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, 0xC00	0, 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.)

Device Configuration	PRINTF Version		
Custom Memory Addresses Program Memory OxC000	 small (int only, no modifier) long (+ long, and modifiers) float (full function) 		
Data Memory 0x1000 Stack Pointer 0x3DFF	Additional Lib.		
Expanded Memory Carlos Enable Addr OxC0000.0xFFFFF Make Paged Functions Default S2 Record Type Linear V Map Vector Page CPU / Banked Address	Advanced Other Options To No Startup/Lib Non-default Startup		
For Expand Vector Pag need to use details. ST 64K of exp.	led Memory, "Linear S2" and "Map e" should generally be used. You may e the SRecCvt program. Click Help for D and Demo version can access up to anded memory. PRO version has no		

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 \rightarrow P&E 68HC12 BDM Programmer \rightarrow 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.

iramete	rs and click OK.		
Connectio	n port and Interface Type		
Interface:	USB HCS08/HCS12 Multilink - USB Port	•	Add LPT Port
Port:	•	Hetresh List	
Target CP CPU:	U Information HC12/HCS12 - Autodetect Device Type		
BDM Com	munications Speed etect communications speed		
Use IC)_DELAY_CNT = 12 (Decimal)		
MCU Inter Auto-E	nal Bus Frequency (For programming))etect nternal Bus frequency (FREQ) in Hz 0	(Decimal)	
Reset Del	ay after Reset and before communicating to target for	0 milliseco	nds (decimal).

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.

Specify Programming Algorithm to Use!								
Look jn:	algorithms		•	+ 🗈 💣 🗉				
My Recent Documents	9512B128_128 9512c32_32k.1 9512C96_96k.1 9512C96_96k.1 9512C96_14.12	6.12P 2P 2P 2P	9512xdp512_5 812a4_4k.12P 912b16_16c.12 912b16_16k.12	i12k_Logical.12P 2P 2P	912d60A_1k.12 912d60A_28k.1 912d60A_32k.1 912d60A_32k.1 912d60A_60k.1			
Desktop	9512dj64_64k.1 9512dp256_4k. 9512dp256_4k. 9512dp256_256 9512dp256_256 9512dp256_26	12P 12P 5k.12P 12P	912b16_512.1: 912b32_32c.12 912b32_32k.12 912b32_32k.12 912b32_768.1:	2P 2P 2P 2P	912d60A_ALL.1 912dg128_2k.1 912dg128_32c0 912dg128_32c0 912dg128_32c1			
My Documents	國 9512dp512_512 國 9512dt128_2k. 國 9512dt128_128 國 9512dt128_128	2k.12P 12P :k.12P 2P	912b32_all.12F 912d60_1k.12F 912d60_28c.12 912d60_28c.12 912d60_28c.12	> 2P 2P	912dg128_32c2 912dg128_32c3 912dg128_32c3 912dg128_32k0 912dg128_32k0 912dg128_32k1			
My Computer	9512uf32_32k.12P 9512xdp512_4k.12P 9512xdp512_4k.12P		© 912d60_32c.12P © 912d60_32k.12P © 912d60A_1c.12P		912dg128_32k2 912dg128_32k2 912dg128_32k3 912dg128_128			
	<			Freed	>			
My Network File name: 9S12dp256_2 Places Files of type: P&E Prog Alg		9S12dp256_25	6k.12P ithm (*.12P)	• •	<u>Open</u> Cancel			

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.