



# Resistance Software Program

## Resistance Software for

OhmRef provides the power of automation for maintaining statistical control of resistance values in your laboratory. This program controls a Low Thermal Scanner along with other equipment commonly available in Standards Laboratories to compare resistance standards over the range of 100μΩ to 10GΩ. Comparison accuracies are better than 1 ppm in the midranges.

Improve your results while reducing labor with OhmRef resistance software. Improvements can be achieved by reducing errors caused by handling test leads and by increasing the quality and quantity of resistance comparisons. Data Proof provides the ideal solution for laboratories who desire a lower cost solution to improve ease and accuracy of maintaining resistance standards.

### Friendly interactive operations include:

- ◆ Range: 100μΩ to 10GΩ
- ◆ Low cost - using commonly available equipment
- ◆ Quickly start tests with a few clicks of a mouse
- ◆ Scaling over a range of ten-to-one
- ◆ Prints out complete analysis reports
- ◆ Plots graphs of historical data
- ◆ Tracks and corrects for resistor drift rates

### DATA PROOF

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The screenshot displays the OhmRef software interface. At the top, a table lists units with columns for Number, Unit Name, Ohms, Channels, Max Amps, and Reference?.

Number	Unit Name	Ohms	Channels	Max Amps	Reference?
1	10ohm#1	10m	1,17	3	Yes
2	10ohm#2	10m	2,18	3	NO
3	1 ohm#1	1	3,19	.3	Yes
4	1 ohm#2	1	4,20	.3	NO
5	10kohm#1	10K	5,21	3m	Yes
6	10kohm#2	10K	6,22	3m	NO
7	1M ohm#1	1M	7	.3m	Yes
8	1M ohm#2	1M	8	.3m	NO
9					
10					

Below the table, a text field contains: "Select or enter all Unit Numbers to check - (i.e. 1,2,): 5,6,11,12,13,1". Buttons for "Start Scanner", "Enter Keyboard", and "Graph Data" are visible.

The middle section shows a diagram of the "160A Opt. 2 or 320A Opt. 2 Low Thermal Scanner" with terminals for "INPUT LINES" and "OUTPUT LINES".

Below the diagram is a "SCANNER SETUP SCREEN" table:

Unit No.	Name	Nominal Value	Channel No. Input, Chan	Max Amps	Nominal Dev. C	Reference Value?
1	10kohm#1	10k	1,2	3m		Yes
2	10kohm#2	10k	4,5	3m		No

The bottom section shows a "DEVIATION FROM NOMINAL OHM FOR: 1 ohm#2" graph. The y-axis is "Parts Per Million" (1.0 to 3.0) and the x-axis is "Year" (1994 to 1999). The graph shows a red line fluctuating around a mean value. Below the graph, statistics are displayed: "MEAN OF DATA = 1.9263 PPM" and "STANDARD DEVIATION = 0.061 PPM".

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## OhmRef Overview

Making resistance measurements with OhmRef is as simple as clicking on resistors from your list and selecting your choice of test methods. OhmRef will create a test design for up to eight resistance devices and control your multimeter, Low Thermal Scanner and source to take the measurements. When all the readings have been taken you can print a complete analysis, save the results and create graphs of the data. OhmRef accommodates any resistance value between  $100\mu\Omega$  and  $10G\Omega$  with comparison accuracy better than 1 ppm for resistor values between  $1\Omega$  and  $10M\Omega$ .

## Choice of Methods

OhmRef allows you to select between four test methods depending upon the resistance level, required accuracy, and equipment available in your laboratory. The first and most basic method requires only the Low Thermal Scanner and ohmmeter. All methods take advantage of equipment that's commonly available in standards laboratories, providing very good accuracy at a low cost.

## Statistical Analysis

OhmRef creates a test design to compare resistors in pairs. Each resistor in the pair is measured, one at a time, and the difference between the two units is saved. When all the measurements are complete OhmRef computes a least-squares-fit to determine the value for each device. This value is based on the average value of the reference units included in the test. A standard deviation of the measurement is also computed. The designs and computations used are similar to those recommended by NIST developed for voltage calibrations.

## Flexibility

OhmRef provides a convenient means to set up a measurement. Scanner connections and traceable values can be saved, so you simply select the resistors to test. It only takes a few seconds to add new resistors that come into your laboratory for calibration. Information for up to 100 resistors can be stored. OhmRef has built in drivers to accommodate suitable multimeters and sources.

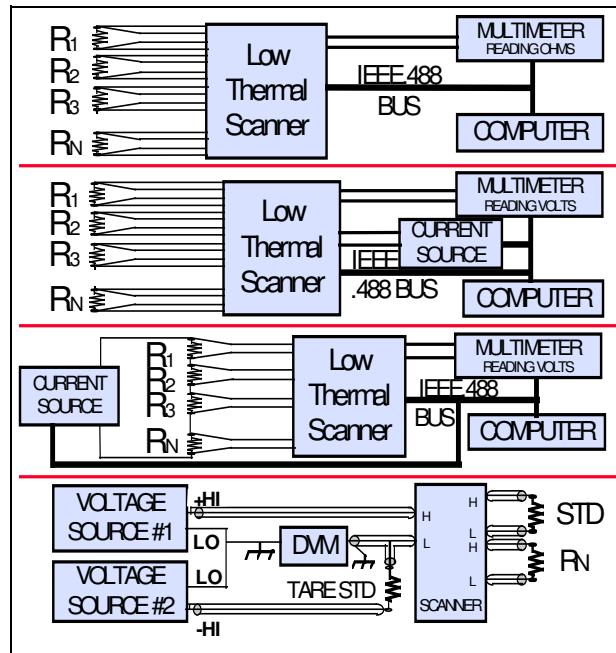
## Reports and Graphs

A complete analysis of the test can be printed. Various graphs can be made to monitor your resistors. Add control

limits to your graphs for statistical control with the click of a mouse. Historical data can be edited in OhmRef or exported to popular spreadsheet programs.

## Drift Rates

OhmRef computes the least-squares, straight-line slope of your resistors. This aids you in predicting the drift for your standards. Also the predicted slope and calibration date can be stored for each traceable unit. This information can be used to calculate the predicted values for your traceable resistors each time a test is run.



## System Requirements

Computer, with Windows® XP or higher a IEEE-488 (GPIB) bus interface card (not included), a Data Proof Low Thermal Scanner and suitable multimeter. (OhmRef runs in TransEra's HWIN with Basic PLUS - runtime versions are included. HWIN Development version is also available to edit OhmRef program code.)

**Recommended:** Suitable source(s) (for methods 2, 3 & 4).

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## Ordering Information:

OhmRef For Windows XP, Windows 7, Windows 10

Also Available:

HWIN TransEra HTBasic for Windows (Development version)

## Order Contact:

### Data Proof

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