WHAT WATTS, WHAT?

AN EDITORIAL

Query from one of our noble and worthy area managers: How can I cope with the question 'what wattage is your iron?' His customers are afflicted with an age old syndrome, wherein they are led to believe that the more watts you have the better the iron will hold temperature.

I'm sure he doesn't want to know the power rating for the various irons, when even your pet cat can look that up if s/he cares to. S/He wants to know how to overcome generations of ignorance, sloth, squalor and pellagra. I shall endeavour, here, to provide an answer without resorting to equations of heat transfer, referring to the several laws of thermodynamics, or mentioning anything likely to make the reader's eyes glaze over.

Production soldering requires the operator to make as many joints per hour as s/he possibly can. This requires the tip to stay at temperature, or get back to temperature cat-quick. Waiting around for the tip to get hot again is not popular with time-and-motion study people (those idiots who stand outside the sandbox door with a stop-watch). In the old days, the only way to make sure the tip temperature stayed more or less constant was to hit the heater with all the power you could get to it. This is true to a certain extent, just as it's true that while you can get rid of flies with an elephant-gun, a fly-swatter is quieter, more effective, cheaper, and leaves a smaller hole. Unfortunately there are drawbacks to this approach:

- The brute-force approach leads to temperature overshoot, which can damage boards and components. It wears the tips out faster, too. I haven't seen any free tips lately.
- All the experts agree - and I don't know who names these experts, perhaps they name themselves - that the lower you keep soldering temperatures the better off you are. This means that control is more important than power. I do know that it is certainly so for surface-mount devices; those little buggers are touchy when it comes to heat.
- Low-power control circuits are cheaper and easier and more accurate (for the buck) than high-power ones. I don't know why this should be so, but it is.
- Power companies charge for volts by the watt-hour. The more watts you use in an hour the higher the bill. This may be the most convincing argument of all.

Thanks to science and technology and the urge to make a buck, modern soldering equipment (Hakko, that is) can hold, or get back to, temperature quickly and accurately without sucking up all the power between Cape Hatteras and the Sea Islands. Three things make this possible:

- Better tip design. The alloys in the Hakko tip transmit heat better than other materials.
- Better heater/sensor design. The sensor, which forms part of the control circuit, is more accurate than it used to be and responds more quickly to changes in temperature; the (ceramic) heater gets hot fast!
- Better control circuit design. Zero-crossing control circuits - which act like an on-off switch in a hurry - are the most effective way to control power to the heater, or keep the heat on when it is wanted and off when it is not. The newer stations use a microprocessor for this; temperature accuracy at idle is thus $\pm$ 1^{o} and recovery time is about a tenth of a second.

There's nothing in the world to prevent Billy Joe Bob from whipping out the 250-watt American Beauty and repairing Luwanda Lou's cell phone if he wants to and is good enough, but he'll get better results with a 936 and Luwanda Lou won't put ground glass in his grits if he burns a hole in the phone.

Short English translation: Power doesn't do it. Temperature control does. All you need is enough power to keep the tip hot. Anything more than that is a waste. Thanks for listening.