A Canadian Electronic Christmas Fable or a Lesson in Electronics

Shamelessly adapted and translated from a story authored by Paul Baumann at:
http://www.mikrocontroller.net/topic/242742?goto=2472680#2472680
December 23th, 2011
by GJO

It was a cold Canadian winter night...

It happened around the Christmas holidays in a brightly lit basement workshop somewhere in a snowed in forest somewhere in a small mountain village in the Rocky Mountains at the west coast. A young schoolboy, fascinated by the many blinking lights he had seen in a store earlier inside the local shopping mall instantly decided, I could make this myself. I must have this at home! Later at home after he did his chores, he finally made it to his basement and he began to inspect eagerly his modest junk box full of used electronics parts he had salvaged and behold, he found:
Many colorful LEDs, a small AC power transformer, also known by some people as TRAFO, a really fat electrolytic capacitor who listened to the name ELKO for short, a crystal and a controller, and a few other small parts which he grouped around him on the table.

No, these were no dead objects and he did not realize they could have a life of their own and were able to even speak with themselves. Indeed, they were capable - in their own language, which no loudspeaker in the world could reproduce.

Moments later: The thick transformer mumbled to himself something like "What only will this become again..." Hey! Shouted ELKO, I know you! Cumbersome and irritated, the transformer turned around to him. It's you! Wasn't it you two years ago standing beside me in a Satellite receiver?

Well, well, look, who is here! The gentlemen from the clique rectifier diodes couldn't again stay away either! Scared, the four diodes snuggled up to each other with their ID rings close to each other.

Ha, Ha, laughed the regulator, you are not going to connect yourself in parallel? Why not, exclaimed one of the diodes? You can't be serious, said ELKO. If I were to become again the storage capacitor, then I want you to form a bridge so you feed me twice as often. It is hard enough to smooth the voltage...

It's OK, uttered one of the diodes, but, then you must also survive one and a half times higher voltage!

Square root of 2, square root of 2, cried the controller, who chose to be quiet until now. Yes, yes - our super brain; we are aware that you can calculate, added a beautiful red LED.

Offended, the controller immediately assumed the Sleep-mode and the crystal stared at the LED angrily. ELKO thought to himself: I really would like to sweep the little LED - and the electrolyte inside him started to boil. The controller, however, guessed his thoughts and declared: The LED is under my protection, - I will determine when she will be lit. ELKO felt caught and changed his designations colors from white to red.

Then, the controller could be heard: Hey, ELKO, you fat thing, roll along to the monitor and find out what our young friend is doing!

ELKO did what he was told and reported what he saw: Our young experimenter was drawing furiously a schematic with EAGLE, in which they all found themselves. He was frightened: Except for e 240-Ohm resistor he couldn't discover anything else resistive. Did our young friend forget the current limiting resistors?! Shocked, ELKO let him self fall from the table and landed gently on top of the watchdog, the friend of the young experimenter.

The reports of the capacitor were capable to freeze the regulators blood right at his connections. Should this be true and our young friend also omitted for himself the bypass capacitors? He would have to miserably oscillate at frequencies right into the Megahertz region, about which even the crystal would be astonished.
Do not complain, said the crystal, -because of this I will not oscillate either. Without the proper load capacitance I am going to strike.

F*** you, your reluctance on startup has annoyed me for a long time. I will take my internal RC oscillator I can rely on!

Stay calm and be brave, said a voltage regulator, which heard to the beautiful name of LM317. When it is time, I will get so warm until my over temperature protection responds and then I will reduce the current through all of you.

Ha, said TRAFO –for you our young friend has provisioned a heat sink, and then you will be almost as big as I.

They all laughed until they became suddenly aware of the seriousness of the situation: Everyone’s life was at stake!

Watchdog barked wildly underneath the table and the young friend shouted: Be quiet, or I will turn you off. But the watchdog did not calm down and jumped on the table, grabbed the only resistor with his muzzle and pointed again and again excitedly to the monitor. Finally, our young friend comprehended what he had forgotten and added the missing parts to the EAGLE schematic. He also

remembered that he had read in the data sheet about bypass capacitors being needed at the regulator and the crystal circuit the controller depended on.

The components made a sigh of relief. It would still become something sensible thought the controller and fell into a deep sleep, out of which, only an interrupt could awake him.

…And if our young friend did not go “Bodmin” * as he programmed the controller all night with determination, then tomorrow the printed circuit board could be ready, on which they would be fed all happy and satisfied by the contently humming TRAFO.

Aehnlichkeiten mit lebenden Personen sind nicht nur zufaellig sondern auch beabsichtigt.

* If you have watched the wonderful UK TV series “Doc Martin” you will know what this word means; -)