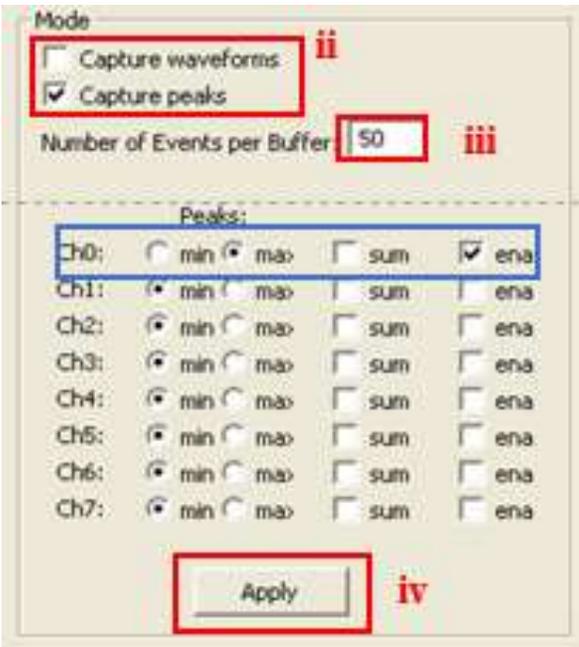
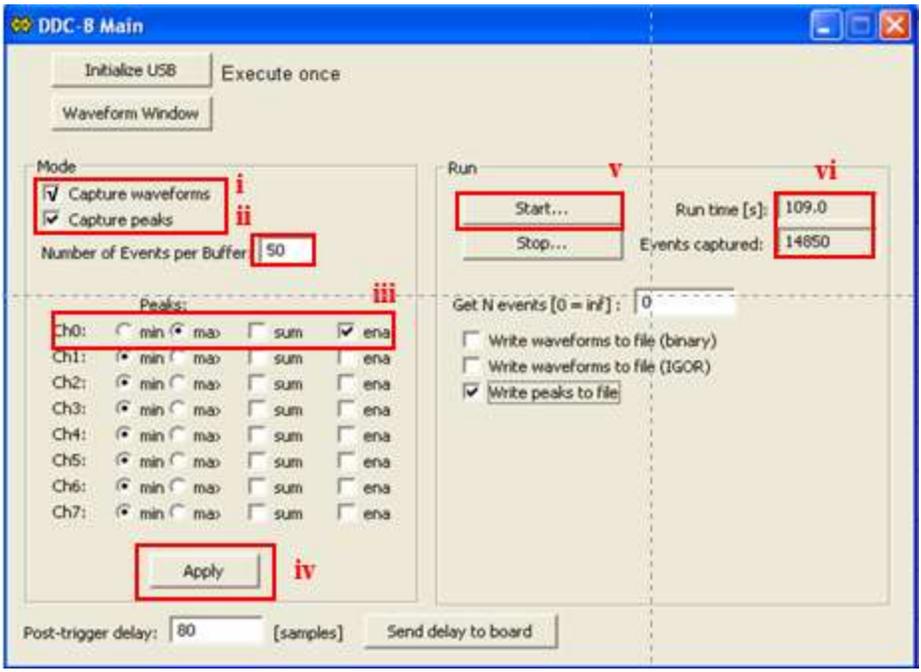


# DDC-8/BlackBox Quickstart User's Guide

- 1) Turn on the DDC-8. Wait to hear **3 dings** come from the computer speakers
- 2) Open up BlackBox and choose **DDCT>Main** from the top menu
- 3) Begin the initialization procedure
  - a. click on Initialize USB (only once!). You should see "**Interface: 0**" in the log window
    - i. If you see something else (possibly -5 or -22), close Blackbox, push the button labeled "Reset USB" on the front panel of the DDC-8 (or power-cycle the device)
  - b. Open the waveform preview window, click "**Initialize Plots**"
    - i. Several flat lines should appear, as well as a legend
    - ii. Double click on the plot to auto-arrange the legend
  - c. Choose the offsets for each channel with the boxes on the right hand side.
    - i. For most cases you will want to input "**32**". This will make the offset approx -0.8V, enabling full scale digitization of ~1.8V pulses.
    - ii. Other offsets can be used here (namely if negative [use "**225**"] or Bipolar [use "**128**"] pulses are to be expected.) For now, stick to an offset of "**32**".
- 4) Inspect the **waveform** and ensure the DDC-8 is reading the proper signal.
  - a. Attach the signal to be measured to **Ch\_0** and the trigger signal to **NIM\_IN\_0** BNC panels
    - i. **Remember to inspect them in the scope first to ensure they are <2V!**
  - b. Check the box for "**capture waveforms**"
  - c. Choose a **value of 1 or 2** for **# of events/buffer** (each waveform is represented by a large number of samples).
    - i. This adjust how often the GUI will update information from the FPGA. **25-50** is sufficient for high count rates. If the events you are recording are sparse, you can bring this down to single digits. Feel free to experiment here!
  - d. Set each of the desired Ch#s to **max** and **ena**
  - e. Press Apply to save all of the settings adjusted so far.
  - f. Adjust the post trigger delay
    - i. This lets the DDC-8 know after how many samples (40ns ea.) after the trigger it should stop capturing the waveform. **80** is a good value to start with, but try several values to explore the effect of changing it!
  - g. Click "send delay to board".
  - h. Click run to see the waveform of the signal. (don't bother saving it)
- 5) After observing that the waveform is correctly displaying, you want to see a histogram of pulse heights
  - a. From the top menu, select **DDCT>Histograms** to display the histogram window
  - b. Configure the histogram parameters, then initialize the histogram
    - i. Good settings to use are **4096** Bins, **2048** Offset & **16** Bin. These should be the default
  - c. This is just for the initial preview, you will be able to re-bin your data in Igor at home
  - d. Back in the main menu, Uncheck "**capture waveforms**" and check "**capture peaks**"
    - i. ensure that you have set the "**max**" and the "**ena**" of the proper channels, if you indeed want to collect the peak height.
    - ii. The device is not fast enough to capture both waveforms and peak heights simultaneously. Keep this in mind
  - e. Click "**Apply**", then "**Send Delay to board**" to collect data and **view the histogram**.
- 6) After ensuring the waveform & histogram are properly displayed, it is time to collect data by checking the "**Write Peaks to File**" box.
  - a. You may set a specific # of events to collect for a simple energy spectrum (**60,000 - 120,000** should be sufficient depending on the activity of your source and detector used)
  - b. Or you can put "**0**" to stop collection manually.

## Tips/Troubleshooting:

- 1) After changing any setting, you need to press "**Apply**", then "**Send delay to board**" before starting data collection. This finalizes the changes in the software, then sends them to the FPGA.
- 2) Be sure to write down in your logbook the Runtime & # of events collected after each run.
  - a. Don't worry if you forget, however, as this information is accessible from the output file.
- 3) Be sure to save all of your data on the EXPERIMENTAL\_DATA partitions on the hard drives. Most of the C: drives will fill up quickly.
  - a. This was a common problem in previous years for students. If your data is not saved correctly, be sure to check and make sure the HDD isn't full.
- 4) Keep an eye on the Log Window. If the machine starts to display "-5"s, there is likely a problem with the connection and it is better to power cycle the instrument and reinitialize.
- 5) Sometimes, you will hear the "ding" of the USB disconnect. This happens occasionally via static discharge or jostling of cables. Power cycle the box & reinitialize to continue
- 6) If you want to quickly export the histogram from Blackbox, double click on the legend entry for "**Hist\_0**" and a window will appear with the bin values in a list. This makes for easy importation into IGOR, but you should practice making the histograms manually on your own.
- 7) If you want to adjust the scaling on the histogram to zoom to a particular region, double click on either axis to bring up the menu.
  - a. Be sure to uncheck the "**autoscale**" box in order to change the scale of a particular axis.



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*Electronics, Practice with Oscilloscope*

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*Photon Spectroscopy With NAI(Tl) Detectors*

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*Spectroscopy With Solid-State Detectors*

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*Radiation Measurements With Gas Detectors*

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*Coincidence/Imaging Experiments*

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*Detection Of Cosmic Radiation ( $\mu$  lifetime)*

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*Precision Spectroscopy (Mössbauer Spectroscopy)*

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*Neutron Activation ( $\beta$  decay lifetime)*

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*ANSEL Data Acquisition System*

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*Neutron Activation ( $\beta$  decay lifetime)*

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*ANSEL Report Format*

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REPT IGOR DAQ Exp 6 Exp 5 Exp 4 Exp 3 Exp 2 Exp 1 Exp 0 Intro

