Design Folder

When designing, the main purpose of the design folder is to help you develop your ideas to communicate the reasoning and conclusions. The following points are intended to assist you in the production of your design folder.

1. ***Research*** – collect a wide range of electronic research material, make reference to books, data sheets and component catalogues that you have used. Carry out practical research in the form of testing circuit ideas, using kits, breadboards and computer simulation.

2. ***Analysis*** – break down the problem into a number of smaller problems or sub-systems. Analyse the research material and the electronic element of the problem. Use a systems approach and identify possible input, process and output devices. Use a variety of diagrams and charts, possibly supported by experimentation and, if need be, market research. The experimentation can be carried out with the use of kits or with the help of computer aided design.

3. ***Specification*** – a good electronic specification is crucial to the success of any Electronic Products project and will make it easier for you to carry out the formative and summative evaluation. It may well be that the electronic specification is re-written a number of times as you proceed with the designing. Points worthy of consideration are the function of the system, the constrains of cost, size and time, the working parameters of input, process and output devices, a reference to power sources and assembly boards.

4. ***Design Proposals*** – involves gathering and exploration of circuits from any suitable resource. This can include material from books, data sheets and computer generated information. You should sketch and draw out several circuits using the electronic signs and symbols shown in the specification. At GCSE level you are not expected to design electronic circuits from first principles, but rather to select and modify existing circuits to meet their needs. This will manifest itself in many ways but may involve finding a way of interfacing a primary and secondary circuit, or changing the input and output devices, or finding a latching device, or re-designing a circuit to fit in the tube framing of a bicycle. This type of activity will give you the chance to hypothesise and carry out experiments using kits, software packages and breadboards to test your theories. It will also give you the opportunity to use a range of measuring instruments and devise tests for your circuits and record your results. The use of photography in the design folder enhances the folder and is an excellent record of experimental work carried out with kits and breadboards. At this stage in designing, you should apply mathematical calculations and record this evidence in the design folder. Work on potential dividers, component ratings, time delays, frequency, current drain, battery life and the size of protective resistors are a few examples of where calculations can be applied.

5. ***Development of Final Solution*** – you should give reasons why you have selected a certain circuit from their generation of ideas and, equally, give reasons why you have rejected the other considered circuits. It may well be that you decided to take a number of sub-systems from discrete circuits and therefore need to explain why. Present an accurate final circuit drawing which satisfies the specification and clearly takes into account relevant research and analysis. The circuit diagram should contain sufficient information for the circuit to be made by a competent third person. Depending upon the type of assembly board to be used, you should design the component layout. This can include a variety of outcomes from printed circuit boards to matrix boards and pins. Whatever method is used, it is expected that you will show evidence of planning the layout of the circuit for ease of component assembly, soldering, inspection purposes, position of input and output devices and final secure positioning of the circuit board in the external package. If Veroboard is used for example, you should show recorded evidence in your design folders of planning the component layout, the number of link wires required and the position of the breaks in the conductive tracks, etc. Equally, if you intend to use a printed circuitboard you should show the developmental stages of your PCB layout or transparent overlay. **Circuits from Electronic Magazines** are totally unsuitable for a GCSE course in Electronic Products.

6. ***Planning of the Making*** – Show evidence in your design folder of where, why and how practical production decisions were made. This evidence can manifest itself in many ways and can be closely linked to industrial practices and the manufacture of products in quantity.

7. ***Testing and Evaluation*** – involves testing the project in the environmental conditions it was designed for and to see whether or not it will meet the demands of the specification. Think up interesting ways of testing your project and the recording of the results, using block diagrams, pie charts, pictograms, etc. Alarms are very popular projects and if, for example you designed an anti-theft alarm for a bicycle, the scope for testing and evaluation are immense. Once again, the use of photography can be encouraged to record testing and to highlight any suggested modifications to the system.

8. ***Communication, Graphical and ICT Skills*** – Throughout the design folder you should show a wide range of communication skills and techniques. A significant change to the Design and Technology criteria is that greater emphasis has been placed on ICT and, in particular, CAD and CAM. You need to show evidence of using computer software packages to design and generate circuit diagrams, to simulate electronic circuits on screen and to use computers in the production of printed circuit board masks.

9. ***Relevant Issues, Industrial Practices and Systems and Control*** – Questions on industrial practices and systems and control will appear on the written paper. You should be aware of and have an understanding of, the processes and technology involved in the manufacturing industries. The following list has been gathered to assist. The Concept of the Designer/Maker, Division of Labour, Methods of Production, Scale of Production, Main Stages of Manufacture, Testing and Evaluation, Quality and Control, Computer Aided Manufacture, Computer Aided Design, Computer Numerical Control, Computer Integrated Manufacture, Information Technology, Health and Safety, The Environment, Vacuum Forming and Injection Moulding Machines, Ways of Working Materials, Forms of Material, Design Evolution and Jig and Tool Design. As electronic circuits are examples of a system and all have some kind of control, it should therefore be possible for you to cover systems and control within your electronic design and making coursework.