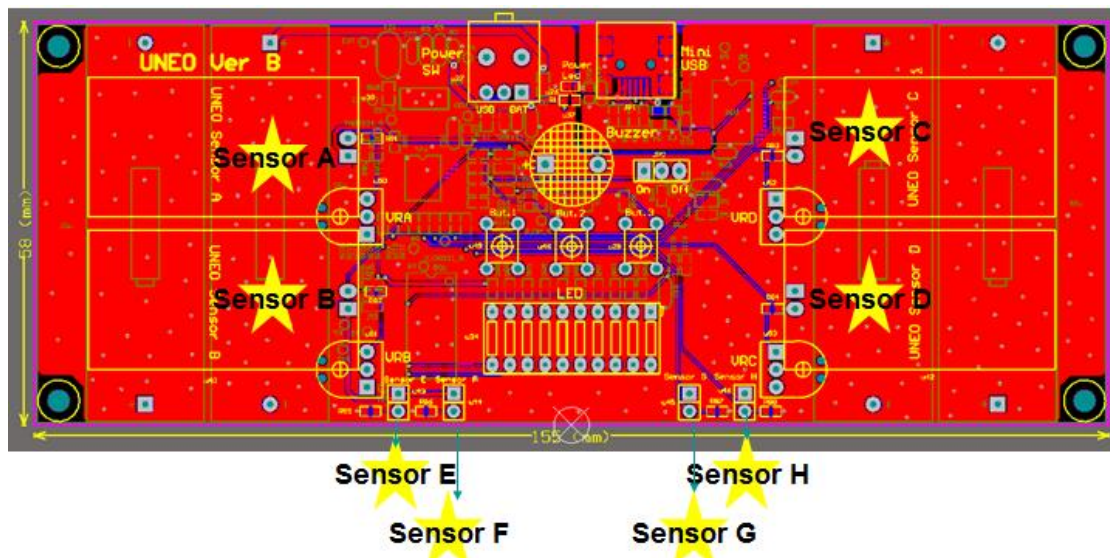


## 8-Channel Resistive Force Sensor Demo Kit

Demo Kit Software Download link:

<http://files.uneotech.com:8080/share.cgi?ssid=05hPvnh>

Hardware spec:58mm x 155mm



- 4-Channel VR100K Resistor ( Sensor A / Sensor B / Sensor C / Sensor D )
- 4-Channel Fixed 10K Resistor ( Sensor E / Sensor F / Sensor G / Sensor H )

Software interface:

The screenshot shows the UNEO software interface. At the top, a window title bar reads 'UNEO'. Below it, a 'Type:' dropdown menu is set to 'R(ohm)'. A 'ChartReset' button is located in the top right corner. The main area contains a table with columns for 'Setting', 'ADC', 'mmHg', 'Force(g)', 'g/cm<sup>2</sup>', 'R(ohm)', and 'Conductivity'. The table lists eight sensors (A through H) with all values currently set to 0. Below the table, there are three controls: a 'Record' button, a '16Hz' dropdown menu, and a 'Change Path' button. A file path is visible below the 'Change Path' button: 'D:\Project\G&A\Software\Version4\201130\Office\主程式\UNEO\Demo\UNEO\Demo\bin\Deb'. To the right of the table is a line chart area with a legend for 'SensorA' through 'SensorH'. Below the interface, five callout boxes with arrows point to the 'Record' button, '16Hz' dropdown, 'Change Path' button, 'Type:' dropdown, and the file path.

Data type for the line chart

Record

16Hz

Change Path

Frequency option

Record

Chang saved path

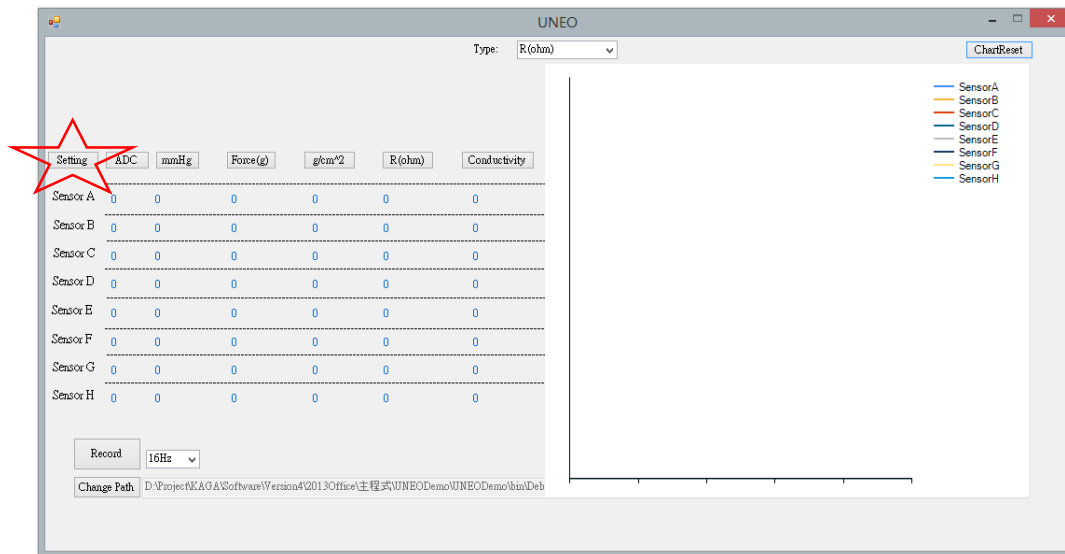
Current saved path

There are five different data types for the line chart (mmHg; Force(g); g/cm<sup>2</sup>; R(ohm); Conductivity) and the line chart image on the software interface can be saved.

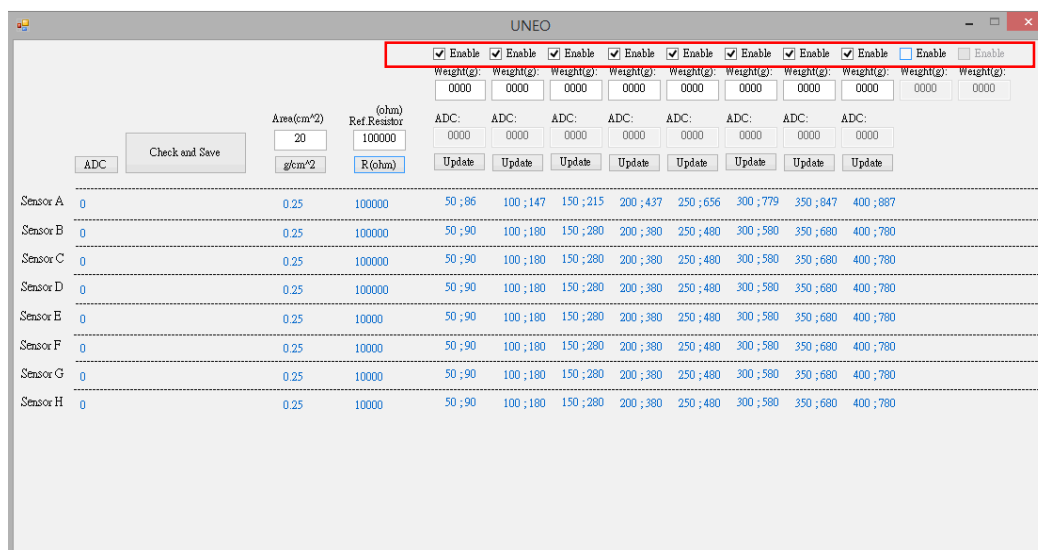
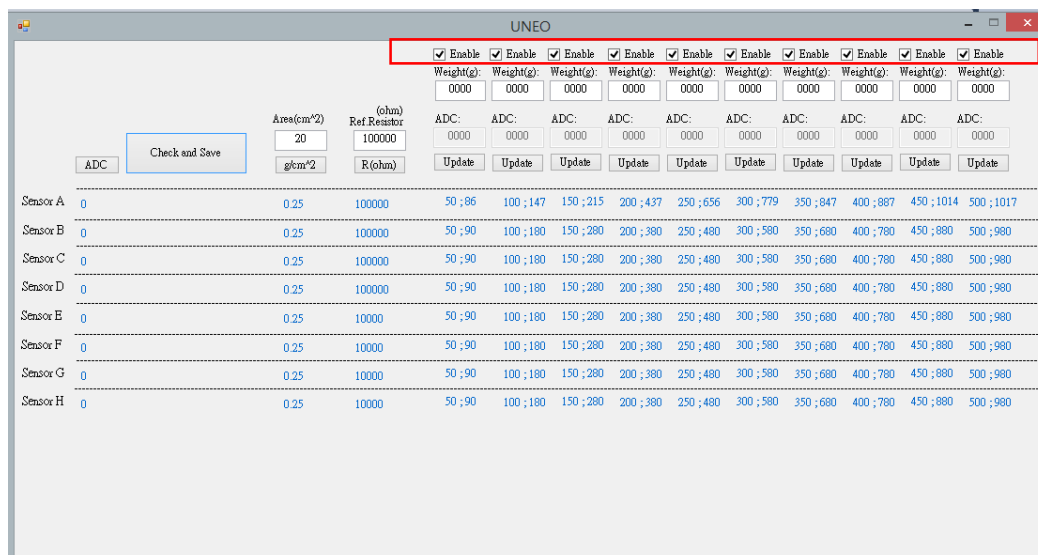
Since the value of each data types (mmHg; Force(g); g/cm<sup>2</sup>; R(ohm); Conductivity) should be computed through the value of ADC to find out their relationship, so setting in advance is required when first time use the demo kit and software.

Software setting function:

Step 1: click "Setting", then enter the operation interface .



Step 2: Choose the quantity of weight that needs to be calibrated.



Step 3: click channel to do calibration (only can calibrate one channel each time)

The screenshot shows the UNEO software interface. At the top, there are several 'Enable' checkboxes and 'Weight(g)' input fields. Below that, there are 'ADC' labels and 'Update' buttons for each of the eight sensors. The main part of the interface is a table with columns for sensor name, area, reference resistor, and eight ADC values. A red star is drawn over the 'Sensor A' row, which has the following values: 0, 0.25, 100000, 50;86, 100;147, 150;215, 200;437, 250;656, 300;779, 350;847, 400;887.

Sensor	Area(cm <sup>2</sup> )	Ref Resistor (ohm)	ADC: 0	ADC: 1	ADC: 2	ADC: 3	ADC: 4	ADC: 5	ADC: 6	ADC: 7	ADC: 8
Sensor A	0.25	100000	50;86	100;147	150;215	200;437	250;656	300;779	350;847	400;887	
Sensor B	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor C	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor D	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor E	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor F	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor G	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor H	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	

Channel you chose will display red.

The screenshot shows the UNEO software interface after calibration. The 'Sensor A' row is now highlighted in red. The 'Weight(g)' input fields at the top are now populated with values: 50, 100, 150, 200, 250, 300, 350, 400, 0000, 0000. The 'ADC' labels and 'Update' buttons are also present. The table data is the same as in the previous screenshot, but the 'Sensor A' row is highlighted in red.

Sensor	Area(cm <sup>2</sup> )	Ref Resistor (ohm)	ADC: 0	ADC: 1	ADC: 2	ADC: 3	ADC: 4	ADC: 5	ADC: 6	ADC: 7	ADC: 8
Sensor A	0.25	100000	50;86	100;147	150;215	200;437	250;656	300;779	350;847	400;887	
Sensor B	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor C	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor D	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor E	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor F	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor G	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	
Sensor H	0.25	100000	50;90	100;180	150;280	200;380	250;480	300;580	350;680	400;780	

Calibrated information:

<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable
Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):
50	100	150	200	250	300	350	400		
Area(cm <sup>2</sup> )	(ohm) Ref.Resistor	ADC:	ADC:	ADC:	ADC:	ADC:	ADC:	ADC:	ADC:
0.25	100000	86	147	215	437	656	779	847	887
g/cm <sup>2</sup>	R(ohm)	Update	Update	Update	Update	Update	Update	Update	Update

0.25	100000	50 ; 86	100 ; 147	150 ; 215	200 ; 437	250 ; 656	300 ; 779	350 ; 847	400 ; 887
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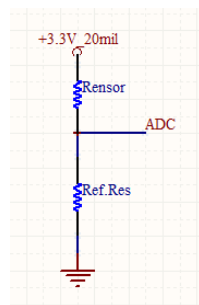
  

Sensor sensing area

Force (unit: g) ; ADC value

Resistance of reference resistor



解析資料:

ADC can measure voltage from voltage divider circuit. In order to get the resistance of sensor, please refer to below formula:

$$R_{\text{sensor}} = \text{Ref.Res} * \{[(\text{ADC full level}) - \text{ADC}] / \text{ADC}\}$$

Uneo sensor have linear relationship between Conductivity and Force, so need to get the conductivity first, then calculate the force.

There are 8 channels in one demo kit. 4 Ref.Res for Variable resistance+Fixed resistance and 4 RefRes for only Fixed resistance.

For example, Ref.Res is 100K and ADC value is 256, so  
 $R_{\text{sensor}} = 100\text{K} * (1023 - 256) / 256 \implies R_{\text{sensor}} \text{ is } 300\text{K}$

Resistance / Conductivity: Use ADC value and RefRes to find out

Pressure: Use Force(g) to construct a linear equation with one variable, and find the pressure value by current Conductivity.

mmHg / g/cm<sup>2</sup>: Use Sensor Sensing Area and Force(g) to find out pressure.

Step 4: Update “Sensor Area/ Ref. resistance/ Force/ ADC value”

<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable
Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):	Weight(g):
50	100	150	200	250	300	350	400	450	500	
Area(cm <sup>2</sup> )	(ohm) Ref.Resistor	ADC:	ADC:	ADC:	ADC:	ADC:	ADC:	ADC:	ADC:	ADC:
0.25	100000	86	147	215	437	656	779	847	887	1014
Update	Update	Update	Update	Update	Update	Update	Update	Update	Update	Update

0.25	100000	50 ; 86	100 ; 147	150 ; 215	200 ; 437	250 ; 656	300 ; 779	350 ; 847	400 ; 887	450 ; 1014	500 ; 1017
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Update Sensor area size:

Area(cm<sup>2</sup>)  
0.25  
Update  
-----  
0.25

Click "Update":

Update above area size to below channel which was selected.

Update Ref. resistance:

(ohm)  
Ref.Resistor  
100000  
Update  
-----  
100000

Click "Update":

Update above resistance value to below channel which was selected.

Update force and ADC:

ADC    Check and Save    Area(cm<sup>2</sup>)    (ohm) Ref.Resistor     Enable Weight(g):  
170    0.25    100000    51  
Update    Update    Update    170  
-----  
Sensor A    170    0.25    100000    51 ; 170

Click "Update":

Update force value and ADC value.

Step 5: check current parameter and save, then re-start software.

The screenshot shows the UNEO software interface. At the top, there are several 'Enable' checkboxes and 'Weight(g)' input fields. Below these, there are 'ADC' labels and 'Update' buttons for each sensor. A red box highlights a 'Check and Save' button. The main area contains a table of sensor parameters and a list of sensors (A through H) with their respective ADC values and weights.

Sensor	ADC	Area(cm <sup>2</sup> )	Ref. Resistor (ohm)	Weight(g)	Weight(g)	Weight(g)	Weight(g)	Weight(g)	Weight(g)	Weight(g)	Weight(g)	Weight(g)
Sensor A	0	0.25	100000	50 ; 86	100 ; 147	150 ; 215	200 ; 437	250 ; 656	300 ; 779	350 ; 847	400 ; 887	
Sensor B	0	0.25	100000	50 ; 90	100 ; 180	150 ; 280	200 ; 380	250 ; 480	300 ; 580	350 ; 680	400 ; 780	
Sensor C	0	0.25	100000	50 ; 90	100 ; 180	150 ; 280	200 ; 380	250 ; 480	300 ; 580	350 ; 680	400 ; 780	
Sensor D	0	0.25	100000	50 ; 90	100 ; 180	150 ; 280	200 ; 380	250 ; 480	300 ; 580	350 ; 680	400 ; 780	
Sensor E	0	0.25	100000	50 ; 90	100 ; 180	150 ; 280	200 ; 380	250 ; 480	300 ; 580	350 ; 680	400 ; 780	
Sensor F	0	0.25	100000	50 ; 90	100 ; 180	150 ; 280	200 ; 380	250 ; 480	300 ; 580	350 ; 680	400 ; 780	
Sensor G	0	0.25	100000	50 ; 90	100 ; 180	150 ; 280	200 ; 380	250 ; 480	300 ; 580	350 ; 680	400 ; 780	
Sensor H	0	0.25	100000	50 ; 90	100 ; 180	150 ; 280	200 ; 380	250 ; 480	300 ; 580	350 ; 680	400 ; 780	

Circuit:

