Chroma

AC Source Soft Panel
617XX Series
User's Manual

Version 1.0
June 2004
P/N A11 000924

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CHROMA ATE INC. 43 Wu-Chuan Road, Wu-Ku Industrial Park, Wu-Ku, Taipei, Taiwan

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CHROMA ATE INC.
43 Wu-Chuan Road, Wu-Ku Industrial Park,
Wu-Ku, Taipei Hsien, Taiwan
Tel: 886 -2-2298-3855
Fax: 886-2-2298-3596
http://www.chromaate.com

Revision History

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

Date	Version	Revised Sections
June 2004	1.0	Complete this manual

Table of Contents

1. System Structure

This chapter explains the structure and functions of Chroma 617XX Soft Panel application. The supported instruments and communication interfaces to PC are listed below for users to identify the required environment easily.

1.1 Introduction

This software is applicable to CHROMA AC Source 617XX Series only. The remote transmission between PC and AC Source must be active before using the software in order to communicate by commands.

The software application can perform internal parameter settings for AC Source and monitor the output measurement. Another feature of the application is to preview the simulated output waveform. Before sending the parameters set for voltage frequency, the screen will display an output waveform element for previewing the waveform. Once the waveform is confirmed by the user, the voltage will be sent. In addition the software is able to save the parameter settings so that users can open an existing file for execution from hard disk easily.

1.2 Supported Hardware

Chroma 617XX Series Programmable AC Sources contain the following models:
a. 61701
b. 61702
c. 61703
d. 61704
e. 61705

1.3 Communication Interface

There are two types of communication interfaces between PC and AC Sources:
a. GPIB
b. RS232 serial port.

1.4 Software and Hardware Requirements

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

- Intel CPU 500MHz or above
- Microsoft Windows 98/2000/XP, VISA 3.0, LabVIEW 7.0 RTE, CVI 7.0 RTE, IVI Compliance Package Version 2.1
- 400 MB hard disk with at least 80 MB or above disk space
- 128MB memory at least
- VGA or SVGA color monitor
- PS2 mouse

2. Installation

Before using Chroma AC Source 617xx Soft Panel the drivers GPIB 488.2 1.7, VISA 3.0, CVI RTE 7.0 and IVI Compliance Package Version 2.1 must be installed in the OS. The following sections explain how to install this software to the Windows step by step. First place the Chroma AC Source 617xx Soft Panel System Software CD into the CD drive.

2.1 Installation Procedure

1. The CD came along with the application contains the files shown in Figure 2-1. The **Manual** directory contains the PDF files of both English and Chinese User's Manuals for use. Place the CD into the CD drive and the installation begins automatically as Figure 2-2 shows by executing `setup.exe` program. If not, double-click `setup.exe` to execute it manually.

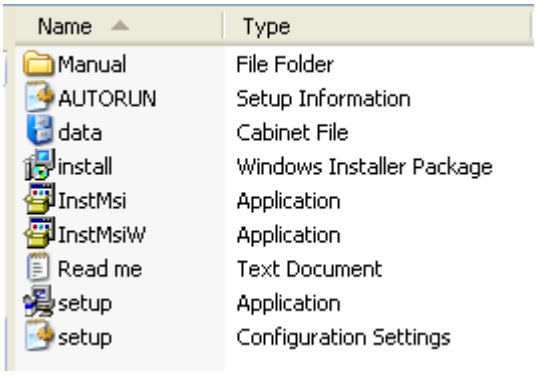


Figure 2-1 Files in CD

Figure 2-2 Installation Start Screen

2. The program is predefined to install in `C:\Program Files\Chroma 617xx Soft Panel` directory. If there is a need to install it to another directory, click 

to specify the path for installation.

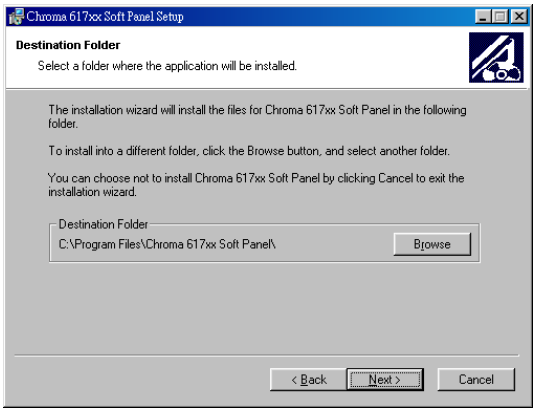


Figure 2-3 Installation Path

3. The following message will prompt before the installation is completed. It reminds users to check or install the necessary drivers before executing Chroma 617xx Soft Panel to in ensure the main program runs normally.

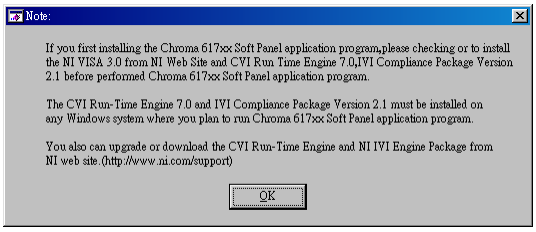


Figure 2-4 Prompted Message

4. At last the screen of successfully installed will appear after the installation is done.

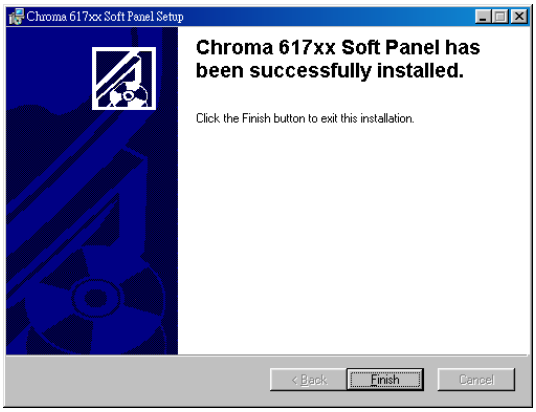


Figure 2-5 Installation Completed

2.2 Installing the Necessary Drivers

1. Please go to the NI WEB SITE listed below to download the VISA 3.0 driver for installation and upgrade. If a GPIB Card is in use, be sure to install the IEEE 488.2 Interface Driver.
http://digital.ni.com/softlib.nsf/webcategories/71306ECAF5B2FE6786256BBC005ECCA8?OpenDocument&node=132070_US\

2. Install the CVI RTE 7.0 and IVI Compliance Package Version 2.1 drivers program:

   For CVI RTE7.0: On WINDOWS Desktop click **Start →Programs → Chroma 617xx Soft Panel → CVI Run Time Engine 7.0** as Figure 2-7 shows.

   For IVI Compliance Package Version 2.1: On WINDOWS Desktop click **Start → Programs → Chroma 617xx Soft Panel → IVI Compliance Package Version 2.1**. A WinZip dialog box appears as Figure 2-6 shows and the unzipped files are default placed in `C:\WINDOWS\TEMP` directory. To change the directory, just click Browse... and specify the path, then click Unzip to begin the installation.

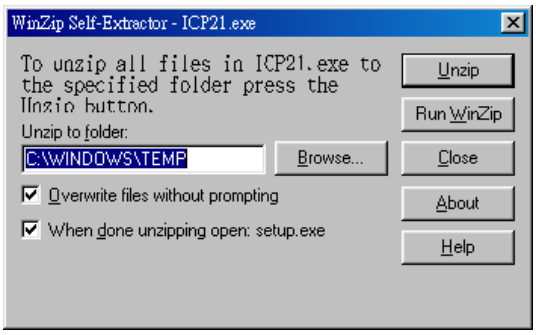


Figure 2-6 WinZip Dialog Box

3. The program menu contains a Read me file for users to read the notices during installation.

Figure 2-7 Program Menu

2.3 Uninstalling Chroma 617xx Soft Panel

To remove the Chroma 617XX Soft Panel software, it is suggested to click **Start → Settings → Control Panel → Add/Remove Programs** to uninstall the related programs.

3. Starting Chroma 617xx Soft Panel

3.1 Function Description

After the installation is done, click **Start → Programs→ Chroma 617xx Soft Panel** will prompt the screen as Figure 3-1 shows.

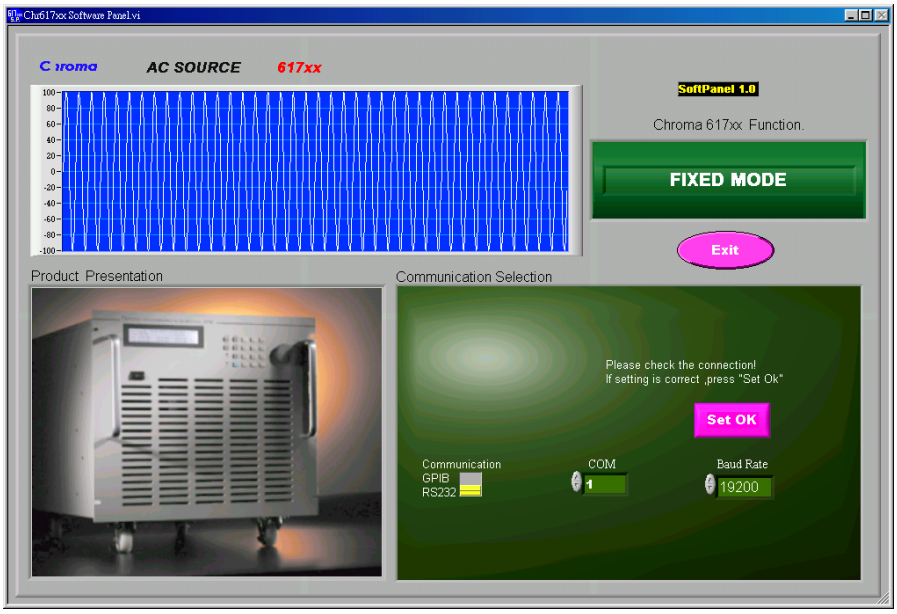


Figure 3-1 Start Screen

Description: The start screen is mainly composed of the following 4 modules.

a. Chroma 617xx Functions
b. Demo Waveform Window
c. Product Presentation
d. d. Communication Selection

- Chroma 617xx Functions: There are Fixed Mode, List Mode and Waveform Editor.
- Demo Waveform Window: It displays the mapped AC Source output waveform according to the function.
- Product Presentation: It introduces the device outline.
- Communication Selection: It sets the communication protocol of PC and AC Source. Chroma 617XX Soft Panel provides the communication protocols of GPIB and RS232 as Figure 3-2 shows. When selecting GPIB as the communicating protocol there must have a GPIB card in PC.

Figure 3-2 Communication Selection

3.2 Buttons Description

- When the communication protocol is confirmed, click **Set OK** as Figure 3-3 shows on Soft Panel to enter into next screen (Fixed Mode screen also called main screen.)

Figure 3-3 Set OK Button

- GPIB Address: Set the correct GPIB Address as Figure 3-4 shows.

Figure 3-4 Set GPIB Address

- Exit the program completely as Figure 3-5 shows.

Figure 3-5 Program Exit Button

4. Fixed Mode (Main Screen)

4.1 Function Description

Enter the Fixed Mode screen as Figure 4-1 shows from the Start screen.

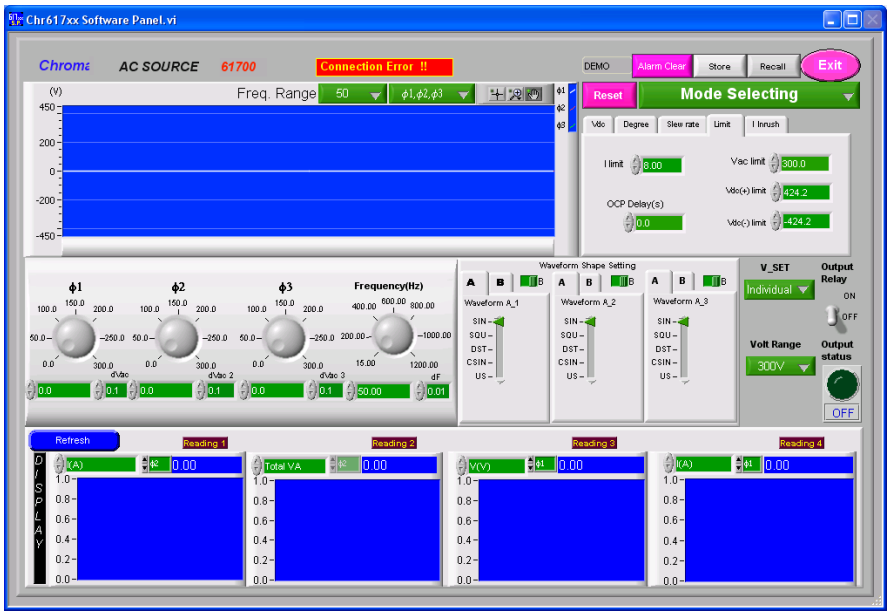


Figure 4-1 Fixed Mode Function Panel

- Be noted if the AC Source is connected when entering into the main screen. If the hardware is connected, the Firmware Version number will appear as Figure 4-2 shows.

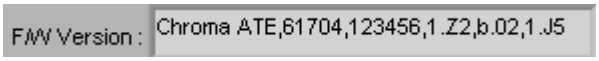


Figure 4-2 Firmware Version

- If the hardware is not connected, the Firmware Version will prompt `Connection Error` and Demo appears as Figure 4-3 shows.

Figure 4-3 DEMO Appears When No Instrument is Connected

- When error appears please check the communication interface or if its setting parameters are correct. If any mistake is found, click **Reset** to return to the Start screen as showed in Figure 3-1 for setting.

4.2 Buttons Description

1. Simulation Output Window: The main function of this window is able to know the output voltage status when changing an input setting. It is similar to a DSO is connected to the instrument's output port. It can simulate the relationship of change between set and output values as Figure 4-4 shows, so that users can realize if the value is set correctly and met the requirement.

Figure 4-4 Simulation Output Window

This window can simulate the result with or without output voltage from the instrument. Since it has 3 phases in order to show the waveform clearly there is a Display Output Phase area on the screen. Users can choose ϕ1, ϕ2, ϕ3 or ϕ1+ϕ2+ϕ3. It will show the waveform according to the setting of 3 phases.

Waveform Chart Tool  : Click "+" indicates no action, click "Hand" indicates the x and y axes can be moved to drag the Waveform Chart directly, and click "Magnifier" to zoom in or zoom out the waveform.

2. 617xx Fixed Mode Parameter Setting: See the User's Manual of the instrument for detail usages and setting ranges.

- Voltage Output Setting:

ϕ1(V): It sets the output voltage of phase 1 as Figure 4-5 shows.

Figure 4-5 Setting Output Voltage for Phase 1

ϕ2(V): It sets the output voltage of phase 2 as Figure 4-6 shows.

Figure 4-6 Setting Output Voltage for Phase 2

ϕ3(V): It sets the output voltage of phase 3 as Figure 4-7 shows.

Figure 4-7 Setting Output Voltage for Phase 3

- Frequency: It sets the output frequency for 3 phases as Figure 4-8 shows.

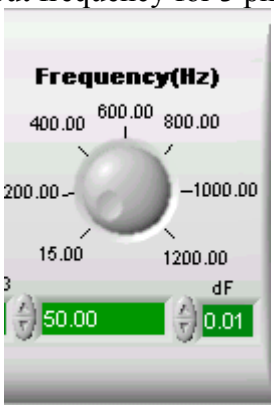


Figure 4-8 Setting Output Frequency

- Output Relay: This element allows the Output Relay to be fixed at the ON or OFF position. When it is switched to OFF as Figure 4-9 shows the Relay hook up sound will be heard every time the output is on, and a release sound will also be heard when the output is off. If it is switched to ON in contrast the Relay hook up or release sound won't be heard whenever the output is on or off.

Figure 4-9 Setting the Output Relay On or Off

- Voltage Range: There are 300V and 150V for selection as Figure 4-10 shows. If the previous voltage has exceeded 150V it will be modified to 150V output automatically when the range 150V is set.

Figure 4-10 Setting Output Voltage Range

- V_SET: It is a voltage output coupler. When "All" is selected, set phase 1 voltage from the control panel only can control the 3 phases voltage output at the same time. On the contrary when "Individual" is selected as Figure 4-11 shows, it is necessary to set the voltage to be output for each phase in order to output different voltage in different phase.

Figure 4-11 Voltage Output Coupler

- Alarm Clear: Each mode has this button in their screen as Figure 4-12 shows. It clears the alarm and warning state when there is a warning occurs. For safety consideration, the button also stops the instrument from output.

Figure 4-12 Alarm Clear Button

- Vdc: It sets the DC voltage output of 3 phases as Figure 4-13 shows.

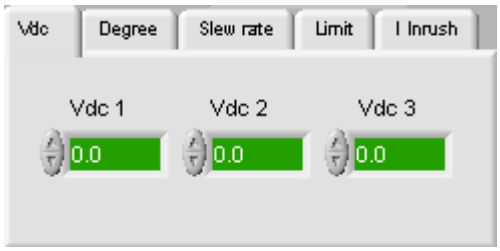


Figure 4-13 Setting 3 Phases DC Voltage

- Degree: It sets the power on phase angle that is the phase difference.
  Phase1-2: It sets the angle degree of phase 2 vs. phase 1.
  Phase1-3: It sets the angle degree of phase 3 vs. phase 1 as Figure 4-14 shows.

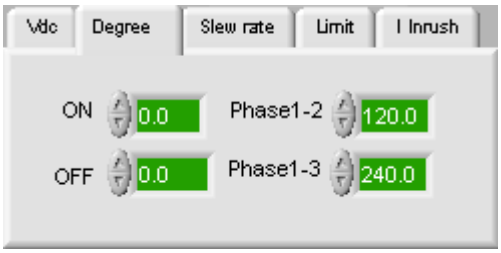


Figure 4-14 Setting the Power On Degree of Phase 1

- Vs(V/ms): It sets the AC output voltage slew rate.
  DC(V/ms): It sets the DC output voltage slew rate as Figure 4-15 shows.

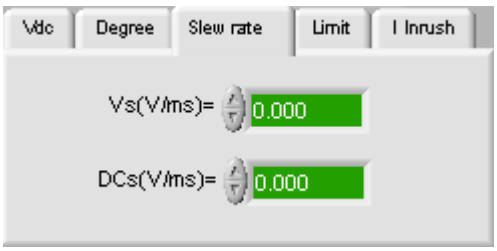


Figure 4-15 Setting AC/DC Output Voltage Slew Rate

- I limit: It sets the upper limit of output current. It enters protection mode when exceeds the limit.

OCP Delay(s): It sets the time delayed for warning when the output current exceeds as Figure 4-16 shows.

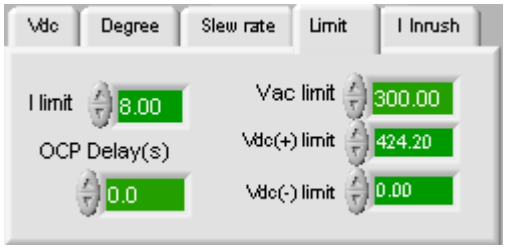


Figure 4-16 Setting the Upper Limit of Output Current and Voltage

- Is Start (ms): It sets the time delayed for Inrush to begin the measurement and avoid measuring the meaningless noise. The unit is millisecond (ms).
  Is Interval (ms): It sets the interval time for measuring the internal Inrush as Figure 4-17 shows. The unit is millisecond (ms).

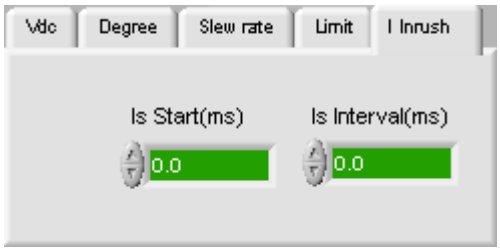


Figure 4-17 Setting for Inrush Measurement

- Waveform Shape Setting:
  Since the waveform can be set by the 3 phases separately, each phase has a mapped waveform setting. The parameters are Phase 1, Phase 2 and Phase 3. Each setting has a Waveform A or waveform B element. The number after "_" is the mapping phase, for instance Waveform A_2 indicates phase 2 is using the options defined in waveform of group A.

  Set Waveform A_x or Waveform B_x: It sets to use the Waveform defined in A buffer or B buffer. User's can predefine two frequent used Waveform in A and B buffer, and then choose waveform A_x or waveform B_x for use. The output waveforms set for each phase support SIN, SUQ, DST, CSIN and User Define 5 type. Each has its mapping parameters for setting. For example, if a user wants to set the 17th waveform output for DST, just select the option to DST and a must set parameter will prompt, then choose or enter 17 to set it. The settings for Waveform B_x and Waveform A_x are the same and different output parameters can be set individually for 3 phases as Figure 4-18 shows.

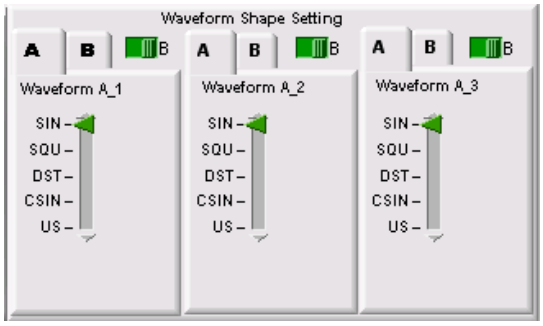


Figure 4-18 Setting Waveform Shape

- RUN: It sets the Output Status ON or OFF as Figure 4-19 shows to control the voltage sent by the instrument. Only when the Output Status is ON the Display area has returned readings.

Figure 4-19 Output Status

- Mode Selecting: As Figure 4-20 shows it can be pulled down for other modes selection.

Figure 4-20 Selecting Other Mode

- Exit: Click the button as Figure 4-21 shows to exit the Soft Panel.

Figure 4-21 Exit Button

- Display: It displays the readings as Figure 4-22 shows.
  This function is active only when Output Status is ON.

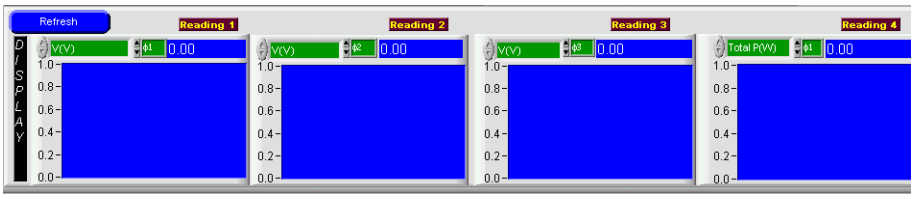


Figure 4-22 Displaying the Readings

Click the reading as Figure 4-23 shows to change it for monitoring. The settings are same for Reading1 (R1) ~ Reading4 (R4). Figure 4-24 shows the selected phase. Figure 4-25 is the menu of reading types and users can select one of it to show its description as listed in Table 4-1. Users can click the up/down arrow keys or the element directly to pull down the menu. In addition, the measurement phase has to be

selected. There is no need to select ϕ1, ϕ2 or ϕ3 if Total_Power and Total_VA are selected.

Figure 4-23 Selecting the Reading to be Monitored

Figure 4-24 Selecting the Measurement Phase

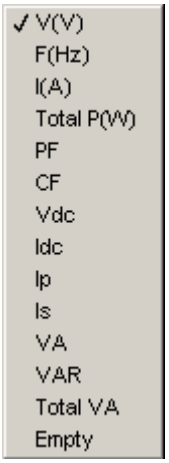


Figure 4-25 Menu of Reading Types

Function	Definition
V	It is the measurement reading of voltage. (RMS measurement)
F	It is the measurement reading of frequency.
I	It is the measurement reading of current. (RMS measurement)
Total_P	It is the measured total real power of 3 phases.
PF	It is the Power Factor and the calculation is true power/ (Vrms × Irms).
CF	It is the Peak Factor and the calculation is Ipeak/Irms.
Vdc	It is the measurement reading of DC voltage. (RMS measurement)
Idc	It is the measurement reading of DC current. (RMS measurement)
Ip	It is the amperes of peak measurement, which is once every 200 mS.
Is	It is the I surge, which measures output convert occurs till “Is meas. time” ends.
VA	It is the apparent power and the calculation is Vrms × Irms.
VAR	It is the calculation of $\sqrt{VA^2 - P^2}$.
Total_VAR	It is the VAR total of 3 phases.

Table 4-1 Description of Reading Types

- Reading Chart: It is the reading display screen. Axis X indicates the reading times and will reset after reading 100 data. The red axis is the track of previous 100 data to current reading. The scale on axis Y will adjust automatically to appropriate range as Figure 4-26 shows.

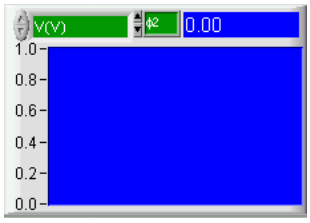


Figure 4-26 The Reading Display Screen

- Refresh Button: As Figure 4-27 shows it clears the remaining readings in all Reading Charts. It erases 4 Waveform Charts when clicked.

Figure 4-27 Refresh Button

- Store: Click this button as Figure 4-28 shows can save the settings on the present screen to a .fixed file. To open a saved .fixed file for use saves the time for setting again.

Figure 4-28 Store Button

To save the current parameters when executing the 617XX Soft Panel for next time use, click **Store** will prompt a dialog box as Figure 4-29 shows. Select the path and enter a filename (extension .fixed is appended automatically by instrument model) to save it. Various setting files can be saved respectively as long as the hard disk space is enough.

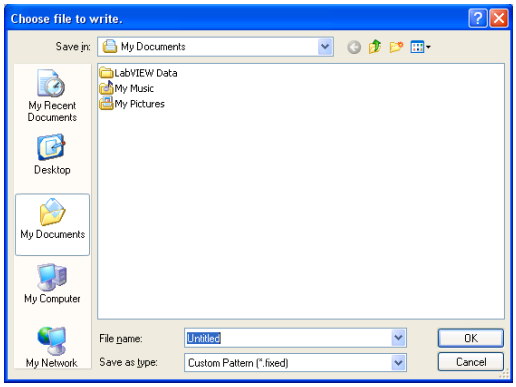


Figure 4-29 Dialog Box for Storing a File

- Recall: Click this button as Figure 4-30 shows can open an existent file in hard disk (opening a .617fixed file) as Figure 4-31 shows. It not only simplifies the input parameter but also avoid input errors from occurring. However, the file won't be opened if it is illegal.

Figure 4-30 Recall Button

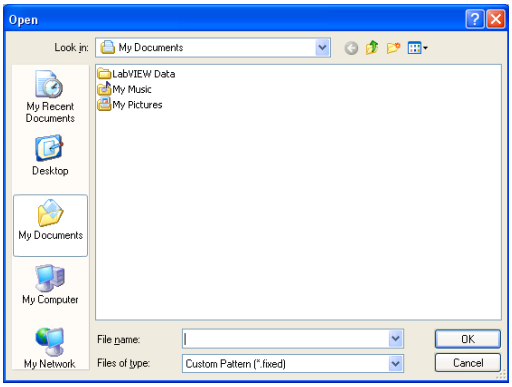


Figure 4-31 Dialog Box for Opening a File

5. List Mode (Option)

5.1 Function Description

This is a software specialized for Chroma AC Source 617xx. There are 100 sequences in this mode and each sequence has Degree, V_Start, V_end, F_start, F_End, Vdc_Start, Vdc_end, Waveform and Time/Cycle parameters. When the sequence parameters are defined, it will follow the number of times the count is set to execute the sequence of each phase. In order to let users operate it easily and effectively, this control unit also has simulation windows and the function for saving/opening settings. The divided simulation windows on the screen allow users to see if the parameter settings for each sequence are correct clearly. Figure 5-1 shows the control screen after entering into List Mode

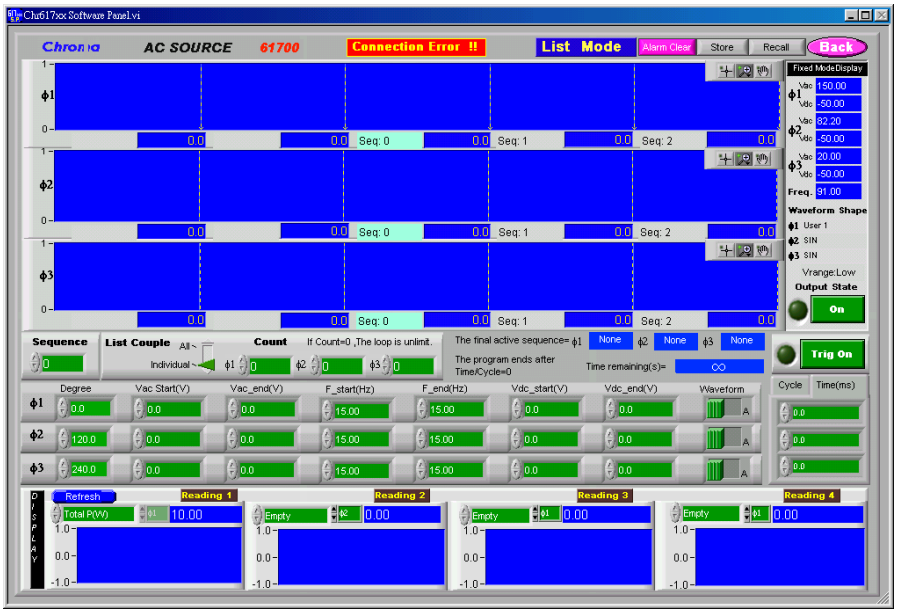


Figure 5-1 List Mode Main Screen (for Demo)

5.2 Button Description

- Sequence: It sets the number of sequences as Figure 5-2 shows. Users can click the specified sequence directly or use the up/down arrow to change the setting or just enter the number. The selected sequence may have a mapped parameter for setting. The maximum number is 99.

Figure 5-2 List Mode Sequence

- Degree: It sets the start degree of phase.

Figure 5-3 List Mode Degree

- Vac_Start (V): It sets the start of AC voltage as Figure 5-4 shows. It is limited by the Voltage Range set in Fixed Mode.

Figure 5-4 List Mode V_start

- Vac_end (V): It sets the end of AC voltage as Figure 5-5 shows. It is limited by the Voltage Range set in Fixed Mode.

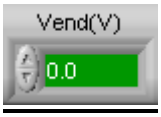


Figure 5-5 List Mode V_end

- F_Start (Hz): It sets the start of frequency as Figure 5-6 shows. The range is 15 ~ 1200 Hz.

Figure 5-6 List Mode F_start

- F_End (Hz): It sets the end of frequency as Figure 5-7 shows. The range is 15 ~ 1200 Hz.

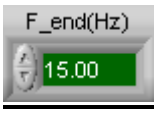


Figure 5-7 List Mode F_End

- Vdc_Start (V): It sets the start of DC voltage as Figure 5-8 shows. It is limited by the Voltage Range set in Fixed Mode.

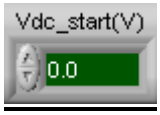


Figure 5-8 List Mode Vdc_Start(V)

- Vdc_End (V): It sets the end of DC voltage as Figure 5-9 shows. It is limited by the Voltage Range set in Fixed Mode.

Figure 5-9 List Mode Vdc_End(V)

- Waveform: It sets the waveform parameter placed in A or B buffer. Refer to the waveform parameter setting of each phase in Fixed Mode.

Figure 5-10 List Mode Waveform

- Cycle/Time (ms): It sets the cycle and time as Figure 5-11 shows. It can switch the sequence output of 3 phases simultaneously to Cycle or Time (ms). If Cycle is set, the sequence output is presented in cycle.

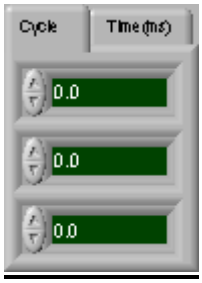


Figure 5-11 Cycle/Time

- Trig On: It triggers the execution on in List Mode. The light is on when executing output.

Figure 5-12 Trig On Button

- Trig Off: It triggers the execution off in List Mode. Click it if it is necessary to stop in the midway. This button will disappear and the light will go off if all sequences are executed.

Figure 5-13 Trig Off Button

- Count: It sets the number of times for executing sequence as Figure 5-14 shows. For List Couple setting, it can control the count parameter change of 3 phases individually or simultaneously. If it sets to 0, it indicates it will loop indefinitely.

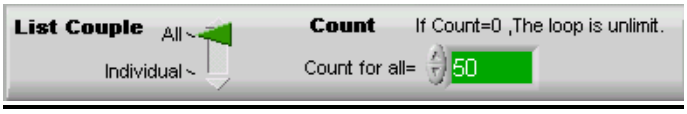


Figure 5-14 Setting Count

Display (Indication) Element:

- The final active sequence: It shows the maximum executable sequence for 3 phases. For Cycle/Time (ms) setting, the valid Sequence, Cycle/Time (ms) cannot be zero. This element instructs the valid sequence from 0-99 as the instrument's feature. For example, if users set Time/Cycle to 0 for the 3 phases sequence 0, then no matter if the Time/Cycle in sequence 1 or latter sequences are set to 0, all are invalid and set to None as Figure 5-15 shows.

Figure 5-15 The final active sequence

- Time remaining(s): It is a time indication element. It shows the total execution time of all sequences when running edit. The unit is second. When Trig on is clicked, it will start to countdown to inform users the time remaining for sequence execution as Figure 5-16 shows.

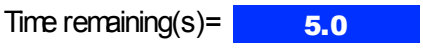


Figure 5-16 Time remaining(s)

- Fixed Mode Display:

  Fixed Mode Output Voltage Frequency Indicator: There are 4 elements to indicate the voltage and frequency setting of phase 1, 2 and 3 in Fixed Mode.

  Voltage Range: This element shows the Range setting of Fixed Mode. It is easy for users to refer to the Fixed Mode setting.

  Fixed Mode Output State Indicator: This element indicates the voltage, frequency, Waveform Shape of sequence and readings of voltage range output at present in Fixed Mode. The Output State is able to control the instrument's output as Figure 5-17 shows.

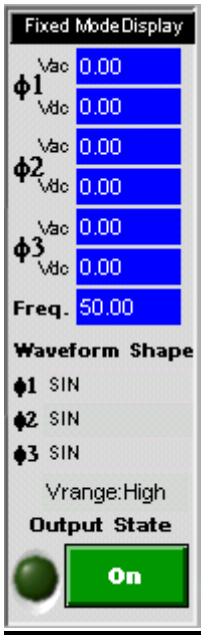


Figure 5-17 Fixed Mode Display Indicator

- Waveform Simulation: This area shows the output waveform of edited 3 phases in List Mode as Figure 5-18 shows.

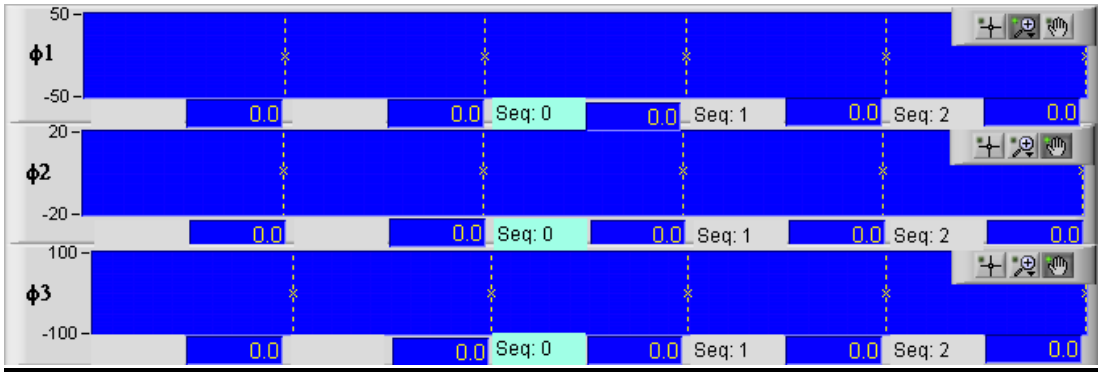


Figure 5-18 Waveform Simulation Display Screen

This screen is divided into 3 voltage waveform display areas: ϕ1, ϕ2 and ϕ3. The waveform simulation of each phase is divided into 5 blocks and separated by white dot lines. The bottom area of each phase's waveform simulation area shows the value and execution time of a sequence. The unit is millisecond (ms). The Y axis of each phase for voltage is Auto Scale.

The simulated waveform chart will refer to all of the parameter settings in List mode. However it will fix the selected sequence in the middle, which is the light blue block when showing it. If the previous sequence is invalid (Cycle or Time= 0), the invalid sequence will not be shown in the simulation window.

Waveform Chart Tool: Click "+" indicates no action, click "Hand" indicates the x and y axes can be moved to drag the Waveform Chart directly, and click "Magnifier" to zoom in or zoom out the waveform as Figure 5-19 shows.

Figure 5-19 Waveform Chart Tool

- Store: Same as Fixed Mode but the file type is changed to *.list file as Figure 5-20 and 5-21 shows.

Figure 5-20 Store Button

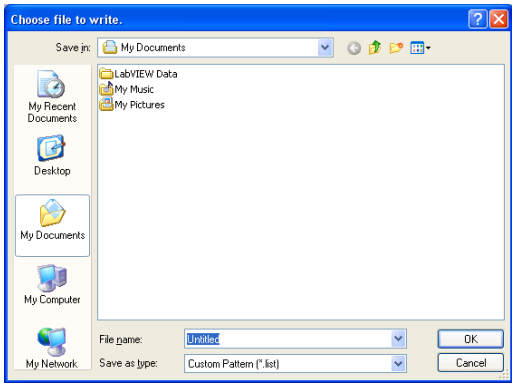


Figure 5-21 The Dialog Box for Storing a File

- Recall: Same as Fixed Mode but the file type opened is a *.list file as Figure 5-22 and 5-23 shows.

Figure 5-22 Recall Button

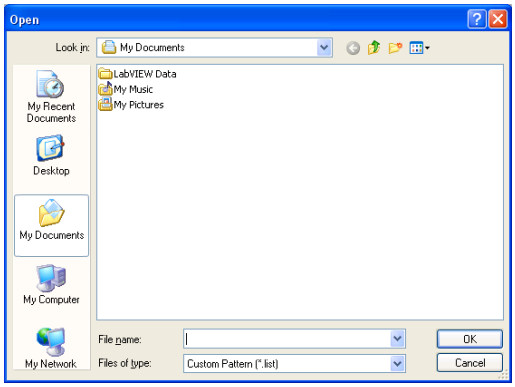


Figure 5-23 The Dialog Box for Opening a File

- Back: Click this button can return to the main screen. It is necessary to click Back to return to Fixed Mode control window from List Mode. When it is clicked, the software will check if the settings have been changed by users. If yes, a message will prompt to ask users if to save them as Figure 5-24 shows.

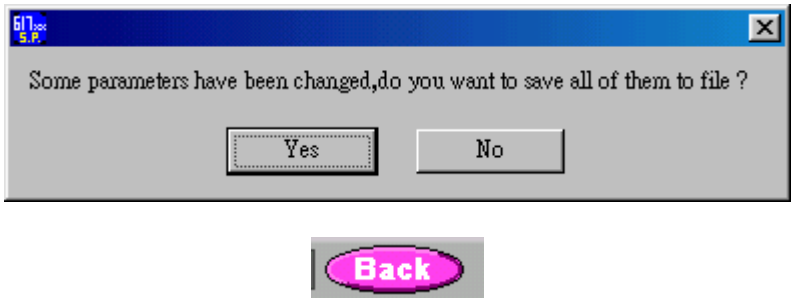


Figure 5-24 Back Button

Connection Error!!: This message shows the connection state of Fixed Mode as Figure 5-25 shows. It indicates the instrument is out of control.

Figure 5-25 The Connection State of Fixed Mode

6. Step Mode (Option)

6.1 Function Description

In STEP mode the AC Source provides an editable ascending or descending voltage or ascending frequency waveform output. The program is able to set the Dwell Time for each ascent or descent step; meanwhile it also provides selectable waveforms and editable output phase for start, as well as the function of Count for execution repetition.

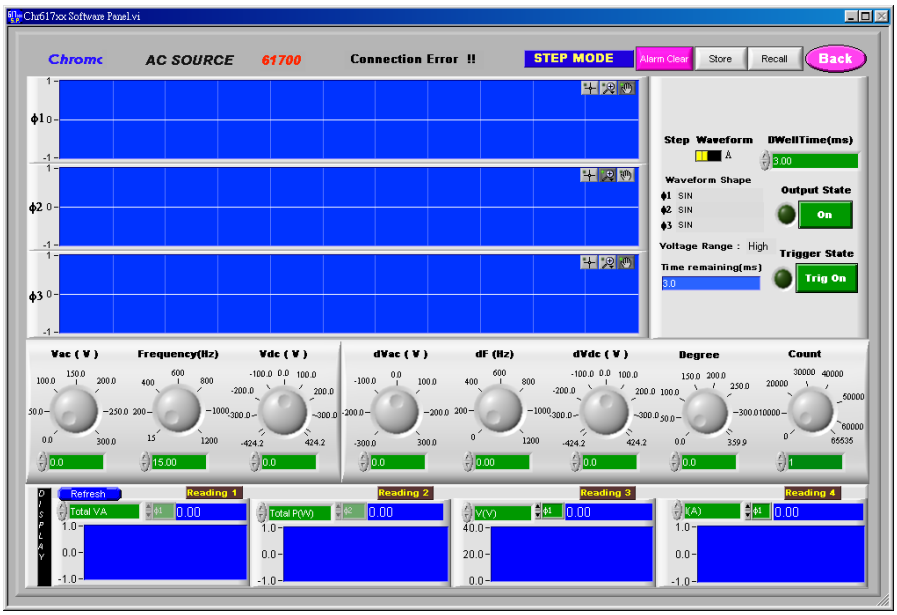
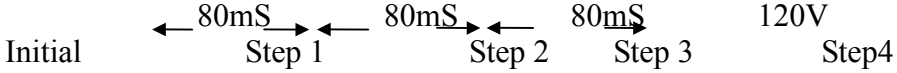


Figure 6-1 Step Mode Function Panel

Example: Below shows a voltage output from STEP mode.
The initial state is Vac=40 V, Frequency =50 Hz, add dVac following dVac=20 V, dF=0, dVdc=0, Degree=0, Dwell Time=40 mS, and count=4 (see Figure 6-2).



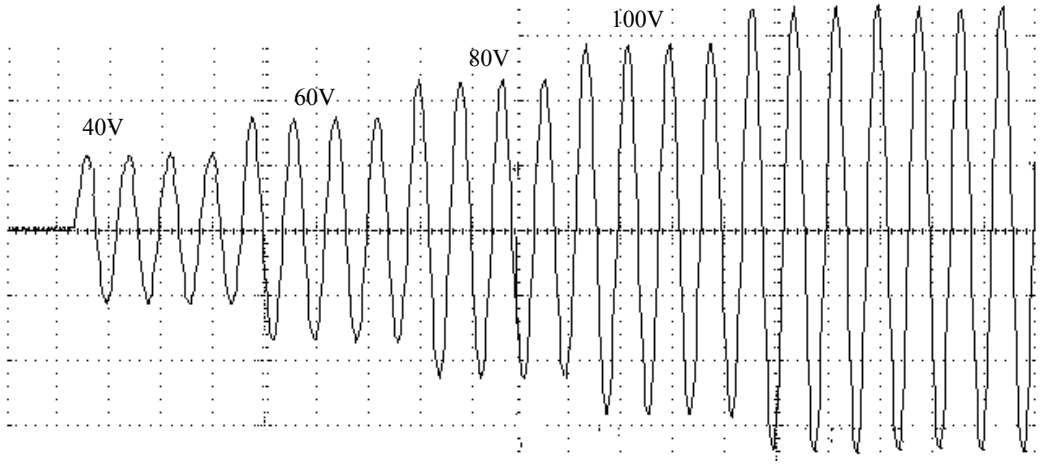


Figure 6-2 Voltage Output Example

6.2 Button Description

- Vac (V): It sets the start AC voltage in 0~150 and 0~300V two ranges.
- Frequency (Hz): It sets the start frequency 15~1200 Hz.
- Vdc (V): It sets the start DC voltage in -212.1~212.1V and -242.2~242.2V two ranges.
- dVac (V): It sets the angle joint AC voltage for each step from –300 to 300V.
- DF (Hz): It sets the angle joint frequency for each step from 0 to 1200 HZ.
- dVdc (V): It sets the angle joint DC voltage for each step in -212.1~212.1V and -242.2~242.2V two ranges.
- Degree: It sets the start phase in Step mode from 0 to 359.9.
- Count: It sets the number of times for execution steps. The range is 0~65535.
- Step Waveform: It sets the waveform to A or B, see the settings in Fixed Mode.
- Dwell Time (ms): It sets the dwell time of each step in the range of 0~999999999.9ms.
- Waveform Shape Display Area: It shows the selected Step Waveform contents of each phase at present.
- Output State: It sets the output state for single unit and the same setting in other modes will be activated too.
- Time Remaining (ms): It shows the total time spent in millisecond when executing this Step waveform.
- Trig On: It starts to output the Step waveform when clicked and the button Trig Off will appear for users to stop outputting Step waveform at any time. The Run Bar will show the progress % for reference.
- Display: Same as Fixed Mode it shows the reading when Output State is On.
- Store: Same as Fixed Mode but the file type is changed to *.step file.
- Recall: Same as Fixed Mode but the file type is changed to *.step file.
- Waveform Simulation Area: It outputs waveform after setting the dynamic simulation parameter. Due to the resolution limit, this area only simulates the output waveform within Count<=10, Frequency +df<=1200Hz. When Count>10 the Step state is shown by ascending or descending ladder track and a small icon of Waveform Shape will appear at the upper right to indicate what kind of waveform is in use. Use the waveform chart tools to view the waveform.
- Back: It returns to Fixed Mode. Same as List Mode a message will prompt to ask if saving the file when the parameters are changed.

7. Pulse Mode (Option)

7.1 Function Description

In PULSE mode users can specify the load percentage above the programmed output transient.

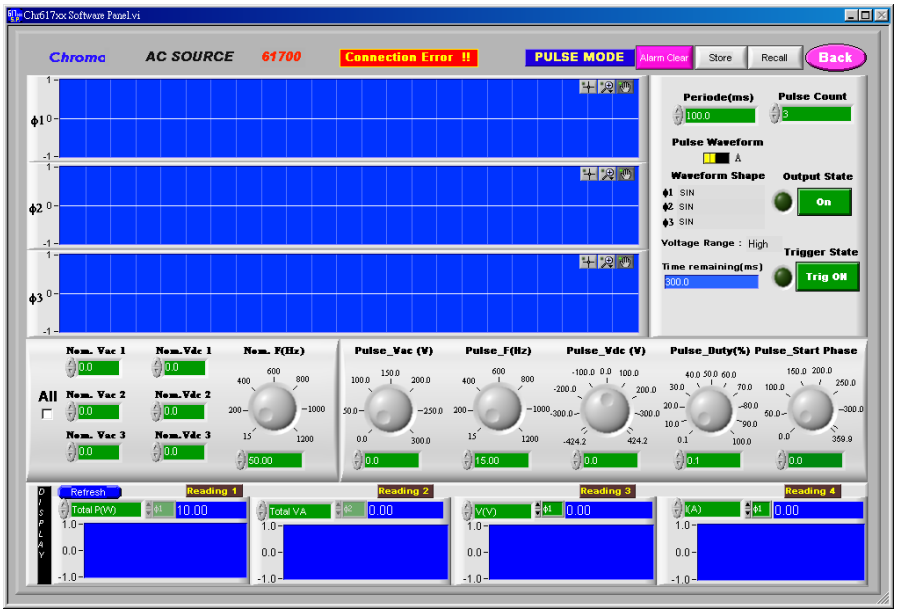


Figure 7-1 Pulse Mode Function Panel

The following example shows how to program the output within specification: According to the internal waveform generator to output Waveform shape =A, Nom.Vac=50V, Frequency =50Hz; the pulse condition is Pulse_Vac =100V, Pulse_Frequency =50Hz, Pulse_Phase=90.00, Pulse_Start_Phase=0, Pulse_Duty =25% and Period =80mS, also set repetition count Pulse_count= 4 as Figure 7-2 shows.

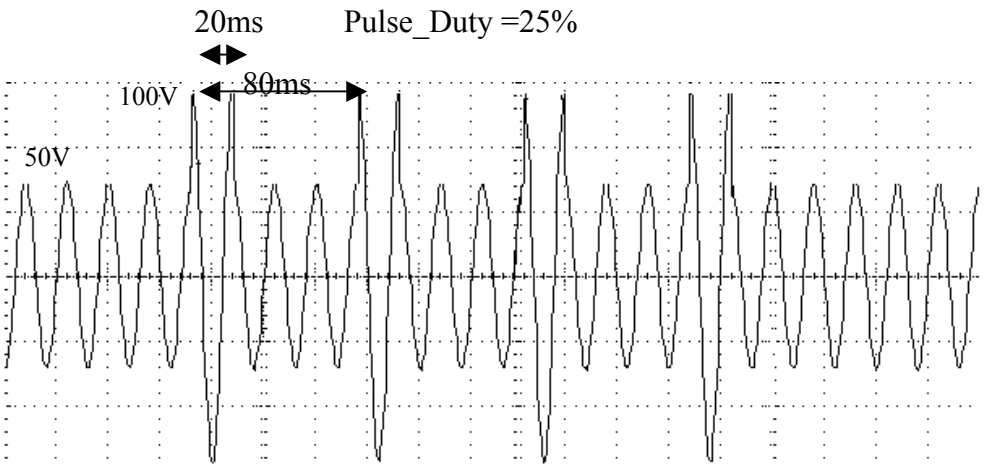


Figure 7-2 PULSE Mode

7.2 Button Description

- All: It is same as the V_SET voltage output couple controller in Fixed Mode. When selected, the control panel only needs to set the voltage of 1st phase to make the 3 phases voltage output simultaneously.
- Nom.Vac 1~3: It sets the AC voltage for the normal 3 phases in 0~150 and 0~300V two ranges.
- Nom.Vdc 1~3: It sets the DC voltage for the normal 3 phases in -212.1~212.1V and -242.2~242.2V two ranges.
- Nom Freq(Hz): It sets the normal frequency. The range is 15~1200 HZ.
- Pulse_Vac(V): It sets the work duty voltage in PULSE mode in 0~150 and 0~300V two ranges.
- Pulse_Freq(Hz): It sets the work duty frequency in PULSE mode. The range is 15~1200 HZ.
- Pulse_Vdc(V): It sets the DC voltage for work duty in PULSE mode in -212.1~212.1V and -242.2~242.2V two ranges.
- Pulse_Duty(%): It sets the work duty of triggered output pulse in PULSE mode. The range is 0~100%.
- Pulse_Start_Phase: It sets the start phase degree of work duty in PULSE mode. The range is 0~359.9.
- Period (ms): It sets the triggered output pulse period in PULSE mode. The range is 0~999999999.9 (ms).
- Pulse_Count: It sets the number of time for output pulse in PULSE mode. The range is 0~65535.
- Pulse Waveform: It selects waveform A or B in PULSE mode, refer to the setting in Fixed Mode.
- Waveform Shape Display Area: It shows the selected Pulse Waveform contents of each phase at present.
- Output State: It sets the output state for single unit and the same setting in other modes will be activated as well.
- Time Remaining (ms): It shows the total time spent in millisecond when executing this Pulse waveform.
- Trig On: It starts to output the Pulse waveform when clicked and the button Trig Off will appear for users to stop outputting Pulse waveform at any time. The Run Bar will show the progress % for reference.
- Display: Same as Fixed Mode it shows the reading when Output State is On.
- Store: Same as Fixed Mode but the file type is changed to *.pulse.
- Recall: Same as Fixed Mode but the file type is changed to *.pulse file.
- Waveform Simulation Area: It outputs waveform after setting the dynamic simulation parameter. Due to the resolution limit, this area only simulates the output waveform within Pulse_Count <=10. Use the waveform chart tools to view the waveform.
- Back: It returns to Fixed Mode. Same as List Mode a message will prompt to ask if saving the file when the parameters are changed as Figure 7-1 shows.

8. Interharmonics (Option)

8.1 Function Description

A start and end harmonic scanning frequency can be set in Interharmonics mode. Add them to the 3 phases output voltage and measure the load reading can find the electricity character of a certain voltage frequency point as Figure 8-1 shows.

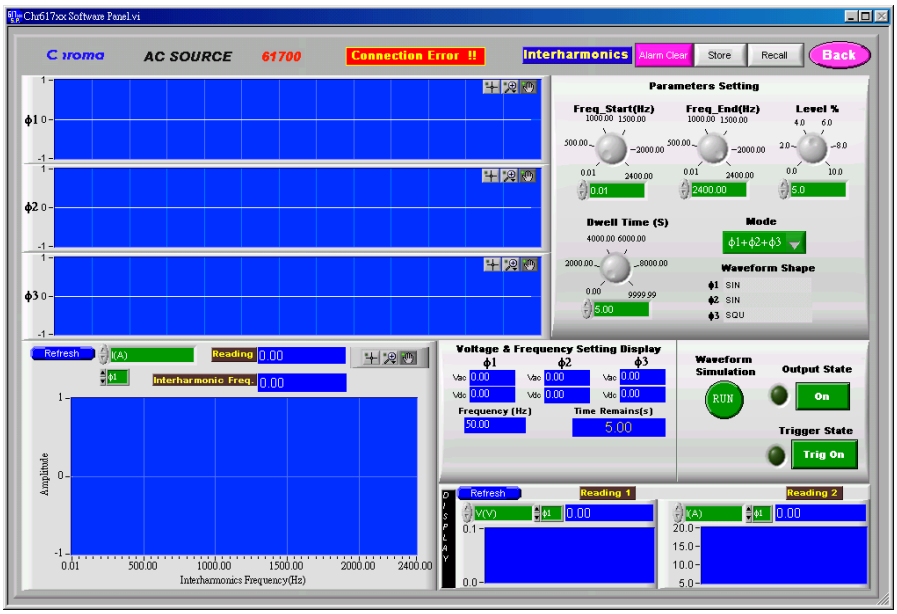


Figure 8-1 Interharmonics Function Panel

8.2 Button Description

- Freq_Start (Hz): It sets the harmonic start frequency in Interharmonics mode. The range is 0.01~2400 Hz.
- Freq_End (Hz): It sets the harmonic end frequency in Interharmonics mode. The range is 0.01~2400 Hz.
- Level (%): It sets the harmonic strength on scanning wave in Interharmonics mode. The unit is percentage of RMS.
  For 0~30%, the Freq_Start~ Freq_End is 0.01~500Hz.
  For 0~20%, the Freq_Start~ Freq_End is 500.01~1000Hz.
  For 0~10%, the Freq_Start~ Freq_End is 1000.01~2400Hz.
- Dwell Time (s): It sets the harmonic scanning time in Interharmonics mode. The range is 0.01~9999.99(s).
- Mode: It sets the harmonic scanning phase. It can be a single phase scanning or 3 phases scanning.
- Waveform Shape Display Area: It shows the selected contents of Interharmonics Waveform for each phase at present.
- Voltage & Frequency Display: It shows the AC voltage and frequency set for each phase in Fixed Mode.

- Waveform Simulation: It can preview the Interharmonics scanning waveform; however, the actual unit has no voltage output.
- Output State: It sets the output state for single unit and the same setting in other modes will also be activated.
- Time Remaining (ms): It shows the total time spent in millisecond when executing this Interharmonics waveform.
- Trig On: It starts to output the Interharmonics waveform when clicked and the buttons Trig Off, PAUSE will appear. Click PAUSE the button will change to Continue, and they allow users to suspend Interharmonics operation at any time or resume it to continue the reading measurement. The Run Bar will show the progress % for reference.
- Display: Same as Fixed Mode it shows the reading when Output State is On as Figure 4-22 shows.
  Another reading display area (at left) shown in XY chart, the readings are loaded to X and Y axes to draw the curve. This area also has Reading Chart, Digital Reading, Refresh, Reading Type Select, and Phase Select(ϕ1、ϕ2、ϕ3) functions. The X axis indicates the reading of Interharmonic Frequency and Y axis indicates the Reading Type. This Interharmonic Frequency reading window can return the readings continuously.
- Store: Same as Fixed Mode but the file type is changed to *.harm.
- Recall: Same as Fixed Mode but the file type is changed to *.harm file.
- Waveform Simulation Area: It outputs waveform after setting the dynamic simulation parameter. It can simulate and scan the waveform of single phase or 3 phases at the same according to the Mode and use the waveform chart tools to view the waveform.
- Back: It returns to Fixed Mode. Same as List Mode a message will prompt to ask if saving the file when the parameters are changed

9. Waveform Editor (Option)

9.1 Function Description

The main function of this software is to input the harmonics component waveform parameter of each step to the parameter table (in 4 tab pages) for 39 sets (except the 1st fundamental frequency) and show the Harmonics simulation waveform dynamically in Waveform Simulation Area as Figure 9-1 shows. This waveform can be sent to the instrument via this software to become a user-defined waveform. The maximum of User Waveform is 6 from US1 to US6.

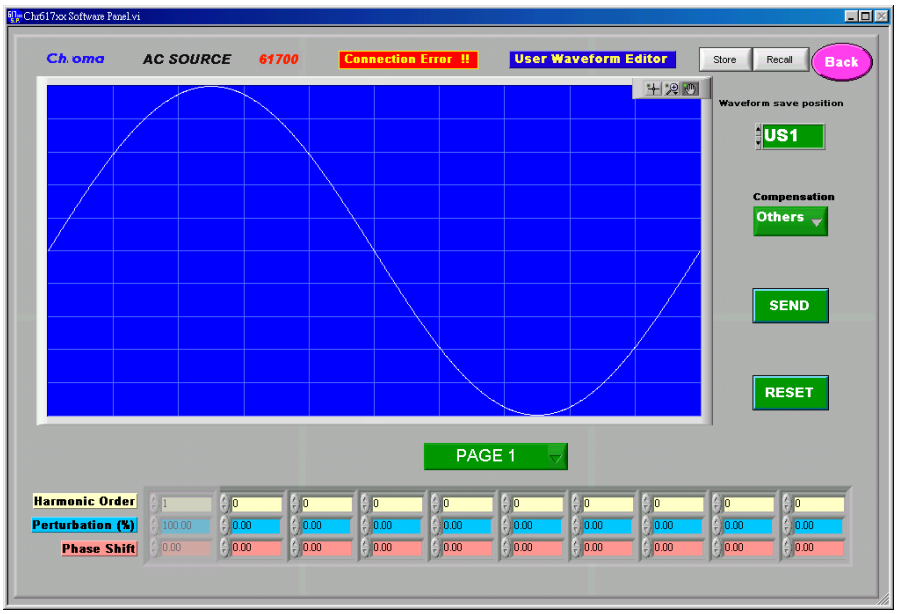


Figure 9-1 Waveform Editor Window

9.2 Button Description

- Harmonics Table: This is a table to enter total 39 sets (in 4 pages) of harmonic components as Figure 9-2 shows.

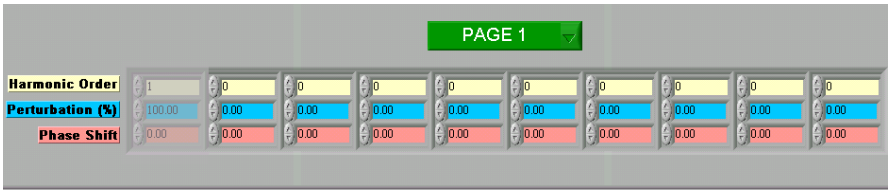


Figure 9-2 Harmonics Group

: There are 50Hz, 60Hz and Others for harmonic compensation selections. When the Fixed Mode frequency output is 50Hz, choose 50Hz for harmonic compensation

during harmonic waveform simulation can make the harmonic output more accurate.

Perturbation (%): Blue area, it enters the harmonic component percentage.
Harmonic Order: Yellow area, it enters the harmonic order.
Phase Shift: Red area, it enters the harmonic phase degree offset.

Waveform save position: Click it to select the location to be saved as Figure 9-3 shows. There are US1, US2, US3, US4, US5 and US6 available for User Define.

Figure 9-3 Selecting the Waveform Save Position

- **Send**: Click this button to convert the set harmonic level to 1024 data and send to AC Source 617XX Series as Figure 9-4 shows.

Figure 9-4 SEND Button

- **RESET**: Click this button will clear all parameters in the Harmonics Table to 0 except the first fundamental frequency as Figure 9-5 shows.

Figure 9-5 RESET Button

- **Store**: Click this button as shown below can save the settings to a .wfm file, which can be opened by Recall to save the time for setting again.

Figure 9-6 Store Button

If users want to save the parameter for next time use when in Waveform Editor, click **Store** will open a dialog box as Figure 9-7 shows. Just select the path and give a filename to store the file (the filename extension .wfm will be added automatically.) Various settings can be saved different files through this function and it can save plenty of files as long as the space is enough.

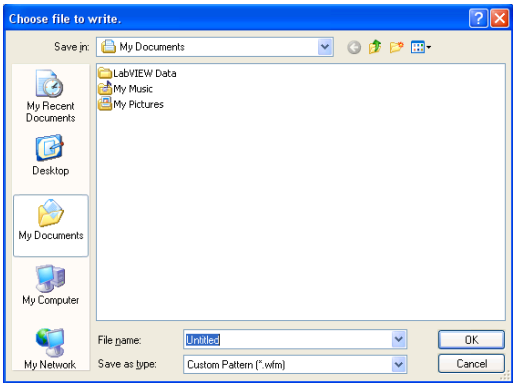


Figure 9-7 Dialog Box of Store

- Recall: Click this button as Figure 9-8 shows can open an existed file (a .wfm file as Figure 9-9 shows.) Select a saved file can simplify the parameter input and avoid errors from occurring; however, it won't open illegal files.

Figure 9-8 Recall Button

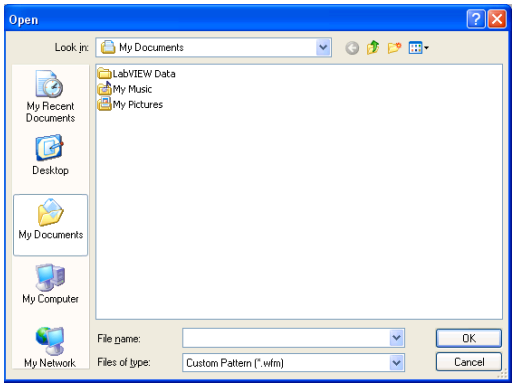


Figure 9-9 Dialog Box of Recall

- Back: Click this button as Figure 9-10 shows can return to the main screen. It is necessary to click Back to return to Fixed Mode control window from List Mode. When it is clicked, the software will check if the settings have been changed by users. If yes, a message will prompt to ask users if to save them.

Figure 9-10 Back Button

Connection Error!!: This message as Figure 9-11 shows the connection state of Fixed Mode. It indicates the instrument is out of control.

Figure 9-11 Connect State of Fixed Mode

- Simulation Window: This Waveform Chart shows the synthesized waveform of all

defined parameters and fundamental frequency Sin wave in Figure 9-12.

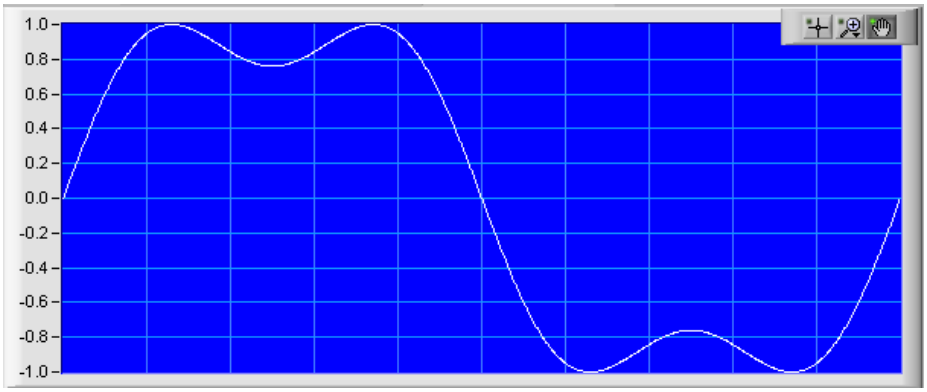


Figure 9-12 Waveform Editor Simulation Window

9.3 Example

■ To output the waveform following the Harmonic parameters in the table below.

Harmonic	%
2	2.3
5	9.8
7	15.8
8	2.5

1. Enter the parameters following the table above into the Waveform Editor table: **Perturbation(%)**:(Blue Area) Set to 2.3%; **Harmonic order**: (Yellow Area) Set to 2; **Phase Shift**: (Red Area) Set to 0 (use default as there is no specified number), and so forth for the rest three parameters.

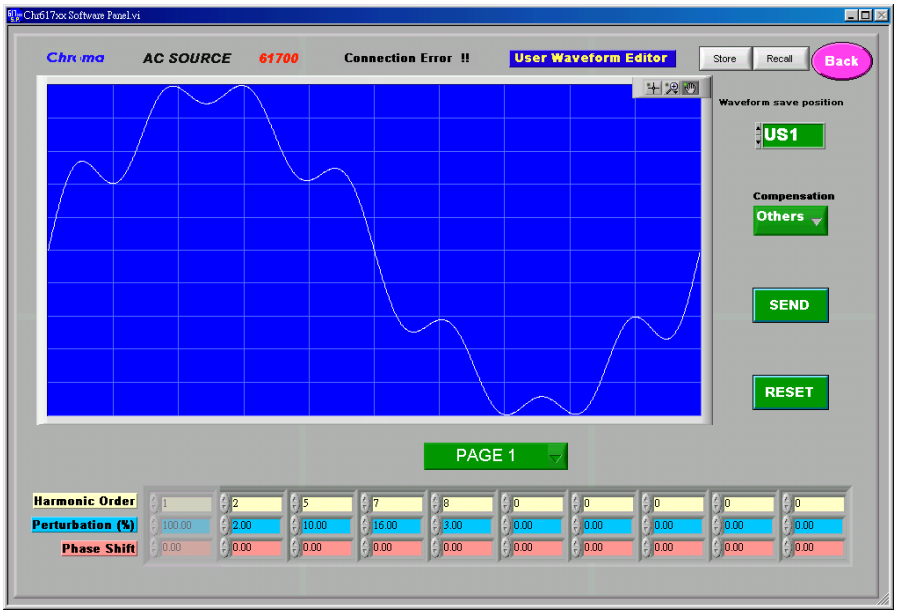
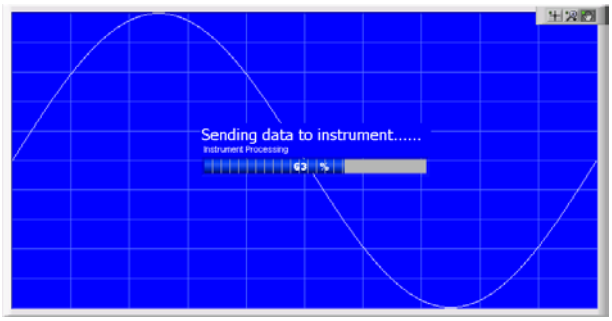


Figure 9-13 Setting Parameter and Simulating Waveform

2. Specify US1 for sending by selecting US1 in **Waveform save position**.

3. Click 

to start sending the data and a sending message screen will prompt. For this example it should not exceed 10secs.



4. Then return to the Waveform setup in Fixed Mode to select US1 and output the Harmonic component waveform from Chroma 617xx AC Source ϕ1 US1.