

ELECTRON TURBO

Want to make your Electron operate at twice its current speed? Of course you do! That's what Slogger are offering with their turbo upgrade for the Electron. It will cost you £49.95 if you send your Electron away to their Kent workshops for the quick fit. Alternatively you can send off £29.95 for the kit.

In order to keep Slogger's workshops free for paid work, we generously did the latter. A small brown box fell through the letterbox and out popped the bubble packaging with a single printed circuit board, a switch attached to a length of wire and some printed instructions stapled together.

OK, it's all here, lets get to work. The add-on board has the name of its originators on it, Andyk, and little else! It's mysteriously bare. How do they do it we asked ourselves. Read on. The printed circuit board has just two chips on board, one of which has the part number deliberately removed. More mystery.

Slogger's new upgrade brings turbo speed. How does it do it? And is twice the speed twice as good?

Do It Yourself

If you are thinking about the kit then think twice if you do not already have some experience of both soldering and desoldering and handling chips. If you are already equipped or fancy braving an hardware project then this upgrade will prove enjoyable and profitable. You will need a soldering iron (preferably fine tipped), a desoldering tool (a sprung device which sucks up the hot solder), some long nosed pliers and lots of patience!

Here Slogger must come in for some criticism for the supplied instructions. They are sorely inadequate for the inexperienced user. A list of parts and tools required and a more complete description of the job is vital, especially on the removal of the chips. Some more technical information about the board would also add to the enjoyment of buying and carrying out the upgrade.

The first thing you have to steal yourself to do is open up the casing and remove key-



Taking out the PCB

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10CODE=&1D00
20P%=CODE
30[
40OPT 0
50LDX#0:LDY#0:DEY:BNE P%-1:DEX:BNE P%-4
60RTS
70]
80TIME = 0
90CALL CODE
100PRINT TIME

```

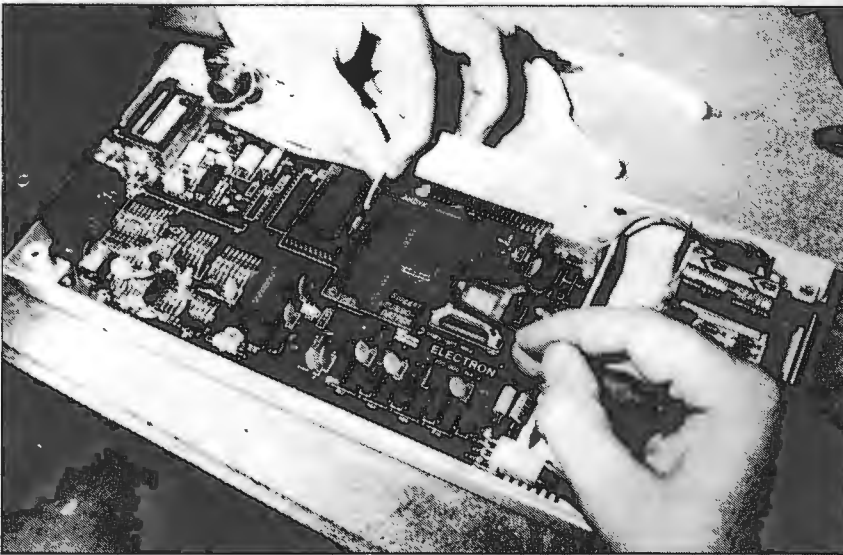
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Electron: 38
Electron Turbo: 19
BBC B+: 17

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Desoldering the 6502 and MOS



Fitting the Turbo board

board, power cables and speaker from the PCB (printed circuit board). The PCB itself must then be taken out. The 6502A microprocessor and the 32K ROM (BASIC/Operating System) must then be desoldered and removed. The instructions assume full knowledge of how this is to be done.

There are two DIL (dual in line) sockets supplied which are now soldered into the Electron printed circuit board in place of the 6502 and ROM. Some boards already have one or both of these chips socketed. Breathe a sigh of relief if this is so with yours.

If you have an issue one Electron (of four as revealed in Feedback) with the OS and BASIC ROMs in two different slots then hard luck. The turbo board can only handle a 32K ROM. If you can get hold of a 32K ROM then your Electron will also have to be tweaked so that the right hand socket into which the turbo board plugs can decode 2 by 16K and not just 16K.

A quick test with the 6502 and ROM back in the sockets is in order at this stage to see if your desoldering and socket soldering has been successful. Ours wasn't but we got there in the end. The chips are then soldered into the turbo board and the board pushed into the sockets on the Electron PCB. The all important switch is soldered onto the turbo board and fed through a hole which you drill in the top left hand side of the Electron case. The pins still had to be filed down to get the case on and even then it was a tight fit.

When changing speeds in both directions, the switch is employed followed by a CTRL BREAK.

Faster Equals Better

We tried a whole host of games with the Turbo on and off. Some games, because they are hardware timed (using the screen sync for instance) didn't speed up much. The maths and loops were going quicker but the

sprites weren't really effected. Such games were Aardvark's Frak!, Acornsoft's Elite and Addictive's Boffin.

Other programs were given a whole new lease of life. Hacker is normally laboriously slow but with the Turbo on it becomes really fast and playable, smoother and a much more enjoyable game in general. Similarly with the shoot 'em up Birds of Prey and the brand new Superior game Karate Combat.

Aviator is the best example of a BBC game which didn't ever cut it on the Electron but with the Turbo switched on the speed is massively improved and it turns into a brilliant game. Aviator also demonstrates a rather annoying cursor which seems to appear on occasion when Turbo is operational and is immune to any attempts to turn it off.

After the Turbo has been on for some time, the smallest chip on the board gets noticeably hot but no faults occurred at any time and when switched off the Turbo might as well not be there. It caused no interference problems of any sort. A graphics test which plotted in different colours at different coordinates in Mode 1 was measured using TIME and showed a speed increase by three, better even than the suggested test displayed here.



How does it work? Adrian Kearney of Slogger: "It's very simple." And that's all he'd say!

Booster

To sum up, the Turbo is very good value for the Electron owner. It isn't going to change the rate at which the complete machine can perform but screen related actions are likely to see a valuable improvement speedwise. If you find graphics disappointing on your Electron then the Turbo is really worth getting. It also speeds up your other programs and without any negative side effects. It's probably worth spending the extra money on the Slogger upgrade rather than take on the do it yourself kit. An important upgrade well worth having.