
NXC2600 Series Processor

NXC2620 DVK 3.2

User's Manual



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RELEASE NOTES

<u>Version</u>	<u>Date</u>	<u>NOTES</u>
1.00	Jun. 27 2008	Initial release
1.01	Sep. 3 2008	Support SDHC for WinCE 5.0

Table of Contents

1. Introduction.....	4
1.1 Package Contents.....	4
1.2 System Block Diagram.....	5
2. Hardware.....	6
2.1 CPU Module	6
2.2 Base Board	13
2.3 LCD Module	15
3 Development Environment Setup.....	20
3.1 JDI Configuration.....	20
4. Operation System	24
4.1 WinCE 5.0.....	24
4.1.1 WinCE 5.0 Platform Builder Installation	24
4.1.2 NXC2620 BSP Installation.....	26
4.1.3 Make New WinCE 5.0 image with NXC2620 BSP	27
4.1.4 Load New Platform Builder to NXC2620 DVK 3.2	31
4.1.5 Boot-up Options.....	35
4.1.6 ActiveSync and SD Card Driver Emulation.....	35
4.1.7 Disk Drives on NXC2620.....	36
4.1.8 WiFi Driver Installation	36
4.1.9 GPU SM502 Driver Installation	36
4.1.10 SDHC Driver Installation	37
4.2 Linux 2.6	38
4.2.1 Boot Loader Installation.....	39
4.2.2 Linux Kernel Installation	39
4.2.3 Root File System Installation	40
4.2.4 Linux Boot up options	41
4.2.5 Tool Chain Installation.....	41
4.2.6 Create New Boot Loader.....	42
4.2.7 Create New Linux Kernel.....	42
5. BSP Download and Update.....	43
6. Electrical Characteristics	44

1. Introduction

By providing hardware and software solution, NCX2620 DVK 3.2 is designed to comprise NXC2620 processor module, baseboard and LCD board as a developing platform to accelerate time to market easily and immediately for targeting application of HMI, Thin Client and SBC. DVK is inexpensive, feasible and high performance development kit for evaluating the functionality and capability of NXC2620 processor and system on module.

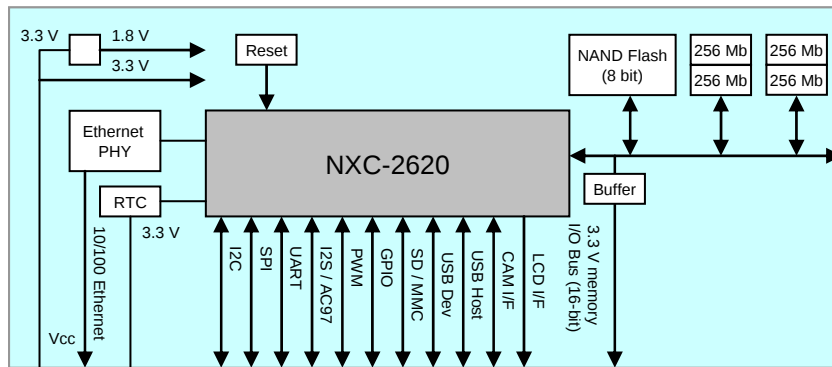
Thank you for choosing IC Nexus products!!

1.1 Package Contents

SODIMM200 CPU Card	NXC2620-PB260A or NXC2620-PB502A
Base Board	NXC2620-DVB32-BDA
LCD Board	NXC2620-DVB32-LB
LCD Module	5.7" or 7" LCD module
Power Adapter	AC 110/220 V (Input) to DC 5 V 3A (Output)
Battery Pack	Rechargeable Li-ion battery – 3.7 V, 1800 mAh
Ethernet Cable	RJ45 Ethernet cable
RS232 Cable	DB9-Female to DB9-Female null modem Cable
SD Card	1 GB or higher
Window CE 5.0 Serial Number	Microsoft Windows CE 5.0 License

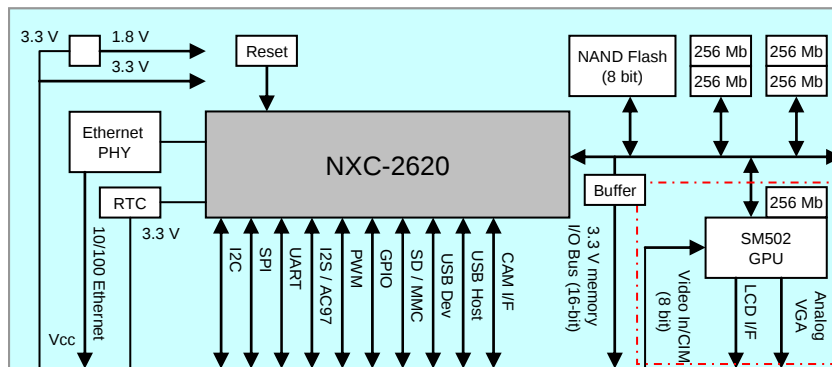
1.2 System Block Diagram

- **NXC2620-PB260A CPU Card (PCB08300)**



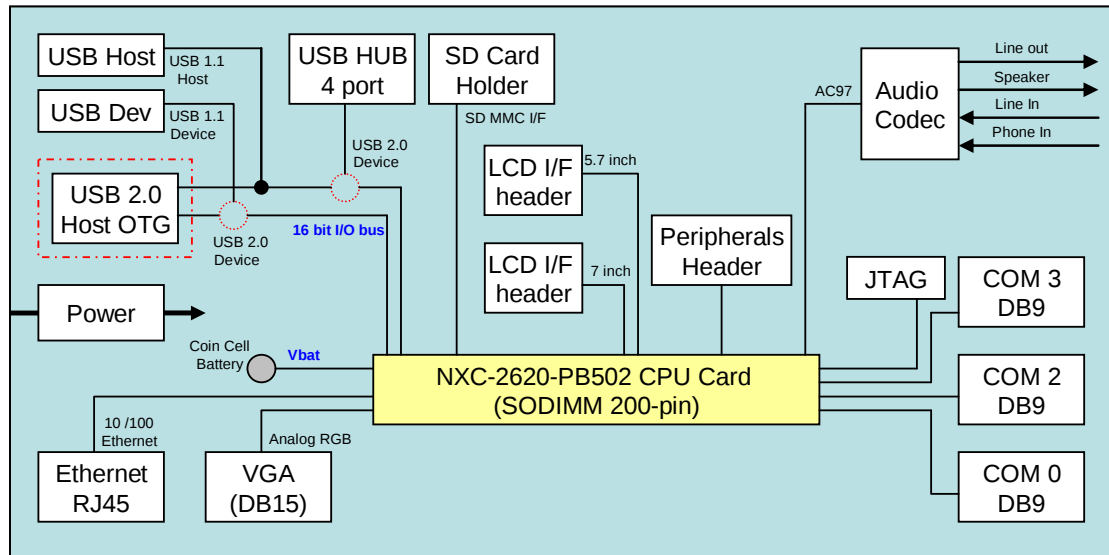
SODIMM 200-pin edge finger

- **NXC2620-PB502A CPU Card (PCB08100)**



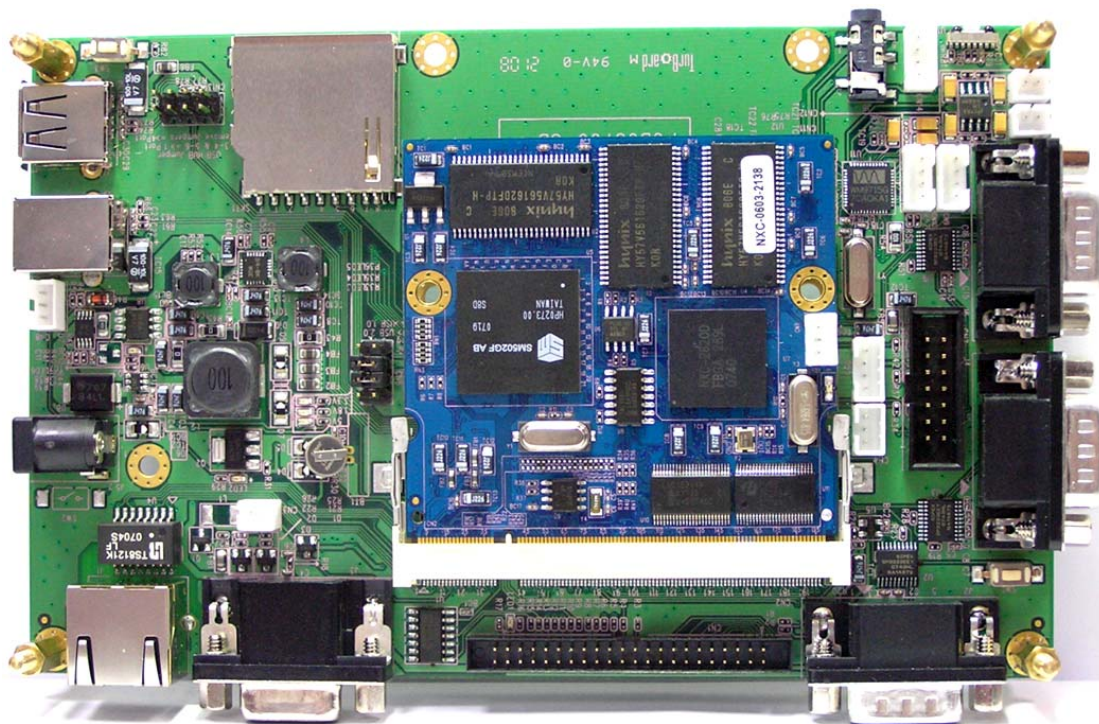
SODIMM 200-pin edge finger

- **NXC2620-DVB32-BDA Base Board (PCB08700)**



2. Hardware

Flexible and cost-effective solution, 32bit RISC core NXC2620 processor module is a system on module designed to perform low power consumption embedded devices. The OS support includes WinCE 5.0 and Linux 2.6. The on board PHY simplifies hardware Ethernet connection.



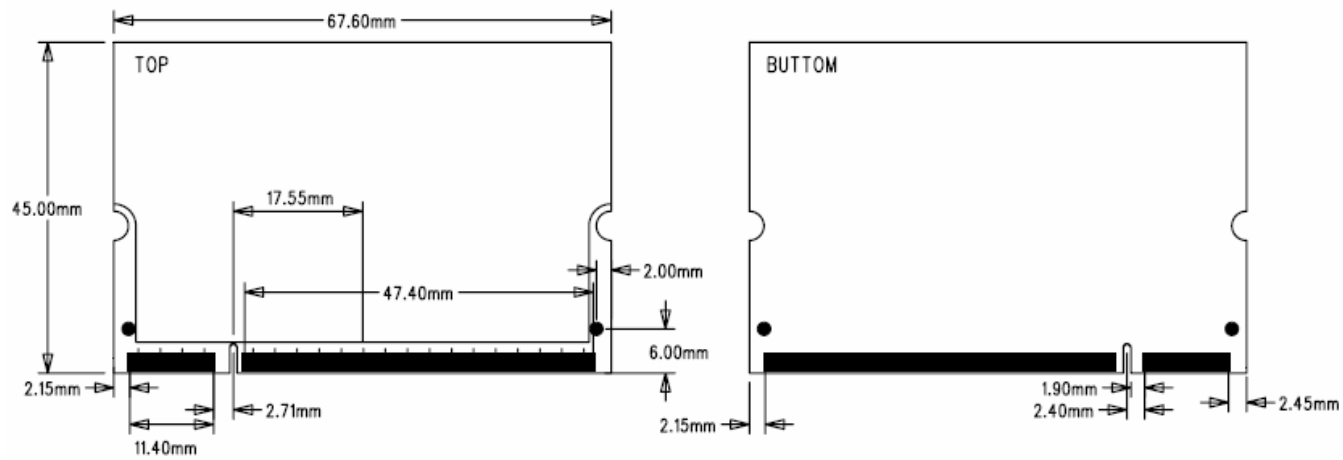
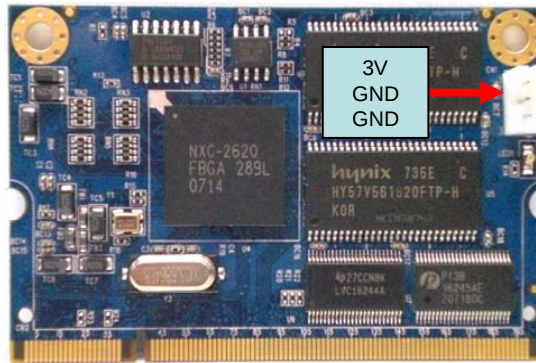
2.1 CPU Module

● Board Description

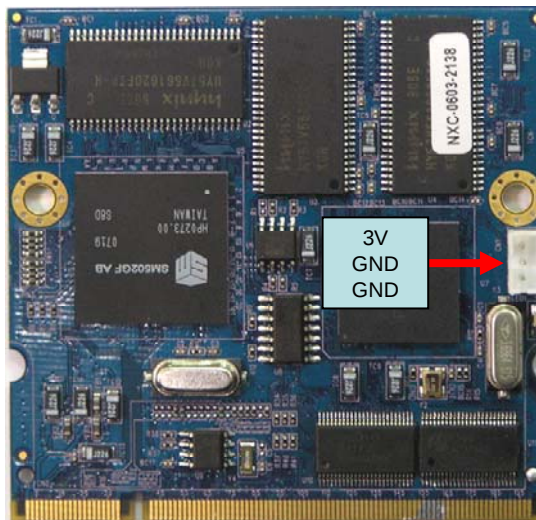
CPU Module		PB260A (PB08300)	PB260B (PB08310)	PB502A (PB8100)	PB502B (PB8110)
CPU Speed		336 MHz			
Memory	NAND	128 MB			
	SDRAM	128 MB	64 MB	128 MB	64 MB
Display	LCD	YES	YES	YES	YES
Control	GPU(502)	NO	NO	YES	YES
JTAG Interface		YES			
10/100 Ethernet PHY		YES			
UART Interface		4, UART 0/debug port, UART 1/IrDA			
USB 1.1	Host	1			
Interface	Device	1			
Peripherals		RTC, WDT, Timer, I ² C, PWM, SPI, SSP, I ² S, SD/MMC			

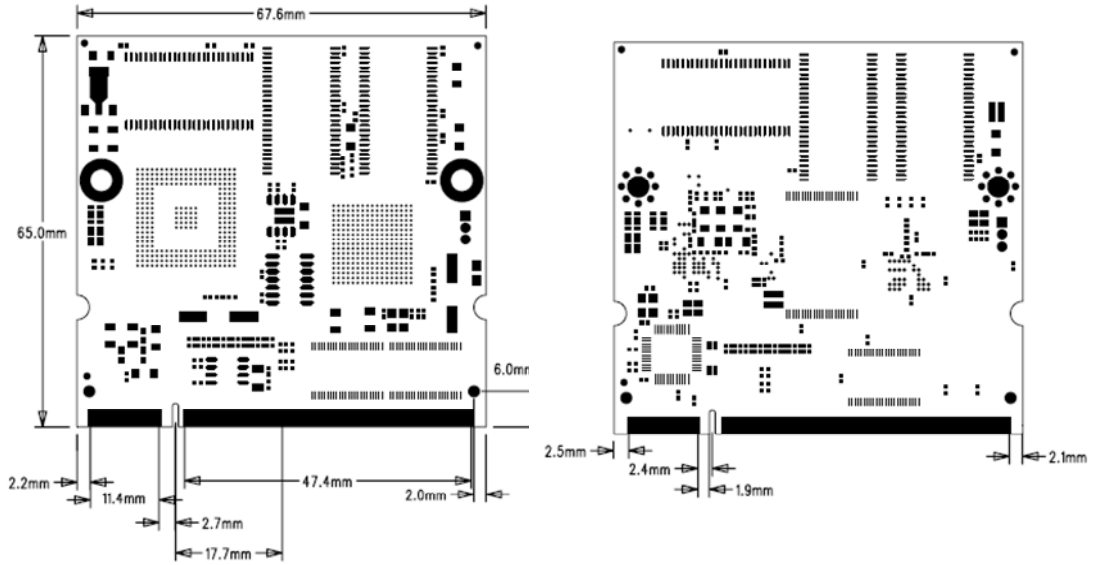
● SODIMM200 Pin Assignment

➤ NXC2620-PB260A/B



➤ NXC260-PB502A/ B





Pin NO	Pin Description	Pin NO	Pin Description
1	ENET_PWRFB *1	2	Reserved3
3	ENET_TXD_N *1	4	ENET_RXD_N *1
5	ENET_TXD_P *1	6	ENET_RXD_P *1
7	ENET_100_LED *1	8	ENET_10_LED *1
9	NC	10	EOP/GP27
	RED Signal *2		
11	NC	12	DACK0/GP13
	RED Signal *2		
13	NC	14	NC
	Blue Signal *2		GREEN Signal *2
15	NC	16	NC
	Blue Signal *2		GREEN Signal *2
17	LCD_PCLK/GP58 *	18	LCD_DE/GP59 *
19	LCD_VSYNC/GP56 *	20	LCD_HSYNC/GP57 *
21	LCD_D[14]/GP54 *	22	LCD_D[15]/GP55 *
23	LCD_D[12]/GP51 *	24	LCD_D[13]/GP53 *
25	LCD_D[10]/GP50 *	26	LCD_D[11]/GP51 *
27	LCD_D[8]/GP48 *	28	LCD_D[9]/GP49 *
29	LCD_D[6]/GP46 *	30	LCD_D[7]/GP47 *
31	LCD_D[4]/GP44 *	32	LCD_D[5]/GP45 *
33	LCD_D[2]/GP42 *	34	LCD_D[3]/GP43 *
35	LCD_D[0]/GP40 *	36	LCD_D[1]/GP41 *
37	CIM_PCLK/GP10 *	38	CIM_MCLK/GP11 *
39	GND	40	Vbat(+3V3)

41	CIM_HSYNC/GP9	*	42	CIM_VSYNC/GP8	*
43	CIM_D[6]/GP6	*	44	CIM_D[7]/GP7	*
45	CIM_D[4]/GP4	*	46	CIM_D[5]/GP5	*
47	CIM_D[2]/GP2	*	48	CIM_D[3]/GP3	*
49	CIM_D[0]/GP0	*	50	CIM_D[1]/GP1	*
51	PPWR0/GP29		52	USB_CLK/GP28	
53	DPLS0		54	DPLS1	
55	DMNS0		56	DMNS1	
57	Reserved1		58	OVC0/TEST_SEN	
59	GND		60	VCC(+3V3)	
61	XTAL		62	RESETOUT_	
63	Reserved2		64	I2C_SDA	
65	BITCLK/GP77		66	I2C_SCK	
67	SDATA_IN/GP71		68	SSI_CLK/GP72	
69	SDATA_OUT/GP70		70	SSI_CE1_/GP73	
71	SYNC/GP78		72	SSI_DT/GP74	
73	SYSCLK/GP68		74	SSI_DR/GP75	
75	ACRESET_/GP69		76	SSI_CE2_/SPI_GPC/GP76	
77	PWM1/GP95		78	PS2_KCLK/GP32	
79	PWM0/GP94		80	PS2_KDATA/GP33	
81	UART3_RTS/GP23		82	UART3_CTS/GP17	
83	UART3_RxD_/GP16		84	UART3_TxD/GP21	
85	UART2_RxD_/GP111		86	UART2_TxD/GP125	
87	UART1_RxD_/GP24		88	UART1_TxD/GP25	
89	UART0_RxD_/GP126		90	UART0_TxD/GP127	
91	GND		92	VCC(+3V3)	
93	PCE2_/GP93		94	Reserved4	
95	PCE1_/GP90		96	PBVD2/GP89	
97	PSKTSEL/GP91		98	INPACK_/GP88	
99	WE3_		100	IOIS16_/GP92	
101	WE1_/PIOR		102	WE2_/PREG_	
103	WE_/PWE_		104	WE0_/PIOW_	
105	FWE_/GP80		106	NC	
107	FRE_/GP79		108	NC	
109	RD_/POE_		110	NC	
111	CS0_		112	NC	
113	CS1_/GP83		114	NC	

115	CS2_/GP84	116	NC
117	CS3_/GP85	118	NC
119	CS4_/GP86	120	NC
121	CS5_/GP87	122	NC
123	GND	124	VCC(+3V3)
125	A12 *3	126	A25 *4
127	A11 *3	128	A24 *4
129	A10 *3	130	A23 *4
131	A9 *3	132	A22 *4
133	A8 *3	134	A21 *4
135	A7 *3	136	A20 *4
137	A6 *3	138	A19 *4
139	A5 *3	140	A18 *4
141	A4 *3	142	A17 *4
143	A3 *3	144	A16 *4
145	A2 *3	146	A15 *4
147	A1 *3	148	A14 *4
149	A0 *3	150	A13 *4
151	GND	152	VCC(+3V3)
153	D15 *3	154	D31
155	D14 *3	156	D30
157	D13 *3	158	D29
159	D12 *3	160	D28
161	D11 *3	162	D27
163	D10 *3	164	D26
165	D9 *3	166	D25
167	D8 *3	168	D24
169	D7 *3	170	D23
171	D6 *3	172	D22
173	D5 *3	174	D21
175	D4 *3	176	D20
177	D3 *3	178	D19
179	D2 *3	180	D18
181	D1 *3	182	D17
183	D0 *3	184	D16
185	MSC_DAT[2]/GP36	186	MSC_DAT[3]/GP37
187	MSC_DAT[0]/GP34	188	MSC_DAT[1]/GP35

189	MSC_CLK/GP39	190	MSC_CMD/GP38
191	GND	192	VCC(+3V3)
193	Reserved5	194	Reserved6
195	RFIO	196	BT_FREQ
197	BT_ACTIVE	198	RX_CLEAR
199	GND	200	VCC(+3V3)
* NXC2620 & GPU SM502		*3 Bus Buffer – 74LVC16244	
*1 Ethernet PHY		*4 Bus Switch – P13B16245A	
*2 GPU SM502			

● Ethernet PHY –Single-Port 10/100M Fast Ethernet PHYceiver

The RTL8201CP is a single-port PHYceiver with an MII (Media Independent Interface)/SNI (Serial Network Interface). It implements all 10/100M Ethernet Physical-layer functions including the Physical Coding Sublayer (PCS), Physical Medium Attachment (PMA), Twisted Pair Physical Medium Dependent sublayer (TP-PMD), with an auto crossover detection function, 10Base-Tx Encoder/Decoder, and Twisted Pair Media Access Unit (TPMAU).

A PECL (Pseudo Emitter Coupled Logic) interface is supported to connect with an external 100Base-FX fiber optical transceiver. The chip utilizes an advanced CMOS process to meet low voltage and low power requirements. With on-chip DSP (Digital Signal Processing) technology, the chip provides excellent performance under all operating conditions.

The RTL8201CP can be used for applications such as those for a Network Interface Adapter, MAU (Media Access Unit), CNR (Communication and Network Riser), ACR (Advanced Communications Riser), an Ethernet hub, and an Ethernet switch. In addition, it can be used in any embedded system with an Ethernet MAC that needs a UTP physical connection or Fiber PECL interface to an external 100Base-FX optical transceiver module

● Mobile Multimedia Companion Chip (SM502)

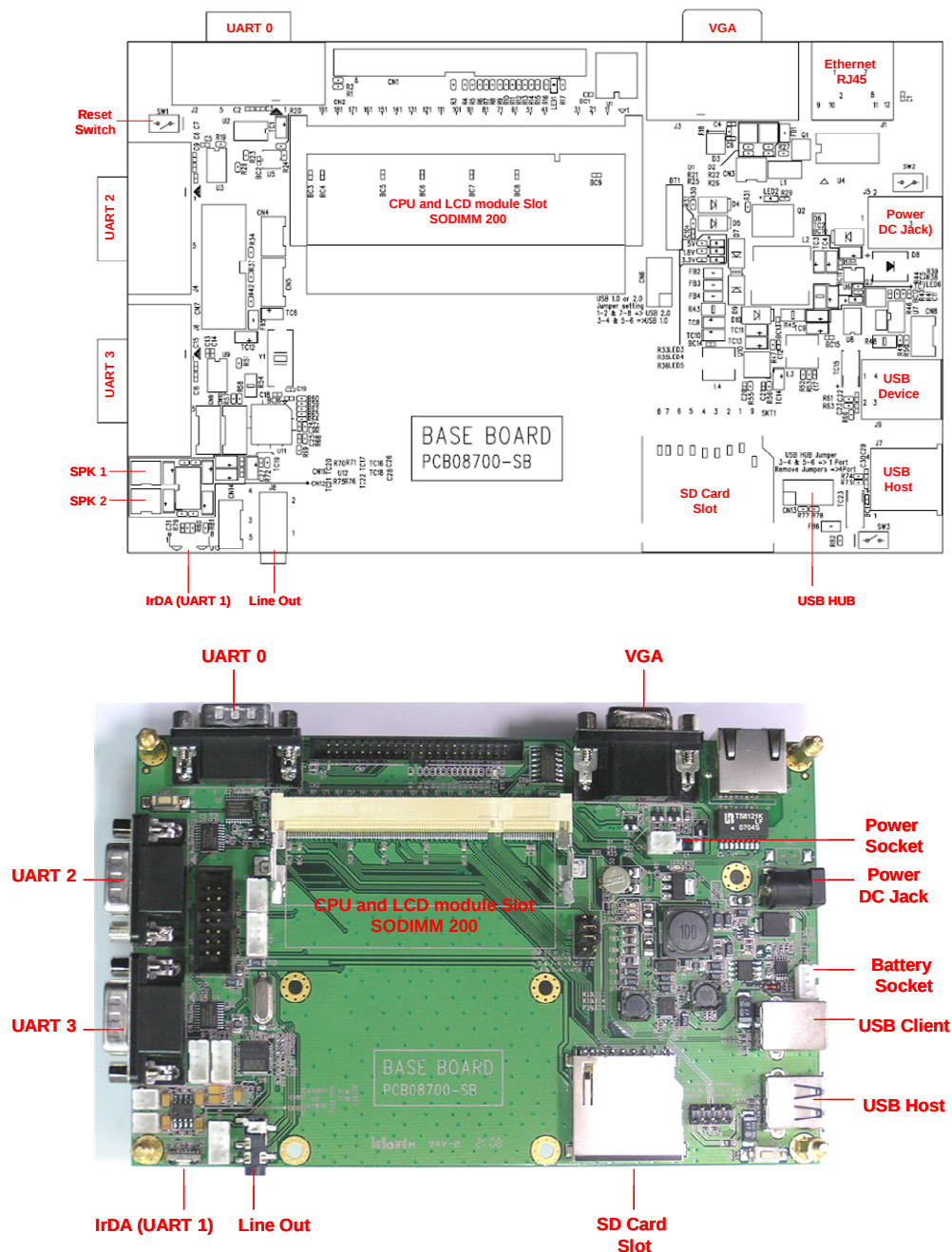
The SM502 is a Mobile Multimedia Companion Chip (MMCC™) device, packaged in a 297-pin BGA and backward-compatible with the SM501. Designed to complement needs for the embedded industry, it provides video and 2D capability. To help reduce system costs, it supports a wide variety of I/O, including analog RGB and digital LCD Panel interfaces, 8-bit parallel interface, USB, UART, IrDA, two Zoom Video interfaces, AC97 or I2S, SSP, PWM, and I2C. There are additional GPIO bits that can be used to interface to external devices as well.

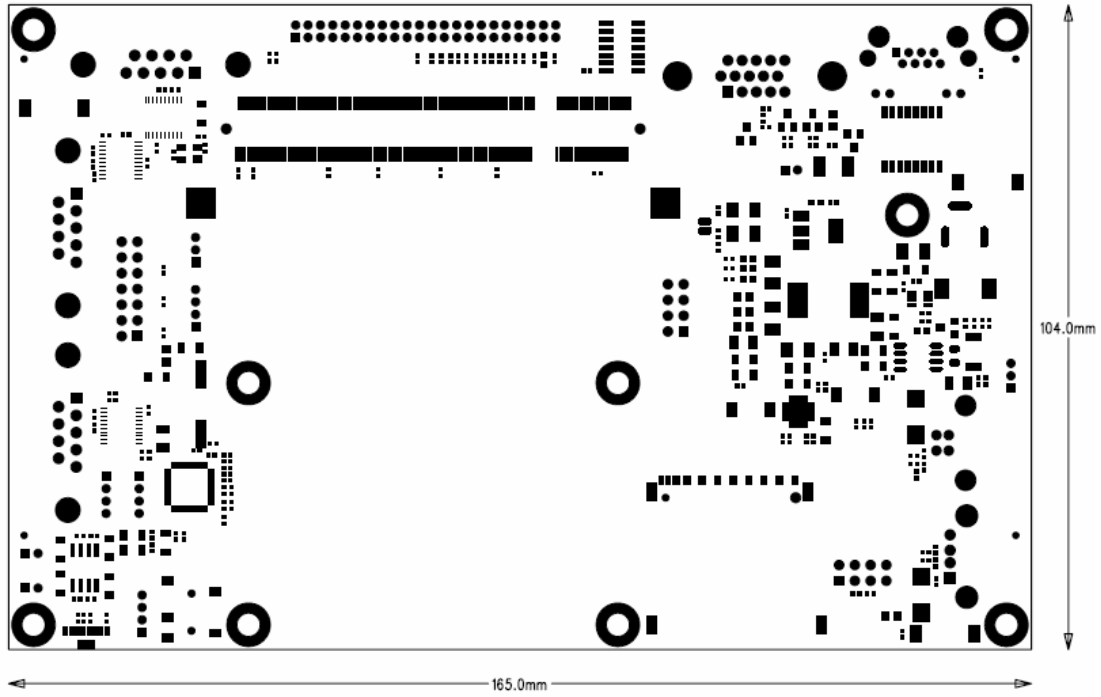
The 2D engine includes a front-end color space conversion with 4:1 and 1:8 scaling support. The video engine supports two different video outputs (Dual Monitor), at 8-bit, 16-bit, or 32-bit per pixel and a 3-color hardware cursor per video output. The LCD panel video pipe supports a back-end YUV color space conversion with 4:1 and 1:212 scaling. A Zoom Video (ZV) port is also included to interface to external circuitry for MPEG decode or TV input.

2.2 Base Board

● NXC2620-DVB32-DBA Description

- Digital LCD interface
- USB 1.1 Host / Device
- USB 1.1 / 2.0 Host Hub up to 4 ports
- SD / MMC / SDIO
- Analog VGA Interface (up to 1280 x 1024 pixels)
- Camera Interface
- RTC / WDT / Timer
- I²C / PWM / SPI / SSP
- I²S / AC97 / UART / IrDA

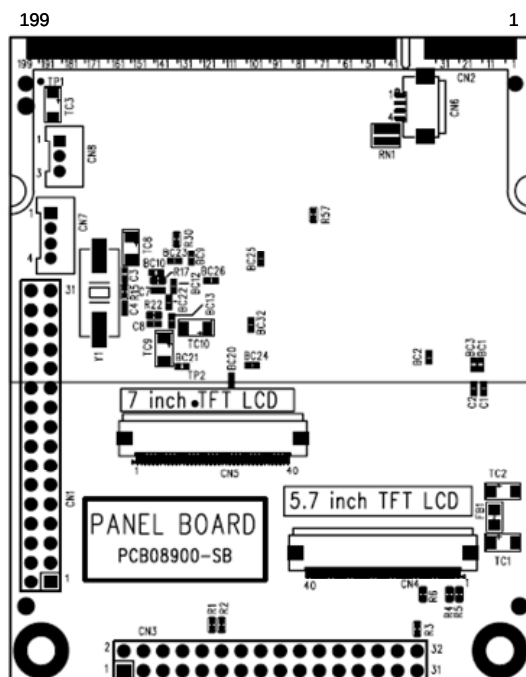




2.3 LCD Module

● NXC2620-DVB32-LB Description (PCB08900)

The LCD board supports 5.7 inch and 7 inch TFT LCD. Both TFT LCD panel are support LED backlight and 4-wire resistance type touch signal input. It is designed to support NXC2620 DVK 16-bit color LCD control with display pixel of 640(H) x 3(RGB) x 480(V) and 800(H) x 3(RGB) x 600(V).



● 5.7" LCD Panel – TFP507MWVGAHBE-03

➤ General specifications

ITEM	SPECIFICATION
Panel Size	5.7 inch (panel diagonal)
Display Area (mm)	116.16(W) x 87.12(H)
Number of Pixels	640 x 3(H) x 480 (V)
Pixel Pitch (mm)	0.1815(H) x 0.1815(V)
Color Pixel Arrangement	RGB vertical strip
Display Mode	Normally white
Number of colors	262,144
Viewing Direction	6 o'clock
Response Time (Tr + Tf)	30 ms
Brightness (cd/ m ²)	180 nit(Typ)
NTSC ratio	50%
Viewing Angle (BL on, CR>=10)	140 degree(H), 100 degree(V)
Electrical Interface (data)	TTL

Power consumption (W)	TBD
Outline Dimension (in mm)	127(W) x 100(H) x 7.65(D)
Weight (g)	~132g
BL unit	LED
Surface Treatment	Anti-Glare, Hardness:3H
Type of touch screen	4 Wire resistance type

➤ Pin assignment

Pin NO	Symbol	Description
1	U/D	Up or Down Display Control
2	NC	Customer non-connect; initial pull high = DE mode
3	Hsync	Horizontal SYNC
4	VLED	Power Supply for LED
5	VLED	Power Supply for LED
6	VLED	Power Supply for LED
7	Vcc	Power Supply for LED
8	Vsync	Vertical SYNC
9	DE	Data Enable
10	X2	TSP control (Left)
11	Y1	TSP control (Up)
12	ADJ	Adjust for LED brightness
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	Vss	Power Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	Vss	Power Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	Vss	Power Ground
25	G2	Green Data 2
26	G1	Green Data 2
27	G0	Green Data 0 (LSB)
28	Vss	Power Ground

29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	Vss	Power Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0 (LSB)
36	X1	TSP control (Right)
37	Y2	TSP control (Down)
38	DCLK	Clock signals
39	Vss	Power Ground
40	L/R	Left / Right Display control

● **7" LCD Panel – NFD70A-CIW-H**

➤ General specifications

ITEM	SPECIFICATION
Display Area (mm)	152.4(W) x 91.44(H)
Number of Pixels	800(H) x 3(RGB) x 480 (V)
Pixel Pitch (mm)	0.1905(H) x 0.1905(V)
Color Pixel Arrangement	RGB vertical strip
Display Mode	Normally white
Number of colors	262,144
Viewing Direction	6 o'clock
Response Time (Tr + Tf)	20 ms
Brightness (cd/ m ²)	250 nit(typ)
Viewing Angle (BL on, CR>=10)	140 degree(H), 110 degree(V)
Electrical Interface (data)	TTL
Power consumption (W)	2.5 W (Typ)
Outline Dimension (in mm)	165(W) x 104(H) x 6(D)
Weight (g)	~132g
BL unit	LED
Surface Treatment	Anti-Glare, Hardness:3H
Type of touch screen	4 Wire resistance type

➤ Pin Assignment – CN1

Pin NO	Symbol	Description
1	U/D	Up or Down Display Control
2	DMS	Selection DE or SYNC
3	Hsync	Horizontal SYNC
4	VLED	Power Supply for LED Driver circuit
5	VLED	Power Supply for LED Driver circuit
6	VLED	Power Supply for LED Driver circuit
7	Vcc	Power Supply for LED Driver circuit
8	Vsync	Vertical SYNC
9	DE	Data Enable Signal
10	AVss	Ground
11	AVss	Ground
12	ADJ	Brightness control for LED B/L
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	Vss	Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	AVss	Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	AVss	Ground
25	G2	Green Data 2
26	G1	Green Data 2
27	G0	Green Data 0 (LSB)
28	AVss	Ground
29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	AVss	Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0 (LSB)

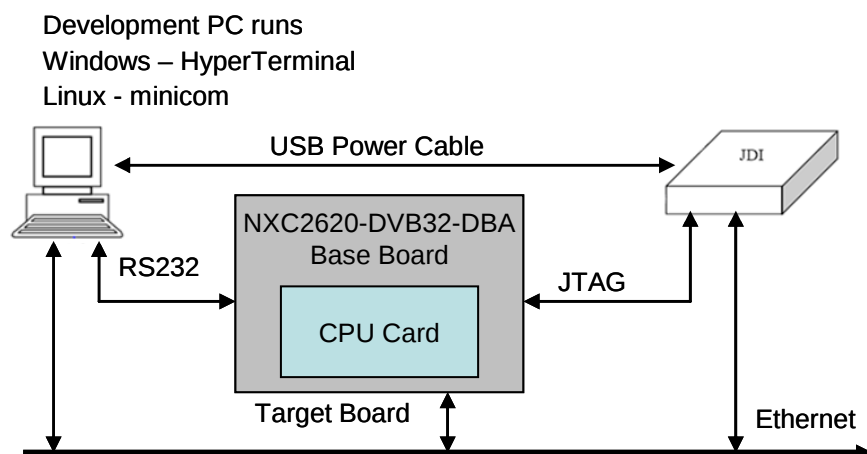
36	AVss	Ground
37	AVss	Ground
38	DCLK	Clock signal
39	AVss	Ground
40	L/R	Left / Right Display control

➤ Pin Assignment – CN2

Pin NO	Symbol	Description
1	XL	X axis resistance
2	YD	Y axis resistance
3	XR	X axis resistance
4	YU	Y axis resistance

3 Development Environment Setup

● Development Environment Diagram



- Connect development PC, JDI and Target Board to network
- Connect USB power cable between development PC and JDI
- Connect RS232 cable between development PC and Target Board
- Plug JDI JTAG cable to Target Board JTAG header

3.1 JDI Configuration

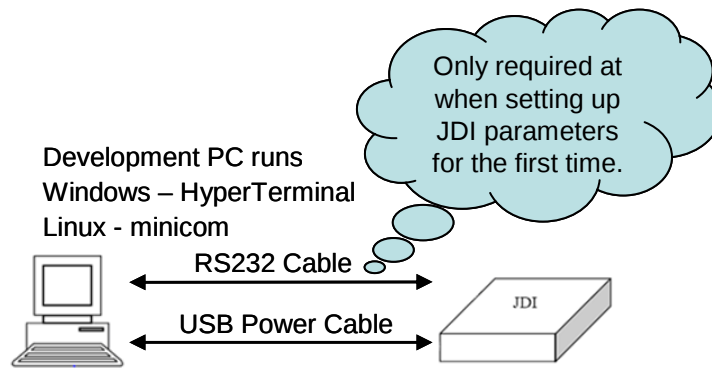
JDI	JTAG debugger
RS232 cable	PS2 to DB9-Female null modem Cable
Flat cable	2 x 7 flat cable
USB cable	JDI gets power supply via USB cable
Ethernet cable	Provides high data throughput for download OS image

* The JTAG debugger is not including in DVK 3.2 package.

JDI is a powerful and flexible JTAG debug tool for product development and debugging. JDI can be used for Flash/EEPROM programming on the target board, and device driver and OS low level debugging.

This section provides brief procedures of JDI setup. For detailed information on JDI setup and command, please refer to the “JDI - JTAG Debug Interface User manual”.

To perform JDI configuration, only a USB power cable and an RS232 cable are required to connect a JDI device.



- **Connect JDI to a development PC**

- Connect USB power cable between development PC and JDI
- Connect RS232 cable between development PC and JDI

- **Prepare JDI configuration file – jdi.cfg**

This configuration file is for JDI to communication with the target board. Please use a text editor to create the file or use a sample file from DVK CD. It is recommended that you create this file in TFTP root directory. A sample

```

;-----
; JDI configuration file for the NXC-2600 development board
;-----
;
; [INIT]
; Init INTC
WM32 0xB0001010 0xFFFFFFFF ; clear all intrs
WM32 0xB0001008 0xFFFFFFFF ; mask all intrs

; Init PLL
WM32 0xB0000000 0x10422220 ; Clock Control Register0 (CPCCR0)
WM32 0xB0000010 0x50800120 ; PLL Control Register (CPPCR)

; Init memory controller
WM32 0xB0010070 0x40000000 ; GPALR2, GPIO as emc
WM32 0xB0010074 0x00005555 ; GPAUR2, GPIO as emc
;
; [HOST]
IP 192.168.1.20
;
; [FLASH]
CHIPTYPE AM29 ; Flash type (AUTO | AM29 | I28F)
CHIPSIZE 0x00800000 ; The size of the flash in bytes (for SST 8MB NOR)

; Parameters for chip type I28F and AM29
CHIPWIDTH 16 ; The width of the flash chip in bits (8 | 16 | 32)
BUSWIDTH16 ; The width of the flash memory bus in bits (8 | 16 | 32)

; Parameters for chip type AM29
SETUPADDR1 0x555 ; The first setup address of chip type AM29
SETUPADDR2 0x2AA ; The second setup address of chip type AM29
;
; [NAND]
BUSWIDTH 8 ; The width of the NAND flash chip in bits (8 | 16 | 32)
ROWCYCLES 2 ; The row address cycles (2 | 3)
PAGESIZE 2048 ; The page size of the NAND chip in bytes (512 | 2048)
FORCEERASE 0 ; The force to erase flag (0 | 1). When set, all blocks
including that were marked as bad blocks will be erased. Don't set it during
normal operation.
;
; [EEPROM]
ADDRESS 7 ; The device address of EEPROM
;
; [SDRAM]
BUSWIDTH 32 ; The bus width of the SDRAM in bits (16 | 32)
BANKS 4 ; The bank number (2 | 4)
ROWADDR 13 ; Row address width in bits (11-13)
COLADDR 9 ; Column address width in bits (8-12)
CASLATENCY 2 ; CAS latency (2 | 3)
;
; [GDB]
INITFILE gdbinit.bin ; Platform-dependent init code, required for gdb
debug
;
; -- END --

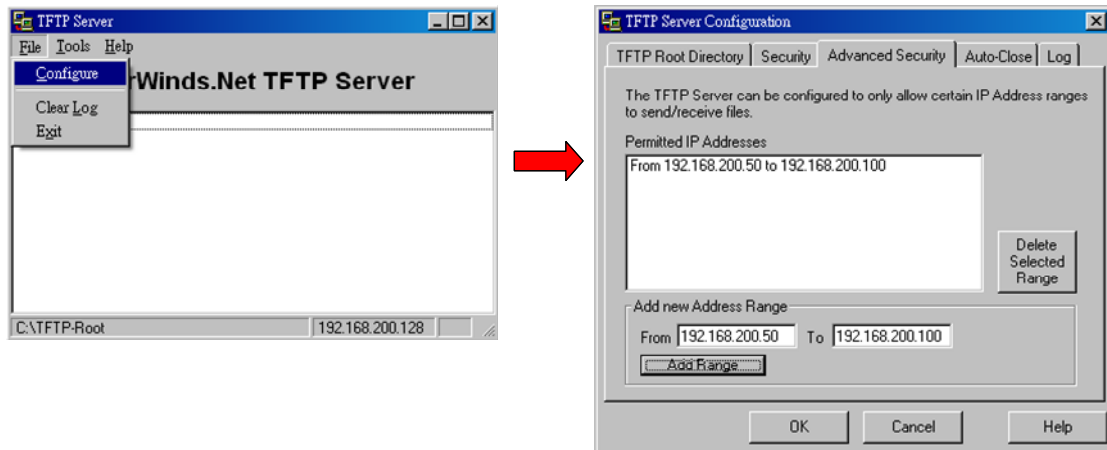
```

- **Start TFTP service**

TFTP service needs to be configured and started on host PC.

- For Windows

- Install "**SolarWinds-TFTP-Server.exe**" from DVK CD
- Enable TFTP server and configure IP address range to fall well within source & destination IP. (**File → Configure**)



- For Linux

- Use **/tftpboot** as the directory to provide TFTP service
- Edit **/etc/xinetd.d/tftp** as following

```
service tftp
{
    disable      = no
    socket_type  = dgram
    protocol    = udp
    wait        = yes
    user        = root
    server      = /usr/sbin/in.tftpd
    ... ..
}
```

- Execute the following command to restart TFTP service
- Copy file to "**/tftpboot**" directory as below
- * Please disable firewall

4. Operation System

NXC2620 DVK 3.2 supports WinCE 5.0 and Linux 2.6 operation system. IC Nexus provide Board Service Package (BSP) and source code for both operation systems on NXC2620 DVK 3.2.

4.1 WinCE 5.0

- **System Requirement**
 - IBM compatible PC
 - CPU 1.6 GHz or higher
 - At least 30 GB free hard disk space or higher
 - 512 MB RAM higher
 - OS: Microsoft Windows 2000 or newer
- **Software Requirements**
 - Microsoft Windows CE 5.0 IDE (Genuine licensed by Microsoft)
 - UART communication tool – Microsoft HyperTerminal
 - TFTP server (A free copy of Windows XP TFTP server software can be download at <http://www.solawinds.com/downloads>)

4.1.1 WinCE 5.0 Platform Builder Installation

- **WinCE 5.0 Platform Builder**

Obtain WinCE 5.0 Platform Builder from Microsoft. Then you can install the WinCE 5.0 with Platform Builder by using the genuine product key.

Then, follow installation instructions displayed on the host PC screen. There may be pre-requisites such as .NET framework 1.1 which needs to be installed. Follow the setup instructions carefully to ensure a CLEAN setup.

- **CPU support**

Select the [Custom (Tools and OS)] choice to Install IDE and debugger support, as well as CPU support for building images. Select “**MIPS-II**” CPU.

Click [Next>] button to continue installation. Once installation is complete, try to “**Open WinCE PB50 to check if the installation is OK. Close PB50 if it is OK**”.

Ensure you do not encounter any problems with WinCE 5.0 Platform Builder.

- **Installing QFE (download from Microsoft website)**

Microsoft frequently releases QFE(s) which contain very important updates for WinCE Platform Builder. Please install the following QFE(s). It is strongly suggested and is not “**optional**”.

- ***WinCEPB50-051231-Product-Update-Rollup-MIPSII.msi***
- ***WinCEPB50-061231-2006M12-MIPSII.msi***
- ***WinCEPB50-061231-Product-Update-Rollup-MIPSII.msi***
- ***WinCEPB50-070131-2007M01-MIPSII.msi***
- ***WinCEPB50-070208-KB931924-MIPSII.msi***
- ***WinCEPB50-070228-2007M02-MIPSII.msi***
- ***WinCEPB50-070331-2007M03-MIPSII.msi***
- ***WinCEPB50-070430-2007M04-MIPSII.msi***
- ***WinCEPB50-070531-2007M05-MIPSII.msi***
- ***WinCEPB50-070630-2007M06-MIPSII.msi***
- ***WinCEPB50-070731-2007M07-MIPSII.msi***
- ***WinCEPB50-070831-2007M08-MIPSII.msi***
- ***WinCEPB50-070930-2007M09-MIPSII.msi***
- ***WinCEPB50-071031-2007M10-MIPSII.msi***
- ***WinCEPB50-071231-Product-Update-Rollup-MIPSII.msi***
- ***WinCEPB50-080131-2008M01-MIPSII.msi***
- ***WinCEPB50-080229-2008M02-MIPSII.msi***
- ***WinCEPB50-080331-2008M03-MIPSII.msi***
- ***WinCEPB50-080531-2008M05-MIPSII.msi***

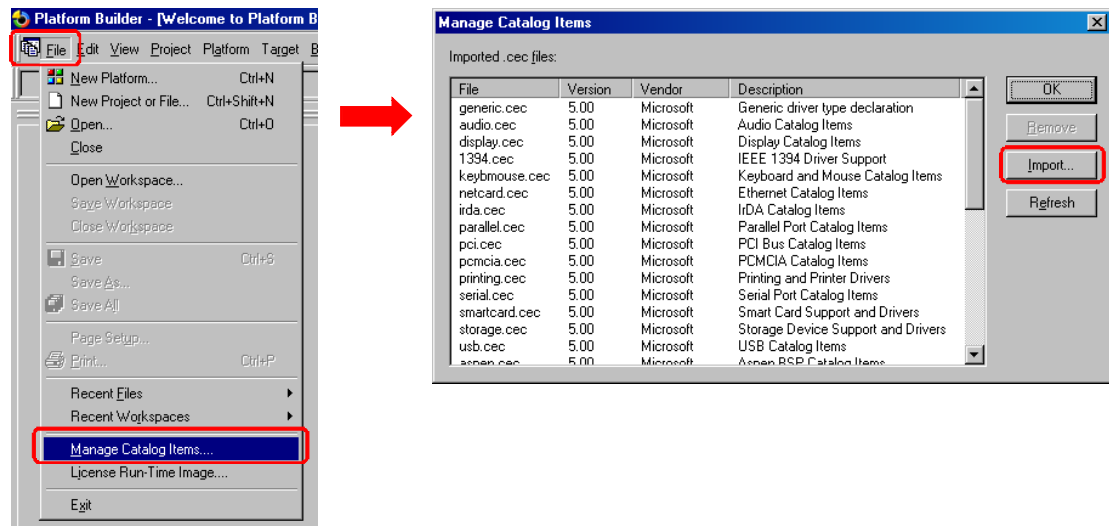
4.1.2 NXC2620 BSP Installation

Locate BSP archive on CDROM and install BSP as below ...

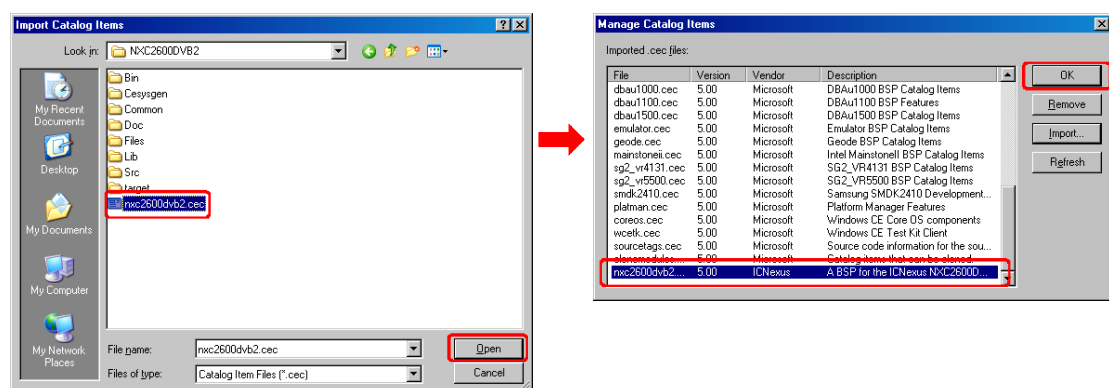
- Copy BSP – “**NXC2600DVK_Vx.x.x BSP**” from CDROM to “**C:\WINCE500\PLATFORM\NXC2600DVB2**” folder.

(Do this; if you install PB 5.0 in C drive else choose the disk drive where you installed PB 5.0)

- Execute “**PB 5.0**” → “**File**” → “**Manage Catalog Items...**” → “**Import...**”



- Identify the folder “**NXC2600DVB2**” in the – “**C:\WINCE\PLATFORM\NXC2600DVB2**” and select “**nxc2600dvb2.cec**” file then click “**Open**”. Catalog files will be imported and the new BSP will be show on the list. Installing new BSP is complete. Verify that as shown in the screenshot below then click “**OK**”.



4.1.3 Make New WinCE 5.0 image with NXC2620 BSP

IMPORTANT:-

Before cooking OS design, you have to set the choice for display type, script file should be modified based on what features you need.

Check the file mentioned below for more details.

C:\WINCE500\PLATFORM\Nxc2600dwb2\Files\Script\ICNEXUS_DVB2.bat

NATIVE - display from CPU

SM502 - display from SM502 chip

Set the parameters correctly.

=====

For 8100:

STEP 1: Copy "SM502_sources" file from DVK 3.2 CD

\WinCE 5.0\NXC2600DVB2 BSP Beta 2

paste to

C:\WINCE500\PLATFORM\Nxc2600dwb2\Src\Bootloader

STEP 2: Rename "SM502_sources" file to "sources" (no file name extension).

Overwrite any existing "sources" file.

STEP 3:

@REM*****

@REM Display Driver Type (0, 1)

@REM 0: NATIVE

@REM 1: SM502

@REM*****

SET BSP_DISPLAY_TYPE=1

Add SM502 driver as a catalog component into PB and add it to OS design, build OS image

=====

For 8300

STEP 1: Copy "NATIVE_sources" file from DVK 3.2 CD

\WinCE 5.0\NXC2600DVB2 BSP Beta 2

paste to

C:\WINCE500\PLATFORM\Nxc2600dwb2\Src\Bootloader

STEP 2: Rename "NATIVE_sources" file to "sources" (no file name extension).

Overwrite any existing "sources" file.

STEP 3:

@REM*****

```
@REM Display Driver Type (0, 1)
@REM          0: NATIVE
@REM          1: SM502
@REM*****
SET BSP_DISPLAY_TYPE=0
```

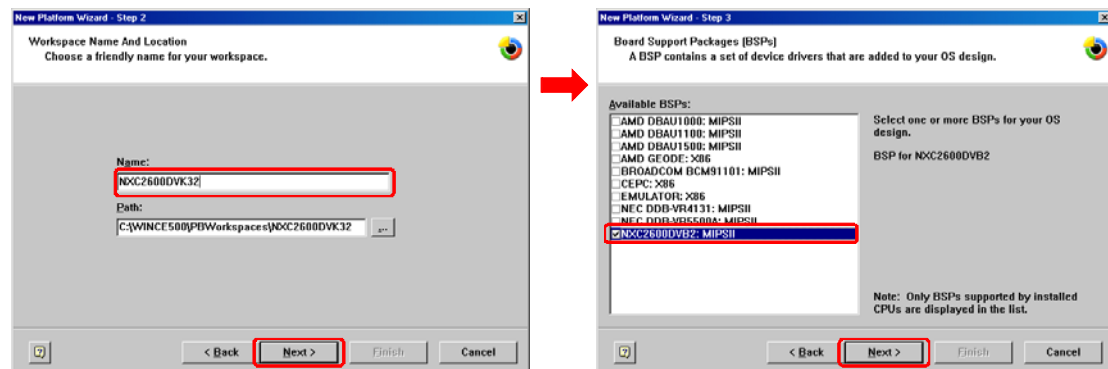
Make sure SM502 driver is NOT included in OS design. Build OS image

Create a new WinCE 5.0 image and bootloader with NXC2620 BSP as below...

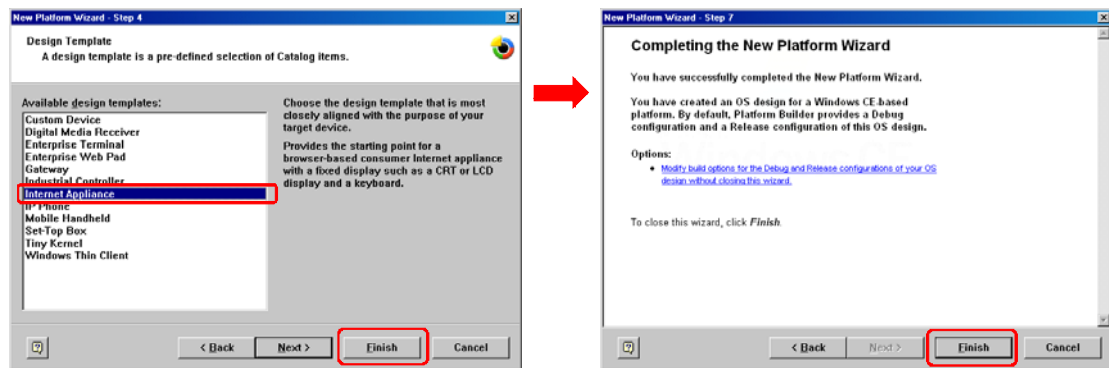
- Execute “PB 5.0” → “File” → “New Platform” and see the wizard then click “Next”



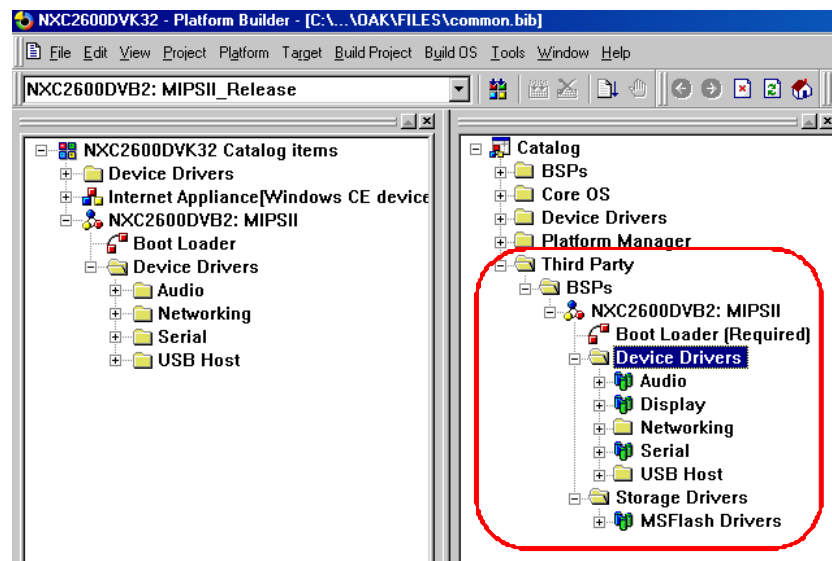
- Choose a relevant name then click “Next” → “NXC2600DVB2: MIPSII” → “Next”



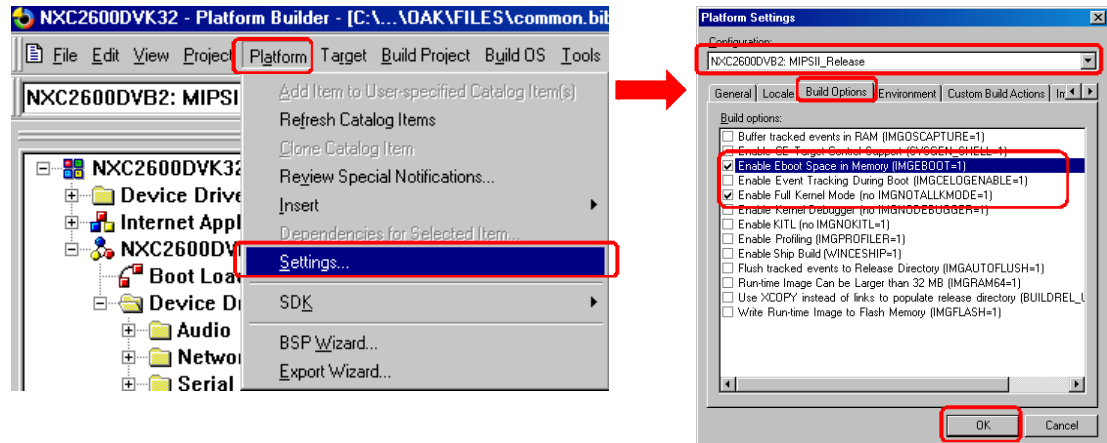
- Select “Internet Appliance” → “Finish” and see the complete wizard then click “Finish”



- * You can optionally choose “**Mobile Handheld**” but it is worth nothing that, some device specific OS configuration might need some extra efforts in terms of shaping the OS components including some device drivers which might need to be added / removed as appropriate.
- * We are trying to get a platform built quickly so no need at this stage to choose many other features initially.
- * Notice that the catalog contains the device drivers as well as the platform folders contains similar items. If some item is missing in your platform it can be added from catalog “**drag and drop**” or “**right click options**”.



- Form the menu, “Platform” → “Settings”



* Make sure the “**Build Options**” are select exactly as show in screenshot above. Avoid choosing debug support options initially to speed up the PB 5.0 process.

* **Configuration** settings shall remain in **RELEASE** mode then click “**OK**”

➤ Select “**Build OS**” → “**Sysgen**”

* It may **take 20 minutes for build procedure to complete**. Be patient. Do not edit or do random clicks on files in the “**PB 5.0**” during build process.

* There may be warning messages. Ignore them. There should be **NO Errors** in the build.

* Errors may arise due to several factors which include incorrect QFE updates or incorrect BSP installation or corrupted “**\\WINCE500\\PUBLIC**” folder files.

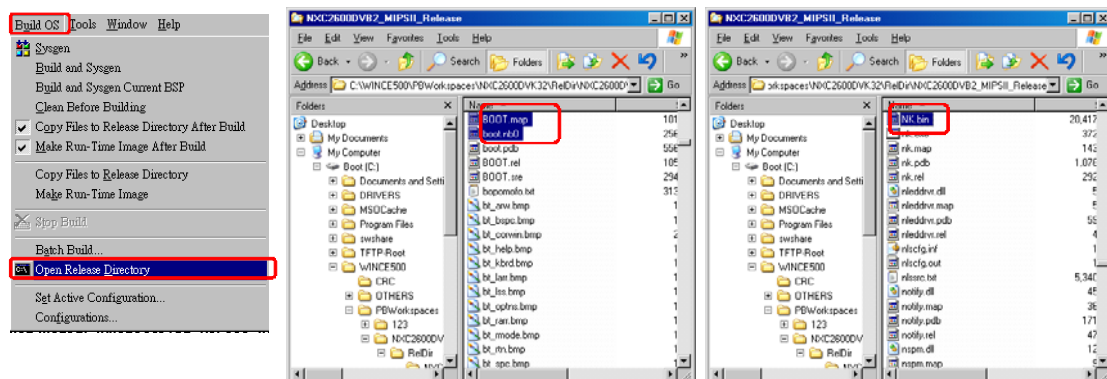
➤ Select “**Build OS**” → “**Open Release Directory**” and follow the path in Windows Explorer and identify the following files.

Boot Loader:

- Boot.map
- Boot.nb0

OS Image:

- NK.bin

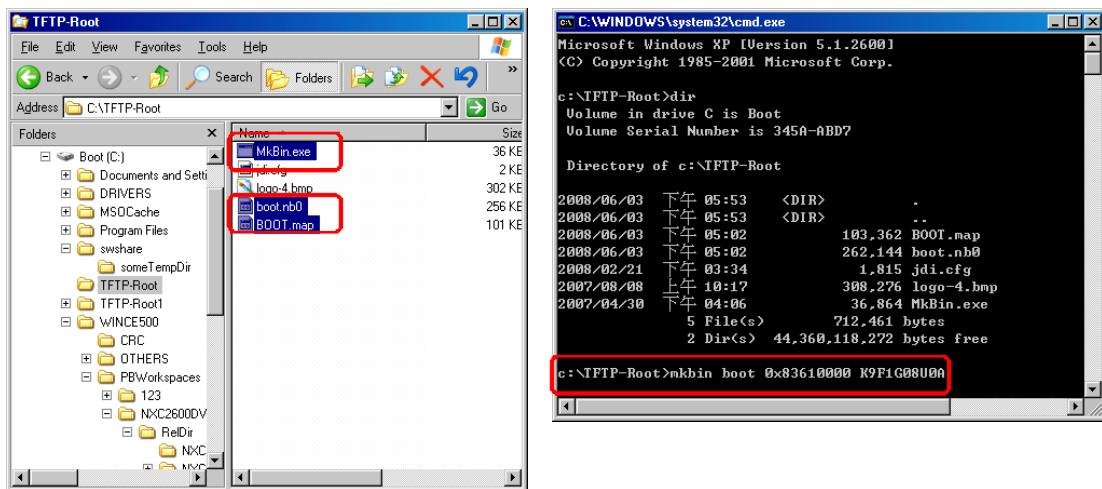


* If you see these files on the “xxx Release” directory, you have successfully built a

platform out of the new BSP. Now you are ready to try load WinCE 5.0 OS on the NXC2620 DVK 3.2 board.

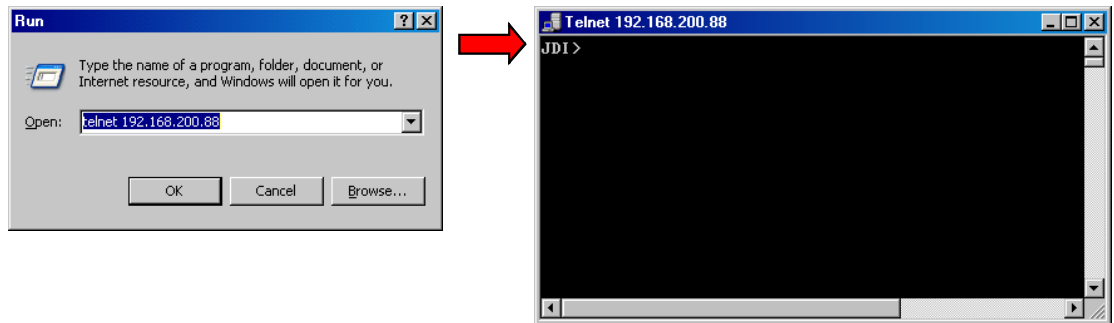
4.1.4 Load New Platform Builder to NXC2620 DVK 3.2

- Adjust “**boot.nb0**” for writing to NAND Flash on DVK 3.2
Copy “**boot.nb0**” and “**boot.map**” files to TFTP root directory. Make sure “**MkBin.exe**” is located in the exactly the same TFTP directory. Just as show below. Notice the files.
Change directory to TFTP root and type “**mkbin boot 0x83610000 K9F1G08U0A**”. “**MkBin.exe**” is used to adjust “**boot.nb0**” address so that “**boot.nb0**” so that “boot.nb0” can be written to NAND Flash or NOR Flash.



- Prepare logo for writing to NAND Flash on DVK 3.2
Currently, only up to “640 x 480” resolution logo file can be used. Only bitmap (*.bmp) file is supported right now. Sample logo file can be found in CDROM.

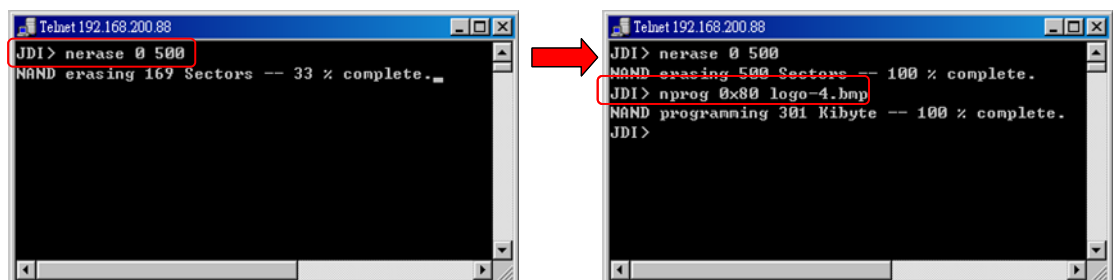
* Logo file size is restriction – 320 KB.
* Logo file is stored at 0x80 on NAND Flash.
- Download boot loader & logo to DVK 3.2
 - Please refer to chapter 3 to set-up development environment and start TFTP Service first.
 - Telnet to JDI – “**telnet xxx.xxx.xxx.xxx**”



- Download logo

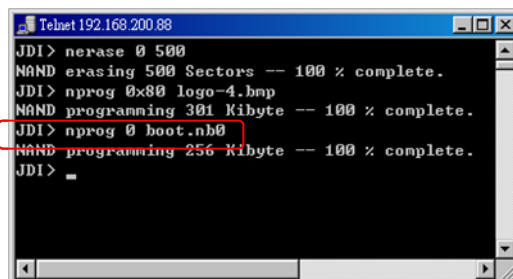
JDI> nerase 0 500

JDI> nprog 0x80 logo-4.bmp



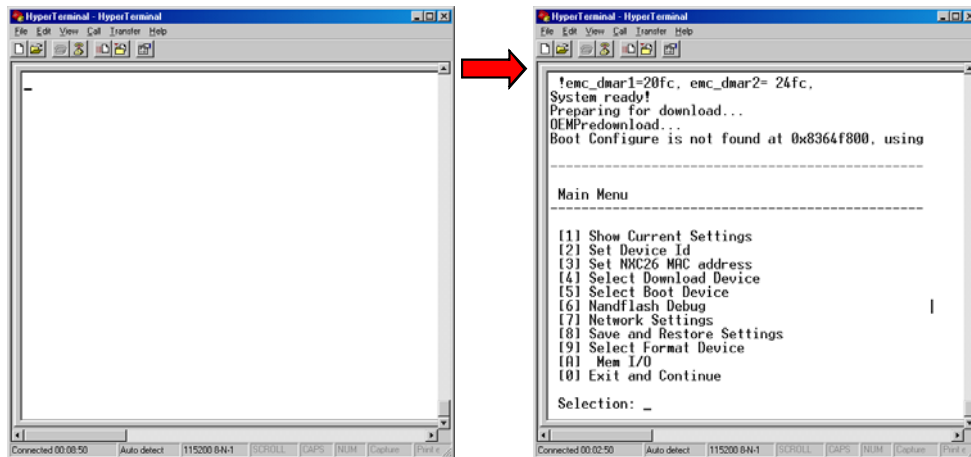
- Download boot loader

JDI> nprog 0 boot.nb0



➤ Download WinCE 5.0 image

- Connect RS232 cable between PC and NXC2620 DVK 3.2 console port.
- Connect Ethernet cable to NXC2620 DVK 3.2
- Execute "**HyperTerminal**", **115200,n,8,1** then press "**SPACE**" key and hold.
- Power on NXC2600 DVK 3.2 and see the boot loader menu as below. Now you can release pressing "**SPACE**" key.



This is the starting point of boot loader and extensive configuration can be done using menu option. Most of them are self explanatory.

- Configure boot loader

ENABLE DHCP

Press **[7] Network Settings** → **[2] Enable/Disable DHCP** → **[0] Exit and Continue**

Select Download Device

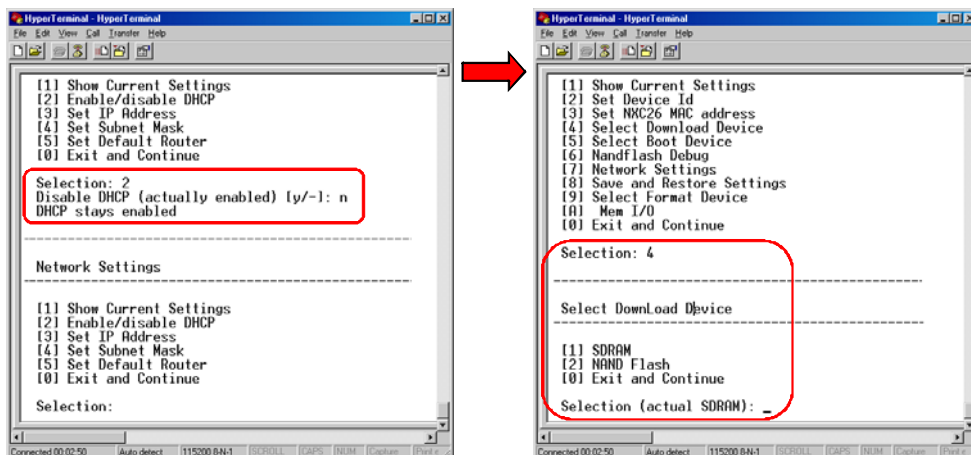
Press **[4] Select Download Device** → **[1] SDRAM**

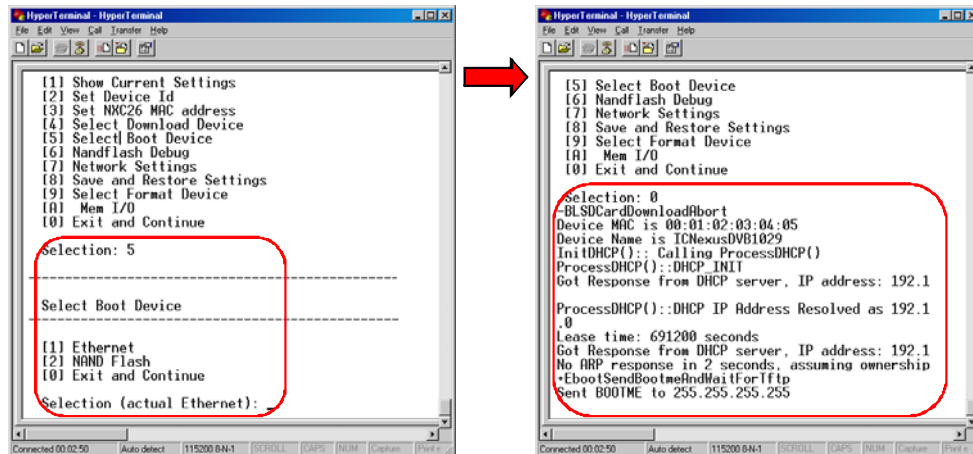
Select Boot Device

Press **[5] Select Boot Device** → **[1] Ethernet**

Select Save Settings

Press **[8] Save and Restore Settings** → **[1] Save Current Settings** → **[0] Exit and Continue**

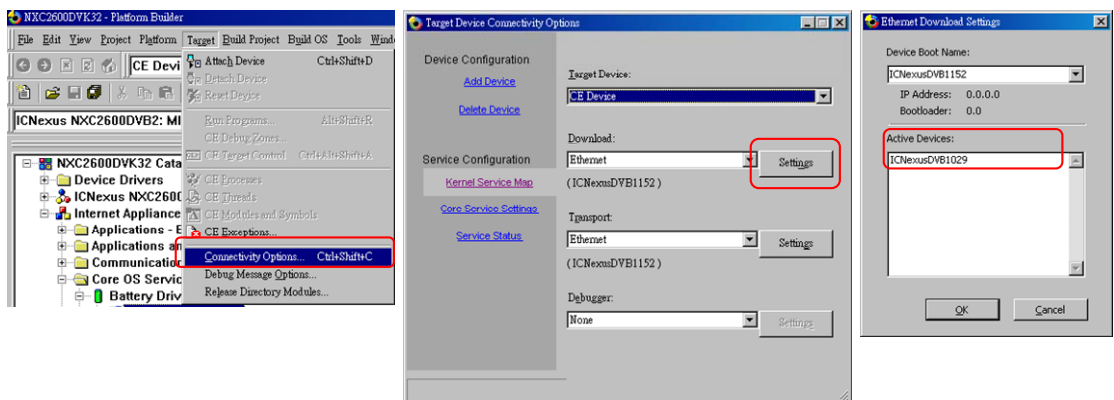




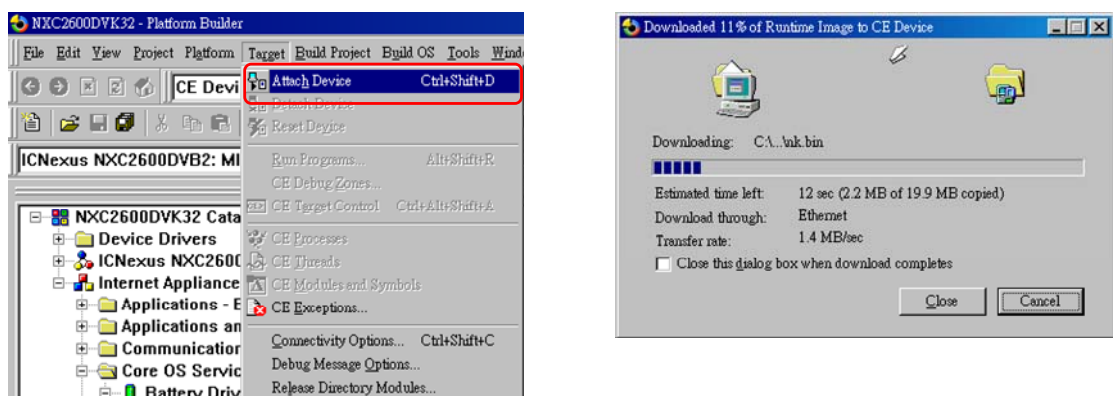
- Download OS image

Execute "PB 5.0" → "Target" → "Connectivity Options" → "Settings"

Select "Active Devices"



Select "Target" → "Attach Device"



4.1.5 Boot-up Options

There are 2 ways to boot on NXC2620 DVB 3.2.

- SD card
 - In PB50, click "**Build OS**" --> "**Open Release Directory**" to open command line window
 - Type "**getnb0**" to generate "**nk.nb0**" file.
 - Copy "**nk.nb0**" into SD card. Then, insert SD card into the board's SD slot.
 - Restart NXC2620 DVB 3.2.

* SD card has to be formatted in FAT32 format, "getnb0.bat" is a batch file, the WinCE 5.0 image size is specified in "-l 0x1E00000" (30 MB), if you build a WinCE size is more than 30 MB, you should change the "-l" parameter. The next image size boundary falls at 40 MB.

- NAND flash
Refer Chapter 4.1.4

4.1.6 ActiveSync and SD Card Driver Emulation

Active Sync USB device & SD card drive emulation functionality is inbuilt in NXC2600DVB2 BSP and it is controlled by a flag. You can locate the file typically at the following location

C:\WINCE500\PLATFORM\Nxc2600dVB2\Files\Script\ ICNEXUS_DVB2.bat

Open the file and edit the flags as shown below to allow Active Sync USB device functionality or SD card drive emulation. Notice the ActiveSync flag is enabled now. It can be changed to SD card by choosing the other flag. Only one can be enabled at a time.

```
@REM*****
@REM USB Function Module
@REM
@REM If using the USB Function Module, such as ActiveSync, the
@REM environment variable BSP_NXC26_USBFN muse be set to 1.
@REM
@REM NOTES:
@REM   The two environment variable,
@REM       1. BSP_NXC26_USB_ACTIVESYNC
@REM       2. BSP_NXC26_MASS_STORAGE_SDMMC
@REM
@REM   CAN NOT set to 1 at the same time, as they use the same
@REM   USB port.
@REM
@REM*****
SET BSP_NXC26_USBFN=1
SET BSP_NXC26_USB_ACTIVESYNC=
SET BSP_NXC26_MASS_STORAGE_SDMMC=1
```

4.1.7 Disk Drives on NXC2620

Two disk drives one fixed and other removable can be found in the NXC2600DVB2 board.

- NAND flash (85 Mbytes)
- SD card (up to 2 GB)

SD card can be hot plugged. **Storage Manager** can access both the disks.

4.1.8 WiFi Driver Installation

Unzip the catalog components to a specific directory as below..

Qcom LR802UKG: C:\WINCE500\3rdparty\Qcom\LR802UKG

In the Platform Builder, import “**QcomLR802UKG.cec**” file.

EPSON WN6501CEP2: C:\WINCE500\3rdparty\EPSON\WN6501CEP2

In the Platform Builder, import “**EPSON-WN6501CEP2.cec**” file.

Ralink RT2501USB: C:\WINCE500\3rdparty\Ralink\RT2501USB

In the Platform Builder, import “**RalinkRT2501USB.cec**” file.

4.1.9 GPU SM502 Driver Installation

Unzip the catalog component to a specific directory as below..

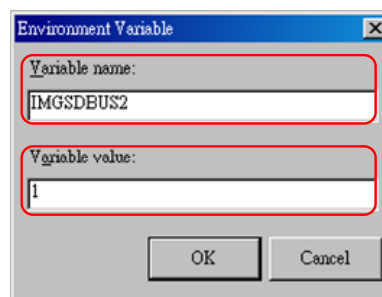
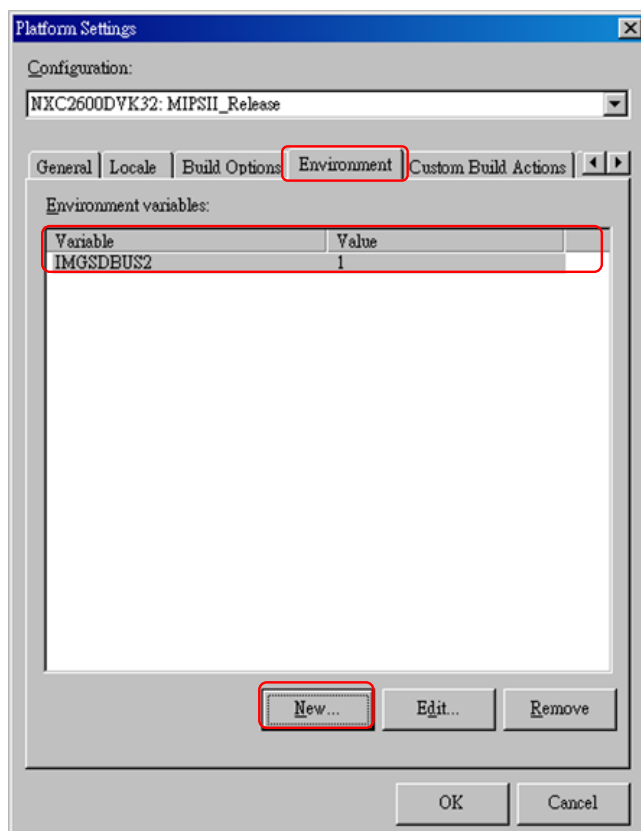
SM502: C:\WINCE500\3rdparty\Silicon_motion\SMIVGX

In the Platform Builder, import “**smivgx5.cec**” file.

4.1.10 SDHC Driver Installation

Please follow steps to install SDHC driver as below...

- PB → Platform → Settings → Environment → New...
- Add "Variable name" → "IMGSDBUS2"
- Add "Variable Value " → "1"



4.2 Linux 2.6

- Files

Bootloader & Kernel Files

File Name	Describe
u-boot.bin	Boot loader for NOR Flash
u-boot-nand.bin	Boot loader for NABD Flash
ulmage.kernel	Linux Kernel

Root File System

File Name	Describe
nxc2600-nfsroot-yyyymmdd.tar.bz2	NFS root file system
Nxc2600-sd-yyyymmdd.img	SD card image (Linux 2.6 root file system)
nxc2600-nand-yyyymmdd.tar.bz2	NAND root file system

Patch Files

File Name	Describe	Version
Linux-2.6.23-nxc2600-0.3.0-20080625-patch.bz2	Linux Kernel patch	0.3.0.
u-boot-1.2.0-nxc2600-0.3.0-20080625-patch.bz2	u-boot patch	0.3.0

Tool Chain

File Name	Describe
mipsel-linux-nxc2600-20071121.tar.bz2	Tool chain

Other Driver

File Name	Describe
rt73-cvs-2007111600.tar.bz2	Ralink rt2571wf driver

4.2.1 Boot Loader Installation

- Please refer to chapter 3 to set-up development environment and start TFTP Service first.
- Connect JDI to Linux PC via USB cable. This provides JDI's power supply.
- Connect JDI to network via Ethernet cable.
- Connect JDI to DVK 3.2 board JTAG port.
- Connect Linux PC to DVK3.2 board UART 0 via RS232 cable.(Default console port is UART 0 on DVK 3.2 board)

Note: Alpha2 or later, default console port change to UART 0

- Execute "minicom" on Linux PC – 57600/8N1
- Power ON DVK 3.2 board
- Telnet to JDI – **telnet 192.168.1.201**
- Boot up from NAND Flash

JDI> nerase 0 2

JDI> nprog 0 u-boot-nand.bin

- Execute "minicom" on Linux PC – 57600/N81 then press "RESET" button on DVK 3.2 board to restart boot loader. Then see the prompt as below...

NXC2600#

Note: User can update boot loader as below...

NXC2600#run update_b

4.2.2 Linux Kernel Installation

- Default network parameters of boot loader as below

Host IP: 192.168.1.3

Server IP: 192.168.1.60

- Change Host IP and Server IP as below

NXC2600# set ipaddr 192.168.xxx.xxx

NXC2600# set serverip 192.168.xxx.xxx

NXC2600# save

- Execute command to update Linux kernel as below...

NXC2600#run update_k

- Execute "minicom" on Linux PC – 57600/N81 then press "RESET" button on DVB2 board to restart Linux kernel. Then see the message as below...

Waiting for root device /dev/mmc1k0p2...

4.2.3 Root File System Installation

- Root File System on SD card
 - Create 2 partitions in SD card, use “**fdisk**” to create partitions.
#fdisk /dev/mmcblk0
 - First partition: FAT format for demo files.
 1. User can put any demo files (*.jpg, *.mp3 etc...) into this partition.
 2. This partition mounts on /mnt/demo in NXC2600 platform system.
 - Second partition: Root File System, 120 MB or higher and install as below...
#dd if=/path/to/rootfs.img of=/dev/mmcblk0p2
- Root File System on NAND Flash
 - untar the file “nxc2600-nand-20080625.tar.bz2” on Linux PC
#tar jxvf /path/to/nxc2600-nand-20080625.tar.bz2 -C /nfsroot/nxc2600
 - copy all files into NAND Flash on nxc2600 DVK 3.2
#mount /dev/mtdblock3 /mnt -t yaffs2
#cp -dprR /nxc2600-nand/* /mnt
#umount /mnt

x

4.2.4 Linux Boot up options

There are 2 ways to boot up Linux on NXC2600 platform.

- Normal Boot Up (default bootup)

NXC2600# run defaultboot

- NFS Boot Up

NXC2600# run nfsboot

by default the nfsroot entry is "serverip:/nfsroot/nxc2600". change entry by:

NXC2600# set nfsargs set bootargs mem=\\${memsize} console=\\${console}

root=/dev/nfs rw ip=\\${ipaddr} nfsroot=\\${serverip}:/path/to/nfsroot

NXC2600# save

- NAND Flash Boot Up

NXC2600# run nandboot

NOTE: if u-boot is not bootup program, you must pass mtd device partitions for system's offset by:

NXC2600# set nandargs set bootargs mem=\\${memsize}

console=\\${console} root=/dev/mtdblock3 rw ootfstype=yaffs2

mtdparts=nxc2600-nand:256k@\${rootfs_addr}(uboot)ro,256k(p

arams),2048k(kernel),-(rootfs)

NXC2600# save

4.2.5 Tool Chain Installation

- Tool chain install as below...

#tar jxvf /path/to/mipsel-linux-nxc2600-20071121.tar.bz2 -C /

- Set Path

#set PATH=\$PATH:/opt/toolchain/mipsel-linux/bin

or

#export PATH=/opt/toolchain/mipsel-linux/bin

4.2.6 Create New Boot Loader

- Download u-boot(ver 1.2.0) source file - **u-boot-1.2.0.tar.bz2** from <http://www.denx.de/wiki/UBoot>
- Install u-boot source file to **/path/to/u-boot-1.2.0** as below...
#tar xjvf /path/to/u-boot-1.2.0.bz2 -C /path/to/u-boot-1.2.0
- Install u-boot patch file as below...
#cd /nxc2600/u_boot/u-boot-1.2.0
#bzipcat /path/to/u-boot-1.2.0-NXC2600-0.3.0-20080625-patch.bz2
|patch -p1
- Create boot loader to boot up from NOR flash
#cd /path/to/u-boot-1.2.0
#make distclean
#make nxc2600_dvb2_config
#make
#cp u-boot.bin /tftpboot/
- Create boot loader to boot up from NAND flash
#cd /path/to/u-boot-1.2.0
#make distclean
#make nxc2600_dvb2_nand_config
#make
#cp u-boot-nand.bin /tftpboot/

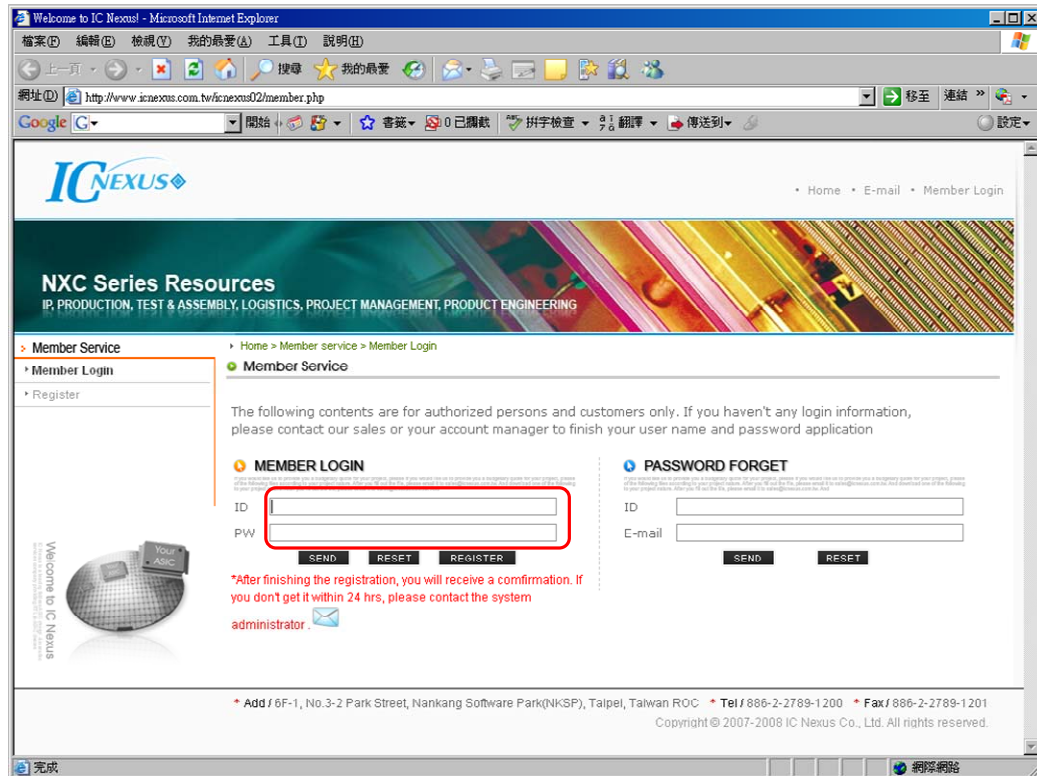
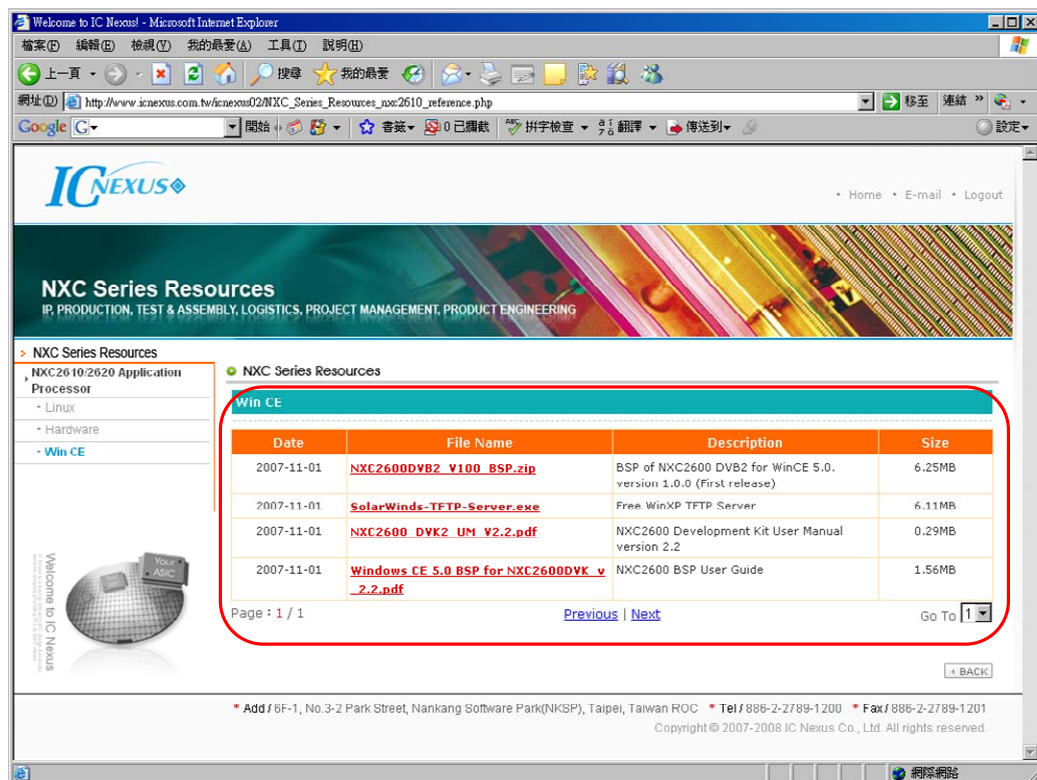
4.2.7 Create New Linux Kernel

- Download Linux kernel(ver 2.6.23) source file – **linux-2.6.23.tar.bz2** from <http://kernel.org>
- Install Linux kernel source file to **/path/to/linux-2.6.23** as below...
#tar xjvf /path/to/linux-2.6.23.tar.bz2 -C /path/to/linux-2.6.23
- Install Linux kernel patch file as below...
#cd /path/to/linux-2.6.23
#bzipcat /path/to/linux-2.6.23-NXC2600-0.3.0-20080625-patch.bz2
|patch -p1
- Create Linux kernel
#cd /path/to/linux-2.6.23
#cp arch/mips/defconfig .config
#make ulmage

5. BSP Download and Update

Please apply ID and password from our website first. Then download & update the latest WinCE 5.0 / Linux 2.6 BSP from the website.

IC Nexus website: <http://www.icnexus.com.tw/icnexus02/member.php>

Date	File Name	Description	Size
2007-11-01	NXC2600DVB2_V100_BSP.zip	BSP of NXC2600 DVB2 for WinCE 5.0, version 1.0.0 (First release)	6.25MB
2007-11-01	SolarWinds-TFTP-Server.exe	Free WinXP TFTP Server	6.11MB
2007-11-01	NXC2600_DVK2_UM_V2.2.pdf	NXC2600 Development Kit User Manual version 2.2	0.29MB
2007-11-01	Windows CE 5.0 BSP for NXC2600DVK_v2.2.pdf	NXC2600 BSP User Guide	1.56MB

6. Electrical Characteristics

Standard Battery	Rechargeable Li-ion battery – 3.7 V, 1800 mAh
Backup Battery	3 V, 5 mAh, Coin Cell Battery
Power Adapter	AC 110/220 V (Input) to DC 5 V 3A (Output)