Auto-start a user application program from on-chip EEPROM of the MiniDRAGON+ Rev. D board during power up
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After your application program runs perfectly in RAM, you can program it into on-chip EEPROM for auto starting during power up. If your code size is smaller than 3K ($400-$FFF) you can download your code into EEPROM by LOAD command and then set J9 and S7 for Jump-to-EEPROM mode. During power up, it runs the bootloader first then jumps to $400, the starting address of your application program in the EEPROM. The EEPROM memory is non-volatile memory. Your code will run every time the board is powered or reset.

The most common mistake made by a user is to download an s1 file into eeprom memory.

The EEPROM on the HCS12 is not conventional byte-writable EEPROM. It's actually made of flash memory. In order to program the MC9S12DP256 EEPROM, you must program an even number of bytes and begin on an even address boundary for each s-record. If any one s-record in the file contains an odd number of bytes or begins with an odd address, the EEPROM cannot be programmed. Let's use the test_eeprom.asm as a sample program and assume that the assembler successfully generated the test_eeprom.s19. Next, you must use the Freescale's s-record conversion utility, sreccvt.exe, to make an s2 file from the test_eeprom.s19 by using the following command line:

Srccvt -m c0000 fffff 32 -of f0000 -o test_eeprom.s29 test_eeprom.s19

It will create a new s2 file named test_eeprom.s29 that has an even number of bytes and can be programmed into the EEPROM. For your convenience, I made a batch file, make_s2_test_eeprom.bat that can be placed along with the srccvt.exe in your working directory. After assembling your test_eeprom.asm without an error, you can double click the make_s2_test_eeprom.bat and it will create test_eeprom.s29 from test_eeprom.s19. You can use this batch file on your other application programs and edit the make_s2_test_eeprom.bat by substituting the filename 'test_eeprom' with your new file name. For instance, if your new filename is demo.asm the dos command in the make_s2_test_eeprom.bat will be:

Srccvt -m c0000 fffff 32 -of f0000 -o demo.s29 demo.s19.

To edit the make_s2_test_eeprom.bat, right click it and a small pull down menu will appear on screen. Left click the edit option to modify the dos command.

Here are the steps to program the EEPROM with test_eeprom.asm for auto-starting:
(For your convenience, I have made steps 1 - 4 for you and you can use the test_eeprom.asm as a template for modifying your assembly source program. By comparing our original test.asm and the new test_eeprom.asm you can see what have to be done for modifying your source program)

1. Our original test.asm was made for running in RAM and it must be modified by changing the starting address from RAM to EEPROM.

2. In the beginning of the test.asm you still have to initialize the interrupt vectors table addresses in RAM at $3E00-$3E7F because bootloader will redirect interrupts to the RAM interrupt vector addresses at $3E00-$3E7F. The addresses $400 and $401 must contain the starting address of your program.

3. Edit and Assemble the test_eeprom.asm until it's assembled without error messages.

4. Double click on make_s2_test_eeprom.bat and it will create test_eeprom.s29 and a duplicated file named test_eeprom.s2, which will only be recognized by some IDEs as an s2 file.

5. Make sure that the jumper is on the right side of J9 and the slide switch S7 is set at the right side so the D-Bug12 monitor is running. Then enter LOAD command. The D-Bug12 will wait for your file. Do not type any thing.

6. Click the Build button in AsmIDE, then click the Download option and select the file test_eeprom.s29. If you don't see the test_eeprom.s29 you have to select 'all files' for type of file. The speed of download is fairly slow because the D-Bug12 inserts necessary delays and uses Xon-Xoff to slow down communication with the host PC. You should see a few marching stars on the screen:
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7. The D-Bug12 prompt '>' re-appears after the EEPROM is programmed.

8. You do not have to erase the EEPROM before programming it because the D-bug12 will erase it before programming it.

9. Change the jumper on J9 from right side to left side for setting up jump-to EEPROM mode. (In order to set the Jump-to-EEPROM mode, the jumper on J9 must be placed at left side and the slide switch S7 must be set at right side)

10. Press the reset button. The 7-segment display will show J-4-3 sequentially and test_eeprom.asm will run from EEPROM just like the test.asm runs from RAM.

You can program EEPROM with the ex2_eeprom.s29. For your convenience, I generated ex2_eeprom.s29 for you to download. The ex2_eeprom is a much simpler sample program. By comparing our original ex2.asm and the ex2_eeprom.asm you can easily see what have to be done for modifying your source program.