

# ECE 204L - COMBINATIONAL BUILDING BLOCKS - LAB 12 INTRODUCTION TO ACTIVE HIGH AND ACTIVE LOW

WINTER 2004

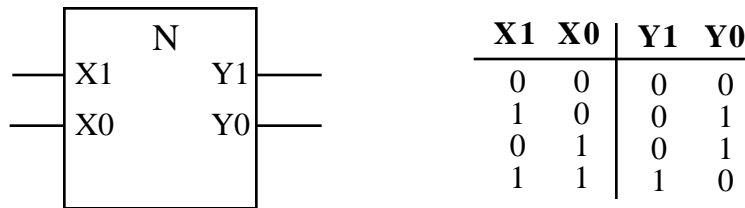
A.P. FELZER

## OBJECTIVE

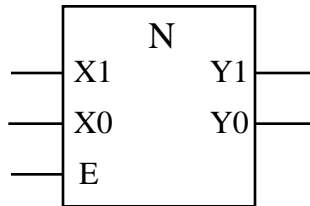
The objective of this lab is to introduce how to design and work with circuits with enables and inputs and outputs that are active-high and active-low.

## LAB

1. Given a circuit N with chip diagram and truth table as follows



- a. **Prelab** - Design N with AOI gates
- b. **Prelab** - Expand the truth table for N above to include an active-high enable E as follows. Be sure to always put E in the first column of your truth table



- c. **Prelab** - Redraw your circuit in part (b) with AND gates to implement the Enable
- d. Build and test your circuit in part (c).
- e. **Prelab** - Draw the chip diagram and truth table for N if the enable E is active-low. Use  $E_L$  for the active-low enable
- f. **Prelab** - Add an inverter to implement your circuit in part (e)
- g. Build and test your logic circuit in part (f).
- h. Describe in words how the behavior of your circuits in parts (d) and (g) are different
- i. **Prelab** - Draw the chip diagram and truth table for N above if both the enable and the output Y are active-low. Use  $Y0_L$  and  $Y1_L$  for the active-low outputs
- j. **Prelab** - Add inverters to implement your circuit in part (i)
- k. Build and test your circuit in part (j)
- l. Now make use of your circuit in part (k) with active low outputs to obtain a circuit for  $Z = Y0 + Y1$ . Explain how you dealt with the fact that  $Y0$  and  $Y1$  are active-low. Be sure to include a chip diagram of N with active-low enable and output