

SEEING THE LIGHT

I've been reading your great magazine for decades, and it's still as fascinating today as the day I discovered it. Recently, something happened that I feel must be shared with the other readers of **Radio-Electronics**.

Back at Christmas time a friend and I were standing in the light-bulb aisle of Builder's Square talking about the merits of different types of light bulbs. All of a sudden, without warning, he started telling me about the surge of power a light bulb uses to warm up, and how he leaves his lights on so that he doesn't waste electricity turning them on and off. I've heard that insane notion before, but this guy launches satellites into orbit for a living. I was absolutely flabbergasted that an actual rocket scientist believed an old wife's tale-like that.

Well, I asked him to explain, and he told me that the filament of a cold light bulb had a resistance close to zero, and therefore was effectively a short circuit when power was first applied. I replied that, while that might be true, the warm-up period is so short that it couldn't possibly pull more current than even a second of operation, let alone the minutes and possibly hours he was talking about. He disagreed, and, after all, he is an engineer!

So, forget the opinions. Here's an actual measurement. I stoked up my trusty Macintosh and set up my analog-to-digital converter to measure the current of a 100-watt GE soft white bulb (in my desk lamp) at 22,000 samples per second. Anything that was so short as to fall in between the samples would certainly not affect a power meter.

When first turned on, a 100-watt bulb pulls about 165 watts, but rapidly falls off to a nominal 100 watts in less than $\frac{9}{60}$ second. In fact, it falls to less than 150 watts in just $\frac{1}{60}$ second. That makes the average wattage for the first second only 103 watts, but by the end of the next second, the wattage has been stabilized at 100 watts for $\frac{59}{60}$ of a second.

My friend the rocket scientist told me in the light-bulb aisle that he leaves his lights on to the tune of 100 watts per second to save 3 watts for one second. In other words, he wastes 30 times more power in each extra second he leaves his lights on than were used to start them up. One extra minute's operation would consume 1800 times the power to turn them on, and an hour's would amount to a whopping 108,000 times the power to warm them up. No wonder it costs so much to run the space program!

If I were to figure in the inertia and internal friction of the power meter, I'm sure I would find that it would underread so short (and small) a change in power, reducing even those 3-watts. I wonder how I could measure that?

By the way, the same friend once told me that if you leave a car battery sitting on a concrete floor overnight it will go dead! But I've never actually checked on that. In light of all this, I have actually checked for the existence of satellites, and they are up there—amazing!
STEPHEN A. SCHLEICK
Livonia, MI