How to Program the Flash Memory of a Minidragon+ (9s12dp256 based evaluation board)

Gavin Philips
Electrical and Computer Engineering
University of Wyoming
July 24, 2006

The following steps describe one process for programming the flash memory of the Minidragon+. Other methods exist, but this method has been proven and is relatively simple.

- **Preparing the program to be flashed**

  1) Use the ICC12 Professional programming software. The professional version is necessary, as the standard version does not allow the use of paged memory. (UW students: ICC12 Pro is available in the senior design lab.)

  2) The reset vectors must be prepared in the program. In order to do so, add the following lines of code at the beginning of the main function. These lines fill the addresses 0xFFF8 through 0xFFFF with the starting address of the program, 0xC000. (Additional instructions will be necessary if using other interrupts, like the timer overflow. Addresses for other interrupts can be found on the Minidragon+ CD.)

```
        asm( ".area vector(abs)\n"
             ".org 0xFFF8\n"          // Reset, Clock monitor fail reset, COP
                                      //  failure reset, and unimplemented
                                      //  instruction.
             ".word 0xC000, 0xC000, 0xC000, 0xC000\n"
             ".text" );              // start at beginning of code whenever any
                                      // of the above exceptions occur
```

3) In the "Project – Options" menu:
   - In the "Compiler" tab, select "Motorola S19" as the Output Format.
   - In the "Target" tab, set the option as shown in figure 1. (Even if paged memory is not used, this is necessary for successful flashing.)
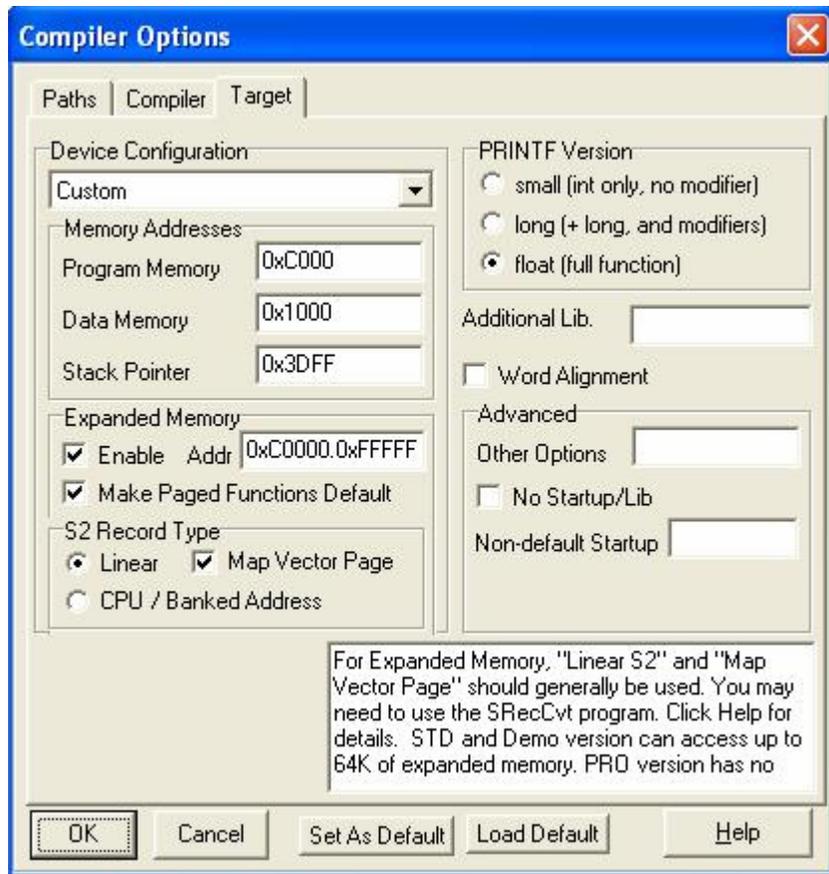
Figure 1. Compiler Settings

4) Compile the program (or just hit F9 to Make Project), and note the name of the .S19 file.

- **Programming to flash memory**

1) Connect the "USB Multilink" programming pod to a USB port on the computer in use.

2) Connect the programming pod to the Minidragon+ as shown in Figure 2, with the red line toward the reset button.
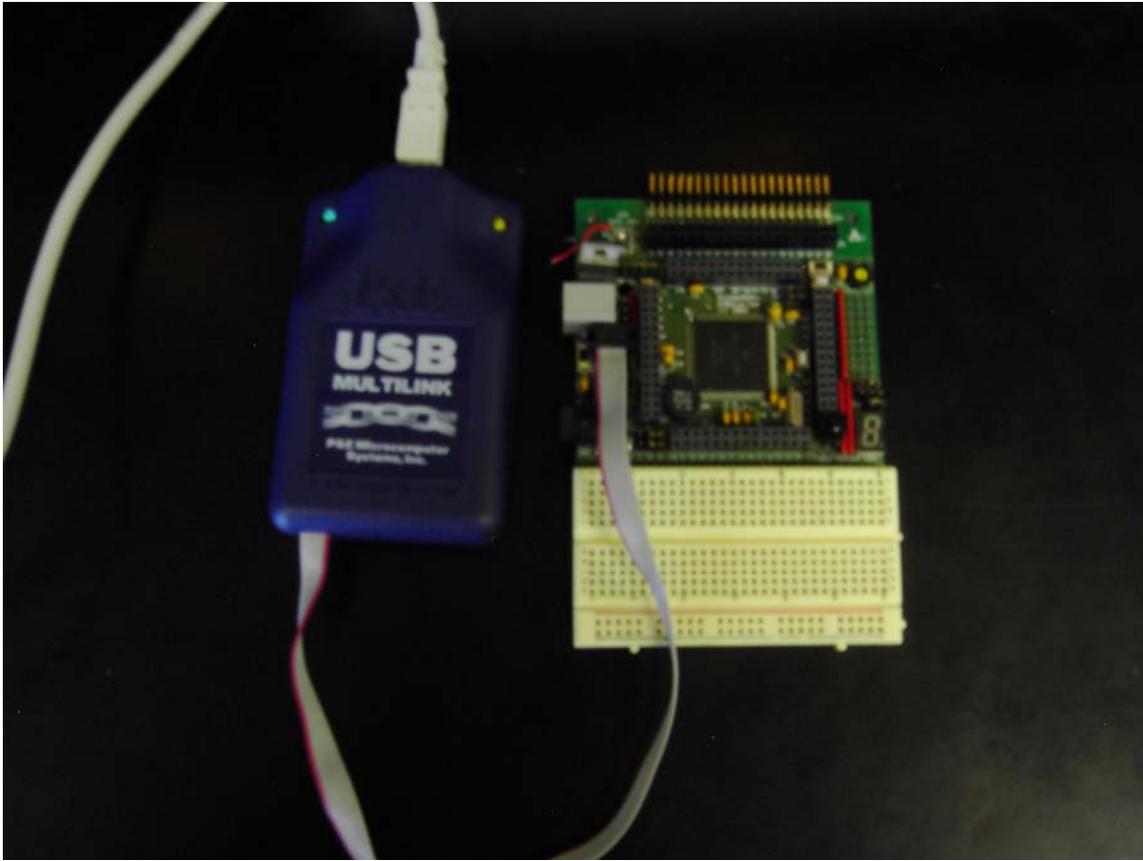
Figure 2. Pod connection to Minidragon+

3) Power the Minidragon+, using either batteries or the including AC adapter.

4) Select "Start → P&E 68HC12 BDM Programmer → PROG12Z – 68HC12 Programmer". (If this software is not installed, you may need someone with administrator privileges to do so, and to install the programming pod the first time it is connected.)

5) The Connection Assistant should start. Make sure the option match those shown in figure 3, and click "OK". The blue and green LEDs should be lit at this point.
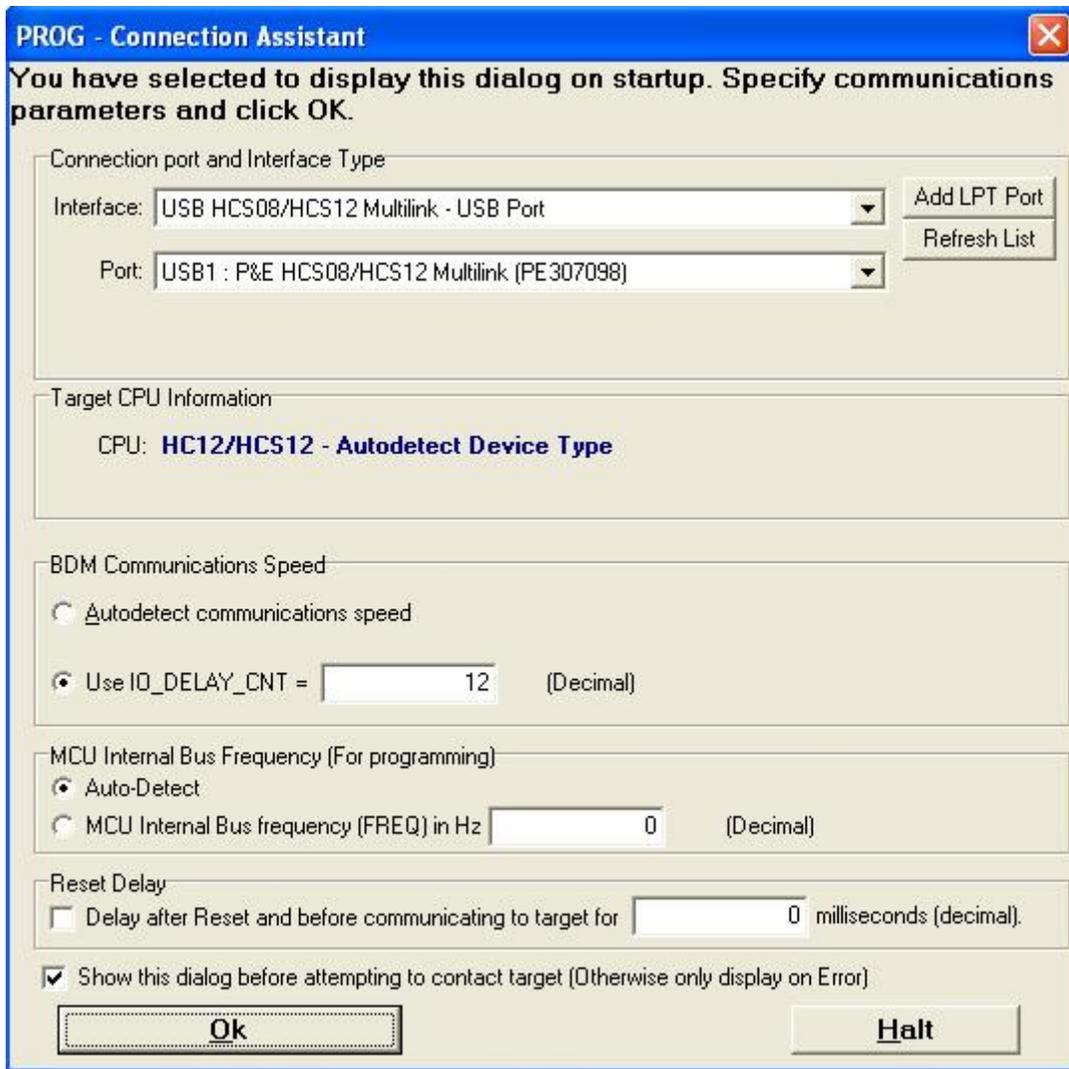
Figure 3. Connection Assistant

6)   A prompt should appear, allowing selection of the module to be used. Select "9s12dp256_256k.12P" as shown in figure 4. If the prompt does not appear, select the "CM Choose Module .12P" option.
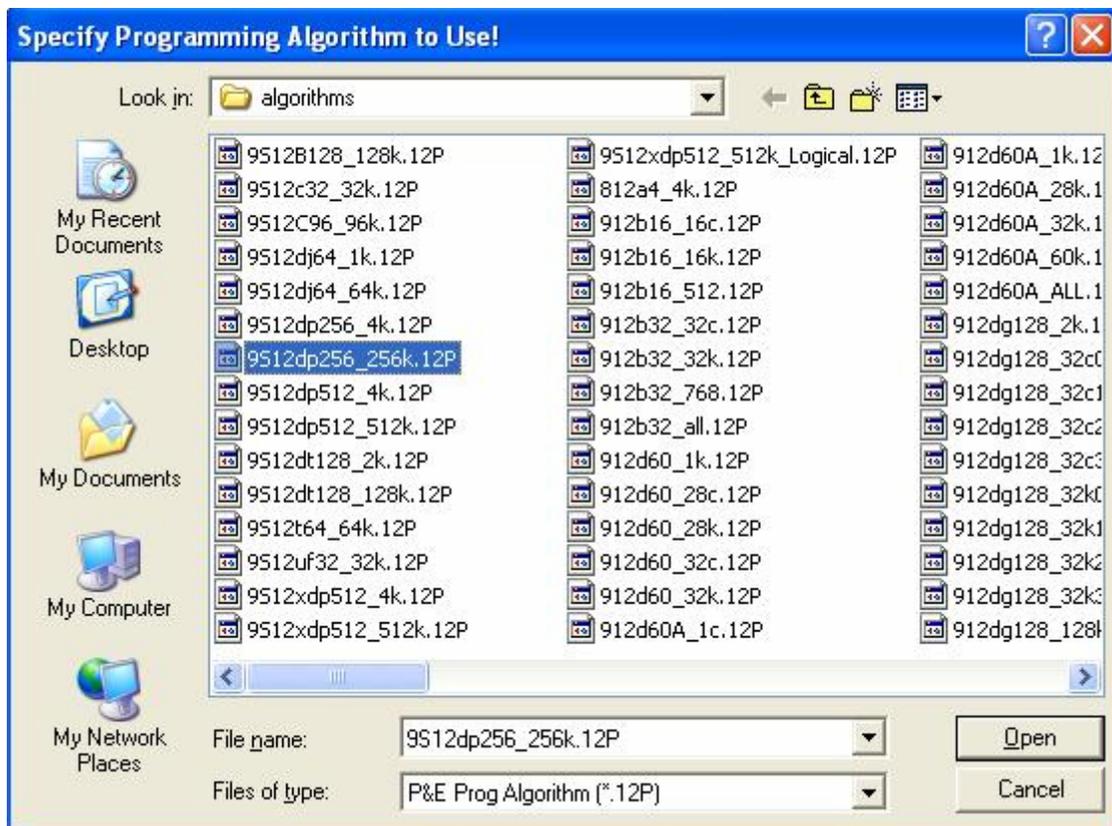
Figure 4. CM Choose Module .12P

7) The base address should automatically be entered for these settings. If it is not already set, enter "0C0000". When complete, the interface should look exactly as shown in figure 5.
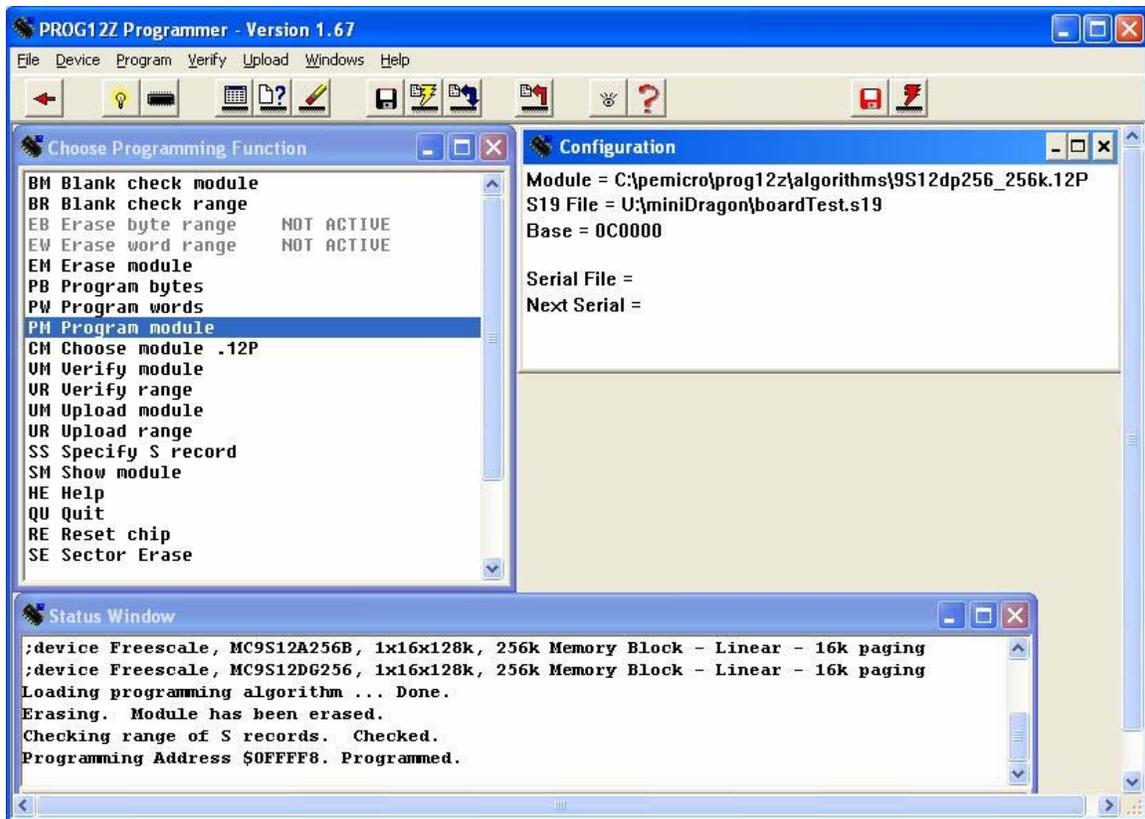
Figure 5. Flash Programmer Interface

8) Double-click the "SS Specify S record" option, and browse to select the .S19 previously compiled with ICC12 Pro.

9) Double-click the "EM Erase Module" option. This action will be confirmed in the command window at the bottom of the interface.

10) Double-click the "PM Program Module" option. This action will be confirmed in the command window at the bottom of the interface.

11) Reset the Minidragon+ and watch it work!

* If at any time the error message "all S record addresses not in range or module. Continue?" appears, select no and check that each step has been followed precisely.