| g GE Industrial Systems | **Functional Testing Specification** |
|---|---|
| ***Renewal Services***<br>***Louisville, KY*** | **LOU–GED-193X730xx-B** |

## Test Procedure for a Card

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

| REV. | DESCRIPTION | SIGNATURE | REV. DATE |
|---|---|---|---|
| A | Initial release | John Madden | 7/2/02 |
| B | Added notes to testing process, section 6.1 | John Madden | 11/22/02 |
| C | | | |



| PREPARED BY | REVIEWED BY | REVIEWED BY | QUALITY APPROVAL |
|---|---|---|---|
| John Madden | | | Robert Dwell |
| **DATE** | **DATE** | **DATE** | **DATE** |
| 07/02/02 | | | 08/09/02 |

**Functional test procedure for a Reversing Driver card**

## 1. SCOPE

**1.1** This is a functional testing procedure for a 193X730 Reversing Driver 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 193X730xx Documentation Folder**

## 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 | H033535 | 193X730 test Fixture |
| 1 | | O-Scope |
| | | |
| | | |

## 6. TESTING PROCESS

**6.1** Setup

**6.1.1** Using BNC to BNC cable, connect scope to test fixture.

**6.1.2** Set fixture to settings listed in procedure below.

**6.1.3** Plug card in and test.

**Note: It is a good idea to change out all electrolytic caps, UJT's, glass bead diodes, and both 20V zener diodes before testing. These will usually be bad and need replacement anyway, so get it out of the way first.**

**It is also advisable that if it takes anything other than a 3.01k or 2.74k resistor to get proper saw tooth waveforms on steps 5 & 6, then you may have a bad UJT (even if it's new) on that circuit, and it would be advisable to try to replace it (UJT) one more time and run thru steps 3 & 4 again before re-trying steps 5 & 6.**

**6.2** Testing Procedure

**6.2.1** See following pages

6.1.1 193X730A___

Step 1 Plug card into test box

Set Scope for 5V per DIV 1ms per DIV

Set Test Box SW1 to open SW2 to L SW3 to 1

Step 2 Measure For the following voltages

| From | To | Volts |
|---|---|---|
| TP1 | TP2 | 20V+ |
| TP1 | TP3 | 20V- |
| TP1 | TP4 | 1.5V- * See Note 1 INSIDE |
| TP1 | TP5 | -0.57V- * See Note 2 P2 |
| TP1 | TP6 | 1.5V+ * See Note 1 INSIDE |
| TP1 | TP7 | 0.57V+ * See Note 2 P1 |

Note 1 : This Voltage can be adjusted inside of test Fixture

Note 2: This Voltage can be adjusted by P1 and P2 on top of Test Fixture

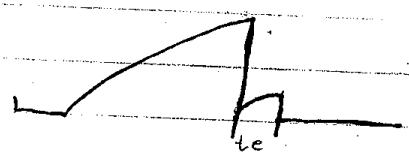
6.2.1 Step 3 Turn SW3 to 1 Turn SW2 to 1

SW3 puts 1.5V+ on tab 5 and .57V+ on tab 11

SW2 looks at tab 12 For Waveform below

Verify that te is between 1.1 and 1.5 milliseconds.
If not in tolerance remove R238 (80) and use a
resistance box to select new value. Disconnect
resistance box and measure, replace R238 with this
value. Solder R238 in to place and reverify
te is between 1.1 and 1.5 milliseconds. (higher resistance will decrease te)

Step 4 TURN SW3 to 2 TURN SW2 to 2
SW3 puts 1.5V- on tab 5 and .57V- on tab 8
SW2 looks at tab 27 for waveform below




Verify that te is between 1.1 and 1.5 milliseconds.
If not in tolerance remove R237 (79) and use a
resistance box to select new value. Disconnect
resistane box and measure, replace R237 with this
value. Solder R237 into place and reverify te
is between 1.1 and 1.5 milliseconds.

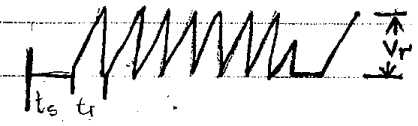
Step 5 TURN SW3 to 3 TURN SW2 to 2

SW3 puts 1.5V t on Tab 5

SW2 looks at Tab 27

Verify waveform below

MAKE SURE SW1 ON TEST BOX IS IN OPEN POS




Verify that output ramps up and down with Amplitude of 8V min.

Verify ts and tr combined are not greater than 2.0 milliseconds

If not correct this can be corrected by Changing U31 I211 and replacing R206 with 5K pot. Set pot to 5K and Adjust to get correct waveform above

Step 6 TURN SW3 to 3 TURN SW2 to 5

SW3 put 1.5V ton tab 5

SW2 looks across tab 21 and 25

Verify wave form below

TURN SW2 to 6 SW2 is looking across tab 22 and 25

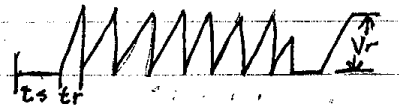
Verify waveform is same as above on SW2 to 6

Step 6 TURN SW3 to 4 TURN SW2 to 1

SW3 puts 1.5V- on tab 5

SW2 looks at Tab 12

Verify waveform below




MAKE SURE SW1 ON TEST BOX IS IN OPEN POS.

Verify that output ramps up and down with amplitude of 8V min.

Verify ts and tr combined are not greater than 2.0 milliseconds.

If not correct this can be corrected by changing T212 and replacing R207 with a ~~5K pot~~ Pres. Res or POT, Set pot to 5K and Adjust to get correct waveform above

Step6 TURN SW3 to 4 TURN SW2 to 3

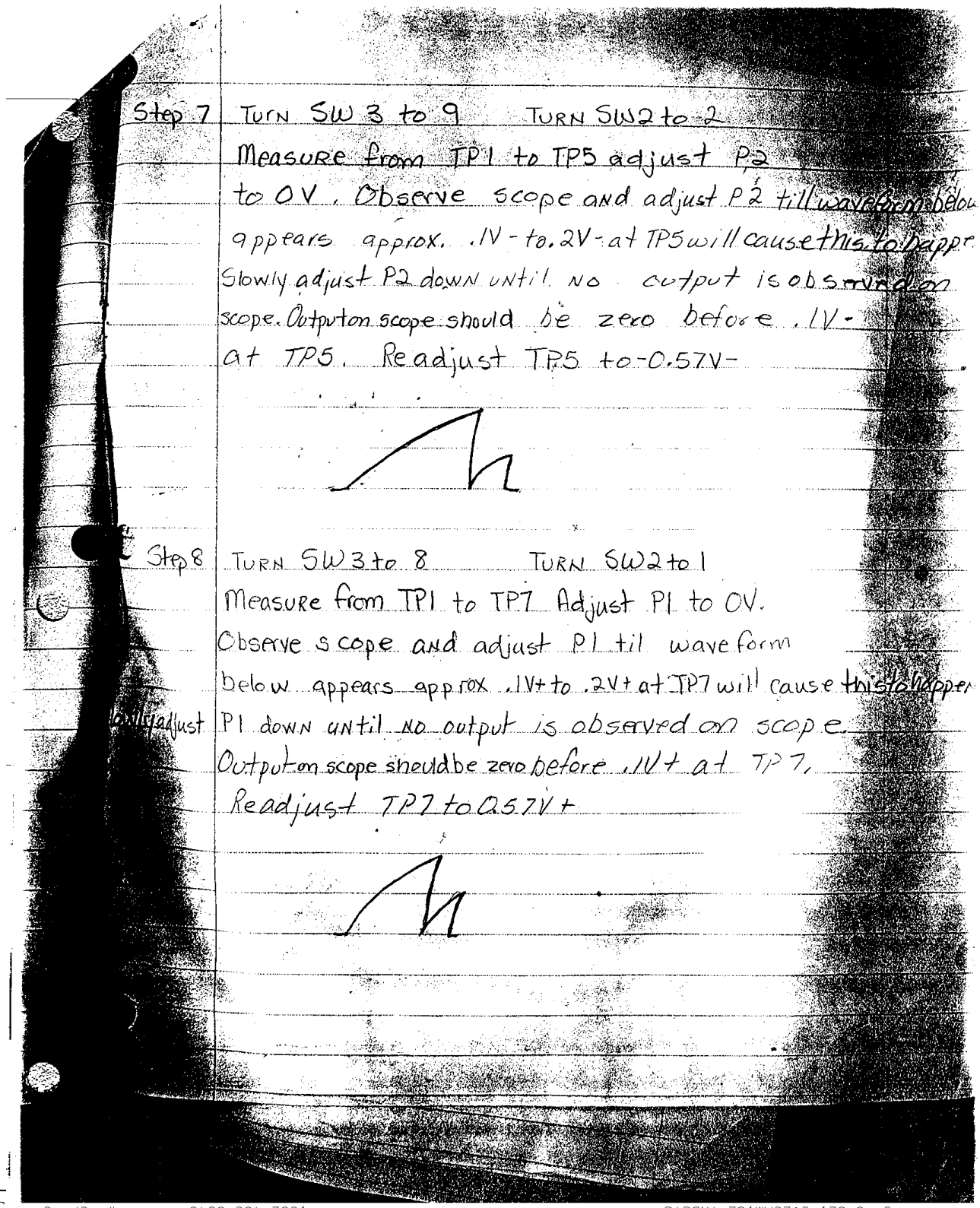
SW3 puts 1.5V- on tab 5

SW2 looks across tab 14 AND 17

Verify waveform below

TURN SW2 to 4 SW2 is looking across tab 13 and 15

Verify wave form is same as above or like SW2 to 3



Step 7 Turn SW 3 to 9 Turn SW2 to 2
Measure from TP1 to TP5 adjust P2
to 0V. Observe scope and adjust P2 till waveform below
appears approx. .1V - to .2V - at TP5 will cause this to happe
Slowly adjust P2 down until no output is observed on
scope. Output on scope should be zero before .1V -
at TP5. Readjust TP5 to -0.57V -

Step 8 Turn SW3 to 8 Turn SW2 to 1
Measure from TP1 to TP7 Adjust P1 to 0V.
Observe scope and adjust P1 til waveform
below appears approx .1V+ to .2V+ at TP7 will cause this to happen
Slowly adjust P1 down until no output is observed on scope.
Output on scope should be zero before .1V+ at TP7,
Readjust TP7 to 0.57V+

***6.3 ***TEST COMPLETE ******

## 7. NOTES