



Roseville Hardware Test Center
Test Data

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RHTC JOB NUMBER 030848 – A1
(see 'Amendment History' on page 2)

TEST NAME ESD (EN IEC 61000-4-2)

HP TEST SECTION 765.002

REGULATION/STANDARD IEC 61000-4-2

DATE TEST PERFORMED 12 October 2007

PROJECT NAME AS1602

REGULATORY MODEL N/A

CPL NUMBER..... AS1602

DIVISION Akros Silicon

QUANTITY TESTED 6

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Amendment History: Report amended on 19 October, 2007, to re-label incorrect headers for the data tables and add clarification statements for air and contact discharge procedures.

AIR DISCHARGE TEST DATA / 12 OCTOBER 2007

“X” = No trouble found “ND” = No discharge “NT” = Not tested

Air Discharge Procedure: ‘N=1’ indicates 1 positive and 1 negative discharge to each pin of the RJ-45

AIR DISCHARGE AS1602/BRCM-EVB / s/n12 – GROUNDED / WITH AS1602

Locations	+/- 15kV N=1	+/- 16kV N=1	+/- 17kV N=1	+/- 18kV N=1	+/- 19kV N=1	+/- 20kV N=1	+/- 21kV N=1	+/- 22kV N=1	+/- 23kV N=1
PIN1 RJ Dataline	X	X	X	X	X	X	X	A	X
PIN2 RJ Dataline	X	X	X	X	X	X	X	A	X
PIN3 RJ Dataline	X	X	X	X	X	X	X	A	X
PIN4 RJ Dataline	X	X	X	X	X	X	X	A	X
PIN5 RJ Dataline	X	X	X	X	X	X	X	A	X
PIN6 RJ Dataline	X	X	X	X	X	X	X	A	X
PIN7 RJ Dataline	X	X	X	X	X	X	X	A	X
PIN8 RJ Dataline	X	X	X	X	X	X	X	A	X

AS1602/BRCM-EVB / s/n12 – GROUNDED / WITH AS1602

Locations	+/- 24kV N=1	+/- 25kV N=1	+/- 26kV N=1	+/- 27kV N=1	+/- 28kV N=1	+/- 29kV N=1	+/- 30kV N=1	+30kV Anoma- lies	-30kV Anoma- lies
PIN1 RJ Dataline	X	X	X	X	X	X	B & C	B	C
PIN2 RJ Dataline	X	X	X	X	X	X	B & C	B	C
PIN3 RJ Dataline	X	X	X	X	X	X	B & C	B	C
PIN4 RJ Dataline	X	X	X	X	X	X	B & C	B	C
PIN5 RJ Dataline	X	X	X	X	X	X	B & C	B	C
PIN6 RJ Dataline	X	X	X	X	X	X	B & C	B	C
PIN7 RJ Dataline	X	X	X	X	X	X	B & C	B	C
PIN8 RJ Dataline	X	X	X	X	X	X	B & C	B	C

Observations/Anomalies:

- A: SOFT ERROR AFTER +/- 22kV. POWER CYCLING CLEARED THE ERRORS.**
- B: 10 HITS PER PIN AT +30kV KILLED THE EUT, NO LINK, POWER CYCLING CLEARED IT.**
- C: AT END OF -30kV TESTING HAD NO GIGABIT LINK, 10OMB LINK OK.**

AIR DISCHARGE

Air Discharge Procedure: 'N=1' indicates 1 positive and 1 negative discharge to each pin of the RJ-45

AS1602/BRCM-EVB / s/n13 – GROUNDED / WITH AS1602

Locations	+/- 15kV N=1	+/- 16kV N=1	+/- 17kV N=1	+/- 18kV N=1	+/- 19kV N=1	+/- 20kV N=1	+/- 21kV N=1	+/- 22kV N=1	+/- 23kV N=1
PIN1 RJ Dataline	X	NT	NT	NT	NT	X	X	X	X
PIN2 RJ Dataline	X	NT	NT	NT	NT	X	X	X	X
PIN3 RJ Dataline	X	NT	NT	NT	NT	X	X	X	X
PIN4 RJ Dataline	X	NT	NT	NT	NT	X	X	X	X
PIN5 RJ Dataline	X	NT	NT	NT	NT	X	X	X	X
PIN6 RJ Dataline	X	NT	NT	NT	NT	X	X	X	X
PIN7 RJ Dataline	X	NT	NT	NT	NT	X	X	X	X
PIN8 RJ Dataline	X	NT	NT	NT	NT	X	X	X	X

AS1602/BRCM-EVB / s/n13 – GROUNDED / WITH AS1602

Locations	+/- 24kV N=1	+/- 25kV N=1	+/- 26kV N=1	+/- 27kV N=1	+/- 28kV N=1	+/- 29kV N=1	+/- 30kV N=1
PIN1 RJ Dataline	X	X	X	X	X	X	A
PIN2 RJ Dataline	X	X	X	X	X	X	A
PIN3 RJ Dataline	X	X	X	X	X	X	A
PIN4 RJ Dataline	X	X	X	X	X	X	A
PIN5 RJ Dataline	X	X	X	X	X	X	A
PIN6 RJ Dataline	X	X	X	X	X	X	A
PIN7 RJ Dataline	X	X	X	X	X	X	A
PIN8 RJ Dataline	X	X	X	X	X	X	A

Observations/Anomalies:

A: AT END OF +/-30KV NO GIGABIT LINK / 100MB OK / POWER CYCLED EUT AND RECOVERED GIGABIT LINK BUT HAD DATA TRANSFER ERRORS

CABLE DISCHARGE EVENT TEST DATA / 12 OCTOBER 2007

Contact mode using 0.7 – 1ns rise time tip

“X” = No trouble found

“ND” = No discharge

“NT” = Not tested

Contact Mode Discharge Procedure: For each test voltage, 10 positive and 10 negative contact discharges were applied to each pin of the RJ-45 at 10 pulses per second.

AS1602/BRCM-EVB / s/n16 – GROUNDED / WITHOUT AS1602

Direct Locations	+/-1kV 10 p/s 0.7 - 1ns	+/-2kV 10 p/s 0.7 - 1ns	+/-3kV 10 p/s 0.7 - 1ns	+/-4kV 10 p/s 0.7 - 1ns	+/-5kV 10 p/s 0.7 - 1ns	+/-6kV 10 p/s 0.7 - 1ns	+/-7kV 10 p/s 0.7 - 1ns	+/-8kV 10 p/s 0.7 - 1ns
PIN1 RJ Dataline	X	X	X	X	X	X	X	A
PIN2 RJ Dataline	X	X	X	X	X	X	X	A
PIN3 RJ Dataline	X	X	X	X	X	X	X	A
PIN4 RJ Dataline	X	X	X	X	X	X	X	A
PIN5 RJ Dataline	X	X	X	X	X	X	X	A
PIN6 RJ Dataline	X	X	X	X	X	X	X	A
PIN7 RJ Dataline	X	X	X	X	X	X	X	A
PIN8 RJ Dataline	X	X	X	X	X	X	X	A

Observations/Anomalies:

A: AT END OF +/-8KV TESTING NO GIGABIT LINK / 100MB OK

Contact mode using 0.7 – 1ns rise time tip

Contact Mode Discharge Procedure: For each test voltage, 10 positive and 10 negative contact discharges were applied to each pin of the RJ-45 at 10 pulses per second.

AS1602/BRCM-EVB / s/n17 – GROUNDED / WITHOUT AS1602

Direct Locations	+/-1kV 10 p/s 0.7 - 1ns	+/-2kV 10 p/s 0.7 - 1ns	+/-3kV 10 p/s 0.7 - 1ns	+/-4kV 10 p/s 0.7 - 1ns	+/-5kV 10 p/s 0.7 - 1ns	+/-6kV 10 p/s 0.7 - 1ns	+/-7kV 10 p/s 0.7 - 1ns	+/-8kV 10 p/s 0.7 - 1ns
PIN1 RJ Dataline	NT	NT	NT	X	X	X	X	X
PIN2 RJ Dataline	NT	NT	NT	X	X	X	X	X
PIN3 RJ Dataline	NT	NT	NT	X	X	X	X	X
PIN4 RJ Dataline	NT	NT	NT	X	X	X	X	X
PIN5 RJ Dataline	NT	NT	NT	X	X	X	X	X
PIN6 RJ Dataline	NT	NT	NT	X	X	X	X	X
PIN7 RJ Dataline	NT	NT	NT	X	X	X	X	X
PIN8 RJ Dataline	NT	NT	NT	X	X	X	X	X

AS1602/BRCM-EVB / s/n17 – GROUNDED / WITHOUT AS1602

Direct Locations	+/-9kV 10 p/s 0.7 - 1ns	+/-10kV 10 p/s 0.7 - 1ns	+/-11kV 10 p/s 0.7 - 1ns	+/-12kV 10 p/s 0.7 - 1ns	+/-13kV 10 p/s 0.7 - 1ns	+/-14kV 10 p/s 0.7 - 1ns	+/-15kV 10 p/s 0.7 - 1ns	+/-16kV 10 p/s 0.7 - 1ns
PIN1 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN2 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN3 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN4 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN5 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN6 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN7 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN8 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT

Observations/Anomalies:

A: AT END OF +/-10KV TESTING NO GIGABIT LINK / 100MB OK

Contact mode using 0.7 – 1ns rise time tip

Contact Mode Discharge Procedure: For each test voltage, 10 positive and 10 negative contact discharges were applied to each pin of the RJ-45 at 10 pulses per second.

AS1602/BRCM-EVB / s/n14 – GROUNDED / WITH AS1602

Direct Locations	+/-1kV 10 p/s 0.7 - 1ns	+/-2kV 10 p/s 0.7 - 1ns	+/-3kV 10 p/s 0.7 - 1ns	+/-4kV 10 p/s 0.7 - 1ns	+/-5kV 10 p/s 0.7 - 1ns	+/-6kV 10 p/s 0.7 - 1ns	+/-7kV 10 p/s 0.7 - 1ns	+/-8kV 10 p/s 0.7 - 1ns
PIN1 RJ Dataline	X	X	X	X	X	X	X	X
PIN2 RJ Dataline	X	X	X	X	X	X	X	X
PIN3 RJ Dataline	X	X	X	X	X	X	X	X
PIN4 RJ Dataline	X	X	X	X	X	X	X	X
PIN5 RJ Dataline	X	X	X	X	X	X	X	X
PIN6 RJ Dataline	X	X	X	X	X	X	X	X
PIN7 RJ Dataline	X	X	X	X	X	X	X	X
PIN8 RJ Dataline	X	X	X	X	X	X	X	X

AS1602/BRCM-EVB / s/n14 – GROUNDED / WITH AS1602

Direct Locations	+/-9kV 10 p/s 0.7 - 1ns	+/-10kV 10 p/s 0.7 - 1ns	+/-11kV 10 p/s 0.7 - 1ns	+/-12kV 10 p/s 0.7 - 1ns	+/-13kV 10 p/s 0.7 - 1ns	+/-14kV 10 p/s 0.7 - 1ns	+/-15kV 10 p/s 0.7 - 1ns	+/-16kV 10 p/s 0.7 - 1ns
PIN1 RJ Dataline	X	X	X	X	X	X	X	X
PIN2 RJ Dataline	X	X	X	X	X	X	X	X
PIN3 RJ Dataline	X	X	X	X	X	X	X	X
PIN4 RJ Dataline	X	X	X	X	X	X	X	X
PIN5 RJ Dataline	X	X	X	X	X	X	X	X
PIN6 RJ Dataline	X	X	X	X	X	X	X	X
PIN7 RJ Dataline	X	X	X	X	X	X	X	X
PIN8 RJ Dataline	X	X	X	X	X	X	X	X

AS1602/BRCM-EVB / s/n14 – GROUNDED / WITH AS1602

Direct Locations	+/-17kV 10 p/s 0.7 - 1ns	+/-18kV 10 p/s 0.7 - 1ns	+/-19kV 10 p/s 0.7 - 1ns	+/-20kV 10 p/s 0.7 - 1ns	+/-21kV 10 p/s 0.7 - 1ns	+/-22kV 10 p/s 0.7 - 1ns	+/-23kV 10 p/s 0.7 - 1ns	+/-24kV 10 p/s 0.7 - 1ns
PIN1 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN2 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN3 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN4 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN5 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN6 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN7 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT
PIN8 RJ Dataline	X	A	NT	NT	NT	NT	NT	NT

Observations/Anomalies:

A: AT END OF +/-18KV TESTING GOT GIGABIT DATA TRANSMISSION ERRORS / HARDWARE FAILURE

Contact mode using 0.7 – 1ns rise time tip

Contact Mode Discharge Procedure: For each test voltage, 10 positive and 10 negative contact discharges were applied to each pin of the RJ-45 at 10 pulses per second.

AS1602/BRCM-EVB / s/n15 – GROUNDED / WITH AS1602

Direct Locations	+/-1kV 10 p/s 0.7 - 1ns	+/-2kV 10 p/s 0.7 - 1ns	+/-3kV 10 p/s 0.7 - 1ns	+/-4kV 10 p/s 0.7 - 1ns	+/-5kV 10 p/s 0.7 - 1ns	+/-10kV 10 p/s 0.7 - 1ns	+/-11kV 10 p/s 0.7 - 1ns	+/-12kV 10 p/s 0.7 - 1ns
PIN1 RJ Dataline	NT	NT	NT	NT	X	X	X	X
PIN2 RJ Dataline	NT	NT	NT	NT	X	X	X	X
PIN3 RJ Dataline	NT	NT	NT	NT	X	X	X	X
PIN4 RJ Dataline	NT	NT	NT	NT	X	X	X	X
PIN5 RJ Dataline	NT	NT	NT	NT	X	X	X	X
PIN6 RJ Dataline	NT	NT	NT	NT	X	X	X	X
PIN7 RJ Dataline	NT	NT	NT	NT	X	X	X	X
PIN8 RJ Dataline	NT	NT	NT	NT	X	X	X	X

AS1602/BRCM-EVB / s/n15 – GROUNDED / WITH AS1602

Direct Locations	+/-13kV 10 p/s 0.7 - 1ns	+/-14kV 10 p/s 0.7 - 1ns	+/-15kV 10 p/s 0.7 - 1ns	+/-16kV 10 p/s 0.7 - 1ns	+/-17kV 10 p/s 0.7 - 1ns	+/-18kV 10 p/s 0.7 - 1ns	+/-19kV 10 p/s 0.7 - 1ns	+/-20kV 10 p/s 0.7 - 1ns
PIN1 RJ Dataline	X	X	X	X	X	X	A	NT
PIN2 RJ Dataline	X	X	X	X	X	X	A	NT
PIN3 RJ Dataline	X	X	X	X	X	X	A	NT
PIN4 RJ Dataline	X	X	X	X	X	X	A	NT
PIN5 RJ Dataline	X	X	X	X	X	X	A	NT
PIN6 RJ Dataline	X	X	X	X	X	X	A	NT
PIN7 RJ Dataline	X	X	X	X	X	X	A	NT
PIN8 RJ Dataline	X	X	X	X	X	X	A	NT

Observations/Anomalies:

A: AT END OF +/-19KV TESTING LOST GIGABIT LINK / 10/100 OK

RHTC TEST AND MEASUREMENT EQUIPMENT:

Test equipment	Model	Manufacturer	Ser. No.	Cal Due
ESD Simulator	MZ-15	KeyTek	9610395	28 Mar 08
ESD Tip	TPC-2A	KeyTek	0612370	23 Feb 08
A/C Power Source	6813A	Hewlett Packard	3503A00181	22 Feb 08
Temp and Humidity Meter	CAT 63-855	Radio Shack	J6999	22 Aug 08
ESD Gun	TC-815D	NoiseKen	I168079	28 Mar 08
ESD Simulator	ESS-200AX	NoiseKen	0179C00657	28 Mar 08

Note: There is no software associated with this test

Measurement uncertainty: It has been demonstrated that the ESD generator meets the specified requirements in the standard with at least a 95% confidence.

AMBIENT CONDITIONS DURING TEST:

Shift / Date	Start of Test			End of Test		
	Temp (°C)	Hum (%RH)	Pressure (kPa)	Temp (°C)	Hum (%RH)	Pressure (kPa)
Day / 12 October 2007	21	53	29.9	21	52	29.9
Swing / 12 October 2007	21	52	29.9	21	52	30.0

INITIAL DISTRIBUTION LIST:

Mattias Nilsson

RHTC Archive File

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ATTACHMENTS: None

REFERENCES: Unless otherwise noted the latest revision is used.

CISPR24:1997 + A1:2001 + A2:2002

EN 55024:1998 + A1:2001 + A2:2003

IEC 61000-4-2 :2001

EN 61000-4-2 :1995 + A1 :1998 + A2 :2001

HP Environmental Manual Section 765.002.

RHTC Test Procedure - ESD

Rev. 4.1

LAB34 August 2002

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END OF REPORT