



*Application Note 1076-303*

**Using the PPMS Resistivity Option in Voltage Mode**

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The Quantum Design PPMS Resistivity Option (model P400) can be used as a sensitive voltmeter to perform experiments like reading sample voltages as function of temperature and applied magnetic field. Instead of reporting a resistance (in ohms), the bridge channel will now report a voltage (in millivolts). While in voltage mode, each bridge channel can also output a current up to 5 mA.

To enable this mode of operation you will need to use the following command either in a sequence or through *Mon6000*.

**\$BR\_VCNF Ch# Range Avg Current;**

Where in the above command:

**Ch#** is an integer ranging from 0 to 3 which selects the Bridge Channel to be used in the voltage mode measurement; a “0” indicates bridge channel 1, etc.

**Range** takes a value of 1 or 2 which selects the type of ranging during the measurement (it is required to use auto-ranging). Here, 1 = standard auto ranging and 2 = sticky auto ranging;

**Avg** is an integer which specifies the number of averages per measurement

**Current** is a number from 0.00 to 5000  $\mu$ A (5 mA)

In addition, the voltage measurements can be made in a relative mode to eliminate any offsets that might be present in the voltage measurements. These voltmeter offsets can be significant (typ. 0.1 mV). To use the card in relative mode use the command:

**\$BR\_VREL Ch# Mode;**

Where:

**Ch#** is an integer ranging from 0 to 3 which selects the Bridge Channel (1-4) to be used in the voltage mode measurement;

**Mode** where 0 = absolute, and 1 = relative.

In relative mode, voltages are reported relative to the voltage at the time the **\$BR\_VREL Ch# Mode** command was sent.

The figure below depicts a typical MultiVu sequence which can be used to employ the Resistivity Option in Voltage mode.

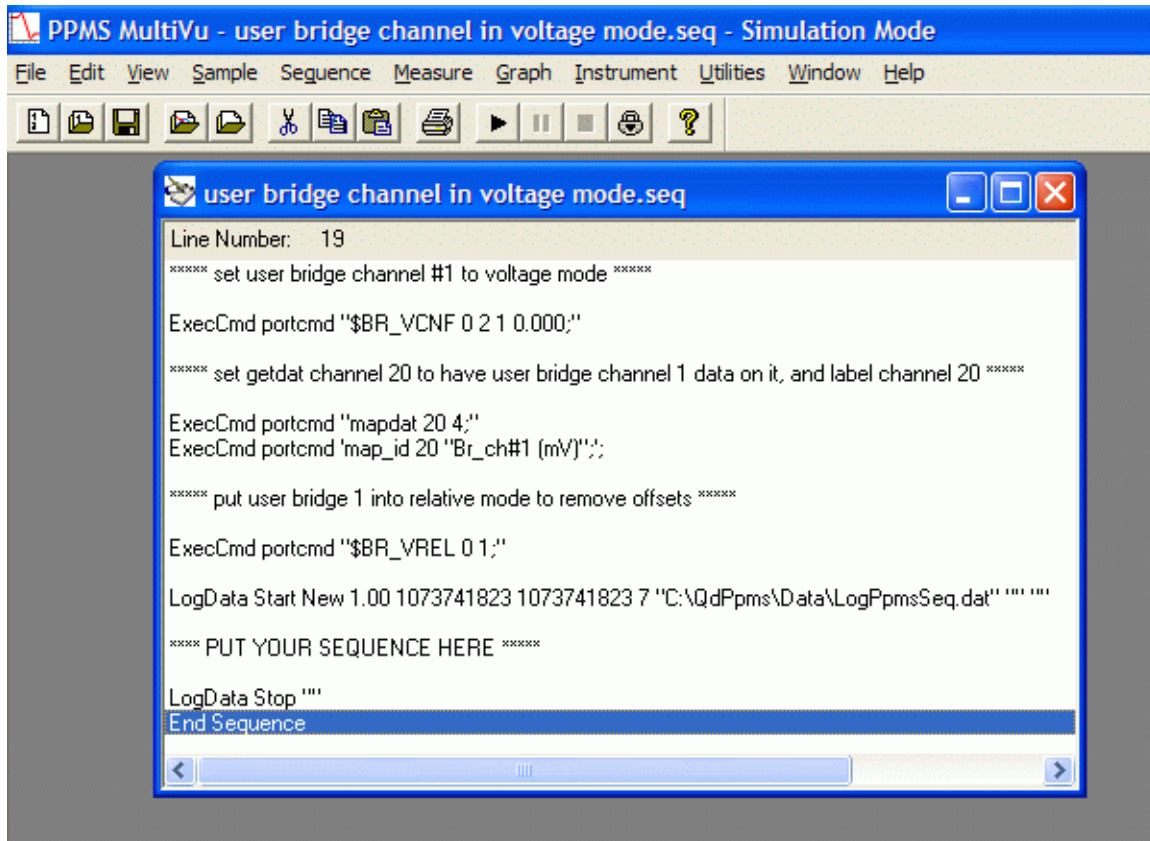


Figure 1: User bridge channel in voltage mode sequence.