

SAM4S-EK2 Test Software

Hardware board: RevA
Test software: V1.1

Revision Table:

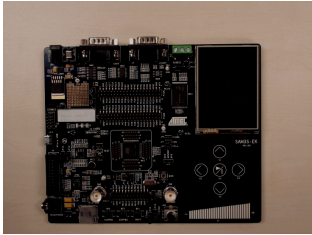




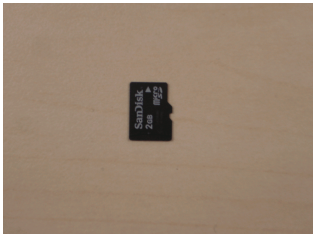

Revision	Date	Comments
0.1	Jun 02, 2012	Temporary version
1.0	Jul 02, 2011	First version
1.1	Jul 05, 2011	SD card section integrated

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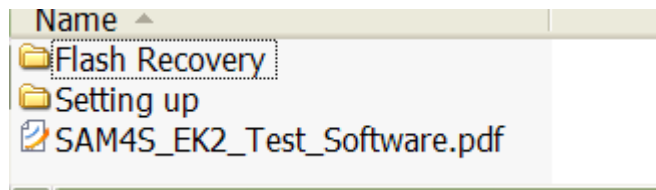
1 Requirements

1.1 Hardware Requirements

SAM4S-EK2 :		5V power supply :	
serial cross cable :		micro-USB Cable :	
headphone :		micro-SD card :	
PC with serial COM port and USB port Windows2000/XP		DB9 Serial loopback plug(Female) :	 DB9 / F 

1.2 Software Requirements

An archive file which contains all the test files and tools mentioned in this user guide is provided for use. Please extract all its contents to your local disk just like:

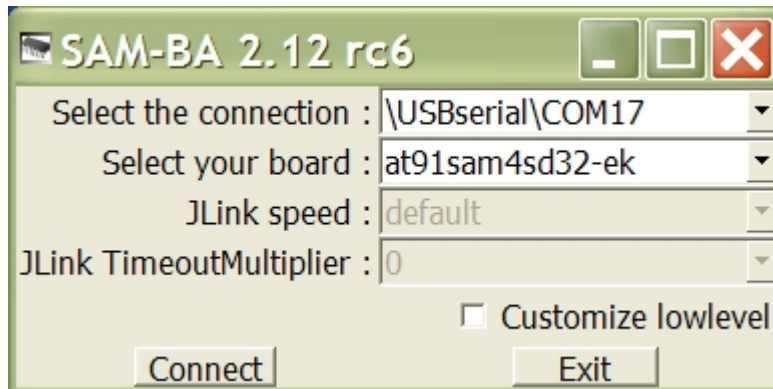


Note: please update antivirus software on your PC with latest virus definition.

2 Preliminary (mandatory) software setup

2.1 SAM-BA

SAM-BA (Boot Assistant) is one of the tools provided in ATMEL AT91 In-System Programming (ISP) solution. It provides an easy way for programming AT91 family microcontrollers using a graphical or command-line interface. It is also possible to create powerful scripts which can then be run via the command line, enabling the automation of many tasks. Those scripts can be hand written by the programmer or recorded through the graphical interface.



- Ø During our test, we will need **SAM-BA** tool to program the testing board. So please install **SAM-BA v2.12** provided with this document.

Note: any other version of SAM-BA previously installed on your PC should be removed.

3 Jumpers setting

EK boards are delivered with all Jumpers in their default setting.

Summary:

Place all the Jumpers in default setting

Detail:

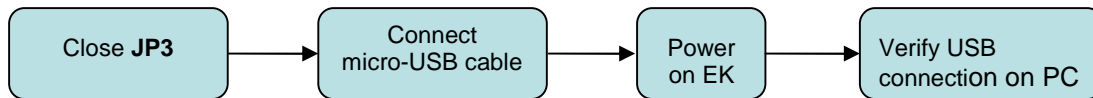
1. Before the test, please check that all Jumpers are in default status.

The table below lists all Jumpers on EK board and their default setting.

Designation	Default Setting	Feature
JP1	Open	Close to select JTAG boundary scan
JP2	2-1	Analog reference voltage selection: 2-1: 3.3V 2-3: 3.0V
JP3	Open	ERASE: close to reinitialize internal Flash contents and some of its NVM bits
JP4	Open	Test: close for manufacturing test or fast programming mode
JP5	Close	VPLL: access for current measurement
JP6	Close	VIO: access for current measurement
JP7	Close	VIN: access for current measurement
JP8	Close	VCORE: access for current measurement
JP9	Close	NandFlash chip select enable
JP11	Close	RS485 bus termination enable
JP10 JP12	Open	RS485 pull resistor selectors
JP13	Close	LCD chip select enable
JP14 JP15	Open	Sync close to degrade gain stage on microphone input
JP16	Open	Close for impedance matching on AD BNC port
JP18	2-1	ADC input selection: 2-1: potentiometer 2-3: BNC port
JP17 JP19	Open	Close to mux RIN/LIN into MONO-IN path within audio PA
JP20	Open	Close to fix in mono speaker mode, no matter stereo plug state
JP21	Open	Close for impedance matching on DA BNC port
JP22 JP23 JP24	2-1	DC voltage selection for PIO expansion ports: 2-1: 5V 2-3: 3.3V
JP25 JP26	Close	Open to disable Button BP2 and BP3
JP27	Close	Power consumption measure for ZigBee module
JP29	2-1	AUDIO Amplifier power select between +5V and VCC33
JP30	2-1	DAC output between AUDIO left channel and BNC connector
JP31	2-1	RS232 USART and RS485 selection

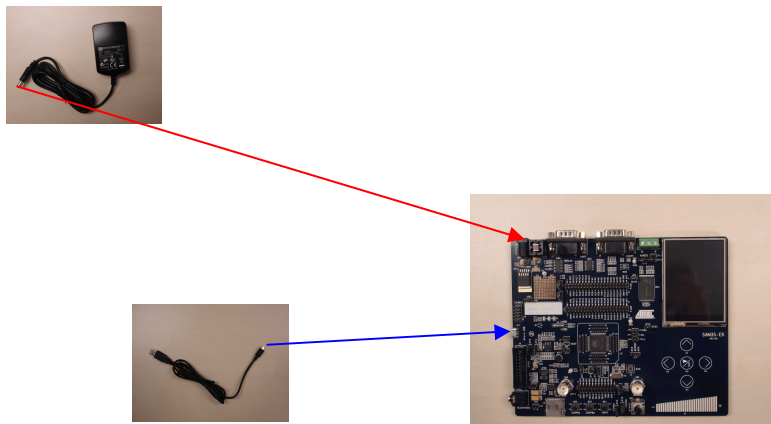
4 USB driver checking

Summary:



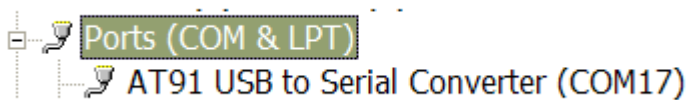
Detail:

1. **Close** Jumper JP3.
2. **Connect** EK board to PC via micro-USB Cable.



3. **Plug in** 5V power supply to power on EK board.

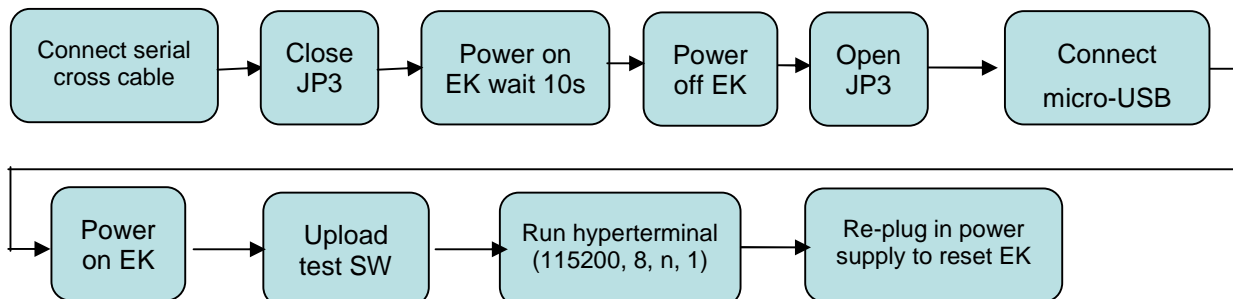
Verify that the USB connection is established open “Device Manage” and you can see “AT91 USB to Serial Converter”.



5 Test software upload

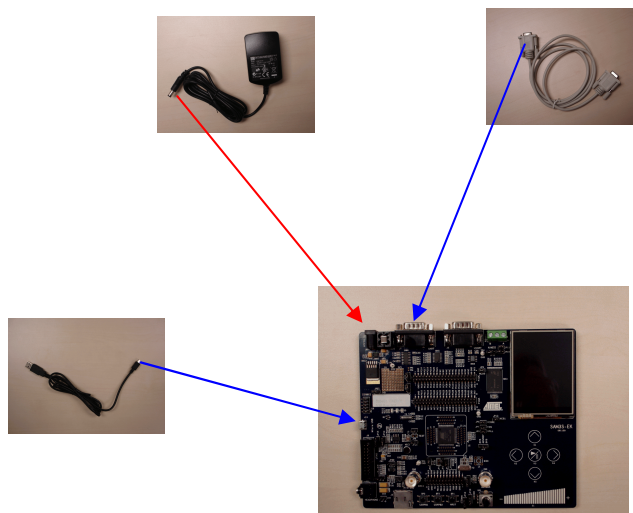
Follow below steps to upload test software into the EK board.

Summary:



Detail:

1. **Connect** serial cross cable between EK board and PC COM port.
2. **Connect** micro-USB between EK board and PC USB port.



3. Launch SAM-BA boot:

- I Close Jumper JP3.
- I Power on EK and wait 10-20 seconds.
- I Power off EK and open JP3.
- I Connect EK board to PC via micro-USB Cable.
- I Plug in 5V power supply to power on EK board.
- I Verify the USB connection is established.

4. Launch *SAM4SEK2_TestprogramRecovery.bat* by double-click on it under: *\Flash Recovery*.

A MS-DOS Window should appear, like:

```
X:\SAM4S-EK2_test_10_full\Flash Recovery>sam-ba.exe \usb\ARM0 at91sam4sd32-ek SA
M4SEK_TestprogramRecovery.tcl 1>logfile.log
```

5. Wait about 10 seconds and verify internal flash has been programmed correctly when *logfile.log* appear at the end of programming.

```
-I- Waiting ...
-I- TCL platform : Windows NT
-I- SAM-BA 2.12 rc6 on : windows
current connection is \usb\ARM0, \usb\ARM0 to be matched
-I- Retrieved arguments from command line :
-I- argv 0 : \usb\ARM0
-I- argv 1 : at91sam4sd32-ek
-I- argv 2 : SAM4SEK_TestprogramRecovery.tcl
0
\USBserial\COM17
-I- Connection : \USBserial\COM17 (target(comType) = 0)
-I- Board : at91sam4sd32-ek
-I- Traces Level : 4
-I- target(handle) : 18420552
Read device Chip ID at 0x400e0640 --- get 0x00000000
Read device Chip ID at 0x400e0740 --- get 0x29a70ee0
-I- Found processor : at91sam4sd32 (Chip ID : 0x29a70ee0)
sourcing device file C:/Program Files/Atmel/sam-ba_2.12_rc6/sam-
ba.exe/./tcl_lib/devices/at91sam4sd32.tcl
sourcing board description file C:/Program Files/Atmel/sam-ba_2.12_rc6/sam-
ba.exe/./tcl_lib/at91sam4sd32-ek/at91sam4sd32-ek.tcl
-I- Loading applet applet-lowlevelinit-sam4sd32.bin at address 0x20000800
-I- Memory Size : 0x0 bytes
-I- Buffer address : 0x4
-I- Buffer size: 0x0 bytes
-I- Applet initialization done
-I- Low level initialized
-I- Loading applet applet-flash-sam4sd32.bin at address 0x20000800
-I- Memory Size : 0x200000 bytes
-I- Buffer address : 0x20002224
-I- Buffer size: 0x10000 bytes
-I- Applet initialization done
-I- FLASH initialized
-I- Command line mode : Execute script file : SAM4SEK_TestprogramRecovery.tcl
-I- === SAM4S-EK product test software Programming ===
-I- === Send executable bin into Flash ===
-I- Send File ./test-board-project-at91sam4s-ek2-flash.bin at address 0x400000
first_sector 0 last_sector 6
-I- Complete 0%
-I- Writing: 0xCC88 bytes at 0x0 (buffer addr : 0x20002224)
-I- 0xCC88 bytes written by applet
-I- === Send .wav file ===
-I- Send File ./sound.wav at address 0x420000
first_sector 16 last_sector 29
-I- Complete 0%
-I- Writing: 0x10000 bytes at 0x20000 (buffer addr : 0x20002224)
-I- 0x10000 bytes written by applet
-I- Complete 58%
-I- Writing: 0xB408 bytes at 0x30000 (buffer addr : 0x20002224)
```

```
-I-      0xB408 bytes written by applet
-I- === Init internal Flash ===
-I- Loading applet applet-flash-sam4sd32.bin at address 0x20000800
-I- Memory Size : 0x200000 bytes
-I- Buffer address : 0x20002224
-I- Buffer size: 0x10000 bytes
-I- Applet initialization done
-I- === Chang GPNVM to Boot from Flash ===
-I- GPNVM1 set
-I- === End of Flash programming ===
```

Close the window of this file.

6. Open hyper terminal console on PC (115200, 8, N, 1).

7. Re-plug in 5V power supply to reset EK board.

The EK board should boot from internal flash.

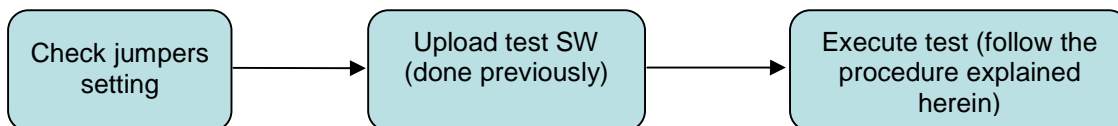
8. Check output information on hyper terminal and it looks like:

```
=====
TEST BOARD APPLICATION
Board : AT91SAM4S-EK2 RevA
Version: 1.1 (Jul 5 2012 - 13:37:25)
=====
-----
Tests list
-----
01  DBGU
02  COM
03  Led
04  Button
05  Nand
06  SDCard
07  LCD
08  TSC
09  AD&DA
10  QTOUCH
11  RESET
-----
-I- Hit 'w' to launch test sequence or
-I- hit 'x' to do one test
```

6 Test EK board

In this chapter, our test software will perform a full test for components on EK board.

Summary:



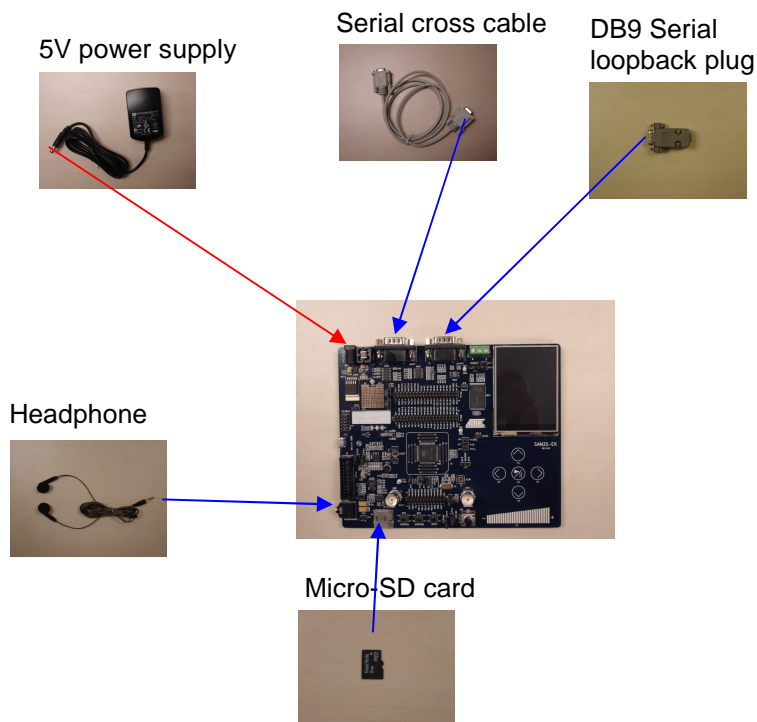
Detail:

1. Here, we assume test software has been uploaded to the EK board.

For more information please refer to chapter 5.

2. Make sure the jumpers are set in default setting as explained in chapter 3.
3. **Un-plug** 5V power supply to power off EK board if connected.
4. **Plug** DB9 Serial loopback plug to J5 on board.
5. **Connect** serial cross cable between J7 on board and PC COM port.
6. **Connect** a headphone to J11 on board.
7. **Insert** a micro-SD card into slot J3 on board.

The below picture shows the connections:



- ```
=====
TEST BOARD APPLICATION
Board : AT91SAM4S-EK2 RevA
Version: 1.1 (Jul 5 2012 - 13:37:25)
=====

Tests list

01 DBGU
02 COM
03 Led
04 Button
05 Nand
06 SDCard
07 LCD
08 TSC
09 AD&DA
10 QTOUCH
11 RESET

-l- Hit 'w' to launch test sequence or
-l- hit 'x' to do one test
```

- ```

-|- DBGU : TEST OK !!!
***** TEST OK *****

```

- I- Led :TEST OK !!!

***** TEST OK *****

[illegible]

-I- Button : Start...

-I- Button : Press any key to abort test !

-I- Button : Push button BP2

***** TEST OK *****

13. **Push** button BP2 and BP3 on EK board.
Make sure each button tested ok.

-I- Button : Push button BP2 -> Ok

-I- Button : Push button BP3 -> Ok

***** TEST OK *****

14. **Make sure** NANDFLASH is tested OK.

-I- Nand :Start...

-I- Nand :The NAND CS jumper has to be already closed!

```
-I- Nandflash ID is 0x9590DA2C
```

```
-I- Nand :Nandflash driver initialized
```

-I- Size of the whole device in bytes : 0x10000000

-l- Size in bytes of one single block of a device : 0x20000

-I- Number of blocks in the entire device : 0x800

-I- Size of the data area of a page in bytes : 0x800

-I- Number of pages in the entire device : 0x40

-I- Number of pages in the entire device : 0x40

-I- Bud width : 0x8

-I- Nand :TEST OK !!!

***** TEST OK *****

15. **Make sure** micro-SD is tested ok.

[illegible]

-I- SDCard :Start...

-I- SDCard :Please connect a SD card ...

-I- SDCard :SD card connection detected

-I- SDCard :Cannot check if SD card is write-protected

-I- PMC_EnablePeripheral: clock of peripheral 11 is already enabled

-I- SDCard :Please connect an SD, MMC or SDIO card.

-I- SDCard :Card information:

-I- SDCard :SD card.

-I- SDCard :Card access speed: 12000 KHz

-l- SDCard :Card size: 1931264 KB

Card R/W and performance test:

Total test size: 1048576 B

R/W uint size: 4096 B

Write test... Done: speed is 446 KBps

Read test... Done: speed is 2162 KBps

Data verification... OK

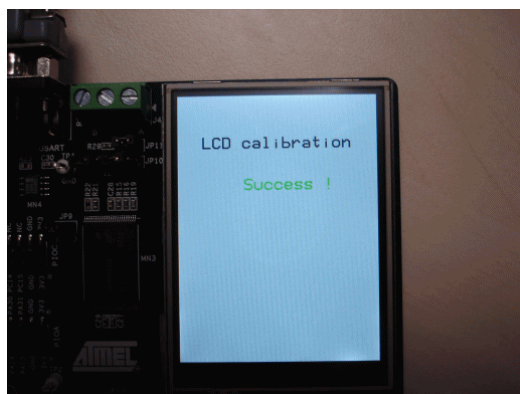
***** TEST OK *****

[illegible]

-I- LCD :Start...

-I- LCD :hit 'Y' if display is OK and 'N' if not

***** TEST OK *****



18. **Test** ADC and DAC.

```
-I- AD&DA :Start...
-I- AD&DA :wav_size = 0x1b3dc
-I- AD&DA :P1:Adjust vr1 and voltage(AD5) range should be 0-3300mv
-I- AD&DA :P2:Headphone(R channel) is playing the wav file
-I- AD&DA :P3:MIC input should be played on headphone(L channel)
-I- AD&DA :hit 'Y' if all parts are tested OK!
```

```

-!- AD&DA :AD5 in=1287mV    D5 in=1286mV
-!- AD&DA :TEST OK !!!
***** TEST OK *****
Hit 'Y' if part1, part2 and part3 are tested OK.

```

19. Test Qtouch.

[illegible]

Press every button and check the monitor information on HyerTerminal.
For example, if you press K1, message shows up:
-I- QTOUCH :Sensor_1/K1 Press
When you release it, message shows up:
-I- QTOUCH :Sensor_1/K1 Release

Hit 'Y' if all buttons and slider are tested OK.
***** TEST OK *****

20. Test Reset.

```
-l- >>>>>>>>>>>>>>>>>>>-l- >>>>>>>>>>>>>>>>>>
-l- RESET :Start...
-l- RESET :(this test does not test the reset but the button reset)
-l- RESET :Press button Reset or press any key to cancel
Push reset button BP1 on board (test button BP1).
```

```
-I- RESET :TEST OK !!!
***** TEST OK *****
```

Then, you can get a summary. Please double check all test items are tested OK.

Tests result

01 DBGU : OK
02 COM : OK
03 Led : OK
04 Button : OK
05 Nand : OK
06 SDCard : OK
07 LCD : OK
08 TSC : OK
09 AD&DA : OK
10 QTOUCH : OK
11 RESET : OK

***** TEST OK *****

-I- hit any key to continue...

7 Pack EK board

Follow below steps to pack EK board:

1. **Disconnect** all cables connected to EK board.
2. Set the jumpers back to the default settings described in chapter 3.
3. **Put** EK board in a protective anti-static package and pack.