



## Nabsys, Inc.

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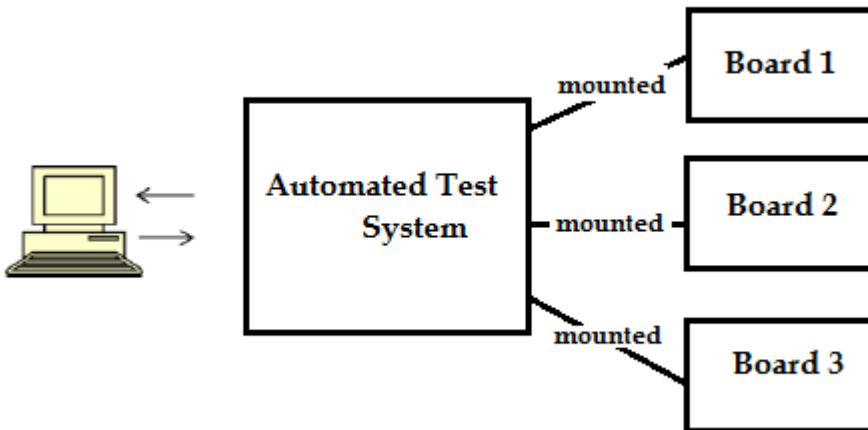
### ***Automated Test System for Nabsys Electronics***

#### ***Overview:***

NABsys has developed a system for sensing DNA molecules using solid state detectors. To accomplish this, several printed circuits boards are required; however, before each circuit board can be used it must be tested to ensure not only proper operation but also data of the highest possible quality. Currently Nabsys engineers personally test each board prior to use, but as Nabsys starts producing more systems hand testing will become impractical. As such, Nabsys would like a team of students to design, build and test an automated test system.

The test system will consist of a mechanical fixture to which each board will be mounted for testing. This fixture will run I/O diagnostics, test pin checks, and collect relevant performance data on each board. Students will develop a computer program to control the test system and run these diagnostics. The program will also generate an output file that details the results of each test and indicates to the user if the board has passed or failed the test regime.

#### ***System Diagram:***



**Deliverables:**

1. Detailed electrical specification (developed interactively with NABsys Engineers)
  - a. Input power supply requirements
  - b. Input control specification
  - c. Output specifications i.e. voltage, current, etc.
2. Selection of any “off-the-shelf” components i.e. Microcontroller, Connectors, Converters, etc.
3. Implementation of computer interface (i.e. Labview, C, Java)
4. Detailed circuit design & schematic capture of Test Bed via PCB Artist™ software (available from Advanced Circuits) or equivalent.
5. Working Test Bed PCB meeting all agreed upon specifications
6. Final report including block diagram, theory of operation, material cost & results of early test runs.

**Team Description:**

1. Team consists of three students – one computer engineering, two electrical/electronics engineering.
2. Strong drive, independence, and initiative is a must.
3. Lab experience is a big plus.
4. Knowledge of computer programming (C, Java, etc), electronic circuits and Labview experience is a big plus.

**Team Division of Labor:****Computer Engineer:**

The computer engineer’s primary responsibility for this project will be to create a computer program capable of driving the test system. The first step in the process will be generating the I/O protocol for the chosen interface (USB, Ribbon Cables, etc) so the program can communicate with system electronics. Once communication is established the computer engineer will be required to automate the Nabsys’s developed test procedures and collect relevant data. Finally the computer engineer will use the collected data to populate a test results document which will be displayed to the user at the end of a run.

**Electrical Engineers:**

The electrical engineers’ primary responsibility will be to develop the test board on which the Nabsys electronics will be mounted. The first step will be to determine how the instructions from the program will be transferred to the test bed and translated into signals. Next, the electrical engineers will determine what components are required to automate the tests. This may include, but is not limited to, microprocessor(s), DC/DC converters, DAQ, DAC, connectors, cables, and filters. Once the architecture has been finalized the design will be fabricated into a PCB and a prototype will be produced. Finally, the Prototype PCB will be assembled and the system will run automated tests on boards which have already been tested by hand.