# EB-SAM9G45 WinCE User Manual





The Development Specialist Of Embedded System

**Revision History** 

| Rev | Date       | Description     |  |
|-----|------------|-----------------|--|
| 1.0 | 2011-05-20 | Initial version |  |

## Windows CE User Manual

| 1. How to use the winCE image in the CD-ROM             | 1 -  |
|---|------|
| 2. How to use the image compiled by yourself            | 1 -  |
| 3. WinCE principle of operation                         | 1 -  |
| 3.1. Running process                                    | 1 -  |
| 3.2. Storage structure and operating structure          | 2 -  |
| 4. Compile  | 3 -  |
| 4.1. Install BSP package                                | 3 -  |
| 4.2. Configure Project                                  | 3 -  |
| 4.2.1. Configure the project to release mode            | 3 -  |
| 4.2.2. Select board type and screen type                | 3 -  |
| 4.3. Compile the project to create images               | 5 -  |
| 5. Download   | 6 -  |
| 5.1. Automatically download                             | 6 -  |
| 5.2. Manual download                                    | 6 -  |
| 5.2.1. Enable NandFlash                                 | 7 -  |
| 5.2.2. Manual Download FIRSTBOOT.nb0                    | 7 -  |
| 5.2.3. Manual Download EBOOT.nb0,NK.nb0                 | 8 -  |
| 6. Use  | 9 -  |
| 6.1. Start winCE  | 9 -  |
| 6.2. How to use flash disk                              | 9 -  |
| 6.3. How to use SD Card                                 | 10 - |
| 6.4. How to use Windows Media Player to play a mp3 file | 11 - |
| 6.5. 10M Ethernet Test                                  | 11 - |
| 6.6. Touchscreen calibration                            | 13 - |
| 6.7. Use ActiveSync to communicate with PC              | 14 - |
| 7. WINCE BSP List                                       | 16 - |



## 1. How to use the winCE image in the CD-ROM

Location where the image: EB-SAM9G45-V110214\02-Images\Wince\_Image. There are three packages for three types screens, 4.3 inch, 7.0 inch and 10.2 inch. You can open EB-SAM9G45\_WinCE\_4.3\_LCD folder directly. This is an automatically downloaded package. Using <u>Automatically download</u>, press the reset key then it can run. If you want to run the image to see the effect, reference the chapter of <u>use</u>.

## 2. How to use the image compiled by yourself

Compiling image, move Firstboot.nb0, Eboot.nb0, NK.nb0 which in the directory of WINCE600\OSDesigns\AT91SAM9xxx\_DEMO\AT91SAM9xxx\_DEMO\RelDir\AT91 SAM9xxx\_ARMV4I\_Release to the automatically downloaded package, such as EB-SAM9G45\_WinCE\_4.3\_LCD folder under WinCE\_Image directory. Using Automatically download, press the reset key then it can run. If you want to run the image to see the effect, reference the chapter of use. Notes: xxx represents the chip type, for this board, xxx represents G45M10EK.

## 3. WinCE principle of operation

#### 3.1. Running process

When you power on the board, because of the characteristics of the hardware design, it will copy Firstboot.nb0 to SRAM and then let it run, when Firstboot.nb0 is running, Firstboot.nb0 can move Eboot.nb0 to SDRAM and then the Eboot.nb0 is running, when Eboot.nb0 is running, Eboot.nb0 then copy NK.nb0 to SDRAM and the NK.nb0 is running .So WinCE image begins to run.



#### **3.2.** Storage structure and operating structure



According to the file whose suffix is tcl in the automatically downloaded package, we can get the address of related images in the Nandflash.Eboot.nb0 is 0x80000,NK.nb0 is 0x200000.

Eboot.nb0 and NK.nb0 whose starting address in the SDRAM can be get from Eboot.bib and config.bib.

Eboot.nb0 and NK.nb0 must be compiled for the absolute address.



## 4. Compile

## 4.1. Install BSP package

Open WinCE folder in the CD-ROM, the directory name is 06-WinCE\_Source.Open Embest\_Code folder, double-click ATMEL9M10G45\_BSP.exe, Installation file can automatically select the directory according to the WinCE Installation directory. Users only need all the default settings when install it.

Move the folder of OSDesigns\AT91SAM9G45M10EK\_DEMO to directory of OSDesigns which is under the WinCE install path.

AT91SAM9G45M10EK\_DEMO.sln in the AT91SAM9G45M10EK\_DEMO folder is the project file, you can open directly by double-click it.

## 4.2. Configure Project

#### ? Configuration Manager ativo colution configuration Active solution <u>p</u>latform: AT91SAM9263EK Release Y Platform Builder-Specific (\_TGTCPU) v Project contexts (check the project configurations to build or deploy): Platform Build Project Configuration AT91SAM9263EK DEMO ~ AT91SAM9263EK Re... 💌 Platform Builder-Sp... Close

#### 4.2.1. Configure the project to release mode

#### 4.2.2. Select board type and screen type

This BSP can be used for two types of board, MBS-SAM9G45 and EB-SAM9G45.



You can select the type of board and the type of screen. For example, your board is MBS9G45 and your screen is 10.2. So your choice is as follow:



(Notes: View -> Other Windows -> Catalog Items View can open the dialog above.)

For this board ,the board choice is Embest EM9G45, and you can select the LCD Type according your screen.



### 4.3. Compile the project to create images



From

WINCE600\OSDesigns\AT91SAM9xxx\_DEMO\AT91SAM9xxx\_DEMO\RelDir\AT91 SAM9xxx\_ARMV4I\_Release we can get three images Firstboot.nb0,Eboot.nb0, NK.nb0.



## 5. Download

There are two ways to download, automatically download and manual download The essence of manual download is to download the images to the specified location in the Nandflash one by one. The essence of automatic download is let SAM-BA automatically download images according to the file whose suffix name is tcl. This file provide the images name which need to download and the address in the Nandflash.

You can use one of two ways to complete download.

#### 5.1. Automatically download

- (1) Set the board
- (2) Open the Image package of the disk
- (3) Click the bat script to download
- (4) Wait for downloading until finished
- (5) If the image has downloaded over, there will be a logfile.log file will appear
- (6) Reset the board, run the program.

#### 5.2. Manual download

Set the board, open the software of SAM-BA.



#### 5.2.1. Enable NandFlash

| 🐱 SAH-BA 2.10 - at91sam9g45-ek   |                    |
|--|--------------------|
| File Script File Link Help   |                    |
| at91sam9g45 Memory Display       Start Address : 0x300000       Refresh       Display format       Size in byte(s) : 0x100         Applet traces on DBGU         Infos         Apply |                    |
| 0x00300000 0xEA000020 0xFFFFFFF 0x0000000 0x08000000<br>0x00300010 0x003016D4 0x00000000 0x00000001 0x00000010   |                    |
|  |                    |
| DDRAM DataFlash AT45DB/DCB EEPROM AT24 NandFlash NorFlash SRAM SerialFlash AT25/AT26   | 1 Select "Flach"   |
| Send File Name : Send File   | I. Select Flash    |
| Address : 0x0 Size (For Receive File) : 0x1000 byte(s) Compare sent file with memory   | 2. Select "Enable  |
| Scripts Enable NandFlash Execute   | NandFlash"         |
|  | 3. Click "Execute" |
| -I- Memory Size : 0x10000000 bytes -I- Buffer address : 0x70003E34   |                    |
| -I- Buffer size: 0x20000 bytes<br>-I- Applet initialization done<br>(SAM-BA v2.10) 1 %   | Sucessful          |

#### 5.2.2. Manual Download FIRSTBOOT.nb0

| SAIL-BA 2.10                                      | <mark>– at91sa∎9g</mark> ∢<br>nk Help | l5-ek                    |                                 |                  |                        |                       |
|---|---------------------------------------|--------------------------|---------------------------------|------------------|------------------------|-----------------------|
| at91 sam9g45 Memory [                             | Display                               |                          |                                 |                  |                        |                       |
| Start Address : 0x3000<br>Size in byte(s) : 0x100 | 00 Refresh                            | Display format           | it 🦳 16-bit 🕥 32-bit            | Applet tra       | ces on DBGU<br>▼ Apply |                       |
| 0x00300000  | 0xEA000020                            | OxFFFFFFFF               | 0x00000000 0x                   | 00000080         |                        |                       |
| 0x00300010  | 0x003016D4                            | 0x00000000               | 0x00000001 0x                   | 0000010          | ~                      |                       |
| <   |                                       |                          |                                 |                  | >                      |                       |
|   |                                       | ROMAT24 NandEla          | sh NorFlash SBAM                | SerialFlach AT2  | 5/6726                 |                       |
| - Download ( Upload I                             |                                       | HOM ATZ4 Hanaria         |                                 | JenariashA12     | 5/A120                 |                       |
| Send File Name                                    |                                       |                          |                                 | Send             | File                   |                       |
| Beceive File Name :                               | <u>k</u>                              |                          |                                 | Beceiv           | e File                 |                       |
| Address :   | 0x0 Siz                               | e (For Receive File) : C |                                 | Compare sent fil | e with memory          |                       |
| Scripts   |                                       |                          |                                 |                  |                        | 1.Select "Send Boot F |
| Send Boot File                                    |                                       |                          | Execute                         |                  |                        |                       |
|   |                                       |                          |                                 |                  |                        | 2.Click "Execute"     |
|   |                                       |                          |                                 |                  |                        | Select bootstrap file |
| Writing: 0x1                                      | 410 bytes at 0x0                      | (buffer addr : 0x70      | 003E34)                         |                  | ^                      |                       |
| Writing: 0x1                                      | 410 bytes at 0x2                      | )000 (buffer addr :      | 0x70003E34)                     |                  |                        |                       |
| 0x1410 byte                                       | s written by apple                    | et                       | Bull - Sur second di stratica ( |                  |                        | Sucessful             |
| AM-BA v2.10) 1 %                                  |                                       |                          |                                 |                  | *                      |                       |

Operating Instructions: First step: Select sendBootFile , Second step,Click Execute button, select the FIRSTBOOT.nb0 file.



#### 5.2.3. Manual Download EBOOT.nb0,NK.nb0

| t91sam9m10 Memory Dis   | play           |  |                                    |  |   |     |  |
|---|----------------|--|------------------------------------|--|---|-----|--|
| tart Address : 0x300000<br>ize in byte(s) : 0x100   | Refresh        | Display format                             | bit 🦳 16-bit 🔎 32                  | -bit infos   | aces on DBGU<br>Apply                             | , j |  |
| 0x00300000 0  | XEA000020      | Oxffffffff                                 | 0x00000000                         | 0x08000000   |   | ^   |  |
| 0x00300010  | 0x003016E4     | 0x00000000                                 | 0x0000001                          | 0x00000010   |   |     |  |
| 0x00300020  | 0x00000000     | 0x00000000                                 | 0x00000000                         | 0x00000000   |   | ~   |  |
|   |                |  |                                    |  | 1   |     |  |
| DRAM DataFlash AT4  | 5DB/DCB   EEPP | ROM AT24 NandF                             | lash   NorFlash   SF               | RAM SerialFlash AT   | 25/AT26   | 1   | 1. Select <u>file name</u>   |
| DRAM DataFlash AT4<br>-Download / Upload File<br>Send File Name :<br>Receive File Name :  | 5DB/DCB   EEPP | ROM AT24 NandF                             | lash   NorFlash   Sf               | BAM SerialFlash AT<br>→ SenialFlash AT<br>SenialFlash AT<br>SenialFlash AT<br>SenialFlash AT | 25/AT26 )<br>1 File<br>ve File                    | ]   | <ol> <li>Select <u>file name</u></li> <li>Click "Send File"</li> </ol>                                   |
| DRAM DataFlash AT4<br>- Download / Upload File<br>Send File Name :<br>Receive File Name :<br>Address : Dx0                                  | 5DB/DCB   EEPF | ROM AT 24 NandF                            | lash NorFlash Sf                   | AM SerialFlash AT  | 25/AT26 ]<br>d File<br>ve File<br>ile with memory |     | <ol> <li>Select <u>file name</u></li> <li>Click "Send File"</li> </ol>                                   |
| DRAM DataFlash AT4<br>- Download / Upload File<br>Send File Name :<br>Receive File Name :<br>Address : Dxt<br>- Scripts                     | 5DB/DCB   EEPF | ROM AT24 NandF                             | lash NorFlash Sf                   | AAM SerialFlash AT   | 25/AT26   |     | <ol> <li>Select <u>file name</u></li> <li>Click "Send File"</li> <li>Select <u>file addre</u></li> </ol> |
| DRAM DataFlash AT4<br>- Download / Upload File<br>Send File Name :<br>Receive File Name :<br>Address : Dxt<br>- Scripts<br>Enable NandFlash | 5DB/DCB   EEPf | ROM AT24 NandF<br>e (For Receive File) :   | Iash NorFlash Sf<br>0x1000 byte(s) | AAM SerialFlash AT   | 25/AT26 )<br>d File<br>ve File<br>ile with memory |     | 1. Select file name         3. Click "Send File"         2. Select file addre                            |
| DRAM DataFlash AT4<br>- Download / Upload File<br>Send File Name :<br>Receive File Name :<br>Address : Dxt<br>- Scripts<br>Enable NandFlash | 5DB/DCB   EEPf | ROM AT24 NandF<br>e (For Receive File) : [ | Iash NorFlash Sf                   | AAM SerialFlash AT   | 25/AT26   |     | <ol> <li>Select <u>file name</u></li> <li>Click "Send File"</li> <li>Select <u>file addre</u></li> </ol> |

Instructions :

- (1) First step:select download file.
- (2) Second step :set the address
- (3) Third step click the SendFile button.

If you want to run the wince image successfully, you must download the three images of FIRSTBOOT.nb0 EBOOT.nb0 NK.nb0 to the boards.

| Set the board   |  |  |  |
|---|--|--|--|
| Install SAM-BA Software < If SAM-BA has been installed, Skip this step.   |  |  |  |
| Or not reference 04-tools\SAM-BA\sam-ba install >   |  |  |  |
| Install the board usb driver <if been="" driver="" has="" installed.skip="" step.<="" td="" the="" this="" usb=""></if> |  |  |  |
| Or not reference 04-tools\SAM-BA\the board driver install >   |  |  |  |
| Open the NandFlash jumper JP2 on the board. Reset the board   |  |  |  |
| Then you will see the following picture on your PC.   |  |  |  |
|   |  |  |  |
| 安全册除 atm6124.Sys ATMEL AT91xxxxx Test Board   |  |  |  |
|   |  |  |  |
| Close the NandFlash jumper JP2 on the board.  |  |  |  |



## 6. Use

#### 6.1. Start winCE

Because we set the start wince image information as the default setting in the eboot source code, so we can start eboot directly.

Boot screen is below:



#### 6.2. How to use flash disk

Use flash disk in WinCE is similar to use it in standard Windows OS. When startup the WinCE, insert the flash disk into the USB Host, at this time the board will power on the flash disk, and the LED in flash disk will blink, and the WinCE will load the flash disk after a few seconds. Then you can double click the "My Device" icon in the desktop, open the explorer you will see a new folder, this is your flash disk.



Double click "Hard Disk", you can read or write the flash disk.

Inserting the U disk before system up, or inserting U disk after system up, the system can recognize the SD card.

#### 6.3. How to use SD Card

WinCE supports SD Card plug and play. Insert SD Card into the SD slot in the board, then you can see the Storage Card folder in the explorer. Open this folder, you can read or write the SD Card.

Insert the SD card before system up,or insert SD card after system up ,the system can recognize the SD card.





#### 6.4. How to use Windows Media Player to play a mp3 file

Firstly insert the headphone to the LINE OUT interface in the board, and then insert a SD Card which has stored an mp3 file into the slot. Then in WinCE you can open this mp3 file and use Windows Media Player to play it, and you can listen to the music from the headphone.

Windows Media Player also can play WMV video files, and the way is same as the mp3 files, you should just double click it.



#### 6.5. 10M Ethernet Test

First connect the board and PC with a cross-ruling (or connect the board to a Switch using a straight-through Ethernet cable). Then click "My Device->Control Panel->Network and Dial-up Connections", open this interface:





Double click EMACB1 to open settings interface, the default settings are as follows, and you can configure it according to you network.

| <u>File Edit View Advanced</u>  | 🗙 🕋 💁 🔚 🕯   | ? ×                                    |
|---|---|--|
| 'EMACB Adapter' Settings  |   | ок 🗙                                   |
| IP Address Name Servers   |   |  |
| An IP address can be<br>automatically assigned to this<br>computer, If your network | <ul> <li>Obtain an IP add</li> <li>Specify an IP add</li> </ul> | dress via DHCP<br>Idress               |
| does not automatically assign<br>IP addresses, ask your network                     | IP <u>A</u> ddress:   | 192.168. 2 .115                        |
| administrator for an address,<br>and then type it in the space                      | S <u>u</u> bnet Mask:   | 255.255.255.0                          |
| provided.   | Default <u>G</u> ateway:  | 192.168.0.1                            |
|   |   |  |
|   |   | —————————————————————————————————————— |
| 🎸 🛸 Network Connections   |   | 😼 🕹 6:05 PM 🎬                          |

(Notes: This is the default Network setting. You must change according your network information.)

Use ping command in PC to test the network.



C:\\TINDOTS\system32\cmd.exe
C:\\TINDOTS\system32\cmd.exe
C:\\Documents and Settings\kevin>ping 192.168.2.115
Pinging 192.168.2.115 with 32 bytes of data:
Reply from 192.168.2.115: bytes=32 time<1ms TTL=128</p>
Reply from 192.168.2.115: bytes=32 time<1ms TTL=128</p>
Reply from 192.168.2.115: bytes=32 time<1ms TTL=128</p>
Ping statistics for 192.168.2.115:
Packets: Sent = 4, Received = 4, Lost = Ø (Ø% loss),
Approximate round trip times in milli-seconds:
Minimum = Øms, Maximum = Øms, Average = Øms
C:\Documents and Settings\kevin>

#### 6.6. Touchscreen calibration

After power on the board, you can see the calibration interface, as follows. You can press the cross to calibrate the touchscreen. If the calibration is successful, you can enter into the WinCE interface, or you should calibrate again.

Click "My Device" -> "Control Panel" -> "Stylus" -> "Calibration", Interface as follows:



Click"Recalibrate", we can see the calibration interface as follows, if Calibration

13



#### success you can enter WinCE operation interface, or you need to calibration again.



#### 6.7. Use ActiveSync to communicate with PC

Use the ActiveSync provided by Microsoft, you can make synchronous communication between the board and PC, and you can transfer files easily or do remote debug. You only need to install the ActiveSync with all default setting. After install ActiveSync, connect the board with PC using a USB line, and then reset the board. After WinCE startups, you can see a pop-up dialog in PC and the ActiveSync in the right bottom of the task bar turns to green.





Then you can see the Windows Mobile in "My Computer". Open Windows Mobile, you can see all the files of the board. Now you can read files from the board, or copy files to the board.





## 7. WINCE BSP LIST

| Туре          | Function     | Description   |
|---------------|--------------|---|
|               | FirstBoot    | Boot Eboot, provide<br>source and the last<br>image<br>FIRSTBOOT.nb0  |
| Bootloader    | Eboot        | Provide source and<br>the last image<br>Eboot.nb0<br>Eboot Function:<br>1.NET download:<br>Can set Mac<br>address, static IP,<br>dynamic DHCP IP,<br>and download<br>WinCE kernel<br>2.FormatNandFlash<br>3.Set startup delay<br>time<br>4.Set the kernel<br>address in the<br>NandFlash, the<br>address in the<br>RAM, and the size<br>of the kernel |
|               | Kernel       | Version: WinCE6.0   |
| 内核及底层驱动程<br>序 | System Clock | System Clock drive,<br>use PITC Control<br>unit<br>★provide source  |
|               | Display      | LCD driver,support<br>4.3 inch 480 * 272<br>screen ,★provide<br>source  |
|               | Touchscreen  | Touchscreen<br>driver,★provide<br>source  |
|               | EEPROM       | EEPROM<br>driver,★provide   |

The Development Specialist Of Embedded System \_ 16



| hv | Fmhos   | 21 |
|----|---------|----|
| Dу | LIIIDOG | ינ |

|                 |            | source                   |
|-----------------|------------|--------------------------|
|                 | EMACB      | NET driver, ★            |
|                 | EMAGE      | provide source           |
|                 |            | FMD mode                 |
|                 | NandElash  | NandFlash                |
|                 |            | driver,★provide          |
|                 |            | source                   |
|                 |            | Micro SD card            |
|                 | SDHC       | driver,★provide          |
|                 |            | source                   |
|                 | Serial     | Serial driver,           |
|                 | Senar      | ★provide source          |
|                 |            | USB Host                 |
|                 |            | driver,support EHCI      |
|                 | USB Host   | and OHCI                 |
|                 |            | modes,★provide           |
|                 |            | source                   |
|                 |            | USB Device               |
|                 |            | driver, ★ provide        |
|                 |            | source                   |
|                 | USB Device | Function:                |
|                 |            | Synchronization          |
|                 |            | with PC                  |
|                 |            | Audio driver,            |
|                 |            | support                  |
|                 |            | WM8731,I2C               |
|                 | WAVEDEV    | transmit command,        |
|                 |            | SSC transmit             |
|                 |            | data,★provide            |
|                 |            | source                   |
|                 |            | PWMC                     |
|                 | PWM        | driver. * provide        |
|                 |            | source                   |
|                 |            | DMA                      |
|                 | DMA        | driver. <b>★</b> provide |
|                 | 2          | source                   |
|                 |            | SPI driver.              |
|                 | SPI        | *provide source          |
|                 | I2C        | I2C driver +             |
|                 |            | provide source           |
|                 |            | Use to transmit data     |
| Synchronization | Microsoft  | between PC and           |
| Software in PC  | Activesync | board with LISR line     |
|                 |            |                          |

The Development Specialist Of Embedded System \_ 17



| bv  | Embe   | 5 |
|-----|--------|---|
| ~ y | LIIIDO | - |

| Download tools in | HyperTerminal  | Serial debug<br>terminal, USB<br>download the image<br>tool |
|-------------------|----------------|---|
|                   |                | SAM-BA downloads  |
| FU                |                | Bootloader and kernel                                       |
|                   | SAM-BA1.13+USB | to NandFlash on the   |
|                   |                | board through the USB                                       |
|                   |                | line  |