# IMPLEMENTATION OF AREA AND SPEED EFFICIENT ALU USING 32-BIT MODIFIED BOOTH MULTIPLIER

In this digital world, technology depends on the operations of A.L.U to decide the system performance. The need for an Arithmetic Logic Unit (ALU) is as important as the computer, simply because ALU forms the fundamental part of any Central Processing Unit (CPU). And so the encryption of an ALU is highly mandatory for the safety of the device as there are hardly any device without an ALU. This paper deals with the design of an single-bit ALU using a hardware description language, HDL that is structurally modelled The results are verified and synthesized through EDA playground. Arithmetic and Logic Unit (ALU) is the most crucial and core component of central processing unit as well as of number of embedded systems and microprocessors.

ALU consists of many computational units like adders, multipliers, logical units etc. Modified booth multiplier concept is proposed here for designing the computational units of an 32-bit ALU. Here, a high-speed 32×32-bit multiplier is proposed which is based on the modified booth multiplier mechanism. The proposed modified booth multiplier based ALU is designed using high level hardware description language Verilog, followed by synthetization using EDA playground.

**Steps required for modified booth multiplier multiplication:**

- Take the multiplier(binary)and multiplicand.
- Consider multiplier, Insert 0 on the right side of LSB of multiplier.
- Start grouping each 2bits from x-1.(overlapping).
- Generate partial product from truth table.
- Multiply with radix 2 exponents from right to left(in matrix form).
- Multiply with radix 4 exponents from right to left(in matrix form).

- Multiply the result with multiplicand.

| Q0 | Q1 | PP |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | +1 |
| 1 | 0 | -1 |
| 1 | 1 | 0 |

## Outcomes of these project

Designing of modified booth multiplier reduces the no. of partial products required So it reduces area and power consumption required.

Applications:

- Electronic system in cars
- Digital electronics control VCRs
- Transaction processing system, ATM
- Personal computers and Workstations