

# SAM4S-XPLD Test Software

Hardware board: RevB  
Test software: V1.2

**Revision Table:**



Revision	Date	Comments
0.1	Jun 15, 2012	Temporary version
1.0	Jun 29, 2012	First version

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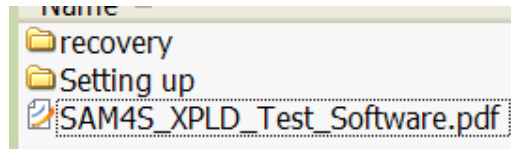
# 1 Requirements

## 1.1 Hardware Requirements

SAM4S-XPLD :			PC with serial COM port and USB port <i>Windows2000/XP</i>
micro-USB Cable :			

## 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.

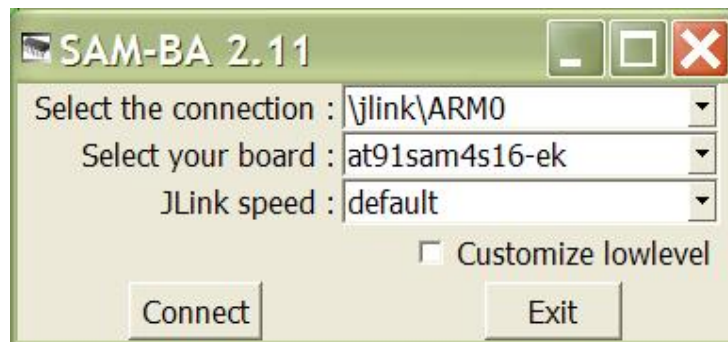
## 2 Preliminary (mandatory) software setup

### 2.1 JLINK

JLINK\_ARM is a simulator for ARM core, there is an on-board JLINK with CDC virtual UART channel on XPLD, which can facilitate Debug and programming, JLinkARM V4.42 or higher version (Setup\_JLinkARM\_V442.zip) and JLinkCDCDriver (Install\_JLinkCDCDriver.exe) are needed! You can find them in folder setting up of the test package.

### 2.2 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 v2.11** provided with this document. Patch "SAM-BA\_2.11\_sam4s\_patch\_0.1.zip" should be installed after SAM-BA installed. (unzip it and copy the files into SAM-BA folder)
- Ø XPLD shares the SAM-BA configuration of AT91SAM4S16-EK

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

### 3 Jumpers setting

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

Summary:

Place all the Jumpers in default setting

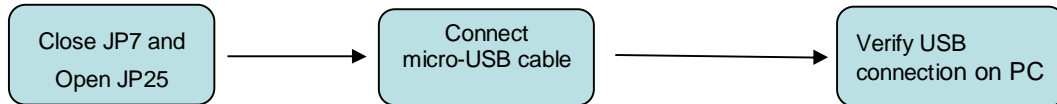
Detail:

Before the test, please check that all Jumpers are in default status.  
The table below lists all Jumpers on XPLD board and their default setting.

Designation	Default Setting	Feature
JP7	Close	Power SAM4S16
JP25	OPEN	Erase SAM4S16

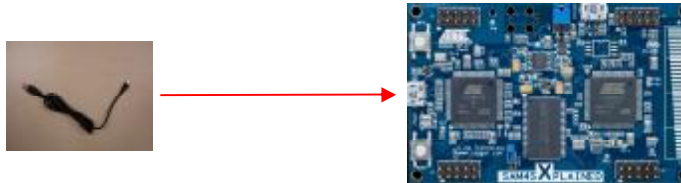
## 4 USB driver checking

Summary:

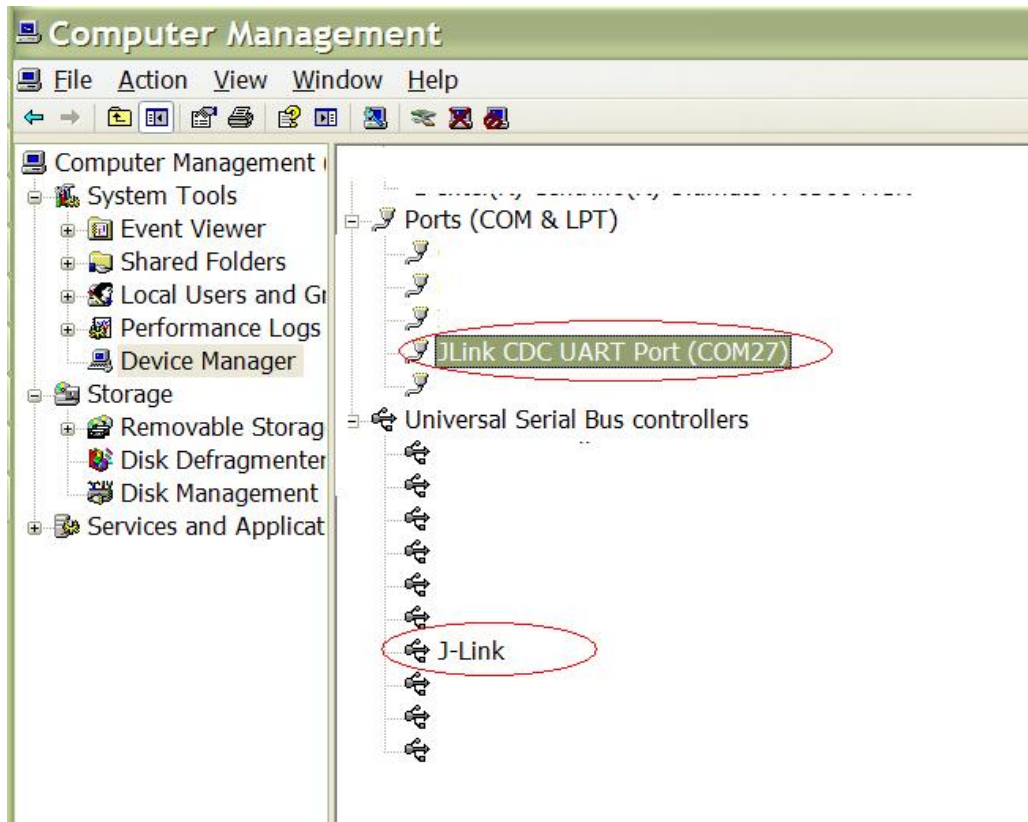


Detail:

1. **Close** Jumper JP7 and open JP 25.
2. **Connect** XPLD board (J21) to PC via micro-USB Cable.



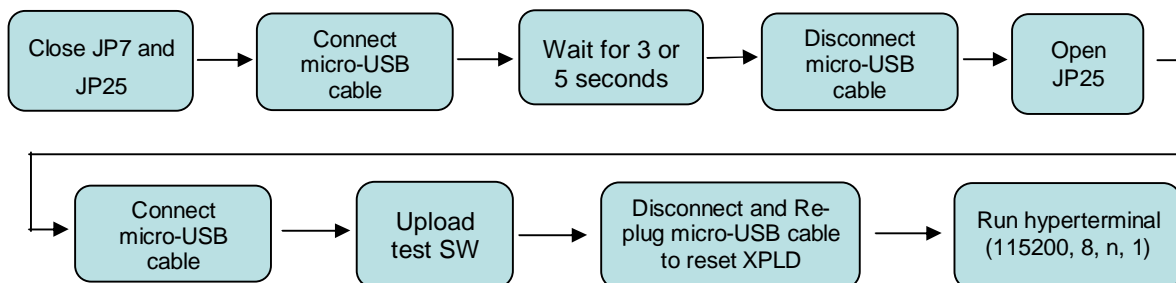
3. **Verify** that the USB connection is established open "Device Manager" and you can see "JLink CDC UART Port (COM XX)" in Ports (COM & LPT) category and "J-Link" in Universal Serial Bus Controllers category.



## 5 Test software upload

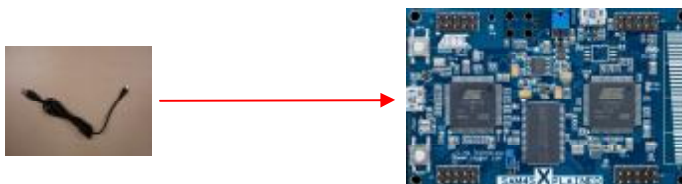
Follow below steps to upload test software into the XPLD board.

Summary:



Detail:

1. **Close** JP7 and JP25.
2. **Connect** micro-USB between XPLD board and PC USB port.
3. **Wait for** 3 or 5 seconds.
4. **Disconnect** micro-USB between XPLD board and PC USB port.
5. **Open** JP25.
6. **Connect** micro-USB between XPLD board and PC USB port.



7. **Launch** SAM-BA boot
8. **Launch** *SAM4S\_XPLD\_DEMO\_Programming.bat* by double-click on it under: *\Flash Recovery*.

A MS-DOS Window should appear, like:

```
X:\test package\XPLD_REUB\recovery>sam-ba.exe \jlink\ARM0 at91sam4s16-ek SAM4S_XPLD_Programming.tcl 1>logfile.log
```

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

```
-I- target(handle) : 18148712
Read device Chip ID at 0x400e0640 --- get 0x00000000
Read device Chip ID at 0x400e0740 --- get 0x28ac0ce0
-I- Found processor : at91sam4s16 (Chip ID : 0x28ac0ce0)
sourcing device file C:/Program Files/ATMEL Corporation/sam-ba_2.11/sam-ba.exe/./tcl_lib/devices/at91sam4s16.tcl
sourcing board description file C:/Program Files/ATMEL Corporation/sam-ba_2.11/sam-ba.exe/./tcl_lib/at91sam4s16-ek/at91sam4s16-ek.tcl
-I- Loading applet applet-lowlevelinit-sam4s16.bin at address 0x20000800
-I- Memory Size : 0x2 bytes
-I- Buffer address : 0x4
-I- Buffer size: 0x0 bytes
-I- Applet initialization done
```



```
-I- Low level initialized
-I- Loading applet applet-flash-sam4s16.bin at address 0x20000800
-I- Memory Size : 0x100000 bytes
-I- Buffer address : 0x20002054
-I- Buffer size: 0x1DA00 bytes
-I- Applet initialization done
-I- FLASH initialized
-I- Command line mode : Execute script file : SAM4S_XPLD_Programming.tcl
-I- === SAM4S-xplained software Programming ===
-I- === Init internal Flash ===
-I- Loading applet applet-flash-sam4s16.bin at address 0x20000800
-I- Memory Size : 0x100000 bytes
-I- Buffer address : 0x20002054
-I- Buffer size: 0x1DA00 bytes
-I- Applet initialization done
-I- === Erase internal Flash ===
-I- GENERIC::EraseAll
-I- === Send executable bin into Flash ===
-I- Send File ./SAM4S-XPLD_REVB.bin at address 0x400000
first_sector 0 last_sector 4
-I- Complete 0%
-I-      Writing: 0x83AC bytes at 0x0 (buffer addr : 0x20002054)
-I-      0x83AC bytes written by applet
-I- === Chang GPNVM to Boot from Flash ===
-E- Set GPNVM1 failed
-I- === End of Flash programming ===
Close the window of this file.
```

10. **Re-Connect** micro-USB between XPLD board and PC USB port.

11. **Open** hyper terminal console (115200, 8, N, 1) on PC, select the virtual UART port.

The XPLD board should boot from internal flash.

12. **Reset** XPLD, check output information on hyper terminal and it looks like:

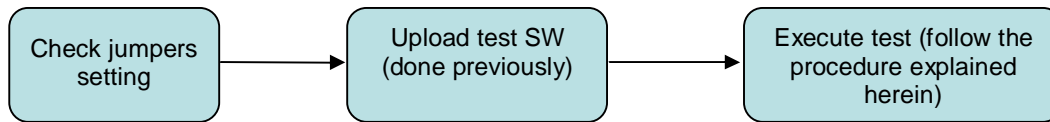
```
=====
TEST BOARD APPLICATION
Board : AT91SAM4S-XPLD_LQFP100 RevB
Version: 1.2 (Jun 29 2012 - 16:53:43)
=====

-----
Tests list
-----
01  TEST_TWI_ID
02  TEST_LED
03  TEST_GPIO
04  TEST_BUTTON
05  TEST_EXTRAM
06  TEST_Qtouch
-----
-I- Hit 'w' to launch test sequence or
-I- hit 'x' to do one test
```

## 6 Test XPLD board

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

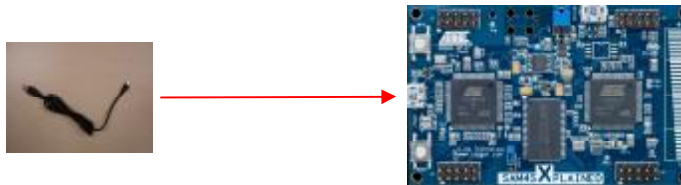
Summary:



Detail:

1. Here, we assume test software has been uploaded to the XPLD board.  
For more information please refer to chapter 5.
2. Make sure the jumpers are set in default setting as explained in chapter 3.

The below picture shows the connections:



3. **Connect** micro-USB between XPLD board and PC USB port.
4. **Open** hyper terminal console on PC (115200, 8, N, 1).
5. Reset XPLD by push "RESET" button.

TEST BOARD APPLICATION  
Board : AT91SAM4S-XPLD\_LQFP100 RevB  
Version: 1.2 (Jun 29 2012 - 16:53:43)

## Tests list

- ```
01 TEST_TWI_ID
02 TEST_LED
03 TEST_GPIO
04 TEST_BUTTON
05 TEST_EXTRAM
06 TEST_Qtouch
```

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

6. **Plug** XPLD extension board ATAVRSBIN1 on J1 and J2, Hit 'w' to launch test sequence and test items one by one automatically.

-I- Launch test sequence...

[illegible]

```
-I- TEST_TWI_ID :TWI Test Start...
```

-I- TEST\_TWI\_ID :The chip ID read value:0x2, it should be 0x2

```
-I- TEST_TWI_ID :TEST OK !!!
```

7. Check USER LEDs are blinking independently.

Have a look on the board,

-I- TEST\_LED :Test led Start...

-I- TEST\_LED :Hit 'Y' if the 2 leds are blinking or 'N' if not

Hit 'Y' if LEDs are tested OK.

-I- Test LED : TEST OK !!!

[illegible]

8. **Check** signal pins on extension ports (J1 ~ J4) are toggled simultaneously.

-I- TEST\_GPIO :Hit 'Y' if the 32 GPIO are toggled or 'N' if not

**Test** them with multimeter, Hit 'Y' if signal pins are toggled.

```
-I- TEST_GPIO :TEST OK !!!
```

[illegible]

-I- TEST\_BUTTON :Press any key to abort test !

```
-I- TEST_BUTTON :Button BP2 Test start:
```

-I- TEST\_BUTTON :Press any key to abort test !

9. **Push** button **BP2** on XPLD board.  
Make sure test ok.

```
-I- Test BUTTON : Button BP2 Test start:      it is OK
-I- >>
-I- TEST_EXTRAM :Test range is 524288 Byte on channel 0 and channel 1
-I- TEST_EXTRAM :Memory Test Start...
```

10. **There** are two SRAM sections located on the EBI bus, so test software will check them by two steps. One is check them individually, and another is in striping. Make sure external SRAM is tested OK.

```
-I- TEST_EXTRAM :Channel 0 test start:
error number in data bit 0 is 0
error number in data bit 1 is 0
error number in data bit 2 is 0
error number in data bit 3 is 0
error number in data bit 4 is 0
error number in data bit 5 is 0
error number in data bit 6 is 0
error number in data bit 7 is 0
-I- TEST_EXTRAM :Channel 0 test consumes 1328 ms:
-----
-I- TEST_EXTRAM :Channel 1 test start:
error number in data bit 0 is 0
error number in data bit 1 is 0
error number in data bit 2 is 0
error number in data bit 3 is 0
error number in data bit 4 is 0
error number in data bit 5 is 0
error number in data bit 6 is 0
error number in data bit 7 is 0
-I- TEST_EXTRAM :Channel 1 test consumes 1329 ms.
-----
-I- TEST_EXTRAM :striping pattern test start.
-I- TEST_EXTRAM :In this test, different patterns will be written
into Channel 0 and Channel 1 in striping,
then MCU read them out and verify them
error number in channel 0 data bit 0 is 0
error number in channel 0 data bit 1 is 0
error number in channel 0 data bit 2 is 0
error number in channel 0 data bit 3 is 0
error number in channel 0 data bit 4 is 0
error number in channel 0 data bit 5 is 0
error number in channel 0 data bit 6 is 0
error number in channel 0 data bit 7 is 0
-----
error number in channel 1 data bit 0 is 0
error number in channel 1 data bit 1 is 0
error number in channel 1 data bit 2 is 0
error number in channel 1 data bit 3 is 0
error number in channel 1 data bit 4 is 0
error number in channel 1 data bit 5 is 0
error number in channel 1 data bit 6 is 0
error number in channel 1 data bit 7 is 0
-I- TEST_EXTRAM :striping_Pattern test consumes 1963 ms.
-I- TEST_EXTRAM :TEST OK !!!
-I- TEST_Qtouch :Please select test mode for Qtouch test:
-I- TEST_Qtouch :Input S for Slider test mode
-I- TEST_Qtouch :Input T for Touch button test mode
```

11. **Select** a mode of Qtouch you want to test, hit “S” key to test slider mode, and “T” to test button mode.

-I- TEST\_Qtouch :Your input is: s

## Library QTouch for IAR

Max Channels 32

supports keys and rotors/sliders

Maximum number of Rotors/Sliders 8

Version 0x430

[illegible]

-I- TEST\_Qtouch :Test start:

Please input Y to indicate test is OK and N for test failed:

\*\*\*\*\*

## Tests result

\*\*\*\*\*

TEST\_TWI\_ID : ok

TEST\_LED : ok

TEST\_GPIO : ok

TEST\_BUTTON : ok

TEST\_EXTRAM : ok

TEST\_Qtouch : ok

\*\*\*\*\* TEST OK \*\*\*\*\*

-I- hit any key to continue...

## 7 Pack XPLD board

Follow below steps to pack XPLD board:

1. **Disconnect** all cables connected to XPLD board.
2. **Put** XPLD board in a protective anti-static package and pack.