

ELECTRONICS II

Lecture No.(10)- Semester 2

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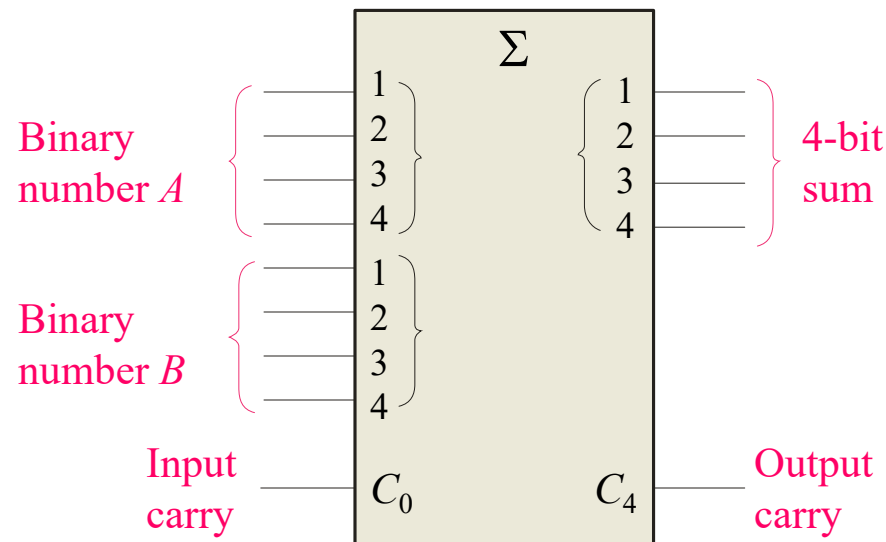
Al-Muthanna University

2018-2019

Summary

Parallel Adders

The logic symbol for a 4-bit parallel adder is shown. This 4-bit adder includes a carry in (labeled C_0) and a Carry out (labeled C_4).



The 74LS283 is an example. It features *look-ahead carry*, which adds logic to minimize the output carry delay. For the 74LS283, the maximum delay to the output carry is 17 ns.

Summary

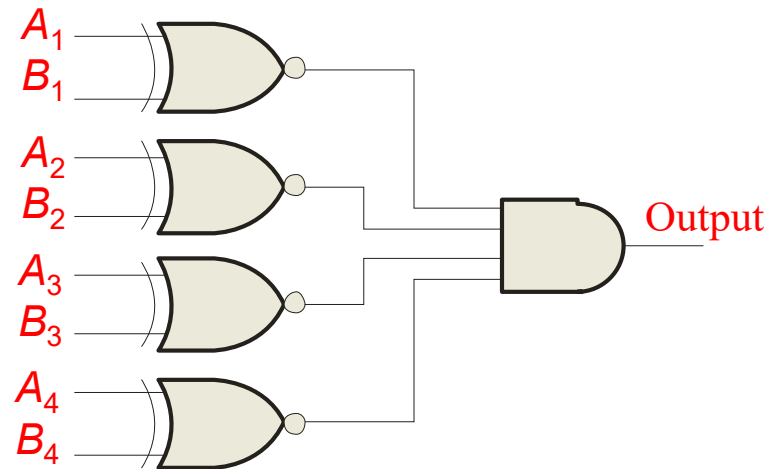
Comparators

The function of a comparator is to compare the magnitudes of two binary numbers to determine the relationship between them. In the simplest form, a comparator can test for equality using XNOR gates.

Example Solution

How could you test two 4-bit numbers for equality?

AND the outputs of four XNOR gates.





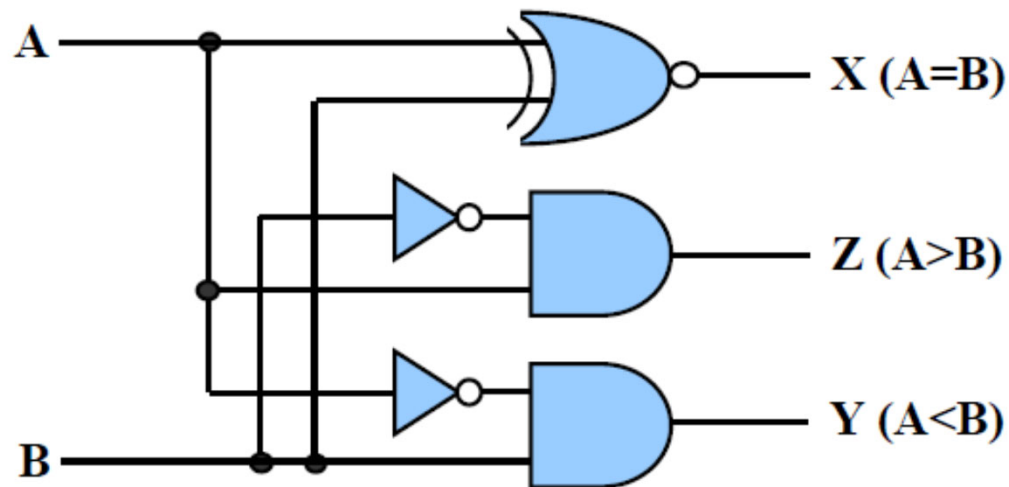
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الدخل		الخرج		
A	B	X A=B	Y A<B	Z A>B
0	0	1	0	0
0	1	0	1	0
1	0	0	0	1
1	1	1	0	0

$$X = \bar{A} \bar{B} + AB \Rightarrow (A = B)$$

$$Y = \bar{A} B \Rightarrow (A < B)$$

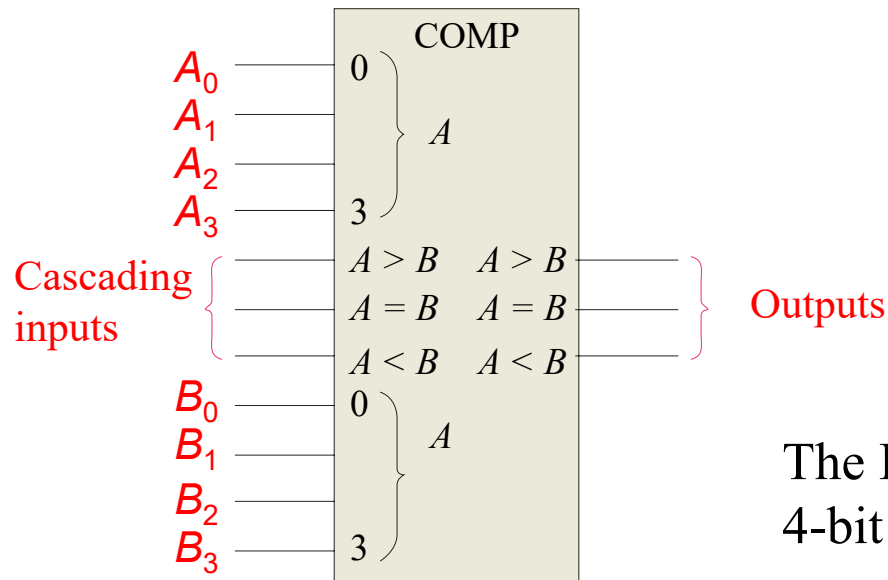
$$Z = A \bar{B} \Rightarrow (A > B)$$



Summary

Comparators

IC comparators provide outputs to indicate which of the numbers is larger or if they are equal. The bits are numbered starting at 0, rather than 1 as in the case of adders. Cascading inputs are provided to expand the comparator to larger numbers.

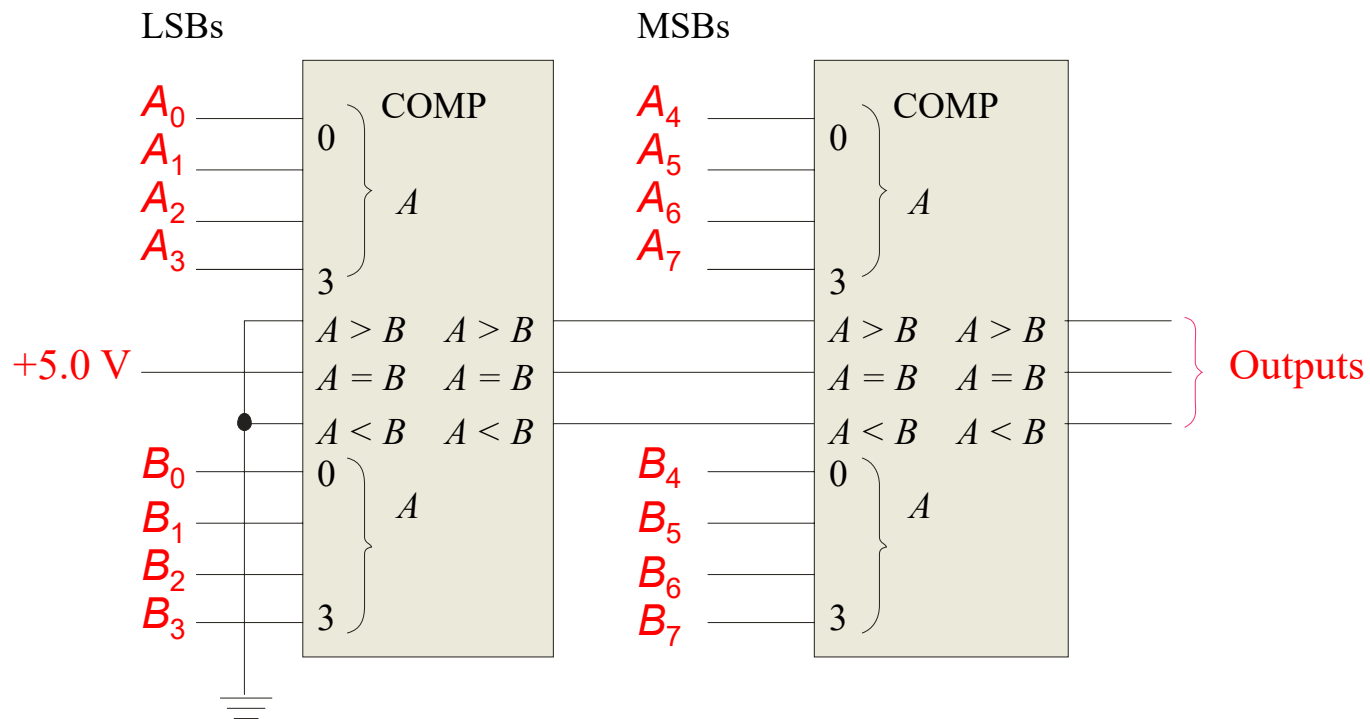


The IC shown is the 4-bit 74LS85.

Summary

Comparators

IC comparators can be expanded using the cascading inputs as shown. The lowest order comparator has a HIGH on the $A = B$ input.





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