
SAMA5D3 Xplained Getting Started

ARM-based Embedded MPU



Scope

This document explains how to get started quickly with your SAMA5D3 Xplained board. It provides details on how to connect the SAMA5D3 Xplained board to a computer and the steps to access the on-board Linux distribution.

Kit Contents

The SAMA5D3 Xplained Kit contains:

- One SAMA5D3 Xplained board
- One Micro-AB to typeA USB cable
- A welcome letter

1. Reference Documents

Table 1-1. Reference Documents

Information	Document Title
User Manual Electrical/Mechanical Characteristics Ordering Information	SAMA5D3 Series Datasheet
SAMA5D3 Xplained User Guide	SAMA5D3 Xplained User Guide

2. Power Warning

Warning: Unlike Arduino Uno boards, the Atmel SAMA5D3 Xplained board runs at 3.3V. The maximum voltage tolerated by the I/O pins is 3.3V. Providing higher voltage levels, e.g., 5V, to an I/O pin may result in damage to the board.

2.1 Electrostatic Warning



Warning: ESD-Sensitive Electronic Equipment!

In the evaluation kit box, the board is packaged in a protective anti-static bag. When in use, the board must not be subjected to high electrostatic potentials. When not in use, it is recommended to store the board in the protective bag.

It is strongly recommended to use a grounding strap or similar ESD protective device when handling the board in hostile ESD environments (e.g., offices with synthetic carpeting). Avoid touching the component pins or any other metallic element on the board.

2.2 Power Supply Warning



Warning: Hardware Power Supply Limitation

Using a power adapter greater than 5Vcc (e.g., at 12Vcc from other kits such as Arduino) may damage the board

Warning: Hardware Power Budget

Using USB as the main power source (max. 500 mA) is acceptable only with the use of the on-board peripherals and low-power LCD extension.

When an external peripheral or add-on boards must be powered, it is recommended to use an external power adapter connected to the J2 DC jack (can provide up to 1.2A on the 3.3V node).

3. Introduction

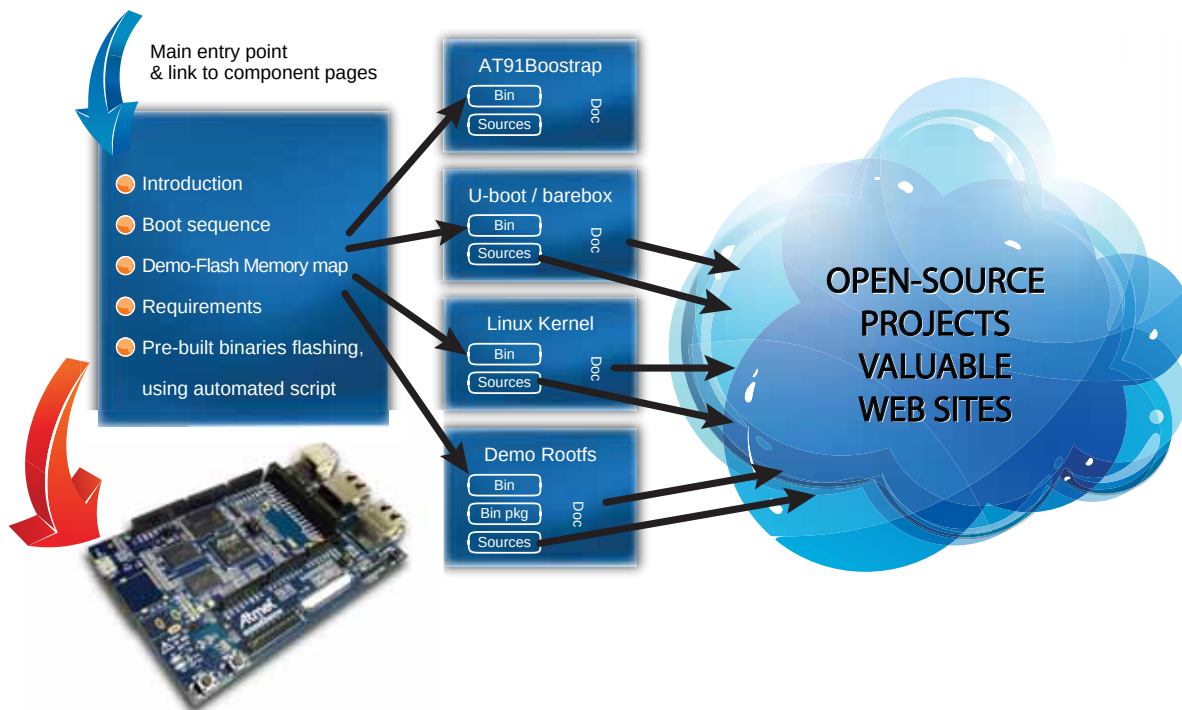
The SAMA5D3 Xplained board is pre-loaded with a Linux-based embedded operating system. The software components stored in the NANDFlash have been compiled following instructions found on the [Linux4SAM](#) website. All related source code is located on the Linux4SAM [github account](#):

- Bootloaders
 - AT91Bootstrap
 - U-Boot and associated environment
- Linux kernel and associated Device Tree database
- Poky distribution root filesystem (from the Yocto project).

The on-board pre-installed Linux distribution can be controlled through the standard Linux console accessible via the Atmel SAMA5D36 DBGU (standard debug interface (J23)).

An additional USB-CDC console is configured and can be directly accessed using the USB Micro-AB cable included in the evaluation kit. This is an efficient single-cable solution for easy log-in and fast access to the pre-installed Linux distribution.

Figure 3-1. Linux4SAM Website Organization



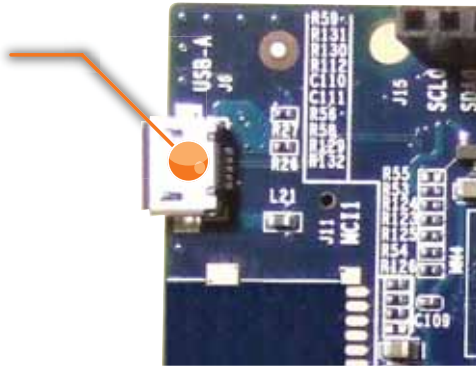
4. Powering the Board

Unpack the board, taking care to avoid electrostatic discharge. Connect the USB Micro-AB cable from the connector (J6) to a free USB port of your PC.

When the board is powered, the blue LED (marked D2) will light up and the default board firmware will start to run.

Figure 4-1. Device USB Port Used as Supply

USB A Device
And Supply Input
(J6)



5. Boot Sequence

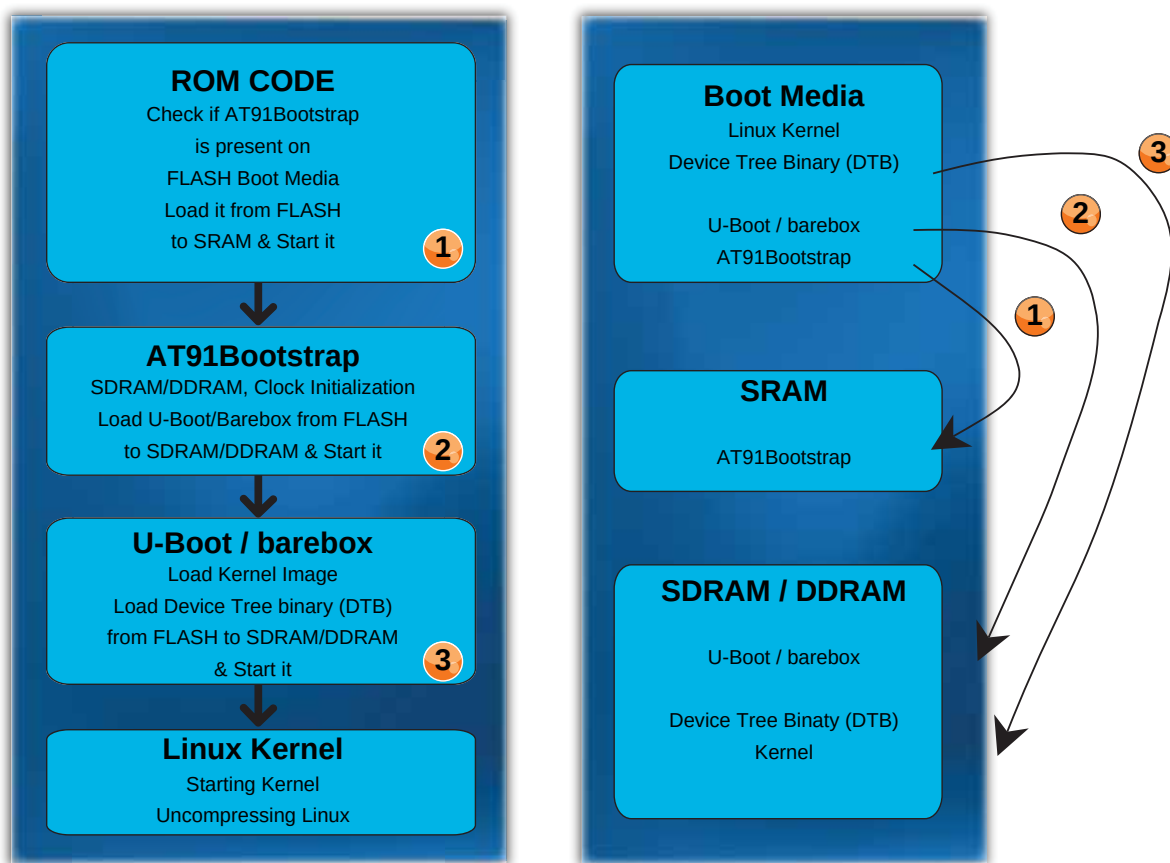
Several pieces of software are used to boot a Linux kernel on SAM products:

- ROM code
- AT91Bootstrap
- U-Boot bootloader

The following steps describe the boot sequence of the Linux kernel:

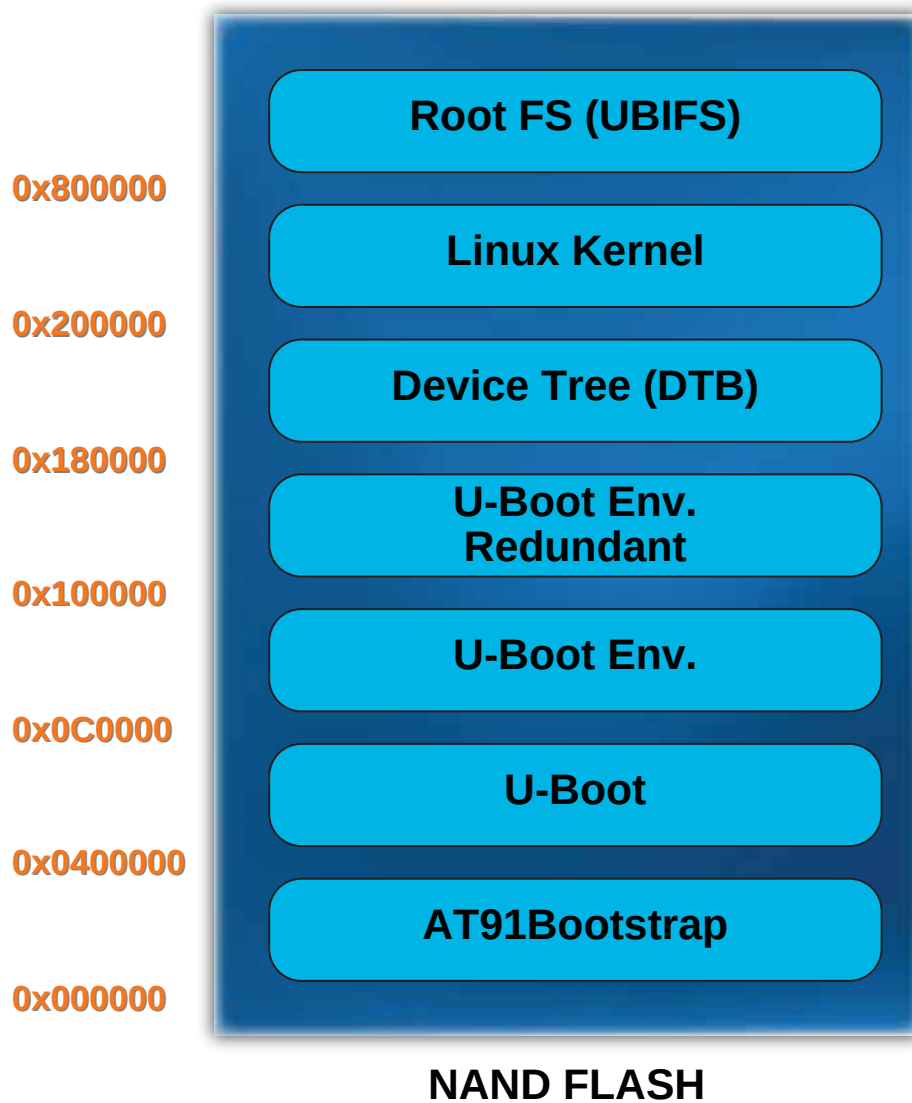
1. The ROM code checks if a valid application is present in the supported media (Flash, DataFlash, NANDFlash, SDCARD). If so, the ROM code downloads it into internal SRAM. For details, refer to the AT91Bootstrap section on [Linux4SAM](#) and the sub-chapters “Boot strategies” and “Boot capabilities matrix”.
2. The AT91Bootstrap manages the hardware configuration and downloads the U-Boot / barebox binary from Flash to SDRAM / DDRAM. It starts the bootloader (third-level bootloader).
3. U-Boot is the bootloader in charge of downloading kernel binaries from Flash, the network, an SD card, etc. It then loads the Device Tree Binary and starts the Linux kernel.

Figure 5-1. Boot Sequence



6. On-board Linux4SAM Demo - Memory Map

Figure 6-1. NANDFlash Memory Map



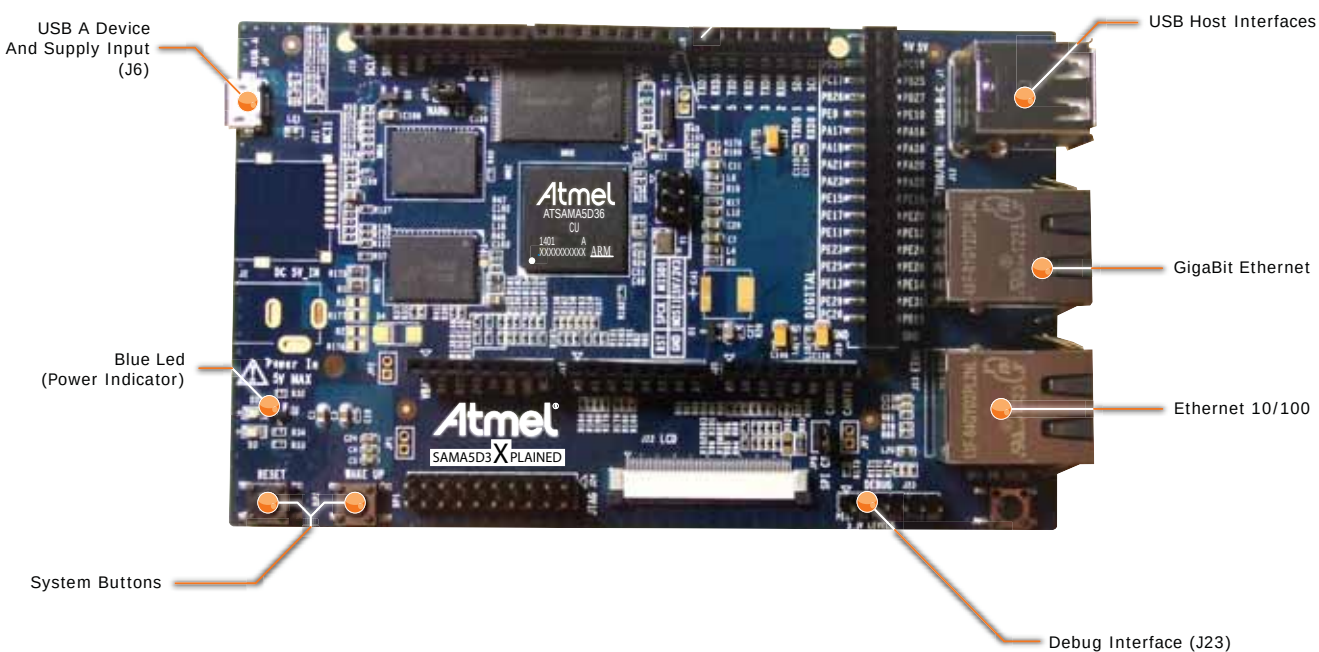
7. Getting Started Pre-requisites

7.1 Hardware

To begin using the Atmel SAMA5D3 Xplained kit, the following items are required:

- Windows® XP (or later) or a Linux distribution
- Micro-AB to TypeA USB Device cable
- Atmel SAMA5D3 Xplained board
- An optional USB/Serial DBGU port bridge, e.g., FTDI TTL-232R-3V3 USB to TTL serial cable

Figure 7-1. SAMA5D3 Xplained Board Overview



7.2 Serial Terminal Emulator

To access the Linux console, a serial terminal emulator is required, e.g., HyperTerminal, minicom, PuTTY, picocom, screen, etc.. The standard serial communication parameters are 115200 8-N-1:

Table 7-1. Serial Communication Port Parameters

Parameter	Parameter Value
Baud Rate	115200
Data	8 bits
Parity	None
Stop	1 bit
Flow Control	None

8. Accessing the Linux Console

The Linux console is accessed through the USB device (also known as “USB gadget”) port of the SAMA5D36 device. Connect the USB Micro-AB cable from the connector (J6) to a free USB port of your PC and use the USB-CDC interface.

8.1 Linux Users

Once the board is powered up and the connection with the host machine is made, follow the steps below:

1. Identify the USB connection by monitoring the last lines of the **dmesg** command. The **/dev/ttyACMx** number will be used to configure the serial terminal emulator.

```
$ dmesg
[...]
```

```
[73507.188239] usb 1-1.1.1: new high-speed USB device number 49 using ehci-pci
[73507.281410] usb 1-1.1.1: New USB device found, idVendor=0525, idProduct=a4a7
[73507.281418] usb 1-1.1.1: New USB device strings: Mfr=1, Product=2,
SerialNumber=0
[73507.281421] usb 1-1.1.1: Product: Gadget Serial v2.4
[73507.281422] usb 1-1.1.1: Manufacturer: Linux 3.10.0-yocto-standard with
atmel_usba_udc
[73507.287341] cdc_acm 1-1.1.1:2.0: This device cannot do calls on its own. It
is not a modem.
[73507.287377] cdc_acm 1-1.1.1:2.0: ttyACM0: USB ACM device
```

The CDC driver is used and you can see that a **/dev/ttyACM0** node has been created on your host system.

2. Run the serial terminal emulator application with the 115200 8-N-1 parameters.

```
$ picocom -b 115200 /dev/ttyACM0
picocom v1.7
port is : /dev/ttyACM0
flowcontrol : none
baudrate is : 115200
parity is : none
databits are : 8
escape is : C-a
local echo is : no
noinit is : no
noreset is : no
nolock is : no
send_cmd is : sz -vv
receive_cmd is : rz -vv
imap is :
omap is :
emap is : crcrlf,delbs,
Terminal ready
```

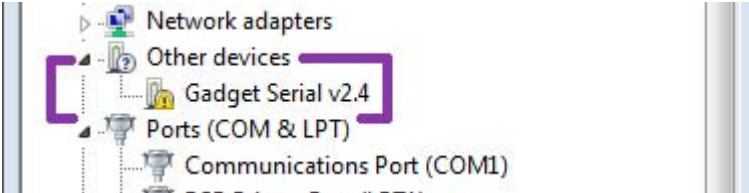
3. Connect to the board with the **root** login account. No password is required.
Poky (Yocto Project Reference Distro) 1.5.1 SAMA5D3 Xplained /dev/ttyGS0
SAMA5D3 Xplained login: root
root@SAMA5D3 Xplained:~#
4. You are now ready to go with the on-board Linux system.

8.2 Windows Users

After the board is powered up and the connection with the host machine is made, the Windows system requests a driver for the USB-CDC device that corresponds to the SAMA5D3 Xplained board. Then follow the steps below:

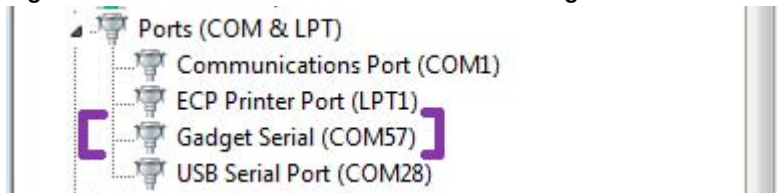
1. Download the official .inf file required to configure the USB-CDC driver: www.kernel.org/doc/Documentation/usb/linux-cdc-acm.inf
2. Make sure that the file is properly saved as an .inf file. Do not use a.txt extension.
3. Click on the “Start Menu”, and open up the “Control Panel”. In the “Control Panel” click on “System”. Once the System window is up, open the “Device Manager”.
4. Look under Other devices. An open port named “Gadget Serial v2.4” should be available.

Figure 8-1. Device Manager Window



5. Right-click on the “Gadget Serial V2.4 “ device and choose the “Update Driver Software...” option.
6. Install the serial driver with “Browse my computer for driver software” option.
7. Windows may prompt for confirmation to install the driver. If so, accept the installation. The use of the official gadget serial .inf file (see [Step 1.](#)) ensures driver software integrity.
8. After the driver installation process, the system displays the message: “Windows has successfully installed your driver software”.
9. On the Windows host system, identify the USB connection that is established: the port should appear in the Windows Device Manager. The COMxx number is used to configure the serial terminal emulator.

Figure 8-2. Serial Port Installed - Device Manager Window



10. Run a serial terminal emulator application with the parameters specified in [Table 7-1](#) and the COMxx port number.
11. You can now login to the board with the root login account. No password is required.

```
Poky (Yocto Project Reference Distro) 1.5.1 SAMA5D3 Xplained /dev/ttyGS0
SAMA5D3 Xplained login: root
root@SAMA5D3 Xplained:~#
```
12. You are now ready to go with the on-board Linux system.

9. Revision History

Table 9-1. SAMA5D3 Xplained Getting Started Rev. 11270A Revision History

Doc. Rev. 11270A	Changes
	First Issue.



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