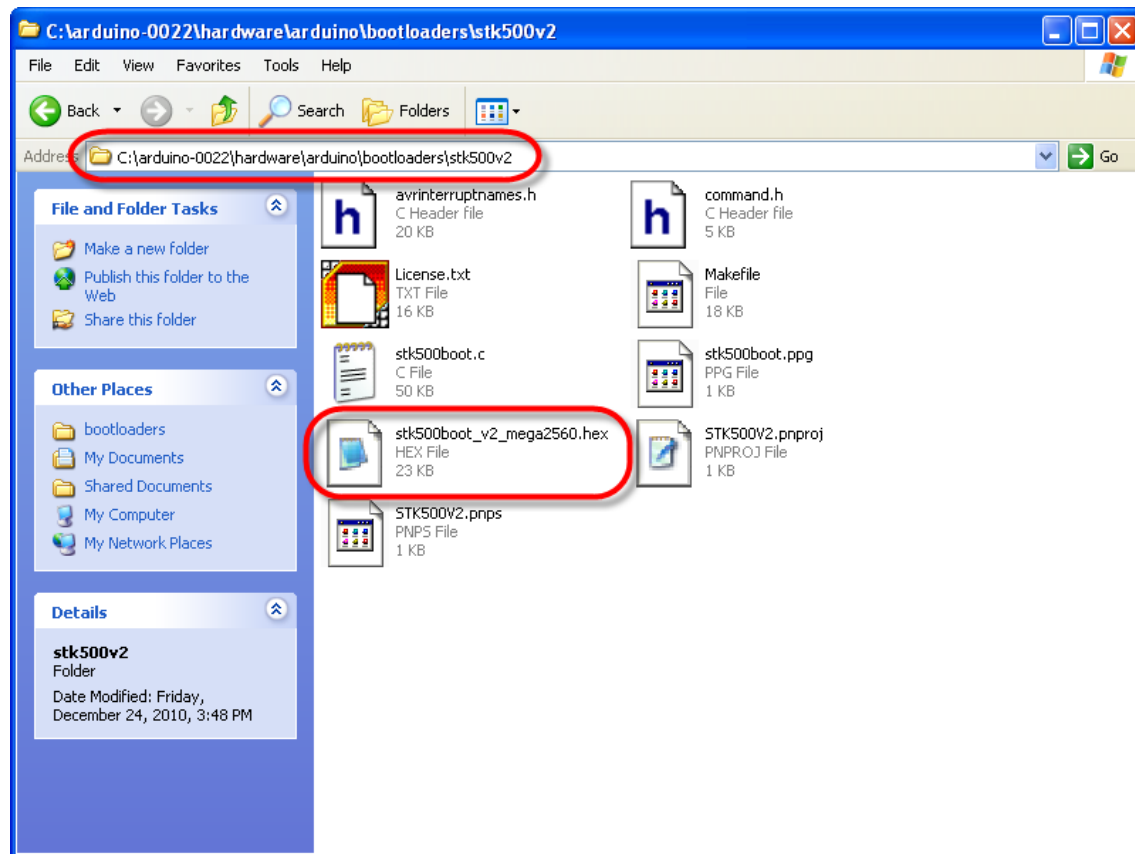


**How to Program Bootloader into Board ET-MEGA2560-ADK**

Normally, Board **ET-MEGA2560-ADK** has already been programmed Bootloader; so, user can use it instantly. If user requires changing or editing Bootloader; or if there is any error while using Program Bootloader, user can program new Bootloader into the board. Board ET-MEGA2560-ADK has been designed to have Connector AVRISP; it can program Code into MCU directly by all Programmer versions that have the Connector AVRISP according to the standard of ATMEL instantly. However, it has to use external Programmer.

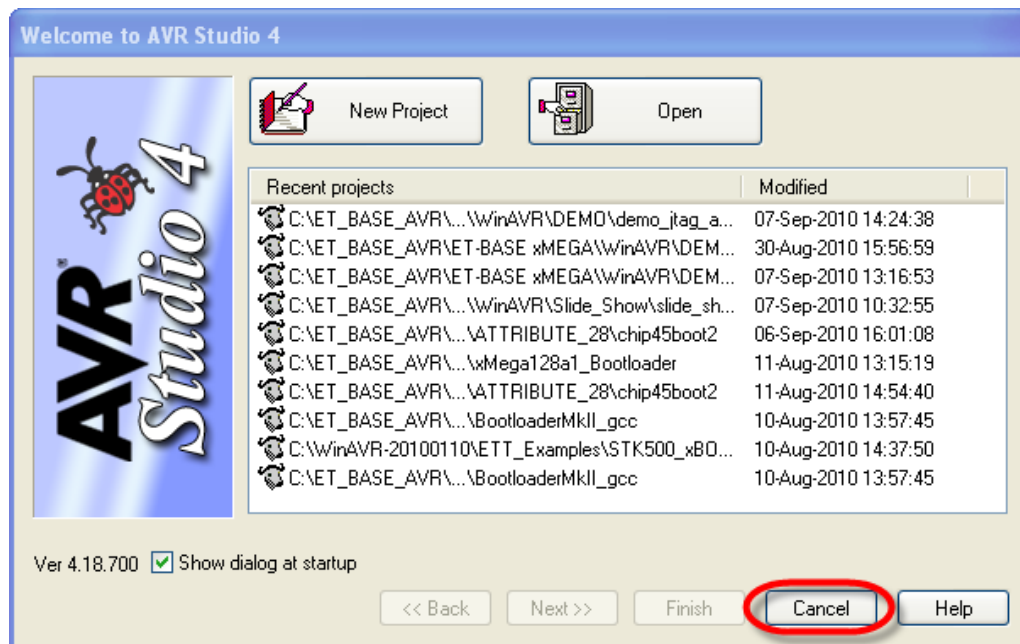
This Board ET-MEGA2560-ADK uses File Bootloader according to the standard of Arduino. File HEX of Bootloader for this Program Arduino version Arduino-0022 has already been contained in "C:\arduino-0022\hardware\arduino\bootloaders\stk500v2\stk500boot\_v2\_mega2560.hex".



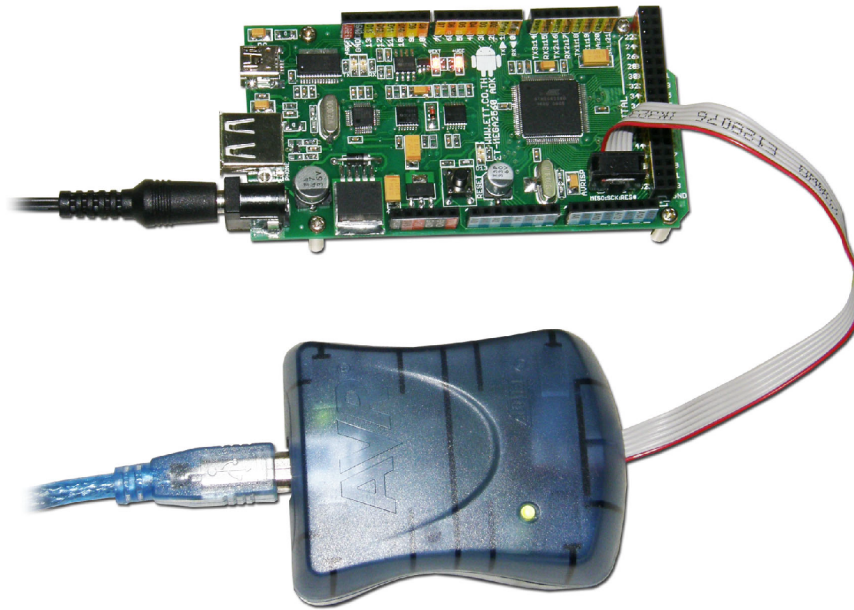
## How to program BootLoader into Board ET-MEGA2560-ADK by AVRISP mkII

If using Programmer ET-AVRISP mkII of ETT, it has to use through Program AVRStudio; normally, this AVRStudio is Text Editor of ATMEML that is used to develop program of AVR. It can link with Program C-Compiler such as WinAVR and Tools of ATMEL to develop program for AVR MCU. In this case, we don't describe any detail and process of writing program, but we only mention details about using Program AVRStudio to program HEX File into MCU as described below;

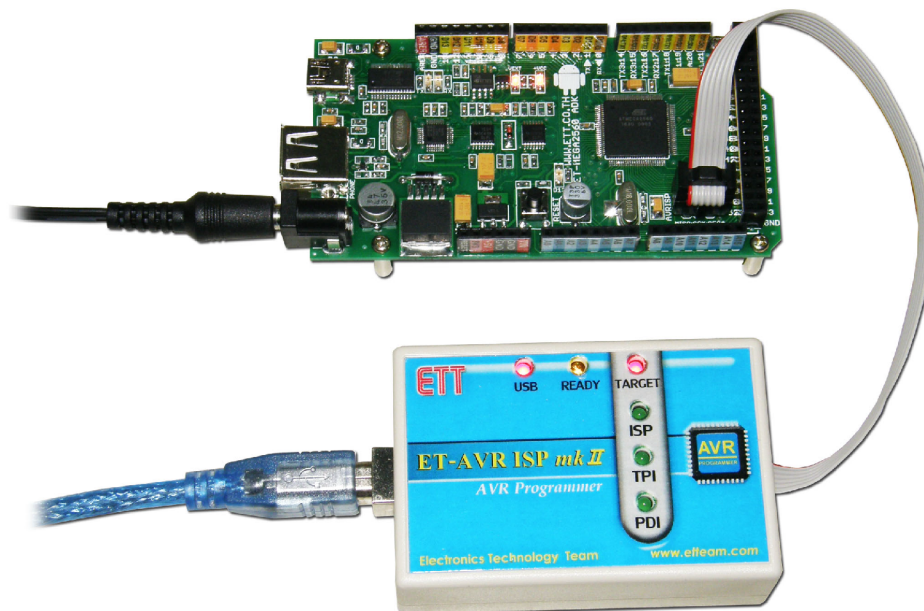
1. Open Program AVRStudio, choose and open the required Project that user has built; in this case, click *Cancel* as shown in the picture below;



2. Interface Cable USB of AVRISP mkII with computer PC; and interface Cable 6Pin Pair from ET-AVRISP mkII to Connector AVRISP of Board ET-MEGA2560-ADK completely.

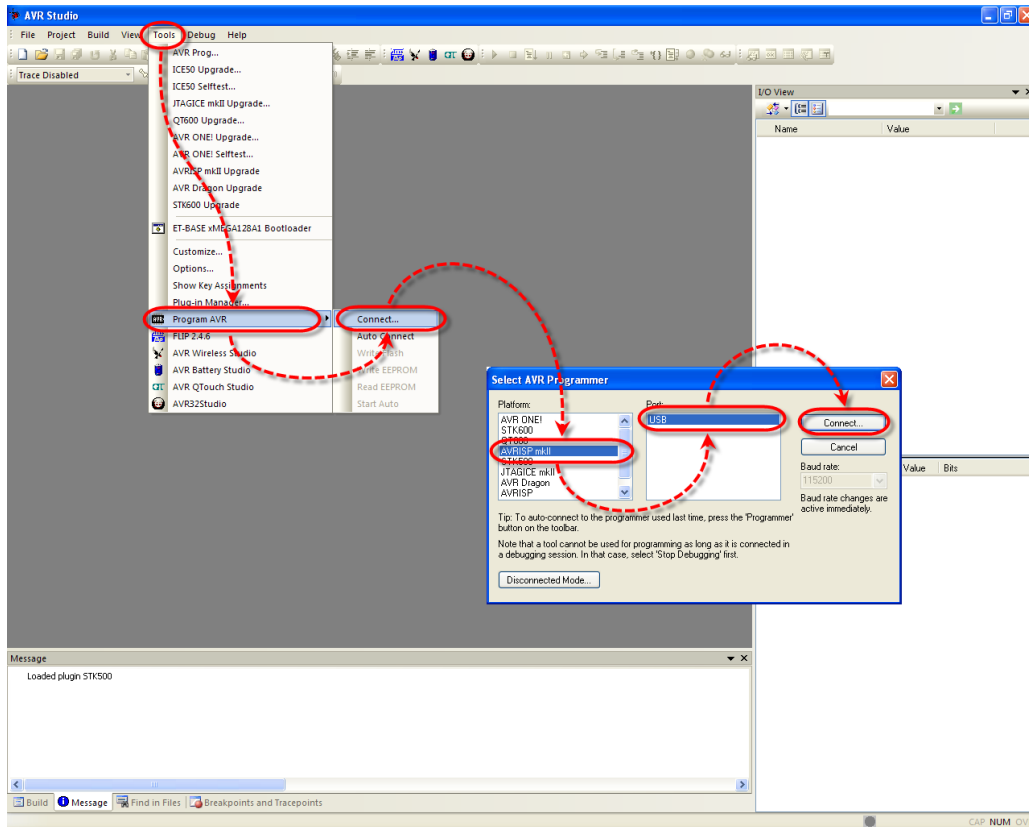


This example shows the connection between Board ET-MEGA2560-ADK and ATMEGA AVR ISP MKII.

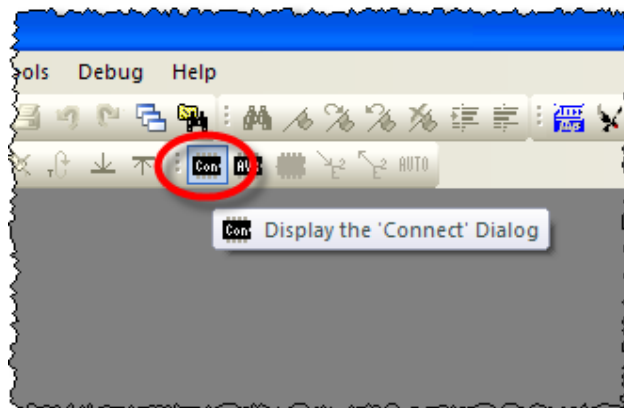


This example shows the connection between Board ET-MEGA2560-ADK and ET AVR ISP MKII.

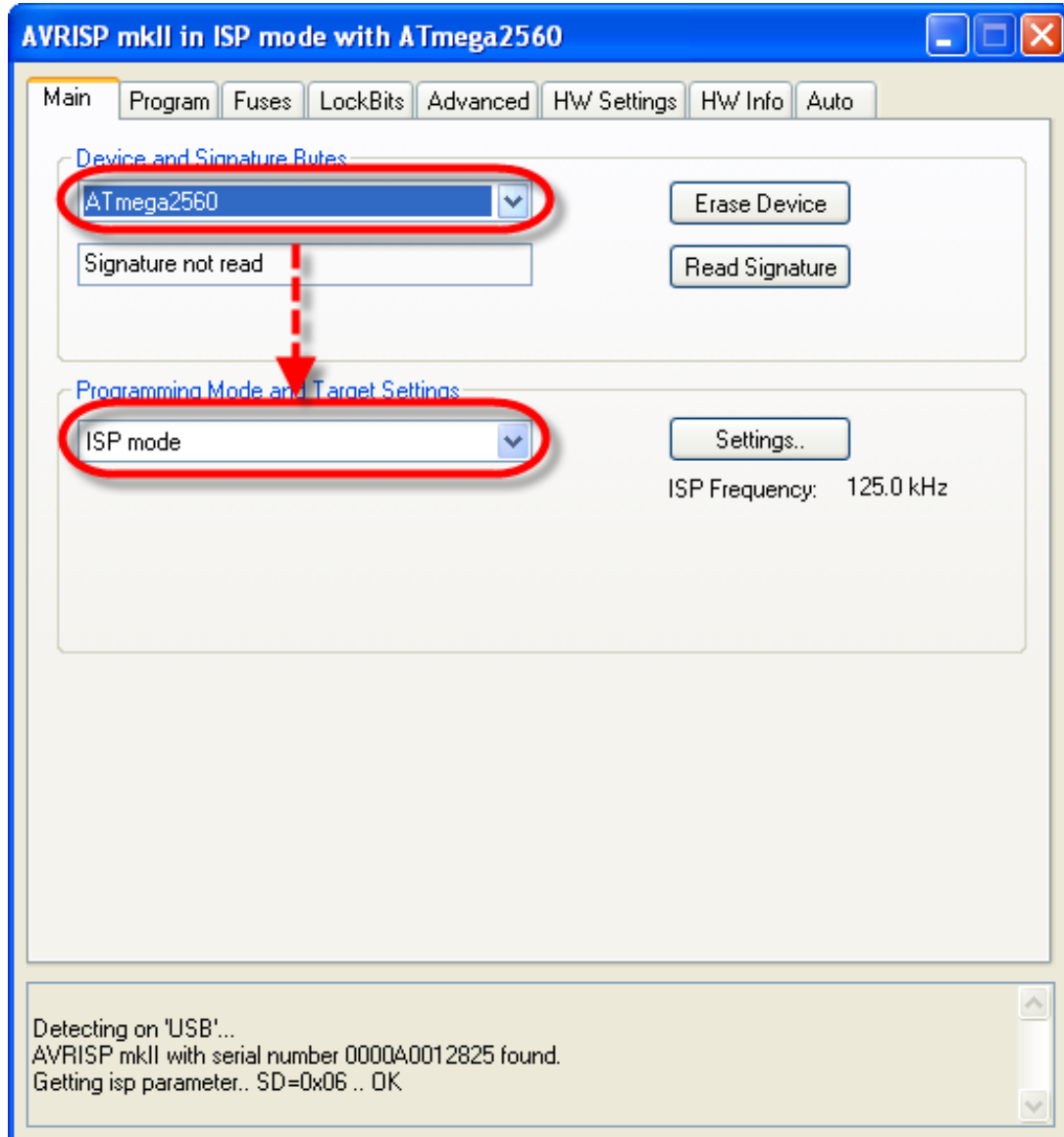
- Click Menu **Tools** → **Program AVR** → **Connect**; next, set values in *Select AVR Programmer* in Tab *Platform* as *AVRISP mkII* and then set *Port* as *USB*. Finally, click **Connect** as shown in the picture below;



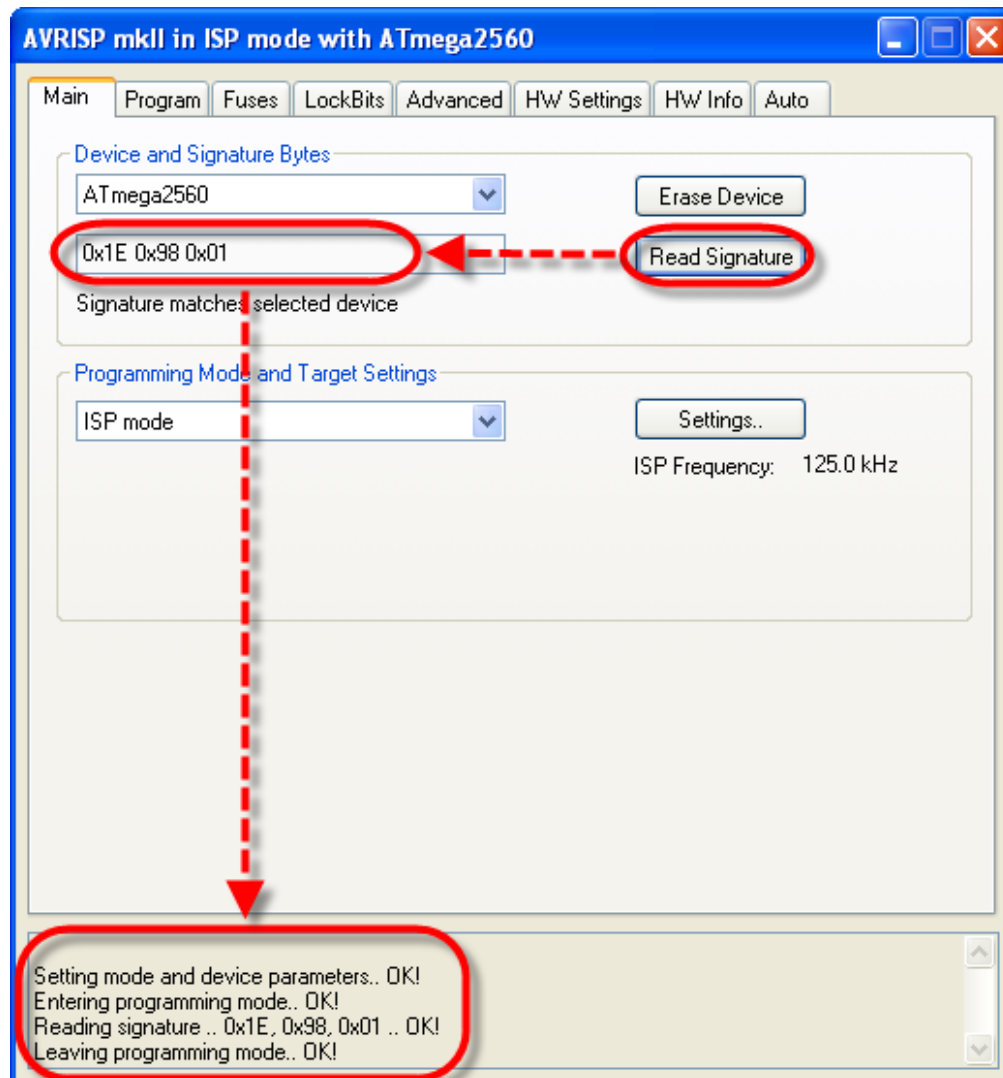
**NOTE:** In case of Menu **Tools** → **Program AVR** → **Connect...**; it is easier and more convenient to click **Dialog Connect** instead as shown in the picture below;



4. If everything is correct, program enters window of Program AVRISP mkII instantly; choose Tab *Main* and then set MCU number in *Device and Signature Bytes* that user requires programming. When user has already set the MCU number completely; in the blank of *Programming Mode and Target Settings*, program shows the possible Interface type of the MCU number instantly. If using *ATmega2560*, it is *ISP Mode* as shown in the example below;

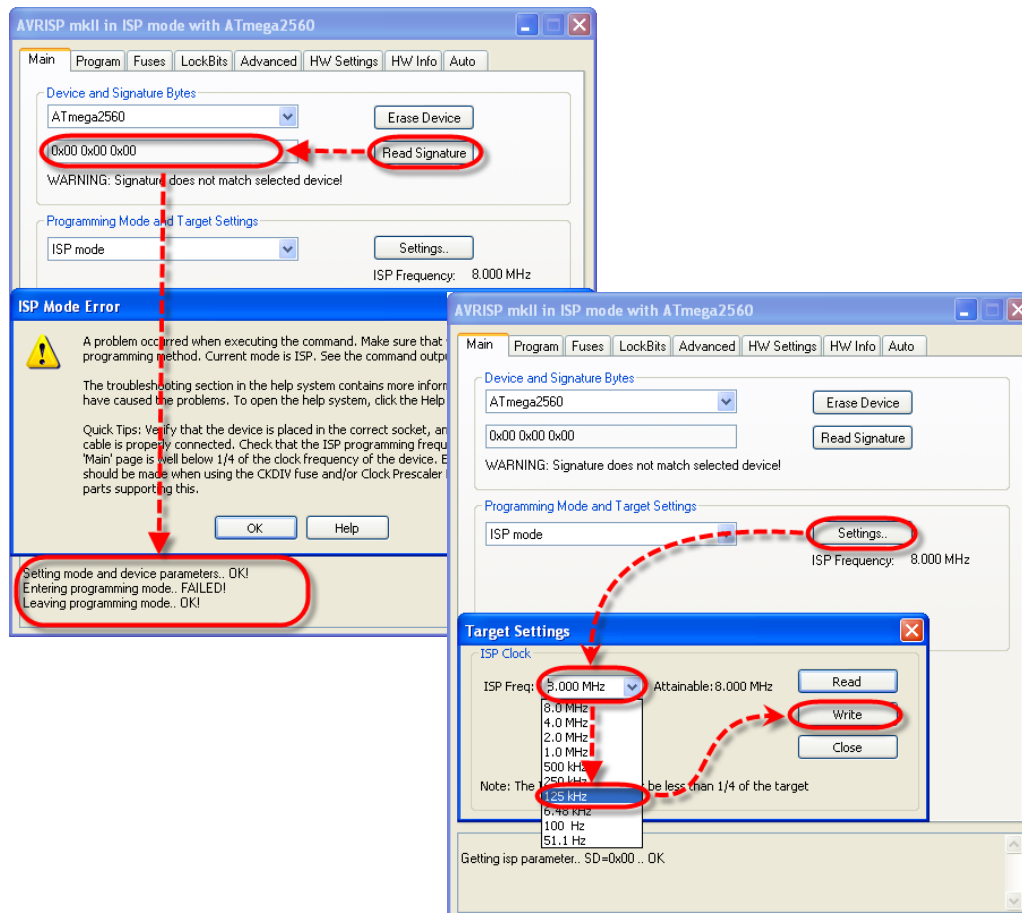


5. Programmer ET-AVRISP mkII automatically changes the operation mode according to the chosen Programming Mode; user can test the connection between MCU and Program to check whether it can communicate correctly. In this step, user has to set the MCU number correctly according to the actual connection. Click *Read Signature*; if everything is correct, program should read the Signature of MCU number that user has chosen correctly. On the other hand, if there is an error, user has to check and solve the error first. Use should not skip this process or should not command programmer to affect MCU such as *Program Flash* or *Program Fuse* or *LockBits* because some errors can be occurred. If everything is correct, it should display the operating result as follows;



If there is any error, user has to check the cause and then solve the error correctly. This is a guideline for user.

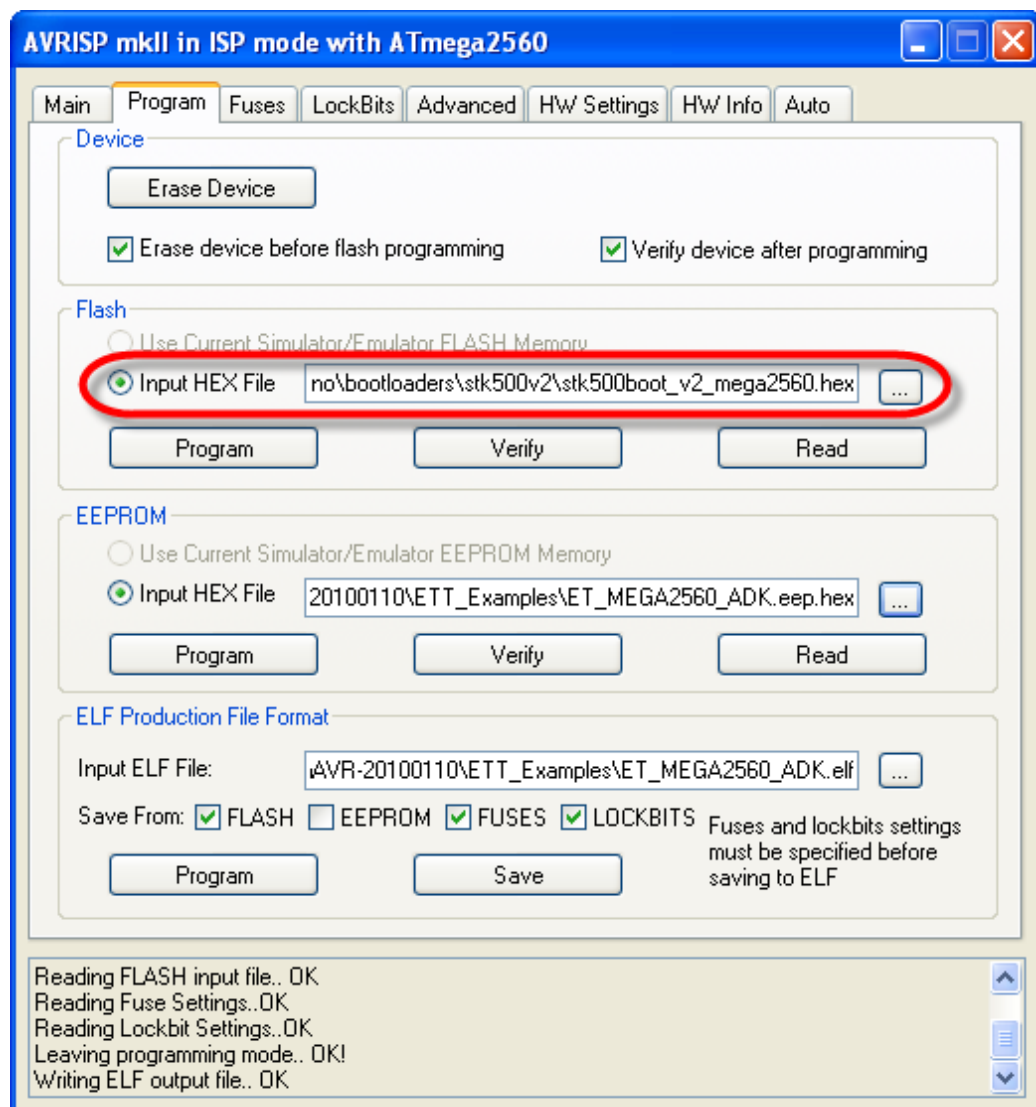
- Check whether cable between Target Board and Programmer is connected correctly; and check whether Target Board is ready to operate.
- If Target Board is used as ISP Interface, please check whether PIN ISP is used or connected by other user while programming. If yes, user has to remove the connection first to let the pin free.
- Check whether ISP Frequency of Programmer is set correctly according to the frequency of MCU that is running in Target Board. The correct ISP Frequency is not greater than  $\frac{1}{4}$  of frequency for running MCU in Target Board; for example, if MCU runs by 1MHz Frequency, the correct ISP Frequency is not greater than 250 KHz. If user does not ensure, try to adjust the ISP Frequency to lower first; when it can connect with MCU successfully, user should check Fuse Bit of MCU regarding Signal Clock later as shown in the picture below;





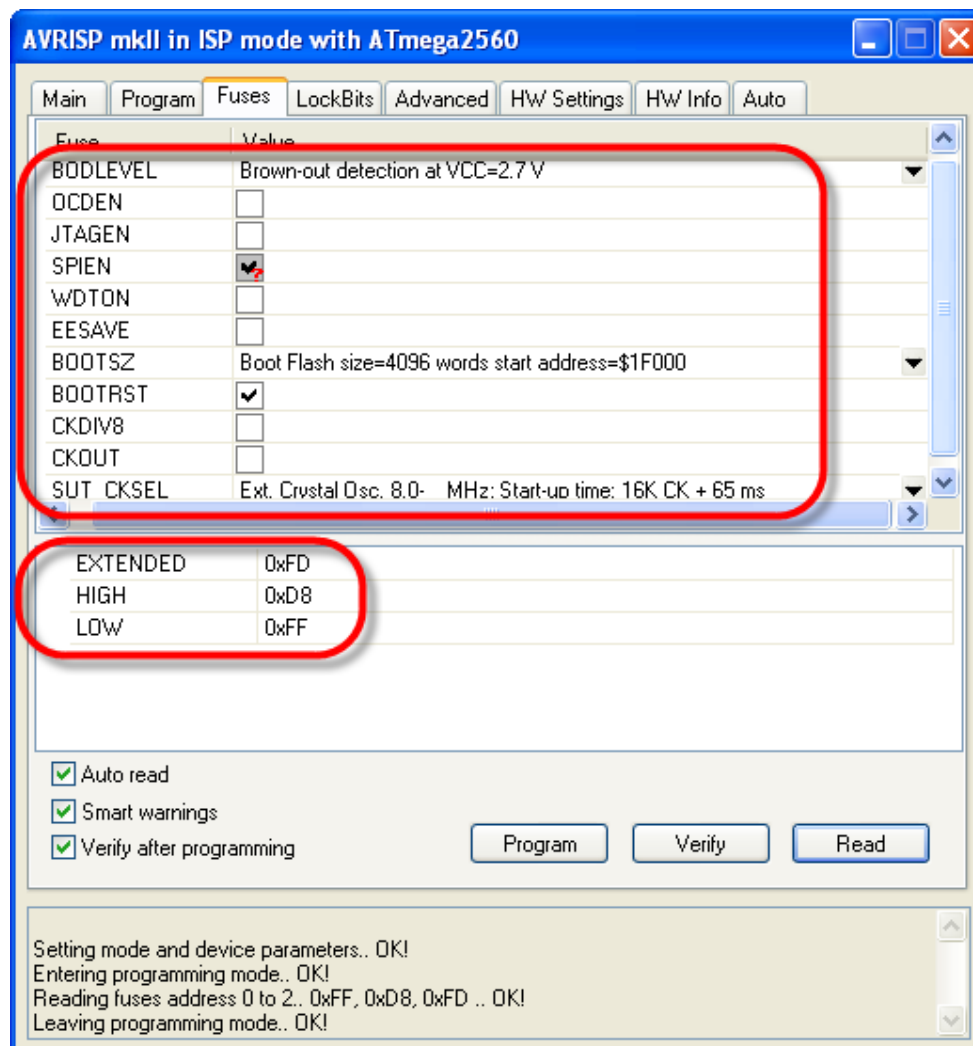
6. If everything is correct; click Tab *Program* and then set values as follows;

- Set *Device*: as follows;
  - Erase device before flash programming
  - Verify device after programming
- *Flash*: Choose the required Input HEX File for programming into MCU on Board; in this case, it is set as "*..\stk500boot\_v2\_mega2560.hex*". Next, click *Program* to program HEX File into MCU and the operating result will be displayed as below;





7. For **Fuses and LockBits**, user can set and program the value as required. Before programming this Fuse Bit, user has to learn and understand details of setting this value well; in this case, user has to set the value according to the requirement of Hardware System. If user does not ensure the details, it should not set any value or program any Fuse Bit. If user has set the value incorrectly, it has effects on the operation of MCU and errors occur. Especially Fuse Bit for setting Clock and Fuse Bit of SPIEN(SPI Enable), it is allowed to disable this value because user cannot command MCU to program by ISP Mode any more.



8. For **LockBits**, user only chooses to lock especial part of Boot Section. When everything is correct, the **Lock Bit** should be **0xCF** as shown in the picture below;

