| g GE Industrial Systems | **Functional Testing Specification** |
|---|---|
| ***Chapter 2***<br>***Renewal Services***<br>***Louisville,KY*** | **LOU-GED-DS3800XDCD** |

## Test Procedure for a Card

**DOCUMENT REVISION STATUS: Determined by the last entry in the "REV" and "DATE" column**

| REV. | DESCRIPTION | SIGNATURE | REV. DATE |
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| A | Initial release | M. Starling | 10/30/2002 |
| B | | | |
| C | | | |



| PREPARED BY | REVIEWED BY | REVIEWED BY | QUALITY APPROVAL |
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| Monte Starling | | | Robert Durell |
| **DATE** | **DATE** | **DATE** | **DATE** |
| 10/30/2002 | | | 11/04/02 |

**Functional test procedure for a IGTO Load Firing Card**

## 1. SCOPE

**1.1** This is a functional testing procedure for a DS3800XDCD IGTO Load Firing 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** DS3800XDCD Schematics
- **3.1.2** This Document

## 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 the local documented procedures 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 or cracked
  - **4.2.1.2** Terminal strips / connectors broken or cracked
  - **4.2.1.3** Loose wires
  - **4.2.1.4** Components visually damaged
  - **4.2.1.5** Capacitors leaking
  - **4.2.1.6** Solder joints damaged or cold
  - **4.2.1.7** Circuit board burned or de-laminated
  - **4.2.1.8** Printed wire runs 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 | | Fluke 85 DMM (or Equivalent) |
| 1 | | Oscilloscope |
| 1 | | Function Generator |
| 1 | | Bench Power Supply |
| 1 | | 12 Output Fiber Optic Module |

## 6. TEST SETUP

**6.1** Connect power supply plug connector to JB on XDCD card.

**6.2** Connect RED lead to +5V, YELLOW lead to +15V and BLACK lead to COM on power supply.

**6.3** Do not make any connections to JA, JC and JDC until instructed to do so.

## 7. TESTING PROCESS

**7.1** Apply power to supply, verify IMOK LED on XDCD card comes on. Verify listed voltages at the following locations with respect to COM.

| POSITIVE 5 VOLTS | POSITIVE 15 VOLTS |
|---|---|
| JDA13 | JDA17 |
| JDB13 | JDB17 |
| JDC13 | JDC17 |

**7.2** Turn off power and check for continuity at the following locations.

| FROM | TO |
|---|---|
| COM | JDA16, JDB16, JDC16 |
| COM | JDA16, JDB16, JDC16 |
| COM | JZ1, JZ3, JZ5, JZ7 |
| COM | JZ9, JZ11, JZ13 |
| JA9 | JZ14 |
| JA12 | JZ24 |
| JA11 | JZ23 |
| JA14 | JZ19 |
| JA13 | JZ22 |
| JA16 | JZ16 |
| JA15 | JZ15 |
| JA18 | JZ18 |
| JA17 | JZ17 |
| JA20 | JZ26 |
| JC5 | JDA2, JDB2, JDC2 |
| JC1 | JDA1, JDB1, JDC1 |
| JC3 | JZ4 |
| JC8 | JDA8, JDB8, JDC8 |
| JC10 | JDA7, JDB7, JDC7 |
| JC30 | JDA10, JDB10, JDC10 |
| JC32 | JDA9, JDB9, JDC9 |
| JC34 | JZ10 |
| JC27 | JDA4, JDB4, JDC4 |
| JC23 | JDA3, JDB3, JDC3 |

| | |
|---|---|
| JC25 | JZ8 |
| JC18 | JDA6, JDB6, JDC6 |
| JC14 | JDA5, JDB5, JDC5 |
| JC16 | JZ6 |
| JC17 | JDA12, JDB12, JDC12 |
| JC19 | JDA11, JDB11, JDC11 |
| JC21 | JZ12 |
| TP1 | JA19, JZ25 |
| TP1 | JDA20, JDB20, JDC20 |

**7.3** Turn power on and set DVM for DC volts, make the following checks.

| FROM | TO | VOLTAGE |
|---|---|---|
| COM | JA3, JDA15, JDB15, JDC15 | APPROX. 1.62 VDC |
| COM | JDA14, JDB14, JDC14 | APPROX. 0 VDC |

**7.4** Apply a LOW to JA7 and check following.

| FROM | TO | VOLTAGE |
|---|---|---|
| COM | JDA14, JDB14, JDC14 | APPROX. 3.34 VDC |
| COM | JDA18, JDB18, JDC18 | APPROX. 5 VDC |

**7.5** Remove LOW from JA7 and apply a LOW to JA5. Check the following.

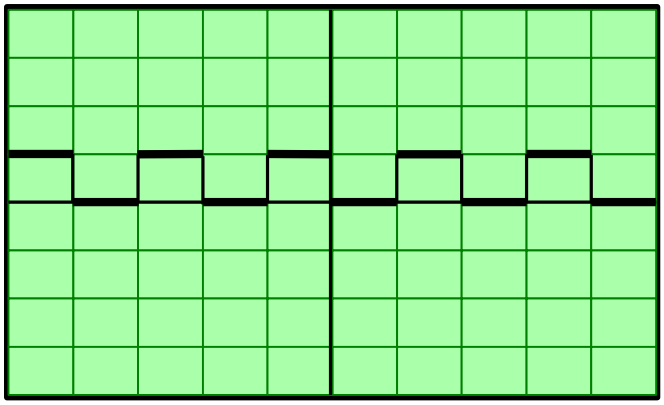
| FROM | TO | VOLTAGE |
|---|---|---|
| COM | JDA18, JDB18, JDC18 | APPROX. 0.2 VDC |

**7.6** Install test plug marked DS3800XDCD JC and JDC into their respective connectors.
**7.7** Verify all gray transmit laser LED's are illuminated and equal in intensity.
**7.8** Apply a LOW to JA5 and JA7.
**7.9** Using one Fiber Optic cable insert the gray end into any one of the gray transmitters.
**7.10** Insert the blue end of Fiber Optic cable one by one into each of the blue receivers; verify that it's respective LED on front edge of XDCD card illuminates. The LED should remain on when Fiber Optic cable is removed. This will verify that the SCR's hold after being triggered. *Note: Only pull cable out of receivers and transmitters by the end connectors, or they may be damaged.*
**7.11** After all front edge LED's are illuminated, remove low at JA7. All LED's should go out.
**7.12** Setup spare output on bench power supply for 12 VDC and turn off power supply.
**7.13** Connect red and black power leads of the 12 Output Fiber Optic Module to the spare output you just setup.
**7.14** Setup a Function Generator to output a 5 VDC TTL square wave at 25 kHz.
**7.15** Connect the common of the spare power supply channel to the common of the Function Generator. Connect the positive output of the Function Generator to the + post of the 12 Output Fiber Optic Module.
**7.16** Connect JA plug to JA connector and turn on power supply.

**7.17** Verify light is being emitted through the Fiber Optic cables.
**7.18** Connect the 12 Fiber Optic cables to 12 of the receivers on the XDCD card. *Note: Since there are 18 circuits and only 12 fiber optic outputs, 6 of the outputs will need to be moved to the other locations to complete tests.*
**7.19** Verify that the appropriate LED's on front edge of card are illuminated with respect to respective inputs on the front edge of card.
**7.20** Setup an O-scope for 5 VOLT/DIV and 20µS TIME/DIV. Verify waveform in Section 8 Fig. 1 while monitoring JDA19, JDB19 and JDC19 respectfully.
**7.21** Verify that when a cable is removed from a receiver it's respective LED will extinguish.
**7.22** Move cables to other 6 locations and repeat step 7.20.
**7.23** Allow unit to warm up and verify no failures occur.
**7.24 END OF TEST**

## 8. Oscilloscope Verification Examples:

**Fig. 1**



5 VOLTS / DIV 20µS TIME / DIV