

Radio Programming Manual – Updating Firmware

OVERVIEW

AstroDev strives to maintain products by releasing firmware updates periodically. New firmware releases are posted on the AstroDev website as soon as they are available.

The firmware of AstroDev radios can be easily updated via using the correct setup. This document serves as a manual for updating the firmware, detailing all steps required to write to the onboard MSP430's flash. The only items needed are the radio, the USB debug-interface (programmer), a piece of software from elpionic, and the JTAG adapter to plug into the radio.

Features:

- Updating firmware of AstroDev radios
- Programming adapter orientation

For more information, contact:

info@astrodev.com

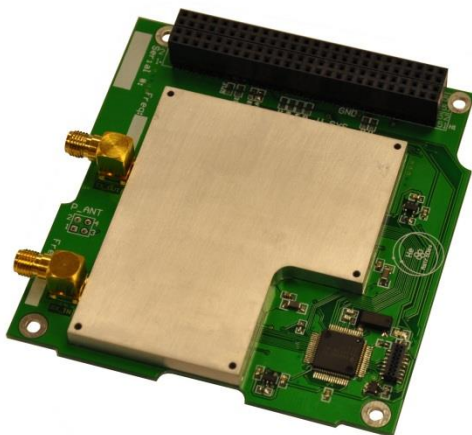


Figure 1 – He-100 Radio

Radio Configuration Program Manual

TABLE OF CONTENTS

Overview	1
Setup	3
Attaching a 50 Ohm Load to the Radio	3
Connecting a Power Supply to the Radio	3
Connecting the Programmer to the Radio.....	3
Updating Firmware.....	4
Download Newest Firmware from AstroDev Website	4
Run Elprotronic's FET-Pro430 Software	4
Apply Settings and Open Code File	4
Write Flash	5
Trademarks	7
Disclaimer	7
Notes.....	7

Radio Configuration Program Manual

SETUP

In order to update the firmware of an AstroDev radio, it must have the proper setup. Setup includes connecting a load to the RF connector, an external power supply, and the programmer.

Attaching a 50 Ohm Load to the Radio

Reflections occur in communications systems and in some cases, can cause damage to components if necessary precautions are not taken. Although it is unlikely for a radio to be damaged during a firmware update, it is good practice to always terminate the transmit side of the radio in a 50Ω load. Figure 2 and Figure 3 below depict 50Ω loads connected to the transmit side of different AstroDev radios.



Figure 2 – He-100 with 50 Ohm load attached

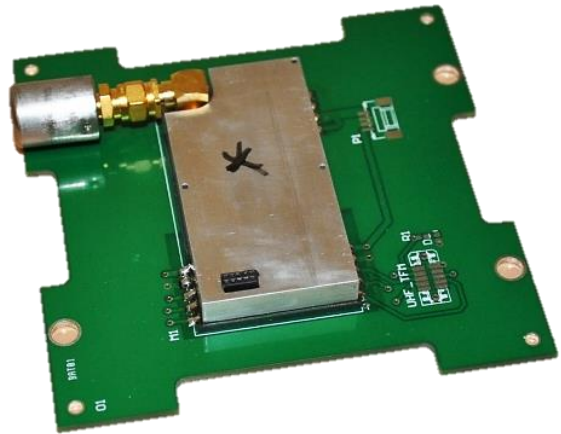


Figure 3 – Li-1 with 50 Ohm load attached

Connecting a Power Supply to the Radio

In some cases, the programmer will supply enough power to run the radio while updating firmware. However, it is recommended to connect an external power supply. To update the firmware, all AstroDev radios will only need 3.3V supplied. If using an AstroDev configuration board (Figure 2 above shows an He-100 mounted on its configuration board), power can be connected through the banana plugs. Otherwise, a breakout connection can be made to a connector.

Connecting the Programmer to the Radio

The Texas Instruments MSP-FET430UIF USB-Debug Interface (programmer) is used for configuring the radio as well as for updating firmware. AstroDev provides an adapter for use between the programmer and the radio connector. Make sure that the side of the programmer's ribbon cable tinted red corresponds to the pin 1 marking on the adapter PCB. **If the programming header is oriented incorrectly, it would likely cause damage to the radio.** The red wire in the ribbon cable aligns with pin 1 in Figure 4 and Figure 5 below.

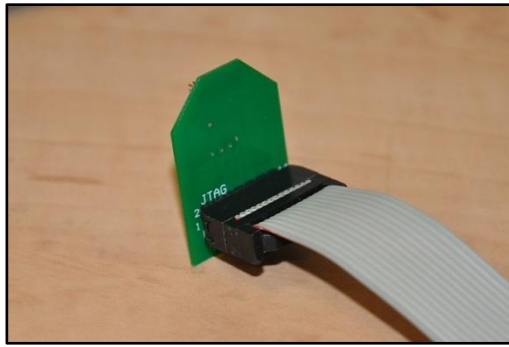


Figure 4 – He-100 programming adapter connected properly to programmer cable

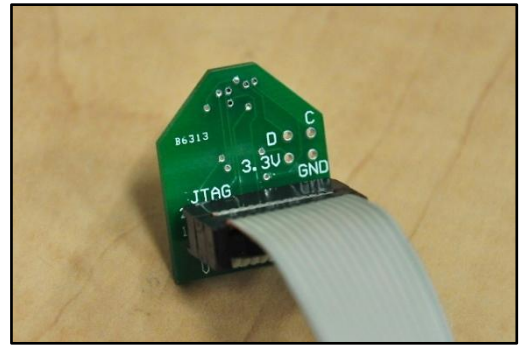


Figure 5 – Li-1 programming adapter connected properly to programmer cable

UPDATING FIRMWARE

AstroDev periodically releases firmware updates for radios when bugs are found or improvements are made. The following section describes the steps necessary to successfully update an AstroDev radio to the newest firmware release.

Download Newest Firmware from AstroDev Website

The newest firmware release for a given radio can be found on the AstroDev website by clicking on the corresponding radio's "Support Page" link. The file will download as a zipped folder that should first be unzipped before proceeding. There should be at least one .hex file contained within the folder will be used to write to the flash on the MSP430 that runs the AstroDev radio.

Run Elprotronic's FET-Pro430 Software

Elprotronic offers free software that is designed for use with the Texas Instruments FET430 programmer. The software is available at: <http://www.elprotronic.com/files/FET-Pro430-Lite-Setup.zip>. The zip file contains the setup files that will install FET-Pro430 Lite on your computer. After installing, run FET-Pro430.

Apply Settings and Open Code File

The FET-Pro430 has a field for selecting which MSP430 model. Under "Microcontroller Type," click on the drop down for Group and select "MSP430F2xx." Then click the drop down below group and select the "MSP430F2618" from the list of MSP430s (highlighted in Figure 6). The RAM and FLASH information under "Selected Device Information" will update. Note that the processor selection should be based on the product List:

He-100 and Li-1: MSP430F2618

Li-2: MSP430FR5969

Li-3: MSP430FR5994

Next, the .hex file downloaded from the website earlier must be pointed to. Click the "Open Code File - >" button and browse to the location where the .hex was downloaded. If multiple .hex files were downloaded, make sure to select the one that matches the intended radio setup (e.g. if using the He-100, select the "He100_TXUHF_RXUHF" .hex file if you plan to transmit on the UHF band and receive on the VHF band). Then click "Open." The file name and path boxes will update. Also, the "Report" field should now show "Reading Code File..... done" along with the code size of the .hex file.

Radio Configuration Program Manual

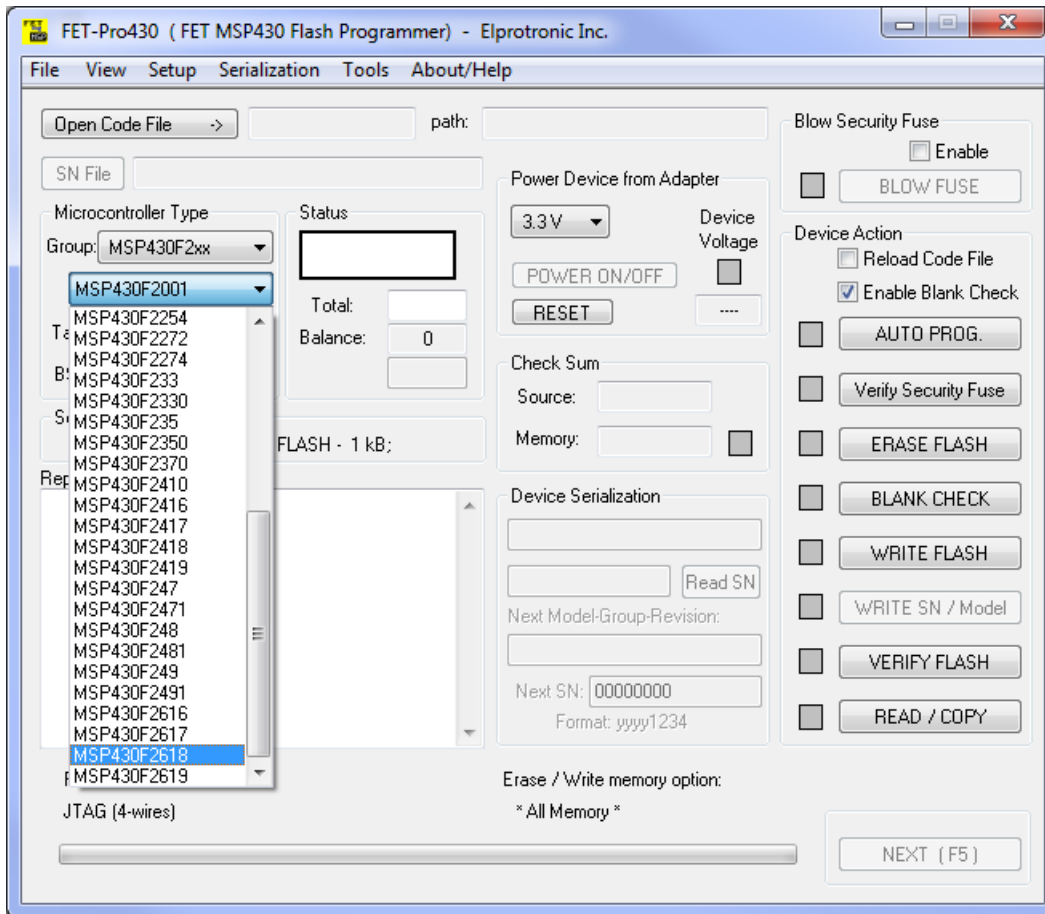


Figure 6 – Selecting the MSP430 model in FET-Pro430

Write Flash

After opening the code file, the last step is to write to the flash of the MSP430. Simply click the "WRITE FLASH" button to upload the firmware selected in the previous step (Figure 7).

Radio Configuration Program Manual

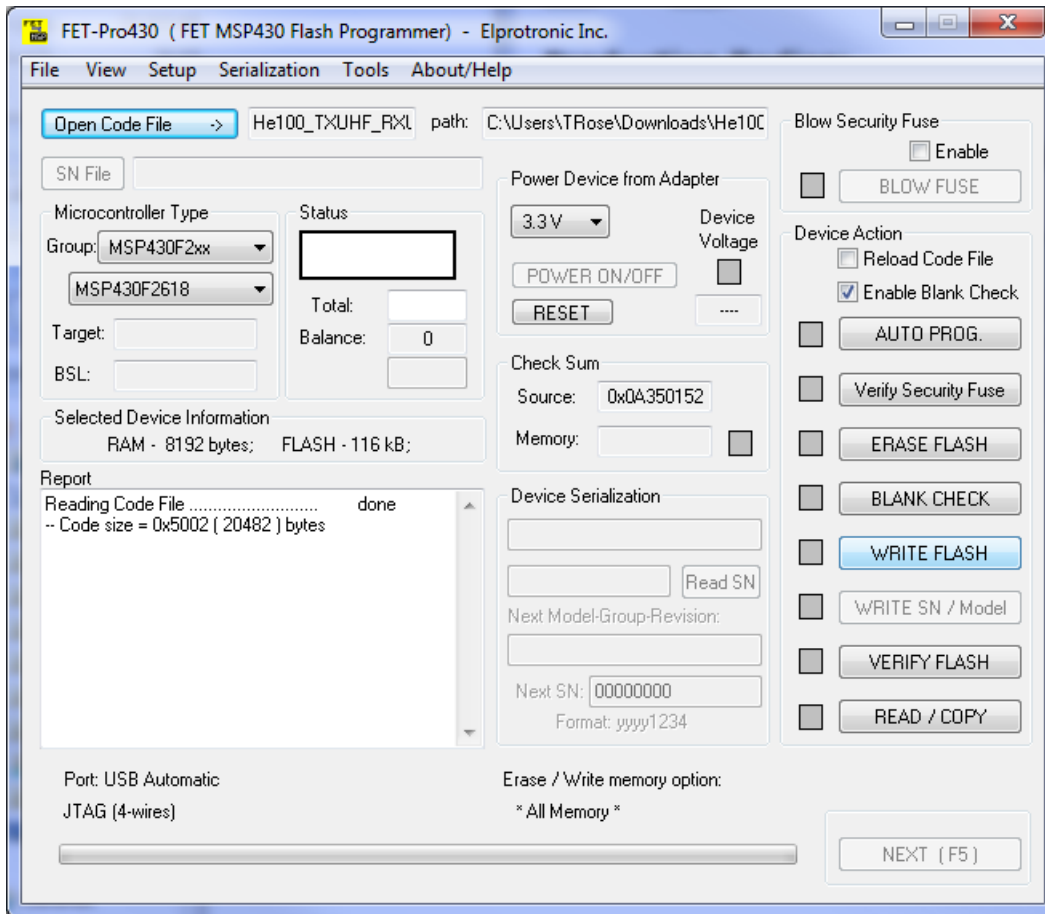


Figure 7 – Writing the .hex file to flash

Radio Configuration Program Manual

TRADEMARKS

In progress.

DISCLAIMER

All information in this document is subject to change at anytime. Look for continued updates at:
<http://www.astrodev.com/>

Helium radios are sold as test devices and require users to gain experimental license from the FCC for use in terrestrial and CSK satellite missions.

NOTES