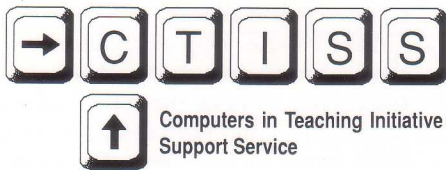## Centres stimulate academics to teach with computers

→ CTISS
↑ Computers in Teaching Initiative Support Service

Acorn
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Acorn Computers is working closely with centres which have recently been set up to encourage university lecturers to use computers in their teaching. The nineteen Computers in Teaching Centres have been offered a package of the latest Acorn hardware and software.

The centres have been set up by the Computers in Teaching Initiative Support Service in a programme that will run for at least four years. The centres are located within university departments around the country; each is responsible for providing support in a different discipline. The subjects they cover range from accountancy and psychology, history and modern languages. Although it is not intended that they develop or program software themselves, the centres will create a helpful and supportive interface to all computer users in their subject area, and encourage more lecturers to incorporate computers into their teaching repertoire.

One of the first tasks for each centre will be to establish personal contact with every university lecturer in its discipline, throughout the whole of the United Kingdom. Staff from the centres will also give lectures, demonstrations and seminars in other universities on the use of computers in the teaching of their subject and organize an annual workshop or conference.

Part of the centres' brief is to evaluate the available software. As soon as possible they will distribute a guide to sources of software that can be used in the teaching of their subject, and update it as more software is released.

Most of the centres have expressed a keen interest in evaluating Acorn's products, and have already specified the hardware most appropriate to their discipline, and the software they will be running on it. Acorn and independent software houses are supplying copies of their packages for evaluation.

Acorn computers bring the power of 32-bit RISC technology, with its exceptional processing speeds, within the budget of the average university department. The Archimedes machines, with the RISC OS multi-tasking operating system and graphics-based user interface, combined with the system's ease of use, make Archimedes computers especially attractive for teaching in higher education. The R140 UNIX workstation supplies low-cost desktop power while maintaining full connectivity with other workstations, PCs and multi-user, graphics, windowing and network capabilities built in at a very competitive price.

The availability of BBC BASIC, powerful versions of C, FORTRAN and other languages, together with a wide range of applications software, all help to ensure that the range of hardware from Acorn provides a cost effective solution to needs in higher education.

For full details of the Computers in Teaching Centres and the subjects they cover, please contact Jonathon Darby, CTISS, 59 George Street, Oxford OX1 2BH. For further details of the Acorn range of computers please contact Michele Swann, Acorn Computers Limited, Fulbourn Road, Cambridge CB1 4JN. Tel. (0223) 245200.
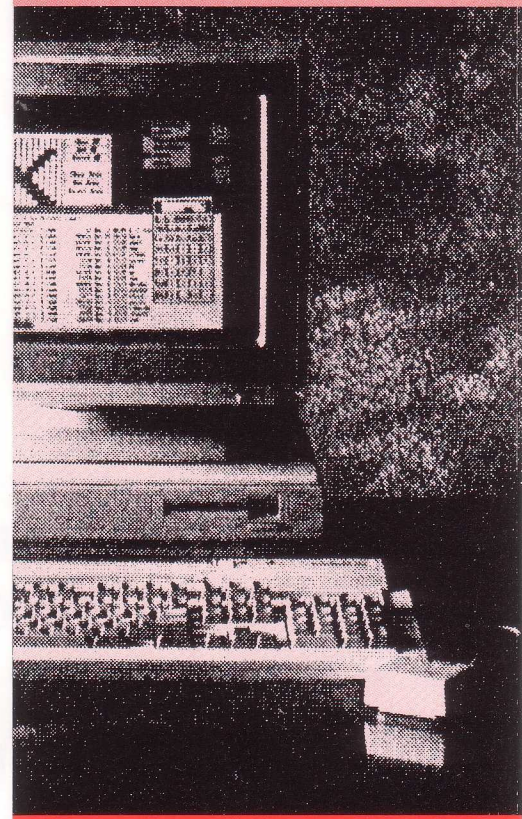
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Essex teaches electronic engineering on Archimedes systems

Peter Noakes and Andy Green are members of the CAD Research Group in the Department of Electronic Systems Engineering at the University of Essex. Here they describe how they have used Archimedes 440 computers to support computer-aided design (CAD) in an undergraduate electronic engineering course.

The Archimedes computers in use in the laboratory.

For many years we have supported design experiments and projects in the first and second year laboratory programmes with CAD software that has been written in the department for the BBC microcomputer. During 1988 we decided to upgrade the computer support in the laboratory, and so we purchased twelve Archimedes 440 computers. One of our reasons for choosing the Archimedes system was that our CAD programs were already written in BBC BASIC and would need only minor changes to run on the new machines. We were also aware of the power of the

system's RISC chipset, and the improvement in processing speed this would bring with it. Students have been using the new computers in their CAD activities since last October. Two are reserved for final projects and one is dedicated to program development and support.

Our own software supports linear circuit analysis, filter design and gate array design. For example, **LINAC** allows linear ac analysis of circuits that include both passive and active elements, **TICLE** carries out transient analysis of passive circuits, whilst **TRAGIC** is a dedicated program for undertaking the ac analysis of a common emitter amplifier. Another suite of programs is used by students during the design of passive filters using the Darlington Insertion Loss technique. The software we have developed for teaching gate array design is now being marketed by Silicon Vision.

The introduction of the Archimedes computers has allowed us to increase the level of CAD within the laboratory by purchasing Silicon Vision's own **ARC PCB** program for the design of printed circuits. This program is a layout package for multilayer boards, with the additional facility that it allows the user to define layouts which can then be held in a library for future use. Using **ARC PCB** first-year students can rapidly design a single-sided board for a simple transistor switching circuit; second-year students have used the package to design a more complex double-sided board for a TTL circuit.

We now have Qudos' **Quickchip** and **Quickchip-Plus** for our Archimedes computers (obtained through the UGC/DTI ECAD initiative) and have introduced a new four-week gate array design project for all second-year students. Although there were one or two teething problems with the pre-release version of the schematic capture package we were using, we found Qudos very co-operative and our problems were soon sorted out.

Our investment in Acorn's Archimedes computers has allowed us to improve our CAD computer support significantly. Our own software runs appreciably faster and the screen plots of the results are much improved. Our Archimedes computers have been in use every day since the beginning of the academic year and have given no problems. The decision to upgrade our facilities to the Archimedes systems has proved a definite success, and we are looking forward to even greater use of these resources in the next academic year.

Sussex students learn mathematics through programming

The thirty Archimedes 310 computers networked in the mathematics laboratory at Sussex University's School of Mathematics and Physical Sciences are solely for the use of the undergraduates. The laboratory is open all day and students have free access to the machines whenever the room is not booked for teaching. (The BBC B and Master Series microcomputers that the Archimedes machines have replaced are now used as terminals to the department's VAX computer.)

Dr Joe Taylor, chairman of the university's data processing committee, welcomes the greater speed of the Archimedes computers – especially noticeable in their graphics processing – and particularly likes their file-handling system.

During their first year all students of pure and applied mathematics take a course called 'Introduction to Computing'. This teaches them how to code mathematics in BBC BASIC. During their subsequent years they reinforce the formal teaching of mathematics by solving course-work problems in the laboratory. As the students analyse each problem in order to construct a program that will solve it, they have to define their terms, and this deliberate process of definition leads to rigorous mathematics. It also produces some very exciting answers!

The library command on the Archimedes computer makes the system very attractive for this style of teaching, since it enables each student to build up a library of pro-

cedures. Every week students are asked to write a program which consists of about half-a-dozen lines and this is saved as a procedure. The course is structured so that they have to incorporate procedures from the library into subsequent programs; by the end of term they will have written a fairly long and complex program with little trouble.

Dr Taylor has, with the help of a grant from the University Grants Committee, compiled a library of mathematics software which is made available to the students as a source of techniques.

Archimedes computers control low temperature NMR research

The Millikelvin Laboratory at London University's Royal Holloway and Bedford New College is populated almost entirely by Archimedes machines. Dr Brian Cowan purchased one of the very first 305 models and installed an Archimedes 440 system as soon as it became available.

Dr Cowan researches into the remarkable properties of solid helium at temperatures within a degree or so of absolute zero. Nuclear magnetic resonance (NMR) is his main experimental technique.

The programme of automation started with the measurement and regulation of temperature. By using cryogenic temperature sensors and a low dissipation conductance bridge it is possible to measure the temperature of the helium to within one thousandth of a degree. Additionally, the cooling power of the refrigerator can be controlled to regulate the temperature to this level of accuracy. Both measurement and regulation are performed by an Archimedes 440 machine running a program written in C. This will soon be one of many operations running under multi-tasking control, either in the RISC OS windowing environment or as a background task installed as a relocatable module.

The NMR spectrometer operates independently under computer control. The Archimedes computer generates sequences of pulses which initiate NMR measurements before the data is captured. These pulse trains have been generated in several different ways. One method depends entirely on software: by programming the 6522 VIA chip in the I/O card. This was an adaptation of a scheme originally developed on the 6502-based BBC computers. Very much faster sequences are now generated using an external unit containing fast counters clocked at 50 MHz, programming them and then reprogramming them from the Archimedes computer. Other features of the spectrometer,
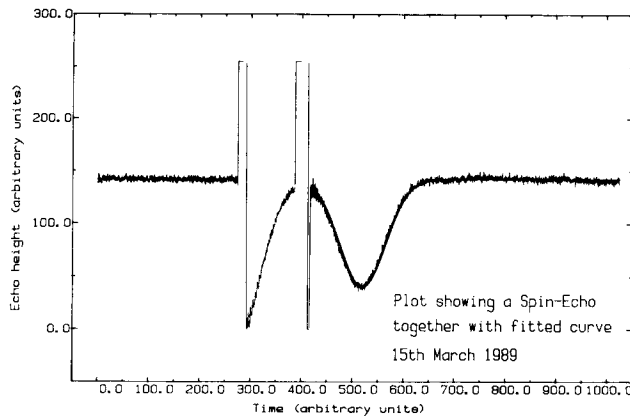
such as gain control and phase adjustment, are controlled in a straightforward manner by the Archimedes computer.

One particular advantage of the Archimedes system is the speed of real-time data processing. Signals from the

Plot showing a Spin-Echo together with fitted curve
15th March 1989

NMR spectrometer are captured on a digital storage oscilloscope and analysed between successive pulse sequences. Non-linear least-square curve-fitting algorithms, written in FORTRAN, are used to place a curve with a specified shape through the data points. This form of data smoothing rapidly obtains the relevant signal parameters. The figure shows a typical spin-echo signal which has had a curve fitted through it. The extent to which the fitted curve cannot be discerned is a measure of the smoothness of the fit.

Other applications of the Archimedes machines in the research project, apart from number-crunching, include using the computer algebra system **REDUCE** in the development of the theory of magnetic relaxation in quantum systems. This software has enabled calculations of considerable complexity to be performed rapidly and without error. Acorn's **1st Word Plus** package is used for word processing, together with the **First Fonts** scientific character set available from Ian Copestake Software.

Much of the work described here has been carried out by Mr Tom Crane as part of his PhD research programme, and the projects are supported with research grants from the Science and Engineering Research Council. *For further information please contact Dr Brian Cowan or Mr Tom Crane at the Royal Holloway and Bedford New College, Egham Hill, Egham, Surrey TW20 0EX; tel. (0784) 39091.*

Archimedes users meet to compare notes

Dr Brian Cowan is planning to hold a one-day meeting during the Michaelmas term for academic users of Archimedes computers in research, including both software and hardware applications. Dr Cowan hopes to attract participants from many subject areas, and would welcome ideas for 20-minute presentations on topics such as interfacing, control, software applications and cpu-intensive programs. It is hoped

that the proceedings will be published.

If you would like to take part in such a meeting, or have suggestions for a presentation, please contact Dr Brian Cowan at the Royal Holloway and Bedford New College. His e-mail address is COWAN at UK., AC.RHBNC.PH.V1; his telephone number is (0784) 39091.

Acorn's DTP package prints professionally

The Acorn Desktop Publisher is the first of a new generation of powerful yet affordable DTP packages. It runs on the Archimedes computer within the RISC OS multi-tasking operating system and outputs through very high-quality printer-drivers to a range of popular dot-matrix and laser printers.

Acorn Desktop Publisher is a general-purpose tool that will bring desktop publishing to a much wider public. By employing just the basic levels of operation users can produce quality output, the sophistication of their product will develop as their knowledge of the system grows. Materials from almost any source can be integrated into a document, and pictures, text and diagrams produced with packages running under RISC OS are particularly easy to incorporate.

A selection of type-styles including symbols is provided. All are scaleable with the new outline font manager. Automatic formatting facilities, including style sheet and paragraph tagging, mean that long documents can quickly be assembled to a consistent format. The pages can be numbered automatically, and layouts for both right- and left-hand pages specified to speed the preparation of multi-page documents.

Simple illustrations can be created directly on the page. More complex artwork can be created in a separate window on the screen with the Paint and Draw programs that are provided with RISC OS, or imported from another package. Once the illustration has been placed on the page, it can be scaled and cropped to achieve the best layout.

Making apparently simple changes to a page layout requires a lot of recalculation by the computer. Reformatting can cause lengthy hold-ups on most DTP systems, but here the power of the Archimedes system smoothly maintains a fast pace.

The printer control built into RISC OS makes the best possible use of your printer's mechanism. Inexpensive dot-matrix printers produce exceptionally neat results, with the minimum of 'stepping'; at the other end of the spectrum the package operates laser printers efficiently to produce correctly profiled characters in all font sizes, and accurately drawn vector graphics.

Acorn Desktop Publisher will be available in June for £149.00 (excluding VAT). For full details of the package please contact your local Acorn Dealer.

Snaps and snippets

New models launched in the Archimedes 400 series

The three new models in the Archimedes 400/1 series are the 410/1, with 1 Mbyte RAM, the 420/1 with internal 20 Mbyte hard disc and 2 Mbyte RAM, and the 440/1 with a fast-access 50 Mbyte hard disc and 4 Mbyte RAM. The speed of the Archimedes computer has been increased by 10%, and the RISC OS operating system uses the machines' processing power to the full. All three models have a four-slot expansion backplane with a fan so that they can be upgraded with ease. Other standard hardware features include built-in graphics controllers, the circuitry for a hard disc controller, and a co-processor bus. Prices start from only £1199 (+VAT) for the Archimedes 410/1, £1699 (+VAT) for the Archimedes 420/1 and £2499 (+VAT) for the Archimedes 440/1 model. (Prices do not include monitors.) Education prices are available to recognized institutions.

Acorn's Ken Millard supports the R140 ISVs

Ken Millard has joined Acorn's UNIX product management team as the ISV support co-ordinator. Ken's brief is to co-ordinate Acorn's liaison with the increasing number of people who are porting software to the R140. He is preparing a series of application notes with details of forthcoming products from Acorn and the independent software vendors. If you are developing software and would like a copy of the application notes, or a draft version of the R140 Programmer's Reference Manual, write to Ken at Acorn Computers Limited, Cambridge Technopark, 645 Newmarket Road, Cambridge CB5 8PB.

Eight dealers appointed for the R140

Acorn Computers and its distributor, Dorset-based Hugh Symons, have appointed the first UK dealers for the UNIX-based R140 workstation. They are Surrey-based Calancraft (tel. 09323 42137), D A Computers of Leicester (tel. 0533 549407), Data Store in Bromley (tel. 01 460 8991), Lansdowne UK in Poole, Dorset (tel. 0202 26535), Cambridge-based Qudos (tel. 0223 420033), Rotherham Computer Centre (tel. 0709 369912) and 3SL in Cheshire (tel. 0270 761516). Further dealers will be signed up over the next few months to achieve an initial network of 25 suppliers.

R140s available on loan

Accredited R140 dealers have a number of R140 computers available for short-term loan or evaluation. If you would like to evaluate this machine, please telephone your nearest R140 dealer, or write to Frank Burdett at Acorn Computers Limited, Fulbourn Road, Cambridge CB1 4JN.

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