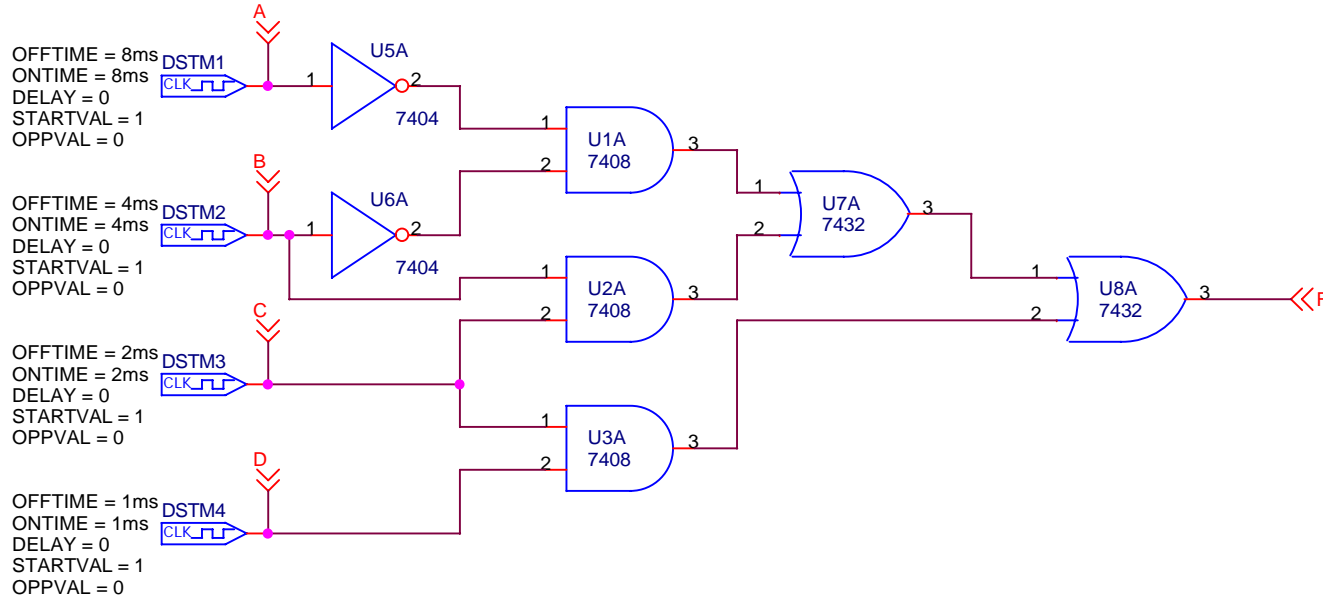


Combinational Logic Circuit

Purpose: Implement the function $f(A,B,C,D) = \text{Sum}(0-3, 6-7, 11, 14-15) = A'B' + BC + CD$ using AND, OR, and NOT gates.

Analysis: In order to display the output for all 16 combinations of inputs, a TRANSIENT analysis will be performed. Since D is the LSB and has an ONTIME and OFFTIME of 1ms, the transient analysis should be performed for at least $16(1\text{ms}) = 16\text{ms}$.



Notes:

- 1) The logic gates are found in the EVAL library.
- 2) Digital Clocks from the SOURCE library are used for the circuit inputs.
- 3) The frequency (or the ONTIME and OFFTIME) of the digital clocks is not important. The ONTIME and OFFTIME for D were chosen as 1ms, but could have just as easily been 1us or 5s.
- 4) OFFPAGE symbols (<<<C on the toolbar) were used to conveniently label the inputs A, B, C, D and the output F. These labels can then be used when graphing the results.
- 5) The binary value of the input has been displayed on the graph by using a BUS (group of signals). To do this, analyze the circuit and on the graph select TRACE - ADD then enter {A,B,C,D};COUNT;D where
 - {A,B,C,D} represents the signals in the binary value with the MSB listed first
 - COUNT could be any name that will appear on the graph
 - D means to show the count in decimal format
 - (use B for binary, O for octal, and H or X for hexadecimal)

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(A) Circuit Output: $F = \text{Sum}(0-3, 6-7, 11, 14-15)$

