



ELECTRICAL DOUBLE LAYER CAPACITOR AUTOMATIC TEST SYSTEM MODEL 8801

The Chroma Electrical Double Layer Capacitor Automatic Test System model 8801 is the ultimate solution for EDLC (electrical double layer capacitor) testing. The system includes a various range of hardware choice such as DC Sources, Electronic Loads, Timing Analyzer and LCR Meter. This flexibility combined with its open architecture software platform gives users a flexible, powerful and cost effective test system for almost all range of EDLC.

The Chroma 8801 EDLC ATS 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 8801 an ideal choice for both high speed production applications as well as design verification.

The Chroma 8801 EDLC ATS includes a sophisticated test executive which includes pre-written test items for standard EIAJ RC-2377 EDLC tests. User may also create new test items by using a special test item editing function, which users the capability to expand the test library unlimitedly.

This open architecture software also includes statistic and management functions, making the system capable to generate various test documents and performing system administration. Because the 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 Window 2000/XP the model 8801 provides test engineers with a dedicated EDLC test system in an easy-to-learn Windows environment and allow access to resources provided by Windows.

This auto test system uses the unique test command optimization technology to prevent the repeating control commands from sending to the system hardware devices. This improves the system test speed dramatically and makes Chroma 8801, which uses open software architecture, but still highly efficient as optimized auto test system.

MODEL 8801

Key Features :

- Suit for electrical double layer capacitor production line automatic test, test parameter includes Static Capacitance and Internal resistance (IR and ESR) (for EIAJ RC-2377 Test method of Electrical Double Layer Capacitor)
- Open architecture software
 - Expandable hardware support
 - Support GPIB instruments&RS232/RS485 interface
 - User editable test library
 - User editable test programs
 - Statistic report
 - On-Line Soft-panel
 - User authority control
 - Release control
 - Activity log
 - Multi-UUT test capability for single-output PSU
 - Support Barcode reader
- Measurement function: C/ IR / ESR (For EIAJ RC-2377)
- High test throughput
- Synchronized measurement in multi-channel reduce the test time
- One DC source and one DC load design
- Hardware protect circuit
- Microsoft® Word basicd evaluation report or UUT characterization
- Cost effective
- Other hardware expandable upon request
- Windows 2000/XP basicd software



Chroma



Diversified Test Items

The Model 8801 EDLC ATS comes standard with a test item library covering EIAJ RC-2377 EDLC tests. Unlike traditional ATE software, users do not need to have programming language background to create new test items. Instead the Model 8801 allow users to use pre-compiled test items and to simplify defining test conditions and specifications. The diversified test items cover various type of EDLC testing requirements, which are defined by EIAJ RC-2377 (Fig. 1). Different type of EDLC uses different test item that is also defined by the standard. (Fig.2)

Chroma 8801 ATS provides basic test items, that are for static capacitance, ESR and IR. It also offers function test item, like charge and low level discharge. In addition, some protect test item to check test condition.

The basic test item of Static Capacitance is using to measure static capacitance. The basic test item of Static Capacitance is using the variation ratio of voltage and time with loading current, that is define in EIAJ RC-2377, to measure static capacitance (Fig. 3). It is a suggestion loading current by different type EDLC in EIAJ RC-2377 (Fig. 4).

The basic test item of Internal Resistance is using to measure international resistance. The basic test item of Internal Resistance test item is using the variation ratio of voltage and time to calculate Vo and using Vo and operating voltage with loading current to calculate IR, that is define in EIAJ RC-2377, to measure IR(Fig. 5). It is a suggestion loading current by different type EDLC in EIAJ RC-2377 (Fig. 4).

The function test item of Charge is using for charging EDLC to operating voltage. Users can set up the charging time and charging current etc... The function test item of Low Level Discharge is using for discharging the voltage of EDLC to reach the anticipative voltage. It also offers the dwell time function to ensure the low voltage that is maintained.

The protect test item of Pre-test Voltage is using for ensuring the connection of DUT. In addition, the protect test item of pre- test C is using for saving the test time.

Fig.1

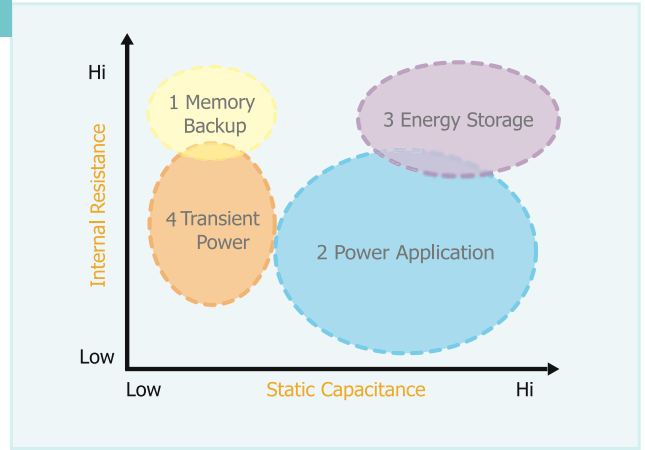


Fig.2

Test Item		EDLC Types			
		1 Memory Back Up	2 Power Application	3 Energy Storage	4 Transient Power
Static Capacitance	Constant Current Discharge Test	A	A	A	A
	ESR(AC)	A	B	B	B
Internal Resistance	IR(DC)	B	A	A	A
	Leakage Current	C	C	C	C

A. Standard Test Item
B. Simple Test Item
C. Specifically Test Item
(EIAJ RC-2377)

Fig.3

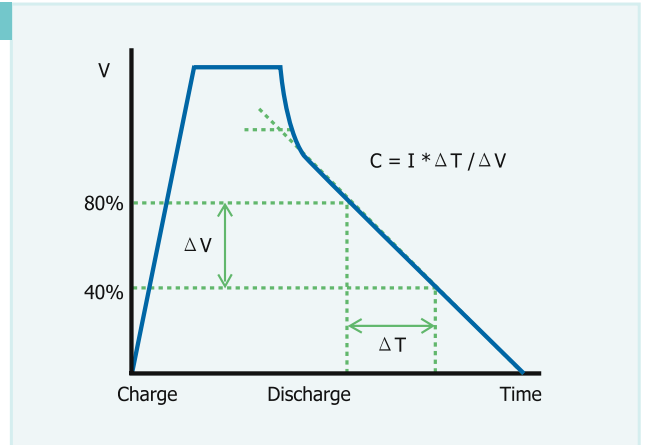
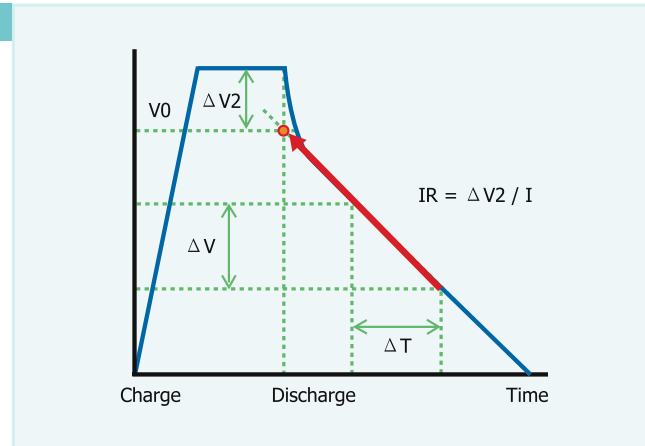


Fig.4

Type	EDLC Types			
	1 Memory Back Up	2 Power Application	3 Energy Storage	4 Transient Power
I for C (mA)	1°C	4°C	0.4°C	400°C
I for IR (mA)	10°C	40°C	4°C	400°C

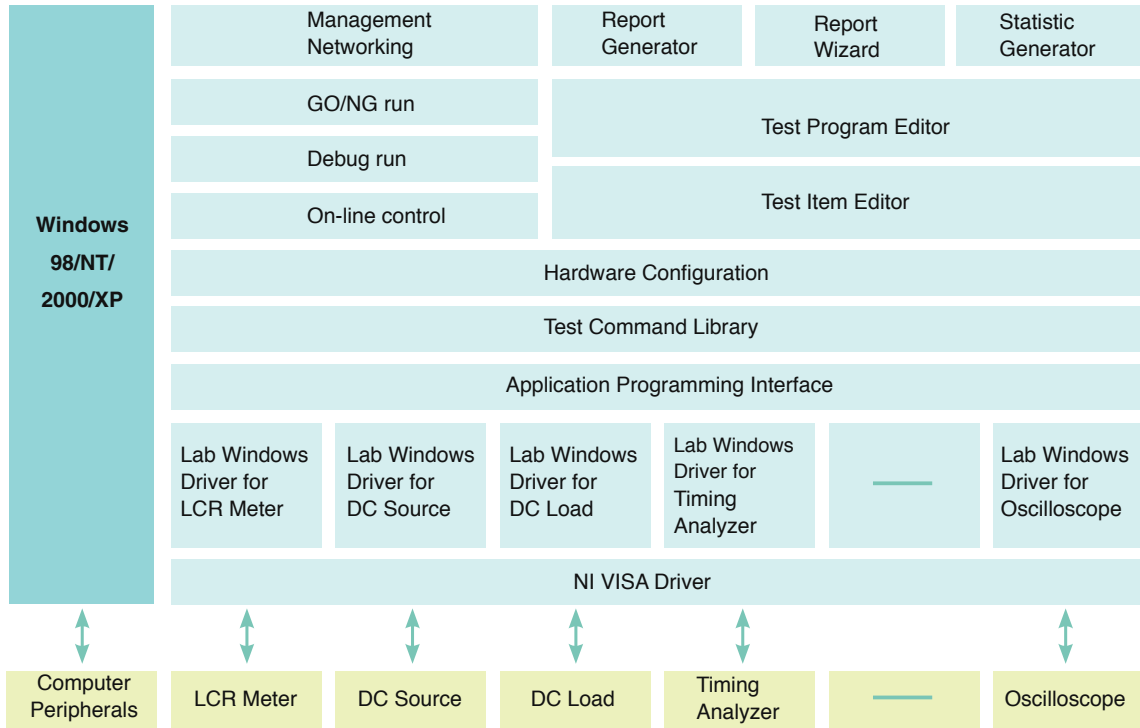
(EIAJ RC-2377)

Fig.5



NEW MILLENNIUM ATS SOFTWARE PLATFORM

The Model 8801 EDLC Auto Test Systems include the industries most sophisticated automatic testing software platform, Chroma ATS software. The Chroma software provides users with an open software architecture suited for a wide range of applications and devices. The software is a windows 98/2000/XP environment which provides necessary computer peripherals.



Maximum flexibility and expendability

NI VISA Driver

National Instrument VISA driver are used by software to allow support to almost any instrument which uses GPIB/RS-232/RS-485 interface protocols. As a result, users do not have you concerned about which interface is provided by individual instrument that may want to intergrade into system. By using these standard instrument drivers 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 software 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.

Off-the-shelf test commands

Test command library

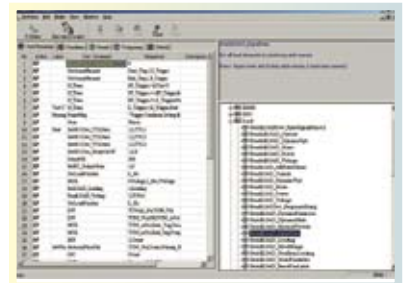
For some special controls, it is not very easy for most of the users to figure out how to make relevant instrument work properly. Chroma ATS software collects most useful test commands for users in order to provide user-friendly editing environment. On the other hand, Chroma ATS software also provides some low level test commands, such as GPIB read/write, RS-232 read/write, RS-485 read/write...etc. That allow users to have the full access to all the equipment on 8900 electrical equipment safety auto test system directly. Meanwhile, The test command library stops the repetitive test conditions from sending to hardware devices; Thus it can improve the test speed dramatically.

Flexible and easy to use

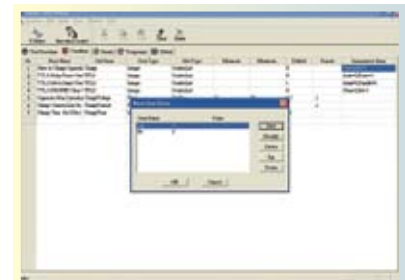
Test item editor

Following with the test command library, Chroma ATS software provides an editing environment for user to create new test items to fit new test requirements. In this test item editor, Chroma ATS software establishes a powerful tool which is similar to the C language, but much easier to learn and operate.

In the test item editor, it allows users to define test procedure, test condition variables, test result variables and temporary variables. Furthermore, Chroma ATS software test item editor also provides global variables for advanced control test requirement. For instance, it may be used for auto alignment system which need to pass the aligned value of the previous UUT as the next UUT s default value. In this way, it is very helpful to improve the align speed .



Add test command to the test procedure from test command library.

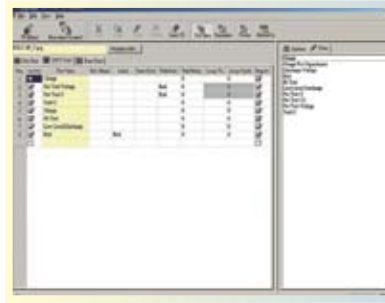


Enumerative items allow programmers define limited selections for low level users.

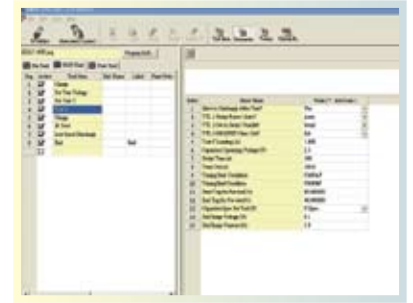
Sequential and Batch testing

The program editor

The test program editor provides a useful means to link several pre-defined test items for batch test. It also introduces pre-test and post-test functions which allow users to send the test commands that are not necessary to use all the time to the equipment on system but only when the execution just begin, or on the opposite, at the end of the test. This feature helps to optimize the test program and reduce test time. Meanwhile, its run-time control allows users to determine the process and the direction of the test program according to the individual test result of test items.



Test program can be created by stacking test items in test library.



Just fill the test conditions! The test procedure was defined in the test item library.

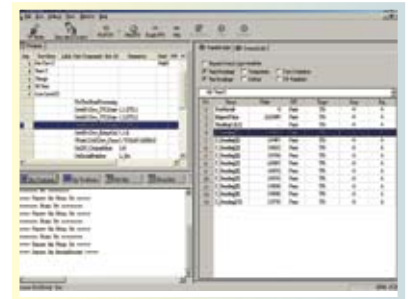
Test program editor can also open a M/S Excel file as the source of test program data. Users may first export test program as M/S Excel file. Then basic on the external databasic. Users may create new test programs by modifying the Excel databasic. Thus, only one databasic needs to maintain for multiple test programs.

Versatile and powerful execution mode

Chroma ATS 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 Electrical Equipment Auto Test System model 8900 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

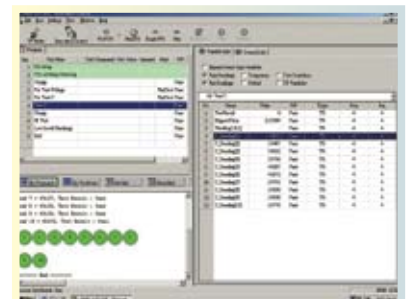
The debug run provides a versatile and immediate tool for users to verify the test items and test programs created before releasing them to operators. All the essential debugging tools are provided here, such as step run, set break point(s), run to break and simultaneous variables display. Users may 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.

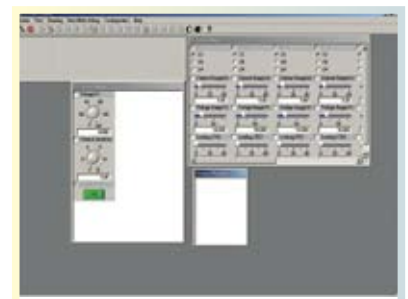
The GO/ NG run provides friendly and easy execution environment for production line and operators. All the test programs tested here need to be released in management function. This may minimize the risk of running a wrong or unchecked test program. The test results will be stored in hard drive of the 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.



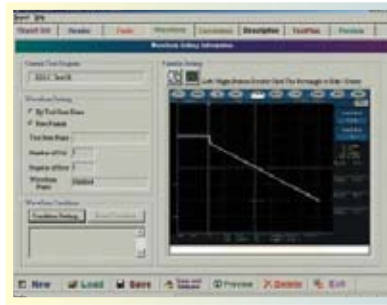
Users allow to create their own softpanel layout and store it for recall later.

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 ATS software, 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.



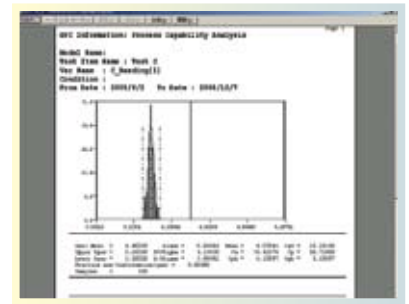
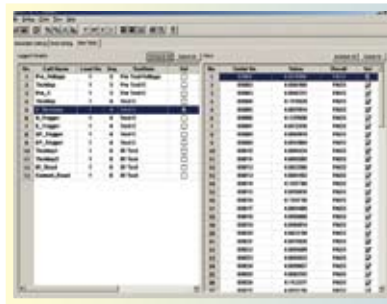
Define parameters and waveform preview Report Wizard.



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

Statistical report

Chroma ATS software provides off-the-shelf statistic report function. All the test conditions defined in the test program and the test readings can be stored and analyzed by statistic report function. In statistic report function, it provides process capability, Pareto, Xbar-R chart, Xbar-S chart, nP chart, P chart, U chart and C chart. Users may select test program, test date period and even include test data from remote computer via network connections. Then choose any one of the control chart to generate statistical report. The report may be printed out or stored in file. Or users may store the raw data as a text file directly which is able to be imported by Excel or similar word processor software package for further analysis.



Example of statistic report - Process Capability

COMPLETE SYSTEM ADMINISTRATION

MANAGEMENT FUNCTION

Management	Chroma software provides a series of management functions for advance system control and management.
User Function	User function allows users to define authorized person list and their authorized level.
Activity log	Activity log records the historical log-in, log-out time and activated functions of the system users.
Release	Users are allowed to define the release flags of test programs and test items. These flags will be used to check if the test program can be executed by GO/ NG run. Or if the test item can be shown in user test item library.
Instrument	Instrument function is used to import and export H/ W instrument drivers.
Network	Network function provides interface for software to communicate with external software package or system. For example, Shop-Floor or Product-Data-Management system. It is also used to define the source location of the test programs when users want to centralize them.

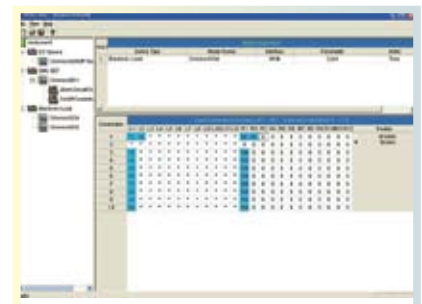
Hardware configuration

The hardware configuration function allows users to define the system configuration by selecting devices from the instrument list defined in the "Instrument" section of Management function.

Shop-Floor control system

For modern mass production line, it is a big challenge to have the full control of the scenarios happened on production line. Therefore, Shop-Floor control system is wildly used to improve fabrication process.

To satisfy customers' requirement, Chroma also provides customized Shop-Floor control system. For details, please contact your local representative of Chroma ATE INC.



Parallel setting for E-loads allow users to control multiple load channels as one.



1. DC Electronic Load : Model 6330 Series
2. DC Power Source : Model 6200,6200F,6260,62120,62000P Series
3. Display
4. EDLC 10 Channel C/IR Scanner : Model A880100
5. Timing / Noise Analyzer : Model 6011
6. LCR Meter : Model 11022
7. System Controller : Industrial PC
8. Fans
9. 3U board
10. Breaker : 30A
11. EMI Filter : 30A
14. System Power Inlet : 1Ø 3W/ 30A

* Other devices supported upon request

DC Power Source

Chroma EDLC automatic test system model 8801 supports all Chroma Model 6200, 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	1200-12000W		
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	600-1200W	
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	

DC Electronic Load

Chroma EDLC automatic test system model 8801 can support all Chroma Model 6330 series 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	6330 series
Load mode	CC/ CR/ CV
Power rating	30-1200W
Voltage range	1-500V
Current range	Up to 240A
Slew rate	Up to 10A / μ s
Measurements	Voltage/Current
Monitoring output	No
Current share measurement	No
Noise measurement	No
Voltage sense input	Yes
Sync Signal	Yes
High Speed	Yes



Timing / Noise Analyzer

Chroma EDLC automatic test system model 8801 provides an unique timing / noise analyzer, Chroma Model 6011. 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
NO. of input module	Up to 10
Noise measurement range	2V / 0.4V
Low Pass Filter	Up to 20MHz
Input circuit	Differential input
Timing range	0-16 / 0-64 second / up to 8365 second
NO. of trigger input	4 sets
NO. of comparator	2 / Input module
Controllable TTL bits	16 output
Controllable floating relay	6
NO. of multiplex input	10
NO. of multiplex output	2 for DMM &. 2 for DSO



LCR Meter

The Chroma 11022 LCR Meters are the measurement instruments for passive components. They are applicable to the automatic manufacturers for passive components in material inspection. With the features of 21ms high-speed measurement and 0.1% accuracy, 11022 LCR Meter fulfills the requirements for fast production. Its functions of 8-level counting, pass/fail judgment, and 50 sets of internal save and recall settings totally meet the production line requirements for easy operation.

The four impedance output modes can measure the results with the LCR Meters of other brands to get a common measurement standard. The measurement results can also be compared with other brand of LCR Meters. Chroma 11022 is the ideal selection for passive components quality assurance and automatic production.



Model	11022
Test Parameter	L, C, R, IZL, Q, D, ESR, X, θ
Test Signals	
Level	10 mV~1V , step 10 mV; $\pm(10\% + 3 \text{ mV})$
Frequency	50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz, 100kHz ; $\pm 0.01\%$
Measurement Display Range	
C (Capacitance)	0.001pF ~ 1.9999F
L, M, L2 (Inductance)	0.001 μ H ~ 99.99kH
Z (Impedance), ESR	0.01m Ω ~99.99M Ω
Q (Quality Factor)	0.0001 ~ 9999
D (Distortion Factor)	
θ (Phase Angle)	-180.00° ~ +180.00°
Basic Measurement Accuracy (Note1)	$\pm 0.1\%$
Measurement Time (Fast) (Note2)	21ms

Note 1 : $23\pm 5^\circ\text{C}$ after OPEN and SHORT correction. Slow measurement speed. Refer to Operation Manual for detail measurement accuracy descriptions

Note 2 : Measurement time includes sampling, calculation and judge of primary and secondary test parameter measurement.

Digital Multi-Meter & Storage Oscilloscope

Chroma EDLC auto test system model 8801 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.

ORDERING INFORMATION

8801 : Electrical Double Layer Capacitor ATS

6011 : Timing/Noise Analyzer

80611N : Timing/Noise module

DC Electronic Load : Refer to Model 6330 Series

DC Power Source : Refer to Model 6200,6200F,6260,62120,62000P Series

LCR Meter : Refer to Model 11022

A880100 : EDLC 10 Channels C/IR Scanner

A600009 : GPIB Cable (200 cm)

A600010 : GPIB Cable (60cm)

A800005 : PCI Bus GPIB Card (National Instrument)

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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