225D INDICATOR FIRMWARE UPDATE INSTRUCTIONS

Items Required

- PC with Microsoft Windows OS and USB port

- AVR-ISP program (Either AVRISP-U or AVRUSB)

- AVR USB interface cable (Dongle)

- Firmware HEX file downloaded from the dealer-protected software section of CardinalScale.com. *Download the file from CardinalScale.com by navigating to 225 Navigator > Resources > Resource Type > Software >.*

1. Install the AVR software on your computer if not already installed. Please note that either the AVRISP-U or AVRUSB software/hardware will work with these instructions. Otherwise, proceed to step 2.

- Refer to Figure 1 on the next page for the AVRISP-U program.

- Refer to Figure 2 on the next page for the AVRUSB program.

⚠️ *IMPORTANT! When loading the AVR program on your computer, do NOT connect the USB cable to the computer until the AVR program has been loaded and is operating.*

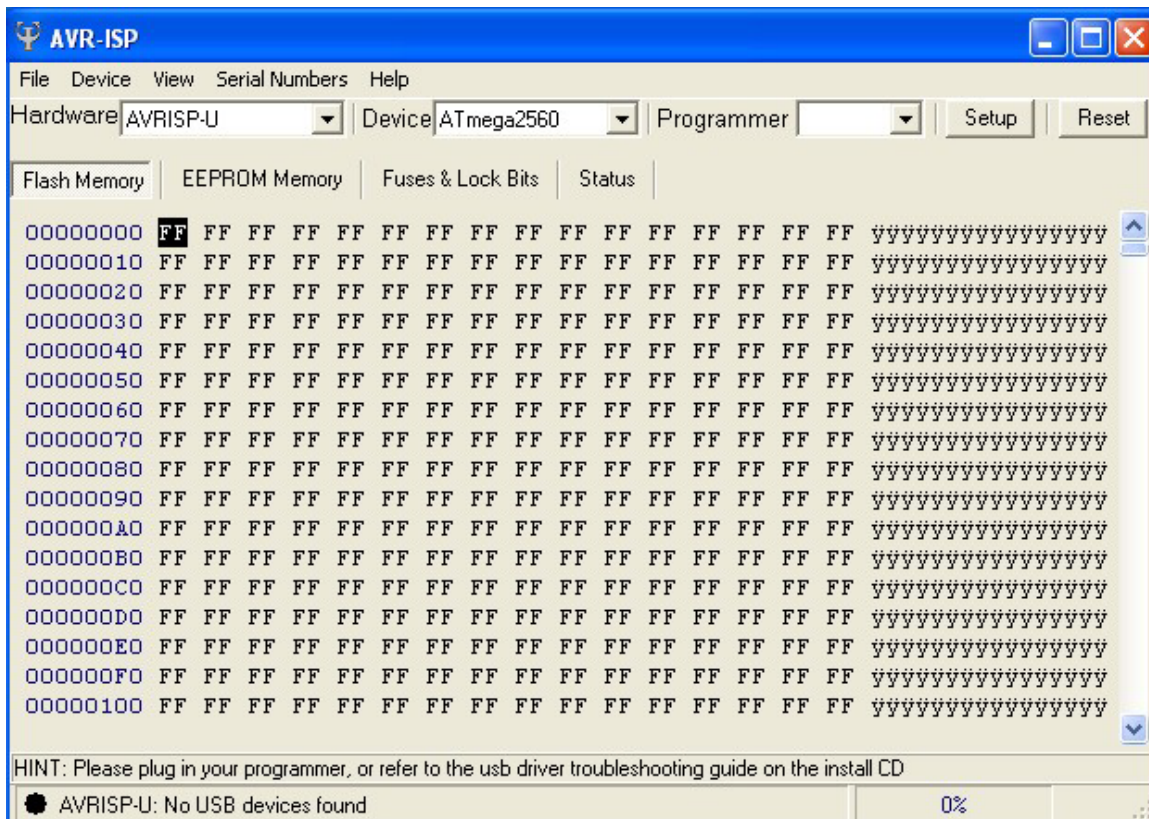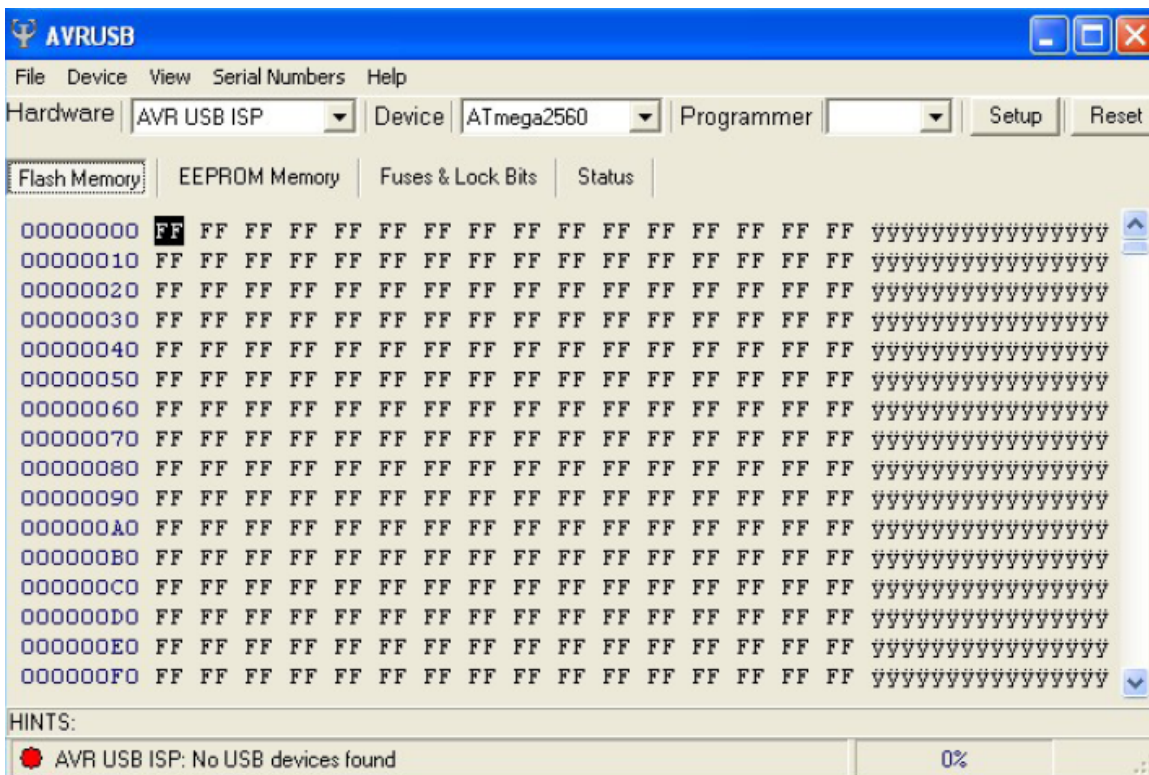*Failure to do so could allow the computer to assign an incorrect driver to the AVR dongle.*

Figure 1

Figure 2

8200-0820-0M Rev B • 225D Firmware Update Instructions

IMPORTANT! *If the message in Figure 3 appears after connecting the AVR dongle interface cable to the PC, follow the update wizard to update the firmware. Note that this will require an internet connection.*

Warning! *Do **NOT** connect the ribbon cable to the indicator during this process.*

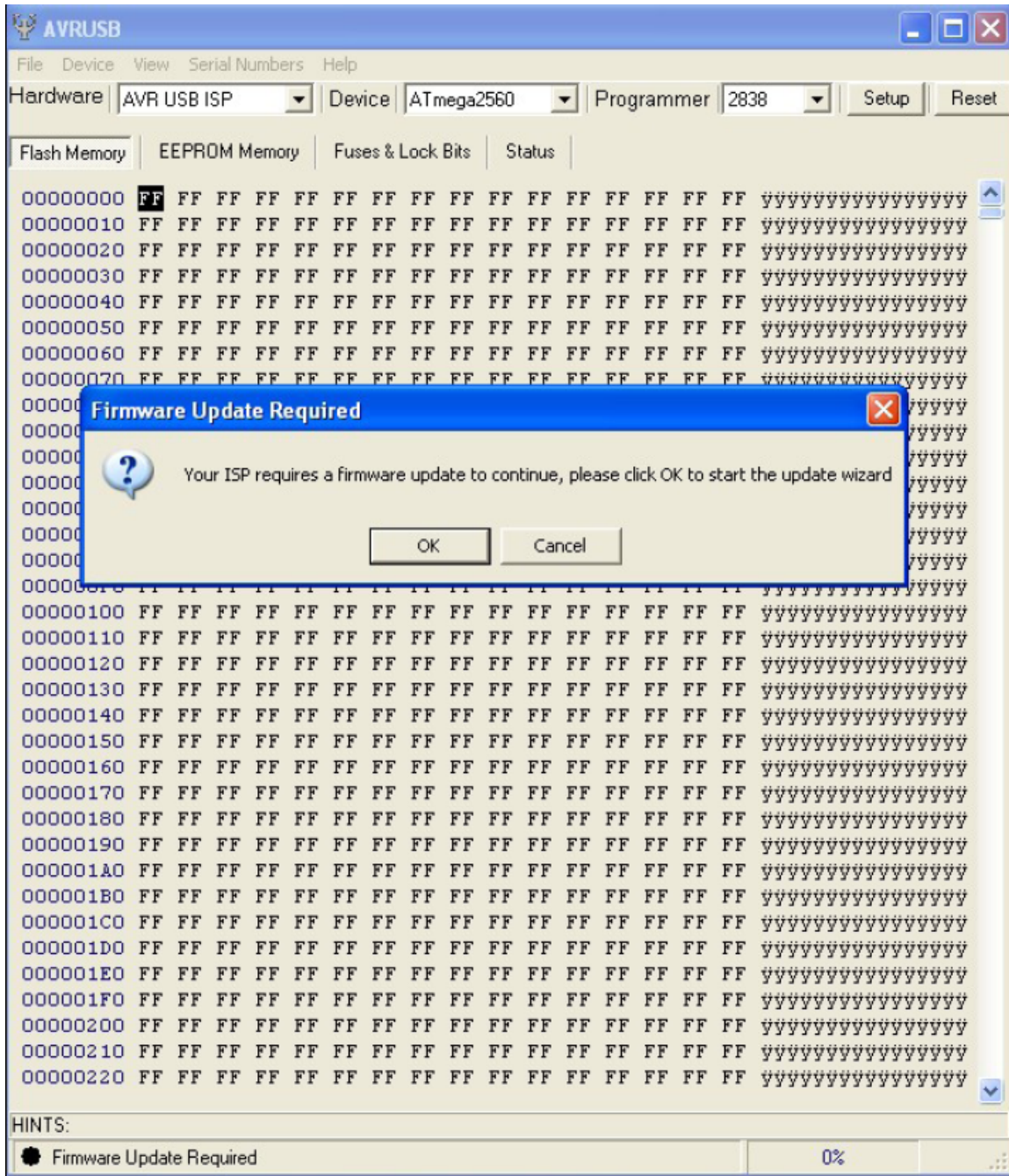*Connecting the ribbon cable to the indicator while updating the firmware may cause the indicator to fail!*

Figure 3

2. Save the indicator firmware HEX file to a location on your computer such as My Documents.

IMPORTANT! Confirm that the indicator firmware is in a hex file format where the file name ends with .hex such as 225D.hex or if custom firmware such as B12345.hex or SO123456.hex. Should the file be compressed, the file name will end with .zip such as 225D.zip. Zip files must be decompressed before they can be loaded into the indicator. To decompress the file, save the .zip file to a location on your computer that will be easy to locate like My Documents, then open the file. The window will have the option to Extract all files. See Figure 4. Click on this and use the folder extraction wizard to decompress and save the file(s). Ensure that you select a location to save the file to such as My Documents so you can locate the file when using the AVR programmer. See Figure 5.
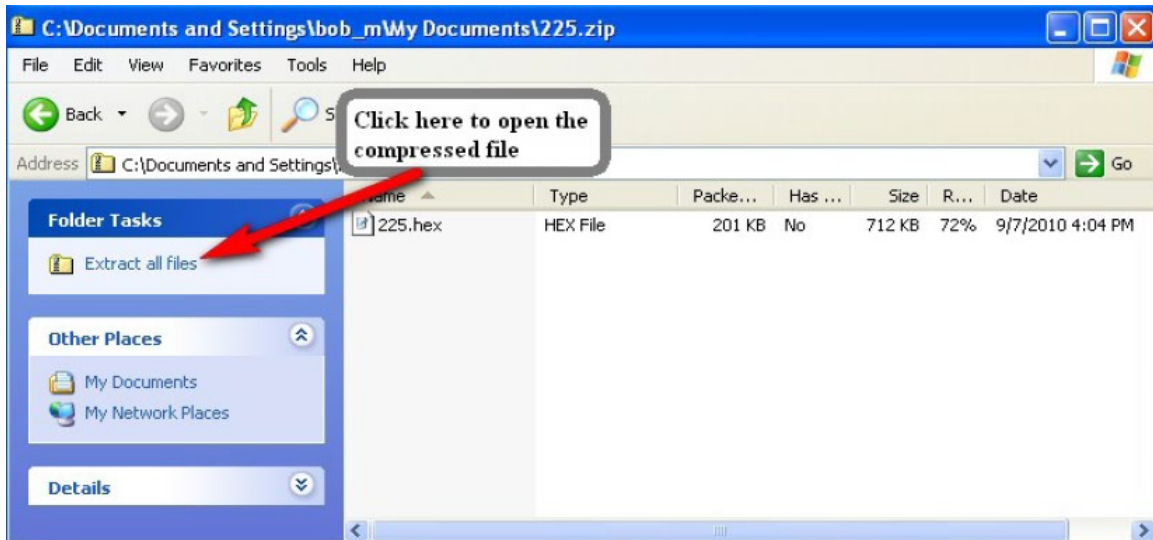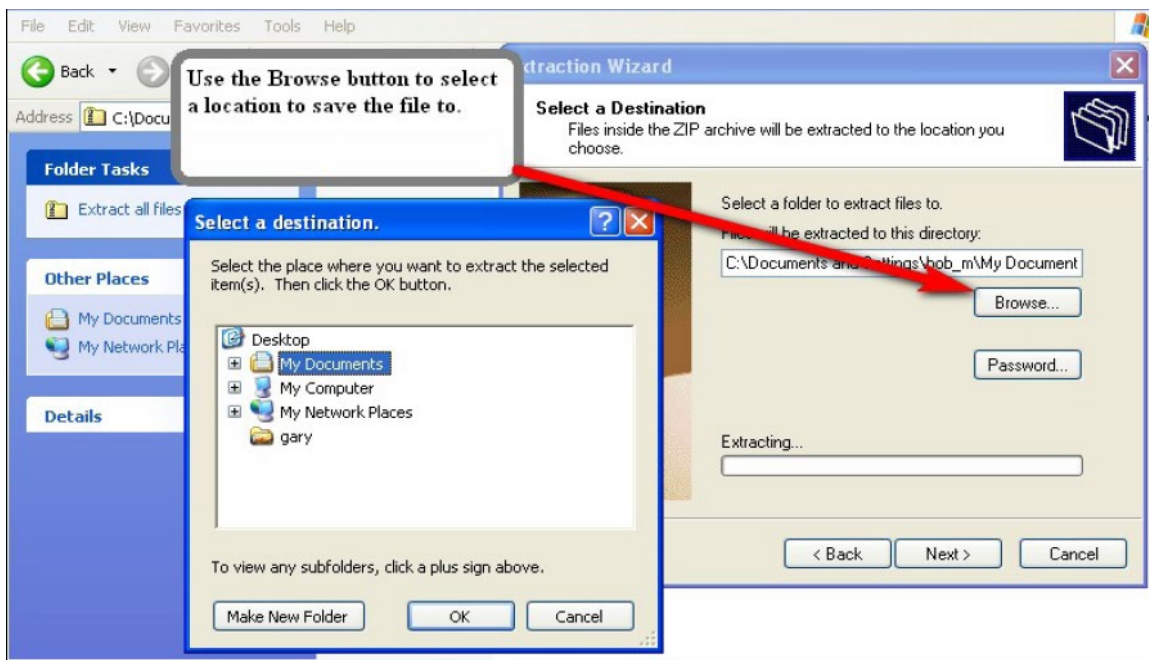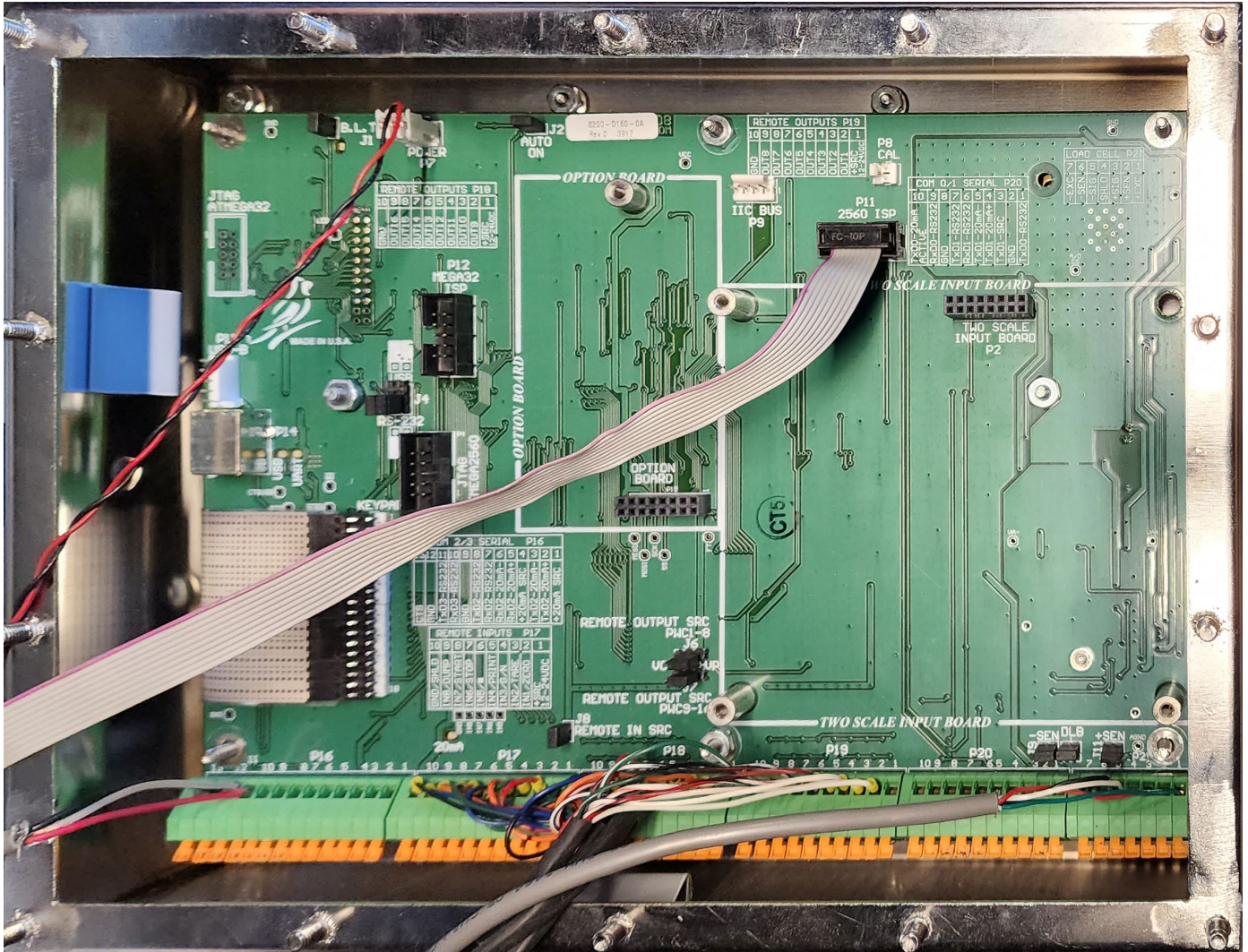

Figure 4

Figure 5

3. Power the 225D on.

4. When the 225D is in the operation mode, connect the AVR dongle ribbon cable to the port labeled *P11 2560 ISP* on the 225D circuit board. See Figure 6.

IMPORTANT! Connecting the dongle to the ISP port before the indicator is fully operating will cause connection problems.

Figure 6

5. Connect the dongle to a USB port of the computer and open the AVR program.

IMPORTANT! If the message "Your ISP requires a firmware update" is displayed, see page 3 for instructions.

6. Click on the *Reset* button in the AVR program. A message will be displayed at the bottom left of the AVR screen in the Status Box indicating the condition of the connection. See Figure 7.

- A RED light indicates a problem with the connection.

- A GREEN light indicates a good read along with the processor detected.

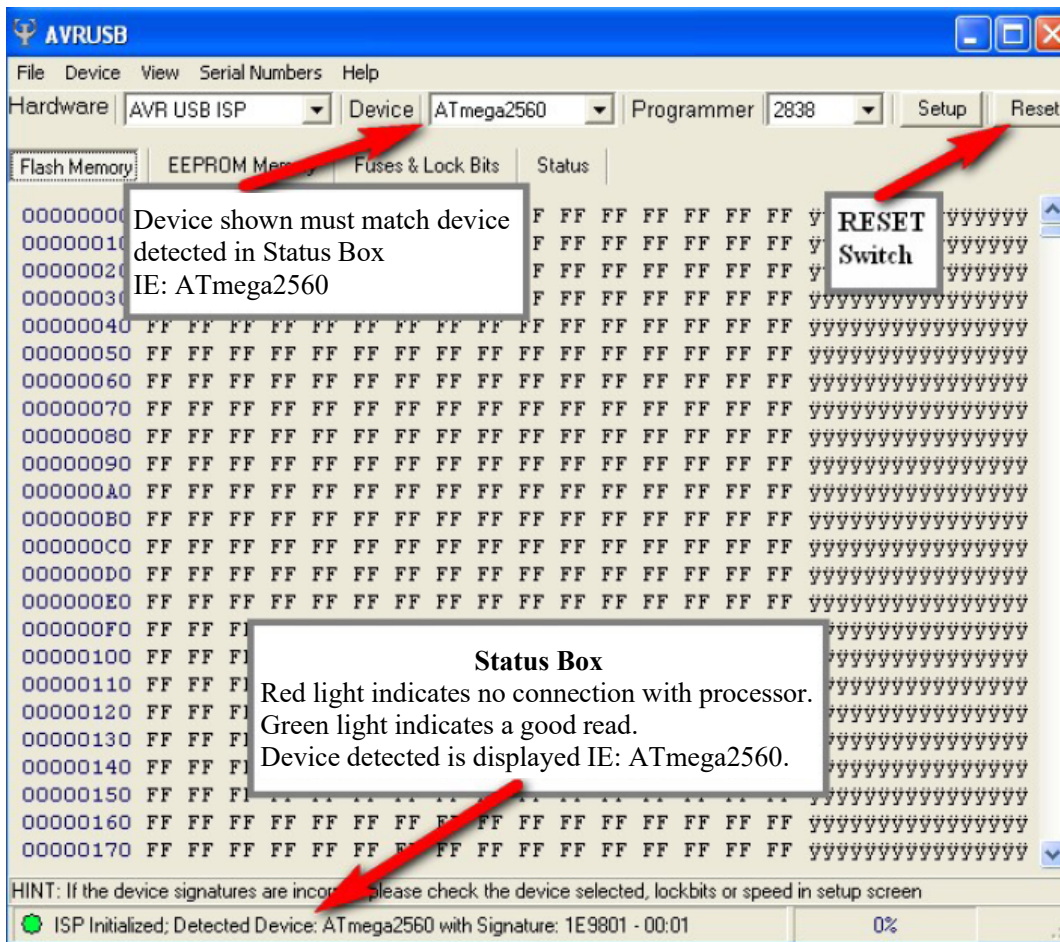 **NOTE:** The correct processor for a 225D will be "Detected device: ATmega2560".

Figure 7

7. The detected device shown in the Status Box must match the Device window at the top of the screen. See Figure 7. If they do not match use the drop-down list of the Device window to select the correct device.

NOTE: The correct device for the 225D Main PC Board is ATmega2560.

Note that some revisions of the AVR software will automatically detect that the device is incorrect and ask to change to the correct device. See Figure 8.
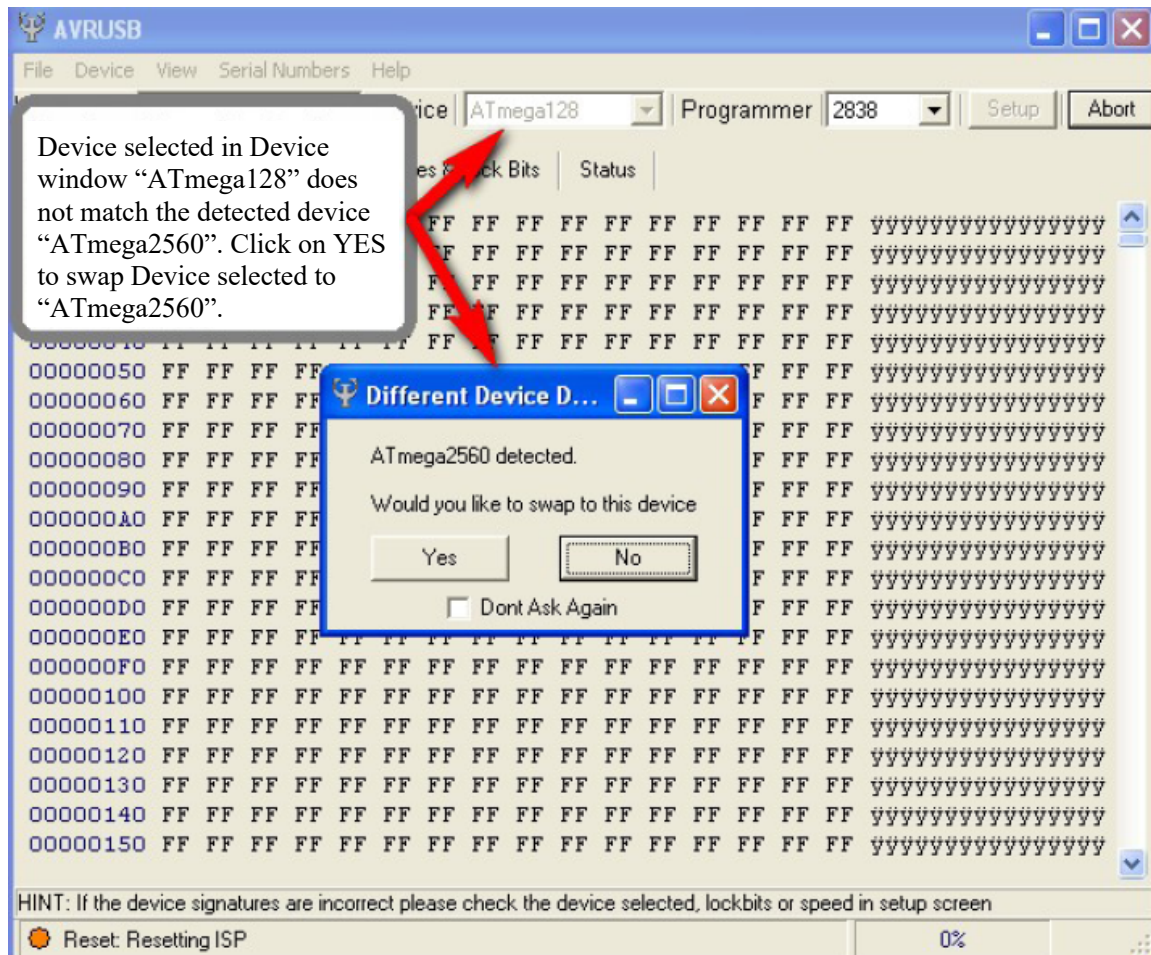

Figure 8

8. Next, read the Fuse settings from the 225D Main PC Board. From the menu list at the top of the screen select *Device*, *Read,* and then *Fuses*. See Figure 9.
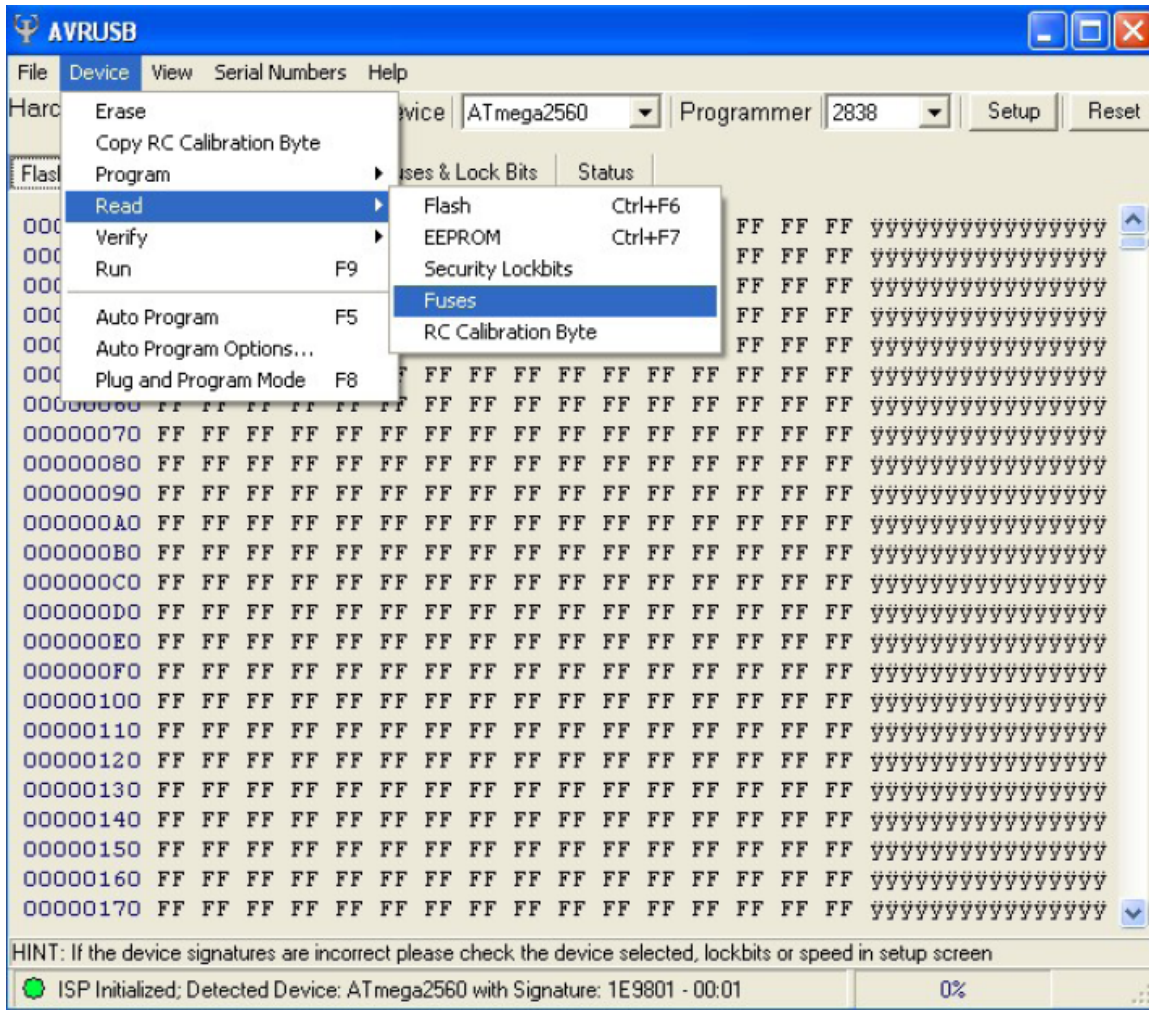

Figure 9

9. The Fuses and Lock Bits screen will open after it reads the fuses of the indicator. The correct settings are shown in Figure 10.

IMPORTANT! Ensure that the values read match the values shown in Figure 10. If necessary, change the values that do not match.
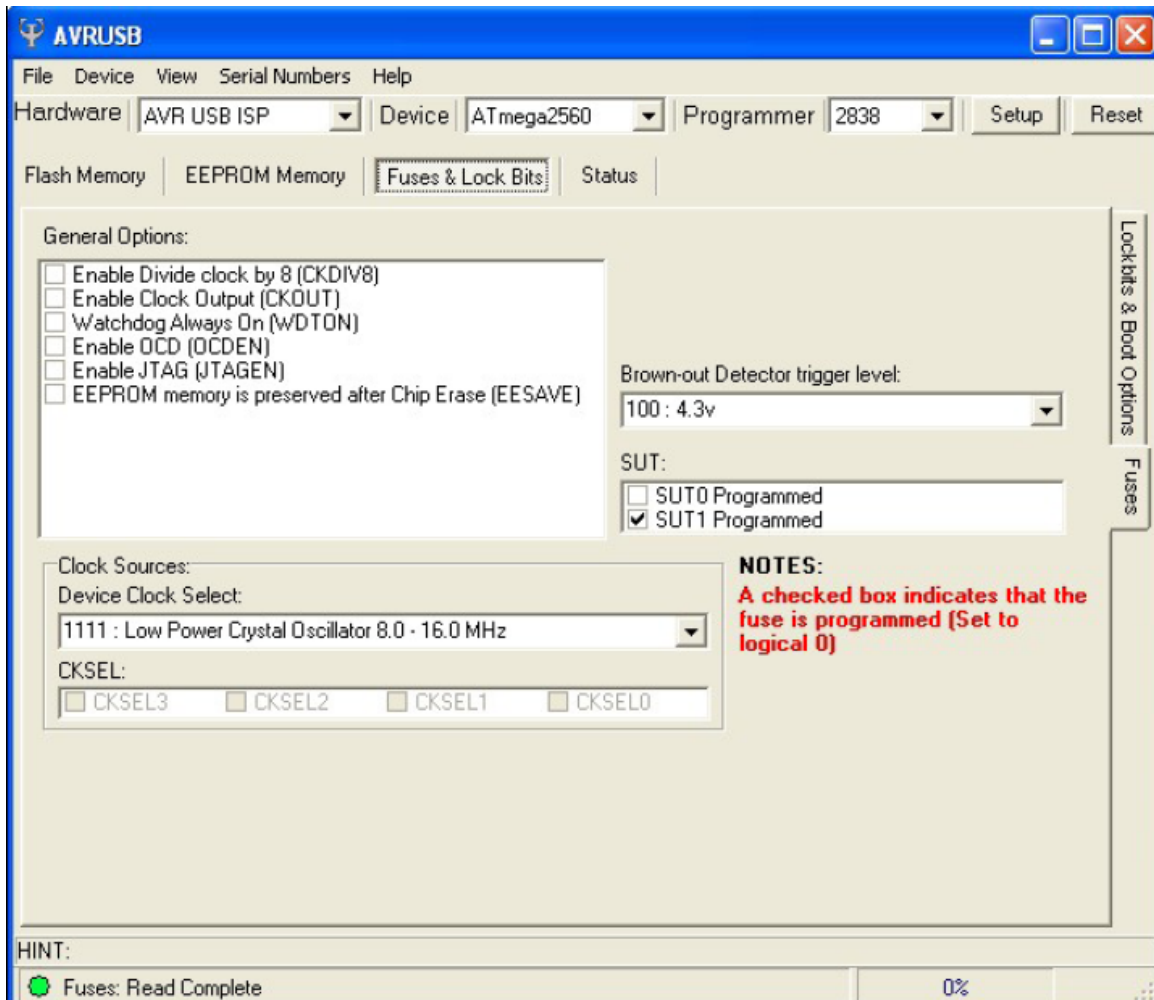
Failure to do so will cause the 225D to fail!

Figure 10

10. From the menu list at the top of the screen select *Device* and then *Auto Program Options*. See Figure 11.

Figure 11

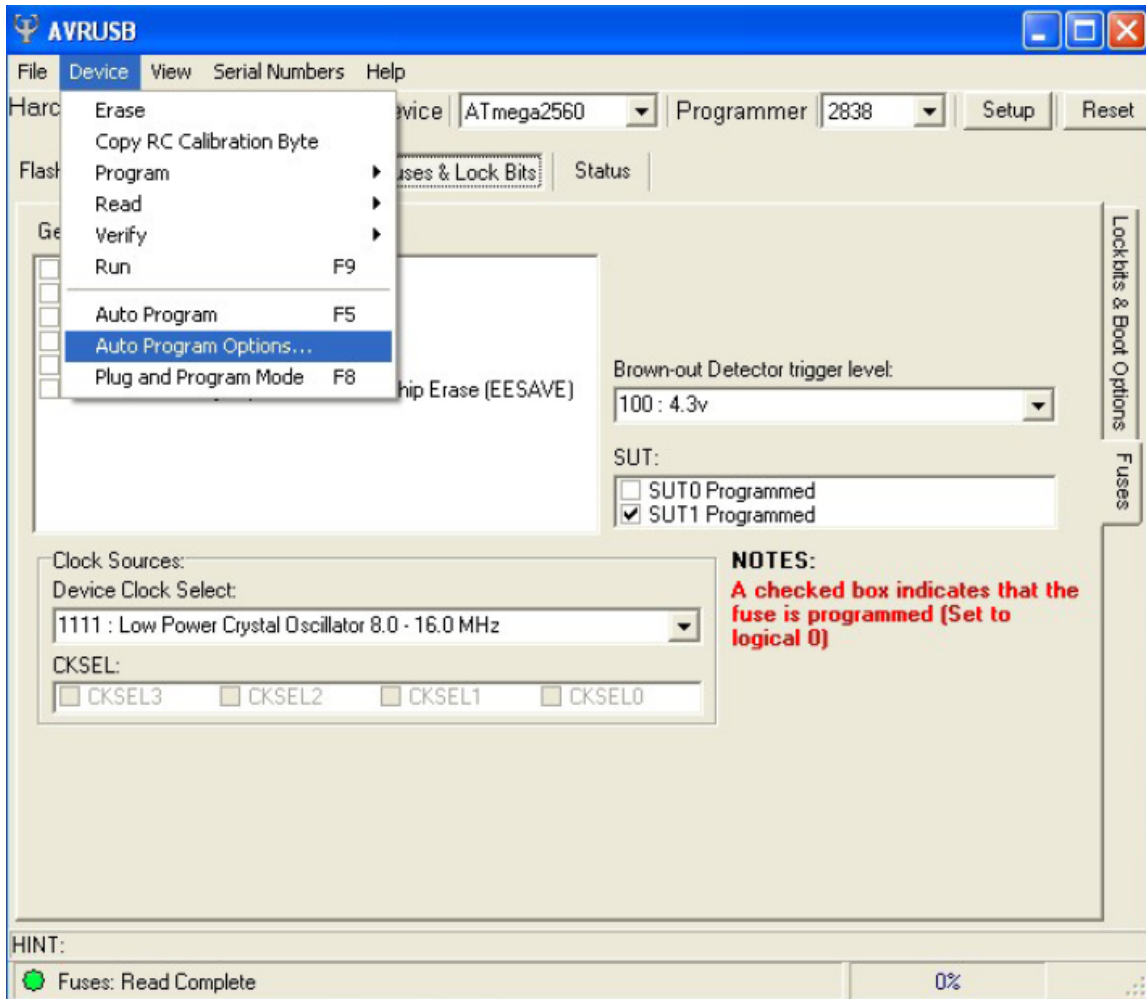**11.** This will open the Auto Program Options window. See Figure 12. Select the options shown in Figure 12 then click *OK* to save them. Generally, when using a notebook PC, it is best to select Medium Programmer ISP Speed.

IMPORTANT: Make sure the selected options match those shown in Figure 12.

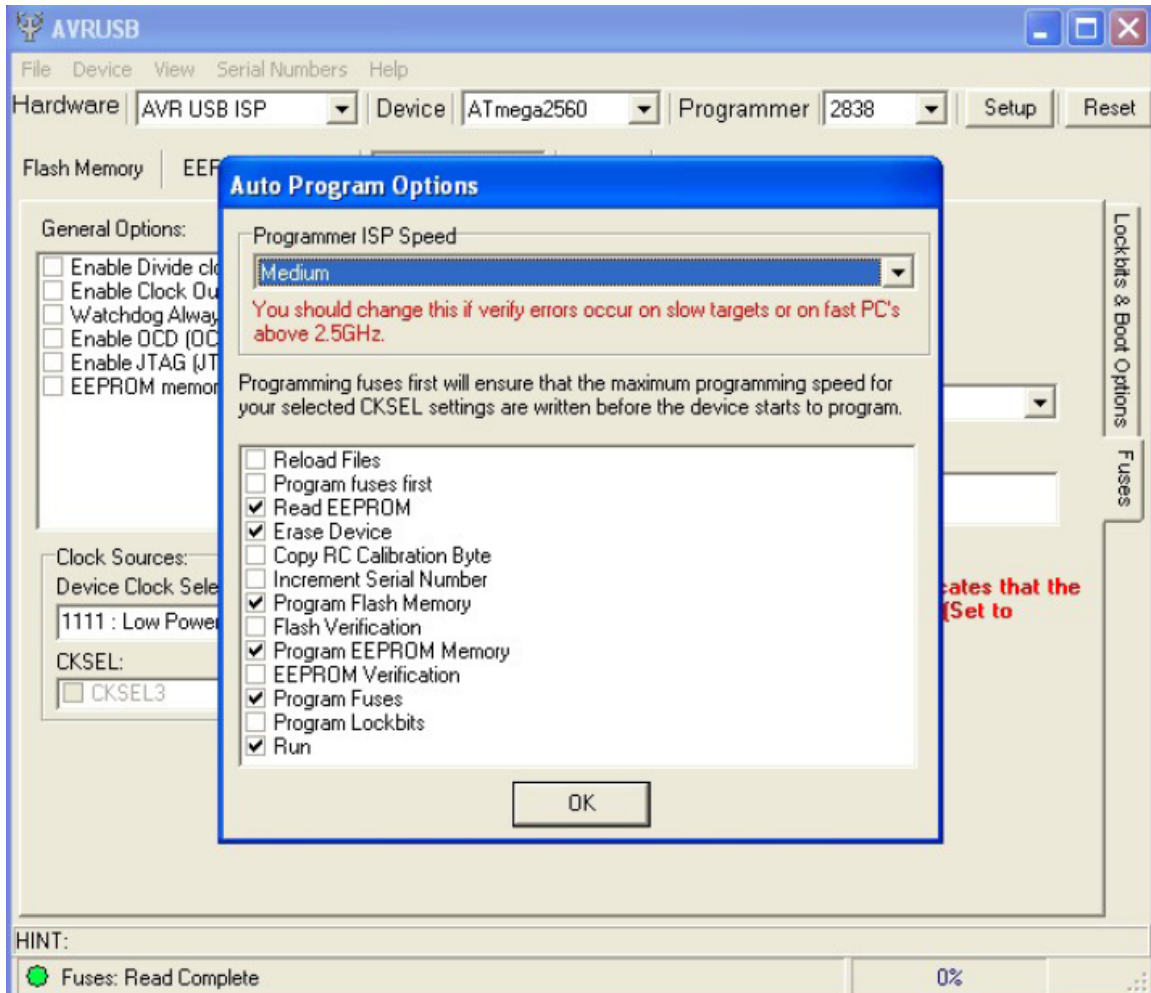*Failure to do so will cause the 225D to fail.*

Figure 12

12. Next, load the hex file into the AVR so that it can be transferred to the 225D. From the menu list at the top of the screen select *File*, *Load,* and then *Flash*. See Figure 13.
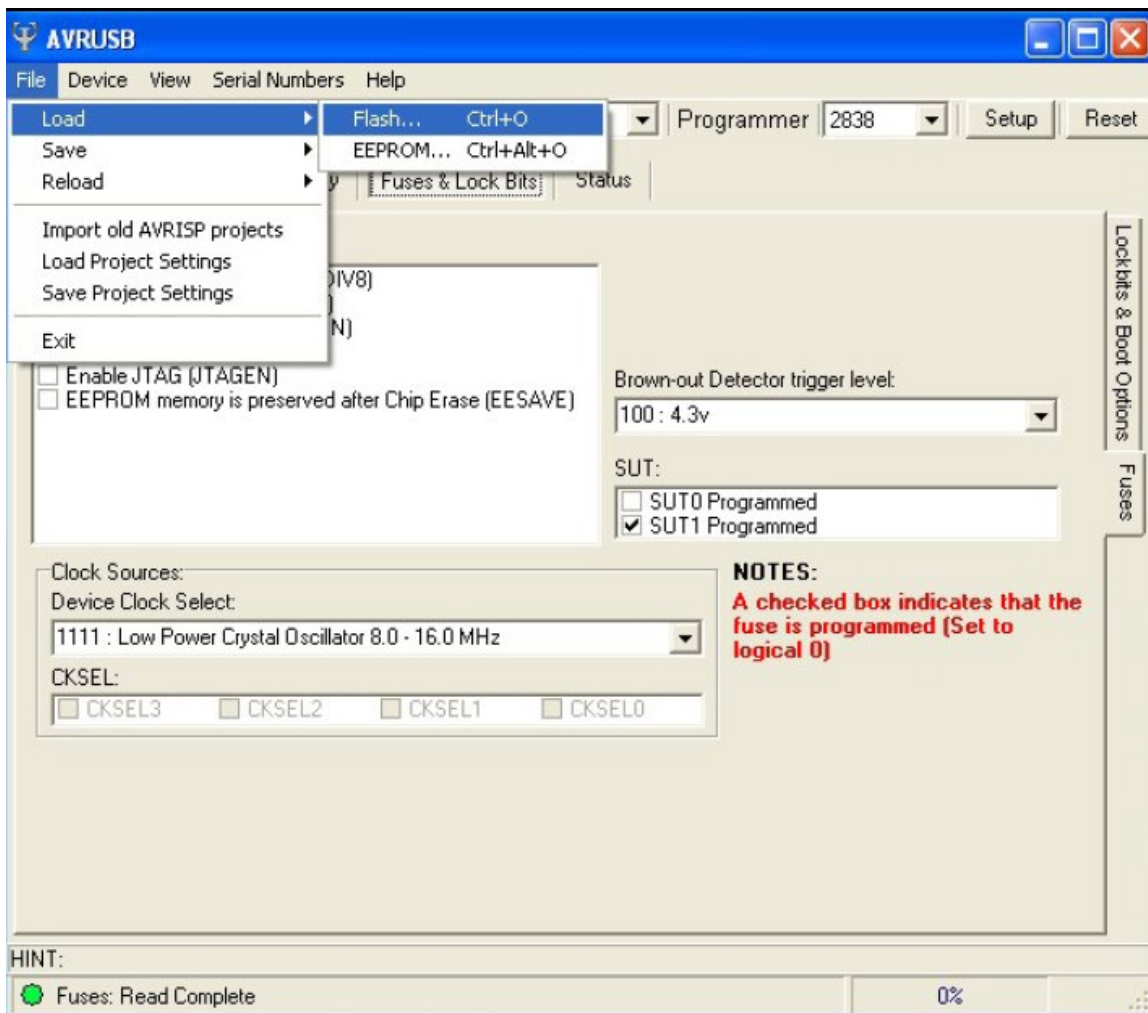

Figure 13

13. Browse to the location where you saved the hex file (.hex). Then click on the file to highlight it and click *Open* to select it. *The suggested location to store this file in Step 2 was in My Documents*. See Figures 14 and 15. Figure 14 shows a standard 225D hex file while Figure 15 shows a custom firmware hex file. **NOTE:** Some custom firmware files could also start with the letter "B" such as "B12345".

IMPORTANT: It is critical to select a file that ends in .hex.
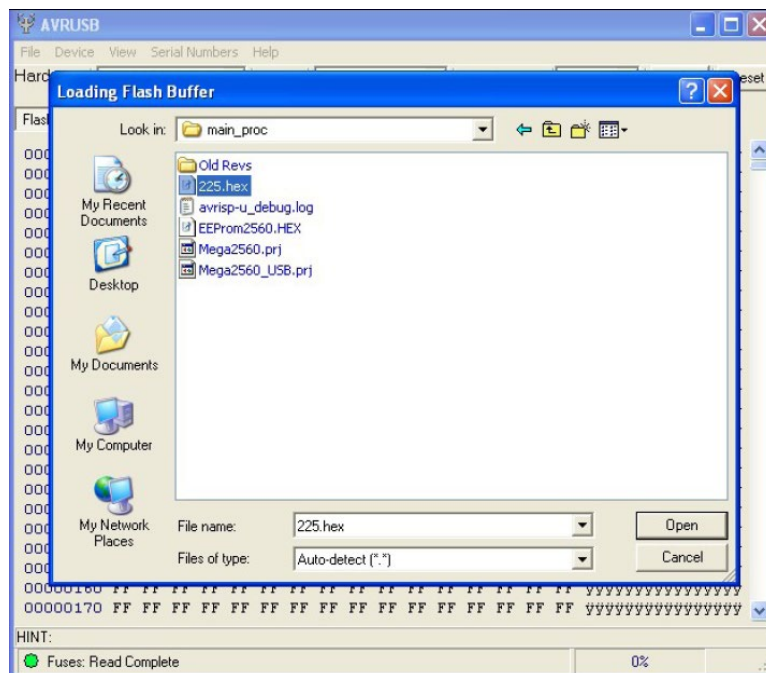
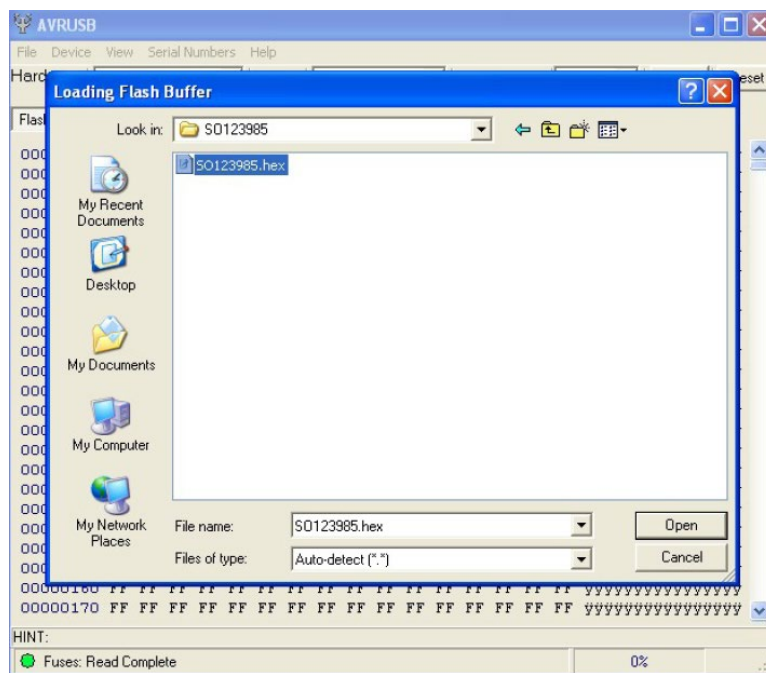*Failure to do so will cause the 225D to fail.*

Figure 14

Figure 15

14. Now that the flash file is successfully loaded, a confirmation message will be displayed in the Status Box at the bottom of the AVR screen. **NOTE:** A good hex file will always start with OC 94 for the first two bits. See Figure 16.

IMPORTANT: Do NOT load a program that starts with anything other than OC 94 as in Figure 16.
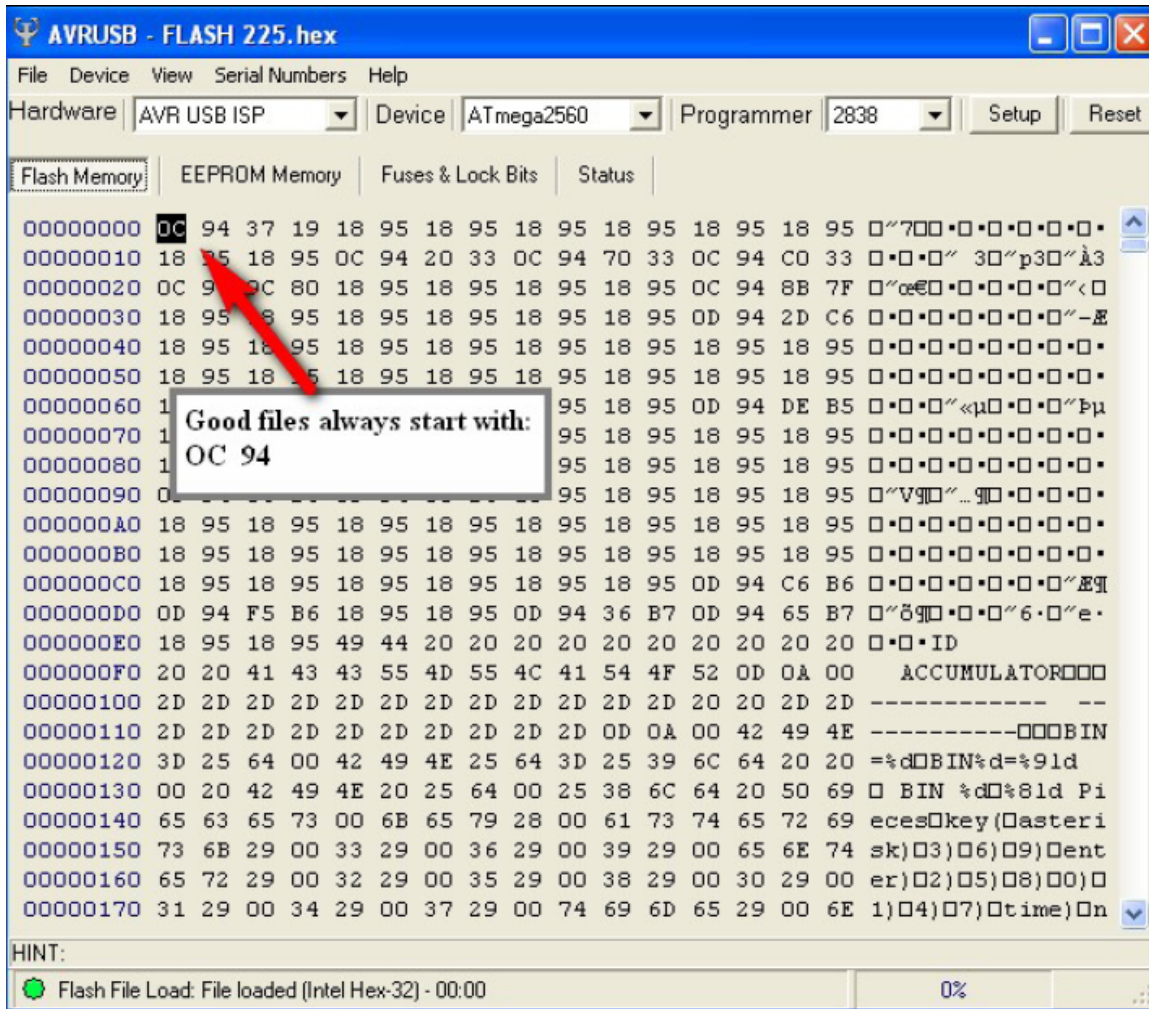
Failure to do so will cause the 225D to fail.

Figure 16

15. Once the flash file has been successfully loaded into the AVR and the Fuse settings and Auto Program Options have been verified, either press F5 on the computer keyboard or select *Auto Program* from the *Device* menu to begin programming. See Figure 17.
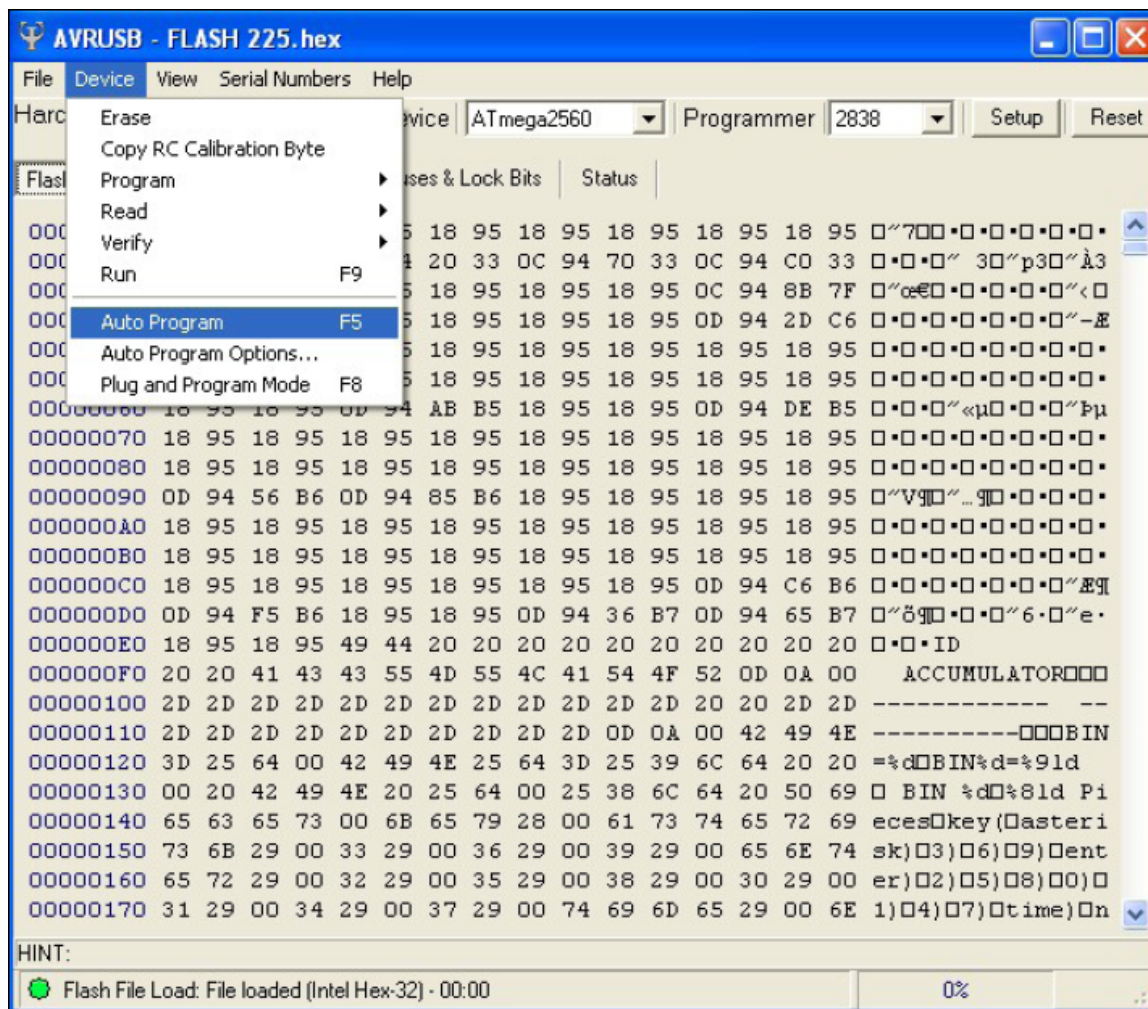

Figure 17

16. While programming, a progress bar will be displayed in the Status Box located at the bottom right of the AVR screen along with a message indicating the current activity being performed. See Figure 18.
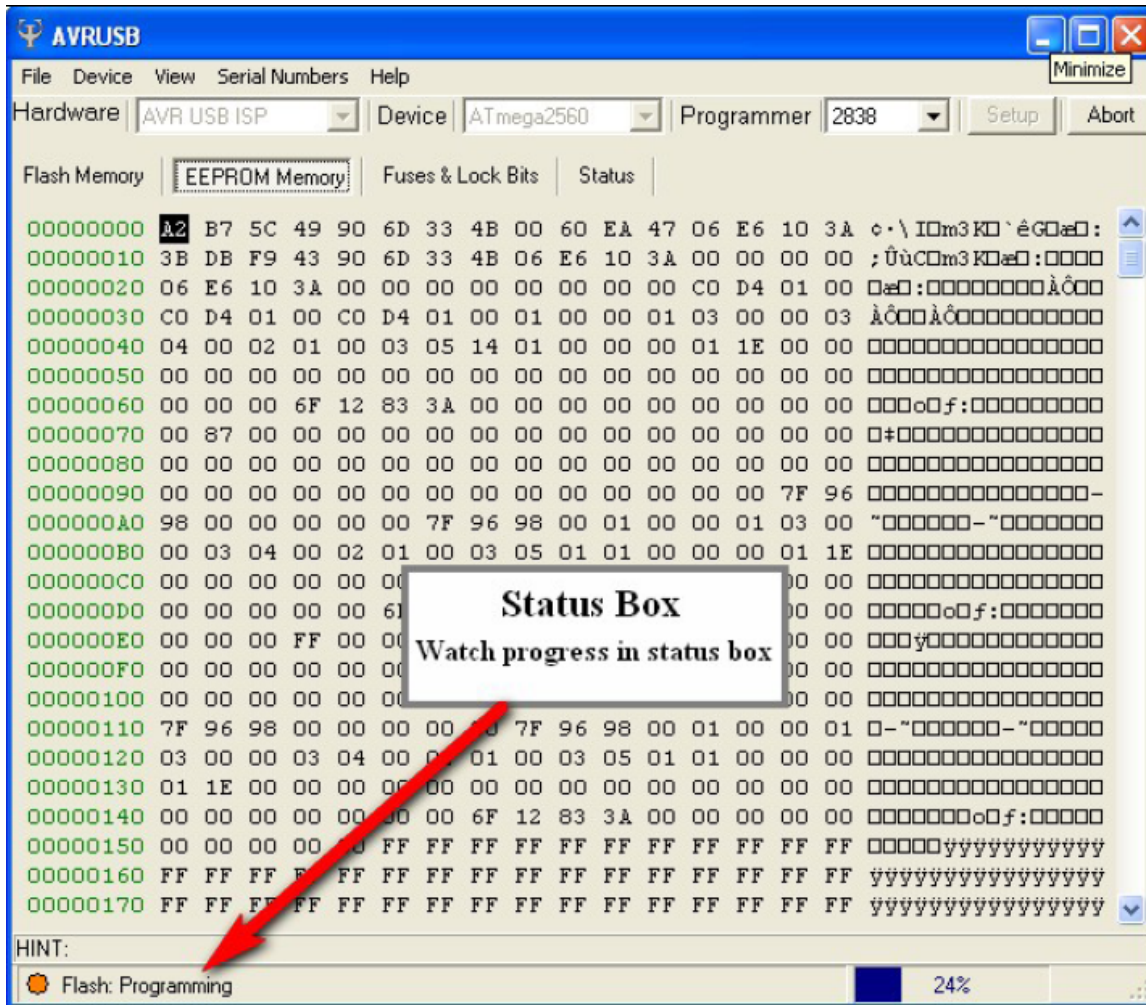

Figure 18

17. When programming is complete, the Status Box located at the bottom of the AVR screen will display a confirmation message "Auto Program Complete" along with a GREEN light. See Figure 19.

If an error occurs during programming a RED light will be displayed along with an error in the Status Box. If this occurs, first confirm that all settings are correct, save a copy of the EPROM from AVR to your hard drive, go to Auto Program options and remove the check next to Read EEPROM, and try to program again.

IMPORTANT: Indicator setup and calibration data are stored in the EEPROM.
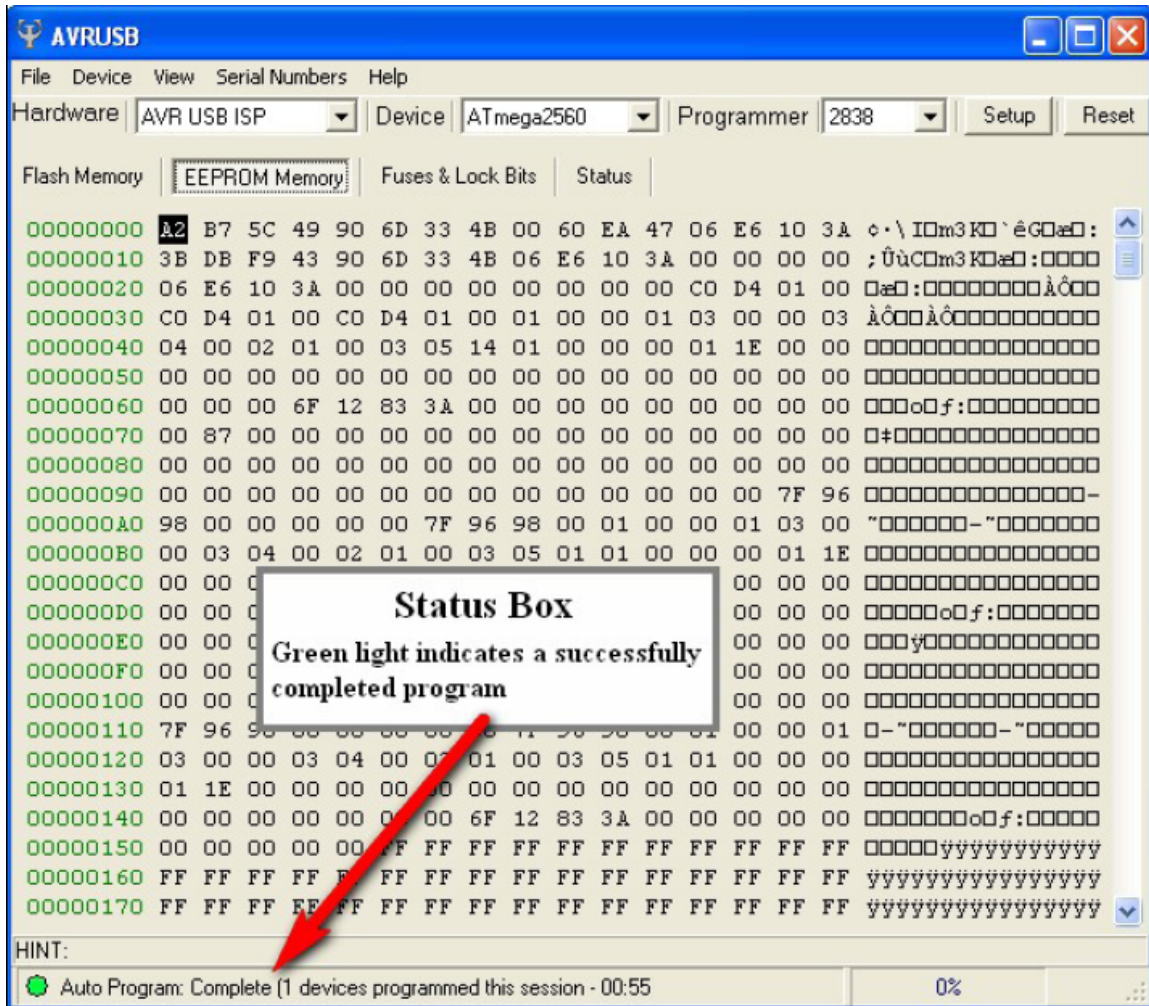*If the EEPROM file is lost or corrupted the indicator will require setup and calibration.*

Figure 19

18. The update of the 225D indicator is now complete.

19. Disconnect the dongle from the circuit board and confirm the indicator operation.

8200-0820-0M Rev B 06/23