Guiliani applications on Altera Cyclone III NEEK Board: Quick Guide

This demo presents the capabilities of the Guiliani HMI Framework running on the ALTERA Nios II Soft-CPU and the D/AVE 2D GPU. Additionally the efficient way of working for HMI application development by using the Guiliani streaming editor is illustrated.

This quick guide runs you through the processes of:

0. Preparing your PC, i.e. installing and configuring the required tool chain
1. Installing the Demo on the ALTERA NEEK board
2. Using the Guiliani Editor in order to create your first own application
3. Loading your first own application to the ALTERA NEEK board

0. System Preparation

- o The board for which the software and this manual are developed is *Nios II Embedded Evaluation Kit, Cyclone III Edition*:
  http://www.altera.com/products/devkits/altera/kit-cyc3-embedded.html?GSA_pos=1&WT.oss_r=1&WT.oss=NEEK
- o The ALTERA Quartus II Toolchain version 12.1 (or higher) needs to be installed on your PC. It is available at:
  https://www.altera.com/download/software/quartus-ii-we
- o In *Windows Vista* and *Windows 7*, a driver for the *USB-Blaster* cable has to be installed. Please follow the instructions given in:
  http://www.altera.com/download/drivers/usb-blaster/dri-usb-blaster-vista.html

1. Load pre-built example project:

- Connect the board to the computer via USB and to the power supply. Turn it on.
- Execute the file *FlashDemo.bat*, located under the evalkit's main folder. This batch file will install the complete demo: The FPGA logic (mainly the D/AVE GPU and the NIOS II processor), the Guiliani Runtime Engine and application and the resources (e.g. the application behavior, pictures, textures, fonts…).
- Wait until the flash process has finished. This will take several minutes.
- Reset the board. That can be done turning it off and back on, or pressing the *cpu reset* button located on the rear part of the board.
- Now you can start playing with demo on the board

2. Edit example project in the computer:

- Execute the file *GSE.bat,* located under the evalkit's main folder. This will open the *Guiliani Streaming Editor* (Fig 1).
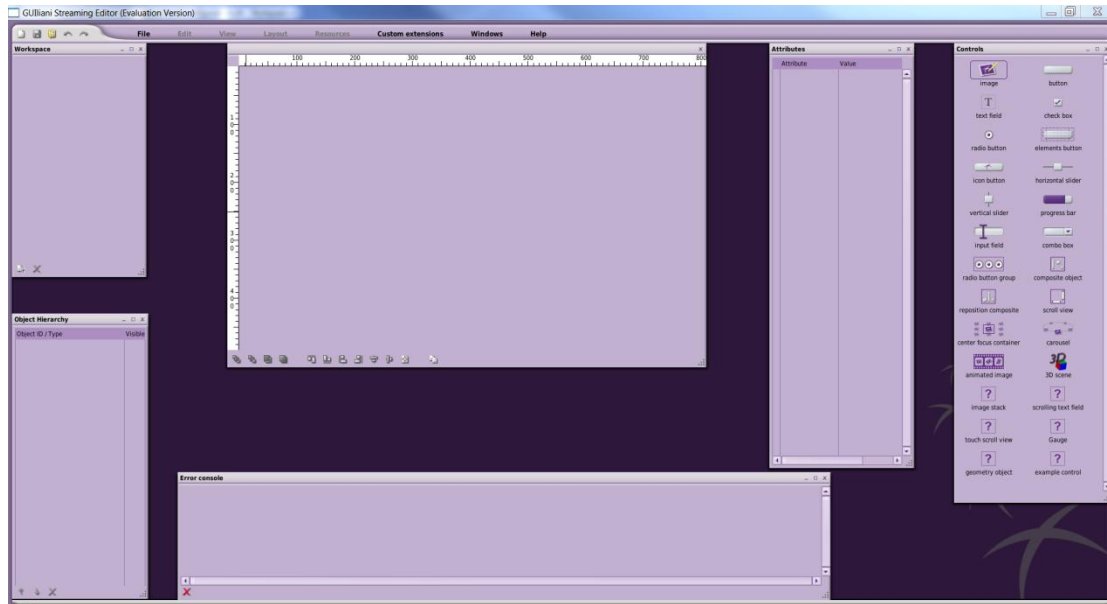

Fig 1. Guiliani Streaming Editor.

- If the different windows are not displayed as it shows in Fig 1. Please click on *Windows* and click on each of the options (Fig 2).

Fig2. Click on the different windows to make them visible.
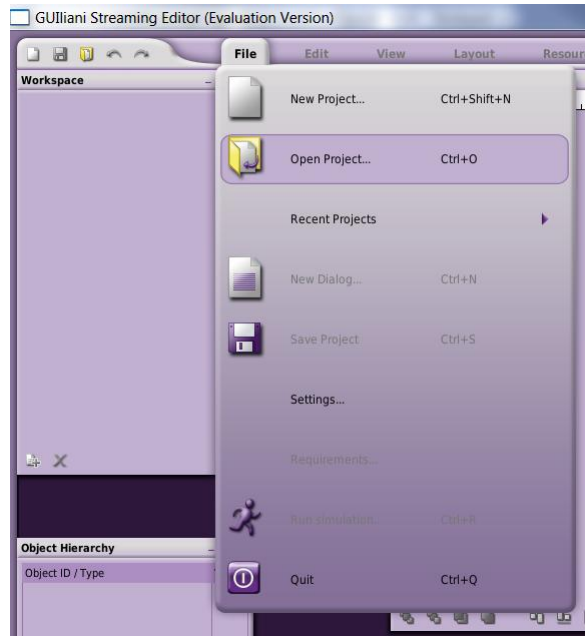
- Click on *File → Open project* (Fig 3).

Fig 3. Open project.

- Find the folder where the evalkit is located, double click in the folder
  Demo_ShowRoom and select the file *ShowRoom.gpr* (Fig 4). Now the demo
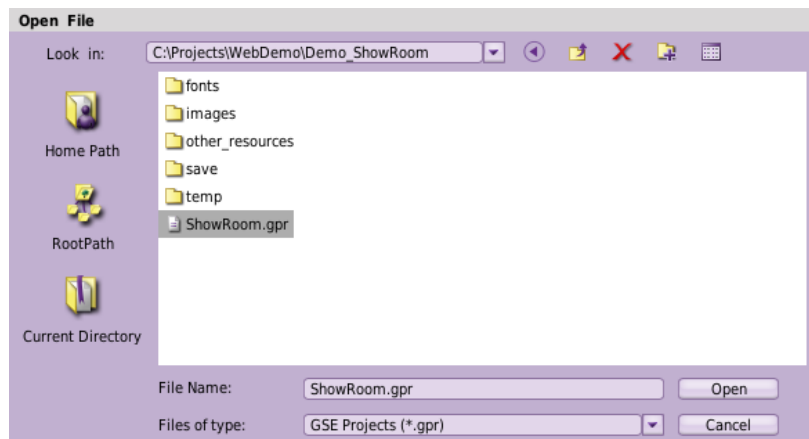 project is open and ready for being edited.

Fig 4. Open ShowRoom project.

- Now we will add some functionality to the project:
- In the *Workspace* window (Fig 5), click on *Demo_Scratchpad*. It will open an
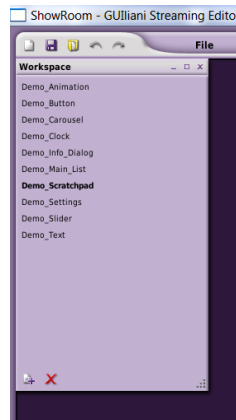 intentionally empty dialog, the Scratchpad (Fig 6).

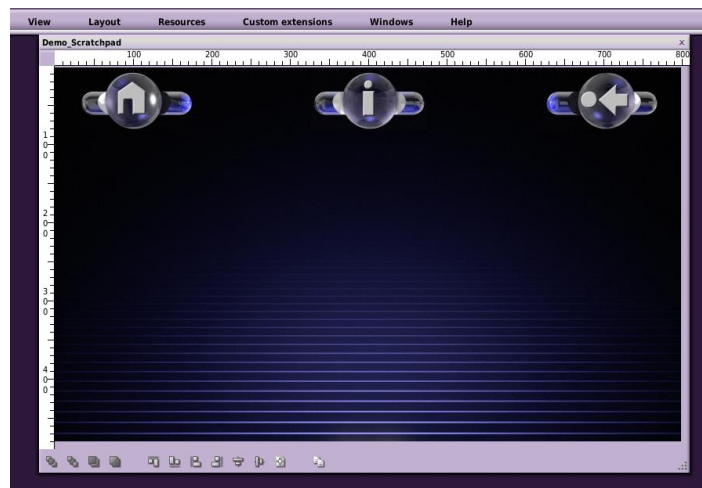Fig 5. Workspace window.

Fig 6. Scratchpad dialog.

- In the *Controls* window, click on the *Image stack* widget (Fig 7).

Fig 7. Controls window.

- It will be included in the window, place it the center (by clicking and dragging) and resize it, by clicking and dragging one of the corners of the widget (Fig 8).
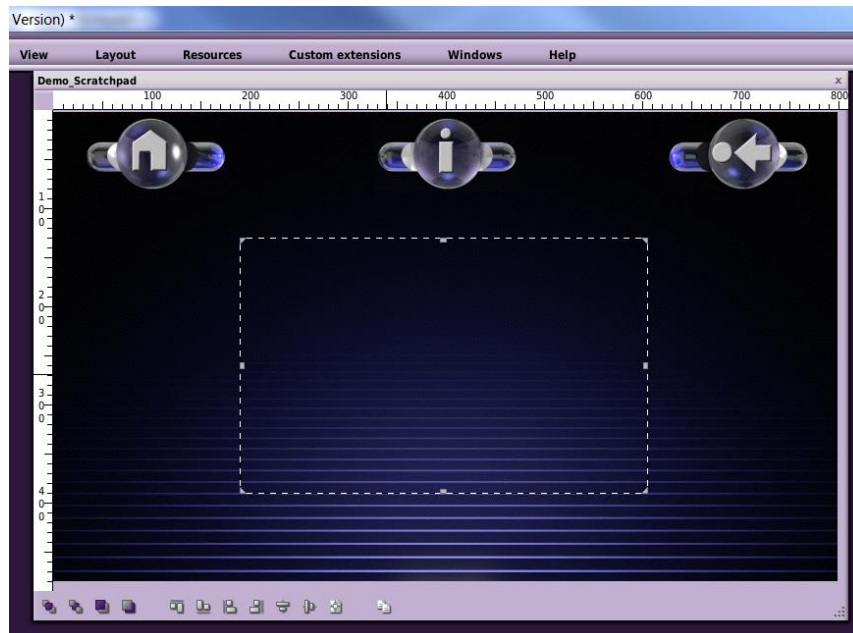

Fig 8. Image stack widget.

- In the *Attributes* window, unfold Images and click on the button *NumberOfImages* until it reaches 5 (Fig 9).
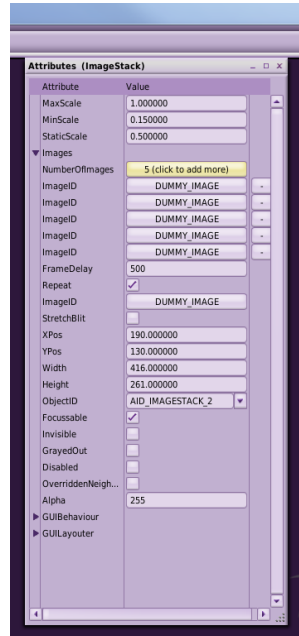

Fig 9. Adding image ID's.

- For each of the five buttons next to *ImageID*, click and choose an image from the *Image manager* window (Fig 10).
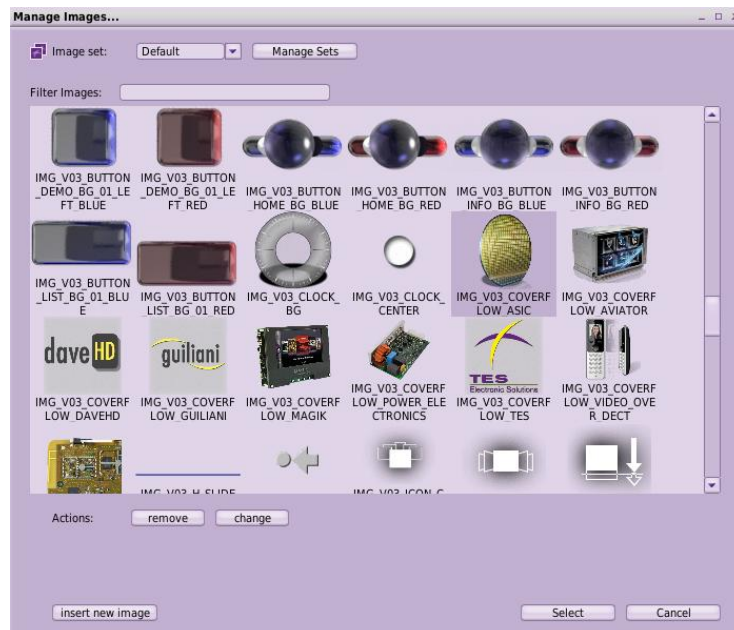

Fig 10. Image manager window.

- Save the changes in the project (Ctrl+S) and run the simulation (Ctrl+R).

- On the *Run simulation* window, make sure the options are configured as shown (Fig 11).
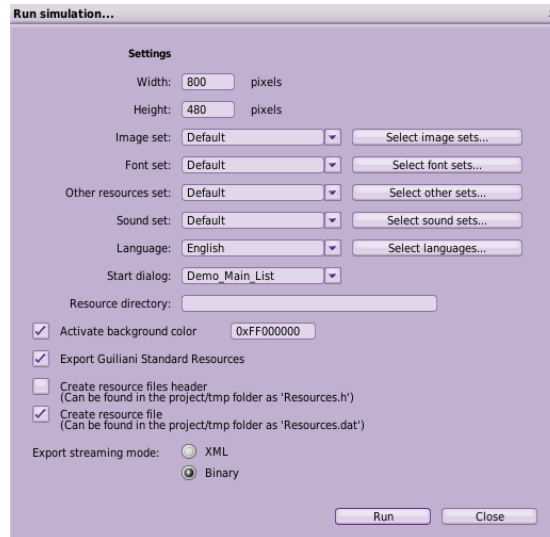- Click *Run*.

Fig 11. Run simulation window.

- On the simulation (Fig 12), find the *SCRATCHPAD* option in the main menu, and click on it. For visualizing the different images loaded, drag the image with the mouse up or down (Fig 13).
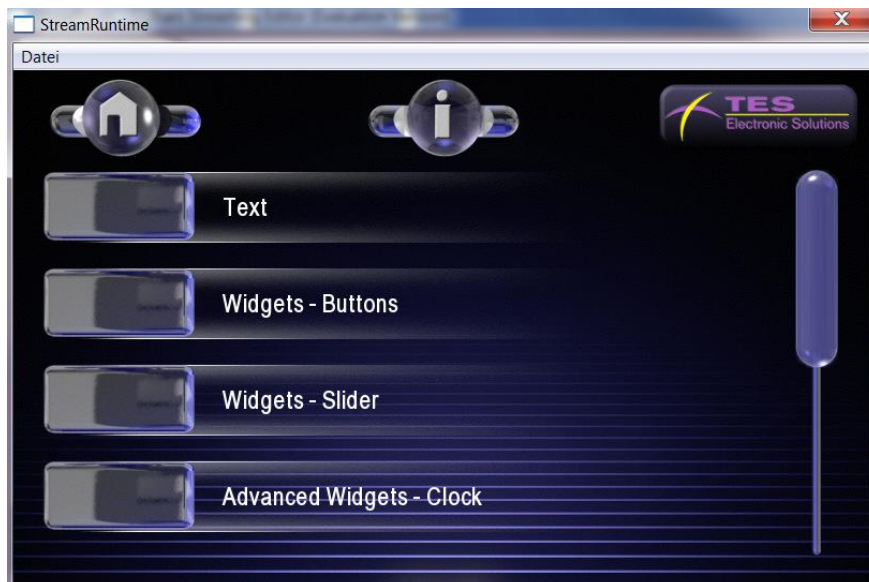

Fig 12. Simulation.

Fig 13. Image stack in movement.

- Stop the Simulator by clicking on the upper right corner of the Simulator Window frame.

For further information regarding *GSE*, please read the *GSE User Manual* document, located in the Evalkit, under the *Documents* folder

3. Load edited example project onto the board:

- In the previous step we were able to edit a *GSE* project and see the modifications on a running simulation in the computer. Now we will see those changes in the board.
- Connect the board to the computer via USB and to the power supply. Turn it on.
    - If you did not test the pre-built example project (as described in Step 1.), the first thing to do then is to execute the file *FlashConfiguration.bat*, located under the evalkit's main folder (this step has to be done only once, the loading of the resources will have to be done every time a change in the *GSE* project is made).
- With the *GSE* project open, export the resources (i.e. the Guiliani application including all pictures etc.) by clicking *Resources → Export* (Fig 14).

Fig 14. Export option.

- In the *Export* window (Fig 15), make sure all the options are as shown except *Export directory*. In there, please write (or navigate) the path to the *Export* folder. It is: *<Path where the evalkit is> /Export*. (*)
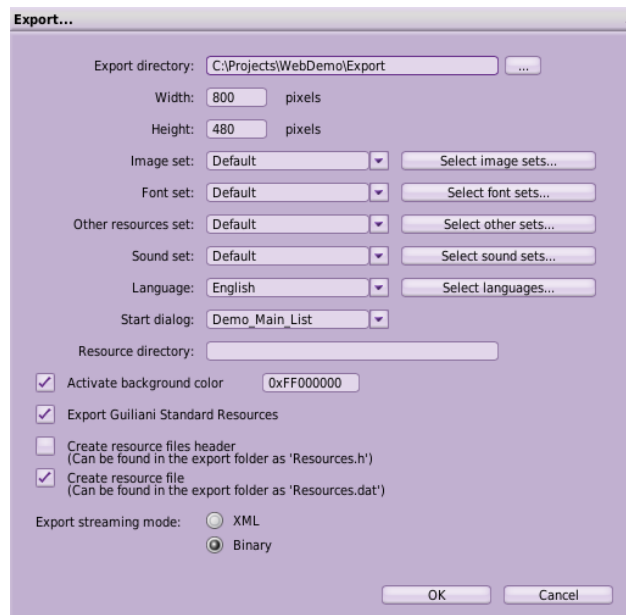

Fig 15. Exporting configuration.

- Click on *OK*
- Execute *FlashResources.bat* (in the evalkit's main folder). This batch file will install the resources (e.g. application behavior, pictures, textures, fonts…).
- Wait until the flash process has finished. This will take several minutes.

- Reset the board. That can be done turning it off and back on, or pressing the *cpu reset* button located on the rear part of the board.
- Now you can again start playing with demo on the board, navigate to "SCRATCHPAD" and you will see your first own Guiliani HMI application running on the target board.

(*) If you want to export the project to a different folder, you will have to modify the *FlashResources.bat* file (Fig 16). In the line @ *set _EXPORT_PATH= %~dp0Export* please substitute the text *%~dp0Export* with the complete path where the resources will be exported.

```
@ set _NIOS2EDS_ROOT=%SOPC_KIT_NIOS2%nios2eds\
@ set _NIOS2EDS_ROOT=%_NIOS2EDS_ROOT:\=/%
@ set _QUARTUS_ROOT=%SOPC_KIT_NIOS2%quartus\

:: If you have exported your GSE project into a different folder, please change
:: the path in the following line (substitute %~dp0Export with the whole path)
@ set _EXPORT_PATH= %~dp0Export
@ set _EXPORT_PATH=%_EXPORT_PATH:\=/%
@ %_QUARTUS_ROOT%bin\cygwin\bin\bash.exe -c "%_NIOS2EDS_ROOT%nios2_command_shell.sh ./NEEK/Scripts/FlashResources.sh %_EXPORT_PATH%"

@ CLS
@ ECHO Flashing done, this window will close briefly.
@ BREAK
@ EXIT
```

Fig 16. FlashResources.bat