INTEGRATED CIRCUITS

DATA SHEET

16 Bits ALU

PRODUCT SPECIFICATION

2001 Nov 23

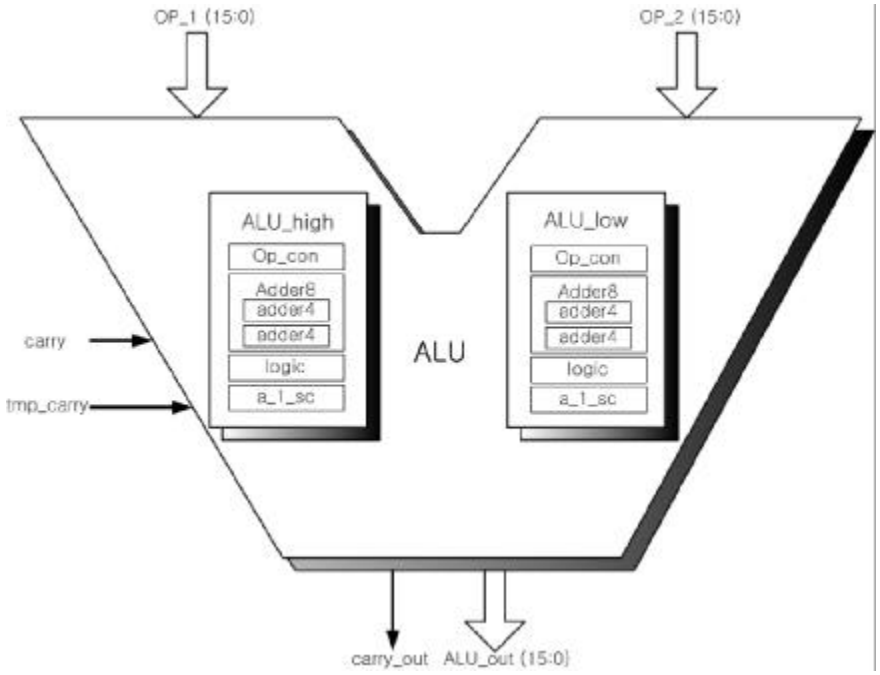
ALU

Data operations in the XA core are accomplished with a 16-bit ALU, providing both 8-bit and 16-bit functions. Special circuitry has been included to allow some 32-bit functions, such as shifts, multiply, and divide.

OPERATION CODE

Arithmetic Function	ALU Code	Operation
ADD	0000	op1 + op2
ADDC	0001	op1 + op2 + Carry
ADD with tmp_carry	0011	op1 + op2 + tmp_carry
SUBB	0100	op1 - op2 - Carry
SUB	0110	op1 - op2
Logical Function		
AND	1000	op1 AND op2
OR	1001	op1 OR op2
XOR	1010	op1 XOR op2
NOT	1011	NOT op1
MOV	1100	op2
MOV	1101	op1

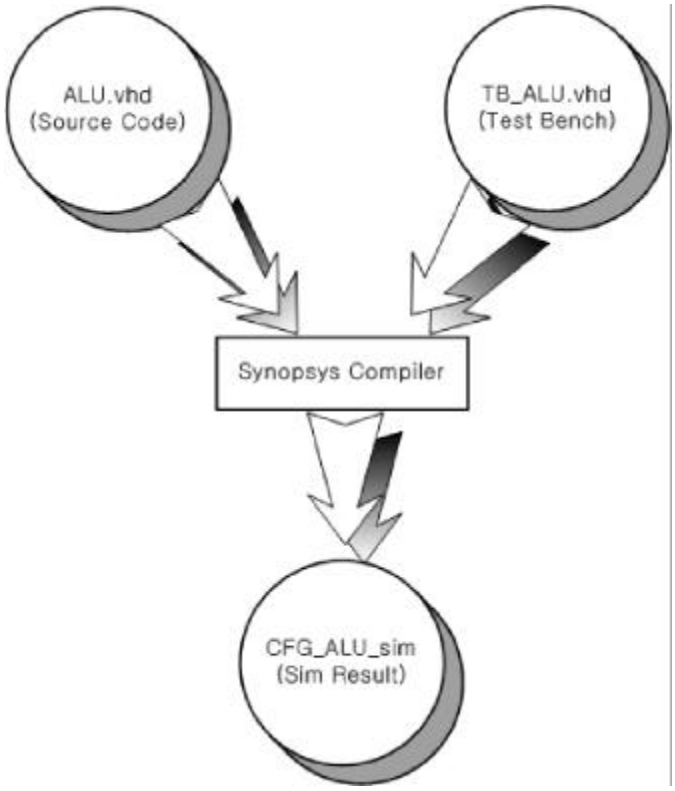
ALU BLOCK DIAGRAM



Pin Description

Pin Name	Type	Description
op1	Input	ALU Input opcode1 data bus
op2	Input	ALU Input opcode2 data bus
alu_code	Input	ALU operation code data pin
carry	Input	external carry pin
tmp_carry	Input	external temporary carry pin
sz	Input	signal zero pin
mul_or_div	Input	multuplex or divide instruction pin
mul_byte_word	Input	multiplex byte or word indicated pin
div_byte_word	Input	divide byte or word indicated pin
negate	Input	negative value indicated pin
now_decode	Input	current instruction decode bus
a2_pcl_add	Input	program addition pin
a3_pcl_add	Input	program addition pin
a7_pcl_add	Input	program addition pin
alu_out	Output	ALU result output bus pin
flag_af	Output	affect in FLAG register
flag_ov	Output	overflow in FLAG register
flag_cf	Output	carry in FLAG register

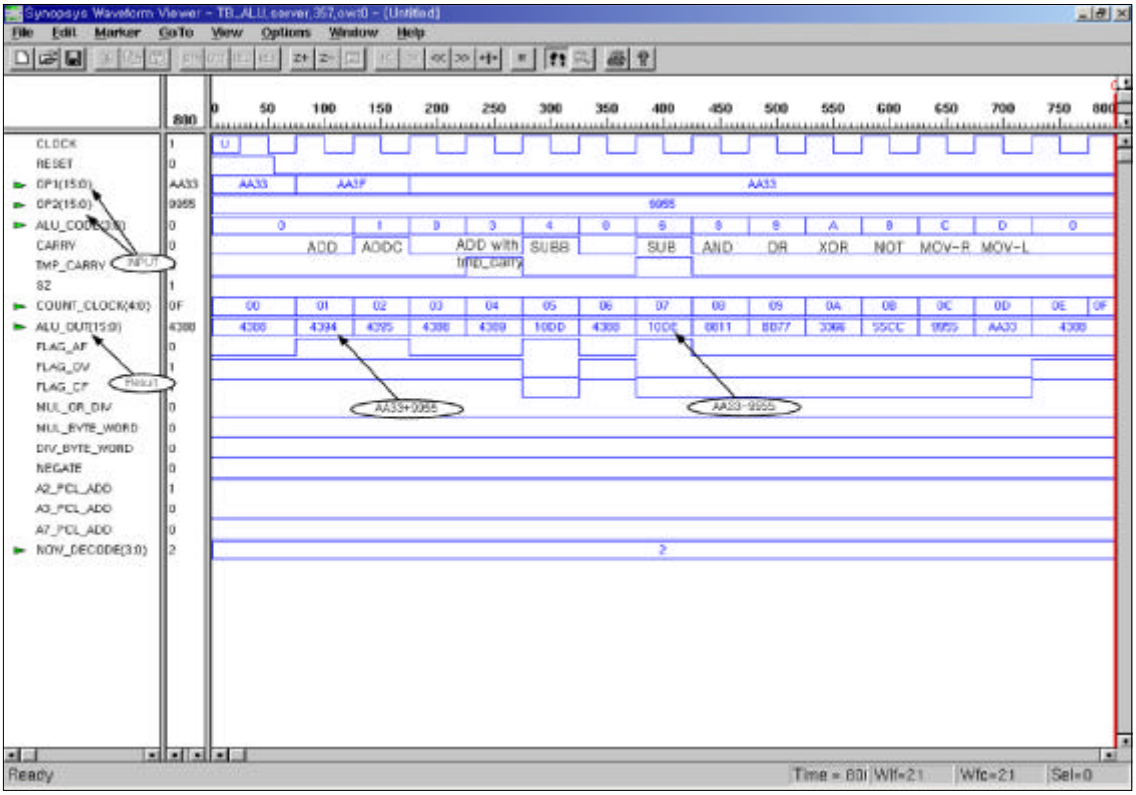
Prototype method



alu.vhd and tb_alu.vhd compile to verified simulation result file (cfg_alu_sim).

※ Compiler Tool : Synopsys Compiler

Result Simulation



ALU operation Result simulation wave