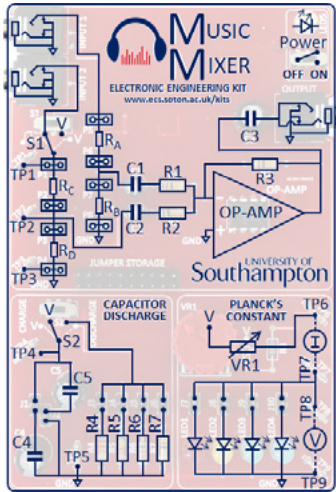


# Music Mixer

## Student Guide



**A-Level Physics  
Electronics Kit**



- The Music Mixer uses a summing op-amp to add the two input audio signals. The potential dividers change the voltage, and hence volume, of each.
- *The op-amp can also be used to amplify and measure the human heartbeat. Did you know that they can also be configured to subtract signals, or even perform numerical integration and differentiation?*

## Capacitor Discharge

- Capacitors can be connected in serial and parallel. Monitor their discharge rate through different resistors.
- *Capacitors are present in most electronic devices, and enable applications including cardiac pacemakers and camera flashes.*

## Planck's Constant

- By measuring the current-voltage characteristics of different LEDs you can estimate Planck's constant.
- *This section of the board contains four LEDs. Did you know that a 4K OLED TV contains as many as 33 Million LEDs?!*

	= Resistor		= Ground (GND)
	= Variable resistor	<b>V</b>	= 5V
	= Capacitor	<b>S</b>	= Switch
	= Light emitting diode	<b>TP</b>	= Test point
	= Ammeter		= Pin header
	= Voltmeter		= Pin socket

Electronic Engineers apply Maths and Science to use components like these to design and build complex systems such as smart phones. 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](#)

## 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)

[f/ECSUoS](#) | [@ECSUoS](#)

## 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)