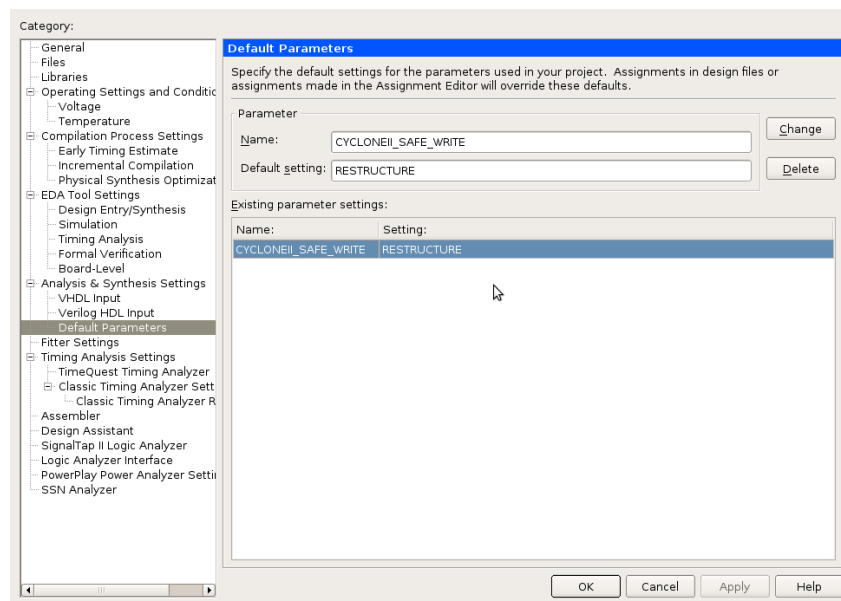


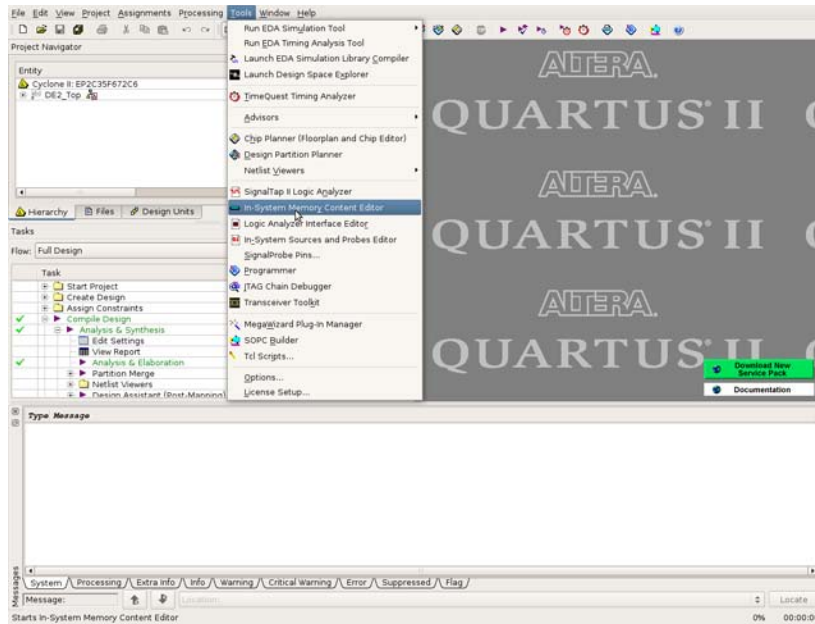
Editing On-FPGA Memories for Loading Code and Initializing Data

The In-System Memory Content Editor allows access to complex FPGA designs. When programming devices, you have read and write access to the memories and constants through the JTAG interface. You can then identify, test, and resolve issues with your design by testing changes to memory contents in the FPGA while your design is running.

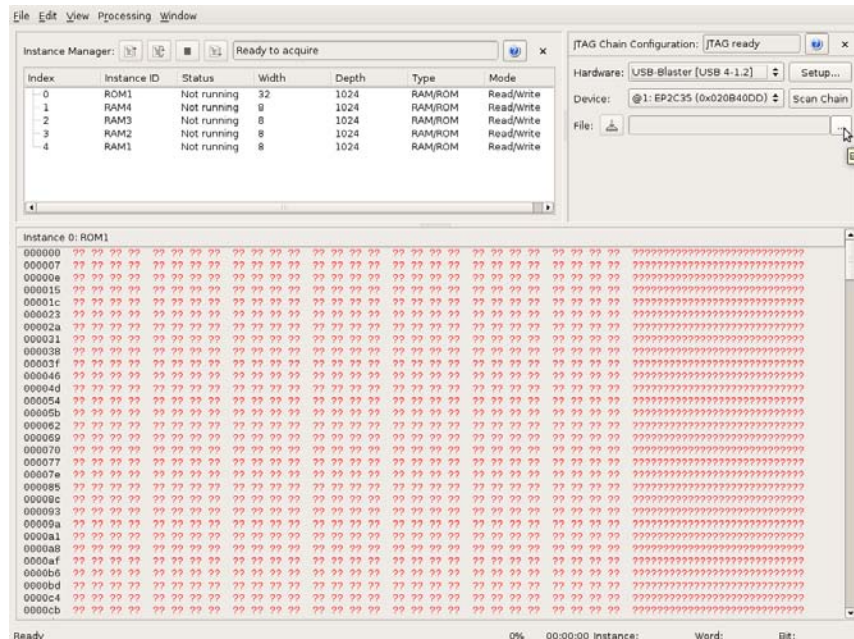
Before you can use the In-System Memory Content Editor tool, one additional setting has to be made. In the Quartus II software select **Assignments > Settings** to open the window shown below and then open the item called **Default Parameters** under **Analysis and Synthesis Settings**. As shown in the figure, type the parameter name **CYCLONEII_SAFE_WRITE** and assign the value **RESTRUCTURE**. This parameter allows the Quartus II synthesis tools to modify the single-port RAM as needed to allow reading and writing of the memory by the In-System Memory Content Editor tool. Click **OK** to exit from the Settings window.



After full compilation of the single-cycle processor design in Quartus, click the **Tools** Menu and select **In-System Memory Content Editor**. The In-System Memory Content Editor has three separate panes: the Instance Manager, the JTAG Chain Configuration, and the Hex Editor. The Instance Manager pane displays all available run-time modifiable memories and constants in your FPGA device.



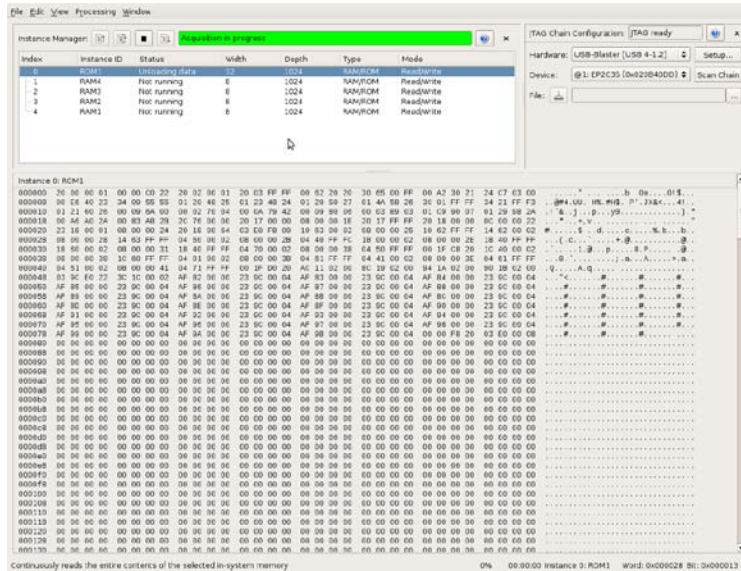
In the JTAG Chain Configuration pane select **USB-Blaster** for **Hardware** setup and click the **...** button to select an **.sof** file to program your FPGA. Then click the button next to the label **File:**.



After programming the FPGA you can view a list of all run-time modifiable memories and constants in the design. The **Instance Manager** pane displays the Index, Instance, Status, Width, Depth, Type, and Mode of each element in the list.

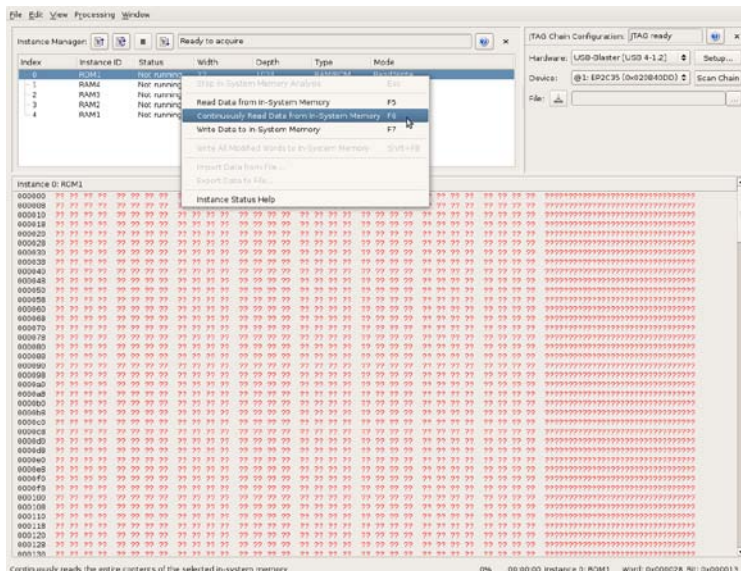
In addition to the buttons available in the Instance Manager pane, you can read and write data by selecting commands from the Processing menu, or the right-click menu in

the Instance Manager pane or Hex Editor pane. The status of each instance is also displayed beside each entry in the Instance Manager pane. The status indicates if the instance is **Not running**, **Offloading data**, or **Updating data**. The health monitor provides information about the status of the editor.



The In-System Memory Content Editor allows you to import and export data values for memories that have the In-System Updating feature enabled. **Importing from a data file** enables you to quickly load an entire memory image. **Exporting to a data file** enables you to save the contents of the memory for future use.

If you want to test your CPU design with another assembly program, you can simply select **Importing from a data file** and then choose your *new ROM1.mif* file in the directory which is generated after rerunning the *GenMIF.sh* script.



For each instance of an in-system memory or constant, the Hex Editor pane displays data in hexadecimal representation and ASCII characters (if the word size is a multiple of 8 bits). The arrangement of the hexadecimal numbers depends on the dimensions of the memory. For example, if the word width is 16 bits, the Hex Editor pane displays data in columns of words that contain columns of bytes.

Unprintable ASCII characters are represented by a period (.). The color of the data changes as you perform reads and writes. Data displayed in black indicates the data in the Hex Editor pane was the same as the data read from the device. If the data in the Hex Editor pane changes color to red, the data previously shown in the Hex Editor pane was different from the data read from the device.

Reference

http://www.altera.com/literature/hb/qts/qts_qii53012.pdf
<http://quartushelp.altera.com>