Science & Technology Equipment News

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For Primary Schools and Teachers of S1/S2 courses

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Now, as some Python once hissed, "for ssssomething completely different". This Newsletter concentrates on technology and looks at four control technology packages, intended for use with 5 - 14 year groups. This may seem a strange time to be looking at 'control technology' in the context of Environmental Studies, especially with draft proposals for revision currently out for consultation. We are convinced that even after revision that ICT skills will still be there somewhere as will some form of computer based, simple control technologies. We have already been involved with a secondary school where single chip controllers have been introduced at S1/S2. We judge that in the not too distant future this type of controller may be in use in primary schools. The chips are commonly found in toys that children received as gifts at Christmas. These range from the idiotic Millennium speaking ball to the so-called pet Furby. Don't panic! All of the packages we have looked at are intended to be easy to use and understand. Thankfully - most are. Part 2 of this review, in the next Newsletter, will look at packages where control is of a more mundane nature e.g. speed and direction. We shall look also at other technology education kits for use at 5 -14.

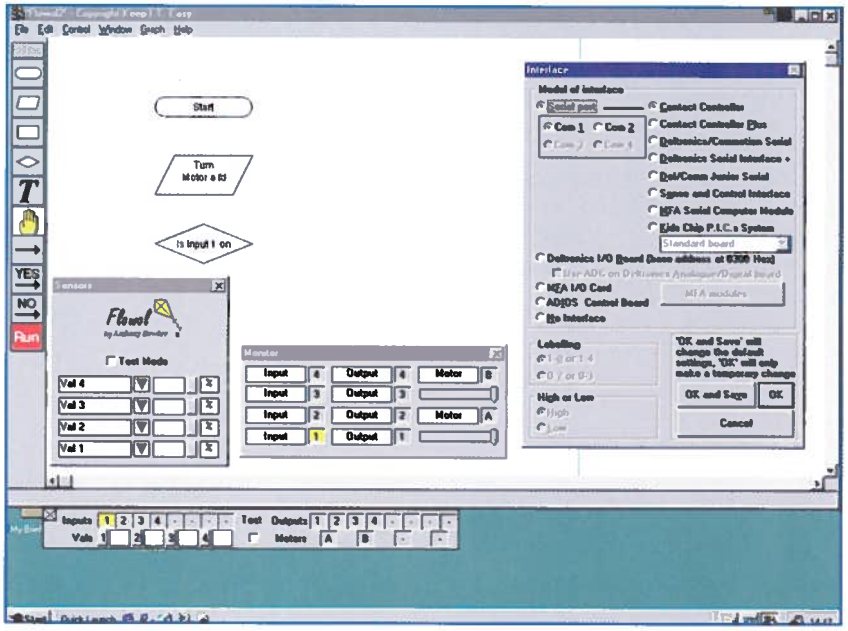


Figure 1 Flowol screen showing commands and other prompt boxes etc.

Flowol

This software package is a pleasure to use. It is simple and reasonably intuitive. More importantly, it will retain the children's interest. It can be used on its own to simulate control in a variety of everyday situations. These range from traffic lights to a washing machine. From a primary teacher's perspective, it is useful in that the pupils can create a programme and test the result on screen first. This they can do without having the complications and costs associated with interfacing and model building.

Facilities to use an interface with ready built models are available as an enhancement to the package, at extra cost. The rational of *Flowol* is startingly simple. Pupils write a program using flowchart symbols. Instructions appear in a prompt box. Figure 1 above illustrates these points. Thus may spelling mistakes and syntax errors be avoided (would that literacy initiatives were all so easy!). The program can then be run on screen to ensure all is well. A picture or *Mimic* can then be imported and the program run in simulated mode.

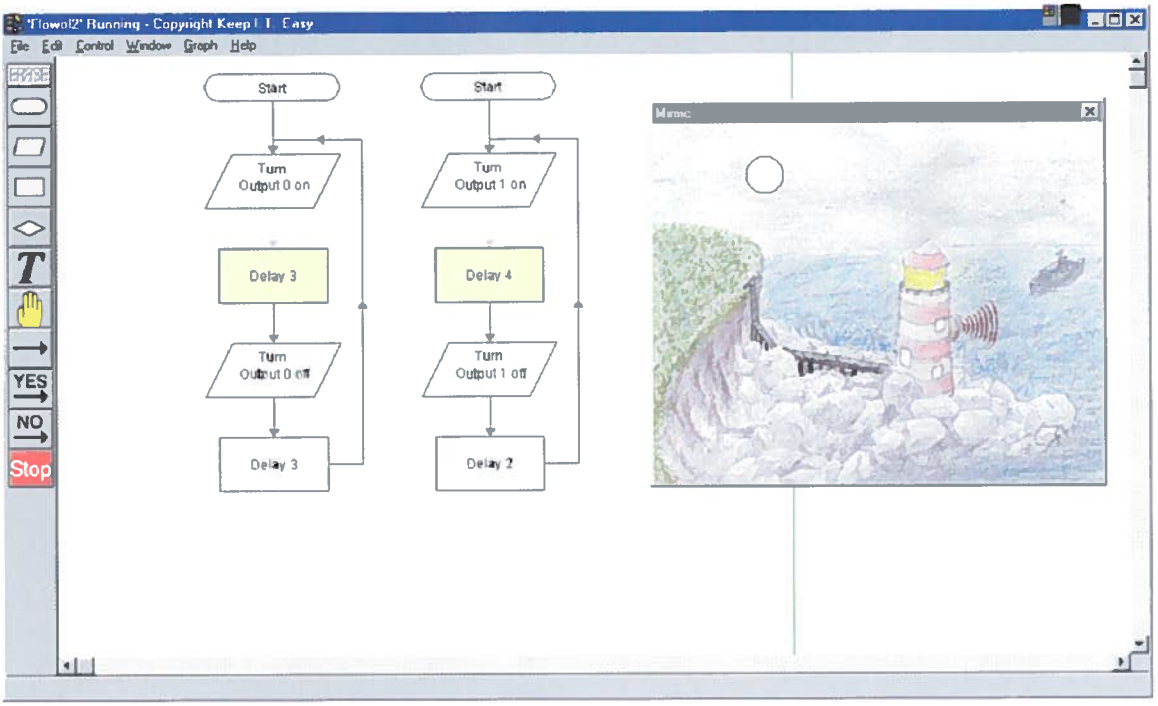


Figure 2 Flowol screen for lighthouse program with MIMIC

Figure 2, shows an embarrassingly simple program designed to switch on both the light and the horn of a simulated lighthouse. After the program is written and tested to iron out any bugs, a *MIMIC* or picture of the lighthouse is imported. The program is then started when not only is the picture animated, but we hear the sound of the foghorn. From the picture it should be a simple matter to see where a little progression can be introduced. What if the light only came on when the Sun did not shine? Now we are controlling both inputs and outputs.

The software boasts one other useful tool - a simple graphical facility, which allows inputs and outputs to be monitored. The 'graph' can be saved, printed and where possible analysed. Figure 3, opposite, shows the simple graphical display for the lighthouse programme. This is not a particularly useful example, and merely indicates what can be done.

The basic *Flowol* kit includes programs for three *MIMICS*: the lighthouse; zebra crossing and bridge traffic lights. Other mimics are available but, of course, at extra cost.

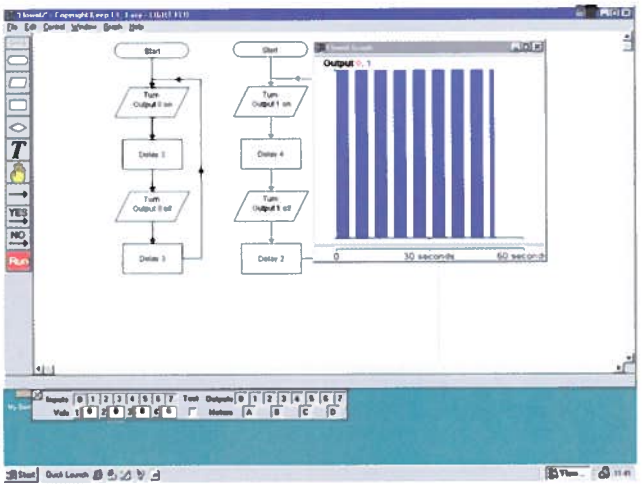


Figure 3 Simple Flowol graphical display - lighthouse program

Kids' chip system

The Kids' Chip system again has simple well designed packages that look a bit overpowering at first sight but are worth a little time and effort to realise the benefits.

Basic Kids Chip

This is the model that looks to be of most use in primary school. No computer is needed as the chips are pre-loaded with 15 separate programs. We have seen this system in operation. We have not ourselves used it so are unable to give anything other than a general comment. In the demontration we saw, the system worked well and was very well designed.

Kids Chip PIC System

This is the system we trialled at the bench. It too makes use of the Flowol high level language. Therefore it is a fairly easy matter to write and trial a program on-screen. All that needs to be done thereafter is to download the program to the PIC chip via the Downloader provided.

This seems simple, easy even. But, then we found what could be some wee problems in schools. The I/O (input/ output) and motor boards (see Figure 4 opposite) are fiddly to use. We are reasonably familiar with circuit boards and electronic components and were not too taken aback by having to fiddle about with wires and cable to get things to work.

We can see that this may not necessarily so in Auchenshoogle Primary School. We judge that this system would need to be introduced with good in-service support if it were to be made available to teachers of pupils in P6/P7. In S1/ S2 it may present less problems and there it could provide a good introduction to PIC controllers. Overall we thought this a good package for the price and could see it being a useful addition to Technology Departments' coverage of the control element in Environmental Studies.

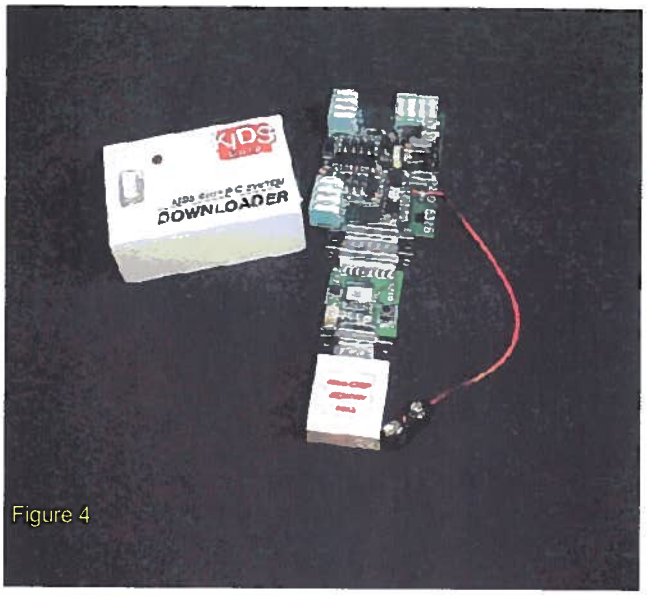


Figure 4

ROBOLAB™

This system makes use of a retail robotics package from *LEGO*™ commonly known as *Mindstorms*. In this variant, its *Robolab* guise, it is intended for formal educational use. Usually the tag "educational" means that the kit is a wee bit more expensive and includes a set of workcards. This one is no exception. It is and it does.

At the heart, or should we say the brain, of the system is the *RCX brick*. This is actually a cleverly designed microcomputer about the size of a small digital camera. (See Figure 5 opposite). The really clever bit though, is the facility to connect standard LEGO bricks on to an RCX so that the chip becomes an integral part of a working model.

ROBOLAB software is based on the *LabVIEW* software which was developed by Texas Instruments. It is an industrial package redesigned for educational use. Such adaptations to educational usage can mean software that is initially difficult to understand and with long learning curves thereafter. This is not so with this package. It has an excellent Teacher's Guide and uses simple, pictorial programming. Children should have few problems with the programming. The whole concept is 'games' oriented and it is simple to click the pictorial parts together (Figure 6, over). More extensive model building using standard LEGO parts should also be fairly straightforward since the instructions will be within the ken of children used to normal LEGO projects.

This is a well thought out package using standard building block techniques and you do get lots for a lot of your money. There are 1,615 bits and pieces in the Starter Set.

The software is easy to install and simple to use. However there is a bit missing, the ability to simulate a program on-screen. Now we know the supplier will say it is an easy matter to download and have things working immediately. This may be so but how many RCXs at £75 each will I need to buy to satisfy a class of 30? Many teachers with limited school budgets do ask for on-screen simulation; they know that this allows most pupils to achieve some form of success in creating a working program.

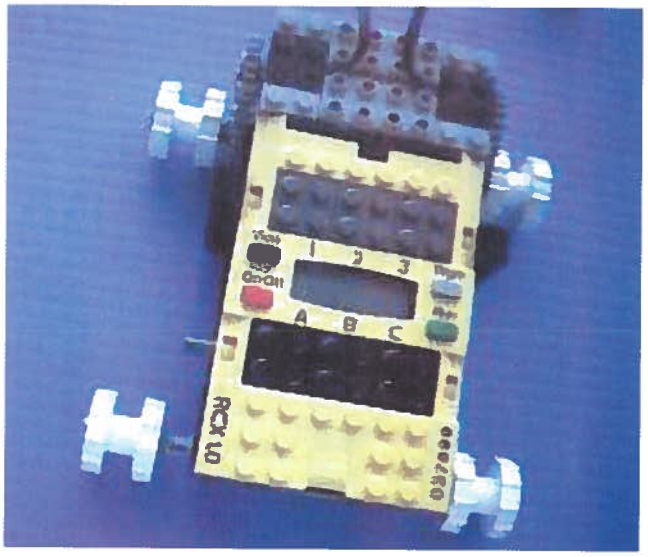
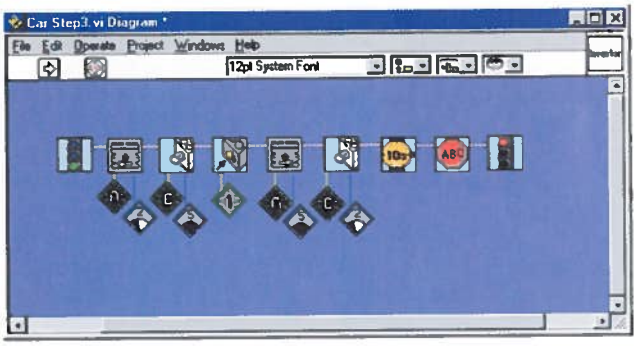


Figure 5 *Lego Mindstorms* : buggy with control chip



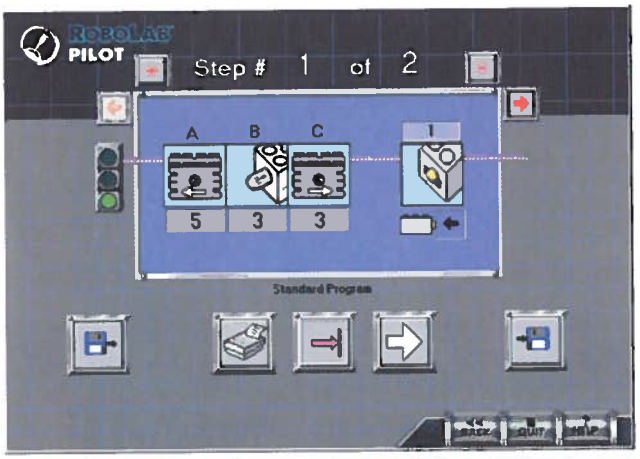
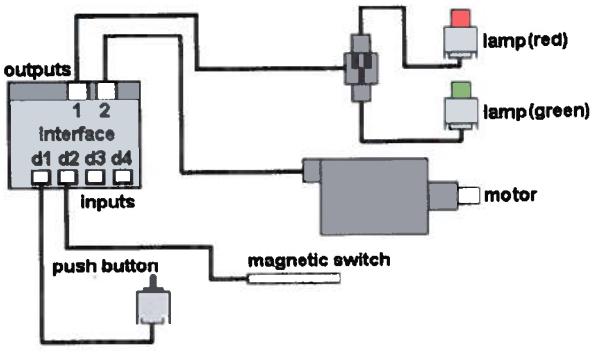


Figure 6 *Lego Mindstorms* : Programming screens showing the pictorial approach

LASY Junior Control

This package is fairly new to us. At first sight, it appeared to have all the ingredients of a useful package for teaching computer control at the primary level. Plus points were the clear wiring diagrams for each of the programs, which were held on disk, with a relatively simple programming vocabulary (See Figure 7 below). The minus points, for us at any rate, were the on-screen simulations and the rather old-fashioned look to the programming screens. Simulation of the effects of inputs is only shown when the interface is connected. This is not what the busy teacher wants or needs.

As game programs become more and more sophisticated, then so children look at educational software in increasingly critical ways. Here there was a sense of deja vu to the presentation. Had we not seen this in software written for the Acorn BBC platform? The chunky modelling components are, however, first class. It should be well within the capabilites of P3 pupils to build working *Lasy Junior Control* models. The interface is compact, small even. It has easily distinguished inputs and outputs. A useful and enjoyable package to help overcome the attainment outcomes of control in Environmental Studies. However at £500 a kit it may be well beyond many Primary school budgets.



Assembly instructions page 44 - 60

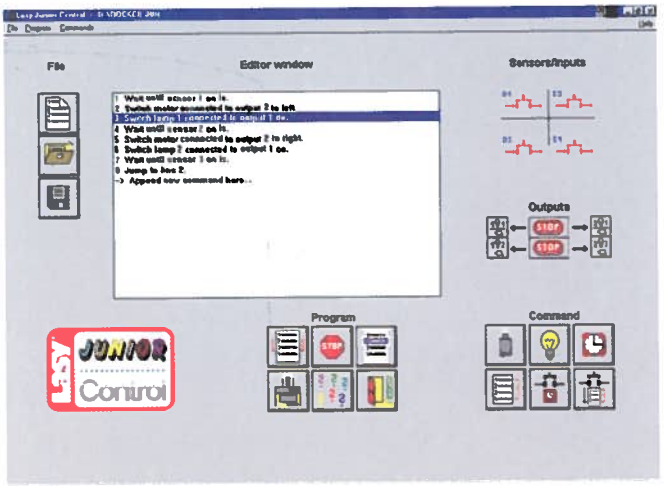


Figure 7 *Lasy Junior Control* : Simulation (above) and Programming screens (right column).

Overall summary and verdict

Information on all four kits is tabulated opposite. For our own simple evaluation exercise, we looked mainly at cost, ease of use and curricular fit. *ROBOLAB*, *Flowol* and *Kids' Chip* were all close contenders. *LASY*, although expensive, is a package that has many good points. Currently it lacks a Scottish dimension. We believe this is being addressed by staff at Nothern College. *Robolab* is an exciting package but price and lack of on-screen simulation cost it first place. *Kids' Chip*, we felt would be more suitable at S1/S2, since in-service training is needed to boost the primary teacher's confidence in its use.
Ease of use and cost, coupled to simulated programmes on-screen, gave *Flowol* an important edge. Within the limits of our short trials, we currently commend it as a best buy, at least for those aspects of control technology to be covered P4-P7.

Kit	Supplier	Cost	Curricular fit
Flowol Site Licence 3 Mimics	*Data Harvest*	£138	Control P4/P7
Kids Chip Starter Pack (needs Flowol software)	*Data Harvest*	£125	P7/S1/S2
Robolab Starter Set	*Commotion*	£355	P6/P7/S1/S2
Lasy	*Spectrum*	£499	P6/P7/S1/S2