

# Programmable AC Source

**61501/61502/61503/61504**

Quick Start Guide

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# Material Contents Declaration

A regulatory requirement of The People's Republic of China defined by specification SJ/T 11364-2006 mandates that manufacturers provide material contents declaration of electronic products, and for Chroma products are as below:

Part Name	Hazardous Substances					
	Lead	Mercury	Cadmium	Hexavalent Chromium	Polybrominated Biphenyls	Polybromodiphenyl Ethers
	Pb	Hg	Cd	Cr <sup>6+</sup>	PBB	PBDE
PCBA	×	○	○	○	○	○
CHASSIS	×	○	○	○	○	○
ACCESSORY	×	○	○	○	○	○
PACKAGE	○	○	○	○	○	○

“○” indicates that the level of the specified chemical substance is less than the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

“×” indicates that the level of the specified chemical substance exceeds the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

1. Chroma is not fully transitioned to lead-free solder assembly at this moment; however, most of the components used are RoHS compliant.
2. The environment-friendly usage period of the product is assumed under the operating environment specified in each product's specification.

## Disposal

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new one, the retailer is legally obligated to take back your old appliances for disposal at least for free of charge.





# Declaration of Conformity

For the following equipment :

**61505 AC SOURCE**

(Product Name/ Trade Name)

**Chroma AC SOURCE 61505 ,61601 ,61602 ,61603 ,61604 ,61501 ,61502 ,61503 ,61504**

(Model Designation)

**Chroma ATE INC.**

(Manufacturer Name)

**66, Hwa-Ya 1<sup>st</sup> Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan Hsien 333, Taiwan**

(Manufacturer Address)

Is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directives (2004/108/EC), For the evaluation regarding the Directives, the following standards were applied :

**EN 61326 : 2006 Class A**

**EN 61326 : 2006(industrial locations)**

IEC 61000-4-2:1995+A1:1998+A2:2000, IEC 61000-4-3:2006

IEC 61000-4-4:2004, IEC 61000-4-5:2005, IEC 61000-4-6:2006

IEC 61000-4-8:2001, IEC 61000-4-11:2004

**EN 61010-1:2001**

The following importer/manufacturer or authorized representative established within the EUT is responsible for this declaration :

**Chroma ATE INC.**

(Company Name)

**66, Hwa-Ya 1<sup>st</sup> Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan Hsien 333, Taiwan**

(Company Address)

Person responsible for this declaration:

**Mr. Benjamin Huang**

(Name, Surname)

**T & M BU Director**

(Position/Title)

**Taiwan**

**2009.09.14**

(Place)

(Date)

(Legal Signature)

# Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or specific WARNINGS given elsewhere in this manual will violate safety standards of design, manufacture, and intended use of the instrument. *Chroma* assumes no liability for the customer's failure to comply with these requirements.



## BEFORE APPLYING POWER

Verify that the power is set to match the rated input of this power supply.



## PROTECTIVE GROUNDING

Make sure to connect the protective grounding to prevent an electric shock before turning on the power.



## NECESSITY OF PROTECTIVE GROUNDING

Never cut off the internal or external protective grounding wire, or disconnect the wiring of protective grounding terminal. Doing so will cause a potential shock hazard that may bring injury to a person.



## FUSES

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.



## DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes.



## DO NOT REMOVE THE COVER OF THE INSTRUMENT

Operating personnel must not remove the cover of the instrument. Component replacement and internal adjustment can be done only by qualified service personnel.

## WARNING

- Touching the output terminal on the rear panel when the power or current is set and outputting may result in personal injury or death.

# Safety Symbols



**DANGER** – High voltage.



**Explanation:** To avoid injury, death of personnel, or damage to the instrument, the operator must refer to an explanation in the instruction manual.



**High temperature:** This symbol indicates the temperature is now higher than the acceptable range of human. Do not touch it to avoid any personal injury.



**Protective grounding terminal:** To protect against electrical shock in case of a fault. This symbol indicates that the terminal must be connected to ground before operation of equipment.



The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.



**CAUTION**

The **CAUTION** sign denotes a hazard. It may result in personal injury or death if not noticed timely. It calls attention to procedures, practices and conditions.

## ACOUSTIC NOISE INFORMATION

This product has a sound pressure emission (at the operator's side) < 65dB(A).





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# 1. Introduction

The series of Chroma AC source 61501/61502/61503/61504 are high efficiency AC power source which provide sine wave output with low distortion, and accurate measurement of power. The DSP microprocessor generates accurate, stable output voltage and frequency. The PWM design of power stage allows for full volt-ampere into loads. The front panel has both RPG (rotary pulse generator) and keypad controls for setting the output voltage and frequency. The LCD provides a complete operating state of the unit to the user. Remote programming is accomplished either through the GPIB bus or the RS-232C serial port.

## 1.1 Key Features

### A. Configuration

- Local operation from the keypad on the front panel.
- Remote operation via GPIB or RS-232C interface.
- Protection against Over-power, Over-Current, Over-temperature, Fan-fail.
- Temperature-controlled fan speed.
- Built-in output isolation relays.

### B. Input/Output

- Selective output voltage with full scale of 150V/300V/600V/Auto where 600V is for A615003 fixture only.
- Remote control by the use of analog voltage reference.
- Universal of input voltage range 90Vac ~ 250Vac.
- Measurement of V, I, P, CF, PF, I<sub>dc</sub>, V<sub>dc</sub>, I<sub>pk</sub>, I<sub>s</sub>, VA and VAR.
- Remotely inhibited control.
- AC ON/OFF output signal.

## 1.2 Names of Parts

### 1.2.1 Front Panel

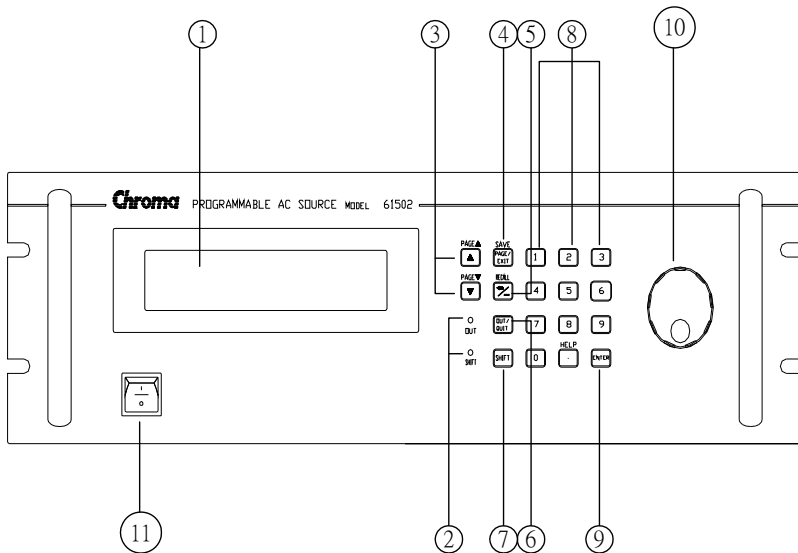








Figure 1-1 Front Panel

Table 1-1 Description of Front Panel

Item	Symbol	Description
1		<b>Display:</b> The LCD is to display configuration, output setup, and measurement results.
2		<b>Indicator LED:</b> "OUT" and "SHIFT", for showing activation of output and shift mode, are available which are located on the keypad area next to the corresponding keys.
3	  -----or----- PAGE ▲ PAGE ▼	<b>Cursor moving keys:</b> These two keys move the cursor to different directions respectively. In normal mode, pressing any of these two keys will change the place of the cursor. Under shift mode, these keys enable the LCD display to change to last page or next page if there are ▲ or ▼ patterns in right-down side of display.

4	<p style="text-align: center;"><b>PAGE/EXIT</b></p> <p style="text-align: center;">-----or-----</p> <p style="text-align: center;">SAVE</p>	<p><b>PAGE or EXIT command key:</b> Pressing this key will make the LCD display switching between MAIN PAGE and CHOICE PAGE. Or change to CHOICE PAGE in each functional list. Under shift mode, pressing this key on MAIN PAGE, the user can save the output setting (see 3.8.1 in the <i>Programmable AC Source 61501/61502/ 61503/61504 User's Manual</i>). If pressing the key on CHOICE PAGE, the user can save system data (see 3.8.2 in the <i>Programmable AC Source 61501/61502/ 61503/61504 User's Manual</i>).</p>
5	<p style="text-align: center;"></p> <p style="text-align: center;">-----or-----</p> <p style="text-align: center;">RECALL</p>	<p><b>Backspace and Minus command key:</b> Pressing this key will erase the keyin number. Or it may show " - ", if no number is in front of cursor. Under shift mode, pressing the key on MAIN PAGE, the user can recall the output setting (see 3.8.1 in the <i>Programmable AC Source 61501/61502/ 61503/61504 User's Manual</i>). If pressing the key on CHOICE PAGE, the user can recall system data (see 3.8.2 in the <i>Programmable AC Source 61501/61502/ 61503/61504 User's Manual</i>).</p>
6	<p style="text-align: center;"><b>OUT/QUIT</b></p>	<p><b>OUT/QUIT command key:</b> Pressing this key may enable the ac source output voltage or quit the output voltage.</p>
7	<p style="text-align: center;"><b>SHIFT</b></p>	<p><b>Shift mode selection key:</b> Pressing this key will switch the ac source from normal operational mode to the shift mode.</p>
8	<p style="text-align: center;"><b>0</b> to <b>9</b>, and </p> <p style="text-align: center;">-----or-----</p> <p style="text-align: center;">HELP</p>	<p><b>Numeric and decimal keys:</b> The user can program numeric data by pressing the digital and decimal keys. Under shift mode, pressing  acts the HELP function. The LCD display will show more information about cursor locating place.</p>
9	<p style="text-align: center;"><b>ENTER</b></p>	<p><b>ENTER key:</b> It confirms the settings of parameter.</p>
10	<p style="text-align: center;"></p>	<p><b>RPG:</b> The user can input programming data or options by turning the RPG to the desired ones.</p>
11		<p><b>Main power switch:</b> It is to power on or off.</p>

## 1.2.2 Rear Panel

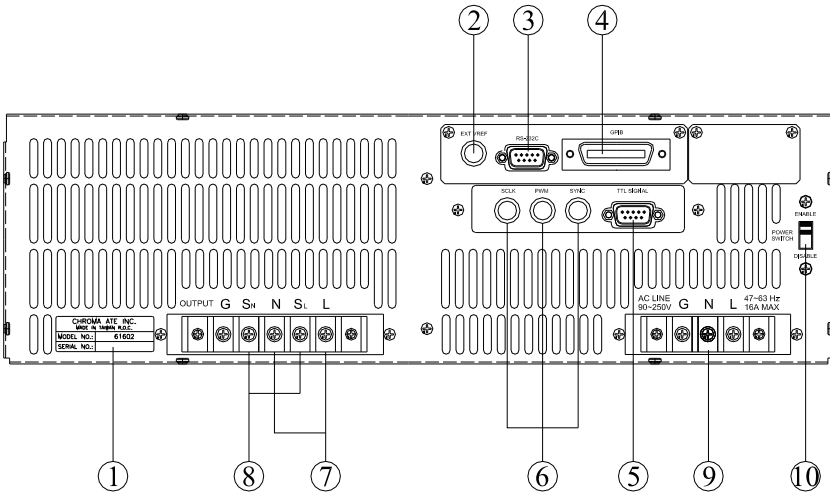


Figure 1-2 Rear Panel

Table 1-2 Description of Rear Panel

Item	Symbol	Description
1	Label	The label includes model number, series number of the AC source.
2	Ext. Ref.	The BNC connector inputs control waveform amplitude from external analog signal.
3	S-232C	The 9-pin, D-type female connector transfers control commands to and from the remote PC for remote operation.
4	GPIB Connector	A remote controller using GPIB bus is connected to the AC source through this connector for remote operation.
5	TTL Signal	The 9-pin, female connector transfers control signals (fault_out, remote inhibit, and AC_ON).
6	SCLK, PWM, SYNC	The BNC connectors SCLK and PWM are for AC Source parallel connectivity only. SYNC transfers a pulse signal synchronously when output changes. It also sends synchronizing signal for 3-phase mode operation.

7	Output Connector	This connector outputs power to the loading device.
8	Remote Sense Connector	It senses directly at the terminals of the load to eliminate any voltage drop on the connecting cable. Make sure of connecting the terminal "SL" of the remote sense connector to the terminal "L" of the load, and the "SN" to the "N" of the load. Reverse polarity is not allowed.
9	Power Line	Power line input is connected to AC source through this connector.
10	Power Switch	It enables or disables the main power switch. Users can power on or off with the main power switch when the power switch is set to "ENABLE". Conversely the main power switch is inactive when the power switch on the front panel is set to "DISABLE".





## 2. Installation

### 2.1 Inspection

After unpacking the instrument, please inspect any damage that may have occurred during the shipment. Save all packing materials in case the instrument has to be returned one day.

If any damage is found, please file a claim with the carrier immediately. Do not return the instrument to the factory without obtaining the prior RMA acceptance from Chroma.


### 2.2 Preparation for Use

In the beginning, the instrument must be connected with an appropriate AC line input. Then, since fans intelligently cool it, it must be installed in sufficient space for circulation of air. It should be used in an area where the ambient temperature does not exceed 40°C.

### 2.3 Requirements for Input Power

#### 2.3.1 Ratings

Input Voltage Range	:	90 ~ 250 Vac, single phase
Input Frequency	:	47-63 Hz
Max. Current	:	61501 : 8 A
		61502 : 16 A
		61503 : 21 A
		61504 : 28 A

 **CAUTION** ■ AC source may be damaged if it is operated at an input voltage that is outside its configured input range.

## 2.3.2 Input Connection

The input terminal is located at the bottom of the instrument rear panel. The rated withstand temperature of power cord must be at least 85°C or above. The current carried by power line input should be greater than or equal to the maximum rated input current of AC source. Do not use three separate lead wires to connect the power to the input of AC Source and do the followings step by step.

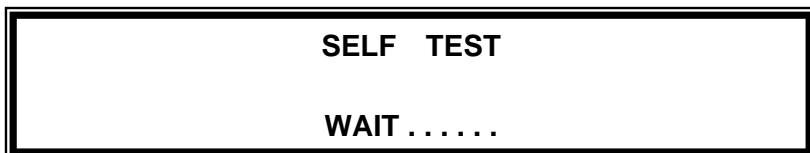
1. Remove the safety cover from the back of AC Source.
2. Plug in the power cord to the INPUT terminal of AC Source as described below:  
Green or green/yellow wire to the terminal labeled "G".  
White or blue wire to the terminal labeled "N".  
Black or brown wire to the terminal labeled "L".
3. Slide the safety cover over the AC input terminal, and secure the cover with two screws.

**⚠WARNING** To protect the operators, the wire connected to the GND terminal must be connected to the earth. Under no circumstances shall this AC source be operated without an adequate ground connection.

## 2.4 Power-on Procedure

**⚠WARNING** Before turning on the instrument, all protective earth terminals, extension cords, and devices connected to the instrument must be connected to a protective earth ground. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in personal injury.

Apply the line power and turn on the power switch on the front panel. The AC Source will do a series of self tests. The LCD on the front panel will light up and display as below:




Meanwhile, the AC source does the memory, data and communication self test. After the routines of self test are done, the display shows the MODEL number, and the serial number of the AC Source, and it shows an "OK" at the right side of each test item indicating that the item is no problem. It takes about 6 seconds to complete the routines of the self test. Then the display shows the versions of software as below.


<b>MODEL : 61502</b>	<b>SERIAL NO : 123456</b>
<b>1. DISPLAY &lt; OK &gt;</b>	<b>Ver : 1.01</b>
<b>2. WAVEFORM &lt; OK &gt;</b>	<b>Ver : 1.02</b>
<b>3. REMOTE &lt; OK &gt;</b>	<b>Ver : 1.03</b>

If any failure is detected on a certain item, an "ERROR CODE" will be shown at the right of that item. The error messages and troubleshooting are shown 7.2 and 7.3 of the *Programmable AC Source 61501/61502/61503/61504 User's Manual*. The test item "3. REMOTE" shows "<EMPTY>" if the option board (with GPIB and RS-232) is not connected.

After finishing memory, data and communication self-test, the AC source do the power output self-test. In this procedure, the output relays are in OFF status to sure not harming the load connecting on output terminal. The AC source will output and measure the voltage. If the voltage is abnormal, the power self-test is failed, and the display will show "NG". If it's normal, the display is shown as below as well as it changes to MAIN PAGE automatically.

**OUTPUT SELF TEST < OK >**

-  **CAUTION**
1. The user can do diagnosis if error or NG happens in power-on self-test procedure. Please see 7.2 in the *Programmable AC Source 61501/61502/61503/61504 User's Manual*.
  2. The inner digital circuit of AC source maybe not reset if turn off power then turn on immediately. Waiting more than 3 seconds is suggested to turn on power after turning off.

-  **Notice**
1. For more detail information, please see the User's Manual in the CD attached to the shipment.



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