

Switching Power Supply ATS

MODEL 8000

Key Features :

- Open architecture software
 - Expandable hardware support
 - Support GPIB instruments & RS232/RS485/I²C interface
 - User editable test library
 - User editable test programs
 - User editable reports
 - Statistic report
 - On-Line Softpanel
 - User authority control
 - Release control
 - Activity log
 - Master/Slave control mode
 - Multi-UUT test capability for single-output PSU
 - Support Barcode reader
 - Support Shop-floor control
 - Remote monitoring via internet
- Test command optimizer helps to improve test speed
- Capable of testing almost any power supply or related device
- Comprehensive hardware modules provide high accuracy and repetitive measurements
- High test throughput by system default test items
- Microsoft Word based evaluation report or UUT characterization
- Cost effective
- Other hardware expandable upon request
- Windows 98/2000/XP based software



SWITCHING POWER SUPPLY AUTOMATIC TEST SYSTEM MODEL 8000

The Chroma Automatic Power Supply Test system Model 8000 is the ultimate solution for power electronic testing. The system includes a wide range of hardware choice such as AC/DC Sources, Electronic Loads, DMM, Oscillate Scope, Noise Analyzer and OVP/Short Tester. This flexibility combined with its open architecture software platform -PowerPro III, gives users a flexible, powerful and cost effective test system for almost all types of power supply testing.

The C8000 test system uses a unique test command optimization technology to prevent repetitive control commands from being sent to the system hardware devices. This improve test speed dramatically and makes the Chroma 8000 an ideal choice for both high speed production applications as well as design verification.

The C8000 test system includes a sophisticated test executive which includes

pre-written test items covering almost all industry standard power supply tests. User may also create new test items by using a special test item editing function. This gives users the capability to expand the test library unlimitedly.

PowerPro III also includes powerful report, statistic and management functions, making the system capable to generate various test documents and performing system administration. Because the test and statistical reports are critically important in modern factories for R/D evaluation, QA verification and production tests, these functions are an integral part of the system.

Working under Window98/2000/XP the model 8000 provides test engineers with a dedicated power supply test system in an easy-to-learn Windows environment and allow access to resources provided by Windows.



Chroma

Comprehensive Test Items

The Model 8000 automatic power supply test system comes standard with an off-the-shelf test item library covering most industry standard power supply tests. Unlike traditional ATE software, users do not need to have programming language background to create new test items. Instead the Model 8000 allow users to use pre-compiled test items and to simplify defining test conditions and specifications.

The comprehensive test items cover 7 categories of power supply testing requirements. OUTPUT PERFORMANCE checks the general performances of the UUT. INPUT CHARACTERISTIC verifies the input parameters of a power supply. REGULATION tests the stability of the UUT under varying line-in and loading changes. TIMING AND TRANSIENT measures the transient state during turn-on, turn-off or when events occurred. PROTECTION TESTS triggers the protection circuit of the power supply. Finally, the SPECIAL TEST and the SPECIAL FEATURES provides means to test the most sophisticated power supplies when unique test routines are needed.

OUTPUT PERFORMANCES

1. DC output voltage
2. DC output current
3. Peak-Peak noise
4. RMS noise
5. Current ripple*
6. Efficiency
7. In-test adjustment
8. Power good signal
9. Power fail signal
10. P/ S ON signal
11. Extended measure
12. Waveform capture
13. Overshoot voltage

INPUT CHARACTERISTICS

14. Input Inrush current
15. Input RMS current
16. Input peak current
17. Input power
18. Current harmonics against regulations
19. Input power factor
20. Input voltage ramp
21. Input freq. ramp
22. AC cycle drop out
23. PLD simulation

REGULATION TESTS

24. Current regulation
25. Voltage regulation
26. Total regulation

TIMING AND TRANSIENT

27. Power up sequence
28. Power down sequence
29. Transient response time
30. Transient spike
31. Turn ON time
32. Rise time
33. Fall time
34. Hold-up time
35. Extra timing
36. Tracking
37. Swing check

PROTECTION TESTS

38. Short circuit
39. OV protection
40. UV protection
41. OL protection
42. OP protection

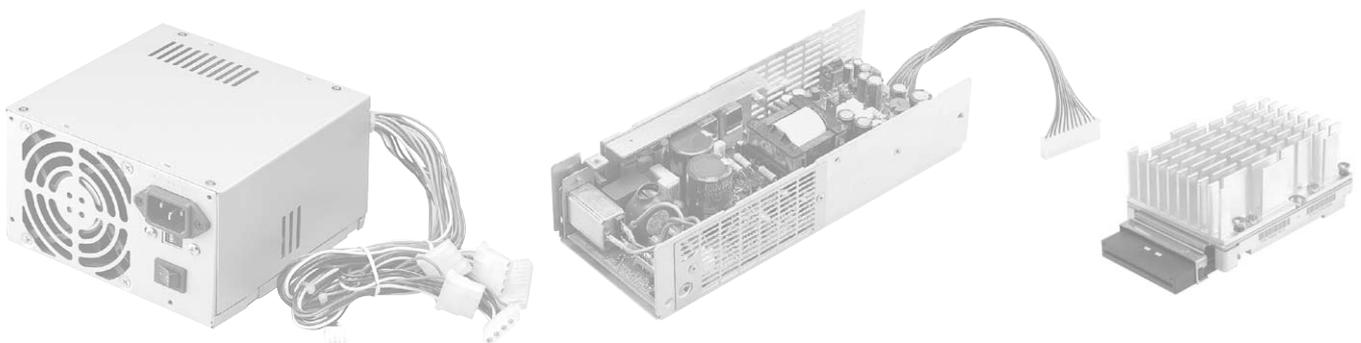
SPECIAL TESTS

43. Fan speed
44. Auto alignment*
45. Correlation test
46. UUT measurement verification test
47. High di/ dt loading*

SPECIAL FEATURE

48. Can bus read/ write
49. I²C read/ write*
50. GPIB read/ write
51. RS-232 read/ write
52. RS-485 read/ write*
53. TTL signal control
54. Relay control
55. Bar code scan*
56. DMM measure

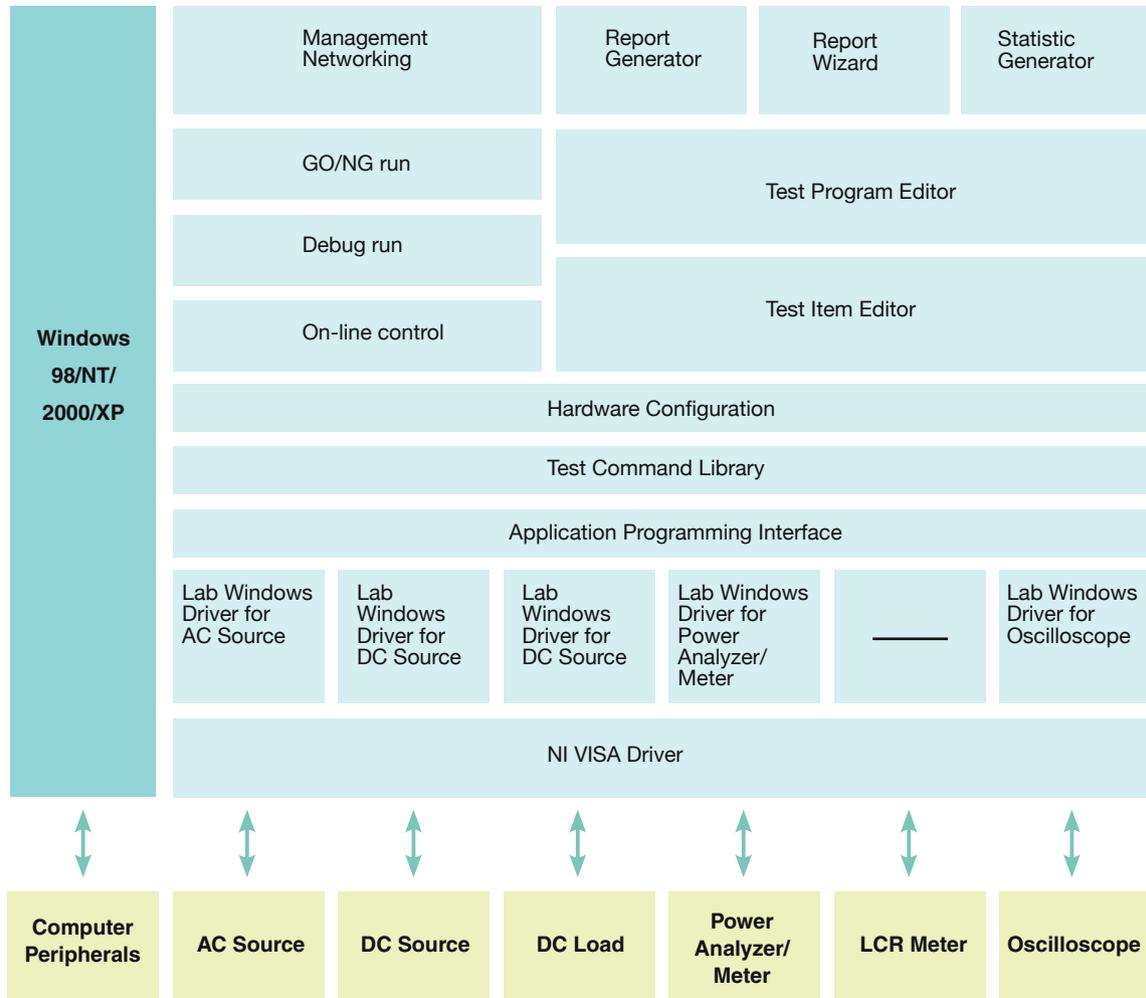
*These test items need to be created by users by using test item editor due to the variety of the UUTs. And unlimited customized or user defined test items are allowed.



New Millennium ATS Software Platform

The Model 8000 Test Systems include the industries most sophisticated power supply testing software platform, PowerPro III. PowerPro III provides users with an open software architecture suited for a wide range of applications and devices.

Power Pro III is a windows 98/NT/2000/XP environment which provides necessary computer peripherals.



Maximum flexibility and expendability

NI VISA Driver

National Instrument VISA driver are used by PowerPro III to allow support to almost any instrument which uses VXI/PXI/GPIB/RS-232/RS-485 interface protocols. As a result, users do not have yo concerned about which interface is provided by individual instrument that may want to intergrate into system. By using these standard instrument drivers PowerPro III can incorporated almost any modern test device.

Higher compatibility

Application Programming Interface

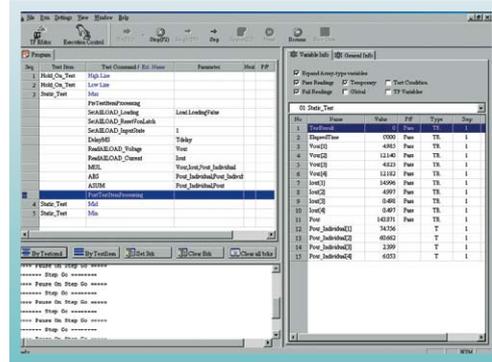
When users want to change the equipment from one brand to the others, for traditional ATS design, users are prohibited to do that. The main problem is caused by the different format of the remote commands. Chroma PowerPro III provides a unique application programming interface which interprets the different remote commands of various instrument to a standard format. Thus, if the functions of two equipment are identical, even manufactured by two different suppliers, they still can be replaced directly by adding a new application programming interface driver in Chroma ATS software, PowerPro III.

Versatile and powerful execution mode

Chroma PowerPro III software platform provides three execution modes. DEDUG RUN is used to verify the user-defined test items and test programs. For production line testing, GO/ NG RUN allows one key operation to perform Pass/ Fail test. And the On-LINE-CONTROL mode extends Chroma Power Supply Auto Test System model 8000 to control and monitor the hardware devices simultaneously. Thus, it is capable of simulating the manual test scenarios just like you did on the bench.

Debug run

The debug run provides a versatile and immediate tool for users to verify the test items and test programs created before releasing them to operators. All the essential debugging tools are provided here, such as step run, set break point(s), run to break and simultaneous variables display. Users may use this to control the process of execution and at the mean time, monitor the test results and verify them. As a result, there's no risk for users to put an uncheck test item or test program onto production line.



The selected variables will be updated simultaneously when the test item or test program is under going.

GO/ NG run

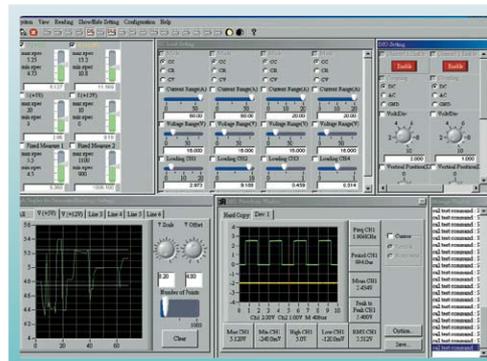
The GO/ NG run provides friendly and easy execution environment for production line and operators. All the test programs tested here need to be released in management function. This may minimize the risk of running a wrong or unchecked test program. The test results will be stored in hard drive of the system controller which may be used to create statistic and the test report. Plus the fail rate check, bar code scanner support, Pass/Fail indication TTL signal. All these powerful features make it an ideal tool for mass production testing.



Failure rate check function is available in GO/NG execution mode.

On line control

The display tells it all. Users may achieve all the instrument on system to control them and get readings from them. The type of reading showing on display could be selected by user and user may even define specifications for them. Furthermore, user can also select them to show as a time graph in order to see the trends. And, the waveform measured by DSO can be merged onto the same display as well. The waveform can be downloaded as hard copy or digitizing waveform. Under digitizing mode. Users can select measurement parameters just like it provides in DSO. In a word, this execution mode is the implementation of virtual instrumentation.



Users allow to create their own softpanel layout and store it for recall later.

Comprehensive analyzing tools

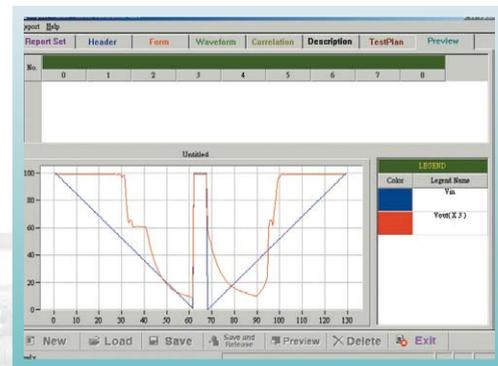
Report generator & wizard

Documentation and offering a readable report has been the weakest part of the traditional auto test system. Users usually need to spend a lot of effort to modify the data stored by the auto test system to make it more recognizable to their customer. During the process, it has great chance to get an incorrect result due to typing error.

Now, Chroma PowerPro III, its outstanding report wizard and generator provide the total solution for any documentation requirement. From tabular test data, DSO waveform to correlation chart, it allows users to integrate different types of presentation in the same report. Users may also edit and store report format for next use, thus it saves a lot of precious time in creating test report. Meanwhile, to make the test report more portable, the output of the report wizard is already a standard M/S Word file.



Define parameters and waveform preview Report Wizard.



Preview the correlation chart in Report Wizard before converting it to M/S Word file.

Switching Power Supply ATS

Pass/Fail criteria:
The PSU shall survive over specified operating temperature test limits. A remote Power ON/OFF only is allowed to resume normal operations. AC power line cycle is NOT allowed to resume normal operations.

Test Result: Pass (sampleOTC42)

A. 100VAc
Brownout/Recovery: Zinfaidel, T= 50°C, Date:07-26-2002, Pout=250W, 30mn

Input (V)	Frequency (Hz)	I _a (Arms)	P _{in} (W)
115	60	5.087	336.6
230	50	2.875	329.6

Efficiency Max Load 1:

Input (V)	Frequency (Hz)	I _a (Arms)	P _{in} (W)	P _{out} (W)
115	60	5.240	348	
230	50	2.902	340.5	

Efficiency Min Load:

Input (V)	Frequency (Hz)	I _a (Arms)	P _{in} (W)	P _{out} (W)	Disso	Pos
115	60	0.4163	21.26	8.7	12	
230	50	0.2593	21.4	8.7	12	

Revision: 02 **Date: 04.17.2002** **Page 10 of 50**

TEST 1:
(T1): +5Vsb
(T2): 3.3V
(T3): Rpsod
(T4): Vin = 230 VAc 50 Hz

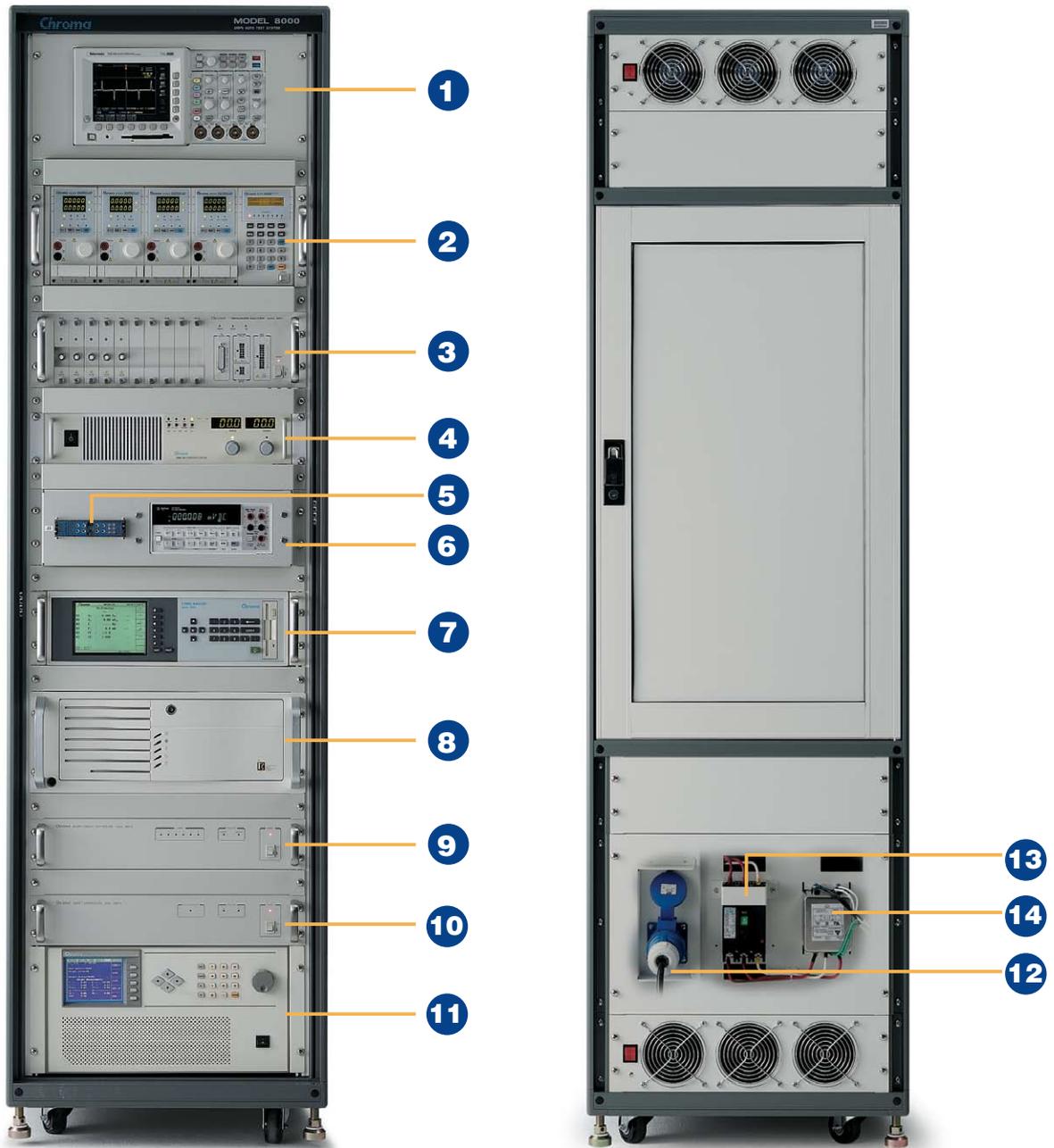
TEST 2:
(T1): +5Vsb
(T2): 3.3V
(T3): Rpsod
(T4): Vin = 115 VAc 60 Hz

TEST 3:
(T1): +5Vsb
(T2): 3.3V
(T3): Rpsod
(T4): Vin = 230 VAc 50 Hz

TEST 4:
(T1): +5Vsb
(T2): 3.3V
(T3): Rpsod
(T4): Vin = 115 VAc 60 Hz

Revision: 02 **Date: 04.17.2002** **Page 7 of 50**

High Performance Hardware Devices



1. **Digital Storage Oscilloscope** : TDS-3000/TDS-5000/TDS-7000 series ; Other types or brands of DSO supported upon request
2. **Electronic Load** : Model 6300 / 6310 / 6330 / 63200 / 6340 / 63472 series Electronic Load
3. **Timing / Noise Analyzer** : Model 6011 / 80611
4. **DC Source** : Model 6200 / 6200F /6260 /62120 /62000P series
5. **Connection Panel** : Interface to UUT
6. **Digital Multi-Meter** : Agilent - 34401A ; Other types or brand of DMM supported upon request
7. **Power Analyzer / Meter** : Model 6630 / 6632 Power Analyzer ; Model 66200 series Digital Power Meter
8. **System Controller** : Industrial PC
9. **OVP / Short Circuit Tester** : Model 6012 / 80612
10. **ON / OFF Controller** : Model 6013 / 80613
11. **AC Source** : Model 6400 / 6500 / 61500 / 61600 / 61700 series AC Source
12. **System Power Inlet** : 1Ø 3W / 30A, 60A selectable
13. **Breaker** : 30A / 60A selectable with emergency stop control
14. **EMI Filter** : 30A

* Other devices supported upon request

AC power source

Chroma power supply automatic test system model 8000 supports all Chroma Model 6400, 6500, 61500, 61600 and 61700 series AC power supplies. They provide stable and clean AC or DC (Model 61500/61600 series) output and power line disturbance simulation for advanced power supply input characteristic testing.



MODEL	6400 Series	6500 Series	61500 Series	61600 Series	61700 Series
Power rating	375-9000VA	1200-9000VA	500-4000VA	500-4000VA	1500-12000VA
Voltage range	0-300V	0-300V	0-300V	0-300V	0-300V
Output phase	1 or 3 phases	1 or 3 phases	1 phases	1 phases	3 phases
DC output	No	No	Yes	Yes	Yes
Output measurement	Yes	Yes	Yes	Yes	Yes
Harmonic measurement	No	No	Yes	No	No
Waveform simulation	No	Yes	Yes	No	Yes
Programmable impedance	No	No	Yes	No	No
Harmonic synthesis	No	Yes	Yes	No	Yes
Inter-harmonic synthesis	No	No	Yes	No	Yes

DC power source

Chroma power supply automatic test system model 8000 supports all Chroma Model 6200, 6200K, 6200F, 6260, 62120, 62000P series DC power sources which may be used as line-in or OVP sources.



MODEL	6200 Series	6200F Series
Power rating	60-1000W	1200-2800W
Voltage range	0-5V/ 150V	0-5V/ 600V
Programmable current limit	Yes	Yes
Programmable OV point	Yes	Yes
Analog programming	Yes	Yes
Remote sensing	Yes	Yes
Line-drop compensation	5V	5V

MODEL	6260 Series	62120 Series	62000P Series
Power rating	6000W	12000	600,1200,2400W
Voltage range	0-10V/ 600V	0-10V/ 600V	0-100V/ 600V
Programmable current limit	Yes	Yes	Yes
Programmable OV point	Yes	Yes	Yes
Analog programming	Yes	Yes	Yes
Remote sensing	Yes	Yes	Yes
Line-drop compensation	5V	5V	5V

Power analyzer / Meter

Chroma power supply automatic test system model 8000 can also support all Chroma Model 6630, 6632 series Power Analyzer, and Model 66200 Series Digital Power Meter. They do not only provide traditional high precision power measurement, but also the voltage/current harmonics measurements defined in IEC and EN regulation.

MODEL	6630	6632	66201	66202
NO. of input module	1 to 3	1 to 3	1	1
Power measurement range	48 ranges	48 ranges	12 ranges	24 ranges
Voltage measurement range	6 ranges	6 ranges	3 ranges	3 ranges
Current measurement range	8 ranges	8 ranges	4 ranges	8 ranges
Front panel display	Yes	No	Yes	Yes
Front panel editable	Yes	No	Yes	Yes
Harmonics measurement	Yes	Yes	No	Yes
Flicker measurement	Yes	No	No	No
Waveform measurement	Yes	Yes	No	Yes
Build-in regulation limit	Yes	Yes	No	No



DC Electronic Load

Chroma power supply automatic test system model 8000 can support all Chroma Model 6300, 6310, 6330, 63200, 6340 series and 63472 DC electronic load. They come with different powers, load modes, slew rates and features. This provides users maximum selection opportunities for different test application requirements.



MODEL	6300 Series	6310 Series	6330 Series	63200 Series	6340 Series	63472
Load mode	CC/ CR/ CV/ CP	CC/ CR/ CV	CC/ CR/ CV	CC/ CR/ CV/ CP	CC	CC
Power rating	60-300W	30-1200W	30-1200W	2000-12000W	625W	200W
Voltage range	1-254V	1-500V	1-500V	1-500V	0.8-50V	0.5-2V
Current range	Up to 60A	Up to 240A	Up to 240A	Up to 600A	Up to 150A	150A
Slew rate	Up to 2.5A/ μ S	Up to 10A/ μ S	Up to 10A/ μ S	Up to 25A/ μ S	Up to 150A/ μ S	1000A/ μ S
Measurements	Voltage/ Current/ Power	Voltage/ Current	Voltage/ Current	Voltage/ Current/ Power	Voltage/ Current	Voltage/ Current
Monitoring output	Current	No	No	Current	Voltage/ Current	Voltage/ Current
Current share measurement	No	No	No	No	Yes	No
Noise measurement	Optional	No	No	No	No	No
Voltage sense input	Yes	Yes	Yes	Yes	Yes	Yes
Sync Signal	No	No	Yes	Yes	No	No
High Speed	No	No	Yes	No	No	No

Timing / Noise Analyzer

Chroma power supply automatic test system model 8000 provides an unique timing / noise analyzer, Chroma Model 6011/80611. Its modular design allows users to expand up to 10 input measurement modules. Each module is capable of measuring timing period and noise level. Furthermore, it also provides 16 bits TTL signals and 6 pairs of floating relays for external control. Meanwhile, the 10 multiplexer inputs and 2 DMM and 2 DSO outputs further extend the Chroma Model 6011 for advanced measurement requirements.

MODEL	6011	80611
NO. of input module	Up to 10	Up to 10
Noise measurement range	2V/ 0.4V	2V/ 0.4V
Low Pass Filter	Up to 20 MHz	Up to 20 MHz
Input circuit	Differential input	Differential input
Timing range	0-64 second	0-64 second
NO. of trigger input	4 sets	6 sets
NO. of comparator	2 / Input module	4 / Input module
Controllable TTL bits	16 Output	16 Output / 16 Input
Controllable floating relay	6	6
NO. of multiplex input	10	10
NO. of multiplex output	2 for DMM & 2 for DSO	1 for DMM



OVP/ Short Circuit Tester

Chroma OVP/ Short circuit tester provides model 6012 and 80612 versatile tool for OVP/ UVP/ Short circuit. Its unique programmable impedance makes it ideal to simulate OV / UV situation for all types of power supplies.

MODEL	6012	80612
NO. of input terminal	Up to 6	Up to 6
Short circuit impedance	< 0.1 ohm	< 0.05 ohm
Short current measurement	Yes	Yes
Sync. Signal for short circuit	6 relay signal	6 relay signal
OVP/UVP testing	Internal/ External	Internal/ External
Internal impedance range	1K-1M ohm	100-1M ohm
External OVP/UVP source	DC source	DC source
Measurement Capability	By external DMM	Internal
Control Interface	Via Chroma 6011	RS 485



ON/ OFF Controller

Chroma ON / OFF controller Model 6013 and 80613 are used to control AC and DC inputs simultaneously. Meanwhile, it can control AC to turn on and off at any phase angle and measure the input inrush current of the UUT.

MODEL	6013	80613
Input	AC/ DC	AC/ DC
ON/OFF angle - AC	0-360°	0-360°
Voltage range - AC	250V	270V
Current range - AC	30A	30A
Voltage range - DC	200V	200V
Current range - DC	40A	60A
Measurement Capability	By external DMM	Internal
Control Interface	Via Chroma 6011	RS 485



Digital Multi-Meter & Storage Oscilloscope

Chroma power supply auto test system model 8000 is capable to support Agilent 34401A / 34970A and Keithley 2700 series DMM and most of Tektronix Scopes. Other DMM and DSO are supported upon request.

Application & Selection Guide

Model Applications Equipment	PC Power Supply	Server Power Supply	Adapter	Telecom Power Supply	Battery Charger	DC-DC Converter	VRM	Industrial Power Supply
AC Source	61500;61600 6400;6500	61500;61600 6400;6500	61500;61600 6400	61500;61600 6400;6500;61700	61500;61600 6400	-	-	61500;61600 6400;6500
DC Source	6210;6260 62120;62000P	6210;6260 62120;62000P	6210;6260 62120;62000P	6210;6260 62120;62000P	6210;6260 62120;62000P	6200;6200F;6260; 62120;62000P	6200;6200F;6260; 62120;62000P	6200;6200F;6260 62120;62000P
Power Analyzer/ Meter	6630;6632 66200	6630;6632 66200	6630;6632 66200	6630;6632 66200	6630;6632 66200	6630;6632 66200	6630;6632 66200	6630;6632 66200
Electronic Load	6300 6310;6330	6300;6310; 63200;6330	6300 6310;6330	63200;6330	6300 6310;6330	6300;6310 63200;6330;63472	6340;6330 63472	6300;6310 63200;6330
Timing Noise Analyzer	6011;80611	6011;80611	6011;80611	6011;80611	6011;80611	6011;80611	6011;80611	6011;80611
OVP/Short Tester	6012;80612	6012;80612	6012;80612	6012;80612	6012;80612	6012;80612	6012;80612	6012;80612
ON/OFF Controller	6013;80613	6013;80613	6013;80613	6013;80613	6013;80613	6013;80613	6013;80613	6013;80613
DSO	User Selectable	User Selectable	User Selectable	User Selectable	User Selectable	User Selectable	User Selectable	User Selectable
DMM	-	User Selectable	-	User Selectable	-	-	-	User Selectable
Other Instrument	-	-	-	Voice Band/RF Noise Meter	-	-	-	-
GPIO Card	NI-GPIB	NI-GPIB	NI-GPIB	NI-GPIB	NI-GPIB	NI-GPIB	NI-GPIB	NI-GPIB
Other Interface Card	-	I ² C	-	I ² C/CAN BUS/RS-485	-	-	-	I ² C/CAN BUS/RS-485
Rack	35U	41U	25U	41U	25U	35U	25U	41U
Software	Power Pro III	Power Pro III	Power Pro III	Power Pro III	Power Pro III	Power Pro III	Power Pro III	Power Pro III

Telecom Power Supply Testing

For the Switching Mode Rectifier or Telecom Power Supply Testing, it should build in other special instruments just like :

RF Voltmeter :

It offers measurement with high-input impedance, excellent stability and low noise. It measures the wide band noise of SMR at different frequency.

Transmission Impairment measurement Set :

It offers testing of voice-grade data circuits and metallic digital circuits. It measures the output voltage voice and noise of SMR.



Telecom Power Supply ATS

DC to DC Converter Testing



DC to DC Converter ATS



DC to DC Converter Test Fixture



DC to DC Converter

Software:

Special Design Test Items (Load Fault Power Dissipation Test, Switching Frequency Test, Synchronization Frequency Test)

Hardware:

Create Standard Test Fixture platform (Receiver)

Ordering Information

8000 : Switching Power Supply ATS

6011 : Timing/Noise Analyzer

6011N/ 80611N : Timing/ Noise module

6012/ 80612 : OVP/ Short Circuit Tester

6013/ 80613 : ON/ OFF Controller

5004ATM : System Controller

A600009 : GPIB Cable (200 cm)

A600010 : GPIB Cable (60 cm)

A600011 / A800027 : Test Fixture for Model 8000

A800004 : 19" Rack for Model 8000

A800005 : PCI Bus GPIB Card (National Instrument)

A800010 : 8000 Software Package - Basic version

(Including Test Program Editor, Test Report Editor, Go/NOGO run, Test Report Generator, Hardware Configuration, Management Function)

A800011 : 8000 Software Module - Statistics

A800012 : 8000 Software Module - Test Item Editor

A800013 : 8000 Software Module - Report Wizard

A800014 : 8000 Software Module - On-line Control

A800015 : 8000 Software Package

DC Load Module : Refer to Model 6300, 6310, 63200, 6330, 6340, 63472 series

Power Analyzer : Refer to Model 6630, 6632

Digital Power Meter : Refer to Model 66200 series

AC Source : Refer to Model 6400, 6500, 61500, 61600, 61700 series

DC Source : Refer to Model 6200, 6200F, 6260, 62120, 6200P series

Developed and Manufactured by :

CHROMA ATE INC.

致茂電子股份有限公司

HEADQUARTERS

66, Hwa-Ya 1st Rd., Hwa-Ya
Technology Park, Kuei-Shan Hsiang,
Taoyuan Hsien 33383, Taiwan
Tel: +886-3-327-9999
Fax: +886-3-327-8898
http://www.chromaate.com
E-mail: chroma@chroma.com.tw

U.S.A.

CHROMA ATE INC. (U.S.A.)

7 Chrysler Irvine, CA 92618
Tel: +1-949-421-0355
Fax: +1-949-421-0353
Toll Free: +1-800-478-2026

EUROPE

CHROMA ATE EUROPE B.V.

Max Planckstraat 4, 6716 BE
Ede, The Netherlands
Tel: +31-318-648282
Fax: +31-318-648288

CHINA

CHROMA ELECTRONICS

(SHENZHEN) CO., LTD.

8F, No.4, Nanyou Tian An
Industrial Estate, Shenzhen,
China PC: 518054
Tel: +86-755-2664-4598
Fax: +86-755-2641-9620

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