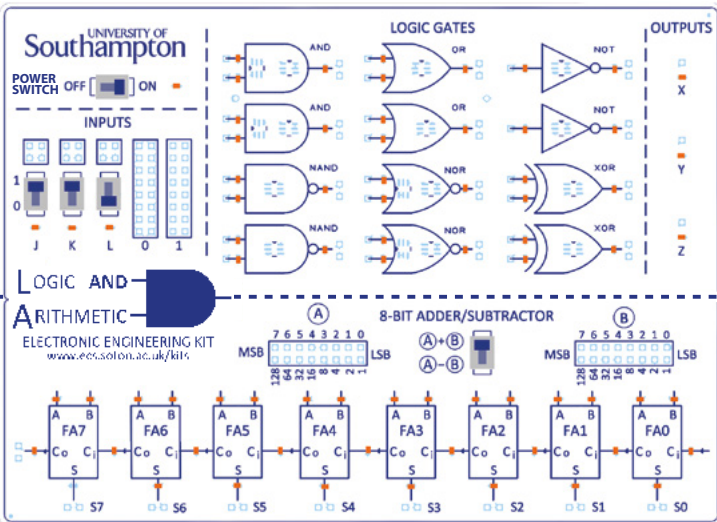


# **Logic and Arithmetic**

## **Student Guide**

**A-Level Computer Science  
Electronics Kit**

[www.ecs.soton.ac.uk/kits](http://www.ecs.soton.ac.uk/kits)



# LOGIC AND ARITHMETIC

ELECTRONIC ENGINEERING KIT

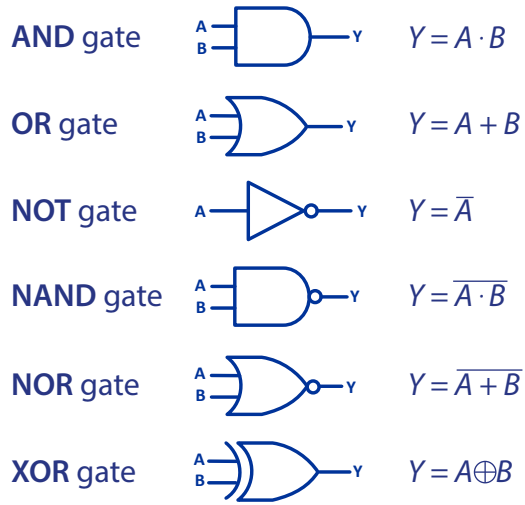
The Logic and Arithmetic kit allows exploration of Boolean operations, logic gates and base 2 (binary) number systems in the context of electronic engineering. It is split into two sections: 'Logic' and 'Binary Arithmetic', with Light Emitting Diodes (LEDs) used to indicate logic states throughout.

## Logic Section

- By connecting logic gates together, and connecting them to inputs and outputs, you can explore their properties and implement simple logic functions and circuits.
- Logic gates are the building blocks of digital electronics and computers. Did you know that modern CPUs contain hundreds of millions of logic gates, all squeezed into a few square centimetres?*

## Binary Arithmetic Section

- An 8-bit two's complement adder/subtractor circuit allows experimentation with both unsigned and signed Boolean arithmetic.
- Adding and subtracting signed numbers are just two of many functions that processors can perform. How would you design a circuit to multiply two binary numbers?*



Electronic Engineers apply Maths and Science to use components like these to design and build complex systems such as smart phones and computers. Exciting developments in Electronics mean we can develop innovative products and help transform the way we live; from healthcare and energy to entertainment.

## UKESF

In the UK, the Electronics sector is big, valuable and growing; however, the demand for capable, employable graduates is currently outstripping supply. The UKESF is an educational charity that operates collaboratively with major companies, leading universities and other organisations to tackle the skills shortage.

[www.ukesf.org](http://www.ukesf.org) | [info@ukesf.org](mailto:info@ukesf.org)  
f /UKESF | [@theUKESF](https://twitter.com/theUKESF)

## University of Southampton

The University of Southampton is a global centre for excellence in research and education, and a founding member of the prestigious Russell Group. Southampton graduates are highly regarded by leading employers and the university works closely with industrial partners, both in teaching and research.

- We build on over 70 years' expertise across electronics and computer science to develop technologies for an ever more connected and automated world;
- Our range of electronic engineering and computer science degrees are informed by our research, and advanced theory is underpinned by hands-on application in our state-of-the-art labs;
- Through our research led teaching and exceptional industry connections, we prepare our students for future challenges not yet imagined and jobs not yet thought of.

[www.ecs.soton.ac.uk](http://www.ecs.soton.ac.uk)  
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## Find out more

For more resources, including tutorials on how to use the board, videos related to the concepts and technologies used, visit: [www.ecs.soton.ac.uk/kits](http://www.ecs.soton.ac.uk/kits)