CPUGEN TUTORIAL V1.00

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Getting start

1) Decompress cpugen.zip inside a working directory (ex. C:\cpugen)

2) Add the working directory into the windows PATH

Cpu4Bit

Goal:

- compare 4 digital input with 4 fixed thresolds and move a PWM output consequently

CPU 4 bit => Data Bus Length Word = 4
If I use a 8 bit Istruction Words Length (the minimum length), I have a 16 word (8 – 4) istruction page size (too small), so I need a 10 bit Istruction Words Length => 64 word istruction page size. The source code (Asm) isn't too long so 256 rom words (8) are enough. Istruction Address bus = 8 => 4 pages of 64 words each.
I have 16 nibble of RAM, a control register and a PWM peripheral.

Altera Design:

Start cpu4bit.quartus in cpu4bit\Altera directory.

EAB (Embedded Array Blocks) are used for ram (ram.mif) and rom (rom.mif).
In Assignments\Device I choice the ACEX1K device and Auto Selected.

Cpu8Bit

cpugen

Run

Goal:

CPU 8 bit => Data Bus Length Word = 8
I use a 14 bit Istruction Words Length, so I have a 10 bit (14 – 4) istruction/data addressing capability => 1K words of

I need interrupt and indirect addressing support.
I set a 8 deep stack (see Help/CpuCore: How to set stack deep)

Code structure:

1)

1) Simulate it with Quartus Waveform simulator:

Cpu16Bit

Altera Design:

Start cpu16bit.quartus in cpu16bit\Altera directory.

EAB (Embedded Array Blocks) are used for ram (ram.mif) and rom (rom.mif).

[illegible]

Design flow

Steps for a new design:

1) Define what processor have to do
2) Decide a first cpu architecture
3) Set the cpu parameters
4)

Bibliography: