

CONTENTS

APPLICATION

CALCULATED MOVES We look at the two principles on which robot arms are programmed to move: point-to-point and continuous path movement



701

HARDWARE

BETTER BY FOUR The Commodore Plus/4 is the natural successor to the Commodore 64, both in terms of facilities offered and sales potential



709

SOFTWARE

SEND IN THE CLONES Our series on spreadsheets for home micros continues with a look at Abacus, the program offered with the Sinclair QL



712

PSYCHIC ATTACK Psytron is a strategy game in which you are charged with the running of a space colony besieged by attacking alien saucers

720

COMPUTER SCIENCE

WOOLLY JUMPERS Our LOGO series concentrates on the Atari machines. This week we develop a program that uses sprites



706

JARGON

GREEDY METHOD TO HAMMING CODE A weekly glossary of terms



716

PROGRAMMING PROJECTS

ROOM FOR MANOEUVRE We continue to develop program utilities by discussing a variable replace routine for the Commodore 64, BBC Micro and Spectrum



704

MACHINE CODE

FREE TRANSFER As the 6809 course draws to a close, we introduce the important concept of position-independent code



717

WORKSHOP

CONTROLLING POWER We begin a new project in which we build a digital-to-analogue converter to control analogue devices from the user port and eventually produce digitally synthesised sound



714

INDEX A complete index to issues 25 to 36

BACK
COVERS

Next Week

■ Following our examination of the state of the home computer market, we cast a similar eye over peripherals — everything from infrared joysticks to double disk drives

■ Our Workshop series brings you a discussion of real-time programming and some test programs for the digital-to-analogue converter

■ In BASIC programming we extend the search utility's scope by 'bolting on' a replace facility

■ Robotics depends on making decision-making mobile: we investigate intelligent robotic movement



QUIZ

- 1) Where do you find 'demons'?
- 2) What does 'REPLICATE' do?
- 3) What is 'continuous path training'?
- 4) What is a hacker?

Answers To Last Week's Quiz

- 1) When a file update program is run, the oldest version of the file — known as the 'grandfather' file is deleted, and is replaced by what was previously the 'father' file.
- 2) Decoders translate digital instructions from the computer to its peripherals into electrical signals, and vice versa.
- 3) Transducers take a measurement in one form — such as pressure — and convert, or transduce, it into another form — such as voltage.
- 4) The system variable 'PAGE' is part of the BBC Micro operating system. It contains the address of the start of the BASIC text area.

Editor Mike Wesley; Art Director David Whelan; Technical Editor Brian Morris; Production Editor Catherine Cardwell; Art Editor Claudia Zeff; Chief Sub Editor Robert Pickering; Designer Julian Dorr; Art Assistant Liz Dixon; Editorial Assistant Stephen Malone; Sub Editor Steve Mann; Researcher Melanie Davis; Staff Writer Steve Colwill; Contributors Geoff Bains, Harvey Mellor, Mike Curtis, Steve Colwill, Chris Naylor, Tony Harrington, Jim Lennox, Steve Malone, Ted Ball; Software Consultants Pilot Software City; Group Art Director Perry Neville; Managing Director Stephen England; Published by Orbis Publishing Ltd; Editorial Director Brian Innes; Project Development Peter Brookesmith; Executive Editor Maurice Geller; Production Controller Peter Taylor-Medhurst; Circulation Director David Breed; Marketing Director Michael Joyce; Designed and produced by Bunch Partworks Ltd; Editorial Office 14 Rathbone Place, London W1P 1DE; © APSIF Copenhagen 1984; © Orbis Publishing Ltd 1984; Typeset by Universe; Reproduction by Mullis Morgan Ltd; Printed in Great Britain by Artisan Press Ltd, Leicester

HOW TO OBTAIN ISSUES AND BINDERS FOR THE HOME COMPUTER ADVANCED COURSE — Issues can be obtained by placing an order with your newsagent or direct from our subscription department. If you have any difficulty obtaining any back issues from your newsagent, please write to us stating the issue(s) required and enclosing a cheque for the cover price of the issue(s). **AUSTRALIA** — please write to: Gordon & Gotch (Aus) Ltd, 114 William Street, PO Box 767G, Melbourne, Victoria 3001. **MALTA, NEW ZEALAND & SOUTH AFRICA** — Back numbers are available at cover price from your newsagent. In case of difficulty, write to the address given for binders.

UK/EIRE — Price: 80p/IRE1. Subscription: 6 months: £23.92. 1 Year: £47.84. Binder: please send £3.95 per binder, or take advantage of our special offer in early issues. **EUROPE** — Price: 80p. Subscription: 6 months air: £37.96. Surface: £31.46. 1 year air: £75.92. Surface: £62.92. Binder: £5.00. **MALTA** — Obtain binders from your newsagent or Miller (Malta) Ltd, MA Vassalli Street, Valetta, Malta. Price: £3.95. **MIDDLE EAST** — Price: 80p. Subscription: 6 months air: £43.94. Surface: £31.46. 1 year air: £87.88. Surface: £62.92. Binder: £5.00. Airmail: £8.31. **AMERICAS/ASIA/AFRICA** — Price: US/CAN\$1.95/80p. Subscription: 6 months air: £51.74. Surface: £31.46. 1 year air: £103.48. Surface: £62.92. Binder: £5.00. Airmail: £9.44. **SOUTH AFRICA** — Price: SA R1.95. Obtain binders from any branch of Central News Agency or Intermag, PO Box 57394, Springfield 2137. **SINGAPORE** — Price: Sing \$4.50. Obtain binders from MPH Distributors, 601 Sims Drive, 03-07-21, Singapore 1438. **AUSTRALASIA/FAR EAST** — Price: 80p. Subscription: 6 months air: £55.38. Surface: £31.46. 1 year air: £110.76. Surface: £62.92. Binder: £5.00. Airmail: £9.84. **AUSTRALIA** — Price: Aus\$1.95. Obtain binders from First Post Pty Ltd, 23 Chandos Street, St Leonards, NSW 2065. **NEW ZEALAND** — Price: NZ\$2.25. Obtain binders from your newsagent or Gordon & Gotch (NZ) Ltd, PO Box 1595, Wellington.

ADDRESS FOR BINDERS AND BACK ISSUES — Orbis Publishing Limited, Orbis House, Bedfordbury, London WC2 4BT. Telephone 01-379 6711. Cheques/postal orders should be made payable to Orbis Publishing Limited. Binder prices include postage and packing and prices are in sterling. Back issues are sold at the cover price, and we do not charge carriage in the UK.

NOTE — Binders and back issues are obtainable subject to availability of stocks. Whilst every attempt is made to keep the price of the issues and binders constant, the publishers reserve the right to increase the stated prices at any time when circumstances dictate. Binders depicted in this publication are those produced for the UK and Australian markets only. Binders and issues may be subject to import duty and/or local taxes, which are not included in the above prices unless stated.

ADDRESS FOR SUBSCRIPTIONS — Orbis Publishing Limited, Hurst Farm, Baydon Road, Lambourn Woodlands, Newbury Berks, RG16 7TW. Telephone: 0488-72686. All cheques/postal orders should be made payable to Orbis Publishing Limited. Postage and packaging is included in subscription rates, and prices are given in sterling.

COVER PHOTOGRAPHY BY IAN MCKINNEL