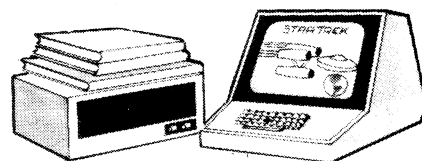


Microcomputer News & Products



N-channel PACE

National Semiconductor has announced a new N-channel version of its established PACE 16-bit microprocessor. Designated the INS8900, the new processor offers higher speed and lower cost than the P-channel device, together with direct Schottky-TTL compatibility on all inputs and outputs. The INS8900 also requires only single-phase clock signals.

The new device is completely software compatible with the P-channel PACE chip, offering the identical 45-instruction repertoire. The higher operating speed of the INS8900 combined with the higher efficiency of single-word 16-bit instructions makes it very fast, significantly faster than most 8-bit processors.

Further information on the INS8900 is available from NS Electronics Pty Ltd, cnr Stud Rd and Mountain Hwy, Bayswater, Victoria.

National Panasonic's JB-3000 computer

The JB-3000 from National Panasonic is an elegantly styled state-of-the-art computer for the office or self-employed professional. Running MS-DOS, the JB-3000 is said to be compatible with the IBM Personal Computer, but includes features which may make it superior for some applications.

by PETER VERNON

Our review machine was initially supplied without any software apart from the MS-DOS system disk. Since this disk contains two versions of Microsoft Basic and various utilities it was quite enough to get started and to develop an appreciation of the qualities of the system.

Physically the JB-3000 is an attractive set-up. The low profile keyboard unit measures 430mm×220mm (W×D) and is not more than 38mm high, sloping to 10mm at the front. A wrist rest is included which is both comfortable and convenient during long typing sessions.

The keyboard is connected by a coiled cable to the "logic unit" which contains the main processor board and slots for expansion options. The system supplied for this review included 96K of RAM and a dual 13.5cm minifloppy disk controller board. Interfaces for a Centronics type

printer and monochrome and colour video monitors are built in so these items do not take up expansion slots.

The logic unit itself is just 90mm high, 435mm wide and 333mm deep and a 30cm (diagonal) video display sits comfortably on top. The rear panel of the unit carries connections for RGB and monochrome video displays, a small reset button, volume control for the internal sound generating circuitry and the mains fuse and mains cord socket. A push button power switch is conveniently located on the front of the unit with a small illuminated panel above the switch to indicate "power on". Overall the impression is of careful engineering and attention to detail.

The minifloppy disk drives are in separate cabinets not built in to the logic unit. Apart from saving space in the logic

unit, this approach means that 20cm disk drives can be added with a minimum of fuss when more storage is required. The drives use a locking lever rather than the conventional flip-up doors, and are almost silent in operation. Each 13.5cm disk provides 160K of storage when formatted.

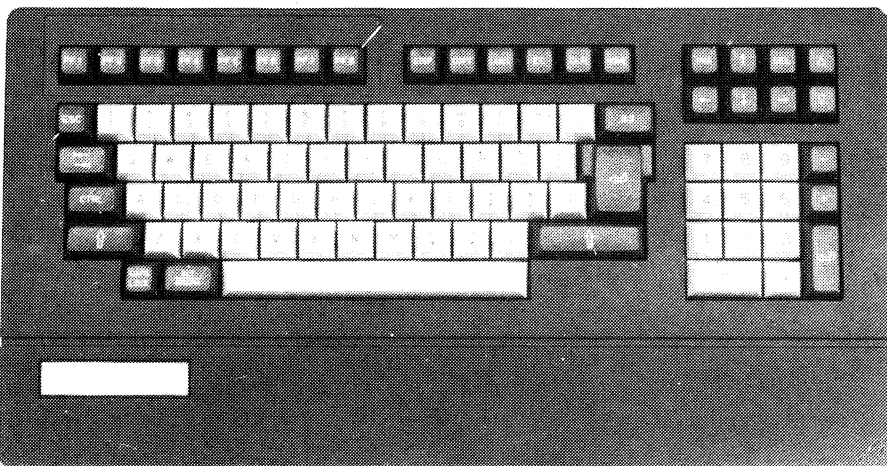
Apparently Technics are responsible for the styling of the unit, and the result is pleasing. The disk drives and colour monitor are in cream with a charcoal-grey surround and front panel. The logic unit is also in cream enamel with a grey front panel decorated by an olive-green stripe.

The keyboard has a non-glare top surface with the alphanumeric keys and separate numeric keypad in white. Control keys, special function keys and programmable keys are picked out in olive-green.

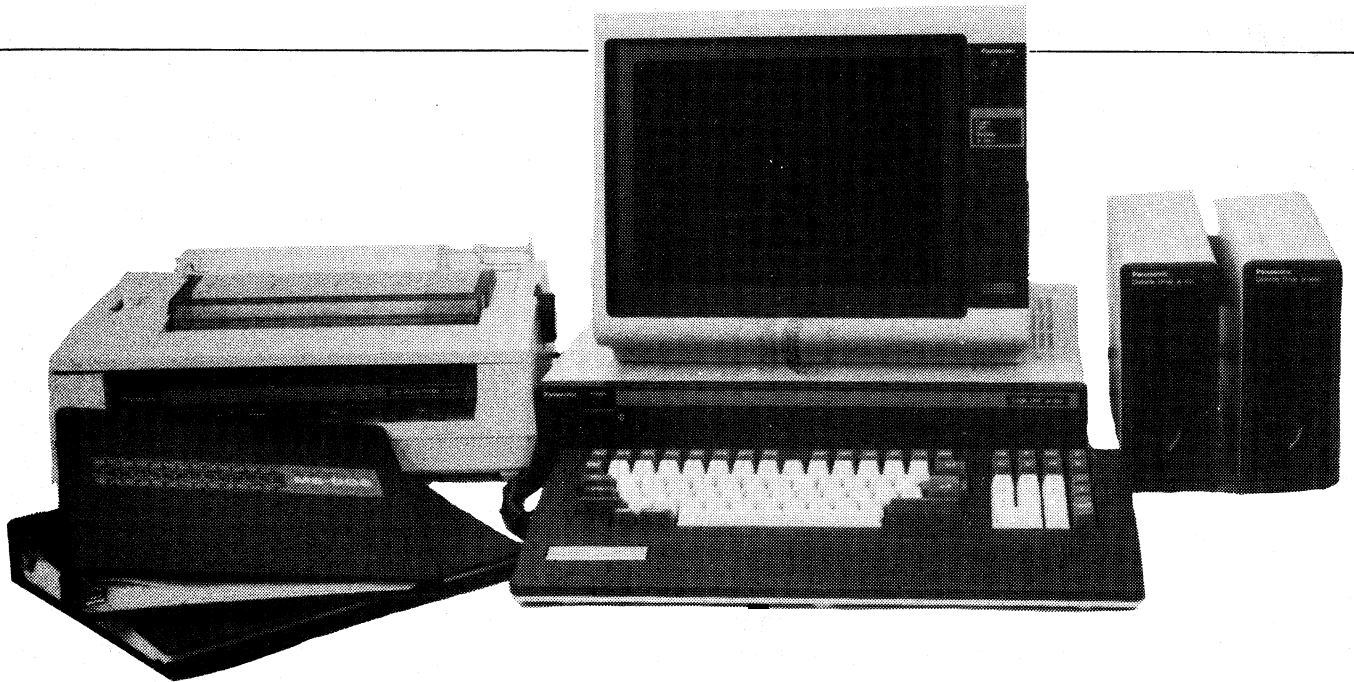
The eight programmable function keys (16 functions with Shift) can be assigned command strings of up to 15 characters each. When Basic is first loaded these keys are assigned various Basic commands, (their "default" values) such as LIST, LLIST, etc, allowing entry of the keyword with a single key press. The operating system also uses the keys to assist command line editing and to set display modes and colours.

Basic also includes statements which allow these keys to interrupt a program as it is running and invoke specified sub-routines, so that programmers can write routines which use the programmable keys for special purposes.

MS-DOS has a rather unusual command line editing facility. As commands to the operating system are entered they are sent to a single line "template" buffer and the user can copy this buffer, delete selected characters or add new characters with the programmable function keys. The template always holds the last command line entered and all MS-DOS commands, such as DEBUG and FILCOM can make use of this buffer when input is required from the terminal. A command line can be repeated



The keyboard of the JB-3000 is well laid-out, with colour-coded function keys and separate numeric keypad and is a pleasure to use.



The system reviewed here includes dual 14cm disk drives and a dot matrix printer. Manuals for MS-DOS and Basic are at left.

with just two key-strokes, an incorrect command edited without re-typing the entire line, or minor variations of particular commands created with a minimum of typing.

Six other keys are included along the top of the keyboard, labelled "STOP", "COPY", "LABEL", "EC", "CLR" and "HOME". These keys are used in conjunction with the shift key. COPY in particular is notable. Whenever this key is pressed program execution will be suspended while the contents of the screen are copied to an attached dot matrix printer — excellent for producing hard copy of text and graphics. The JB-3021 dot matrix printer used for this review is covered in more detail later. Under MS-DOS these keys give the user the option of either copying a static CRT display to the printer or continuously outputting data to the screen and the printer at the same time.

A cluster of eight cursor control keys above the numeric keypad allows convenient cursor movement and insertion and deletion of characters. Two of the keys, labelled with small scroll arrows, are not used by the operating system, or Basic.

The video display is normally in "mode two", with text in an 80-column×25-line format. Graphics characters are available from the keyboard in this mode but colour cannot be used. Text is displayed in white characters on a black background on a colour monitor (a monochrome monitor can also be used).

We were supplied with an RGB colour monitor from Panasonic which provided an excellent display of both text and graphics. Text is displayed either in

25 lines of 40 double size characters or as 25×80 character lines. The 40×25 mode allows text display in any of eight colours on a background selected from the same eight-colour set. Some of these combinations such as green on green, are less than useful.

In the 80×25 line mode text is displayed as white on black. The display is stable, clearly readable and easy on the eyes thanks to the low-glare surface on the screen. Panasonic deserve full marks for this aspect of the system.

The inclusion of a 40×25 line display mode means that the JB-3000 could be

used with a video monitor or converted television set which does not have the bandwidth to handle the 80-column format.

The operating system

Microsoft's MS-DOS provides a simple yet powerful series of commands and has a number of excellent features. First off, MS-DOS emulates calls to the 8-bit CP/M operating system so that most CP/M-80 assembly language programs can be made to work under MS-DOS with just minor modifications. The operating system itself is written in 8086

```
ABS, ASC, ATN, AUTO, CALL, CBDBL, CHAIN, CHR#, CINT, CLEAR
CLOSE, COMMON, CONT, COS, CSNG, CSRLIN, CUI/CVS,CVD, DATA
DATE#, DEF FN, DEFINT/SNG/DBL/STR, DEF SEG, DEF USR, DELETE
DIM, EDIT, END, EOF, ERASE, ERR, ERL, ERROR, EXP, FIELD
FILES, FIX, FOR...NEXT, FRE, GET, GOSUB, GOTO, HEX#, INP
IF...THEN...ELSE, INPUT, INPUT#, INSTR, INT, KILL, LEFT#
LEN, LET, LINE INPUT, LINE INPUT#, LIST, LLIST, LOAD, LOC
LOF, LOG, LPOS, LPRINT, LPRINT USING, LSET, RSET, MERGE
MID#, MKI#/MKS#/MKD#, NAME, NEW, OCT#, ON..ERROR, ON..GOSUB
ON..GOTO, OPEN, OPTION BASE, OUT, PEEK, POKE, POS, PRINT
PRINT#, PRINT# USING, PUT, RANDOMIZE, READ, REM, RENUM, RESET
RESTORE, RESUME, RETURN, RIGHT#, RND, RUN, SAVE, SGN, SIN
SPACES, SPC, SQR, *STOP, STR#, STRING#, SWAP, SYSTEM, TAB
TAN, TRON, TROFF, USR, VAL, VARPTR, WAIT, WHILE..WEND, WIDTH
WRITE, WRITE#
```

The statements and functions of Basic-86 are shown above. The table is reduced by 20% from the original print-out of the JB-3021 dot matrix printer.

```
BEEP, BLOAD, BSAVE, CLS, COLOR, COM, DRAW, GET, KEY, KEY(n)
LINE, LOCATE, ON COM, ON KEY, ON PEN, ON STRIG, OPEN COM
PAINT, PEN, PLAY, PSET, PRESET, PUT, SCREEN, SOUND, STICK
STRIG, TIME#
```

Statements added by BasicA provide for control of graphics, sound, joysticks, a lightpen and the optional serial interface of the JB-3000.

Business computer review — the JB-3000

code however, so users are not restricted by the inefficiencies of translated 8-bit code.

Other features of the operating system include the ability to re-direct input and output between the terminal console, a printer, and disk drives. There is no need to "log-in" disks, and the operating system will prompt the user to install the correct disk if a file is asked for which is not on the disk in current use. The built-in time and calendar functions also work with disk files, so that files include the time and date of the last modification in their directory data — a handy feature.

Software provided on the system disk includes Basic86, Microsoft's 16-bit Basic, and BasicA (for Advanced), which is the same Microsoft language with extensions to handle sound and graphics. Keywords for each language are as shown in Tables 1 and 2.

MS-DOS, one of the operating systems available for the JB-3000, is the generic version of PC-DOS supplied with the IBM Personal Computer. Internal commands (those which are loaded into memory when the computer is turned on) include commands to check the directory of a disk, to copy, delete and re-name disk files or display their contents, and the time and date functions.

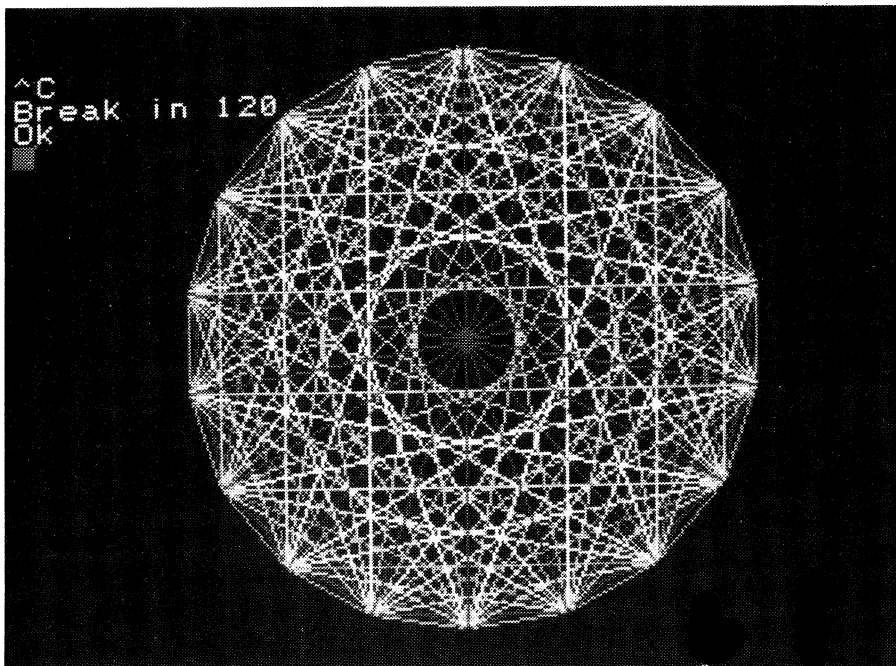
Other commands are held on disk until needed. These include the command interpreter itself, disk formatting, comparison and checking facilities, a line editor and DEBUG, a machine language monitor program. DEBUG, unlike the equivalent CP/M-86 utility program, does not include an assembler, making it of less use to the programmer.

The Format command allows formatting of disks and optional copying of all system files to a new disk, so back-up is easy. Edlin, the line editor, can be used for preparation of programs or other text and is a useful complement to more sophisticated word processing programs. DIR, used to check the contents of a disk directory, displays the file name and size of a file and the time and date of the last modification, a useful feature which is not provided by CP/M-86.

Two versions of Basic

Both Basic86 and BasicA are supplied with the JB-3000. Basic86 is a 16-bit version of Microsoft's version 5 interpreter while BasicA includes extensions for graphics and sound functions and incorporates an excellent screen editor which makes full use of the cursor control keys of the computer.

BasicA includes two "sub-languages", one for graphics and the other for sound and music generation. In addition it has extensions for handling a lightpen,



Graphics resolution and text in the 40-column mode are shown in this photograph of the screen of the JB-3000. On the screen the graphics design is in eight colours.

joysticks, and the programmable function keys of the computer. A Basic compiler is also available.

A single manual is included covering both Basic interpreters and noting those statements and functions of BasicA which are not implemented in Basic86. In addition to sound and graphics functions these include BLOAD and BSAVE for loading and saving a binary image of memory on a specified device.

While most useful for machine language programs these statements are not restricted, and may, for example, be used to store a copy of a screen image on disk and restore it when required.

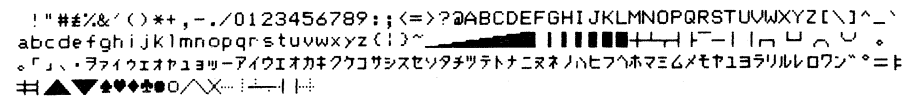
Also included in BasicA but not in Basic86 is the COM statement for control of optional communications ports, KEY, for defining and listing assignments of the programmable function keys, LOCATE, for control of cursor position on the screen and TIME\$ for reading the value of the on-board timer. In short, Basic86 is a standard implementation of Basic for 16-bit machines while BasicA is adapted to the hardware features of the JB-3000.

The graphics functions are exceptional. What Panasonic calls "low resolution"

mode provides a display of 320×200 pixels, in eight colours. Medium resolution is 640×200 while high resolution is 640×400 pixels. Both these last modes are available in monochrome only and display text and graphics characters in the 80 column × 25 line format. The highest resolution mode, 600×400 pixels, exhibits a disturbing flicker though, presumably because of the time taken to refresh the 32K bit-mapped display in this mode.

In low resolution the screen displays characters on a 40×25 format but allows the use of the full set of graphics statements of BasicA.

Anyone who has used the Tandy Color Computer will be familiar with Microsoft's graphics language. Statements are included to set or reset individual pixels, test the status of a pixel, draw lines between two specified end-points or lines relative to one specified point, draw circles and curves and PAINT areas of the screen until a specified border colour is encountered. These statements take parameters in the form of absolute or relative co-ordinates and a DRAW statement is also available which takes a string of motion com-



The character set of the JB-3021 dot matrix printer is shown above reduced by 20%. The graphics symbols and Japanese katakana character set can be redefined by the programmer and the printer is also capable of high resolution dot graphics.

APPLICATIONS SOFTWARE

The Computer Company, who distribute the JB-3000 in Australia, claim that the machine is compatible with software written for the IBM Personal Computer under MS-DOS. If this claim is interpreted to mean that standard disks can be taken from the PC and run without modification on the JB-3000 it is not quite correct. It is necessary to first re-format the disks using special "emulator" software available with the Panasonic computer.

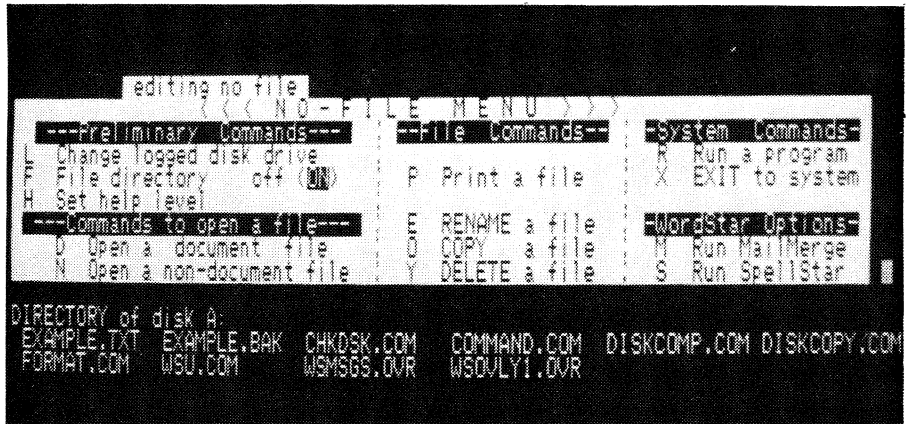
A demonstration of the JB-3000 by the suppliers showed both WordStar and Dbase II software running on the system. The Multiplan electronic spread-sheet and other Microsoft packages are also available together with a variety of complete packages for retailers, the hotel trade and real estate applications. There is even a "Church Contributions Package".

Other "vertical market" applications packages will be available and a number of educational and entertainment packages are listed in The Computer Company's promotional material.

An independent company, Attache Software Pty Ltd is also producing software for the JB-3000. This series of programs is being specially written to take advantage of the high resolution colour graphics and large disk capacity of the Panasonic computer, and is being promoted as setting new standards for ease of use and documentation in the software market. The accent will be on business applications, with a general ledger and accounting programs the first releases.

WordStar

WordStar 3.0 is currently available for the JB-3000. This word processing program from MicroPro International is supplied on a 14cm diskette accompanied by a hefty manual in a ring binder and a spiral bound training guide. The manual is heavy going. As one author has put it "WordStar, like all of Micropro's software, is an impressive program but the manuals that explain it tend to be intimidating, repetitive and stuffy." (Arthur Naiman, *Introduction to WordStar*, Sybex, 1982.) The training guide is more useful. It contains a "short course" and an intermediate training course with practice exercises and examples to help the new



WordStar in action. The photo shows the "no file" manual prior to beginning an editing session.

user, and is conveniently organised for use as a desk-top reference.

WordStar is known for its on-screen menus and use of Control keys to call up all functions. The main menu takes up the top half of the screen, although it can be suppressed if not desired. Supplementary menus cover the three levels of explanation of each command, block-move operations, printing options, commands for moving the cursor through large areas of text, and on-screen formatting. At help level 3 (the most extensive), explanatory menus can take up to half the screen space. Each menu is called up from disk when required by a Control-character key combination.

No attempt has been made to configure this version of the program to the JB-3000, so control keys must still be used. The cursor control keys and programmable function keys of the JB-3000 are inoperative — a pity, because these features would make WordStar considerably easier for the new user.

The problem is that with so many options and such flexibility, WordStar is correspondingly difficult to learn. There are literally hundreds of functions available to the user, many of them called into action by combinations of two or three control key codes. The on-screen menus are of little use, cluttering the screen while providing insufficient detail to be helpful, and the training manual can take the user only so far. Of course, not all features are required in any particular application and a subset of commands can be learned quickly. The problem with this approach however is the lingering feeling of

overkill. Many of the options available will remain unused in typical applications, simply adding to the complexity of the program without benefiting the user. Anyone considering WordStar should expect to take several weeks of extensive use to learn to use the program effectively.

There are at least two approaches to WordStar on the JB-3000. Readers already familiar with WordStar will find the JB-3000 implementation to be absolutely standard while operation is enhanced by the quality of the system's keyboard and display.

Those considering the JB-3000 computer and looking for a word processor to run on it may prefer some other program which makes better use of the "added extras" such as function keys and colour capability. They may object to a program which takes no advantage of the sophisticated features of the computer they have paid for. Ultimately the decision must rest with the user, and made on the basis of previous experience, the type of work to which the program will be put and the proportion of time the computer will be used for word processing.

The choice of a word processing program is very much a matter of individual taste. There can be arguments on the merits of using special function keys as against Control-key combinations, whether menus should be constantly on view on the screen and whether the basic mode of operation inserts new characters into existing text or overwrites the old text.

Certainly control keys while harder

The National Panasonic JB-3000

to remember are faster for a touch-typist who need not move fingers from the standard keys to invoke particular commands. Programmable and special function keys are conversely easier to learn but can slow down a touch-typist considerably.

On the other two points WordStar provides a choice. The menu display on the screen can be deleted, and the Insert function (normally on) can be altered to a "type over" function with the press of two keys (Control-V).

Multiplan

We were also supplied with Microsoft's Multiplan, a spreadsheet calculator. This program makes full use of the facilities of the computer, using the cursor control keys and special function keys to move around the spreadsheet and to call up various operations. Audible feedback is also provided to indicate that the computer has accepted the user's command and to indicate errors.

Multiplan is an impressive program, and the comprehensive instruction manual is clearly written, taking user step-by-step through the creation and editing of spreadsheets as well as providing a complete and detailed reference to all facilities available. As far as instruction manuals go this is one of the best we have seen.

In addition to the manual the program also includes an extensive series of on-screen explanations and descriptions of commands, which can be viewed at any time without interfering with work in progress.

Multiplan allows the user to set up an array of rows and columns, with each "cell" of the array containing either a name, a heading or a numeric value or a form the result of a calcu specified calculation. A single cell or a range of cells can be copied or repeated across the spreadsheet, edited, or referred to by name by other cells. Calculations based on the contents of any group of cells can be instantly updated when the contents of those cells are changed.

Multiplan shines as an aid in financial modelling and planning, business budgeting and decision making. Once the user has acquired some skill in using the program it can be turned to almost any application. Multiplan and the JB-3000 work together well, each bringing out the virtues of the other — power, flexibility, and ease of use.

mands and allows rotation and scaling of drawings.

Also available are the statements GET and PUT, which allow specified areas of the screen display to be stored as an array and then placed back on the screen, perhaps in a new position, or altered using one of the operators PSET, PRESET, AND, OR or XOR, which combine the contents of the array with the data already on the screen in a variety of ways.

All in all the graphics statements allow a great deal of flexibility in making use of the JB-3000's excellent video display.

The sound statements are easy to use. SOUND X,T will produce a tone of frequency XHz (between 37 and 32767Hz) with a duration of T "clock ticks". Clock ticks are produced by the internal timer at a rate of 18.2 a second and sound duration can be specified in the range 0 to 65536 "ticks". Minimum duration is therefore around 55ms and the maximum is just over an hour.

The PLAY statement takes a string expression indicating the note to be played, the length of the note, tempo, and a variety of other musical effects. Seven octaves are covered by the sound generator but only one voice is provided. The volume of the sound produced is controlled by the knob on the rear panel of the logic unit.

Basic86 is a full-featured interpreted version of the language containing 116 statements and functions, many of them with alternate forms and parameters. Hex and octal constants are supported and there is provision for calling in machine code sub-routines from within

Basic. Both sequential and random access disk files are also available.

Integer and single and double precision arithmetic are provided and control structures include WHILE ... WEND in addition to the familiar IF ... THEN ... ELSE. Programs can also be chained together, either sharing all variables or only those designated as COMMON.

A full complement of error handling functions and the TRON and TROFF functions are included for ease of program debugging.

Editing under Basic86 uses single letter keys combined with the control key to allow insertion and deletion within lines, cursor movement and addition of new statements. BasicA has a more convenient screen-based editor which uses the insert and delete keys. A feature of the BasicA editor is that program lines can be edited anywhere on the screen. A program can be listed on the screen, for example, and the cursor moved to the desired position. Once edited the new line can be entered into the program as listed. This facility is in addition to the editing functions invoked by the EDIT command.

Basic86 allowed the user to specify start-up parameters such as the number of disk files to be used, the maximum record size and the highest memory location to be used by Basic.

The DEF SEG statement will be new to users of 8-bit machines. This statement is used to define the current 64K segment of memory which will be referenced by following instructions such as USR. Together with an offset specified in the program the statement will result in a

JB-3000 SPECIFICATIONS

Processor: Intel 8088

RAM: 96K with 32K video memory, expandable to 256K

ROM: 16K

Interfaces: Monochrome and RGB video outputs, parallel printer port RS-232C interface available as an option

Keyboard: 93 keys with 16 programmable functions, 6 special functions, 8 cursor control and editing keys and numeric keypad.

Display: 80 x 25 or 40 x 25 double-size characters

Graphics: 320 x 200 resolution in 8 colours. 640 x 200 and 640 x 400 in monochrome. Text and graphics can be mixed in all modes

Sound: Single voice, 7 octave range

Disk drives: 14cm disks with 160K bytes storage per disk. Quad density 14cm disks available shortly providing 720K bytes per disk. 20cm disk drives are also available, providing 1.2MB per disk. A hard disk drive will also be available, providing 8.3MB storage

System software: MS-DOS, BasicA, Basic-86 and compiled Basic, Cobol and Fortran and Pascal.

CP/M86 and MP/M (multi-user) available shortly, with CIS-Cobol, Pascal/M, CBasic and assembler.

A CP/M 2.2 to MS-DOS or CP/M-86 conversion utility is also available.

Documentation: Generally good, although the quality of manuals for specific applications programs varies.

The National Panasonic JB-3000

20-bit address, enabling up to one megabyte of RAM to be accessed from Basic!

Peripheral equipment

A complete Panasonic system includes a printer, and we were supplied with the JB-3021, a compact dot matrix printer using a Centronics-type interface. Characters are printed on a 7x9 matrix, with graphics on an 8x8 dot matrix. Print speed is up to 120 characters per second, bidirectionally, and up to 80 characters can be printed per line, at 10 characters per inch.

In addition to use for program listings and draft copies of text material the JB-3000 uses the printer to provide hard copy of screen displays. With two key presses the display on the CRT can be transferred to the printer. Colour is not supported however. A point on the screen will be printed as black with unlit points creating white space. As a result, text of one colour on a coloured background will not be reproduced on the printer – both colours will be printed as black.

When copying from the screen the printer uses a double-size character set formed on a 16x16 matrix with two passes of the print head for each line. The result faithfully reproduces the aspect ratio of the screen display, but of course takes twice as long as standard printing.

96 ASCII characters are provided by the printer character generator, and special graphics characters and dot graphics can be programmed.

Other peripheral controllers can be plugged in to a 3-slot "mini-motherboard" inside the logic unit. A hard disk drive and controller are on the

way, and 20cm disk drives are available, each providing storage capacity of around 1.2 megabytes and also significantly increasing the speed of operation of the system.

A communications controller for local area networks will also be available for linking the JB-3000 with other computer systems.

A fully expanded JB-3000 can include 256K bytes of memory, two RS-232C serial ports and four disk drives. An expansion unit is also available providing additional slots for more peripherals.

The JB-3000 has a few peculiarities. In particular some aspects of BasicA are a little rough. Some mistakes in specifying graphics modes and operations for example, instead of producing an error message will re-boot Basic, wiping out the existing program. The printer, at least in the review system, was not fully integrated with the computer. Dollar signs were printed as what is apparently a Japanese Yen sign – although this problem is easy to rectify and may not show up in systems on the market.

The instruction manuals, while com-

plete, are poorly organised. The use of separate schemes for pages and section numbering could cause confusion for example, when comparing the two Basics.

In conclusion

Considered without reference to IBM the JB-3000 is a powerful, easy-to-use machine, attractively packaged and available at an attractive price. Compatibility with the IBM Personal Computer must be considered an added extra because of the need for modification of disk formats before IBM programs can be used. The only way to get a guaranteed 100% IBM-compatible computer is to buy one from IBM.

The JB-3000 should not be considered as just another IBM clone, however. The superior graphics capabilities and larger disk capacity may make it a better machine in many applications. As long as sufficient software is made available the JB-3000 can more than hold its own, on its own merits.

Various JB-3000 configurations are available. A system with 128K of memory, monochrome video monitor, dot matrix printer, MS-DOS, Multiplan software and two disk drives is priced at around \$5998. A 128K RAM expansion board is \$533, and the RGB colour monitor would add about \$600 to the price.

The price may also include training courses conducted by the Metropolitan Computer College. Maintenance contracts are also available, supported by STC Computer Service.

You can see and try out the JB-3000 at Angus and Robertson Business Centres, computer centres in some Grace Brothers stores and many other retailers. For further information contact The Computer Company Pty Ltd, 4 Cliff St, Milsons Point, NSW, 2061. Phone (02) 436 1733.

