University of New South Wales
School of Physics

PHYS 3630 Electronics

Assignment 2.

The perfect cup of tea, according to the Blissful Relaxation Tea Company (BRTC), requires water of precisely the right temperature. The BRTC consider this temperature to be 94 ± 2 C.

You have just landed a lucrative contract with BRTC to design a tea thermometer, to be marketed under the brand name *"Bliss-o-meter"*. The Bliss-o-meter will run from a single 5V (nominal) battery pack, and consist of a temperature probe plus a display made up of three light-emitting diodes. The display works as follows:

One LED is labelled "too cold" and is lit when the temperature, T < 92.0 C,

One LED is labelled "too hot" and is lit when the temperature, T > 96.0 C,

One LED is labelled "blissful" and is lit when the temperature, T = 94.0 ± 2.0 C.

You will use the following components:

- AD590J (one only), http://www.analog.com
- MAX6133 (one only), http://www.maxim-ic.com
- LT1218 or LT1219 (as many as you like – you may use these as op-amps or comparators), http://www.linear-tech.com
- LEDs (three), LED characteristics: operating current 5 – 20 mA (depending on desired brightness), forward voltage drop 1.8V
- Resistors, capacitors, diodes etc. as desired.

The Assignment: Download the data sheets, draw a full circuit diagram of the Bliss-o-meter, and show complete calculations that demonstrate that the device will work as specified. Explain how the circuit works, any design compromises you had to make, and any novel or especially clever features.

Notes:

1. This assignment must be handed in by COB, Friday June 13, 2003.
2. You may collaborate on the conceptual design, but the final design, calculations and write-up must be your own.
3. You must fully cite all references used, and you must acknowledge all other sources of assistance (such as your collaborators).
4. There is no one "right" solution – just wrong solutions, good solutions, and really good elegant solutions.

Professor John Storey
22 May 2003.