



ARTEKIT

electronic artists

VGA Demo

Forza 4 and Slideshow





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About this document

Revision history

The table below displays the revision history for the chapters in this manual.

Chapter	Date	Revision	Changes made
All	August 2013	1.0	First publication

Contact information

For the latest news, upgrades and information about Artekit products, visit the Artekit web site at


<http://www.artekit.eu>

For technical support on this product, visit the support page at <http://www.artekit.eu/contact> or use the Artekit forum.

For additional information about Artekit products, consult the sources below.

Information type	Resource
Technical support	support@artekit.eu
Literature	www.artekit.eu
Sales	sales@artekit.eu
Products forum	http://www.artekit.eu/forums/

Regarding this document

	Prepared:	Document name:	
	Ferrari Fabrizio	VGA demo guide	
	Approved:	Date:	Revision:
	Ferrari Fabrizio	05/08/2013	Preliminary

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VGA Demo

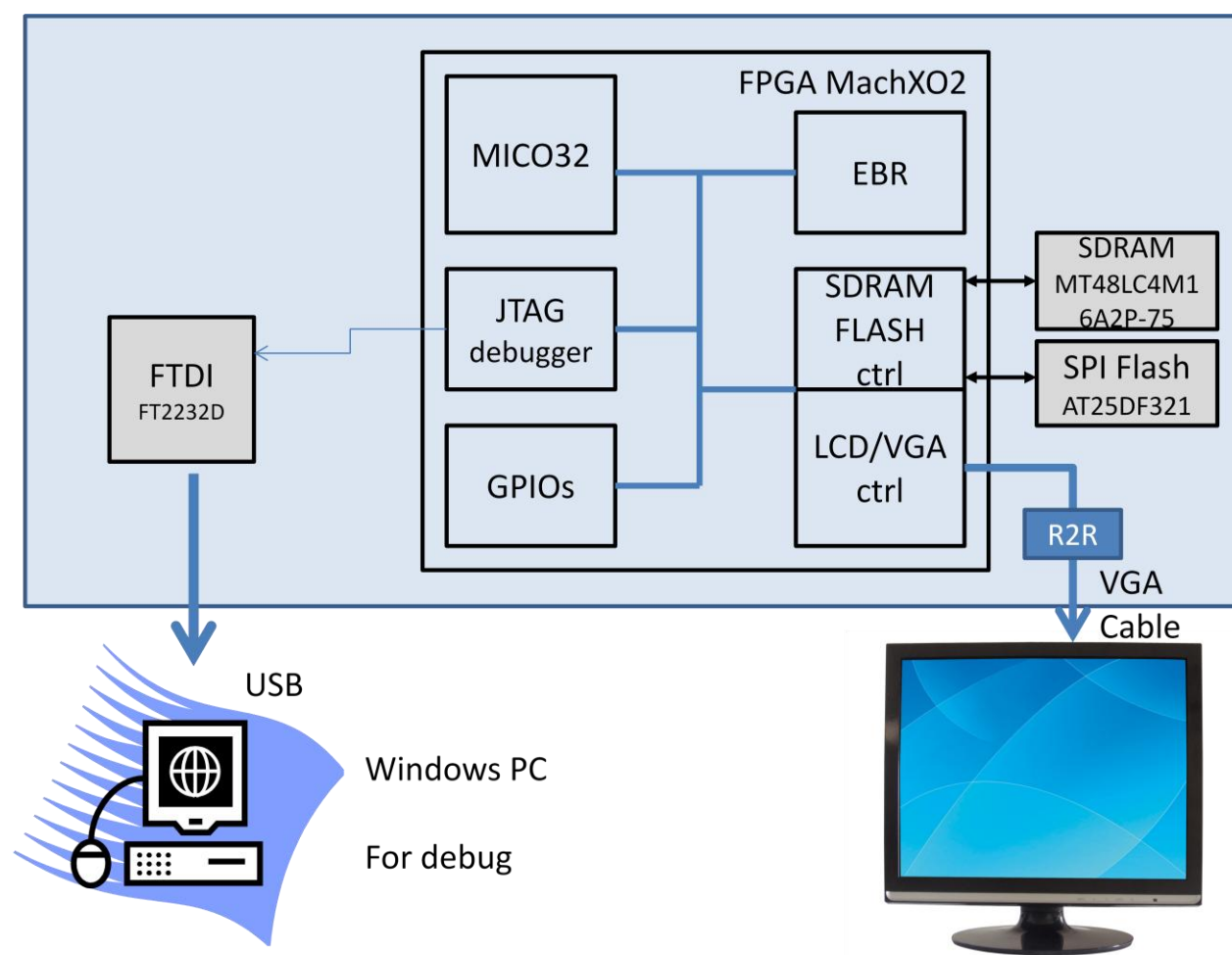
General description

This document describe the VGA demo on Mico32 Artekit board.

There are 2 VGA demo based on the same HW (platform) design:

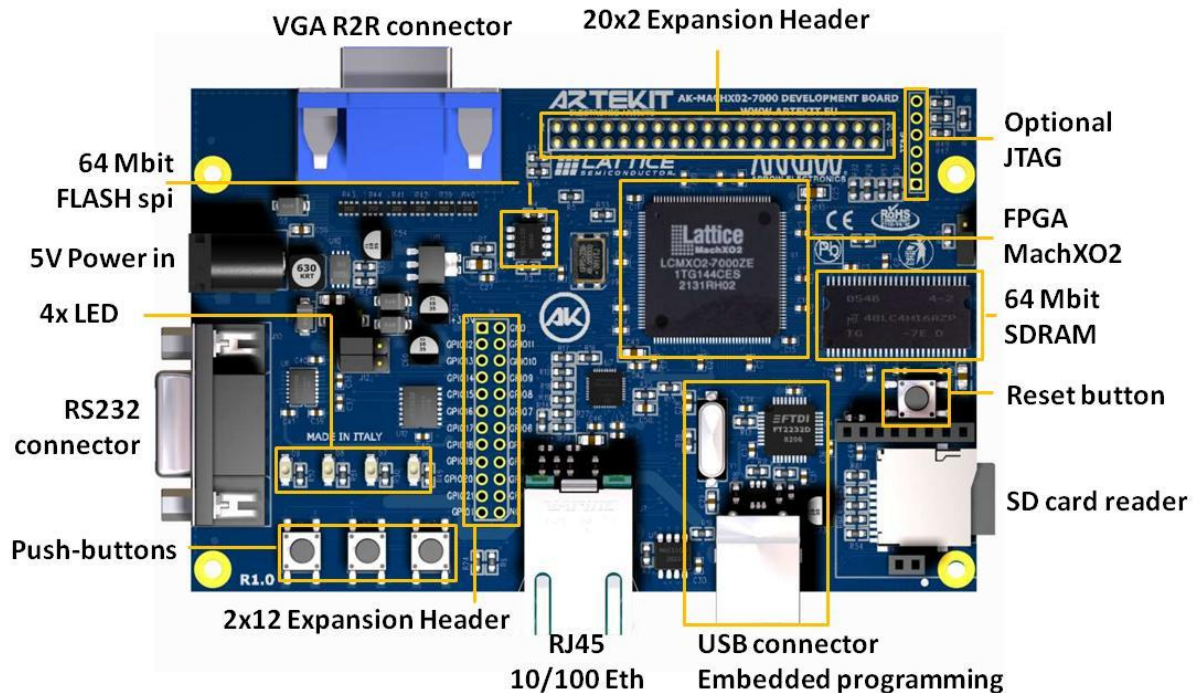
- Artekit slideshow presentation.
- Forza 4 game.

The demo shows a MICO32 ANSI C application running on a low cost Flash based Lattice MachXO2 FPGA, internally to EBR memory.



In order to run/modify this demo you need the Artekit board only. Programming tool is embedded on the Artekit board and Diamond software can be downloaded for free from Lattice web site.

ARTEKIT MACHXO2-7000 Evaluation Board



The AK-MACHXO2-7000 development board is a full-featured hardware platform to evaluate the Lattice MachXO2 PLD Line. The complete schematics of the board are provided and can be download from the Artekit website.

Main components

The AK-MACHXO2-7000 Development board features the following components:

- Lattice MACHXO2-7000 PLD
- 10/100 Mb Ethernet adapter with link/speed LEDs
- 32Mb (4MB) serial data flash
- 64Mb (8MB) DRAM
- 1 RS232 (TX/RX only)
- VGA output using R2R method
- 2 x expansion connector
- 4 user LED
- 4 user KEY
- Lattice JTAG programmer/debug cable on board
- 25 MHz clock oscillator
- Powered from USB cable or external 5V DC power supply



Artekit slide show presentation

Running this demo an animated slide show will give you all information regarding Artekit AK-MACHX02-7000 hardware.

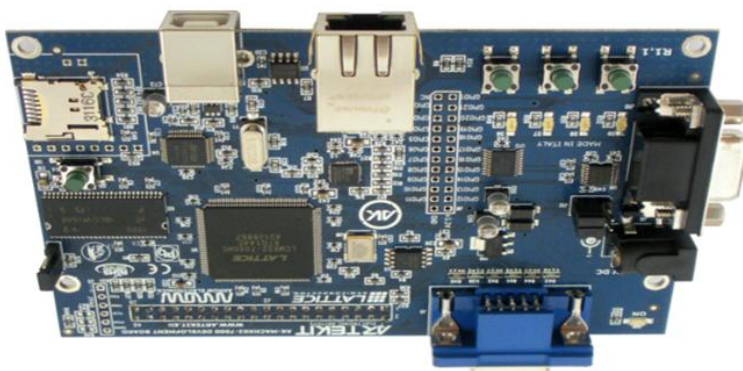
Using the push buttons K1, K2 and K3 you can navigate into power features, debug facility, video output, Ethernet and memory capabilities.

This is the initial screen:



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ARTEKIT
DEMO



www.artekit.eu

www.arroweurope.com

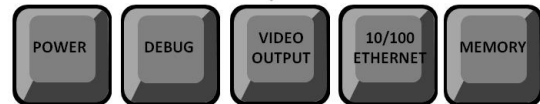
10 second "LEFT" + "SELECT" + "RIGHT" to continue

To start the presentation push K1+K2+K3 (LEFT-SELECT-RIGHT) for 10 seconds and then you can navigate into the features using the push buttons.



Board can be powered externally by 5V external power supply through connector.

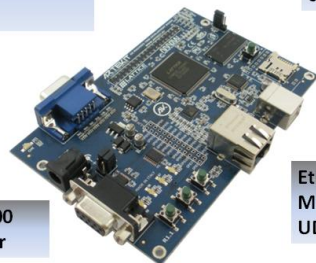
Board is powered by USB also through USB connector



No MAC ethernet available from Lattice; available from SanitasEG

Standard RJ magnetics and connector

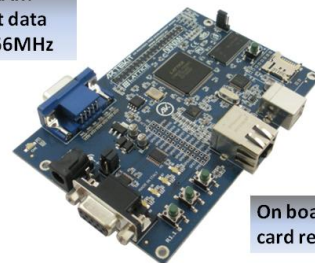
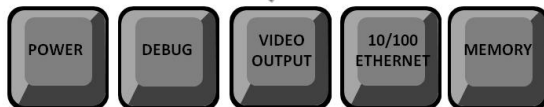
32 Mbit on board SPI Flash



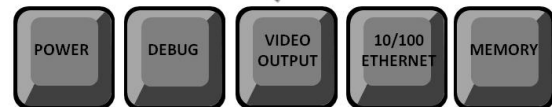
On board SDRAM 64Mbit; 16 bit data path, up to 166MHz

Micron 10/100 phy controller

Ethernet UDP/IP MAC available: UDP/IP modem



On board miniSD card reader

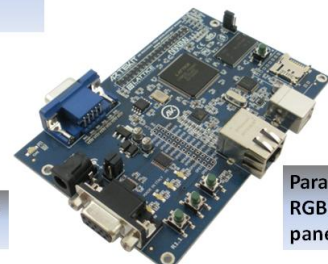


R2R VGA OUTPUT (3 bit per color) for debug purpose.

VGA 800x600 demo available

Debug facility are added to ARTEKIT board using 4 LED and 3 push-button

FTDI USB UART & MICO32 JTAG UART



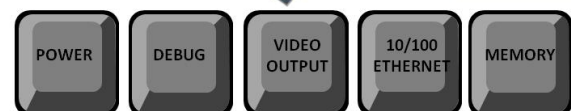
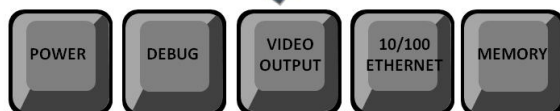
TFT module available

Parallel LVCMOS RGB output for panel control

GPIO connectors

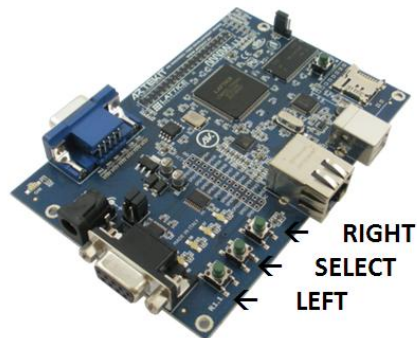
On-board FTDI allow JTAG program and debug using standard Lattice tools: Programmer, reveal and ORCASTR

Standars RS232 UART connector

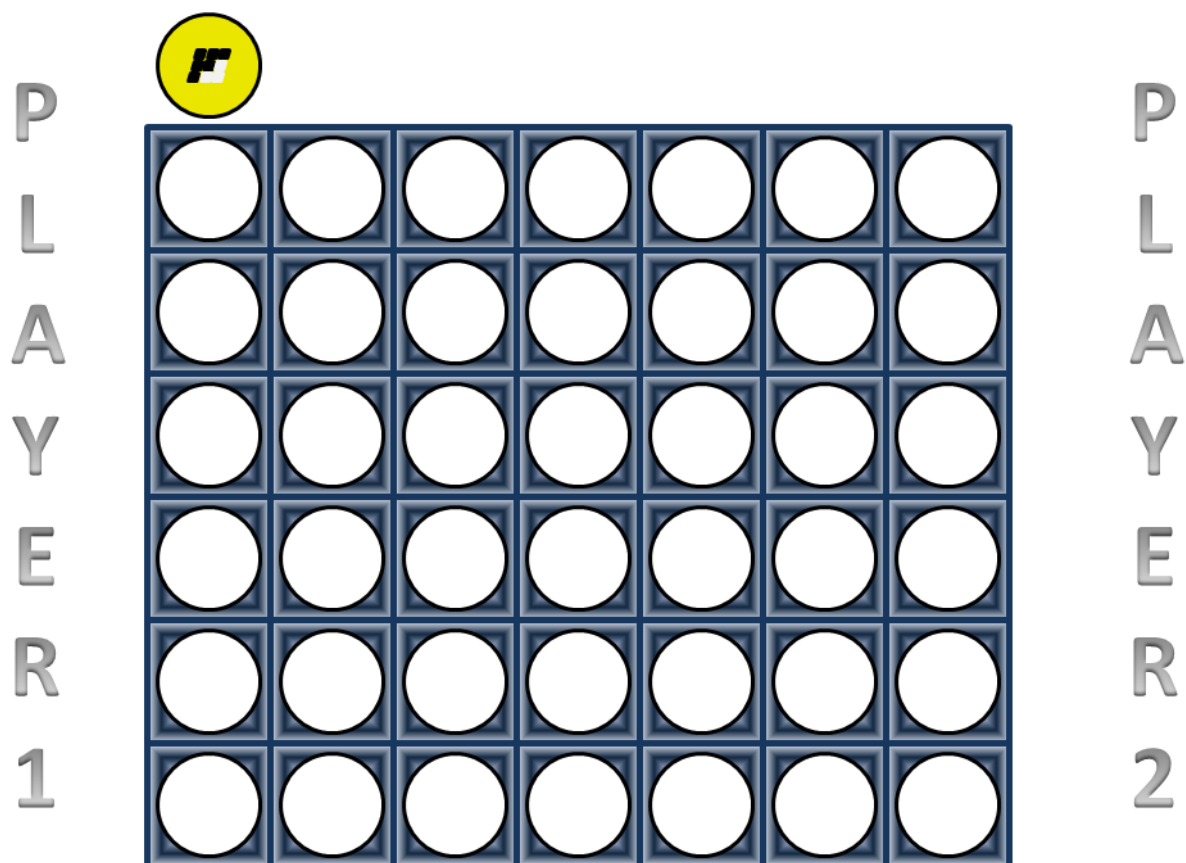


Forza 4 game

The demo similar to the well known "connect4" game: http://en.wikipedia.org/wiki/Connect_Four
This is the initial screen:



Using the LEFT and RIGHT push buttons you can select Player vs. CPU or Player vs. Player game. And by pushing SELECT the game starts.



Use LEFT and RIGHT to move. Use SELECT to put the token in.



Demo contents

Both demo share the same database. Inside the database there is still some development data that is not relevant for the final release.

The database is based on Diamond version 2.2.

Database contents

/ tftsurfer_demo_v003_..._OSC_DELL_CLKOP	Contains the diamond database
/ mico32_ver0	Contains all Eclipse MICO32 MSB Platform database
/ mico32_ver0/platform	Contains the eclipse MSB Platform database
/ mico32_ver0/software	Contains the eclipse slide show SW database
/ mico32_ver0/connect4_ver0	Contains the eclipse connect four SW database
/Workspace	Eclipse workspace

It is possible to place database everywhere on the disk and import projects into Diamond and eclipse. Better to place the database in C:\work\project\artekit\.

Project description

The demo shows:

- [1] The ability of the MICO32 to run/debug executable application into internal RAM (EBR).
- [2] LCD controller reference design feature.
- [3] the ability to debug using Eclipse features.

Slide Show Demo usage

Step 1: program the SPI Flash with image

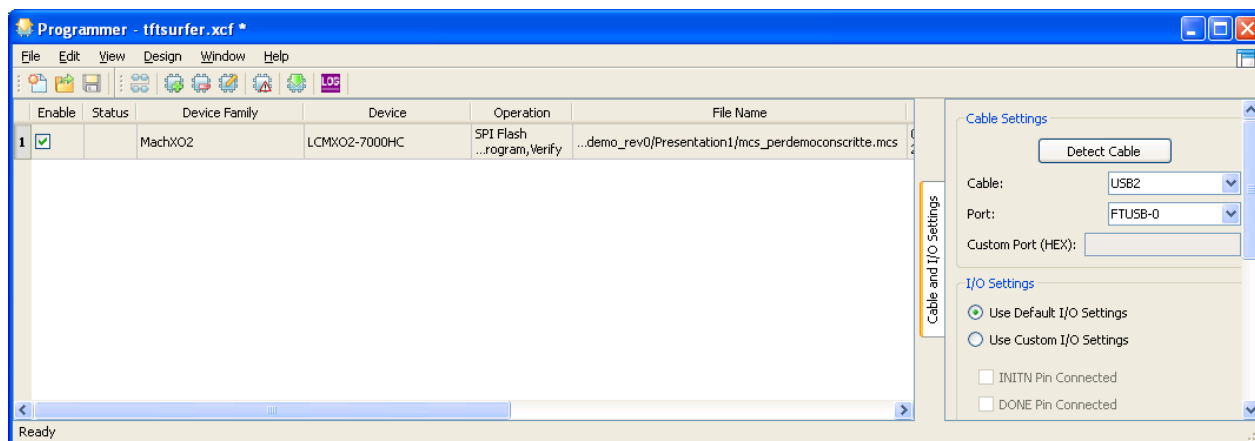
Using Diamond programmer, program the external SPI Flash with pre generated image:

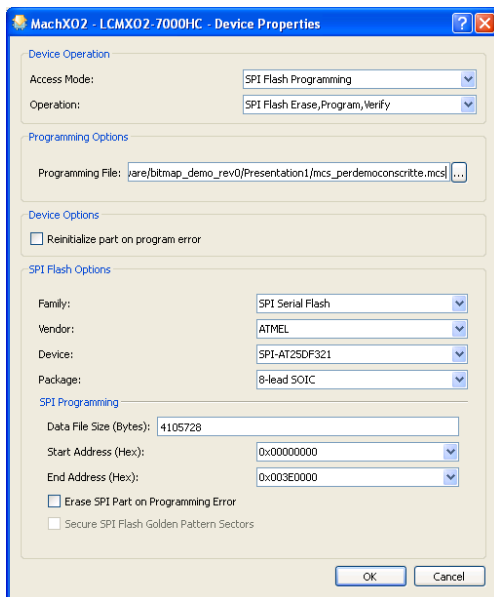
C:\work\project\artekit\demosFILE\slide show\ mcs_perdemoconscriitte.mcs

(the same as:

C:\work\project\artekit\mico32_ver0\software\bitmap_demo_rev0\Presentation1\mcs_perdemoconscriitte.mcs)

The following figures show how to configure Diamond Programmer. Remember to connect the USB cable.



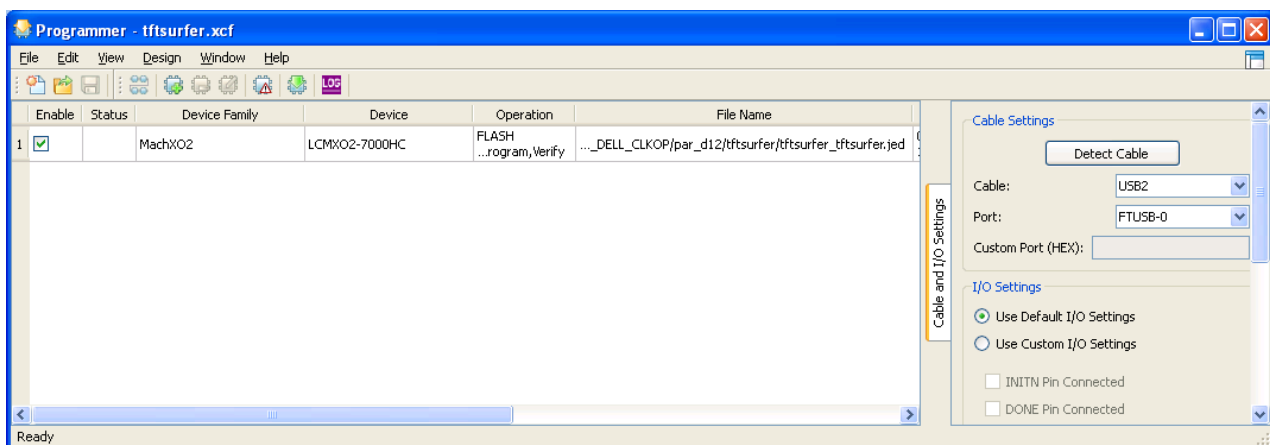


Press 'program' and in about 11 seconds the flash is programmed through JTAG.

Step 1.1: programming the FPGA

Using Diamond Programmer, program the FPGA with:

C:\work\project\artekit\tftsurfer_demo_v003_versione_EAS_TFTSURFER_demo_OSC_DELL_CLKOP\par_d12\tftsurfer\tftsurfer_tftsurfer.jed
(same as: C:\work\project\artekit\demosFILE\tftsurfer_tftsurfer.jed)



And press 'program'.

The Board is now configured with FPGA internal MICO32 Platform, including executable SW into EBR and on the external flash there are the bmp to be composed and displayed.

Step 2 run the demo

As the first image is displayed, press K1-K2-K3 for 10 seconds to run the demo.

Forza 4 demo usage

Step 1: program the SPI Flash with image

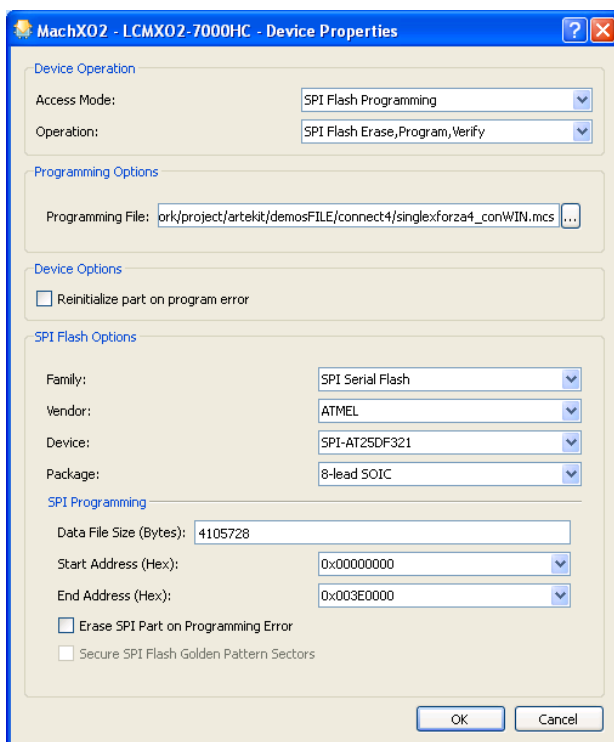
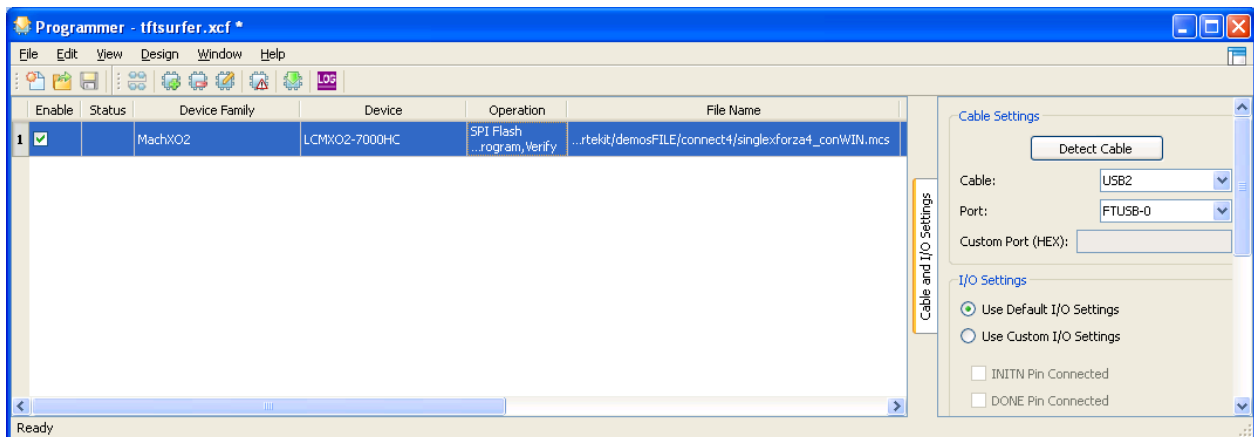
Using the Diamond programmer, program the external SPI Flash with pre generated image:

C:\work\project\artekit\demosFILE\connect4\singlexforza4_conWIN.mcs (same as :

C:\work\project\artekit\mico32_ver0\connect4_ver0\singlexforza4_conWIN.mcs)

The following figures show how to configure the Diamond Programmer.

Remember to connect the USB cable.



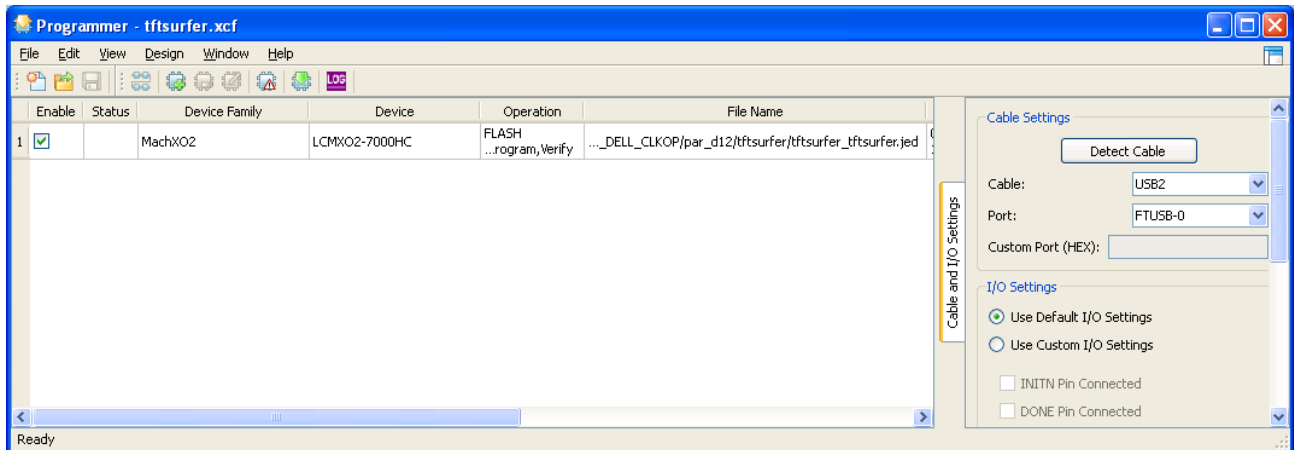
Press 'program' and in about 11 seconds the flash is programmed through JTAG.

Step 1.1: programming the FPGA

Using Diamond Programmer, program now the FPGA with

C:\work\project\artekit\tftsurfer_demo_v003_versione_EAS_TFTSURFER_demo_OSC_DELL_CLKOP\par_d12\tftsurfer\tftsurfer_tftsurfer.jed

(same as: C:\work\project\artekit\demosFILE\tftsurfer_tftsurfer.jed)



And press 'program'.

The board is now configured with the internal MICO32 Platform, including executable SW into EBR and on the external flash there are the bmp to be composed and displayed.

Step 2 run the demo

As the first image is displayed, press LEFT or RIGHT to select the game and SELECT to start.