		
Session Logging Terminal Keyboard Bell Features Window Appearance Behaviour Translation	Basic options for your PuTTY ses Specify the destination you want to connect to Serial line COM1 Connection type: Raw I elnet Rlogin SSH Load, save or delete a stored session	sion Speed 9600 © Seral
Selection Colours Data Proxy Telnet Rlogin SSH Serial	Sav <u>e</u> d Sessions Default Settings Server	Load Sa <u>v</u> e Delete
About	Close window on exit Always Never Only on cle	an exit <u>C</u> ancel

■ Modify the defualt "**COM1**" to the COM port that you are using to communicate with the device. Also, change the default baud rate to "**115200**". Here for the demo purpose the COM selection is done for "**COM10**" since it is the port currently used for communication.

🕵 PuTTY Configuration	
Category:	
-Session Logging -Terminal -Keyboard -Bell -Features -Window -Appearance -Behaviour -Translation -Selection	Basic options for your PuTTY session Specify the destination you want to connect to Serial line Speed COM10 115200 Connection type: Raw Raw Ielnet Rlogin Load, save or delete a stored session Saved Sessions
Colours Connection Data Proxy Telnet Rlogin SSH Serial	Default Settings Server Save Delete
	Close window on e <u>x</u> it. Always Never Only on clean exit
About	<u>Open</u> <u>Cancel</u>



- COM10 PUTTY
- After the changes has been done click on button "**Open**" to open the serial console.



2. Boot from SD-Card:

2.1. Software Requirements:

Bootable SDCard preloaded with the following files:

- MLO
- EBOOTSD.nb0
- NK.bin

2.2. Hardware Requirements:

- WEGA Board
- Serial Cable (as communication channel between board and computer)
- Power Adapter (to power-up board)
- SDCard.

Firstly do the necessary hardware setup to carry out this operation, like setting the jumper settings (for WEGA Board pins 3-4 of jumper JP5 should be connected to boot from SDCard) and insert the SDCard in respective slot provided on the board. Thereafter plug in the power cable to the board and start with the procedure as below.

2.3. Procedure:

■ Hit spacebar before the counter expires to get "Main Menu", if you fail to press spacebar, then press "**Reset**" button on board and repeat the same procedure again.

🛃 COM9 - PuTTY 📃 📃 🗮 🗶
EBOOT Version 0.0.1, BSP PHYTEC PhyCORE_AM335x BSP 2.0.00
TI AM33X
System ready!
Preparing for download
INFO: Predownload
Reserving BootBlocks
Checking bootloader blocks are marked as reserved (Num = 18)
done
Reading BootCfg
INFO: Boot configuration found. Boot config Version 3, Signature 1111705159
ShowLogo
OALFlashStoreOpen: 4096 blocks, 64 sectors/block
OALFlashStoreOpen: 2048 bytes/sector, 18 reserved blocks
IsValidMBR: MBR sector = 0x480 (valid MBR)
OpenPartition: Partition Exists=0x1 for part 0x20.
>>> Forcing cold boot (non-persistent registry and other data will be wiped) $<<<$
7fbaedc4 d059 -> c4 ed ba 7f 59 d0
7fbaedc4 d159 -> c4 ed ba 7f 59 d1
Hit space to enter configuration menu [470] 3
Hit space to enter configuration menu [1470] 2
▼



• Once you hit spacebar you will get "Main Menu" as shown



■ Before starting with the procedure it is important to enable the flashing of "**NK.bin**" image. To perform this task press "**5**" to select option "**[5] Flash Management**".





■ Press "8" to select option "[8] Enable flashing NK.bin" and then press "y" when asked for conformation.

🖉 COM9 - PuTTY 📃 📃 💻 🔀	
[b] Read NAND Block	
[0] Exit and Continue	
Selection: 8	
Enable Flashing NK.bin [y/-]: y	
Flashing NK.bin is enabled	
Flash Management	
[1] Show flash geometry	
[1] Show Hash geometry	
[3] Erase flash	
[4] Erase block range	
[5] Reserve block range	
[6] Set bad block	
[7] Format flash	
[8] Enable flashing NK.bin	
[9] Set ECC mode	
[a] Write NAND Block	
[b] Read NAND Block	
[0] Exit and Continue	
Selection:	-

■ Press "2" to select option "[2] Select Boot Device" option as Selection. After selecting option [2] you will get menu to select boot device as shown below.

🖉 COM9 - PuTTY 📃 📃 💻 🖂	
<pre>[2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue</pre>	•
Selection: 2 Select Boot Device	
<pre>[1] Internal EMAC [2] NK from SDCard FILE [3] NK from NAND [0] Exit and Continue Selection (actual Internal EMAC):</pre>	III +



Press "2" to select option "[2] NK from SDCard FILE" to enable SDCard as booting device. On successful selection, a message "Boot device set to NK from SDCard FILE" will be displayed on the screen, and you will be directed back to "Main Menu".

COM9 - PuTTY	
<pre>[3] NK from NAND [0] Exit and Continue</pre>	^
Selection (actual Internal EMAC): 2 Boot device set to NK from SDCard FILE	
Main Menu	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue</pre>	
Selection:	-

■ Save your settings by pressing "7" to select option "[7] Save Settings".





Once you press "7" you will be asked to confirm your selection. Here press "y". On successful selection, a message "Current settings have been saved" will be displayed on the screen, and you will be directed back to "Main Menu".

🛃 COM9 - PuTTY	x
[0] Exit and Continue	-
Selection: 7 Do you want save current settings [-/y]? y Current settings has been saved	
Main Menu	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue</pre>	
Selection:	-

■ Press "0" to select option "[0] Exit and Continue", after this the booting process will start automatically.

NOTE: Booting process will take some time, please do not disconnect power supply or reset the board, since this will cause booting process to terminate.



Below is shown the series of screen shots of booting process, last screenshot shows the booting process completed successfully.

Putty COM9 - Putty		X
Kernel Flags :	0x0000000	-
FileSys RAM Percent :	0x80808080	
Driver Glob Start :	0x000000x0	
Driver Glob Length :	0x00000000	
CPU :	0x01c2	
MiscFlags :	0x0002	
Extensions :	0x80003020	
Tracking Mem Start :	0x0000000	
Tracking Mem Length :	0x00000000	
IsValidMBR: MBR sector OpenPartition: Partitic BP_SetDataPointer at 0x BP_SetDataPointer at 0x WriteData: Start = 0x0, NK image written ROMHDR at Address C0002	= 0x480 (valid MBR) on Exists=0x1 for part 0x20. 5596974 00 Length = 0x5596974.	
Load NK image from flas	n memory	
ISVALIOMBR: MBR sector	= 0X480 (Valid MBR)	
openPartition: Partitio	n Exists=0x1 for part 0x20.	=
- SetDataPointer at 0x		_

<pre>[6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable (Disable OAL Retail Messages</pre>
[/] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages
[9] Enable/Disable OAL Retail Messages
[5] HIRDIC DISUBIC OND RECAIL HESSAGES
[a] Select Display Resolution
[b] Select OPP Mode
[C] Aux Functions [0] Exit and Continue
Selection: 0
OEMPreDownload: Filename nk.bin
BL_IMAGE_TYPE_BIN
+OEMMultiBinNotify(0x8feb24d8 -> 1)
Download file information:
[0]: Address=0xc0002000 Length=0x05596974 Save=0x80002000
Download file type: 6
ΞΞ

Putty					X	
Copy Entries Offset Prof Symbol Length Prof Symbol Offset Num Files Kernel Flags FileSys BAM Percent		0x80986f50 0x0000000 0x0000000 226 0x00000000 0x80808080			*	
Driver Glob Start Driver Glob Length CPU MiscFlags Extensions Tracking Mem Start Tracking Mem Length		0x00000000 0x0000000 0x01c2 0x80003020 0x80003020 0x0000000 0x00000000				
NK Image Loaded Launch Windows CE imag Windows CE Kernel for CPU CP15 Control Regis CPU CP15 Auxiliary Con +OALTimerInit(1, 24000 High Performance F	ge Al st(nt:),	by jumping RM (Thumb Er er = 0xc5387 rol Register 200) equecy is 24	to 0x80002000 nabled) 7f r = 0x42 4 MHz		4 III	

This completes the booting process from SDCard.

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3. Boot from NAND:

3.1. Software Requirements:

Bootable SDCard with the following images:

- MLO
- EBOOTSD.nb0
- XLDRNAND.bin
- EBOOTND.bin
- NK.bin

3.2. <u>Hardware Requirements:</u>

- WEGA Board.
- SDCard (with above mentioned files)
- Power cable (to power up the board)

This process consists of two parts, Downloading images from SDCard to NAND and then Booting from NAND.

3.3. Procedure:

3.3.1. Downloading images from SDCard to NAND:

For the first part of this process, since images from SDCard has to be downloaded in NAND, hence required setup for SDCard needs to be done (for WEGA Board short pins 3-4 of jumper JP5 and then insert SDCard in the respective slot on board.)



3.3.1.1 Download "xldrnand.bin":

Hit spacebar before the counter expires to get "Main Menu", if you fail to press spacebar, then press "Reset" button on board and repeat the same procedure again.



■ Once you hit spacebar you will get "Main Menu" as shown.

🔗 COM9 - PuTTY	
7fbaedc4 d059 -> c4 ed ba 7f 59 d0 7fbaedc4 d159 -> c4 ed ba 7f 59 d1 Hit space to enter configuration menu [470] 3 Hit space to enter configuration menu [1470] 2 Hit space to enter configuration menu [2470] 1	
Main Menu	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] Flash Management [6] Set Device ID [7] Save Settings</pre>	
<pre>[7] Save Settings [8] Enable/Disable OAL Retail Messages [9] Select Display Resolution [a] Select OPP Mode [b] Aux Functions [0] Exit and Continue</pre>	III
Selection:	-



■ Before starting with the procedure it is important to enable the flashing of "**NK.bin**" image. To perform this task press "**5**" to select option "**[5] Flash Management**".



■ Press "8" to select option "[8] Enable flashing NK.bin" and then press "y" when asked for conformation.

COM9 - PuTTY	X
[b] Read NAND Block [0] Exit and Continue	^
Selection: 8 Enable Flashing NK.bin [y/-]: y	
Flashing NK.bin is enabled	
Flash Management	
[1] Show flash geometry	
[3] Erase flash	
[4] Erase block range	
[5] Reserve block range	
[6] Set bad block	
[8] Enable flashing NK.bin	
[9] Set ECC mode	
[a] Write NAND Block	
[b] Read NAND Block	
[0] Exit and Continue	
Selection:	*



Press "5" to select option "[5] Flash Management" to start with the procedure of downloading first file to NAND. After you press "5" you will get menu "SDCard Settings" as follows.

COM9 - PuTTY	X
 Show Current Settings Select Boot Device Select KITL (Debug) Device Network Settings SDCard Settings Set Device ID Save Settings Flash Management Enable/Disable OAL Retail Messages Select Display Resolution Select OPP Mode Aux Functions Exit and Continue 	•
Selection: 5	
SDCard Settings	=
<pre>[1] Show Current Settings [2] Enter Filename [0] Exit and Continue</pre>	
Selection:	~

Press "2" to select option "[2] Enter Filename" to specify the name of first file to be downloaded in the NAND.

B COM9 - PuTTY	
<pre>[3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue Selection: 5</pre>	
SDCard Settings	
<pre>[1] Show Current Settings [2] Enter Filename [0] Exit and Continue</pre>	Ш
Selection: 2 Type new filename (8.3 format) :	-



■ Now type "xldrnand.bin" to specify the respective file and hit "Enter".



■ Press "0" to select "[0] Exit and Continue".





Now that the name of image to be downloaded in NAND is specified, next we need to specify the device to locate the required file. Hence press "2" to select option "[2] Select Boot Device".

COM9 - Putty	
 [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue 	*
Selection: 2 Select Boot Device	
<pre>[1] Internal EMAC [2] NK from SDCard FILE [3] NK from NAND [0] Exit and Continue</pre>	 Ш
Selection (actual NK from SDCard FILE):	-

■ Press "2" to select option "[2] NK from SDCard FILE".

COM9 - PuTTY	
<pre>[3] NK from NAND [0] Exit and Continue</pre>	
Selection (actual NK from SDCard FILE): 2 Boot device set to NK from SDCard FILE	
Main Menu	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue</pre>	
Selection:	-



■ Save your settings by pressing "7" to select option "[7] Save Settings".



Once you press "7" you will be asked to confirm your selection. Here press "y". On successful selection, a message "Current settings have been saved" will be displayed on the screen, and you will be directed back to "Main Menu".

COM9 - PuTTY	X
[0] Exit and Continue	~
Selection: 7	
Do you want save current settings [-/y]? y Current settings has been saved	
[1] Show Current Settings	
[2] Select Boot Device	
[3] Select KITL (Debug) Device	
[4] Network Settings	
[5] SDCard Settings	
[6] Set Device ID	
[7] Save Settings	
[8] Flash Management	
[9] Enable/Disable OAL Retail Messages	
[a] Select Display Resolution	
[b] Select OPP Mode	
[0] Fyit and Continue	
[0] Exte and continue	=
Selection:	-



Press "0" to select option "[0] Exit and Continue", after this the downloading process from SDCard to NAND will start automatically and after successfully download you will get message "INFO: XLDR/EBOOT/IPL downloaded, spin forever".

🛃 COM9 - PuTTY			×	J
Physical Last	:	0x402fa320	-	1
Num Modules		1		I
RAM Start		0x40306000		1
RAM Free		0x40308000		1
RAM End		0x4030a000		
Num Copy Entries		1		
Copy Entries Offset		0x402fa310		1
Prof Symbol Length		0x000000x0		1
Prof Symbol Offset		0x000000x0		1
Num Files		0		1
Kernel Flags		0x000000x0		1
FileSys RAM Percent		0x80808080		1
Driver Glob Start		0x000000x0		1
Driver Glob Length		0x000000x0		1
CPU		0x01c2		1
MiscFlags		0x0002		1
Extensions		0x000000x0		1
Tracking Mem Start		0x000000x0		1
Tracking Mem Length		0x000000x0		1
XLDR image written			-	1
INFO: XLDR/EBOOT/IPL o	lot	wnloaded, spin forever	-	1
			-	

This completes the download process for first file "xldrnand.bin" from SDCard to NAND.

Procedure of downloading remaining two files namely "**ebootnd.bin**" and "**nk.bin**" is exactly similar as mentioned above, below provided are the screenshots for the downloading process of these two files.

3.3.1.2. Download "ebootnd.bin":

Reset board and hit spacebar before counter expires.

🔁 COM9 - PuTTY	
IsValidMBR: MBR sector = 0x480 (valid MBR) OpenPartition: Partition Exists=0x1 for part 0x20. 7fbaedc4 d059 -> c4 ed ba 7f 59 d0 7fbaedc4 d159 -> c4 ed ba 7f 59 d1 Hit space to enter configuration menu [480] 3	*
Main Menu	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue</pre>	III
Selection:	-

■ Select option "[5] SDCard Settings".



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Enter filename as "ebootnd.bin" and press "Enter".



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COM9 - PuTTY	
<pre>[c] Aux Functions [0] Exit and Continue</pre>	•
Selection: 5	
SDCard Settings	
[1] Show Current Settings[2] Enter Filename[0] Exit and Continue	
Selection: 2	
Type new filename (8.3 format) :ebootnd.bin	
SDCard Settings	
<pre>[1] Show Current Settings [2] Enter Filename [0] Exit and Continue</pre>	
Selection:	HI V

■ Select option "[0] Exit and Continue".





■ Select option "[2] Select Boot Device".

🛃 COM9 - PuTTY	٢
 [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Erable Obt Detail Macazza 	*
<pre>[9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue Selection: 2</pre>	
Select Boot Device	
 [1] Internal EMAC [2] NK from SDCard FILE [3] NK from NAND [0] Exit and Continue 	=
Selection (actual NK from SDCard FILE):	-

Select option "[2] NK from SDCard FILE".





■ Select option "[7] Save settings" and then press "y".

B COM9 - PuTTY	
[0] Exit and Continue	^
Selection: 7	
Current settings has been saved	
Main Menu	
[1] Show Current Settings	
[2] Select Boot Device [3] Select KITL (Debug) Device	
[4] Network Settings	
[5] SDCard Settings [6] Set Device ID	
[7] Save Settings	
[8] Flash Management	
[9] Enable/Disable OAL Retail Messages	
[b] Select OPP Mode	
[c] Aux Functions	
[0] Exit and Continue	
Selection:	
Selection:	•

Select option "[0] Exit and Continue" and downloading will complete.

🛃 COM9 - PuTTY			
Num Modules	:	1	
RAM Start		0x8fe80000	
RAM Free		0x8feb9000	
RAM End		0x8fed0000	
Num Copy Entries		1	
Copy Entries Offset		0x8fe2adac	
Prof Symbol Length		0x0000000	
Prof Symbol Offset		0x0000000	
Num Files		0	
Kernel Flags		0x0000000	
FileSys RAM Percent		0x808080	
Driver Glob Start		0x0000000	
Driver Glob Length		0x0000000	
CPU		0x01c2	
MiscFlags		0x0002	
Extensions		0x0000000	
Tracking Mem Start		0x0000000	
Tracking Mem Length		0x0000000	
EBOOT image written			
ROMHDR at Address 8FE(00)44h	
INFO: XLDR/EBOOT/IPL o	lo	vnloaded, spin forever	Ξ
			Ŧ

This completes with downloading of file "ebootnd.bin" from SDCard to NAND.



3.3.1.3. Download "NK.bin":

Reset board and hit spacebar before counter expires.

🛃 COM9 - PuTTY	J
IsValidMBR: MBR sector = 0x480 (valid MBR)	
7fbaedc4 d059 -> c4 ed ba 7f 59 d0	
7fbaedc4 d159 -> c4 ed ba 7f 59 d1	
Hit space to enter configuration menu [480] 3	
Main Menu	
[1] Show Current Settings	
[2] Select Boot Device	
[3] Select KITL (Debug) Device	
[4] Network Settings	
[5] SDLara Settings	
[7] Save Settings	
[8] Flash Management	
[9] Enable/Disable OAL Retail Messages	
[a] Select Display Resolution	
[b] Select OPP Mode	
[c] Aux Functions	
[0] Exit and Continue	
Selection:	

Select option "[5] SDCard Settings".







■ Enter filename as "nk.bin" and press "Enter".

COM9 - PuTTY	×
<pre>[3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue Selection: 5</pre>	
SDCard Settings	
<pre>[1] Show Current Settings [2] Enter Filename [0] Exit and Continue</pre>	
Selection: 2	
Type new filename (8.3 format) :nk.bin	-

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■ Select option "[0] Exit and Continue".



■ Select option "[2] Select Boot Device".

🛃 COM9 - PuTTY	
 [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings 	*
 [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue Selection: 2 	
Select Boot Device	
<pre>[1] Internal EMAC [2] NK from SDCard FILE [3] NK from NAND [0] Exit and Continue</pre>	
Selection (actual Internal EMAC):	-



■ Select option "[2] NK from SDCard FILE".

🛃 COM9 - PuTTY	x
[3] NK from NAND [0] Exit and Continue	Â
Selection (actual Internal EMAC): 2 Boot device set to NK from SDCard FILE	
Main Menu	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Ewit and Continue</pre>	
Selection:	•

■ Select option "[7] Save Settings" and press "y".

B COM9 - PuTTY	
[0] Exit and Continue	^
Selection: 7 Do you want save current settings [-/y]? y Current settings has been saved	
Main Menu	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue</pre>	
Selection:	-



■ Select option "[0] Exit and Continue" and the downloading process of file "nk.bin" will start automatically, wait till the download is completed successfully.

COM9 - PuTTY	X
 [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue 	
Selection: 0 OEMPreDownload: Filename nk.bin BL IMAGE TYPE BIN	
 +OEMMultiBinNotify(0x8feb24f8 -> 1) Download file information: 	
[0]: Address=0x80002000 Length=0x02c5caf8 Save=0x80002000	Ħ
Download file type: 1	

🗗 COM9 - PuTTY				1
Copy Entries Offset	:	0x80986f50		
Prof Symbol Length	:	0x0000000		
Prof Symbol Offset	:	0x0000000		
Num Files	:	226		
Kernel Flags	:	0x0000000		
FileSvs RAM Percent	:	0x80808080		
Driver Glob Start	:	0x0000000		
Driver Glob Length	:	0x0000000		
CPU	:	0x01c2		
MiscFlags	:	0x0002		
Extensions	:	0x80003020		
Tracking Mem Start	:	0x0000000		
Tracking Mem Length		0x0000000		
NK Image Loaded				
Launch Windows CE imag	е	by jumping to 0x80002000		
Windows CE Kernel for	AI	M (Thumb Enabled)		
CPU CP15 Control Regis	te	er = 0xc5387f		
CPU CP15 Auxiliary Con	t	col Register = $0x42$		
+OALTimerInit(1, 24000	,	200)	_	
High Performance F	'n	equecy is 24 MHz	Ξ	
			-	

This completes with downloading of file "NK.bin" from SDCard to NAND.



Once all of the three files:

- 1. xldrnand.bin
- 2. ebootnd.bin
- 3. nk.bin

are downloaded successfully in NAND, then disconnect the power cable of your board, do the necessary jumper settings for NAND booting (for WEGA Board – to boot from NAND remove the jumper 1-2 and 3-4) and detach the SDCard from the board. After these settings are been done, then plug in the power cable to board to start with procedure of Booting from NAND.

1.2.2. Boot from NAND:

After power plug in hit the spacebar before the counter expires, if you fail to do so, then perform hardware resetting of board and do the same process again.

B COM9 - Putty	_ 0	X
>>> Forcing cold boot (non-persistent registry and other data will be	wiped)	
7fbaedc4 d059 -> c4 ed ba 7f 59 d0 7fbaedc4 d159 -> c4 ed ba 7f 59 d1 Hit space to enter configuration menu [476] 3		
Main Menu		
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] Flash Management [6] Set Device ID [7] Save Settings [8] Enable/Disable OAL Retail Messages [9] Select Display Resolution [a] Select OPP Mode [b] Aux Functions [0] Exit and Continue</pre>		
Selection:		-



Press "2" in order to select option "[2] Select Boot Device" to specify where to find OS Image "NK.bin" to start with booting process.

COM9 - PuTTY	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] Flash Management [6] Set Device ID [7] Save Settings [8] Enable/Disable OAL Retail Messages [9] Select Display Resolution [a] Select OPP Mode [b] Aux Functions [0] Exit and Continue Selection: 2</pre>	•
Select Boot Device	
<pre>[1] Internal EMAC [2] NK from NAND [0] Exit and Continue</pre>	H
Selection (actual (NULL)):	-

Press "2" to select option "[2] NK from NAND" so as to specify the NAND as location to find OS Image.

NOTE: Since we have modified the jumper settings and detached the SDCard, "**NK from SDCard** *FILE*" will not be available.

B COM9 - PuTTY	x
[1] Internal EMAC	-
[2] NK from NAND	
[0] Exit and Continue	
Soloction (actual (NULL)), 2	
Boot device and to NG from NAND	
BOOL DEVICE SEL LO NK ITOM NAND	
Main Menu	
[1] Show Current Settings	
[2] Select Boot Device	
[3] Select KITL (Debug) Device	
[4] Network Settings	
[5] Flash Management	
[6] Set Device ID	
[7] Save Settings	
[8] Enable/Disable OAL Retail Messages	
[9] Select Display Resolution	
[a] Select OPP Mode	
[b] Aux Functions	
[0] Exit and Continue	
Onlantions.	=
Selection:	-



Press "7" to select option "[7] Save Settings" so as to save the modified settings, and then press "y".

Putty	
[2] NK from NAND	
[0] Exit and Continue	
Selection (actual (NULL)): 2	
Boot device set to NK from NAND	
Main Menu	
[1] Show Current Settings	
[2] Select Boot Device	
[3] Select KITL (Debug) Device	
[4] Network Settings	
[5] Flash Management	
[6] Set Device ID	
[7] Save Settings	
[8] Enable/Disable OAL Retail Messages	
[9] Select Display Resolution	
[a] Select OPP Mode	
[D] Aux Functions	
[0] Exit and continue	
Selection: 7	
Do you want save current settings [-/y]?	-

COM9 - PuTTY	_ D X	
[b] Aux Functions [0] Exit and Continue		
Selection: 7		
Do you want save current settings [-/y]? y		
Current settings has been saved		
Main Menu		
[1] Show Current Settings		
[2] Select Boot Device		
[3] Select KITL (Debug) Device		
[4] Network Settings		
[5] Flash Management		
[0] Set Device ID [7] Save Settings		
[8] Enable/Disable OAL Retail Messages		
[9] Select Display Resolution		
[a] Select OPP Mode		
[b] Aux Functions		
[0] Exit and Continue	_	
Selection:		₹



■ Press "0" to select option "[0] Exit and Continue" so as to exit "Main Menu" and start with the booting process.

NOTE : Boot process will start automatically, please wait till the boot process is completed, do not plug out the power cable or "Reset" the board, since this would cause the boot process to terminate.

🖉 COM9 - PuTTY	- 🗆 🗙
Current settings has been saved Main Menu	·····
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] Flash Management [6] Set Device ID [7] Save Settings [8] Enable/Disable OAL Retail Messages [9] Select Display Resolution [a] Select OPP Mode [b] Aux Functions [0] Exit and Continue Selection: 0</pre>	
Load NK image from flash memory	
IsValidMBR: MBR sector = 0x480 (valid MBR)	=
OpenPartition: Partition Exists=0x1 for part 0x20.	
BP_SetDataPointer at 0x0	T
COM9 - PuTTY	- 🗆 🗙
BP_SetDataPointer at 0x0 COM9 - PuTTY RAM Free : 0x82cb5000	- 🗆 🗙
BP_SetDataPointer at 0x0 PCOM9 - PuTTY RAM Free : 0x82cb5000 RAM End : 0x8d000000	- 🗆 🗙
BP_SetDataPointer at 0x0 PCOM9 - PuTTY RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3	- D X
COM9 - PuTTY RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98	
BP_SetDataPointer at 0x0 COM9-PuTTY RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Durf Combal Offset : 0x8098000	- 🗆 X
BP_SetDataPointer at 0x0 Image: COM9 - PuTTY RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Num Files : 0x0000000 Prof Symbol Offset : 0x0000000 Num Files : 0x0000000	
BP_SetDataPointer at 0x0 PCOM9 - PuTTY RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Num Files : 95 Kernel Flags : 0x0000000	
BP_SetDataPointer at 0x0 RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Prof Symbol Offset : 0x0000000 Num Files : 95 Kernel Flags : 0x0000000 FileSvs RAM Percent : 0x80808080	
BP_SetDataPointer at 0x0 COM9-PuTTY RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Prof Symbol Offset : 0x0000000 Num Files : 95 Kernel Flags : 0x0000000 FileSys RAM Percent : 0x80808080 Driver Glob Start : 0x0000000	
BP_SetDataPointer at 0x0 RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Prof Symbol Offset : 0x0000000 Num Files : 95 Kernel Flags : 0x0000000 FileSys RAM Percent : 0x80808080 Driver Glob Start : 0x0000000 Driver Glob Length : 0x0000000	
BP_SetDataPointer at 0x0	
BP_SetDataPointer at 0x0	
BP_SetDataPointer at 0x0 Image: COM9 - PuTTY RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Prof Symbol Offset : 0x0000000 Num Files : 95 Kernel Flags : 0x0000000 FileSys RAM Percent : 0x80808080 Driver Glob Start : 0x0000000 Driver Glob Length : 0x0000000 CPU : 0x01c2 MiscFlags : 0x80003020 Extensions : 0x80003020	
P_SetDataPointer at 0x0 RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries Offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Prof Symbol Offset : 0x0000000 Num Files : 95 Kernel Flags : 0x0000000 FileSys RAM Percent : 0x80808080 Driver Glob Start : 0x0000000 Driver Glob Length : 0x0000000 CPU : 0x01c2 MiscFlags : 0x8003020 Tracking Mem Start : 0x0000000	
BP_SetDataPointer at 0x0 RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Prof Symbol Offset : 0x0000000 Num Files : 95 Kernel Flags : 0x0000000 Driver Glob Start : 0x0000000 Driver Glob Length : 0x0000000 CPU : 0x01c2 MiscFlags : 0x80003020 Tracking Mem Start : 0x0000000 Tracking Mem Length : 0x0000000	
BP_setDataPointer at 0x0	
BP_setDataPointer at 0x0	
BP_SetDataPointer at 0x0 RAM Free : 0x82cb5000 RAM End : 0x8d000000 Num Copy Entries : 3 Copy Entries offset : 0x8098bf98 Prof Symbol Length : 0x0000000 Prof Symbol Offset : 0x0000000 Num Files : 95 Kernel Flags : 0x0000000 Driver Glob Start : 0x0000000 Driver Glob Length : 0x0000000 CPU : 0x01c2 MiscFlags : 0x0000000 Tracking Mem Start : 0x0000000 Tracking Mem Length : 0x00	

🛃 COM9 - PuTTY				
Copy Entring Offset	0** 00006550			
Copy Entries Offset	0x00900130			
Prof Symbol Length	0x0000000			
Prof Symbol Offset	0x0000000			
Num Files	226			
Kernel Flags	0x00000000			
FileSys RAM Percent	0x80808080			
Driver Glob Start	0x0000000			
Driver Glob Length	0x0000000			
CPU	0x01c2			
MiscFlags	0x0002			
Extensions	0x80003020			
Tracking Mem Start	0x0000000			
Tracking Mem Length	0x0000000			
NK Image Loaded				
Launch Windows CE image by jumping to 0x80002000				
Windows CE Kernel for ARM (Thumb Enabled)				
CPU CP15 Control Register = 0xc5387f				
CPU CP15 Auxiliary Cont	rol Register = 0x42			
+OALTimerInit(1, 24000	200)			
High Performance F	requery is 24 MHz	=		
	Concerts 24 Mile			

This completes the boot process from NAND.

PHYT


4. Boot from Ethernet :

NOTE: Here the explanation is provided, assuming that precompiled NK.bin is available with you, this section does not include procedure for compilation of source bsp to generate NK.bin.

- 4.1. <u>Software Requirements:</u>
 - 1. NK.bin file
 - 2. Visual Studio 2008 Professional Edition.
 - 3. Service Pack 1 for Visual Studio 2008.
 - 4. Windows Embedded Compact 7.
- **4.2.** <u>Hardware Requirements:</u>
 - 1. WEGA Development Board.
 - 2. Ethernet Wire.
 - 3. SDCard preloaded with image of "ebootsd.nb0" and "MLO".

Before starting with the process, establish connection between board and host computer via Ethernet cable. Insert SDCard in the respective slot on board. Short pins 3-4 of jumper JP5, and then connect power cable to power up the board.



■ Open new instance of Visual Studio, and then click File → Open → Project/Solution

🛃 N	licrosoft Visual Studio				
File	File Edit View Project Target Tools Test Window Help				
	New) · · · · · · · · · · · · · · · · · · ·			- 🕐 🖄 🕾 🕸 🏷 💽 🗆 -
	Open 🕨	đ	Project/Solu	ition Ctrl+Shift+O	
	Close	1	Web Site	Shift+Alt+O	
6	Close Solution	2	File	Ctrl+O	
	Save Selected Items Ctrl+S		Convert		
	Save Selected Items As				
1	Save All Ctrl+Shift+S				
	Export Template				
	Page Setup				
8	Print Ctrl+P				
	Recent Files				
	Recent Projects				
	Exit				
_		-			
-	Jution Evoloror the Catalog Terrer Vi				
-2130	Catalog Items Vi	ew			
G 🕰	ode Definition Window 💯 Call Brov	wser 🖪 (Output 🙀 Fii	nd Results 1 😼 Error List	
Rea	dy				

■ Browse to the folder containing "NK.bin" file, select the file, and click "Open".



■ Upon the successful selection, you will find selected image in "Solution Explorer" window.



Now before starting with the process, the ip address of host machine and device needs to be changed so as they fall in same domain.

Hence change the host ip address respectively, example is shown below

Internet Protocol Version 4 (TCP/IPv	4) Properties						
General							
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.							
Obtain an IP address automatica	lly						
Ose the following IP address:							
IP address:	192.168.1.33						
Subnet mask:	255.255.255.0						
Default gateway:	192.168.1.1						
Obtain DNS server address auto	matically						
Ose the following DNS server ad	dresses						
Preferred DNS server:							
Alternate DNS server:	• • •						
Validate settings upon exit	Advanced						
	OK Cancel						



Once the host ip address is set it is also important to set device ip address. Open putty serial console and hit spacebar before the counter expires.



■ In order to see the device ip address and other information of your device, after getting the "Main Menu" press "1" to select option "[1] Show Current Settings".

```
Real COM9 - PuTTY
 Boot device:
                Internal EMAC
                                                                              .
 Debug device: Internal EMAC
 Retail Msgs: disabled
 Device ID:
 Device ID. 0
Display Res: 7in LCD_017 (800x480@60Hz)
 Flashing NK.bin: disabled
 OPP Mode: MPU[720Mhz @ 1.26V]
SDCard:
 Filename:
                "nk.bin"
Network:
 KITL state: enabled
              active
interrupt
 KITL type:
 KITL mode:
 DHCP:
              disabled
 IP address: 192.168.0.182
             255.255.255.0
0.0.0.0
 IP mask:
 IP router:
 Eth MAC Addr : 1c:ba:8c:a5:0c:b1 (Boot settings)
 Eth MAC Addr 1: 1c:ba:8c:a5:0c:b3 (Boot settings)
 VMINI: enabled
                                                                              Ξ
 Note: USBFN RNDIS MAC Addr cannot be changed.
```



■ Now to change the ip address of your device, hit "Enter" to return back to "Main Menu", and press "4" to select option "[4] Network Settings".



■ Press "6" to select option "[6] Set IP address" and enter the desired ip address.

COM9 - PuTTY	X
<pre>[b] Select OPP Mode [c] Aux Functions [0] Exit and Continue</pre>	•
Selection: 4	
Network Settings	
<pre>[1] Show Current Settings [2] Enable/disable KITL [3] KITL interrupt/poll mode [4] KITL Active/Passive mode [5] Enable/disable DHCP [6] Set IP address [7] Set IP mask [8] Set default router [9] Enable/disable VMINI [a] Set MAC address [b] Set MAC address 1 [0] Exit and Continue</pre>	
Selection: 6 Enter Device IP address (actual 192.168.0.182): 192.168.1.34	III ▼



■ After entering the ip address, hit "Enter" to go back to "Network Settings" Menu.



■ Press "7" to select option "[7] Set IP Mask" and then enter necessary IP mask, in this example we enter mask address as 255.255.255.0.

🛃 COM9 - PuTTY	
[0] Exit and Continue	-
Selection: 7 Do you want save current settings [-/y]? y Current settings has been saved	
Main Menu	
<pre>[1] Show Current Settings [2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue</pre>	
Selection:	-

B COM9 - Putty	
[0] Exit and Continue	
Selection: 6	
Enter Device IP address (actual 192.168.0.182): 192.168.1.34 Device IP address set to 192.168.1.34	
Network Settings	
[1] Show Current Settings	
[2] Enable/disable KITL [3] KITL interrupt/poll mode	
[4] KITL Active/Passive mode	
[5] Enable/disable DHCP [6] Set ID address	
[7] Set IP mask	
[8] Set default router	
[9] Enable/disable VMINI [a] Set MAC address	
[b] Set MAC address 1	
[0] Exit and Continue	
Selection: 7	
Enter Device IP mask (actual 255.255.255.0): 255.255.255.0	T

■ After entering ip mask address hit "Enter" to go back to "Network Settings" Menu.



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■ Press "8" to select option "[8] Set default router" and then enter default router address, in this example we enter router address as shown.

🛃 COM9 - PuTTY 📃 📃 🔤 🛃	
[0] Exit and Continue	~
Selection: 7 Enter Device IP mask (actual 255.255.255.0): 255.255.255.0 Device IP mask set to 255.255.255.0	
Network Settings	
<pre>[1] Show Current Settings [2] Enable/disable KITL [3] KITL interrupt/poll mode [4] KITL Active/Passive mode [5] Enable/disable DHCP [6] Set IP address [7] Set IP mask [8] Set default router [9] Enable/disable VMINI [a] Set MAC address [b] Set MAC address 1 [0] Exit and Continue</pre>	
Selection: 8 Enter Default router IP address (actual 0.0.0.0): 192.168.1.1	

■ After entering default router address hit "Enter" to go back to "Network Settings" Menu.

COM9 - PuTTY	
[b] Set MAC address 1 [0] Exit and Continue	^
Selection: 8 Enter Default router IP address (actual 0.0.0.0): 192.168.1.1 Default router IP address set to 192.168.1.1	
Network Settings	
<pre>[1] Show Current Settings [2] Enable/disable KITL [3] KITL interrupt/poll mode [4] KITL Active/Passive mode [5] Enable/disable DHCP [6] Set IP address [7] Set IP mask [8] Set default router [9] Enable/disable VMINI [a] Set MAC address [b] Set MAC address 1 [0] Exit and Continue</pre>	
Selection:	-



■ Press "1" to select option "[1] Show Current Settings" so as to verify the changes.

🛃 COM9 - PuTTY		_ 🗆 🗙
Boot device:	Internal EMAC	*
Debug device:	Internal EMAC	
Retail Msgs:	disabled	
Device ID:	0	
Display Res:	7in LCD_017 (800x480@60Hz)	
Flashing NK.bi	n: disabled	
OPP Mode: MP	U[720Mhz @ 1.26V]	
SDCard:		
Filename:	"nk.bin"	
Network:		
KITL state:	enabled	
KITL type:	active	
KITL mode:	interrupt	
DHCP:	disabled	
IP address:	192.168.1.34	
IP mask:	255.255.255.0	
IP router:	192.168.1.1	
Eth MAC Addr	: 1c:ba:8c:a5:0c:b1 (Boot settings)	
Eth MAC Addr 1	: 1c:ba:8c:a5:0c:b3 (Boot settings)	
VMINI:	enabled	
Note: USBFN RN	DIS MAC Addr cannot be changed.	
		~

■ Hit Enter to go back to "**Network Settings**" Menu and then press "**0**" to select option "**[0] Exit and Continue**" so as to exit current menu and go back to "**Main Menu**".

COM9 - PuTTY	
[a] Set MAC address	^
[b] Set MAC address 1	
[0] Exit and Continue	
Selection: 0	
 Main Menu	
[1] Show Current Settings	
[2] Select Boot Device	
[3] Select KITL (Debug) Device	
[4] Network Settings	
[5] SDCard Settings	
[6] Set Device ID	
[7] Save Settings	
[8] Flash Management	
[9] Enable/Disable OAL Retail Messages	
[a] Select Display Resolution	
[b] Select OPP Mode	
[c] Aux Functions	
[0] Exit and Continue	-
Selection:	-



■ Press "5" to select option "[5] Flash Management".



■ Press "8" to select option "[8] Enable flashing NK.bin" and then press "y" when asked for conformation.





■ Now to save the changes, press "7" to select option "[7] Save Settings" and then press "y" as conformation of selection.

Putty	
[b] Set MAC address 1	·
Selection: 0	
Main Menu	
[1] Show Current Settings	
[2] Select Boot Device	
[3] Select KITL (Debug) Device	
[4] Network Settings	
[5] SDCard Settings	
[6] Set Device ID	
[7] Save Settings	
[8] Flash Management	
[9] Enable/Disable OAL Retail Messages	
[a] Select Display Resolution	
[b] Select OPP Mode	
[c] Aux Functions	
[0] Exit and Continue	
Selection: 7	=
Do you want save current settings [-/y]?	~



Now that the ip address of both host machine and device is set appropriately, the procedure for downloading NK.bin can be started. Go back to the Visual Studio window, click on "Target" and then select "Connectivity Options".





Clicking "Connectivity Options" in "Target" list will open window "Target Device Connectivity Options", in this window, under "Device Configuration" click "Add Device" to add new device. Enter desired name for device under "New target device name", also in the drop down list of "Associated OS Designs/SDK (Optional)" select "Windows CE". And then click "Add".





■ **"Target Device**" will be set with the provided name. Now click on the "**Settings**" button of **"Kernel Download**" column. This will open "**Ethernet Download Settings**" window.

🔏 NK - Microsoft Visual Stu	idio				3
File Edit View Project	Debug Target Tools Te	est Window Help			
🖥 🕶 🖼 🕶 📓 🖉	🖌 🖻 🖻 🤊 🗸 🖓 🗸 💭	- 🖳 🕨 😴 🖼 💭			
🛛 式 Device: (auto) Ether	Target Device Connectivity	y Options			
Solution Explorer - E\lmag	Device Configuration Add Device Delete Device Service Configuration Kernel Service Map Application Service Map Core Service Settings Service Status	Target Device: Demo Kernel Download: Efternet (-) Kernel Transport: Ethemet (-) Kernel Debugger: KdStub (Prompt On Error)	Settings	Ethernet Download Settings	Properties
l					
र्ञ्Solution Explorer 🍓 Cata	log Items View			Apply Cancel	
🖬 Code Definition Window 💷 Call Browser 🗉 Output 🖼 Find Results 1 🍰 Error List					
Deadu					



In order to establish connection between device and host, our device needs to be recognized by host application, i.e device name needs to be appear under the "Active target devices " in order to achieve this, go back to putty console, press "2" to select the option "[2] Select Boot Device".

🚰 COM9 - PuTTY	x
<pre>[2] Select Boot Device [3] Select KITL (Debug) Device [4] Network Settings [5] SDCard Settings [6] Set Device ID [7] Save Settings [8] Flash Management [9] Enable/Disable OAL Retail Messages [a] Select Display Resolution [b] Select OPP Mode [c] Aux Functions [0] Exit and Continue Selection: 2</pre>	
Select Boot Device	
 [1] Internal EMAC [2] NK from SDCard FILE [3] NK from NAND [0] Exit and Continue 	
Selection (actual Internal EMAC):	-

■ Press "1" to select option "[1] Internal EMAC".

B COM9 - PuTTY	
[3] NK from NAND	A
[0] Exit and Continue	
Selection (actual NK from SDCard FILE): I	
BOOL device set to internal EMAC	
Main Menu	
[1] Show Current Settings	
[2] Select Boot Device	
[3] Select KITL (Debug) Device	
[4] Network Settings	
[6] Set Device ID	
[7] Save Settings	
[8] Flash Management	
[9] Enable/Disable OAL Retail Messages	
[a] Select Display Resolution	
[b] Select OPP Mode	
[c] Aux Functions	
[0] Exit and Continue	
Selection:	-



■ Then press "**7**" to select option "[**7**] Save Settings" and then press "**y**" when asked for conformation.

B COM9 - PuTTY	
[0] Exit and Continue	^
Selection: 7	
Do you want save current settings [-/y]? y	
current settings has been saved	
[1] Show Current Settings	
[2] Select Boot Device	
[3] Select KITL (Debug) Device	
[4] Network Settings	
[6] Set Device ID	
[0] Set Device ID [7] Save Settings	
[8] Flash Management	
[9] Enable/Disable OAL Retail Messages	
[a] Select Display Resolution	
[b] Select OPP Mode	
[c] Aux Functions	
[0] Exit and Continue	
	=
Selection:	~

■ Press "**0**" to select option "**[0] Exit and Continue**". Here in the log message device name would be displayed as shown below.

Putty	
[6] Set Device ID	*
[7] Save Settings	
[8] Flash Management	
[9] Enable/Disable OAL Retail Messages	
[a] Select Display Resolution	
[b] Select OPP Mode	
[C] Aux Functions	
[U] Exit and Continue	
Soloction: 0	
$\frac{1}{2}$	
Phy init: Auto perotitation completed	
Cosw3qInit, wait link up on mac port:1	
link up on port 1, speed 100, full duplex	
INFO: Boot device uses MAC 1c:ba:8c:a5:0c:b1	
INFO: *** Device Name AM335X-3249 ***	
+EbootSendBootmeAndWaitForTftp	
Sent BOOTME to 255.255.255.255	•



Now go back to "Ethernet Download Settings" window. Here the entry with the device name will be displayed once the application receives the "Sent BOOTME to 255.255.255.255" from device. Upon receiving the device name entry, click on it so as to select it and then click "Apply".

🐴 NK - Microsoft Visual Stu	idio			
File Edit View Project	Debug Target Tools Te	est Window Help		
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Solution Explorer - E:\Imag				
	Device Configuration	Target Device:		
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••• 🖲 E:\Image\NK.bin	Add Device	Kernel Download:		٥. ا
	Delete Device	Ethernet 🔹	Settings	
	Service Configuration	()		Ethernet Download Settings
	Kernel Service Map	Kernel Transport:		Target device boot name:
	Application Service Map	Ethernet 👻	Settings	AM335X-3249
	Advanced Service Map	(-)		Active target devices:
	Core Service Settings	Kernel Debugger:		Active target devices.
	Service Status	KdStub 🔹	Settings	AM335X-3249
		(Prompt On Error)		Ip Address: 192.168.1.34
				Boot Loader Version: 0.0
		Apply Close Help		
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■ After click on "Apply" in "Ethernet Download Settings" window, the device name would appear under "Kernel Download" and "Kernel Transport" in "Target Device Connectivity Options" window.

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		(AM335X-3249)	
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	Advanced Service Map	(AM335X-3249)	
	Core Service Settings	Kernel Debugger:	
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■ After the KITL connection is established, the downloading of "**NK.bin**" image can be started. To do this, click "**Target**" and then select "**Attach Device**" from the list. This will open "**Device Status**" window and the downloading will start automatically.





Log message of downloading "NK.bin" can also be seen in putty console while the downloading is going on. Wait for the download to complete.

Putty					X	
ROMHDR at Address 8000 Got EDBG_CMD_JUMPIMG Got EDBG_CMD_CONFIG, f	COMHDR at Address 80002044h Got EDBG_CMD_JUMPIMG Got EDBG_CMD_CONFIG, flags:0x0					
Writing NK image to OS	3]	partition				
ROMHDR (pTOC = 0x82c5k	94	60)				
DLL First		0x4001ef06				
DLL Last		0x428df000				
Physical First		0x80002000				
Physical Last		0x82c5eaf8				
Num Modules		351				
RAM Start		0x82c60000				
RAM Free		0x82cb5000				
RAM End		0x8d000000				
Num Copy Entries		3				
Copy Entries Offset		0x8098bf98				
Prof Symbol Length		0x00000000				
Prof Symbol Offset		0x00000000			=	
Num Files		95				
Kernel Flags		0x00000000				
FileSys RAM Percent		0x80808080				
Driver Glob Start		0x00000000				
Driver Glob Length	:	0x0000000			-	

```
_ 🗆 🗙
Putty COM9 - Putty
  Copy Entries Offset : 0x80986f50
  Prof Symbol Length : 0x0000000
 Prof Symbol Offset : 0x00000000
 Num Files : 226
Kernel Flags : 0x0000000
 FileSys RAM Percent : 0x80808080
 Driver Glob Start : 0x00000000
 Driver Glob Length : 0x0000000
               : 0x01c2
: 0x0002
: 0x80003020
 CPU
 MiscFlags
 Extensions : 0x80003020
Tracking Mem Start : 0x00000000
Tracking Mem Length : 0x00000000
NK Image Loaded
Launch Windows CE image by jumping to 0x80002000...
Windows CE Kernel for ARM (Thumb Enabled)
CPU CP15 Control Register = 0xc5387f
CPU CP15 Auxiliary Control Register = 0x42
+OALTimerInit(1, 24000, 200)
    High Performance Frequecy is 24 MHz---
```

This completes Boot from Ethernet.



5. Accessing device contents through USB-OTG connection.

In order to access the contents of the device through USB-OTG, we need tool called "**Windows Mobile Device Center**".

Download and install from the link:

- for 32 bit Windows 7: <u>http://www.microsoft.com/en-in/download/exe-validation.aspx?id=14</u>
- for 64 bit Windows 7: http://www.microsoft.com/en-in/download/exe-validation.aspx?id=3182
- After the software has been downloaded and installed. Then open the application by double clicking on it.



■ After the device has booted successfully, then connect device with the host computer through USB-OTG connection and you will get **Connecting** message as below:





■ After the connection has established successfully then application will show the "Connected" message.





After previous click, you will get the below screenshot.



■ Select option "File Management" and click on option "Browse the contents of your



device" to access the device as drive.



Compu	ter 🕨 Compact	•	▼ 4,	Search Compact	× م
Organize •					0
+ Favorites		\ 	Network		
Libraries					
Nomegroup					
.android					
Desktop	-				
2 items					

With this the USB-OTG connection with the device is completed, this connection would be used in further manual to download the application from Host to the device.

6. <u>Sample Application development</u>



6.1. Creating Project.

This section will guide you to develop the simple Visual Basic application that will send some string from target device to Host console over UART connection.

In order to develop the application **Visual Studio 2008 Professional Edition (full version)** is required to be installed on the development computer.

■ To begin with development, open the Visual Studio 2008.

Microsoft Visual Studio	X
File Edit View Project Target Tools Test Window Help	
3 ▼ 図 ▼ 20 ▼ 20 ▼ 20 ▼ 20 ▼ 20 ▼ 20 ▼ 20	
💢 Device: 🔽 🔻 💀 🐵 🖳 🔐 💂	
atalog Items View 🗸 🕂 🗙	
Solution Explorer Catalog Items View	
Code Definition Window 📴 Call Browser 🗉 Output 🗟 Find Results 1 🕃 Error List	
leady	

■ To develop application we need to first create new project. To create new project click on



$\textbf{File} \rightarrow \textbf{New} \rightarrow \textbf{Project}$

🚰 Mio	crosoft Visual Studio			
File	Edit View Project Target	Tools	Test Window Help	
	New		Project Ctrl+Shift+N	
	Open	0	Web Site Shift+Alt+N	
	Close	2	File Ctrl+N	
đ	Close Solution		Project From Existing Code	
	Save Selected Items Ctrl+S			
	Save Selected Items As			
9	Save All Ctrl+Shift+S			
	Export Template			
	Page Setup			
6	Print Ctrl+P			
	Recent Files			
	Recent Projects			
	Exit			
		_		

■ This is open the "New Project" window, here under "Project types" listbox expand the option "Other Languages → Visual Basic → Smart Device", after clicking on the option "Smart Device" select "Smart Device Project" in "Templates" window.

New Project				? <mark>×</mark>
Project types:		Templates:		.NET Framework 3.5 💌 📖
CLR General MFC Smart Device Test Win32 Other Language Visual Basic Windows Web Smart Dev Office Database Reporting Test WCF Workflow	e es vice	Visual Studio installed templat	es	
A project for Smar	rt Device applications	. Choose target platform, Framev	ork version, and template in	the next dialog box.
Location:	D:\Console program	ns\test applications		▼ Browse
Solution Name:	SmartDeviceProject	1	Create directory for so	lution
				OK Cancel



■ Provide any desired name for your application in the "**Name:**" textbox, browse to assign the folder where you want to keep application code and supporting files, and then click on button "**OK**".

New Project			6. M. 10. 1	? ×
Project types:		<u>T</u> emplates:		.NET Framework 3.5 🔻 🖽
CLR General MFC Smart Device Test Win32 Other Language Visual Basic Vindows Web Smart Dev Smart Dev Office Database Reporting Test WCF Workflow	e es vice	Visual Studio installed templat Smart Device Project My Templates Search Online Templates	es	
A project for Smar	t Device applications	s. Choose target platform, Framew	ork version, and template in	the next dialog box.
<u>N</u> ame:	Demo Application			
Location:	D:\Device Apps			<u> ■</u> rowse
Solution Na <u>m</u> e:	Demo Application		Create <u>d</u> irectory for sol	ution
				OK Cancel

■ After clicking "OK" for "New Project" window, the "Add New Smart Device Project"



window would pop out, here in this window select the target platform for application as "**phyCORE-AM335x**".

- Next, select the desired .NET Framework version for which you want to build the application, here in this application we are using ".NET Compact Framework Version 3.5".
- Then in the "**Templates**" subwindow select "**Device Application**" by clicking on it, and then click button "**OK**".

Add New Smart Device Project - Demo	Application	? <mark>×</mark>
Add New Smart Device Project - Demo / Target platform: .NET Compact Framework version: Templates: Device Application Class Library Console Application	Application phyCORE-AM335x .NET Compact Framework Version 3.5 Control Empty on Library Project	
Download additonal emulator image	es and smart device SDKs	OK Cancel

6.2. Developing project.



- After clicking on "**OK**" in "**Add New Smart Device Project**" as in previous screenshot, your development enviroment would be ready for the development process.
- As in the below screen, under the "Solution Exporer" window, your created application i.e "Demo Application" could be seen.

💁 Demo Application - Microsoft Visual Studio	
File Edit View Project Build Debug Data Tools	s Test Window Help
- 💭 + 🗁 - 😂 🛃 🖓 👗 🛍 🖄 - 🕅 -	🛛 🔁 🕨 Debug 🔹 Any CPU 💿 💌 🖄 🖓 📅 🖄 🎇 🖬 📼
i phyCORE-AM335x ARMV7 💌 🎭 🛤 🗛 📮 i 🛱	『かぬ」、きょない。 記 三日 はる。 ちょう (
🗾 Device: 🔽 🚽 💀 💀 📲 😭	÷
Solution Explorer - Solution 'Demo Application' $ eq \ \ \downarrow \ \ \chi$	Form1.vb [Design]
	Formed
Solution 'Demo Application' (1 project)	
⊡	
Form1.vb	

If "Solution Explorer" window is not visible, then click on "View \rightarrow Solution Explorer",



similarly, if "**Toolbox**" window is not visible, then click on "**View** \rightarrow **Toolbox**". Toolbox window provides the set of visual contents required to create and application through drag and drop functionality.



🖓 Demo Application - Microsoft Visual Studio
File Edit View Project Build Debug Data Tools Test Window Help
🗄 🖬 🕶 📨 📂 🛃 🦪 👗 🐁 🛍 🖄 🤊 👻 🖓 🖛 🕮 🕨 🚱 💆 🖉 🖉 🖄 🎘 🗄
i phyCORE-AM335x ARMV7 🔽 💁 💷 🕰 斗 📮 🕸 👘 🗁 🍕 🗐 📅 💀 🏨 🛱 🏭 🛱 🌞 🖛 25 🕸 음 찾 음
🔀 Device: 🔽 🔽 🔽 🐨 📲 🗃
Toolbox - T X Form1.vb [Design]
All Device Controls
Pointer Form1
📅 BindingSource
ab Button
☑ CheckBox
📧 ComboBox
R ContextMenu
🛺 DataGrid
DataSet
The Date Time Picker
I DomainUpDown
HScrollBar
🗇 ImageList
InputPanel
A Label
A LinkLabel
E ListBox
232 ListView

■ You can resize the **Form1** to make it more compact as shown. From the **Toolbox** search



for "**Button**", drag and drop the control in your form, you can then resize the shape of control and align it as per requirement. Right click on the control and select option "**Properties**", this will open the **Properties window.**



- "Properties" window below provides properties of the particular control, which can be modified as per required.
- Now, expand the "Font" and in the text option change the default text with "Open Port" and hit Enter. Once this is done the same text would be the text on Button1 control.

Form1.vb [Design]*	Properties	- ₽×
	Button1 System	Windows.Forms.Bu 🕶
Form1 LIX	₽ 2↓ 🗉 🗲 🛛	
	Appearance	^
	BackColor	Control
9		Tahoma, 10pt
o Open Port o	ForeColor	ControlText
	Text	Open Port 🔻
	Behavior	
	ContextMenu	(none)
	DialogResult	None
	Enabled	True
	TabIndex	0
	TabStop	True =
	Visible	True
	🗆 Data	
	Tag	

■ Follow the similar procedure to add two more buttons i.e **Button2** and **Button3** controls in



your form and edit there "**Text**" field in Properties windows with "**Send String**" and "**Close Port**" respectively.



- Now search for "SerialPort" control from Toolbox, drag and drop it in the "Form1", control would appear at the bottom of "Form1.vb[Design]" with name "SerialPort1",
- If the "**Properties**" window does not appear, then right click on the "**SerialPort1**" and select "**Properties**".
- In this Properties window change the default **BaudRate** to "**115200**" and default **PortName** to "**COM0**". Once done with he changes hit Enter.

Toolbox	- ↓ X	Form1.vb [Design]*	• X	Properties	▼ ‡
MenthCalendar	^			SerialPort1 Syste	m.IO.Ports.SerialP
Monuncalendar		Form1		a 🕴 🗉 🖌 🖻	
				Design	
				(Name)	SerialPort1
Paner		Onen Port		GenerateMemb	True
				Modifiers	Friend
Progressbar				3 Misc	
RadioButton		Send String		BaudRate	115200
SaveFileDialog				DataBits	8
JenaiPort	=	Close Port		DiscardNull	False
Tr Spinter				DtrEnable	False
				Handshake	None
				Parity	None
M Timor				ParityReplace	63
TaolPar				PortName	сомо
				ReadBufferSize	4096
* Trackbar				ReadTimeout	-1
VScrollPar				ReceivedBytesT	1
WebBrowser				Ktsenable	Palse
Common Device Contr	ale			WritePufforCize	2049
Pointer	515			WriteTimeout	-1
a Putton				WhiteHincour	1
DateTimePicker					
A Label	T	SerialPort1		BaudRate	
				The baud rate to	use on this serial



Double click on the Button1 control in "Form1", this will open the new window named "Form1.vb". In this window the "Button1_Click" function would be created by default, inside this function you need to provide the code to state the action that has to be taken when Button1 is pressed.

Button1	✓ ^ダ Click	
Public	Class Form1	
-) Pr	<pre>ivate Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Ha</pre>	and
– En	d Sub	
	288	

■ Now inside the function **Button1_Click()** add the following code:

```
If SerialPort1.IsOpen = True Then

MsgBox("COM0 is already open", MsgBoxStyle.Exclamation)

Else

SerialPort1.Open()
```

```
End If
```

1	Form1.vb Form1.v	/b [Design]	▼ ×
	✓ Button3	✓ 🧳 Click	•
	Public Cla	ss Form1	
	- Privato	e Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) SerialPort1.IsOpen = True Then	Handl
		<pre>MsgBox("COM0 is already open", MsgBoxStyle.Exclamation)</pre>	
	EL	se SerialPort1.Open()	
	En	d If	
	- End Sul	0	=

■ Similarly add the code inside Button2_Click() function as:

SerialPort1.Write("Hello World")

■ And, inside Button3_Click() function as:

```
If SerialPort1.IsOpen = False Then

MsgBox("COM0 is already closed", MsgBoxStyle.Exclamation)

Else

SerialPort1.Close()

End If
```



Form1.vb Fo	vrm1.vb [Design]
🕮 (General)	✓ ^{III} (Declarations)
- Public	Class Form1 -
📋 Pri	vate Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handle
	If SerialPort1.IsOpen = True Then
	MsgBox("COM0 is already open", MsgBoxStyle.Exclamation)
	Else
	SerialPort1.Open()
	End If
- End	l Sub
= Pri - End	vate Sub Button2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handle SerialPort1.Write("Hello World") & Sub
= Pri	<pre>vate Sub Button3_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handle If SerialPort1.IsOpen = False Then</pre>
	MsgBox("COM0 is already closed", MsgBoxStyle.Exclamation)
	Else
	SerialPort1.Close()
	End If
– End	l Sub
End Cla	SS

6.3. Build the Project

■ Before building the project it is important to save the work done. Click on **File** → **Save All** to all the changes done in the project.





■ Once all the work has been saved, then compiling can be started, for this, click on option Build → Build Demo Application



If the project is builded successfully i.e without any errors then notification will be shown on "Output" window as follows. Output window shows the build log which is used to view and locate errors or warnings in build process.

Output
Show output from: Build 🔹 🔹 💀 🔿
Build started: Project: Demo Application, Configuration: Debug Any CPU C:\Windows\Microsoft.NET\Framework\v3.5\Vbc.exe /noconfig /imports:Microsoft.VisualBasic,System,System.Collection Demo Application -> D:\Device Apps\Demo Application\Demo Application\bin\Debug\Demo Application.exe ===================================
🗐 Output 🖫 Code Definition Window 🎾 Call Browser 🖼 Find Results 1 🝰 Error List
Ready

- If the project is builded successfully then, the executable file of the same is generated. To locate the **.exe** file, go to the folder path which was choosen while creation of the project.
- In this example, the project folder is located at path "D:\Device Apps". In this folder there would be another folder with same project name, track the Debug folder which contains .exe file of your project, with the path as follows:

D:\Device Apps\Demo Application\Demo Application\bin\Debug\Demo Application.exe



6.4. Deploying and Executing your project on target device.

Before deploying the project on the device the device must be running **Windows Embedded Compact 7** on it.

Also the application requires the **LCD connection with the board** using which the application will be executed and tested.

For **board bring-up**, follow the documentation of Booting process,

After the board is booting successfully, and display on LCD, then connect device host with USB-OTG, refer the documentation on "Accessing device contents using USB-OTG connection".

This connection will be used primarily to copy the application from host to target device.

Once the connection is established, copy the executable from host and paste in "**Application Data**" folder.

While coying the file you might get warning window for copy operation, click on "**Yes**" to proceed with the copying.



Connect the Device to Host with through UART connection, with **COM0** of device connected to any running COM port of Host. Open the serial terminal i.e Putty to get the string on serial console. Open the console on with baudRate set as "**115200**".

Now, manually go to the "**Application Data**" folder from LCD, double click on executable, this will open up the **Form1**. Click on Button "**Open Port**" from the form to open the port for communication, Then click button "**Send String**", with this the string "**Hello World**" would be visible on the console of Host.

This completes the simple application development from Windows Embedded Compact 7 using Visual Basic.



Get the dialog going and stay in touch

India

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......We are looking forward to hearing from you!.....