

LCD Inverter Auto Test System

MODEL 8490

Key Features :

- For both inverter & LIPS testing
- Standard & probe pin test fixture selectable
- High test throughput by system default test items
- Cost effective
- Synchronized measurement in multi-channel reduce the test time
- Expandable PCI interface card
 - Measurement Card
 - Control Card
 - DMM Card
- Three brightness control modes
 - DC Voltage, PWM, and SM Bus control
- Three lamp current balance check
- Waveform check function
- Built-in timing measurement
- Compensation function to correlate the error caused by fixture
- Transformer DCR measurement
- Burst mode frequency & duty measurement
- Open architecture software
 - Expandable hardware support
 - Support instrument with GPIB/RS-232/RS-485/I²C interface
 - User editable test library
 - User editable test programs
 - User editable reports
 - Statistical report
 - On-line Softpanel
 - User authority control
 - Release control
 - Activity log
 - Support Barcode reader
 - Support Web-cam for remote monitoring via internet
- Other hardware expandable upon request
- Windows 98/2000/NT/XP based software



LCD INVERTER AUTO TEST SYSTEM

The Chroma LCD Inverter Auto Test System model 8490 is the ultimate solution for LCD inverter. It not only test traditional DC to AC inverter but also the LIPS (LCD Integrated Power Supply) type that combines adapter and inverter in one board.

It has wild variety of choices in hardware, such as AC/DC Source, Power Analyzer, Electronic Load, DMM, Oscilloscope, Timing/ Noise Analyzer , OVP/Short Tester and ON/OFF Controller. And 3 PCI interface cards-Measurement Card, Control Card, DMM Card to measure all of the inverter parameter. Combining with the open architecture system software platform - PowerPro III, it gives users a flexible, powerful and cost effective auto test system for both inverter and LIPS type testing.

To meet the different inverter test requirements, Chroma LCD Inverter Auto Test System model 8490 has off-the-shelf test items built in. Users may create new test items based on new test requirements using the test item editing function, which gives users the capability to expand the test items unlimitedly.

With the powerful report, statistic and management functions, Chroma LCD Inverter Auto Test System model 8490 is able to provide complete tools to generate various test documents and improve system administration. Since the test and statistical reports are equally important nowadays for R/D evaluation, QA verification and mass production tests. So these save users a great deal of time for paper work.

Working under Windows98/2000/NT/XP operation system, Chroma 8490 LCD Inverter Auto Test System is able to get all the resources provided by Windows; thus, it can easily export the test results to network or to your web-page for remote manufacturing monitoring.

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 8490, which uses open software architecture, but still highly efficient as optimized auto test system.

Chroma

Comprehensive Test Items

The comprehensive test items covers 5 categories of traditional DC to AC inverter testing requirements. OUTPUT PERFORMANCE checks the general performances of the UUT. INPUT CHARACTERISTIC verifies the input parameters of a inverter. TIMING TESTS measures the turn-on, turn-off or when events occurred. PROTECTION TESTS trigs the protection circuit of the power supply. Finally, the SPECIAL TESTS provides means to test the most sophisticate inverter which need unique test solutions. For the D/A Inverter testing requirements. The comprehensive test items as below.

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OUTPUT PERFORMANCES

1. Lamp current
2. Lamp voltage
3. Lamp frequency
4. Kickoff(Vopen) voltage
5. Efficiency

INPUT CHARACTERISTICS

5. Input voltage
6. Input current
7. Inrush current
8. DIM frequency
9. DCR

TIMING TESTS

10. Kickoff(Vopen, shut down) delay time
11. Voltage turn on time
12. Current turn on time
13. Voltage turn off time
14. Current turn off time
15. Voltage rise time
16. Current rise time
17. Voltage fall time
18. Current fall time

PROTECTION TESTS

19. Short circuit test
20. Open circuit test

SPECIAL TESTS

21. Burst Mode frequency & duty measurement
22. Lamp current balance
23. Waveform unbalance rate check
24. Waveform wave height check

For the LIPS testing requirements. The comprehensive test items as below.

OUTPUT PERFORMANCES

1. Lamp current
2. Lamp voltage
3. Lamp frequency
4. Kickoff(Vopen) voltage
5. DC output voltage
6. Peak-Peak noise
7. Efficiency

INPUT CHARACTERISTICS

8. Input voltage
9. Input current
10. Inrush current
11. DIM frequency
12. DCR
13. Input RMS current
14. Input peck current
15. Input power
16. Input power factor

REGULATION TESTS

17. Voltage regulation
18. Combine regulation

TIMING TESTS

19. Kickoff(Vopen, shut down) delay time
20. Voltage turn on time
21. Current turn on time
22. Voltage turn off time
23. Current turn off time
24. Voltage rise time
25. Current rise time
26. Voltage fall time
27. Current fall time
28. Turn on time
29. Rise time
30. Fall time
31. Hold-up time

PROTECTION TESTS

32. Short circuit test
33. Open circuit test
34. Short circuit
35. OV protection
36. UV protection
37. OL protection
38. OP protection

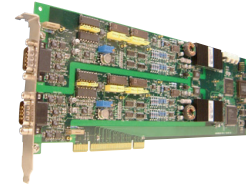
SPECIAL TESTS

39. Burst Mode frequency & duty measurement
40. Lamp current balance
41. Waveform unbalance rate check
42. Waveform wave height check
43. GPIB read/write
44. RS-232 read/write

*Regarding the others LIPS test items. it's already available upon request.

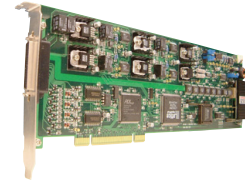
Measurement Card

Chroma LCD inverter auto test system model 8490 uses Measurement Card to measure the output inverter part performances. The 1 Measurement Card is capable of measuring 2 lamps. It is capable to measure the lamp current, voltage, frequency, power, and timing as well as kick off voltage.



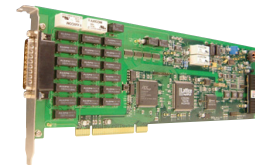
Control Card

Chroma LCD inverter auto test system model 8490 uses Control Card to provide 3 brightness control types, DC voltage, PWM and SM bus. DC voltage is using DC voltage level to control the brightness, PWM uses pulse width modulation and SM bus is using digital signal control as well. And it also measures the brightness control current and enable signal current. Furthermore, it provides 2 DC voltage and enable signal outputs. It has 4 bits digital input and 12 bits digital output for automation and external control.



DMM Card

Chroma LCD inverter auto test system model 8490 designs DMM Card to measure the DC to AC inverter input characteristics, and 20 MUX input channels are available for build-in DMM. It measures DC voltage, current, DIM frequency and transformer impedance(DCR).



Test Fixture

Test fixture has been the most critical ingredient for LCD inverter ATS due to the inverter is very easy to be influenced by loading effect that from measurement circuit and cable (See the fixture module equivalent capacitance in test fixture specification). Chroma LCD inverter auto test system model 8490 provides standard and various test fixtures such as probe pin design for those inverters that are keen in reducing loading effect. All fixtures use insulation module design. Two different modules can be selected (standard & high current module) for different types of inverter. The standard module is for CCFL inverter while the high current module for EEFL inverter. Each module built-in 5 high voltage relay to guarantee operating in high voltage environment. Furthermore two different resistors can be added on the fixture for loading selection.



A849005:
16 channels Inverter Test Fixture



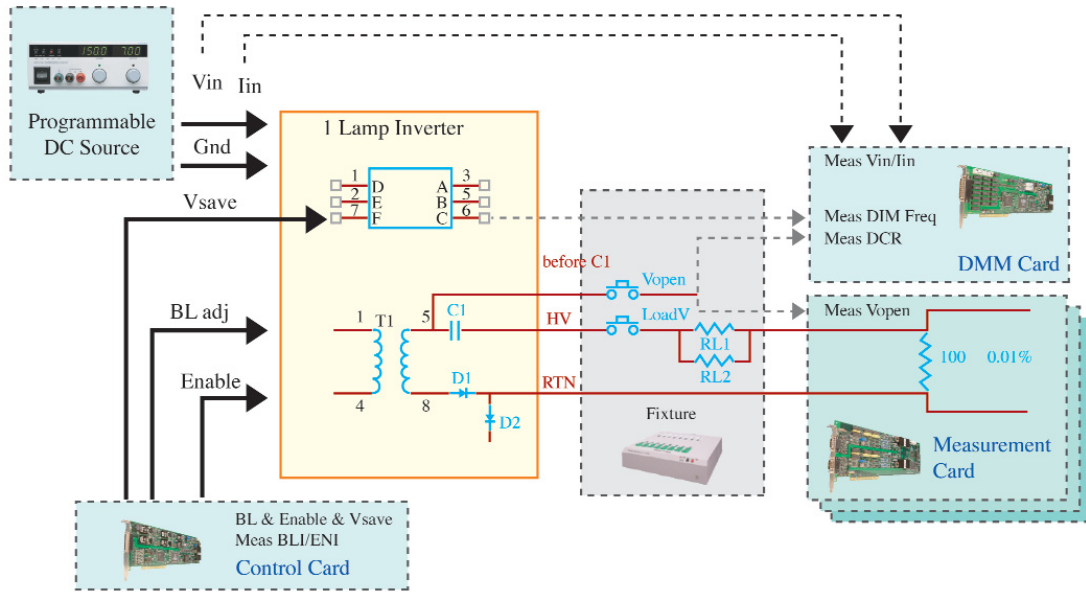
A849013:
20 channels Inverter Automatic Tester

Control Unit

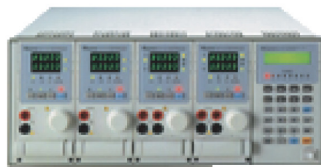
An industrial grade PC is used as system controller for Chroma LCD inverter auto test system model 8490. It provides lot more PCI slots than commercial PC for future expansion.



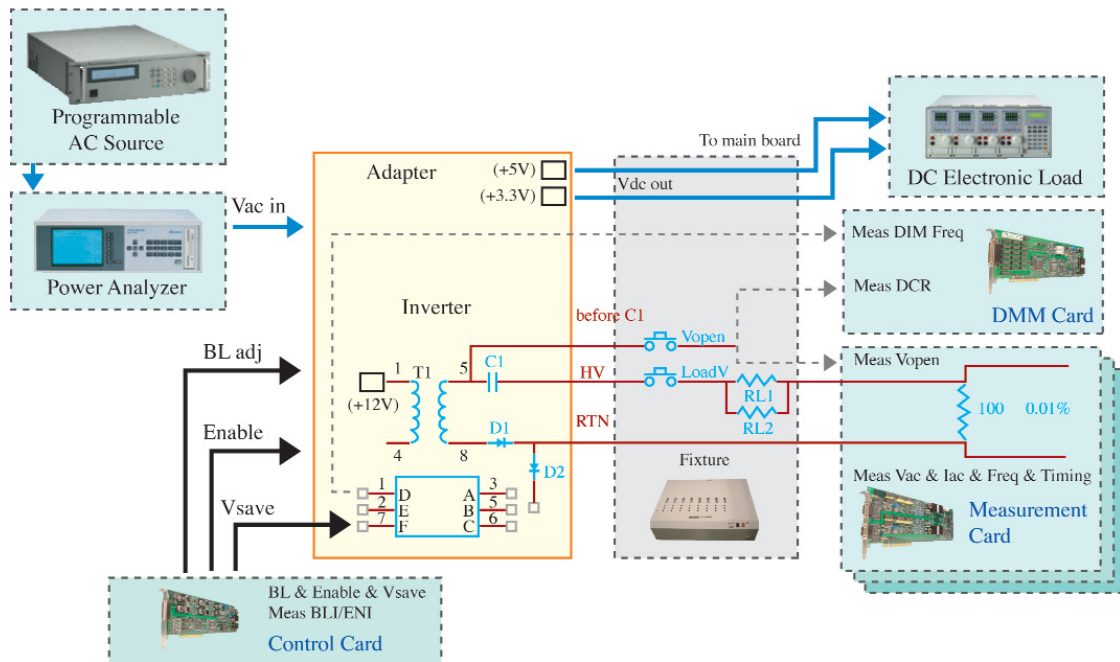
DC to AC Inverter Test Block Diagram



Plus additional hardware



LIPS Test Block Diagram



High Performance Hardware Devices



Model 8490 for LIPS Type

1. **Digital Storage Oscilloscope**
TDS Series : other type or brand of DSO support upon request; used to capture waveform or measurement current ripple for design verification
2. **Electronic load**
Chroma 6300/6310/6330/63200/6340 series electronic load : used to simulate DC voltage output performance (LIPS only)
3. **Timing/Noise analyzer**
Chroma 6011 : it's for DC voltage output noise and timing measurement (LIPS only)
4. **DC source**
Chroma 6200/6200K/6200F/62000P : supply inverter input DC voltage or be an OVP source in LIPS testing
5. **Digital Multi-Meter**
Agilent-34401A : other type or brand of DMM support upon request; it's for more precision measurement. (LIPS only)
6. **Power analyzer**
Chroma 6630/6632 series power analyzer : used to measure AC input part parameter (LIPS only)
7. **Controller Unit**
With Measurement Card : V inverter output parameter measurement
Control Card : brightness control and enable signal output
DMM Card : inverter input parameter measurement
8. **OVP/Short circuit tester**
Chroma 6012/80612 : it's for DC voltage output OVP and short circuit measurement (LIPS only)
9. **ON/OFF controller**
Chroma 6013/80613 : used to control AC and DC inputs simultaneously and measure the inrush current (LIPS only)
10. **AC source**
Chroma 6400/6500/61500/61600 series AC source : provide stable and clean AC voltage output (LIPS only)
11. **Test Fixture**
Chroma A849005/A849006/A849007/A849009/A849013: provides standard and various test fixtures such as probe pin design for those inverters that are keen in reducing loading effect.

* Other devices supported upon request

* Only item 4, 7, 11 are needed for D/A inverter test



A849005:
16 Channels Inverter Test Fixture

A849013:
20 Channels Inverter Automatic Tester



Model 8490 for D/A Inverter

Model 8490

All specifications are subject to change without notice.

Specifications

Measurement Card

No. of channel	Vx2, Ix2
Vac measurement	
Input Voltage	5Vpk max. (reference to 5000Vpk)
<i>Vpk+ / Vpk- / Vpp measurement</i>	
Range	5Vpk
Bandwidth	10k-200kHz
Resolution	14 bits
Accuracy	0.5 % + 0.5 % F.S. (10K-100kHz) 1 % + 0.5 % F.S. (100K-200kHz)
<i>Vrms measurement</i>	
Range	3.5KVrms~2KVrms / 2KVrms~1KVrms / 1KVrms~500Vrms
Bandwidth	10k-200kHz
Resolution	14 bits
Accuracy	1 % + 0.2 % F.S. (10K-100kHz) 1.5 % + 0.2 % F.S. (100K-200kHz)
Iac measurement	
Input Voltage	5Vpk max. (reference to 50mApk)
<i>Ipk+ / Ipk- / Ipp measurement</i>	
Range	50mApk
Bandwidth	10k-200kHz
Resolution	14 bits
Accuracy	0.5 % + 0.5 % F.S. (10K-100kHz) 1 % + 0.5 % F.S. (100K-200kHz)
<i>Irms measurement</i>	
Range	35mArms~20mArms / 20mArms~10mArms / 10mArms~5mArms 5mArms~2.5mArms / 2.5mArms~1.25mArms / 1.25mA~0.6mArms
Bandwidth	10K-200KHz
Resolution	14 bits
Accuracy	1 % + 0.2 % F.S. (10K-100kHz) 1.5 % + 0.2 % F.S. (100K-200kHz)
Pac measurement	
Range	V range x I range
Bandwidth	10K-200KHz
Resolution	14 bits
Accuracy	1 % + 0.2 % F.S. (10K-100kHz) 2 % + 0.3 % F.S. (100K-200kHz)
Frequency measurement	
Range	10K-200KHz
Resolution	1Hz
Accuracy	0.1 % reading
Input	Via voltage/current input
Timing measurement	
Trigger input	External x1 and V measurement input and I measurement input
<i>Trigger level</i>	
Range	5 % ~ 95 % F.S.
Resolution	10V for voltage / 0.1mA for current
Accuracy	1 % setting
<i>Timing measure</i>	
Resolution	1uS / 1mS
Accuracy	5uS / 5mS
Timing range	65mS / 65sec
Burst Mode measurement	
<i>Frequency</i>	
Range	10Hz-2KHz
Resolution	0.1Hz
Accuracy	0.1 % reading
<i>Duty</i>	
Range	0.05ms-90ms
Resolution	0.001ms
Accuracy	Error Max :100uS
Measurement speed	<10mS
Interface	PCI
Dimension	1 Slot width

Specifications

Control Card

BL control

DC level control

Program level	0-10V
Resolution	11 bits
Level Accuracy	0.5 % setting +0.1 % F.S.
Sourcing current	20mA

PWM control

Program level	0-10V
Resolution	For PWM DC Level is 7 bits
Accuracy	For PWM DC Level is 2 % + 1 % F.S
Sourcing current	20mA
Frequency	20Hz-10kHz
Freq. Resolution	1Hz
Freq. Accuracy	0.1 %
Duty	0 % ~ 100 %
Duty Resolution	1 %
Duty Accuracy	Error Max :100nS

SMBus control

DC Output	5V
SM DATA	Bidirectional
SM CLK	Bidirectional

BLI measurement (DC)

Range	0-2mA/0-20mA
Resolution	15 bits
Accuracy	0.1 % reading +0.5 % F.S.

Analog output (Enable V and Vsave1, 2)

Channel

No. of channel	1 for Enable 2 for Vsave
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DC level output

Program level	0-10V
Resolution	11 bits
Level Accuracy	0.5 % setting +0.1 % F.S.
Sourcing current	20mA

Analog I measurement (Idc)

Range	0-2mA/0-20mA
Resolution	15 bits
Accuracy	0.1 % reading +0.5 % F.S.

Digital I/O

No. of channel	12 bits For Output 4 bits For Input
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Output type	Open collector
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Measurement speed	<30mS
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Interface	PCI
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Dimension	1 Slot width
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Specifications

DMM Card

No. of multiplexer input	20 (1 ch max 200V, others max 60V)
Vdc measurement	
Range	200V/60V/20V/6V/2V/0.6V/Auto
Resolution	15bits
Accuracy	0.05 % + 0.05 % F.S.
Frequency measurement	
Range	10-10kHz
Resolution	1Hz
Accuracy	0.05 % F.S.
Resistance measurement	
Range	10Ω ~ 2KΩ / 10Ω ~ 20KΩ / Auto
Resolution	1Ω / 0.1Ω
Accuracy	2 % reading + 0.01 % F.S.
Measurement speed	<50m Sec including relay switching
Measurement type	Single channel and Scan mode
Interface	PCI
Dimension	1 Slot width

Test Fixture - Standard with HV Relays

Load Voltage measurement	
Range	100Vpk~5000Vpk
Bandwidth	10k-200kHz
Accuracy	1% +0.5 % F.S. (10K-200kHz)
Vopen Voltage measurement	
Range	100Vpk~5000Vpk
Bandwidth	10k-200kHz
Accuracy	1.5 % +0.1 % F.S. (10K-200kHz)
Iac measurement	
Range	0.1mApk~50mApk (Standard Module) 1mApk~500mApk (High Current Module)
Bandwidth	10k-200kHz
Accuracy	1 % +0.1 % F.S. (10K-200kHz)
Iin measurement	
Range	0~0.01A / 0~5A / 0~20A
Accuracy	0.5 % +0.1 % F.S.
Module Parasitic Capacitance	
H.V.→RTN	Approx. 7.3 pF
Vopen→RTN	Approx. 4.3 pF

Test Fixture - Probe Pin

Customized Low Parasitic Capacitance (< 2pF/channels) Probe Pin Test Fixture design upon request.

All specifications are subject to change without notice.

Ordering Information

8490 : LCD Inverter ATS

84902 : Measurement Card

84903 : Control Card

84904 : DMM Card

A849005 : 16 Channels Inverter Test Fixture

A849006 : 8 Channels Inverter Test Fixture

A849007 : 8 Channels LIPS Test Fixture

A849008 : Control Unit

A849009 : 24 Channels Inverter Test Fixture

A849010 : 8490 software

A849013 : 20 Channels Inverter Automatic Tester

6011 / 80611 : Timing / Noise Analyzer

6011N / 80611N : Timing / Noise Module

6012 / 80612 : OVP / Short Circuit Tester

6013 / 80613 : ON / OFF Controller

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

Power Analyzer : Refer to Model 6630, 6632 series

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

DC Source : Refer to Model 6200, 6200K, 6200F, 62000P series

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