

# ProgSam - Device Programmer for DREAM SAM Series

## User's Manual

### 1. Description

ProgSam software is the Dream tool to be used for programming memory components mounted on target boards based on Dream SAM ICs. SAM models with embedded flash memory or eFuse can also be programmed.

Table below shows tasks supported by ProgSam

SAM Model	Supported Programming Tasks				
	External SPI/QPI NOR Flash	External Parallel NOR Flash	External NAND Flash	Embedded eFuse	Embedded Flash
SAM5504	Yes	-	-	Yes	-
SAM5704, SAM5708, SAM5716	Yes (Multi-purpose port & Main port)	Yes	Block 0 only	Yes	-
SAM5809, SAM5916	Yes (Multi-purpose port)	Yes	Block 0 only	Yes	-
SAM2634, SAM2635 SAM2653 SAM2655	Yes (Single SPI only)	Yes	-	-	-
SAM3703	-	-	-	-	Yes

Target board to be programmed is connected to Windows PC through the Dream debug/programming interface 5000DBG-IF. See [https://www.dream.fr/pdf/Serie5000/Boards\\_Datasheets/5000DBG-IF.pdf](https://www.dream.fr/pdf/Serie5000/Boards_Datasheets/5000DBG-IF.pdf)

### 1.1 Software Installation

Latest version of ProgSam software can be downloaded from this location: <http://www.dream.fr/progsam>  
Supported platforms are Windows© XP, Vista, 7, 8, 10.

**For operating systems prior to Win10:**

ProgSam must be installed in the PC before connecting the 5000DBG-IF board to a PC USB socket!

Install ProgSam by running “ProgSam Vx.xxx setup.exe”.

Follow the instructions from the installer. By default it will install in directories:

- C:\Program Files\DREAM\ProgSam\ -> Executable file
- C:\Program Files\DREAM\ProgSam\Config\ -> Target Board Definition List files (\*.BDL)
- C:\Program Files\DREAM\ProgSam\Drivers\ -> Text Driver Files for memory components description (\*.TDF)
- C:\Program Files\DREAM\ProgSam\Doc\ -> Reference Documents:
  - User's Manual and Application notes
  - TDF and BDL file format description

In order to support the 5000DBG-IF board, “**DREAM USB-DBG-IF**”, the device driver is installed during ProgSam installation.


**Remark:** DREAM USB-DBG-IF driver (dream\_usb\_dbg.inf) is not Microsoft signed. In Win7 64-bit and Win8 32-bit/64-bit versions, signature checking needs to be disabled. Refer to Dream application note **AN\_Install DREAM USB-DBG-IF on 64-bit Win7 & Win8.pdf**.

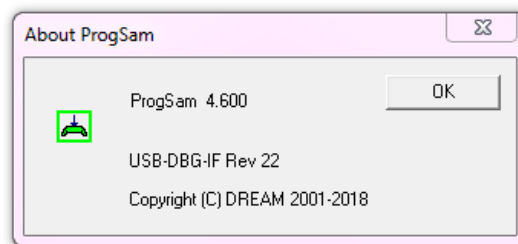
Windows© 10 automatically detects and installs the DREAM 5000-DBG-IF board as ‘**USB Serial Device (COMx)**’. It then will be used by DREAM software ProgSam, “dream\_usb\_dbg.inf” is not needed to be used.

After ProgSam has been successfully installed, you can connect 5000DBG-IF to a USB port of your PC. The 5000DBG-IF board will be automatically recognized when connecting it the first time.

## 1.2 ProgSam and environment Info

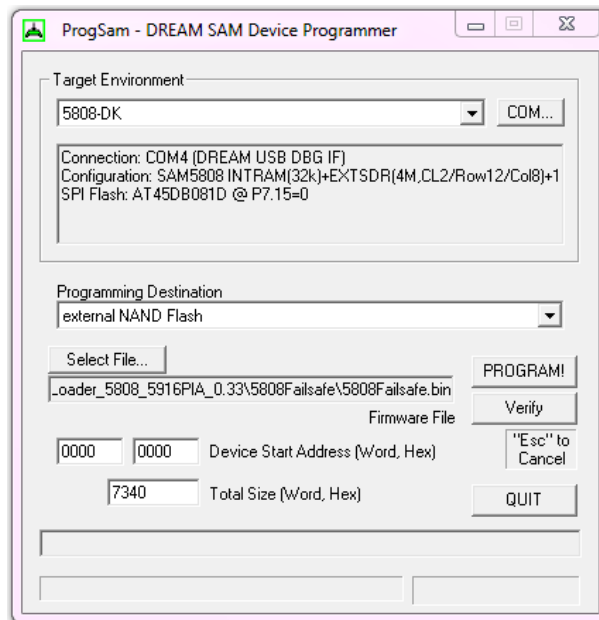
You can get info about your programming environment, launch ProgSam software, then:

- a) Click on the ProgSam Icon  in the upper left corner to open menu.
- b) Select “About ProgSam...” A pop-up windows shows following info:
  - ProgSam software Version
  - Debug interface Firmware Name if found (5000DBG-IF should be connected, COM port selected, see below)
  - Debug interface Firmware Revision

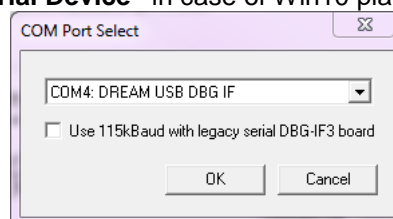


## 2. Programming Flash memory

The main window of ProgSam software will be shown when launched:



- a) Use the “COM...” button to select the COM port named: “DREAM USB-DBG-IF” in case of Windows version prior to Win10, resp. “USB Serial Device” in case of Win10 platform:

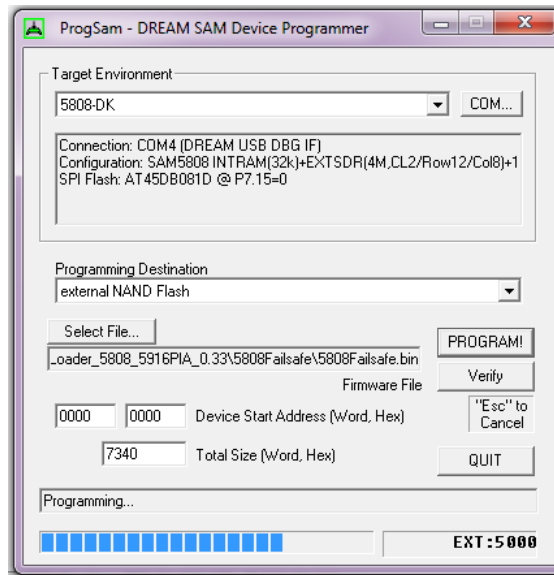


- b) In “**Target Environment**” dropdown list, select your target board.  
The description of target board is shown in the greyed field, just below.  
Customized target boards can be added by writing their description in a board description file (.BDL) stored in Directory...\DREAM\ProgSam\config\.For doing this it is recommended to create a new .BDL file beside the DreamBoards.bdl file. See §3Create a BDL file.
- c) In “**Programming Destination**” dropdown list, select the memory to be programmed.
- d) Select the file to be programmed (.bin or.hex). You can use the “**Select File...**” button to open a browser window or drag and drop the file on ProgSam window.
- e) In “**Device Start Address**”, enter the destination start address (as hexadecimal number). For a firmware file it should be normally “0000” “0000”.

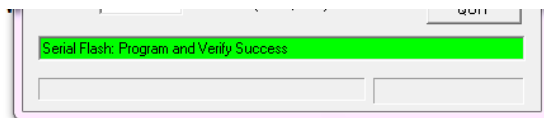
Special cases:

- **NAND Flash:** Address must be always set to “0000” “0000” because only first block can be programmed with ProgSam (typically for for Firmware programming only). Programming of other data (for example Sound banks etc.) to the NAND Flash needs to be done by application firmware, for example from USB Host or Device port, or via Host Parallel Interface (the application firmware running on SAM IC must support this). External programmer can also be used to pre-program the components before mounting.
- **Multi-Purpose SPI/QSPI Flash:** The MP QSPI Flash controller is mapped in page 0xC000, so Device Start Address to be used for programing from first address of MP QPI Flash is “C000” “0000”.

- f) Press “**PROGRAM!**” to start programming. Progress bar shows the status.



- g) Verification of programmed content is automatically executed after programming operation. It can also be manually started with “**Verify**” button. The result is reported in the status bar:



- h) Switch off target board. Disconnect 5000DBG-IF from target board.

### 3. Create a BDL file

BDL (Board Description List) File contains the info about hardware architecture and components of target boards. BDL files are stored in directory \DREAM\ProgSam\config\.

The provided DreamBoards.BDL file is a list of descriptions for all Dream Evaluation and Development boards. Customized target boards can be added by writing their description in a separate board description file also stored in directory \DREAM\ProgSam\config\.

Refer to directory \DREAM\ProgSam\doc\DREAM BDL File Format.pdf for complete description of the BDL format.

There are two easy ways to create a customized BDL file:

#### 3.1 Create a BDL file from existing description

- Create a blank *MyBoards.bdl* text file with Notepad.
- Open *DreamBoards.bdl* file as reference and copy the description of a Dream reference board quite similar to yours. e.g. choose a board using same SAM device and same memory config.
- Paste the description in your new BDL file and change the name of the board between brackets as shown in the below example, starting from 5704FX-EK\_REV1 Dream board.
- Modify the description at points where your board is different from the original one. In the below example we have changed the reference of the Multi-Purpose QSPI NOR.

```
[MY_5704FX]
Config=SAM5704 INTRAM(16k)+EXTNOR(512k,8/8WS)+EXTSDR(4M,CL2/Row12/Col8)
;MpQspiDevice=WINBOND:W25X10BV; Reference used on 5704FX-EK_REV1 Dream board
MpQspiDevice=MACRONIX:MX25L2005; Reference used on MY_5704FX board
MpQspiSingleBit=Yes
```


- Save *MyBoards.bdl* file to Drive:\DREAM\ProgSam\config\

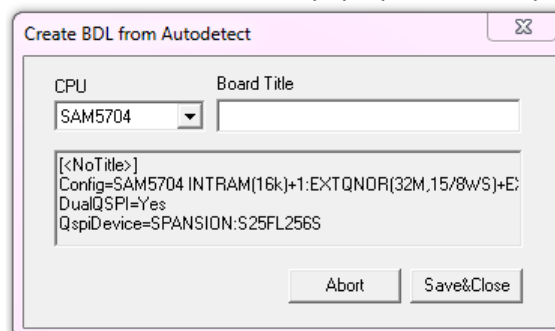
Next time you will start ProgSam, the board "MY\_5704FX" will be a new item of "Target Environment" dropdown list.

#### 3.2 Auto-Detect & Create a BDL file

With its Auto-Detect & Create a BDL file feature, ProgSam can detect automatically the hardware architecture of a connected target board. However this function has few limitations.

##### 3.2.1 Procedure

- Be sure the 5000DBG-IF interface is connected to target board and that target board is powered.
- Click on the ProgSam Icon  in the upper left corner to open menu.
- Select "Auto-Detect & Create a BDL file..." A pop-up window displays the detected hardware.



- If you accept it as a valid configuration to program you board, enter a name in "Board Title" field and save it as a .bdl file in Directory:\DREAM\ProgSam\config\

### 3.2.2 Limitations

- a) Only known components can be found. Known components are listed and described in TDF files. Descriptions for new components can be added in TDF files. Refer to Directory:\DREAM\ProgSam\doc\DREAM TDF File Format.pdf for complete description of the TDF format.
- b) RAM component is always listed when it is supported by the detected memory configuration but it doesn't reflect the real hardware. On target board RAM could be not mounted or could have another size. If the BDL file will be used in SamVs development environment, RAM size parameter should be adjusted to real situation.
- c) Auto-detect does not work for boards based on SAM3703. Anyway it is not needed because flash memory to program is always the internal 256kbit one.

## 4. Programming eFuse

SAM5000 Series have embedded eFuse array, allowing firmware and sound bank protection by 128-bit AES key. AES key can be programmed and secured in SAM5000 with ProgSam.

AES key and other parameters to be specified are contained in an EFU file with ".efu" extension.

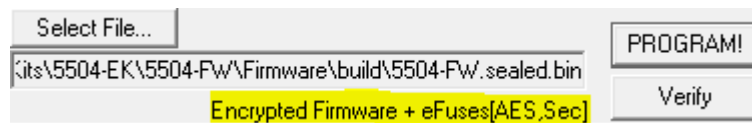
EFU file is a text file generated by Dream SamVs development environment. It can be edited by hand if needed, especially to activate the secured option that will close the debug access to SAM5000 at production.

There are two different ways to program eFuse.

### 4.2 Program an encrypted firmware in external memory + eFuses in SAM5000

This method is used when external memory is not pre-programmed. In a single shot ProgSam will program the encrypted firmware in external memory and eFuse in SAM5000.

- a) With "Select File..." button, load the *projectname.sealed.bin* file from SamVs "build" directory.



ProgSam automatically loads the *projectname.sealed.efu* file at the same time.

The programming option are shown has highlighted in the above capture:

Possible "eFuses [ ]" programming attributes are:

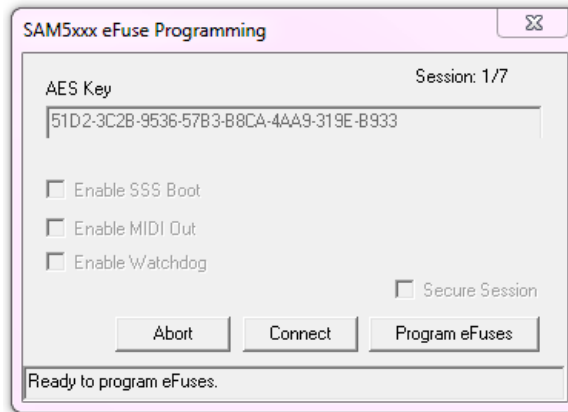
- **AES**: AES key
- **Sec** : Secure session (recommended for production !!)
- **MidiOut**: Enable MidiOut during Host Boot (SAM5504B/SAM5704B)
- **SSSBoot**: Enable Host Boot over Serial Slave Synchronous interface (SAM5504B/SAM5704B)

- b) Pressing the "PROGRAM!" button will first program the *projectname.sealed.bin* in selected external memory, then blown the SAM5000 eFuses as described in *projectname.sealed.efu*.

### 4.3 Program only eFuses in SAM5000

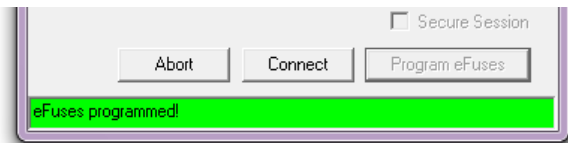
This method is used when the external memory is pre-programmed with external programmer before mounting, or in case of firmware boot load from Host CPU.

a) With “**Select File...**” button, load the .efu file. Following pop up windows is displayed:



eFuse programming attributes are shown as they are specified in the EFU file. They cannot be changed at this step. If changes are needed they have to be done by editing the EFU file.

b) Press “**Program eFuses**”. Operation success is shown by:



c) In case of batch programming, disconnect target board and connect a new one, then use the “**Connect**” button to establish communication with the new board.

## Dream Contact

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## Website

http://www.dream.fr

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