

MCA8000A OPTION PA INSTRUCTIONS

1. WINDOWS SOFTWARE

Install the Windows software by following the instructions in the Quick Start Guide. Then, using Windows Explorer, browse to the “MCA8000A Windows\Spectra” directory and unzip the file WindowsOptionPA.zip into the current directory. Four files should have extracted, three .mca files and one readme.txt file.

1. Open the Windows software. The **Starting Pmca** dialog will appear. Select **Open File** and load the calibration file that corresponds to the voltage scale to be used. See section 3 for voltage scale description.

0_5v.mca for the 0-0.5 V scale

5v.mca for the 0-5 V scale

10v.mca for the 0-10 V Scale

2. Connect to the MCA by pressing the Connect/Disconnect button on the toolbar. Press the Acquisition Setup button on the toolbar. Set the Threshold to 7 (see section 3). If you wish to use the MCA in Absolute peak mode (see section 6) select Absolute from the Peak Mode box. All parameters in this dialog are retained by the MCA and software, so every time the software is opened, the MCA will be in the last state. Click OK. Verify that the MCA8000A is in the correct voltage range (see section 4). Note that the MCA is calibrated separately for each voltage range. If the x-axis scale does not read in mV press F7.

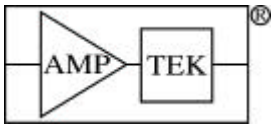
3. Now press the Spectra List button on the toolbar and position the dialog box on the left of your screen. The Spectra List should have two lines in it: live_data and Cal_5V (or 10V or 0_5V). There should be an A next to the Cal_5V. If there is not, click on the Cal_5V line and an A should appear. Open the Calibrate dialog from the toolbar button and position it on the right of your screen.

4. You should now be able to see both the Spectra List and the Calibrate dialogs. Click on the live_data in the Spectra List and then click OK on the Calibrate dialog. The calibration has now been applied to the spectrum. Close the Spectra List.

5. The MCA is now ready to take data. Press the Start/Stop button on the toolbar to begin data acquisition.

Refer to the Quick Start Guide or the online Help File for information on how to use the windows software.

The above procedure needs to be followed the first time the software is used and when switching calibration files (i.e. when switching voltage scales). To load the same calibration file automatically on startup (so that the steps above do not need to be repeated every time), go to the View menu and select Preferences. On the General tab in the Spectrum Template section, click the button at the right of the Spectrum Filename text box to Browse to the file. Select the appropriate file and click Open and then OK. Every time the software starts, the calibration from that cal file will be loaded.



The MCA8000A has been calibrated only in the 4k channel mode. If for some reason the setting gets changed, make sure the MCA is connected and click on the Acquisition Setup button on the toolbar. Select 4096 from the ADC Gain box and click OK.

2. DOS SOFTWARE

Install the DOS software by following the instructions in the Quick Start Guide. Then, using Windows Explorer, browse to the "MCADOS\Spectra" directory and unzip the file optpa.zip into the current directory. Four files should have extracted, three .asc files and one readme.txt file.

1. If you wish to use the MCA in absolute peak mode (see section 6) you must edit the MCA8A.BAT file to read:

```
C:\PMCA\cgagraph.com d  
C:\PMCA\MCA8000A.exe -1  
C:\PMCA\cgagraph.com d
```

The important change is the **-1** in the second line. The path should reflect the path in which the DOS software was installed.

2. Open the MCA DOS software by using the shortcut in the start menu or by clicking on the mca8a.bat file in the directory (you cannot run the dos software straight from the mca8000a.exe file). Press F3 to go to the File menu and select Open. Load the calibration file that corresponds to the voltage scale to be used. See section 3 for voltage scale description. You will have to set the file type to ASCII.

```
0_5v.asc for the 0-0.5 V scale  
5v.asc for the 0-5 V scale  
10v.asc for the 0-10 V Scale
```

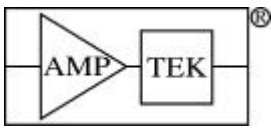
3. You have now loaded the calibration file onto the system. Now connect to the MCA by pressing F10.

4. Press F3 and go to Setup. Select Threshold and set the threshold to 7 (see section 3). Verify that the MCA is in the correct voltage scale (see section 4). Note that the MCA is calibrated separately for each voltage range. If your scale does not read in mV press F7.

5. You are now ready to take spectra. From now on, as long as new files are not loaded or any settings changed, the calibration will load automatically when the software is started. If the calibration is lost, repeat step 2 to reload.

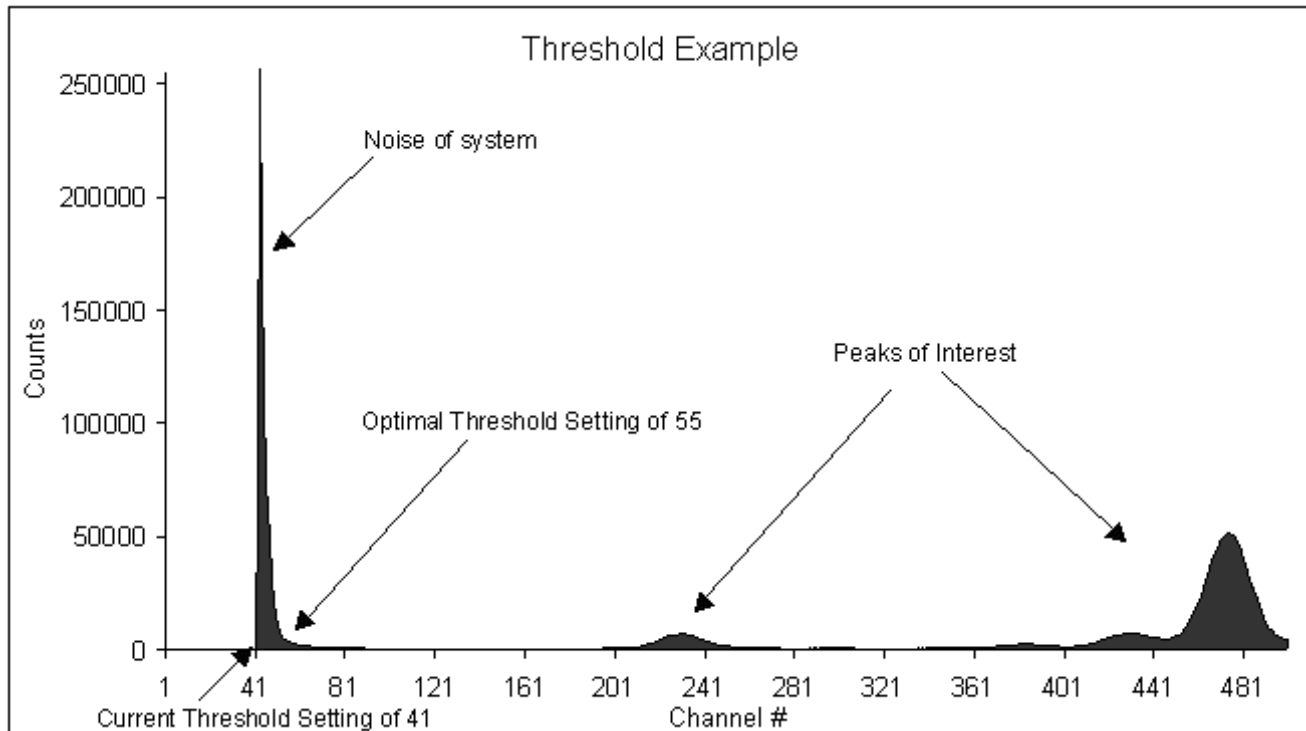
Refer to the DOS manual for information on how to use the DOS software (F1 provides keyboard shortcuts). The DOS manual is available on the installation CD (and is installed with the software) and at the Amptek website in PDF format. <http://www.amptek.com/mcasoft.html>

The MCA8000A has been calibrated only in the 4k channel mode. If for some reason the setting gets changed, make sure the MCA is connected and press F3 and go to Settings and then ADC. Select 4096 and press return.

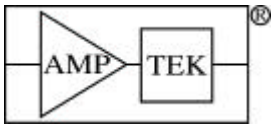


3. SETTING THE THRESHOLD

The threshold is a very important parameter to set correctly. It is a low level discriminator that tells the MCA to only look at pulses above that channel. It should always be set above the noise of the system. If it is not, then the MCA will be stuck triggering on the noise and the peaks of interest will not be seen. The noise will vary depending on the gain and noise of each systems. **Never set the threshold to channel 0.** As a minimum, it should be set above the calibrated 3 mV level (channel 5 or greater in the 5 V scale). To appropriately set the threshold, move the cursor to the appropriate channel above the noise wall and press F8 (F8 sets the threshold to the current cursor position). Begin and acquisition. If no spectrum appears it means the threshold is set too low and must be raised. Move the cursor up one channel and press F8. Repeat this until the spectrum appears. It is often helpful to set the display in Log mode for this procedure. Press L on the keyboard until the plot displays in Log. It will take some user experience to set the threshold in an optimum way. The important thing to remember is that regardless of the pulse amplitude of the peak of interest, the threshold must be set above the noise level of the system. See the example spectrum below.



In this example, the threshold was incorrectly set at channel 41. This caused the large noise spike to be seen. An optimal setting would have been channel 55 which is after the large noise slope. Notice how in this example the noise extends all the way out to around channel 55. Had the threshold been set to channel 7, then no spectrum would have been seen because the MCA would have been stuck triggering on the huge number of noise counts around channel 7 instead of the peaks of interest.



4. OPTION PA VOLTAGE SCALE DESCRIPTION AND SELECTION

Option PA provides a 3 position switch to change between the 0-0.5 V, 0-5 V, and 0-10 V voltage scales. On the back side of the MCA8000A is the following diagram:

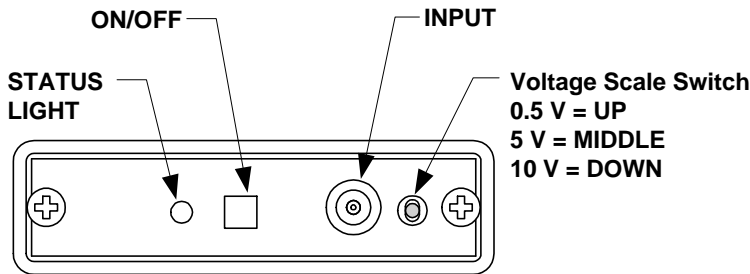
← 0.5V | 5V | 10V →

When looking at the front panel of the MCA8000A as in the figure below, the up position corresponds to the 0-0.5 V scale, the middle to the 0-5 V scale, and the down to the 0-10 V scale. Take care to make sure the MCA is in the correct range for the measurement being performed and remember to load the corresponding calibration file in the software. Follow the guidelines below for the correct voltage scale selection.

0-0.5 V scale only for very small pulses < 20 mV.

0-5 V scale for 20 mV to 5 V pulses.

0-10 V scale for 5 V to 10 V pulses.



5. MCA8000A OPTION PA CALIBRATION FILES

Option PA provides three calibration files: 0_5v for 0-0.5 V range, 5v for 0-5 V range, and 10v for 0-10 V range. The files will either have a .mca extension for the windows version or .asc for the DOS version. The calibration file and the voltage scale switch must always agree. All Option PA equipped MCA8000A units use the same calibration files since they were all internally calibrated to those files. The files are provided on the installation CD and can also be downloaded from the Amptek web site at www.amptek.com/mcapa.html.

6. PEAK DETECTION MODES

