Department of Electrical and Computer Engineering

CG3207: COMPUTER ARCHITECTURE

Avnet Programming Utility 4.05
and Cypress PSoC Programmer 3.13
Download and Installation Procedures
for Xilinx Spartan-3A Evaluation Kit FPGA Board

Synopsis:
This manual describes how to get the software used to program the Xilinx Spartan-3A Evaluation Kit FPGA board. The Avnet Programming Utility AvProg 4.05 is used to upload the program created by Xilinx ISE WebPACK 13.2 onto the FPGA board. The Cypress PSoC Programmer 3.13 is used to update the firmware of the FPGA board and will not be required if the FPGA board has already been updated with the latest firmware.

This manual is a simplified version of the documentations that come together with the programs. If more details are required, the manuals *might* be found in the following directories where the programs are installed by default:
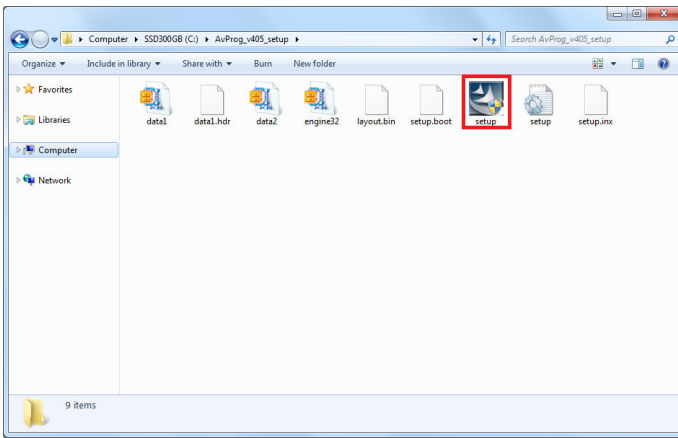
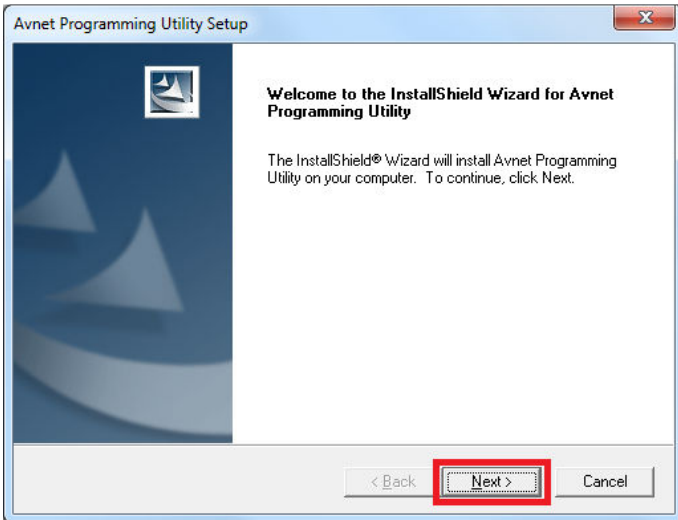| **Windows XP / Vista:**	**Windows 7**
C:\Program Files\Avnet\AvProg\Doc	C:\Program Files (x86)\Avnet\AvProg\Doc
C:\Program Files\Cypress\Programmer\3.13\Documents	C:\Program Files (x86)\Cypress\Programmer\3.13\Documents

1. Avnet Programming Utility AvProg 4.05 is downloadable from the CG3207 workbin as **02B - AvProg 4.05**
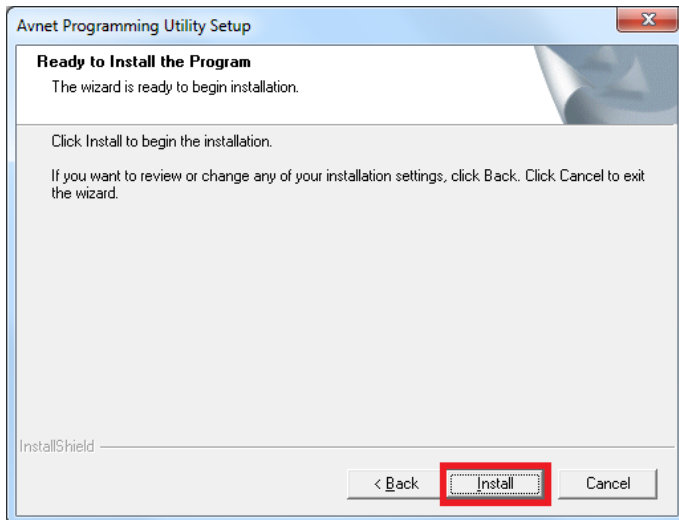
   The download size is about 5 MB.

   In this manual, Windows 7 Professional SP1 64 Bits is used and the screenshots and procedures will differ depending on actual hardware and operating system used.
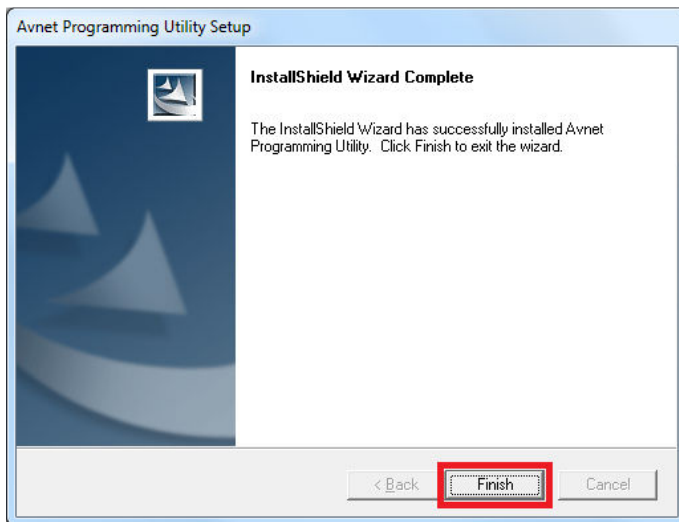
   After the downloaded file has been unzipped, launch **setup.exe**.

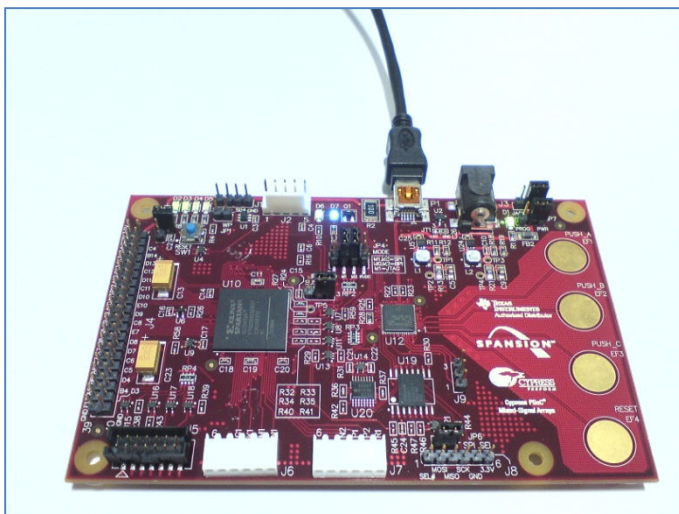2. Click on **Next**.

3. Click on *Install* to begin installation.

4. Click on *Finish* to close the window. The installed files <u>*might*</u> be located at:

    Windows XP / Vista:
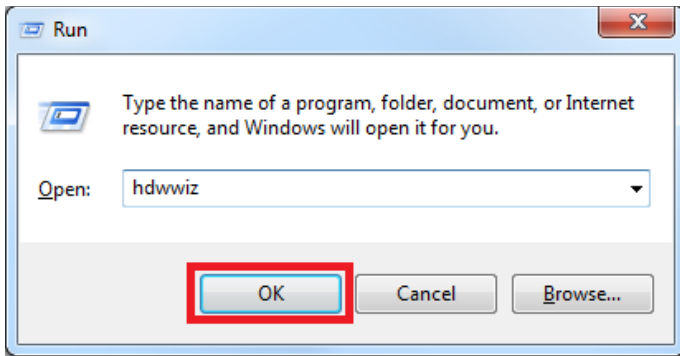   C:\Program Files\Avnet\AvProg

    Windows 7
    C:\Program Files(x86)\Avnet\AvProg

5. Use the USB cable to connect the FPGA board to the USB port of your computer.

    * Additional images are shown at the end of this manual.
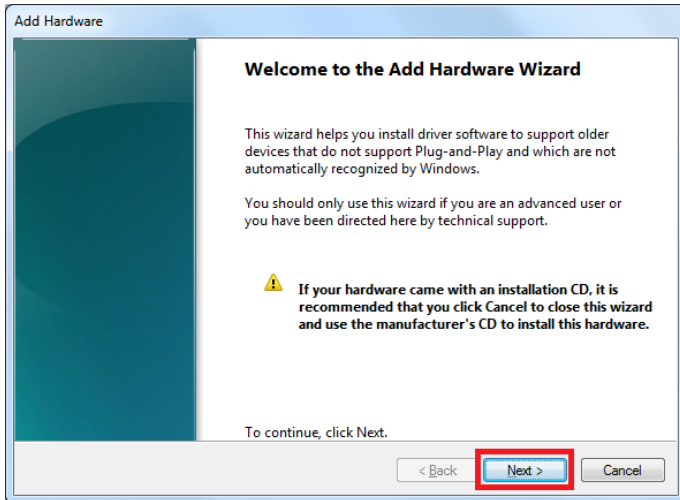
6. If Windows 7 is able to detect the FPGA board, skip step 6 to 17.

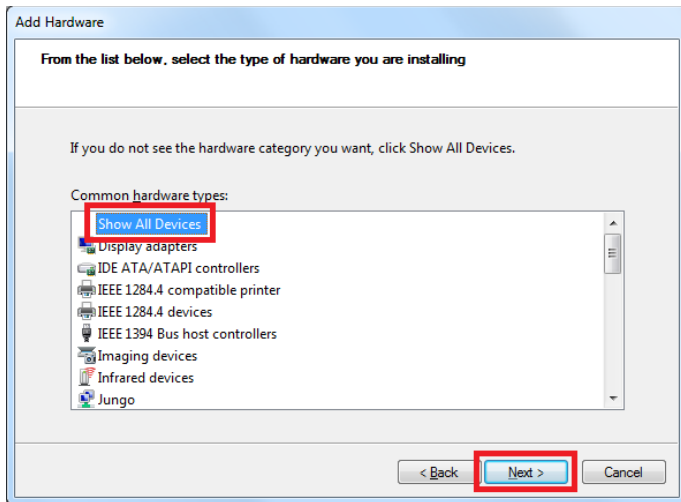   If Windows 7 is unable to detect the FPGA board automatically,
    (i)   click the Windows Start button.
    (ii) In the search box, type **Run**.
    (iii) In the list of results, find and click on **Run**.
    (iv) This window will appear.
    (v)   Type **hdwwiz** and click **on OK**.
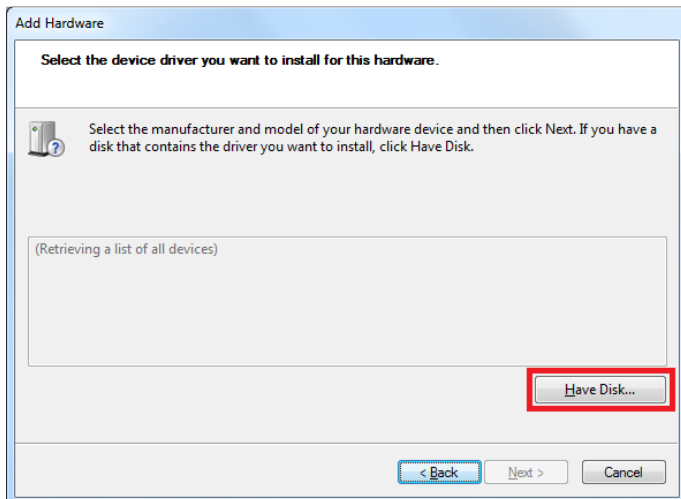
7. Click on **Next**.

8. Select **Install the hardware that I manually select from a list (Advanced)** and click on **Next**.
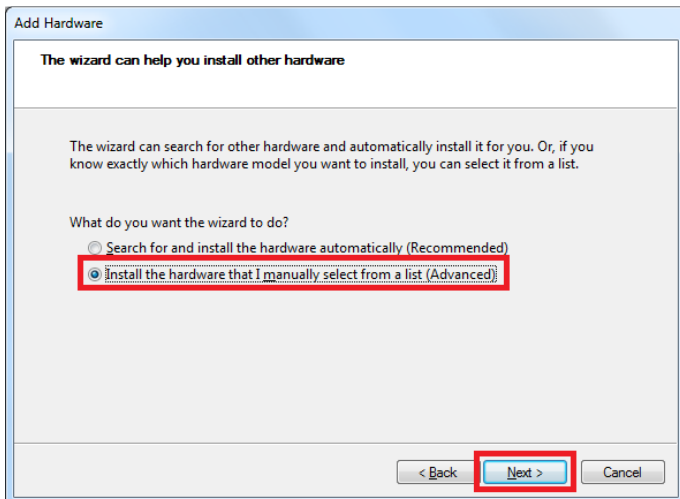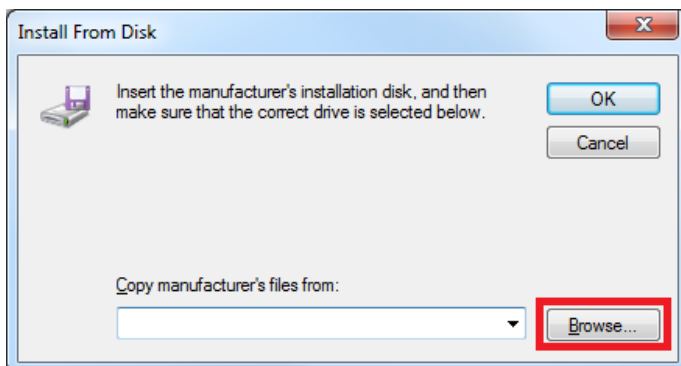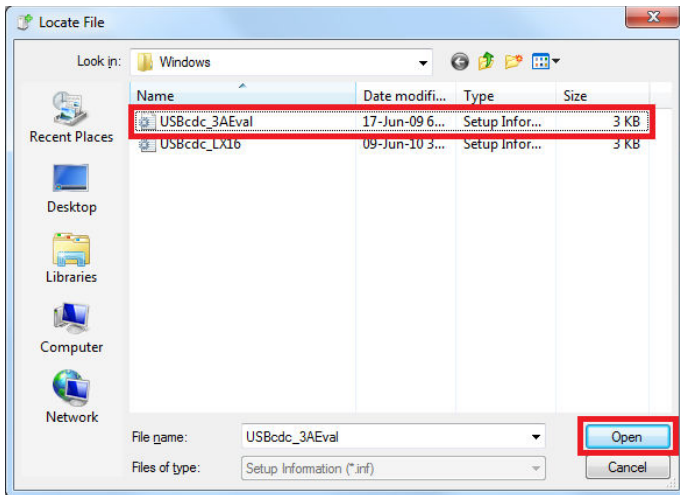
9. Select **Show All Devices** and click on **Next**.

10. Click on **Have Disk**.

11. Click on **Browse**.

12. Locate the correct driver for your operating system.

    Drivers _might_ be located at:

    Windows XP (Not SP3) or Vista:
    C:\Program Files\Avnet\AvProg\Driver\Windows

    Windows XP (SP3):
    C:\Program Files\Avnet\AvProg\Driver\WindowsXP_SP3
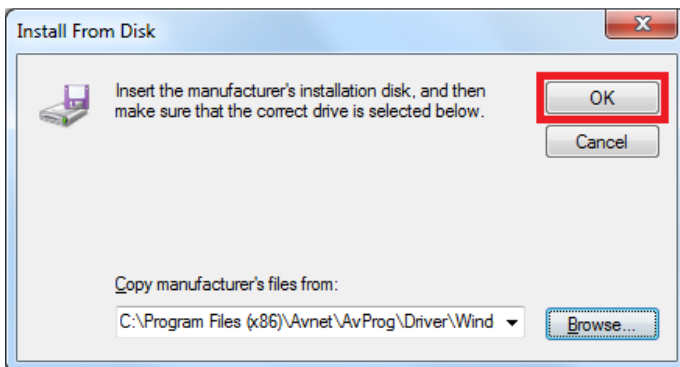
    Windows 7:
    C:\Program Files (x86)\Avnet\AvProg\Driver\Windows

    Select:
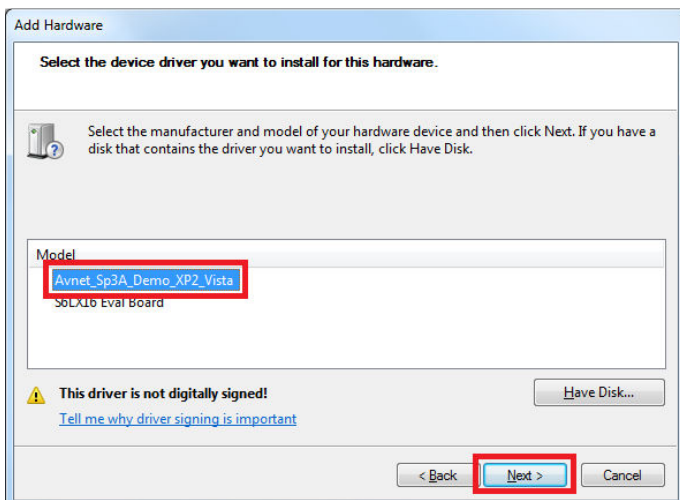   **USBcdc_3AEval**
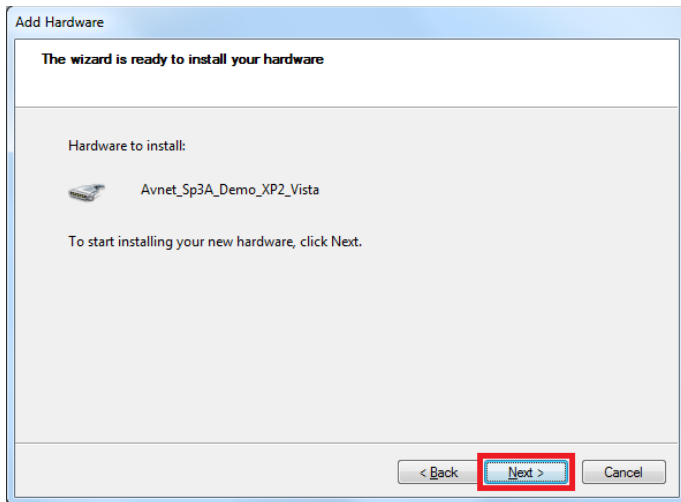
    Click on **Open** to proceed.
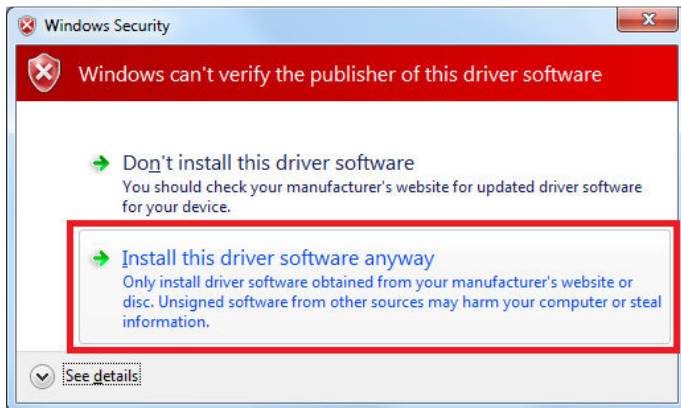
13. Click on **OK**.

14. Depending on the options chosen in step 12, a window similar to the one shown will appear.

    Select **Avnet_Sp3A_Demo_XP2_Vista** and click on **Next**.
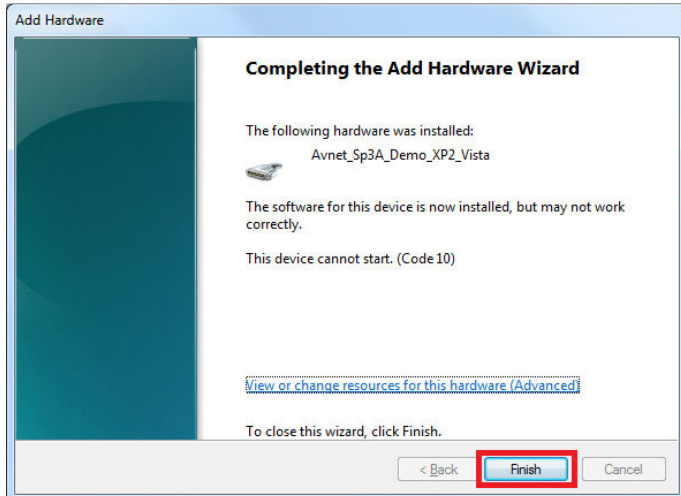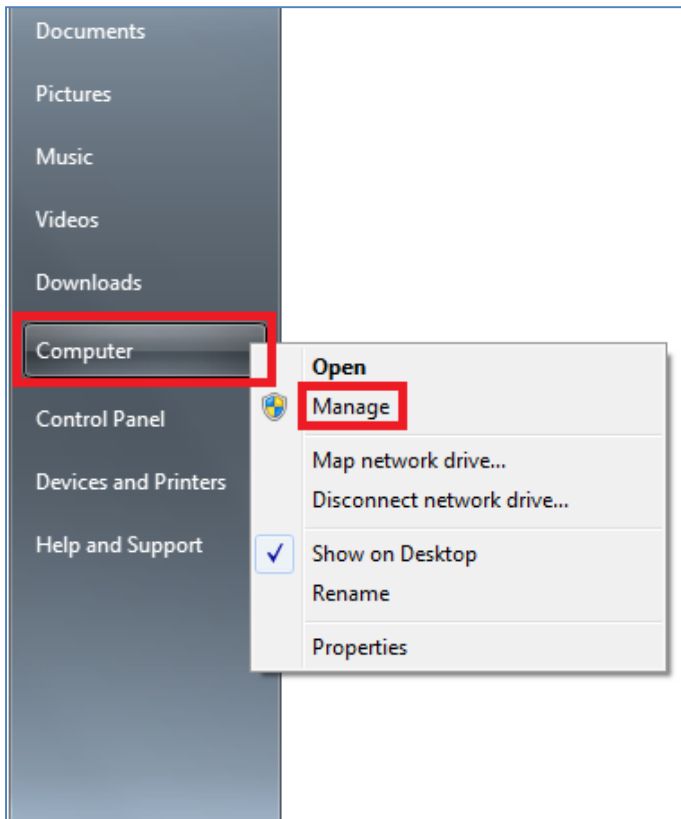
15. Click on *Next* to start installing the new hardware.

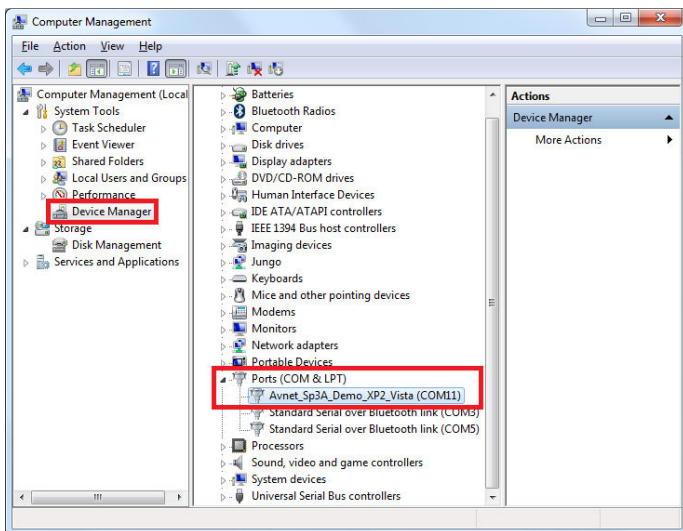16. If presented with a security window, select *Install this driver software anyway* to continue with the driver installation for the FPGA board.

17. Click *Finish* after the driver has been successfully installed.

18. To ensure that the driver has been installed and to know the COM port, in the Windows Start menu, right click on *Computer* and select *Manage*.

19. In the window that appears, select *Device Manager.* Expand *Ports (COM & LPT)*. Take note of the COM port of your device, usually indicated as *Avnet_Sp3A_Demo_XP2_Vista (COMx)*. Note that this name might be different depending on the operating system used.

   For this session on this PC, the COM port assigned to the FPGA board was COM11. This value will usually not be the same for different PC and might even be different after each Windows restart.
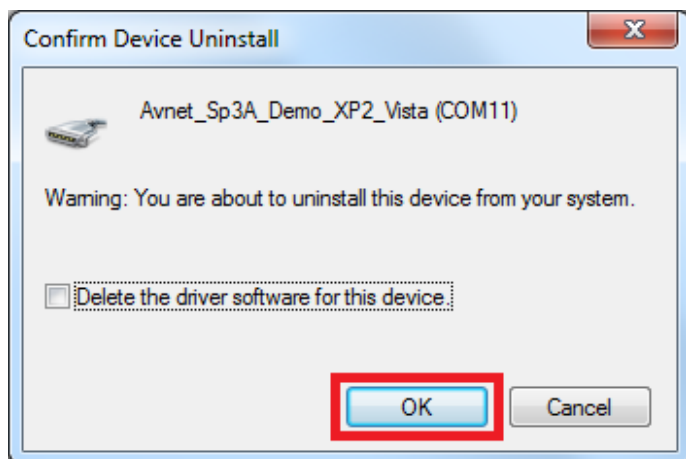
20. Skip this step if your ***Avnet_Sp3A_Demo_XP2_Vista (COMx)*** does not have any exclamation mark in a yellow enclosure on it.

    If your ***Avnet_Sp3A_Demo_XP2_Vista (COMx)*** has an exclamation mark in a yellow enclosure on it, unplug your FPGA board from the USB port. Wait a few seconds and plug the FPGA board again. Another instance of the Avnet should be created without the exclamation mark.

    The ***Avnet_Sp3A_Demo_XP2_Vista (COMx)*** with the exclamation mark should preferably be removed:
    (i)   Right click on the ***Avnet_Sp3A_Demo_XP2_Vista (COMx)*** with the exclamation mark.
    (ii) Select ***Uninstall***.
    (iii) Make sure ***Delete the driver software for this device*** is <u>not</u> selected.
    (iv) Click on ***OK*** to proceed.
   (v)   All related windows can be closed after uninstall.

21. Launch the ***AvProg*** utility.

    The utility is created by default in the Windows Start menu under the Avnet folder. A desktop shortcut is also created by default.
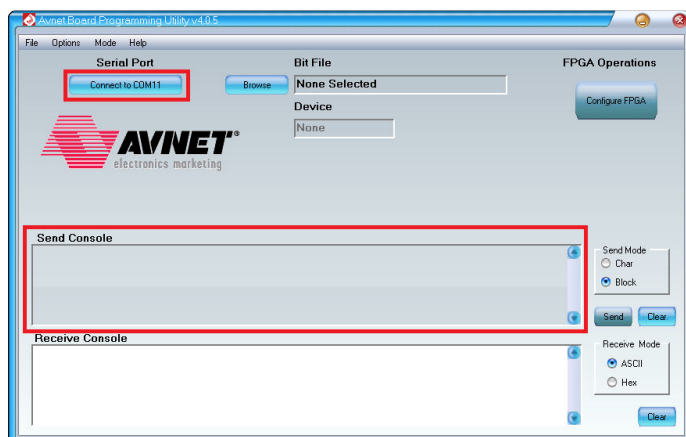
22. Click on ***Connect to COMx***, where ***x*** is generally the COM port noted in step 19.

    If the ***Send Console*** window gets enabled (In other words, the window is no longer disabled/grey in colour), then **skip the subsequent steps till step 40**.
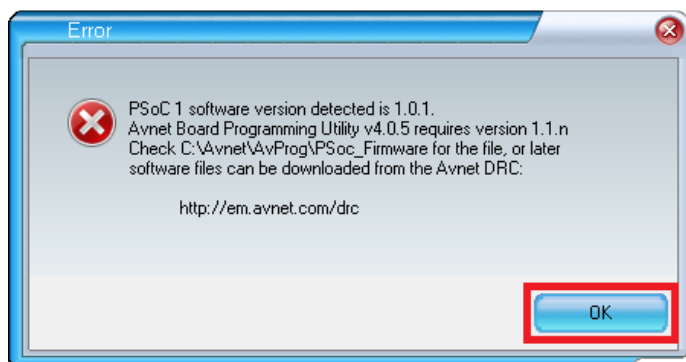
23. If this window appears while performing step 22, then there are some more steps to perform. Click on ***OK*** to close this window.

    The subsequent steps will show how to upgrade the PSoC firmware so that this Error window does not appear.
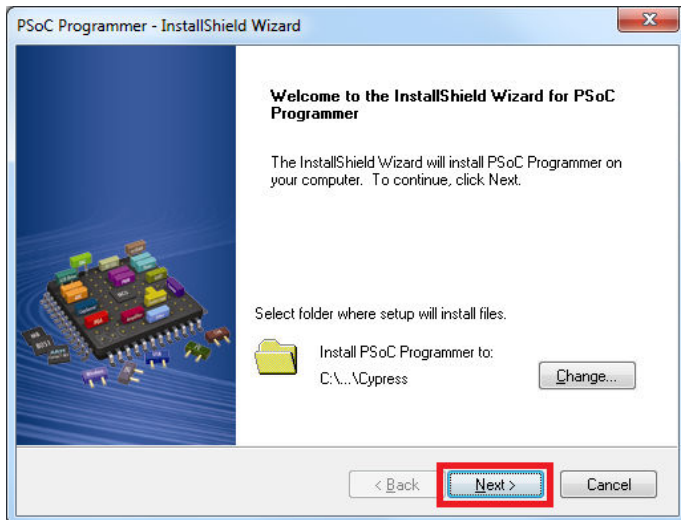
24. Download the *PSoC Programmer 3.13* from the CG3207 workbin. The filename is **02C - PSoC Programmer 3.13.** Do not get newer versions of the PSoC from the web as incompatibilities might arise with other programs later on.

    In the event the *PSoC Programmer 3.13* (26 MB) cannot be executed on your computer because your computer lacks some required files, you will need to download the *PSoC Programmer 3.13.ISO* (306 MB) from *http://www.cypress.com/?rID=2575*. Burn the ISO file to an optical media and follow the installation instructions.

    Run the downloaded file (26 MB) from step 24. You might need to **Run as administrator** if the requested operation requires elevation. Click *Next* in this window to proceed.
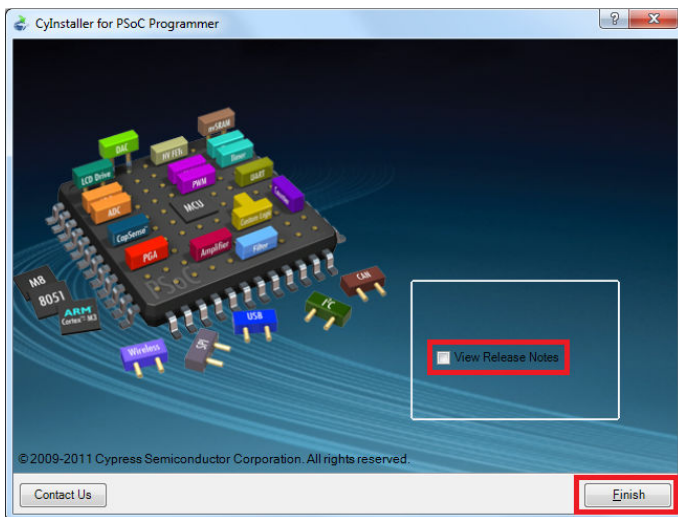
    You can change the installation destination here if desired.
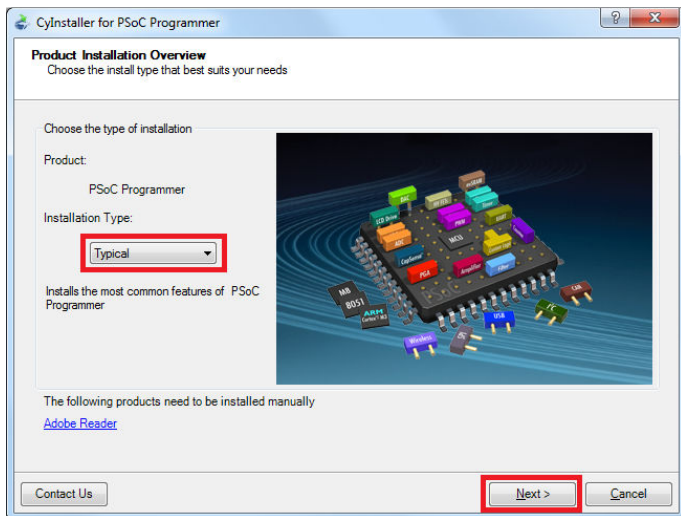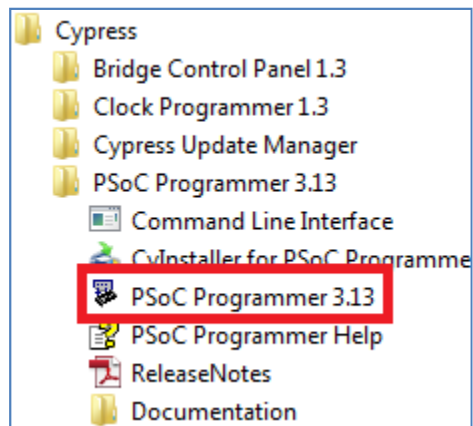
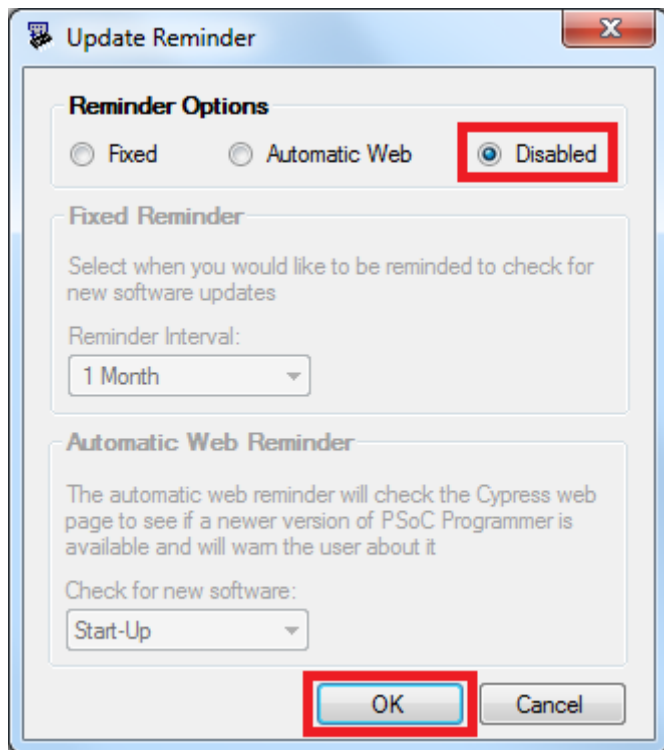25. Select the *Typical* Installation Type and click on *Next*.
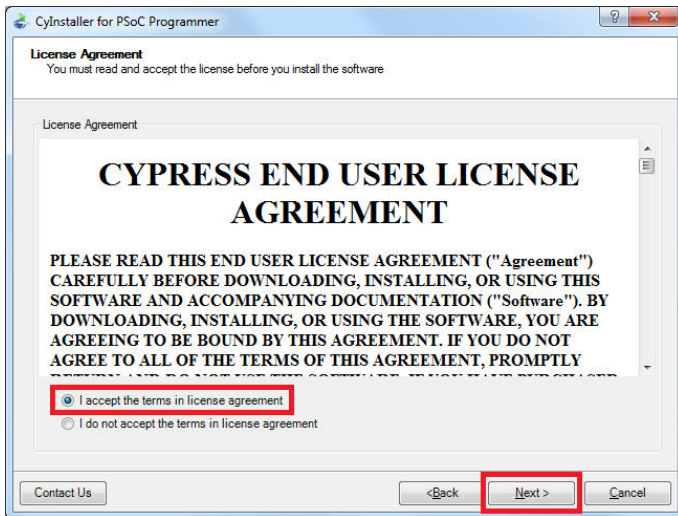
26. Select *I accept the terms in license agreement* and click on *Next* to proceed.

27. Uncheck *View Release Notes* and click on *Finish* to close the window.

28. Launch the *PSoC Programmer 3.13* program. It is located on Windows Start menu under the *Cypress* folder.

29. If the Update Reminder window appears, the **Disabled** option can be selected. Click on **OK** to close the window.

30. Connect the USB cable to MiniProg programmer. Then connect the USB cable to your PC.

    Windows will automatically install the drivers if step 24 to 27 has been correctly followed. A green "Status" LED should light and flicker on the PSoC MiniProg device.

   ** Additional images are shown at the end of this manual.*
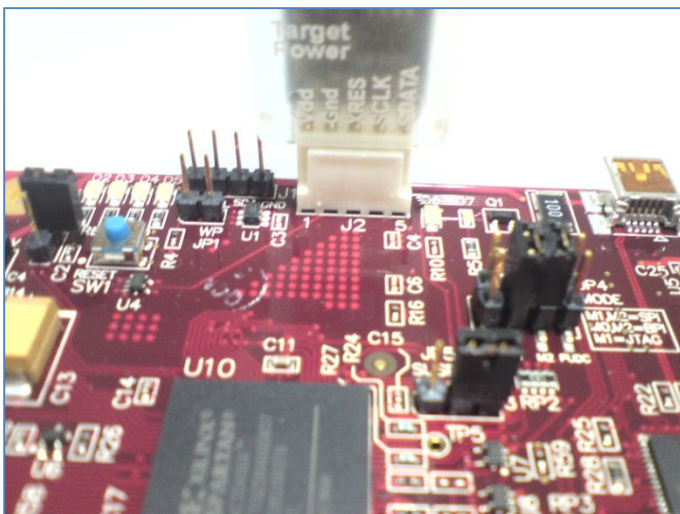
31. Plug the MiniProg onto the J2 header on the board. Due to the key on J2, the MiniProg can only plug in one way. Vdd on the MiniProg matches with J2 Pin 1.

   ** Additional images are shown at the end of this manual.*
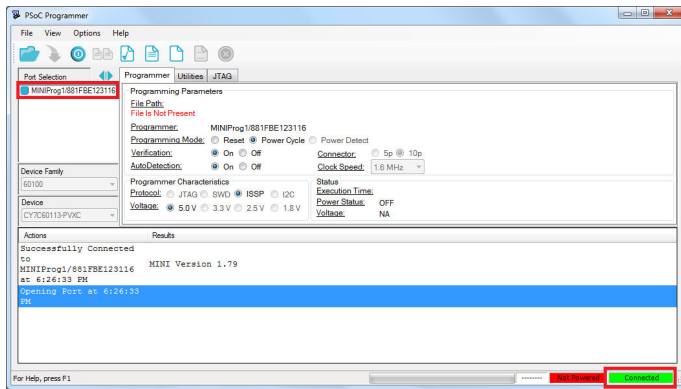
32. If the MiniProg is not automatically connected, connect to the MiniProg by selecting "*MINIProg ...*" from the Port Selection list. The status bar in the lower right-hand corner should change to a green "*Connected*" message.
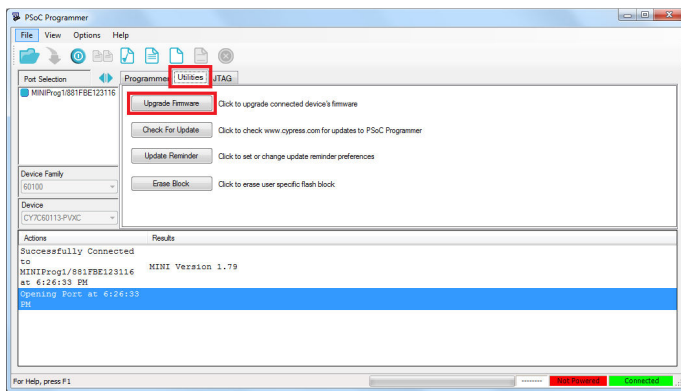
33. Select the *Utilities* tab and click on *Upgrade Firmware*.

    If the firmware has previously been upgraded, there is no need to perform this step. If unsure, continue with this step, and should the firmware be already up to date, a message similar to the one below will appear:
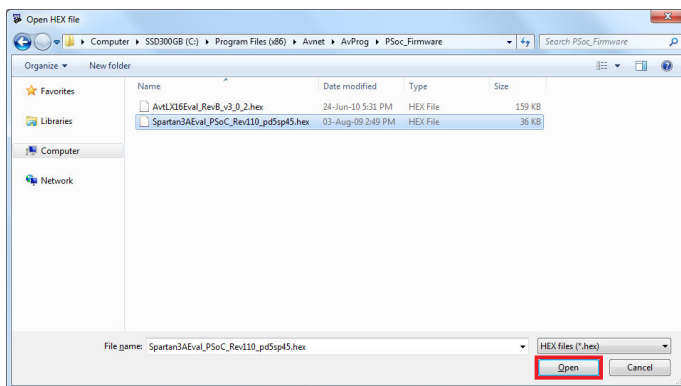
    FAILED! Programmer firmware is up to date, no upgrade possible
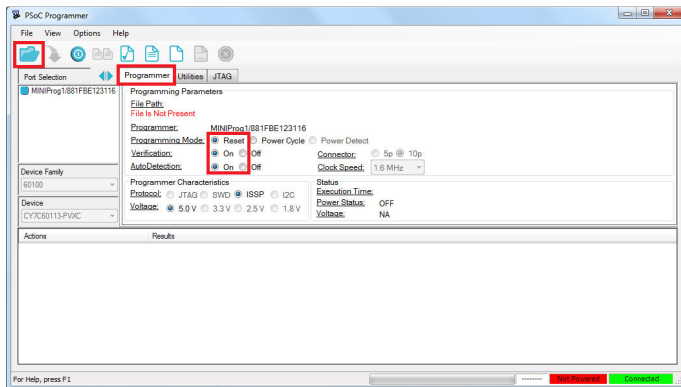
34. Back in the *Programmer* tab, select:

    (i)   Programming Mode: *Reset*
    (ii) Verification: *On*
    (iii) AutoDetection: *On*

    Click on *File Load*, either by clicking on the indicated icon or in the *File* menu

35. Select *Spartan3AEval_PSoC_Rev110_pd5sp45.hex*.

    The .hex file _might_ be located at:

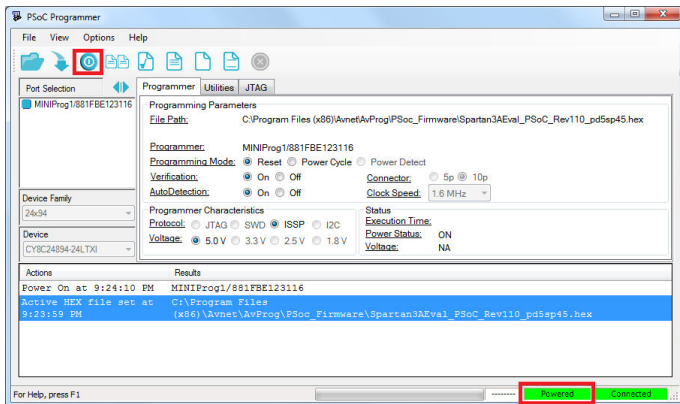   Windows XP or Vista:
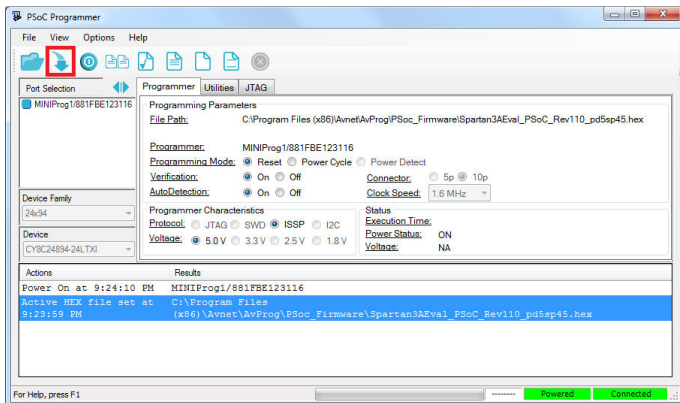   C:\Program Files\Avnet\AvProg\PSoc_Firmware

    Windows 7:
    C:\Program Files (x86)\Avnet\AvProg\PSoc_Firmware

    Click on *Open* to continue.

36. Click on **Toggle Power**. The **Powered** status will turn green. A red status LED will also light up on the PSoC MiniProg device.

    * Additional images are shown at the end of this manual.

37. In addition to the USB port of the PSoC device being connected to the USB port of your computer, ensure that the USB on the FPGA is also connected to the USB port of your computer. Click on **Program**, either by clicking on the indicated icon or in the **File** menu. Do not remove or turn off the power supply to the device during this step.

    There might not be any noticeable progress during this step and you might need to wait for about 1 minute if the FPGA is not powered. A FAIL message will then be displayed. Ensure that both the PSoC device and FPGA are connected to the USB ports of your computer and try this step again.
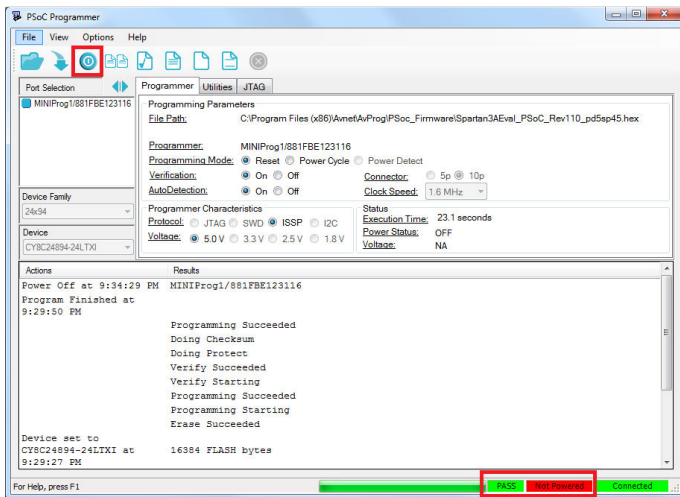
38. Click on **Toggle Power** after the programming has succeeded. The **Not Powered** status will turn red. The red status LED on the PSoC MiniProg device will also turn off.

    Close the PSoC Programmer window.

    The PSoC MiniProg device can be unplugged from the FPGA board and the computer, and put away. It will not likely be used again.

    Also, disconnect the FPGA board from the USB port of the computer, wait a few seconds, and reconnect it to the same USB port.
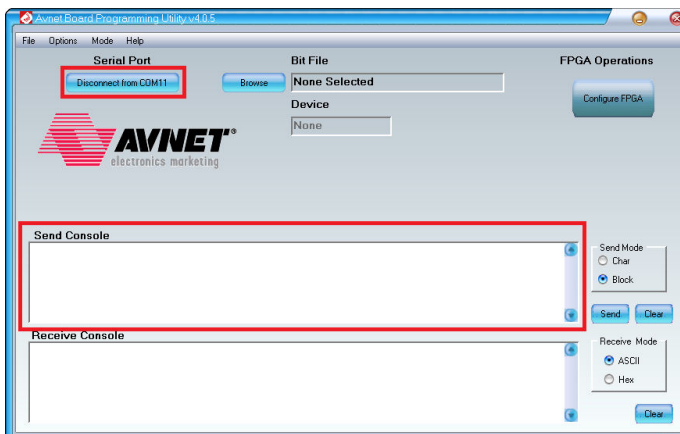
39. Perform step 22. If step 24 to 38 has been properly followed, the connection to the COM port will occur and the **Send Console** window will no longer be disabled / grey in colour.

    Step 24 to 38 is performed only if the PSoC MiniProg was not previously updated with the latest software version. Without the latest version software, an alert window like in step 23 will be shown.

    Once this step is completed, the FPGA board is ready to receive bit files, created after the VHDL codes have been developed on the Xilinx ISE WebPACK 13.2.
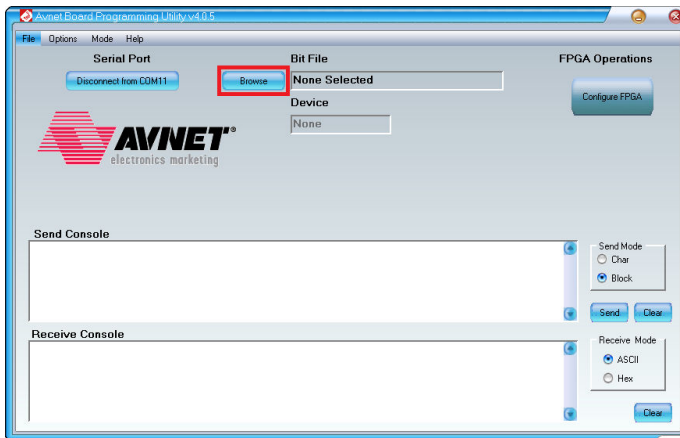
40. To test whether the FPGA board is able to properly receive the bit files, an existing bit file example will be used. Ensure that the **Send Console** window is enabled (Not disabled/grey in colour). Click on **Browse**.
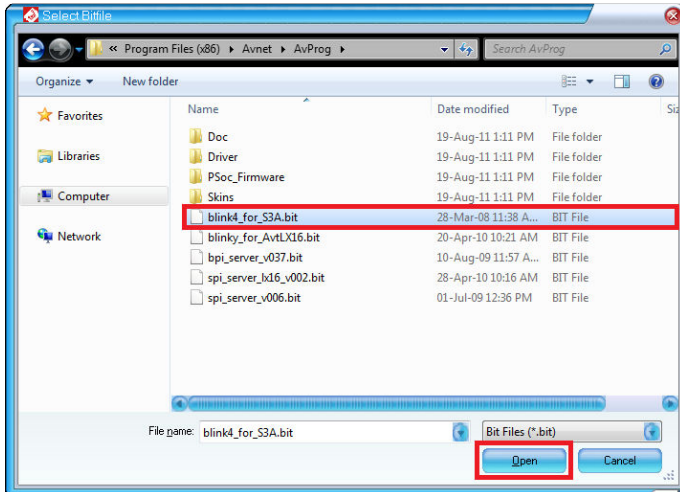
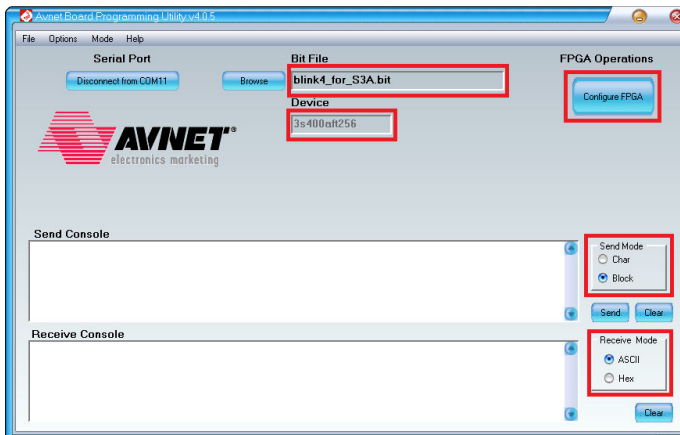41. Locate the **blink4_for_S3A.bit** file. The file _might_ be located at:

Windows XP / Vista:
C:\Program Files\Avnet\AvProg

Windows 7
C:\Program Files(x86)\Avnet\AvProg

Click on **Open** to proceed.

42. Confirm the values indicated in the Avnet Board Programming Utility v4.0.5 window:
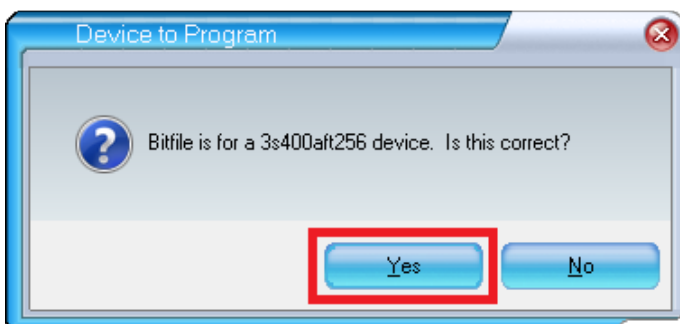(i)   Bit File: **blink4_for_S3A.bit**.
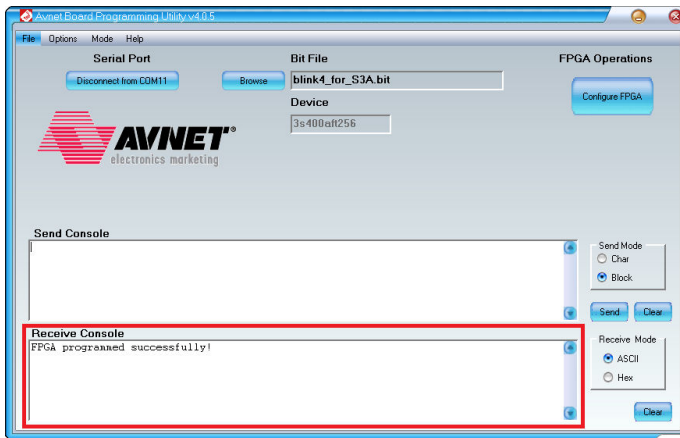(ii) Device: **3s400aft256**.
(iii) Send Mode: **Block**.
(iv) Receive Mode: **ASCII**.

After verification, click on **Configure FPGA**.



43. Choose **Yes** in this window.

44. If the .bit file has been properly uploaded onto the FPGA board, the **Receive Console** window will display **FPGA programmed successfully!**

    On the FPGA board, D2, D3, D4 and D5 will blink rapidly. This confirms that everything has been properly set up. Note that the next time the FPGA board is connected to the USB port or the RESET SW1 switch is pressed, the program that has been uploaded will be discarded and the behaviour of D2, D3, D4, and D5 will revert back to normal.
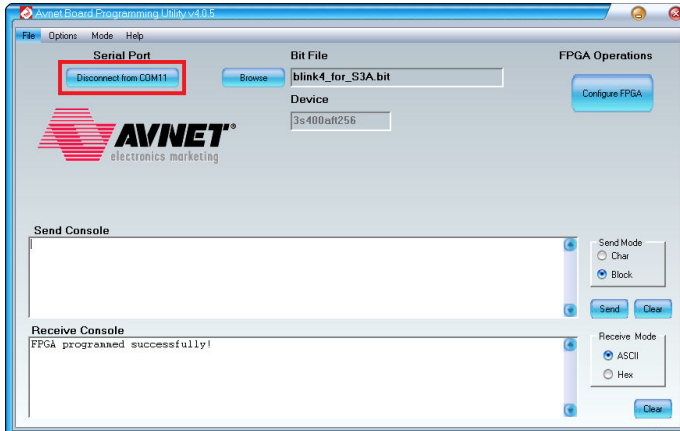
45. Before disconnecting the FPGA board from the USB port of the computer, it is recommended to click on **Disconnect from COMx**, where **x** is your COM port number.
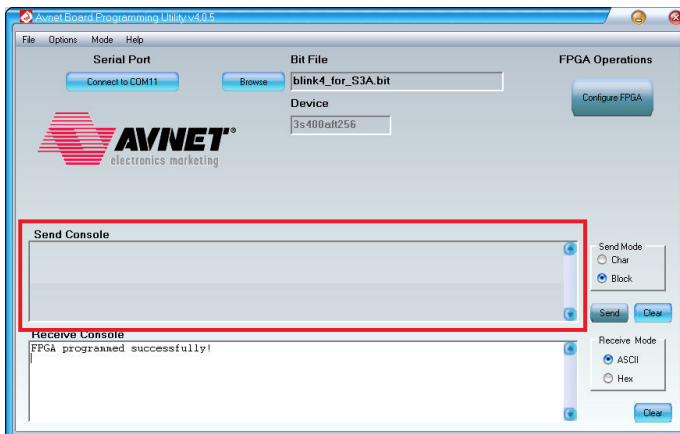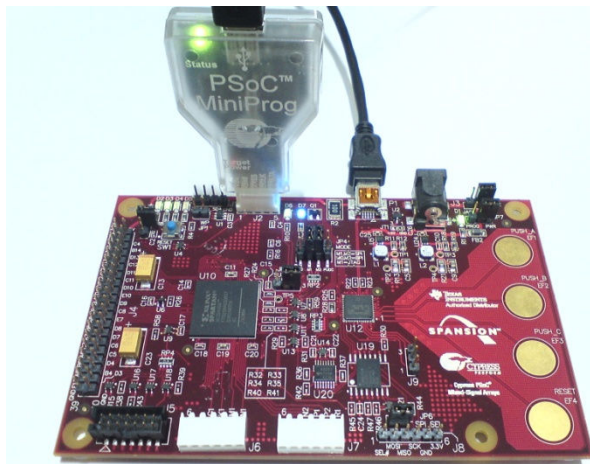
46. The **Send Console** window will be disabled and the FPGA board can safely be disconnected from the USB port of the computer. The **Avnet Board Programming Utility v4.0.5** can also be closed.
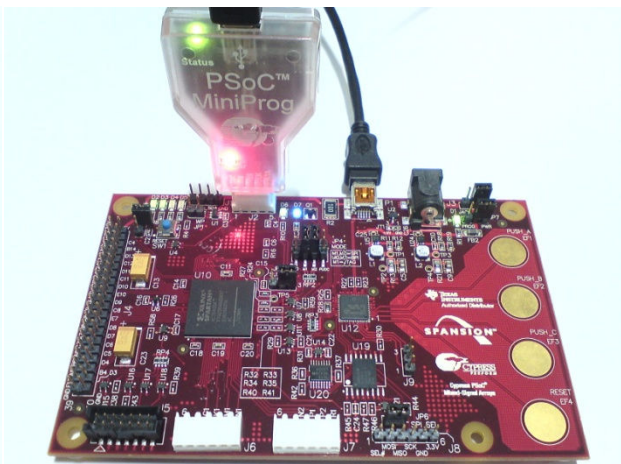
Images: Cypress PSoC MiniProg

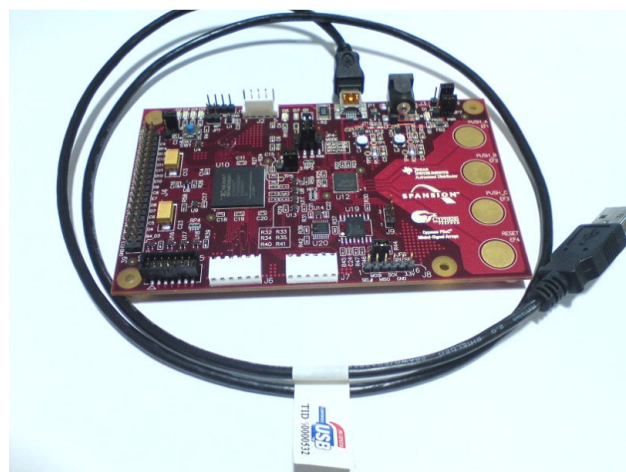*(Vdd connected to pin 1 of J2 on the FPGA board)*

Images: Connections with the Xilinx Spartan-3A Evaluation Kit

(Flickering green Status LED)

(Powered PSoC has red LED turned on)

(USB cable connected to FPGA board)