Obituary for a fax

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Abstract: The continual failure of personal technology highlights the growing problem of obsolete, irreparable and non-recyclable toxic waste. Moore's Law is a symptom of failure as much as a promise of better technology. Better design could avoid the problems.

Keywords: Life cycle design.

Introduction

This "obituary" tells the final story of a BT DF200 fax that was just five years old when it stopped working, and the light went from its buttons. An earlier paper described its day-to-day life, its design and use [1]: the story is completed here by reviewing the end of its life cycle. For concreteness this article refers to a particular product: but it is a typical consumer product and has had a typical life cycle. This obituary, then, uses the DF200 as an example to raise and question wider issues.

BT DF200 1994–1999

Cause of death: the fax died when power was restored after a mains power cut. A post-mortem revealed the cause of death was multiple component failure on the main PCB due to the power surge. The separate 24V power supply is operational and would have been made available for organ donation had there been any way to make it available to other power supply failure victims.

Funeral arrangements: the DF200 will be buried at a community landfill site in the normal way.

Flowers may grow on the landfill site in due course; however donations can be made to Thames Water, the main agency that will deal with the consequent leachate and other pollution.

At the time of writing, BT would repair the fax for a £85 engineer's callout, plus the cost of repair, which was estimated at £200. A company sells the main board of the fax for £165.59, or £100 exchange (plus £5.00 for two-way carriage). Figures exclude Value Added Tax, which adds 17.5%. The choices seem to be £335 *minimum*, or £124 with *no guarantee* that the main board is the only problem to fix. As described before [1], the DF200 was *already* running on its third main board, due to failures during its warranty period. (For the last four years of its life it was wrapped in tape, since the repair engineer who last serviced it broke some of the weak casing fixings.)

Given than equivalent new faxes cost from £140 and come with one year's warranty, it makes no financial sense *for the owner* to repair the DF200. The DF200 therefore joins the UK's electronics landfill.

The pricing of BT's engineer call-outs is probably designed to cover costs (or to dissuade call-outs being made in the first place), rather than to build customer relations, preserve the environment, or even to collect lifecycle feedback on products in use in the field. In contrast, Dixons (a consumer goods store) offers annual repair contracts at £77, which suggests that BT prices their so-called service primarily to make a

profit. Moreover, since Dixons are not manufacturers, they get no useful evaluation out of any servicing they subcontract.

A BT engineer we spoke to claimed that the fault arose because of one or more "worn components" on the main board, which would have been killed by the power surge when electricity was restored. In our view, electric outages are not an unanticipated occurrence, so the device design should allow for them. When the (still functioning) switched mode power supply is switched on, it produces no significant surge over its 24V operating voltage. Reference [1] noted that the operational device over-heated. In other words, the main board of the DF200 itself is under-rated and/or badly suppressed, evidently with a planned short time to failure. That the board is the third the DF200 has needed appears to confirm the poor quality of design.

Conclusions

Electronics can easily be made to survive for long periods in very harsh environments — for example, our Sony television is ten years old and has been regularly switched on and off (and has survived all the power cuts the fax has experienced). A TV has much higher voltages that stress components more than inside the fax. Thus one is led to assume that the DF200 was *designed for* a short life. Further, one is also led to assume that the supplier's policy (in this case, BT) is designed to encourage product replacement rather than product repair. The engineer we spoke to *explicitly* advised replacement with a new product. Clearly designers make trade offs in design, for example that of balancing design time, product cost, reliability, servicing, recall and so forth.

Environmental costs have been discounted — or ignored — and disgracefully so. For example, the DF200 contains six wired-in batteries (nickel/cadmium), and has no instructions for their safe disposal. The previous article [1] argued that human costs, in terms of usability, had been ignored. One might now argue that a wide range of human costs — physical and spiritual, environmental and psychological — have been disregarded. When, if, the European Waste from Electrical and Electronic Equipment (WEEE) Directive [2] is enforced, it will also raise legal issues.

Most obituaries bring out the best memories of the dead, but in the case of the DF200, departed representative of the electronics consumer marketplace, to go so quickly and unnecessarily from desirable product to polluting debris is obscene. Its death, in such routine circumstances, should have been avoidable.

Let the DF200's passing not be in vain, and let this obituary redeem its toxic contribution to the 900,000 tons of electronic waste disposed of annually in the UK.

References

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