# Measurements International

*A Metrology Based Company*


## Model 6000B

Automated 100 Volt High Resistance Bridge

*Cutkosky Divider*
*Range: 1K to 1T Ohm*
*4 Channel Matrix Scanner*
*IEEE488 Interface*
*Self Balancing - Self Calibration*

**General Description:**

The Model 6000B is a fully automated bridge using the Cutkosky Divider principle. Maximum voltage for the 6000B is 100 Volts. This technology offers new solutions for measuring high value resistors more accurately and at lower currents. The Cutkosky or Binary Voltage Divider Technology, solves all errors normally associated with a direct current comparator while offering significantly improved uncertainties. An internal guard circuit is used to guard the measuring circuit. This guard may also be used to drive the measuring leads, a guarded detector and resistor enclosures to increase the effective insulation resistance and improve overall performance.

Measurements International's (6000SW) operating software is available in both windows 95/98 and NT platforms. The system requires a stable 100V source (Model 1000A) and a DVM Detector (Fluke 8842A, HP3458A). Optimum performance is achieved using the HP 3458A as a guarded detector.

The Model 6000B has a four-channel matrix scanner with inputs labeled R1, R2, R3 and R4. The number of inputs can be expanded to 40 when the 6000B is used in conjunction with Models 4210A and 4220A, ten and twenty channel, Low Thermal Four Terminal Matrix Scanners.

Calibration of the 6000B is performed easily and automatically. Calibration data is stored to file for history analysis. New calibration data is compared to the last calibration data for tracking drift of the BVD.

The principle of the 6000B Automatic Potentiometer is based on the Binary Voltage Divider (BVD). The reference to the BVD is supplied from a stable voltage reference, Model 1000A. The Model 1000A is a low drift, stable, noise free 100-Volt Source. The 100V reference is connected to the rear of the 6000B Source input terminals. The DMM detector with an input impedance of 10 GΩ or higher is used to measure the difference between the output of the BVD and the voltage under test. An isolated guard circuit is provided to guard the BVD and the DMM detector when performing measurements. The guard voltage can also be used to drive the cans and/or shields of resistors under test to reduce leakage problems between the case and the resistor.

**System Software and Applications:**

The Measurements International's 6000SW controls all of the above automatically. The software features report generation, historical analysis, while tracking and correcting for resistor drift rates. All measurement data is displayed in graph form as the measurement progresses. All uncertainties are calculated at 2 sigma. The software allows selection on standard deviation and uncertainty calculations.

For SR104 measurements, the 6000SW allows users to measure the temperature of the SR104 at time of measurement using an external thermistor. The thermistor is placed in the well of the SR104 and is measured against a 1 MΩ reference resistor. The 1MΩ standard resistor is used to keep the current in the thermistor as low as possible as not to cause self heating in the well of the SR104. The software can then correct the value of the SR104 back to 23 or 25° C.

The 6000B can also be used in conjunction with Measurements International's Model 4220A and 4220-1 interface adapter for calibration of SR1010 series of hamon resistance boxes.

Combined with the Measurements International Model 9300 series of air baths, alpha and beta calculations can be performed automatically on resistors under test. All data can be exported directly to Excel for various test patterns or mainframe applications. External atmospheric pressure, humidity and temperature indicators are optional and the entire system can be enclosed in a 4 or 6 ft. rack. Resistor baths (oil or air), instrument controllers, printers, system software, IEEE interface, installation and training are all available for complete system packages.

**System Requirements:**

Computer, 486 or higher running at 166 MHz, with 32 MEG of RAM, Windows 95/98 or Windows NT and a National Instruments IEEE488 Interface Card (not included).



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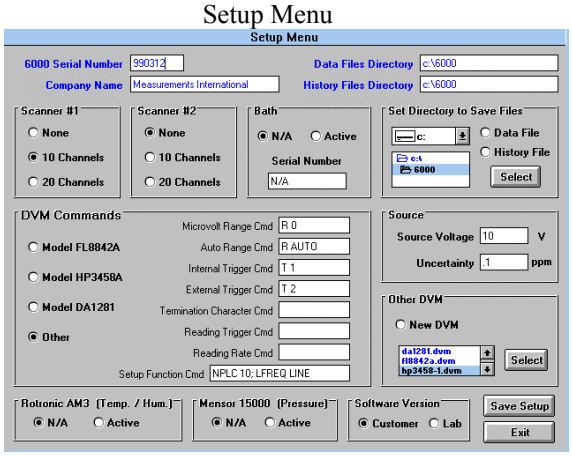
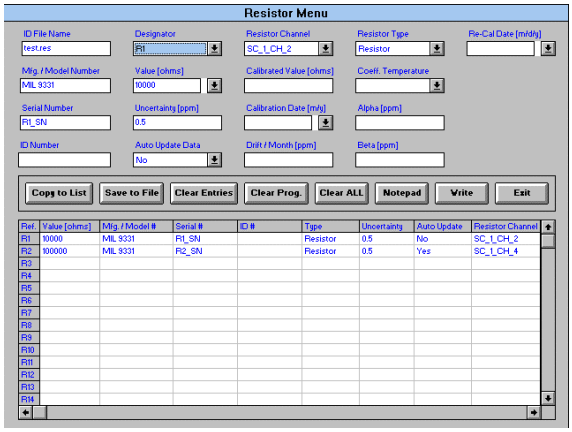
## 6000SW – Windows Operating Software:

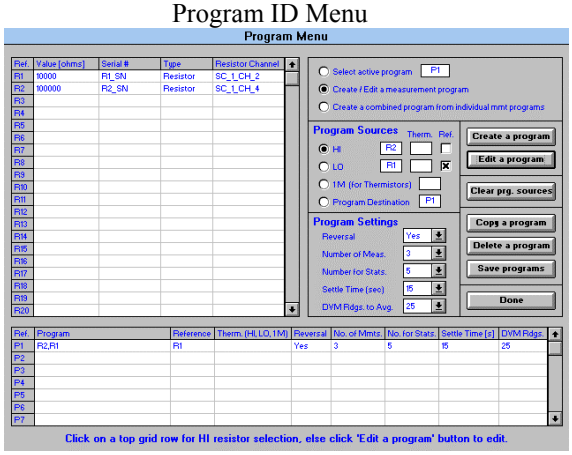
Setup Menu



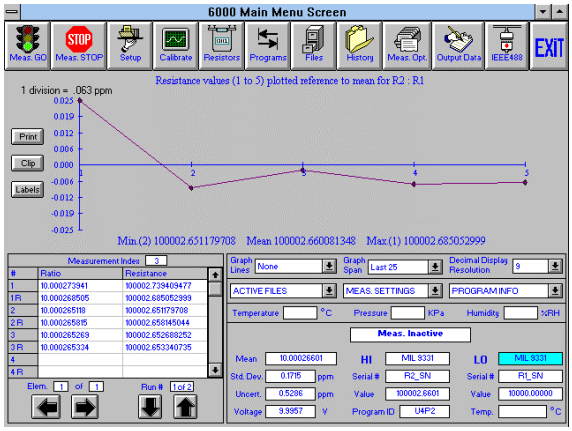

Resistor ID Menu



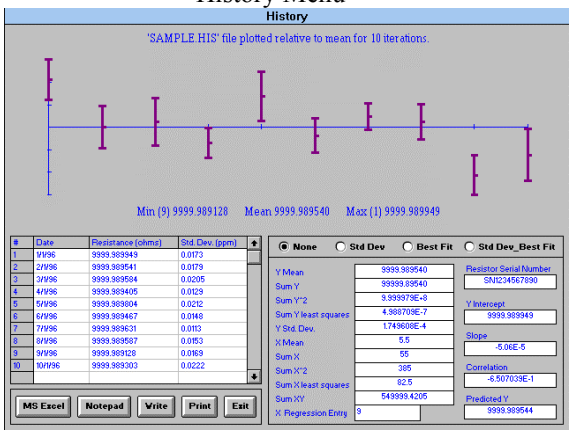

Program ID Menu



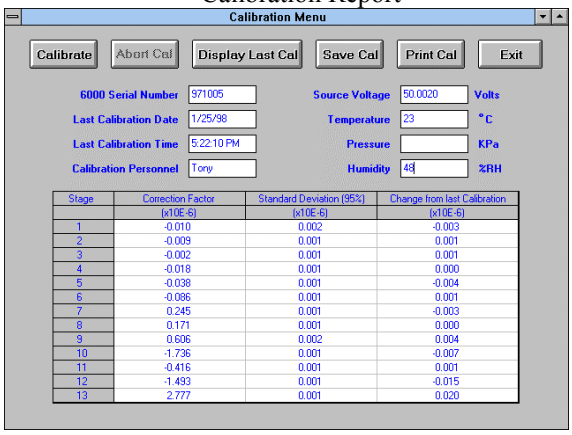

Measurement Menu




History Menu




Calibration Report




Measurements International's 6000SW was developed by metrologists for metrologists. The software features real time uncertainty analysis, graphing, history logging and graphing, data storage with export to excel and regression analysis. The 6000SW provides ultimate programmability and control for all your resistors and temperature calibrations, now and in the future.

# Model: 6000B

**Specifications:**

| Resistor Range | Accuracy (95%)<br>2s<br>Ratio 0.1 Through 10 | Applied Voltage |
|---|---|---|
| 1K to 10 K Ohm | <0.1 ppm | 1, 2, 5, 10, 20, |
| 10K to 100K Ohm | <0.1 ppm | 10, 20, 50, 100 |
| 100K to 1M Ohm | <0.1 ppm | 10, 20, 50, 100 |
| 1M to 10M Ohm | <0.1 ppm | 10, 20, 50, 100 |
| 10M to 100M Ohm | <0.5 ppm | 10, 20, 50, 100 |
| 100M to 1G Ohm | <5 ppm | 10, 20, 50, 100 |
| *Measurements Above 1G Ohm Require Special Resistor Configurations* | | |
| 10G Ohm | <20 ppm | 10, 20, 50, 100 |
| 100G Ohm | <200 ppm | 10, 20, 50, 100 |
| 1T Ohm | <500 ppm | 10, 20, 50, 100 |
| | | |
| Ratio 100:1 | <2 ppm | 10, 20, 50, 100 |
| Ratio 1000:1 | <20 ppm | 10, 20, 50, 100 |
| Linearity | 0.01 ppm | |
| Short Term Drift (2 hours) | < .2 ppm for 8 hours | |
| Operating Environment | 18 to 34°C, 10 to 80% | |
| Warranty | 1 Year Parts & Labor | |

**Dimensions:**
270 x 450 x 380 mm

**Weight:**
15 kg

**Shipping Weight:**
20 kg

**Accessories:**
4210A Matrix Scanner
4220A
1000A
9300
TR104 Thermistor

**Operating Power:**
100, 120, 220, 240V - 50/60Hz

**Distributed By:**

**How to Order:**
Model: 6000B - High Resistance Bridge
Model 1000A - 100 Volt Source

*Rev. 02/99/08*

*Data Subject to Change*

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