

AMPTEK INC.

MCA8000D OPTION PA NIST TRACEABLE CALIBRATION VERIFICATION PROCEDURE REV B

FOR OPTION PA ONLY

For Public Release

**TURN ON ALL EQUIPMENT AT LEAST 4 HOURS BEFORE CALIBRATION
MCA8000D MUST BE POWERED FROM A/C ADAPTER, NOT USB**

Equipment:

1. HP 34401A Multimeter or equiv.
2. Precision DC Millivolt Standard or equiv.
3. PC to run Amptek DPPMCA software.

HP 34401A General Setup

DC Volts

Precision DC millivolt Standard

Output Volts: Positive (+)

Volt "Vernier" pushed in at 0 to start

Use the following DC levels for the two different input voltage scales

0-1 V: 100 mV and 900 mV

0-10 V: 100 mV and 9,000 mV

Overview

The MCA8000D is calibrated and traceable to NIST standards because it has been calibrated against a source which has an un-broken chain of calibrations leading back to NIST. The calibrated NIST traceable instrument in this procedure is the HP 34401A Multimeter.

First, the DC Precision Voltage standard is connected to the multimeter and set to a particular voltage. This voltage is accurately read on the multimeter. Second, the voltage standard is fine adjusted to read the correct value according to the multimeter. For example, the voltage standard is set to 100 mV and the HP 34401A reads 102 mV. This means the voltage standard needs to be fine adjusted to read 100 mV. Third, the DC level is injected into the MCA8000D. The peak centroid appearing in the spectrum is then checked against the reference table below to verify the calibration.

Voltage Standard Calibration Procedure

1. Connect the voltage standard to the HP 34401A. Set the voltage standard to read 9,000 mV (or whichever dc level you are using). There should be a reading that is close to 9,000 mV on the 34401A. To fine adjust the voltage standard to the correct voltage use the Voltage Vernier dial. Pull out and turn to set. This creates a calibrated voltage source that can be connected to the MCA8000D. You will then input this voltage to the MCA8000D and then repeat this procedure for the other voltages levels and the other input range.

MCA8000D Calibration Verification Procedure

	100 mV	900 mV	9,000 mV
0 to 1 V range	100 mV +/-0.2 mV	900 mV +/- 1.2 mV	NA
0 to 10 V range	100 mV +/-2.0 mV	NA	9,000 mV +/- 45 mV

1. Set the voltage standard for the appropriate DC level according to the table and procedure above. Connect the voltage standard to the MCA8000D with a BNC cable. Connect the A/C adapter to the MCA8000D. [The verification may fail if the MCA8000D is powered from USB.] Then connect the USB port of the MCA8000D to the PC with a USB cable. Open the DPPMCA software and connect.
2. Open the DPP Properties and go to the MCA tab.
3. Set the **Peak Detect Mode to INT** and click Apply and OK.
4. Click the cursor into the plot window and then press the A key on the keyboard to delete all data.
5. Start an acquisition by pressing the space bar. Only acquire for 10 seconds as anything longer may saturate the buffer (no damage can occur if this happens, you just press the A key to clear again).
6. Mark a region of interest around the peak and verify that the reported centroid on the right hand info panel is correct for the voltage that was input into the device.
7. Repeat for appropriate voltages for the two input ranges.
8. When done, it is important to put the Peak Detector Mode back to either **NORM or ABS**, **otherwise you will NOT acquire the correct spectrum from your particle analyzer.**

This is the end of the Option PA calibration verification procedure.