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# Get rid of your secretary .... **Toshiba's T1100** sits comfortably on your lap

For anyone still under the impression that portable lap-top computers are little more than toys, the new Toshiba T1100 should be a real eye-opener. Functionally it's near enough to a portable equivalent to the IBM-PC, crammed into a case only 310 x 316 x 66mm — and able to operate for up to eight hours from its internal rechargeable batteries.

### by JIM ROWE

Lap-top portable computers have been available for a couple of years now, and have sold in reasonable numbers. They've been popular with journalists as portable word processors, and also with gad-about executives, who found that they could use them for "homework" on business trips. At least this was the theory.

In practice, I wouldn't be at all surprised if many of those early lap-top portables are now quietly gathering dust in cupboards, because they weren't actually capable of much serious use. With painfully small display screens, limited memory and generally rather crude tape cassette storage for files, they were really little more than executive toys. If you wanted a serious personal computer, you had to go for a "solid" desktop model taking up most of a desk and powered from the mains.

But things are now changing. Laptops are rapidly coming of age, and have now reached the point where you can have serious computing power and portability in the one machine.

The Toshiba T1100 is an example of this new breed of lap-tops, and a very impressive example it is. With an 8/16bit CPU, 256K bytes of inbuilt RAM (expandable to 512K) and an inbuilt microfloppy disk drive taking 720K byte



Toshiba's T1100 lap-top computer — a portable equivalent to the IBM PC.



Despite compromises, the keyboard is of professional quality and pleasant to use.

double-sided double density disks, it offers more computing power than most desktop machines — plus a very high level of compatibility with the industry reference IBM-PC.

#### **Display screen**

Instead of the cramped 1-line or 4line displays of earlier lap-tops, the T1100 features a large swing-up LCD screen with an active area measuring 223 x 97mm. This displays exactly the same amount of data as the monitor screen of the IBM-PC and many other desktop machines — 25 lines of 80 characters. It has the same graphics resolution too: 640 x 200 pixels, although they're all in LCD-grey rather than colour.

As an alternative to the inbuilt LCD screen, the T1100 will also operate with a normal external monochrome or colour video monitor (either composite or RGB). Not that you'd want to lug such a monitor along with you on the plane, of course, but it does allow you to get a full colour display when you're back at the desk.

Along with the LCD screen, the T1100 provides a keyboard with 83 keys — the same number as the IBM-PC, and although there are differences the two are functionally very close.

The T1100 also provides an inbuilt Centronics-type parallel printer port, with a 25-pin D-type connector pincompatible with that on the IBM-PC.

In short, then, the T1100 offers virtually everything you get with the base level IBM-PC — *plus* the fact that it is portable and can run for up to eight hours from inbuilt NiCd batteries. Back at the desk, you charge the batteries via an 18V/600mA plugpack power adaptor, which can also run the computer as a desktop unit when the batteries are charged.

All this in a trim and compact package measuring only 310 x 306 x 65 mm, and weighing about 4kg — less than all but the lightest and most flimsy portable typewriters!

So it's a powerful little package, and anything but a toy. In fact I can well imagine people buying it in preference to full size desktop models like the IBM-PC, not because they want to take it on their travels, but simply because of its neatness and compact elegance. Even as a desktop it will have considerable appeal — especially if you don't want to expand it dramatically.

#### Expansion

Needless to say, in the T1100's compact little case there just isn't space for the usual row of "expansion slots" beloved of committed computer freaks. But the machine is still capable of quite a deal of expansion — probably quite enough for the majority of professional and business users.

For example, there's a 37-way D-type connector at the back to plug in a second disk drive, and Toshiba provides a choice of two add-on drives. There's another  $3\frac{1}{2}$  inch microdrive to add a second 720K bytes of storage, or a  $5\frac{1}{4}$  inch minifloppy with the standard 360K bytes of storage if you want to be able to swap data and/or software with an IBM or more conventional IBM clone.

Interestingly enough, the add-on  $3\frac{1}{2}$  inch drive has an inbuilt NiCd battery,

like the T1100 itself. So if you really need to, you can take the second drive away on your travels — or do your homework in comfort out on the patio, without having to search for an extension cord! The  $5\frac{1}{4}$  inch drive doesn't offer this feature.

Of course the inbuilt Centronics-type printer port lets you hook up the T1100 to a wide variety of standard printers. It worked quite happily with my TEC-Itoh F-10/40 daisywheel, for example.

Incredibly enough, the T1100's designers have allowed space inside its compact case for two further internal expansion options. There's provision for an RS-232C serial communications adaptor, so you can hook it up to a telephone modem, a serial printer or some other serial format peripheral. The second option is a memory expansion card providing an additional 256K bytes of dynamic RAM.

By the way, these expansion options are quite independent of each other. You can fit either or both as you wish. The RS-232C port adaptor fits just inside the rear of the case, which has a small break-out piece to allow access to the adaptor's 9-pin D type connector.

So if you wish, the T1100 can be expanded to a full-blown system with RGB colour monitor, 512K bytes of RAM, two disk drives with 1.44 Megabytes of storage, a printer of your choice and a communications modem. This is more powerful than most existing IBM-PC systems in use, and quite sufficient for a lot of serious work.

#### Software

On the software side, as I mentioned

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## Toshiba's T1100

earlier, the T1100 offers a high order of compatibility with the IBM-PC. It runs with MS-DOS, and also seems to be able to run a majority of programs written for the IBM and its clones. This suggests that its BIOS routines are functionally very close to those in the IBM, making it about as close to the IBM as you can get.

I have been able to try out the sample machine with quite a few programs, either as supplied with the sample unit on  $3\frac{1}{2}$  inch micro disks or on 5- $\frac{1}{4}$  inch disks which I know to run on my IBM. Just about all of them worked normally, including Flight Simulator — which often comes to grief on "compatible" machines, because it makes direct call to the the graphics hardware.

Wordstar and Multiplan seemed to work quite happily, as did Crosstalk although I couldn't try this out properly as the sample machine wasn't fitted with the RS-232C port.

I tried booting up PC-DOS itself, using the external 5<sup>1</sup>/<sub>4</sub> inch drive (the T1100 has a slider switch on the back which allows you to make the external drive the "A" drive, and the internal drive "B", if you desire). Although it seemed to function quite normally handling programs and files on its own drive, it didn't like trying to find files on disks in the microdrive — presumably the directory is formatted differently.

Similarly the IBM version of BASICA wouldn't run, no doubt because this version is designed to graft itself onto



The T1100 features an in-built 3<sup>1</sup>/<sub>2</sub> inch microfloppy disk drive.

the IBM's ROM BASIC and the Toshiba doesn't have any. But a program called BASICA that I found on one of the T1100's microdisks did run some programs written on and for the IBM without any problems.

Even though this was called BASICA on the microdisk directory, presumably it is really a version of Microsoft's sister product GW-BASIC, tailored for the T1100. Its file size on the disk is shown as 53440 bytes, which suggests the free standing RAM resident GW-BASIC rather than BASICA.

Not that these complications with the DOS and BASIC are of any real consequence, I hasten to add. Since the T1100 comes with its own version of MS-DOS and (ultimately) BASIC, and both seem to be able to cope directly with IBM software, it's fairly easy to do almost anything most people are ever likely to want.

### Using the T1100

Right then — so much for the basic hardware and software capabilities of



The external 5¼ inch minifloppy drive adds an extra 360K bytes of storage.

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the Toshiba T1100. But what's it like to use?

Generally, very nice indeed, although it does have a few shortcomings. There are also a few things which are bound to irritate anyone like myself, used to using an IBM. I'll go through these in approximate order of importance.

Probably the first thing that struck me when I fired up the sample T1100 was the modest contrast and visibility of the LCD screen, particularly in certain types of ambient lighting. After having used it for a few days now, I'm inclined to think this is probably the machine's main shortcoming.

Being a passive display, the LCD panel is very dependent on the surrounding light level — without any ambient light, there's no display. So you must have a reasonable amount of light; yet at the same time you can't have it coming from an angle such that it produces annoying reflections from the front glass. Diffused light seems to be best, but here again if it's too bright, you tend to get an annoying reflection of yourself.

Like all LCD displays the T1100 screen has to be tilted at just the right angle for best contrast, too, producing a further element of complication.

Mind you, I'm not suggesting that the T1100 is any worse than any other machine with an LCD display. At this stage of their development LCD displays are rather more finicky and a little inferior to CRT screens in terms of readability. But they do have one big advantage, that of compactness and the ability to consume very little power. So if you want a truly portable machine like the T1100, an LCD screen is really the only choice.

In the case of the T1100, my reaction is that despite the limitations of the LCD screen, it will still be found quite acceptable when the machine is used as a portable. But back at home base when it is used on the desk top, most people will find that a conventional CRT-type monochrome or colour monitor makes a very worthwhile addition.

By the way the T1100 does provide a control to adjust LCD contrast, and this does help in getting the best display.

One further point should be noted about the LCD screen. Unlike a CRT monitor, it can't provide two levels of display contrast to correspond to the "normal" and "enhanced" IBM's character display modes. The T1100 designers have apparantly elected to substitute a flashing underline for the "enhanced" mode, when the LCD screen is being used. This causes a further problem with some software programs which happen to make extensive use of the enhanced mode.

I discovered this initially with Wordstar, which uses the enhanced mode for displaying all of your text. This means that on the T1100's LCD screen, every single character of your text is displayed with a flashing underline. The problem is that Wordstar also uses a flashing underline as its cursor, so the "real" cursor tends to get lost in a forest of pseudo cursors. It can be quite irritating.

Fortunately, when you switch the T1100 over for use with an external video monitor, it changes over to the usual "enhanced" display mode — so the problem disappears (another reason for using an external monitor when you are back at the desk).

#### Keyboard

The only other area in which the T1100 seems to have a few shortcomings concerns the keyboard. Basically, these seem to be the result of some inevitable compromises forced upon the Toshiba designers in achieving their goal of squeezing a keyboard of 83 keys into an area only 281 x 138 mm.

Like the IBM, the T1100 combines the cursor control keys with the numeric keypad. However, because of the space limitation these keys are no longer in the familiar and convenient square array to the right of the main QWERTY section. Instead they're in two horizontal rows, above the number/punctuation row of the main section. The odd numbered keys are in the top row, with the even keys below them.

I guess the designers had little choice about this, but it has made the numeric keypad as such virtually useless; you're better off using the normal number keys. The cursor control keys are also considerably less convenient than on the IBM and similar machines, although you would probably get used to them if you were using the T1100 all the time.

The programmable function keys F1-F10 are also in two horizontal rows above the main section of the keyboard, to the left. This is again not quite as convenient as having them in two vertical columns at the far left. There are also quite a few minor differences from the IBM keyboard, such as the double quote mark being in the shift position on the "2" key like a normal typewriter keyboard. But as before, if you're using the T1100 all the time you'd no doubt adjust to these differences in short order. They are really quite minor points.

On the positive side, the keyboard seems quite positive in its action and is pleasant to use. The highly important (ENTER) key is better shaped and more conveniently placed than on the IBM, as are the two SHIFT keys. The (ALT) and (CAPS LOCK) keys are also one removed from the space bar at each end, making it rather less easy to hit them by mistake. The (NUM LOCK) key also has the word STOP engraved on its front, making it easier to remember its control function with MS-DOS.

So all in all, the pros and cons of the keyboard should balance out reasonably well, particularly if you're going to use the T1100 by itself and not flit back and forth between it and another machine.

#### Conclusion

In summary, I have to say I am most impressed with the Toshiba T1100. It is a very professional machine, and is far more powerful than you'd normally expect to find in something so compact. In fact it's the nearest thing you're likely to find to an IBM-PC, squeezed into a lap-top case and able to operate from batteries.

Whether you're after a serious portable PC, or just a serious desktop PC that takes up less space, it has to be a strong contender.

The review sample came from Dick Smith Electronics, who quoted a price of \$2995 for the basic 256K machine complete with inbuilt 720K microdrive, power adaptor/charger, operating manuals, MS-DOS system disk and two disks with "Access-4", an integrated spreadsheet/desk manager package. This sounds very good value for money.

The add-on 720K  $3^{-1/2}$  inch microdrive costs a further \$899, while the alternative  $5^{-1/4}$  inch minifloppy drive costs \$699. Both come complete with power adaptor and connection cable. The optional 256K RAM expansion board costs \$649, and if you want the RS-232C communications adaptor this costs \$165.

At the time of writing, the T1100's version of BASIC is not yet available for sale, but is expected shortly. Other systems and applications software should also be coming along soon, and may well be available by the time this is published. It is also likely that a lot of the software becoming available on 3-1/2 microdisks for the IBM model JX will run quite happily on the T1100, and suppliers like Dick Smith Electronics will no doubt be able to advise you regarding specific programs.

For those readers who have somehow managed to get this far without becoming aware of Dick Smith Electronics (!), the company has stores in most cities and large towns. If there isn't one near you, their head office address is PO Box 321, North Ryde 2113. The head office phone number is (02)888-3200



The rear panel has ports for an external disk drive and printer plus sockets for RGB and composite video outputs.