

# Radiocrafts

Embedded Wireless Solutions

## AN012: FIRMWARE UPGRADING RADIOCRAFTS MODULES

APPLICATION NOTE

We Make Embedded Wireless  
Easy to Use

# Firmware Upgrading Radiocrafts modules

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## Introduction

The Radiocrafts Demo Boards and USB-sticks include an on-board firmware upgrade connector compatible with different flash programming adapters. It is also recommended that PCB layouts include a connector for firmware upgrade. This Application Note describes how to upgrade the firmware of any Radiocrafts RF-module using either a CC Debugger or the FlashPro-CC tools.

Firmware upgrade should only be done after approval by Radiocrafts. The warranty of the module will be void after reprogramming outside our factory, and should only be done in special cases under agreement with Radiocrafts.

## Supported modules

This Application Note is applicable for the following Radiocrafts module families: RC11xx, RC11xxHP, RC25xx, RC25xxHP, RC17xx and RC17xxHP.

## Preparations

Before the upgrade can start you need the following:

1. RCxxxx(HP)-DB with USB connector or USB-stick. Demo boards with RS232 connector do not support firmware upgrades.  
Alternatively your own PCB with firmware upgrade connector.
2. Module firmware file (\*.hex) from Radiocrafts. This is available under a NDA that ensure that that the file only can be used on Radiocrafts modules.
3. The FlashPro-CC Flash Programming Adapter. See [www.elprotronic.com](http://www.elprotronic.com).
4. FlashPro-CC PC software which can downloaded for free at [www.elprotronic.com](http://www.elprotronic.com).  
See next page for download details.  
Or:
5. CC debugger USB dongle: [http://www.ti.com/graphics/tool/cc\\_debugger\\_800.jpg](http://www.ti.com/graphics/tool/cc_debugger_800.jpg)
6. SmartRF Flash Programmer which can be downloaded at: [www.ti.com/lit/zip/swrc044](http://www.ti.com/lit/zip/swrc044)  
(SmartRF Studio can be used as well if this is installed from before).

## Important Notice on calibration values

RC11xx modules with date code 201014 or newer supports initial tolerance calibration during production, resulting in a Slave lifetime of >> 30 years. The calibration value is stored in configuration memory address 0x39 (Please check with latest Data Sheet / User Manual). If firmware upgrades are to be done, this value must be read, and written back in the module to keep the frequency calibration after firmware upgrade.

For Development Kits and evaluation purposes, this procedure is not mandatory.

## Connecting RCxxxx(HP)DB (Demo board) to FlashPro-CC / CC Debugger

The Demonstration Kit includes a connector (P8) that allows the end user to firmware upgrade the module. Figure 1 illustrates how to connect the RC11xx Demo Board to the FlashPro-CC via the 14 to 10 pin adaptor board. The CC debugger connects via the same connector. The USB stick has a 2x5 pin connector with 1.27 mm pitch so the adaptor following the CC Debugger must be used.



**Figure 1: FlashPro-CC connected to RC1180DB-USB**

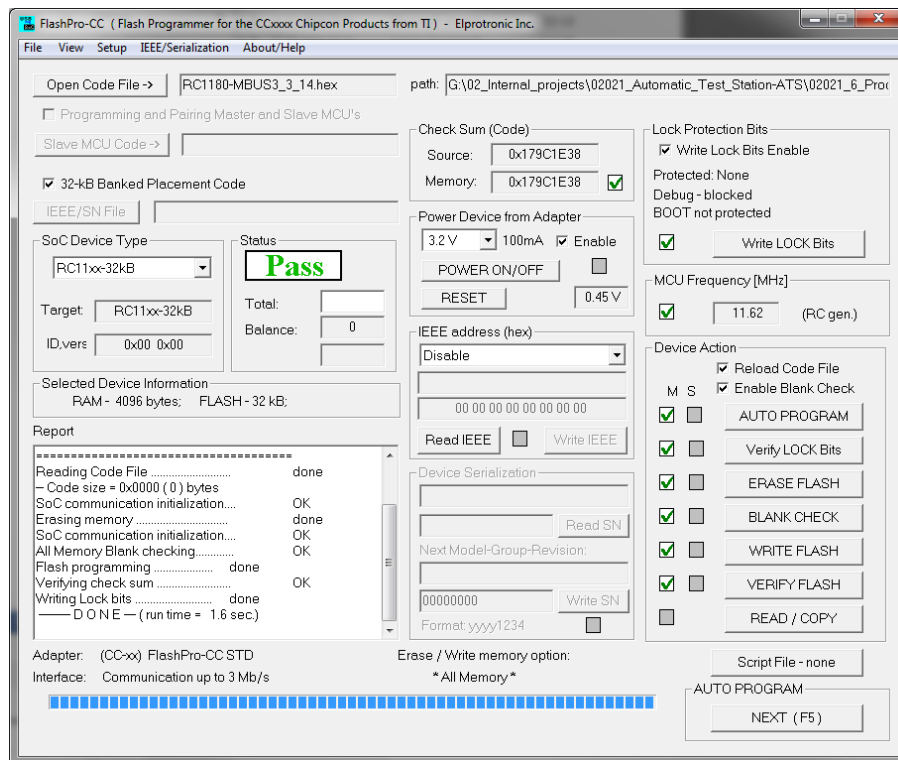
### FlashPro-CC software

The FlashPro-CC software from Elprotronic can be downloaded from:

<http://www.elprotronic.com/download.html>

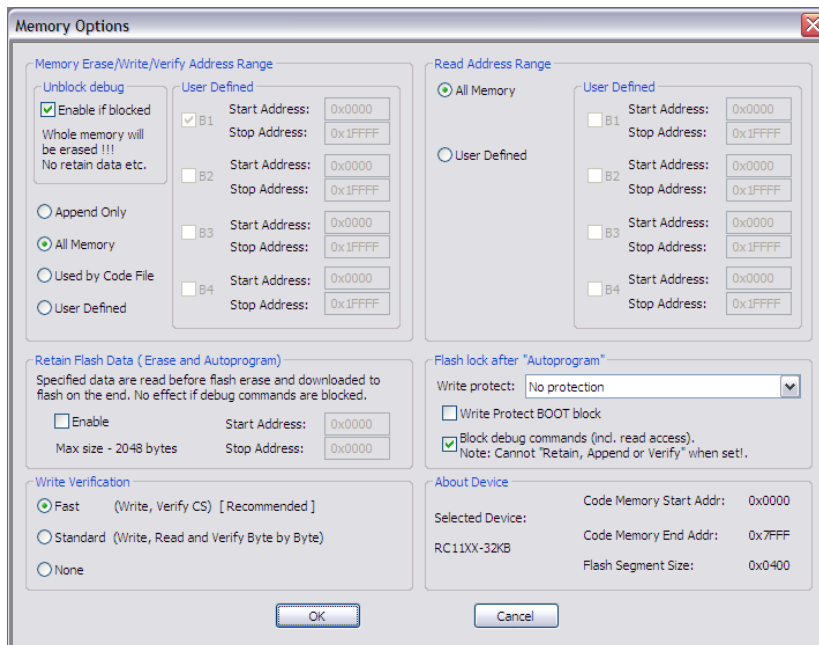
Download the version valid for CCxx series devices. FlashPro-CC Revision 1.32 or newer supports the RC1180-MBUS module from Radiocrafts.

The installation will also install a manual for the FlashPro-CC, and you should use this manual if you need additional help. The software program with RC11XX setup is illustrated in figure 2.



**Figure 2: FlashPro-CC software**

According to the firmware NDA the user must ensure that the hex file is not available for others. For this reason the debug interface must be blocked after firmware update to ensure that no one can read back the memory. This is handled by the FlashPro-CC in the Setup->Memory Option menu using the following setting:



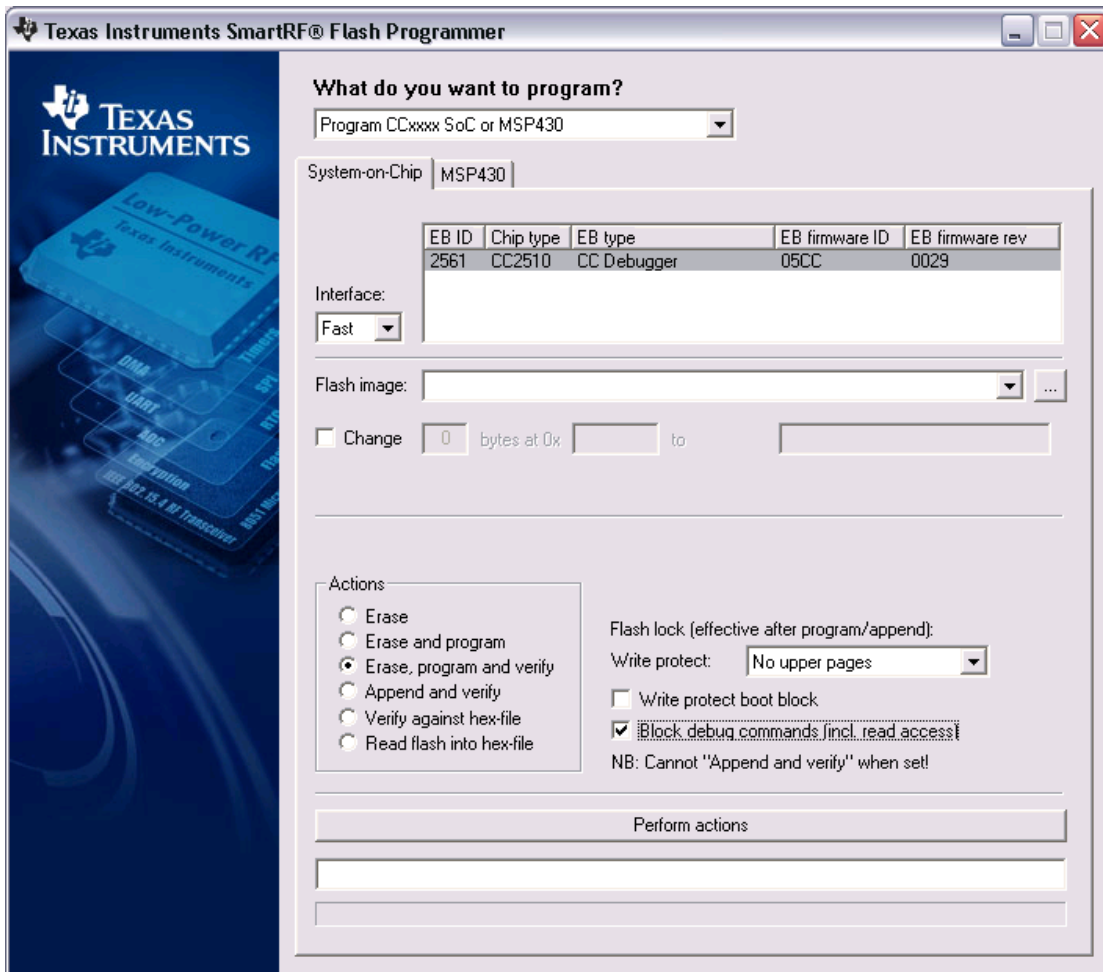
**Figure 3: FlashPro-CC Memory options for block Debug interface**

### Step-by-step guide

1. Run the downloaded setup file to install FlashPro-CC on your PC
2. Ensure that you have all jumpers set to default position. See Development Kit user manual for details.
3. Connect The Flash-Pro-CC to P8 as illustrated in figure 1.
4. Connect the FlashPro-CC to an available USB port. If this is the first time you connect the FlashPro-CC to your PC, you need to follow the *Found new Hardware wizard* for installing the USB driver in windows. See Manual from elprotronic for details.
5. Open FlashPro-CC software after the USB driver is installed
6. Click on the "Open Code File ->" button and select the module firmware file (\*.hex) you have received from Radiocrafts under NDA.
7. Select "RC11XX-32KB" as your SoC Device Type
8. "Enable" power Device from Adapter
9. "Disable" IEEE address
10. "Enable" Lock Protection Bits
11. Block debug commands in the Memory Options
12. Click on the "Auto Program" button
13. Verify that the status gives a green "PASS" sign
14. Disconnect Flashpro-CC from P8 on RC11XXDB.

The module is now updated. You can verify that you have an updated version by reading the FW revision from the RCTools software from Radiocrafts.

**SmartRF Flash Programmer**



**Figure 4: SmartRF Flash Programmer and default settings (do not tick different)**

**Step-by-step guide**

1. Run the downloaded setup file to install SmartRF Flash programmer
2. Ensure that you have all jumpers set to default position. Se Development Kit user manual for details.
3. Connect to connector P8 and provide power to the board (via USB connector)
4. Press Reset-button on CC Debugger and the green LED shall lit. If not, turn the programming connector 180 degrees and try again. If still no Red light, check power connection to the Demonstration board
5. Import the .hex-file from the stored location
6. Tick exactly the buttons as described in the picture above, otherwise the re-flashing will fail
7. Press "Perform actions"
8. Disconnect the CC debugger



### Document Revision History

Document Revision	Changes
1.0	First release
1.1	- Memory option to block debug commands included - Notice about keeping frequency tolerance calibration value
1.2	Added CC Debugger information
1.21	Update figure 4.
1.22	"Enable" Lock Protection Bits in page 3; Include info on all supported modules
1.3	Design Update

### Disclaimer

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As far as possible, major changes of product specifications and functionality, will be stated in product specific Errata Notes published at the Radiocrafts website. Customers are encouraged to check regularly for the most recent updates on products and support tools.

### Trademarks

RC232™ is a trademark of Radiocrafts AS. The RC232™ Embedded RF Protocol is used in a range of products from Radiocrafts. The protocol handles host communication, data buffering, error check, addressing and broadcasting. It supports point-to-point, point-to-multipoint and peer-to-peer network topologies.

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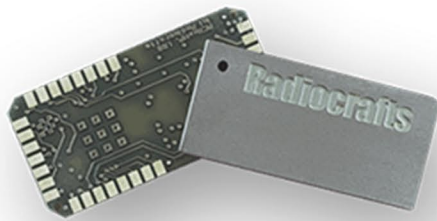
### Life Support Policy

This Radiocrafts product is not designed for use in life support appliances, devices, or other systems where malfunction can reasonably be expected to result in significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness. Radiocrafts AS customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Radiocrafts AS for any damages resulting from any improper use or sale.

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