

At last - the no comp

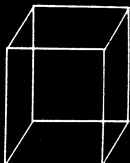
With the release of the MicroBee, Applied Technology brings you a state of the art computer you can build yourself. MicroBee is unique among kit computers in its price range. It offers facilities which make it comparable to machines costing 2 to 4 times its price. Brilliant, cost effective design and new technology have come together to make this machine possible. MicroBee is a complete computer. It is physically complete. You get a full case and chassis. You get the power supply. You get full manuals for assembly, BASIC programming and software development. IC sockets are supplied. The advanced 16K basic is supplied in ROM (not on cassette). There are no extras to buy with MicroBee. In terms of performance, MicroBee comes standard with features which come as extras on SYSTEM 80 and APPLE. Such as upper/lower case and RS232 interface. And things not available on either of these machines. Like continuous memory and built in sound. MicroBee achieves this at its incredibly low price by using the latest technology. The huge price drops in ICs in recent years have also aided us in bringing you the MicroBee at such a down to earth price.

16K ROM BASIC

MicroBee has been developed as the finest instructional computer on the market. Its superb 16K BASIC in ROM makes this possible. Whether you are a novice or advanced enthusiast, MicroWorld BASIC is a delight to use, with its advanced error reporting and powerful graphics facilities. Just to give you some idea of its power, its gives you:-

- Advanced error reporting with 33 comprehensive error messages and a feature packed program editor. This BASIC is so 'friendly' that anyone can master the computer and establish computer literacy, so vital in today's technological world.

```
05000 REM This subroutine draws a square of lengths l1,l2
05005 REM with the bottom corner at a1,b1
05010 VAR(A1,B1,L1,L2)
05020 REM Draw left side, then top, then right, then bottom
05030 GOSUB ( A1,B1,A1,B1+L2 ) 4000
05040 GOSUB ( A1,B1+L2,A1+L1,B1+L2 ) 4000
05050 GOSUB ( A1+L1,B1+L2,A1+L1,B1 ) 4000
05060 GOSUB ( A1+L1,B1,A1,B1 ) 4000
05999 RETURN
65000 END
```



- Powerful PLOT facility and high resolution graphics can be combined with alphanumerics to give the MicroBee unparalleled graphic display

Portions of lines may also be underlined for another effect,

e.g. This procedure must be followed at all times.

or in case of special notation ...

$$r = a \cos(w) + b \sin(w)$$

The verb in this sentence is sum

and educational capability. And with Microworld BASIC you have the support of a great software base. Your MicroBee will run the whole range of MicroWorld BASIC software. This includes a wide range of games and utilities. And the range is increasing all the time thanks to the enthusiasm of the Microworld Users Group.

Full constructional details as well as a BASIC manual and program development ideas are available this month as an article in

**your
computer**

Due for Release mid February

Complete Kit

\$399⁰⁰

Includes manual
16K BASIC in ROM
supply, and IC sockets
kit is complete.

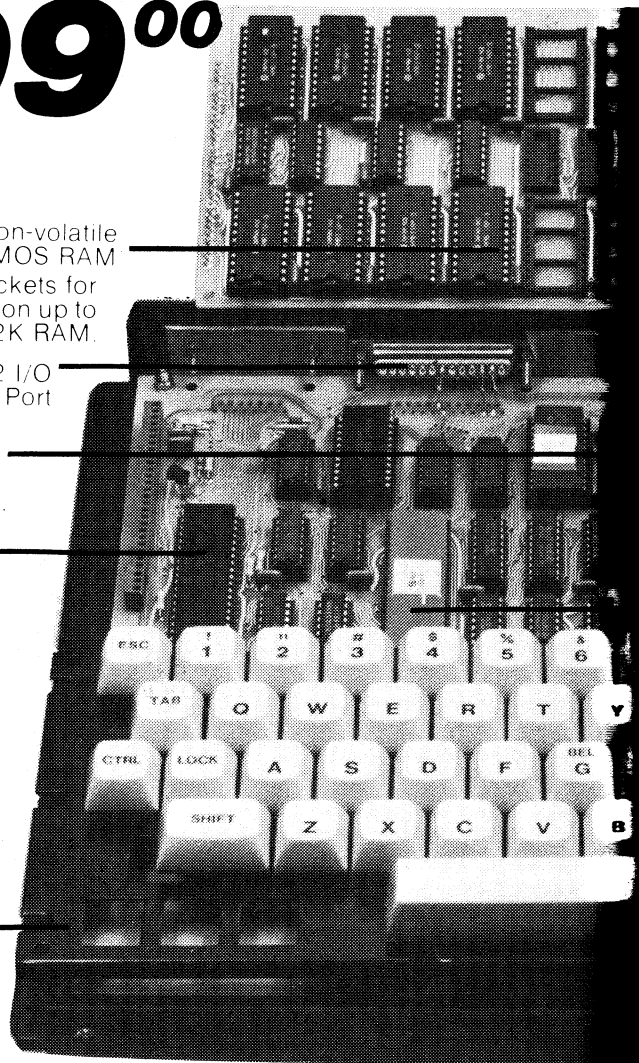
16K non-volatile
CMOS RAM
Sockets for
Expansion up to
32K RAM.

RS232 I/O
Port

PCG RAM and
ROM gives you
HiRes graphics.

Z80 PIO
Programmable
I/O Chip

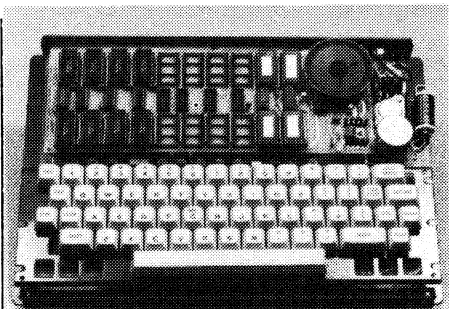
Metal Baseplate
Plastic cover is
also supplied.



romise kit computer

MicroBee Brief Specs.

CPU	Z80A
VDU	Memory Mapped 16x64 format. Upper/lower case. Under BASIC. Hires 512x256
Graphics	Low res 128x64.
Keyboard	Full size 60 key QUERTY standard layout.
Cassette Interface	Interface loads and saves at 300, 1200 BAUD.
Serial Interface	RS232. With connector.
Parallel Interface	Suits printers, modems etc.
Audio Output	Optional 8 bit I/O. Fully programmable.
Power	Internal speaker. BASIC control. 2 octaves, semitones. Period resolution 1/4 sec. Max. period 1/4x255sec. 12VAC at 1 amp (supplied).



How Good is MicroBee?

Compare MicroBee feature for feature with imported built-up Micros. Only then will you appreciate what a bargain it is. At last you can buy an Australian designed computer incorporating all the best features of TRS80, APPLE and SORCERER. But at a fraction of the price.



NON VOLATILE CMOS MEMORY

The use of the latest CMOS RAM chips (6116), has made battery backup of memory possible. With MicroBee, you can store a program or data in RAM, switch off, come back later (or move the machine to a new location) switch on again, and your program or data is still there.

No Apologies Service Coupon

With our easy step-by-step assembly manual, solder masked PC boards and socketing throughout, assembly is very straightforward. If you do have any trouble getting your MicroBee going, just fill in the NO APOLOGIES coupon supplied and return your kit to us for service.

ORDER DIRECT SAVE TIME

To order your MicroBee, all you have to do is phone on our Hotline number, give your Bankcard number and name. We'll get the goods away to you right away.

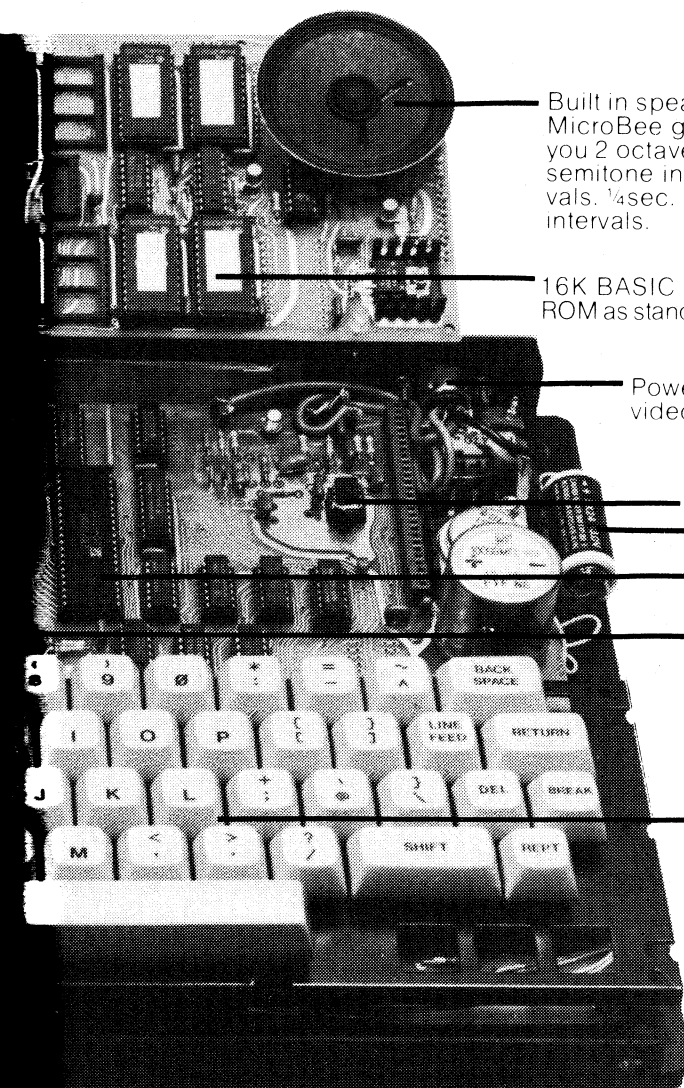
**Hotline Number:-
(02) 487 2711**

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Phone (02) 487 2711
Telex APPTEC AA72767**

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ower
& This



Built in speaker. MicroBee gives you 2 octaves in semitone intervals. 1/4sec. intervals.

16K BASIC in ROM as standard

Power input. video output.

Cassette Interface. 300/1200 BAUD.

Battery Backup.

Z80A CPU gives you a massive software base.

VDU Generator gives upper/lower case.

Full function Keyboard.

AT

APPLIED TECHNOLOGY — THE COMPUTER SUPERMARKET



Do you want to know why MicroBee is the best investment in personal micros available today? Then you need our 32 page 'Ideas Book'.

The Ideas Book, published as an insert in February 'Your Computer' magazine is now available separately. Just send 50¢ to cover post and packing, and we'll rush your copy to you. The book shows how MicroBee works, how it can be programmed using its fantastic 16K BASIC, as well as a variety of software ideas which illustrate the power and usefulness of the MicroBee. If you want to know about the most advanced kit Micro around, you owe it to yourself to find out about MicroBee.

The no compromise kit computer, complete for \$399

I pack a
real sting



Brief Specifications:-

- CPU Z80A ● Screen format 64x16 upper/lower case. PCG gives 512x256 pixels HiRes Graphics (can be combined with alphanumerics).
- Built in sound. Semitone intervals. Under BASIC control.
- RS232 interface standard for Modems, printers.
- Continuous Memory with Battery Backup.
- Cassette interface 300/1200 baud.
- Parallel interface option.
- Full function QWERTY keyboard.
- Expandable to 32K RAM/32K ROM (user fitted) or to 48K RAM to run CP/M 2.2 and take disc drives (factory fitted option)

ORDER FORM

MicroBee kit with 20K RAM (16K user)
16K BASIC in ROM. Full manuals for
assembly and programming. **\$399.00**
Cassette Recorder **\$35.00**
Video Monitor **\$129.00**
32K RAM upgrade kit includes
sockets, powerdown ICs. **\$120.00**
Editor/Assembler in ROM
with manual. **\$49.50**
All cassette programs (see above
for details) **each \$6.95**
Blank C10 computer cassettes **\$1.00**

How to get MicroBee.

**Don't waste time driving across town.
Order your MicroBee on our Hotline
number. Use your Bankcard.
We'll get it away to you tonight.**

(02)487 3798

**Or order Direct through our superfast
Mail Order department.
Postage and packing is \$6.00.
Monitors are sent freight on via road
freight.**

APPLIED TECHNOLOGY

Office/Showroom: 1A Pattison Ave,
Waitara 2077
Hours: 9-5 Monday to Saturday
Telephone (02) 487 2711
Mail Orders to PO Box 311, Hornsby
2077

Prices correct and goods expected in stock at time of going to press. Please phone to check stock.

MicroBee - Superbly Expandable

The problem with most personal micros, such as the TRS80 and APPLE lies not such much in the basic machines, but in the cost of expansion. Once you have mastered the base machine, getting it to do any more is very expensive. MicroBee gets around this by having a special plug-in top board. We call it the Core Board. The MicroBee is supplied as standard with a Core Board which takes up to 32K RAM (16K supplied), 16K ROM BASIC, and a further 12K ROM (for Monitor Program, Networking ROM, or your own custom ROM programs). A factory change fits a new Core Board so you have 48K RAM, an 80x24 screen format, and are ready to run CP/M 2.2 with disc drives.

MicroBee is a new generation design. It is designed to grow painlessly in the ways we have found most computer enthusiasts will want to move.

Software Growth.

Because it's Z80 based, MicroBee has a huge software base. And it's a base which we're improving all the time. MicroBee runs all the MicroWorld BBASIC software. Newly released software for March includes:- Editor Assembler in ROM Write machine code software on your MicroBee. BEEBUG monitor lets you examine and modify memory. Supplied with full operator's manual. Preprogrammed ROMs fit straight onto your MicroBee. **\$49.50**

Cassette Software The following programmes are supplied in machine code on cassette. All are \$6.95 each.

Pilot A simple programming language used extensively in computer aided instruction.

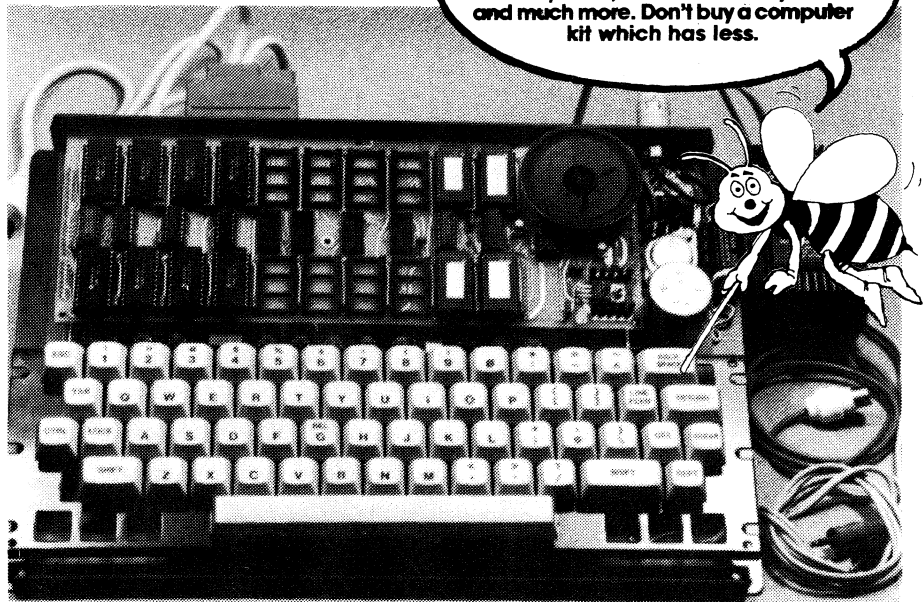
Chatterbox Experiment with artificial intelligence as the computer answers your questions and actually carries on a meaningful conversation.

Type Drill Teach yourself to touch type. This program draws a keyboard on the screen and as you type it indicates the keys pressed and the correct fingers to use.

Target The computer screen comes alive with enemy aircraft and you have to blast them out of the sky.

Trek Take command of the USS Enterprise and destroy Klingons from surrounding galaxies.

No hidden extras with MicroBee! You get full case, power supply, IC sockets, 16K BASIC in ROM, 20K Continuous Memory RAM, full function keyboard and much more. Don't buy a computer kit which has less.



At last - the no com

Do you want to build your own state of the art computer? Do you want a computer which can grow and expand with your changing needs? Then MicroBee is the answer.

MicroBee incorporates some of the most advanced technology available today. So it's not surprising that it has features not available on computers such as APPLE and TRS80; like built in sound and battery backup. And it comes standard with features that are supplied as options on these machines. Like upper/lower case, HiRes (512x256) programmable graphics and an RS232 port for printers and modems.

Superbly Expandable

Most personal Micros offer good value in their basic form, but let you down when it comes to expansion. This is where MicroBee is different. The top or 'Core' board of the MicroBee plugs in and offers tremendous expansion potential. As standard, you can have 32K RAM. 16K BASIC in ROM is standard and there is room for a further 12K of ROM (For the Monitor ROM and Networking ROM).

For people whose needs grow further, we have provided two things:-

YES! CP/M and \$100

● All the Z80 CPU pins necessary have been brought out (see photo) to the rear of the Core Board. So your MicroBee can be interfaced with any of the S100 standards.

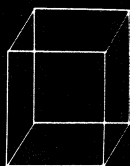
● In the near future, MicroBee owners will be able to have their machines factory upgraded (by the fitting of a modified Core board and other mods.) to 48K RAM/S100 running CP/M and disc drives. The programmable VDU chip in MicroBee allows the switch to 80x24 screen format.

MicroBee opens the doors to the massive library of CP/M software. MicroBee is the most forward thinking Micro you can buy today. It is your best starting point, wherever you want to go in personal computing. And it's still only \$399 in kit form.

YES! 16K ROM BASIC

MicroBee has been developed as the finest instructional computer on the market. Its superb 16K BASIC in ROM makes this possible. Whether you are a novice or advanced enthusiast, MicroWorld BASIC is a delight to use, with its advanced error reporting and powerful graphics facilities.

```
06000 REM This subroutine draws a square of lengths l1,l2
06005 REM with the bottom corner at a1,b1
06010 VARP(A1,B1,L1,L2)
06020 REM Draw left side, then top, then right, then bottom
06030 GOSUB [ A1,B1,A1,B1+L2 ] 4000
06040 GOSUB [ A1,B1+L2,A1+L1,B1+L2 ] 4000
06050 GOSUB [ A1+L1,B1+L2,A1+L1,B1 ] 4000
06060 GOSUB [ A1+L1,B1,A1,B1 ] 4000
06999 RETURN
55000 END
```



Portions of lines may also be underlined for another effect,

e.g. This procedure must be followed at all times.

or in case of special notation ...

$r = a \cos(w) + b \sin(w)$

The verb in this sentence is swim

YES! Continuous Memory is here

The use of the latest CMOS RAM chips, (6116), has made battery backup of memory possible. Just think, you can store a program or data in RAM, switch off, move to a new location and your program and data is still there.

FIRST PRODUCTION SELLS OUT IN 10 DAYS

MicroBee looks like being Australia's most popular kit computer ever!! As you read this magazine, we are assembling the next run. So order now to avoid delay and disappointment.

If you want to learn more about MicroBee, then get us to send you a copy of our fantastic 'Ideas Book'. Its 32 pages are packed with information and applications software on MicroBee. Just send 50c to cover postage and packing and we'll get your ideas book to you today.

Complete Kit \$399



Includes manuals, case, 16K BASIC in ROM, Power Supply and IC sockets. This kit is complete.

16K non-volatile CMOS RAM

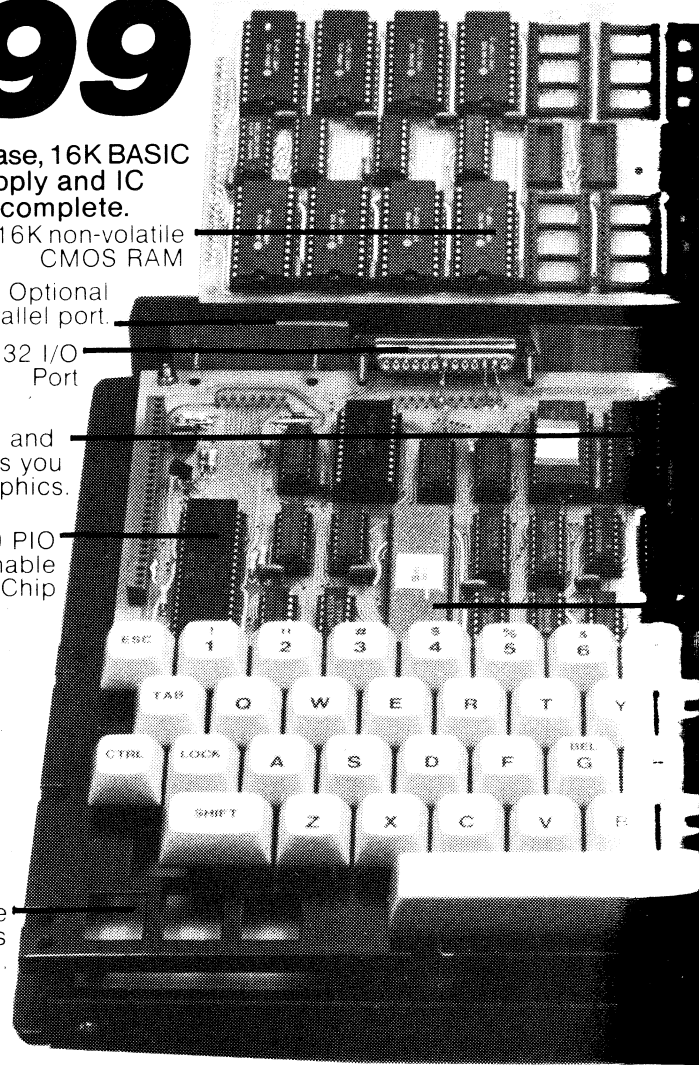
Optional parallel port.

RS232 I/O Port

PCG RAM and ROM gives you HiRes graphics.

Z80 PIO Programmable I/O Chip

Metal Baseplate
Plastic cover is also supplied.



promise kit computer

Software Growth

Being Z80 based, MicroBee has a huge software base. And it's one we're improving all the time. New releases include:-

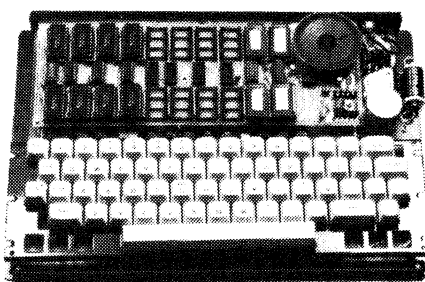
Mini Word Processor/Assembler in ROM.

This great monitor not only lets you write machine language programmes, it also functions as a great little word processor. Functions include search and replace and edit. **\$49.50**

Cassette Software. The following programmes are supplied on cassette. All are \$6.95 each.

Pilot A very user friendly language. Especially good for writing computer aided instruction material.

Eliza The ultimate artificial intelligence



programme. Actually carries on meaningful conversation.

Target The computer screen becomes a battlefield covered with enemy aircraft.

Trek Take command of the USS Enterprise and destroy those nasty Klingons.



No Apologies Service Coupon

With our easy step-by-step assembly manual, solder masked PC boards and socketing throughout, assembly is very easy. If you do have any trouble, just fill in the NO APOLOGIES coupon with the \$50 service fee and we will finish building your MicroBee for you and return it to you.

FREE MEMBERSHIP

When you get your MicroBee, you gain free membership of the MicroWorld Users Group. You'll be kept fully informed of all software developments and ideas. We'll keep you and your MicroBee busy!

ORDER DETAILS

MicroBee with 16K RAM. 16K ROM BASIC and all manuals **\$399.00**

MicroBee as above but with 32K RAM **\$499.00**

16K to 32K RAM upgrade (changeover) **\$120.00**

Mini Word Processor /Assembler in ROMs with manual **\$49.50**

All Cassette software **each \$6.95**

Video Monitor **\$129.50**

Cassette Recorder **\$35.00**

Order Direct Save Time

To order your MicroBee, all you have to do is phone on our Hotline number, give your Bankcard number and name. We'll get the goods on their way to you.

**Hotline Number:-
(02) 487 2711**

**Mail Orders to
PO Box 311, Hornsby
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PTY. LTD.**

**Showroom/Office at 1A Pattison
Ave. Waitara.
Hours: 9-5 Monday to Saturday
Phone (02) 487 2711
Telex APPTEC AA72767**

Full expansion capability. All Z80 pins are brought out for future growth.

Built in speaker. MicroBee gives you 2 octaves in semitone intervals. 1/4sec. intervals.

16K BASIC in ROM as standard

Power input, video output.

Cassette Interface. 300/1200 BAUD.

Battery Backup.

Z80A CPU gives you a massive software base.

VDU Generator gives upper/lower case.

Full function Keyboard.

HIGH RESOLUTION, HIGH VISIBILITY GRAPHICS

MicroBee brings you unsurpassed graphics facilities under easy to learn BASIC control. In low resolution mode (128x48 units) you can generate 'chunky' graphics and run Tandy programmes. For finer control a couple of keystrokes, switch you to high resolution graphics (512x256 units) and still let you combine them with text. Doing all this is easy for MicroBee. It shares the same intelligent VDU controller IC with IBM's new personal computer. So, like the IBM, MicroBee has a fully programmable screen display. MicroBee's standard 16 line by 64 character upper/lower case format can be updated to the professional 80x24 format to run CP/M programs. No need for expensive add ons. Simple, easy to use BASIC commands make using your MicroBee easy, even if you're just getting into computers.

UNIQUE CONTINUOUS MEMORY AND BUILT IN SOUND

Only MicroBee brings you this great facility. You can hold programs and data in continuous memory when you switch off, or move to a new location. There's no longer any need to store on cassette or floppy discs at the end of the day. A power failure doesn't mean the loss of valuable programs or data. An inbuilt battery holds everything in memory until power is restored or you switch on again. MicroBee, your portable terminal. MicroBee's built in sound facilities bring you two octaves of music to tune up your programming skills. Again under simple to use BASIC control. Add sound to your game programs. Or maybe write your own music. The speaker is inbuilt. And it's so easy to learn. MicroBee brings you unique facilities and opens up new programming opportunities. MicroBee, the personal computer that never forgets.

SERIAL AND PARALLEL PORTS READY.

Your MicroBee is fully equipped to interface and communicate with the outside world. The programmable RS232 standard port means connecting a serial printer, modem or another computer is as simple as plugging it in. MicroBee's built in software means you're ready to run at 300 or 1200 baud. When you're ready to go further, use MicroBee's parallel port and connect up joysticks, Centronics type printers or any other peripherals needing a parallel port. Even the cassette interface has something special. It will store and load programmes at 300 or 1200 baud in either BASIC or Z80 code as well as letting you merge lines into an already existing BASIC program. MicroBee works happily with your ordinary audio cassette recorder, and gives you a good load and save every time, even at the higher (1200 baud) rate. It's as simple as plugging it in with MicroBee.

microbee does



EXPANSION POWER

If you're not sure how you'll be using your MicroBee in the future, we've thought of that too. MicroBee is designed for inexpensive future expansion. The basic MicroBee with 16K of user RAM easily converts to 32K with a changeover board. Adding ROM (Read Only Memory) up to 28K is as easy as plugging it in to the memory board. Want S100 expansion? MicroBee goes one better. Its unique Z80 expansion bus lets your MicroBee interface with S100 as well as all the other expansion busses.

And if you're thinking of using disc drives and want to be able to run world standard CP/M Software, MicroBee's still with you. The soon to be released memory board and factory mod convert your MicroBee to 48K RAM, running CP/M with the ability to take disc drives. So you can run the same programs as IBM, DEC, Xerox and HP do on their Micros. MicroBee, ready when you are.

POWERFUL 16K MICROWORLD BASIC

Programming has never been simpler. Novice or experienced programmer, you'll find MicroBee's 16K BASIC in ROM a delight to use. MicroWorld gives you everything you get with other BASICs plus extra help. Like special error reporting and editing. And support of the built in sound and graphics facilities. So MicroBee's powers aren't hard to use. The BASIC also controls printers and modems. Writing programs is simpler because of the BASIC's search and replace ability. When you want to go further,

MicroWorld Editor/Assembler helps you use Z80 code and write USR subroutines. It's in ROM for instant access. Or get going right away with **Cassette Programs**. From only \$6.95 each. Chose from games like Chase, Target, ZTrek, Solitaire, Wumpus, Biorythm, Calender Maker or utilities like Typing Drill, Diagnostic, Textmaster.

SOFTWARE SUPPORT

As a MicroBee owner, you'll become a member of the MicroWorld Users' group, and receive our newsletter and updates. Your kit comes on 14 day satisfaction guarantee. And there's a \$50 complete cover service coupon if you have trouble.

You can phone order MicroBee on (02) 487 3798. Use your Bankcard. Or to Mail Order your MicroBee just write to:- **MicroBee, Box 311, Hornsby NSW 2077**
Due to enormous demand, MicroBee deliveries have been delayed.

Complete kit

Includes 16K RAM,
16K ROM BASIC,
all manuals.

\$399

Software includes:

Editor/Assembler (ROMs, Manual) \$49.50
Cassette software (each) \$6.95

APPLIED TECHNOLOGY

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microbee



more, simply



Glover & Assoc. AT/24

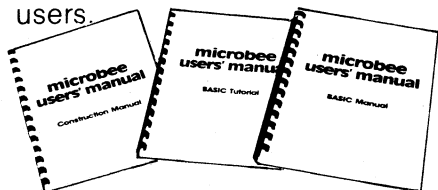
Try this with any

MicroBee, the visual breakthrough.

The power of the personal computer lies in what it can do on the screen. MicroBee brings you superb graphics capabilities under easy to use BASIC control. Both high and low resolution graphics can be combined with text. And text is full upper/lower case. This makes MicroBee the finest low cost educational machine you can buy. MicroBee has been chosen for use in NSW government schools.

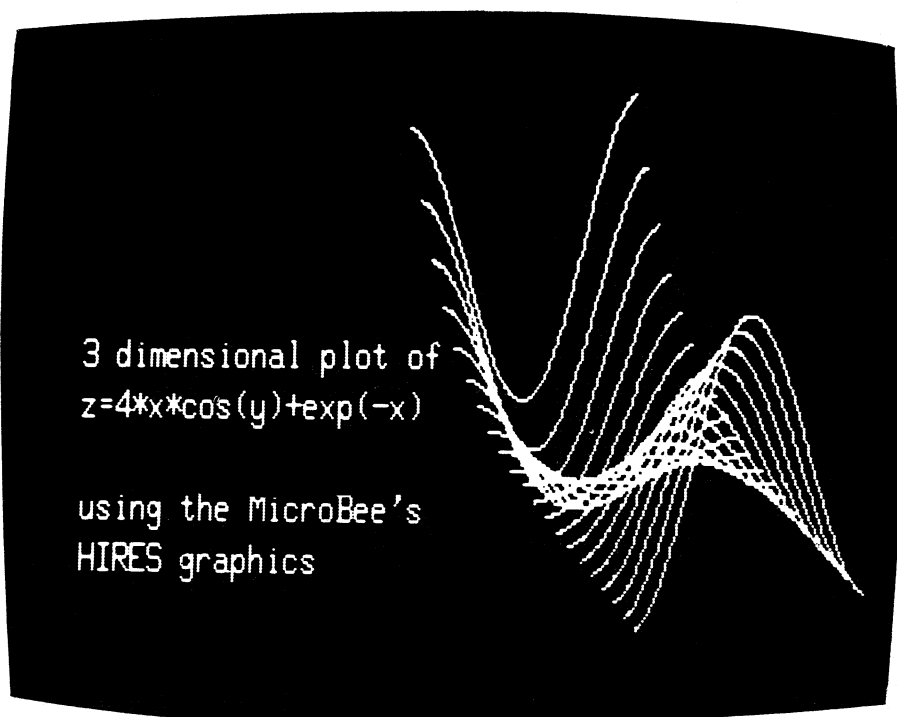
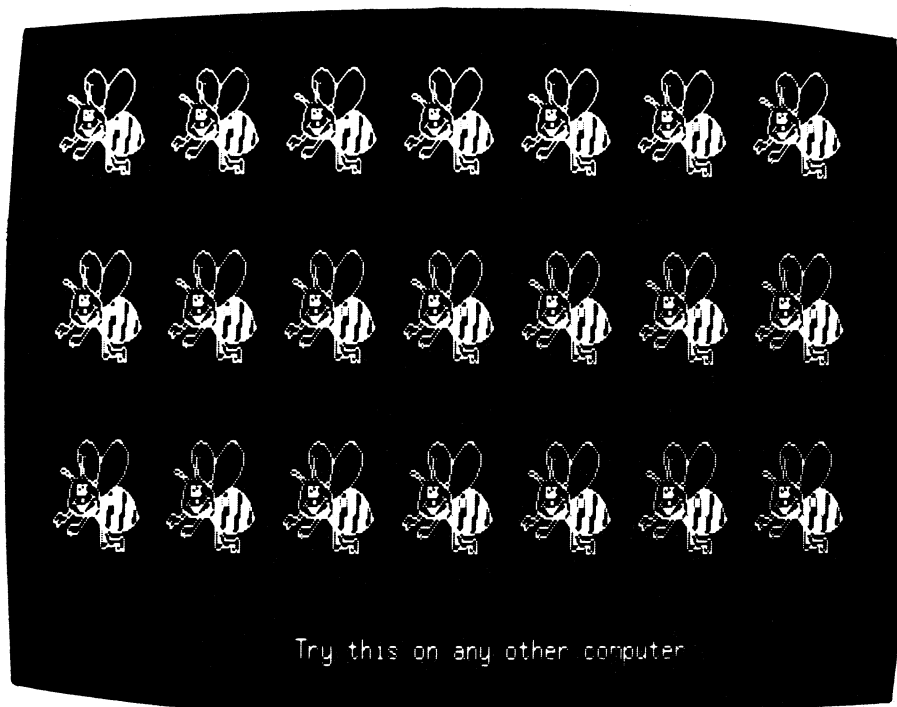
MicroBee, your guide into programming.

Your MicroBee isn't just a computer it's a complete learning package. You get a step by step construction guide (and a service coupon if you get into trouble). The BASIC tutorial and BASIC manual give you the knowledge you need to master programming. You'll quickly learn how to use MicroBee's powerful BASIC language. And you'll be able to enter a whole range of demonstration programs which show you how to use MicroBee. As a MicroBee owner, you become a member of the MicroWorld Users' Group. You'll receive our Newsletter. So you'll be in contact with other MicroBee users.

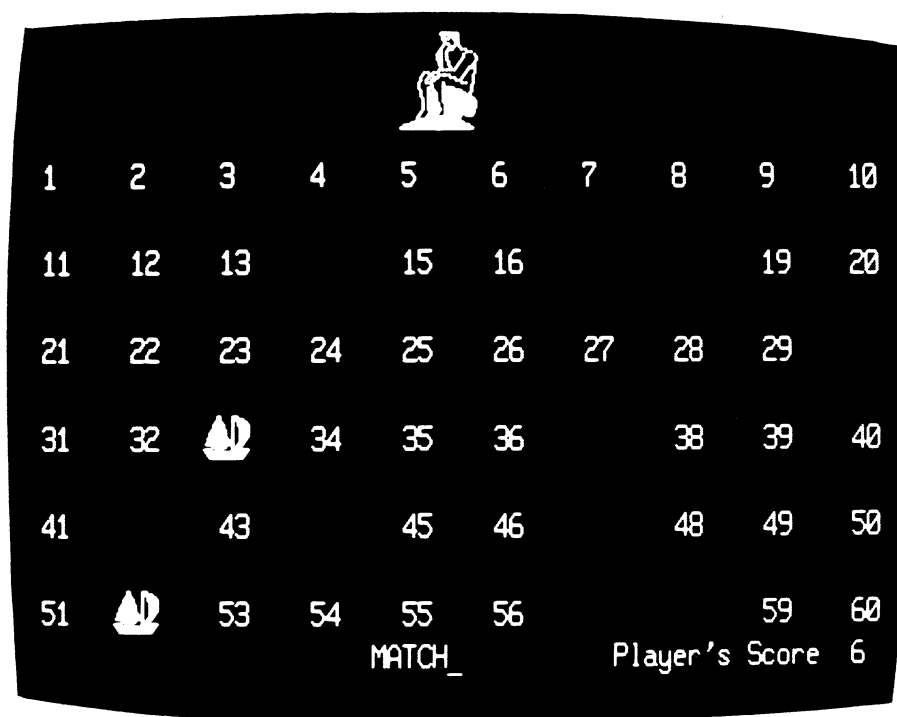
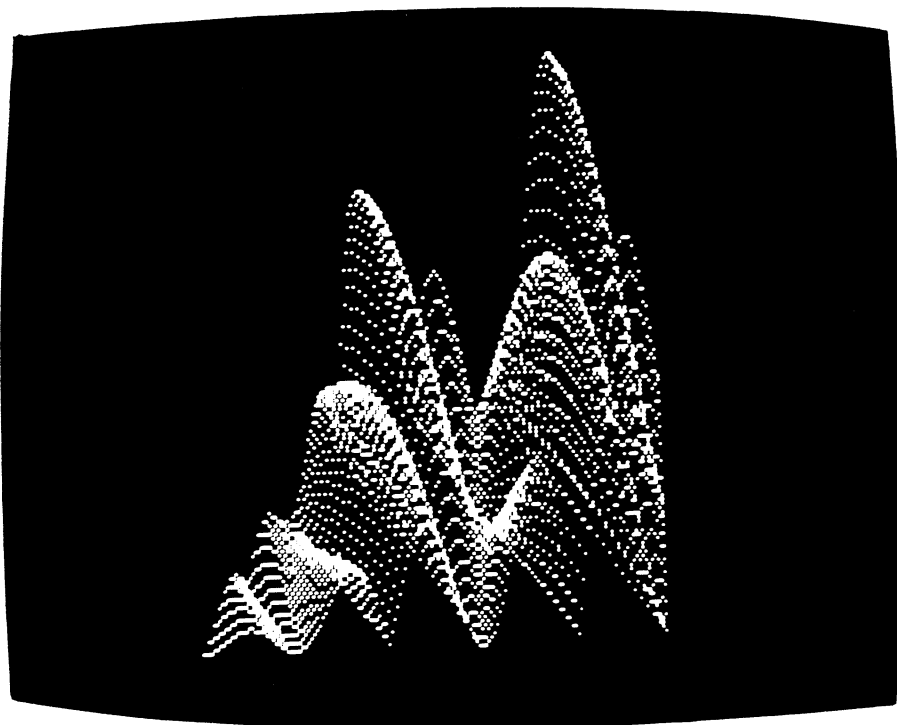
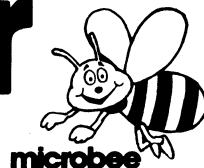


Programming has never been simpler.

MicroBee is very powerful, yet easier to use than other Micros. Because they're under



other computer



BASIC, the sound and graphics are easy to master. The BASIC also controls printers and modems. So interfacing your MicroBee is easy. When you want to go further, MicroWorld Editor/Assembler helps you write in Z80 code.

Ready for expansion.

Your MicroBee is equipped with a programmable RS232 port, so you can connect a printer or modem straight on. A dual speed cassette interface is fitted. Continuous memory means you can move to a new location and your program and data are still there!!

MicroBee is complete.

MicroBee kit including all manuals, 16K BASIC in ROM, Power Supply, IC sockets, 16K RAM. **\$399.00**

Editor/Assembler in ROM

\$49.50

Video monitor

\$129.50

Cassette Recorder

\$35.00

Order direct on our Hotline number.

Just phone (02)487 2711.

Or use our Blue Ribbon mail order service:- PO Box 311, Hornsby NSW 2077

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Hours:- 9-5 Monday to Saturday.

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Telex APPTEC AA72767



grasp the future



With one giant step, Australia's MicroBee brings the power of the personal computer within your reach. MicroBee is now ready built with a superb new case. Yet incredibly it costs no more.

MicroBee is a complete learning package. Explore and master programming with the BASIC manuals, and inbuilt 16K ROM BASIC. The NSW Department of Education chose MicroBee. Find out why. MicroBee is powerful and "friendly". You learn to control the built in sound, graphics and write and correct programs more easily with MicroBee.

Printers, modems and cassette storage plug straight in. The optional parallel and Z80 port let you connect joysticks, or use the world standard S100 bus. MicroBee grows with you. Inexpensively. Add disc drives, voice synthesizers, colour graphics and EPROM programmers.

Editor /Assembler in ROM lets you programme in Z80 code. And when you're ready, MicroBee's memory board unplugs, to take the just released 64K memory card. With disc drives you can run CP/M 2.2; your ticket to the world's finest software. Order your MicroBee direct or call in and put the little Aussie marvel through it's paces.

To order MicroBee
phone (02)487 2711
or mail order:
PO Box 311 Hornsby
NSW 2077

\$399⁰⁰ 16K
Fully built
and tested



microbee

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\$5 - \$49.99 \$6.00
\$100 or more \$7.50

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The MicroBee low cost personal computer

A revised version of the Applied Technology Microbee computer has just been released and is now available from selected retailers throughout Australia. A feature of the new computer is an extensive array of software available in EPROM.

by **PETER VERNON**

Our first impression of the Microbee was that it was a compact, neatly presented unit. The case is moulded in white and grey plastic, with overall dimensions of 350 x 230 x 58mm (W x D x H) — not much bigger than some machines being promoted as “hand-held” computers. It would fit nicely in a briefcase, with room to spare.

Keyboard and video

The Microbee keyboard has 60 full-travel keys, again in grey and white, and is acceptable, if nothing fancy. Undoubtedly it is well suited for the hobbyist or occasional user, although it remains to be seen how the switch contacts hold up under extensive use in a

word processing application, for example. At high typing speeds the keyboard produces a rattling sound which may be disturbing to bystanders.

The keyboard is normally in a typewriter mode, generating lower case characters, with upper case accessed by the Shift key. Pressing “Lock” however, reverses this format for alphabetic characters only. In this mode upper case letters are generated with lower case produced by Shift. This arrangement is very convenient for program entry, and an unexpected bonus in a low-cost system.

The video display is a rock steady 64 x 16 lines, and the 6545 programmable video generator can be programmed for other formats, such as 40 x 24, or 80 x

24, although no details of how to do this are given.

Characters are formed in an 8 x 16 block, rather than the more usual 8 x 8 pixels. The resulting characters are tall and narrow. Because of the design of the character set there is almost no horizontal separation between some adjacent characters, making the screen hard to read at times.

On the plus side, the character set has true descenders and has no “vertical compromises” to give these descenders. This is probably one of the reasons that the Microbee was approved for use in schools by the NSW Education Department.

In addition to upper and lower case alphanumeric characters the Microbee has four display modes; underline, inverse, low resolution graphics and high resolution graphics. Low resolution is 128 x 48 pixels and can be mixed indiscriminately with text. High resolution is 512 x 256 pixels and can be mixed with text with some restrictions. Activating the high resolution mode clears the screen, but alphanumeric characters can be printed after the completion of a high resolution drawing.

Inverse and underline characters are mutually exclusive — the display can be either one or the other. These two attributes are not available on a character-by-character basis — typing “UNDERLINE” for example, means that every character is displayed with an underline until the display is restored by typing “NORMAL”.

When none of the graphics or character attribute modes are in use the programmer can access 128 programmable character blocks held in RAM to create unique graphics patterns or alternate character sets. It is these programmable blocks which are used to create the high resolution graphics, and this approach does have some limitations.



The Applied Technology MicroBee computer is supplied with a 12VAC plugpack power supply, manual and demonstration cassette. Plugs at front are for cassette recorder.

A program incorporated in the Basic Interpreter determines which pixels of the character cell need to be illuminated and where the character must be placed on the screen to create the display required. The same program keeps track of how many of the 128 programmable characters have been used and which of these can be over-written as more of the screen is filled.

As long as displays are confined to vertical and horizontal lines this method works well. Diagonal lines exhaust memory space more quickly, and circular patterns or complex, full screen graphics are not possible.

Internal details

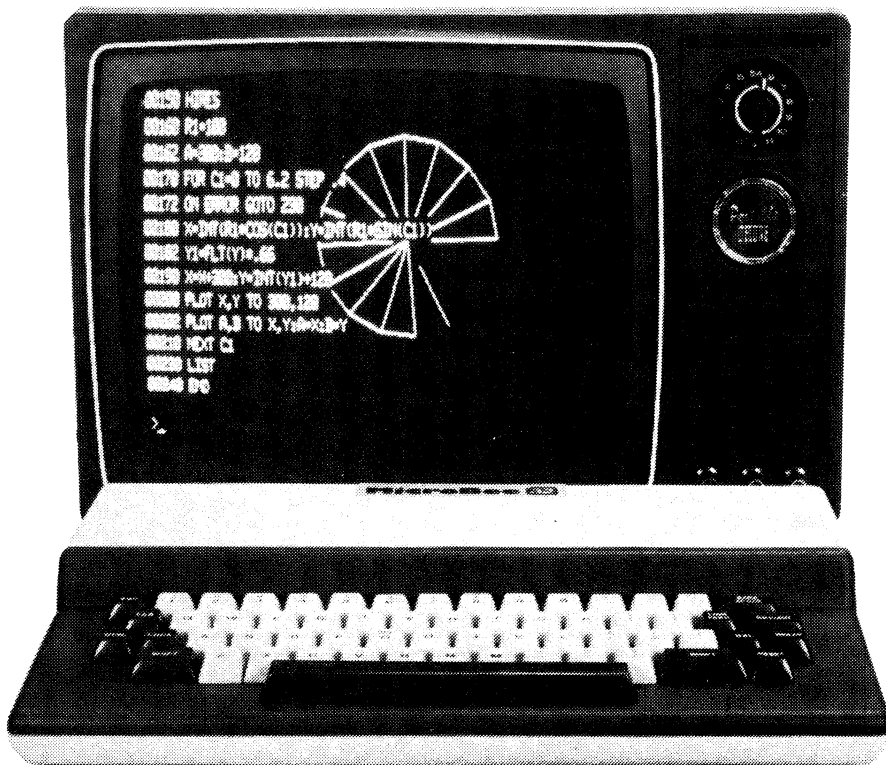
Opening up the MicroBee reveals two circuit boards, the upper containing a mixture of RAM and ROM and the lower carrying the Z80 microprocessor, video display circuitry, cassette interface, tone generator, keyboard and interface connectors.

A standard Microbee has 16K of programmable memory, with room for on-board expansion to 32K. The other half of the memory board has space for up to 28K of ROM. MicroWorld Basic occupies 16K, with the remaining space available for utilities such as an editor/assembler, network communications program or a word processing package. Our review machine contained the word processor (of which more later).

A feature of the Microbee is its use of CMOS memory which draws very little current. A 4.5V camera battery provides sufficient power to allow the memory to be maintained on standby while the mains supply is off. The program in memory is retained, whether the user wants it or not.

An RS-232C interface is provided for connection of a printer or other serial device. Two other openings at the rear of the case provide access to the circuit board, which is pre-drilled to allow addition of an expansion connector for the Z80 bus and parallel interface circuitry. A parallel port can be added by installing a 25-pin D-type connector and a single integrated circuit.

One of the reasons why the Microbee is so compact is that it has an external power supply in the form of a 12VAC plugpack. This feeds rectifiers, filters and three 5V regulators in the Microbee. As such, this arrangement could be improved upon. For a start, the plugpack voltage of 12VAC means that a relatively high DC voltage is fed to the regulators, leading to higher than necessary power dissipation in the case.



High resolution (512 x 256) graphics displays can be over-printed with text as shown here. The incomplete design results when all programmable characters have been used.

And it would seem that when the Microbee is fully optioned up, the power supply is not quite up to the task. While some owners have gone to the trouble of building a more rugged external supply it would seem that these problems could be overcome by providing a plugpack with a lower output voltage and a higher current rating, ie, with the same overall power rating.

Power is supplied to the Microbee from the 12VAC plugpack with a 5-pin DIN connector. The same connector is also used for the cassette interface connections and direct video output. There is no RF modulator, so attempting to connect the computer to a standard television set is doomed to failure.

The manual accompanying the machine makes no mention of the need

for a direct entry video monitor. In the same fashion it is not until page 124 of the 144 page booklet that instructions are given for connecting a cassette recorder — and even then the manual refers to a red plug which is actually grey. Considering that a demonstration tape intended for classroom use was included with the computer, this is a serious failing.

All in all, the manuals supplied with the Microbee suffer from the common failing of those written by someone too close to the subject. Features not commonly used are treated in loving detail while vital information for the beginner is either glossed over or missing entirely. At the time of this review an extensive re-writing of the manuals was underway, so these comments may not be ap-

MicroBee specifications

Processor: Z80

RAM: 16K, expandable on-board to 32K, with battery back-up

ROM: 16K, expandable on-board to 28K

Interfaces: RS232C serial port, optional parallel port and S-100 expansion.

Keyboard: 60 keys including spacebar, typewriter style

Display: 64 x 16 upper and lower case, underline and inverse video modes

Graphics: High resolution, 512 x 256 using programmable characters Low resolution 128 x 48

128 programmable characters, 8 x 16 pixel matrix

Sound: 25 tones with duration in increments of 1/8 second.

Expansion: 64K memory version, S-100 interface, disk drives
Editor/Assembler, word processor and network communications software is available in ROM

Documentation: Incomplete at time of writing.

The MicroBee: a low-cost personal computer

plicable to the final versions of the manuals.

Basic programming

Microworld Basic, supplied with the Microbee has a strong resemblance to the Basic of the Super-80. This is not surprising since both are based on Basic ETC, originally supplied by East Texas Computers and written by John Arnold and Dick Whipple, the co-developers of the original Tiny Basic.

Microworld Basic shows its Tiny Basic heritage, particularly in the use of single letter variable names and restrictions on mixing variables of different types.

Perhaps the most confusing point for new users of Microworld Basic is the restriction on variable names. There are a number of rules which must be observed.

Firstly the type of variable is indicated by its name. A numeric variable is represented either by a single letter, for integer values or a letter followed by a number between 0 and 7 for real number values. A string variable consists of a letter, a number from 0 to 7 and a \$ sign. Variables are distinguished by the first letter part of the name, so A0 and A0\$ cannot both be used in the same program as Basic will not recognise them as different variables.

Mixing integer and real variables in the same expression will result in an error

Microsoft. In many ways the Microworld string statements are more flexible, and are certainly more consistent in format. A single reference to a string of characters combined with the appropriate parameters can do the same duty as Microsoft's LEFT\$, RIGHT\$ and MID\$.

For example the following program reproduces all three functions;

```
10 A1$="ABCDEFGH"
20 PRINT A1$(1,N):REM PRINT THE
  FIRST N CHARACTERS OF A1$
30 PRINT A1$[:LEN(A1$)-N+1,
  LEN(A1$)]:REM PRINT THE LAST
  N CHARACTERS
40 PRINT A1$(N,M):REM PRINT THE
  CHARACTERS FROM POSITION N TO
  POSITION M
```

Also unusual is the presence of a SEARCH statement. This statement searches a designated string for the occurrence of a specified substring, and returns the position at which the substring is found (or zero if the search is unsuccessful). An example will make this clearer;

```
A0$="ABCDEF"
PRINT SEARCH (A0$,"DEF")
```

This example will return 4, the position of the start of the substring "DEF".

On a more general basis, the command GX activates a global search and

input and output. Basic statements are provided to allow output that would normally be displayed on screen to be sent to a printer, cassette recorder or RS-232C device such as a modem. Input data can similarly be taken from the keyboard, cassette recorder or the RS232C interface.

Activating a printer connected to the parallel port is simply a matter of typing; OUT#1 ON

Cassette operation can be at one of two speeds, either 300 baud or 1200 baud, and file names can be up to six characters long. All file names are displayed as the Microbee searches the cassette tape and a LOAD? command is provided which allows a program on tape to be compared with a program in memory. Given this array of cassette operating facilities it is unfortunate that no provision has been made for direct computer control of the cassette recorder.

Automatic line numbering is provided by the AUTO command, and programs can also be re-numbered on command. In combination with the ability to accept input from the cassette recorder as if it was typed from the keyboard this facility allows a program on tape to be merged with a program held in memory.

Graphics abilities

MicroWorld Basic provides an extensive series of statements to make use of the graphics capabilities of the computer. The PLOT statement, available in either high or low resolution allows lines to be drawn on the screen by specifying the start and end points. Lines can also be erased with PLOT R, or inverted by adding "I" to the statement.

Inversion, in this sense, means that any points on the line which are illuminated will be erased while points which are currently off will be turned on. The SET statement allows individual points to be turned on; RESET is provided to erase a point. An "H" following the SET statement will place the origin of the graphics co-ordinates at the top left hand corner of the screen rather than its usual position at the bottom left.

While the graphics capabilities are extensive and the high resolution mode impressive, a considerable amount of screen flicker is evident while these statements are being executed. Apparently no attempt has been made to synchronise memory accesses by the CPU and the video display generator.

The result is that the CPU updates memory at the same time as the display generator is attempting to read the current contents for display, and the conflict causes a series of black lines on the

MicroWorld Basic statements and functions

ABS ASC ATAN AUTO CHR\$ CLEAR CLS CONT COS CURS DATA
DELETE DIM EDIT END ERRORC ERRORL EXEC EXP FLT FOR . . TO
FRACT FRE GOSUB GOTO GX HIRES IF . . THEN IN IN# INPUT INT IN-
VERSE KEY\$ LEN LET LIST LLIST LOAD LOG LORES LPRINT NEW NEXT
NORMAL ON ERROR ON . . GOSUB ON . . GOTO OUT OUT# outL#
PCG PEEK PLAY PLOT POINT POKE POS PRINT PRMT READ REM
RENUM RESET RESTORE RETURN RND RUN SAVE SD SEARCH SET
SGN SIN SPC SPEED SQR STEP STOP STR STRS TAB TRACE
UNDERLINE USED USR VAL VAR ZONE

message. The Statements PRINT A1 + B or PRINT C + D0 will cause this error because of the combination of integer and real variables.

This peculiarity has more subtle effects as well. The following program;

```
10 A=3
20 PRINT A/2
```

will return 1, not 1.5. Division of an integer always returns an integer result.

Two statements are provided to get around the problem. INT converts a real value into the next lowest integer, while FLT does the reverse, converting an integer into real number format so that it can be combined with other real number values.

String handling is another major difference between Microworld Basic and

replace function which will locate a specified series of characters and replace them with another set of characters. It is an editing command, and very useful for correcting errors which occur throughout a program.

Although similar to Super-80 Basic, MicroWorld Basic is more extensive, as indicated by the additional 4K of ROM required to contain it (Super-80 Basic is a 12K version). MicroWorld Basic adds extensive error handling statements, including ON ERROR GOTO and ERRORL (which returns the line number at which the last error occurred). Error messages are explanatory text, rather than cryptic code numbers, and an arrow is displayed at the approximate position of the error.

Another valuable feature of this version of Basic is the capability to re-direct

The MicroBee low cost personal computer

screen as graphics statements are carried out. The Microbee is excellent for generating static pictures, but any attempt at animated scenes is likely to cause disappointment.

Limited sound capabilities are also provided by the Microbee. The PLAY statement will sound one or more notes from an internal speaker, with a duration specified in increments of $\frac{1}{8}$ second. Twenty-five possible notes can be generated, covering a frequency range of 220Hz to 831Hz (almost two octaves).

Sounds are produced directly by the microprocessor, interrupting the execution of other program statements for the duration of the sound.

There have been reports of "bugs" in MicroWorld Basic, possibly as a result of the continuous memory feature. Even a cold start does not clear out memory, and bad values can remain from a program gone awry. This results in mysterious errors which show up when a program is listed, and remain in spite of attempts to correct the offending line.

Perhaps some of these problems could be solved by adding a switch to disconnect the battery backup and thus ensure a truly cold start.

Representatives at Applied Technology stated that investigations into these problems are continuing, and that any Basic bugs will be corrected.

Wordprocessing on the MicroBee

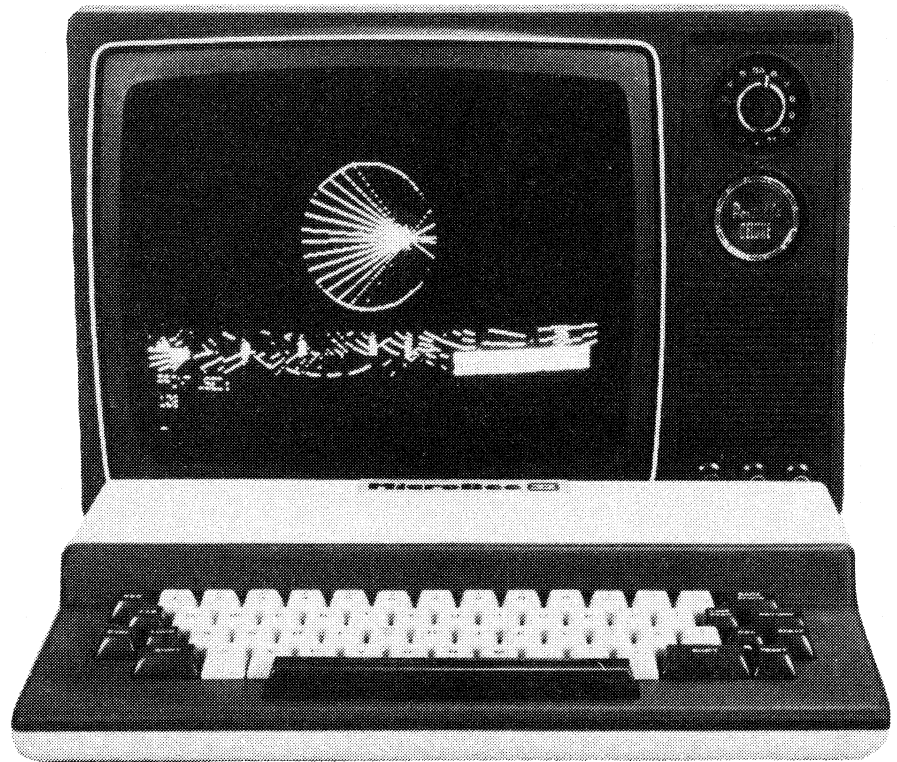
The version of the MicroBee reviewed here was supplied with word processing software built in. Called "WordBee", this the program is contained in a set of ROM chips and when combined with the battery back-up for the MicroBee's memory produces a very powerful and unusual word processing system.

It should be noted that the version of WordBee we received was a sample only, and the program was not then advertised by Applied Technology. This aside, "WordBee" shows great promise.

The author of the program and the preliminary manual which accompanied it makes no secret of the fact that WordBee has features of several of the most popular word processing systems, with screen formatting and menu displays reminiscent of "Electric Pencil" (tm), a "Help" command as in "Word Master" (tm) and dot commands embedded in the text for printer control as in "WordStar" (tm).

Whatever the inspiration, however, WordBee is an impressive program. It is menu-driven, with extensive prompts and operating guides available at any time.

Because it is ROM, co-resident with



High resolution display which also shows the programmable characters that have been used to build up the design. White areas are inverse video characters.

MicroBee's Basic, the word processing program is available for use at any time. Battery-powered memory means that word processor files can be retained even when the power is switched off. The result is a word processor that can be used anywhere a video monitor is available. Files can be entered into memory and edited and then printed out at a later date.

WordBee is entered from Basic by typing "EDASM" — apparently this command accesses the ROM address space, and the first program to be supplied for this space by Allied Technology was an Editor/Assembler. On entry the first menu is displayed and the MicroBee is in the "interface" mode. This mode is used for switching between control menus and text, saving and loading files from tape and checking file status.

A nice feature is the word count function which returns the number of words in the text file. File status can also be found, returning the position of the cursor in the file, the total length of the file in characters, the number of characters which can be added to the file remaining memory space and total memory space (30462 bytes in a 32K system).

Automatic word wraparound at the end of each line is provided, as is auto key repeat.

Using the editing functions is fairly easy, although few of the single letter Control commands bear any relationship

to the actions they invoke. Control-E for example, moves the cursor up one line, while Control-U is not currently used. Control-B activates the block mode, while Control-C scrolls the file towards the beginning. Control-D moves the cursor left, while again Control-L is not used. All in all, 22 Control-key commands are provided.

The Block command (Control-B) and the Find function (Control-F) activate their own sub-menus, which in the first case allows the user to copy, delete and move marked blocks of text around in a document, and in the second allows specified words to be searched for and, optionally, replaced, either on a continuous or case-by-case basis.

Print formatting commands are equally extensive. Printer control functions are indicated by "dot" commands embedded in the text. Functions available include justification, double spacing, line and page length specifications, and page headers. The user can also specify whether a line feed is to be sent after a carriage return, the number of line feeds to be sent at the end of a page and Escape code sequences to control special features of a particular printer.

As supplied, WordBee is set up to use an Epson MX80 or equivalent printer with a serial interface. Neither the Microworld Basic manual or the

continued on p.108

preliminary word processor manual provides sufficient information to connect a printer without a great deal of trial and error.

Although extensive, WordBee does have some faults. The lack of easily remembered control command names is one. More serious is the apparent absence of any command which allows spaces to be opened in text to insert new material. It can be done with the use of the Block copy mode, or the Find and replace function, but this seems like a lot of work just to insert a missing letter, for example.

Other failings are no doubt due to the fact that we reviewed a preliminary version of the program. The most glaring is the "Kil" or erase function, which according to the manual double checks the user's intention before deleting a text file. In our version of the program, it does not.

These details aside, WordBee is an impressive program, and is considerably enhanced by the features of the MicroBee itself. Bearing in mind the reservations expressed on the robustness of the keyboard, the MicroBee with WordBee would not be out of place in the small business.

Conclusions

All in all the MicroBee is a compact, powerful computer, with features equally likely to meet the needs of the newcomer and the experienced computer user. For the newcomer the manuals leave something to be desired, despite the presence of a tutorial section (why is it one of the last sections in the book?).

Experienced programmers will be delighted by the power and flexibility of MicroWorld Basic and the extensive graphics capabilities of the MicroBee. A simple program to clear the entire memory will circumvent problems caused by retention of programs in memory. Ultimately, though, a heftier power supply may be required if much expansion of the system is planned.

With these reservations, the MicroBee seems to provide excellent value for the price. If Applied Technology's marketing and manufacturing plans are realised, the system will take off in a big way!

A MicroBee with 16K of memory and MicroWorld Basic costs \$449. An additional 16K of memory adds \$100 to the price. The WordBee word processing program is \$89.50 and an Editor/Assembler in ROM is available for \$59.50. An S-100 expansion interface is also available, at \$299, with disk drive, controller and CP/M operating system for \$799. There is no shortage of expansion options.



A STAR IS BORN



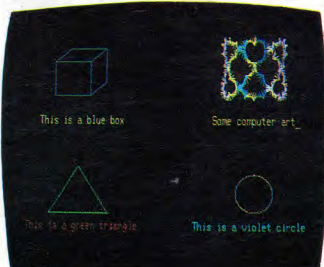
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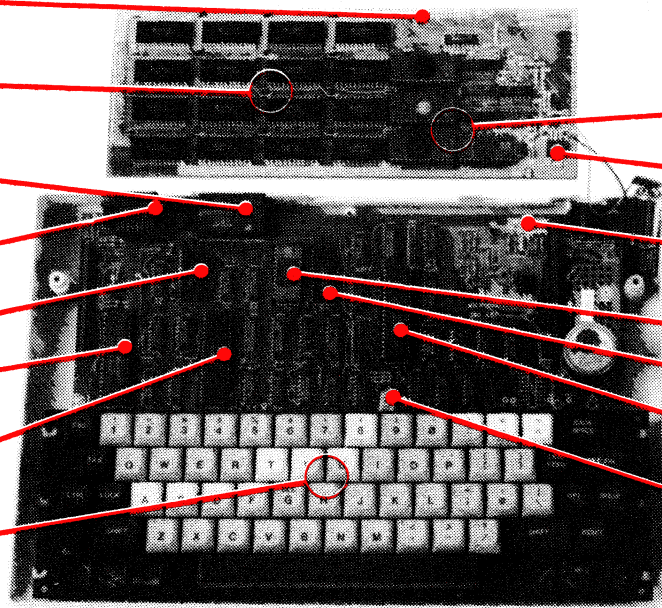
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MICROBEE 32K IC \$599



microbee®



AUSTRALIA'S OWN EDUCATIONAL AND PERSONAL COMPUTER

CEAT2934

Learning is Fun



Green Screen Monitor pictured is an optional extra.

16K PLUS

The 16K PLUS has built in features such as music generation, PCG high and low resolution graphics, with a screen display of 16 lines each containing 64 upper and lower case characters. When you also consider all of the standard extras like continuous memory, built in printer and input/output interfaces and parallel port, 4.5 volt battery back-up and self testing BASIC in ROM, the Microbee 16K PLUS is unbeatable in its class.

\$449

32K PLUS

All of the standard features of the 16K Plus with twice as much usable RAM. When you add the new Wordbee ROM Pack, you have a powerful word processing capability which does a lot more than play the many games available for the Microbee. Add a printer and just see what you and your family can now do with your home computer.

\$549

microbee 

AUSTRALIA'S OWN EDUCATIONAL AND PERSONAL COMPUTER

Designed and manufactured in Australia by

APPLIED TECHNOLOGY PTY LTD

Head Office/Showroom: 1 Pattison Avenue, Waitara 2077 N.S.W.
Telephone: (02) 487 2711

Factory: 1 Debenham Road, West Gosford 2256 N.S.W.
Telephone: (043) 24 2711 Telex: AA72767

For direct enquiries or the
name of your nearest dealer,
Phone: (02) 487 2711.



CEAT2935

Microcomputer News



New products at Personal Computer Show

The First Australian Personal Computer Show was held at Sydney's Centrepont from March 9th to March 11th this year, and from all accounts was an immensely successful event.

by **PETER VERNON**

There were 91 exhibitors, many of them displaying three or four different computer systems. IBM was out in force with a new computer, the IBM XT — an upgrade of their Personal Computer, announced just one month after the launch of the PC in Australia.

Apple's Lisa system attracted a lot of attention as one of the most innovative new systems on display. The price of the system at the moment puts it in a different market from that of the IBM and its look-alikes, but rumours abound of new, lower-cost implementations of the Lisa concept.

The Osborne portable seemed to appeal to many people looking for a low-cost business system — chiefly, one suspects, because of the software offered with the computer. Osborne have now gone into production with an 80-column card — designed in Australia — which overcomes the handicap of the 50-column screen.

Also announced by Osborne was a new networking system, O-Net, which allows four computers to share access to a hard disk drive — significantly increasing the storage capacity of the computers while also adding communications capabilities.

Japanese manufacturers were also well represented but many of their products showed a depressing sameness. Toshiba, Sharp and Okura presented Z80-based systems running CP/M and Microsoft Basic, which is nothing out of the ordinary. Seiko attracted more interest with an impressive 8088-based system.

The most attractive Japanese system would have to be the NEC Advanced Personal Computer. Using the 8086, the true 16-bit version of the 8088, the APC includes two 20cm disk drives and a high resolution colour monitor with the most impressive graphics capability of any machine at the show. Both MS-DOS and CP/M-86 operating systems are available,



Two of the new systems at the show were the Mitsui Sord M23P with microfloppy disks and LCD display and 64K CP/M disk versions of the Applied Technology Microbee.



giving access to a wide range of software.

At the low end the most significant new releases were the colour and disk versions of Applied Technology's MicroBee computer. With 26 background and foreground colours, high resolution graphics and complete compatibility with earlier MicroBees the colour machine is certain to be a winner.

The disk-based MicroBee provides 64K of memory coupled with two "slim-line" 13cm minifloppy disk drives and CP/M 2.2. It may set a new low price for a CP/M based computer system.

Both Tandy and Commodore had displays of their low cost offerings, the Color Computer and the VIC-20, both eagerly surrounded by the school-children who were present en masse. Commodore also showed the VIC-64, although in a very low key way. It should be in the shops by the end of this month so readers can judge for themselves.

Again in the "low end" as far as pricing goes (but not in capabilities) was the BBC Microcomputer, a product which should give Tandy, Commodore and Atari a run for their money. With colour graphics, sound effects and an excellent version of Basic, the BBC Microcomputer will also have the marketing advantages provided by the Australian Broadcasting Commission's decision to screen the BBC's instructional series on microcomputers later this year.

An Australian Company, R.D.M. Computers Pty Ltd, were exhibiting a new single board computer, designed and manufactured in Australia specifically to run the newer, higher performance operating systems such as CP/M 3, MP/M II, CPNET 1.1 and Turbodos. On

a single 420 × 297mm board are 256K bytes of RAM, four RS232C serial ports, a Z80A processor, two Winchester hard disk interfaces, a floppy disk controller capable of handling up to eight double sided, double density drives, video circuitry for 80 × 24 text and high resolution graphics and a keyboard port.

Called the "Aussie Byte", the board is offered fully assembled and tested with a 12 months warranty, for \$950 plus tax.

Significantly, at least two exhibitors were displaying robots at the show. Jaycar Pty Ltd had the Genesis P-102 and the Micrograsp (which is available in kit form), while Mitsubishi showed their "Movemaster" robot arm. The Sorcerer Users Group of Sydney exhibited a more practical device, a computer-controlled engraving machine built by one of their members.

Perhaps the most notable aspect of the show was the relative absence of games. The emphasis was very much on the "serious" aspects of microcomputer use, with business applications occupying perhaps 85% of the show.

Also noticeable was the emphasis on "stand-alone" computers, perhaps linked into a network but each fully capable of all computer functions. With the decreasing cost of microcomputers the idea of multi-terminal systems with one central computer seems to be on the decline. The trend to built-in hard disk drives can only accelerate this movement.

Attendance figures indicate that over 23,000 people saw the three day show, well above the 15,000-20,000 initially expected. Many dealers reported a strong buying interest and many will gain quite a few customers from their participation.

Applied Technology expands Microbee production

Applied Technology has opened a new factory in West Gosford to meet the demand for their Microbee personal computer. At the opening in April, Applied Technology's managing director Owen Hill announced that the Microbee will be distributed in Sweden, Norway, Israel, the UK, Canada, United States, South Africa, Malaysia, the Philippines and West Germany. In Malaysia the computer is being considered for use in government schools as an educational computer.

Over 8000 Microbees are already in use in Australian homes and schools, with over 2500 computers used in primary and secondary education in NSW. The computer is recommended for use in schools in NSW along with the Apple, while negotiations are continuing with the Education Departments of Western Australia and Queensland.

In addition to the basic Microbee, new colour and disk-based CP/M systems are in production and the new Microbee "IC" has been introduced. This new machine includes integrated Basic, word processing, machine language monitor and terminal communications software "built-in" in ROM.

The new factory is already producing just on 1000 Microbees a month, with production set to move to 2000 a month. Future plans call for the production of 100,000 units each year from the Gosford factory and the establishment of an Australia-wide network of retailers and dealers for Microbee computers, software and peripherals.

Largely under the impetus of the Microbee, Applied



Mr Owen Hill, Managing Director of Applied Technology, looks on as the new Gosford factory is officially opened by the NSW Minister for Education Mr J. J. Mulock.

Technology has grown from just two employees two years ago to over 80 full-time and part-time employees, providing a significant boost to employment in Gosford.

For further information on the Microbee contact Applied Technology, PO Box 311, Hornsby, NSW 2077.

SENSATIONAL SCOOPS

**MADE IN
JAPAN
QUALITY**

BRILLIANT NEW FAX 80 DOT MATRIX PRINTER LESS THAN \$700

**14 DAY
MONEY-BACK
GUARANTEE**

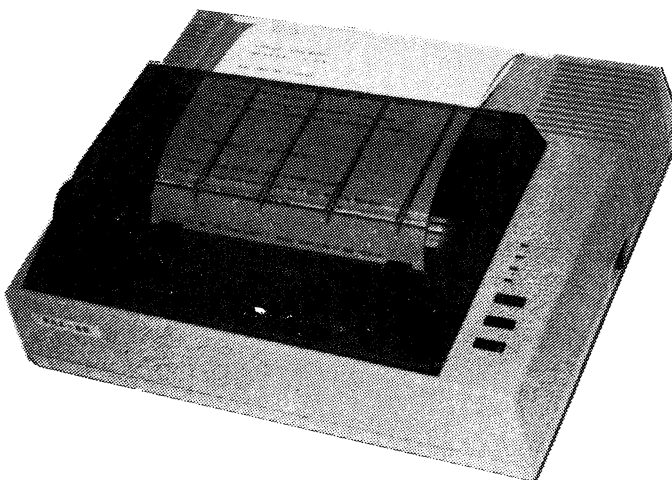
Just a few short months ago we were selling printers of comparable quality and specification for around \$1000. With the release of the exciting new FAX-80 and our bulk purchase powers we are offering these for sale at just

\$699.50.

Hurry — present stocks are limited.

GENERAL INFORMATION

This printer is designed to operate through software control, supplied from any general purpose micro-computer, personal computer, office computer etc. that has provision of printing data out-put that should conform with this specification. It prints upper-and lower-case alpha-numeric characters in both normal and italic letter forms, and graphic characters available on the character code set of this printer beside capability of bit image graphic printing it is also functionated. Additionally, this printer has considerable formatting capability owing to its own internal microprocessor system.



Interface specifications

Interface:
Standard Centronics parallel. Optional RS-232C (SERIAL).
Data transfer rate:
4,000 CPS max.
Synchronization:
By external supplied STROBE pulses.
Handshaking:
By ACK/NLG or BUSY signals.
Logic level:
Input data and all interface control signals are TTL level.

Functional specifications

Printing method:
Serial impact dot matrix.
Printing format:
Alpha-numeric — 7 x 8 in 8 x 9 dot matrix field.
Semi-graphic (character graphic) — 7 x 8 dot matrix.
Bit image graphic — Vertical 8 dots parallel, horizontal 640 dots serial/line.
Character size:
2.1mm (0.083")-W x 2.4mm (0.09")-H/7 x 8 dot matrix.

Character set:

228 ASCII characters, Normal and italic alpha-numeric font, symbols and semi-graphics.

Printing speed:

80 CPS, 640 dots/line per second.

Printing direction:

Normal — Bidirectional, logic seeking. Superscript and bit image graphics — Unidirectional, left to right.

Line spacing:

Normal — 4.23mm (1/6"). Programmable in increments of 0.35mm (1/72") and 0.118mm (1/216").

Columns/line:

Normal size — 80 columns. Double width — 40 columns. Compressed print — 142 columns. Compressed/double width — 71 columns.

The above can be mixed in a line.

Paper feed:

Adjustable sprocket feed and friction feed.

Paper type:

Fanfold, Single sheet. Paper width — 101.6mm (4") to 254mm (10").

**VALUE PACKED AT
CAT. D 1170. . . \$699.50**

**Printer Cable Interface Kit
to suit Microbee
D 1190. \$49.95**

THE FANTASTIC MICROBEE IC HAS ARRIVED

**NEW 3.375 MHz
CLOCK SPEED**

**AVAILABLE IN
16 K or 32 K VERSIONS**



**64 x 16 OR 80 x 24
SCREEN FORMAT**

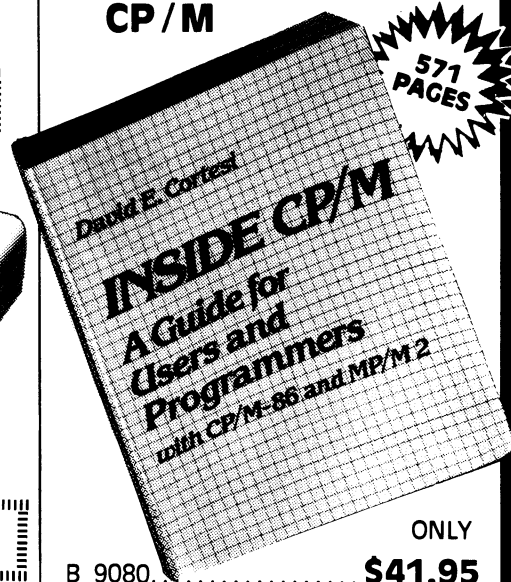
**OVER 10,000
MICROBEES SOLD**

The all new Microbee IC has got to be the most value packed ROM based personal computer available today. **New enhanced basic** enables 64 x 16 or 80 x 24 screen format and the clock speed is now a **zippy 3.375 MHz** and over \$140 worth of software integrated in ROM i.e. the absolute-

ly delightful **Wordbee** wordprocessor package and **Editor Assembly** plus all the other exciting features that have made the Microbee famous.

D 1020. 16 K. **\$499.00**
D 1035. 32 K. **\$599.00**

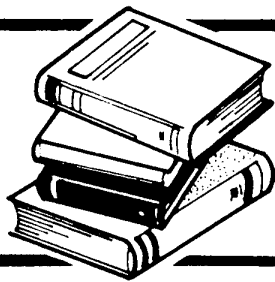
THE ULTIMATE GUIDE TO CP/M



**571
PAGES**

**ONLY
B 9080. \$41.95**

Penned by international computer expert David E. Cortesi, **INSIDE CP/M** is divided into a Tutorial Section and a Reference Section. The tutorial is again divided into four sections, one for Novices, Users, New Programmers and Experienced Programmers. The Reference Section is the most comprehensive we have ever seen and this book should sit proudly next to any CP/M system.
APPLICABLE TO CP/M 1.4, 2.2, 86, MP/M and MP/M 2.



Books & Literature

The Microbee computer — beginner's guide

An introduction to microbee personal computers and programming.

Your First 100 programs



AN INTRODUCTION TO MICROBEE PERSONAL COMPUTERS AND PROGRAMMING: Published by Honeysoft Publishing Company, Waitara, NSW 1983. Soft covers, 210 x 298mm, 50 pages. \$14.95.

This thin book, subtitled "Your first 100 programs" is an introduction to the Microbee computer written by two Australian school teachers and intended "for people who have never had their hands on a computer before". In 50 rather tight-packed pages it covers the Microbee from setting up to advanced graphics procedures, aided by sample programs and extensive diagrams.

Topics covered in the book include the use of the PRINT statement and punctuation, the edit mode, programming style and presentation, program structure, constants, variables and arrays, and mathematical operations.

Both high resolution and low resolution graphics are discussed in detail, again with extensive examples and programs illustrating the use of the programmable character generator.

Music is also well covered, and a brief explanation of all Basic statements and commands is included. Worksheets for defining programmable characters and formatting screen displays are included towards the end of the book, with a glossary.

While we didn't count them, there appear to be at least 100 program listings in the book, most of them short examples on one or another feature of the Microbee computer. Larger programs are provided to cover financial planning,

appointments scheduling and filing, among other topics.

This book will be of interest to all users of the Microbee computer. Our review copy from the publishers. The amount of information provided on the Microbee and Microworld Basic makes it worthwhile reading. (P.V.)

Microbee manual — updated version

USER'S MANUAL: MICROWORLD 16K BASIC: Published by Honeysoft Publishing Company, Waitara, NSW 1983. Soft covers, 152 x 210mm, 157 pages. \$14.95.

This is not the usual type of publication reviewed in these pages but rather a revised and re-written version of the User's Manual for the Applied Technology Microbee computer, published by Honeysoft, the publishing subsidiary of Applied Technology Pty Ltd. We do not normally review user's manuals, but Applied Technology sought our comments following criticism of the original manual in our review of the Microbee computer.

The new manual is well presented and laid out and incorporates all the suggestions, comments and corrections that have been received from users over the past six months. With that sort of feedback it should now be thoroughly debugged. The manual is divided into eight sections.

Section one is an introduction to the Microbee, with sub-sections covering setting up the system and an explanation of terms used in the manual. Section two is a broad overview of Microworld Basic, explaining in simple language the uses of variables, constants and expressions, the process of entering a program and use of the Microbee in the immediate mode.

A tutorial introduction to Microworld Basic is found in Section three, covering line numbering, saving and loading programs, program editing, music, graphics, string functions and error trapping. Section four begins programming, with a complete discussion of the many Basic statements, mathematical and string operations, loops and subroutines and graphics and input/output operations.

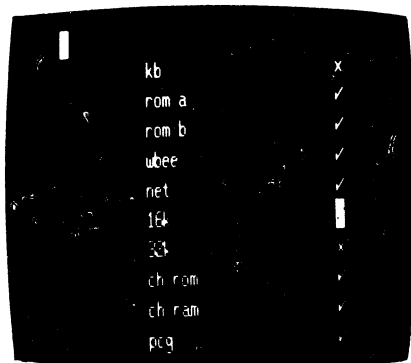
The most extensive part of the manual is Section five which contains descriptions and examples of all statements and commands used by Microworld Basic. Section six rounds out the manual with a selection of applications programs and instructions for converting programs in other versions of Basic to the Microworld format.

A glossary and appendices covering ASCII and hexadecimal codes, ROM memory locations, I/O ports and the Microbee Basic token codes completes the manual.

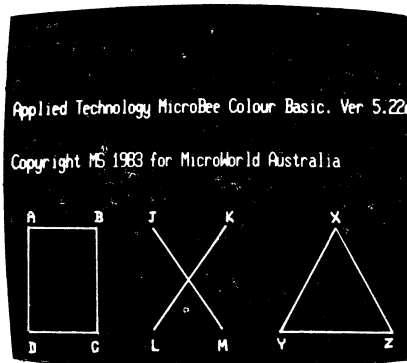
All in all this new user's manual is certain to meet the criticisms levelled against the original publication. It has been re-written with the beginner in mind with extensive examples and a step by step guide to getting the Microbee up and running. It is the ideal complement to the versatile and friendly Microbee computer. (P.V.)



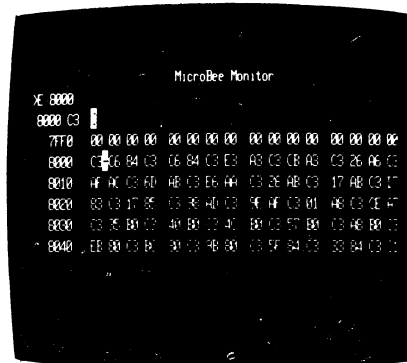
Now! Australia's leading
ahead with totally
operation.



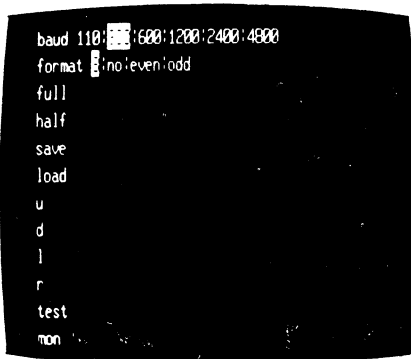
SELF TEST.



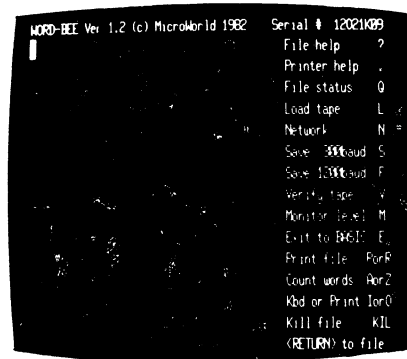
BASIC WITH GRAPHICS



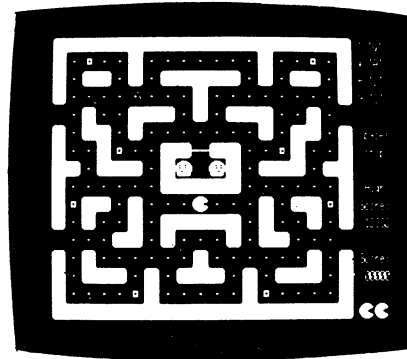
MONITOR



NETWORK



WORDBEE



ARCADE GAMES



Microbee features:

- 16K and 32K.
- Non-Volatile CMOS RAM.
- Programmable RS232 Serial Port.
- Programmable 8 Bit I/O Port.
- Display 64 x 16 and 80 x 24 screen format.
- 6545 Programmable VDU Driver.
- Cassette Interface, 300 and 1200 baud.

Personal Computer moves further integrated software and faster

microbee®

First in the world with all these software features integrated
into one computer —

MICROWORLD COLOUR BASIC 5.22e
WORDBEE WORD PROCESSOR
NETWORKING
TERMINAL COMMUNICATIONS
MACHINE CODE MONITOR
SELF TESTING

Here's why **microbee** has become Australia's biggest selling personal/educational computer. Over 3000 **microbees** are already helping teaching in Australian schools, T.A.F.E.'s and Universities.

New enhanced MICROWORLD BASIC 5.22e allows easy programming of colour into educational software and games with high resolution graphics. 16 Background and 26 Foreground colours. Wordbee in ROM means you can connect your **microbee** to a printer and have a complete word processor in your home for letters, school and Uni assignments and accounts.

Add a low cost modem or acoustic coupler and you can exchange BASIC and WORDBEE files with other **microbees** OR you can talk to the popular bulletin boards and sources around the world. Select the Terminal Mode to give you standard ADM3A or Televideo 912C terminal emulation in 80 x 24 format. Your **microbee** becomes a personal terminal to communicate with mainframe computers — your window to the world! Select the machine code monitor and you can program the Z80 microprocessor directly.

Your **microbee** IC even has a built in self test facility so you can be sure its not the machine but possibly your program that has the bug!



microbee® 16K IC — \$499.
microbee® 32K IC — \$599.

Recommended Retail Price Only. Prices may vary beyond Sydney.



PHONE ORDERS
(02) 487 2711



Available from your **microbee computer shops:**

1 Pattison Ave, Waitara, Sydney.
Phone (02) 487 2711

729 Glenferrie Rd, Hawthorn,
Melbourne. Phone 818 2244

141 Stirling Highway, Nedlands,
Perth. Phone 386 8250

Coolman Court, Weston. Phone
88 6384

Microbee dealers:

NSW: **Electronic Agencies**,
117 York Street, Sydney.
115 Parramatta Road, Concord.
Compu-K, 7 Casino Street, South Lismore.
Comput/Ed, 8 Park Arcade, Park Avenue,
Coffs Harbour.

ACT: **Computech**, Belconnen Churches
Centre, Benjamin Way, Belconnen.

VIC: **Computerland South Melbourne**,
37 Albert Road, Melbourne.

S.A.: **Key Computers**, 1061 South Road,
Edwardstown. 77 Grenfell Street, Adelaide.

W.A.: **Altronics**, 105 Stirling Street, Perth.

QLD: **Software 80**, 200 Moggill Road,
Taringa. **Electrographic Office Systems**,
25 Grafton Street, Cairns.

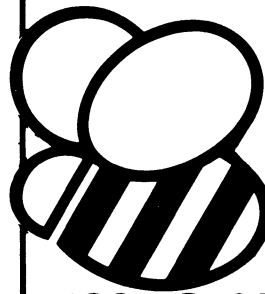
Town and Country Computers,
CTL Centre, Anne Street,
Aitkenvale, Townsville.

TAS: **Central Data**, 14A Goodwin Street,
Launceston.

PHONE ORDERS

(02) 487-2711

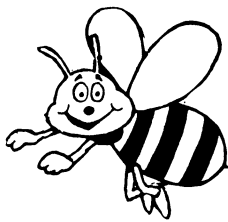
Applied Technology Retail Pty Ltd



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JAYCAR & ELECTRONIC AGENCIES



KEPLER'S LAWS

A simulation of planetary orbits, producing data for analysis by students of the laws of Periods, Ellipses and Areas. Year 11/12 Physics.
Cat. XE-6900

\$14.95

GRAPHIC LIFE

Life is "played" on a two dimensional grid of squares, so that every square has eight neighbouring squares or cells. Each cell is either alive or dead and each cell lives or dies depending on its neighbour cells. A dead cell with three live neighbours will be brought to life in the next generation. A very intriguing experimenters tool kit.
Cat. XE-6905

\$14.95

MILLIKAN'S EXPERIMENT

In 1910 Millikan deduced the charge of an electron. Side A is a simulation in HIREC graphics of the experiment. Side B contains a tutorial on Millikan and his experiment and students must answer questions as they work through. Year 11/12 Physics.
Cat. XE-6910

\$14.95

DISASSEMBLER By Dreamcards

Some may say "Not another Disassembler". But this one has a difference. It allows you to set out where the data fields are so the computer is saving time, not trying to disassemble data. A program you shouldn't be without.
Cat. XE-6915

\$15.00

CHEAPIE By Dreamcards

Two top quality programs for the price of one. The best Hangman we've seen yet on side A and a superb version of Battleship on side B. Both have excellent graphics.
Cat. XE-6920

\$15.00

CANNIBALS AND MISSIONARIES

The old logic problem game of transferring 3 Cannibals and 3 Missionaries from one side of a river to the other in a boat that holds two. If there are more Cannibals than Missionaries on either side at any time the Cannibals revert to their favourite form of feeding.
Cat. XE-6925

\$14.95

COMPOSER BEE

This is a very written program for music. This program allows you to compose, play, edit, transpose as well as being able to load and save your music. A program that has been a long time in the writing and well worth buying.
Cat. XE-6930

\$22.50

WORD ADVENTURE

A program with very good graphics using little characters to entice the user to think what word is either a synonym, antonym or homonym of the word they are showing. Everytime you get it wrong you are given more clues. After the clues run out you must face the Dragon when you must spell the word he is holding correctly before you.
Cat. XE-6935

\$14.95

PONTOON

A quality fast moving card game where up to 6 players can play against the computer who is banker.
Cat. XE-6940

\$14.95

WORD PROCESSOR - MYTEK

Mytek Wordprocessor comes with a quality ring binder and features most of the commands of the highly acclaimed SPELLBINDER. Mytek Wordprocessor is screen orientated and re-formats the screen to 32 lines, allowing twice the amount of text to be displayed at once. Commands, which are all single keystrokes, included APPEND, BACK, CLOSE, DELETE, EDIT, FORWARD, HOLD, INSERT, KILL, LINE LENGTH, MEMORY, OPEN, PRINT, READ, SEARCH/REPLACE, TOP, UNHOLD, VERIFY, WRITE and EXIT. Mytek Wordprocessor is not a plaything. Although simple to use, it is one of the most powerful cassette based wordprocessors currently available on any microcomputer.
Cat. XE-7015

Was \$80, now \$33
Save \$15

MUSIC - B - MYTEK

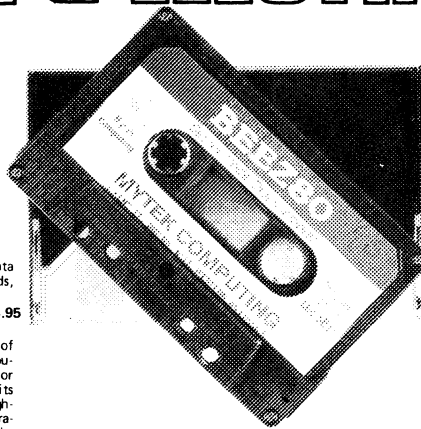
MusicB is a music Composer/Editor that lets you create and save music and sound effects with a flexibility that makes chopsticks of the Basic PLAY command. MusicB is a great way to learn and play music! Comprehensive instructions are included.
Cat. XE-7010

\$20.00

STOCK SUPERVISOR

This program is the means of creating a stock or product data base which provides an on-line information system. This system is then capable of being continuously and easily updated to reflect all the inventory and accounting aspects of stock on hand.
Cat. XE-6865

\$15.95



GAMES BUSINESS EDUCATION FOR THE MICROBEE

TRS-BEE - MYTEK

TRS-BEE is a package of three programs that loads TRS-80 Model 1 and 3 program tapes into the MicroBee without any additional hardware. Although some program editing will still be required prior to their running, the majority of program typing time is saved by TRS-BEE. The first program loads TRS-80 BASIC programs into MicroWorld BASIC. Most programs may then be edited and run. The second program in the package loads any TRS-80 machine code file into MicroBee memory. The third program loads TRS-80 assembler files into the MicroBee EDITOR/ASSEMBLER. Any TRS-80 Model 1 or 3 tape may be loaded. TRS-BEE opens up a whole new world of possible software on your MicroBee!
Cat. XE-7005

\$30.00

HOUSEHOLD REGISTER

This program will simplify the task of determining the value of your home's contents for insurance purposes, as well as providing descriptions of all listed items in the event of their loss or destruction. Effects are catalogued by name, description and value. Nine separate rooms are provided, and up to 28 items may be listed in each.
Cat. XE-7000

\$15.95

STAT PACK - STATISTICS

This program is a general purpose graph plotting, linear regression, line of best fit and correlation program. It features a t-test of significance for the correlation coefficient and, if no evidence of correlation is found, a determination of minimum sample size is performed.
Cat. XE-6999

\$14.95

LOG - GENERAL PURPOSE INDEX

This program is designed to suit a wide range of records where indexing (and later searching) can be on one or two words, or on a string of up to 15 characters. Each record consists of its index heading, plus up to 12 lines of text. Each line can contain up to 41 characters.
Cat. XE-6890

\$15.95

PROGRAMMING HINTS

Consists of a collection of modules which you may use to improve your own BASIC programs. They are all linked together under a menu driven display which allows you to RUN or LIST each module to see how they work.
Cat. XE-6895

\$14.95

PROSPECTOR

Arcade game in which you are the prospector attempting to get gold and diamonds which are scattered around the field, and at the same time avoid two drunken bandits who are chasing you.
Cat. XE-6885

\$14.95



BASIC TUTORIAL

Is a super teaching aid for any classroom. Basic Tutorial is a set of 9 interactive exercises designed for teaching Basic to the computer novice. No previous knowledge is assumed. Basic Tutorial uses a unique double screen technique to display both the normal computer output and the tutorial exercises at the one time. This allows the student to use the MicroBee in the normal way, while the tutorial instructions appear in the lower half of the screen.
Cat. XE-6860

\$20.00

MACHINE CODE TUTORIAL - MYTEK

Consists of 8 interactive exercises designed for teaching machine code programming and related topics as they apply to the MicroBee computer. Only a general knowledge of the BASIC language is assumed. Machine Code Tutorial is designed to bridge the gap between BASIC programming and being able to understand and use typical Z80 manuals.
Cat. XE-6855

\$25.00

BUDGET - SPREADSHEET

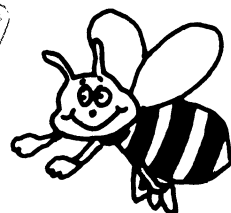
This program is designed to speed up and simplify the task of framing a usable financial budget. Applications range from personal or household to small business finances. A quality program.
Cat. XE-6850

\$15.95

SEADOG

Seadog a war game between two ships from the days of Nelson. You may play against a friend, or against the computer. The game features limited resolution graphics for the war battle sequences. As well as the enemy fleet, you must survive hazards such as hurricanes, diseases, and your own gun aimers who do not always shoot straight!
Cat. XE-6845

\$14.95



DECODE

Basic decoder and listing formatter

This programme will be an invaluable aid to any one taking first steps in understanding machine code or wants to expand their library of proven machine code routines. Decode will (a) print imbedded machine code routines fully and accurately (b) print all unprintable characters (c) provide a clearer, easier to read listing and send all output to a printer if so required. ED ASM is not required.
Cat. XE-6765

\$15.95

CARDEX - CARD INDEX SYSTEM

This program simulates the card index systems of yesteryear in that it neatly files a series of records, and the user can leaf through the file inspecting each record one by one.
Cat. XE-6755

\$9.95

FILEX

Filex is a larger version of Cardex, but handles larger amounts of data, and also is easier to find "the cards".
Cat. XE-6760

\$14.95

FINANCIAL MANAGER

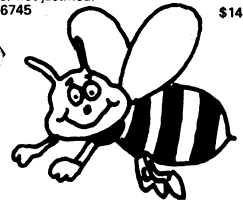
Provides an accurate and clearly formatted record of any financial account, and a cost analysis stated in money amounts and percentages - Personal Account Monitor and Business Account Analyst.
Cat. XE-6750

\$15.95

TEXTED

This program helps to produce a neatly formatted document of word processor appearance, with an absolute minimum of fuss on the user's part. It is the logical alternative when a high powered (and high priced) word processor is not warranted and/or not justified.
Cat. XE-6745

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ASTEROIDS PLUS - MYTEK

Asteroids Plus is one of the finest high resolution graphic arcade games available for the MicroBee computer. It features 3-D point by point resolution graphics, shields, sound effects, intelligent objects, guided missiles, black holes and a score board. If you enjoy playing computer games, you will be captivated by Asteroids Plus.
Cat. XE-6297

\$22.50

BEEZ 80 - MYTEK

This secret code disassembler will disassemble any code sequence. Nothing is illegal. It will allow you to program with codes that no other disassembler can decipher!
Cat. XE-6298

\$20.00

SPACE INVADERS

One of the most popular programmes ever released. This version was written especially for the MicroBee.
Cat. XE-6030

\$14.95

SCREEN DUMP

This tape comes with two programmes and can be used on both parallel and serial printers such as Star, FX80, Epson and other compatible types. Side A - Horizontal Dump - executed from net command. Side B - Vertical Dump - executed from CTRL P command.
Cat. XE-6970

\$14.95

FORTH

A new language for the MicroBee. Comes complete with interpreter on one side of the tape and supporting programs on the other side. As well as this it includes a very well written, bound manual.
Cat. XE-6965

\$45.00

MINE DROP

You are a tank running around a maze gathering all the supplies you can. It sounds easy, but you have a guided missile hot on your trail. Your only defence is a remote controlled mine which you drop and explode at will. A very fast joystick or key controlled game.
Cat. XE-6960

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PENETRATOR

A low resolution graphic version of the popular game "Scrambler". You must defeat the rockets and bomb the radars in an effort to get to the next stage which is even harder. This game can be either controlled by a joystick or by keys. Being in Lores graphics it is a very fast game. If you are bored with the same land pattern you can devise your own.
Cat. XE-6955

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SPACE PATROL

A lot like Penetrator but in high resolution graphics. You must battle your way through the various stages where at the last stage you have four chances of blowing up a neutron bomb shelter. If you are successful, the next round is a lot harder.
Cat. XE-6950

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DATABASE

This program is a well written data base management system that utilises the MicroBee to its fullest to provide a Data Management system similar to those found on larger and more expensive systems. This comes complete with large bound manual.
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TEACHERS MASTER TAPE

This tape allows the user to enter 20 words for a spelling list. These words are then at a later stage displayed back on the screen in clear graphics with four options of speed and display time. It makes a very useful program.
Cat. XE-6985 \$21.50

FRACTIONS AND DECIMALS

Side one of the tape goes through a graphic tutorial of what fractions are and what they look like. Side two explains what equivalent fractions are and also introduces decimals to two decimal places. A well written tape which uses graphics to its fullest to teach the principles.
Cat. XE-6980 \$16.95

NUMBER HANGMAN

A graphic game which helps improve times in solving mathematical questions. You must answer the question before the hangman has time to hang himself. Optional times and difficulty are available making it suitable for everyone.
Cat. XE-6990 \$13.50

MEASUREMENT

This tape starts from scratch and defines the unit of measurement and what its other equivalents are. It gives exercises converting, measures small and large to the standard metre. It continues on to show perimeters, length and area and giving various exercises on the way. Another program that uses graphics to prove a point.
Cat. XE-6998 \$13.50

MULTIPLICATION TABLES

This program is directed more at operation rather than age or grade. It uses graphics to enhance the display and optional time limits and difficulty to bring anyone's multiplication tables up to scratch.
Cat. XE-6975 \$10.95

ALGEBRA 1

This program introduces the uses of pronumerals as theoretical numbers with simple problems. Simple algebraic equations are treated showing collection of like terms, etc. It then gives exercises to try to further push the principles of algebra.
Cat. XE-6995 \$13.50

METEOR RESCUE - MYTEK

Your mission is to rescue stranded astronauts. You are the commander of the Landing Module docked in space with the mother ship. It is your responsibility to guide the landing module through a meteor field, down to the surface of the planet, to land safely on a landing pad. An astronaut will then run to your landing module and you will blast off. You must use your lasers if necessary and dock with the mother ship again. A total of six astronauts must be shuffled to the mother ship.
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Corville Castle is an adventure which will take you to a far away place of mystic castles, fierce monsters and evil warlocks. You must enter the warlocks castle and find some dark secret which will help you to destroy the warlock. But remember, you only have until dusk.
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CARACE

A fast exciting graphic game for the MicroBee. You must weave your way through a field of cars and oil slicks to produce the highest score. If you're too good at one speed then try the next (10 speeds to choose from!)
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EYE OF MIN (32K)

An adventure game with a difference in that it gives you a picture of where you are. Once you enter the castle you are given a floor plan making it easier than moving in the dark. A very thrilling adventure game.
Cat. XE-7025 \$14.95

MORSE CODE TUTOR

Perfect for all you budding young amateurs. Quality program which covers the full alphabet, random letters, and allows you to enter a sentence in English and plays it back in morse, plus more.
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PSYCHOTEC By Dreamcards

Psychotec provides a striking example of artificial intelligence, allowing a dialogue in English between computer and operator, the computer playing the role of psychiatrist and the operator being a "patient" on the couch. Leaves other "similar" types for dead.
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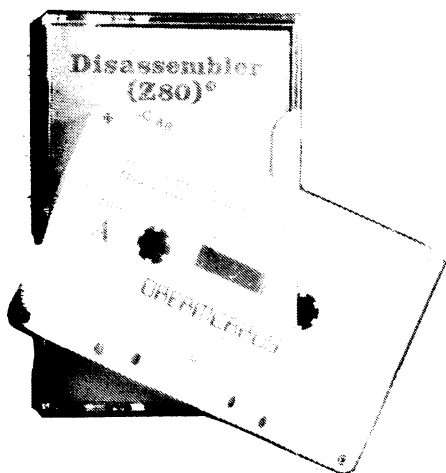
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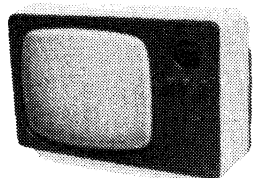
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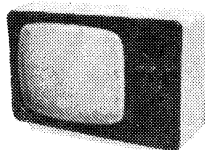


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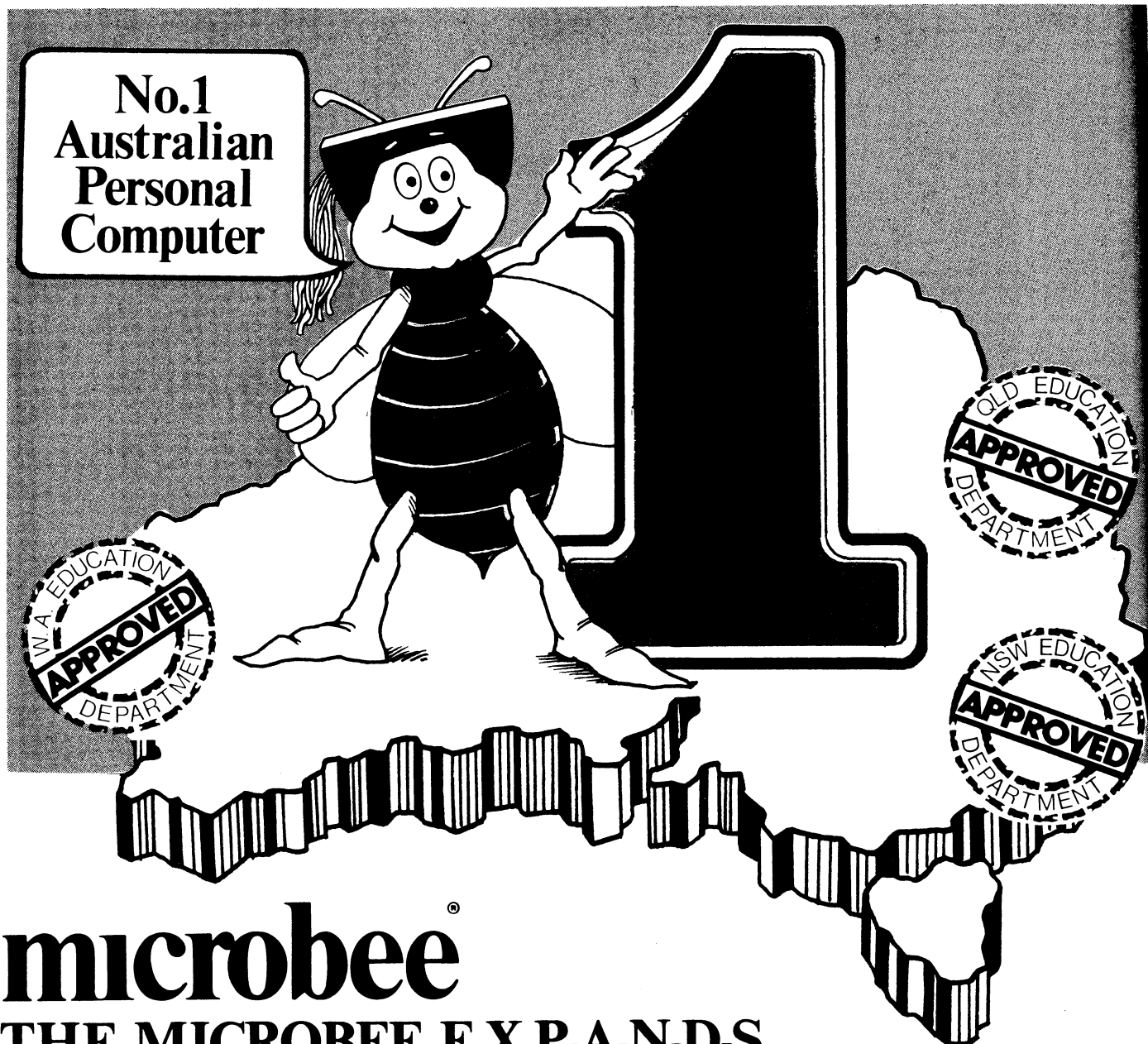
ETI 668 MicroBee EPROM Programmer. Ref: ETI February 1983. This simple, low cost EPROM programmer just plugs into the Bee's I/O port and enables you to save programs in any of the 5 different common EPROMs available (2716, 2532, 2732, 2732A, 2764). Kit comes complete with 'Personality' plug and all IC sockets.
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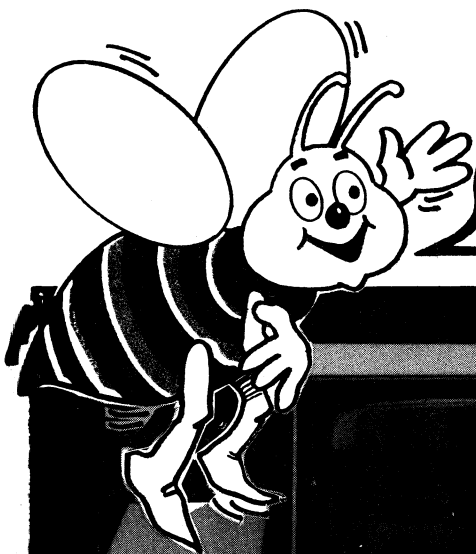
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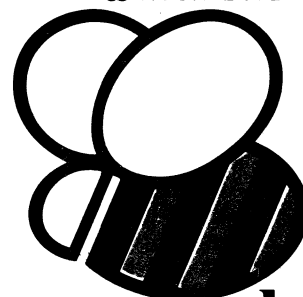
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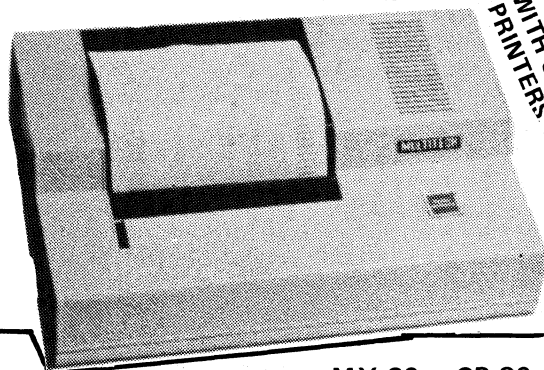
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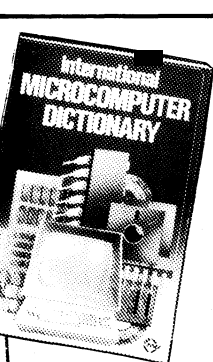
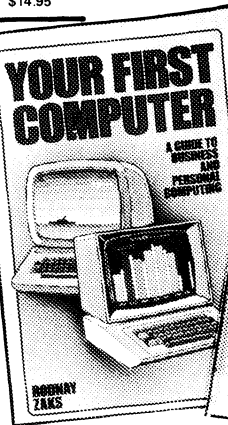
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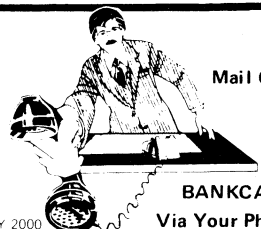
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MicroBee IC comes with software

by PETER VERNON

The MicroBee IC is the newest version of the well-known MicroBee computer, with features that should further enhance the popularity of the system.

While retaining the same case and keyboard, the MicroBee IC (for Integrated Computer) provides faster operation as a result of upgrading the system clock speed to 3.375MHz and comes with an extensive array of built-in software.

We first reviewed the MicroBee computer in our February 1983 issue and our comments then remain applicable — "a compact, neatly presented unit . . . not much bigger than some machines being promoted as 'handheld' computers". The potential of the MicroBee as a portable computer has yet to be exploited, chiefly due to the need for an external plug-pack power supply.

The powerful MicroWorld Basic interpreter was fully described in the previous article so we will not go into detail here. Version 5.22e, supplied with the IC system, has a number of modifications worth mentioning however, more for the light they throw on Applied Technology's plans than for their current usefulness.

The new version of Basic is fully upward-compatible with older versions

so programs written for previous versions will run without changes under the new. The major modification is the inclusion of new statements to support colour operation so that no software changes are necessary when a colour display board is installed in the MicroBee. The COLOUR statement allows the selection of one of 32 foreground colours in conjunction with one of eight background colours specified by COLOURB. A third statement, COLOURM, selects a half-intensity background colour mode. Colours are specified for each character block on the screen, so any graphics character, for example, can be displayed in one colour only, limiting the high resolution capability of the system.

Other new statements include the PAK command, which allows the selection of one of several banks of Read Only Memory. Future plans for the MicroBee include the production of ROM cartridges, a number of which could be installed in the system and activated by the appropriate PAK (number) command. At the moment these cartridges

are in the planning stage, and the PAK command is equivalent to typing EDASM (it activates the ROM software installed at address C000).

One other minor change is the inclusion of the commands LISTU and LISTL, which gives the user the option of listing programs with Basic keywords in upper or lower case — contributing to the readability of listings.

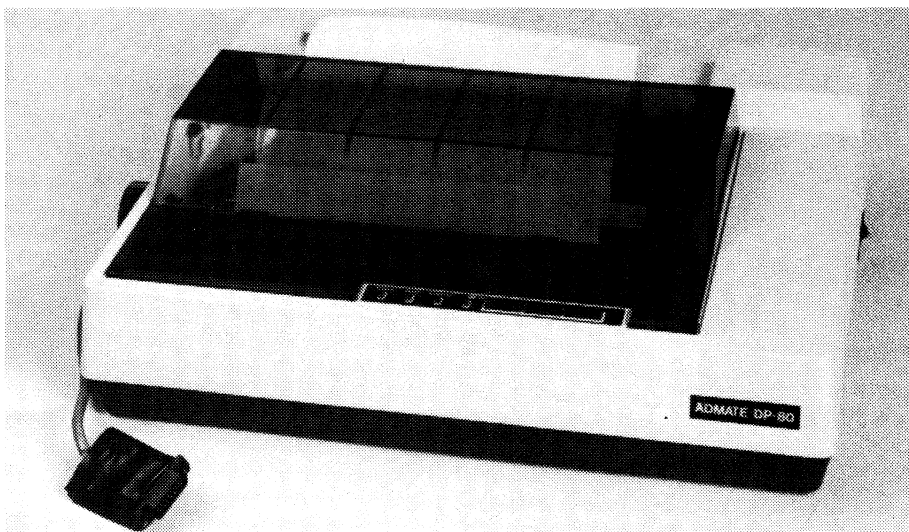
Word processing is built in

The MicroBee IC also features an enhanced version of WordBee, a ROM-based word processing program. Version 1.2 of the program incorporates several modifications, both to eliminate defects of the earlier version and to implement suggestions from users.

The major (and very welcome) change is that WordBee now supports redirection of input and output in the same way as does Basic, allowing a parallel printer to be used with the system with a minimum of fuss. The new "O" command allows output to parallel and serial printers (at either 300 or 1200 baud) or output to a cassette recorder, and will also work in conjunction with the NET communications program.

The new WordBee also supports the special features of the low-cost Centronics-type dot matrix printers now appearing on the market. Underlining and double-strike printing can be switched on and off by inserting user-defined markers in the text, and the .XN and .XY commands are now fully implemented, allowing a printer to be switched on and off-line by the computer. Also available is the .ES command which allows control codes to be sent straight through to the printer port to enable features such as double-width printing and bit-mapped graphics.

Other modifications to the word processing program have generally speeded up operation. Text wrap-around and screen updating are now much faster (no more dropped characters, even at typing speeds of 50 words per minute). The on-screen HELP files (a nice feature) have



The Admate DP-80 printer is distributed by Applied Technology for use with the MicroBee computer. The 80cps dot matrix printer provides a range of type fonts and sizes and dot-addressable graphics, accepting either friction or tractor-feed paper.



The Microbee IC in operation. On the screen is the initial WordBee menu.

also been re-formatted for greater clarity.

To make room for the additional code required for these enhancements the diagnostic "tape CRO" program has been removed from the new WordBee ROMs. It is still available on cassette tape however.

Using WordBee

The first screen display on entering WordBee is an "interface menu" which serves as a despatch point for subsequent commands. Either of the two HELP files can be used to display editing or printer control codes and text can be loaded or saved to tape. Printing of a text file is initiated from this level, and the user can also activate Basic, the network communications program or the machine language monitor from this menu. At any time during text entry the interface menu can be activated by pressing the line feed key on the keyboard.

Pressing RETURN while in the interface menu puts the user in the text editing mode, signified by a blank screen with a flashing block cursor. Combinations of the Control key and a letter key control the movement of the cursor and allow the insertion and deletion of lines and characters in the text and activate a separate block move mode.

The cursor control keys are chosen so that they are arranged in a diamond pattern on the standard typewriter

keyboard. CTRL-E, for example, moves the cursor up one line, CTRL-S and -D move the cursor left and right respectively and CTRL-X moves the cursor down one line. CTRL-A moves the cursor to the start of the current line, and in answer to numerous requests there is now also a CTRL-F combination which will move the cursor to the end of the current line. The logic of this choice is dictated by the layout of the other cursor movement keys, but it does mean that the search command of previous versions of WordBee (CTRL-F for "Find") has had to be re-named. The search function is now initiated by pressing CTRL-L (for "Locate").

While not new, we should also mention the insert and delete functions provided by CTRL-V and CTRL-G because we missed them last time. Control-V activates a character insert mode which moves existing text to the right to make space for new characters as they are typed. Control-G on the other hand deletes the character under the cursor and moves the text to the left to close up the vacant space. This is not quite the same as using the Delete key, which will erase characters without closing up the space.

An interesting use of the I/O redirection facility allows on-screen review of the appearance of the final printed document. By specifying "O" in the interface menu before beginning a print-out, the text will be sent to the video screen

rather than the printer. The dot commands which specify printing format will be operative however, allowing the user to check specifications such as line length, line spacing and justification before the text is committed to paper.

Print formatting commands are extensive but there is a noticeable lack of versatility. As the manual puts it "Whilst WordBee can do an excellent job of printing a complete document that will totally fit into memory, it is somewhat deficient when it comes to printing just part of a document, or a document that is too large to fit into memory. These tasks can be handled by WordBee but often require a bit of fiddling round with DOT commands and the shuffling of bits of the file to or from cassette". There are two commands for printing — one to print the entire document and the other to print from the position of the cursor to the end of the file. There is no provision for printing a single paragraph or a group of lines in the middle of a file, which makes updates and corrections a tedious matter.

Several features of WordBee are particularly attractive — we especially liked the file status and word counting utilities, for example, and the provision for automatic page headings and page numbering. WordBee does have some problems, however.

The MicroBee computer is a rapidly evolving product, and it seems that each new suggestion for improvements and modifications is eagerly implemented, sometimes with undesirable side-effects. Time and again the manual for the first version of WordBee uses phrases such as "The code is not yet optimised, and..." or worse still, "It is hoped that these problems will be cured by the next release of WordBee". The most glaring example is this quote, again taken from the manual for the first version:

"Several users have discovered that if you enter a line of text that is exactly one screen width long and then press the (RETURN) key the program will sometimes either destroy the file or omit the line from the file. I cannot see any easy fix for this one but will ensure that it is fixed by the next release. In the meantime if you have a long file in memory keep backups in case you are unlucky enough to be caught by this bug."

We can only report that, yes, some problems have been fixed while yet some remain. In effect, owners of the MicroBee must expect to serve as a captive test market and quality control department. In this spirit we can report that there seems to be some fault in the block movement routines. Each time we attempted to relocate a paragraph within the text, following the directions given in the instruction manual, the result was to reset the computer, dump-

MicroBee IC computer

ing us back into Basic. It was no surprise, but extremely frustrating, to return to the word processing program and find that all the text in memory had been erased.

Network communications

An outstanding feature of the MicroBee IC is the provision of network communications software in Read Only Memory. The Network ROM is activated with the command NET from Basic or by selecting the "N" option of the WordBee interface menu and allows word processor files and Basic or machine code programs to be transferred into and out of the computer, either via a modem or a direct RS232C link to another system.

Once activated the network ROM displays a menu of commands and options to be used for setting communication parameters. Standard transmission rates from 110 to 4800 baud can be selected, data format established and either full or half duplex communication initiated from this menu.

For modem communications the default transmission speed is 300 baud, but a terminal emulation mode can also be selected at speeds of up to 1200 baud to allow the MicroBee to be connected directly to a host computer. If two MicroBees were connected via an RS232C link data can be transferred at up to 4800 baud, while intermediate baud rates are provided to allow the use of a wider range of serial printers.

Other facilities are also provided by the network ROM in conjunction with Basic. The Basic command OUT#6 now sets the screen to an 80 x 24 lines format, as used by the terminal emulation routines of the NET program. Under Basic this facility is of limited use, as graphics, screen positioning commands and the CLS statement are not supported in this mode. A second command, IN#7, selects input from the buffered RS232C port, while I1 selects input from the parallel port. The manual for the IC suggests that some users may like to add an encoded external keyboard (either parallel or serial) to suit their own requirements, and these two commands make the addition easy.

The communications protocol used by the network ROM is one which has been publicised as the "Ward Christensen" format, widely used by hobbyist and commercial networks in the United States and gaining increasing popularity in Australia. One factor in this wide support is that various programs are available to implement the protocol under CP/M, allowing communication between the MicroBee and CP/M systems. A number of computer clubs have also announced

plans for computer bulletin boards based on the MicroBee and this communications protocol.

Machine language monitor

An extensive monitor program is also provided by the MicroBee IC. Accessible from Basic, NET or WordBee, this monitor includes commands for examining and modifying the contents of memory, running machine language programs, moving blocks of memory and searching memory for a particular pattern of characters. Other routines provide direct access to the NET commands for sending and receiving data files and saving and loading files from tape at 1200 baud. The MicroBee IC manual also provides the details required to allow a user program to make full use of the communications routines contained in the network ROM.

Both the monitor and the networking ROM allow the user to activate the MicroBee's self-test routine which provides a screen display and automatic check of the functioning of the keyboard, ROM and RAM and the character generators of the system. Just what you do when a fault is reported is not mentioned however. A troubleshooting guide, internal details and circuit diagrams are not included in the MicroBee manual.

The Hardware

Internally the MicroBee consists of two circuit boards, one containing a mixture of RAM and ROM and the other carrying the Z80 microprocessor, support chips, video display circuitry and keyboard. A programmable tone generator and cassette interface are also provided.

The MicroBee 32, as the name implies, provides 32K bytes of programmable memory while the other half of the memory board has provision for up to 28K of Read Only Memory. MicroWorld Basic occupies 16K, with the remaining space available for the WordBee, NET and monitor ROMs. A feature of the MicroBee is its use of CMOS memory which draws very little current. A 4.5V battery provides sufficient power to allow the memory to be maintained on standby when the main supply is switched off. Programs and text in memory are retained between uses unless explicitly erased.

At the rear of the machine is a 25-pin D-type connector for the RS232C serial interface and a 15-pin connector which gives access to the pins of a Zilog PIO (Parallel Input/Output) chip. As it stands this port is unsuitable for driving a parallel printer and requires an additional IC and a few minor components. This circuit was incorporated in the printer cable of the review machine.

Two other openings at the rear of the case are provided for later expansion of the system and the circuit board is designed to allow for the addition of an expansion interface connector. There is not enough information available to make this practicable for the average hobbyist, however.

In conclusion

With an array of built-in software; powerful Basic interpreter, word processor and communications programs, the MicroBee IC seems ideally suited for the hobbyist. Deservedly the machine is also attracting a lot of attention in the educational field because of its potential as a teaching system, and software for a wide variety of applications is becoming available.

There may be problems with business

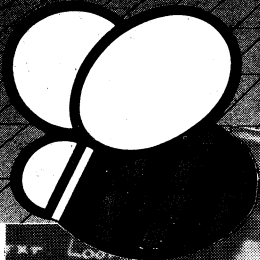
MicroBee IC Specifications

Processor	Z80 at 3.375MHz clock rate
RAM	32K plus 4K for video
ROM	28K
Interfaces	RS232C and parallel ports
Keyboard	60 keys, typewriter style
Display	64 x 16 lines upper and lower case, underline and inverse graphics modes
Graphics	80 x 24 terminal emulation mode
	Low resolution 128 x 48
	High resolution 512 x 256 using programmable characters. A colour option is available
Sound	25 tones with duration in increments of 1/8 second
Software in ROM	MicroWorld Basic
	WordBee 1.2
	Network communications
	M/L monitor
Documentation	Reviewed EA, July 1983, page 118

MicroBee IC computer

applications of the machine however. While the honesty of the WordBee manual is a refreshing change from the ambitious claims of more commercially oriented authors and manufacturers, it does leave a lingering doubt as to the reliability of the software. While it's nice to draw your customers' attention to program defects that may effect their use of the computer it is far preferable to ensure that the bugs are eliminated before the product is sold.

In the near future expansion options will be available to add a colour display to the MicroBee IC, and to convert the standard model to a 64K disk-based CP/M system. At its present stage of development the MicroBee is a remarkable product and at \$599 offers exceptional value for money. Its wider appeal however, will depend to a great extent on "polishing" the software to bring it up to the standard expected by business and professional users.



microbee series 2 EDUCATOR



Specifications:

PROCESSOR: Z80A running at 3.375 MHZ
KEYBOARD: 60 key FULL SIZED QWERTY layout with full travel.
MEMORY: 44K comprising of 16K user RAM (expandable on-board to 32K), 20K ROM software, 4K character ROM, 4K graphics and screen memory.
DISPLAY: Direct video to external monitor or modified TV. 80 by 24 and 64 by 16 character display modes, high resolution PCG graphics to 512 by 256 pixels. Upper and lower case with full programmability at any screen location.
SOFTWARE: MICROWORLD 16K BASIC V5.22 in ROM, MICROWORLD Z80 machine code monitor, built-in diagnostics, NETWORKING with programmable baud rates from 110 to 4800 Baud, 7,8 bit formats, half, full duplex transmission and complete file transfer using the 'HOBBY' standard Christensen protocol.
INPUT/OUTPUT: Programmable 8 bit input/output parallel port, programmable RS232 port, cassette interface, direct video, 50 way Z80 expansion bus.



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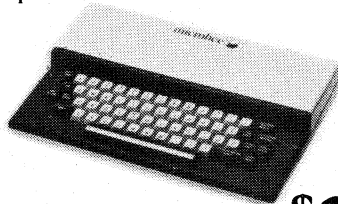
KEYBOARD: 60 key FULL SIZED QWERTY layout with full travel.

MEMORY: 36K comprising of 8K user RAM (expandable on-board to 16K), 20K ROM software, 4K character ROM, 4K graphics and screen memory.

DISPLAY: Direct video to external monitor or modified TV. 80 by 24 and 64 by 16 character display modes, high resolution PCG graphics to 512 by 256 pixels. Upper and lower case with full programmability at any screen location.

SOFTWARE: MICROWORLD 16K BASIC V5.22 in ROM, MICROWORLD Z80 machine code monitor, built-in diagnostics, NETWORKING with programmable baud rates from 110 to 4800 Baud, 7,8 bit formats, half, full duplex transmission and complete file transfer using the 'HOBBY' standard Christensen protocol.

INPUT/OUTPUT: Programmable 8 bit input/output parallel port, programmable RS232 port, cassette interface, direct video, 50 way Z80 expansion bus.



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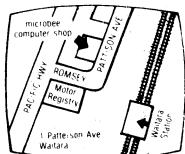
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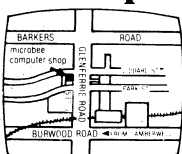
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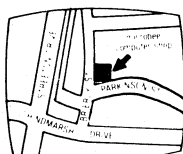
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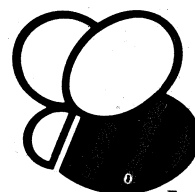
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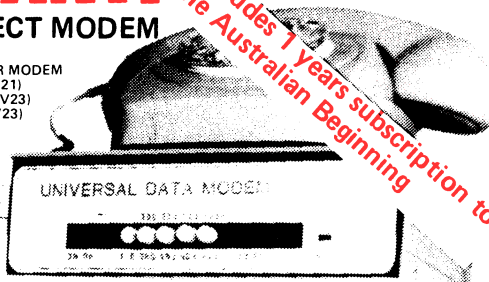
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Cat. XE-7010 \$20.00

TRSBEE - MYTEK
TRSBEE is a package of three programs that loads TRS-80 Model 1 and 3 program tapes into the MicroBee without any additional hardware. Although some program editing will still be required prior to their running, the majority of program typing time is saved by TRSBEE. The first program loads TRS-80 BASIC programs into MicroWorld BASIC. Most programs may then be edited and run. The second program in the package loads any TRS-80 machine code file into MicroBee memory. The third program loads TRS-80 assembler files into the MicroBee EDITOR/ASSEMBLER. Any TRS-80 Model 1 or 3 tape may be loaded. TRSBEE opens up a whole new world of possible software on your MicroBee!
Cat. XE-7005 \$30.00

HOUSEHOLD REGISTER
This program will simplify the task of determining the value of your home's contents for insurance purposes, as well as providing descriptions of all listed items in the event of their loss or destruction. Effects are catalogued by name, description and value. Nine separate rooms are provided, and up to 28 items may be listed in each.
Cat. XE-7000 \$15.95

STAT PACK - STATISTICS
This program is a general purpose graph plotting, linear regression, line of best fit and correlation program. It features a t-test of significance for the correlation coefficient and, if no evidence of correlation is found, a determination of minimum sample size is performed.
Cat. XE-6999 \$14.95

BASIC TUTORIAL
Is a super teaching aid for any classroom. Basic Tutorial is a set of 9 interactive exercises designed for teaching Basic to the computer novice. No previous knowledge is assumed. Basic Tutorial uses a unique double screen technique to display both the normal computer output and the tutorial exercises at the one time. This allows the student to use the MicroBee in the normal way, while the tutorial instructions appear in the lower half of the screen.
Cat. XE-6860 \$20.00

MACHINE CODE TUTORIAL - MYTEK
Consists of 8 interactive exercises designed for teaching machine code programming and related topics as they apply to the MicroBee computer. Only a general knowledge of the BASIC language is assumed. Machine Code Tutorial is designed to bridge the gap between BASIC programming and being able to understand and use typical Z80 manuals.
Cat. XE-6855 \$25.00

BUDGET - SPREADSHEET
This program is designed to speed up and simplify the task of framing a usable financial budget. Applications range from personal or household to small business finances. A quality program.
Cat. XE-6850 \$15.95

DECODE
Basic decoder and listing formatter
This programme will be an invaluable aid to any one taking first steps in understanding machine code or wants to expand their library of proven machine code routines. Decode will (a) print imbedded machine code routines fully and accurately (b) print all unprintable characters (c) provide a clearer, easier to read listing and send all output to a printer if so required. ED ASM is not required.
Cat. XE-6765 \$15.95

DATABASE
This program is a well written data base management system that utilised the MicroBee to its fullest to provide a Data Management System similar to those found on larger and more expensive systems. This comes complete with large bound manual.
Cat. XE-6945 \$19.95

ASTEROIDS PLUS - MYTEK
Asteroids Plus is one of the finest high resolution graphic arcade games available for the MicroBee computer. It features 3-D point by point resolution graphics, shields, sound effects, intelligent objects, guided missiles, black holes and a score board. If you enjoy playing computer games, you will be captivated by Asteroids Plus.
Cat. XE-6297 \$22.50

BEEZ 80 - MYTEK
This secret code disassembler will disassemble any code sequence. Nothing is illegal. It will allow you to program with codes that no other disassembler can decipher!
Cat. XE-6298 \$20.00

SPACE INVADERS
One of the most popular programmes ever released. This version was written especially for the MicroBee.
Cat. XE-6030 \$14.95

FORTH
A new language for the MicroBee. Comes complete with interpreter on one side of the tape and supporting programs on the other side. As well as this it includes a very well written, bound manual.
Cat. XE-6965 \$45.00

PSYCHOTEC By Dreamcards
Psychotec provides a striking example of artificial intelligence, allowing a dialogue in English between computer and operator, the computer playing the role of psychiatrist and the operator being a "patient" on the couch. Leaves other "similar" types for dead.
Cat. XE-6875 \$15.95

MERLIN By Dreamcards
Merlin is a 32K adventure set in England during the dark ages. Your task is to search through the dark forest inhabited by robbers, outlaws and creatures with awesome magic powers to find a legendary sword. An excellent adventure.
Cat. XE-6870 \$25.00

PROGRAMMING HINTS
Consists of a collection of modules which you may use to improve your own BASIC programs. They are all linked together under a menu driven display which allows you to RUN or LIST each module to see how they work.
Cat. XE-6895 \$14.95

LOG - GENERAL PURPOSE INDEX
This program is designed to suit a wide range of records where indexing (and later searching) can be on one or two words, or on a string of up to 15 characters. Each record consists of its index heading, plus up to 12 lines of text. Each line can contain up to 41 characters.
Cat. XE-6890 \$15.95

MINE DROP
You are a tank running around a maze gathering all the supplies you can. It sounds easy, but you have a guided missile hot on your trail. Your only defence is a remote controlled mine which you drop and explode at will. A very fast joystick or key controlled game.
Cat. XE-6960 \$14.95

PENETRATOR
A low resolution graphic version of the popular game "Scrambler". You must defeat the rockets and bomb the radars in an effort to get to the next stage which is even harder. This game can be either controlled by a Joystick or by keys. Being in Lores graphics it is a very fast game. If you are bored with the same land pattern you can devise your own.
Cat. XE-6955 \$19.95

SPACE PATROL
A lot like Penetrator but in high resolution graphics. You must battle your way through the various stages where at the last stage you have four chances of blowing up a neutron bomb shelter. If you are successful, the next round is a lot harder.
Cat. XE-6950 \$16.95

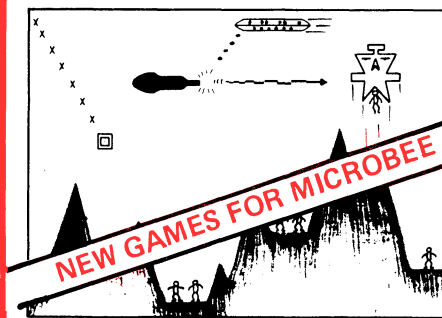
METEOR RESCUE - MYTEK
Your mission is to rescue stranded astronauts. You are the commander of the Landing Module docked in space with the mother ship. It is your responsibility to guide the landing module through a meteor field, down to the surface of the planet, to land safely on a landing pad. An astronaut will then run to your landing module and you will blast off. You must use your lasers if necessary and dock with the mother ship again. A total of six astronauts must be shuffled to the mother ship.
Cat. XE-7020 \$17.50

CORVILLE CASTLE
Corville Castle is an adventure which will take you to a far away place of mystic castles, fierce monsters and evil warlocks. You must enter the warlocks castle and find some dark secret which will help you to destroy the warlock. But remember, you only have until dusk.
Cat. XE-6285 \$16.95

DEFENDER

for the
MicroBee Computer

Fast Furious Action Game



NEW GAMES FOR MICROBEE



DEFENDER - FROM MYTEK
This long awaited program is finally available. Defender needs no introduction. The Defender arcade game is one of the most popular ever produced and the Mytek version is brilliant, a rival for Asteroids Plus.
Cat. XE-7036 \$22.50

DESTROYER
You are the UFO and you must destroy the enemy city buildings before you can land. You have no control over the UFO except for the three bombs on every pass you make over the city. But beware the UFO gets lower with every pass. Good graphics and sound.
Cat. XE-7048 \$14.95

COULOMBS LAW
This program is another in the series of Physics simulations. The first part is a tutorial and the second is a simulation of the experiment.
Cat. XE-7049 \$14.95

BACKGAMMON - FROM MYTEK
This game conforms exactly to that set down in the official rules of the International Backgammon Association, including the rules of doubling and scoring.
Cat. XE-7050 \$17.50

POOLS AND LOTTO
Two programs to help make life easier for the Pools and Lotto enthusiasts. The first program chooses your numbers for the week and the second program allows you to input your numbers into a program and when Lotto night arrives you can input the winning numbers and the computer will check your Lotto for you.
Cat. XE-7045 \$14.95

WONDER WORDS
This program allows you to input 20 words and the computer will create a Wonder Word puzzle. This can be either sent to a printer or solved on the screen or let the computer solve it. Just the program for Wonder Word enthusiasts.
Cat. XE-7046 \$14.95

GEO-TECH DRAWING
This is the first tape in a series to assist students in grasping the fundamentals of geometric and technical drawing. It uses good graphics with excellent explanations.
Cat. XE-7047 \$14.95

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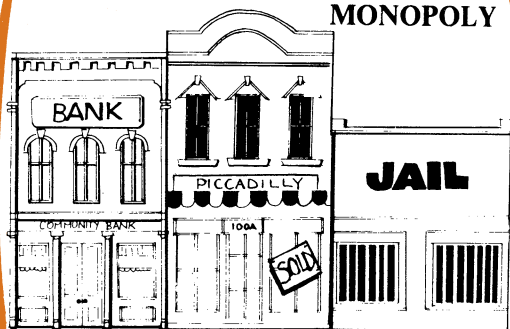
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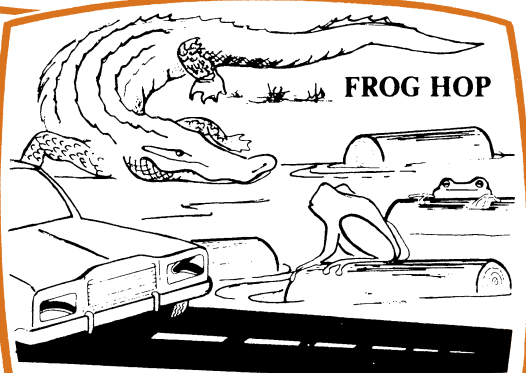
SWORD QUEST



MONOPOLY



FROG HOP



VIPER

A highly addictive game. You must eradicate the rabbits before they reach plague proportions but each time you catch a rabbit your tail grows.

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MONOPOLY

Now a full graphic version of the old family game of the same name. The entire board, players, Community Chest and Chance cards are displayed as required in this fast moving game. Full details of land ownership and finances. Supurb graphics and sound effects. (Requires 32K).

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SWORD QUEST

Just like the 'Dungeons and Dragons' series. Select your characters level of armour, weapons, strength and skill. Explore in search of treasure and the Great Sword, and battle with the dungeon's creatures.

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FROG HOP

A most graphic variation of the popular arcade game. You must hop across a busy street (watch out for the trucks . . .) and across a crocodile infested stream before your frogs are safely home. Guaranteed to appeal to all ages.

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ROBOT MAN '84

Now one of the most popular games ever written for the **microbee** has been rewritten with new twists, a joystick and colour option.

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MICROSPACE INVADERS '84

New update of one of the original **microbee** games. Now with full colour and joystick option. Sound and speed controls. Turn your **microbee** into a home arcade machine.

Cassette **\$14.95** Diskette **\$19.95**

SCRAMBLER

A full colour version of the popular arcade game. You are the sole surviving defender of earth and you must destroy the aliens at all cost ... very effective colour graphics (also suitable for non colour **microbees**).

Cassette **\$14.95** Diskette **\$19.95**

EYE OF MIN

A graphic adventure game that will absorb you for hours. If you can solve this excellent mystery then you can proceed to the next saga 'Sabre of Sultan'. (Requires 32K).

Cassette **\$14.95** Diskette **\$19.95**

ELECTRONIC HOBBY MATE

A real first. This clever program deals with resistors, capacitors, electronic terms and contains a wealth of 'live' information. A must for all experimenters. Your **microbee** will become a useful design aid.

Cassette **\$14.95** Diskette **\$19.95**

TUTORIAL: Touch Typing Tutor and Basic Tricks.

The **microbee** is an ideal educational computer recommended by educational authorities across Australia. This package enables you to learn to touch type using the Pitman touch typing method. For those who want to master Microworld Basic there is a series of hints and suggested subroutines arranged in a most effective menu driven style.

Cassette **\$14.95** Diskette **\$19.95**

RING OF DOOM

Your quest is to search for the Dark Lord of Saurean's Ring of Power. This action adventure game will operate in a 16k **microbee**.

Cassette **\$14.95** Diskette **\$19.95**

SKETCH PAD

Use the high resolution graphics in your **microbee** with this most effective drawing aid. Ideal as an introduction to Cad techniques and you can create complex shapes with a little practice. You can also 'trace' from images taped onto the screen to generate faithful reproductions. Have you ever wondered how programmers create the graphics for their software?

Cassette **\$14.95** Diskette **\$19.95**

CHOPPER PILOT

Fly your helicopter through a small city and a series of mazes without crashing into the scenery. Has a training mode as well as the real thing for those who want to practice first. Now with joystick option.

Cassette **\$19.95** Diskette **\$19.95**

GENIUS AND INSANITY

Yes, those insanity blocks are back! The game has several levels of difficulty but really serves as a vivid demonstration of the **microbee** colour graphic capability.

Cassette **\$14.95** Diskette **\$19.95**

CHESS/CHESS TUTOR

For those who enjoy a serious graphics game it is hard to beat Chess. If your game needs improving try the tutorial first. You can select from 6 levels of play and these can be altered during the game. This program features very good graphics and, particularly at the higher play levels, becomes a most worthy opponent. (32k **microbee** recommended).

Cassette **\$14.95** Diskette **\$19.95**

TARGET/TREK

These are two of the 'classics' of computer games and will still impress with the use of characters to emulate graphics (remember they only had teletypes on the 'old' days around 1976). The challenge of Trek will attract even the most ardent 'anti games freaks'.

Cassette **\$14.95** Diskette **\$19.95**

LEARNING CAN 'BEE' FUN

Now the full series by John Grimley in one value package containing 6 cassette tapes (or 1 diskette). Utilizing well known games such as 'Donkey Kong', 'Frog Hop' and 'Rescue' you can enjoy the game and learn at the same time.

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Diskette **\$39.95**

WORD ADVENTURE

A powerful and gripping educational program. Follow the trails by solving problems involving homonyms, synonyms and antonyms. Various creatures will meet you along the trails and give you clues to the words you seek. If you make too many errors you will certainly have to face the spelling serpent who will test your fate. Once you master the first game you will learn a password which will enable you to load the next secret program. (Requires 32K).

Cassette **\$14.95** Diskette **\$19.95**

'BEE' CASINO

Another value package with a collection of all the popular gambling/casino games written for the **microbee**. No need to take the wife to Las Vegas or West Point! This makes ideal party material for after the kids go to bed.

Cassette Library Pack **\$39.95**

Diskette **\$39.95**

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Laboratory. A collection of practical experiments and courses on physics and chemistry. You can study chemical equations, valency, Kepplers laws, Coulombs Laws and Milliken's experiment. A valuable teaching aid now used in schools.

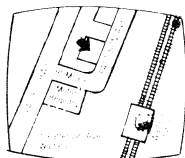
Cassette Library Pack **\$49.95**

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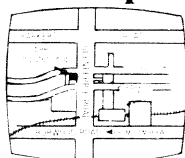
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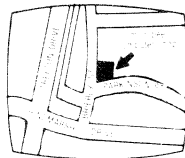
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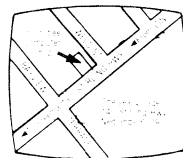
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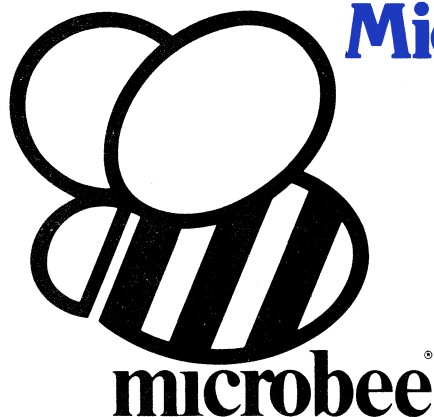
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microbee Series 2 EXPERIMENTER

By popular request, the low cost microbee Series 2 Experimenter has been designed for those who are starting out in the fascinating world of computers or those who want to share the fascination of exploring the exciting developments in the fast moving MICRO WORLD.

Demand for projects using the microbee is so great that 'Electronics Today' are now planning to run a microbee project every month during 1984. So far ETI has described the light pen, EPROM programmer, a radio TTY printer, the world's first home facsimile receiver and ROM expander board for the microbee. Virtually every local computer magazine has run reviews and/or columns devoted entirely to the microbee. If you want to be part of the MICROCOMPUTER GENERATION in 1984 then microbee Series 2 Experimenter is the ideal starting point. Of course you can expand your microbee Series 2 Experimenter as your need grows.

microbee Series 2 EDUCATOR

The microbee Series 2 was specifically designed to serve the needs of the EDUCATION MARKET. Let's face it, the primary non-business use for most personal microcomputers is to increase our learning capabilities either about computers (computer awareness) or about life itself. microbee Series 2 has now been officially approved by Education Departments in NSW, WA and Queensland and is being carefully considered in virtually all other states and by the National Schools Commission at the time this ad was going to press.

The microbee Educator uses BATTERY BACKED NON-VOLATILE CMOS RAM so your programs are saved in the microbee Series 2 after the power is switched off. Students can bring the microbee Series 2 Educator home from school to complete assignments ready for class the next day. With the optional BEEMODEM you can use your microbee Series 2 Educator to talk to other computers or information networks.

microbee Series 2 PERSONAL COMMUNICATOR

With the BUILT-IN WORDBEE in ROM as well as MICROWORLD BASIC and NETWORKING, the Personal Communicator is a powerful home computer ideal for virtually any home use from wordprocessing, spreadsheet analysis, education and even experimentation with the computer concepts as they evolve during the year. With the optional BEEMODEM you can send WORDBEE files across any telephone line to another computer. Bee the first on your block to have home telex!

microbee Series 2 ADVANCED PERSONAL COMPUTER

Now for the first time in Australia: the microbee Series 2 Advanced Personal Computer with 400K disk drive. Then add bundled world class software such as CP/M, MICROSOFT BASIC, MULTIPLAN, WORDSTAR and a powerful library of support programs and you will have some idea as to why the microbee Series 2 Advanced Personal Computer is the most powerful and best price/performance computer in its class. What's more any existing microbee owner can convert his microbee to the Series 2 APC at any time.

The microbee Series 2 APC uses the popular Z80 microprocessor and runs standard CP/M so that users have access to the vast library of CP/M software available world wide. MICROSOFT BASIC is now supplied on disk. WORDSTAR, according to independent surveys now accounts for 50% of ALL word processing software now in use so the designers of the Series 2 APC decided to purchase the OEM rights for your benefit. MULTIPLAN is considered by many to be one of the most powerful spreadsheets yet produced for the microcomputer.



\$399



Cat. XE-4000

Note: the software that is supplied with each machine — at no extra charge!!

\$449



Cat. XE-4050

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Cat. XE-4100

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DUAL 400K DISK DRIVE

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SINGLE 400K DISK DRIVE

Cat. XE-4300

MICROBEE KITS—KITS—KITS—KITS—KITS—KITS—KITS

ETI 733 RTTY Converter. Ref: ETI April 1983. This simple project allows you to hook up your MicroBee to a HF receiver and print radio teletype messages on a monitor screen. Listen to world news for FREE!!
Cat. KE-4654

ONLY \$17.95

ETI 649 MicroBee Light Pen. Ref: ETI August 1983. This simple, low cost device plugs into the Bee's 8 bit port. The 'pen' gives you an entry into the world of light pens and interactive software.
Cat. KE-4656

SHORTFORM \$19.50

SPECIAL PROBE CASE TO SUIT (as specified in ETI article) Cat. HB-6400 \$19.95
ETI 668 MicroBee EPROM Programmer. Ref: ETI February 1983. This simple, low cost EPROM programmer just plugs into the Bee's I/O port and enables you to save programs in any of the 5 different common EPROMs available (2716, 2532, 2732, 2732A, 2764). Kit comes complete with 'Personality' plug and all IC sockets.
Cat. KE-4650

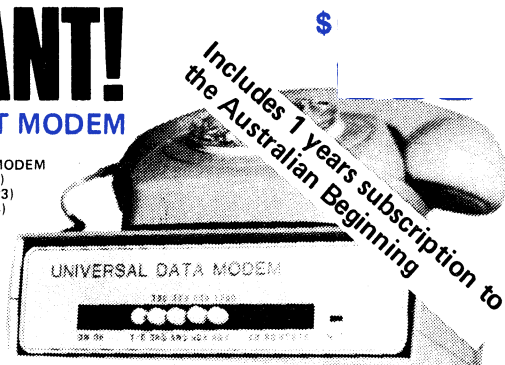
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Parallel Interface Kit for the MicroBee. Includes 15 pin 'D' plug — add \$15.00 if Centronics plug required.
Cat. KE-7017

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DISASSEMBLER By Dreamcards

Some may say "Not another Disassembler". But this one has a difference. It allows you to set out where the data fields are so the computer is saving time, not rtying to disassemble data. A program you shouldn't be without.

Cat. XE-6915 \$15.00

CHEAPEE By Dreamcards

Two top quality programs for the price of one. The best Hangman we've seen yet on side A and a superb version of Battleship on side B. Both have excellent graphics.

Cat. XE-6920 \$15.00

CANNIBALS AND MISSIONARIES

The old logic problem game of transferring 3 Cannibals and 3 Missionaries from one side of a river to the other in a boat that holds two. If there are more Cannibals than Missionaries on either side at any time the Cannibals revert to their favourite form of feeding.

Cat. XE-6925 \$14.95

COMPOSER BEE

This is a very well written program for music. This program allows you to compose, play, edit, transpose as well as being able to load and save your music. A program that has been a long time in the writing and well worth buying.

Cat. XE-6930 \$22.50

WORD ADVENTURE

A program with very good graphics using little characters to entice the user to think what word is either a synonym, antonym or homonym of the word they are showing. Everytime you get it wrong you are given more clues. After the clues run out you must face the Dragon when you must spell the word he is holding correctly before you.

Cat. XE-6935 \$14.95

PONTOON

A quality fast moving card game where up to 6 players can play against the computer who is banker.

Cat. XE-6940 \$14.95

MUSIC - B - MYTEK

MusicB is a music Composer/Editor that lets you create and save music and sound effects with a flexibility that makes chopsticks of the Basic PLAY command. MusicB is a great way to learn and play music! Comprehensive instructions are included.

Cat. XE-7010 \$20.00

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Cat. XE-6860 \$20.00

MACHINE CODE TUTORIAL - MYTEK

Consists of 8 interactive exercises designed for teaching machine code programming and related topics as they apply to the MicroBee computer. Only a general knowledge of the BASIC language is assumed. Machine Code Tutorial is designed to bridge the gap between BASIC programming and being able to understand and use typical Z80 manuals.

Cat. XE-6855 \$25.00

BUDGET - SPREADSHEET

This program is designed to speed up and simplify the task of framing a usable financial budget. Applications range from personal or household to small business finances. A quality program.

Cat. XE-6850 \$15.95

DECODE

Basic decoder and listing formatter

This programme will be an invaluable aid to any one taking first steps in understanding machine code or wants to expand their library of proven machine code routines. Decode will (a) print inbedded machine code routines fully and accurately (b) print all unprintable characters (c) provide a clearer, easier to read listing and send all output to a printer if so required. ED ASM is not required.

Cat. XE-6755 \$15.95

DATABASE

This program is a well written data base management system that utilised the MicroBee to its fullest to provide a Data Management System similar to those found on larger and more expensive systems. This comes complete with large bound manual.

Cat. XE-6945 \$19.95

ASTEROIDS PLUS - MYTEK

Asteroids Plus is one of the finest high resolution graphic arcade games available for the MicroBee computer. It features 3-D point by point resolution graphics, shields, sound effects, intelligent objects, guided missiles, black holes and a score board. If you enjoy playing computer games, you will be captivated by Asteroids Plus.

Cat. XE-6297 \$22.50

BEEZ 80 - MYTEK

This secret code disassembler will disassemble any code sequence. Nothing is illegal. It will allow you to program with codes that no other disassembler can decipher!

Cat. XE-6298 \$20.00

SPACE INVADERS

One of the most popular programmes ever released. This version was written especially for the MicroBee.

Cat. XE-6030 \$14.95

FORTH

A new language for the MicroBee. Comes complete with interpreter on one side of the tape and supporting programs on the other side. As well as this it includes a very well written, bound manual.

Cat. XE-6965 \$45.00

PSYCHOTEC By Dreamcards

Psychotec provides a striking example of artificial intelligence, allowing a dialogue in English between the computer and operator, the computer playing the role of psychiatrist and the operator being a "patient" on the couch. Leaves other "similar" types for dead.

Cat. XE-6875 \$15.95

MERLIN By Dreamcards

Merlin is a 32K adventure set in England during the dark ages. Your task is to search through the dark forest inhabited by robbers, outlaws and creatures with awesome magic powers to find a legendary sword. An excellent adventure.

Cat. XE-6870 \$25.00

PROGRAMMING HINTS

Consists of a collection of modules which you may use to improve your own BASIC programs. They are all linked together under a menu driven display which allows you to RUN or LIST each module to see how they work.

Cat. XE-6895 \$14.95

LOG - GENERAL PURPOSE INDEX

This program is designed to suit a wide range of records where indexing (and later searching) can be on one or two words, or on a string of up to 15 characters. Each record consists of its index heading, plus up to 12 lines of text. Each line can contain up to 41 characters.

Cat. XE-6890 \$15.95

MINE DROP

You are a tank running around a maze gathering all the supplies you can. It sounds easy, but you have a guided missile hot on your trail. Your only defence is a remote controlled mine which you drop and explode at will. A very fast joystick or key controlled game.

Cat. XE-6960 \$14.95

PENETRATOR

A low resolution graphic version of the popular game "Scrambler". You must defeat the rockets and bomb the radars in an effort to get to the next stage which is even harder. This game can be either controlled by a Joystick or by keys. Being in Loes graphics it is a very fast game. If you are bored with the same land pattern you can devise your own.

Cat. XE-6955 \$19.95

SPACE PATROL

A lot like Penetrator but in high resolution graphics. You must battle your way through the various stages where at the last stage you have four chances of blowing up a neutron bomb shelter. If you are successful, the next round is a lot harder.

Cat. XE-6950 \$16.95

METEOR RESCUE - MYTEK

Your mission is to rescue stranded astronauts. You are the commander of the Landing Module docked in space with the mother ship. It is your responsibility to guide the landing module through a meteor field, down to the surface of the planet, to land safely on a landing pad. An astronaut will then run to your landing module and you will blast off. You must use your lasers if necessary and dock with the mother ship again. A total of six astronauts must be shuffled to the mother ship.

Cat. XE-7020 \$17.50

CORVILLE CASTLE

Corville Castle is an adventure which will take you to a far away place of mystic castles, fierce monsters and evil warlocks. You must enter the warlocks castle and find some dark secret which will help you to destroy the warlock. But remember, you only have until dusk.

Cat. XE-6285 \$16.95

NEW SOFTWARE FOR JANUARY

KING KONG - from MYTEK

Just like the arcade game of a similar name. The game consists of several frames which you must complete to rescue your sweetheart from Kong. Excellent graphics and sound. Joystick compatible.

Cat. XE-7054 \$20.00

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A fast action packed game which must rate as one of Mytek's best. You have full control of a helicopter and you must fly over enemy lines to rescue your allies. Fast realistic graphics and excellent sound.

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A "Turtle" program which has been written by a teacher and has been several months in the writing. This is one of the best Turtle programs written and comes complete with a 40 page clearly written manual with many helpful drawings.

Cat. XE-7053 \$29.50

DEFENDER - FROM MYTEK

This long awaited program is finally available. Defender needs no introduction. The Defender arcade game is one of the most popular ever produced and the Mytek version is brilliant, a rival for Asteroids Plus.

Cat. XE-7036 \$22.50

DESTROYER

You are the UFO and you must destroy the enemy city buildings before you can land. You have no control over the UFO except for the three bombs on every pass you make over the city. But beware the UFO gets lower with every pass. Good graphics and sound.

Cat. XE-7048 \$14.95

COULOMBS LAW

This program is another in the series of Physics simulations. The first part is a tutorial and the second is a simulation of the experiment.

Cat. XE-7049 \$14.95

BACKGAMMON - FROM MYTEK

This game conforms exactly to that set down in the official rules of the International Backgammon Association, including the rules of doubling and scoring.

Cat. XE-7050 \$17.50

POOLS AND LOTTO

Two programs to help make life easier for the Pools and Lotto enthusiasts. The first program chooses your numbers for the week and the second program allows you to input your numbers into a program and when Lotto night arrives you can input the winning numbers and the computer will check your Lotto for you.

Cat. XE-7045 \$14.95

WONDER WORDS

This program allows you to input 20 words and the computer will create a Wonder Word puzzle. This can be either sent to a printer or solved on the screen or let the computer solve it. Just the program for Wonder Word enthusiasts.

Cat. XE-7046 \$14.95

GEO-TECH DRAWING

This is the first tape in a series to assist students in grasping the fundamentals of geometric and technical drawing. It uses good graphics with excellent explanations.

Cat. XE-7047 \$14.95

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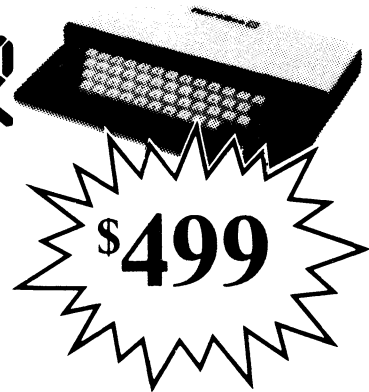
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SERIES 2 PERSONAL COMMUNICATOR



\$499



microbee Series 2 PERSONAL COMMUNICATOR

Now ready for 1984 (watch out George Orwell, big brother is watching with envy!), the **microbee Series 2 Personal Communicator** has been designed to meet the needs of modern times. It has **BUILT-IN WORDBEE** in ROM as well as **MICROWORLD BASIC** and **NETWORKING**.

The **Personal Communicator** is a powerful home computer ideal for virtually any home use from wordprocessing,

spreadsheet analysis, education and even experimentation with the computer concepts as they evolve during the year.

With the optional **BEEMODEM** you can send **WORDBEE** files across any telephone line to another computer. Bee the first on your block to have home telex!

A big feature of the **Personal Communicator** is the use of battery-backed **CMOS RAM** so that programs can be stored even when the power has been disconnected. This is particularly useful with **WORDBEE** or **BASIC** files which can be developed at home and then the computer can be taken to the school or office for printout. Of course the **MICROWORLD BASIC** is also built-in to your **Personal Communicator** so you can run any of the software developed for any **microbee** to date.

In fact, the **Personal Communicator** is also the **Experimenter** and **Educator microbees** fully expanded. You have the features of every machine. If your needs grow you may consider expanding your **Communicator** to the **Advanced Personal Computer** using disk drives. Ask your local **microbee** shop for details.

Specifications:

PROCESSOR: Z80A running at 3.375 MHZ
KEYBOARD: 60 key FULL SIZED QWERTY layout with full travel.

MEMORY: 68K comprising of 32K user RAM 28K ROM software, 4K character ROM, 4K graphics and screen memory.

DISPLAY: Direct video to external monitor or modified TV. 80 by 24 and 64 by 16 character display modes, high resolution PCG graphics to 512 by 256 pixels. Upper and lower case with full programmability at any screen location.

SOFTWARE: **MICROWORLD 16K BASIC V5.22** in ROM, **MICROWORLD Z80** machine code monitor, built-in diagnostics, **NETWORKING** with programmable baud rates from 110 to 4800 Baud, 7, 8 bit formats, half, full duplex transmission and complete file transfer using the 'HOBBY' standard Christensen protocol.

INPUT/OUTPUT: Programmable 8 bit input/output parallel port, programmable RS232C port, cassette interface, direct video, 50 way Z80 expansion bus.

Recommended Options:

microbee HIGH RESOLUTION MONITOR	\$199.00
BEEMODEM	\$149.50
RGB COLOUR MODULE	\$125.00
microbee PRINTER	\$449.00

Other Personal Computers in the Microbee Series 2 range — all with guaranteed E-X-P-A-N-D-A-B-I-L-I-T-Y

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The low cost **microbee Series 2 Experimenter** has been designed for those starting out in the fascinating world of computers or those who want to explore the exciting developments in the fast moving **MICROWORLD**.

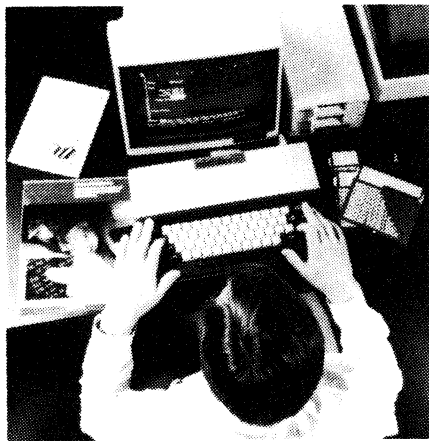
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The **microbee Series 2 Educator** was specifically designed to serve the needs of the education market, to increase our learning capabilities either about computers or about life itself. In constant use in schools universities and technical colleges throughout Australia and New Zealand.





SERIES 2 ADVANCED PERSONAL COMPUTER



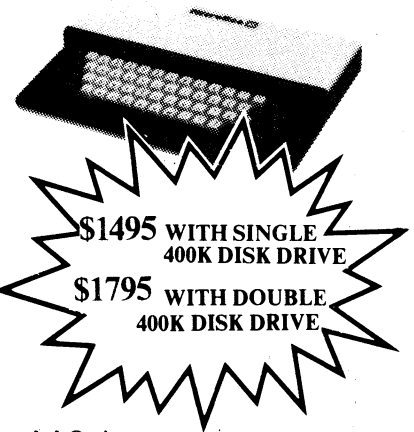
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Now for the first time in Australia: the **microbee Series 2 Advanced Personal Computer** with 400K disk drive for \$995.00 (including sales tax)! Then add bundled world class software such as CP/M, MICROSOFT BASIC, MULTIPLAN, WORDSTAR and a powerful library of support programs for \$500.00 and you will have some idea as to why the **microbee Series 2 Advanced Personal Computer** is the most powerful and best price/performance computer in its class. What's more any existing **microbee** owner can convert his **microbee** to the Series 2 APC at any time

The **microbee Series 2 APC** uses the popular Z80 microprocessor and runs standard CP/M so that users have access to the vast library of CP/M software available world wide. MICROSOFT BASIC is now supplied on disk. WORDSTAR, according to independent surveys now accounts for 50% of all word processing software now in use so the designers of the **Series 2 APC** decided to purchase the OEM rights for your benefit. MULTIPLAN is considered by many to be one of the most powerful spreadsheets yet produced for the microcomputer.

You can expand your **microbee Series 2 APC** to drive 2 or more disk drives. A hard disk drive unit is now operational and will release soon. Watch the magazines for news of the 128K/controller board for the **Series 2 APC** and the 16 bit expansion policies.

Your **microbee Series 2 APC** is a world class machine from the hardware as well as the software point of view. The exclusive SETDRIVE utility will convert your disk system to read diskettes from other computers such as OSBORNE, KAYPRO, BBC, and a host of others! The **Series 2 APC** is also equipped with VIRTUAL DRIVE capability. This means single disk owners can readily copy from A to B using only one drive. Another world first is the CONFIG program which enables a **Series 2 APC** user to reCONFIGure his CP/M system to select screen positioning, background and foreground colour, parallel and serial printers disk drive information and even auto-start disks.



Recommended Options:

ADDITIONAL DISK DRIVE	\$300.00
microbee HIGH RESOLUTION MONITOR	\$199.00
BEEMODEM	\$149.50
RGB COLOUR MODULE	\$125.00
microbee PRINTER	\$449.00
128K EXPANSION UNIT (Soon to be released)	

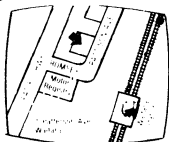
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SOFTWARE: CP/M 2.2, MICROSOFT BASIC-80, WORDSTAR 3.0, MULTIPLAN V1.05, MICROWORLD BASIC V6.0, WORDBEE, EDASM, CP/M UTILITIES, COMMUNICATIONS PACKAGE, MICROWORLD SUPPORT LIBRARY.
INPUT/OUTPUT: Programmable 8 bit input/output parallel port, programmable RS232 port, cassette interface, direct video.

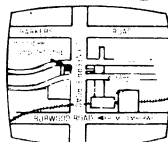
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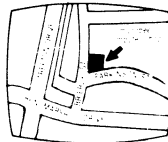
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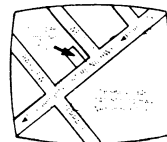
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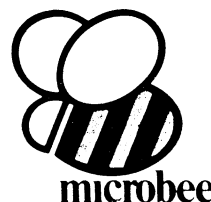
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Cat. XE-7047.....\$14.95

DISASSEMBLER By Dreamcards

Some may say "No another Disassembler". But this one has a difference. It allows you to set out where the data fields are so the computer is saving time, not trying to disassemble data. A program you shouldn't be without.

Cat. XE-6915.....\$15.95

CHEAPIE By Dreamcards

Two top quality programs for the price of one. The best Hangman we've seen yet on side A and a superb version of Battleship on side B. Both have excellent graphics.

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COMPOSER BEE

This is a very well written program for music. This program allows you to compose, play, edit, transpose as well as being able to load and save your music. A program that has been a long time in the writing and well worth buying.

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PONTOON

A quality fast moving card game where up to 6 players can play against the computer who is banker.

Cat. XE-6940.....\$14.95

TRS-BEE - Mytek

TRS-BEE is a package of 3 programs that loads TRS-80 Model 1 and 3 program tapes into the MicroBee without any additional hardware. Although some program editing will still be required prior to their running, the majority of program typing time is saved by TRS-BEE. The first program loads TRS-80 BASIC programs into MicroWorld BASIC. Most programs may then be edited and run. The second program in the package loads any TRS-80 machine code file into the MicroBee memory. The third program loads TRS-80 assembler files into the MicroBee EDITOR/ASSEMBLER. Any TRS-80 Model 1 or 3 tape may be loaded. TRS-BEE opens up a whole new world of possible software on your MicroBee!

Cat. XE-7005.....\$32.50

HOUSEHOLD REGISTER

This program will simplify the task of determining the value of your homes contents for insurance purposes, as well as providing descriptions of all listed items in the event of their loss or destruction. Effects are catalogued by their name, description and value. Nine separate rooms are provided, and up to 28 items may be listed in each.

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BASIC TUTORIAL

Is a super teaching aid for any classroom. Basic Tutorial is a set of 9 interactive exercises designed for teaching Basic to the computer novice. No previous knowledge is assumed. Basic Tutorial uses a unique double screen technique to display both the normal computer output and the tutorial exercises at the one time. This allows the student to use the MicroBee in the normal way, while the tutorial instructions appear in the lower half of the screen.

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MACHINE CODE TUTORIAL - Mytek

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Cat. XE-6855.....\$27.80

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Cat. XE-6945.....\$19.95

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If you think that you have a program that is exciting, unique or simply better than what's around - why not contact us?

Just send a quality recording of the cassette, (yes, you CAN trust us) for us to evaluate.

TOP PRICES PAID FOR GOOD PROGRAMS

NEW! ETI 675 MICROBEE Parallel-to-serial interface

Ref: ETI January 1984

Great kit enables you to convert the serial (almost RS-232) port on your MicroBee to a parallel port suitable for the cheap parallel printers now around.

Cat. XE-4665

ONLY \$29.50
BASIC KIT

NEW! ETI 656 BUG DEBUGGER

Ref: ETI January 1984

What a great idea! This project enables you to analyse a programming what in an EPROM. You can also use it for temporary program storage with battery backup. The Jaycar kit comes with all the ETI specified components.

Cat. XE-4655

ONLY \$35.00

MICROSOFT BASIC-80 MANUAL

This book explains in detail the MicroSoft BASIC that comes with Disc Drive Systems. It includes information about Disc file loading and instructions on the use of assembly language routines.

Cat. XE-8018.....\$29.95



NEW SOFTWARE FOR FEBRUARY 1984

COMPOSER BEE II

This program allows you to write music straight onto the screen. You can then either edit, transpose, playback or save the notes onto cassette. This is a program which is educational and entertaining.

Cat. XE-7061.....\$21.95

DATA MANAGER

Data Manager can hold up to 200 records (32K) or 60 records (16K). Each record consists of 4 lines, a search can then be done on any word in any record and those records displayed.

Cat. XE-7062.....\$15.95

WILDCARDS II

This book is the sequel to Wildcards Vol.1. It contains much, much more information and a memory map of 7 pages. If you liked the first volume you're going to love the second even more.

Cat. XE-8016.....\$16.00

EMU JAUST

Another excellent hires graphic game from Mytek. This is a game with added realism, excellent graphics and fantastic sound. Mytek have far surpassed themselves with this one.

Cat. XE-7058.....\$22.50

TAPE DOCTOR

A great utility program from Mytek. As well as being able to make backup tapes, it can load bad tapes and in doing so points out the errors in the tape. A very useful program.

Cat. XE-7059.....\$18.50

DEBUG

Another utility program from Mytek. It operates at assembler level and allows the entering of breakpoints into machine language programs. A very useful utility to use.

Cat. XE-7060.....\$18.50

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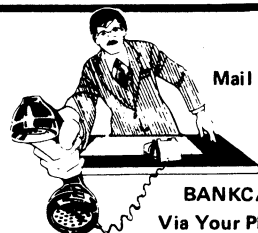
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NEW LOWER PRICES!

Microbee-No.1 for computers Jaycar -No.1 for Microbee

Jaycar Electronic Agencies is proud to announce the 1984 range of microbee computers — at new low prices!! The microbee Series 2 machines are ALL supplied with built-in communications capability, dual font 80 character by 24 line & 65 character by 16 line displays. Remember, your microbee is obsolete-proof with g'eed upward expandability.



**CALL IN
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microbee Series 2 EXPERIMENTER

By popular request, the low cost microbee Series 2 Experimenter has been designed for those who are starting out in the fascinating world of computers or those who want to share the fascination of exploring the exciting developments in the fast moving MICRO WORLD.

Demand for projects using the microbee is so great that 'Electronics Today' are now planning to run a microbee project every month during 1984. So far ETI has described the light pen, EPROM programmer, a radio TTY printer, the world's first home facsimile receiver and ROM expander board for the microbee. Virtually every local computer magazine has run reviews and/or columns devoted entirely to the microbee. If you want to be part of the MICROCOMPUTER GENERATION in 1984 then microbee Series 2 Experimenter is the ideal starting point. Of course you can expand your microbee Series 2 Experimenter as your need grows.

microbee Series 2 EDUCATOR

The microbee Series 2 was specifically designed to serve the needs of the EDUCATION MARKET. Let's face it, the primary non business use for most personal microcomputers is to increase our learning capabilities either about computers (computer awareness) or about life itself. microbee Series 2 has now been officially approved by Education Departments in NSW, WA and Queensland and is being carefully considered in virtually all other states and by the National Schools Commission at the time this ad was going to press.

The microbee Educator uses BATTERY BACKED NON-VOLATILE CMOS RAM so your programs are saved in the microbee Series 2 after the power is switched off. Students can bring the microbee Series 2 Educator home from school to complete assignments ready for class the next day. With the optional BEEMODEM you can use your microbee Series 2 Educator to talk to other computers or information networks.

microbee Series 2 PERSONAL COMMUNICATOR

With the BUILT-IN WORDBEE in ROM as well as MICROWORLD BASIC and NETWORKING, the Personal Communicator is a powerful home computer ideal for virtually any home use from wordprocessing, spreadsheet analysis, education and even experimentation with the computer concepts as they evolve during the year. With the optional BEEMODEM you can send WORDBEE files across any telephone line to another computer. Bee the first on your block to have home telex!

microbee Series 2 ADVANCED PERSONAL COMPUTER

Now for the first time in Australia: the microbee Series 2 Advanced Personal Computer with 400K disk drive. Then add bundled world class software such as CP/M, MICROSOFT BASIC, MULTIPLAN, WORDSTAR and a powerful library of support programs and you will have some idea as to why the microbee Series 2 Advanced Personal Computer is the most powerful and best price/performance computer in its class. What's more any existing microbee owner can convert his microbee to the Series 2 APC at any time.

The microbee Series 2 APC uses the popular Z80 microprocessor and runs standard CP/M so that users have access to the vast library of CP/M software available world wide. MICROSOFT BASIC is now supplied on disk. WORDSTAR, according to independent surveys now accounts for 50% of ALL word processing software now in use so the designers of the Series 2 APC decided to purchase the OEM rights for your benefit. MULTIPLAN is considered by many to be one of the most powerful spreadsheets yet produced for the microcomputer.

\$399



Cat. XE-4000

Note: the software that is supplied with each machine — at no extra charge!!

\$449



Cat. XE-4050

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Cat. XE-4100

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DUAL 400K DISK DRIVE

Cat. XE-4200

SINGLE 400K DISK DRIVE

Cat. XE-4300

NEW GAMES FOR MICROBEE

KING KONG — from MYTEK
Just like the arcade game of a similar name. The game consists of several frames which you must complete to rescue your sweetheart from Kong. Excellent graphics and sound. Joystick compatible.
Cat. XE 7054

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Cat. XE 7056

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Cat. XE 7052

\$15.95

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A Turtle program which has been written by a teacher and has been several months in the writing. This is one of the best Turtle programs written and comes complete with a 40 page clearly written manual with many helpful drawings.
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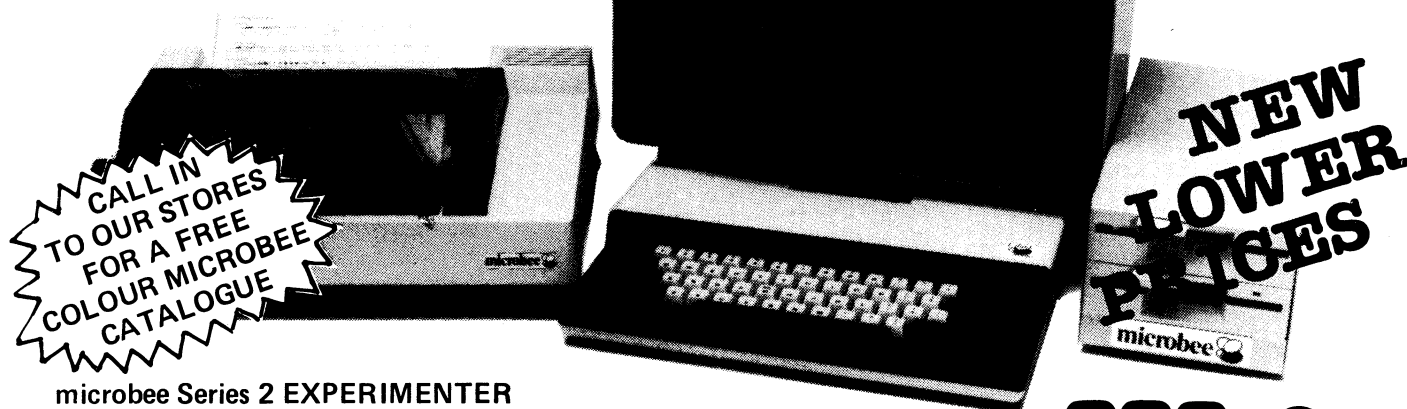
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Cat. XE-4050

Cat. XE-4100

Cat. XE-4200

SINGLE 400K DISK DRIVE

Cat. XE-4300

DUAL 400K DISK DRIVE

MICROBEE KITS—KITS—KITS—KITS—KITS—KITS

ETI 733 RTTY Converter. Ref: ETI April 1983. This simple project allows you to hook up your MicroBee to a HF receiver and print radio teletype messages on a monitor screen. Listen to world news for FREE!!
Cat. KE-4654

ONLY \$17.95

ETI 649 MicroBee Light Pen. Ref: ETI August 1983. This simple, low cost device plugs into the Bee's 8 bit port. The "pen" gives you an entry into the world of light pens and interactive software.
Cat. KE-4656

SHORT FORM \$19.50

SPECIAL PROBE CASE TO SUIT (as specified in ETI article) Cat. HB-6400 \$19.95
ETI 668 MicroBee EPROM Programmer. Ref: ETI February 1983. This simple, low cost EPROM programmer just plugs into the Bee's I/O port and enables you to save programs in any of the 5 different common EPROMs available (2716, 2532, 2732, 2732A, 2764). Kit comes complete with "Personality" plug and all IC sockets.
Cat. KE-4650

\$39.95

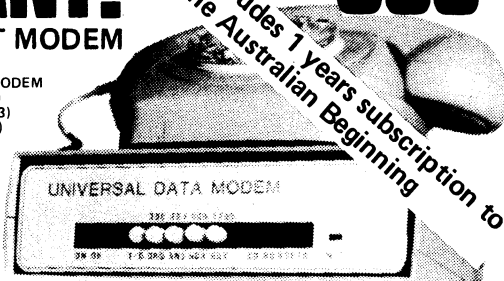
Parallel Interface Kit for the MicroBee. Includes 15 pin 'D' plug — add \$15.00 if Centronics plug required.
Cat. KE-7017

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Cat. YC-1350

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microbee SOFTWARE



DISASSEMBLER By Dreamcards
Some may say "Not another Disassembler". But this one has a difference. It allows you to set out where the data fields are so the computer is saving time, not trying to disassemble data. A program you shouldn't be without.
Cat. XE-6915 \$15.00

CHEAPIE By Dreamcards
Two top quality programs for the price of one. The best Hangman we've seen yet on side A and a superb version of Battleship on side B. Both have excellent graphics.
Cat. XE-6920 \$15.00

CANNIBALS AND MISSIONARIES
The old logic problem game of transferring 3 Cannibals and 3 Missionaries from one side of a river to the other in a boat that holds two. If there are more Cannibals than Missionaries on either side at any time the Cannibals revert to their favourite form of feeding.
Cat. XE-6925 \$14.95

COMPOSER BEE
This is a very well written program for music. This program allows you to compose, play, edit, transpose as well as being able to load and save your music. A program that has been a long time in the writing and well worth buying.
Cat. XE-6930 \$22.50

WORD ADVENTURE
A program with very good graphics using little characters to entice the user to think what word is either a synonym, antonym or homonym of the word they are showing. Everytime you get it wrong you are given more clues. After the clues run out you must face the Dragon when you must spell the word he is holding correctly before you.
Cat. XE-6935 \$14.95

PONTOON
A quality fast moving card game where up to 6 players can play against the computer who is banker.
Cat. XE-6940 \$14.95

MUSIC - B - MYTEK
MusicB is a music Composer/Editor that lets you create and save music and sound effects with a flexibility that makes chopsticks of the Basic PLAY command. MusicB is a great way to learn and play music! Comprehensive instructions are included.
Cat. XE-7010 \$20.00

TRSBE - MYTEK
TRSBE is a package of three programs that loads TRS-80 Model 1 and 3 program tapes into the MicroBee without any additional hardware. Although some program editing will still be required prior to their running, the majority of program typing time is saved by TRSBE. The first program loads TRS-80 BASIC programs into MicroWorld BASIC. Most programs may then be edited and run. The second program in the package loads any TRS-80 machine code file into MicroBee memory. The third program loads TRS-80 assembler files into the MicroBee EDITOR/ASSEMBLER. Any TRS-80 Model 1 or 3 tape may be loaded. TRSBE opens up a whole new world of possible software on your MicroBee!
Cat. XE-7005 \$30.00

HOUSEHOLD REGISTER
This program will simplify the task of determining the value of your home's contents for insurance purposes, as well as providing descriptions of all listed items in the event of their loss or destruction. Effects are catalogued by name, description and value. Nine separate rooms are provided, and up to 28 items may be listed in each.
Cat. XE-7000 \$15.95

STAT PACK - STATISTICS
This program is a general purpose graph plotting, linear regression, line of best fit and correlation program. It features a t-test of significance for the correlation coefficient and, if no evidence of correlation is found, a determination of minimum sample size is performed.
Cat. XE-6999 \$14.95

BASIC TUTORIAL
Is a super teaching aid for any classroom. Basic Tutorial is a set of 9 interactive exercises designed for teaching Basic to the computer novice. No previous knowledge is assumed. Basic Tutorial uses a unique double screen technique to display both the normal computer output and the tutorial exercises at the one time. This allows the student to use the MicroBee in the normal way, while the tutorial instructions appear in the lower half of the screen.
Cat. XE-6860 \$20.00

MACHINE CODE TUTORIAL - MYTEK
Consists of 8 interactive exercises designed for teaching machine code programming and related topics as they apply to the MicroBee computer. Only a general knowledge of the BASIC language is assumed. Machine Code Tutorial is designed to bridge the gap between BASIC programming and being able to understand and use typical Z80 manuals.
Cat. XE-6855 \$25.00

BUDGET - SPREADSHEET
This program is designed to speed up and simplify the task of framing a usable financial budget. Applications range from personal or household to small business finances. A quality program.
Cat. XE-6850 \$15.95

DECODE
Basic decoder and listing formatter
This programme will be an invaluable aid to any one taking first steps in understanding machine code or wants to expand their library of proven machine code routines. Decode will (a) print inbedded machine code routines fully and accurately (b) print all unprintable characters (c) provide a clearer, easier to read listing and send all output to a printer if so required. ED ASM is not required.
Cat. XE-6765 \$15.95

DATABEE
This program is a well written data base management system that utilised the MicroBee to its fullest to provide a Data Management System similar to those found on larger and more expensive systems. This comes complete with large bound manual.
Cat. XE-6945 \$19.95

ASTEROIDS PLUS - MYTEK
Asteroids Plus is one of the finest high resolution graphic arcade games available for the MicroBee computer. It features 3-D point by point resolution graphics, shields, sound effects, intelligent objects, guided missiles, black holes and a score board. If you enjoy playing computer games, you will be captivated by Asteroids Plus.
Cat. XE-6297 \$22.50

BEEZ 80 - MYTEK
This secret code disassembler will disassemble any code sequence. Nothing is illegal. It will allow you to program with codes that no other disassembler can decipher!
Cat. XE-6298 \$20.00

SPACE INVADERS
One of the most popular programmes ever released. This version was written especially for the MicroBee.
Cat. XE-6030 \$14.95

FORTH
A new language for the MicroBee. Comes complete with interpreter on one side of the tape and supporting programs on the other side. As well as this it includes a very well written, bound manual.
Cat. XE-6965 \$45.00

PSYCHOTEC By Dreamcards
Psychotec provides a striking example of artificial intelligence, allowing a dialogue in English between computer and operator, the computer playing the role of psychiatrist and the operator being a "patient" on the couch. Leaves other "similar" types for dead.
Cat. XE-6875 \$15.95

MERLIN By Dreamcards
Merlin is a 32K adventure set in England during the dark ages. Your task is to search through the dark forest inhabited by robbers, outlaws and creatures with awesome magic powers to find a legendary sword. An excellent adventure.
Cat. XE-6870 \$25.00

PROGRAMMING HINTS
Consists of a collection of modules which you may use to improve your own BASIC programs. They are all linked together under a menu driven display which allows you to RUN or LIST each module to see how they work.
Cat. XE-6895 \$14.95

LOG - GENERAL PURPOSE INDEX
This program is designed to suit a wide range of records where indexing (and later searching) can be on one or two words, or on a string of up to 15 characters. Each record consists of its index heading, plus up to 12 lines of text. Each line can contain up to 41 characters.
Cat. XE-6890 \$15.95

MINE DROP
You are a tank running around a maze gathering all the supplies you can. It sounds easy, but you have a guided missile hot on your trail. Your only defence is a remote controlled mine which you drop and explode at will. A very fast joystick or key controlled game.
Cat. XE-6960 \$14.95

PENETRATOR
A low resolution graphic version of the popular game "Scrambler". You must defeat the rockets and bomb the radars in an effort to get to the next stage which is even harder. This game can be either controlled by a Joystick or by keys. Being in Lores graphics it is a very fast game. If you are bored with the same land pattern you can devise your own.
Cat. XE-6955 \$19.95

SPACE PATROL
A lot like Penetrator but in high resolution graphics. You must battle your way through the various stages where at the last stage you have four chances of blowing up a neutron bomb shelter. If you are successful, the next round is a lot harder.
Cat. XE-6950 \$16.95

METEOR RESCUE - MYTEK
Your mission is to rescue stranded astronauts. You are the commander of the Landing Module docked in space with the mother ship. It is your responsibility to guide the landing module through a meteor field, down to the surface of the planet, to land safely on a landing pad. An astronaut will then run to your landing module and you will blast off. You must use your lasers if necessary and dock with the mother ship again. A total of six astronauts must be shuffled to the mother ship.
Cat. XE-7020 \$17.50

CORVILLE CASTLE
Corville Castle is an adventure which will take you to a far away place of mystic castles, fierce monsters and evil warlocks. You must enter the warlocks castle and find some dark secret which will help you to destroy the warlock. But remember, you only have until dusk.
Cat. XE-6285 \$16.95

NEW SOFTWARE FOR 1984

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Cat. XE-7053 \$29.50

DEFENDER - FROM MYTEK
This long awaited program is finally available. Defender needs no introduction. The Defender arcade game is one of the most popular ever produced and the Mytek version is brilliant, a rival for Asteroids Plus.
Cat. XE-7036 \$22.50

DESTROYER
You are the UFO and you must destroy the enemy city buildings before you can land. You have no control over the UFO except for the three bombs on every pass you make over the city. But beware the UFO gets lower with every pass. Good graphics and sound.
Cat. XE-7048 \$14.95

COULOMBS LAW
This program is another in the series of Physics simulations. The first part is a tutorial and the second is a simulation of the experiment.
Cat. XE-7049 \$14.95

BACKGAMMON - FROM MYTEK
This game conforms exactly to that set down in the official rules of the International Backgammon Association, including the rules of doubling and scoring.
Cat. XE-7050 \$17.50

POOLS AND LOTTO
Two programs to help make life easier for the Pools and Lotto enthusiasts. The first program chooses your numbers for the week and the second program allows you to input your numbers into a program and when Lotto night arrives you can input the winning numbers and the computer will check your Lotto for you.
Cat. XE-7045 \$14.95

WONDER WORDS
This program allows you to input 20 words and the computer will create a Wonder Word puzzle. This can be either sent to a printer or solved on the screen or let the computer solve it. Just the program for Wonder Word enthusiasts.
Cat. XE-7046 \$14.95

GEO-TECH DRAWING
This is the first tape in a series to assist students in grasping the fundamentals of geometric and technical drawing. It uses good graphics with excellent explanations.
Cat. XE-7047 \$14.95

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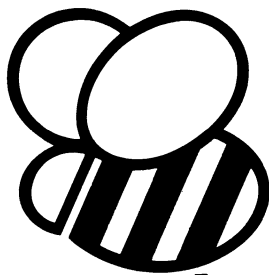
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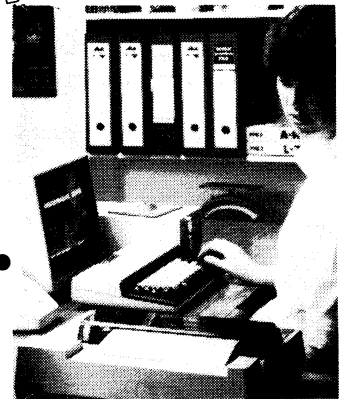


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- File capture to Wordbee format and screen printing
- Super friendly menu driven
- Usable as stand alone or through Wordbee or Basic
- Now available for all IC or later microbees
- World standard Christensen protocol for file transfer



Now every **microbee** can become a personal terminal using **TELCOM 1**. **TELCOM 1** is a ROM based communications program suitable for all ROM based **microbee** IC and later models. It allows the use of the serial RS232 port at 16 baud rates from 50 to 19200 Baud, provides real time clock with alarm feature, modem control functions such as automatic dialling, **BASIC WORDBEE** and **MACHINE LANGUAGE** file transfer via the serial port. Additionally the ROM emulates the **ADM 3A** and **Televideo 912** terminals for connection to other computers. All information can be viewed on the screen and retrieved as a **WORDBEE** file and even printer-out using the built in screen print utility.

1984 IS THE YEAR OF THE NETWORK with over 20,000

microbees now in everyday use and most with integrated software including **WORDBEE**, **MICROWORLD BASIC** and **COMMUNICATIONS** capability are you missing out on the computing opportunity of the year? Using a low cost modem such as the **BEEMODEM** you can now talk to other computers around the world, use the public domain bulletin boards, shop electronically, communicate with friends with your own home telex and extend your computing horizons by converting your **microbee** to your personal **INFORMATION WINDOW** to the world.

A big feature of the **microbee PERSONAL COMMUNICATOR** is the battery backed **CMOS RAM** which stores your programs even when the power has been disconnected. This

is particularly useful with **WORDBEE** or **BASIC** files which can be entered at home and then your **microbee** can be taken to school or the office for printout or further editing. If your needs grow you can expand your **PERSONAL COMMUNICATOR** to the **ADVANCED PERSONAL COMPUTER** using disk drives. Ask your **microbee computer shop** for details.

microbee SERIES 2 PERSONAL COMMUNICATOR (with TELCOM 1)
microbee HIGH RESOLUTION MONITOR (Green)
microbee HIGH RESOLUTION MONITOR (Amber)
microbee DOT MATRIX PRINTER with cable
microbee DATA TAPE RECORDER
BEEMODEM 300 baud DIGITAL MODEM (Telecom approved)
TELCOM 1 ROM SET (with manual and conversion details)



microbee

**SERIES 2
ADVANCED
PERSONAL
COMPUTER**

The **microbee Series 2 Advanced Personal Computer** with 400K disk drive and world class software such as **CP/M**, **MICROSOFT BASIC**, **MULTIPLAN**, **WORDSTAR** and a powerful library of support programs all for only \$1495.

The **microbee Series 2 Advanced Personal Computer** is the most powerful and best price/performance computer in its class. What's more any existing **microbee** owner can convert his **microbee** to the **Series 2 APC** at any time.

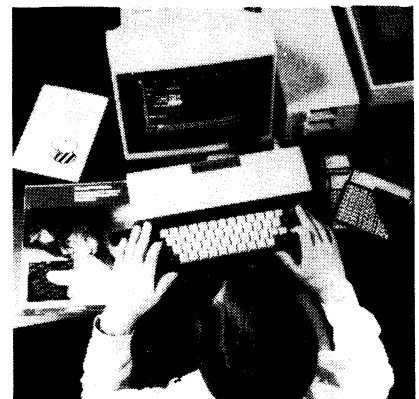
The **microbee Series 2 APC** uses the popular **Z80** microprocessor and runs standard **CP/M** so that users have access to the vast library of **CP/M** software available world wide.

You can expand your **microbee Series 2 APC** to drive 2 or more disk drives. A hard disk drive unit is now operational and will release soon.

Your **microbee Series 2 APC** is a world class machine from the hardware as well as the software point of view. The exclusive **SETDRIVE** utility will convert your disk system to read diskettes from a host of other computers. The **Series 2 APC** is also equipped with **VIRTUAL DRIVE** capability. This means single disk owners can readily copy from A to B using only one drive. Another world first is the **CONFIG** program which enables a **Series 2 APC** user to re**CONFIGure** his **CP/M** system to select screen positioning, background and foreground colour, parallel and serial printers disk drive information and even auto-start disks.

**\$1495 WITH SINGLE
400K DISK DRIVE**

**\$1795 WITH DOUBLE
400K DISK DRIVE**



STIMULATING SOFTWARE

VIPER

A highly addictive game. You must eradicate the rabbits before they reach plague proportions but each time you catch a rabbit your tail grows.

Cassette \$14.95 Diskette \$19.95

BEE MONOPOLY

Now a full graphic version of the old family game of the same name. The entire board, players, Community Chest and Chance cards are displayed as required in this fast moving game. Full details of land ownership and finances. Superb graphics and sound effects. (Requires 32K).

Cassette \$14.95 Diskette \$19.95

SWORD QUEST

Just like the 'Dungeons and Dragons' series. Select your characters level of armour, weapons, strength and skill. Explore in search of treasure and the Great Sword, and battle with the dungeon's creatures.

Cassette \$14.95 Diskette \$19.95

FROG HOP

A most graphic variation of the popular arcade game. You must hop across a busy street (watch out for the trucks ...) and across a crocodile infested stream before your frogs are safely home. Guaranteed to appeal to all ages.

Cassette \$14.95 Diskette \$19.95

ROBOT MAN '84

Now one of the most popular games ever written for the microbee has been rewritten with new twists, a joystick and colour option.

Cassette \$14.95 Diskette \$19.95

MICROSPACE INVADERS '84

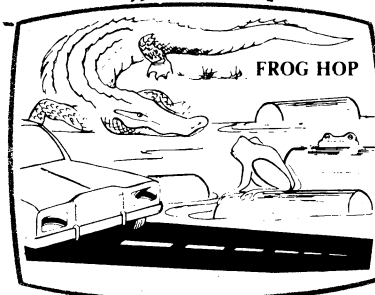
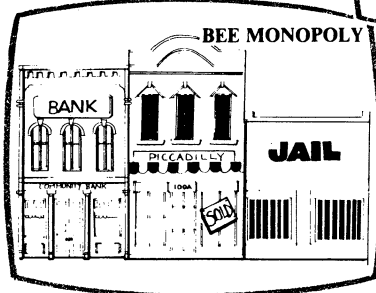
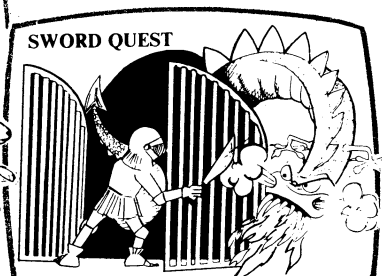
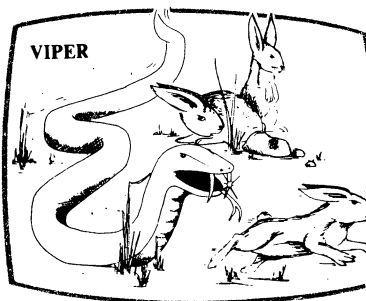
New update of one of the original microbee games. Now with full colour and joystick option. Sound and speed controls. Turn your microbee into a home arcade machine.

Cassette \$14.95 Diskette \$19.95

SCRAMBLER

A full colour version of the popular arcade game. You are the sole surviving defender of earth and you must destroy the aliens at all cost ... very effective colour graphics (also suitable for non colour microbees).

Cassette \$14.95 Diskette \$19.95



EYE OF MIN

A graphic adventure game that will absorb you for hours. If you can solve this excellent mystery then you can proceed to the next saga 'Sabre of Sultan'. (Requires 32K).

Cassette \$14.95 Diskette \$19.95

SKETCH PAD

Use the high resolution graphics in your microbee with this most effective drawing aid. Ideal as an introduction to Cad techniques and you can create complex shapes with a little practice. You can also 'trace' from images taped onto the screen to generate faithful reproductions. Have you ever wondered how programmers create the graphics for their software?

Cassette \$14.95 Diskette \$19.95

LEARNING CAN 'BEE' FUN

Now the full series by John Grimley in one value package containing 6 cassette tapes (or 1 diskette). Utilizing well known games such as 'Donkey Kong', 'Frog Hop' and 'Rescue' you can enjoy the game and learn at the same time.

Cassette Library Pack \$49.95

Diskette \$39.95

ELECTRONIC HOBBY MATE

A real first. This clever program deals with resistors, capacitors, electronic terms and contains a wealth of 'live' information. A must for all experimenters. Your microbee will become a useful design aid.

Cassette \$14.95 Diskette \$19.95

TUTORIAL: Touch Typing Tutor and Basic Tricks. The microbee is an ideal educational computer recommended by educational authorities across Australia. This package enables you to learn to touch type using the Pitman touch typing method. For those who want to master Microworld Basic there is a series of hints and suggested subroutines arranged in a most effective menu driven style.

Cassette \$14.95 Diskette \$19.95

RING OF DOOM

Your quest is to search for the Dark Lord of Sauron's Ring of Power. This action adventure game will operate in a 16k microbee.

Cassette \$14.95 Diskette \$19.95



Ask your nearest microbee dealer for a catalogue of over 100 microbee programs now available on cassette, diskette and ROM covering applications in education, games and utility functions.

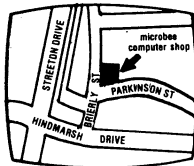
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Compu-K, 7 Casino Street, Lismore.
Comput/Ed, 8 Park Arcade,
Park Avenue, Coffs Harbour.

ACT: Computech, Belconnen Churches Centre,
Benjamin Way, Belconnen.
VIC: Computerland South Melbourne,
37 Albert Road, Melbourne.
S.A.: Key Computers,
1061 South Road, Edwardstown.
77 Grenfell Street, Adelaide.

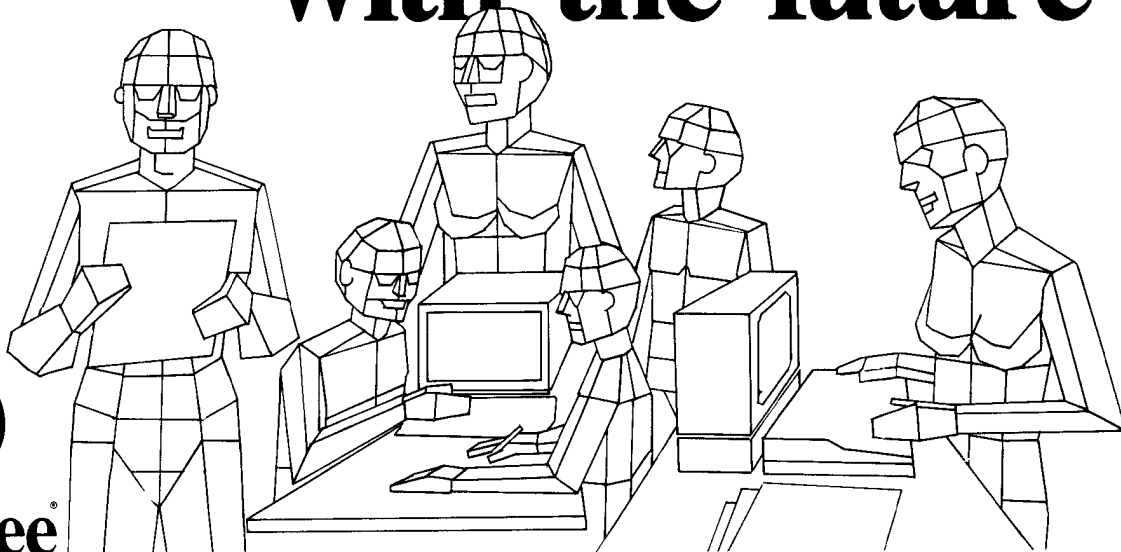
QLD: Software 80, 105 Milton Road, Milton.
Electrographic Office Systems,
25 Grafton Street, Cairns.
Town and Country Computers,
CTL Centre, Anne Street, Aitkenvale, Townsville.
TAS: Central Data, 14A Goodwin Street,
Launceston.

**TOP SELLING
AUSTRALIAN COMPUTER**

Coming to terms with the future



microbee®



Education

microbee is now officially recognized as Australia's Educational Home Computer. With the release of BEENET 2 it is now possible to NETWORK 16 or more microbees in a classroom with each student station linked to the teacher's file server to produce the ideal classroom system sharing printers, disk drives and rapidly transferring information as required.

Personal Business Use

People don't only want to just use a personal computer. Computers are

for doing something useful in the world. Man uses TOOLS to achieve his goals. microbee recognises this and provides Wordprocessing, Communications, BASIC and a host of utilities inside each unit. In all cases microbee is being used as a TOOL in the service of mankind.

Family Entertainment

Not all applications need to be so serious. microbee is ideal as a basis for exciting and stimulating games for all the family. Fast moving graphics, sound effects and over 200 top quality popular games mean your microbee is ideal for family fun as well.

Why not try your hand at Micro Space Invaders, Robotman, or play Bee Monopoly the 1984 way. Think you know a lot about chess? Try your skills against microbee . . . it can also show how to improve your game . . .

Personal Finance

microbee is a powerful calculator and can be used to improve your personal financial planning, start a data base or even schedule your appointments. microbee is indeed a modern tool for today's times, enabling young and old to come to terms with the future in a constructive, informative and entertaining way.

SERIES 2

EXPERIMENTER

By popular request, the low cost microbee Series 2 Experimenter has been designed for those who are starting out in the fascinating world of computers or those who want to share the fascination of exploring the exciting developments in the fast moving MICROWORLD. All microbees can be expanded at any time.

microbee Experimenter \$399

SERIES 2

EDUCATOR

The microbee Series 2 Educator was specifically designed to serve the needs of the education market. This is recognised by the fact that the microbee has been chosen by the NSW, WA, Queensland and the Australian Schools Commission as a recommended computer for use in schools. With the exceptional performance at a realistic price, powerful software designed for Australian curriculum needs, microbee is now in wide use throughout primary, secondary schools, technical colleges and universities.

microbee Educator \$449



SERIES 2

ADVANCED PERSONAL COMPUTER

The microbee Series 2 APC with 500K Disk Drive is the most powerful and best priced/performance computer in its class. The APC is now supplied 'bundled' with WORDSTAR, MULTIPLAN, microbee BASIC, CP/M 2.2 plus MICROWORLD packages such as disk WORDBEE, EDASM, BASIC as well as vital utilities such as CONFIG, FORMAT, COMPARE. Comprehensive Microworld User Manual also supplied.

microbee APC (Single Disk Drive) \$1495

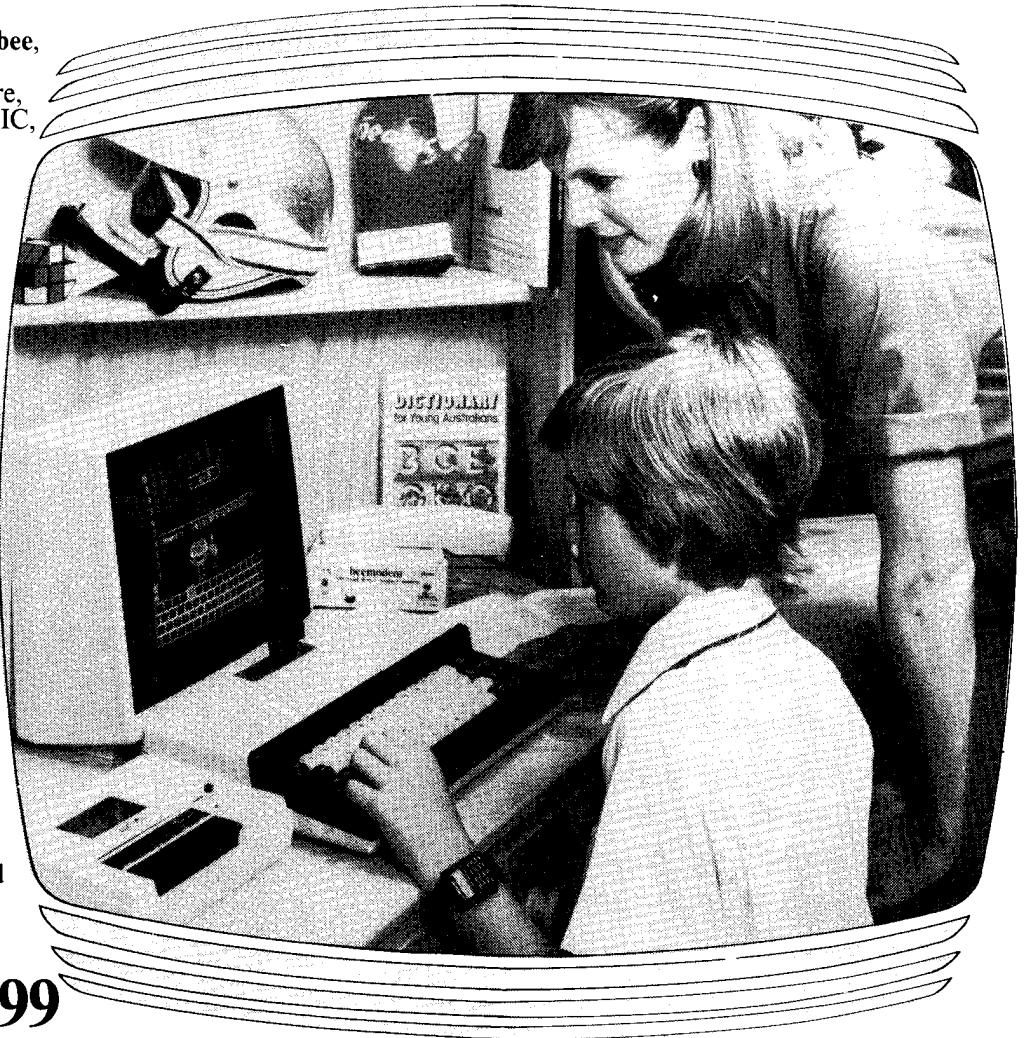
microbee APC (Dual Disk Drive) \$1795

The Solution: microbee Personal Communicator

Our top selling portable **microbee**, the Personal Communicator now features Telcom1 firmware, WORDBEE, Microworld BASIC, machine code MONITOR, ADM-3A terminal emulation, self-test in 28K of ROM with 32K of CMOS battery backed user memory, high resolution PCG GRAPHICS, SERIAL AND PARALLEL I/O ports, programmable cassette interface, and direct monochrome video output.

Add the low cost BEEMODEM and your Personal Communicator uses the home telephone line to become a complete home terminal ready, willing and able to communicate with other computers worldwide.

Microworld BASIC has long been a powerful feature of the **microbee**. A vast library of educational, entertainment and utility software is now widely available on the market. Microworld BASIC supports full high resolution graphics, colour if required, music, I/O data can be directed at will and, best of all, MW BASIC is a breeze to learn to program yourself.

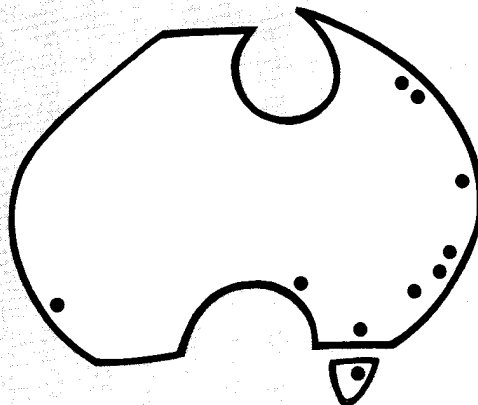


microbee
Personal Communicator... **\$499**

microbee computer shops

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Phone (03) 819 5288
141 Stirling Highway,
Nedlands, Perth.
Phone (09) 386 8250
Cooleman Court,
Weston A.C.T. 2611.
Phone (062) 88 6384
151 Unley Road, Unley.
S.A. (Opening Soon).
457 Logan Road,
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Koala Crescent,
West Gosford 2250.
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Meeting the challenge of change



Four award winning models to choose from.

microbee really is "meeting the challenge of change" with two ROM and two DISK based models, each guaranteed expandable to any level. From arcade games through to word processing and business management, you can choose the level of development to suit your needs.

Tomorrow looks equally bright for microbee owners with new technology and advances with reports and literature on new software and peripherals and with training courses for each level of development.

HI RES Economy Green Screen Monitor



16K Educator \$449

Now with **WORDBEE!**

The microbee Educator is specifically designed for the education market and has been chosen by NSW, Western Australia, Queensland and the Australian Schools Commission as a computer for use in schools.

microbee Educator boasts high quality graphics and sound effects capability, exceptional performance at a realistic price plus powerful software designed for Australian curriculum needs.

32K Personal Communicator \$499

microbee's top selling portable computer now features:

Telcom 1 firmware **WORDBEE**, Microworld **BASIC**, machine code **MONITOR**, **ADM-3A** terminal emulation, self-test in 28K of ROM with 32K of CMOS battery backed user memory, high resolution **PCG GRAPHICS**, **SERIAL AND PARALLEL I/O** ports, programmable cassette interface and direct monochrome video output.

A vast library of educational, entertainment and utility software is now widely available.

Microworld **BASIC** supports full high resolution graphics, colour if required, music, I/O data can be directed at will and best of all, **MW BASIC** is a breeze to program yourself.

The low cost

BEEMODEM can be added enabling your microbee (via your phone line) to communicate with other computers worldwide!

Software and your microbee

Whichever microbee model you choose there is a vast and growing array of software to use with it some built-in and included in the price of your computer. Games and family entertainment, education programmes, communication, information systems, personal and business finance, word processing and much, much more.

Ask at your microbee Computer Centre for the current range of software included with each model or ask for the catalogue of "Software Available".

Options and Peripherals

Advanced "State of the Art" peripherals and options are available to interface with your microbee such as:

- microbee HI RES Economy Green Screen Monitor . . . \$149.50
- Adjustable Monitor Stand . . . \$19.95
- BEEMODEM \$149.50
- microbee MB80 Dot Matrix Printer
 - Parallel \$399.00
 - Serial \$449.00 (Includes cables)
- microbee High Resolution Anti Glare Ergonomically Designed Amber Screen Monitor . . . \$249.00

Now with Dynamic RAM to meet today's user demands

64K Advanced Personal Computer

(with Single 400K Disk Drive
and all manuals) **\$1,595**

The microbee 64K Advanced Personal Computer with a Single 400K Disk Drive is the ultimate configuration for the serious enthusiast.

It is supplied 'bundled' with world class software such as CP/M, MICROSOFT BASIC, MULTIPLAN, WORDSTAR and a powerful library of support programs. Comprehensive user manuals are also supplied. No wonder this model microbee is regarded as the most powerful and best price/performance computer in its class.

microbee 128K

(with Dual 400K Disk Drives
and all manuals) **\$1,995**

Designed for the serious home and small business user, the package consists of the microbee with 128K of dynamic RAM controlled by the proven Z80A processor plus a dual 400K disk drive, with the increased power more sophisticated programs can be executed including a whole host of bundled software for word processing, terminal emulation and communication with other computers worldwide, spreadsheet analysis and networking.



**microbee 128K
Computer with
Dual Disk Drive**

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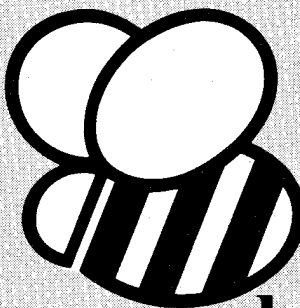
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```

00100 REM BY JOHN LIVINGSTON 11/06/86
00110 REM ##### B O M B S #####
00120 H=3:N1$="COMPUTER"
00130 DATA 255,126,60,60,255,126,126,60,60,60,60,60,24,24
00140 DATA 0,0,0,128,128,128,192,192,224,240,248,252,255,255,255
00150 DATA 0,0,0,0,0,0,0,0,0,0,0,255,255,255,255
00160 DATA 0,0,0,1,1,1,3,3,7,15,31,63,255,255,255
00170 DATA 1,1,3,3,11,11,47,47,39,191,191,255,255,255,255
00180 DATA 128,128,192,202,204,216,240,240,240,240,249,250,250,252,255,255
00190 K=15:J=30:R=0
00200 S=INT(RND*59)+2
00210 FORM=64528TO64528+90
00220 READD:POKE M,D:NEXTM
00230 CLS:NORMAL:PRINT"### INSTRUCTIONS ###"
00240 PRINT"MISSILES (";PCG:PRINT"A";NORMAL:PRINT") ARE FALLING TO EARTH.
YOU MUST SAVE YOUR PLANET YOU MUST DESTROY THESE MISSILES."
00250 PRINT"TO DO THIS YOU MUST BLOCK IT'S PATH AND MAKE IT CRASH ON YOUR
DEFLECTOR-";PCG:PRINT"BCCD";NORMAL:PRINT"TO MANOUVRE YOUR DEFLECTOR USE
THE < > KEYS FOR SLOW MOVING &"
00260 PRINT"YOUR Z X KEYS FOR FAST MOVING. IF YOU'RE STRUCK TEN TIMES BY
A BOMB YOU AND YOUR PLANET EARTH ARE DESTROYED. POINTS ARE "
00270 PRINT"AWARDED FOR EVERY BOMB YOU DEFLECT." "!!!GOOD LUCK DEFENDING
EARTH!!!""PRESS ANY KEY"
00280 FOR X=1 TO 1024:IF KEY<>" "THEN 320 ELSE OUT 2,X:OUT 2,0:NEXT X
00290 S3$=KEY
00300 IF S3$=" " THEN 320
00310 IFS3$="" THEN 290
00320 CLS:PRINT"!!!!!! GET READY. INCOMING BOMBS !!!!!!!":FOR K4=1TO2000:NEXTK4
00330 S=S+2
00340 PCG=R=0
00350 S=INT(RND*62)+1
00360 CLS:CURS J,K:PRINT"B":CURS J+1,K:PRINT"C":CURS J+2,K:PRINT"C":CURS
J+3,K:PRINT"D"
00370 R=R+1:CURS R:PRINT"A"
00380 A=PEEK(258):IFA=44 THEN LET J=J-2
00390 IFA=26 THEN LET J=J-4
00400 IFJ<1THEN LETJ=1
00410 IF J=S AND K=R THEN GOTO 500

00420 IF K=R AND J=1:GOTO 500
00430 IFK=R AND J=2:S THEN GOTO 500
00440 IFK=R AND J=3:S THEN GOTO 500
00450 IF R=15 THEN GOTO 550
00460 IFA=46 THEN LET J=J+2
00470 IFA=24 THEN LET J=J+4
00480 IFJ>61 THEN LET J=59
00490 GOTO 340
00500 CURS S,R:PRINT"EF":B=B+1
00510 NORMAL:CURS 1,1:PRINT"MISSILES DESTROYED ";B:CURS 30,1:PRINT"MISSILES
HIT EARTH ";N:PCG
00520 FORI=1 TO 100:OUT 2,125:OUT 2,24:NEXTI
00530 FORW=1TO1000:NEXTW
00540 GOTO 340
00550 CURS S,R:PRINT"EF":N=N+1
00560 NORMAL:CURS 1,1:PRINT"MISSILES DESTROYED ";B:CURS 30,1:PRINT"MISSILES
HIT EARTH ";N:PCG
00570 FORI=1 TO 100:OUT 2,125:OUT 2,0:NEXTI
00580 U=U+1:IFU=10 THEN 610
00590 FORW=1TO1000:NEXTW
00600 GOTO 340
00610 CLS:NORMAL:PRINT"YOUR SCORE WAS";B:IFB>H THEN 620 ELSE GOTO 650
00620 LETH=B:GOTO 640
00630 FORD4=1TO2000:NEXTD4:GOTO 640
00640 PRINT"YOU HAVE MADE A NEW HIGHEST SCORE." "YOUR NAME IS":INPUT N1$
00650 FORDJ=1TO1000:NEXTJ
00660 J=40
00670 LETB=H
00680 CLS:PRINTN1$;" HAS THE HIGHEST SCORE OF ";H
00690 LETO=0:LETN=0:U=0
00700 J=30
00710 PRINT"DO YOU WISH TO SAVE THE EARTH AGAIN Y/N "
00720 INPUT B2$
00730 IFB2$="Y" THEN 320
00740 IFB2$="Y" THEN 320
00750 IFB2$="" THEN 720
00760 IFB2$="Y" THEN END

```

Bomb deflector

The aim of this simple game for the Microbee is for the player to deflect falling bombs using a deflector shield. To move the shield

quickly press:Z for left,X for right, and for slow alterations press < for left and > for right. You are awarded a point for every missile you

deflect. If you miss 10 missiles then the game is over.

**J. Livingstone
Townsville, Qld**



```

5 POKE53280,4:POKE53281,4:PRINTCHR$(144)
10 PRINTCHR$(147):PRINT
20 PRINTSPC(13)"\\":PRINTSPC(12)"\\\\"
30 PRINTSPC(10)"\\\\"
40 PRINTSPC(10)"\\\\"
50 PRINTSPC(8)"\\\\" (RVON) (C/RT) (C/RT) (RVDF)"
60 PRINTSPC(8)"\\\\" (RVON) (C/RT) (C/RT) (C/RT) (C/RT) (RVDF)"
70 PRINTSPC(6)"\\\\" (RVON) (C/RT) (RVDF)"
80 PRINTSPC(6)"\\\\" (RVON) (C/RT) (C/RT) (C/RT) (C/RT) (RVDF)"
90 PRINTSPC(7)"\\\\" (RVON) (C/RT) (C/RT) (C/RT) (RVDF)"
100 PRINTSPC(14)"(C/DN) (C/DN) (C/DN) (C/DN) (C/DN)PRESS A KEY!"
110 GETA$:IFA$=" "THEN110
120 PRINT"(CLR)"
130 POKE53280,0:POKE53281,0
140 X=1524:T=0:C=1
150 A=PEEK(56320):B=PEEK(197)
155 IFA=122THENX=X-41:POKEX,160:T=0
160 IFA=123THENX=X-1:POKEX,160:T=0
165 IFA=117THENX=X+41:POKEX,160:T=0
170 IFA=119THENX=X+1:POKEX,160:T=0
175 IFA=121THENX=X+39:POKEX,160:T=0
180 IFA=126THENX=X-40:POKEX,160:T=0
185 IFA=118THENX=X-39:POKEX,160:T=0
190 IFA=125THENX=X+40:POKEX,160:T=0
200 IFA=107THENT=1:GOTO400
210 IFA=103THENT=1:GOTO430
220 IFA=110THENT=1:GOTO460
230 IFA=109THENT=1:GOTO490
235 IFB=57THENC=1
240 IFB=56THENC=2
245 IFB=32THENC=12
250 IFB=59THENC=3

255 IFB=35THENC=11
260 IFB=8THENC=4
265 IFB=40THENC=10
270 IFB=11THENC=5
275 IFB=43THENC=13
280 IFB=16THENC=6
285 IFB=48THENC=14
290 IFB=19THENC=7
300 IFB=24THENC=8
310 IFB=27THENC=9
320 IFB=0THENPOKEX,32
330 IFB=51THEN120
350 IFX<=1063THENS20
360 IFX<=1984THENS50
370 Z=X+54272:POKEZ,C
390 GOTO150
400 IFT=1THENPOKEX,32
410 X=X-1:POKEX,160
420 GOTO240
430 IFT=1THENPOKEX,32
440 X=X+1:POKEX,160
450 GOTO240
460 IFT=1THENPOKEX,32
470 X=X-40:POKEX,160
480 GOTO240
490 IFT=1THENPOKEX,32
500 X=X+40:POKEX,160
510 GOTO240
520 IFT=0THENX=X+960:POKEX,160
530 IFT=1THENPOKEX,160:X=X+960
540 GOTO360
550 IFT=0THENX=X-960:POKEX,160

```

Draw 64

This is a drawing program which is controlled by the joystick in port 2, and the top row of the keyboard. Pressing the 'fire' button and required

direction will move the cursor around the screen. The *INST/DEL* key will delete at the current cursor position, and the *CLR/HOME* key will clear the

screen. The remaining keys in the top row changes the colours.

**J. Avis,
Frenchs Forest, NSW**



```
00100 CLS:CURS 18,6:UNDERLINE:PRINT"Budget Savings Account":NORMAL:PLAY 8,25
00110 REM *** 1984 by D.R.Barney ***
00120 REM *** EDMONTON OLD ***
00130 N10="3 ACCT":E70="
00140 DIM C0(10),N0(7)
00150 S10="Car Registration":S20="Car Insurance":S30="Life Assurance No. 1":S40="
Life Assurance No. 2":S50="Contents Insurance"
00160 S60="Electricity":S70="Telephone":S80="Car Tyres & Maintenance":U10="Savin
g"
00170 CLS:CURS 450:INPUT"Enter today's date DD,MM,Y'YY 7'10,0,0,Y
00180 CLS
00190 PRINT"\\Do you wish to enter data off tape (Y/N) '":
00200 B10=KEY:IF B10="" THEN 200
00210 IF B10="Y" OR B10="y" THEN GOSUB 1290 ELSE GOTO 240
00220 GOTO 550
00230 REM *** Enter amounts via keyboard ***
00240 CLS
00250 INPUT"Enter Total Amount in Account:"IC0(1)
00260 CLS:REM *** Transfer amounts use negative to subtract, positive to add ***

00270 UNDERLINE:PRINT"Amount in Acct":NORMAL:CURS 29:UNDERLINE:PRINT"Item":NORMA
L:CURS 47:UNDERLINE:PRINT"Amount Entered":NORMAL:PRINT
00280 PRINT [F10.2 C0(2)]E70:
00290 PRINT"Enter Savings Amount.....":INPUTIK2
00300 C0(2)=C0(2)+K2
00310 PRINT [F10.2 C0(3)]E70:
00320 PRINT S10+.....":INPUTIK3
00330 C0(3)=C0(3)+K3
00340 PRINT [F10.2 C0(4)]E70:
00350 PRINT S20+.....":INPUTIK4
00360 C0(4)=C0(4)+K4
00370 PRINT [F10.2 C0(5)]E70:
00380 PRINT S30+.....":INPUTIK5
00390 C0(5)=C0(5)+K5
00400 PRINT [F10.2 C0(6)]E70:
00410 PRINT S40+.....":INPUTIE1
00420 C0(6)=C0(6)+E1
00430 PRINT [F10.2 C0(6)]E70:
00440 PRINT S50+.....":INPUTIK6
00450 C0(6)=C0(6)+K6
00460 PRINT [F10.2 C0(7)]E70:
00470 PRINT S60+.....":INPUTIK7
00480 C0(7)=C0(7)+K7
00490 PRINT [F10.2 C0(8)]E70:
00500 PRINT S70+.....":INPUTIK8
00510 C0(8)=C0(8)+K8
00520 PRINT [F10.2 C0(9)]E70:
00530 PRINT S80+.....":INPUTIK1
00540 C0(9)=C0(9)+K1
00550 CLS
00560 IF C0(1)<C0(2)+C0(3)+C0(4)+C0(5)+C0(6)+C0(7)+C0(8)+C0(9)+C0(10) THEN PRIN
T"DOESN'T BALANCE":PLAY8,20:GOTO 100
00570 GOTO 740
00580 REM *** Deposit routine ***
00590 CLS:PRINT"Are Deposits to be added to savings only?":
00600 Q10=KEY:IF Q10="" THEN 600
00610 IF Q10="Y" OR Q10="y" THEN 1050
00620 M0=N0(0):M1=N0(1):M3=N0(2):M2=N0(3):M4=N0(7):M5=N0(5):M6=N0(6):M7=N0(4)
00630 PRINT"Enter Amount Deposited for distribution.....":
00640 INPUT A2
00650 IF A2<(M0+M1+M2+M3+M4+M5+M6+M7):A2=0:PRINT"Amount entered is too small to dis
tribute as required.":GOTO 750
00660 A4=A4+A4
00670 C0(1)=C0(1)+A2
00680 A4=A2-M0-M1-M3-M2-M4-M5-M6-M7
00690 C0(2)=A4-C0(2)
00700 C0(10)=C0(10)+M0-C0(3)+C0(3)+M1-C0(4)+M3-C0(5)+C0(5)+M2-C0(9)+C0(9)+
M4-C0(7)+C0(7)+M5-C0(8)+C0(8)+M6-C0(6)+C0(6)+M7
00710 CLS:REM *** Display routine ***
00720 IF D=1 THEN OUTW1
00730 IF D=1 THEN PRINTW1
00740 PRINT"Date "101"101":IY1
00750 PRINT S10+....."[F10.2 C0(3)]S20+....."[F10.2 C0(4)]S30
+....."[F10.2 C0(5)]S40+....."[F10.2 C0(6)]
00760 PRINT S50+....."[F10.2 C0(6)]S60+....."[F10.2 C0(7)]S70
+....."[F10.2 C0(8)]
00770 PRINT S80+....."[F10.2 C0(9)]
00780 PRINT U10+ Balance....."[F10.2 C0(2)]{A26 32}{A10 45}"TOTAL BALA
NCE
"[F10.2 C0(1)]
00790 PRINT {A26 32}{A10 61}
00800 IF D=1 THEN PRINTW1
00810 OUTW0=D=0
00820 PRINT"Press any key to Continue"
00830 K10=KEY:IF K10="" THEN 830
00840 CLS
00850 PRINT"Type 1 to Transfer amounts within Account"
00860 PRINT"Type 2 to Deposit money into Account"
00870 PRINT"Type 3 to Withdraw money from Account"
00880 PRINT"Type 4 to Save Data on tape"
00890 PRINT"Type 5 to Alter Item Amounts"
00900 PRINT"Type 6 to Dump Display to Printer"
00910 PRINT"Type 7 to Return to Display"
00920 PRINT"Type 8 to End"
00930 Z=0:GOSUB 1610
00940 ON X GOTO 260,590,980,950,1520,1650,710,1000
00950 GOSUB 1100
00960 GOTO 710
00970 REM *** Withdrawl routine ***
```

```
00980 CLS:PRINT"Where is the amount to be withdrawn from?":
00990 GOSUB 1660
01000 PRINT U10+.....Type 9"
01010 Z=9:GOSUB 1610
01020 CURS 704:PRINT"Enter Amount to be Withdrawn from {Z70}":
01030 ON X GOSUB 1090,1100,1110,1170,1120,1130,1140,1150,1160
01040 GOTO 710
01050 PRINT"Enter Amount Deposited.....":INPUT A2
01060 C0(2)=C0(2)+A2:C0(1)=C0(1)+A2
01070 GOTO 710
01080 CLS:END
01090 INPUT B1:C0(3)=C0(3)-B1:C0(1)=C0(1)-B1:RETURN
01100 INPUT B3:C0(4)=C0(4)-B3:C0(1)=C0(1)-B3:RETURN
01110 INPUT B2:C0(5)=C0(5)-B2:C0(1)=C0(1)-B2:RETURN
01120 INPUT B4:C0(6)=C0(6)-B4:C0(1)=C0(1)-B4:RETURN
01130 INPUT B5:C0(7)=C0(7)-B5:C0(1)=C0(1)-B5:RETURN
01140 INPUT B6:C0(8)=C0(8)-B6:C0(1)=C0(1)-B6:RETURN
01150 INPUT B7:C0(9)=C0(9)-B7:C0(1)=C0(1)-B7:RETURN
01160 INPUT B0:C0(2)=C0(2)-B0:C0(1)=C0(1)-B0:RETURN
01170 INPUT E4:C0(10)=C0(10)-E4:C0(1)=C0(1)-E4:RETURN
01180 GOSUB 1390
01190 POKE 61440,13
01200 OUTW3
01210 PRINT"*****{I15 13}N10
01220 PRINT{I5 13}":I
01230 PRINT C0(1):,"{C0(2)}","{C0(3)}","{C0(4)}","{C0(5)}","{C0(6)}","{C0(7)}",
"{C0(8)}","{C0(9)}","{C0(10)}"
01240 PRINT N0(0):,"{N0(1)}","{N0(2)}","{N0(3)}","{N0(4)}","{N0(5)}","{N0(6)}",
"{N0(7)}"
01250 POKE 61439,9
01260 PRINT"0,0,0,0,0,0,0,0,0,0"
01270 OUTW:PLAY 23,4
01280 RETURN
01290 GOSUB 1390
01300 INW3:OUTW0 OFF
01310 INPUT Z00:IF Z00<{1,5}<*****THEN 1310
01320 N10=C0(11,16):R=1:R=INT(VAL(Z00*(16,10))):POKE 61440,13
01330 INPUT Z00,C0(1),C0(2),C0(3),C0(4),C0(5),C0(6),C0(7),C0(8),C0(9),C0(10)
01340 INPUT N0(0),N0(1),N0(2),N0(3),N0(4),N0(5),N0(6),N0(7)
01350 IF INT(VAL(Z00))<1 THEN 1300
01360 POKE 61439,9:INW0:OUTW0
01370 CLS:PRINT N10:PLAY 9:RETURN
01380 INW0:OUTW0:CURS 1,16:PRINT"BAD LOAD":PLAY 9:RETURN
01390 CLS
01400 CURS 470:INVERSE:PRINT" TAPE READY? ":NORMAL:CURS780:PRINT"Press any key t
o continue":
01410 Z60=KEY:IF Z60="" THEN 1410 ELSE CLS:RETURN
01420 REM *****
01430 CLS
01440 CURS 20:INVERSE:PRINT" Alter Amounts of Items ":NORMAL
01450 PRINT"Where is the item to be altered?":
01460 GOSUB 1660
01470 Z=0:GOSUB 1610
01480 CURS 760:PRINT"Enter Item to be altered {Z70}":
01490 IF X=0:X=X-1
01500 IF X=4:X=X-1
01510 INPUT N0(X)
01520 M0=N0(0):M1=N0(1):M3=N0(2):M2=N0(3):M4=N0(7):M5=N0(5):M6=N0(6):M7=N0(4)
01530 REM *** Amounts for deduction ***
01540 CLS:PRINT"Each item is set to deduct the amount as listed below :-":
01550 PRINT S10+....."[F10.2 M1]S20+....."[F10.2 M3]S30+....."[F
10.2 M2]S40+....."[F10.2 M0]
01560 PRINT S50+....."[F10.2 M7]S60+....."[F10.2 M5]S70+.....
"[F10.2 M6]
01570 PRINT S80+....."[F10.2 M4]
01580 PRINT"Do you wish to alter any items? Y/N":
01590 Z10=KEY:IF Z10="" THEN 1590
01600 IF Z10="Y"ORZ10="Y"THEN 1420 ELSE 710
01610 REM ***** Select Option *****
01620 CURS 960:PRINT"Select Option (1 to {Z1})":
01630 Z70=KEY:IF Z70="" THEN 1630 ELSE LET X=INT(VAL(Z70))
01640 IF X<1 OR X>2 THEN 1630 ELSE RETURN
01650 D=1:GOTO 710:REM *** Dump to printer ***
01660 PRINT S10+.....Type 1"
01670 PRINT S20+.....Type 2"
01680 PRINT S30+.....Type 3"
01690 PRINT S40+.....Type 4"
01700 PRINT S50+.....Type 5"
01710 PRINT S60+.....Type 6"
01720 PRINT S70+.....Type 7"
01730 PRINT S80+.....Type 8"
01740 RETURN
```

Budget savings account

This program for the Micro-bee helps to keep track of your savings and is useful for checking your balances with your bank statements. The program deducts amounts

for the various budget items and keeps a balance of each item. A net balance is given to compare with your bank statement. Amounts can be transferred within the ac-

count and item deduction can be changed (for inflation).

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