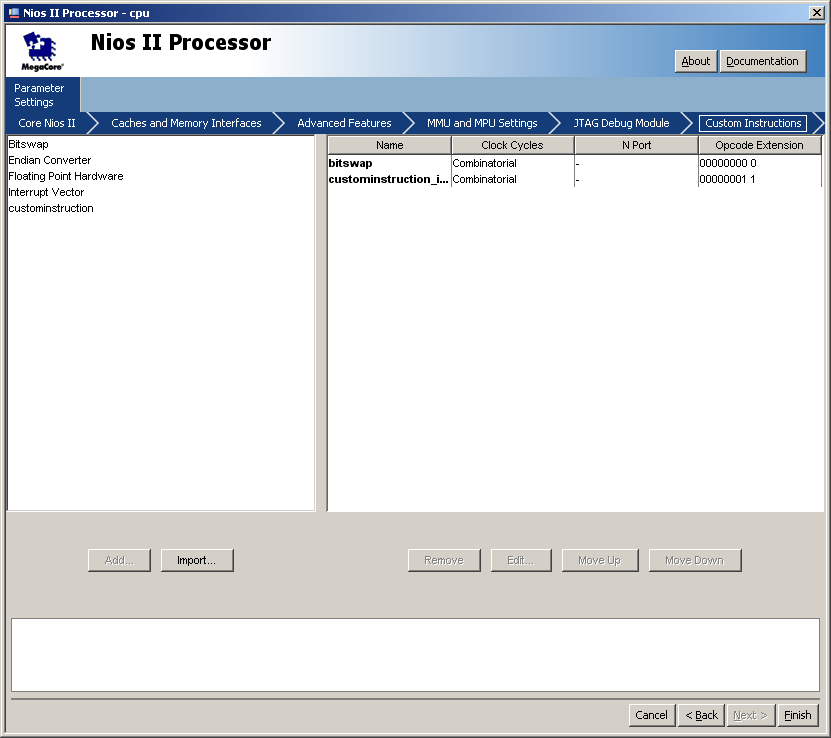
Paul Kafka

11/20/13

Embedded System Design

**Homework 8 – Custom Instruction BITSWAP**

# Snapshot of SOPC CI



# C Code

#include <stdio.h>

#include <string.h>

#include <time.h>

#include <system.h>

#define switches (volatile char \*) 0x01901050

#define leds (char \*) 0x01901060

*/\*\* look up the SW and LED base address from SOPC builder \*\*\*/*

void wait ( int s ) */\* Custom wait since usleep() not available\*/*

{

int u,v,sum=0;

for (u=1;u<100000;u++)

for (v=1;v<s;v++)

sum+=v;

}

int SW\_BITSWAP(int a) {

int lsb, k, r=0;

int t=a;

for (k=0; k<8; k++) {

lsb = t & 1;

r = r\*2 + lsb;

t >>= 1;

}

return(r);

}

int main( void )

{

int a=0;

int b=0;

int a\_swap=0;

int i;

printf("This Homework 8 by Paul Kafka\n");

int start\_time, finish\_time, total\_time, speed\_up, c\_time;

*//*

*//while (1) { /\* run forever \*/*

*// a = \*switches;*

*//*

*// a\_swap = SW\_BITSWAP(a);*

*//*

*// //a\_swap = ALT\_CI\_CUSTOMINSTRUCTION\_INST(a,b);*

*// //a\_swap = ALT\_CI\_BITSWAP(a);*

*// // a\_swap >>=24;*

*// \*leds = a\_swap;*

*//}*

*//-------------------------------SW\_BITSWAP----------------------------------*

start\_time = alt\_nticks();

for (i=0; i<1000000; i++) {

a = \*switches;

a\_swap = SW\_BITSWAP(a);

\*leds = a\_swap;

}

finish\_time = alt\_nticks();

total\_time = ((finish\_time - start\_time)\*1000) / alt\_ticks\_per\_second();

c\_time = total\_time;

printf("SW\_BITSWAP Time Used=%d ms\n", total\_time);

*//------------------------------ALT\_CI\_CUSTOMINSTRUCTION\_INST----------------*

start\_time = alt\_nticks();

for (i=0; i<1000000; i++) {

a = \*switches;

a\_swap = ALT\_CI\_CUSTOMINSTRUCTION\_INST(a,b);

a\_swap >>=24;

\*leds = a\_swap;

}

finish\_time = alt\_nticks();

total\_time = ((finish\_time - start\_time)\*1000) / alt\_ticks\_per\_second();

speed\_up = c\_time / total\_time;

printf("ALT\_CI\_CUSTOMINSTRUCTION\_INST Time Used=%d ms\n", total\_time);

printf("ALT\_CI\_CUSTOMINSTRUCTION\_INST Speed Up=%d ms\n", speed\_up);

*//-----------------------------ALT\_CI\_BITSWAP------------------------------*

start\_time = alt\_nticks();

for (i=0; i<1000000; i++) {

a = \*switches;

a\_swap = ALT\_CI\_BITSWAP(a);

a\_swap >>=24;

\*leds = a\_swap;

}

finish\_time = alt\_nticks();

total\_time = ((finish\_time - start\_time)\*1000) / alt\_ticks\_per\_second();

speed\_up = c\_time / total\_time;

printf("ALT\_CI\_BITSWAP Time Used=%d ms\n", total\_time);

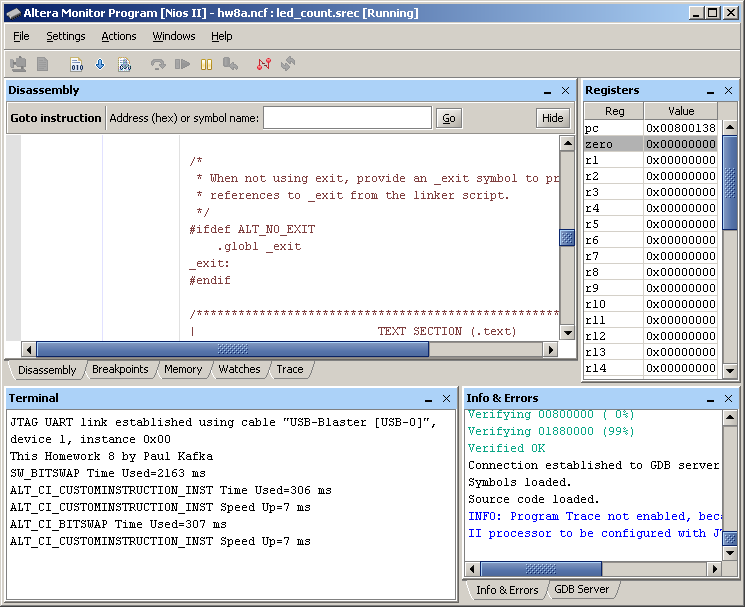
printf("ALT\_CI\_CUSTOMINSTRUCTION\_INST Speed Up=%d ms\n", speed\_up);

*//--------------------------------------------------------------------------*

return 0;

}

# Measurements (Terminal Output)



# Camera Images

