



AN-ELNEC-EN-OSCTRIM-HC08

**Application note about OSCTRIM handling for
Motorola/Freescale HC08 microcontrollers**

HC08

Quick introduction

Some members of the HC08 family have an oscillator trimming (OSCTRIM) location implemented as FLASH cell in the memory map. It's value is used to initialize OSCTRIM volatile register, to trim oscillator's frequency if desired. Brand-new MCU comes with OSCTRIM factory preprogrammed to value, which gives the best accuracy required for communication using forced monitor mode.

Typical for whole HC08 family is the security feature, which has to prevent unauthorized access to FLASH content. Security can be bypassed by sending 8 security bytes (SECURITY) to MCU while entering monitor mode. These bytes are user-defined (location used for vectors, \$FFF6-\$FFFD), so user should know it. If you don't know SECURITY, there is up to 2^{64} of combinations to check, before you get the right response from MCU.

Implementation of algorithm for HC08 with OSCTRIM location to our software (SW) comes with **minor complication**, which is, **erasing the FLASH will erase also the OSCTRIM. To preserve its value, OSCTRIM must be read out before chip erase, and then programmed back to its original location.** As stated above, without sending SECURITY, any access to FLASH is prevented, so in some cases (when MCU's SECURITY is not blank), **you must enter valid SECURITY before "Erase with Preserve OSCTRIM" operation.**

Because our effort is to make programming easier, there are some additional settings in control SW, which allows you to operate more efficiently.

Anyway, for some applications, it's not necessary to preserve OSCTRIM value, and on other hand the value can be calculated using specific algorithms.

Control SW

Please look at the Table 1. and try to understand the control SW behaviour according to "Preserve OSCTRIM value" setting in Erase parameters (menu Device operation options <ALT+O>, Figure 1.). It describes, what SECURITY bytes are sent before the specific operation.

Operation	SECURITY BYTES based on Erase parameters setting	
	Don't preserve OSCTRIM value	Preserve OSCTRIM value
Blank	blank	blank
Read	from buffer	from buffer
Verify	from buffer	from buffer
Program	blank *1	blank
Erase	don't care	from menu <ALT+S>

Table 1. Security bytes used to bypass security feature of HC08

*1 - If you want to program the OSCTRIM location, SECURITY bytes sent before this operation are strictly set to FFh. It means, the device should have SECURITY bytes blank.

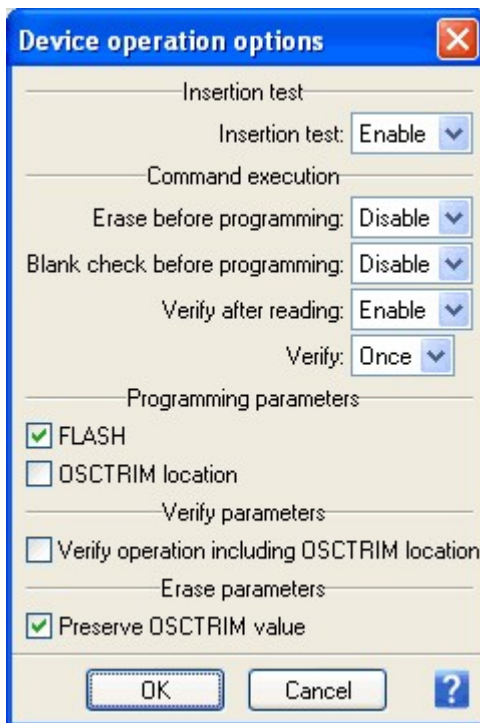


Figure 1.

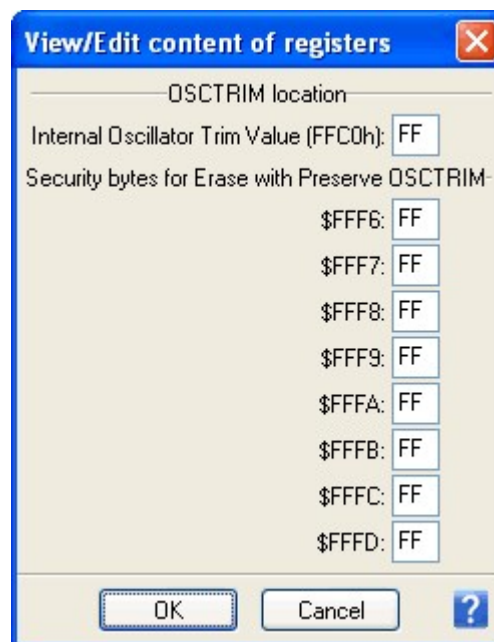


Figure 2.

Figure 1. Device operation options <ALT+O>

Figure 2. View/Edit content of registers <ALT+S>