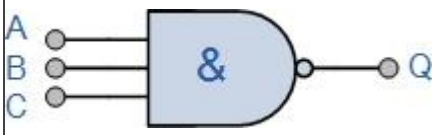
	1	1	0
Boolean Expression **Q = A.B**	Read as A **AND** B gives **NOT** Q		

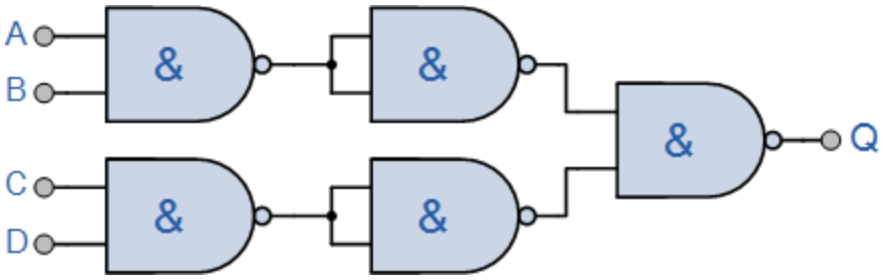
3-input Logic NAND Gate

Symbol	Truth Table			
	C	B	A	Q
	0	0	0	1
	0	0	1	1
	0	1	0	1
	0	1	1	1
	1	0	0	1
	1	0	1	1
	1	1	0	1
	1	1	1	0
 3-input NAND Gate				
Boolean Expression **Q = A.B.C**	Read as A **AND** B **AND** C gives **NOT** Q			

As with the AND function seen previously, the NAND function can also have any number of individual inputs and commercial

available NAND Gate IC's are available in standard 2, 3, or 4 input types. If additional inputs are required, then the standard NAND gates can be cascaded together to provide more inputs for example

A 4-input NAND Function



The Boolean Expression for this 4-input logic NAND gate will therefore be: **Q = A.B.C.D**

If the number of inputs required is an odd number of inputs any “unused” inputs can be held HIGH by connecting them directly to the power supply using suitable “Pull-up” resistors.

The **Logic NAND Gate** function is sometimes known as the **Sheffer Stroke Function** and is denoted by a vertical bar or upwards arrow operator, for example, A NAND B = A|B or A↑B.

The “Universal” NAND Gate

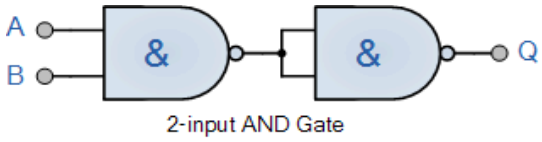
The **Logic NAND Gate** is generally classed as a “Universal” gate because it is one of the most commonly used logic gate

types. NAND gates can also be used to produce any other type of logic gate function, and in practice the NAND gate forms the basis of most practical logic circuits.

By connecting them together in various combinations the three basic gate types of AND, OR and NOT function can be formed using

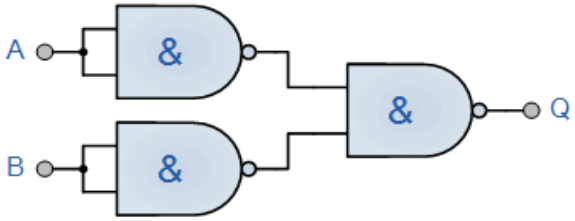
only NAND gates, for example.

Various Logic Gates using only NAND Gates



2-input AND Gate

NOT Gate



2-input OR Gate