Teacher Resource Bank

GCE Electronics

Resources List
RESOURCES LIST

A very basic kit of parts, tools and test instruments to teach AS and A2 Electronics

Enough components and tools to enable a small group of students with very few other resources to follow the AS course is described here. Things like power supplies, signal generators and oscilloscopes are not included as it is felt that these will already be available in most centres with a Physics department. This is very much a “get you started” kit rather than an ideal version that would do everything.

The parts can be obtained from a variety of the usual suppliers, including the “£ shops” springing up, where tools and the case (if required) can be obtained.

All of the basic kit can be contained within an aluminium flight case where portability and security are paramount. Others may simply substitute plastic trays or even a suitable cardboard box to keep costs to an absolute minimum. Small components are mostly held conveniently in a sectional plastic box of which there are several types commonly available, this will help to keep things in order when working with the kit.

The intention was that all circuits would be constructed on a breadboard system, in line with AQA guidance, and be powered using a safe low voltage battery that simply cannot deliver enough current to do any real damage. In this case a 9V PP3 battery was chosen.

This kit is also capable of supplying most of the common components required for simple project construction, certainly providing a basic reservoir to be drawn from initially. Other, more specialised parts required for individual student projects would have to be obtained separately.

There are just enough materials here to support the work of four students, with some sharing of tools and components etc. The intention was to give each student access to their own breadboard, multimeter and a selection of the common components. The multimeter is of the very basic type commonly called a “domestic tester”, which is a misnomer since it has a full complement of voltage, current and resistance ranges as well as diode and transistor test functions, and is available for just a few pounds.
A flight case containing the complete suggested AS kit

Suggested major contents of basic AS kit

1 flight case (if required)  wire strippers  jewellers screwdriver set
4 multimeters  side cutter  bell wire
E12 resistor kit  long-nose pliers  jumper wire kit
electrolytic capacitor kit  combination pliers  4 bread boards
LED kit  microphone
A sectional plastic box containing the small components

Suggested contents of sectional plastic box

<table>
<thead>
<tr>
<th><strong>Op-amps:</strong></th>
<th><strong>Logic ICs:</strong></th>
<th><strong>Miscellaneous:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x TL081</td>
<td>4 x 4001</td>
<td>4 x PP3 battery boxes</td>
</tr>
<tr>
<td><strong>Transistors, npn:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 x 2N2222A</td>
<td>4 x 4011</td>
<td>4 x PP3 9V batteries</td>
</tr>
<tr>
<td>4 x BC635</td>
<td>4 x 4013</td>
<td>4 x 555 timer ICs</td>
</tr>
<tr>
<td>4 x BC108</td>
<td>4 x 4017</td>
<td>4 x LDRs</td>
</tr>
<tr>
<td>4 x BC548</td>
<td>4 x 4029</td>
<td>4 x thermistors</td>
</tr>
<tr>
<td>4 x 2N2219</td>
<td>4 x 4049</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 x 4071</td>
<td><strong>A range of low to mid value poly capacitors:</strong></td>
</tr>
<tr>
<td><strong>Npn and pnp pair:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 x 2N4033</td>
<td>4 x 4081</td>
<td>1nF to 470nF, 4 of each</td>
</tr>
<tr>
<td>1 x BC141</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MOSFET:</strong></td>
<td><strong>Diodes:</strong></td>
<td><strong>Buzzers, sounders etc:</strong></td>
</tr>
<tr>
<td>2 x HUF75337</td>
<td>4 x IN4001</td>
<td>1 piezo speaker</td>
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<tr>
<td></td>
<td><strong>zener diodes:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 x IN4148</td>
<td>1 6V buzzer</td>
</tr>
<tr>
<td><strong>Potentiometers min:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 x 10k horiz pre-set</td>
<td>4.7V</td>
<td>1 small loudspeaker 80Ω</td>
</tr>
<tr>
<td>4 x 50k horiz pre-set</td>
<td>5.6V</td>
<td></td>
</tr>
<tr>
<td>4 x 100k horiz pre-set</td>
<td>6.2V</td>
<td>1 miniature relay (6V coil)</td>
</tr>
<tr>
<td>4 x 250k horiz pre-set</td>
<td>7.5V</td>
<td>1 x reed relay (6V coil)</td>
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The A2 starter kit

The A2 kit is intended to be used in addition to the AS kit described earlier. It follows the same theme of providing a basic starting point for up to four students with some sharing of resources.

The A2 flight case

Suggested contents of A2 kit

- 1 flight case (if required)
- 1 advanced multimeter (additional ranges for capacitance, frequency)
- 1 environmental meter (temperature, light level, sound level)
- wire stripper
- side cutter
- long-nose pliers etc
- jewellers screwdriver set
- crystal radio kit
- 1 PIC chip board, power supply and lead
Environmental meter and parts box

Suggested contents of parts box:

**Semiconductors:**
1 infrared LED
1 infrared photo diode
1 visible photo diode
2 HUF75337 MOSFETs
2 LM386 audio amp ICs
4 NE555 timer ICs
4 TL081 op-amp ICs
2 4543 ICs

**Modules:**
433 MHz TX and RX modules
1 PIR sensor module

**Sensors:**
2 thermistor
2 LDR microphone
1 x reed switch & magnet
2 4AA holders
2 PP3 clips
8 x AA cells
1 microswitch
1 tilt switch

**Miscellaneous:**
2 ferrite rods and coils
2 6.5V 0.3A lamps
2 MES lamp holders
2 tuning capacitors
4 thermistors
22Ω 3W resistor
1m optical fibre