

# 1 Exercise 3

In this section, we will show how using the lower cost technology to implement a truth table, can result in some glitches and issues. For this exercise, we were asked to simplify the truth Table on Table 1.

A	B	C	O
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0

Table 1: Truth Table

When we express this in the form of the Karnaugh map, we've got the Figure 1. As we see there, if we do not take into account the yellow minterm, there are two separate subsets of ones that can represent the Table 1. However, as we know, because the two subsets have no element in common, representing this truth tables with just two minterms can cause glitches.

	ab			
	00	01	11	10
c				
0	0	1	0	0
1	1	1	0	1

Figure 1: Karnaugh's Map

By implementing this with NAND gates we've got the circuit shown on Figure 2.

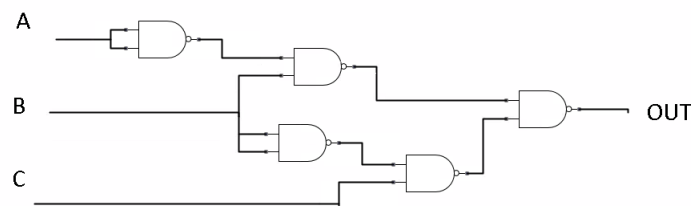


Figure 2: NAND Circuit Implementation

Finally, when we tried to test the circuit shown, we noticed some glitches of time less than 10 microseconds, these glitches are shown on Figure 3.

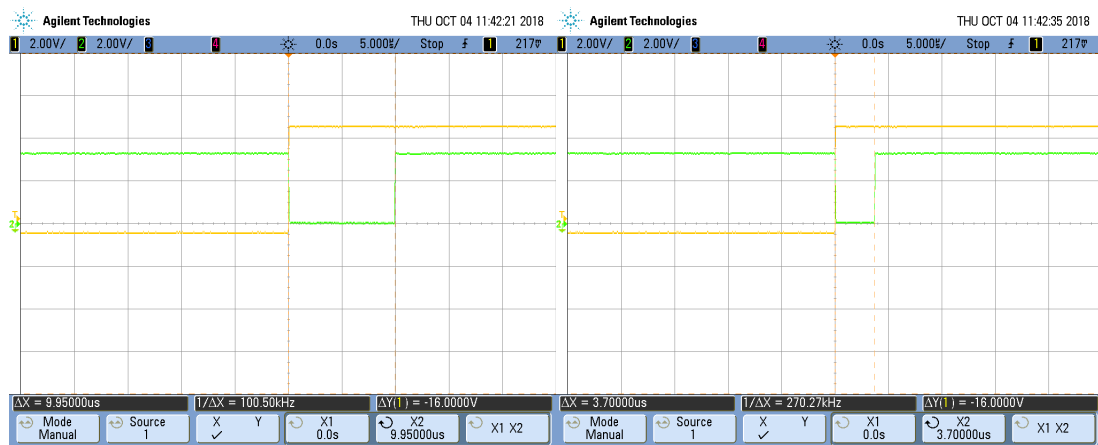


Figure 3: Glitches

This little negative peaks shouldn't be there since we were changing from one positive state, to another positive state in both cases. To resolve this, we only need to add a third minterm to the equation, and this would be the yellow minterm on Figure 1.