Senior Design Project Description for SPRING 2016

Project Title: Electroluminence Characterization System for Electronic Devices (UNCC_ECSED)

Supporter: UNCC ECE

Supporter Technical Representative: ASSIGNED

Faculty Mentor: __X__ ASSIGNED _____ TBD (check one)

Single Team _____ Dual Team _____ (check one)

Personnel (EN/ET): __2__ E, __2__ Cp, _____ Cv, _____ M, _____ SE

(Complete if the number of students required is known)

Expected person-hours: (250 per student)

Description of Project:

Electroluminescence (EL) is an optical phenomenon and electrical phenomenon in which a material emits light in response to the passage of an electric current or to a strong electric field. This is a characterization technique used to assess the series resistance in an electronic device, especially to ascertain how good the contacts are. In this work, an electric current is applied to a device such as solar cell mounted on a stage in the dark, with a camera mounted atop to capture the image as it lights up. Students will be adapting the ccd camera to extend its exposure time to capture clear images and use this images to quantify the series resistance.

Initial Project Requirements (e.g. weight, size, etc.):

(i)   Panasonic WV-CP454 CCD camera
(ii)   Solar cell
(iii)   Lenses
(iv)   Power supply (10 A)

Expected Deliverables/Results:

(i)   Adapt the provided Panasonic WV-CP454 CCD camera to take images at an exposure time of up to 1s. CCD acquisition time needs to be extended past NTSC frame rates. CCD arrays are sensitive in some of the more desirable wavelengths for EL emission detection.
(ii)   Show very clear images that is easy to identify the dark spots that could be due to series resistance
(iii)   Quantify the series resistance to match the images

List here any specific skills or knowledge needed or suggested (If none please state none):

Electrical Engineering or Electrical Engineering Technology
-        Circuit design
-        Device fabrication and utilization of clean room facilities
-        VLSI design
-        Communication and wireless

-      Power systems and power management
-      Robot control and systems

Computer Engineering

-      Embedded systems and software development
-      Advanced Logic design and computer architecture
-      Advanced FPGA development in VHDL and/or Verilog
-      Communications
-      Robot control and systems