

Getting started

The guidance sheets suggest how you could use the six different resources available within **OCR Electronics for A2**. These are:

- the **A2 text book**, which students can use to prepare themselves for a new topic and consult as they solve problems
- the **AS text book**, which students will need to consult when they need reminders about the synoptic aspects of the course
- the **exercises**, which students could use cooperatively or on their own to consolidate their understanding of a new topic
- the **practicals**, which give students step-by-step instructions for designing, assembling and testing circuits on breadboard
- the **data sheets**, which contain details of the small range of components required for practical work
- the **questions** in the text book, which students can use to confirm that their understanding of a topic is at A2 level.

Timings

The guidance suggests that delivery of the course requires a total of about 90 hours of classroom time. This does not include time for coursework (16 hours?), formal end-of-chapter tests (9 hours?) or final exam past paper practice (6 hours?). A single teacher is assumed in the guidance notes, but two teachers could deliver the first and second halves of the course separately (about 45 hours each), with both delivering the coursework element at the end.

Apparatus

The guidance notes assume the following provision of apparatus for practical work.

- the integrated circuits shown on the **Integrated Circuits** data sheet
- the discrete components shown on the **Discrete Components** data sheet
- prototyping boards (called breadboard in the practical instructions)
- wire strippers and 1/0.6 mm plastic coated tinned copper wire with a variety of colours
- electret microphones, 64 Ω loudspeakers, small d.c. motors and 6 V lamps
- stabilised power supplies which can deliver up to 1 A at +5 V and -5 V
- double-beam oscilloscopes and signal generators
- multimeters as voltmeters and ammeters
- PICAXE-18 microcontroller system (full details at www.picaxe.co.uk)
- access to PC computers to program microcontrollers and run spreadsheets
- STK500 microcontroller board for ATMega48 PICs (see below)

Suppliers

Components can be purchased from a variety of sources. These include:

- Rapid Electronics at www.rapidonline.com
- RS Components at rswww.com
- Maplin at www.maplin.co.uk

Microprocontrollers

Atmel have generously agreed to provide each student with an STK500 microcontroller programming board. Each board comes supplied with a copy of the AVR Studio software for installation on a PC. The handbook gives complete instructions for configuring the board.

Contact the subject officer at OCR at www.ocr.org.uk for more details.

It is recommended that each PIC is placed in a turned-pin socket to facilitate transfer to and from the student's breadboard. It is best to ignore the on-board switches and LEDs as the ribbon cables get in the way and their active-low nature easily confuses students.

The header file supplied assumes that the ATmega48 PIC has a clock speed of 4 MHz. If your PICs have a different clock speed, then you will have to adjust the delay factor in the wait1ms subroutine accordingly. Note that the header file only activates the six lsb of port B as input.

The header file is designed specifically for use with ATmega48 PICs, and will need adapting for other types. Comprehensive support for users of Atmel PICs is available on www.avrfreaks.net.

One Teacher

Chapter	Section	Hours	Total
MOSFETs	Variable resistors	5	11
	Amplifiers	6	
Digital Processing	Memory modules	3	10
	Memory cells	3	
	Processing words	4	
Servo Control	On-off control	3	13
	Proportional control	5	
	Power supplies	5	
Microcontroller Systems	Hardware	4	12
	Software	8	
Video Displays	Monochrome	4	9
	Colour	5	
Modulating Carriers	Amplitude modulation	4	16
	Pulse width modulation	4	
	Frequency modulation	4	
	Signal transmission	4	
Frequency Division Multiplexing	Channels	3	8
	Radio receivers	5	
Time Division Multiplexing	Digital transmission	5	12
	Synchronous transmission	3	
	Asynchronous transmission	4	

Two Teachers

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	Amplifiers	6	
Digital Processing	Memory modules	3	10
	Memory cells	3	
	Processing words	4	
Servo Control	On-off control	3	13
	Proportional control	5	
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