

Application Note



4200 Series- Contact Testing

Reference: 046-03



This Application Note describes the method for contact testing used on the 4200 Series of test systems. Please note that this information applies to the FA03 and FA13 test point cards.

General Description

A contact test is performed as part of an in-circuit test to verify that specified testpoints are making contact with the UUT via the fixture interface. It is invoked by the MTL CONTACT verb. In addition to a list of pins to be tested, MTL allows for specified pins to be excluded from the measurement. This is to simplify the CONTACT statement when, for example, only a few pins on a board are to be omitted from the test.

Because of the length of time required to carry out the necessary analog measurements when large numbers of pins are involved, a pre-pass is included in the CONTACT verb, which uses a logic test to eliminate as many good contacts as possible. The only limitation on the logic pre-pass is that it should not mark open circuits as connected.

The widespread use of protection diodes internal to devices means that the technique used for contact measurement must be capable of switching these devices on, and the stimulation must therefore be of the correct polarity for the type of device (e.g. logic family) being tested, in order to eliminate as many good contacts as possible during the pre-pass.

Logic Pre-Pass

The test is configured across all utp (FA03) pins on all boards with pins included in the test. Pins on such boards not included in the CONTACT statement are turned off using their status register bits.

Note that PSTP (eg #PS1) and FA13 testpoints are not tested by the logic pre-pass. They are all marked as 'failed' and passed on to the analog stage for measurement.

For negative polarity, a MNH instruction is rippled through each selected pin in turn, against a background of DMH instructions. The tristate terminations and the drive and monitor thresholds are set such that if a pin is connected, the leakage current to the drive high voltage will cause the MNH to pass. The drive voltage is always 0 V, irrespective of polarity.

The test is run at a suitable speed to allow time for transitions to tristate.

The test is similar for positive polarity, using a MNL instruction against a background DML.

The user is allowed to turn the logic pre-pass off via an MTL acceptor, reverting to an analog-only technique. In this case FA03 testpins will be treated as FA13 testpins. This can be used to guarantee compatibility between analog-only and utp-populated systems.

Analog Pass

This performs a leakage measurement on pins marked as open circuit by the logic pre-pass. A stim voltage is applied to each testpoint in turn using a programmable DC voltage source via the programmable resistor, with all background pins (including PSTPs) connected to 0 V. The voltage drop across the programmable resistor will depend on the impedance to 0 V.

The threshold impedance is as per the product specification.

Only the negative polarity situation is described. For positive polarity, the voltages are inverted.

Logic Pre-Pass

The restriction on the logic pre-pass is that it must guarantee to only fail open circuits greater than the specified system contact threshold. Due to system tolerances it may also fail open circuits less than the threshold, but these will then be passed during analog verification.

The nominal tristate (stim) voltage is chosen as -1.6 V, to guarantee diode turn-on, and so as not to overstress devices.

Test Settings

Logic Pre-Pass Settings

The following settings are used for the logic pre-pass phase of CONTACT.

Setting	Value	Comment
Substeps	10	Per test step
Substep Length	4 us	
FORCE	OFF	
Slew Rate	SLOW	
Drive Format	NRZ	
Drive Low Voltage	-2.60 V	Negative Polarity Tests (Default)
Drive High Voltage	0V	
Monitor Low Voltage	-0.75 V	
Monitor High Voltage	-0.75 V	
Tristate Voltage	-1.60 V	
Drive Low Voltage	0 V	Positive Polarity Tests (Optional)
Drive High Voltage	2.60 V	
Monitor Low Voltage	0.75 V	
Monitor High Voltage	0.75 V	
Tristate Voltage	1.60 V	
Monitor Time	4 us	on last phase

Analog Pass Settings

The following settings are used for the analog pass phase of CONTACT.

Setting	Value	Comment
<i>Configuration</i>	<i>CONTACT</i>	<i>REF module (+ve)</i>
	<i>CONTACTR</i>	<i>REF module (-ve)</i>
	<i>GNDGRD</i>	<i>REF module</i>
	<i>IMEAS</i>	<i>MEAS module</i>
	<i>GDOV</i>	<i>TP module</i>
	<i>DRIVE</i>	<i>TP module</i>
	<i>DRIVE</i>	<i>PSTP module</i>
	<i>FETG</i>	<i>PSTP module</i>
<i>Stim Voltage</i>	<i>+/- 1.6 V</i>	<i>Depends on polarity</i>
<i>PROGR</i>	<i>100 k</i>	
<i>Measured Voltage Range</i>	<i>5 V</i>	
<i>Filter</i>	<i>10 KHz</i>	
<i>Settle Time</i>	<i>2 ms</i>	
<i>Integration Time</i>	<i>None</i>	
<i>Discharge Time</i>	<i>2 ms</i>	

CHINA Beijing

Tel: [+86] (10) 6539 1166
Fax: [+86] (10) 6539 1778

CHINA Shanghai

Tel: [+86] 21 2028 3588
Fax: [+86] 21 2028 3558

CHINA Shenzhen

Tel: [+86] (755) 3301 9358
Fax: [+86] (755) 3301 9356

FINLAND

Tel: [+358] (9) 2709 5541
Fax: [+358] (9) 804 2441

FRANCE

Tel: [+33] 1 60 79 96 00
Fax: [+33] 1 60 77 69 22

GERMANY

Tel: [+49] 89 99641 0
Fax: [+49] 89 99641 160

HONG KONG

Tel: [+852] 2832 7988
Fax: [+852] 2834 5364

INDIA

Tel: [+91] 80 [4] 115 4501
Fax: [+91] 80 [4] 115 4502

JAPAN

Tel: [+81] (3) 3500 5591
Fax: [+81] (3) 3500 5592

KOREA

Tel: [+82] (2) 3424 2719
Fax: [+82] (2) 3424 8620

SCANDINAVIA

Tel: [+45] 9614 0045
Fax: [+45] 9614 0047

SINGAPORE

Tel: [+65] 6873 0991
Fax: [+65] 6873 0992

TAIWAN

Tel: [+886] 2 2698 8058
Fax: [+886] 2 2698 8050

UK Stevenage

Tel: [+44] (0) 1438 742200
Fax: [+44] (0) 1438 727601
Freephone: 0800 282388

USA

Tel: [+1] (316) 522 4981
Fax: [+1] (316) 522 1360
Toll Free: 800 835 2352

As we are always seeking to improve our products, the information in this document gives only a general indication of the product capacity, performance and suitability, none of which shall form part of any contract. We reserve the right to make design changes without notice. All trademarks are acknowledged. Parent company Aeroflex, Inc. ©Aeroflex 2011.

www.aeroflex.com
info-test@eroflex.com



Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.