# How to program HEX File into board by BootLoader(chip45Boot2 Protocol)

In this case, user can program HEX File into board without using any external Programmer because MCU on Board ET-BASE MEGA1280/2560 of ETT has already been installed Program BootLoader. So, user can program Hex File into MCU through RS232 Serial Port Communication via Channel USART0 of board instantly.

Program BootLoader that has been installed in MCU of Board ET-BASE MEGA1280/2560 uses Protocol of Chip45Boot2 with the fixed Baud Rate of 115200bps for communication. It can be used with Program chip45boot2 GUI that can be downloaded free from website http://www.chip45.com/info/chip45boot2.html as described below;

1. Supply Power into board by using 5VDC Adapter. Be careful and please check connector of Power Supply correctly. If it is correct, user will see LED Power ON.
2. Interface Cable RS232 from RS232 Serial Port Communication of computer PC to board through Connector RS232 of USART0 as in the picture below;
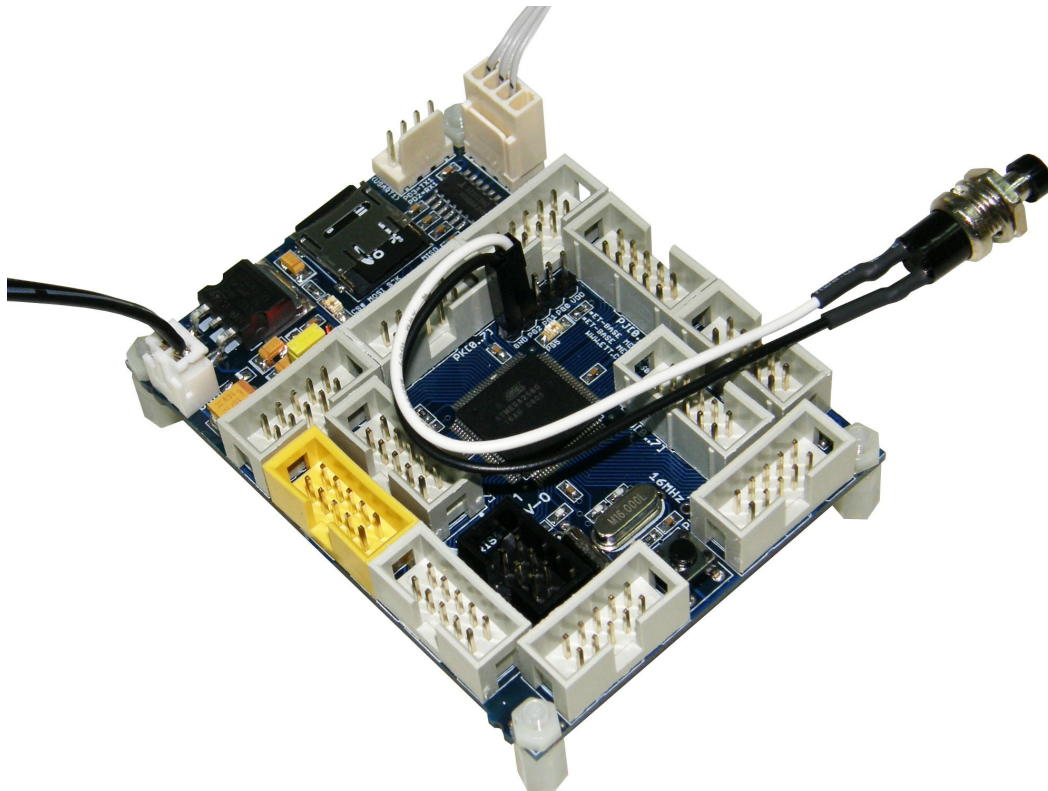
3. Reset MCU to run in BootLoader as described below;

- Press and hold SW PG2 for awhile; or Close Jumper PG2 and GND, it makes PG2 as Logic 0
- Press Switch RESET and Switch PG2 still is pressed
- Release Switch RESET first but Switch PG2 still is pressed
- Finally, release Switch PG2; or Open Jumper PG2 and GND. If everything is ok, LED PG5 blinks 3 times and then ON.
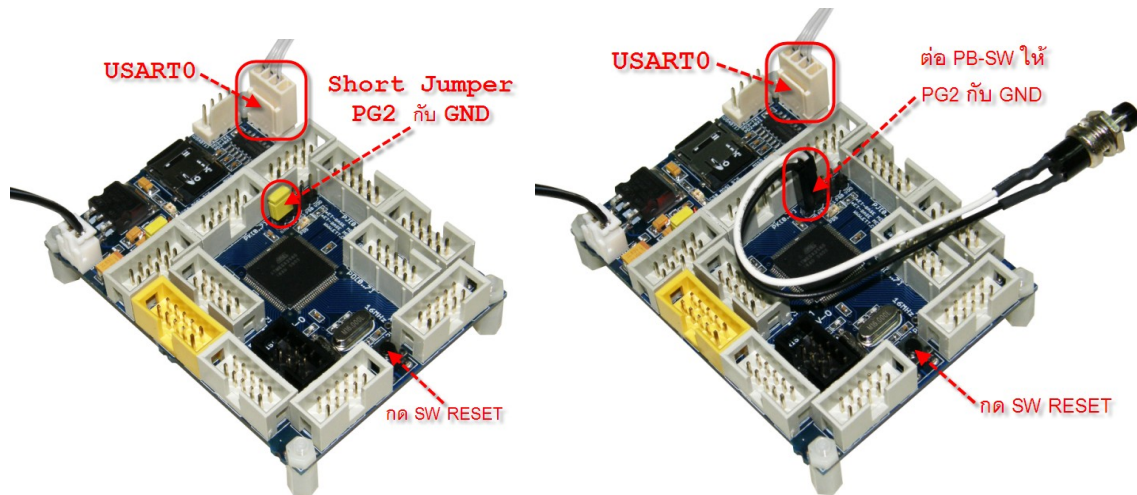

4. Run Program chip45boot2 GUI and set options for program as shown in the picture;

- Select COM Port: Choose the Com Port number according to the actual connection
- Baud Rate: Set as *115200*
- Choose *Enable* for *Send This Pre-String Before Connect and Wait = 0mS*; then, set String as U letter in the format of ASCII; or as 55 in the format of HEX
- Finally, click *Connect to BootLoader*. If everything is ok, Status of program will be changed to *Connected*! with green tab.

→
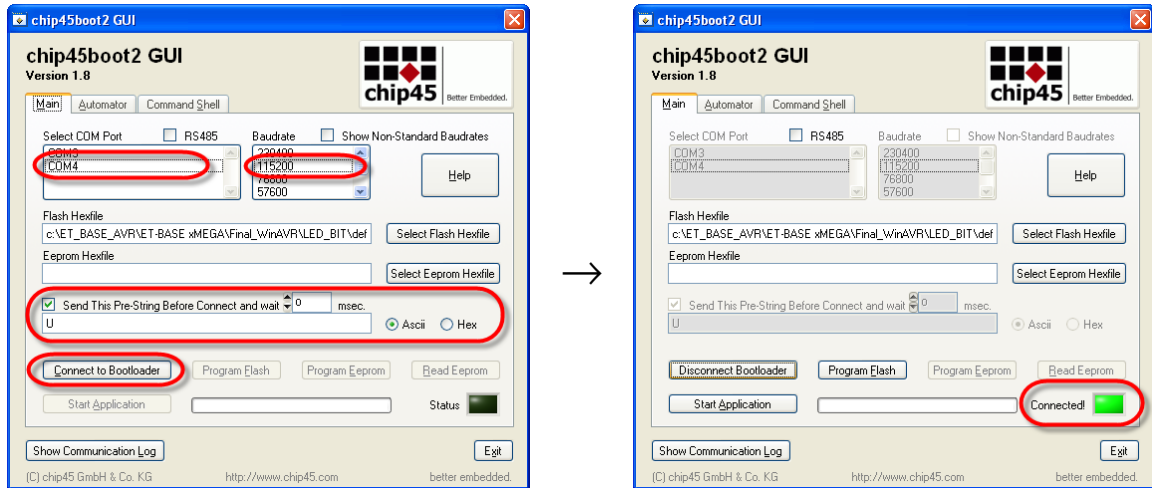
5. Choose *Flash Hexfile* that user requires programming and then click *Program Flash*. User has to waits for a while until the program runs completely, and user will see Status has been changed to *Done*!


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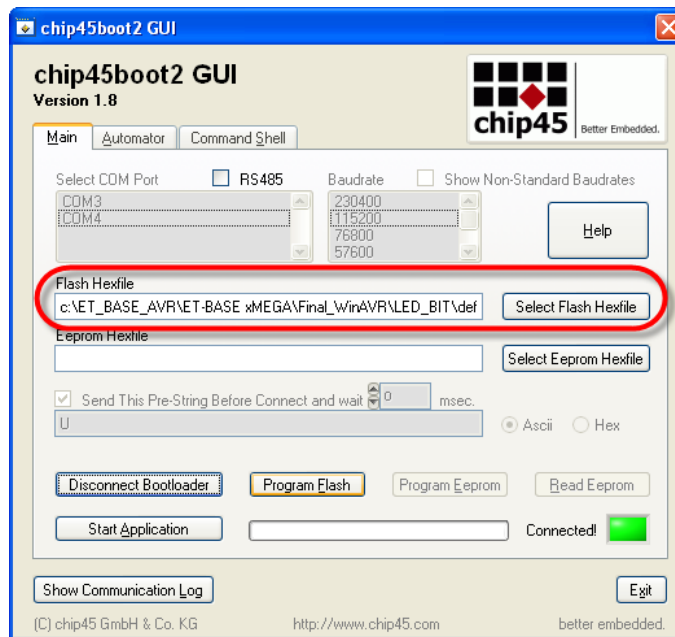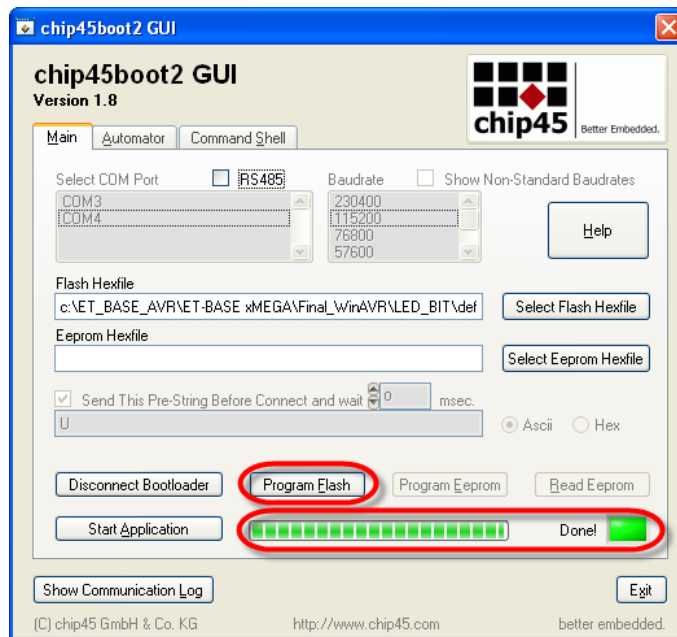
6. When programmed HEX File into MCU on board successfully, click *Start Application* on Program GUI; or press Switch RESET on Board ET-BASE MEGA1280/2560 directly. Board starts running according to the programmed HEX File instantly.

How to install BootLoader(chip45Boot2 Protocol)

If installing BootLoader into MCU, it has to use external Programmer to program BootLoader Code into MCU on board. Normally, it is unnecessary to re-program BootLoader because the MCU on Board ET-BASE MEGA1280/2560 has already included Program BootLoader. This manual is written to be guideline when user encounters any problem and it makes program in BootLoader damaged unintentionally; for example, user programs HEX File into MCU by PDI Programmer instead of BootLoader. In this case, we use Programmer AVRISP mkll or ET-AVRISP mkll that has the same method and file BootLoader in included in CD-ROM that is **"chip45boot2_BaseMega1280.hex"** or **"chip45boot2_BaseMega2560.hex".** The method to process is mentioned below;

1. Supply power into board by using 5VDC Adapter; please be careful, check the Connector of Power Supply correctly. If it is ok, user will see LED Power ON.
2. Interface ISP Cable between AVRISP mkll and Connector ISP of Board ET-BASE MEGA1280/2560. Please check pin position and do not interface it reversely. If using Programmer and Board from ETT, it uses Connector 6-PIN IDE that protects user from interfacing cable reversely. However, if there is any error; for example, LED Power is OFF while interfacing cable, please remove the cable from device instantly and then check to find out the causes instantly.
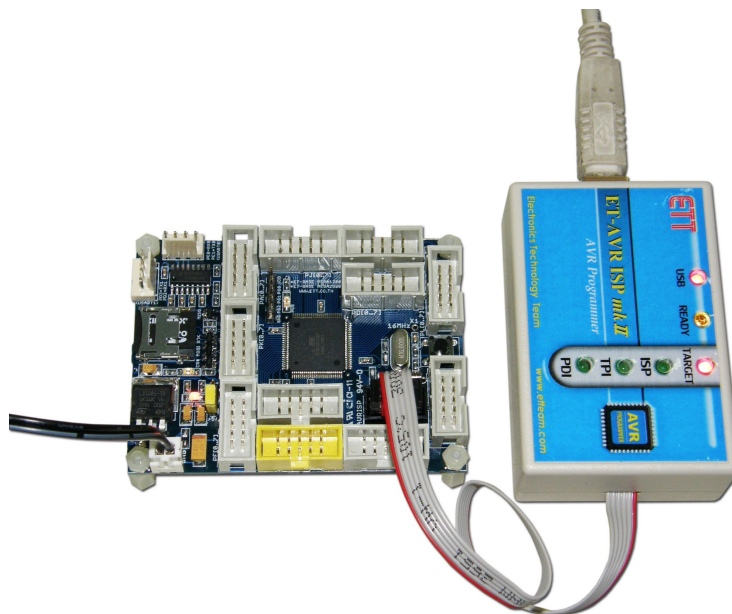
3. After interfacing USB Cable of AVRISP mkll with computer PC and everything is ok, user can run Program AVR Studio instantly. In this case, program asks user for choosing the created Project, click *Cancel* to skip over as shown in the picture below;
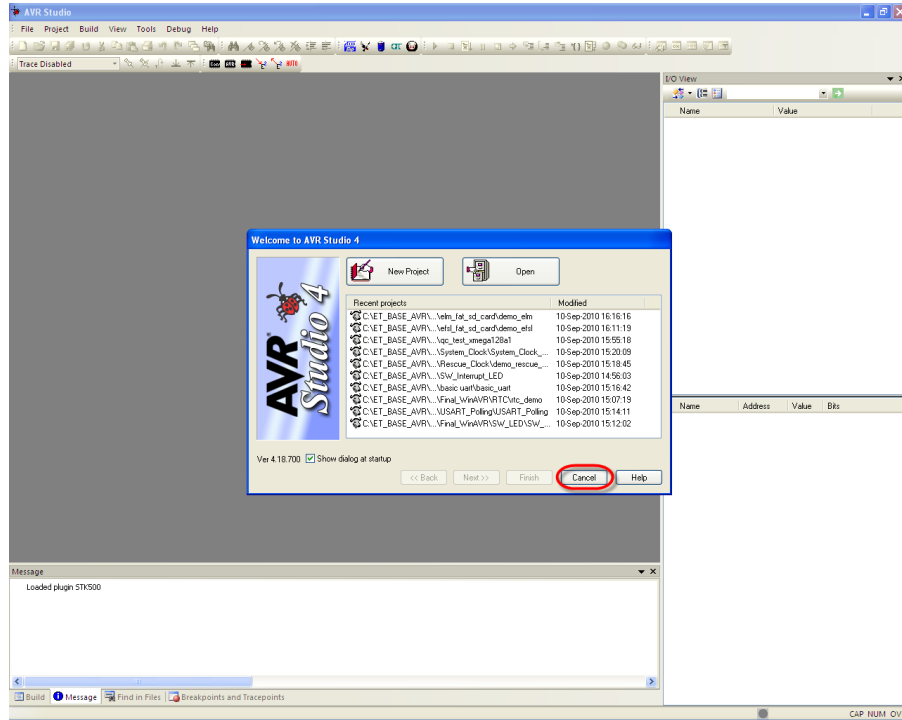
4. Click Menu *Tools → Program AVR → Connect.. → AVRISP mkII*; set Port as USB; and then, click *Connect* as shown in the picture below;
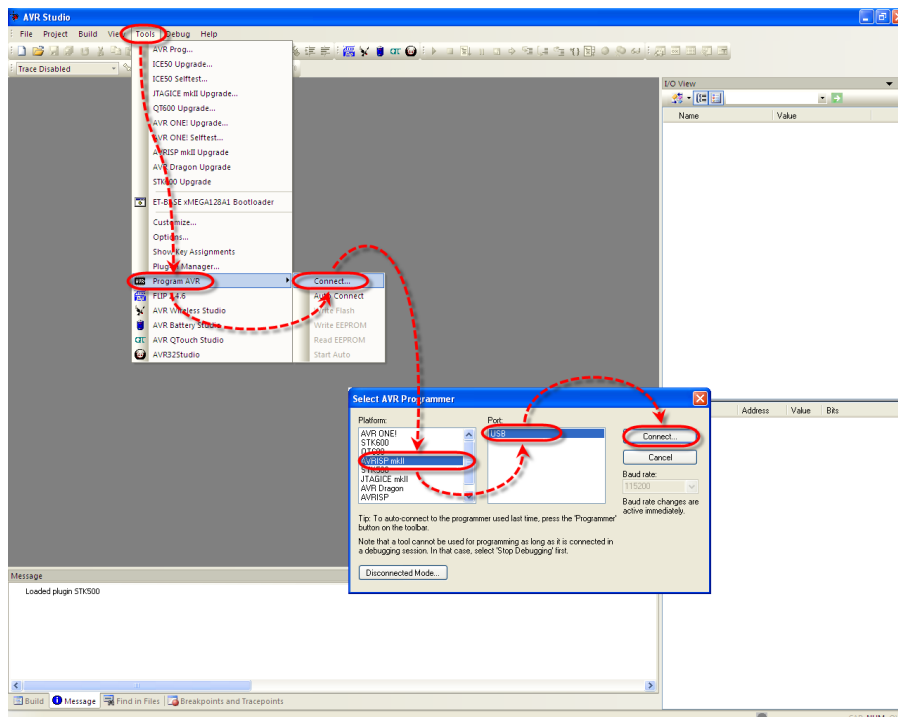
5. If everything is ok, program enters window of Program AVRISP mkll instantly. Please check the connection between ATMEGA1280/2560 and AVRISP mkll to ensure that it is able to communicate correctly. Go to Tab Main, set MCU number in the blank of Device and Signature Bytes as ATmega1280; choose the connection type in the blank of Programming Mode and target Settings as ISP Mode; and then click Read Signature. If everything is ok, program should read Signature of ATMEGA1280 or 2560 correctly as shown in the picture below;
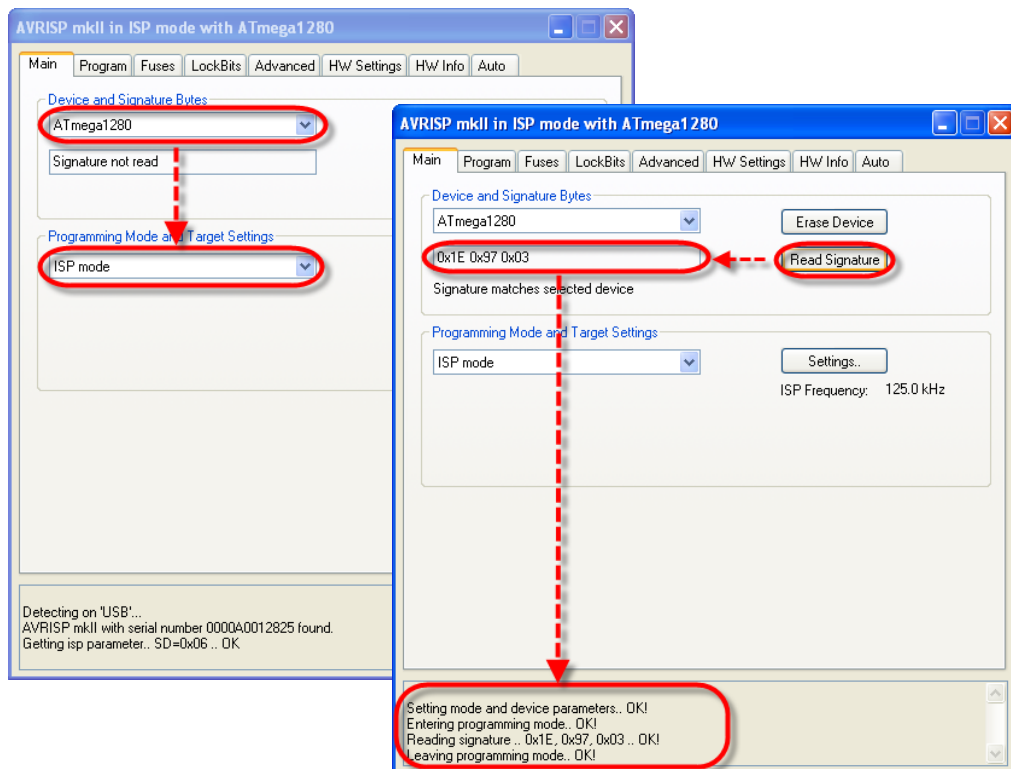
Go to Tab Program and then set options as follows;
- Device: Choose *Erase device before flash programming* and *Verify device after programming*
- Flash: Choose Input HEX File that is BootLoader according to the actual MCU on board; **"chip45boot2_BaseMega1280.hex"** or **"chip45boot2_BaseMega2560.hex"**. Next, choose *Program* to program HEX File into MCU.
- Fuses: Choose Enable in the part of BOOTRST; in this case, MCU always starts running at the area of BootLoader every time after resetting. Next, set Boot Size in BOOTSZ; if it is MEGA1280, please set the value as **F800**; on the other hand, if it is MEGA2560, please set the value as **1F800**.

- **LockBits:** Set *BLB1* as *LPM and SPM prohibited in Boot Section*; it protects memory area of BootLoader from re-written.
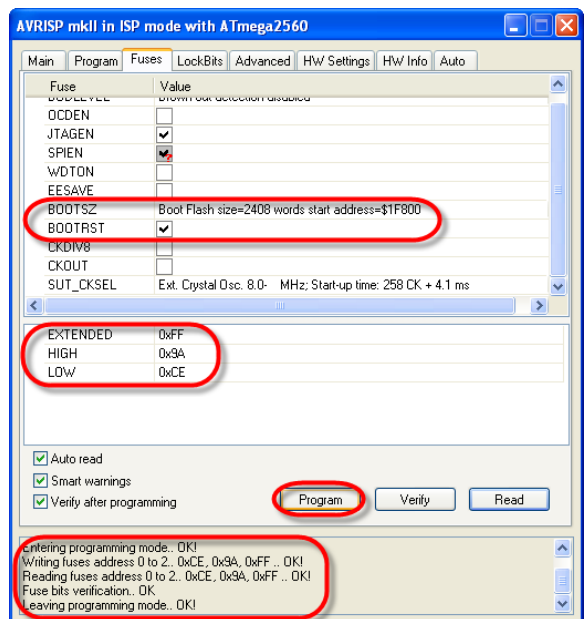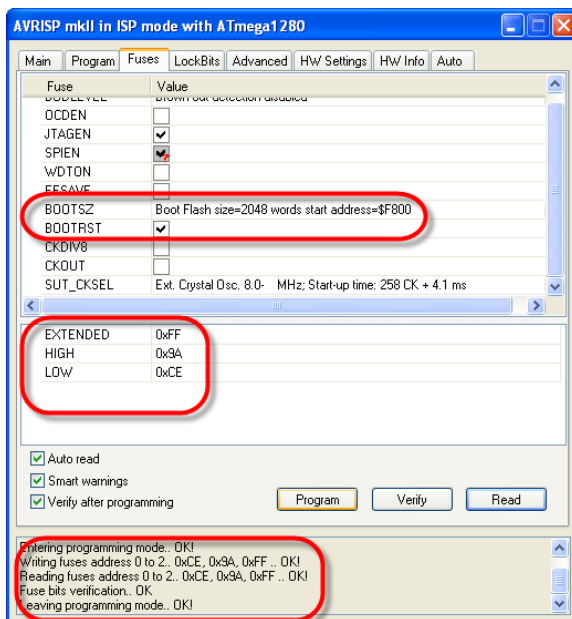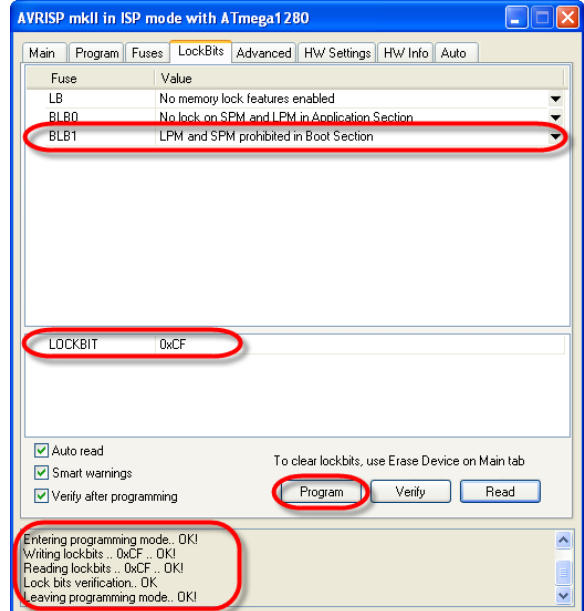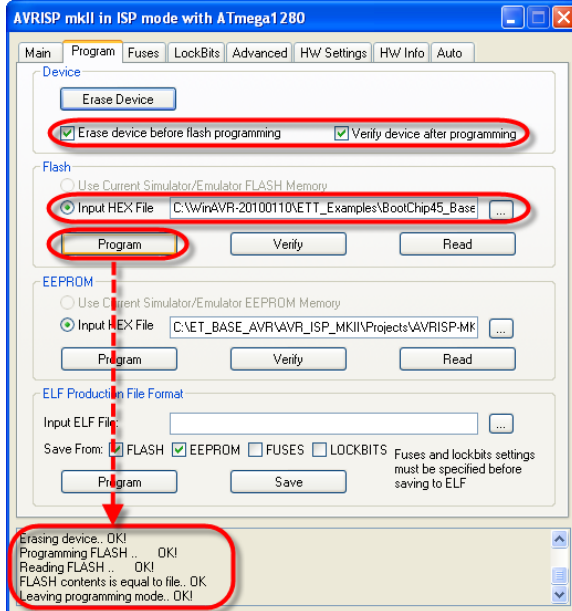
After programmed BootLoader successfully, user is able to program HEX File into board through BootLoader as described above instantly.