

**COMP 3h00 Lab 3**  
**Multiplexers**  
**Print circuits and waveforms for all parts.**

Part A. Goal: Design and implement an 8-1 mux. A mux selects one of 8 1-bit values.

1) What inputs will you need for your mux? <make a table giving them names, and describing what they do. I want to know what “kinds” of inputs you have and how many of each. Hint: they come in two “sets”.>

2) Design a **function** table that will dictate the behavior of your mux.

3) Give an equation for “F” that describes the function of the mux.

4) Implement your circuit in MAX+PLUS II and test all possible inputs. Have your tests verified by the instructor.

Part B: Goal: Solve a complex function **using** a mux (use the one you just built – really you can! Hint Identify your two “types” of input).

1) Build a circuit to implement the Boolean function expressed by the following truth table:

A	B	C	D	F
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	1
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

2) Sketch out your design using a mux as a “black box”.

3) Implement your design in MAX+PLUS II and test all inputs. Show results of inputs 0000 and 1101 to instructor.

Part C: Goal: Building bigger building blocks out of smaller ones.

1) Construct a 15-1 line mux using two 8-1 muxes. Interconnect the 2 muxes and label the inputs such that any added logic required to have selection of codes 0000 through 1110 is **minimized**. Sketch a design of your circuit here using your muxes as “black boxes”.

2. Implement your design in MAX+PLUS II, test.