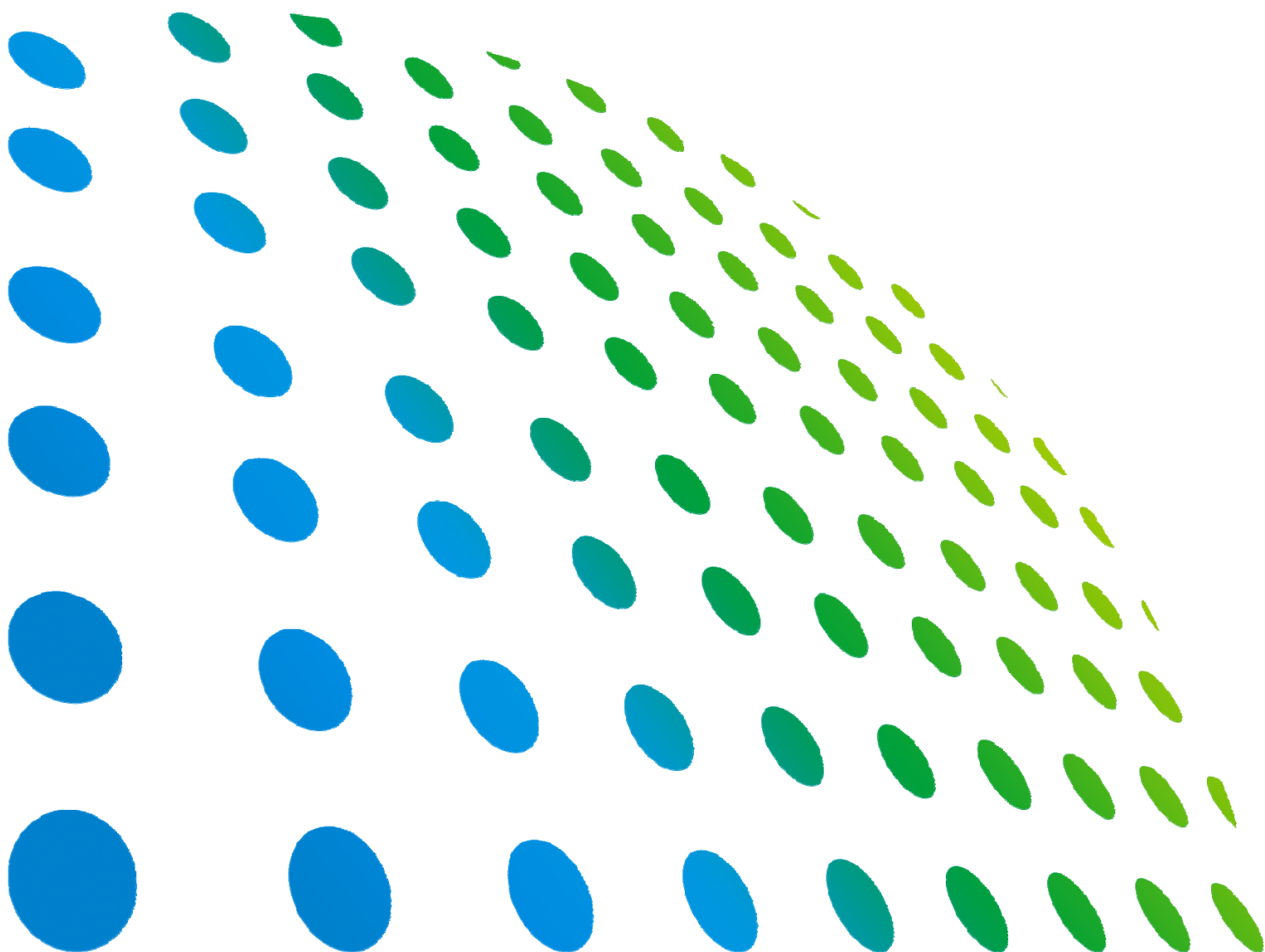
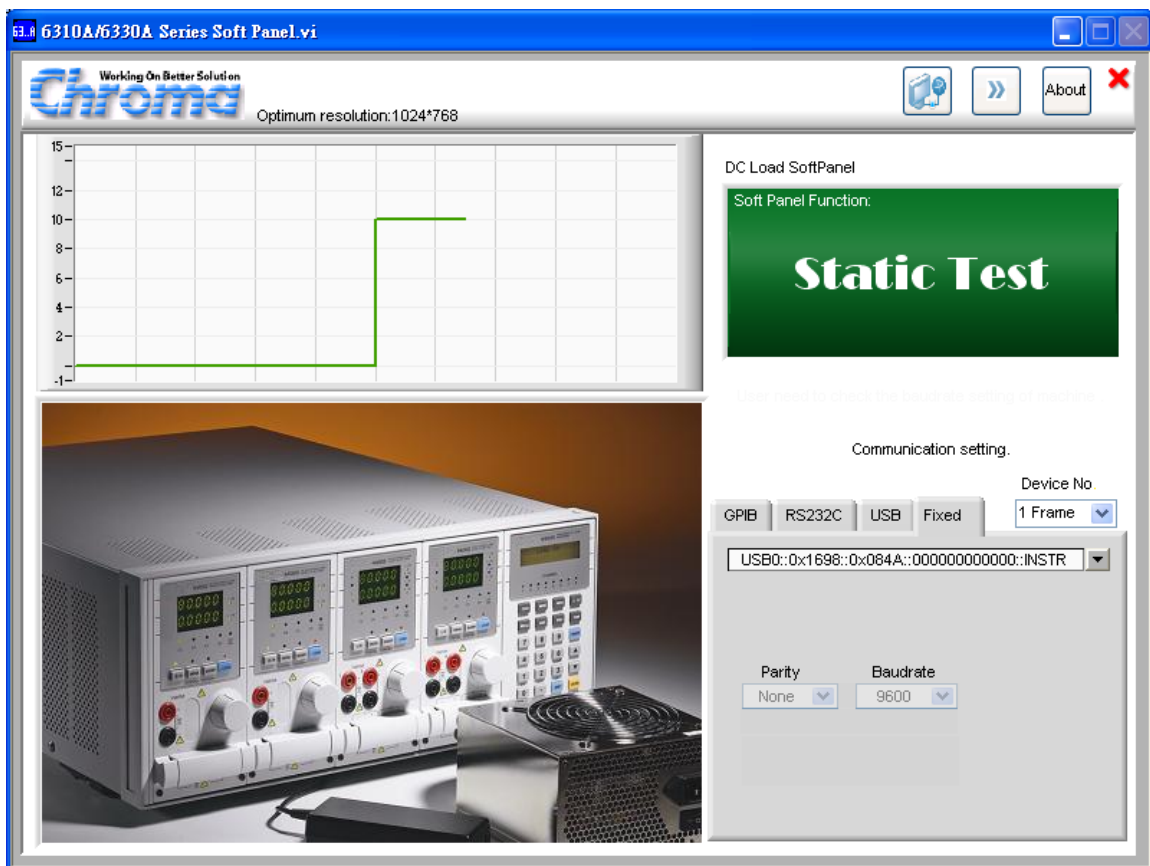




DC Electronic Load
6310A/6330A Series
Soft Panel User's Manual



DC Electronic Load 6310A/6330A Series Soft Panel User's Manual



Version 1.1
September 2012

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Revision History

The following lists the additions, deletions and modifications in this manual at each revision.

Date	Version	Revised Sections
Nov. 2010	1.0	Complete this manual.
Sep. 2012	1.1	Update the screens of soft panel due to software upgrade. Add the chapters of " <i>LED Test</i> " and " <i>LED Program Test</i> ".

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1. System Structure

This chapter explains the structure and functions of Chroma DC Load 6310A Series Soft Panel. The supported instruments and communication interfaces are listed below for the user to identify the required environment easily.

1.1 Introduction

This software is applicable to Chroma DC Load 6310A Series instruments only. The remote transmission between PC and DC Load must be active before using the software in order to communicate by commands.

The software application can perform internal parameter settings for DC Load and monitor the output measurement. In addition the software is able to save the parameter settings so that the user can open an existing file for execution from hard disk easily.

1.2 Supported Hardware

Chroma 6310A Series Programmable DC Electronic Load contain the following models:

- A. Frame
 - a. 6314 or 6334, 6314A or 6334A
 - b. 6312 or 6332, 6312A or 6332A

- B. Module
 - a. 63101 or 63301, 63101 A or 63301 A
 - b. 63102 or 63302, 63102 A or 63302 A
 - c. 63103 or 63303, 63103 A or 63303 A
 - d. 63105 or 63305, 63105 A or 63305 A
 - e. 63106 or 63306, 63106 A or 63306 A
 - f. 63107 or 63307, 63107 A or 63307 A
 - g. 63108 or 63308, 63108 A or 63308 A
 - h. 63112 or 633112, 63112 A or 633112 A
 - i. 63123 or 63323, 63123A or 63323A
 - j. 63110A or 63310A
 - k. 63113A or 63313A

1.3 Communication Interface

There are two types of communication interfaces between PC and DC Loads:

- A. GPIB
- B. RS232 (Cross)
- C. USB

1.4 Operation

It is recommended to work through the Soft Panel by clicking the mouse for operation.

1.5 Software and Hardware Requirements

The soft panel program is quite large; therefore, the following PC software and hardware environments are suggested.

- Intel CPU 2GHz or above
- Microsoft Windows 2000, XP or Win7
- 20GB MB hard disk space at least
- 512 MB memory at least
- VGA or SVGA color monitor
- PS2 mouse

2. Installation

First install the Chroma DC Load 6310A Series Soft Panel to the hard disk on PC before using it. This chapter describes how to install the software on Windows step by step.

- Ensure there is at least 20GB or above hard disk space on PC.
- Insert the Chroma DC Load 6310A Series Soft Panel software CD into the CD drive.

2.1 Start Up the Installation

Place the CD in the CD drive and execute "Setup.exe". A Soft Panel Setup screen will prompt for installation as Figure 2-1 shows. Online test can only begin when both Chroma 6310A/6330A Soft Panel and NI VISA Run Time Engine are installed.



Figure 2-1 Installation Start-up Screen

2.2 Installing Chroma 6310A/6330A Series Soft Panel

Please follow the steps below to install Chroma 6310A/6330A Series Soft Panel.

Step 1

Select "**Chroma 6310A_6330A Series Soft Panel**" and it will prompt a window as Figure 2-2 shows. Click **Next** to carry on the installation.

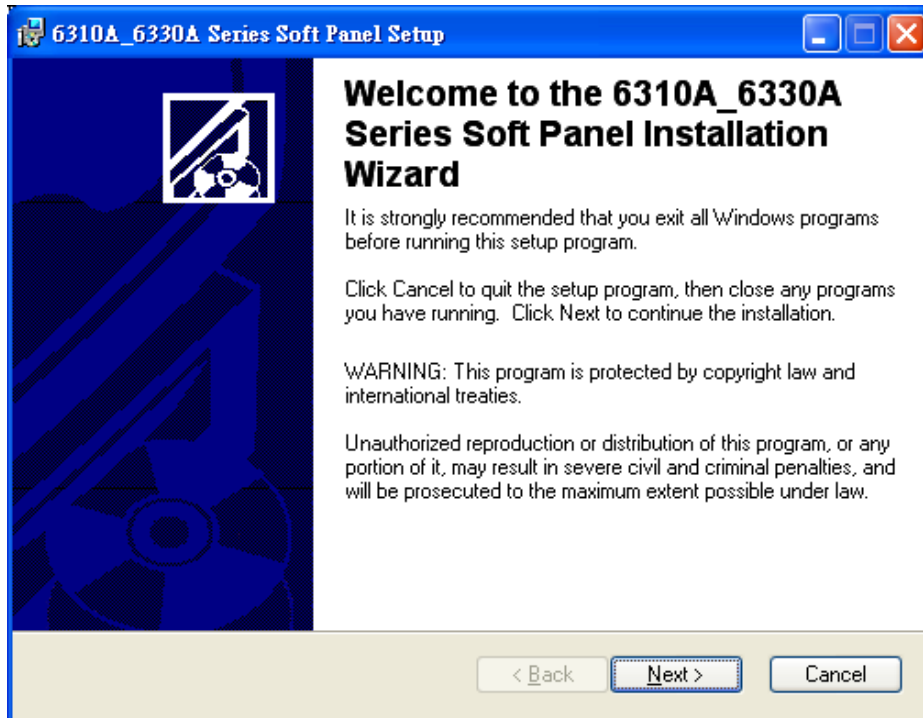


Figure 2-2 Chroma 6310A_6330A Series Soft Panel Installation Wizard

Step 2

The program is default installed under the directory of C:\Program Files\6301A_6330A Series Soft Panel as Figure 2-3 shows. To change it, click **Browse** and specify the path for installation. Click **Next** to proceed.

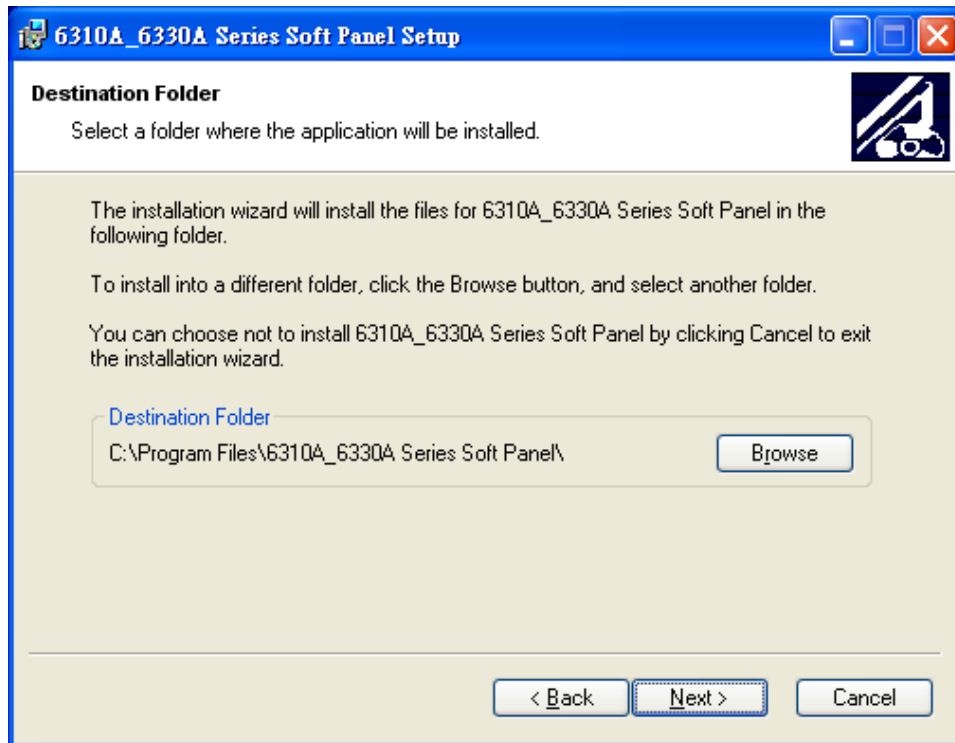


Figure 2-3 Selecting Installation Path

It is ready to begin the installation. Click **Next** to go on.

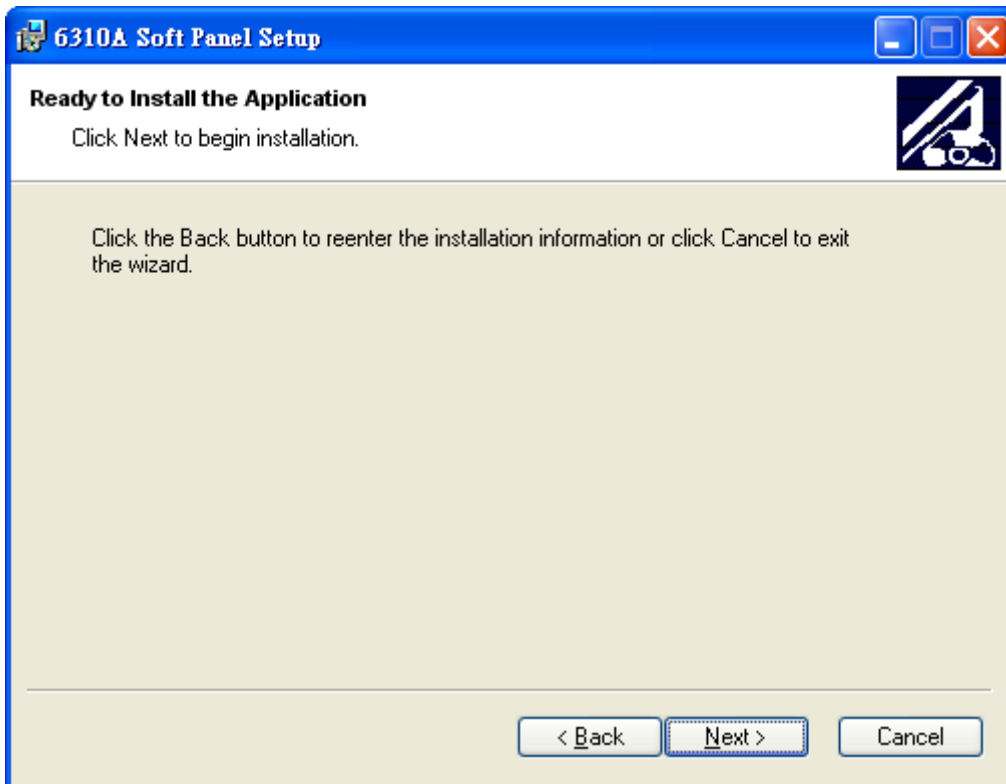


Figure 2-4 Ready for Installing the Application

Click **Cancel** to stop the installation if any mistakes are found during installation.

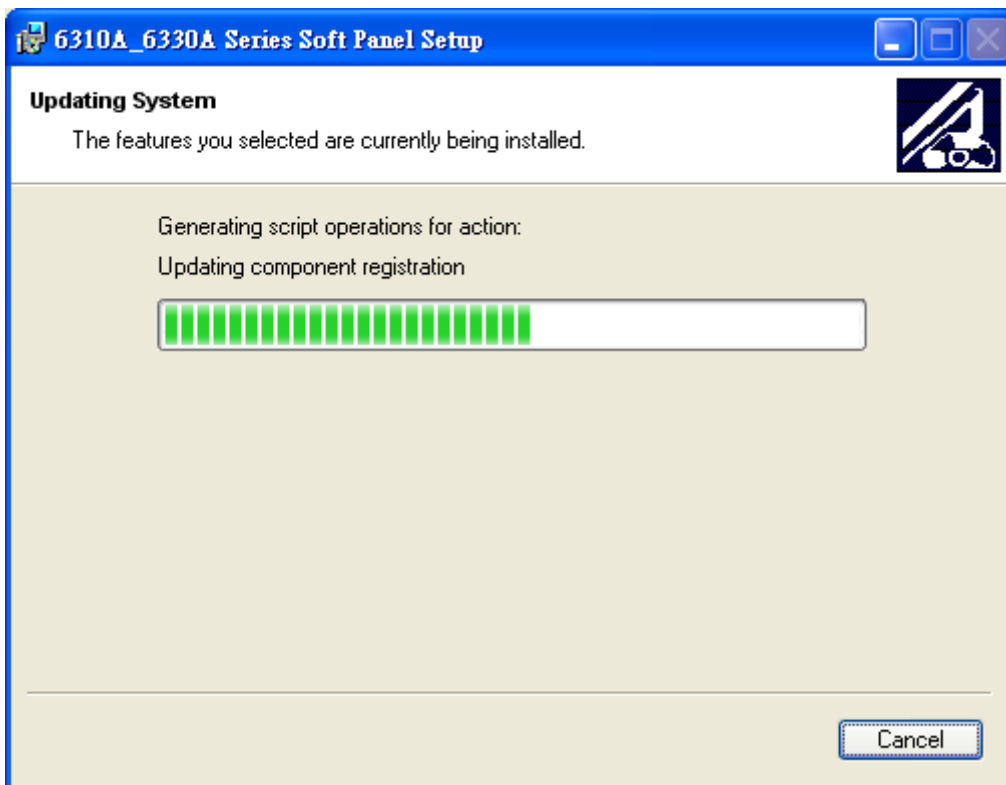


Figure 2-5 Installation Proceeding Screen

Figure 2-6 prompts once the installation is completed. Click **Finish** to end the program without restart the PC.

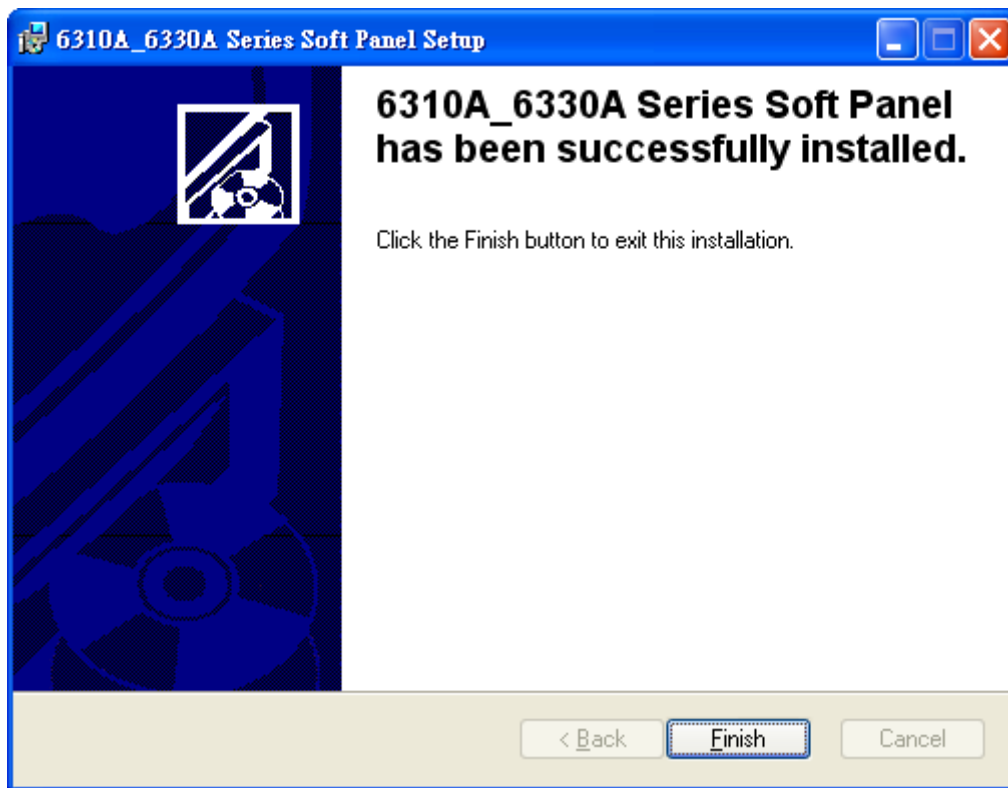


Figure 2-6 Installation Complete Screen

2.3 Installing NI VISA Runtime

It is a must to install NI VISA Runtime. The version suggested for use is 3.0 or above. Following are the steps based on version 3.0.1. For Win7 or above OS, it is suggested to use VISA version 4.6.

Step 1

Select “**NI VISA Run Time Engine**” in Figure 2-1 installation start-up screen and it will prompt a window as Figure 2-7 shows to begin decompressing process. Click **Setup** to continue.

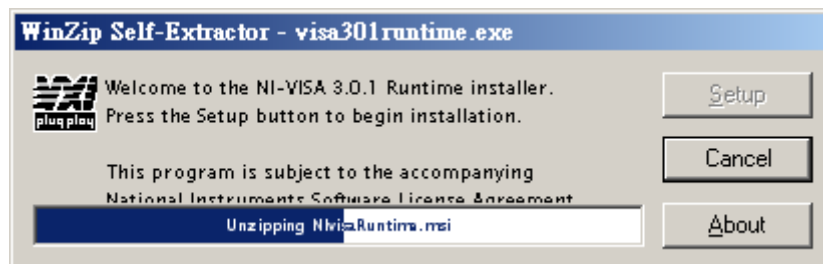


Figure 2-7 NI VISA Installation Screen

Step 2

The following window shows the decompressed NI VISA file. Click **Setup** to carry on the installation.



Figure 2-8 The Decompressed NI VISA

Step 3

The License Agreement Window of NI VISA prompts. Click “I accept the License Agreement” and **Setup** to continue.

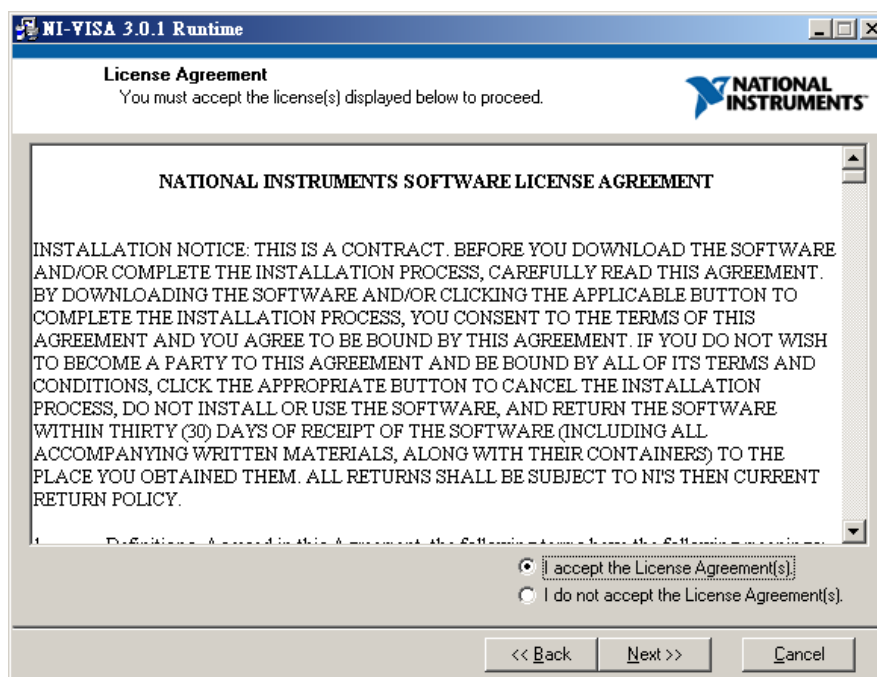


Figure 2-9 The License Agreement of NI VISA

Step 4

The window shows the installation path for NI VISA. The program is default installed in C:\Program Files directory as Figure 2-10 shows. To change it, click **Browse** and specify the path for installation. Click **Next** to proceed.

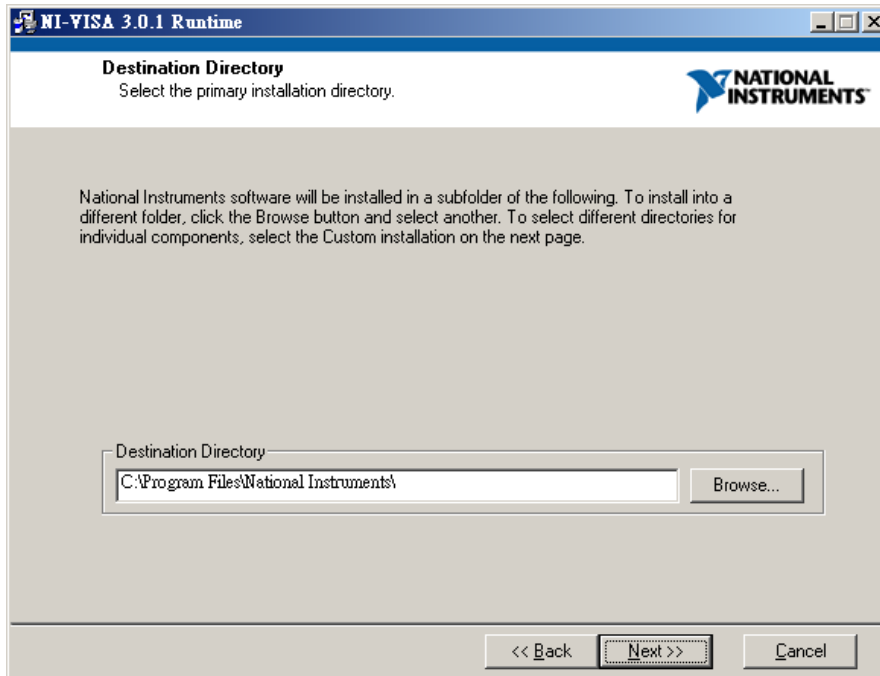


Figure 2-10 Selecting NI VISA Installation Path

Step 5

Select the NI VISA installation option. The default is Complete.

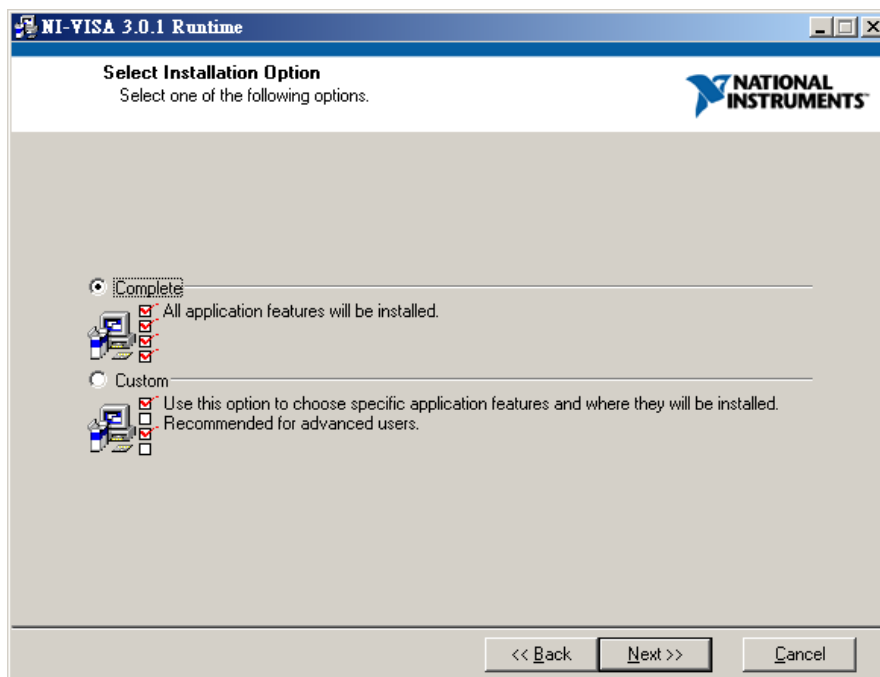


Figure 2-11 Selecting NI VISA Installation Option

Step 6

Start installing NI VISA. Click **Next** to go on.

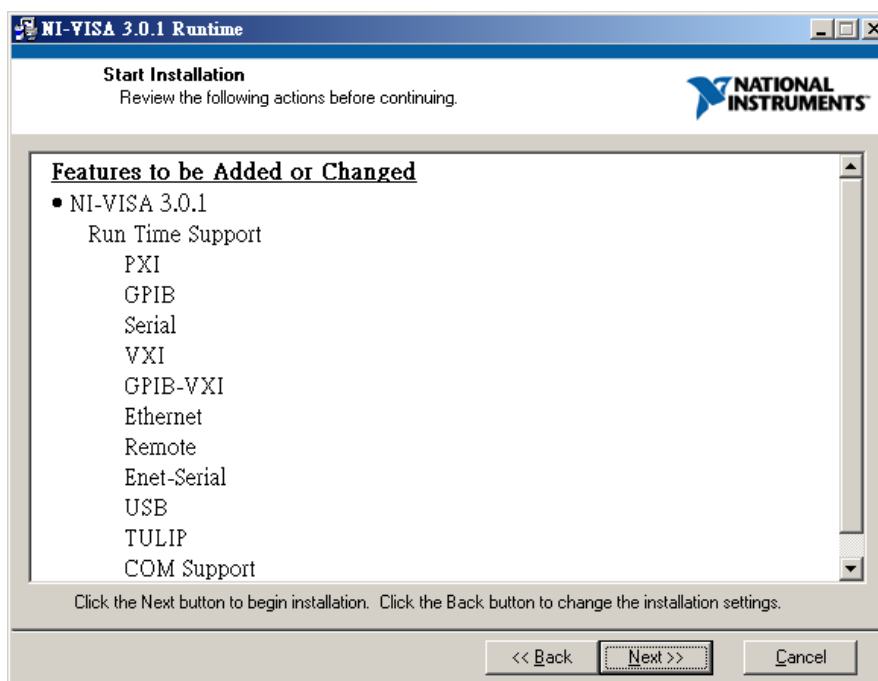


Figure 2-12 Start Installing NI VISA

Step 7

Figure 2-13 shows the installation progress of NI VISA and Figure 2-14 prompts when it is done. Please restart the PC when the NI VISA is successfully installed.

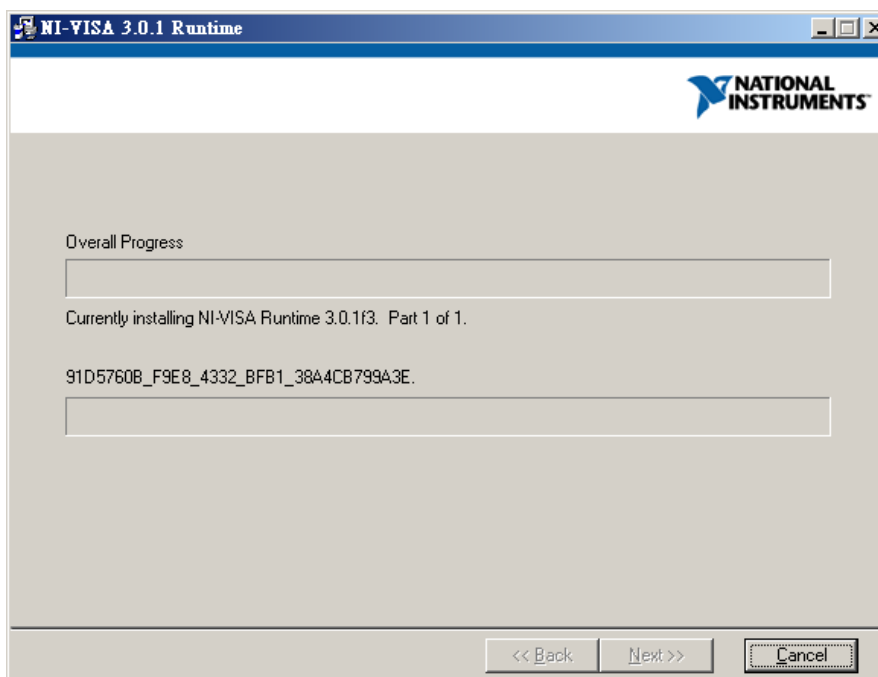


Figure 2-13 NI VISA Installation Progress Screen

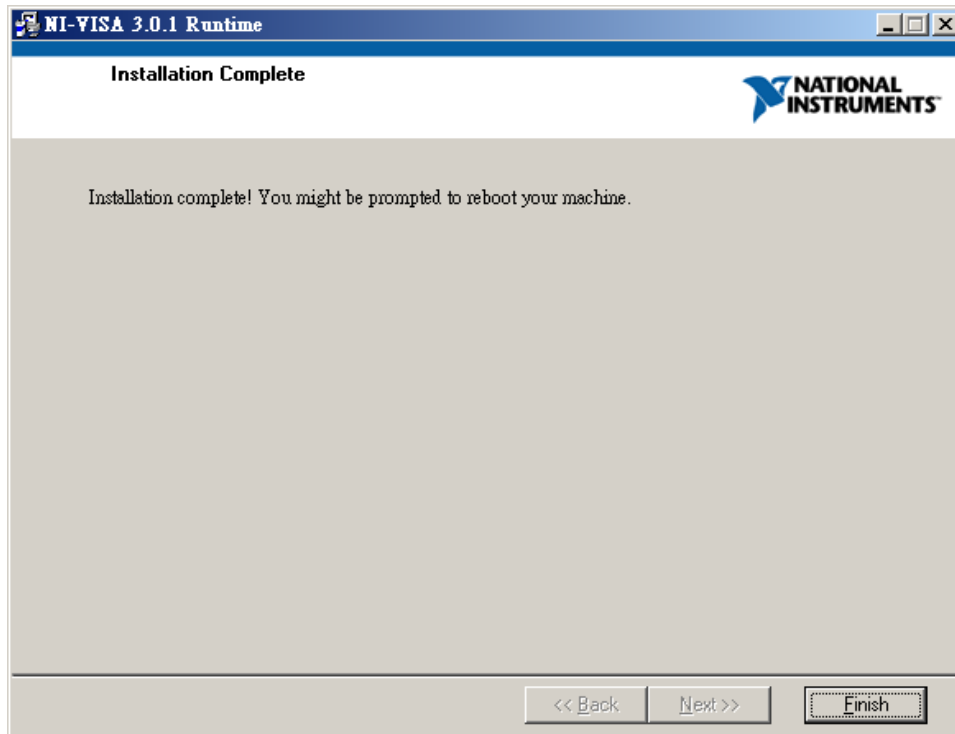


Figure 2-14 NI VISA Installation Complete Screen

2.4 Installing GPIB Interface Driver

Follow the steps listed in the user's manual of GPIB Interface Driver for installation. There is no need to install this drive if RS232 interface is in use.

2.5 Uninstalling Chroma 6310A/6330A Soft Panel

Uninstalling the Soft Panel is same as installing, double-click "Setup.exe" will prompt the window as Figure 2-15 shows. Click **Next** to continue removing the program.

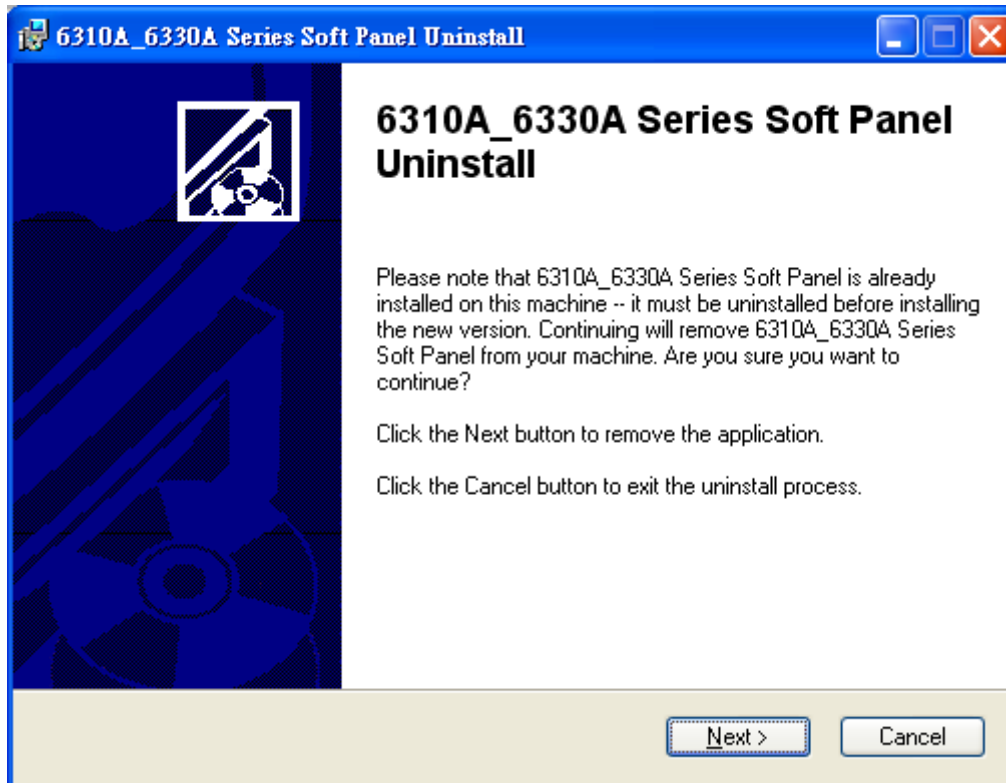


Figure 2-15 Uninstalling 6310A_6330A Soft Panel

3. Starting DC Load 6310A/6330A Series Soft Panel

3.1 Starting

After the installation is done, click **[Start]**→**[Programs]**→**[6310A/6330A Series Soft Panel]** will prompt the start screen as Figure 3-1 shows.

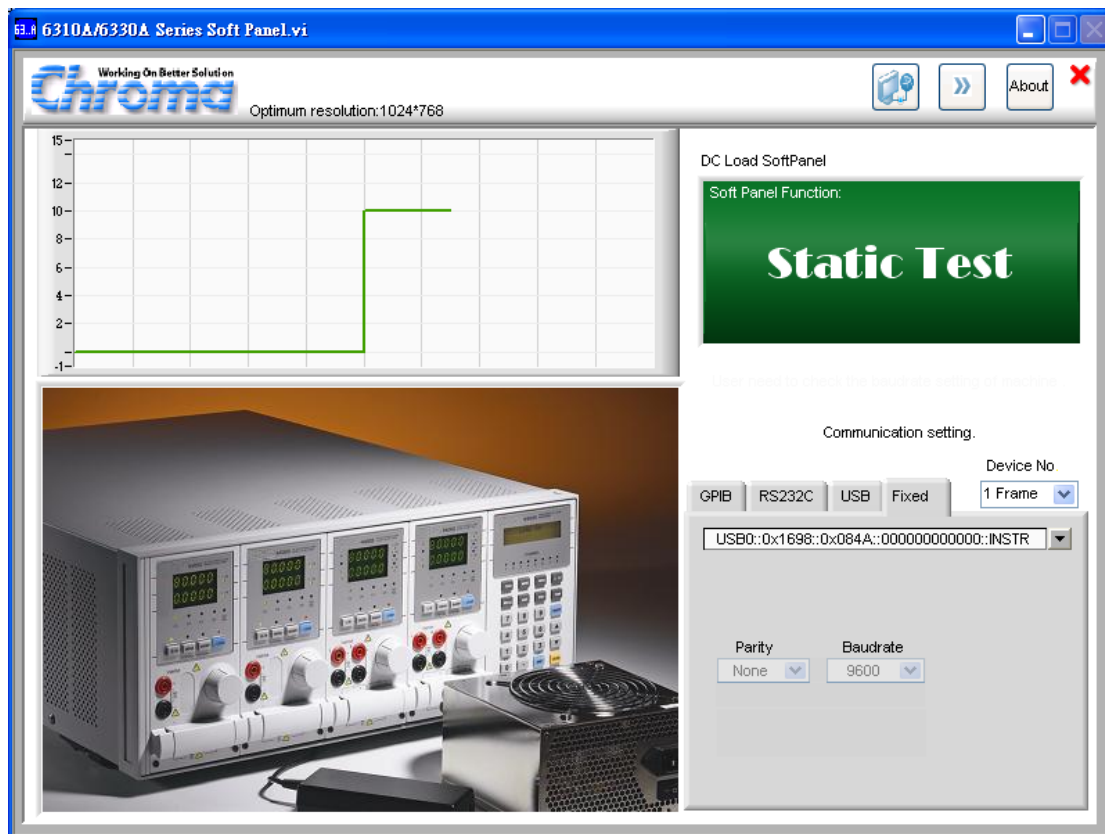


Figure 3-1 Startup Screen of Chroma DC Load 6310A/6330A Series Soft Panel

Description:

- a. The Hardware Configuration needs to be defined first when entering into Chroma DC Load 6310A Soft Panel. The user must define how many hardware devices or Frames to be used and their communication protocol in this screen. The current Soft Panel controls 4 Frames at most and each Frame is able to detect the selected module. Each frame has different channel numbers; however, the last valid channel must be under 32. So only 32 channels are available if the channel number set in Hardware is larger than 32, or the user has to parallel them for use.

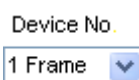


Figure 3-2 Setting the Number of Connected Hardware

- b. The user needs to define the communication protocol which is the transmission command between PC and DC Load. The communication protocols available at

present are GPIB, RS232C or USB. A mapping parameter element will appear when it is in use, for instance the GPIB Address will prompt if GPIB is selected and the Baud rate, Parity and COM parameters will prompt for setting if RS232C is selected, while the USB related Product ID will appear if USB is selected.



Figure 3-3 Selecting Communication Interface

- c. The parameter set for communication interface needs to be same as the one set on DC Load. For instance, the GPIB Address on DC load is set to 27, and then the GPIB Address on Soft Panel has to be set to 27 as well.

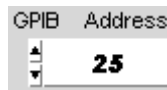


Figure 3-4 Setting GPIB Address

- d. USB: A drop-down menu will appear when the USB interface is selected. If there are many devices connected, it is necessary to set the correct Produce ID Vendor ID need as shown below.

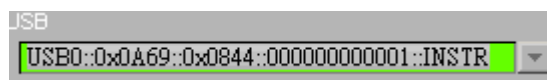


Figure 3-5 USB Produce ID Vendor ID Selection

Scan: Click this button to detect if the communication protocol is connected successfully. The scanned result will show on the drop-down list for selection.



Figure 3-6 Scan Button

The following figure appears after Scan is clicked to search for communication interface and disappears when the interface is found. The common desktop PC has RS232C Port, so it will stop at RS232C if none is found.



Figure 3-7

- e. RS232C: The setting of COM Port, Parity and Baud Rate will appear when the RS232C communication protocol is selected. The COM Port needs to know the actual mapping position on PC site, while the Parity and Baud Rate need to set the same as the DC Load.



Figure 3-8

Definition of Pin No. for RS232C: "N.C." means "no connection".

Pin No.	IBM PC	62000H
1	DCD	"N.C."
2	RX	RX
3	TX	TX
4	DTR	"N.C."
5	GND	DGND
6	DSR	"N.C."
7	RTS	"N.C."
8	CTS	"N.C."
9	"N.C."	"N.C."

- f. Fixed Mode: It is used when there are more than two devices with different communication interfaces. For instance, when the PC has both GPIB and RS232C, the user can decide the channel opening sequence for setting the GPIB or RS232C. Drop-down menu is applied in Fixed page and the selections are the interfaces scanned. If the Device No. is set to 2, there will be two lines for selection.

Though the settings are scanned, it can be modified. For instance, if the GPIB address is 27, the 1st line in the figure below should change to GPIB0::27::INSTR.

The 2nd line is for RS232C, so are the Baud Rate and Parity. Please set the settings of standalone unit same as the one on PC Panel.

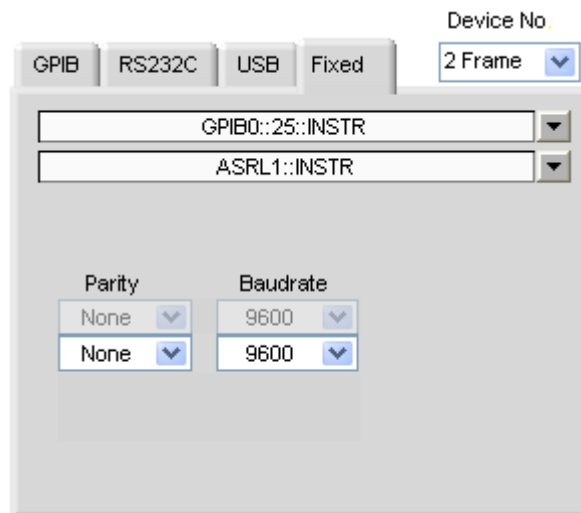



Figure 3-9

- g. When the communication protocol is confirmed, click the button below the program will run an initial communication with hardware and go to next screen.



Figure 3-10 Confirm the Communication Interface Setting

4. Setting Hardware

Click  on the start screen will go to the following window as Figure 4-1 shows.

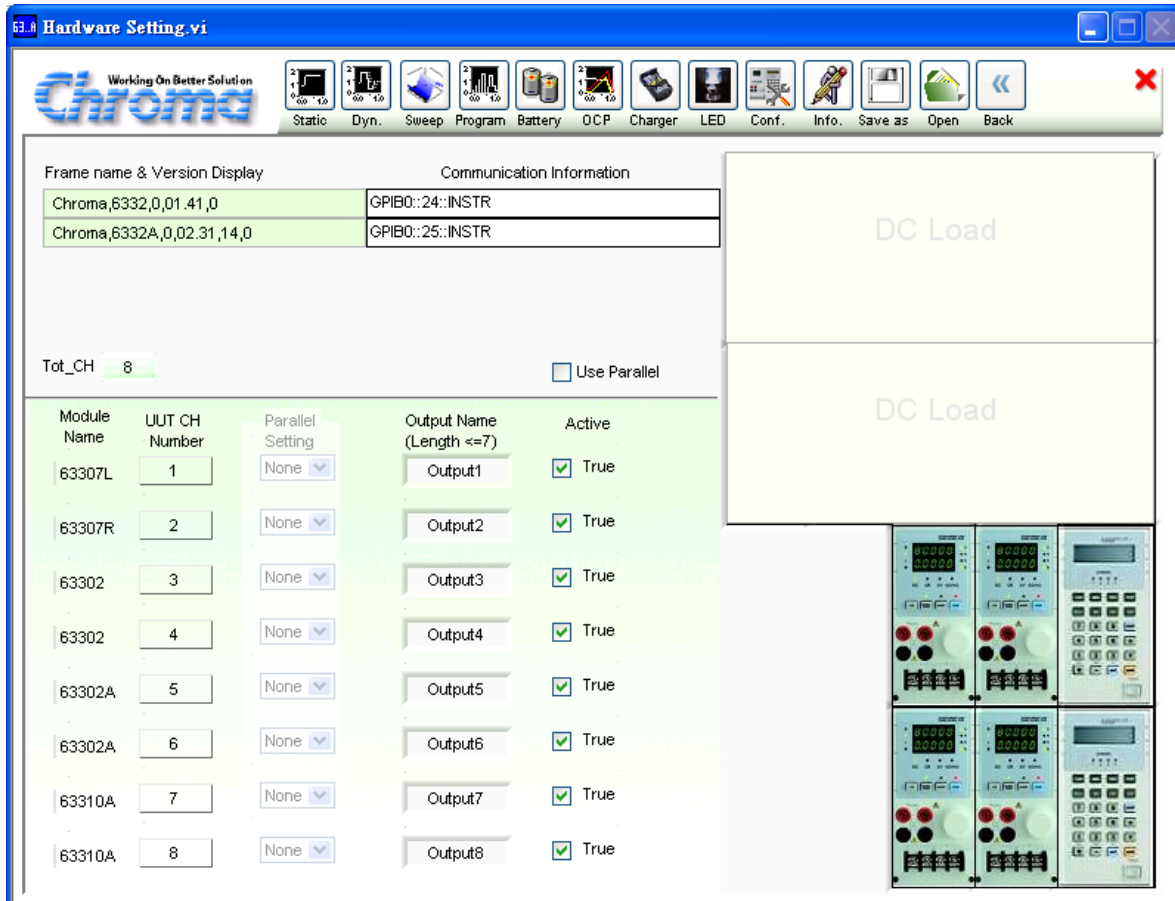


Figure 4-1 Hardware Setting Window

If the communication check passed it will read back the F/W version info of the instrument in Frame Name & Version Display also the hardware settings including the linked Frame and Module. They are displayed in icon on the left of window in order to let the user verify the set structure. If there is any error in the communication protocol, the message “Connection Error” will appear as Figure 4-2 shows. If the communication protocol is correct, the model no. and firmware version will display in black as Figure 4-3 shows.

Frame name & Version Display	Communication Information
Chroma,6332,0,01.41,0	GPIB0::24::INSTR
Chroma,6332A,0,02.31,14,0	GPIB0::25::INSTR

Figure 4-2 Indication when Communication Check Fail

Frame name & Version Display	Communication Information
Chroma,6332,0,01.41,0	GPIB0::24::INSTR
Connection Error.	GPIB0::26::INSTR

Figure 4-3 Indication when Communication Check Pass

4.1 Indication of Channels

Figure 4-4 shows that one Chroma DC Load (one Frame) is connected at the right which is 63X4A, the Frame name of DC Load. For single unit, 4 modules are put in Device 1 and the Channel shows CH1, CH2, CH3... as well as the read back module name, 63X02A.



Figure 4-4 Indication of Channels

4.2 Using Demo Mode

The software will enter into Demo mode if no hardware device is connected, and the user can understand the functions of Soft Panel through the Demo program.

4.3 Using Channel in Parallel

As Figure 4-5 shows, all channel's name will be listed under Module Name and the program starts to define the UUT CH Number from up to down (ex. 1, 2, 3), then defines the Output Name. The name is specified as Output plus CH Number, for instance Output1, Output2, Output3. At last set the Channel to Active True. Following explains the usage of each element or indicator.

Tot_CH 8		<input type="checkbox"/> Use Parallel		
Module Name	UUT CH Number	Parallel Setting	Output Name (Length <=7)	Active
63307L	1	None	Output1	<input checked="" type="checkbox"/> True
63307R	2	None	Output2	<input checked="" type="checkbox"/> True
63302	3	None	Output3	<input checked="" type="checkbox"/> True
63302	4	None	Output4	<input checked="" type="checkbox"/> True
63302A	5	None	Output5	<input checked="" type="checkbox"/> True
63302A	6	None	Output6	<input checked="" type="checkbox"/> True
63310A	7	None	Output7	<input checked="" type="checkbox"/> True
63310A	8	None	Output8	<input checked="" type="checkbox"/> True

Figure 4-5 Channel and Parallel Use Display Screen

4.3.1 Total Channel

It shows the total effective channel number read back by Soft Panel after initialization. It is for indication only and is not changeable.

Tot_CH 8

Figure 4-6 Total Channel

4.3.2 Module Name

All Channel names are listed under Module Name so that the user can map them to icon and Output Name.

Module Name
63102A
.
63102A
.
63102A

Figure 4-7 Module Name

4.3.3 UUT CH Number

The program starts to define the UUT CH Number, and the Channel number is counting sequentially from 1, 2, 3. It is merely for the user to understand the sequence arrangement of Soft Panel. Generally, when inserting different modules into the vacancies of a Frame, they could be CH3, CH4 or CH7, CH8 for hardware's viewpoint; however, from the viewpoint of UUT, the test sequence is defined as CH1, CH2 and the vacant invalid channel will be cancelled and rearranged.



Figure 4-8 UUT CH Number

4.3.4 Output Name

The user can set the Output Name as they like; however, it is suggested not to exceed 7 characters. The reason is that the test report format of Sweep Function, Program Function and Battery Function for Output Name allows 7 characters only. The user should take this restriction under consideration when naming.

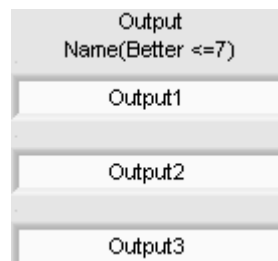


Figure 4-9 Output Name

4.3.5 Active

The default setting is True which indicates the mapped channel is active. Simply clearing the check box can set the channel to non-active without changing the hardware connection. The Soft Panel will not send any commands to the hardware device. When a channel is set to non-active, no matter what panel test is performed (Static \ Dynamic..) it is unable to loading or Trigger On and parallel is not supported. ◦

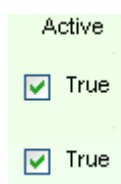


Figure 4-10 Active

4.3.6 Use Parallel

It sets if parallel is in use. The function of Use parallel is to add the power and even the loading current. The functions support parallel testing are Static and Program Panel at present.

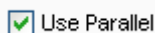


Figure 4-11 Selecting Use Parallel

4.3.7 Parallel Setting

Select Use Parallel will active the setting as Figure 4-12 shows. Parallel Setting turns to available from dimmed. This column is default set to None that indicates parallel is not defined. If parallel is needed, select the options starting with P such as P_1, P_2.... The common usage of parallel is two channels, so if there are 4 channels for paralleling, the number in P_number will be 4 divided 2. P_1 indicates the paralleled first group. The user can define how many channels to be paralleled for the first group according to the requirements. The parallel in general is to even the loading current. When the user specifies a parallel set, the Output name of lower channel under Parallel Setting will be modified to be same as the upper one. However, when it restores to None, Output name will change to “?” string in order to remind the user to modify it.



Figure 4-12 Parallel Setting



4.3.8 Function Buttons

Figure 4-13 shows the function buttons including: Static Test, Dynamic Test, Sweep Test, Program Test, Battery Test, OCP, Charger Test, Configuration Setting, Production Information and Exit. The user can click it for operation based on the test. Detail information of the Function buttons is described in the following chapter.



Figure 4-13 Function Buttons

4.4 Saving and Opening Parameter


There are two buttons at the upper right window, save  and open  that can save all Hardware Setting parameters and open for next time use.

4.4.1 SAVE

Click the button as Figure 4-14 shows can save the parameters set on current page to a .HW file.



Figure 4-14 Save Button

To save the current parameters for next time use, click  will open the dialog box as Figure 4-15 shows. Select the path and the filename (with the extension .HW) for save. The user can save different settings to different files. The saved file will occupy some disk space and more settings can be saved if the disk space is large enough.

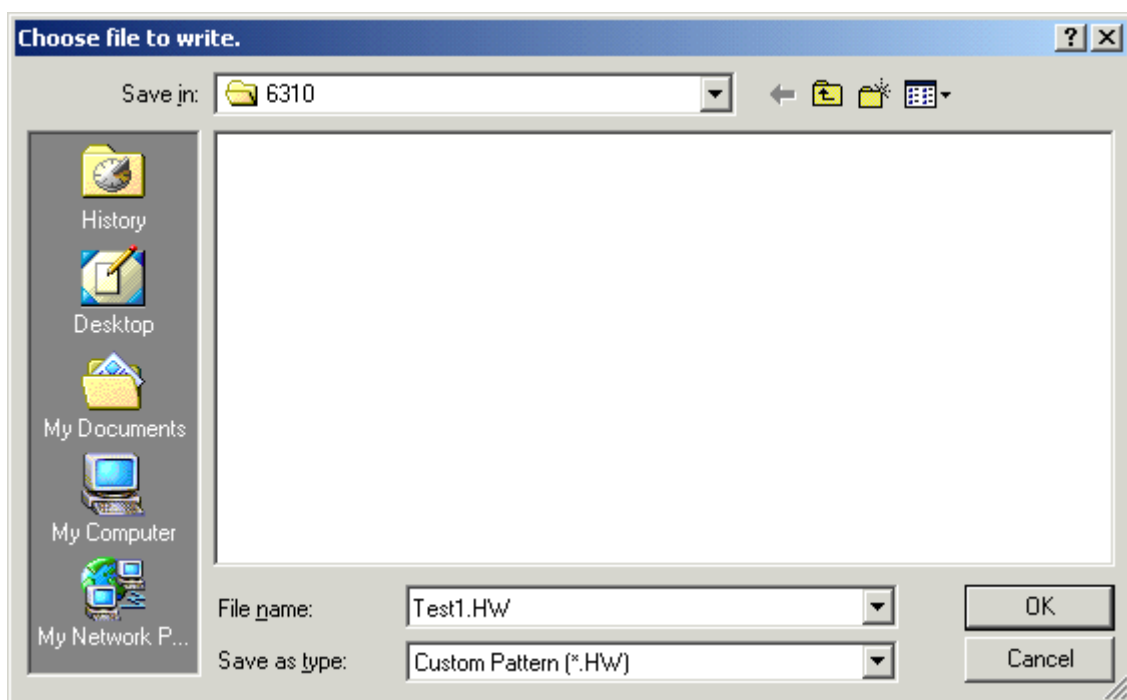


Figure 4-15 Dialog Box for SAVE

4.4.2 OPEN

Click the button as Figure 4-16 shows can open a .HW file that is already saved in the hard disk. It simplifies the work for entering parameters and avoids input errors.



Figure 4-16 Open Button

The user can enter the path in the following dialog box to open the saved parameters or click Cancel to abort the action.

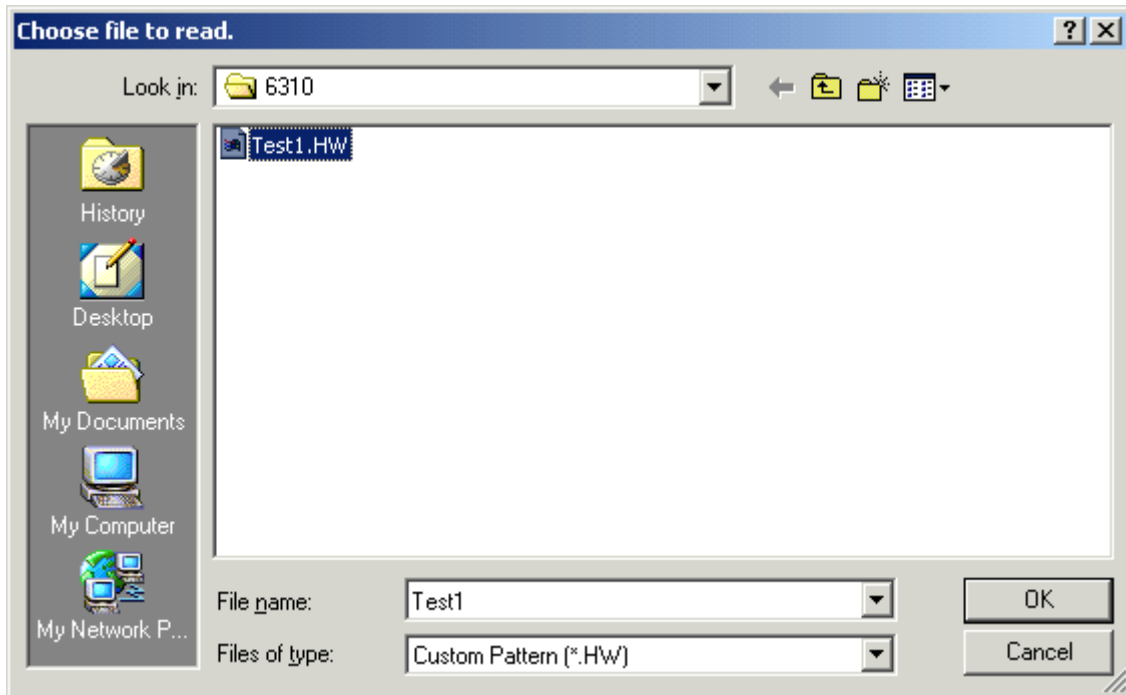


Figure 4-17 Dialog Box for OPEN

4.5 Back

Click this button will skip the current page and return to previous window.



Figure 4-18 Back Button

4.6 Exit

Click this button will quit the Soft Panel.



Figure 4-19 Exit Button

5. Configuration

It will go to Figure 5-1 and download the default settings before doing the Function test. To



modify the configuration, click **Conf.** in Hardware Setting window. There are 3 tabs in Configuration Main Panel – General, Slew Rate Setting and F/W Save. The settings that appeared for the first time are default read from the standalone unit.

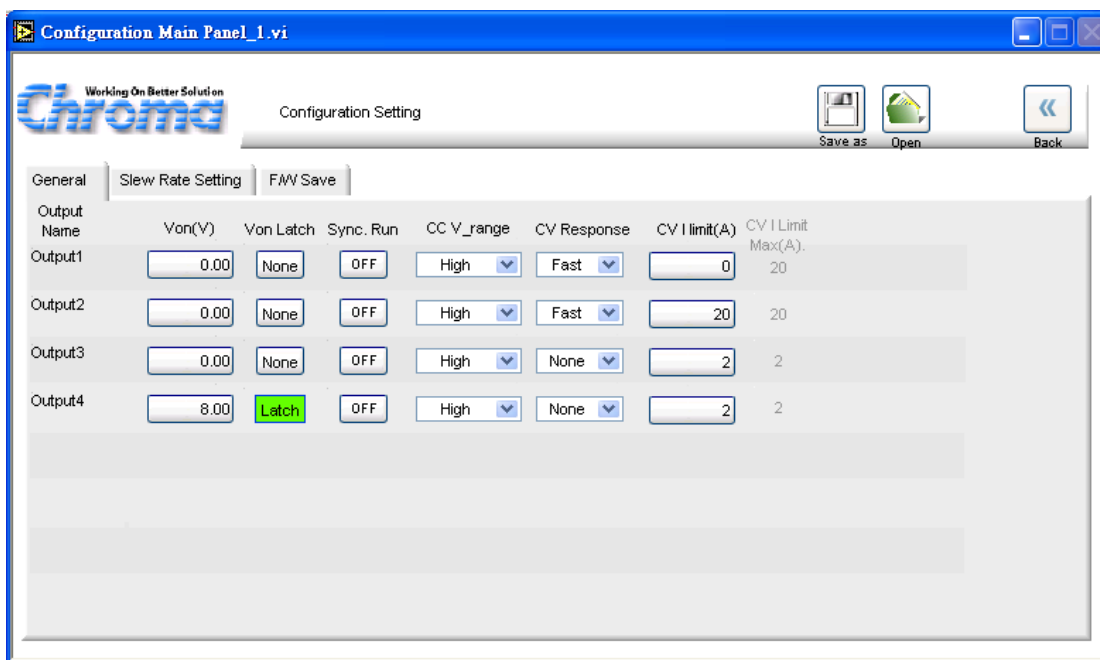


Figure 5-1 Configuration Setting Window

5.1 General

The General tab is Hardware Configuration Setting including Von, Von Latch, Sync Run CC V_range, C_Limit, Response and CV I Limit (A) with the indicator of CV I Limit Max (A). The setting is to map the Output Name to the command-receiving channel.

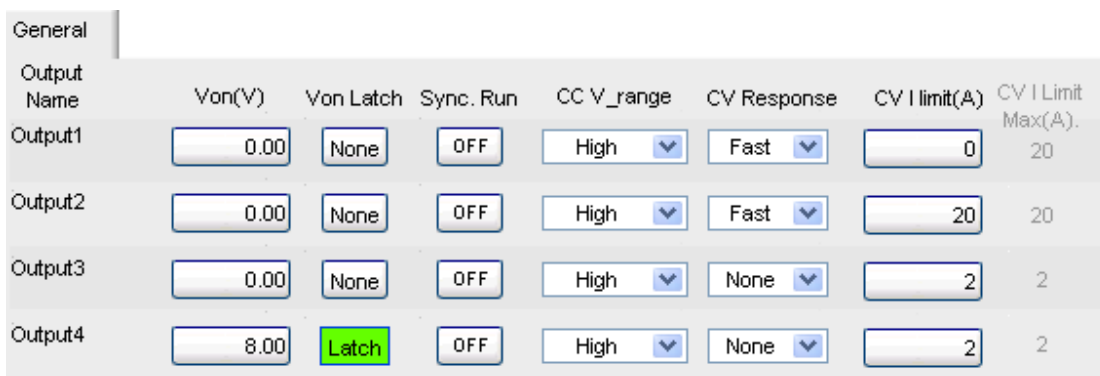


Figure 5-2 General Parameter Setting Page

5.1.1 Von Point

It sets the UUT to start loading current when the output voltage reaches a certain volt.

5.1.2 Von Latch

It maps to Von Point. Latch On means once the measured voltage reaches Von, it will start loading current no matter if the voltage is dropping lower than Von.

5.1.3 Syncn Run

When ON is set the spec judgment will activate under Go/NoGo Test.

5.1.4 CC V_range

When it is set to High it means it is in the high range of module's voltage.

5.1.5 CV Response

It appears when selecting CV Mode. It indicates the hardware internal reaction speed from original voltage rises to the set voltage when set to Fast.

5.1.6 CV Current Limit

It appears when selecting CV Mode which means to set the maximum current. It will go to protection mode when exceeds. The CV I Limit Max on the right side shows the maximum limit available for setting.

5.2 Slew Rate Setting

It sets the Slew Rate for the mode selected. First select the mode and set the maximum and minimum of Rise Slew Rate and Fall Slew Rate in the two columns at right.

Output Name	Mode	Rise SR mA/μS	Fall SR mA/μS	SR Min.	SR Max.
Output1	CCL	0.64	0.64	0.64	160
Output2	CCH	0.8	0.8	0.8	200
Output3	CCL	0.32	0.32	0.32	80
Output4	CCH	3.2	3.2	3.2	800
Output5	CCH	3.2	3.2	3.2	800
Output6	CCH	3.2	3.2	3.2	800
Output7	CCH	0	0	0	0
Output8	CCH	0	0	0	0

Figure 5-3 Slew Rate Setting Page

5.3 F/W Save

It saves the set parameters to device firmware. First select the Save Numeric and click **Save to Firmware** to save the settings in current window to the device firmware. It saves the settings to the Program of standalone unit for execution. The range of Save Numeric is 1~100.

Output Name	Save Numeric	Save to Firmware
Output1	1	<input type="button" value="Save to Firmware"/>
Output2		
Output3		
Output4		
Output5		
Output6		
Output7		
Output8		

Figure 5-4 F/W Save Parameter Setting Page

5.3.1 SAVE, OPEN & BACK

The function of these three buttons is the same as the one in Hardware Setting; see section 4.4 and 4.5 for detail information.

6. Static Test

The main function of this window is to run static test. The user can follow the requirements to select the loading mode for test. First the software will prompt the Output Name to indicate the Channel for action. It is necessary to refer to this column when setting Mode and Loading. If gray shading appears in the window, it means not available for use. When the total Channel number is larger than 8, the scroll bar will be active. The user is able to scroll it for page change and the maximum channel number of each page is 8. The functions of this window are explained below.

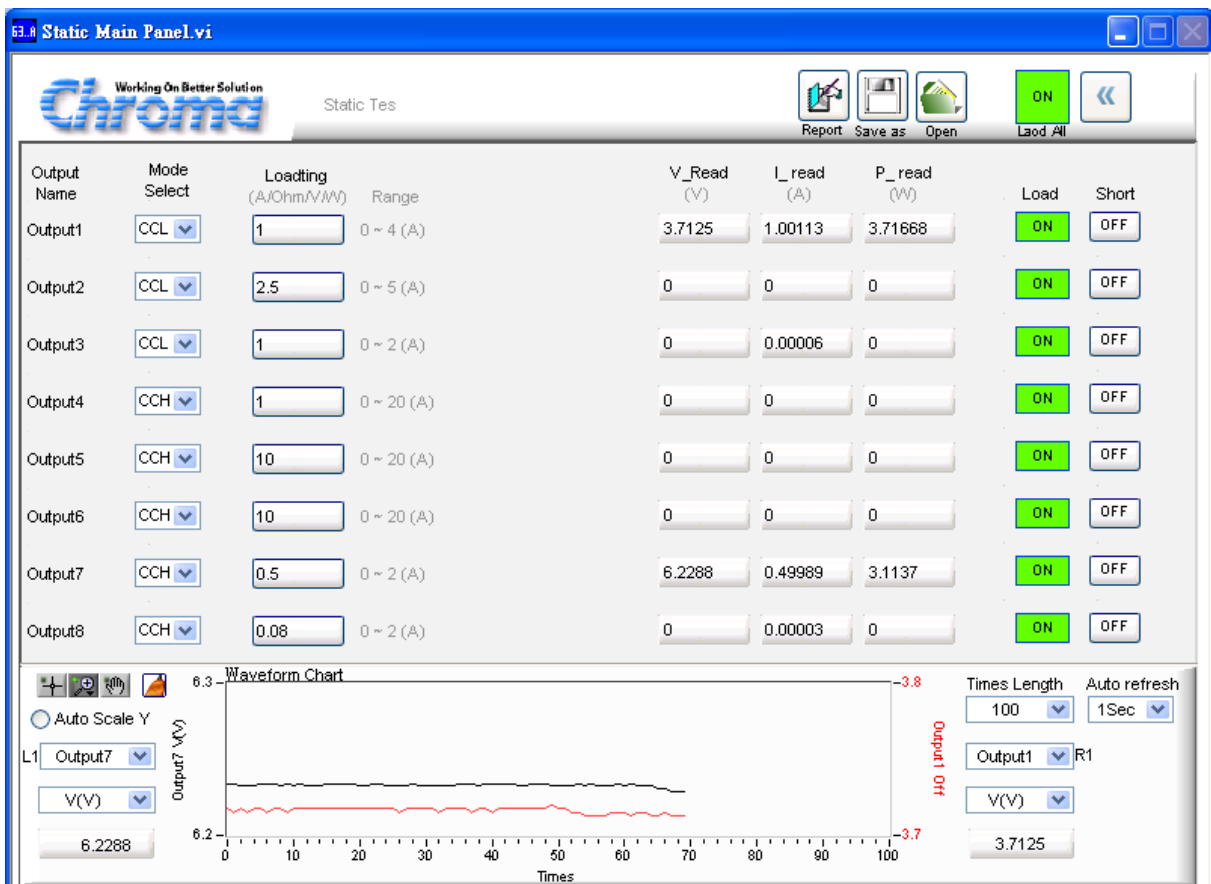


Figure 6-1 Static Test Window

6.1 Selecting Mode

There are CCL, CCH, CRL, CRH, CV, CPL and CPH loading modes in Static Test. Each channel has these 7 options for selection. When different mode is selected, the loading range to be set changes too. Click the mode of each channel will prompt a menu for selection or use the up and down arrow to select it.

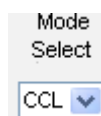


Figure 6-2 Static Test Mode Selection

If the Module does not support the mode selected, it will prompt a warning message. For instance, if the Module is 63110A and changing the CCH Mode to CPL Mode it will prompt the following dialog box and then return to CCH Mode.

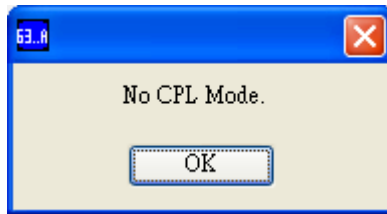


Figure 6-3 Warning Message for Incorrect Mode Setting

Note : The 6310 Series have no CP Mode.

6.2 Setting Loading

The Loading range varies with Mode as well as the Module No. It is also varied when in parallel use. The range available for setting shows in the Range column at right and when the maximum range is entered, the range will return to its original setting. The setting unit is varied with Mode, for instance, the unit is A for CCL and CCH mode and Ohm for A, CRL and CRH mode.

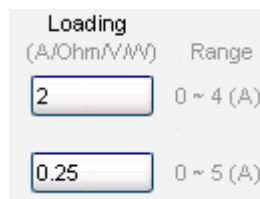


Figure 6-4 Setting Loading

6.3 Readings

When Auto Refresh is not set to Off, the V_Read, I_Read, P_Read and Waveform Chart will show the readings. When Auto Refresh sets to Off, the V_Read, I_Read and P_Read will stay at the last readings and appear in grayscale. The readings of each row represent a channel and each column shows voltage, current and power readings at the same time.

V_Read (V)	I_read (A)	P_read (W)
3.715	1.001	3.71871
0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
6.2305	1.09983	6.85247
0.01038	0.00013	0

Figure 6-5 Readings

6.4 Setting Load On/Off

It enables the loading action to Load On or disables it to Load Off. When Load All is set, all channels will be Load On or Load Off together. Load All facilitates the user's operation only without any hardware loading effect.

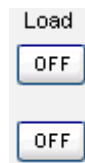


Figure 6-6 Setting Load On/Off



Figure 6-7 Location of Load All

6.5 Setting Short On/Off

It is set for short test. When On appears after clicked, the red LED indicates the hardware loading is shorted and click it again will turn to Short OFF. There are two restrictions for short test, first it has to be in CCH, CCDH, CRL, CRH or CV Mode and second it has to be Load On then Short On.

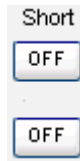


Figure 6-8 Setting Short On/Off

6.6 Reading Display

This area provides a view for a period of time or the correlation between two readings.

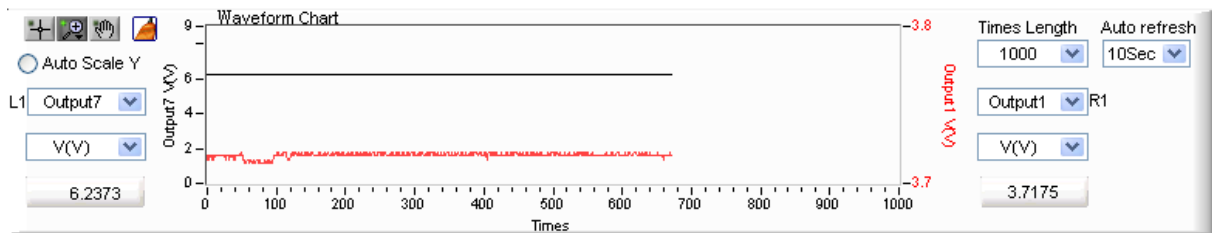


Figure 6-9 Reading Display

6.6.1 Setting Auto Refresh

It decides if enabling all readings in Static Panel. It asks the standalone unit for the readings per second if 1 Sec is set. It is a drop-down menu that has Off, 0.1 Sec, 0.5 Sec, 1 Sec, 2 Sec, 5 Sec and 10 Sec available for selection.

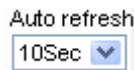


Figure 6-10 Setting Auto Refresh

6.6.2 Waveform Chart

The Waveform Chart is composed of two Y axes and an X axis of Times. The X axis shows in times due to the time setting of Auto Refresh and its length is determined by the Times Length on the right. The left side of Y axis using black font maps to L1 selection while the right side using red font maps to R1 selection. The Auto Scale Y maps to the scale of 2 Y axes.

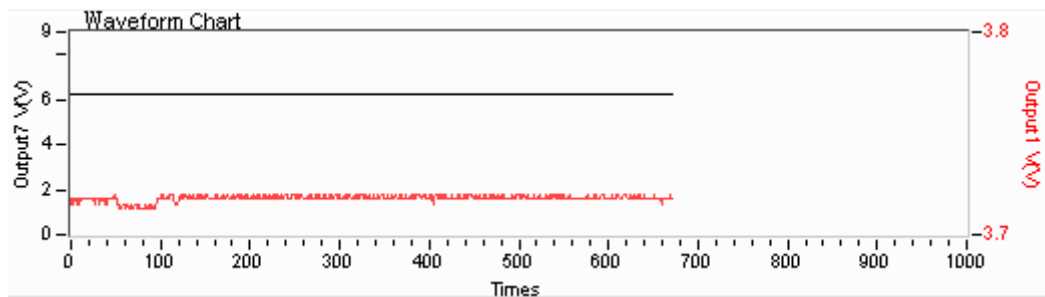








Figure 6-11 Waveform Chart

Graph tools: They are normal , zoom in and move which are explained below.

Normal : No action will be performed on Waveform Chart. Click the button will return to normal.

Zoom In : It has 5 zoom in and 1 zoom out functions as the figure shown below. The

yellow part in  and  can zoom in partially by click-and-drag the mouse. The  means to zoom in the area clicked by the mouse while  means to zoom out the area clicked by the mouse.

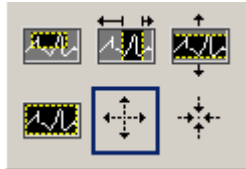




Figure 6-12 Digitizing Graph Zoom In Selection

Note  Since the ratio for zoom in and out is not fixed, it can set Auto Refresh seconds except Off or change the maximum/minimum of X, Y axis directly to return to normal waveform.

Move : Select this function can move the waveform up and down or left and right by click-and-hold Waveform, which means to change the view position but not the scale.

Clear : Click this button will clean the data on the Waveform Chart.

6.6.3 Auto Scale Y

It sets if auto adjusting the two sides scales of Waveform Chart Y axes. The software will follow the data in Chart to adjust the display area when enabled. Generally it retrieves the maximum/minimum value; however, auto scale will make the scale pitch very small when the data change is little. Thus the fluctuation in the graph will look big. If disabled, the scale of Y axis can be changed freely; however, it can't be viewed if exceeding the range and the up/down range has to be adjusted again.

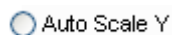


Figure 6-13 Auto Scale Y

6.6.4 Setting L1 Parameter

This parameter sets the display type on the left of Waveform Chart by selecting the Output CH, voltage, current or power. The selection of Output CH is the CH number activated in H/W Configuration. The bottom shows the readings and the mapped color in chart is black.

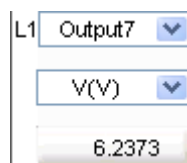


Figure 6-14 Setting L1 Parameter

6.6.5 Setting R1 Parameter

This parameter sets the display type on the right of Waveform Chart by selecting the Output CH, voltage, current or power. The selection of Output CH is the CH number activated in H/W Configuration. The bottom shows the readings and the mapped color in chart is red.

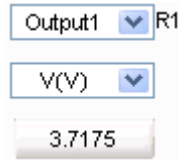


Figure 6-15 Setting R1 Parameter

6.6.6 Setting Times Length

This parameter sets the display dots for Waveform Chart X axis. It is a drop-down menu that has 100, 1000, 10000 and 50000 available for selection. For instance, if 1000 is selected the Waveform Chart shows 1000 dots maximum, and if the entry has more than 1000 dots of data it will keep the last 1000 dots but the data in Waveform Chart won't be missing.

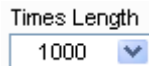


Figure 6-16 Setting Times Length

6.7 Report

It sets the Report and the data to generate the Report. Since both Static and Dynamic are not tested in fixed time length, Report function can be used to set the time and record the V, I



and P values of each channel on standalone unit. Click **Report** to enter into Report Panel for

parameter setting and click  to return to Static Main Panel.



Figure 6-17 Report



The **Report** is on when it is active and recording as shown below.



Figure 6-18 When the Report is On

6.8 SAVE, OPEN & BACK

The function of these three buttons is the same as the one in Hardware Setting; see section 4.4 and 4.5 for detail information.

7. Dynamic Test

The main function of this window is to test the dynamic loading as need. First the software will prompt the Output Name to indicate the Channel for action. It is necessary to refer to this column when setting Mode and Loading. If gray shading appears in the window, it means not available for use. When the total Channel number is larger than 8, the scroll bar will be active. The user is able to scroll it for page change and the maximum channel number of each page is 8. The functions of this window are explained below.

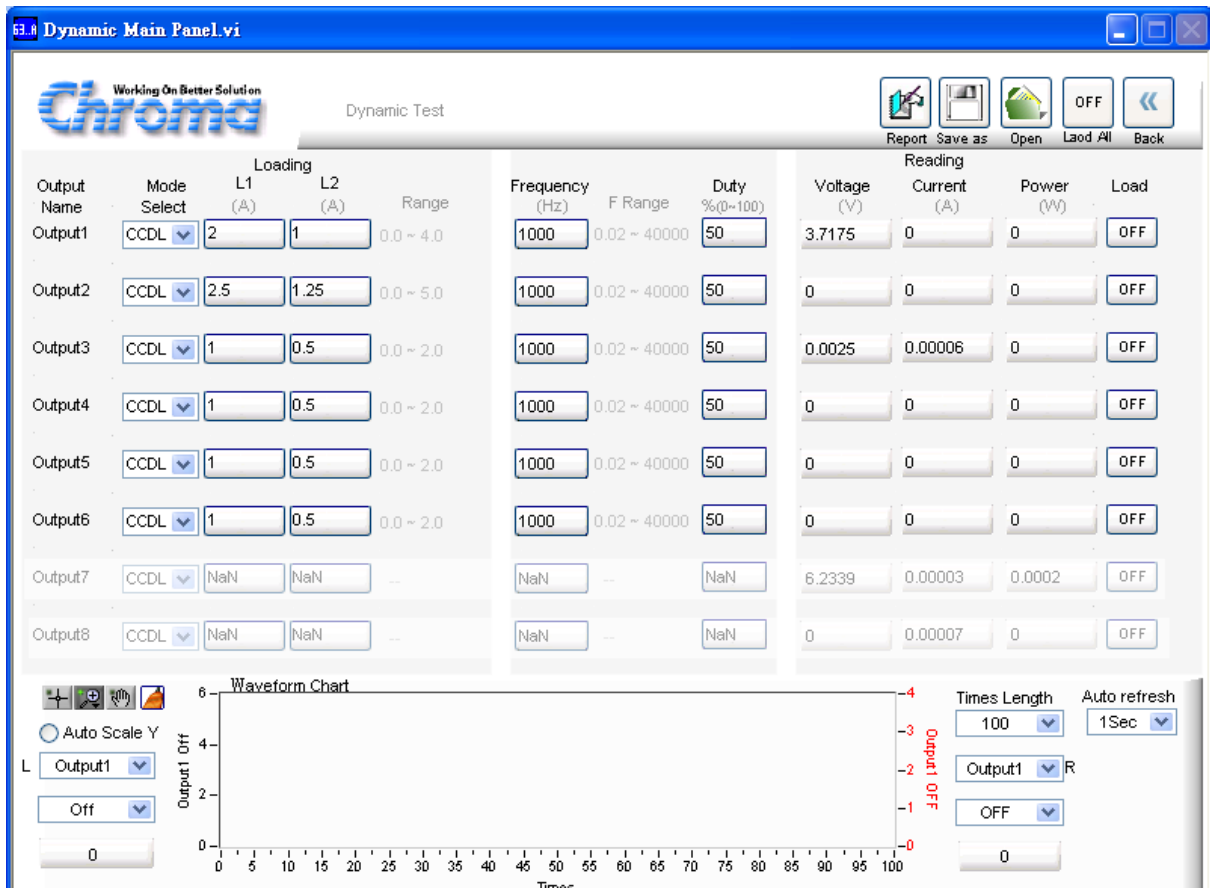


Figure 7-1 Dynamic Test Window

7.1 Selecting Mode

There are CCDL and CCDH loading modes in Dynamic Test. Each channel has these two options. When different mode is selected, the loading range varies as well. Click the mode of each channel will prompt a menu for selection or use the up and down arrow to select it.

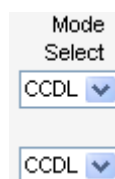


Figure 7-2 Dynamic Test- Mode Select

7.2 Setting Loading

There are L1 and L2 two dynamic loadings. The Loading range changes not only according to the Mode but also following the Module No. Moreover, it changes according to parallel use which should be kept in mind. When the input value exceeds the maximum range, it will return to the original setting.

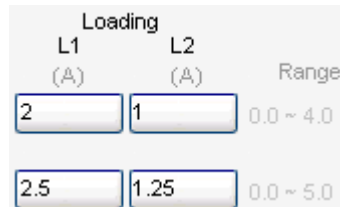


Figure 7-3 Setting Loading

7.3 Setting Frequency-Duty

It is composed of Freq (Hz) and Duty (%). The setting range of Frequency is from 0.033 to 2000Hz and Duty is from 0 % to 100%. The mapped instrument settings are T1 and T2, and the calculation formula is $T1 = (1/\text{Frequency}) * \text{Duty}\%$, $T2 = (1/\text{Frequency}) * (1 - \text{Duty}\%)$.



Figure 7-4 Setting Frequency-Duty

7.4 Readings

Please refer to section 6.3 for detail description.

7.5 Setting Load On/Off

It can enable the loading action to Load On or disable it to Load Off. When Load All is set, all channels will be Load On or Load Off together. Load All facilitates the user's operation only without any hardware loading effect.

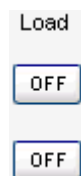


Figure 7-5 Setting Load On/Off

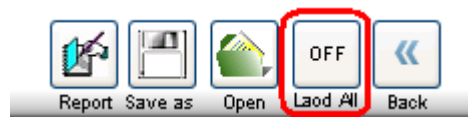


Figure 7-6 Load All

7.6 Reading Display

It is same as the functions described in section 6.6.

7.7 Report

Please refer to section 6.7 for detail description.

7.8 SAVE, OPEN & BACK

The function of these three buttons is the same as the one in Hardware Setting; see section 4.4 and 4.5 for detail information.

8. Sweep Test

Sweep Mode is mainly operated by Dynamic Mode. Its major output is a simulated sinusoidal waveform. When in different frequency the Slew Rate will adjust in order to make the dynamic loading current same as the sinusoidal waveform loading. It adjusts the value of T1, T2 and Slew Rate based on the THD (Total Harmonic Distortion), which is 0.04471 and the value of L1 and L2. The operation mode is divided into Auto and Manual where Auto means to run following the execution time of each step from the start frequency to end automatically, while Manual can define the start frequency and the increment of each step to determine the execution period and number of times. Sweep Mode is not available in parallel mode.

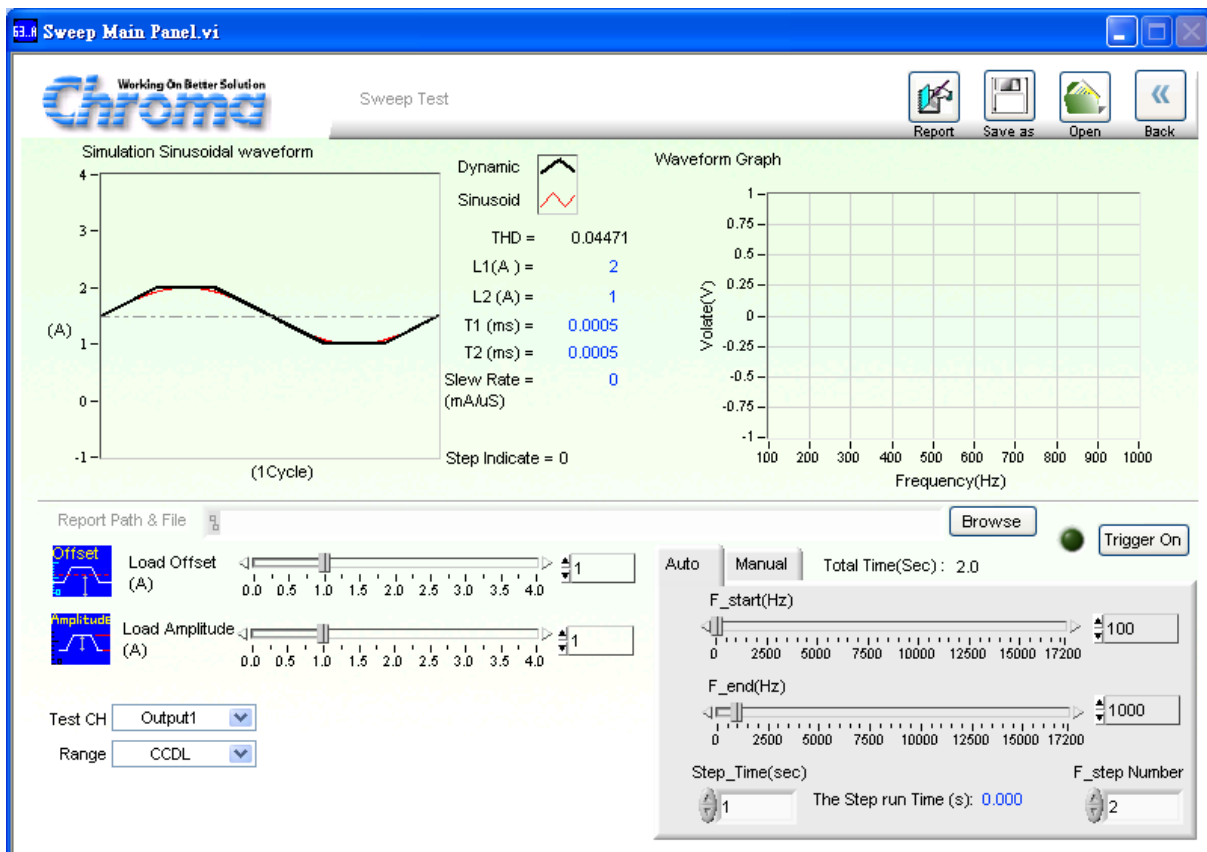


Figure 8-1 Sweep Mode Window

8.1 Simulation Sinusoidal Waveform

This display area will follow setting of Load Offset and Load Amplitude to redraw a Sine wave. Since $THD=0.04471$, the software will calculate different T1, T2 and Slew Rate for various frequencies. The user can see a simulated trapezoidal waveform on the sine wave clearly. This simulated waveform is the output waveform of loading current. Step indicates the how many steps had been executed. L1, L2, T1, T2 and Slew Rate will show the current setting according to the execution condition.

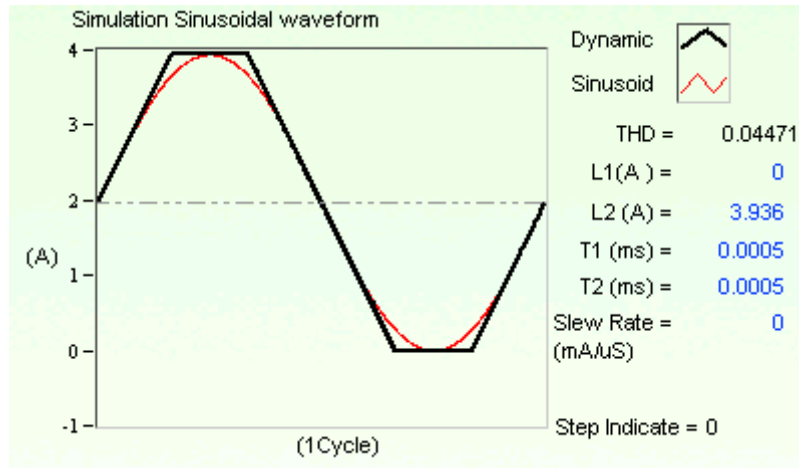


Figure 8-2 Simulation Sinusoidal Waveform

8.2 Setting Loading

There are Load Offset and Load Amplitude two items where Load Offset maps to L1 and Load Offset + Load Amplitude maps to L2. The Loading range changes not only according to the Mode but also following the Module No. Moreover, it changes according to parallel use which should be kept in mind.

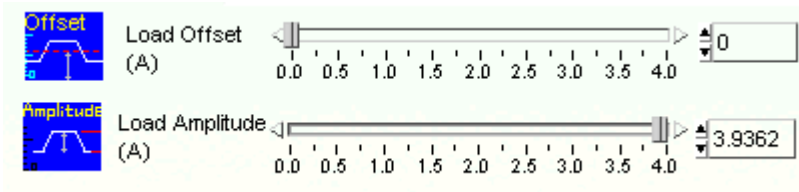


Figure 8-3 Setting Loading

8.3 Scanning Frequency

There are Auto and Manual two tabs for scanning frequency. The scanning and calculation of frequency are related to T1, T2 and Slew Rate. The scanning starts right after it is triggered. The setting range varies with the setting of Loading, Loading Mode and Module. Auto means to run following the execution time of each step from the start frequency to end automatically, while Manual can define the start frequency and the increment of each step to determine the execution period and number of times.

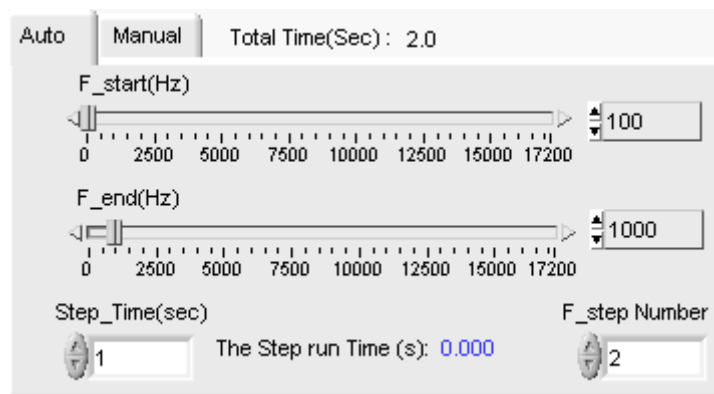


Figure 8-4 Scanning Frequency

8.3.1 Auto

There are F_start, F_end, Step_Time and F_step Number in Auto tab.

F_start: It sets the start frequency. The maximum is 20000Hz and minimum is restricted by THD, Loading, Module and high/low range of loading mode.

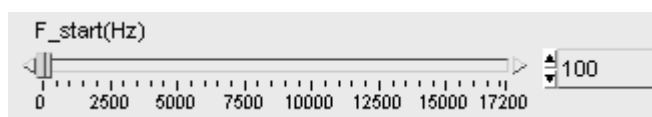


Figure 8-5 F_start

F_end: It sets the end frequency. The range is same as F_start.

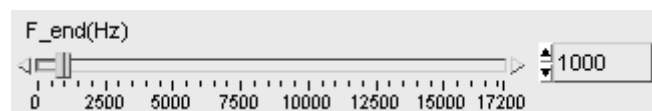


Figure 8-6 F_end

Step_Time: It sets the execution time of a step. The unit is Sec.

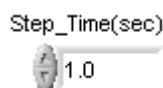


Figure 8-7 Step_Time

F_step Number: It sets the number of steps from F_start to F_end.

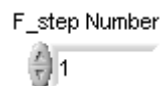


Figure 8-8 F_step Number

8.3.2 Manual

There are F_start, dF and Next in Manual tab.

F_start: It sets the start frequency. The maximum is 20000Hz and minimum is restricted by THD, Loading, Module and high/low range of loading mode.

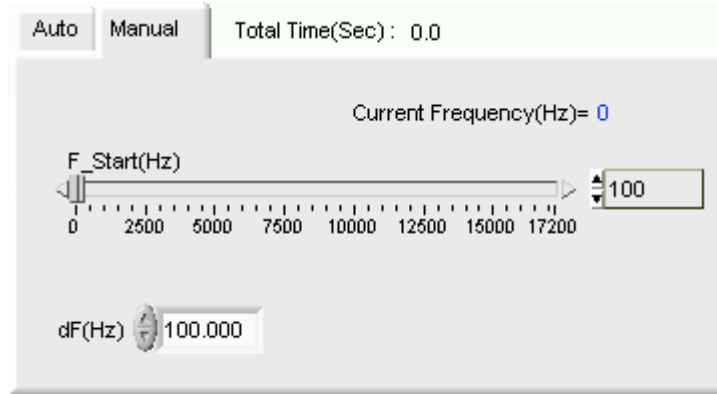


Figure 8-9 Manual

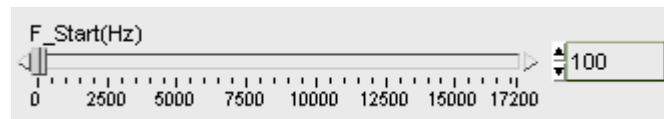


Figure 8-10 F_start

dF: It sets the frequency increment of each addition step from the range of 0.033 to 20000Hz.



Figure 8-11 dF

Next: It can be clicked only when Trigger On. The frequency will increase dF from F_Start but won't exceed the maximum frequency range.



Figure 8-12 Next Button

8.3.3 Test CH

It is used to select the channel to be tested. If a parallel channel is selected, the software will give a warning as the parallel mode is not supported. Sweep Test can only test one channel a time.

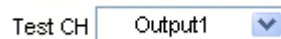


Figure 8-13 Test CH

8.3.4 Range

There are CCDL and CCDH two options for range setting and it affects the loading current to be set

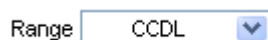


Figure 8-14 Range

8.3.5 Trigger On Button

It triggers Sweep Test for execution. The test starts when Trigger on is clicked and click it again to Trigger Off will cancel the test.

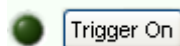


Figure 8-15 Trigger On Button

8.3.6 Total Time Indicator

It sums up the total test time when operating in Auto mode. When in Manual mode, it starts counting the execution time after Trigger On.

Total Time(Sec): 0.0

Figure 8-16 Total Time Indicator

8.4 V-F Chart

When Trigger On enables, the frequency is scanned for the readback voltage of each dot. The voltage curve is drawn according to F_start and the execution time of each step.

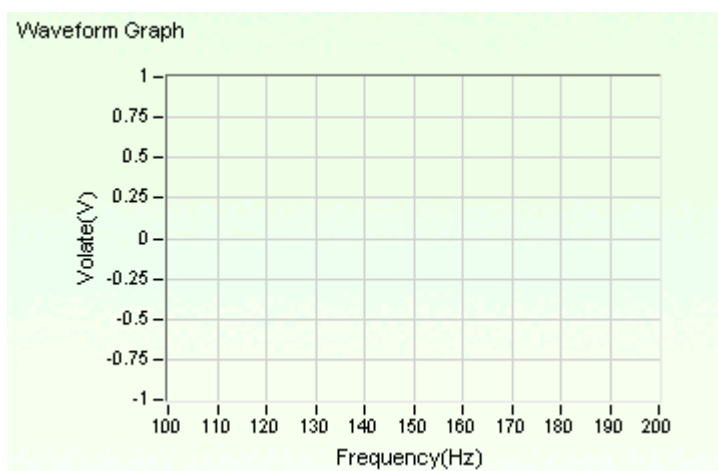


Figure 8-17 V-F Chart

8.5 Report Format

Sweep test provides a simple, pure text report in *.txt format. The report function and its file path as well as filename are explained below:

8.5.1 Report Yes/No

If there is a need to open the Report function, just set the Report to On to enable it and the Report Path & File will appear.



Figure 8-18 Report Yes/No Selection

8.5.2 Report Path & File

This is for the user to define the Report path and file name when Report function is enabled. Click Browse will prompt a dialog box for selecting path and file name.



Figure 8-19 Report Path & File

8.5.3 Report Result

The Sweep Test Report contains settings and readings. The settings include: Output Name, Range, Load Offset(A), Load Amplitude(A), Sweep Mode, F_satart (Hz), F_end(Hz), Step Time(Sec), and F_step Number. The readings include all mapping values of F_V as the figure shown below.

Chroma DC Load Sweep Test Report		
----- Setting -----		
Output Name	:	Output1
Range	:	CCDL
Load Offset(A)	:	0.5000
Load Amplitude(A)	:	1.5000
Sweep Mode	:	Auto
F_satart (Hz)	:	500.000
F_end(Hz)	:	2000.00
Step Time(Sec)	:	1.0
F_step Number	:	10
----- Reading -----		
No.	F(Hz)	Voltage(V)
1	500.00	4.63150
2	666.67	4.61900
3	833.33	4.61675
4	1000.00	4.62575
5	1166.67	4.62275
6	1333.33	4.61825
7	1500.00	4.61725
8	1666.67	4.62250
9	1833.33	4.61975
10	2000.00	4.61575

Figure 8-20 Report Result

8.6 SAVE, OPEN & BACK

The function of these three buttons is the same as the one in Hardware Setting; see section 4.4 and 4.5 for detail information.

9. Program Test

This mode provides List Sequence and Step Sequence tests to replace the manual step test. The test program can be defined in advance so that the software can control the hardware to execute following the timing set. First the Output Name brings out the channel required for setting the Mode and during Loading. If a grayscale bar appears in the window, it is not available for use. The scroll bar is active when the total channel number is larger than 4. Scroll it for page change and the maximum channel number of each page is 4. Please be aware that the Program Mode execution in Soft Panel is done by software and is different from the Program Mode of standalone unit. The functions of this window are explained below.

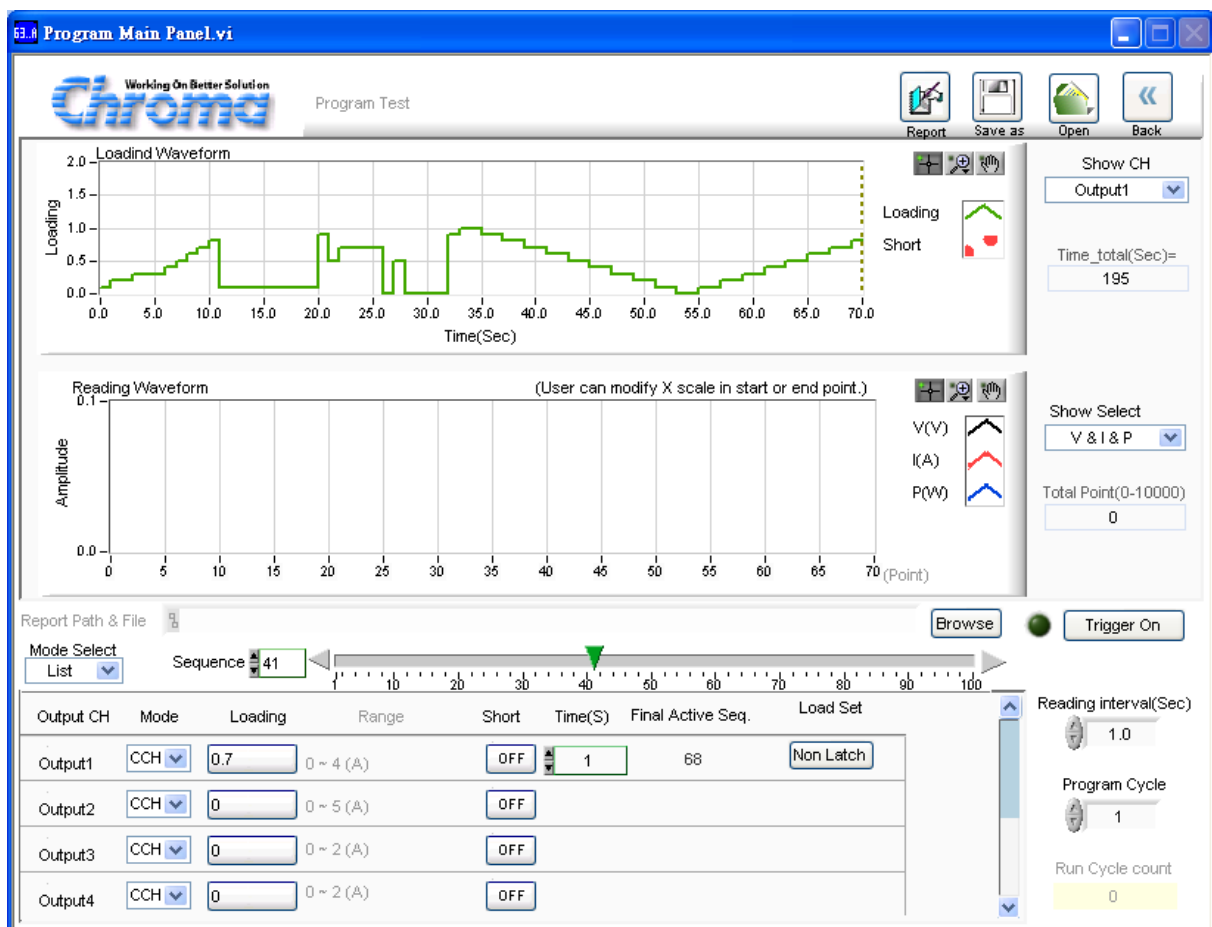


Figure 9-1 Program Test Window

9.1 Loading Simulation Waveform

This is a display area that draws the changes of loading including Loading value (Y axis), execution time ratio (X-axis) and if using Short (List Mode). The red area indicates short. Show CH indicates which channel setting is used to do the simulation. The user can choose only one channel at a time. Time_total indicates the time required for execution under the present settings. The 0 indicator beneath will start counting to inform the user how much time has passed. In the mean time the Waveform Chart has a scanning line to show user the time executed and the loading value.

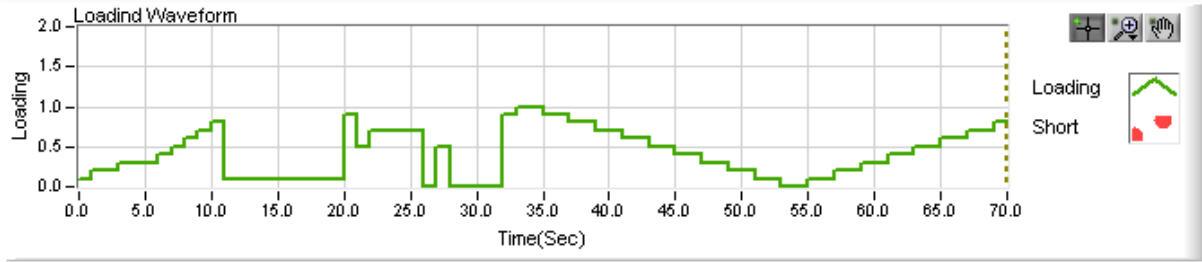


Figure 9-2 Loading Simulation Waveform

9.2 Setting List Mode Parameter

Select List as Figure 9-3 shows in List_Step to use the List Mode. It is composed of 100 sequences (1-100) and the user can enter the settings to specified items based on the requirements or conditions. Each sequence contains Setting, Short and Time parameters. Mode and Load Set will not change as the sequence changes. The definition of each item is described below.

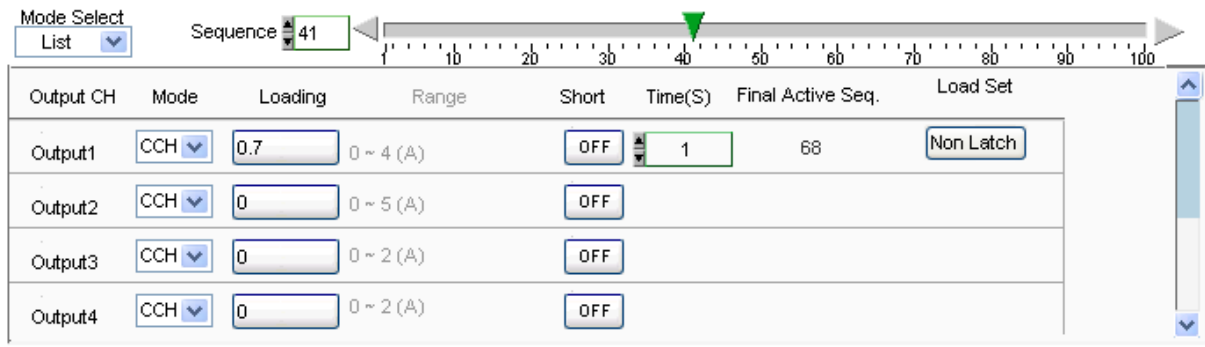


Figure 9-3 List Mode Parameters

9.2.1 Setting List_Step

It is at the upper left of setting area with List or Step Mode for selection. The selected mode will stay when done.



Figure 9-4 Setting List_Step

9.2.2 Setting Sequence

The range of sequence is from 1 to 100. There are 100 sequences in List Mode for execution. When switching to different sequence, the parameters - Setting, Short and Time will change as well, and each of them has 100 sets available for setting.

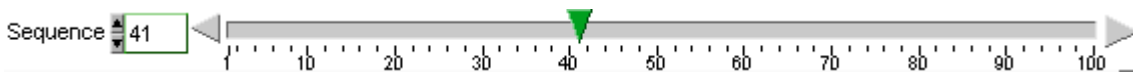


Figure 9-5 Setting Sequence

9.2.3 Displaying Output CH

The names of Output Channel display are defined by the configuration in Hardware window. The user can refer to the chapter *Setting Hardware* for the settings.

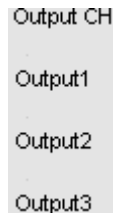


Figure 9-6 Displaying Output CH

9.2.4 Setting Mode

There are CCL, CCH, CRL, CRH, CV, CPL and CPH loading modes in Program Test. Each channel has these 7 options. When different mode is selected, the Loading range will be changed too. Click the channel will prompt a menu of modes for selection or use the up/down arrow to select it. Only one mode can be applied for the 100 sequences and no switch is allowed during the process. The setting will not change in List Mode or Step Mode. If the Module does not support the mode selected, it will prompt a warning message. For instance, if the Module is 63110A and changing the CCH Mode to CPL Mode it will prompt the following dialog box and then return to CCH Mode.

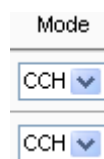


Figure 9-7 Setting Mode

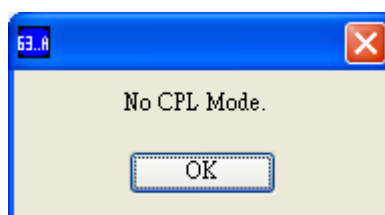


Figure 9-8 Warning Message for Incorrect Mode Setting

9.2.5 Setting Loading

There are 100 sets of "Loading" available for setting in List Mode. When the user changes the sequence, the Index will modify the "Loading" as well for mapping. The Loading range varies with Mode and Module No. Moreover, it changes according to parallel use which should be kept in mind. When the input value exceeds the maximum range, it will stay at the maximum and same for the minimum.

Loading	Range
0.7	0 ~ 4 (A)
0	0 ~ 5 (A)
0	0 ~ 2 (A)
0	0 ~ 2 (A)

Figure 9-9 Setting Loading

9.2.6 Setting Time

There are 100 sets of “Time” available for setting in List Mode. The unit is second. When the user changes the sequence, the Index will modify the “Time” as well for mapping. However, the execution time for all channels under the same sequence will be the same. In addition, if the time sets to 0 it indicates the subsequent time settings for sequence are all invalid. It also means the program doesn't have to be ended when 100 sequences are done. Set a certain sequence to 0, the program will stop running at one sequence prior. The mapping setting is Final Active Seq.



Figure 9-10 Setting Time

9.2.7 Setting Short

There are 100 sets of “Short” available for setting in List Mode. When the user changes the sequence, the Index will modify the “Short” as well for mapping. Short is not available in CCL Mode.



Figure 9-11 Setting Short

9.2.8 Final Active Seq.

Final Active Seq. indicates the present valid sequence, which is one that execution will stop. Set a certain sequence's time to 0 then the program will run till the sequence prior no matter if the later “Time” setting is 0.

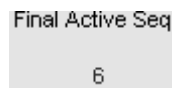


Figure 9-12 Final Active Seq.

9.2.9 Setting Load Set

It maps to Von Point. Latch On means once the measured voltage reaches Von it will do current loading no matter if the voltage is ever lower than Von. The setting will not change either in List Mode or Step Mode.

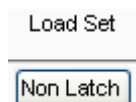


Figure 9-13 Setting Load Set

9.3 Step Mode Parameter

To use Step Mode, select Step in List_Step as Figure 9-14 shows. The same settings to List Mode are Output CH, Mode and Load Set. Following explains their definition. The biggest difference between Step and List is that the execution of each Step is fixed without increasing or decreasing loading, and the increment or decrement is also fixed.

Output CH	Mode	Step Start	Range	Step End	Run Time (Sec)	Count (1~1000)	Load Set
Output5	CCL	0	0 ~ 0 (A)	0	0.0	0	Non Latch
Output6	CCL	0	0 ~ 0 (A)	0			
Output7	CCL	0	0 ~ 0 (A)	0			
Output8	CCL	0	0 ~ 0 (A)	0			

Figure 9-14 Step Mode Parameter

9.3.1 Setting Start_Loading

It sets the start loading of each channel under Step. The Loading range changes not only according to the Mode but also following the Module No. Moreover, it changes according to parallel use which should be kept in mind. When the input value exceeds the maximum range, it will stay at the maximum and same for the minimum.

Step Start	Range
0	0 ~ 0 (A)
0	0 ~ 0 (A)
0	0 ~ 0 (A)
0	0 ~ 0 (A)

Figure 9-15 Setting Start_Loading

9.3.2 Setting End>Loading

It sets the end loading of each channel under Step. The Loading range changes not only according to the Mode but also following the Module No. Moreover, it changes according to parallel use which should be kept in mind. When the input value exceeds the maximum range, it will stay at the maximum and same for the minimum.

Range	Step End
0 ~ 0 (A)	0
0 ~ 0 (A)	0
0 ~ 0 (A)	0
0 ~ 0 (A)	0

Figure 9-16 Setting End>Loading

9.3.3 Setting Run Time

It sets the total execution time for the Step that is same for all channels. The unit is second.

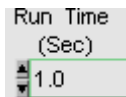


Figure 9-17 Setting Run Time

9.3.4 Setting Count

It sets how many steps are counted from Start>Loading to End>Loading during Run>Time. The range is from 1 to 1000. When setting to 1, it indicates only Start>Loading will be run.

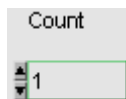


Figure 9-18 Setting Count

9.3.5 Setting Program Cycle

It sets the repeated cycle for execution in Step or List mode.

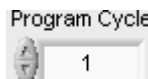


Figure 9-19 Setting Program Cycle

9.3.6 Setting Run Times Count

It shows the count of run time for executing Program Cycle.

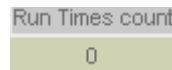


Figure 9-20 Setting Run Times count

9.4 Setting Trigger On/Off

Once all conditions are set, they can be executed by clicking Trigger On. During execution, a Run Bar will appear in the Loading simulation figure to inform the user the present progress. Click Trigger Off to stop it or Pause to suspend it.

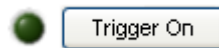


Figure 9-21 Setting Trigger On/Off

Pause Button:

This button only shows when Trigger On to suspend the present action. A dialog box will prompt when clicked, and click "OK" to resume it.

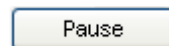


Figure 9-22 Pause Button

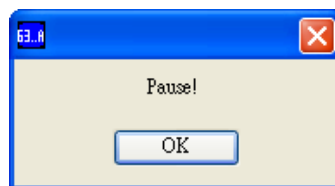


Figure 9-23 Pause Dialog Box

After Trigger on, the Loading Waveform has an indicator to show the execution progress and the user can view the loading condition.

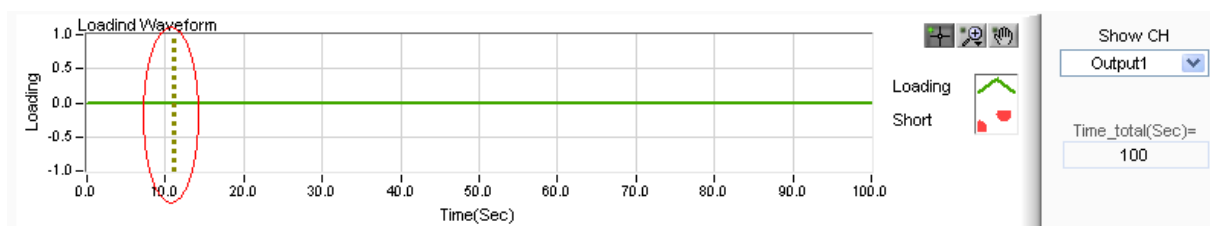


Figure 9-24 Execution Progress Indicator

Show CH

It is a drop-down menu with the selections of all active channels. It affects the display of Loading Waveform and Reading Waveform. It shows all changes in Step or List modes for Loading Waveform and current CH readings for Reading Waveform. When the test is done, the user can change it to view the reading curve of other channel.

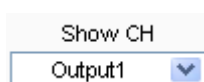


Figure 9-25 Show CH

Time Total (Sec) :

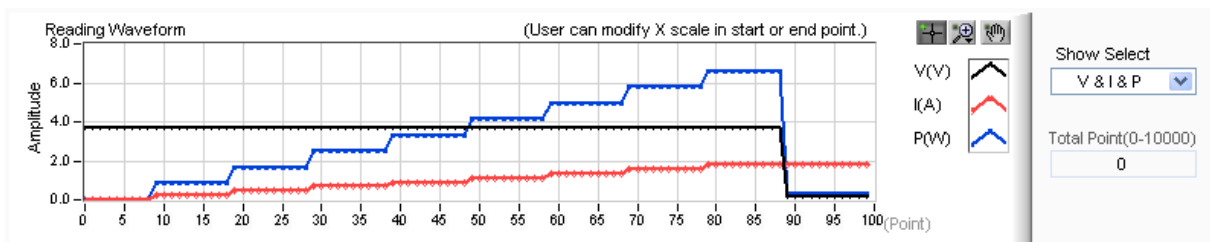
It adds up the total execution time of edited program.



Figure 9-26 Time Total (Sec)

9.5 Reading Waveform

After Trigger On, the user is able to view the changes of voltage, current and power. The Y axis indicates the amplitude size, while the voltage, current and power sizes are also mapped to the Y axis scale. The legend shows the representation of color. The scale maximum and minimum values of X axis can be changed by the user.



Show Select:

It has V&I&P, V, I and P 4 types of selections. If the lines are overlapped, it can select to view one curve only.

Total Point:

It sets the total points for monitoring the readings. For the time being, the test points are if the user extends the test time as each channel can display and save maximum 10000 dots. Thus if the test time is extended, the measure interval must be adjusted due to the limitation of 10000 dots.

Reading Interval (Sec):

It sets the time to read back the channel readings in the unit of second. It shows the measured type read back per second when set to 1 sec.

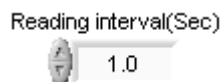


Figure 9-27 Reading Interval

9.6 SAVE, OPEN & BACK

The function of these three buttons is the same as the one in Hardware Setting; see section 4.4 and 4.5 for detail information.

9.7 Report Format

Program test provides a simple, pure text report in *.txt format. See Section 8.5 for the detail description of report function and its file path as well as filename.



Figure 9-28 Program Report

Program Test Report:

The report result contains settings and readings. The settings include: Program Function, Total run time, Load on Setting, Time Interval (Sec), Output Name, Mode, Loading Setting, Short and Time (S). The readings include: Voltage Reading (V), Current Reading (A), and the voltage or current readings of each sequence or step along with the mapping time. See Figure 9-29 for the example.

Chroma DC Load Program Test Report

```

----- Setting -----
Program Function : List Type           Totoal run time : 45.0
Load on Setting  : Non Latch           Time Interval(Sec): 5

Output Channel  Mode      Setting(A/R/U) Short  Time(S) |
-----
Output1        CCL      1.0000        No   5.0
Output1        CCL      0.0000        No   5.0
Output1        CCL      1.0000        No   5.0
Output1        CCL      0.0000        No   5.0
Output1        CCL      0.8000        No   5.0
Output1        CCL      0.0000        No   5.0
Output1        CCL      1.2000        No   5.0
Output1        CCL      0.0000        No   5.0
Output1        CCL      1.3000        No   5.0

----- Voltage Reading (V)-----
Seq.No  Output1  Date/Time
0       4.625   2005/10/20 PM 03:48:58
1       4.665   2005/10/20 PM 03:49:03
2       4.6275  2005/10/20 PM 03:49:08
3       4.665   2005/10/20 PM 03:49:13
4       4.635   2005/10/20 PM 03:49:17
5       4.665   2005/10/20 PM 03:49:22
6       4.6175  2005/10/20 PM 03:49:27
7       4.665   2005/10/20 PM 03:49:32
8       4.615   2005/10/20 PM 03:49:37

----- Current Reading (A) -----
Seq.No  Output1  Date/Time
0       0.99843  2005/10/20 PM 03:48:58
1       0.00018  2005/10/20 PM 03:49:03
2       0.99843  2005/10/20 PM 03:49:08
3       0.00018  2005/10/20 PM 03:49:13
4       0.79912  2005/10/20 PM 03:49:17
5       0.00018  2005/10/20 PM 03:49:22
6       1.19925  2005/10/20 PM 03:49:27
7       0.00018  2005/10/20 PM 03:49:32
8       1.29806  2005/10/20 PM 03:49:37
    
```

Figure 9-29 Report Result

10. Battery Test

This function is to test battery discharge by setting a fixed load and checking the battery output voltage after loading started. Once the voltage is adjusted to a certain cutoff potential, stop loading and calculate the total electric charge (mA-hour). The entire battery discharge status can be seen from the Battery Voltage and Current Reading Chart. If grayscale appears in the window, it means not available for use. When the total channel number is larger than 4, the scroll bar on the right will be active. The user is able to scroll it for page change and the maximum channel number of each page is 4.

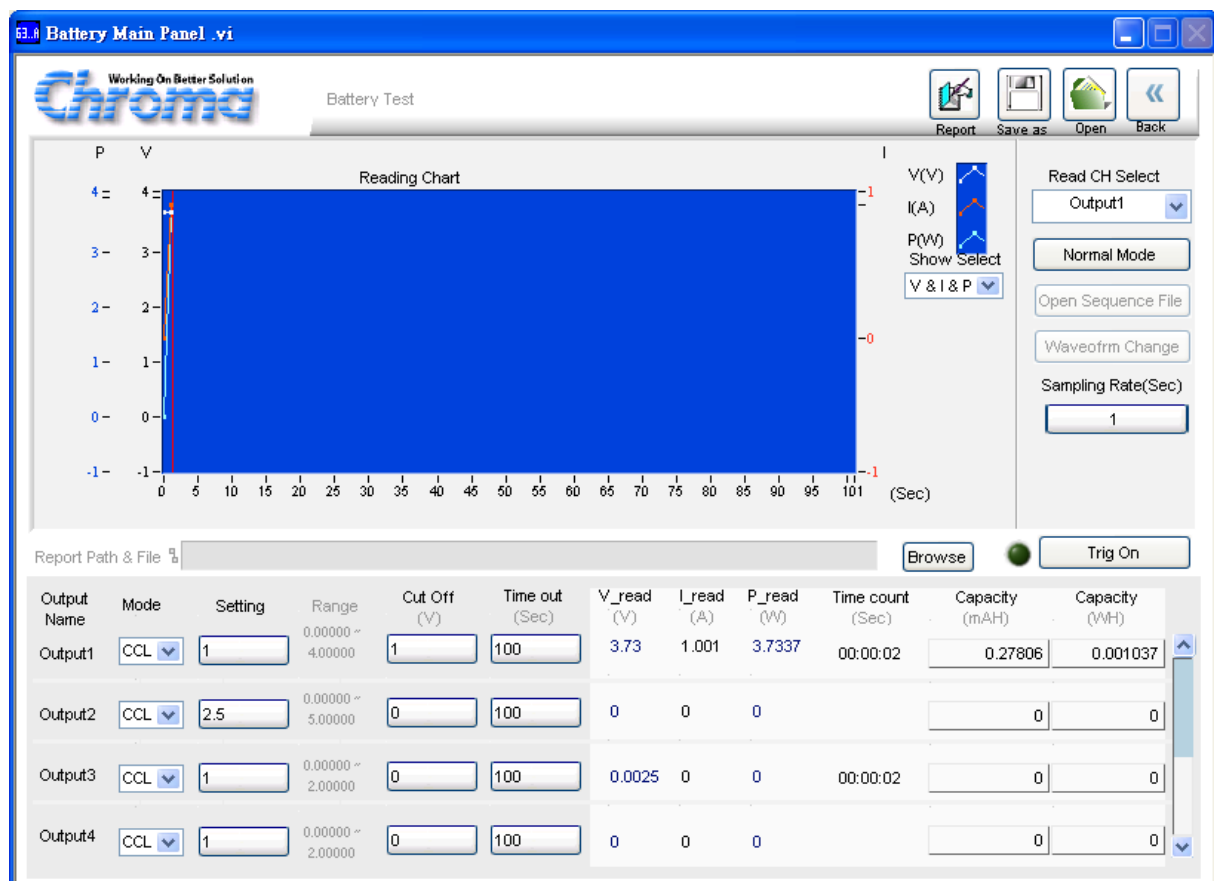


Figure 10-1 Battery Test Window

10.1 Operation Mode

It sets the operation mode to Normal or By Sequence. If Normal is selected, it means both loading and end conditions are activated by this Battery Test window; and if Program Mode is selected, it means the loading condition is determined by Program Test window and end condition is still activated by this Battery Test window. So when Program Mode is in use, the settings are same as the Chapter *Program Test* described; however, the trigger and end control are still performed by Battery Test window.

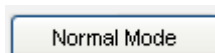


Figure 10-2 Selecting Operation Mode

10.2 Battery Voltage & Current Reading Chart

This chart draws voltage, current and power three curves at the same time as Figure 10-3 shows. The voltage curve is in white mapping to the Y axis scale at left of the first column in chart. The current curve is in red mapping to the Y-axis scale at right of the first column in chart. The power curve is in green mapping to the Y-axis scale at leftmost of chart. Read CH Select indicates what channel reading will be used to draw the curve and one channel can be selected at a time at the beginning. Sampling Rate is to set the time (sec.) to display the graphic readings. For long hour discharge, the rate can be increased so that the points won't be too much. The X-axis is the points for drawing. The points are calculated by comparing the time set by channel with the Sampling Rate before executing discharge test.

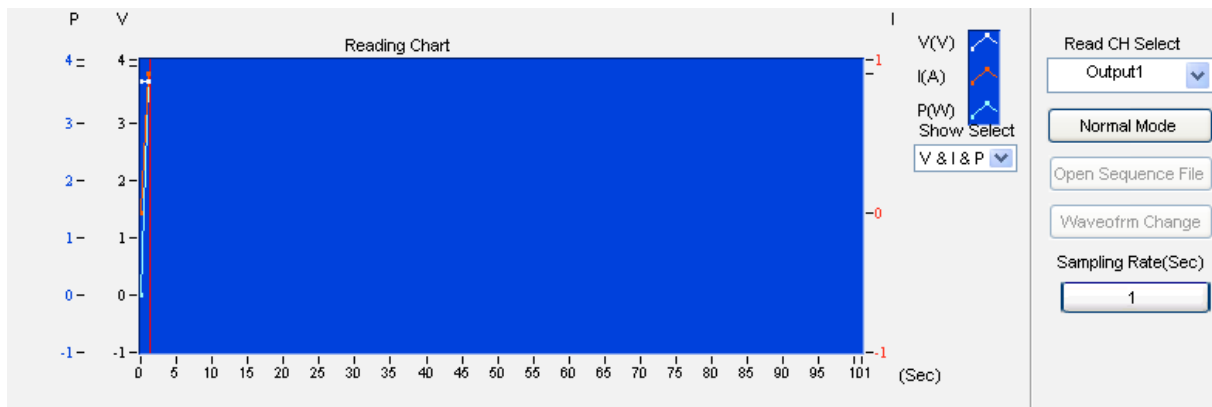


Figure 10-3 Battery Voltage & Current Reading Chart

10.3 Setting Battery Parameter

It sets the discharge loading mode and how many loads for loading. It also sets the end condition such the Cut Off voltage or when to Time Out. Once a condition is met, loading or discharge test will stop immediately.

Output Name	Mode	Setting	Range	Cut Off (V)	Time out (Sec)
Output1	CCL	1	0.00000 ~ 4.00000	1	100
Output2	CCL	2.5	0.00000 ~ 5.00000	0	100
Output3	CCL	1	0.00000 ~ 2.00000	0	100
Output4	CCL	1	0.00000 ~ 2.00000	0	100

Figure 10-4 Setting Battery Parameter

10.3.1 Displaying Output Name

The name of Output Channel is defined by the configuration in Hardware window. The user can refer to the chapter *Setting Hardware* for the settings.

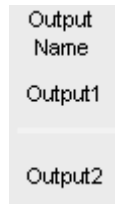


Figure 10-5 Displaying Output Name

10.3.2 Setting Mode

There are CCL, CCH, CRL, CRH, CPL and CPH loading modes in Battery Test. Each channel has these 6 options. When different mode is selected, the Loading range will be changed too. Click the channel will prompt a menu of modes for selection or use the up/down arrow to select it.

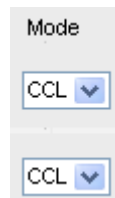


Figure 10-6 Setting Mode

10.3.3 Setting Battery Load

It sets the battery load in discharge test, which is a fixed value. A saved file in Program can be recalled for use and when the Sequence or Step is changed, the loading should change as well. The Loading range varies with Mode and Module. It will return to its original setting when the setting exceeds the maximum setting.

Setting	Range
1	0.00000 ~ 4.00000
2.5	0.00000 ~ 5.00000

Figure 10-7 Setting

10.3.4 Setting Cut Off_V

It sets the condition to end discharge test. When the measured voltage is lower than the set condition, the loading stops and so does the channel discharge test to get the capacity mAH.

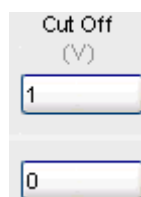


Figure 10-8 Cut Off_V

10.3.5 Setting Time Out

It sets the condition to end discharge test. Once the test time reaches the time out setting though the measured voltage is not lower than the set condition, the loading stops the loading stops and so does the channel discharge test to get the capacity mAH.



Figure 10-9 Setting Time Out

10.4 Displaying Measurements

This area shows the measured voltage, current, power, execution time and the discharged capacity at present. The voltage, current and power read back one time per second. When the voltage is lower than Cut Off_V, the Channel Time Count will stop and the Capacity (mAH) will stop counting too.

V_read (V)	I_read (A)	P_read (W)	Time count (Sec)	Capacity (mAH)	Capacity (Vh)
3.73	1.001	3.7337	00:00:02	0.27806	0.001037
0	0	0		0	0
0.0025	0	0	00:00:02	0	0
0	0	0		0	0

Figure 10-10 Displaying Measurements

10.5 Setting Trigger On/Off

Once all conditions are set, they can be executed by clicking Trigger On. During execution, a Battery Voltage & Current Reading Chart will start to draw the curve according to the measurement values to inform the user the present progress. To stop it, just click Trigger Off. All tested channels will follow the set conditions to proceed counting or stop.

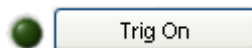


Figure 10-11 Setting Trigger On/Off

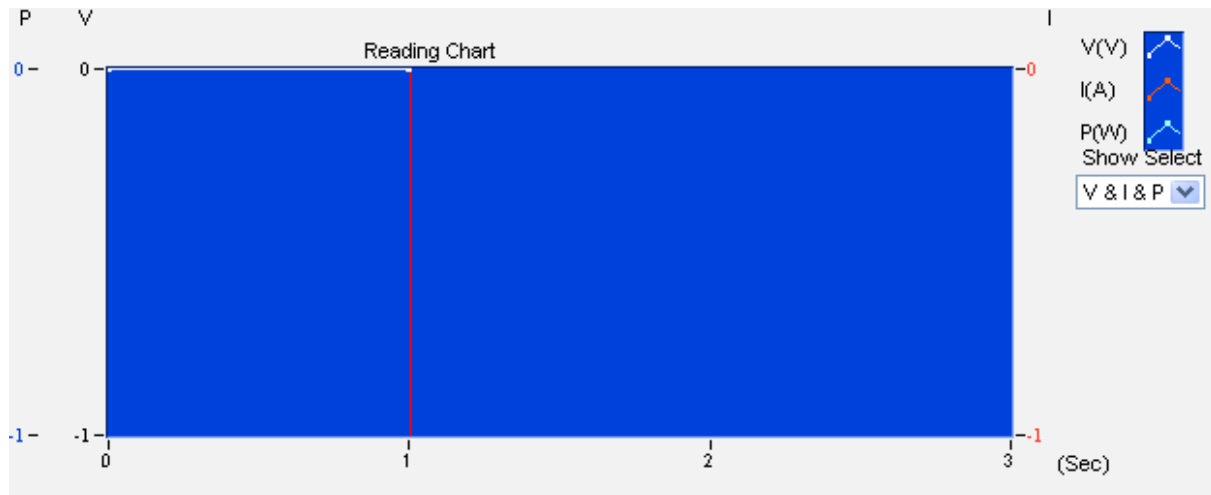


Figure 10-12

Read CH Select:

It is a drop-down menu with the selections of all active channels. It affects the display of Reading Chart which shows the readings of present channel. When the test is done, the user can change it to view the reading curve of other channel.

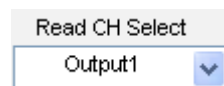


Figure 10-13 Read CH Select

Show Select:

It has V&I&P, Voltage, Current and Power 4 types of selections. If the lines are overlapped, it can select to view one curve only.

10.6 Program Mode

This function will enable when switching from Normal Mode to Program Mode and the load change of battery discharge will be dynamically. The related settings include Open Sequence File and Waveform Change. Click Open Sequence File can select a saved file in Program Test window for the load change of this battery discharge; while clicking Waveform Change can switch the simulation window and reading window.

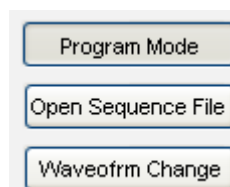


Figure 10-14 Two Settings in Program Mode

Waveform Graph:

Since the loading is variable when opening the program file, the user should confirm if it is correct when loading into the Waveform Graph. It will load Program Cycle, Final Active Seq. and time.

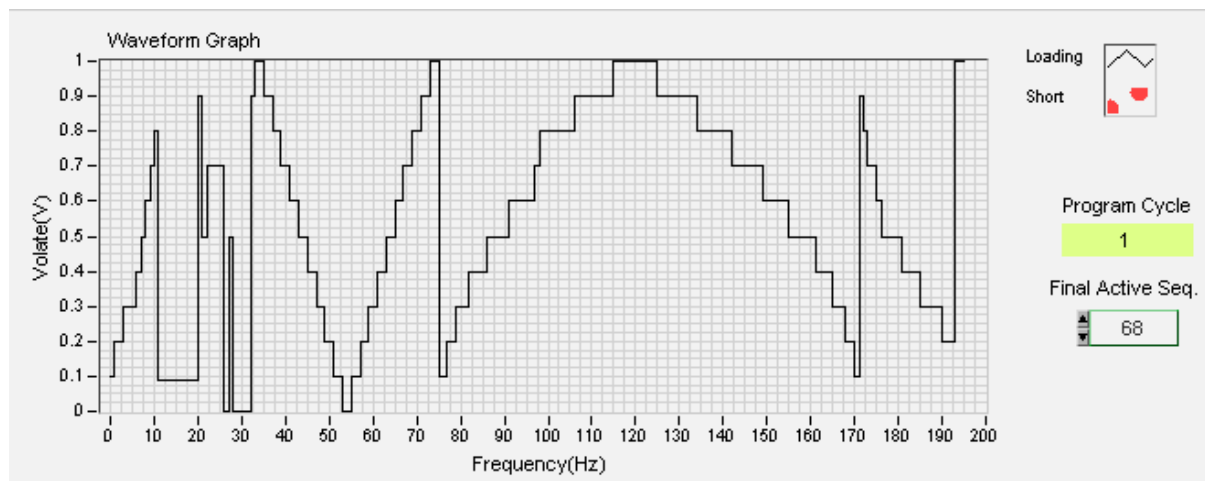


Figure 10-15 Program Loading Display for Battery Test

The Mode, Setting and Time out columns will be changed when loading the Program setting settings for Battery Test. The Cut Off voltage is determined by the Battery test settings. Please be aware that the opening channel number must match when downloading the Program for Battery tests, or it won't be able to confirm if the Range or Mode is supported.

Output Name	Mode	Setting	Range	Cut Off (V)	Time out (Sec)
Output5	CCL	1	0.00000 ~ 2.00000	0	195
Output6	CCL	40	0.00000 ~ 80.00000	0	195
Output7	CCL	0.024	0.00000 ~ 0.60000	0	195
Output8	CCL	0.024	0.00000 ~ 0.60000	0	195

Figure 10-16 Replacing Program for Battery Test

10.7 SAVE, OPEN & BACK

The function of these three buttons is the same as the one in Hardware Setting; see section 4.4 and 4.5 for detail information. The difference is that the setting parameters are saved in an Untitled. Battery file.

10.8 Report Format

Battery test provides a simple, pure text report in *.txt format. See Section 8.5 for the detail description of report function and its file path as well as filename.



Figure 10-17 Report under Battery Test

Battery Test Report:

The report result contains settings and readings. The settings include: Mode, Setting (A/R/W), Cut Off (V) and Time Out (S). The readings include: Time Count, Capacity (mAH). See Figure 10-18 for the example.

```

Chroma DC Load Battery Test Report
----- Setting -----
Output Channel  Mode      Setting(A/R/W)  Cut Off(V)      Time Out(S)
-----
Output1         CCL       1.3000         0.50           100.0

----- Reading -----
Output Channel  Time Count      Capacity(mAH)
-----
Output1         00:01:40       36.057396
  
```

Figure 10-18 Report Result

11. OCP Test

The over current protection test is to observe the output voltage and current changes when the loading current is getting bigger and bigger. The changes are shown in graphic. This test is not suitable when the UUT is in Hiccup mode.

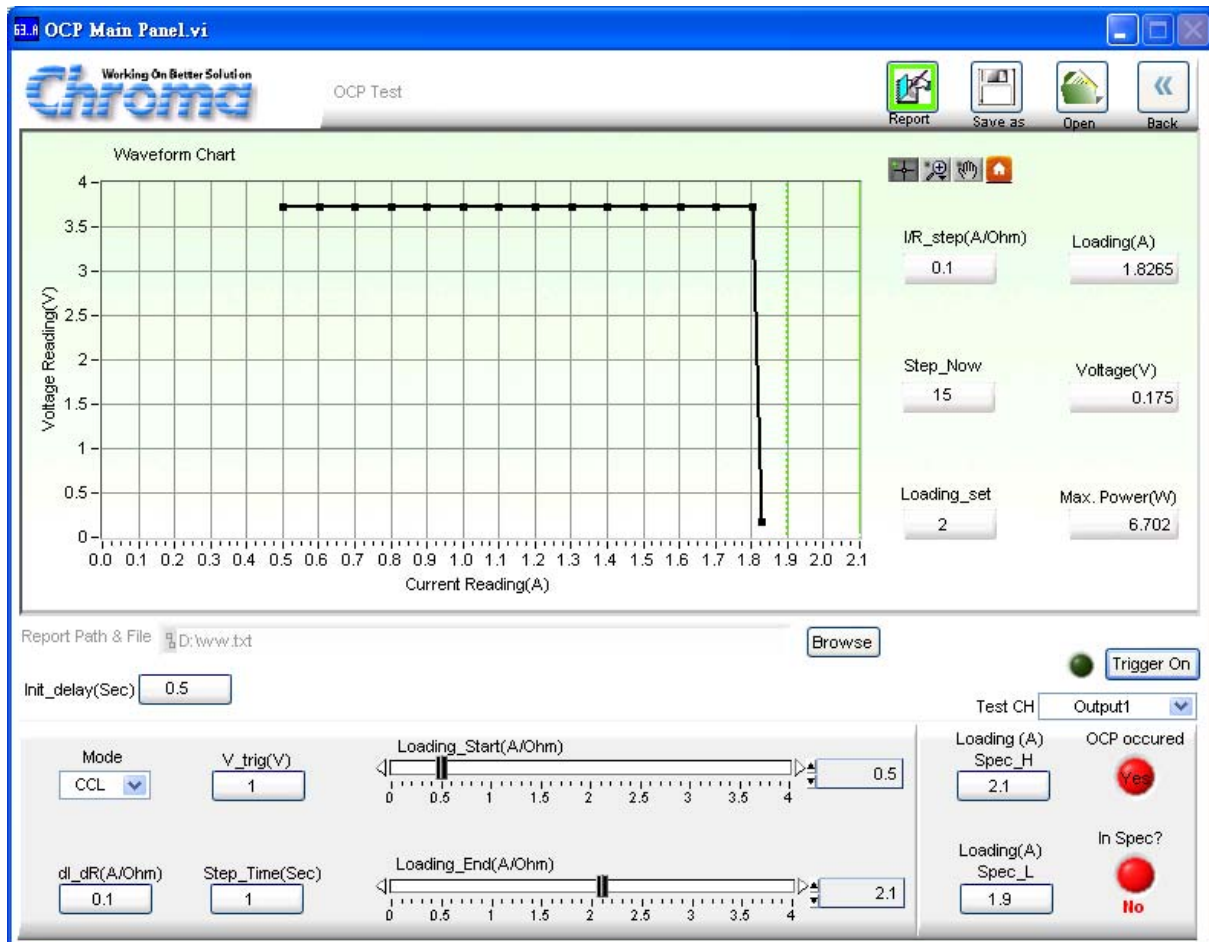


Figure 11-1 OCP Control Screen

11.1 OCP Parameter

There are Mode, V_trig, dl_dR, Step_Time, Loading_Start, Loading_End, Test on the CH, Init_delay, Loading SPEC_H, Loading SPEC_L and Trigger On parameters available for setting. Loading, Voltage, Max Loading, Max Power and Loading_set, Step_Now, and I/R_step are shown in digital format. The OCP Waveform Curve will draw the waveform according to the voltage and current readings.

11.1.1 Setting Mode

There are CCL, CCH, CRL & CRH 4 loading modes in OCP Test for selection. When different mode is selected, the Loading range will be changed too. Click the channel will prompt a menu of modes for selection or use the up/down arrow to select it.

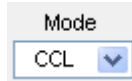


Figure 11-2 Mode

11.1.2 V_trig

It sets the output voltage drop for terminating the test.

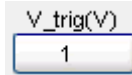


Figure 11-3 OCP – V_trig

11.1.3 Init Delay

It sets the time delayed for measurement after loading. It usually causes measurement error when measuring right after loading.



Figure 11-4 OCP – Init Delay

11.1.4 Loading Start

It sets the start loading current (resistance) for hardware when doing OCP Test.

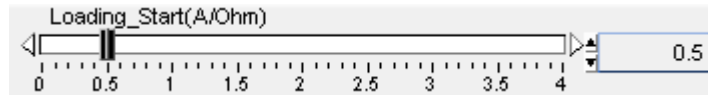


Figure 11-5 OCP – Loading Start

11.1.5 Loading End

It sets the end loading current (resistance) for hardware when doing OCP Test.

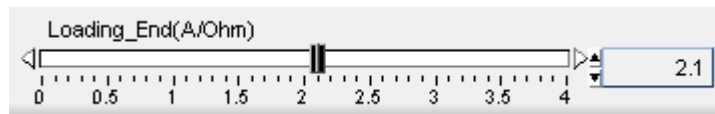


Figure 11-6 OCP – Loading End

11.1.6 dl_dR

It sets the current increment of each step from Loading Start. Since it is for OCP test, the load gets bigger and bigger. If CC is selected for Mode, the dl value will be positive and if CR is chosen for Mode, then the dR value will be negative.

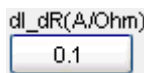


Figure 11-7 OCP – dl_dR

11.1.7 Step Time

It sets the loading time of each step in second.

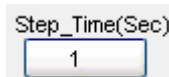


Figure 11-8 OCP – Step Time

11.1.8 Test CH

It specifies the channel to be tested. If a parallel channel is selected, the software will prompt a warning message to inform that the parallel mode is not supported. Only one channel can be selected for OCP Test one time.

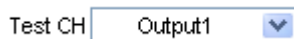


Figure 11-9 OCP – Test on the CH

11.1.9 Loading Spec_H

It sets the high limit spec for OCP measurement.

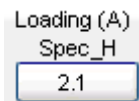


Figure 11-10 OCP – Loading Spec_H

11.1.10 Loading Spec_L

It sets the low limit spec for OCP measurement.

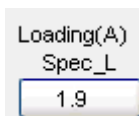


Figure 11-11 OCP – Loading Spec_L

11.1.11 Trigger On

Click this button will start loading current for OCP test.

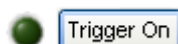


Figure 11-12 Trigger on

11.1.12 Loading Display

It shows the present measured current once the test starts.



Figure 11-13 OCP – Loading Display

11.1.13 Voltage Display

It shows the present measured output voltage once the test starts.

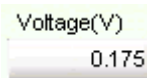


Figure 11-14 OCP – Voltage Display

11.1.14 Max Power Display

It shows the maximum power measured at present once the test starts.



Figure 11-15 OCP – Max. Power

11.1.15 Loading_set

It shows the present used load current once the test starts.

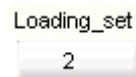


Figure 11-16 Loading_set

11.1.16 Step_Now

It shows the number of step tested after the test begins.



Figure 11-17 OCP – Step_Now

11.1.17 I/R_step

It shows the increment (positive) of current or decrement (negative) of resistance after the test begins.

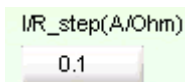


Figure 11-18 OCP – I_Step

11.1.18 OCP Waveform Chart

It shows the X-Y waveform chart of current and voltage. When the test begins the software will keep reading the present voltage/current following different loading current. This Waveform Chart is a dynamic display and it shows the point of all steps where the Y-axis is an Auto Scale of voltage and X-axis is the scale of loading current.

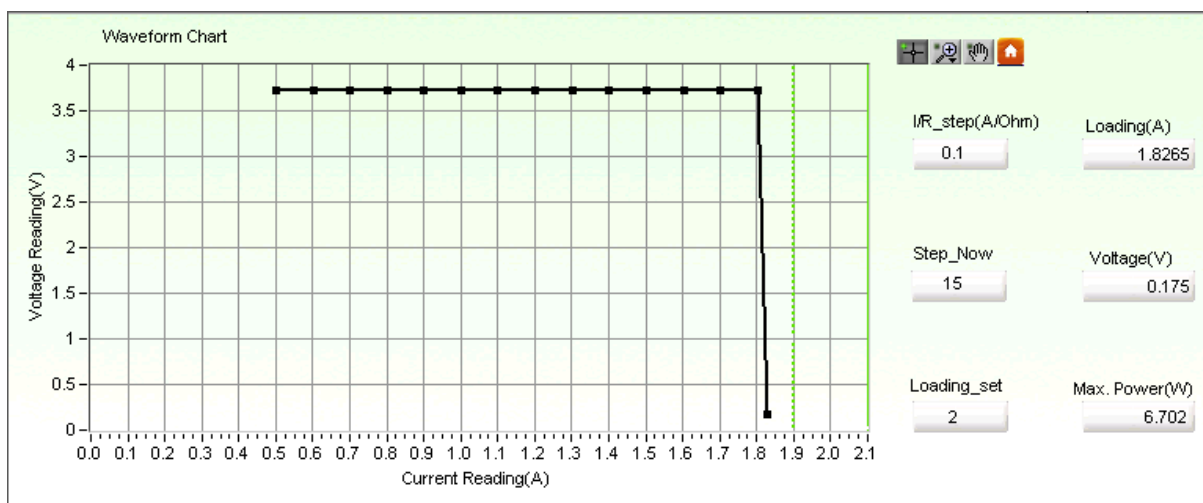


Figure 11-19 OCP Waveform Chart

Graph tools: There are normal , zoom in  and move  available for use. See section 6.6.2 in Static chapter for detail description.

Home : Click this button will reset the XY axis scale to normal.

11.1.19 OCP Occur

The light shows the test result. OCP Occur means if the voltage drops to lower than V trig it will show Yes and appear in red or it will show in grayscale.

In Spec? means if the current is between Loading Spec H and Loading Spec H when OCP occurs. It shows PASS and in green if within the spec, or FAIL and in red if out of spec.

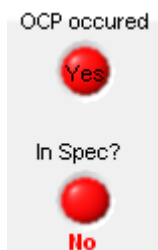


Figure 11-20 OCP occur

11.2 Report

For the setting and using the report function, please refer to the section of *Report Format* in *Sweep Test* chapter.



Figure 11-21 OCP Report Button

11.2.1 Example of OCP Test Report

Chroma DC Load OCP Test Report						
----- Setting -----						
Channel Name	Mode	Load_S (A/0hm)	Load_E (A/0hm)	dI_dR (A/0hm)	U_trig (U)	Step_T (Sec)
Output1	CCL	0.50	4.00	0.500	1.00	1.5
----- Reading -----						
Test Result						PASS
Loading Spec_H	Loading(A)		Loading Spec_L			
100.0	2.0063		0.5			
Max power(W):12.4237						
Step	U_Read	I_Read				
0	6.34	0.51				
1	6.28	1.01				
2	6.24	1.50				
3	6.19	2.01				
4	0.03	2.00				

12. Charger Test

For Charger test, the user can select a Load Channel to perform the test. During the test, the program will follow certain procedure (first CV mode and then CC mode) to execute loading. Check the present voltage/current readings and the user can define the Spec during observation. The program will use the data user inputted to draw the waveform graph for judgment. Furthermore, the user can save the measured data in Excel file.

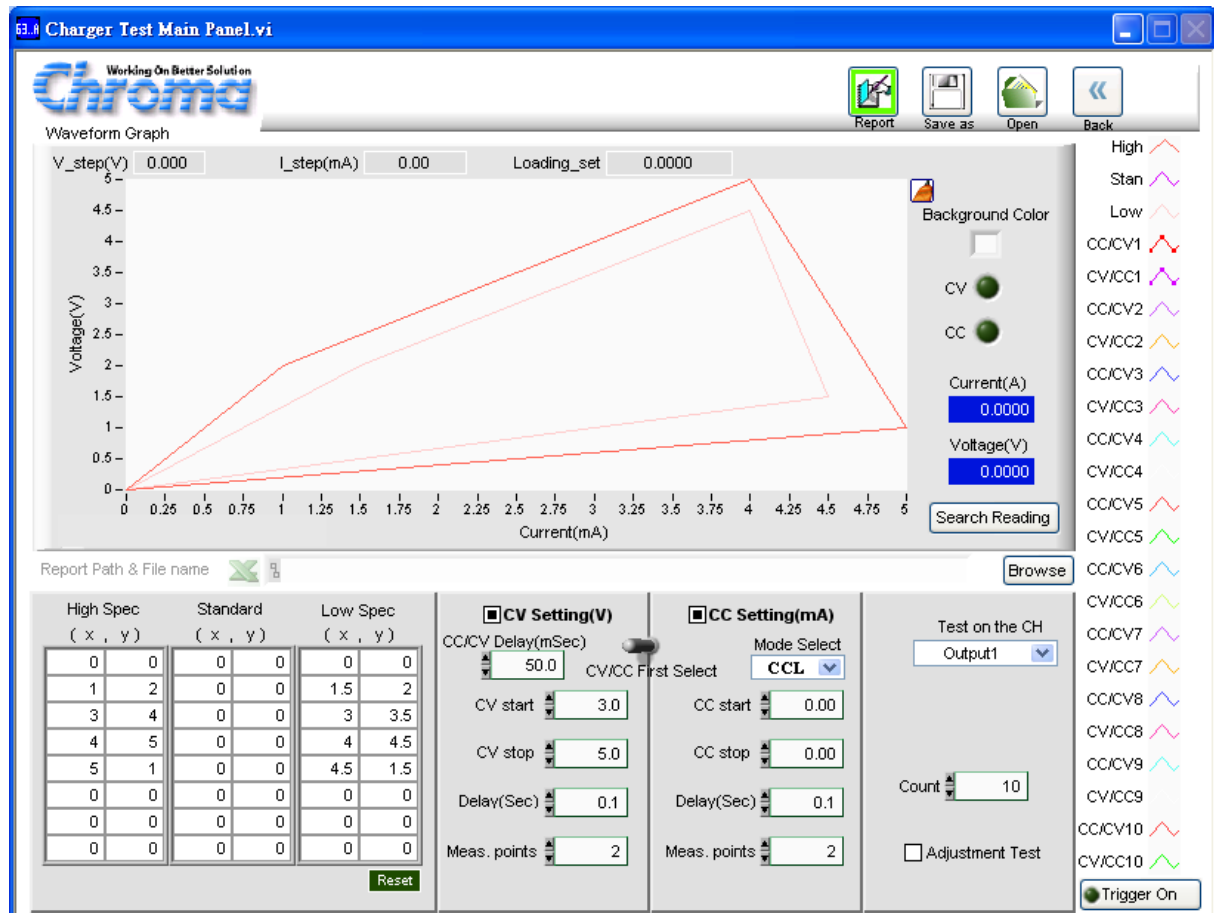


Figure 12-1 Charger Test Main Panel

12.1 Charger Test Parameters

High, Standard, Low Spec parameters allow the user to set the specifications for High Spec, Standard and Low Spec. Each item has 8 sets of X and Y coordinates. The unit of X coordinate is current (mA) and the unit of Y coordinate is voltage (V). Once the values are set, a waveform graph will be drawn and the dot sequence on the graph is from up to down with line connected for 8 sets of values in colors. Click "Reset" to clear all SPEC settings to 0.

High Spec (x , y)		Standard (x , y)		Low Spec (x , y)	
0	9	0	0	0	5.7
800	9	0	0	3	5.6
850	8	0	0	3	1.5
3200	7	0	0	9	1.5
3200	0	0	0	5	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Figure 12-2 Setting SPEC

12.2 Setting Parameters

The main test flow for charger test includes constant voltage and constant current test. First of all the user needs to set the Load Module for UUT to connect, so an applicable channel needs to be selected for Test on the CH. Next, the user can set CV start, CV stop, Delay (Sec) every time the voltage changes in CV mode, and the Meas. points from CV start to CV stop in CV mode, as well as the same for CC mode. At last, the user needs to set the Count for how many times the test will be done. The user can select to test CV mode or CC mode during the test. When CV Setting is disabled, only CC mode will be tested and the items that are not subject to execute will be grayed out on the screen for reminding. In addition, the function of Clear chart is to clear the readings in Waveform Graph when doing tests repetitively. The default is disabled means to remain the data.

The screenshot shows the 'Parameters Setting Area' with three main sections:

- CV Setting(V):** Includes 'CC/CV Delay(mSec)' (50.0), 'CV start' (3.0), 'CV stop' (5.0), 'Delay(Sec)' (0.1), and 'Meas. points' (2).
- CC Setting(mA):** Includes 'Mode Select' (CCL), 'CC start' (0.00), 'CC stop' (0.00), 'Delay(Sec)' (0.1), and 'Meas. points' (2).
- Test on the CH:** Includes 'Output1' (dropdown), 'Count' (10), and an 'Adjustment Test' checkbox (unchecked).

A 'Trigger On' button is located at the bottom right.

Figure 12-3 Parameters Setting Area

Setting CV Mode Parameters

CV mode contains parameters of CV Setting, CV start, CV stop, Delay(sec) and Meas. Points.

CV Setting: It sets if executing the entire CV mode tests. It will process the test when enabled. Test items will be grayed out to remind the user when it is disabled for test.

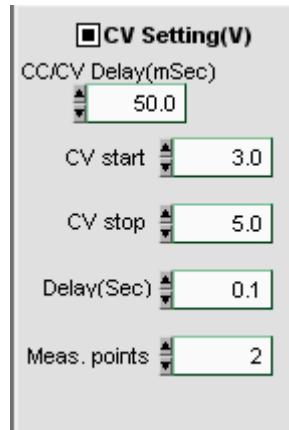


Figure 12-4 CV Setting Parameters

CV Setting (V):

It determines if performing CV test. CV start, CV stop, Delay (Sec) and Meas. Points are grayed out when it is disabled.

Figure 12-5 CV Setting (V)

CC/CV Delay (mSec):

It sets the delay time required for switching CC and CV mode when performing continuous tests.

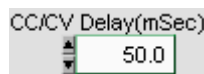


Figure 12-6 CC/CV Delay (mSec)

CV start: It sets the CV start test voltage in the unit of V. The range varies with the mode selected by user.

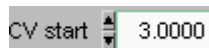


Figure 12-7 CV start

CV stop: It sets the CV stop test voltage in the unit of V. The range varies with the mode selected by user.



Figure 12-8 CV stop

Delay (Sec): It sets the time for each test in the unit of Sec. The range is from 0.1 second to 100000 seconds. The user needs to set the time based on the property of UUT.



Figure 12-9 Delay(Sec)

Meas. points: It sets the measurement points including Start and Stop. Assuming to test 3 points, if $V_{start} = 4V$ and $V_{stop} = 5V$ then it will 4V, 4.5V and 5V 3 points.

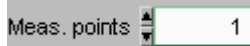


Figure 12-10 Meas. points

Setting CC Mode Parameters

CC mode contains the parameters of CC Setting, CC start, CC stop, Delay (Sec) and Meas. Points.

CC Setting: It sets if executing the entire CC mode tests. It will process the test when enabled. Test items will be grayed out to remind the user when it is disabled for test.

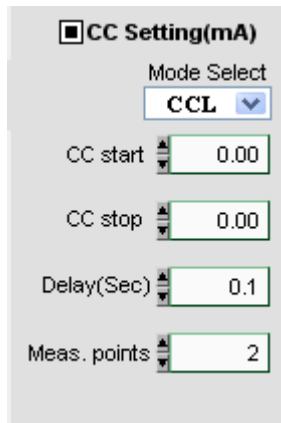


Figure 12-11 CC Setting Parameters

CC Setting (mA):

It determines if performing CC test. CC start, CC stop, Delay(Sec) and Meas. points are grayed out when it is disabled.



Figure 12-12 CC Setting (mA)

CC start: It sets the CC start test voltage in the unit of mA. The range varies with the mode selected by user.



Figure 12-13 CC start

CC stop: It sets the CC stop test voltage in the unit of mA. The range varies with the mode selected by user.

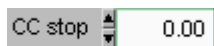


Figure 12-14 CC stop

Delay (Sec): It sets the time for each test in the unit of Sec. The range is from 0.1 second to 100000 seconds. The user needs to set the time based on the property of UUT.



Figure 12-15 Delay (Sec)

Meas. points: It sets the measurement points including Start and Stop. Assuming to test 3 points, if $V_{start} = 4V$ and $V_{stop} = 5V$ then it will 4V, 4.5V and 5V 3 points.



Figure 12-16 Meas. points

Mode select: There are CCL and CCH mode for selection. The user can select the mode as required. The default is CCL.

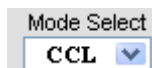


Figure 12-17 Mode Select

Test on the CH: The channel at present can only use 1 channel for test. When the channels are opened more than 1, a pull-down menu will appear to list the name of all channels. The user needs to specify the channel connected to the UUT at present for test.

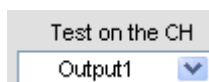


Figure 12-18 Test on the CH

Count: It sets the number of times for the test needs to be done repeatedly after setting CV and CC mode. The test count will show on the Waveform Graph readings. The maximum setting is 10 and 1 in minimum.



Figure 12-19 Count


Adjustment Test:

It tests one time only that can be performed repeatedly under the set condition. The difference between Adjustment and Count 1 is the display of chart which is varied from Report.



Figure 12-20 Adjustment Test

When enabled, all test conditions are grayed out including Report. Click Trigger On it will follow the CV or CC settings to perform test one time and read back the voltage and current. To record the report file, select the path and filename desired before enabling the Adjustment

Test and click  when the test is done. Maximum 10 times of Trigger on can be clicked.

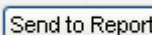


Figure 12-21 Send to Report Button

Clear chart: It sets if clearing the Waveform reading. When Count is greater than 1 and Clear chart is enabled, then each test reading will be cleared when reading the voltage and current of next for save instead. On the contrary, all readings will keep in Waveform Graph and marked with different color, also different shape to show the waveform of different count if Clear chart is disabled.



Figure 12-22 Clear chart

Trigger On: It sets the charger to begin the test. It turns to Trigger Off with light on when clicked. Click Trigger Off can stop the tests.

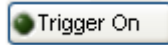


Figure 12-23 Trigger On

12.3 Report Format

An Excel file test report is provided for Charger test under the filename of *.xls. The user can decide to enable or disable the Report function (Report On/Off), the storage path and filename as explained below.

12.3.1 Report On/Off

Click Report to ON to use the Report function. It will log all settings and measurements based on the storage path and filename set when the execution is done or stopped in the middle. Click it again will turn it off.



Figure 12-24 Report On

12.3.2 Report Path & File

Once the Report function is active, it needs to determine the storage path and filename by clicking Browse. A dialog box will appear for the user to enter the path and filename. The file type is an Excel file.



Figure 12-25 Report Path & File

12.3.3 Report Example

	A	B	C	D	E	F
1	Chroma DC Load Charger Test Report		2007/10/4上午 10:55			
2						
3	Test Channel	Output2				
4	CV Start Setting(V)	4				
5	CV End Setting(V)	5				
6	CV Delay(Sec)	0.5				
7	CV Meas. points	20				
8	CC Start Setting(mA)	3000				
9	CC End Setting(mA)	0				
10	CC Mode Select	OCL				
11	CC Delay(Sec)	0.5				
12	CC Meas. points	20				
13	Count setting	3				
14						
15	Curr, High	Volt, High	Curr, Nom	Volt, Nom	Curr, Low	Volt, Low
16	0	9	0	0	0	5.7
17	800	9	0	0	3	5.6
18	850	8	0	0	3	1.5
19	3200	7	0	0	9	1.5
20	3200	0	0	0	5	0
21	0	0	0	0	0	0
22	0	0	0	0	0	0
23	0	0	0	0	0	0
24						
25	Reading					
26	Count	Mode	Voltage(V)	Current(mA)		
27						

Figure 12-26 Charger Report Test Data

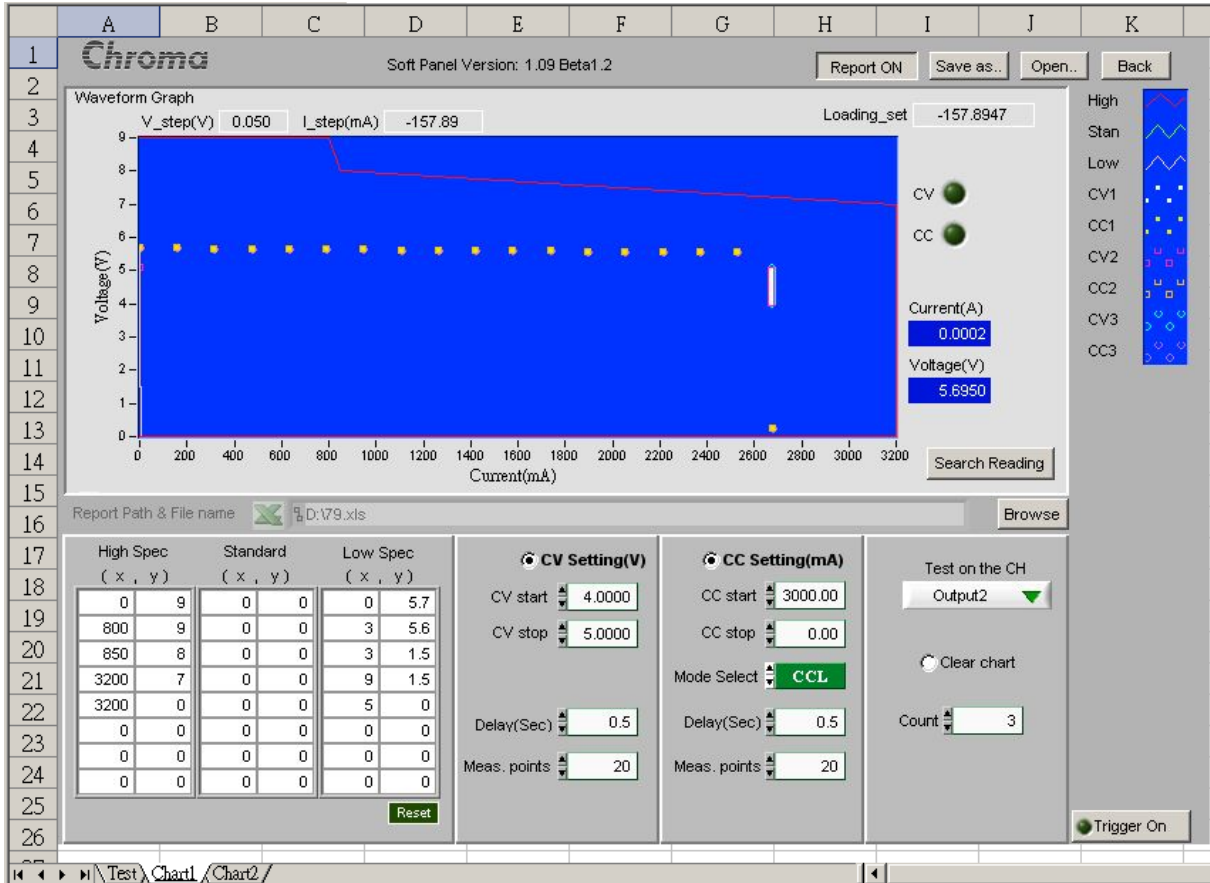


Figure 12-27 Charger Report Chart 1

12.4 Waveform Graph

The Waveform Graph shows the specification values and readings. The user can browse the settings of High, Standard and Low Spec as well as the voltage/current readings after test executed. The illustrations of line in various types are listed next to the graph.

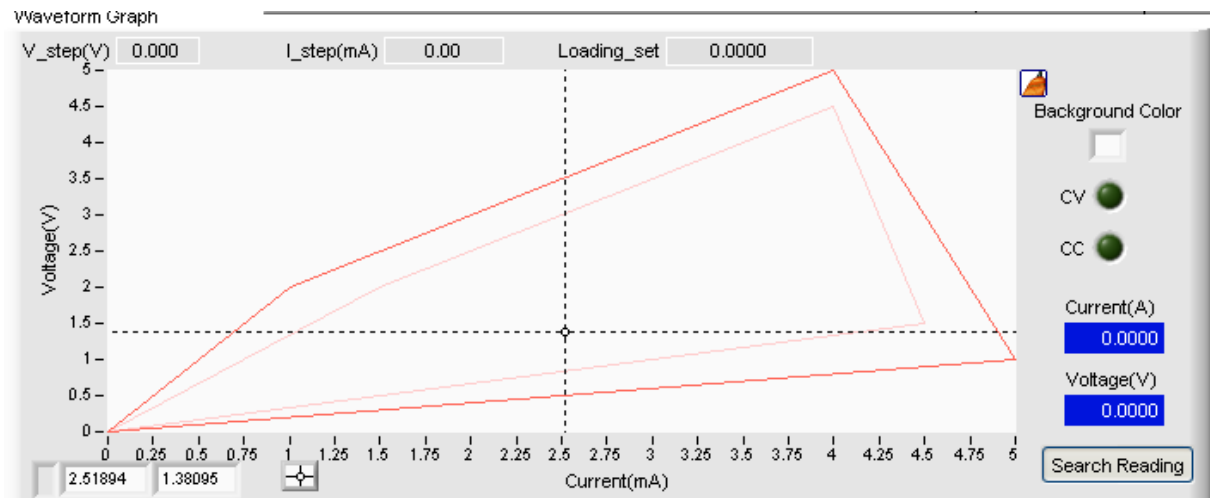


Figure 12-28 Waveform Graph Display

CV/CC Indicator: It shows the loading mode executed at present.



Figure 12-29 CV/CC Indicator

Current(A), Voltage(V): It shows the voltage and current readings at the moment.

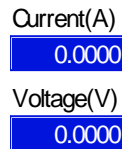


Figure 12-30 Voltage and Current Readings at the moment

V_step(V): It shows the voltage difference of each step after setting start, stop and meas. points in CV mode.



Figure 12-31 V_step(V)

I_step(mA): It shows the current difference of each step after setting start, stop and meas. points in CC.

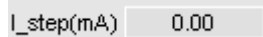


Figure 12-32 I_step(mA)

Loading_set: It shows the loading value during execution.



Figure 12-33 Loading_set

Search Reading: A dashed cross hair will appear on the screen when clicked. The user can move the mouse to point out the reading. The readings of voltage and current are listed beneath the graph for reference as the figure shown below.

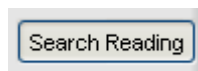


Figure 12-34 Search Reading

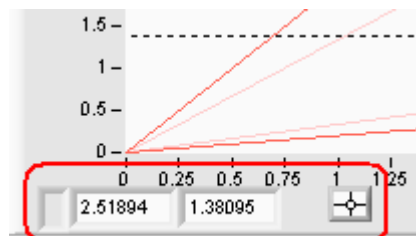


Figure 12-35 Search Reading in Waveform Graph

Background Color:

Click the color palette to change the background color desired.

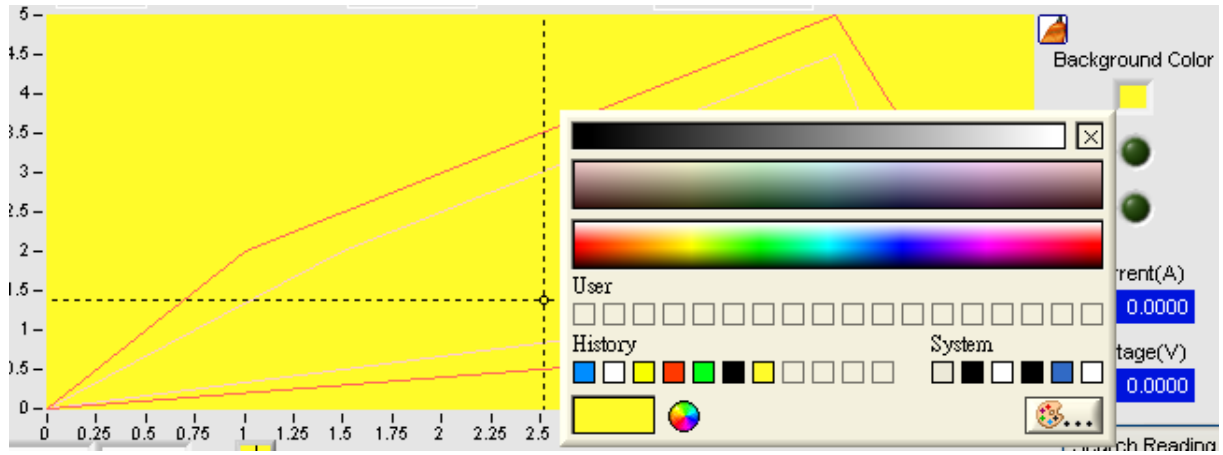


Figure 12-36 Setting Background Color for Waveform Graph

13. LED Test

The LED Test Panel is provided to test the characteristics of LED. It will screen if the Module supports the LED Mode before entering the main panel. There are Hi Low range, Current Range, Vo, Io, Rd select and Rd parameters in the panel with a view of voltage and current during loading.

The operation is the same as Static Panel. Each row indicates a CH and Load All means to together. A Waveform Chart is provided on the bottom of the panel, which allows the user compare the readings. The LED Curve on the right simulates the setting result of channel. The user can enable Report to log the changes.

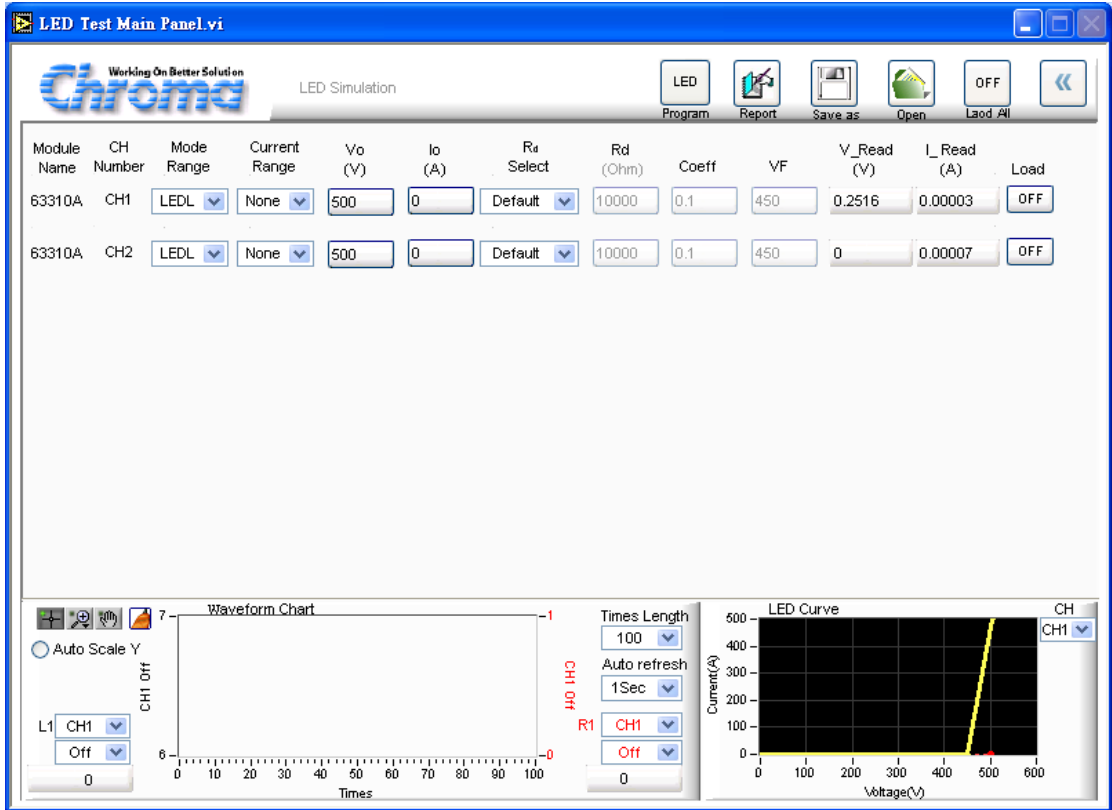


Figure 13-1 LED Simulation Test Window

13.1 Selecting Mode Range

There are LEDL and LEDH loading modes in LED Test Main Panel. Each channel has these 2 options for selection. When different mode is selected, the loading range to be set changes too. Click the Mode Range of each channel will prompt a menu for selection.



Figure 13-2 Selecting LED Mode Range

Current Range:

There are None, Low and High available for selection when different Mode Range is set. The default is None and can be changed using the drop-down menu.

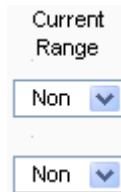


Figure 13-3

If the Module has no Current Range available for selection, a dialog box will prompt to inform the user.

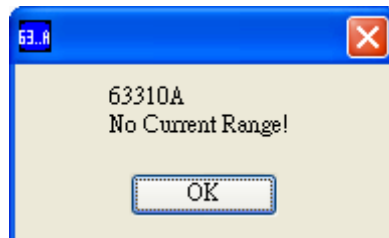


Figure 13-4

Vo:

It sets the Vo parameter. Please see the user's manual of standalone unit for parameter definition.

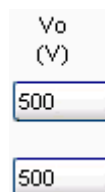


Figure 13-5

The following message appears when the setting is over the range.



Figure 13-6

Io:

It sets the Io parameter. Please see the user's manual of standalone unit for parameter definition.

13.2 Setting Rd Select

Rd Select is drop-down menu with selections of Default, Coeff., Rd (Ohm) and Vf (V) 4 types. The default is set to Default. It will affect the 3 parameters at right when a selection is set. When set to Default, the parameters Coeff., Rd (Ohm) and Vf (V) are grayed out indicating not valid for setting.



Figure 13-7 Setting Rd Select

Rd Select	Rd (Ohm)	Coeff	VF
Coeff.	0.1	0.1	2.7
Rd(Ohm)	3	3	2.7
Vf(V)	3	3	2.7
Default	0.1	0.1	2.55

Figure 13-8 Setting Parameters for Rd Select

13.3 Readings

When Auto Refresh is not set to Off, the V_Read, I_Read and Waveform Chart will show the readings. When Auto Refresh sets to Off, the V_Read and I_Read will stay at the last readings and appear in grayscale. The readings of each row represent a channel and each column shows voltage, current and power readings at the same time.

V_Read (V)	I_read (A)
3.715	1.001
0	0
0	0
0	0
0	0
0	0
6.2305	1.09983
0.01038	0.00013

Figure 13-9 Readings

13.4 Setting Load On/Off

It enables the loading action to Load On or disables it to Load Off. When Load All is set, all channels will be Load On or Load Off together. Load All facilitates the user's operation only without any hardware loading effect.

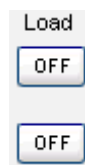


Figure 13-10 Setting Load On/Off



Figure 13-11 Location of Load All

13.5 Reading Chart Display

This area provides a view for a period of time or the correlation between two readings.

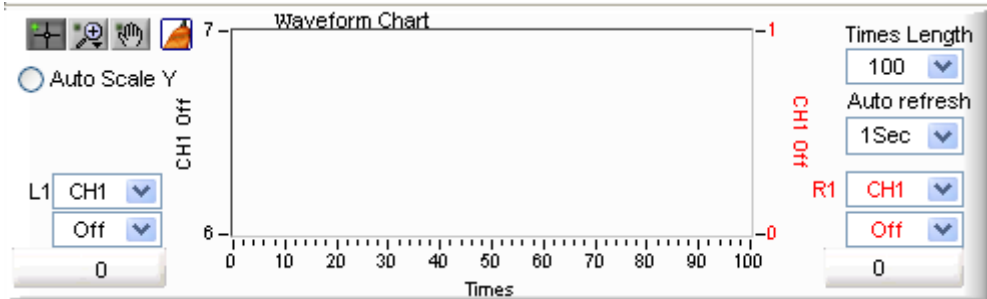


Figure 13-12 Reading Display

13.5.1 Setting Auto Refresh

It decides if enabling all readings in LED Test Main Panel. It asks the standalone unit for the readings per second if 1 Sec is set. It is a drop-down menu that has Off, 0.1 Sec, 0.5 Sec, 1 Sec, 2 Sec, 5 Sec and 10 Sec available for selection.

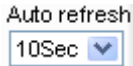


Figure 13-13 Setting Auto Refresh

13.5.2 Waveform Chart

The Waveform Chart is composed of two Y axes and an X axis of Times. The X axis shows in times due to the time setting of Auto Refresh and its length is determined by the Times Length on the right. The left side of Y axis using black font maps to L1 selection while the right side using red font maps to R1 selection. The Auto Scale Y maps to the scale of 2 Y axes.

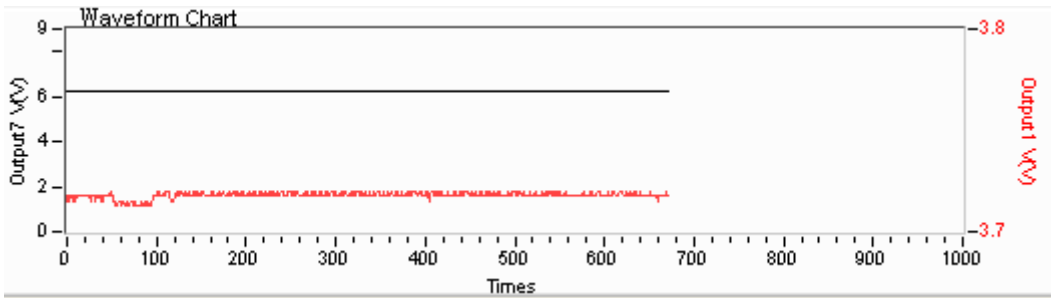


Figure 13-14 Waveform Chart

Graph tools: They are normal , zoom in and move which are explained below.

Normal : No action will be performed on Waveform Chart. Click the button will return to normal.

Zoom In : It has 5 zoom in and 1 zoom out functions as the figure shown below. The

yellow part in and can zoom in partially by click-and-drag the mouse. The means to zoom in the area clicked by the mouse while means to zoom out the area clicked by the mouse.

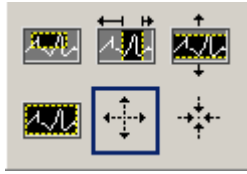



Figure 13-15 Digitizing Graph Zoom In Selection

Note : Since the ratio for zoom in and out is not fixed, it can set Auto Refresh seconds except Off or change the maximum/minimum of X, Y axis directly to return to normal waveform.

Move : Select this function can move the waveform up and down or left and right by click-and-hold Waveform, which means to change the view position but not the scale.

Clear : Click this button will clean the data on the Waveform Chart.

13.5.3 Auto Scale Y

It sets if auto adjusting the two sides scales of Waveform Chart Y axes. The software will follow the data in Chart to adjust the display area when enabled. Generally it retrieves the maximum/minimum value; however, auto scale will make the scale pitch very small when the data change is little. Thus the fluctuation in the graph will look big. If disabled, the scale of Y axis can be changed freely; however, it can't be viewed if exceeding the range and the up/down range has to be adjusted again.

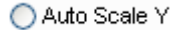


Figure 13-16 Auto Scale Y

13.5.4 Setting L1 Parameter

This parameter sets the display type on the left of Waveform Chart by selecting the Output CH, voltage, current or power. The selection of Output CH is the CH number activated in H/W Configuration. The bottom shows the readings and the mapped color in chart is black.

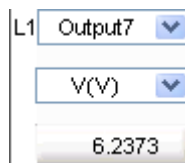


Figure 13-17 Setting L1 Parameter

13.5.5 Setting R1 Parameter

This parameter sets the display type on the right of Waveform Chart by selecting the Output CH, voltage, current or power. The selection of Output CH is the CH number activated in H/W Configuration. The bottom shows the readings and the mapped color in chart is red.

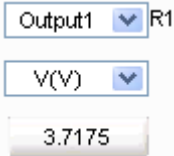


Figure 13-18 Setting R1 Parameter

13.5.6 Setting Times Length

This parameter sets the display dots for Waveform Chart X axis. It is a drop-down menu that has 100, 1000, 10000 and 50000 available for selection. For instance, if 1000 is selected the Waveform Chart shows 1000 dots maximum, and if the entry has more than 1000 dots of data it will keep the last 1000 dots but the data in Waveform Chart won't be missing.

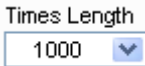


Figure 13-19 Setting Times Length

13.6 Report

It sets the Report and the data to generate the Report. Since LED Test is not tested in fixed time length, it can use Report function to set the time and record the V, I and P values of



each channel on standalone unit. Click  to enter into Report Panel for parameter setting and click  to return to LED Test Main Panel.



Figure 13-20 Report


The  is on when it is active and recording as shown below..



Figure 13-21 Report On

13.7 SAVE, OPEN & BACK

The function of these three buttons is the same as the one in Hardware Setting; see section 4.4 and 4.5 for detail information. The difference is that the setting parameters are saved in an Untitled .LED file.

14. LED Program Test

During the LED test, an editable test program can be provided for editing. The user can follow the LED characteristics to plan the required tests via different parameters under certain timing for the same module range. The software will perform the tests and record the data continuously based on the setting. Each channel has 100 sequences for setting including the value of V_o , I_o and R_d Select. To enter into LED Program Test, simply click



on the LED Test Main Panel.

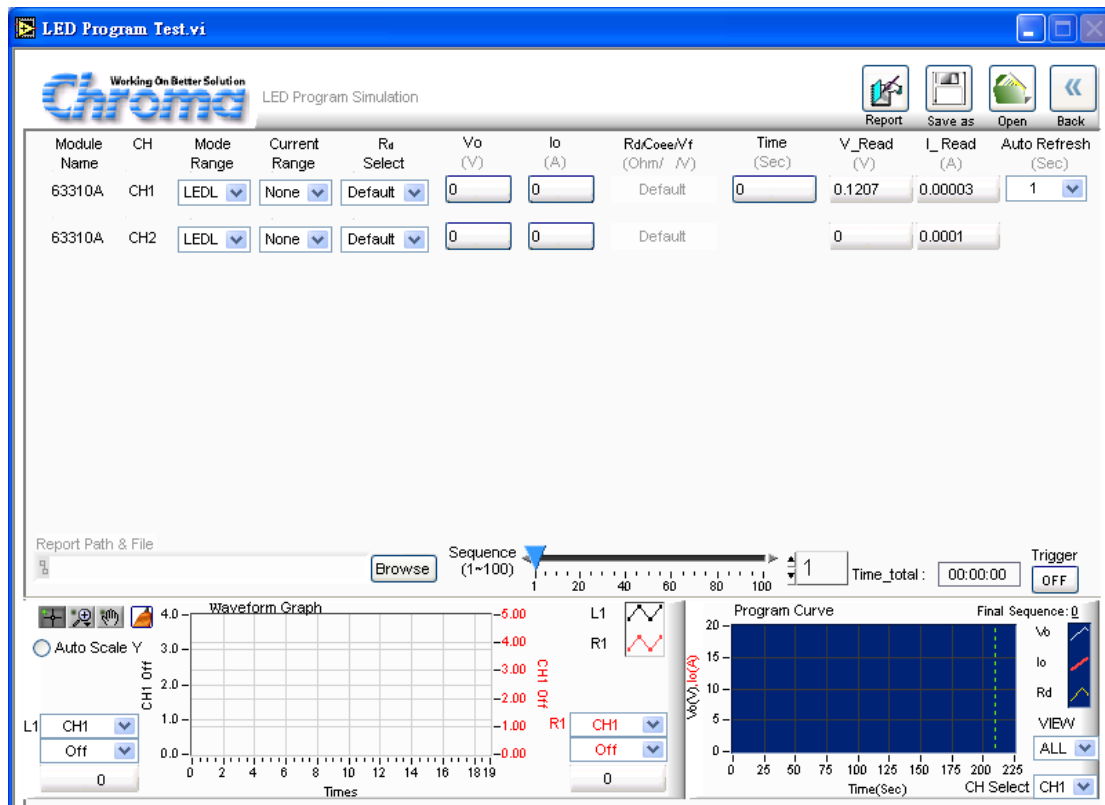


Figure 14-1 LED Program Simulation Test Window

Mode Range, Current and R_d Select are the same as described in the chapter of *LED Test*. A channel can only select one mode for process; however, V_o , I_o and $R_d/Coe/V_f$ have 100 sets for setting. The user can view the settings through Sequence. The setting of V_o , I_o , $R_d/Coe/V_f$ are the same as described in the chapter of *LED Test* except the $R_d/Coe/V_f$ columns are combined as one and the unit maps to R_d Select.

14.1 Setting Time

There are 100 sets of “Time” available for setting in Program. The unit is second. When the user changes the sequence, the Index will modify the “Time” as well for mapping. However, the execution time for all channels under the same sequence will be the same. In addition, if the time sets to 0 it indicates the subsequent time settings for sequence are all invalid. It also means the program doesn’t have to be ended when 100 sequences are done. Set a certain sequence to 0, the program will stop running at one sequence prior. The mapping is Final Sequence.



Figure 14-2 Setting Time

14.2 Setting Sequence

The range of sequence is from 1 to 100. There are 100 sequences in Program Mode for execution. When switching to different sequence, the parameters - V_o , I_o and Time will change as well, and each of them has 100 sets available for setting.

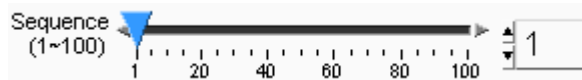


Figure 14-3 Setting Sequence

14.3 Setting Trigger On/Off

Once all conditions are set, they can be executed by clicking Trigger On. During execution, a Waveform Chart will start to draw the curve according to the measurement values to inform the user the present progress. To stop it, just click Trigger Off. All tested channels will follow the set conditions to proceed counting or stop.



Figure 14-4 Setting Trigger On/Off

14.4 LED Program Curve

This is a display area that draws the chart following the Loading changes including Loading value (Y axis), execution time ratio (X axis) and CH Select to indicate which channel setting is used for simulation. The user can select the channel and only one channel at a time. Waveform Chart has a scanning line to show user the time executed and the loading value. Final Sequence shows the sequences being used.

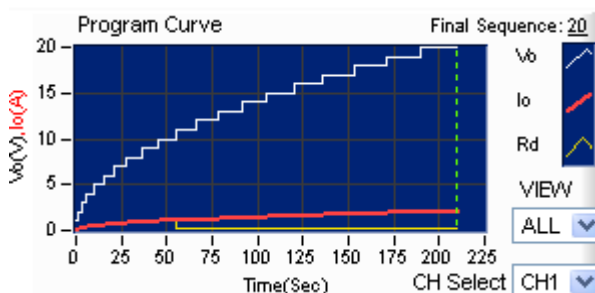


Figure 14-5 LED Program Curve

14.5 Waveform Graph Display

This area shows the voltage and current reading when executing Program Run. It is unable to switch the channel during execution. Once all executions are done, it can switch to L1 and L2 to view the executed readings using the methods described in section 13.5.

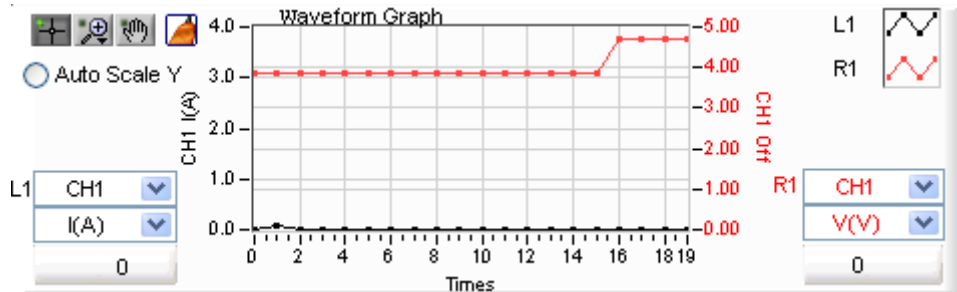


Figure 14-6

14.6 Report

It provides an easy text file (*.txt) report for Program test. The user should determine if enabling the Report function and define the path and filename for storage. Please see section 8.5 for detail description.



Figure 14-7 Report



The  is on when it is active and recording as shown below.



Figure 14-8 When the Report is On

Report result:

The report result includes settings and readings:

The readings are extended from left to right according to the channel amount and from up to down according to time.

```

***** LED Program Report *****
===== Setting =====
Final Sequence : 20
Total run time : 00:03:30

```

Module Name	CH number	Mode Range	Current Range	Rd Select
33310A	1	LEDL	Low	Coeff.
33310A	2	LEDL	Low	Default

----- 100 Sequence Setting -----									
Seq.No	Time	CH	Vo (V)	Io (A)	Rd/Coef /VF	CH	Vo (V)	Io (A)	Rd/Coef /VF
1	1	1	1.000	0.100	0.100	2	1.000	0.100	Default
2	2	1	2.000	0.200	0.200	2	2.000	0.200	Default
3	3	1	3.000	0.300	0.300	2	3.000	0.300	Default
4	4	1	4.000	0.400	0.400	2	4.000	0.400	Default
5	5	1	5.000	0.500	0.500	2	5.000	0.500	Default
6	6	1	6.000	0.600	0.600	2	6.000	0.600	Default
7	7	1	7.000	0.700	0.700	2	7.000	0.700	Default
8	8	1	8.000	0.800	0.800	2	8.000	0.800	Default
9	9	1	9.000	0.900	0.900	2	9.000	0.900	Default
10	10	1	10.000	1.000	1.000	2	10.000	1.000	Default
11	11	1	11.000	1.100	0.110	2	11.000	1.100	Default
12	12	1	12.000	1.200	0.120	2	12.000	1.200	Default
13	13	1	13.000	1.300	0.130	2	13.000	1.300	Default
14	14	1	14.000	1.400	0.140	2	14.000	1.400	Default
15	15	1	15.000	1.500	0.150	2	15.000	1.500	Default
16	16	1	16.000	1.600	0.160	2	16.000	1.600	Default
17	17	1	17.000	1.700	0.170	2	17.000	1.700	Default
18	18	1	18.000	1.800	0.180	2	18.000	1.800	Default
19	19	1	19.000	1.900	0.190	2	19.000	1.900	Default
20	20	1	20.000	2.000	0.200	2	20.000	2.000	Default

```

===== Reading =====
Seq.No  CH      Vo      Io      CH      Vo      Io
        (V)    (A)    (V)    (A)

```

14.7 SAVE, OPEN & BACK

The function of these three buttons is the same as the one in Hardware Setting; see section 4.4 and 4.5 for detail information. The difference is that the setting parameters are saved in an Untitled .LED Program file.

15. Product Information

This window is easy for the user to check the specifications of each module. The modules included in the table are 63x01, 63x02, 63x03, 63x05, 63x06, 63x07, 63x08 and 63x12. The user can click the Module Name on each tab to go to the individual specification page.

The screenshot shows a software window titled "Product Information.vi" with the Chroma logo and the tagline "Working On Better Solution". Below the logo are tabs for "631_30" and "631_30A". A navigation bar contains tabs for models 01A, 02A, 03A, 05A, 06A, 07A, 08A, 12A, 23A, and 10A. The main content area displays a table of specifications for model "63101A or 63301A".

Model	63101A or 63301A	
POWER	20W	200W
CURRENT	0-4A	0-40A
VOLTAGE	0~80V	
Min. Operation Voltage (DC)	0.4V @ 2A, 0.8V @ 4A	0.4V @ 20A, 0.8V @ 40A
Constant Current Range	0-4A	0-40A
Resolution	1mA	10mA
Accuracy	0.1%+0.1%F.S.	0.1%+0.2%F.S.
Constant Resistance Range	0.0375Ω ~ 150Ω (200W/16V) 1.875Ω ~ 15KΩ (200W/80V)	
Resolution	6.667mS (200W/16V) 133uS(200W/80V) 150 Ω: 0.1 S + 0.2 % 7.5kΩ: 0.01 S + 0.1 %	
Constant Voltage Range	0~80V	
Resolution	20mV	
Accuracy	0.05%±0.1%F.S.	
Dynamic Mode	C.C.Mode	
T1 & T2	0.025mS ~ 50mS/Res:5uS; 0.1ms~500ms/Res:25uS; 10mS ~ 50S/Res:2.5ms	
Accuracy	1uS/1mS+100ppm	
Slew Rate	0.64~160mA/uS	6.4~1600mA/uS
Resolution	0.64mA/uS	6.4mA/uS
Current	0 ~ 4A	0~40A
Resolution	1mA	10mA
Current Accuracy	0.4%F.S.	
Constant Power Range	0~20W	0 ~ 200W
Resolution	5mW	50mW
Accuracy	0.5%+- 0.5% F.S.	
MEASUREMENT SECTION		
Voltage Read Back		
Range	0~16V	0~80V
Resolution	0.25mV	1.25mV
Accuracy	0.025%+0.025%F.S.	
Current Read Back		
Range	0~4A	0~40A
Accuracy	0.0625mA	0.625mA
	0.05%+0.05%F.S.	
Power Read Back		
Range	0~20W	0~200W
Accuracy	0.1%+0.1% F.S.	
PROTECTIVE SECTION		
Over Power Protection	Yes	Yes
Over Current Protection	Yes	Yes
Over Temperature Protection	Yes	Yes
Over Voltage Protection	Yes	Yes
General		
Short Circuit		
Current (CC)	-	Yes
Resistance (CC,CV)	-	Yes
Resistance (CR)	-	Yes
Power(CP)	-	Yes
Input Resistance (Load off)		
Temperature Coefficient	> 100KΩ(Typical)	
Power	100PPM/°C(Typical)	
Dimensions(WxHxD)	Supply from 6314A Mainframe 172*82*489.5mm/6.77*3.23*19.27inch	
Weight	4.2Kg/9.25lbs	
Operating Range	0-40°C	
EMC & Safety	CE	

Figure 15-1 Product Information Window



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