

MCA8000D QUICK START GUIDE (FW6)

Amptek's MCA8000D is a state-of-the-art, compact, high performance, digital Multichannel Analyzer (MCA). It replaces the MCA8000A, providing the same functionality with reduced dead time, modern communications interfaces (USB, RS-232, and Ethernet), and much higher data transfer rates.



MCA8000D Software Installation

Step 1: Install the WINUSB Driver

IT IS HIGHLY RECOMMENDED TO USE WINDOWS UPDATE TO INSTALL THE WINUSB DRIVER.

If the computer's operating system is Windows 7 (32 or 64-bit) and has access to the internet, go to **“Windows 7 WINUSB Installation through Windows Update.”**

If the computer's operating system is Windows XP 32-bit and has access to the internet, go to **“Windows XP WINUSB Installation through Windows Update.”**

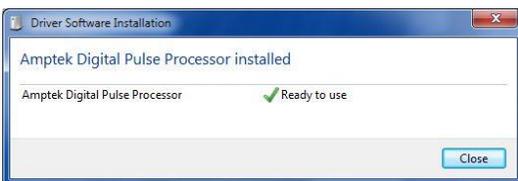
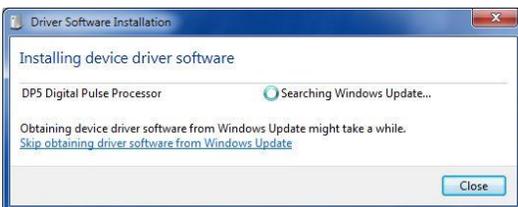
If the computer does not have access to the internet, or if you are using an unsupported operating system, install the driver manually using the “Manual WINUSB Driver Installation Instructions” found on the CD and the website at <http://www.amptek.com/winusb.html>. When performing a manual installation, follow the instructions precisely and carefully. Making an incorrect selection will install the wrong driver and make it difficult, error-prone, and time consuming to remove the incorrect driver from the computer.

Windows 7 WINUSB Installation through Windows Update

1. Power the device and connect it to the computer using the supplied USB cable.
2. Windows will show the balloon on the bottom right side of the screen.



3. Click on the balloon to see the details. You will see the following dialogs.



4. The WINUSB driver is now installed and ready for use. Go to Step 2 to install the DPPMCA display and acquisition software.

Windows XP WINUSB Installation through Windows Update

1. Power the device and connect it to the computer using the supplied USB cable.
2. The Found New Hardware Wizard will appear. Select “Yes, this time only” and then click Next.



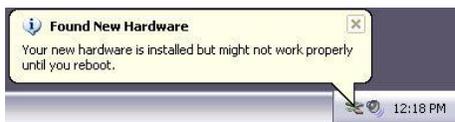
3. Select “Install the software automatically (Recommended)” and then click Next.



4. You will see the following dialogs.

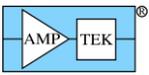


5. Click Finish. The driver is now installed and ready for use.
6. You will see the balloon on the bottom right of the screen.



7. Click the balloon and the following dialog will appear. Click Yes to restart the computer. When the computers restarts, go to Step 2 to install the display and acquisition software.





Step 2: Install the DPPMCA Display and Acquisition Software

Locate the DPPMCA directory and copy and paste it to your local machine. Then run the executable in the directory. There is no "setup," it is a simple copy and paste to the local computer. Amptek recommends copying the software to "Program Files\Amptek."

TIP: Right click on the DPPMCA.exe file and select create shortcut. Then drag the shortcut to your desktop for easy access.

You must have full read/write access to the DPPMCA directory. It cannot run from the CD. In Windows 7 it is best to right-click the executable and select Run as Admin.

MCA8000D Connection Instructions

1. Verify that the MCA8000D is completely unplugged (both USB and power).
2. Use the USB cable to connect the MCA8000D USB connector to the PC's USB connector. When using the USB connection the unit is powered through USB, the external +5V AC adapter is not needed.

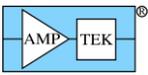
NOTE: Grounding is critical to obtaining the best performance. We strongly recommend using a single point ground for the system. To ensure this, use a 3-prong to 2-prong adapter on the power supply of any notebook computer. This prevents the notebook from introducing another ground into the system.

Quick Use of the MCA8000D

1. Connect the MCA8000D and PC as described in the previous section.
 - The MCA8000D stores its configuration, so when powering the system initially, the factory configuration is loaded. If you modify the configuration, the last configuration is loaded.
2. Launch the DPPMCA software by opening the DPPMCA.exe file.
3. Connect to the MCA8000D
 - a. The connection dialog will appear when DPPMCA is launched.
 - b. Select which interface you will use (USB, Ethernet, or RS232).
 - c. If more than one device is available, select the device you want.
 - d. Click "connect."
4. Configure the MCA8000D
 - a. The most commonly changed parameters are the number of channels and the low level discriminator (LLD) threshold.
 - To quickly change the LLD click the cursor to the desired channel and press F8. Then press the A key on the keyboard to clear the data.
 - b. For all configuration parameters, click  on the toolbar, or press F9, or go to the DPP menu and select DPP Setup. Once you have changed a parameter, click the "Apply" button to send it to the MCA8000D.
 - c. Within the DPP Setup dialog box, you can load a default configuration file or you can save and load custom configurations.
5. Acquire data
 - a. To start or stop acquisition, click the "start/stop" icon in the toolbar or press the space bar.
 - b. To clear the data and time, click the "delete data and reset time" button in the toolbar or press "A" on the keyboard.



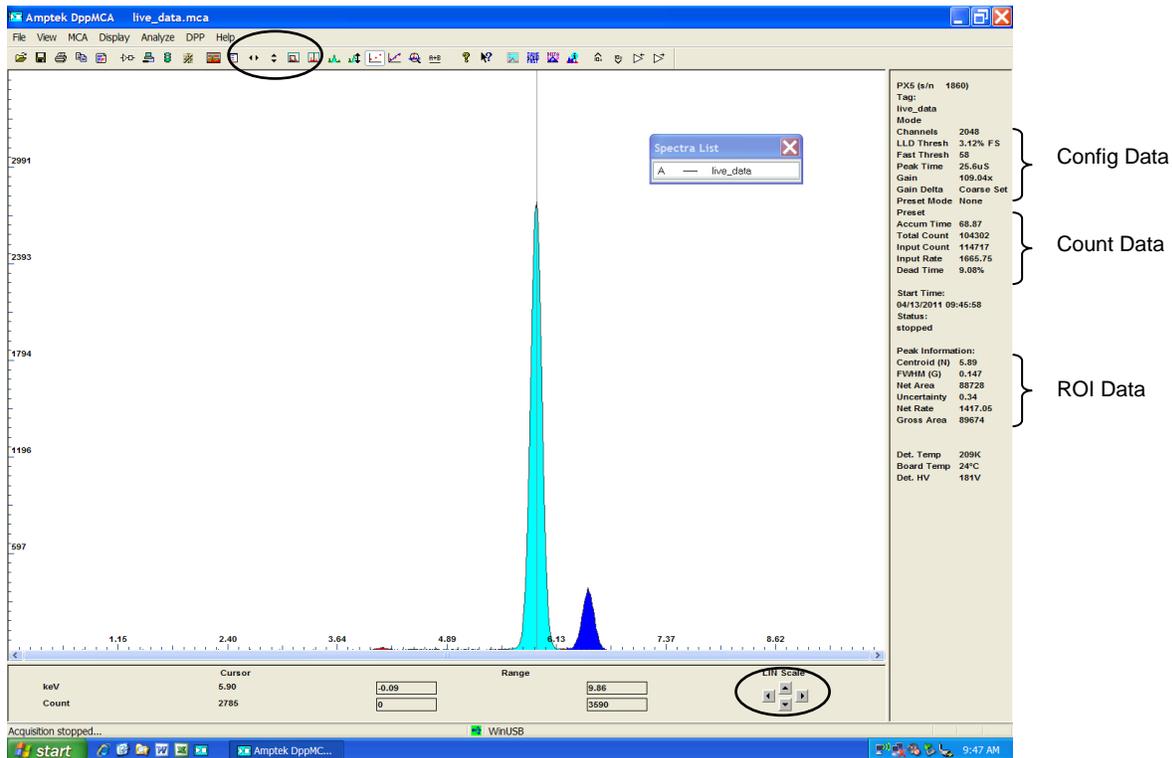
- c. Data Acquisition Tips



- You can tell that data are being acquired if (a) the spectrum appears in the window, (b) the total counts are increasing, (c) the timers are increasing, and (d) the "status" in the right hand Info Panel reads "acquiring." The red light on the MCA8000D input panel will also be flashing.
- You can set the MCA8000D to stop acquisition after a fixed time, after a fixed number of counts are collected, and with other options using the MCA tab on DPP setup.

6. Display data

- The spectrum, counts, and accumulation time are automatically displayed as data are acquired. If a region of interest is defined and selected, its net area and other properties are also shown.
- To zoom in on a portion of the spectrum, use the arrows at lower right. To return to the full screen view, use the full range arrows on the toolbar.
- To toggle between a linear and a logarithmic vertical scale click on the spectrum and press "L" on the keyboard or select the scale from the Display menu.



7. Analyze data

a. Regions of Interest

- A Region of Interest (ROI) is an area marked as a potential peak in a spectrum.
- DPPMCA supports several ways to mark or define an ROI. The easiest way is to place the cursor at the left edge (lowest channel) of desired region and then press and hold the "U" key until the peak is highlighted and the upper edge is reached. You can also click on the Mark ROI button on the toolbar and then click and drag the cursor over the peak.
- For each ROI, DPPMCA computes the total counts (gross area), subtracts the background, and for the difference computes the net area, centroid, and peak width. The resolution is also displayed.

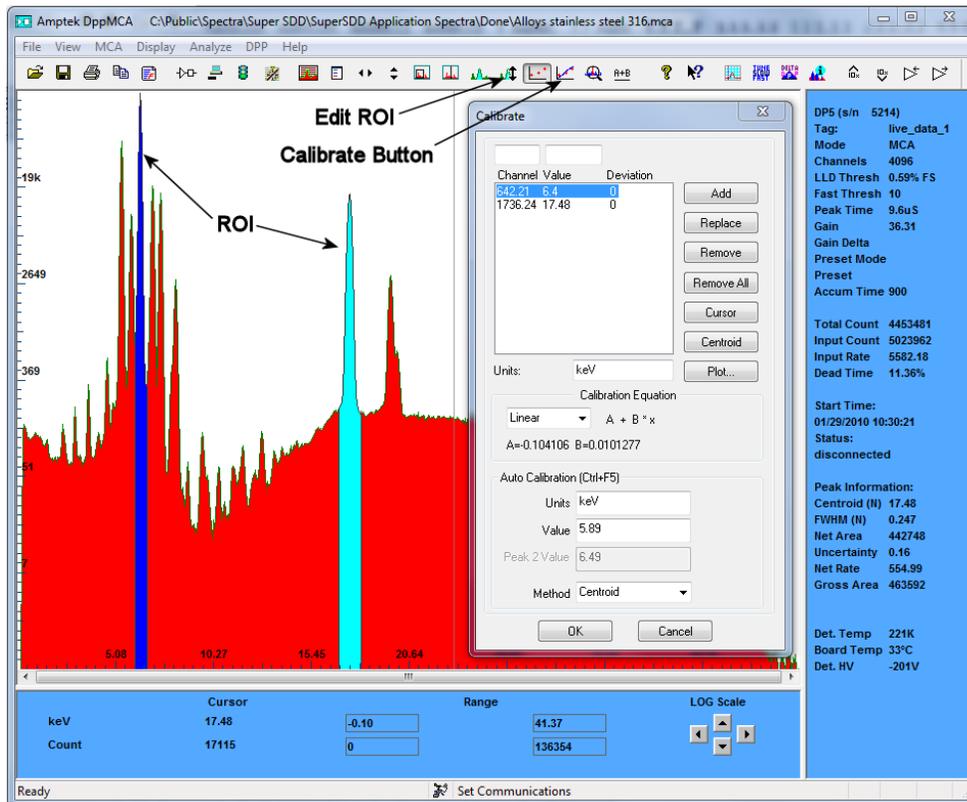
b. Energy calibration

The native scale (x-axis) of the hardware is channels. Most often you will want to convert the channel scale to energy.

1. Chose the two peaks that will be used for the calibration and make note of their energies.
2. Mark an ROI (region of interest) around each peak. This can be done by clicking the cursor at the left base of the first peak and then holding down the "U" key on the keyboard until the whole peak is

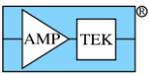
highlighted, or by using the Edit ROI button on the toolbar and then clicking and dragging across the peak until it is highlighted.

3. Now click in the toolbar button “Calibrate” (F5) to open the calibration dialog box.
4. Move the dialog box such that both peaks are visible and then click the cursor into the first peak. The peak should be highlighted and the Peak Information section on the right-hand information panel should be filled in. If the peak is highlighted and there is no peak information, then the ROI is not marked correctly. Try adjusting the start and end points of the ROI.
5. Click the Centroid button on the dialog box. This will enter the center position of the peak into the Channel box. Then enter the energy of that peak into the Value box, e.g. 6.4, and click Add.
6. Now click the cursor into the second peak (it will highlight). Click on Centroid, enter the second energy, e.g. 17.48, and click Add. There should now be two lines in the box.
7. In the Units box type in the energy units, e.g. keV.
8. Click OK. The scale should now be in energy. If it is not press F7, this toggles between calibrated units and channels.



8. Save and load data

- a. To save a data file, click the "File Save" icon or select Save As from the File menu. Data are saved in an ASCII file format with a .mca extension which includes the counts in each channel, slow and fast counts, ROI and calibration data, and the DPP configuration parameters. This file can be opened in notepad, Excel, etc.
- b. To load a saved data file use the "File Open" icon. The ROI and Calibration data from a stored file can be transferred to a spectrum being analyzed or can be automatically loaded when you open DPPMCA (View menu -> Preferences-> General Tab).
- c. To process the data using a different software package the .mca file can be opened as a text file. Alternately, you can click "Ctrl-R" to copy the data to the Clipboard, then paste it where desired, e.g. in Excel.
- d. To print a spectrum press "Ctrl-P" or the "Print" icon on the toolbar.



Troubleshooting the DPPMCA Software

If you cannot connect to the MCA8000D check the following:

- Was the software correctly installed?
- Were the drivers properly installed?
- Are all the cables connected?
- Is the MCA8000D power plugged in?

If you start an acquisition but see no counts:

- Is there an isotopic source in front of the detector or is the X-ray tube turned on?
- Is the MCA8000D configured properly?
 - If you do not see any counts, change the channels to 1024 and set the threshold to 50 as a starting point.

Are the input polarity and offset correct?

- The MCA8000D only accepts positive going shaped pulses with no DC offset. Pulses of the wrong polarity or with an incorrect input offset will be outside the range of the ADC and therefore not measured. Verify the input polarity and input offset are correct.

Are pulse selection settings rejecting everything?

- The pile-up rejection or Gate inputs will reject from the spectrum events which do not meet certain criteria (discussed in the manuals). If the system is configured incorrectly, it is quite common for no pulses to be recorded. Turn off PUR and Gate while you are setting up and debugging the system. Most systems will work best with PUR enabled, once everything else is configured properly.

Is the threshold correct?

- The LLD threshold should always be set above the noise of the system. If you see nothing, try setting the threshold to channel 50 and then try the acquisition again.

If you still do not see a spectrum or the correct spectrum, save a .mca file from the File menu and email it to sales@amptek.com. This file contains important information that will help Amptek troubleshoot the problem. Do not send screen shots or any other type of file. Only the .mca file is needed.

Custom Software

The MCA8000D is NOT backwards compatible with the MCA8000A. It uses a completely different communication protocol. As a result, if you have written custom software using the MCA8000A DLL Package, it will not work with the MCA8000D. It will be necessary to re-write any custom software using the Software Development Kit (SDK).

Proper Use of Equipment

If the equipment is used in a manner not consistent with the specifications, the protection provided by the equipment may be impaired.