

ENGR 271 – Assignment 4

Due Date: June 29, 2000

Material: Based on Experiments [#1](#) and [#4](#) in the *Earth Measurements* manual.

Key Programming Terms:

Shiftin Shiftout Rctime

Key Concepts:

Transducer Digital Temperature Transducer Photodiode Illumination

1. Write a program which lists the following information in the debug window:

# Returned by DS1620	Temp in °C (XX.X)	Temp in °F
X1	TC1	TF1
...

Take a temperature reading approximately every five seconds. Print the temperature in Celsius with one number to the left of the decimal place. The temperature in Fahrenheit may be listed as a whole number. Schematic on page 12. Submit program with remarks.

2. Write a program which lists the following information in the debug window:

Discharge Time (μ s)	Resistance (k Ω)	Light level (lux)
T1	R1	L1
...

Roughly calibrate your light reading as follows:

Insert a new 100 W light bulb into a lamp fixture. Move the Boebot (on its side) until the face of the photodiode is 1 meter from the center of the globe. Use a scale factor to adjust the light level until it reads approximately 100 lux. Submit program with remarks. Sample schematic on page 81. (Connect side of photodiode with + indication to ground.)

3. Imagine that your Boe-bot is a reptile. When the ambient temperature is above 76 °F, the reptile, on the verge of overheating, seeks shade. While he is seeking shade, his eyes have a wild red-yellow look, which can be simulated by alternatively blinking red and yellow LEDs on and off (i.e., Red on & Yellow off then Red off & Yellow on). When the illumination level is below 40 lux, the reptile has found shade. (Suggestion travel approximately 1 foot and then check light level in two different directions and then move in the direction of lower illumination.) Once the reptile has found shade, it checks the ambient temperature approximately every 10 seconds for one minute. If the temperature is below 80 °F for each measurement, the reptile is safe, and its wild look abates (i.e., the blinking stops). Otherwise, the reptile dies and emits a death rattle. (Program the piezoelectric speaker to release a horrific sound.) Demonstrate your work to someone (outside your group) in the class. Submit program with remarks and an original schematic.