MAILBAG

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Pacemakers are a hazard during cremation

I want to comment about the hazard of medical implants, as described in the article in the October 2016 issue. As a funeral director, I have to deal with pacemakers and defibrillators on a daily basis.

Before a person can be cremated, these implants have to be removed and a medical practitioner has to physically check to ensure that nothing has been missed. The reason for this is they can explode during the cremation process, with serious results. The influx of new devices posses a real risk in our profession. Anything containing a battery has to be removed but a lot of health professionals would not be aware of the new risks.

There is provision on a "cause of death" certificate for a doctor to state there is a cremation risk but usually these risks only apply to pacemakers and defibrillators, as no one has yet really looked at the situation.

We have fortunately found a couple of brain stimulators that were not noted on the doctor's certificate and removed them before any harm was done. When questioned, the doctor stated that he did not realize they posed a risk. As more and more various types of implants are used, there is a real risk of some one at a crematorium being seriously injured by a device exploding.

The whole implant industry needs to come up with guidelines in handling the disposal of their devices, and pass that information on to doctors and funeral homes.

John Arnfield,
Narangba, Qld.

Further notes on Circuit Notebook contribution

Thank you for publishing my idea in Circuit Notebook, November 2016 ("Precision switched capacitor DAC needs no precision components") and for improving the clarity of my submission.

I would like to point out to readers that my submission consisted of only the skeleton of the idea, which included Fig.1 and Fig.2 and the descriptions that applied to them. SILICON CHIP staffers have fleshed it out to include Fig.3 and the associated text.

I'm happy that SILICON CHIP has edited and expanded my submission to improve it; the clarity of the description has been improved significantly compared to my submission, and adding extra switches to increase the output range of the circuit to include both 0V and Vref is an inspired idea.

As I was reading the text, it dawned on me that the fourth divider stage of Fig.1 (that was also present in my original submission) is unnecessary. This fourth divider stage has probably also led to some confusion in the text regarding whether Fig.1 represents a 3 or 4-bit DAC: it is in fact a 3-bit DAC.

Fig.3 does not repeat this error and is therefore a 4.1 bit DAC as stated. However, a small change renders IC8, D1 and D2 unnecessary.

For simplicity, I'll describe the change with reference to Fig.1. All that is required is to take Vout from the common terminal of the bottom half of S3. S3 now only needs to be an SPDT switch and the 4th divider stage is no longer needed. With this arrangement, Vout will vary from 0V to 7/8 * Vref in Vref / 8 steps as the digital input is varied from 0 to 7, making it unnecessary to subtract 1 from the digital input.

This rearrangement produces a 3-bit DAC with fewer components than previously required. If it is necessary for the output to range between 0V and Vref (making a 3.1 bit DAC), add a fourth SPDT switch, S0, that switches the output between Vref (when S0 is 1) and the common terminal of S3 (when S0 is 0).

Similar changes can be made to the circuit of Fig.3 to make a 4.1 bit binary DAC with glitch rejection.

Andrew Partridge,
Toowoomba, Qld.

Wind turbine role in SA blackout questioned

I read with interest your editorial in the November edition of SILICON CHIP. You state that "the wind blew just a bit too hard for their much-vaunted wind turbines and they all automatically feathered their blades to stop self-destruction". You also state that "after the blackout occurred a number of their spindly transmission towers then fell over".

I wonder if you have read the initial report on the blackout as published by the Australian Energy Market Operator. It is the best source of factual information I have found so far, and does not seem to have any bias for or against wind power built into it. It is entitled "A preliminary operating incident report for the national electricity market – information as at 9.00am, Monday 3 October 2016" and was published on 5 October 2016. It is available from www.aemo.com.au

It provides a minute-by-minute description of the sequence of events, and the following statement is from the Executive Summary of that document:

"The weather resulted in multiple transmission system faults. In the short time between 16:16 and 16:18, system faults included the loss of three major 275kV transmission lines north of Adelaide. Generation initially rode through the faults, but at 16:18, following an extensive number of faults in a short period, 315MW of wind generation disconnected (one group at 16:18:09, a second group at 16:18:15), also affecting the region north of Adelaide."

Mailbag: continued

Australian submarine decision is incomprehensible

In the Weekend Australian, October 29-30 2016, Rear Admiral Stephen Johnson (US Navy retired) claimed that, anyone who says that you can't put a diesel engine into a nuclear submarine design doesn't know what they are talking about. Mr Johnson now has the job as General Manager, Submarines, in the Australian Defence Department's Capability and Sustainment Group (CASG.) Of course he would say that.

He further claims that many aspects of the future diesel design, eg, cooling and generation systems, galley arrangements, hydraulic steering (etc) will be similar. He does not mention that over 22,000 pages of sensitive classified information on DCNS submarines have been leaked to the public allegedly by disgruntled ex-employees. So much for security!

Rear Admiral Greg Sammut, head of the Future Submarine program at CASG notes that, "it's a new design because no existing design meets our requirements" (echoes of the SeaSprite fiasco.) He also said, "it's going to take a period to get sufficient design maturity before we start construction."

But Australia cannot afford the luxury of a custom-designed submarine, because there is NO TIME to do this. By their public statements, the Defence Department have admitted that the design (even if they manage to fit a diesel engine to a nuclear sub) will take 15 years at least, including testing and evaluation.

By the best estimate the deeply flawed Collins class submarines will be completely worn out by 2025 and they may not even last that long. The decision to build a custom-designed submarine for Australia should have been made about 15 years ago. This would have been right in the middle of the SeaSprite custom helicopter fiasco and politically difficult. So they sat on their hands for 15 years. This is woefully delinquent.

We will now have a situation where, if the Defence Dept and their cronies have their way, we will be without a front line submarine fleet for at least 15 years. That's like owning a house in a dodgy neighbourhood without a front door.

The potential gap of up to 20 years in a front line submarine fleet is the massive consequence of the absolutely inept Dept of Defence.

Gary Johnston,
Submarines For Australia.
www.submarinesforaustralia.com.au

Nowhere in that document is there any suggestion that the wind farms caused the blackout. It does, however, state in no uncertain terms that the transmission line faults caused by the weather triggered the cascade of events that led to the blackout.

I have not yet seen any reliable information that suggests the wind farms caused the blackout. In fact, some wind farms stayed on line until the last of the thermal power stations tripped (page 10 of the above report, Table 3, at T=0).

I have not yet, despite repeated attempts, been able to find anything that reliably implicates the wind turbines as being the source of the blackout. I would be interested to know the source of your information about the wind turbines feathering in strong wind being the cause of the blackout.

Neil Biggar,
Perth, WA.

Leo replies: Since I wrote that editorial, more information has come to light which suggests that the wind turbines did cut out prematurely and that possibly their cut-out settings were too low. It is also clear that there were significant frequency changes (due to the wind turbines) which could have caused the interconnector to disconnect, even before the wind turbines cut out.

Interestingly, some of the sources which support my statements also refer to the AEMO report. For example, Joanne Nova analyses the report here:

Mailbag: continued

Current flow versus electron flow

In your October issue of SILICON CHIP, I was quite happily reading the article on the Micropower LED Flasher, until I got to Fig.2 which shows the charge/discharge paths of the timing/boost capacitor C1.

Why oh why in this day and age, have you found it necessary to still use "conventional" current flow? The charge/discharge paths clearly show the current flowing from + to - !

Being both an Avionics Technical Instructor in my day job and a volunteer Foundation/Standard/Advanced course instructor, the sheer thought of using conventional current paths astounds me! I hope your use of this outdated method to describe current flow was a mere aberration and that I will not see it again in any circuits in SILICON CHIP.

Greg Walker,
West Ipswich, Qld.

Comment: people have been arguing about this, virtually ever since electrons were discovered. In our defence, we use "conventional" current flow because it is the convention. Not even that most dogmatic of organisations, the IEC, have yet determined that conventional current flow must be abandoned.

http://joannenova.com.au/2016/10/sa-blackout-three-towers-six-windfarms-and-12-seconds/

There were also a number of articles in The Australian in the weeks after the blackout which provide evidence that the loss of wind generation was the final straw which took out the interconnector/disconnector by pushing it well over its design capacity.

Regardless of the exact sequence for the total state blackout, it seems likely that it would not have progressed to a total blackout if South Australia had its own base-load power stations operating and was not so dependent on the interconnector to the Victorian brown coal-fired base load power stations.

DAC circuit should have precision capacitors

Andrew Partridge's interesting article in the Circuit Notebook pages of the November 2016 issue, using a capacitor-based Kelvin-Varley divider in a DAC, does require precision capacitors to work accurately. If the paired capacitors are exactly equal in capacitance then the output voltage is exactly one-half of the input voltage. But if they are not equal when the capacitors are paralleled up and charge flows from the higher charged capacitor to the lower charged capacitor then while the resultant voltage will tend towards one half of the input voltage, it is not exactly one half if the two capacitors don't have equal value.

To demonstrate:

$C_1 = C_2$	$V_o/V_i = 0.500$
$C_1 = 1.05\ C_2$	$V_o/V_i = 0.498$
$C_1 = 1.30\ C_2$	$V_o/V_i = 0.491$
$C_1 = 2.00\ C_2$	$V_o/V_i = 0.444$