Building An ALU

Arithmetic and Logic Unit
Components

- AND Gate
- OR Gate
- NOT Gate
- Adder
- Multiplexor
One-bit ALU
One-bit ALU

Diagram showing the components of a one-bit ALU, including inputs 'a' and 'b', b Invert, Carry In, MUX, Carry Out, and outputs Out and Carry Out.
32-bit ALU
One-bit ALU -- ARMv8

Control 11: pass through b used for cbz, cbnz
One-bit ALU -- ARMv8 High Bit

Carry In  aInv  Control

bNeg  Select Out

MUX

Out

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX

MUX
64-bit ALU -- ARMv8

Carry In

Control

Zero

Overflow

Result