How to make Chroma Solar Array Simulator output Shadow I-V curve

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1. Objective:

Besides simulating Static I-V curve, Chroma Solar Array Simulator (62150H-600S/1000S) is able to simulate Shadow I-V curve when the Solar Array is covered by cloud or trees, which is better for realizing the performance of PV Inverter in real environment.

This document tells how to use the Table Mode in Chroma Solar Array Simulation Soft Panel to let Chroma Solar Array Simulator (62150H-600S/1000S) output Shadow I-V curve。

2. Description:

To use Chroma Solar Array Simulation Soft Panel to generate I-V curve, Table mode is available in addition to SAS modeling. If Shadow I-V curve output is desired, Table mode must be used.

Table mode uses software to call the 128 voltage and current points in Excel file, and use them to draw the I-V curve to be simulated by the following six steps.

Step 1: Open an Excel file. Following uses “101_2 - 2 Series for Sandia Equation.xls” as the example.

Step 2: This example uses two Solar Panels of the same characteristics connected in series with different irradiance to get shadow effect. Therefore, in “a. Solar Cell PV&IV Curve” tab page, there are two blocks in the figure below where the user can set MPP Voltage, MPP Current, Open Circuit Voltage, Short Circuit Current and Voltage Temperature Coefficient, also set the irradiance default to 1000W/m^2 in the black box. In the red box, it can set the irradiance (F15) for second panel. As it can be seen the overall specification of two connected Solar Panels are open voltage 300V, short circuit current 5A, maximum power point voltage 280V and maximum power point current 4A, while the irradiance of second panel is 200W/m^2 only.

Microsoft Excel - 101_2 - 2 Series for Sandia Equation.xls

檔案(F) 編輯(E) 檢視(V) 插入(I) 格式(O) 工具(T) 資料(D) TrustView 視窗(W) 說明(H)

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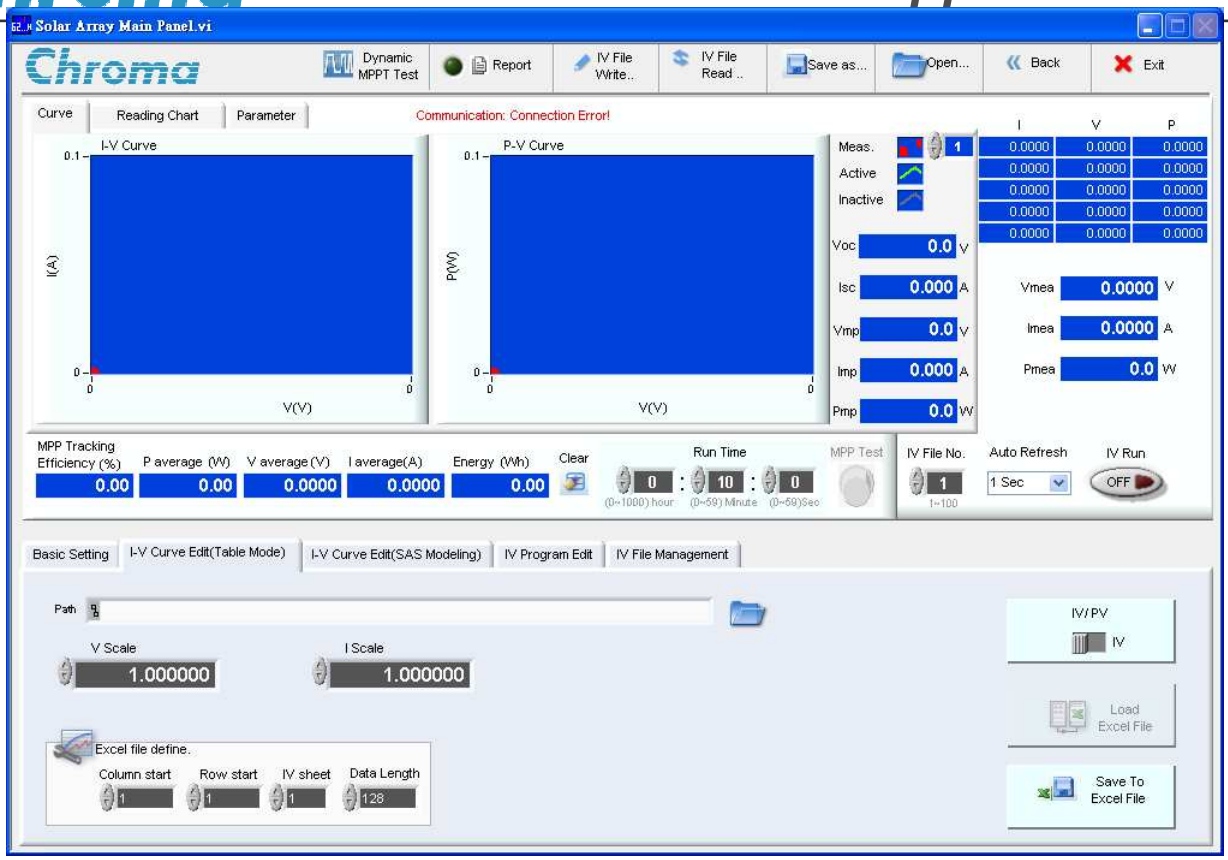
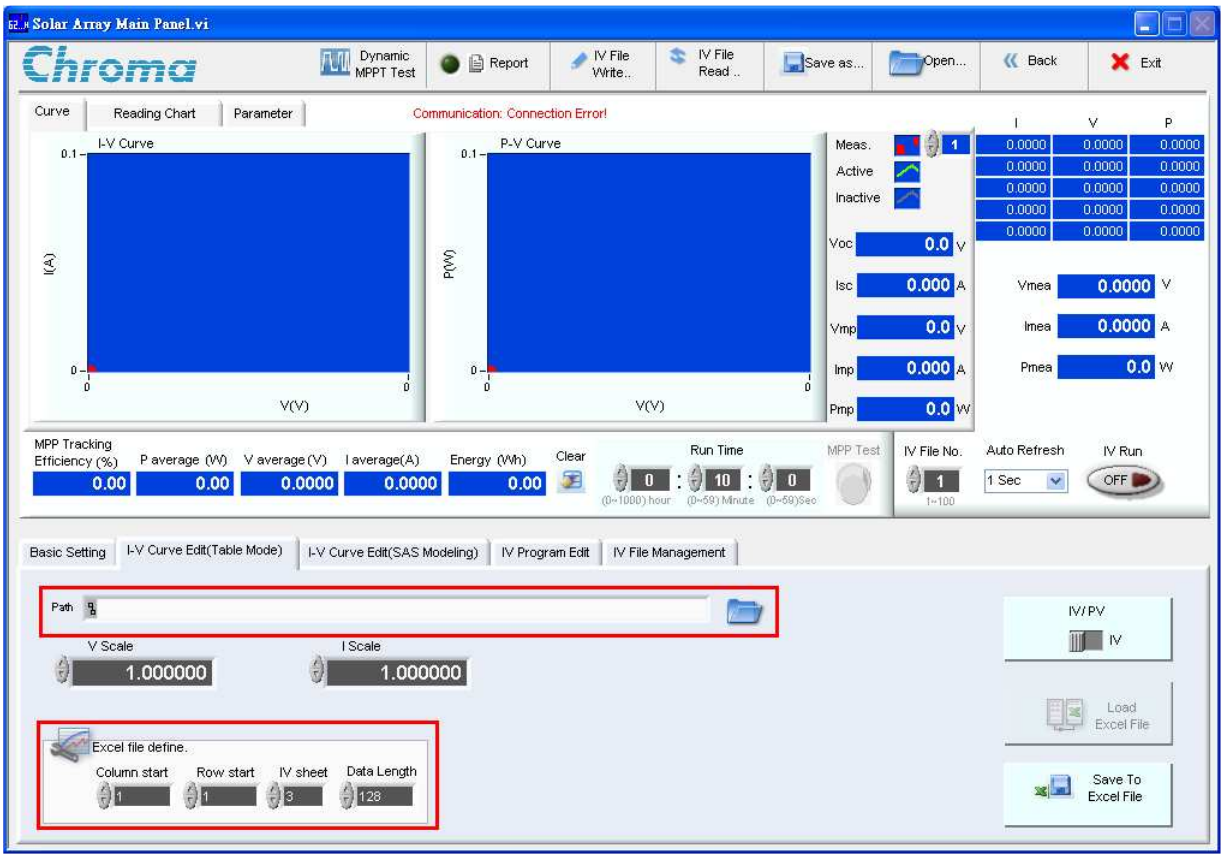
	A	B	C	D	E	F	G
1	1. Solar Cell Parameter Data						
2							
3	Parameter			Abbreviation		Value	Unit
4	Irradiance @ REF			Irr_{REF}		1000	W/m2
5	Cell Temperature @ REF			T_{REF}		25	℃
6	MPP Voltage @ REF			V_{MP_REF}		280	V
7	MPP Current @ REF			I_{MP_REF}		4	A
8	MPP Power @ REF			P_{MP_REF}		1120	W
9	Open Circuit Voltage @ REF			V_{OC_REF}		300	V
10	Shrot Circuit Current @ REF			I_{SC_REF}		5	A
11	Generator Fill Factor 1			FF		0.746666667	
12	Parameter			C1		3.2768E-11	
13	Parameter			C2		0.041422329	
14	Voltage Temperature Coefficient			β (Beta)		-0.32	%(T_{REF})
15	Irradiance			Irr		200	W/m2
16	Cell Temperature			T		25	℃
17	MPP Voltage			V_{MP}		214.763	V
18	MPP Current			I_{MP}		1.043	A
19	MPP Power			P_{MP}		224.000	W
20	Open Circuit Voltage			V_{OC}		230.103	V
21	Shrot Circuit Current			I_{SC}		1.304	A

Step 3: This Excel file refers to Sandia mathematics to calculate the 128 voltage and current points following the parameters set in Step 2 and display in ”a. IV Curve” page.

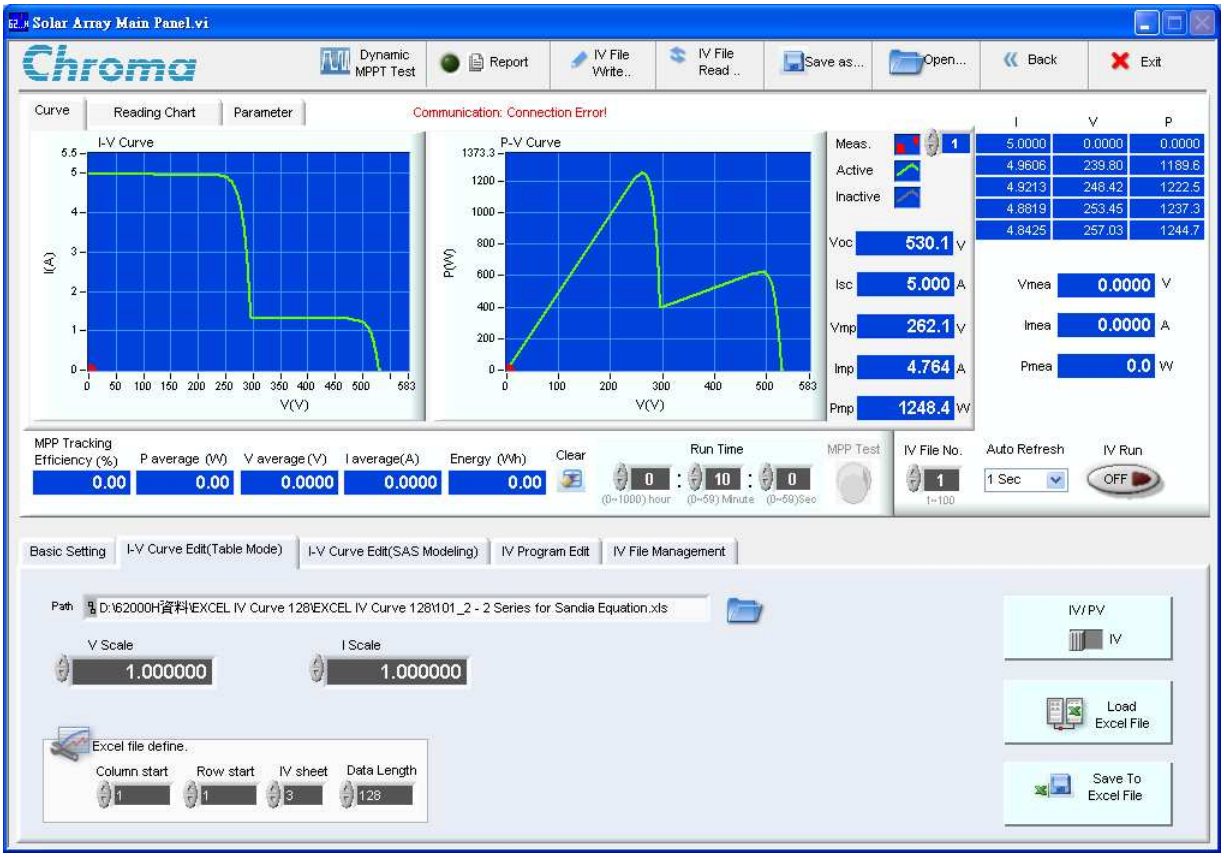
Step 4: Execute Chroma Solar Array Simulation Soft Panel and switch to I-V Curve Edit (Table mode).



Step 5: First change the IV sheet in the Excel file define below to 3 (this setting varies with the Excel file called), click the button next to Path and specify the Excel file set in Step 1.



Step 6: Now the software will follow the data in the Excel file to generate I-V curve. When done, use IV File Write to write the I-V curve to the Solar Array Simulator.



3. Conclusion:

The user can use this function to make Chroma Solar Array Simulator (62150H-600S/1000S) not only applicable for simulating Static I-V curve but also capable of simulating Shadow I-V curve. As to the Excel File mentioned in this document, please contact local Sales Rep. to request a copy.