

## Logic Definitions (A)

### *Fan-in:*

The maximum number of inputs which a gate can have in a particular logic family. For instance, in theory you could design **CMOS NAND** or **NOR** gates with a very large number of inputs. But in practice, the additive "on" resistance of the series transistors required to do so limits the **fan-in** for **CMOS** gates, typically four inputs for **CMOS NOR** gates and **six** inputs for **CMOS NAND** gates.

### *Fan-out:*

The maximum number and types of inputs which may be connected to a devices output. **If too many inputs are connected to an output, the DC noise margins may be inadequate.**

### *Bubbles:*

Indicates the inversion operation and indicates an **Active-Low** signal. The absence of a bubble indicates an **Active-High** signal.

### *Asserted:*

When a 1 or a 0 is placed on an input, the signal is said to be **asserted high** or **asserted low**.

### *Noise Margin:*

Normally, you associate a range of voltages with each logic value. A typical gate isn't guaranteed to have a precise voltage level for a logic 0 or 1 output. Rather, it may produce a voltage somewhere in a range that is a subset of the range guaranteed to be recognized at those levels by other gate inputs. The difference between the range boundaries is called the **NOISE MARGIN**. **If the Noise Margin isn't enough, it may have corrupted outputs.**

### *Current Sinking:*

Current (conventional) is going **INTO** the output terminal.

### *Current Sourcing:*

Current (conventional) is going **OUT** of the output terminal.