Arithmetic Circuits

EXPERIMENTAL WORK

Design an arithmetic circuit that **multiplies** two bit numbers $a_1 a_0$ and $b_1 b_0$. You will need two **half adders** for the addition operations. Connect the circuit and check its operation.

$$
\begin{array}{c c c}
 & \mathbf{a_1} & \mathbf{a_0} \\
\mathbf{x} & \mathbf{b_1} & \mathbf{b_0} \\
\hline
 & \mathbf{a_1 b_0} & \mathbf{a_0 b_0} \\
\mathbf{a_1 b_1} & \mathbf{a_0 b_1} & \\
\hline
\mathbf{a_1 b_1} & \mathbf{a_1 b_0 + a_0 b_1} & \mathbf{a_0 b_0}
\end{array}
$$

Required Equipment: You can use any gate you want to design the circuit: **7408** AND, **7432** OR, **7404** NOT, **7400** NAND, **7402** NOR and **7486** XOR gates. Use switches for the inputs and LEDs for the outputs.

7486 Quad 2-input ExOR Gates

7400 Quad 2-input NAND Gates

7402 Quad 2-input NOR Gates

7404 Hex Inverter

7408 Quad 2 Input AND

7432 Quad 2 Input OR