

Introduction

The Digilent MemUtil application is used to read and write data to and from the Digilent Mem1 module and memory onboard the Nexys and Spartan 3 boards.

MemUtil allows for:

- writing data to Flash from files
- reading data from Flash to file
- erasing data from the Flash
- writing data to RAM from file
- reading data from RAM to file.

Definitions

MEM1 C0	128Kb SRAM, 512Kb Flash
MEM1 C1	512Kb SRAM, 512Kb Flash
MEM1 C2	1Mb SRAM, no Flash
MEM1 C3	1Mb Flash, no SRAM
Nexys 4Mb	4Mb Flash, 16Mb Cell RAM
Nexys 16Mb	16Mb Flash, 16Mb Cell RAM

D2SB	XC2S200E system board
D2FT 300	XC2S300E system board
D2FT 400	XC2S400E system board
Pegasus1	XC2S50 system board
Pegasus2	XC2S200 system board
S3 200	XC3S200 system board
S3 400	XCS3400 system board

USB2	USB Communications Mod
Net1	Ethernet Communications Mod
SIO2	Serial Communications Mod

Setup

Installing Adept Suite

Digilent Adept Suite must be installed before MemUtil can be used. The Adept Suite is available on Digilent's website.

Nexys Onboard memory

Nexy boards have two sets of onboard memory: 16MB Cellular RAM and 4MB or 16MB StrataFlash. Nexys onboard memory can only be written to in 16-bit increments. Thus, all data must be sent in even amounts to even addresses; MemUtil cannot load or store files with an odd number of bytes. The Nexys BIST/Demo contains the logic needed by MemUtil to access both onboard memories.

Board Setup (Memory Modules)

Placement of the communication module and Mem1 module(s) depends on the logic loaded into the FPGA. Configuration files (.bit) to control the reading and writing of memory in the FPGA are provided.

The Communications module (for example the USB2 module) is always placed on the A1 expansion connector on the system board. All memory modules are connected to the A2 expansion connector on the system board. If two MEM1 C1 modules are used simultaneously, then the placement of the second Mem1 C1 module varies depending on the device. Based on the logic loaded in the FPGA, the following table illustrates where memory modules are placed.

	D2FT	D2SB	Peg	S3
Mem1 C1	A2	A2	A2	A2
Mem1 C1X2	A2, B1	A2, C1	A2, B1	A2, B1
Mem1 C2	A2	A2	A2	A2
Mem1 C3	A2	A2	A2	A2

Configure FPGA

Logic to control memory reading and writing must be loaded into the gate array on the system board before MemUtil can be used.

After connecting the modules to the proper expansion ports, power up the module and configure the FPGA with the .bit file that corresponds to the module in use. To locate the .bit file, first open the directory for the specific memory module. Within that directory there are specific directories for each Diligent board. Select the directory that corresponds to the board being used.

Using MemUtil

Once the system board FPGA has been configured with the proper .bit file, MemUtil can be used.

User Interface

All numeric values can be entered into MemUtil as binary, decimal, or hexadecimal. For example, a decimal byte is written as 170, a hexadecimal byte as 0xaa, and a binary byte is written as 10101010.

Selecting a Connection

Click the “Properties” tab in MemUtil. In this tab a communications module can be selected from the device table. Click the “Configure” button and the Communication Modules dialog box will appear. Then the device table can be manipulated. For more information about the device table, see the *Diligent Adept Users Manual*.

Selecting the Mem1 Configuration

The memory configuration must be selected in MemUtil before performing any read/write operations. This setting is under the “Properties” tab in the “Memory Configuration” box.

Setting a Starting Register Address

Different reference designs may need starting register address to be changed from the default address of 0. This setting can be altered under the “Properties” tab in the “Starting Register Address” box. The address must be within the range of 0 and 255 and must be a multiple of 8.

Loading Data to RAM From File

Click the “Load RAM” tab. Enter the path and name of the file to load into RAM in the “File Name” text box. The path and file name can be retrieved using a windows dialog box by clicking the “Browse” button. Enter the offset from the beginning of the file (in bytes) in the “File Start Location” text box. Data will begin loading into RAM from this offset location in the file.

In the “Start Address” text box, enter the starting address in RAM to which the data is to be written. The first address in the RAM is 0x00. In the “Length” text box, enter the number of bytes to be loaded into RAM. A file can be completely loaded or partially loaded into RAM. To verify that the data has been loaded properly, check the “Verify after load” box. Finally, to load the RAM, click the “Load” button.

If MemUtil tries to write to an address higher than the maximum address in the RAM, the logic in the gate array will load the rest of the data from the beginning address in the RAM.

Store Data from RAM to File

Click the “Store RAM” tab. Enter the path and name of the file to store data from RAM in the “File Name” text box. The path and file name can be retrieved using a windows dialog box by clicking the “Browse” button.

Choose a method of writing the data to the file. If the file exists, it can be appended, replaced completely, or overwritten from a specified location. In the “Start Address” text box, enter

the starting address in the RAM from which data is to be read. In the “Length” text box, enter the number of bytes to store from the RAM. Finally, to store the RAM, click the “Load” button.

Loading Data to Flash From File

Click the “Load Flash” tab. Enter the path and name of the file to load into Flash in the “File Name” text box. Click the “Browse” button to retrieve the path and file name from the Windows dialog box.

Enter the offset from the beginning of the file (in bytes) in the “File Start Location” text box. Data will start loading into Flash from this offset location in the file.

In the “Start Address” text box, enter the starting address in Flash to which the data is to be written. The first address in the Flash is 0x00.

In the “Length” text box, enter the number of bytes to be loaded into Flash. A file can be completely loaded or partially loaded into Flash. To verify that the data has been loaded properly, check the “Verify after load” box. Finally, to load the Flash, click the “Load” button.

It is very important that the Flash be erased before it is programmed. To avoid damage to the memory it is advised that the “Auto erase before programming” box remain checked.

If an address higher than the maximum address in the Flash is to be loaded, MemUtil will post an error and not load any data.

Store Data From Flash to File

To store data from Flash, click the “Store Flash” tab. In the “File Name” text box, enter the path and name of the Flash file. Click the “Browse” button to retrieve the path and file name from the Windows dialog box. Choose a method of writing the data to the file. If the file exists, it can be appended, replaced

completely, or overwritten from a specified location. In the “Start Address” text box, enter the starting address in Flash where the data is to be read. In the “Length” text box, enter the number of bytes to store from Flash. To store the Flash, click the “Load” button.

Erase Flash

To erase only certain blocks in the Flash, check the blocks to be erased and click the “Erase Selected” button. To erase all of the blocks in the Flash, click the “Erase All” button.