SAMA5D3x-CM Instruction to program images with PEEDI

1) <u>To begin programing with PEEDI you need to prepare some cables and</u> <u>install a terminal emulation software</u>

- 1.1 First ensure that you have installed "**minicom**" on your sysem. Use the following command to do so: "**sudo apt-get install minicom**"
- 1.2 Ensure that you have the following:
 - RS232 to (USB or RS232)
 - Ethernet Cable
 - J-Tag Cable
 - Power Supply (x2)
- 1.3 Connect to the PEEDI a Ethernet cable and a RS232 cable and both go to the HOST PC's corresponding ports.
- 1.4 Connect the J-Tag to PEEDI and to the target.
- 1.5 Power on PEEDI and the target board.

NOTE: These steps, are most probably detailedly explained, in the appended manual and instruction guides that come with the PEEDI package.

2) Configuring Minicom

2.1 Open a Terminal and launch minicom ("sudo minicom -s").

Filenames and paths	
File transfer protocol	s
Serial port setup	
Modem and dialing	1
Screen and keyboard	1
Save setup as dfl	ĺ
Save setup as	Í
Exit	Í
Exit from Minicom	l l

Figure 1: Minicom Configuration Panel in Terminal

- 2.2 Go to Serial Port Setup and "Enter"
- 2.3 Adjust your window to look like the one shown in the figure below

NOTE: For option "A" specify at which COM port you connected your RS232

NOTE: If you connected a USB to the Host PC then do "*dmesg*" and observe the last line when you plug the USB connector (example "*A* – *Serial Device : /dev/ttyUSB0*")

F - Hardware Flow Control : No G - Software Flow Control : No Change which setting?	+ A - Serial Device B - Lockfile Location C - Callin Program D - Callout Program E - Bps/Par/Bits	: /dev/tty54 : /var/lock : : : 115200 8N1
	G - Software Flow Control G - Software Flow Control Change which setting?	: No

TIP: Use "*dmesg* | *grep ttyS*" in a new Terminal to see the available COM ports of your PC

Figure 2: Serial Port Setup sub-menu

2.4 When your done configuring please press "**Enter**" to exit this menu. Then use "**Exit**" to exit from minicom's configuration menu and initialize the connection.

3) Enter and Configure RedBoot mode.

3.1 Restart PEEDI holding pressed both front panel buttons to enter RedBoot mode.

3.2 Use "**fconfig**" to setup the network configurations. You will need to setup a TFTP server at your host PC and specify a directory used for obtaining the target configuration files for the boards you use for targets.

See the following link for seting up TFTP on a Linux OS. The commands may vary depending on your distribution, but the principal is the same: http://www.webune.com/forums/how-to-install-tftp-server-in-linux.html

3.3 While doing the steps after entering "**fconfig**", follow along by default network configurations.

3.4 You will also need to download the target configuration file to your TFTP directory which usually is "**tftpboot**". Do the following in a terminal

3.4.1 Go to the following link: http://download.ronetix.info/peedi/cfg examples/

3.4.2 Chose the appropriate processor core and then your target board.

3.4.3 Get the link for the specific board. For example: http://download.ronetix.info/peedi/cfg_examples/cortex-a/atsama5d3.cfg 3.4.4 In a new Terminal use "**cd**" and go to the "**tftpboot**" or similar directory and do: "wget <u>http://download.ronetix.info/peedi/cfg_examples/cortex-a/atsama5d3.cfg</u>"

This will download the file so that PEEDI can obtain it any time you connect it to the specific board.

4) Restart PEEDI and connect to the target

4.1 Restart PEEDI using only the backplane button. It will initialize the configured connection and try to obtain the target configuration file.

4.2 When the file is loaded you will receive a Terminal prompt corresponding to the board you are using. This means you can now communicate with the board's memory

NOTE: If you were unable to reach the sever or any other case than the above mentioned, you most probably need to reconfigure the network. Restart PEEDI for RedBoot mode. Refer to section "3)" from this document.

5) Briefs overview of the needed commands for this session

5.1 The command "**flash set n**" is used to set which section of the flash memory you will be programing or performing any operations on. The "**n**" stands for any number usually starting from "**0**" up to "**4**".The flash memory is normally divided into sections for each "**system boot-up element**" such as the bootstrap,u-boot,kernel,device tree and root file system.

5.2 The command "**flash erase**" will erase all the Flash memory so be sure that you want to perform this operation. Normally you will use it if you have some old code and want to replace it or have some nonworking images and want to program new ones.

5.3 The command "**flash program**" is used when you want to upload a specific boot-up element to a given flash section ("**flash set**"). For example you want to upload a bootstrap which is the first element of the system boot-up requirements. It is located in your "**tftpboot**" directory. Here is an example of how you would do so: flash erase flash set 0 flash program tftp://192.168.22.105/bootstrap.bin 0x00000000 (command) (*address to your host PC and image*) (*address on flash memory*)

5.4 The command "**target detach**" and "**target attach**" are used to simulate disconnection of the J-Tag cable. This is required to be able to test your programed images and observe response from the board in the Minicom Terminal.

NOTE: The PEEDI target prompt provides a help for each command it holds so you can understand more if you need to perform other options. These commands will be enough to let

you program the given images to your target.

6) Flashing images to target

- 6.1 Clearing target memory and flash bootstrap. Do the following steps:
 "flash set 2" => "flash erase" => "flash set 0" =>
 "flash program tftp://your host-pc ip address/full name of bootstrap file 0x00000000
- *Tip: Here is an example command* **flash program tftp://192.168.22.105/bootstrap.bin 0x00000000**
- 6.2 Flash u-boot flash set 1 flash program tftp://192.168.22.105/u-boot.bin 0x000C0000
- 6.3 Flash Kernel flash set 2 flash program tftp://192.168.22.105/sama5d3xek.itb bin 0x00300000
- 6.4 Flash RootFS flash set 3 flash program tftp://192.168.22.105/rootfs.ubi bin 0x00F80000

NOTE: *Notice that the image which is to be uploaded is not a .bin file so we will specify its type as shown above*

7) Testing the Board

- 7.1 Now do "target detach"
- 7.2 Now restart the board

Known Issues:

If you encounter a system halt at the following point of the boot process: *"Calibrating delay loop..."* (this message is form the console).

Assure that you have detached the programing interface connection.

The solution is to do a "Power Cycle" of the board. Hopefully it will boot up correctly

7.3 You should reach the login prompt. Use "root" as login name with no password

7.4 Try uploading and running an application. Do the following steps: - tftp -g -r /tftpboot/name_of_application -l name_to_receive_on_board address_of_Host_PC

Here is an example:

- tftp -g -r /tftpboot/sama5d3xek/stud_app -l application_1 192.168.22.105
- **Is** (to list and view if application is uploaded)
- chmod u+x name_of_ap (chmod u+x application_1) to change its permissions
- ./name_of_app (./application_1) to run it.