

9XR Pro: Using SAM-BA to Restore a “Bricked” Transmitter

The Ersky9x open source firmware used by the Turnigy 9XR Pro computer includes an easy means of communicating between the transmitter and a computer, either via a USB cable or by copying files to a micro-SD card and inserting it into the transmitter.

This capability supports upgrading (flashing) the operating system (firmware) of the transmitter, using a boot loader that comes as part of the firmware. It can also be used to link the transmitter to the Eepskye program, which among other things, enables programming to be performed on the computer and EEPROM files to be backed up to the computer.

What the firmware cannot do is to reload itself if the transmitter becomes “bricked”, i.e., totally unresponsive. In that case, the firmware must be erased from the transmitter and reinstalled. Re-installing requires the use of **SAM-BA**, a program provided by Atmel, the maker of the ARM microprocessor used by the 9XR Pro transmitter.

Requirements

As detailed below, SAM-BA is available for download from the Atmel Corporation.

SAM-BA can run under Windows XP, 7 or 8. There is no Macintosh version but it may be possible to run SAM-BA in a Boot Camp Windows partition.

To connect the transmitter to the computer, a USB cable with a Mini-B connector (as used by many older mobile phones) is required. The USB port is under a rubber flap on the bottom of the transmitter. Press the mini USB plug firmly into the socket to ensure that it connects.

Note that some mini-USB cables only support charging. If you encounter a problem connecting, try another cable. Also try a different USB port on the computer. Note that USB 3 ports may not work with any but the newest versions of SAM-BA.

Installing SAM-BA

- Go to the Atmel Corporation site and download the **SAM-BA Version 2.12** file. You will have to register temporarily with Atmel to do so.
- Unzip the file onto your desktop (i.e., right click on the .zip file and select ‘expand file’).
- Open the **sam-ba_2.12** file to open the wizard; follow the prompts. The wizard will ask if you wish to install the files in a folder called “Atmel” in the Program Files directory of your hard disk. Answer ‘Yes’ and continue with the prompts.
- The usual path is something like **C:\ProgramFiles\Atmel\sam-ba_2.12**. Write down or remember where to find this folder. Install a shortcut on the desktop when asked to do so by the wizard. Continue until the wizard is finished.
- Download the file **at91sam3s8-9xr.zip** from the following location:
<http://openrcforums.com/forum/viewtopic.php?f=118&t=4553&start=60#p65474>
- Unzip the file to a convenient location such as the desktop. It contains a folder called **at91sam3s8-9xr.tcl** (within which are three applet files and a couple of .tcl files) plus a file called **boards.tcl**.
- Within the folder where SAM-BA is installed is a folder called **tcl_lib**. Drag the folder you have just extracted into it. Answer ‘Yes’ to any request to overwrite existing files. The result should be that within the **tcl_lib** folder (1) the **boards.tcl** file is replaced (the date may be older than the one it replaces), (2) a new folder called **at91sam3s4-9x** is created, (3) a new folder called **common** is created.

To check the installation, connect the transmitter (turned OFF) to a USB port on your computer. When you turn the radio on you should see 'USB' on the screen. Start the SAM-BA program from the shortcut on the desktop and you will see a dialogue box. From the 'Select your board' menu choose **at91sam3s8-9xr**. If the result looks like the following image (except possibly for a different COM number) and the 'Connect' button is not greyed out, you have been successful.



Write down the connection path accurately (including all capitalization) for later reference.

(Note that if you are using Windows XP and the dialogue box shows blanks for connection and board, you may need to find and install a driver for "GPS Camera Detect.")

You can now quit SAM-BA. Use the Windows 'Safely Remove Hardware and Eject Media' function, then turn off and disconnect the transmitter.

Note that the number following COM is that of the USB port into which you plugged your cable. Try to use this same port whenever you connect to your transmitter. If you do use another port, or forget the number of the one you used, press the Start button (Windows 7) and go to Devices and Printers. There under 'Unspecified' you should see something like 'GPS Camera Detect (COM5)'. Edit the COM number in the SAM-BA connection to match.

Using SAM-BA to Recover a Bricked Transmitter

A transmitter that is unresponsive ('bricked') because of a firmware issue requires that the ARM processor chip be restored to factory defaults and that fresh firmware be flashed to it using the SAM-BA program.

New releases of firmware are available at:

http://ersky9x.googlecode.com/svn/trunk/ersky9x_rom.bin

Step 1: Erasing the Chip

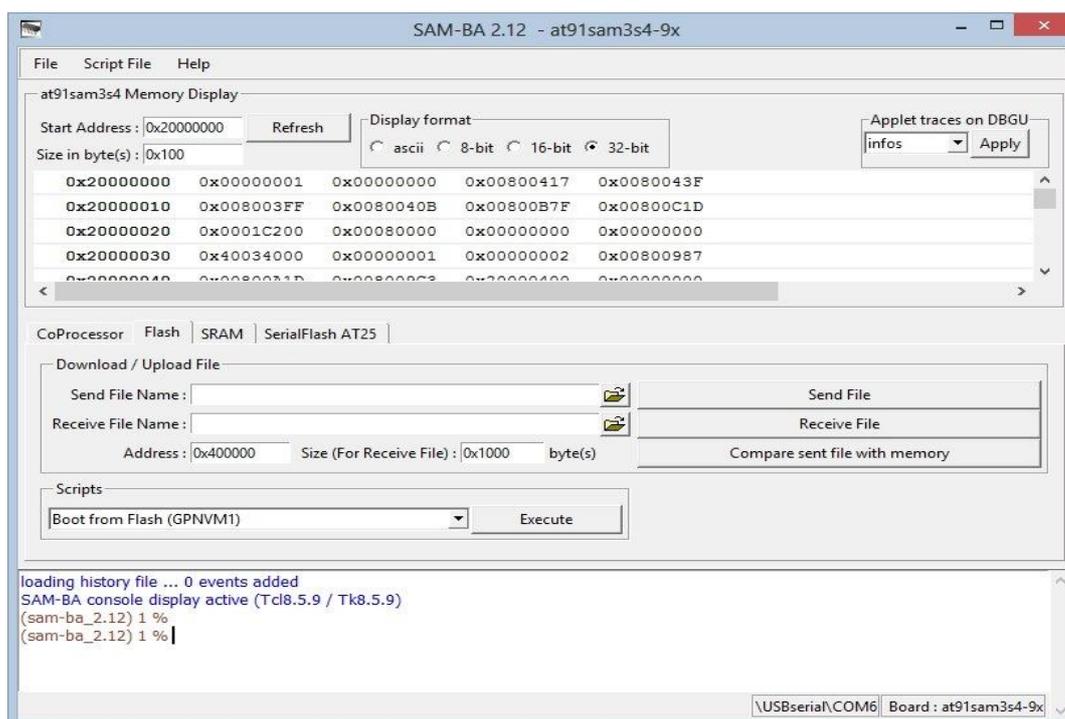
- While turning ON the transmitter, use a paperclip to press and hold the small round Erase Button. It is in a hole beside the USB connector, under the rubber flap on the bottom of the transmitter. The Atmel ARM chip will be reset to factory defaults.

Caution: Pressing the Erase Button completely wipes the firmware off the chip; it does NOT restore the transmitter to original firmware.

Step 2: Updating Firmware

- Download the firmware file to the desktop or a folder where you can find it later. Unzip the file if necessary. The firmware will be in a file such as *ersky9xr_rom.bin*.
- Connect the transmitter to the same USB port on your computer that was used to install SAM-BA. Turn the transmitter ON. The radio should display 'USB' on the screen and the computer make the 'successful connection' sound.
- Start SAM-BA from the shortcut on the desktop. You will see the SAM-BA dialogue box.

- Click 'Connect'. Windows may take up to a minute to connect. You should see:



- Use the browse button next to the "Send File Name" Box to locate and select the new firmware file on your computer.
- Click the "Send File" button. You should see the file upload in the dialog box at the bottom – the process should only take a couple of seconds to complete. The new firmware is now installed (including the boot loader for future firmware updates).
- In Scripts window near the bottom of the page select "Boot from Flash (GPNVM1)"
- Click the Execute button.
- After the programming is finished, you will see an option to 'lock' the firmware. **DO NOT LOCK THE FIRMWARE! Select the "No" button.** (If you do accidentally press "Yes" and lock the firmware, it will be necessary to erase the chip and reload the firmware. Otherwise it will be impossible to do any updates.)
- Quit SAM-BA. Then use 'Safely Remove Hardware and Eject Media', turn the transmitter OFF and disconnect the USB cable.
- Turn on the transmitter and check its operation with the new firmware.

NOTES

- SAM-BA only works **once** each time it is started. After each use you must quit SAM-BA, turn off the radio, and disconnect the transmitter from the USB port. Only then can you reconnect and upload or download a file.
- It is important to connect the transmitter to your computer and turn it on before starting SAM-BA, otherwise the program will not work.
- Be sure to quit the SAM-BA program before shutting down the transmitter.
- To enter boot loader mode, turn on the transmitter while holding the two horizontal trim levers towards the centre; the transmitter is then ready to flash firmware. As well, in this mode, the USB cable can be used to connect with the computer. For details, see *9XR Pro: Communicating with a Computer*.

Further Information

For additional information to help you understand and make best use of your Turnigy 9XR Pro, see the other manuals in this series and/or go to one of the forums dedicated to this transmitter and the open source firmware it uses.

9XR Pro Manuals

The following manuals are designed to help you get the most out of your Turnigy 9XR Pro. They are available at: <http://openrcforums.com/forum/viewforum.php?f=7>

1. 9XR Pro: Introduction to the Hardware
2. 9XR Pro: First Steps with Ersky9x
3. 9XR Pro: Ersky9x Explained
4. 9XR Pro: Communicating with a Computer
5. 9XR Pro: Using Voice with Ersky9x
6. 9XR Pro: Using the Eepskye Program
7. 9XR Pro: Glossary of Terms

Internet Forums

Help is always just a few clicks away on the internet forums where experienced Ersky9x users volunteer their knowledge and experience. Many of these people have been developing the firmware for years without remuneration; all they ask is donations to fund further development.

Open RC Forums: <http://openrcforums.com/forum/index.php>

Ersky9x index page: <http://openrcforums.com/forum/>

9XR index page: <http://openrcforums.com/forum/viewforum.php?f=70>

NOTICE

Ersky9x and Eepskye are free open source software, independently developed. This manual is provided to help you understand and use them specifically for the Turnigy 9XR Pro transmitter, though much of the information also applies to the Sky replacement boards produced as an upgrade for the 9x transmitter.

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For more information go to: <http://openrcforums.com/forum/viewforum.php?f=7>

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