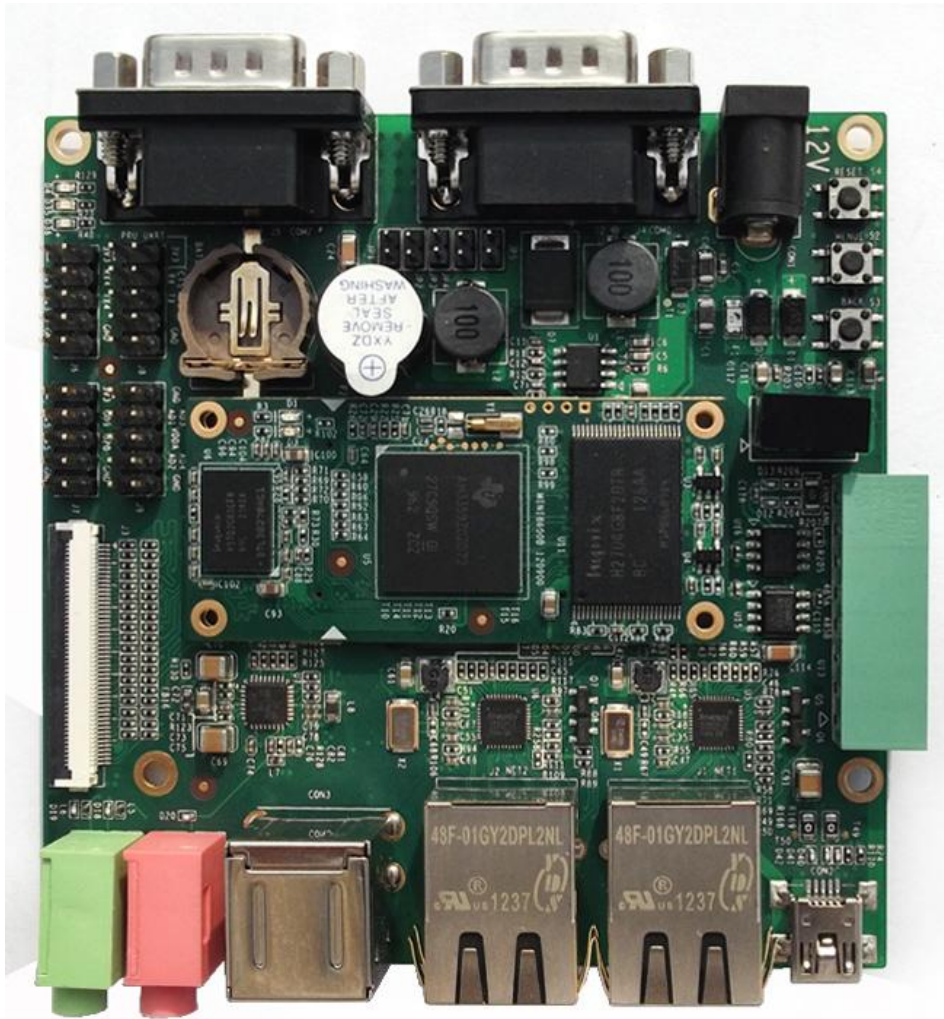


SBC8600B

Single Board Computer



Quick Operation Manual

Version 1.0 – Dec. 12, 2012

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Revision History:

Version	Date	Description
1.0	2012-12-21	Initial Version

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Chapter 1 Overview

The primary purpose of this document is to give users an overview of the software and hardware development environment of SBC8600B, and help users to start their development or to learn faster.

1) This document will cover the following points:

- Where to find the useful contents for different requirements;
- Packing list and DVD contents;
- Default configuration of software and hardware of the Single Board Computer;
- Building development environment of the Single Board Computer quickly;
- Booting up Linux/wince/Android operating systems quickly.

2) SBC8100 Plus optional modules list:

Table 1

Names	Linux	Android	WinCE	Relevant Materials
VGA8000	YES*	YES*	YES*	Available in DVD-ROM
WF8000-U	YES*	NO	NO	Available in DVD-ROM
CAM8100-U	YES*	NO	NO	Available in DVD-ROM
CDMA8000-U	YES*	NO	NO	Download
WCDMA8000-U	YES*	NO	NO	Download
LVDS8000	YES*	YES*	YES*	Available in DVD-ROM and on website

1.1 Getting Started Quickly

This section contains several tables that indicate where to find the useful contents for different requirements, so that users may start their jobs quickly.

For hardware development:

Table 2

Hardware system	Introducing CPU, peripheral chips and hardware interfaces	User Manual->Chapter 2 Hardware System
CPU Datasheet	Learning about principle and configuration of AM3359x	DVD -> \HW design\datasheet\CPU\
Schematic of SBC8600B	Learning about hardware principle of SBC8600B	DVD -> \HW design\schematic
Dimensions of SBC8600B	The actual dimensions of SBC8600B used to help make a mold	User Manual->Appendix-> Appendix I

For software development:

Table 3

Preparations for testing	Connecting external devices , seting up Hyperterminals and booting up the system	Quick Operation Manual->2.1 Establishment of hardware environment 2.2 Establishment of software environment
Testing functionalities of interfaces	Testing the interfaces on the board by using operating system	User Manual -> 3.8.2 Testing
DEMO demonstration	Establish a DEMO system (Android, TISDK)	User Manual -> 3.8.3.1 Android system demonstration 3.8.3.2 DVSDK System Demonstration
Establish developing and compilation environment	Linux developing and compilation environment	User Manual -> 3.4.1 Establishing development environment
	Windows Embedded Compact 7 developing and compilation environment	User Manual ->4.4.1 Installation of compilation tools 4.4.2 Uncompression of BSB and examples into IDE
Recompile system image	Recompile Linux system image	User Manual -> 3.4.2 System Compilation
	Recompile Windows Embedded Compact 7 system image	User Manual -> 4.4.3 Sysgen& BSP compilation
Software development	Refer to introduction of Linux driver and related driver development process	User Manual -> 3.5 Introduction of driver 3.6 Driver Development

	Refer to introduction of Windows Embedded Compact 7 driver and related driver development process	User Manual -> 4.4.4 Introduction of driver
StarterWare	Learning about the bare-metal programming and examples execution	DVD ->\Starterware\doc\SBC8600B Starterware User Manual_cn.pdf

For marketing:

Table 4

Hardware system	CPU features and the contest about on-board interfaces	User Manual->Chapter 2 Hardware System
Software of Linux /	Learning about basic Linux software components and features, and purpose of compilation tool	User Manual->3.2 Software Resources 3.3 Software Features
Windows Embedded Compact 7	Learning about basic software components of Windows Embedded Compact 7 and their features, and purpose of compilation tool	User Manual->4.2 Software Resources 4.3 Features
Dimensional drawing of SBC8600B	Refer to the actual dimensions of SBC8600B to bring convenience for opening die	User Manual->Appendix->Appendix I
DEMO demonstration	Establish a DEMO system (Android, TISDK)	User Manual->3.8.3.1 Android system demonstration 3.8.3.2 TISDK System Demonstration

For learning:

It is recommended reading each part of this Manual from the beginning to the end.

1.2 Development suite

SBC8600B provides two configuration modes: Standard Configuration and Full Configuration. The specific accessories for configuration are as follows:

Standard configuration

- SBC8600BSingle Board Computer (with Mini8600B)
- Serial port line (DB9-DB9)
- 12V@1.25A power adapter
- Crossover cable

Full configuration

- Standard Configuration of SBC8600Bevaluation board.
- 4.3-inch LCD display screen or 7-inch display screen (with touch screen)

Assorted DVD CD

- SBC8600B Quick Operation Manual
- SBC8600B User Manual
- SBC8600B Starterware User Manual
- Schematic Diagram of SBC8600B Hardware, Board Carrier Chip Datasheet
- Development Kit of SBC8600B Software (Linux/WinCE/Android/Starterware)

1.3 Factory default configuration

a) Configuration of hardware

SBC8600B default factory configuration: no RTC cell, no TF card.

b) Factory-setting parameters of software

- SBC8600BSingle Board Computerpreferably boots from NAND Flash by default, if you want to boot from TF Card,you need toshort the jumper **JP5** on the board.
- NANDFLASH is installed by default with linux3.2.0 operating system
- The default display device is 4.3-inch LCD.

Chapter 2 Quick Establishment of Development Environment

2.1 Establishment of hardware environment

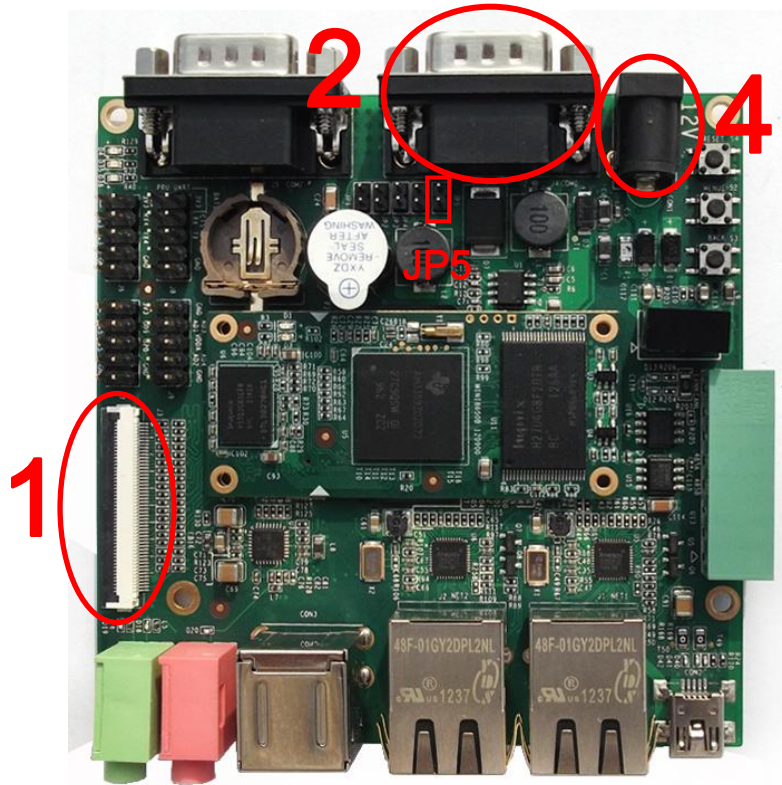


Figure 1-1

Please establish the hardware environment according to the following steps:

- 1) **Connect Touch-Screen LCD**
Connect your 4.3-inch/7-inch touch-screen LCD to the LCD interface, and keep the blue side of FPC cable up
- 2) **Connect Serial Ports**
Use serial cable to connect the debugger serial port and PC serial port of SBC8600B.
- 3) **If you want to boot from TF card, you need to short the jumper JP5**
- 4) **Connect the 12V power adapter to the evaluation board**

2.2 Establishment of software environment

2.2.1 Preparation of Windows XP system environment

Before powering up SBC8600B, a HyperTerminal needs to be set up on PC through the following steps:

- 1) On the desktop of Windows XP, click Start->Programs->Accessories->Communication->HyperTerminal, as shown below;

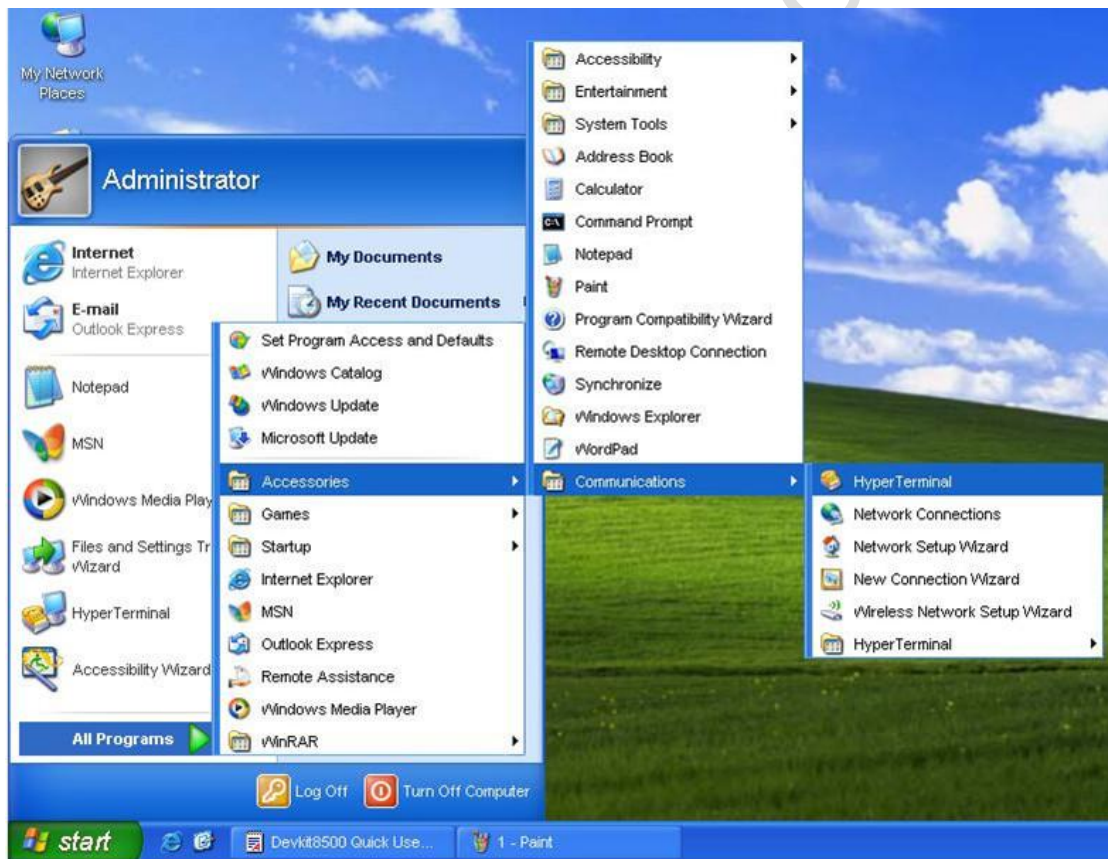


Figure 1-2

- 2) Establish a new HyperTerminal connection:



Figure 1-3

- 3) Select the specific serial port from the list according to your PC's COM port configuration:



Figure 1-4

- 4) Configure parameters for serial port connection as follows:

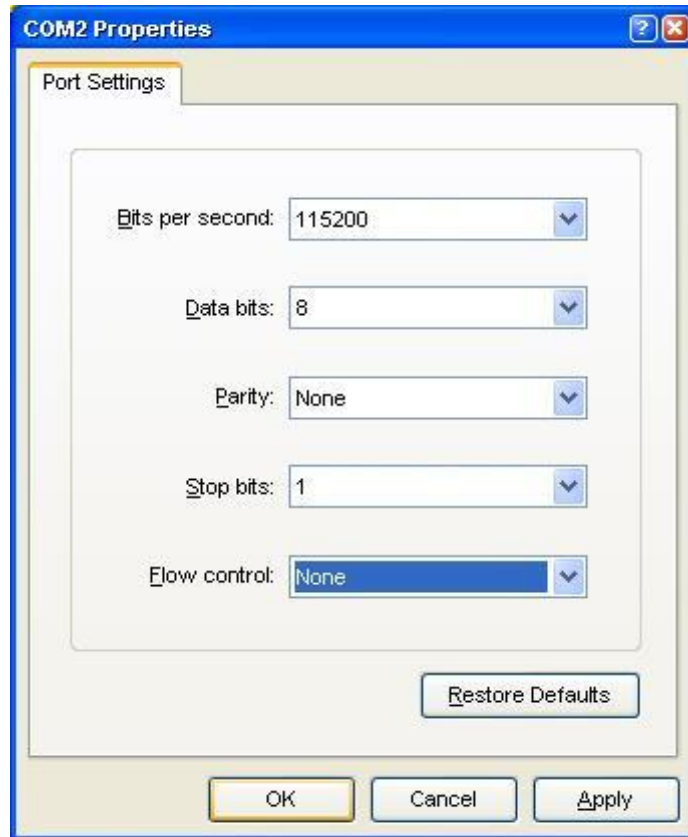


Figure 1-5

- 5) Now we have successfully established a Hyper Terminal connection with PC serial port:

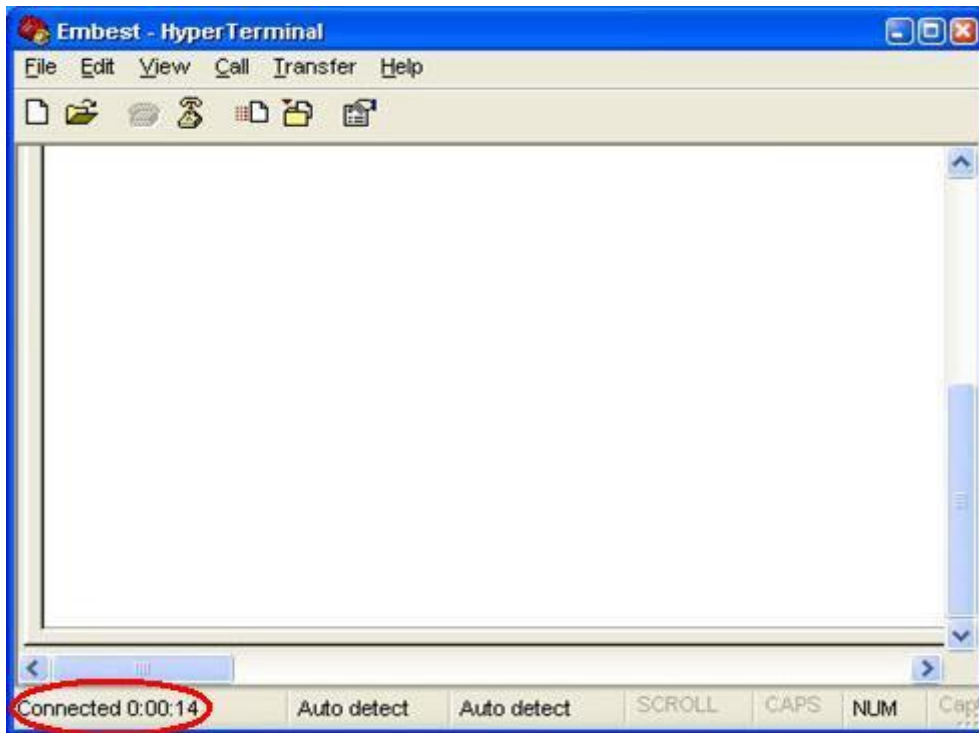


Figure 1-6

2.2.2 Notes for operating system image file

- Skip this step if what you have purchased is 4.3-inch touch screen.
- If you have a 7-inch touch screen, you can change the settings in UBOOT according to the detailed instructions contained in User Manual section 3.8.1 Selecting Display Mode.

Now we successfully established software and hardware environment for the system. We can turn on the power switch to start the development on SBC8600B.

Chapter 3 Quick Switching and Use of Operating Systems

SBC8600B supports three operating systems: Linux 3.2.0, WinCE6.0 and Android. This chapter mainly introduces how to switch between different operating systems and how to boot up from TF card and NAND Flash.

3.1 Quick operation of Linux system

3.1.1 Boot-up from TF card

1) Formatting TF Card

HP USB Disk Storage Format Tool 2.0.6 is recommended as the formatting tool:

Please download it from:

<http://www.embedinfo.com/english/download/SP27213.exe>

- a) Insert TF card into a card reader and then insert the reader into your PC.
- b) Open HP USB Disk Storage Format Tool to show the following window:

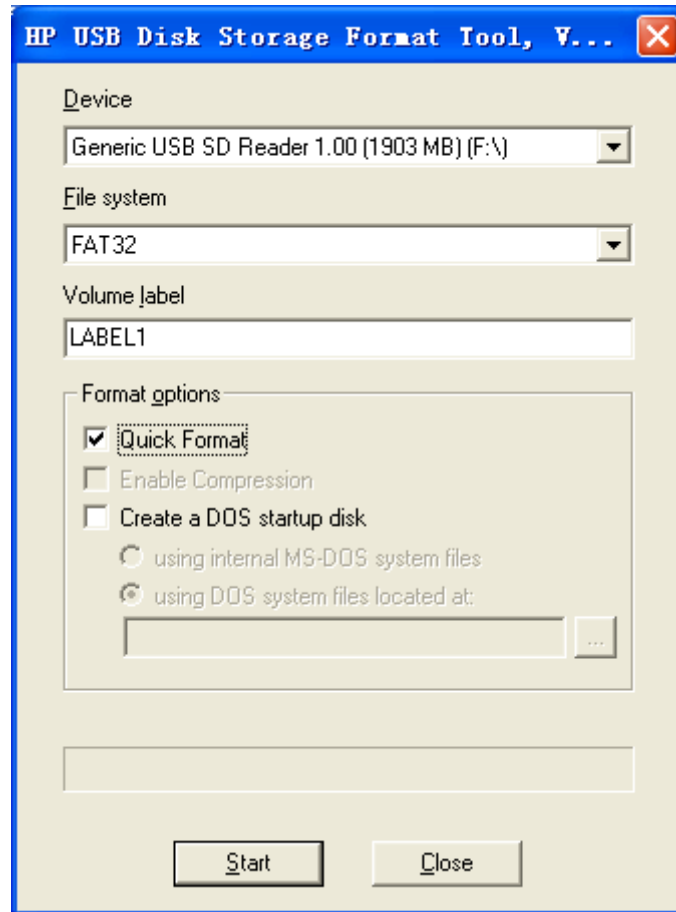


Figure 3-1

- c) Select “FAT32” file system
- d) Click “Start”
- e) When formatting is complete, click “OK”



Note:

HP USB Disk Storage Format Tool will erase partitions of TF card. If you want to maintain the partitions, please use the formatting software of Windows.

2) Image update

Copy all files under the directory linux\image to the TF card, insert it on the board, and then power up the board. The information on serial interface will be shown as below:

Note:

- 
 The default display is a 4.3-inch LCD. If you are working with the LCDs of other size, please enter u-boot when the board is booting up to configure the display mode, and then type boot to continue boot-up process. Please refer to 3.8.1 Selecting Display Mode of User Manual for more details
- 
 If there is already an image in NAND Flash, you need to short the jumper **JP5** on the board so as to make it boot up from TF card. Disconnect JP5 after successful boot-up of the system.

```

Booting from MMC...
OMAP SD/MMC: 0
reading u-boot.img
reading u-boot.img

U-Boot 2011.09-svn55 (Dec 04 2012 - 09:29:02)

I2C:  ready
DRAM:  512 MiB
WARNING: Caches not enabled
Did not find a recognized configuration, assuming General purpose EVM in Profile 0
with Daughter board
NAND:  HW ECC Hamming Code selected
512 MiB
MMC:   OMAP SD/MMC: 0
*** Warning - bad CRC, using default environment

Net:   cpsw
Hit any key to stop autoboot:  0
SD/MMC found on device 0
reading uEnv.txt

** Unable to read "uEnv.txt" from mmc 0:1 **
reading ulmage

3224184 bytes read
reading ramdisk.gz

12514633 bytes read
## Booting kernel from Legacy Image at 80007fc0 ...
Image Name:   Linux-3.2.0
  
```

```
Image Type:  ARM Linux Kernel Image (uncompressed)
Data Size:   3224120 Bytes = 3.1 MiB
Load Address: 80008000
Entry Point: 80008000
Verifying Checksum ... OK
XIP Kernel Image ... OK
OK

Starting kernel ...

Uncompressing Linux... done, booting the kernel.
Linux version 3.2.0 (luofc@TIOP) (gcc version 4.3.3 (Sourcery G++ Lite 2009q1-203) )
#17 Fri Dec 7 10:04:07 CST 2012
.....
.....
RAMDISK: gzip image found at block 0
VFS: Mounted root (ext2 filesystem) on device 1:0.
Freeing init memory: 260K
INIT: version 2.86 booting
Starting udevdevd (741): /proc/741/oom_adj is deprecated, please use
/proc/741/oom_score_adj instead.
tar: removing leading '/' from member names

Remounting root file system...
mount: mounting /dev/root on / failed: Invalid argument
mount: mounting /dev/root on / failed: Invalid argument
root: mount: mounting rootfs on / failed: No such file or directory
Setting up IP spoofing protection: rp_filter.
Configuring network interfaces... udhcpd (v1.11.3) started
Sending discover...
udhcpd: sendto: Network is down
Sending discover...
udhcpd: sendto: Network is down
Sending discover...
udhcpd: sendto: Network is down
No lease, failing
done.
Tue Jan 27 08:47:00 UTC 2009
INIT: Entering runlevel: 5
Starting syslogd/klogd: done

.....
|      |      .-
```



```
U-Boot SPL 2011.09-svn55 (Nov 20 2012 - 10:37:42)
Texas Instruments Revision detection unimplemented
Booting from MMC...
OMAP SD/MMC: 0
reading u-boot.img
reading u-boot.img

U-Boot SPL 2011.09-svn55 (Nov 20 2012 - 10:37:42)
I2C: ready
DRAM: 512 MiB
WARNING: Caches not enabled
Did not find a recognized configuration, assuming General purpose EVM in Profile 0
with Daughter board
NAND: HW ECC Hamming Code selected
512 MiB
MMC: OMAP SD/MMC: 0
*** Warning - bad CRC, using default environment

Net: cpsw
Hit any key to stop autoboot: 0 (press any key to enter uboot)
```

- b)** After entering the u-boot command line, type “run updatesys” to start update process of the system:

```
SBC8600# run updatesys

NAND erase.chip: device 0 whole chip
Erasing at 0x7fe0000 -- 100% complete.
OK
reading MLO

36079 bytes read
HW ECC BCH8 Selected

NAND write: device 0 offset 0x0, size 0x8cef
36079 bytes written: OK
reading u-boot.img

234896 bytes read
HW ECC BCH8 Selected

NAND write: device 0 offset 0x80000, size 0x39590
234896 bytes written: OK
```

```
reading ulmage

3224184 bytes read
HW ECC BCH8 Selected

NAND write: device 0 offset 0x280000, size 0x313278
3224184 bytes written: OK
reading ubi.img

14811136 bytes read
SW ECC selected

NAND write: device 0 offset 0x780000, size 0xe20000
Skip bad block 0x00ce0000
14811136 bytes written: OK
```

Flashing LED on the board indicates that the update has been finished; please remove TF and reboot the board.

3) U-boot configuration

The system image has a default setting for 4.3-inch LCD. You can change the settings in UBOOT according to the detailed instructions contained in 3.8.1 Selecting Display Mode of User Manual.

3.2 Quick operation of WinCE system

3.2.1 Boot-up from TF card

1) Formatting TF card

HP USB Disk Storage Format Tool 2.0.6 is recommended as the formatting tool; You can download it from <http://www.embedinfo.com/english/download/SP27213.exe>

- a) Insert TF card into a card reader and then insert the reader into PC.
- b) Open the HP USB Disk Storage Format Tool, the following window will appear.

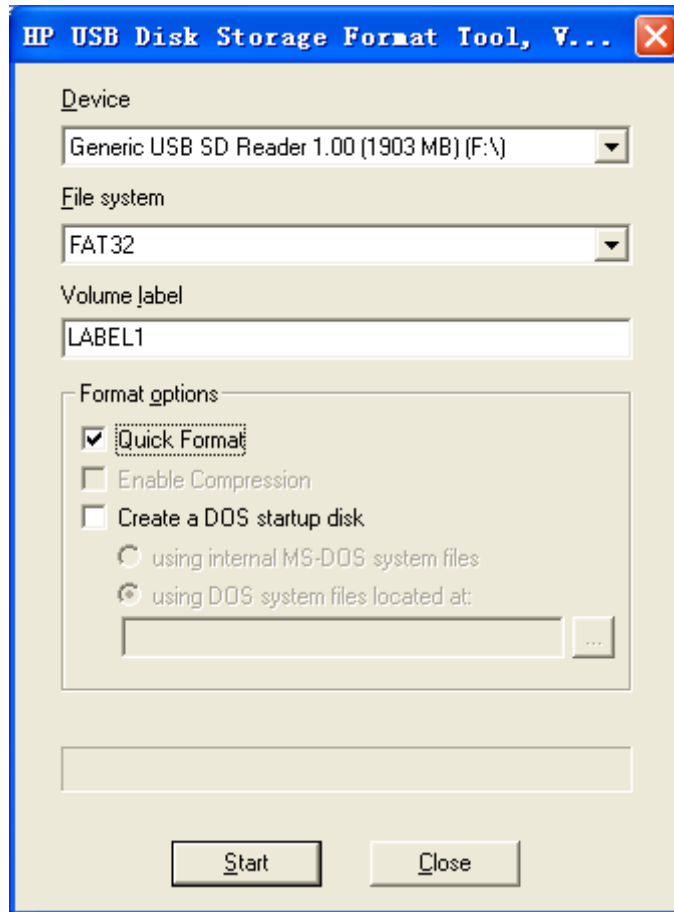



Figure 4-1

- c) Select “FAT32” file system
- d) Click “Start”
- e) Click “OK” when it’s complete

Note:

 HP USB Disk Storage Format Tool will erase partitions of TF card. If you want to maintain the partitions, please use the formatting software of Windows.

2) Copy runtime image

Copy **MLO**, **EBOOTSD.nb0** and **NK.bin** image files under `CD\WINCE700\image` to the TF card;

3) System Boot-up

Insert TF card, reboot the system from TF card and press Space in a few seconds to enter to the EBOOT menu as shown below:

a) Enter EBOOT Menu

```
CCCCCCCC
Texas Instruments Windows CE SD X-Loader33X
Built Jul 27 2012 at 11:25:59
Version BSP_WINCE_ARM_A8 02.30.00.03
open ebootd.nb0 file
Init HW: controller RST
SDCARD: requested speed 1000000, actual speed 1000000
SDCARD: requested speed 25000000, actual speed 19200000
read ebootd.nb0 file

jumping to ebootd image

Microsoft Windows CE Bootloader Common Library Version 1.4 Built Jul 27 2012
11:23:05
I2C EEPROM returned wrong magic value 0xffffffff
INFO:OALLogSetZones: dpCurSettings.ulZoneMask: 0x8409

Texas Instruments Windows CE EBOOT for AM33x, Built Jul 27 2012 at 11:25:53
EBOOT Version 0.0.1, BSP BSP_WINCE_ARM_A8 02.30.00.03
AHCLKX pinmux:0
AHCLKX CTRL:0x8001
pin function:0x0
pin dir:0x8000000

TI AM33X

ecc type:3
System ready!
Preparing for download...
INFO: Predownload...
Checking bootloader blocks are marked as reserved (Num = 18)

BOOT_CFG_SIGNATURE is different, read -1, expect 1111705159
WARN: Boot config wasn't found, using defaults
INFO: SW3 boot setting: 0x04
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) <<<
e0311800 56e4 -> 0 18 31 e0 e4 56
e0311800 57e4 -> 0 18 31 e0 e4 57
Hit space to enter configuration menu [56] 5...(press SPACE to enter EBOOT menu)
```

b) Type [2]->[2] to set the board to boot up from TF card

```
-----
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
[0] Exit and Continue

Selection: 2

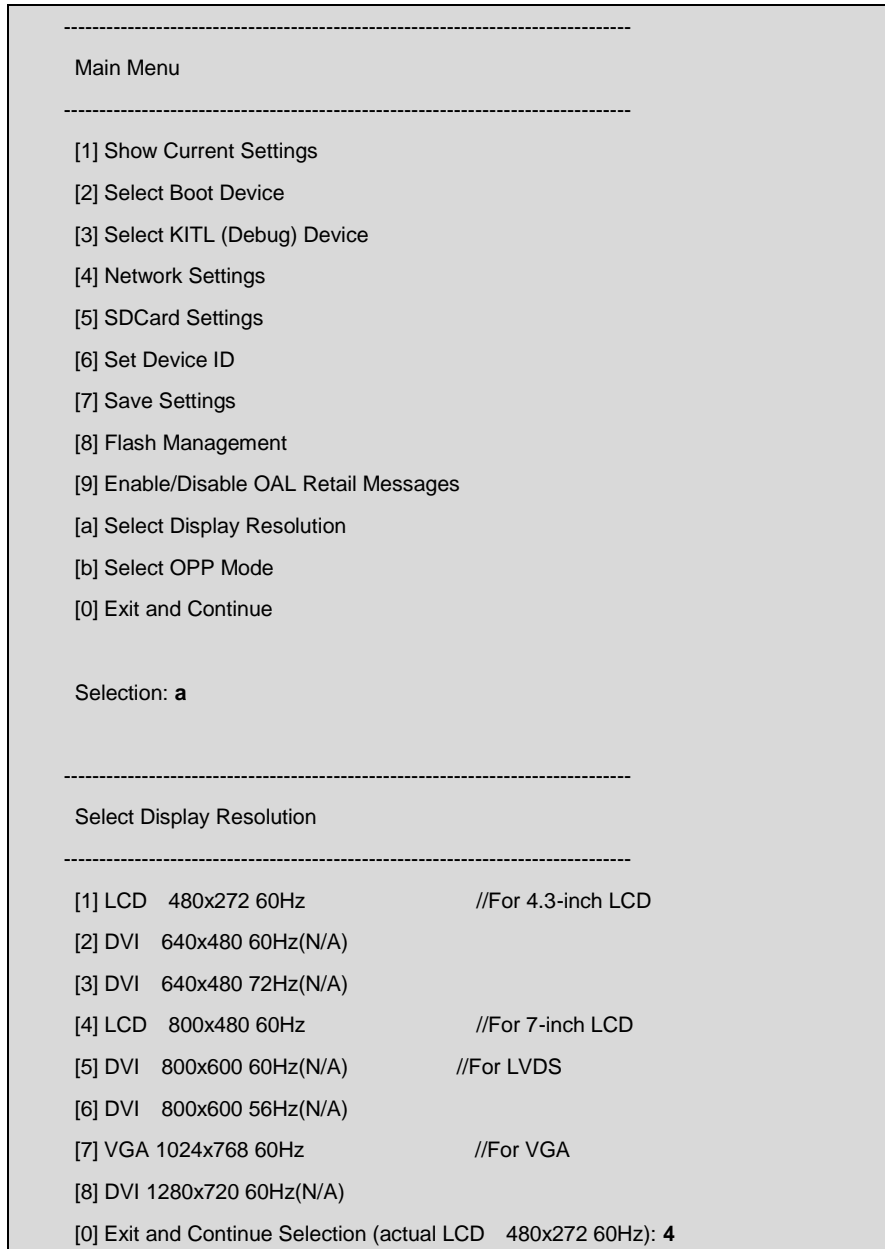
-----

Select Boot Device
-----

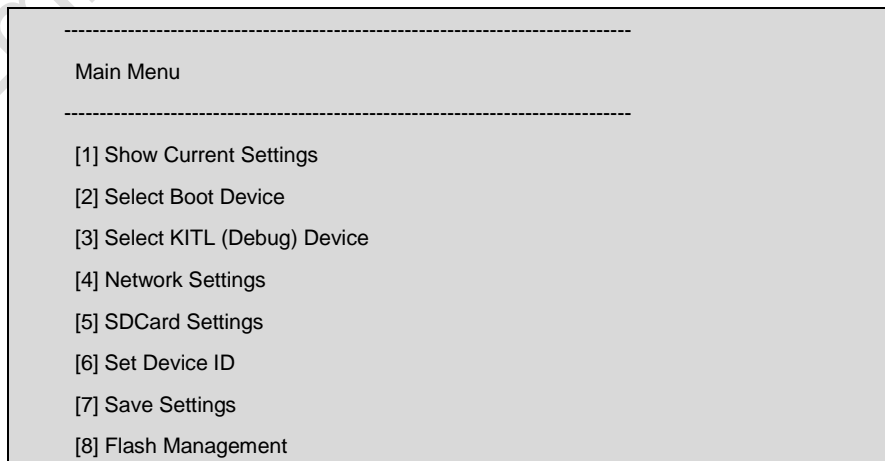
[1] Internal EMAC
[2] NK from SDCard FILE
[3] NK from NAND
[0] Exit and Continue

Selection (actual Internal EMAC): 2
Boot device set to NK from SDCard FILE
```

c) Type [a] to enter “Select Display Resolution” menu and select LCD/LVDS as the output



d) Type [0] to continue the boot-up process



```
[9] Enable/Disable OAL Retail Messages
[a] Select Display Resolution
[b] Select OPP Mode
[0] Exit and Continue

Selection: 0
mode = 3
LcdPdd_LCD_GetMode:3
mode = 3
LcdPdd_LCD_Initialize:3
OEMPreDownload: Filename nk.bin
Init HW: controller RST
SDCARD: requested speed 1000000, actual speed 1000000
SDCARD: requested speed 25000000, actual speed 19200000

BL_IMAGE_TYPE_BIN

+OEMMultiBinNotify(0x8feb24d8 -> 1)
Download file information:
-----
[0]: Address=0x80002000 Length=0x03c9e9bc Save=0x80002000
-----

Download file type: 1
+OEMIsFlashAddr(0x80002000) g_boot.type 1
-----
-----rom_offset=0x0.
..ImageStart = 0x80002000, ImageLength = 0x3c9e9bc, LaunchAddr = 0x8000b6a0

Completed file(s):
-----
+OEMIsFlashAddr(0x80002000) g_boot.type 1
[0]: Address=0x80002000 Length=0x3c9e9bc Name="" Target=RAM
ROMHDR at Address 80002044h
Launch Windows CE image by jumping to 0x8000b6a0...

Windows CE Kernel for ARM (Thumb Enabled)
CPU CP15 Control Register = 0xc5387f
CPU CP15 Auxiliary Control Register = 0x42
I2C EEPROM returned wrong magic value 0xffffffff
+OALTimerInit(1, 24000, 200)
--- High Performance Frequency is 24 MHz---
```


3.2.2 Boot-up from NAND Flash

1) Formatting TF card

Please refer to the contents of 3.2.1 Update of TF Card.

2) Copy runtime image

Copy **MLO**, **EBOOTND.nb0**, **NK.bin**, **XLDRNAND.nb0** and **EBOOTSD.nb0** image files under CDWINCE700\image to the TF card.

3) Update of NAND Flash image files

Insert TF card, reboot the system from TF card and press Space in a few seconds to enter to the EBOOT menu, and then follow the steps listed below:

- Type [8] to enter the Flash menu;
- Type [9]->[4]->[A], [9]->[3]->[B] and [9]->[2]->[C] to write XLDR, EBOOT and NK images;
- Type [0] to return to the main menu, and then type [2] and [3] to select boot-up from NAND Flash; Type [A] to select LCD/DVI display mode; Type [7] and [y] to save the boot-up settings;

Remove TF card and reboot the system. The system will boot from NAND Flash.

3.3 Quick operation of Android system

SBC8600B provides Android system demonstration, please follow the steps listed below:

- 1) Copy all files under the directory \linux\demo\Android\image of the DVD-ROM to a TF card;
- 2) Insert the TF card on the board and short jumper JP5, and then power on the board. The debugging tool will show the following information:

```

CCCCCCC
U-Boot SPL 2011.09-svn55 (Dec 04 2012 - 09:36:25)
Texas Instruments Revision detection unimplemented
Booting from MMC...
OMAP SD/MMC: 0
reading u-boot.img
reading u-boot.img
    
```

```
U-Boot 2011.09-svn55 (Nov 22 2012 - 11:35:28)

I2C:  ready
DRAM:  512 MiB
WARNING: Caches not enabled
Did not find a recognized configuration, assuming General purpose EVM in Profile 0
with Daughter board
NAND:  HW ECC Hamming Code selected
512 MiB
MMC:   OMAP SD/MMC: 0
*** Warning - bad CRC, using default environment

NAND erase.chip: device 0 whole chip
Skipping bad block at 0x03620000
Erasing at 0x1ffe0000 -- 100% complete.
OK
reading MLO

36079 bytes read
HW ECC BCH8 Selected

NAND write: device 0 offset 0x0, size 0x8cef
 36079 bytes written: OK
reading flash-uboot.img

234620 bytes read
HW ECC BCH8 Selected

NAND write: device 0 offset 0x80000, size 0x3947c
 234620 bytes written: OK
reading ulmage

2719416 bytes read
HW ECC BCH8 Selected

NAND write: device 0 offset 0x280000, size 0x297eb8
 2719416 bytes written: OK
reading ubi.img

72744960 bytes read
```

```
SW ECC selected
```

```
NAND write: device 0 offset 0x780000, size 0x4560000
```

```
72744960 bytes written: OK
```

3) When the writing process is complete, on-board LED will be flashing. Please remove TF card and the jumper cap. Power on the board again to load Android operating system;

4) U-boot configuration

The system image has a default setting for 4.3-inch LCD. You can change the settings in UBOOT according to the detailed instructions contained in 3.8.1

Selecting Display Mode.

Technical Support and Warranty

Technical Support



Embest Technology provides its product with one-year free technical support including:

- Providing software and hardware resources related to the embedded products of Embest Technology;
- Helping customers properly compile and run the source code provided by Embest Technology;
- Providing technical support service if the embedded hardware products do not function properly under the circumstance that customers operate according to the instructions in the documents provided by Embest Technology;
- Helping customers troubleshoot the products.



The following conditions will not be covered by our technical support service. We will take appropriate measures accordingly:

- Customers encounter issues related to software or hardware during their development process;
- Customers encounter issues caused by any unauthorized alter to the embedded operating system;
- Customers encounter issues related to their own applications;
- Customers encounter issues caused by any unauthorized alter to the source code provided by Embest Technology;

Warranty Conditions

- 1) 12-month free warranty on the PCB under normal conditions of use since the sales of the product;
- 2) The following conditions are not covered by free services; Embest Technology will charge accordingly:
 - A. Customers fail to provide valid purchase vouchers or the product identification tag is damaged, unreadable, altered or inconsistent with the products.
 - B. Products are damaged caused by operations inconsistent with the user manual;
 - C. Products are damaged in appearance or function caused by natural disasters (flood, fire, earthquake, lightning strike or typhoon) or natural aging of components or other force majeure;
 - D. Products are damaged in appearance or function caused by power failure, external forces, water, animals or foreign materials;
 - E. Products malfunction caused by disassembly or alter of components by customers or, products disassembled or repaired by persons or organizations unauthorized by Embest Technology, or altered in factory specifications, or configured or expanded with the components that are not provided or recognized by Embest Technology and the resulted damage in appearance or function;
 - F. Product failures caused by the software or system installed by customers or inappropriate settings of software or computer viruses;
 - G. Products purchased from unauthorized sales;
 - H. Warranty (including verbal and written) that is not made by Embest Technology and not included in the scope of our warranty should be fulfilled by the party who committed. Embest Technology has no any responsibility;
- 3) Within the period of warranty, the freight for sending products from customers to Embest Technology should be paid by customers; the freight from Embest to customers should be paid by us. The freight in any direction occurs after warranty period should be paid by customers.

- 4) Please contact technical support if there is any repair request.

Note:

- c) Embest Technology will not take any responsibility on the products sent back without the permission of the company.

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