



GE Energy

Functional Testing Specification

Parts & Repair Services
Louisville, KY

LOU-GED-DS200TCPAG1A

Test Procedure for a DS200TCPAG1A card.

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1. SCOPE

- 1.1 This document describes the setup and test procedure for the DS200TCPA card.

2. STANDARDS OF QUALITY

- 2.1 Refer to the current revision of the IPC-A-610 standard for workmanship standards.

3. APPLICABLE DOCUMENTS

- 3.1 The following document(s) shall form part of this specification to the extent specified herein.
Unless otherwise indicated, the latest issue shall apply.
- 3.1.1 Check board's electronic folder for more information

4. ENGINEERING REQUIREMENTS

- 4.1 Equipment Cleaning
- 4.1.1 Equipment should be clean and free of debris prior to applying power unless performing an initial check. Refer to site specific SRA's for cleaning guidelines.
- 4.2 Equipment Inspection
- 4.2.1 Equipment should be visually inspected for any defects prior to applying power. This inspection should include the following as a minimum:
- 4.2.1.1 Wires - broken, cracked, or loosely connected
- 4.2.1.2 Terminal strips / connectors - broken or cracked
- 4.2.1.3 Components - visually damaged
- 4.2.1.4 Capacitors - bloated or leaking
- 4.2.1.5 Solder joints - damaged or cold
- 4.2.1.6 Circuit board - burned or de-laminated
- 4.2.1.7 Printed wire runs / Traces - burned or damaged

5. EQUIPMENT REQUIRED

- 5.1 The following equipment is required to perform the process requirements. Equipment may be substituted provided that all accuracy's and test ratios are equivalent or better.

Qty	Reference #	Description
1		Power Supply (0-125VDC, 1 Amp)
1		26-Pin Ribbon Cable – (as short as possible)
1		34-Pin Ribbon Cable – (as short as possible)
1		DC Amp Meter 1 – Amp Scale

6. Setup

6.1 Power Supply requirements.

POWER SUPPLY REQUIREMENTS			
Supply	Nom	Tolerance	Pins
P125	+125V	+/- 1.0 V	J2-1 (P125)
N125	P125 Ret	+/- 1.0 V	J2-2 (N125) Input Com

6.2 Initial Setup

6.2.1 test setup description

6.2.2 Inspect the following components and devices on the card for correct part number and mounting.

6.2.3 Visually insure that all connectors are mounted per assembly silkscreen on card under test.

6.2.4 Visually inspect the following components that are not ATE tested.

6.2.4.1 CR30 (Loc F3) for proper mounting only. 5.6V Zener 1N5339B, PN= 104X125AB 049 [Elem SH4AA8A]

6.2.4.2 U45 (Loc C10), TI part= TL7757C, PN= 68A9516AM [Elem Sh4AA8A], looks like transistor.

6.2.4.3 Q11-Q14 (Loc A2), PN= 68A9572AM [Elem Sh4EA/SH4FA]

6.2.4.4 C6 (Loc G11) (LP9A1B102K), PN= 68A7199AM [Elem Sh4BA4H]

6.2.4.5 R15 (Loc F7) (18.2K 1%), PN= 68A7035P182F [Elem Sh4BA4M]

6.2.4.6 CR8 (Loc H9) (MUR8100E), proper mounting only, PN= 68A9925P1 [Elem Sh4BA2K]

6.2.4.7 CR27 (Loc F1) (MBR1545CTG), proper mounting only, PN= 68A9931P1 [Elem Sh4CA5J]

6.2.5 Set up manual test fixture.

6.2.6 Set up 125VDC power supply per section 6.1

6.2.7 Connect fixture ground strap to good earth ground.

6.2.8 Put card to be tested on the stand-offs located on the manual test fixture with ribbon connectors.

6.2.9 J01 and JNN toward the front of the test fixture.

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6.3 Test Definitions and special notes

6.3.1 Unless otherwise specified, the following conditions apply through-out the test procedure.

6.3.1.1 Voltages are positive DC.

6.3.1.2 Any negative DC voltages are preceded with a "-".

6.3.1.3 Any AC voltages are RMS (.707 x peak).

6.3.1.4 Inputs are to be floating unless a signal is specifically applied.

6.3.1.5 Once an input is applied it should be left applied until specifically told to remove it.

6.3.1.6 Any pot settings should be adjusted as close to nominal as possible. Not just to within tolerance.

6.3.1.7 Loads to be applied one at a time as required by test steps.

6.3.1.8 ** CAUTION! ** Do not use input common (n125) as a reference point for any measurements except input voltage. This common is not tied to any other common on the card under test.

Special Note: Warning!!! The heat sinks on this printed circuit card are electrically and thermally hot. Every precaution should be taken to prevent contact between the heat sinks and the test operator or any test equipment being used during the test procedure.

6.3.2 Unless otherwise specified, the following conditions apply through-out the test procedure.

6.3.3 ORANGE = P5

6.3.4 BLUE = P15

6.3.5 YEL = N15

6.3.6 GRAY = P24

6.3.7 BLK = COM

6.3.8 RED = N24

7. Testing Process - NO-LOAD Test Procedures

7.1 Install test prom in socket U13. For prom order DS200TCPAF1AAA01.

7.2 Install test prom in socket U15. For prom order DS200TCPAF1AAA02.

7.3 Verify that SW1 N24 load switch is in the off (no-load) position.

- 7.4 Verify that the 125 volt input breaker located on the right side of the fixture is in the off position.
- 7.5 Connect P125(with ammeter in series) and N125 plugs from bulk DC supply to corresponding 125 volt input jacks on the fixture.
- 7.6 Connect voltmeter across 125 volt input jacks on the fixture (P125 = red jack, N125 = black jack) and verify input voltage.
- 7.7 Connect all connectors per the following instructions.
 - 7.7.1 Connect the miniature connector clip (red) marked P15 to the test point marked P15 on the card under test.
 - 7.7.2 Connect the miniature connector clip (black) marked N15 to the test point marked N15 on the card under test.
 - 7.7.3 Connect the miniature connector clip (red) marked P5 to the test point marked p5 on the card under test.
 - 7.7.4 Connect the 34-pin (female) connector marked as J01 into the (male) connector marked J01 on the card under test
 - 7.7.5 Connect the 26-pin (female) connector marked as JNN into the (male) connector marked JNN on the card under test
 - 7.7.6 Connect the 2-pin (male) connector marked J2 into the 2-pin (female) connector marked J2 on the card under test.
 - 7.7.7 Inspect all electrolytic capacitors for proper mounting according to polarity.
- 7.8 Insure that dc source supply is turned down to 0.
 - 7.8.1 Apply power by placing breaker "CB" in the on position.

Caution: Gradually turn up dc source voltage while monitoring the current being drawn from the bulk supply. If the current exceeds 350ma while bringing up voltage, shut off power immediately and check for shorts or improperly mounted or defective components on the card under test. When defects have been cleared, repeat this step until P125 fully reaches 125VDC. Input current will typically be in the area of less than 350ma at 125VDC input.

- 7.9 Adjust and verify P125 to be 125 volts, +/- 3v, measured across input jacks on the fixture (P125-N125).
- 7.10 Connect voltmeter to the following jacks on the fixture:

Meter(+)	Meter(-)
P5 (ORG)	Com (BLK)

- 7.11 Verify that P5 is 5.1 volts. if it is not adjust pot RV1 on the card until P5 = 5.1 volts +/-10mv.

7.12 Connect voltmeter to the jacks on the fixture corresponding to the points in the chart below and verify the proper voltage measurements per chart below.

7.13 Switch SW1 in the no load position and use Com(BLK) for reference in all measurements.

Test Point	DC Voltage Measured	
To Measure	Hi Limit	Low Limit
P15 (Blue)	15.75	14.25
N15 (Yel)	-14.25	-15.75
P24 (Gray)	27.00	20.00
N24 (Red)	-18.00	-40.00

7.14 Verify (CR1) green led is "on". This verifies U4; the "196Uprocessor" is ok.

8. TEST PROCEDURES FOR LOAD CONDITION

8.1 Move switch SW1 to the on (load) position: Notice: input current will typically be in the area of <350ma.

8.2 Verify that P125 is 125.0 volts, +/- 3v.

8.3 Connect voltmeter to the jacks on the fixture corresponding to the points in the chart below and verify the proper voltage measurements per chart below.

8.4 Load switch in the on(load) use Com (BLK) for reference in all measurements.

Test Point	DC Voltage Measured	
To Measure	Hi Limit	Low Limit
P5 (Orange)	5.11	5.09
P15 (Blue)	15.75	14.25
N15 (Yel)	-14.25	-15.75
P24 (Gray)	27.00	20.00
N24 (Red)	-18.00	No Limit

Special Note: Verify that P5 is 5.1 volts. If it is not, adjust pot RV1 on the card until P5 = 5.1 volts +/-10mv.

8.5 Power up under full load conditions.

8.5.1 Turn CB off.

8.5.2 Note: Insure all loads are still applied. Wait until outputs are discharged to near "zero".

8.5.3 Turn CB on and verify power supply recovers under load conditions by repeating voltage measurements in test procedures for load conditions step 8.4.

8.5.4 Turn CB off.

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- 8.5.5 Return DC power supply to 0V.
- 8.5.6 Turn off power to the manual test fixture and the bulk DC power supply.
- 8.5.7 Move all load switches to the off (no load) position.
- 8.5.8 Disconnect all connectors from the card under test.
- 8.5.9 Disconnect all test equipment from the manual test fixture.
- 8.5.10 Remove test prom from socket U13 and remove test prom from socket U15.
- 8.5.11 If card passes all the above tests place appropriate stamp on card.

8.6 ***TEST COMPLETE***

9. Notes

Part Name	Description	Catalog	Qty
	METAL CHASSIS	BUD 11X17X2	1
SW1	SIN-POLE DOUB-THRW SWITCH	68A7336P9	1
RL	100 OHM, 10W RESISTOR	68A7020P100D	1
CR1	RECTIFIER DIODE (6.0 A)	167A8419P1	1
J2	2 Pin Connector	218A4629P1	1
P5	EZ Clip Connector		1
P15	EZ Clip Connector		1
N15	EZ Clip Connector		1
CB	Circuit Breaker	TQC1105LL	1
TP1-6	Banana Plug Jacks	68A7506P_	6
P125	125VDC Binding Post	138A1037P_	1
N125	125VDC Binding Post	138A1037P_	1
	RIBBON CABLE (FOR JO1 CONN.)	36C77452AAG50	1
	SUPPORT, RIBBON CABLE	218A4640P	1
	RIBBON CABLE (FOR JNN CONN.)	36C77452AAG43	1
	SUPPORT, RIBBON CABLE	218A4640P	1
	PWB SPACER, PLASTIC 1-9/32"	218A4554P_	4
	COMPONENT BOARD, 1 POS.	129B8150G1	1
Cover	Lexan Cover		1
Fixt NP	ID Label	TCPA Fixture	1
Warning NP	Warning Nameplate	278A3346P2	1
	Metal Standoff 4"	336A3374P1	2
	Rubber Feet		10
	Ground Cable W/Clip		1
	Piano Hinge 12"		1
	Mesh Bottom Cover		1

9.1 Circuit breaker (CB) will also serve as an on/off switch. Circuit breaker is single-pole on positive line of supply.

9.2 A permanent grounding cable should be attached to fixture to ground fixture during testing attachments

10. Diagram of the manual test circuit.

