

# Resistivity Measurement System



- Easy to test and convenient to save and edit the tested data.
- Test and control the system on s/w program.
- Reasonable price and very compact size.
- Ecopia's Resistivity Measurement System is very accurate since it tests 8 voltage values based on van der pauw technique.

## ▶▶ Resistivity Measurement System

Model No: RMS-1000



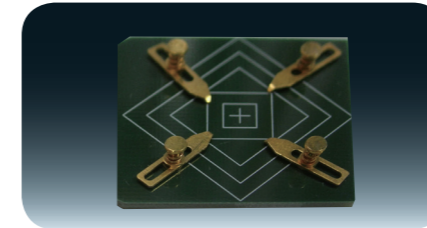
Main Body

Test in variable temperature from RT to 300dc ( Based on van der pauw technique )  
300dc test board can be purchased as an option

### Why it must be ecopia's resistivity test system?

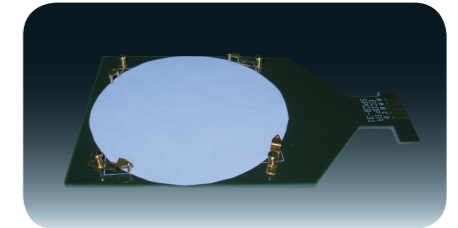
1. Accurate and powerful resistivity test system by getting 8 data values and calculate it's average.  
Checking ohmic contact by flowing +/- input current.
2. Easy to test by various kind of sample mounting board and mechanic tool.
3. Test in Variable temperature from RT to 300dc(as option) by using 8 inch heating chuck.
4. Convenient to test various size and thickness sample by SPCB (Spring Clip type sample mounting board) that can make it possible to move X.Y.Z easily.  
*Convenient to replace sample.*
5. It is useful to probe wafer surface's each point one by one, by moving X.Y.Z axis.  
*Each X.Y.Z has micrometer to see as to how much doping level is.*
6. Successful test of Resistance( $\Omega$ ), Sheet Resistance( $\Omega/\text{sq}$ ), Resistivity ( $\Omega\text{cm}$ ).
7. Input current: 1nA ~ 20mA ( Easily check "Contact fail")
8. Resistivity range:  $10\text{exp-}4 \sim 10\text{exp}7 \Omega\text{cm}$
9. I-V, I-R curve plotting capability for 4point each terminal.  
*It is possible to check ohmic contact quality.*

## ▶▶ Various sample mounting board for testing Resistivity



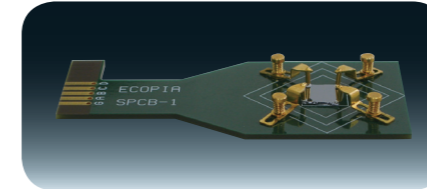
Model No: SPCB-001

- Gold coated tip on copper shank
- 2mm ~5mm size
- sample thickness : less than 2mm



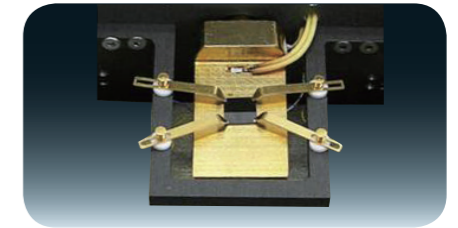
Model No: SPCB-31

- Gold coated tip on copper shank
- 50mm ~60mm size
- sample thickness : less than 2mm



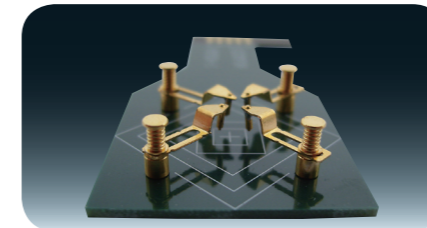
Model No: SPCB-01

- Gold coated tip on copper shank
- 5mm ~20mm size
- sample thickness : less than 2mm



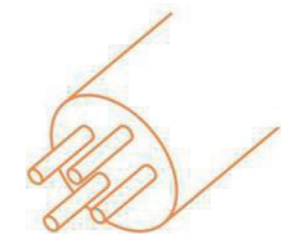
Model No: To be advised

- Gold coated tip on copper shank
- 5mm ~20mm size
- sample thickness : less than 2mm
- High temp: RT ~ 300dc

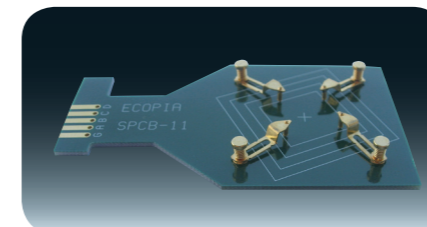


Model No: SPCB-02

- Gold coated tip on copper shank
- 5mm ~20mm size
- sample thickness : 2mm ~4.5mm

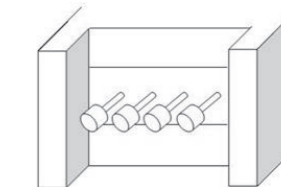


QPP type probe



Model No: SPCB-11

- Gold coated tip on copper shank
- 15mm ~30mm size
- sample thickness : less than 2mm



ASP type probe

## Software Program - 01

### Main Test Page

**Resistivity Measurement System**

**INPUT VALUE**

DATE: 07-07-2010, CURRENT: 10.00 mA, USER NAME: ASP, DELAY: 0.100 sec, COM PORT: [dropdown], THICKNESS: 0.100 um, SAMPLE NAME: ITO-10, STEP: 0, OPERATING DESCRIPTION: [text area]

**MEASUREMENT DATA**

AB: -4.4550 [mV], -AB: 4.2470 [mV], BC: -45.9400 [mV], -BC: 45.7100 [mV], CD: -4.4580 [mV], -CD: 4.2550 [mV], DA: -45.9400 [mV], -DA: 45.7200 [mV], PROGRESS[%]: [progress bar]

**RESULT**

Resistivity: 8.188E-5 [Ω cm], Conductivity: 1.221E+4 [1/Ω cm], Resistance: -1.142E+1 [Ω], Sheet Resistance: -2.520E+0 [Ω /sq], Ratio of V/H: 9.501E-2

	Current	Thick.[um]	Resistivity	Conductivity	Resistance	Sheet Res.	V/H	AB [mV]	-AB [mV]	BC [mV]	-BC [mV]	CD [mV]	-CD [mV]	DA [mV]	-DA [mV]
1	1.000E-2	1.000E-1	6.830E-5	1.464E+4	-9.853E+0	-2.174E+0	7.765E-2	-3.218E+0	3.019E+0	-4.026E+1	4.006E+1	-3.209E+0	3.027E+0	-4.025E+1	4.006E+1
2	1.000E-2	1.000E-1	6.824E-5	1.465E+4	-9.837E+0	-2.171E+0	7.787E-2	-3.215E+0	3.022E+0	-4.020E+1	4.003E+1	-3.219E+0	3.033E+0	-4.015E+1	4.002E+1
3	1.000E-2	1.000E-1	6.826E-5	1.465E+4	-9.854E+0	-2.174E+0	7.771E-2	-3.220E+0	3.024E+0	-4.027E+1	4.001E+1	-3.216E+0	3.013E+0	-4.023E+1	4.000E+1
4	1.000E-2	1.000E-1	4.345E-5	2.301E+4	-6.378E+0	-1.407E+0	7.072E-2	-1.949E+0	1.749E+0	-2.620E+1	2.599E+1	-1.938E+0	1.746E+0	-2.620E+1	2.600E+1
5	1.000E-2	1.000E-1	4.345E-5	2.302E+4	-6.375E+0	-1.407E+0	7.061E-2	-1.945E+0	1.744E+0	-2.619E+1	2.600E+1	-1.939E+0	1.744E+0	-2.622E+1	2.600E+1
6	1.000E-2	1.000E-1	4.345E-5	2.301E+4	-6.382E+0	-1.408E+0	7.062E-2	-1.948E+0	1.740E+0	-2.622E+1	2.600E+1	-1.944E+0	1.742E+0	-2.621E+1	2.600E+1

Buttons: COM.TEST, MEASURE, STOP, CLEAR, CALCUL, LOAD, SAVE, PRINT, CLOSE, HELP, GoTo I/V CURVE

**INPUT VALUE**

DATE: 07-07-2010, CURRENT: 10.00 mA, USER NAME: ASP, DELAY: 0.100 sec, COM PORT: [dropdown], THICKNESS: 0.100 um, SAMPLE NAME: ITO-10, STEP: 0, OPERATING DESCRIPTION: [text area]

**MEASUREMENT DATA**

AB: -4.4550 [mV], -AB: 4.2470 [mV], BC: -45.9400 [mV], -BC: 45.7100 [mV], CD: -4.4580 [mV], -CD: 4.2550 [mV], DA: -45.9400 [mV], -DA: 45.7200 [mV], PROGRESS[%]: [progress bar]

Current(1 nA~ 20mA), Thickness (Doped sample thickness layer) and etc must be filled in input value.

## Software Program - 01

### Tested Results

**RESULT**

Resistivity: 8.188E-5 [Ω cm]

Conductivity: 1.221E+4 [1/Ω cm]

Resistance: -1.142E+1 [Ω]

Sheet Resistance: -2.520E+0 [Ω /sq]

Ratio of V/H: 9.501E-2

Resistivity (Ωcm),  
Conductivity(1/Ωcm),  
Resistance(Ω),  
Sheet Resistance(Ω/sq),  
Ratio of vertical resistance and Horizontal's :  
If V/H value get closer "1", you can decide it is uniform sample electrically.

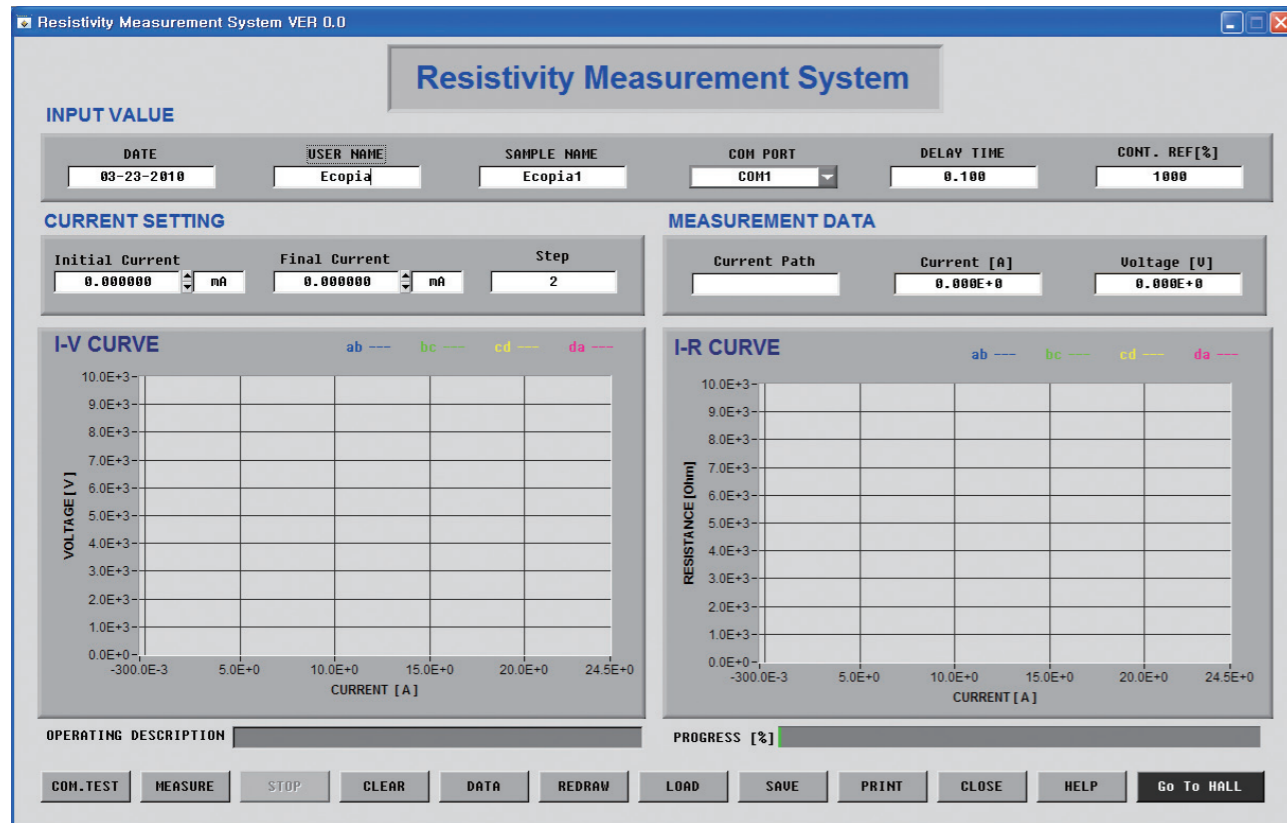
	Current	Thick.[um]	Resistivity	Conductivity	Resistance	Sheet Res.	V/H	AB [mV]	-AB [mV]	BC [mV]	-BC [mV]	CD [mV]	-CD [mV]	DA [mV]	-DA [mV]
1	1.000E-2	1.000E-1	6.830E-5	1.464E+4	-9.853E+0	-2.174E+0	7.765E-2	-3.218E+0	3.019E+0	-4.026E+1	4.006E+1	-3.209E+0	3.027E+0	-4.025E+1	4.006E+1
2	1.000E-2	1.000E-1	6.824E-5	1.465E+4	-9.837E+0	-2.171E+0	7.787E-2	-3.215E+0	3.022E+0	-4.020E+1	4.003E+1	-3.219E+0	3.033E+0	-4.015E+1	4.002E+1
3	1.000E-2	1.000E-1	6.826E-5	1.465E+4	-9.854E+0	-2.174E+0	7.771E-2	-3.220E+0	3.024E+0	-4.027E+1	4.001E+1	-3.216E+0	3.013E+0	-4.023E+1	4.000E+1
4	1.000E-2	1.000E-1	4.345E-5	2.301E+4	-6.378E+0	-1.407E+0	7.072E-2	-1.949E+0	1.749E+0	-2.620E+1	2.599E+1	-1.938E+0	1.746E+0	-2.620E+1	2.600E+1
5	1.000E-2	1.000E-1	4.345E-5	2.302E+4	-6.375E+0	-1.407E+0	7.061E-2	-1.945E+0	1.744E+0	-2.619E+1	2.600E+1	-1.939E+0	1.744E+0	-2.622E+1	2.600E+1
6	1.000E-2	1.000E-1	4.345E-5	2.301E+4	-6.382E+0	-1.408E+0	7.062E-2	-1.948E+0	1.740E+0	-2.622E+1	2.600E+1	-1.944E+0	1.742E+0	-2.621E+1	2.600E+1

Buttons: COM.TEST, MEASURE, STOP, CLEAR, CALCUL, LOAD, SAVE, PRINT, CLOSE, HELP, GoTo I/V CURVE

You can save the tested data in txt file and redraw by click "LOAD" button, to see saved data here again. "CALCUL" button tap is also useful to see correct test data by changing incorrect "THICKNESS" into correct one.

## Software Program - 02

### I-V, I-R test page

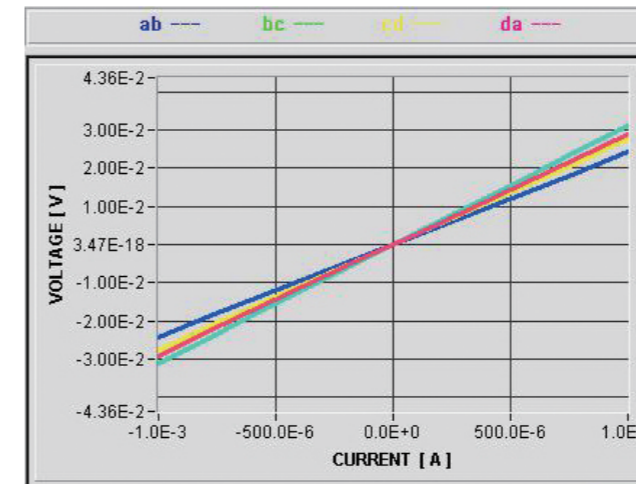


### CURRENT SETTING

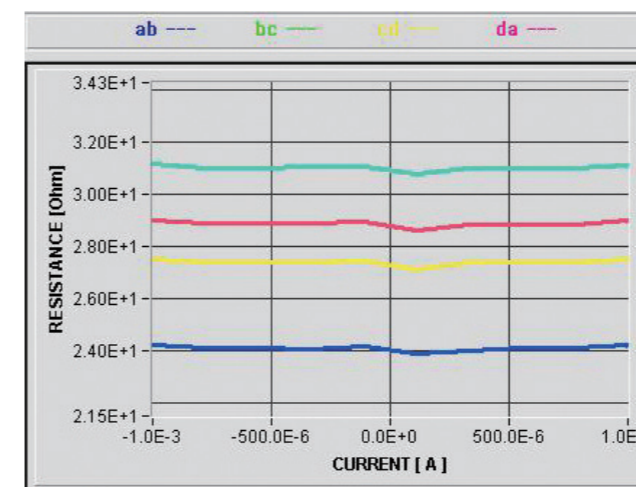
This close-up shows the 'CURRENT SETTING' section. It features three input fields: 'Initial Current' (0.000000 mA), 'Final Current' (0.000000 mA), and 'Step' (2). The units are indicated as 'mA' for the current values.

“Initial current” and “Final current” value must be same in absolute value but different type.  
 “Step” is to say at how many current point it should be tested between initial current and final current.

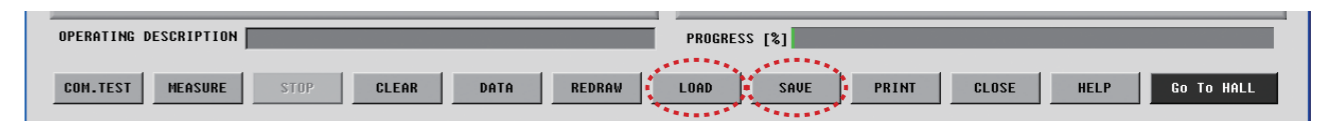
## Software Program - 02



It plots CURRENT versus VOLTAGE graph.  
 Vab, Vbc, Vcd, Vda.  
 Above graph is to show test graph, plotting -1mA to 1mA input current with 10 steps.



This graph is to plot CURRENT versus RESISTANCE.  
 Rab, Rbc, Rcd, Rda



You can save the tested data in txt file by click “SAVE” button. And, you also can recall saved data by clicking “LOAD” button.

## Ecopia' s items that we have made and installed.



**HMS 2000**  
**Hall Effect system**  
10nA ~ 20mA  
Auto/Manual  
alternatively



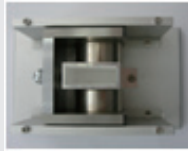
**HMS 3000**  
**Hall Effect system**  
1nA ~ 20mA  
Auto type.  
Best-selling model.



**"NEW" HMS 5000**  
**Hall Effect system**  
**Variable temp**  
80 K ~ 350 K.  
+/-0.5° C accuracy



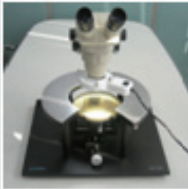
**SPCB and accs.**  
5x5mm ~ 20x20mm  
Gold coated probe tip  
Very convenient to use



**MS 55T and more.**  
**Magnet Kit**  
We have more ,such as,  
0.31T, 0.37T, 1.0T and  
MP 55T.



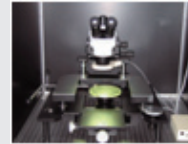
**"NEW" HMS3300**  
**High temp**  
**Hall Effect system**  
RT ~ 300 °C. Manual



**EPS 300**  
**Probe station**  
Reasonable price and  
compact design



**EPS 500**  
**Probe station**  
0 °C ~ 300 °C  
We have more...



**EPS 1000**  
**Probe station**  
RT ~ 300 °C  
We have more...



**EMP-7, EMP-9**  
**Manipulator**  
Reasonable price  
including probe arm,  
tip and cable.



**ETCP 1000**  
**Heating and cooling**  
**Probe station**  
Reasonable price  
including probe arm,  
tip and cable.



**RTA 1000**  
**Rapid Thermal**  
**Annealer**  
RT ~ 1200 °C  
1000 °C /40seconds



**RTA 2000**  
**Controlled by PC s/w.**  
RT ~ 1200 °C  
1000 °C /40seconds



**ELT-1000**  
**LED Tester**  
IV, IR curve, Optical  
characteristics



**"NEW" HMS5300**  
**Variable temp**  
**Hall Effect system**  
80K~ 350K(Low)  
RT ~ 300 °C(High)  
Controlled by PC.



**Electro-conduvtives.**  
To improve ohmic  
contact by electrical  
conductivity materials.  
We have more such  
as Gold paste, Carbon  
paste



**Dark Box and accs**  
We have more accs for  
probe station, such as  
probe tip, Triaxial cable.



**Custom - made**  
- Photonic hall effect  
- Integrating sphere  
system  
- Photo detector test  
system

**ECOPIA Ecopia corp.**

Address: 7th Floor Gyeongdo bld, 986-18 Hogye-dong, Dongan-gu, Anyang-city, Gyeonggi-do, South Korea (431-841)

Webpage: [www.ecopia21.co.kr](http://www.ecopia21.co.kr)

E-mail: [andy lee@ecopia21.co.kr](mailto:andy lee@ecopia21.co.kr) (International), [lgt111@ecopia21.co.kr](mailto:lgt111@ecopia21.co.kr) (domestic)

TEL : +82-505-389-1999 / FAX : +82-31-427-8964