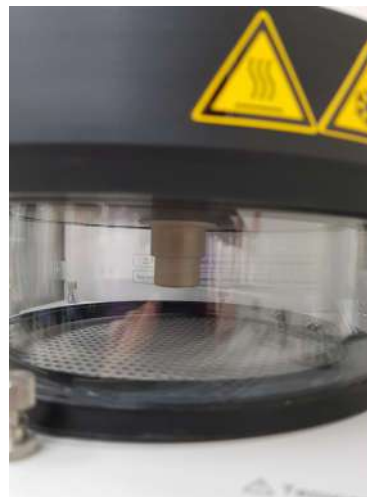
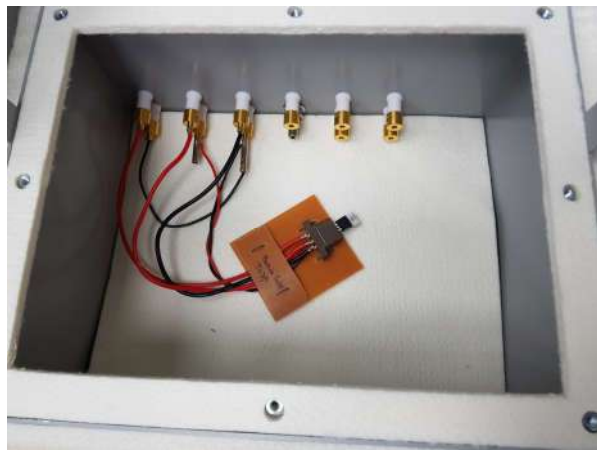


Device Thermal Characteristic Measurement Solution

<http://www.sadhu.design.com>

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Temperature Test Systems



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Thermal Air Test Solution

- **Temperature Range: -80C ~+ 225C**
- **Transition Rate: -55C ~+125C $\leq$ 10 sec.**
- **+125C ~-55C $\leq$ 10 sec.**
- **Air Flow: 5~24 SCFM**
- **Temperature accuracy: $\pm$ 1C**
- **Temperature resolution: $\pm$ 0.1C**
- **Noise level: <49 dBA***



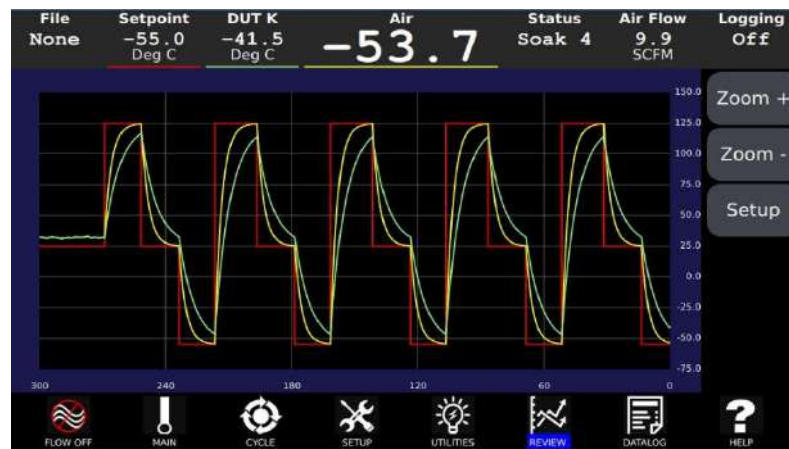
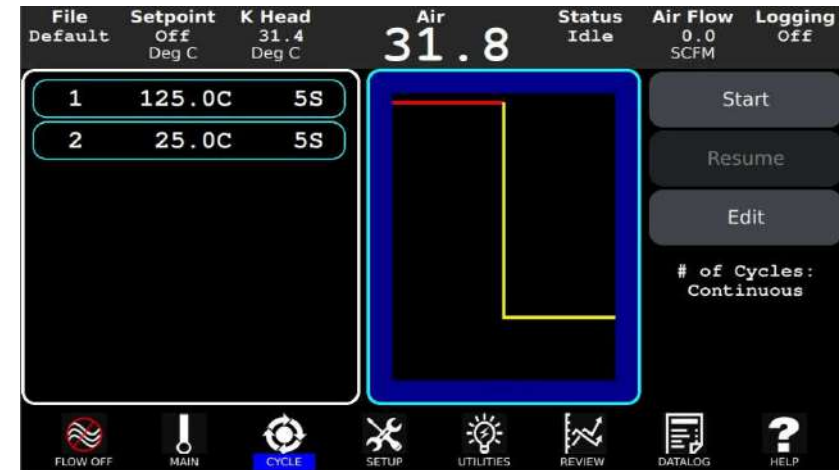
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Touch Panel Control



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Applications



Semiconductor



Automotive



Aerospace & Defense



Telecommunications



Fiber Optic



Electronic & Non-Electronic



Sensors



Advanced Technology



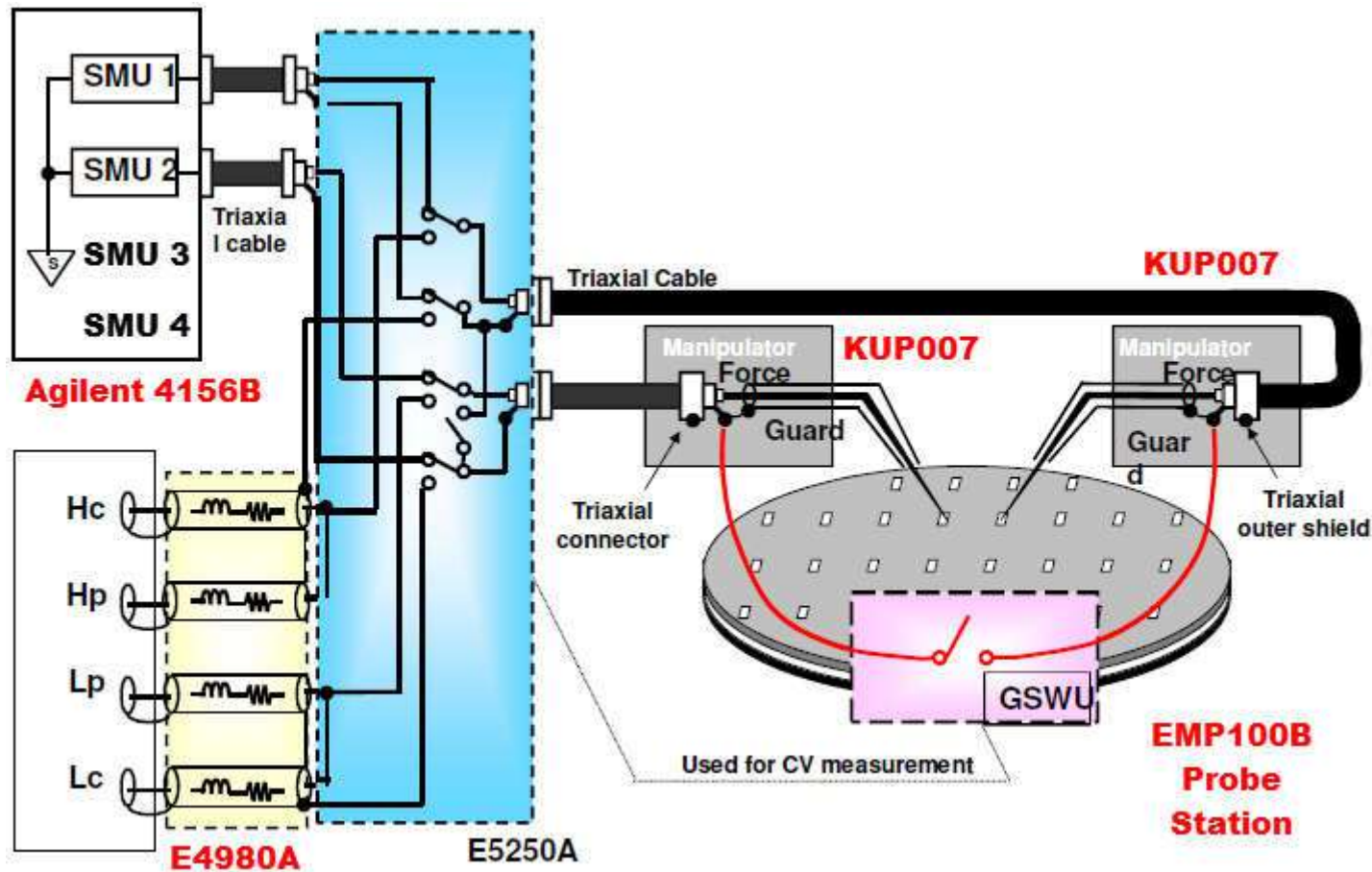
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IV & CV Switching Solution



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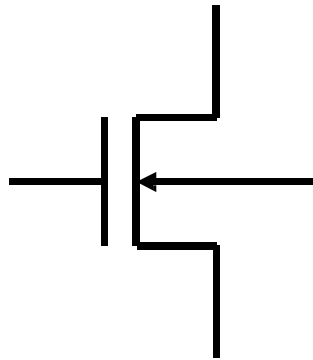


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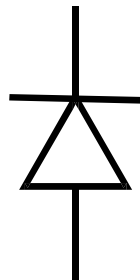
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Parametric Device Under Test

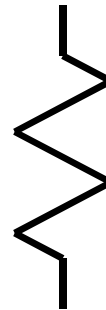
Transistor



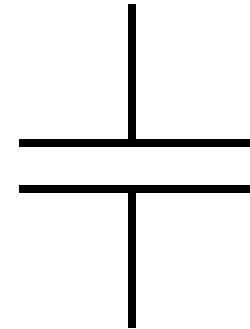
Diode



Resistor



Capacitance



Measure Current vs Voltage (I/V) or Capacitance vs Voltage (C/V)



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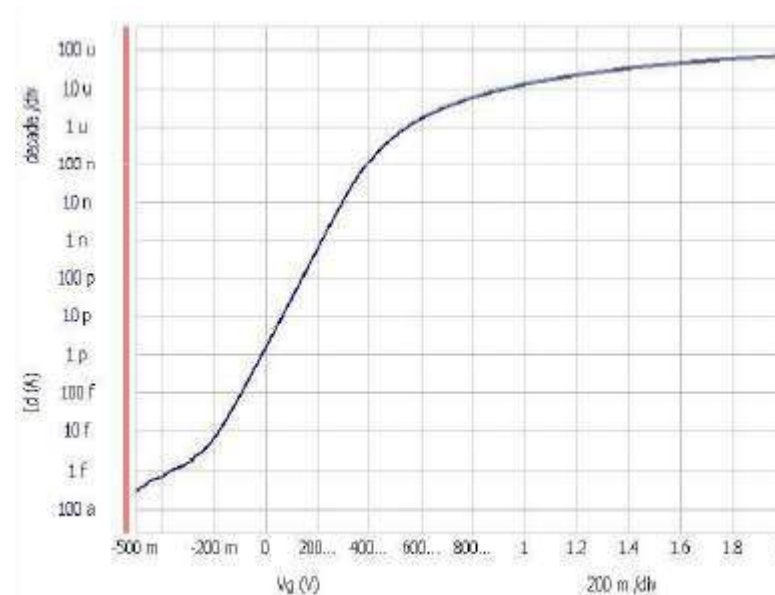


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Source Monitor Unit (SMU) and Guard Technique

- IV Characteristics is one of the most basic parameters to evaluate semiconductor devices
- It is essential to evaluate a wide range of current from fA to mA accurately.



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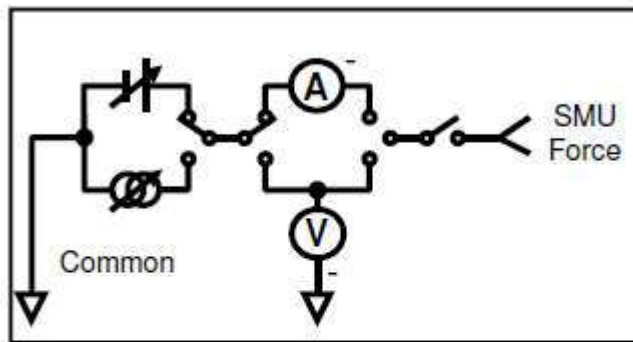


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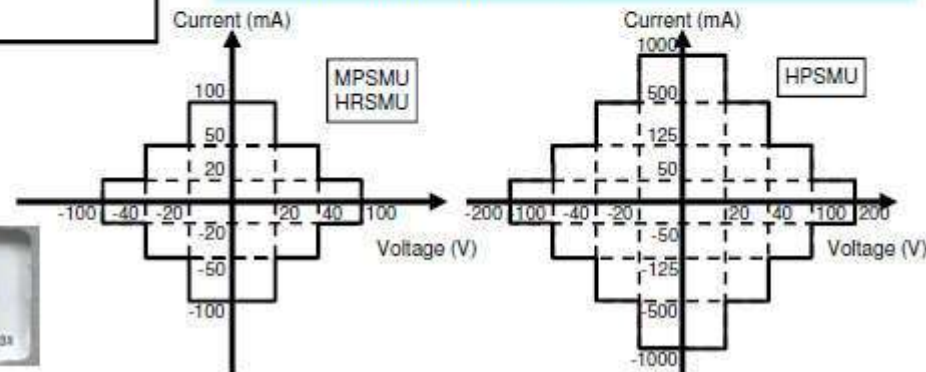
What is SMU (Source Monitor Unit)?

SMU is a single-ended device that combine a current source, a voltage source, a current meter, a voltage meter and several switches



Solution:

- Complex cabling is made redundant
- Make programming simpler
- Measurement over four quadrants enabled without switching
- Calibration function is prepared



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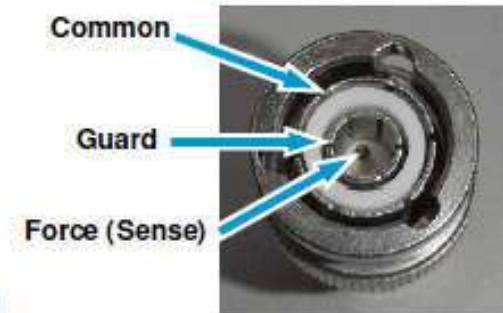
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Triaxial cables and Guard Technique

Triaxial Cables

- Cables used with SMU, which has 3 lines such as Force (Sense), Guard and Common.
- Guard is kept to the same potential as Force (Sense) to prevent leakage current from flowing into Force (Sense) line.

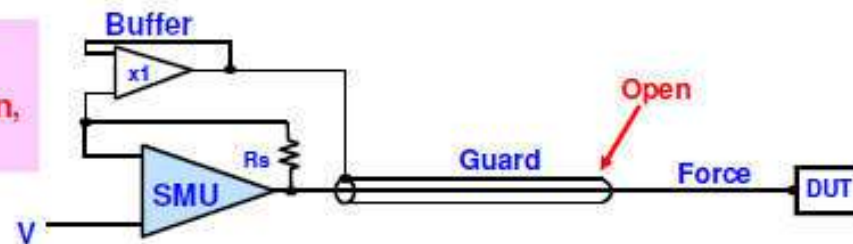


Guard Technique (Prevention of Leakage Current)

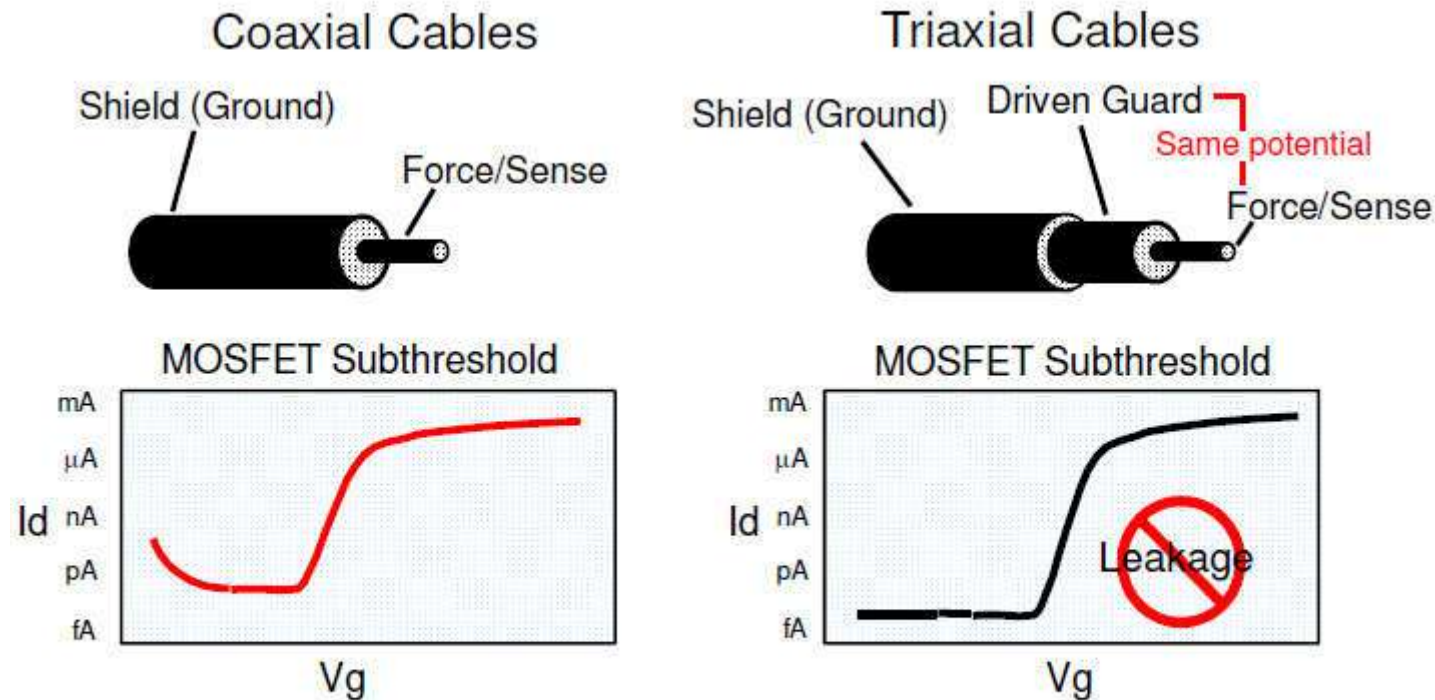
- The signal line is surrounded by the same potential as itself to prevent leakage current

Attention:

- ✓ Guard line mustn't be connected to Common, the terminal of which should be kept open



Why Triaxial cables?



- Below 1 nA, triaxial cables are used to eliminate leakage and charging currents



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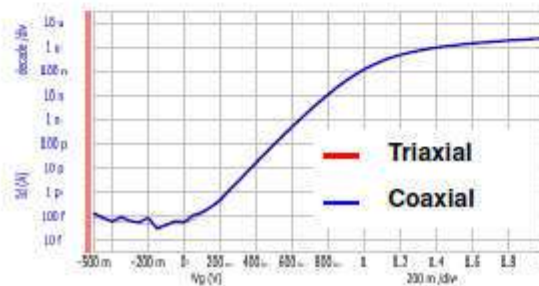
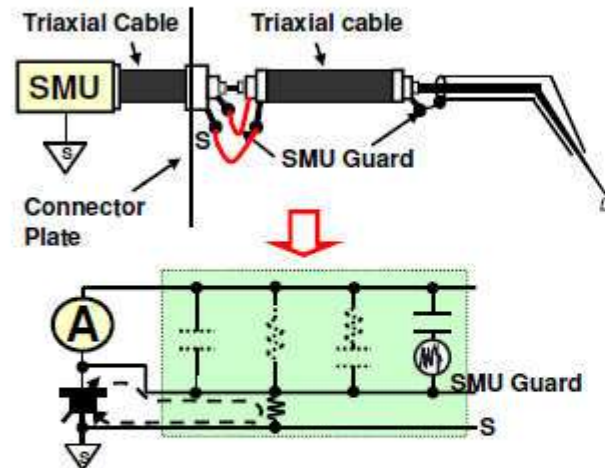
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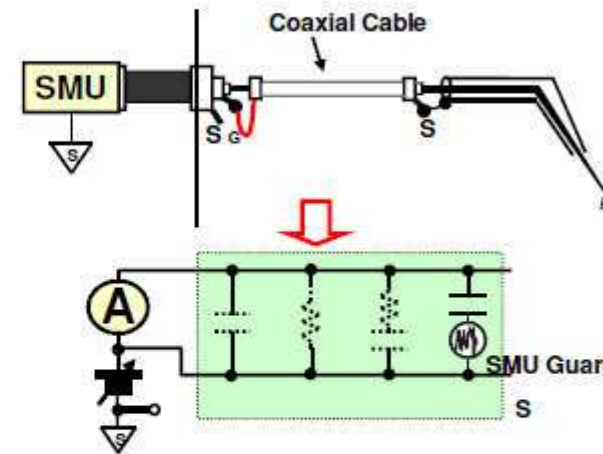
Cabling

Appropriate Cabling: The effect of Triaxial Cables

Triaxial Cable



Coaxial cable



• Effective in the case coaxial cables have to be used in the prober

✓ Connection must be used with the interlock function, because Outer shield of the coaxial cable has the same potential as the center conductor



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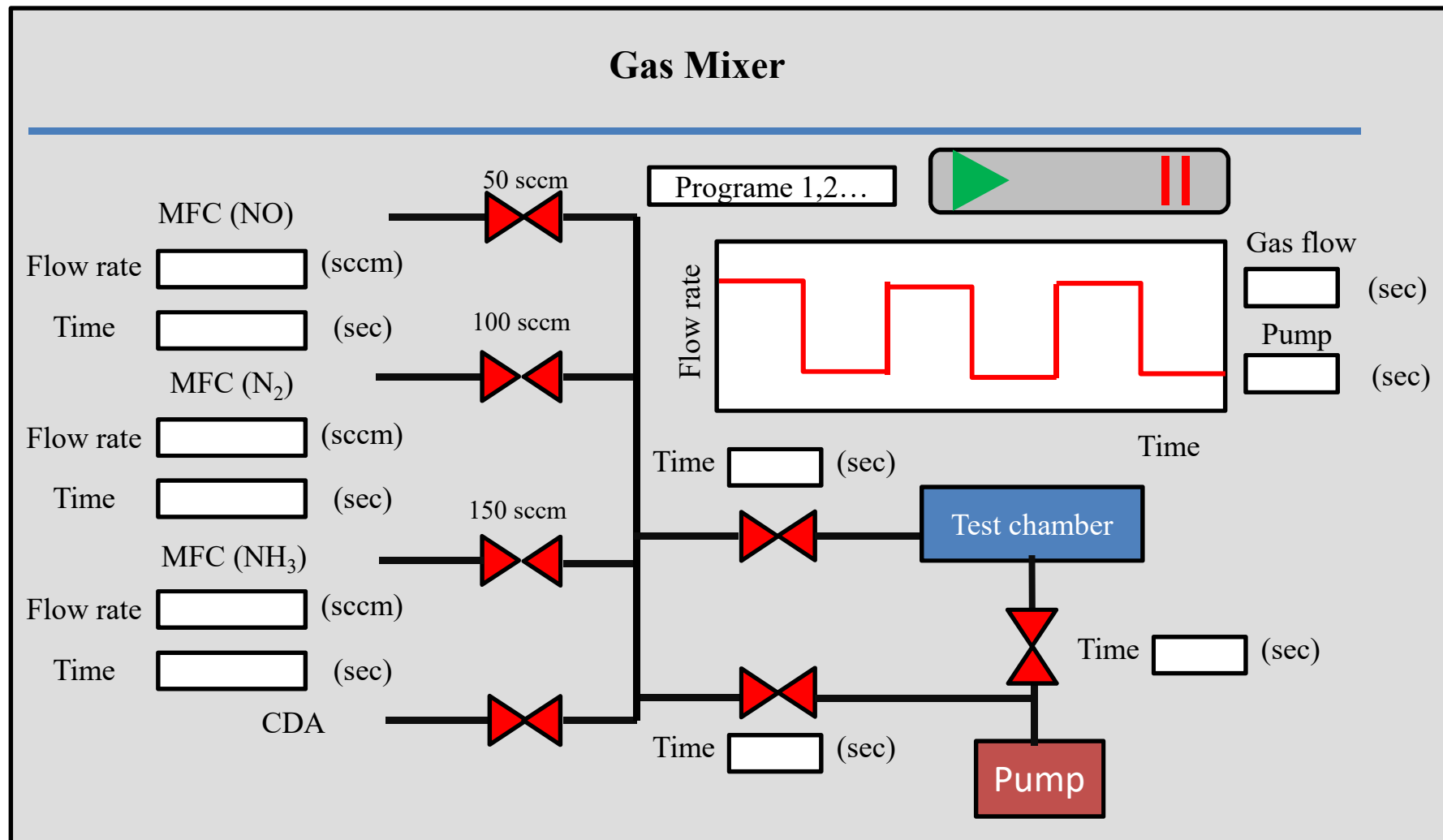
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Semiconductor Analyzer Comparison

Measurement Comparison		Agilent B1500A	4155C / 4156C	4156B	4155B	4145B
Resolution	Current	0.1 fA (HRSMU +ASU) 1fA (HRSMU) 10 fA (MPSMU)	1 fA	1 fA	10 fA	50 fA
	Voltage	0.5 uV (MPSMU & HRSMU)	2 uV (SMU) 0.2 uV (VMU)	1 uV	1 uV	100 uV
Accuracy (Offset)	Current	15 fA @10pA range (HRSMU) 30 fA @10pA range (HRSMU) 300 fA @1nA range (MPSMU)	20 fA (10pA range)	20 fA (Zero offset cancel)	3 pA (Zero offset cancel)	6 pA
	Voltage	120 uV (0.5 V range -MPSMU & HRSMU)	200 uV(2V range -SMU) 10 uV(2V range -VMU)	100 uV	100 uV	10 mV



Sensor Control Panel



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Test Chamber



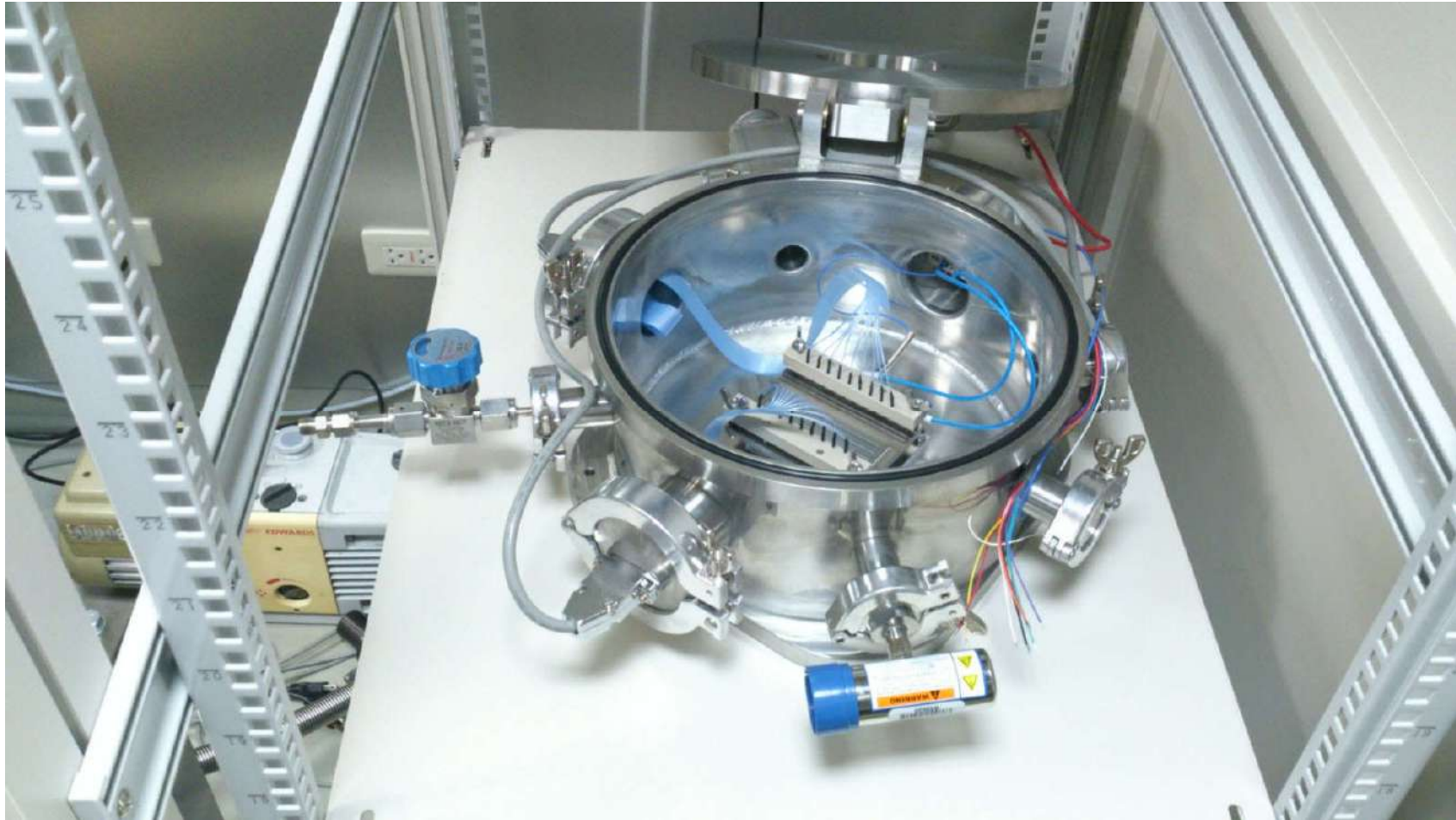
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18 channels with Hot Chuck 250C



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Valve & MFC Control



Gas Mixer

Solenoid Valve Control

	Set Timer	OFF Timer
 SV1	0	0
 SV2	0	0
 SV3	0	0
 SV4	0	0
 SV5	0	0
 SV6	0	0
 SV7	0	0

units: (0.1s)

Mass Flow Controller (N2)

FS Flow rate 100sccm

0

SetPoint

sccm

Mass Flow Controller (NO)

FS Flow rate 50sccm

0

SetPoint

sccm

Mass Flow Controller (NH3)

FS Flow rate 50sccm

0

SetPoint

sccm



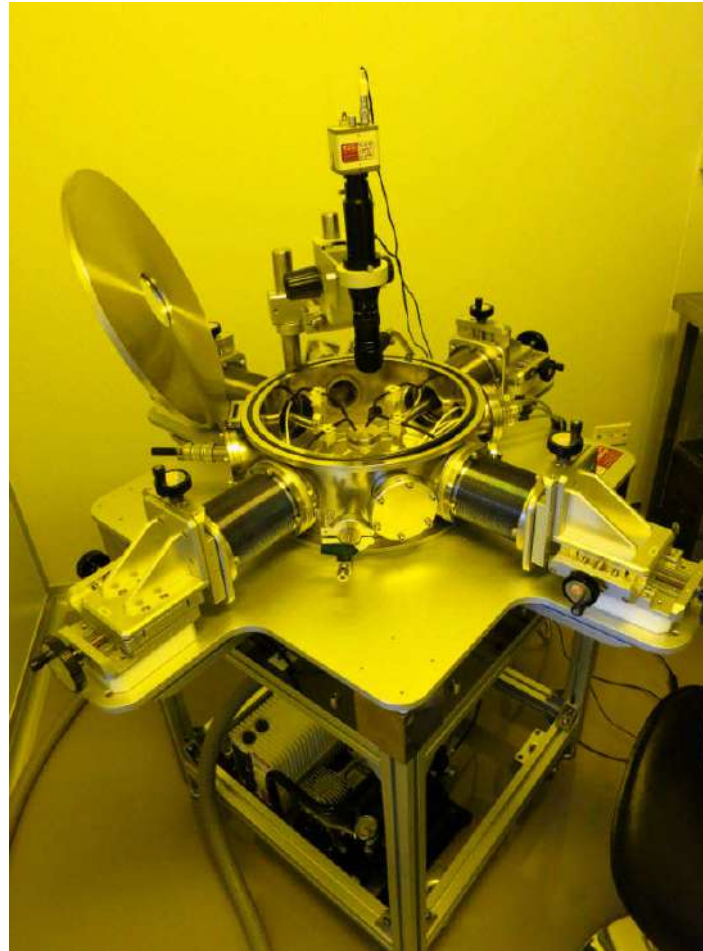
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Micromanipulated Cryogenic & Vacuum System



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Liquid Helium Cryogenic Probe Systems for Device Testing (3.5 K ~ 675 K)



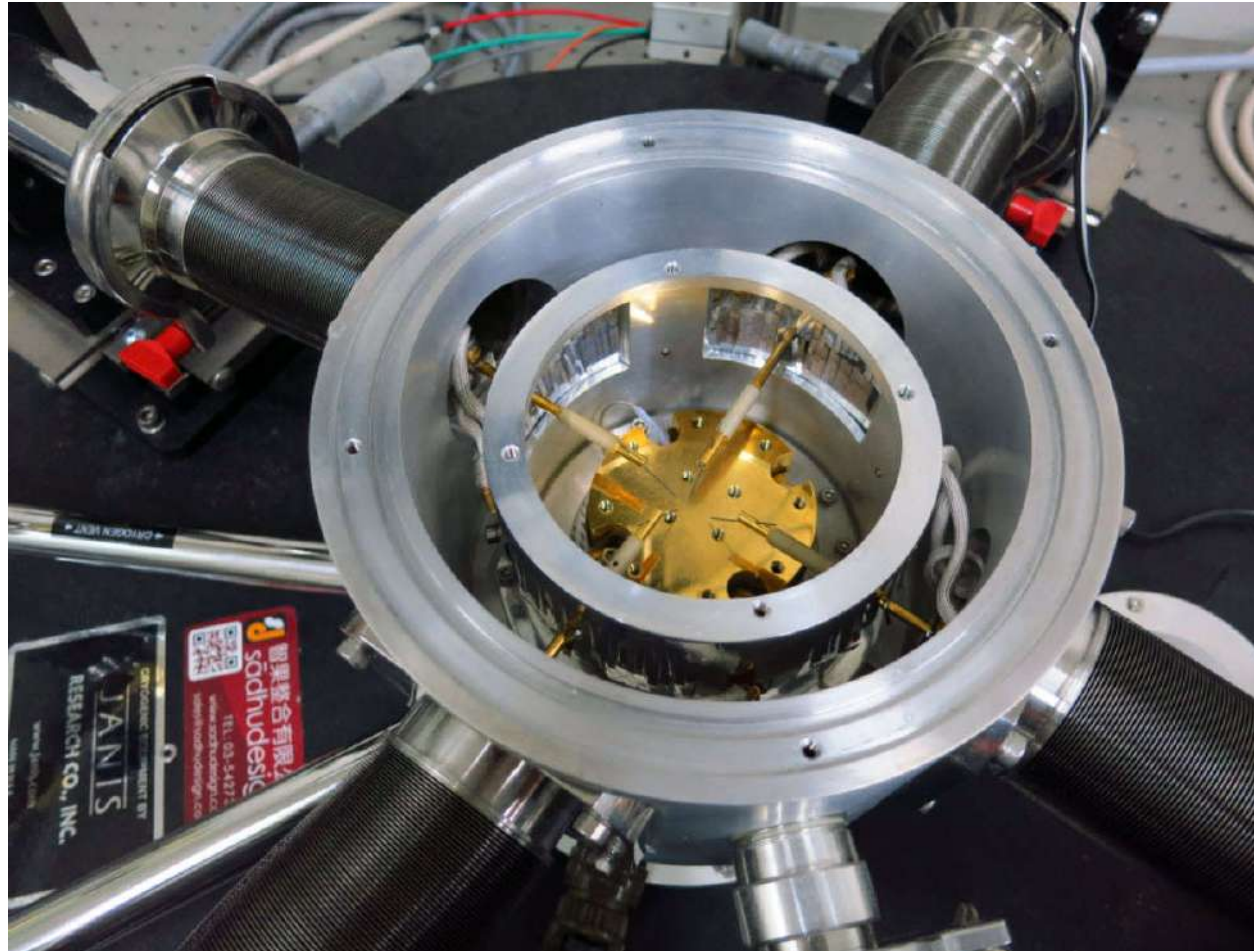
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Coax Probing



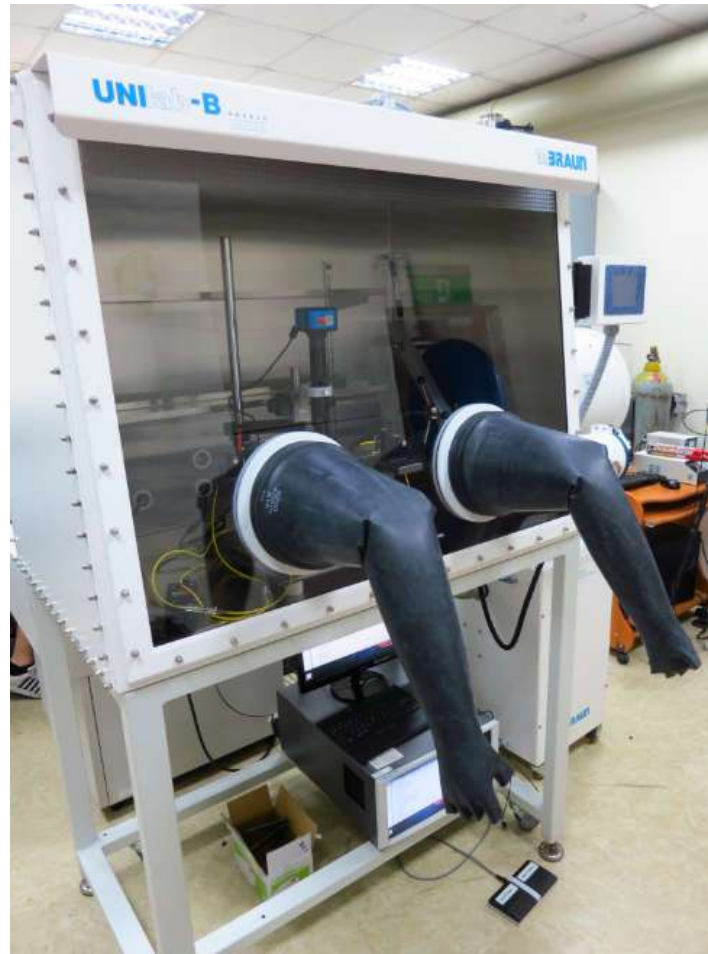
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Probe Station in Glovebox



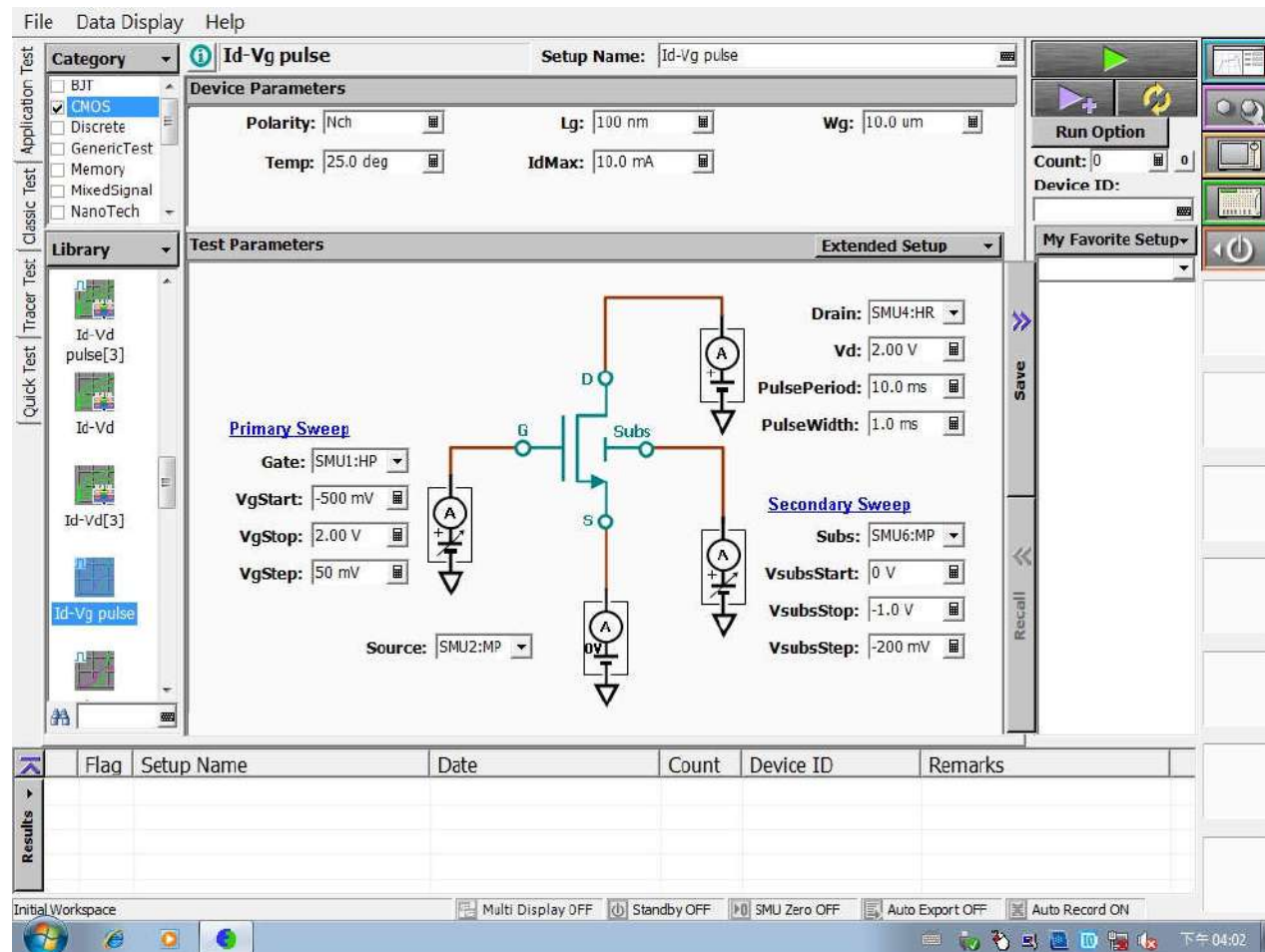
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Keysight Solution EasyEXPERT



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3 D Magnetic Field



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2 D Magnetic Field



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Hall Effect System Configuration



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Resistivity Measurement

B1500_Hall_Effect_Measurement_Resistivity_Measurement_SR.vi

File Edit Operate Tools Window Help

Sample information

Thickness (m) 350p

Dimensions (cm^2) 1 X 1

Sample Gf

Temperatur Room Temp..

Parameter

Parameter

I (A) 5.00E-5

B (Gauss) 5300

Mode Selection

Fast Contact Checking ☐

Detail Contact Checking ☐

Resistivity Measurement ☒

Hall Effect ☐

Result of Resistivity Measurement

Resistivity Measurement	Symmetric Factor	Corrected Factor
V43 8.37500E-3	Q12,23 2.364522895	f12,23 0.9396260460
V34 8.35000E-3	Q23,34 2.406454571	f23,34 0.9377046960
V14 2.01000E-2	Q34,41 2.405975343	f34,41 0.9373376860
V41 2.01500E-2	Q41,12 2.364052018	f41,12 0.9396520780
V21 8.77500E-3		
V12 8.25000E-3		
V32 1.97750E-2		
V23 2.04750E-2		

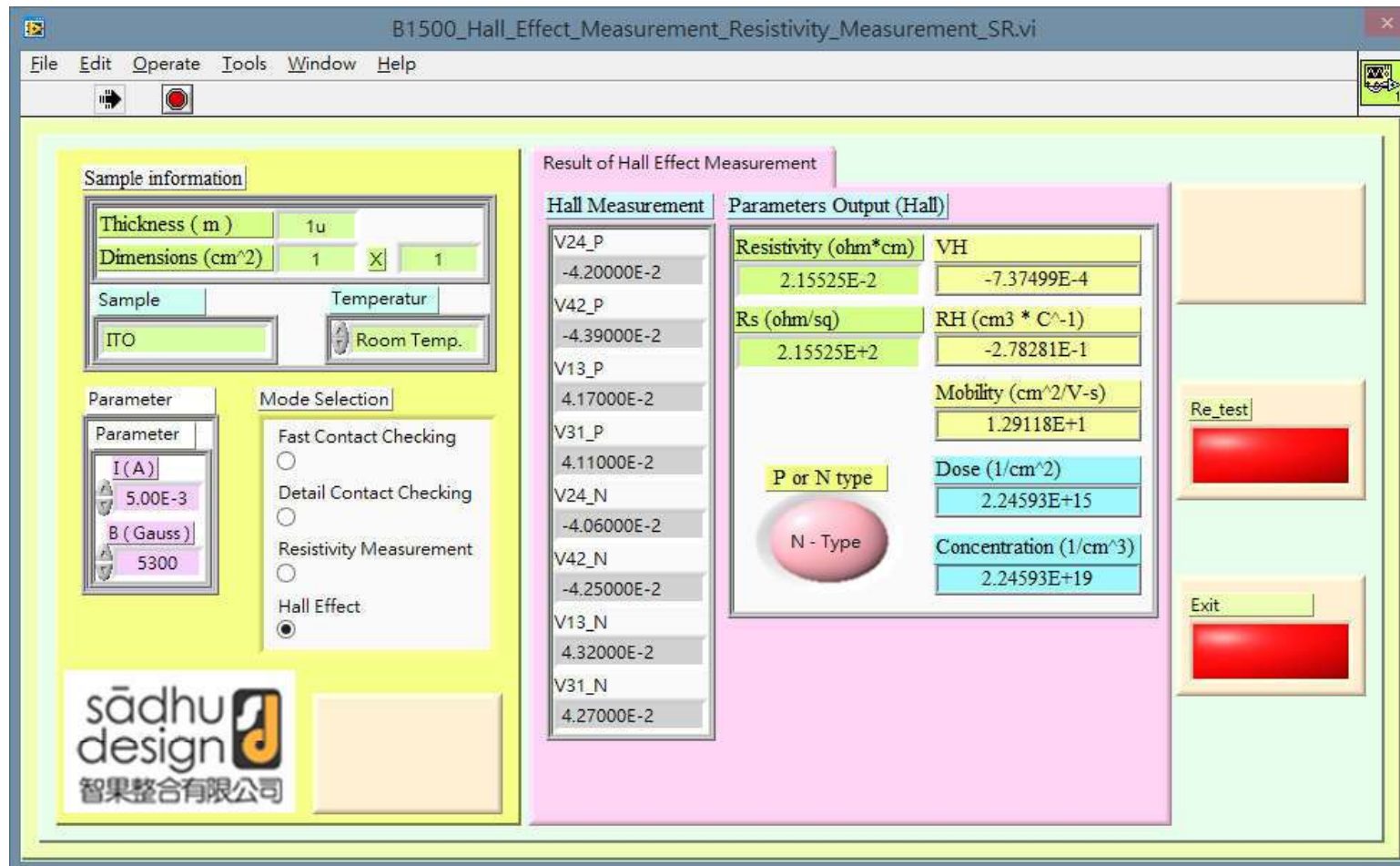
Re_test

Exit

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Hall measurement Result



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Company Profile

- **Establish: September, 2009**
- **Product: High Value-Added Probe Station, Customized Test Fixtures, Test System Integration**
- **Position: Solution Provider & Value Added Logistics**



Product Lists



公司定位/產品服務

- 智果整合有限公司作為先進研發團隊的主要技術服務提供之最佳夥伴。
- 台灣新竹總公司與美國德州分公司產品，提供光、機、電整合設計、製造、與測試方案。
- 主要零組件及模組供應商均來自美日第一線品牌。
- 整合客戶應用規格，提供各大研發實驗室最及時及多變的量測方案服務
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