Re: Why do CPUs run hotter...?

Source: http://sci.tech−archive.net/Archive/sci.electronics.design/2006−06/msg04295.html

- *From*: Keith <krw@xxxxxxxxxx>
- *Date*: Tue, 20 Jun 2006 10:40:16 −0400

In article <1150724687.424300.59780@xxxxxxxxxxxxxxxxxxxxxxxxxxxx>,
irwin@xxxxxx says...

> krw wrote:
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> > In article <1150707795.535043.280960@xxxxxxxxxxxxxxxxxxxxxxxxxx>,
> > irwin@xxxxxx says...
> >
> > > krw wrote:
> > >
> > > > It's called *HALT*, and has been done for at
> > > > least a decade.
> > >
> > > Only on decent preemptive OS's, a decade ago most users
> > > were still
> > > using W95 ;−)
> >
> > Not true. Win95 will HALT also. ...and it's not a decent OS.
>
> Sorry, I meant Win3.1, not that it made much difference because the W95
> systems of a decade ago mostly ran software built to the old API, the
> OS could halt but did not know **when** :−;

Sure it could. It didn't natively, IIRC, but there were several
power saving add−ons available for any of the P54s/K6s/M1s/M2s.

> > Note that HALT is only part of a strategy. HALT can be used
> > in the idle

> task of a CPU, but there is also the possibility of reducing clocks
> when the load is light, which is not the same thing is it :−/

> One can also modulate the power supply, but these topics weren't at issue.

> Disagree, I am not talking about tweaking of the sort that overclockers do, I am talking about the possibilities the OS has to reconfigure on the fly to alter the performance vs consumption ratio.

So am I. If you modulate the clock one buys the 'F' term in P~CV^2. If you're going to modulate 'F' one can also modulate 'V' (since Max(F) is a function of V) and buy the V^2 term, as well. I believe TMTA was the first to do this, but it's commonplace now.

> BTW, another point is that the FP pipelines consume less when they are empty ;−)

All pipelines consume less if you shut the clocks off. It's common for 40−50% of the active power to be dissipated by the clock trees. so developers have gotten quite aggressive with dynamic power management. Unfortunately, static power problems are here to stay (adding to the need for power supply modulation).

−−
Keith
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