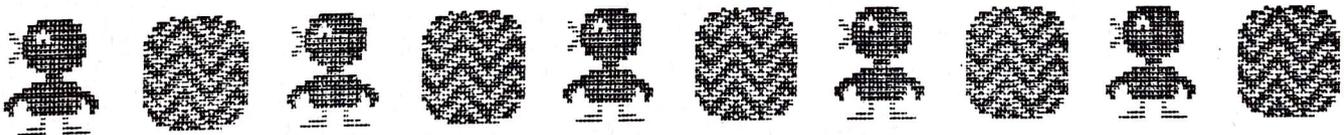
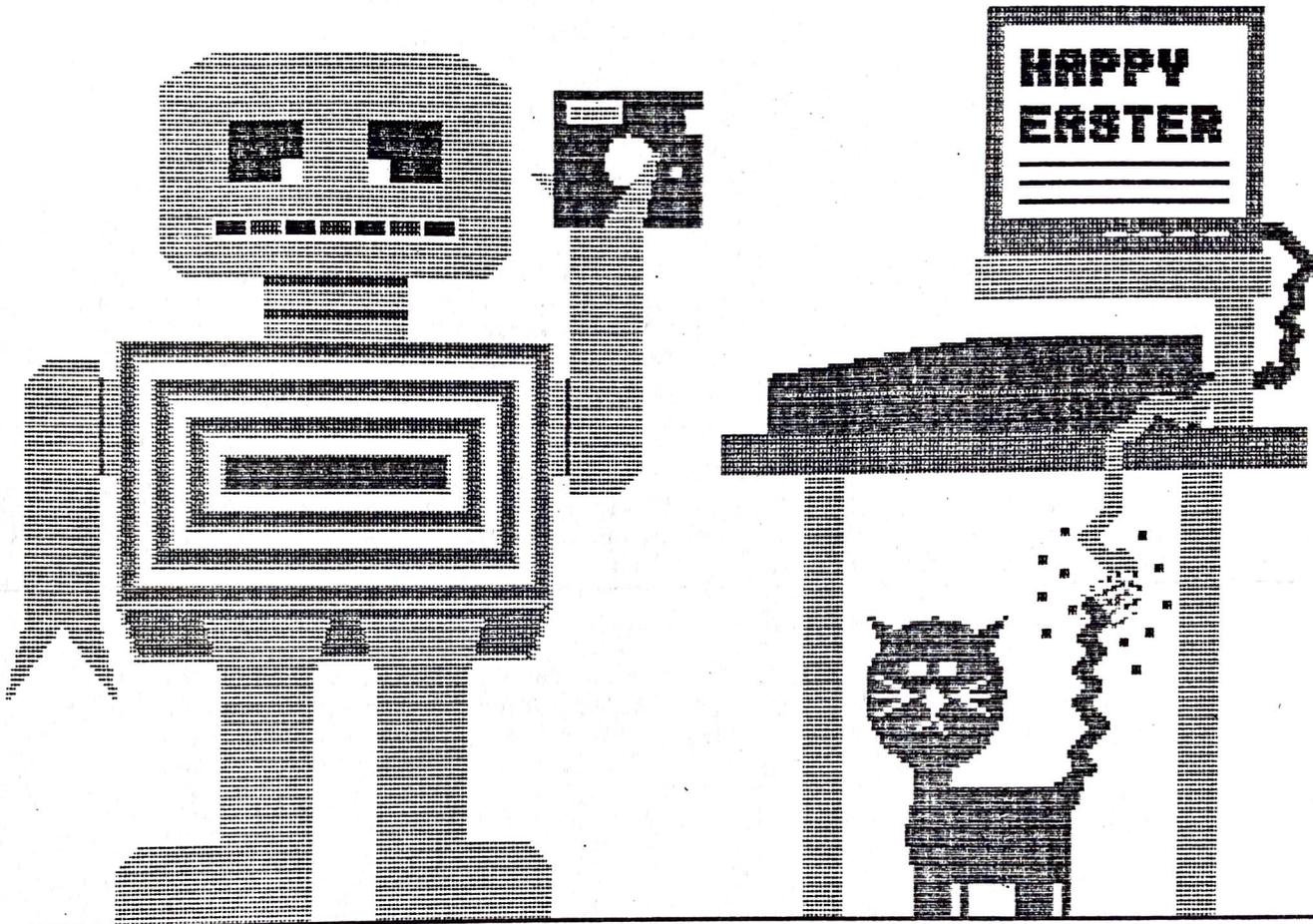


ABUG



ACORN & BBC
microcomputers
USER GROUP
Sheffield

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Diary

April 3rd	(The Hornblower)	Social
April 17th	(venue to be arranged)	Talk and Demonstration by Steve Gold
May 1st	(The Hornblower)	Social
May 15th	The Annual General Meeting	
June 5th	(The Hornblower)	Social

As usual, we thank A.T.P.L. for taking the trouble to bring and set up such an impressive display last month. Some of the equipment, such as the EPROM blower, is fairly familiar to most people, but the music program and the 'Symphony' keyboard gave a glimpse into an increasingly popular application for home micros. At £125 the 'Symphony' keyboard initially might sound a little expensive, but it turns out to be quite good value when you realise what you get for your money. The keyboard itself is professional quality in design and construction. There is an impressive array of software giving access to playing and editing facilities. The addition of the 'System 500' music hardware from Acorn considerably extended the quality of the musical output, and it was enjoyable to see a demonstration, as this is probably beyond the pocket of the casual amateur user. At the moment A.T.P.L. are the only people providing software support for this system.

On the subject of music programs, two very sophisticated music 'word processors' have appeared recently, the ROM-based MUR0M and The Music System. If anyone has any experience of using either of these programs we would be very interested in running an article on it.

One other interesting item is that A.T.P.L. were selling 6264 8K dynamic RAM chips on the night for only £9.50. These are the chips which are needed for the ROM extension boards from Watford, A.T.P.L. etc. to give a sideways RAM facility, often with a battery back-up to preserve the content when the computer is switched off. The price of these chips has now come down from £235 only two years ago and makes the comparison between Sideways RAM and sideways ROM boards a much closer decision. This seems to be in line with the cost of most memory chips, and in fact ICs in general. After the famine which pushed up prices a year ago prices are now coming down to more realistic levels. For instance the 2764s which we used to buy for £4 rose to a high of more than £9 but have now returned to around £4 and are readily available while the 27128s are actually cheaper at £11 than they were a year ago.

The good news for this month is that after its sumptuous refurbishment (?) Park Baths will again be available and, from April onwards, all the formal monthly meetings will be held there. The Hornblower seems to be a popular venue for the social meetings, if only for its central location, and we plan to carry on using this for the foreseeable future.

FISCHERTECHNIK ROBOTS

If you read the microcomputer press (and I am sure you do!) you may have noticed advertisements for the Fischertechnik Computing Kit, with which it is claimed that

"young and old alike" will be introduced to "the fascinating world of robotics". The kit is sold by several different firms, but unfortunately most of them provide neither a computer interface nor software! Quite how you are supposed to operate the models is not stated. However, interfaces are now becoming available, and I found myself writing the software which is supplied with the Economatics interface for the BBC computer.

The instructions in the kit describe how to build ten different models, including a primitive "pick and place" robot, a sorting system, a lift, graphics tablet, and solar tracker, but of course you could design and build your own robot with the parts provided, or you could add further parts.

Apart from a quantity of Fischertechnik parts of various shapes and sizes, you get two DC motors and gearboxes, an electromagnet, and several sections of toothed rack. A large turntable with gear teeth round the outside is the most useful part as it is the means by which any rotating model may be firmly anchored to the ground! Input is provided by eight microswitches and two potentiometers.

Fischertechnik itself is an advanced construction kit from Germany which is finding increasing favour in schools and colleges in this country. It is more varied than Lego, and allows "proper" engineering principles to be used. The resulting model is not totally solid, but will not fall to bits at the slightest knock as is sometimes the case with Lego.

In designing the software, I had to consider what kinds of robot were likely to be built, apart from those suggested in the construction guide, and I was able to divide the models into two groups: those which collect all their own data, and those which require additional information in order to run. In the first category come the traffic light and the lift system, among others, and in the second the more advanced models like the "pick and place" unit and the "Tower of Hanoi" robot, which require to be "taught" the positions to which they are to move.

The requirements of the self-sufficient models were met by producing an "Authoring Language" which allows motors to be switched in either direction and stopped by a combination of time, potentiometer or switch conditions. Overall control was provided by REPEAT and WHILE loops as well as PAUSE statements. It was found unnecessary to provide IF..THEN statements, as most reasonable combinations of events could be handled adequately with WHILE loops and the end-conditions for the MOTOR statements. A Manual Drive facility was included to drive the motors or magnet directly from the keyboard, and for those robots requiring more advanced programming, a large file of procedures written in BASIC was provided for users to add to their own programs. Quite a lot of attention was paid to the "User Interface". The format chosen was to have a "window" of the instructions typed in which scrolls up or down as in Wordwise. Syntax errors can never occur as the program does not accept invalid input. At all times, the acceptable keys to be pressed are displayed in the lower half of the screen, and the list of instructions for the robot is always visible in the window. Comment lines can be added, including coloured text and colour graphics, and although these are not executed, they enhance the user's "program" and can be used as prompts for the operator of the robot.

The software is accompanied by a booklet which goes into detail about the operation of each of the models, and gives hints for users to progress further.

Disc Drive Speeds

One problem which has cropped up several times in the last few weeks is the use of the series of eight links on front right hand side of the keyboard. The standard BBC has nothing in these links and they are thus normally not made. However it is an easy job to solder in an 8-way DIL switch and have access to some useful facilities. The most important as far as disc users are concerned are switches 4 and 5. Most disc filing systems read the values of these two switches and use this reading to set the speed parameters for the disc drives. There are three times which must be set for any particular disc drive; the step time, settle time and head load which control the sideways and vertical movement of the read/write head. For modern drives the most useful parameter to change is the step time. The head moves from the edge to the centre of the disc by means of a stepper motor. If the head has to move more than one track at a time then the computer sends a series of pulses to the motor, one for each track to be moved. It is obviously imperative that each pulse is not sent until the head has finished its motion from the previous pulse. The pulses are thus delayed by the DFS and the amount of delay is determined by the setting on the keyboard. Because old style disc drives took as long as 30 ms between tracks most DFSs take this as their default value. Modern drives however take only 6 ms and thus spend up to 24 ms between every track waiting for something to happen. On an eighty track disc this takes the head two and a half seconds to traverse the disc instead of half a second. This may not sound very much but if the head is at the centre of the disc when a program is requested, the head will have to travel to the edge to read the directory, travel back to the program location and then read the program. All told as much as four or five seconds can be wasted and this sort of time is not trivial if multi accesses have to be made as in most games programs, or especially in random access routines such as databases. The exact setting of the keyboard switches varies between the DFSs available. For Acorn the fastest speed is selected with both links 3 and 4 made (N.B. this is bits 4 and 5 if you are reading this as an 8-bit byte). If you use another DFS it is worth finding out from the user manual which settings are needed. One interesting feature which is included in the latest version of the Solidisc DFS (version 2.0) is a set of star commands to change the disc timings independent of the keyboard links. If you want to experiment you can do this with any of the DFSs by using *FX 255 which changes the value of the links by software.

Changing the setting of link 5 will make your discs auto-boot every time you press Break rather than when you press Shift-Break, while changing links 6,7 and 8 allow you to select other modes than mode 7 as the default after a reset. Links 1 and 2 are not used on the standard Acorn machine but are used by Microware for example to indicate whether you have 40 or 80 track drives.