Cambridge NATIONALS

Accredited

CAMBRIDGE NATIONALS IN ENGINEERING

R113, R114, R115 AND R116

RESOURCES LINK

VERSION 2

OCR
Oxford Cambridge and RSA

WELCOME

A Resources Link is an e-resource, provided by OCR, for teachers of OCR qualifications. It provides descriptions of, and links to, a variety of independent teaching and learning resources that you may find helpful.

In a Resources Link you will find details of independent resources, many of which are free: where this is the case this has been indicated.

If you know of other resources you would like to see included here, or discover broken links, please let us know. We would also like to hear from you if have any feedback about your use of these, or other, OCR resources. Please contact us at resources.feedback@ocr.org.uk.

We leave it to you, as a professional educator, to decide if any of these resources are right for you and your students, and how best to use them.

To give us feedback on, or ideas about the OCR resources you have used, email resources.feedback@ocr.org.uk

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Resources Index

click on a resource to go to the appropriate page.

Unit R115 - Engineering applications of computers

- 3D CAD Models – How to Prototype Just About Anything
- Computer-aided manufacture (BBC Bitesize)
- SIEMENS CAM/Computer-Aided Manufacture
- SIEMENS PDM/Product Data Management
- Human Machine Interface (HMI) and Supervisory Control (SCADA) Solutions
- Artificial Intelligence Techniques in Power Systems
- Advances in Command, Control and Communication Systems
- SCADA Tutorial
- Honeywell – Scanning and Mobility
- HIVE heating from British Gas
- Enhance understanding of maths and science for engineering

Unit R116 - Process control systems

- How Microcontrollers Work – How Stuff Works
- Architecture and programming of 8051 MCU's
- Introduction to microcontrollers
- UK Automation
- Electronics Project Org
- 1507 electronic projects and circuits
- Flexsim Simulation Software
- Simulink from MathWorks
- PLC Training Simulator
- PICsim – PIC Microcontroller simulator
- Enhance understanding of maths and science for engineering

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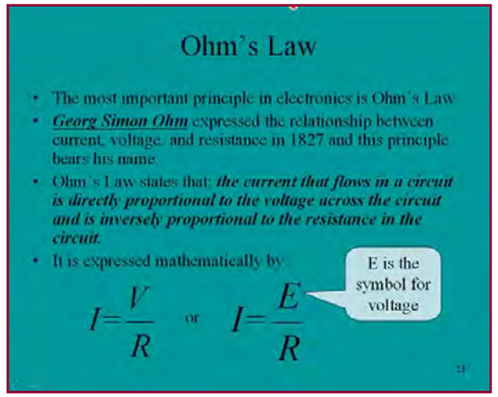
All About Circuits – Electrical Quantities B



A web site with an online lecture on Ohms law by Tim Fiegenbaum of North Seattle Community College. Twenty minutes long and with a written transcript.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO1 Understand basic electronic principles
Cost:	Free
Format:	Online video with written transcript

http://www.allaboutcircuits.com/videos/8.html

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Electrical and Electronic Principles and Technology

A textbook by John Bird, introducing electrical and electronic principles and technology to students new to the subject.

It contains real-world situations examples with 410 worked problems, 540 further problems, 340 multiple-choice questions, 455 short-answer questions, and 7 revision tests with answers online. Available as both paper back and e-book editions.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO1 Understand basic electronic principles
Cost:	Approximately £25 paperback and £17 e-book
Format:	Printed book and e-book

ISBN-13: 978-0415662857

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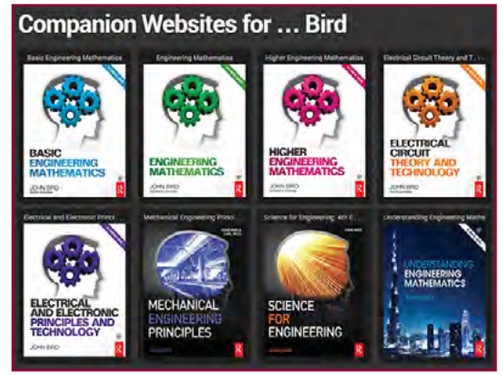
Companion Website for Books by John Bird



Access to answers and lesson plans on a range of STEM subjects. Opportunity to purchase the books.

The resource could support presenters in preparation or can be used to direct students to for self-learning.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO1 Understand basic electronic principles, LO2 Understand the operating principles of electronic components, LO3 Know test methods for electronic circuits, LO4 Understand commercial circuit construction methods
Cost:	Free to access main page, costs beyond that vary depending on content required.
Format:	Commercial website

http://www.routledge.com/cw/bird/

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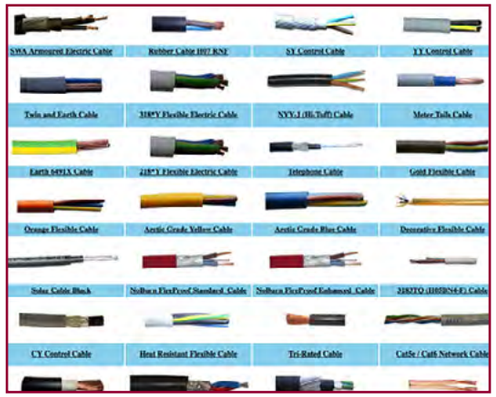
Electric cable sales



A web site selling a broad range of electrical cable. Each cable has description, specification and uses

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO2 Understand the operating principles of electronic components.
Cost:	Free
Format:	Commercial Website

https://www.electriccable.co.uk/

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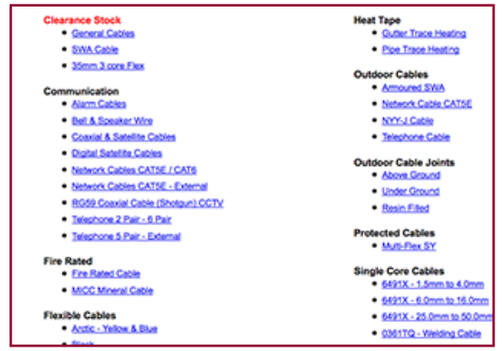
TLC Direct



An electrical component supplier with a website describing the different components and their uses.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO2 Understand the operating principles of electronic components
Cost:	Free
Format:	Commercial Website

http://www.tlc-direct.co.uk/Main_Index/Cable_Index/index.html

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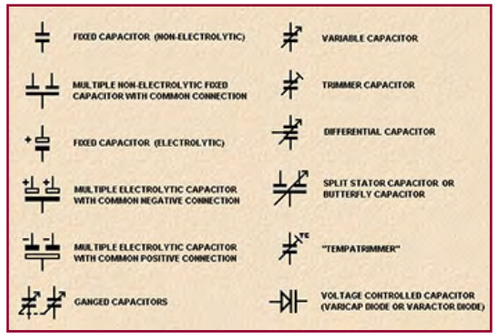
Capacitors and their uses



A UK website run for users of amateur radio with a useful description of how capacitors are used.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO1 Understand basic electronic principles LO2 Understand the operating principles of electronic components
Cost:	Free
Format:	Amateur hobbyist website

http://www.g3npf.co.uk/capacitors.htm

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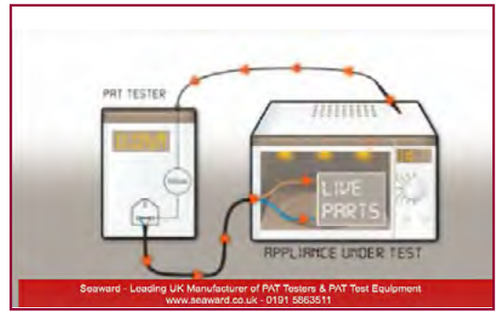
PAT testing



YouTube video introducing PAT testing.

5 minutes in length. Produced by an manufacturer of PAT testing equipment.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO3 Know test methods for electronic circuits
Cost:	Free
Format:	YouTube video

http://youtu.be/4AURsKb0d74

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How to use a Multimeter for beginners: Part 1 – Voltage measurement/Multimeter tutorial

A detailed 30 minute youtube video on how to use a Fluke multimeter. The second link takes you to the YouTube page for Martin Lorton where there are more videos and electronic projects to work through.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO1 Understand basic electronic principles, LO2 Understand the operating principles of electronic components, LO3 Know test methods for electronic circuits, LO4 Understand commercial circuit construction methods
Cost:	Free
Format:	A series of videos on electronics and testing

http://youtu.be/ZBbgiBU96mM and http://www.youtube.com/user/mjlorton

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Faraday Posters

A series of posters to print. Available as part of the IET Faraday materials. Several posters cover electrical components.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO1 Understand basic electronic principles, LO2 Understand the operating principles of electronic components, LO3 Know test methods for electronic circuits, LO4 Understand commercial circuit construction methods
Cost:	Free IET registration required to access resources
Format:	Printable PDF posters

http://faraday.theiet.org/posters-print/posters/index.cfm

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PCB – Copper Printed Circuit Boards

A website showing how to make single sided, double sided and surface mount printed circuit boards.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO3 Know test methods for electronic circuits, LO4 Understand commercial circuit construction methods
Cost:	Free
Format:	Website

http://www.robotroom.com/PCB.html

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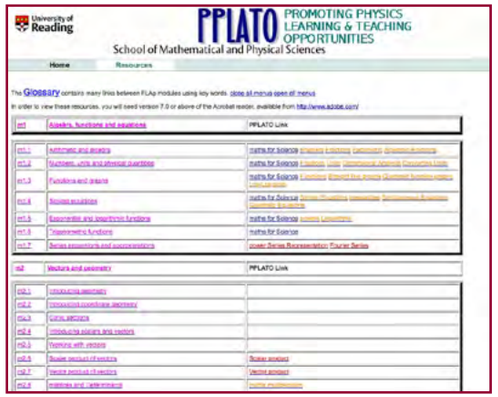
Enhance understanding of maths and science for engineering



A free to access self-learning website for supporting engineering maths and science.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO1 Understand basic electronic principles, LO2 Understand the operating principles of electronic components, LO3 Know test methods for electronic circuits
Cost:	Free
Format:	Website

http://www.met.reading.ac.uk/pplato/resources/

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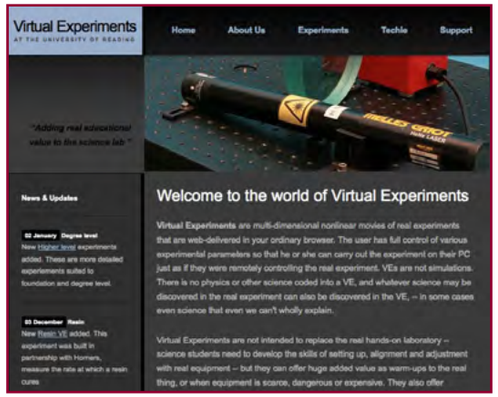
Virtual science experiments



A free to access self-learning website for science in engineering.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R113, LO1 Understand basic electronic principles, LO2 Understand the operating principles of electronic components
Cost:	Free
Format:	Website

http://www.reading.ac.uk/virtualexperiments

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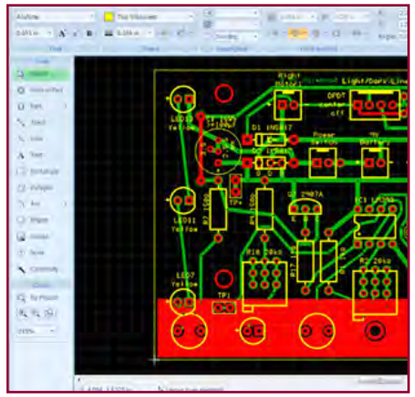
Copper Connection™ Software



A circuit design program with a range of purchase options including a free home licence. Copper Connection is a modern PCB layout editor for creating printed circuit boards at home or commercially. The software includes features suitable for students and professionals.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO1 Be able to use Computer Aided Design (CAD) for circuit simulation and design, LO2 Be able to construct circuits
Cost:	Free home licence available
Format:	Commercial software

http://www.robotroom.com/CopperConnection/index.html

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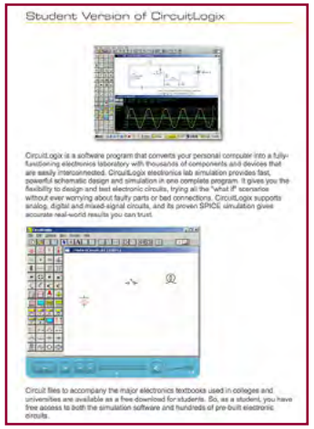
Student version of Circuit Logix



CircuitLogix is a software program that converts your personal computer into a fully-functioning electronics laboratory with thousands of components and devices that are easily interconnected. CircuitLogix electronics lab simulation provides fast, powerful schematic design and simulation in one complete program. It gives you the flexibility to design and test electronic circuits, trying all the "what if" scenarios without ever worrying about faulty parts or bad connections. CircuitLogix supports analog, digital and mixed-signal circuits, and its proven SPICE simulation gives accurate real-world results you can trust.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO1 Be able to use Computer Aided Design (CAD) for circuit simulation and design, LO2 Be able to construct circuits, LO3 Be able to test electronic circuits
Cost:	The student licence is free and requires registrations.
Format:	Educational Software

https://www.circuitlogix.com/student_version.php

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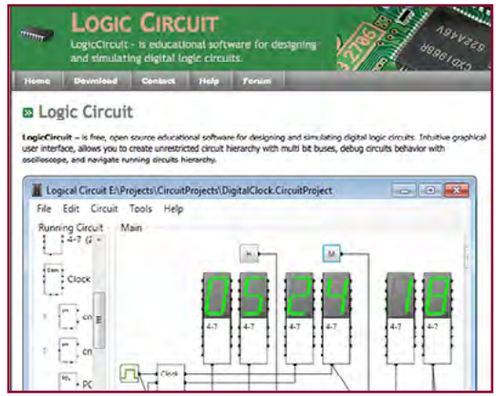
Logic Circuit – free educational software



LogicCircuit is free, open source educational software for designing and simulating digital logic circuits. Intuitive graphical user interface, allows you to create unrestricted circuit hierarchy with multi bit buses, debug circuits behaviour with oscilloscope, and navigate running circuits hierarchy.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO1 Be able to use Computer Aided Design (CAD) for circuit simulation and design, LO2 Be able to construct circuits, LO3 Be able to test electronic circuits
Cost:	Free download
Format:	Educational software

http://www.logiccircuit.org/

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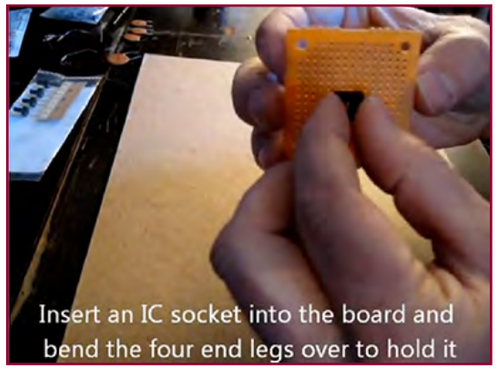
How to solder electronics components – video for beginners



A YouTube video of a worker slowly soldering components onto a circuit board. No audio, close up pictures with text.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO2 Be able to construct circuits
Cost:	Free video
Format:	YouTube Video

http://youtu.be/H3-TfdZVBCc

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Tutorial: How to crimp connectors, strip wire and use heat shrink.

A Martin Lorton YouTube video on making electrical connections. A comprehensive explanation of the tools and techniques used. 30 minutes in total. Very detailed and may be recommended for home study.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO2 Be able to construct circuits
Cost:	Free video
Format:	YouTube video with commentary

http://www.youtube.com/watch?v=kjSGCSwNuAg

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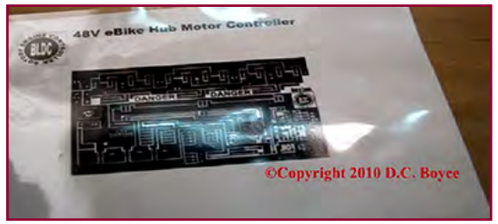
PCB Making – Part 1 – Photo Resist Method of Etching a Printed Circuit Board



Part 1 in a series of informative how-to videos of using the photo resist etching method of making precision printed circuit boards. The videos include the use of tools and assembly of the boards.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO2 Be able to construct circuits
Cost:	Free videos
Format:	A series of 7 videos running through a project step by step.

http://www.youtube.com/watch?v=VkQroiEJBMs

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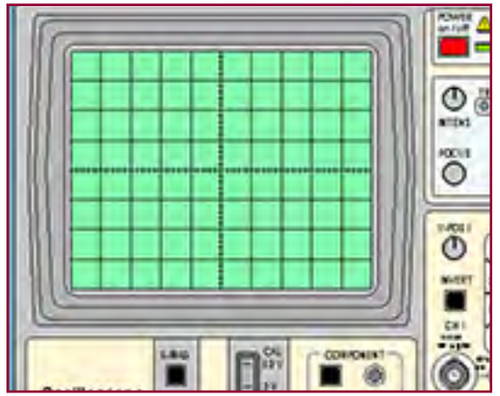
Using an Oscilloscope



An extract of an educational website looking at how to set up and use an oscilloscope effectively.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO3 Be able to test electronic circuits
Cost:	Free website
Format:	Website with pictures, diagrams and explanations.

http://www.doctronics.co.uk/scope.htm

How to use an oscilloscope/What is an oscilloscope/Oscilloscope tutorial

A comprehensive YouTube video by Martin Lorton explaining how an oscilloscope works and how to use one. The video is 30 minutes in length, and might form a useful homework activity.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO3 Be able to test electronic circuits
Cost:	Free YouTube video
Format:	Video tutorial

http://youtu.be/CzY2abWCVTY

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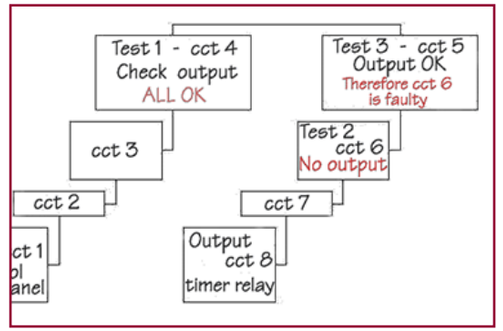
Fault finding on medical electronic devices



A practical demonstration of fault finding on medical equipment with an overview of the input to output, output to input and half-split methods. Useful to help learners contextualise the methods being learned.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO3 Be able to test electronic circuits
Cost:	Free to access site
Format:	An informational website.

http://www.ebme.co.uk/articles/maintenance/342-fault-finding-on-medical-electronic-devices

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How Not to Mod a Blues Junior...or, How to Fix Simple Printed Circuit Mistakes


How *Not* to Mod a Blues Junior...

or, How to Fix Simple Printed Circuit Mistakes

Every once in a while someone installing my mods gets in over his head, or something just goes wrong, and they ask me for help. I looked around on the Web for a page that shows how to fix common printed circuit board problems, so I could refer them to it. I was amazed that I couldn't find such a page. So here are some examples of what not to do, and how to fix common problems when it all goes wrong.

I recently received this board for repair. The owner had attempted to install the reverb mod and the tone stack capacitors, and realized that he wasn't hearing any bass or mids anymore. He had removed the tone stack caps again before he sent me the board. He had attached a piece of push-back wire to the cap that's half-inserted into C20 and tack-soldered it to R40, and tack-soldered the re-routed R56 to the other side of R40. Neither tack-soldering joint held, one broke off in shipment and the other broke when I touched it. Neither would have survived the pounding that a combo amp gets from its speaker.

As you can see, three out of four of the pads for the tone stack capacitors are completely gone. This kind of damage is normally caused when you're desoldering components. The leads are bent over onto the circuit board, and if you try to lift them while any of the solder is still adhered, the pad comes off. If you work carefully

A webpage taken from a website advising on music amps. This page looks at how to recognise and repair damage on a printed circuit board.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO2 Be able to construct circuits, LO3 Be able to test electronic circuits
Cost:	Free
Format:	Webpage with diagrams and text.
	http://home.comcast.net/~machrone/bjr/mistakes.htm

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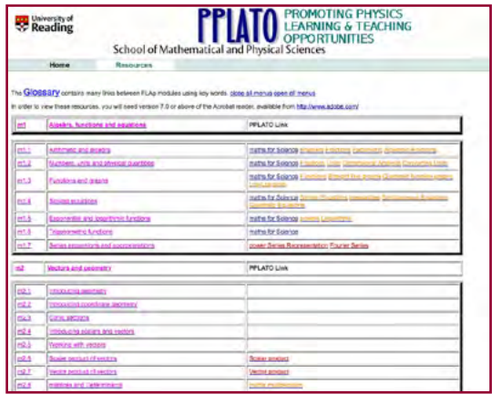
Enhance understanding of maths and science for engineering



A free to access self-learning website for supporting engineering maths and science.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO2 Be able to construct circuits
Cost:	Free
Format:	Website
	http://www.met.reading.ac.uk/pplato/resources/

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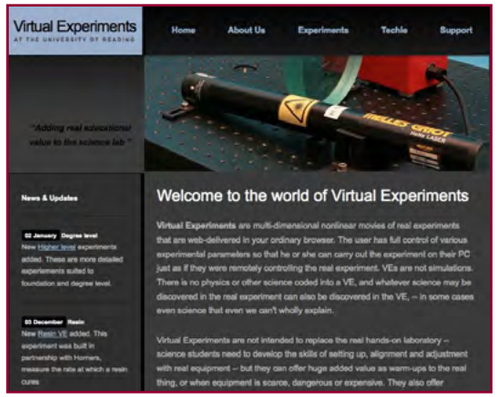
Virtual science experiments



A free to access self-learning website for science in engineering.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R114, LO1 Be able to use CAD for circuit simulation and design, LO2 Be able to construct circuits
Cost:	Free
Format:	Website

http://www.reading.ac.uk/virtualexperiments

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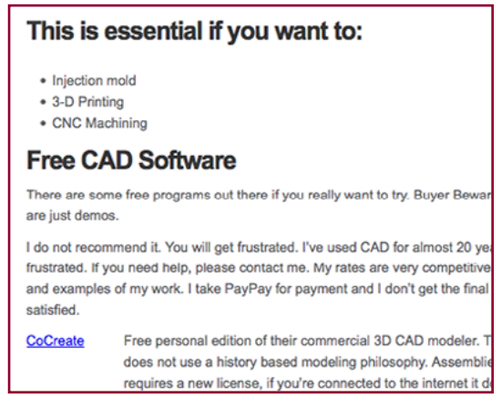
3-D CAD Models – How to Prototype Just About Anything



A web page listing free CAD programmes available for use.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO1 Understand how computers are used in engineering design, manufacture and process control, LO3 Know how computers are used to communicate and use data for production and maintenance
Cost:	Free
Format:	Informational website

http://www.inventionaddict.com/2011/06/17/3-d-cad-models-how-to-prototype-just-about-anything/

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Computer-aided manufacture (BBC Bitesize)

A revision link on the Design and Technology site looking specifically at the advantages and disadvantages of CAM.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO1 Understand how computers are used in engineering design, manufacture and process control
Cost:	Free
Format:	Revision focused website

http://www.bbc.co.uk/schools/gcsebitesize/design/electronics/manufacturing_processesrev2.shtml

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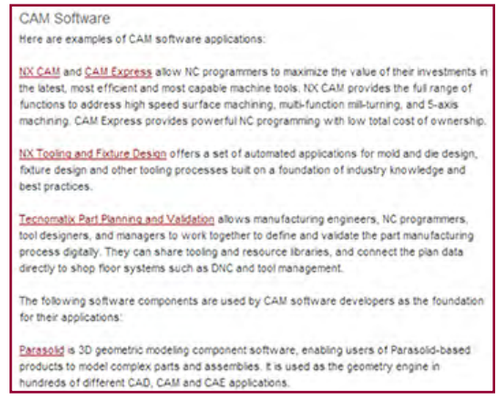
SIEMENS CAM/Computer-Aided Manufacture


CAM Software

Here are examples of CAM software applications:

NX CAM and CAM Express allow NC programmers to maximize the value of their investments in the latest, most efficient and most capable machine tools. NX CAM provides the full range of functions to address high speed surface machining, multi-function mill-turning, and 5-axis machining. CAM Express provides powerful NC programming with low total cost of ownership.

NX Tooling and Fixture Design offers a set of automated applications for mold and die design, fixture design and other tooling processes built on a foundation of industry knowledge and best practices.

Tecnomatix Part Planning and Validation allows manufacturing engineers, NC programmers, tool designers, and managers to work together to define and validate the part manufacturing process digitally. They can share tooling and resource libraries, and connect the plan data directly to shop floor systems such as DNC and tool management.

The following software components are used by CAM software developers as the foundation for their applications:

Parasolid is 3D geometric modeling component software, enabling users of Parasolid-based products to model complex parts and assemblies. It is used as the geometry engine in hundreds of different CAD, CAM and CAE applications.

A commercial site from Siemens discussing the merits of CAM and linking to a range of CAM software applications.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO1 Understand how computers are used in engineering design, manufacture and process control
Cost:	Free to access
Format:	OEM Website

http://www.plm.automation.siemens.com/en_gb/plm/cam.shtml

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SIEMENS PDM/Product Data Management

A commercial web page from SIEMENS looking at Product Data Management, featuring a range of industry case studies showing PDM in use.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO1 Understand how computers are used in engineering design, manufacture and process control, LO2 Understand how computers are used for maintenance of engineering systems
Cost:	Free to access
Format:	OEM Website

http://www.plm.automation.siemens.com/en_gb/plm/pdm.shtml

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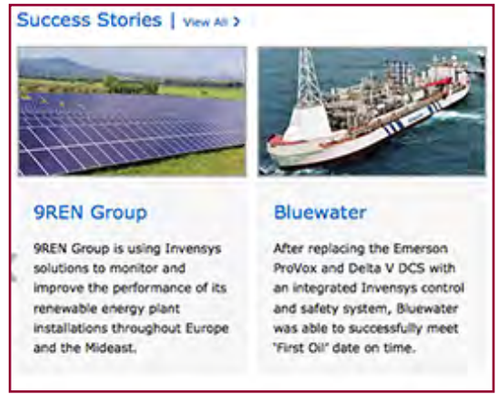
Human Machine Interface (HMI) and Supervisory Control (SCADA) Solutions



A commercial site selling HMI and SCADA systems. An overview of the benefits of HMI systems and links to more than 20 videos of the systems in practical applications.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO1 Understand how computers are used in engineering design, manufacture and process control, LO2 Understand how computers are used for maintenance of engineering systems, LO3 Know how computers are used to communicate and use data for production and maintenance
Cost:	Free access
Format:	Commercial site with YouTube video links.

http://software.invensys.com/solutions/hmi-and-scada/

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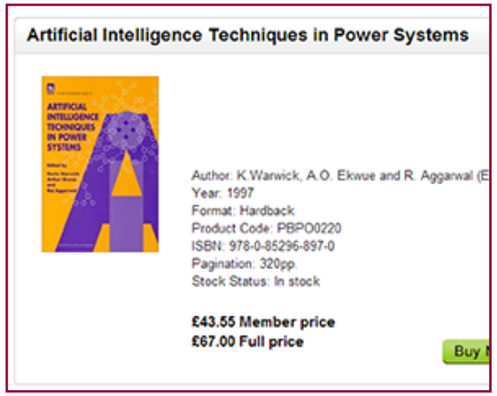
Artificial Intelligence Techniques in Power Systems



This book, published by the IET is suitable for various levels of reader, covering both basic principles and applications. It will serve as an introduction for those from a power systems background and as an overview for those from an AI computing or control background.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO2 Understand how computers are used for maintenance of engineering systems, LO3 Know how computers are used to communicate and use data for production and maintenance
Cost:	£67 for non-members £43.55 for members
Format:	Published Book. ISBN: 978-0-85296-897-0

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Systems Control in Engineering Level 1/2
Cambridge NATIONALS

Advances in Command, Control and Communication Systems

A book focused on electrical command, control and communication systems from the IET. The book can be purchased from the IET directly.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO2 Understand how computers are used for maintenance of engineering systems, LO3 Know how computers are used to communicate and use data for production and maintenance
Cost:	£57.20 for IET members £88.00 for non-members.
Format:	Published book. ISBN: 978-0-86341-094-9

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SCADA Tutorial – A Quick, Easy, Comprehensive Guide

A 12 page guide produced as part of a sales pack fro DPS Telecom. The free download gives basic underpinning knowledge about what SCADA systems are and how they are created.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO2 Understand how computers are used for maintenance of engineering systems, LO3 Know how computers are used to communicate and use data for production and maintenance
Cost:	Free download, requires name and email address to be given download the file.
Format:	PDF guide

http://www.dpstele.com/info2/scada/scada_rtu_pdf.php?source=google&grp_id=90&gclid=COnX56Ht4r0CFagKwwod1mMA8Q

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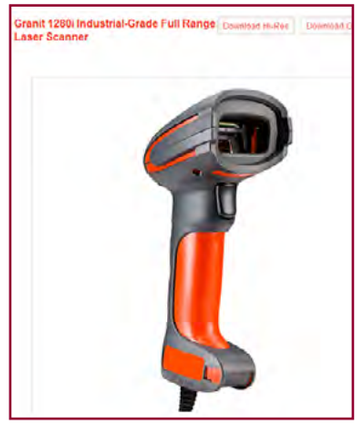
Cambridge NATIONALS

Honeywell – Scanning and Mobility



A commercial website for Honeywell. Specifications, tutorials and guides for a range of communication devices, this includes a wide range of images of the different products.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO3 Know how computers are used to communicate and use data for production and maintenance
Cost:	Free to visit commercial site
Format:	Commercial site with product information

http://www.honeywellaidc.com/en-GB/resources/image-library/Pages/default.aspx

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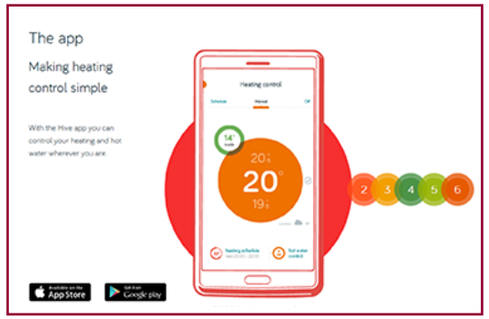
HIVE heating from British Gas



The HIVE system is a practical example of remote communications and control that student scan relate to. The British Gas site at: https://www.hivehome.com/the-app gives a reasonable amount for detail and user guides.

This could be combined with review sites such as: http://www.computerweekly.com/blogs/inspect-a-gadget/2014/01/reviewtwo-days-and-nights-with-hive-active-heating.html and http://www.thegreenage.co.uk/review-british-gas-hive-active-heating/ to prompt discussion.

Whilst not directly manufacturing, the technology in use is the same.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO3 Know how computers are used to communicate and use data for production and maintenance
Cost:	Free
Format:	Advertising web site and review sites. https://www.hivehome.com/the-app http://www.computerweekly.com/blogs/inspect-a-gadget/2014/01/reviewtwo-days-and-nights-with-hive-active-heating.html http://www.thegreenage.co.uk/review-british-gas-hive-active-heating/

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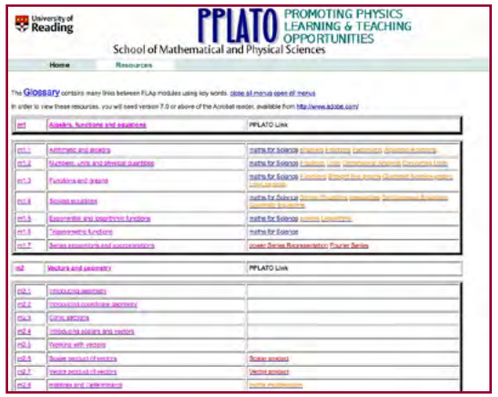
Cambridge NATIONALS

Enhance understanding of maths and science for engineering



A free to access self-learning website for supporting engineering maths and science.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R115, LO1 Understand how computers are used in engineering design, manufacture and process control
Cost:	Free
Format:	Website http://www.met.reading.ac.uk/pplato/resources/

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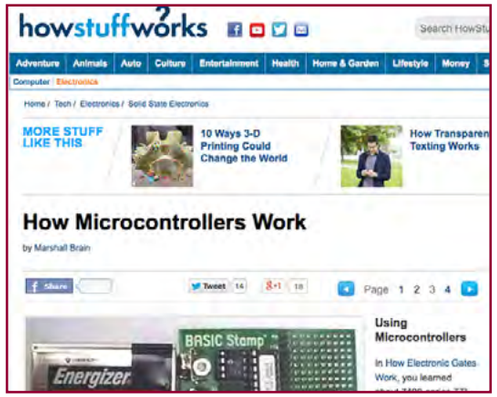
How Microcontrollers Work – How Stuff Works



An education/entertainment website explaining how microcontrollers work.
The content is spread over 8 pages with simple activities that can be undertaken.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO1 Understand the application and operation of microcontrollers and microprocessors in engineered products, LO2 Be able to design, develop and simulate a control system solution, LO3 Be able to test control systems
Cost:	Free site
Format:	Educational website

http://electronics.howstuffworks.com/microcontroller2.htm

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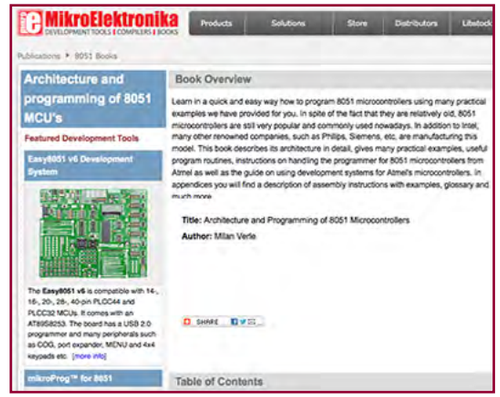
Cambridge NATIONALS

Architecture and programming of 8051 MCUs



An online book explaining how to programme the microcontroller. Includes an introduction to microcontrollers and examples.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO1 Understand the application and operation of microcontrollers and microprocessors in engineered products, LO2 Be able to design, develop and simulate a control system solution, LO3 Be able to test control systems
Cost:	Free to read on line
Format:	Online book

http://www.mikroe.com/products/view/267/architecture-and-programming-of-8051-mcu-s/

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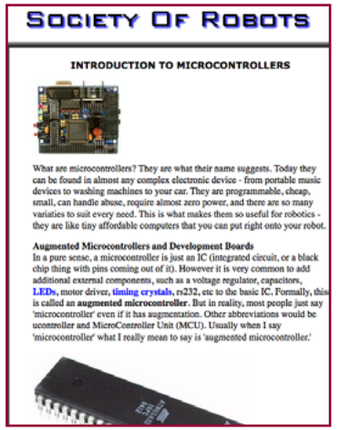
Introduction to microcontrollers



Part of the 'How to build your first robot tutorial' this page explains, in simple terms, what microcontrollers are and what they do. The link to the full tutorial is also included. The building of robots could be used as practical application of microcontrollers.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO1 Understand the application and operation of microcontrollers and microprocessors in engineered products, LO2 Be able to design, develop and simulate a control system solution, LO3 Be able to test control systems
Cost:	Free
Format:	Online written tutorial guide

http://www.societyofrobots.com/robot_tutorial.shtml
http://www.societyofrobots.com/microcontroller_tutorial.shtml

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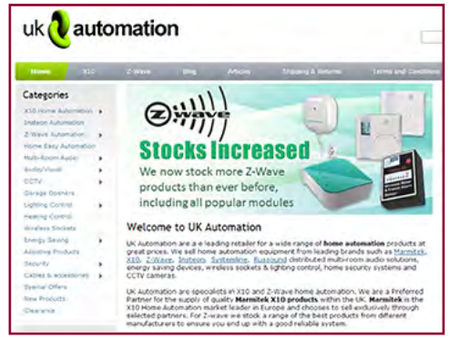
UK Automation



A commercial website selling a broad range of input / output and control devices.
The site can be used to introduce learners to the range of commercial control devices available to the home owner. Learners can be tasked with designing a home control system from the components available on the site.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO2 Be able to design, develop and simulate a control system solution
Cost:	Free
Format:	Commercial website

http://www.uk-automation.co.uk/

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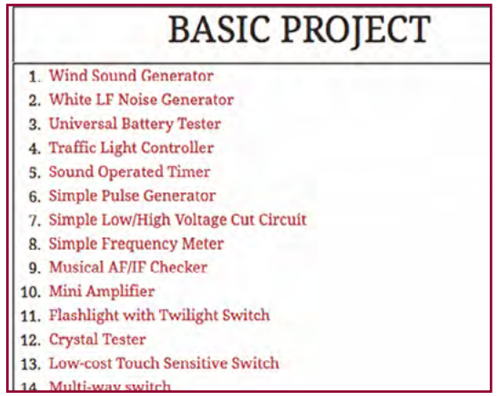
Electronics Project Org


BASIC PROJECT

1. Wind Sound Generator
2. White LF Noise Generator
3. Universal Battery Tester
4. Traffic Light Controller
5. Sound Operated Timer
6. Simple Pulse Generator
7. Simple Low/High Voltage Cut Circuit
8. Simple Frequency Meter
9. Musical AF/IF Checker
10. Mini Amplifier
11. Flashlight with Twilight Switch
12. Crystal Tester
13. Low-cost Touch Sensitive Switch
14. Multi-way switch

A website with a range of basic to advanced electronic projects to download and build. Useful in demonstrating the use of a range of electronic devices.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO1 Understand the application and operation of microcontrollers and microprocessors in engineered products, LO2 Be able to design, develop and simulate a control system solution, LO3 Be able to test control systems
Cost:	Free to access
Format:	Links to online project instructions

http://electronicsproject.org/

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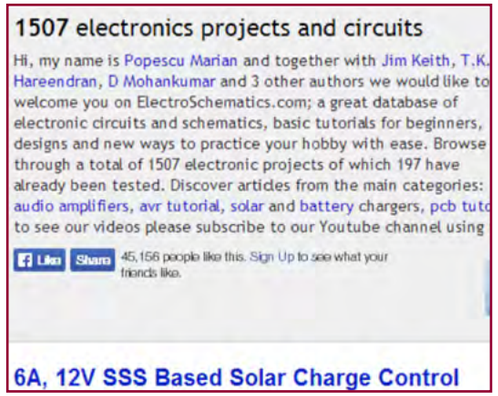
1507 electronic projects and circuits


1507 electronics projects and circuits

Hi, my name is Popescu Marian and together with Jim Keith, T.K. Hareendran, D Mohankumar and 3 other authors we would like to welcome you on ElectroSchematics.com; a great database of electronic circuits and schematics, basic tutorials for beginners, designs and new ways to practice your hobby with ease. Browse through a total of 1507 electronic projects of which 197 have already been tested. Discover articles from the main categories: audio amplifiers, avr tutorial, solar and battery chargers, pcb tuto to see our videos please subscribe to our Youtube channel using

Like Share 45,156 people like this. Sign Up to see what your friends like.

6A, 12V SSS Based Solar Charge Control

A long list of projects and circuits that can be constructed by tutors and learners. Detailed circuit diagrams and lists of materials requires.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO1 Understand the application and operation of microcontrollers and microprocessors in engineered products, LO2 Be able to design, develop and simulate a control system, LO3 Be able to test control systems solution
Cost:	Free to access
Format:	Website with links to projects

http://www.electroschematics.com/

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Flexsim Simulation Software

xsim Simulation Software

A short YouTube video introducing the Flexsim simulation range. This can be used to demonstrate the range of simulation applications. No vocal, soundtrack background.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO2 Be able to design, develop and simulate a control system solution
Cost:	Free
Format:	YouTube video

http://youtu.be/t620IkFkw28

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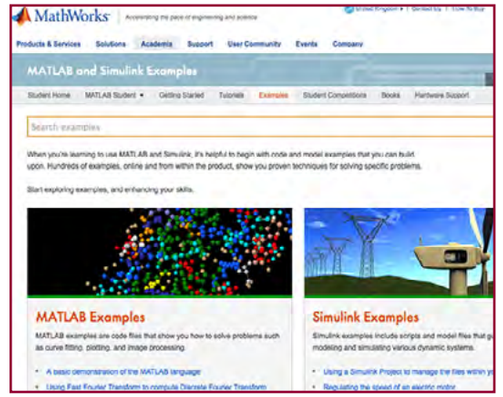
Simulink® from MathWorks



Simulink® is a block diagram environment for multidomain simulation and Model-Based Design. It supports simulation, automatic code generation, and continuous test and verification of embedded systems.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO2 Be able to design, develop and simulate a control system solution, LO3 Be able to test control systems
Cost:	Free evaluation copy can be requested. Student licence available. Student bundles £28 to £55
Format:	Educational software

http://www.mathworks.co.uk/academia/student_version/class_use.html?s_tid=ac_clasuse_sv_bod

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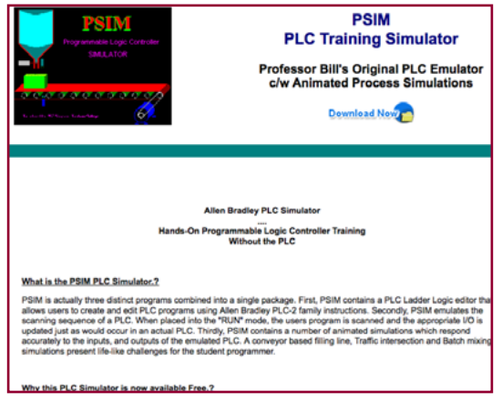
PLC Training Simulator



The Alan Bradley PLC Simulator can be downloaded from the web site and used to demonstrate and practice PLC programming.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO2 Be able to design, develop and simulate a control system solution, LO3 Be able to test control systems
Cost:	Free for educational use
Format:	Educational software

http://www.thelearningpit.com/plc/psim/psim.html

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OCR Oxford Cambridge and RSA
Systems Control in Engineering Level 1/2
Cambridge NATIONALS

PICsim – PIC Microcontroller simulator

PICsim emulates a microcontroller PIC16F628/16F877A/18F452 and periferics such as USART and timers, the simulator architecture permit easy implementation of external elements in c language. PicsimLab is a realtime emulator of development boards.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO2 Be able to design, develop and simulate a control system solution, LO3 Be able to test control systems
Cost:	Free to download
Format:	Open source simulation

http://sourceforge.net/projects/picsim/

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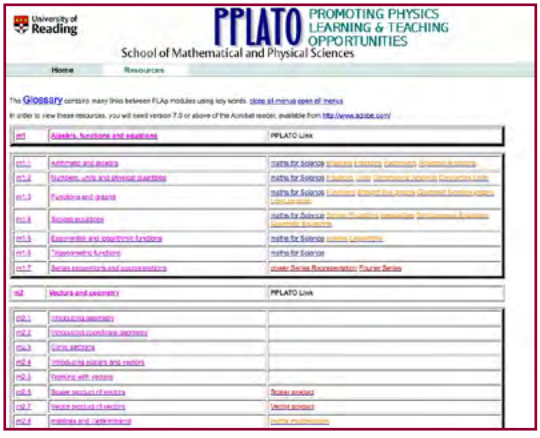
Enhance understanding of maths and science for engineering



A free to access self-learning website for supporting engineering maths and science.

Supports:	OCR Cambridge Nationals Systems Control in Engineering Level 1/2 Unit R116, LO2 Be able to design, develop and simulate a control system solution
Cost:	Free
Format:	Website

http://www.met.reading.ac.uk/pplato/resources/

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resources.feedback@ocr.org.uk

www.ocr.org.uk/cambridgenationals

Contact us

Staff at the OCR Customer Contact Centre are available to take your call between 8am and 5.30pm, Monday to Friday.

We're always delighted to answer questions and give advice.

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