

## Slow Control GUI for Detector Bias

- On the desktop, open LabVIEW 8.0. The program is called **Top\_Bias\_Ctrl\_Current.vi**.
  - File→Open→C:\Program Files→LabJack→LabVIEW UE9→Bias Ctrl Development
- The panel that opens contains buttons, indicators, and file paths. Their functionalities will each be explained briefly below.
  - **‘Read File’**
    - Specify the file path of the bias configuration file.
    - The default is C:\Slow Ctrl\Bias Slow Ctrl\bias\_config.txt.
    - The configuration file is as follows:

<u>Det. Label</u>	<u>Box No.</u>	<u>Ch. No.</u>	<u>Demand</u>	<u>Alarm I</u>	<u>Alarm V</u>
↓	↓	↓	↓	↓	↓
  - **‘Base Path’**
    - Each time a configuration file is written (explained below), the file is designated by a system timestamp. This file name will be appended to the base path the user specifies.
    - The default is C:\Slow Ctrl\Bias Slow Ctrl.
  - **‘Written File Path’**
    - An indicator to show the full path of the written file.
  - **‘Write to File’**
    - Writes the current bias configuration to a time-stamped file (shown in the *Written File Path* indicator).
    - Note: Only the demand bias can be changed when writing to file; all other parameters remain the same.
  - **‘KILL BIAS’**
    - Cuts the bias across all channels but allows the VI (virtual instrument) to continue running.
  - **‘END PROGRAM’**
    - Press both buttons once to stop the VI from running. The VI will not stop running until the next read sequence is finished, so the time for this depends on how long the refresh period is set for (see comment at the end).
- There are two pages available via the “DE/EF” and “CsI” tabs. The first tab corresponds to box address 0, which will be the negative box, while the second tab corresponds to box address 1, the positive box. All of the indicators and controls are arranged in blocks of 8, where the zeroth block corresponds to bias board 0; the first, bias board 1. These two bias boards are in the negative box. The second block (under the second tab) corresponds to bias board 2; the third, bias board 3. These two bias boards are in the positive box.
  - **‘Detector Label’**
    - The names of the detectors from the configuration file are shown here.

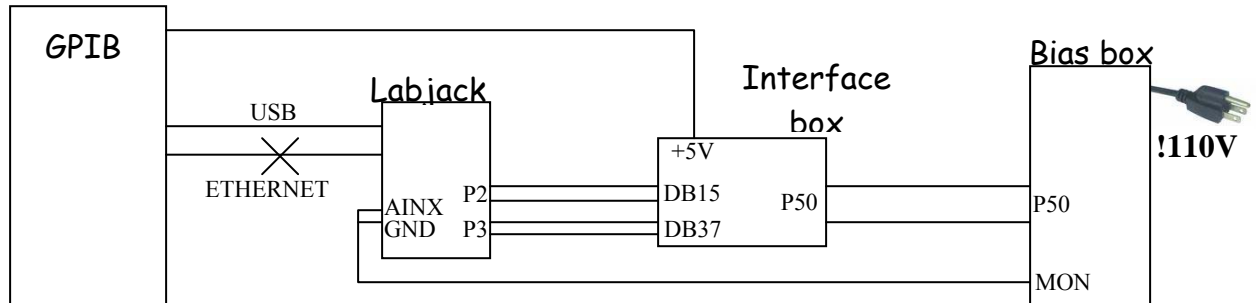
- **‘Box Number’**
  - The box number column should show all zeros for the first tab and all ones for the second tab.
- **‘Channel Number’**
  - The channel number for box address 0 or box address 1 is shown here.
- **‘Demand Bias’**
  - The currently demanded bias is shown here.
- **‘Bias Brd x’**
  - The actual voltage read from the multiplexer is shown here.
- **‘Current Brd x’**
  - The actual current read from the multiplexer is shown here in  $\mu\text{A}$ .
- **‘Alarm’**
  - In the configuration file, the last two columns are the maximum currents and maximum voltages, respectively. These indicators light red whenever a read value surpasses its maximum limit.
- **‘Set Bias’**
  - These controls allow the user to specify a voltage between 0 and 255; **this value must be a positive integer**.
  - Press the adjacent button to set the voltage for that particular channel (and notice that the ‘Demand Bias’ indicator shows this value).
  - Physical limitations allow an actual range of 0V to ~205V for the negative box and 0V to ~65V for the positive box.

Further comments:

- The VI is basically hard-wired to set voltages on channels 0-15 for each box (2 bias boards per box). If the third bias board (the spare) is needed to replace one of the other boards, just make sure that its addressable channels are 0-7 or 8-15.
- The VI is set up so that the analog inputs are as follows:
  - AIN0-AIN1 → box address 0
  - AIN2-AIN3 → box address 1
- The reading of the multiplexed bias boards occurs automatically once per unit time specified by the user, so the voltage and current values should always be updated.

## Operating Instructions

1. Diagram of the bias control setup:



2. After switching ON the bias box and *before* running the control GUI, push the ENABLE button (white button) on the bias box.
3. *Before* running the GUI, choose the correct input file to read.
4. If ready to run, click once the RUN button (the arrow button towards the top left of the GUI display window).
  - a. When running, the grey background of the GUI display will be solid instead of containing dark grid lines.
5. Enter only **positive** values for voltages regardless of whether or not you are communicating with the positive or negative bias boxes.