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# **Physics Revision**

**SOFT 960 (Cassette)**  
**SOFT 1960 (Disc)**

**An aid for 'O' level,  
CSE and GCSE candidates**

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For the Amstrad CPC464 and CPC664

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# Special features

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- \* You can select which topics you wish to revise.
- \* You can choose to see the correct answer if you make a mistake.
- \* Colour graphics and animation are used to illustrate more difficult points.
- \* Suitable for 'O' level, CSE and GCSE syllabi.
- \* Helps you decide in which topics you are weakest.

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# 1. Introduction

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This cassette (or disc) contains nine programs to aid your physics revision. The first two programs test your existing knowledge so that you can see where your strengths and weaknesses lie. The next six programs concentrate on topics which often cause difficulty. The programs also allow you to practise exam techniques such as multiple choice. The final program allows you to keep notes during your revision. The notes can be saved for future reference. The programs have been designed and tested by physics teachers working in schools with pupils taking both 'O' level and CSE examinations. The new GCSE syllabus has been taken into account in the design of these programs. The main topics covered include

Ray diagrams for mirrors and lenses

Heat transfer mechanisms

Heat capacity and latent heat

Linear expansion of metals

Gas laws

Circuit analysis

Electrostatics and electromagnetism

Equations of motion with constant acceleration

Waves

Radioactivity and radiation

These are described in detail under the heading for individual programs.

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## 2. RUNning a Program

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Before RUNning a program it is best to reset the computer by pressing the **[CTRL]** and **[SHIFT]** keys and whilst holding them down press and release the **[ESC]**ape key.

Cassette version: If you have a disc drive plugged into your computer be sure to type

| TAPE

followed by the **[ENTER]** key. The cassette should be placed in the Datacorder with side A upwards and the tape wound back to the beginning. To start RUNning the programs simply press and hold the **[CTRL]** key down and then press the small **[ENTER]** key.

The cassette version of the programs are held in the following order

<i>Side A</i>		
<i>Program Title</i>		<i>Program name</i>
Multiple Choice 1		multi1
Multiple Choice 2		multi2
Optics and Waves		optics
Mechanics		mech
Radioactivity		radio
<i>Side B</i>		
<i>Program Title</i>		<i>Program name</i>
Electricity		elect
Electromagnetism		magnet
Heat		heat
Electronic Notebook		notebook

If you wish to RUN a program out of order, reset the computer and type

TAPE

If you wish to RUN a program out of order, reset the computer and type

RUN " <PROGRAM NAME>

followed by the program name. You can save time by winding the tape to a point just before the program that you wish to RUN. Make sure that you have

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the correct side of the cassette upwards in the Datacorder.

Disc version: The disc versions have the same program titles and names and are held on sides A and B as listed above. Having reset your computer and inserted the disc either way up, type

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RUN "DISC
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followed by the **[ENTER]** key.

The 'DISC' program shows a list of the nine programs available. Simply choose which program you wish to use first (do not forget to press the **[ENTER]** key). You may be asked to turn the disc over. Press the **[SPACE BAR]** after you have turned over the disc.

## 3. General Instructions

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These programs have been designed to be simple and straightforward to use. However, it will help to understand a few general principles which apply to all of the programs.

- \* Most programs initially display a list of options so that you can select the topic you wish to revise. Press **[ESC]** twice to return to the initial list of options. In some cases your score will be displayed before returning to the list of options.
  - \* When space appears at the bottom of the screen, press the **[SPACE BAR]**. This will move you on to the next screen.
  - \* When the computer asks you a question a flashing line appears on the screen. If you make a mistake when typing in your answer, use the **[DEL]** key to rub out the last character you typed. When you are happy with your answer press the **[ENTER]** key.
  - \* Several programs include a section where you fill in the missing words or phrases. If you do not know the answer just press the **[ENTER]** key straightaway. The correct answer is always the same length as the dashes shown. Sometimes there are two correct answers; the program will accept either. If the answer is a phrase, do not press the **[ENTER]** key until you have typed in the whole phrase. If you make a mistake you are given the option to see the correct answers immediately.
  - \* Cassette Versions: All but the last program have the option to move on to the next program on the cassette.
  - \* Disc Versions: All the programs except the Electronic Notebook have the option to RUN another program. This returns you to the 'DISC'
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program that you used at the beginning to select which topic you want to revise.

- \* All nine programs have the option to exit. This completely resets the computer.

## 4. Multiple Choice

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The first two programs contain in total over 70 multiple choice questions covering the key subject areas. The first program covers optics and heat whilst the second includes magnets, radioactivity, electricity, mechanics and waves.

The programs analyse your answers so that you can identify areas of weakness. This allows you to make the best use of your revision time; you can select the programs which cover these areas in more depth.

The questions are presented one at a time in a random order. When you feel that you have spent enough time answering the questions, just press **[ESC]** twice. Your score will be displayed, followed by an analysis of how you performed in each topic. Similar information will be given to you if you have answered all the questions in the program. This detail allows you to identify any areas of weakness and hence plan your revision strategy. You can then use the review option (option 2) to view the correct answers to the problems you answered incorrectly.

## 5. Optics and Waves

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This program covers major aspects of lenses and mirrors – convex, concave and planar. It helps you revise all components of lens diagrams ensuring that you can label them correctly and also understand the concepts behind them. There are over twenty diagrams illustrating the effects of reflection and refraction. The laws governing these are examined and you will be tested on the important terminology.

The waves section of the program is a challenging crossword with over 25 clues – including several with diagrams – which examine many aspects of wave theory. The clues can be selected in any order. As you correctly answer them the crossword is completed. Remember that all the crossword entries consist of letters not numbers!

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## **6. Mechanics**

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This covers the basic laws of motion. It tests your knowledge of the essential formula and also whether you can apply them in practice. The laws of motion are illustrated with a human cannon ball. As the various forces and mass are changed can you still manage to catch the man in the net?

The program also helps you revise the concepts of scalar and vector quantities and checks your knowledge of over twenty essential definitions.

## **7. Radioactivity**

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This program uses several interesting and stimulating techniques to help you revise radioactivity and radiation. The comprehensive list of topics covered includes alpha, beta and gamma radiation, detection of radiation including the cloud chamber, rate of decay and half lives. As you solve the problems posed, working against the clock, your score is constantly displayed. When you have attempted every question, or you have run out of time, your score and the total possible score are presented. This allows you to assess your performance.

Animated diagrams and sound effects are used to help you remember some of the difficult points. In addition you are given the option of whether you wish to see the correct solutions to the programs. By not choosing to see the correct solutions you can use the program to test how your revision is progressing.

## **8. Electricity**

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This program takes you step by step through the analysis of a circuit containing cells, resistors, meters and lights. The program builds from basic principles, so you do not have to understand the whole circuit initially. All relevant equations and definitions are revised before they are applied to the problem being solved. The program investigates the calculation of ammeter and voltmeter readings and power. To be able to analyse circuits in this way you have to be able to calculate the total resistance of a circuit, one of the problems set asks you to evaluate the total resistance of a variety

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of resistor networks. Animated diagrams show the concepts behind the first law of electrostatics.

## **9. Electromagnetism**

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Lots of diagrams help to illustrate the concepts of electromagnetism and the magnetic fields of simple bar magnets and solenoids. The four main topics covered are magnets, dc motors including Fleming's Left Hand rule, induction including Fleming's Right Hand rule, and transformers. In each case key rules are revised before questions which require you to apply these rules are set. The transformers section also asks you to complete tables giving the characteristics of 100% efficient transformers. To simulate exam conditions you can test yourself against the clock to see what score you can achieve.

## **10. Heat**

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This program investigates the three mechanisms by which heat is transferred from one point to another. You are also tested on your understanding of when and how these mechanisms operate. Animated diagrams are used to reinforce the major points.

The second section examines heat energy and investigates the equations and units of the quantities involved. This is illustrated by considering a substance being heated until eventually it turns to vapour. Worked examples help illustrate expansivity and a gas law. Note that the figures in each calculation change every time it is set so that it thoroughly tests your grasp of the subject. Finally you are tested on relevant definitions within the topic of heat.

## **11. Electronic Notebook**

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This program allows you to make notes on your physics revision which you can keep for future reference. You can keep notes on up to 30 different topics in the computer's memory at the same time. The topics are

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automatically kept in alphabetical order for you so you can find them easily. When the program starts you are offered these options:

- 1) Create a note
- 2) Edit a note
- 3) Delete a note
- 4) Look at notes
- 5) Load notes
- 6) Save notes

### **1) Create a note**

You must give the note a name which you have not used before (up to 15 characters). Then you may type in your note. If you make a mistake, just use the **[DEL]** key or the cursor keys to go back to the mistake, then just type over it.

### **2) Edit a note**

You can use this option to alter a note that you created earlier.

### **3) Delete a note**

If you run out of room you can use this option to make more space.

### **4) Look at notes**

Use this option to browse through some or all of the notes. The cursor keys are used to go forwards and backwards between the notes.

### **5) Load notes**

Please note that loading a new set of notes will automatically erase notes already in memory. If you want to retain the existing notes save these under an appropriate file name before loading in your new notes.

Disc version: Before you give the file name the computer gives you a list of all the files on the disc. When you have noted the name of the file that you want to load, press the **[SPACE BAR]**. Then type in the name of the file you wish to load.

Tape version: Place your data cassette in the Datacorder. This function operates similarly to the save option in that it first gives an opportunity to position the tape correctly before attempting to load. Use the **[PLAY]**, **[REW]** and **[F.F.]** keys to position the tape in front of the file you wish to load.

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Press **[ESC]** twice when it is positioned. Having done so, press **[PLAY]** then any key to load the file. The program will indicate when the file has been successfully loaded.

## 6) Save notes

If at any time you wish to break off a session but would like to continue to maintain these notes at some other point in time, you will need to save the notes. If you are making a lot of notes then it may also be a wise precaution to occasionally save them, since if there was a power failure all would be lost. Saving your notes occasionally acts as an 'insurance policy'. Note that all the notes in memory will be saved during this operation.

Disc version: The notes must be saved on a separate data disc since the program disc is 'write protected' – you cannot record on it. When you select this option you must type in the file name. The file type ' . ENB ' is added automatically to the end of the file name.

Tape version: The notes must be recorded on a separate data tape since the program tape is 'write protected' – you cannot record on it. When the save option is chosen the computer operates to catalogue the tape in the Datacorder when **[PLAY]** is pressed followed by any key.

If a new cassette is being used, or if you are sure that the tape is correctly positioned press **[ESC]** twice. This takes you back into the save program. If you are using a tape with existing files which you want to avoid overwriting, use the **[PLAY]** (followed by any key) together with, if necessary, the **[F.F.]** and **[REW]** buttons on the Datacorder. This gives you the ability to position the tape exactly where you want to record the file. Normally this would be after the end of the last recorded file. Beware of overwriting files if there is another recorded after it on the tape since if the notes are much larger, it will use up more tape and there is a risk of overwriting the beginning of the next file.

Having found the correct position press **[ESC]** twice. A file name is requested. Spaces in file names should be avoided since it can be confusing, especially if the space is at the beginning or end. For this reason a file name with a space in it will be rejected. It is suggested that if two words are used then separate with a hyphen or slash. It is recommended that each time a file is recorded that its name is written on the cassette card together with the tape counter number for the start and finish – e.g. FILE 160 195

Having entered the file name by pressing the **[ENTER]** key the message ' Press REC and PLAY then any key ' will appear. Press the **[REC]** and **[PLAY]** keys on the Datacorder – then press any other key. The notes will then be recorded onto the file. NOTE: DO NOT PRESS **[ESC]** whilst saving the file to tape – if you do it will be necessary to reload the Electronic Notebook program. If you suspect there is a problem during the save operation, allow the program to continue until 'File saved' appears. After this message is seen the program can be used as normal and a further attempt made.

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The program then returns to the initial options screen. Should you want to check that the file has recorded properly then again use the procedure outlined at the beginning of this section to catalogue the tape. The file name should appear when **[PLAY]** is pressed followed by any key.

Having checked, press **[ESC]** twice to return to the initial options screen.

## 12. Other Amsoft BES programs

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### Chemistry Revision

This companion series of 8 programs covers the 'O' level, CSE and GCSE syllabus in a similar manner to this physics revision package. The contents are:

**1 Multiple Choice:** Exam questions to find your strengths and weaknesses, so that you can plan your revision strategy efficiently.

**2 Introductory Topics:** Introduces some key areas of the syllabus covering atomic structure, isotopes, bonding and the structure of solids.

**3 The Element Game:** Tests your knowledge of facts about elements and their position in the periodic table.

**4 The Separation Game:** An adventure game, try to find your way through a maze to separate three chemicals. Revises the main separation techniques.

**5 Organic Chemistry:** Revises common formulae and vocabulary. A challenging section covers organic reaction processes concerning carbon dioxide, crude oil, ethanol and ethene.

**6 Electrochemistry:** test your skill in selecting elements in the reactivity series. Also covers general aspects of reactivity and uses of common elements. Electrolysis, including Faraday's laws, is examined.

**7 Electrochemical Applications:** Three key industrial processes are detailed and revised – extraction of aluminium, refining copper and manufacture of sodium hydroxide.

**8 Electronic Notebook** helps you keep tabs on your revision. You can save your notes and refer to them any time in the future.

**Osprey!** Developed in conjunction with the RSPB (and based on their site at Loch Garten in Scotland), 'Osprey!' is a highly original game intended to illustrate the complexity of wildlife conservation.

Given the responsibility of protecting the precariously small Scottish Osprey population, you have at your disposal a team of wardens. They will

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enable you to keep egg-stealers at bay, prevent huntsmen from shooting the birds, and control the ever-inquisitive tourists who can easily disturb the nests.

After allocating the wardens to their duties you can see how successful your strategy has been. And, as in real-life, certain factors (like the weather!) remain beyond your control. So the problems of ensuring the Osprey's survival are by no means straightforward – as the RSPB will tell you.

Colourful and fast-moving 3-D graphics screens show clearly how you have used your wardens, the arrival of the Osprey, and the hazards that befall them! (Suitable for all ages of 8 years and up.)

**Timeman One** The program helps children tell the time and set a clock. Attractive scoring with a man and a ladder keep children's interest. Choice of twelve progressive stages of difficulty, together with the usual attractive sound, colour and monitoring facilities. (Age 4-9 years).

**Timeman Two** Companion program covering minutes to the hour, half and quarter hours and the 24-hour clock. Same attractive features as Timeman One with progressive stages of difficulty, together with attractive sound, colour and monitoring facilities. (Age 4-10 years).

**Happy Numbers** A program to help children learn their numbers and count without need of reading skills. Attractive graphics and scoring make this a favourite with 3 to 5 year olds.

**Happy Letters** The program to teach children to match small and capital letters both on the screen and the keyboard. They love trying to stop the crocodile eating the fish. Features attractive use of sound and colour as well as easy identification of problem letters for further practice. (Age 3-6 years).

**World-Wise** Two programs to stimulate children to 'teach the computer' about geography. Encourages the use of atlases and reference books, helps exam studies and introduces the use of the computer to store information. Data can be readily saved and reloaded at any time. (Age range 7-15 years).

**Map Rally** Try to find the hidden checkpoints in a race against your opponent or the clock! Map co-ordinates and directions are soon mastered as children learn to control the cars. After each rally they can watch the cars retrace their routes taken, showing how well each driver did. (Age 7-13 years).

**Happy Writing** The program helps children form their letters and numbers correctly and encourages them to practise writing. A moving pencil point shows clearly where to start each figure. Tractors, attractive colour and sound all help to keep their interest. (Age 3-5 years).

**Animal/Vegetable/Mineral** This program provides hours of fun enjoyment as the computer tries to guess the object a child has thought of. The computer's failure to guess correctly encourages children to help the computer to tell the difference between the various objects. The program

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stimulates discussion and the use of reference books. Suitable for all ages 7 years and upwards.

**Wordhang** This version of the traditional 'Hangman' spelling game has been described as '... the Rolls-Royce of them all!' Features over 250 words plus the ability to enter your own words – either individually or as a group (ideal for that weekly spelling list!). Improves spelling at all ages of 5 years and upwards.

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