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| | | | | AUTHORIZED BY | Sterling Lin | | DATE | 02 June 08' |
| | | | | CLASSIFICATION | | | | |

1.0 OBJECTIVE

This specification covers the performance, tests and quality requirements for the External Serial ATA plus USB 2 in 1 /COMBO Connector.


2.0 SCOPE

This specification is applicable to the termination characteristics of the External Serial ATA family of products.

3.0 GENERAL

The document is composed of the following sections:

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4.0 APPLICABLE DOCUMENTS

The following documents from a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirement of this specification and the reference document, this Specification shall take precedence.

5.0 REQUIREMENT

5.1 Qualification

Connector furnished under this specification shall be capable of meeting the qualification test requirement specified herein. Unless otherwise specified, all measurements shall be performed within the following lab condition;

Temperature: 15 to 35 C
Relative Humidity: 20% to 80%
Atmospheric Pressure: 650mm to 800mm of Hg (86 ~ 106 Kpa)

5.2 Material

- 5.2.1 Housings – Thermoplastic High Temp., UL94 V-0
- 5.2.2 Contact – Copper Alloy
- 5.2.3 Shield – Copper Alloy

5.3 Finish

- 5.3.1 Contact – Gold plating on contact area, Tin plating on solder tail, Nickel underplating overall.
- 5.3.2 Shield – Nickel under plating overall.

5.4 Design and Construction


The design, construction and physical dimensions of product shall be specified on the product drawing.

5.4.1 Standard Data

- 5.4.1.1 Rated Current – USB :1.5A max. per contact; ESATA:0.1A max. per contact
- 5.4.1.2 Rated Voltage – USB :30V AC max. ESATA:10V AC max.
- 5.4.1.3 Temperature Rating -- -40 C to 85 C

5.4.2 **Mating** The connectors should be capable of mating and unmating manually without the use of special tools.

5.4.3 **Workmanship** Connector shall be uniform in quality and shall be free from burrs, scratches, cracks, voids, chips, blisters, pin holes, sharp edges, and other defects that will adversely affect product's life or serviceability.


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6.0 PERFORMANCE REQUIREMENT AND TEST DESCRIPTION

6.1 TEST REQUIREMENT AND PROCEDURES SUMMARY

The product shall be designed to meet the electrical, mechanical and environmental performance Requirements specified in Table 1.


| Para. | Test Items | Requirements | Procedures |
|--------------------------------|----------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Examination of Product | No physical damage | Visual inspection No physical damage |
| 2 | Examination of plating | Meets plating specification of product drawing | Surface Plating: Checked through X-rays. Under Plating: Checked through X-rays, after surface plating was removed. |
| Electrical Requirements | | | |
| 3 | Termination Resistance (Low Level) | 30 mΩ Max. (Initial) $\Delta R=15$ mΩ Max. (Final) | Mated connector, Contact : ANSI/EIA-364-23B Open circuit 20mV maximum, 10mA Refer to Fig.2 |
| 4 | Dielectric withstanding Voltage | Neither creeping discharge nor flashover shall occur. Current leakage : 0.5 mA Max. | ANSI/EIA-364-20B, Method B, Condition II 500V AC Apply the above specified voltage between adjacent contacts for 1 minute |
| 5 | Insulation Resistance | 1000MΩ minimum | ANSI/EIA-364-21C apply 500V DC Apply the above specified voltage between adjacent contacts for 2 minute |
| 6 | Temperature Rising | 30°C Max. under loaded rating current. | EIA 364-70, Method B USB apply 1.5 A minimum, when measured at an ambient temperature of 25°C. Measure temperature rising while mated connector is energized. Refer to Fig.3 |
| 7 | Capacitance | 2pF Max. (only for USB) | Test Between the adjacent circuits of unmated connector. Frequency: 1kHz |
| 8 | Mated Connector Differential Impedance | $Z_{DIFF}(\Omega)=100\Omega\pm 10\%$ (Only for eSATA) | Mated with receptacle connector Measure with TDR @ 70ps (20 – 80% Rise time) |

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Tab. 1(Cont.)

| Mechanical Requirements | | | |
|-------------------------|---------------------------------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9 | Vibration (Random) | 100 mA applied. No electrical discontinuity greater than 1 μ sec. shall occur. | Vibration Frequency : 10 to 2000 Hz (Random) Accelerated Velocity : 53.9 m/s ² (5.35 G),rms. Vibration Direction : In each of 3 mutually perpendicular planes Duration : 30 minute each Module board should be fixed on the connector mount board or test jig. EIA-364-28, test condition V, test condition letter A |
| 10 | Physical Shock | No electrical discontinuity greater than 1 μ sec. shall occur. | Subject mated specimens to 294 m/s ² (30 G's) half-sine shock pulses of 11 mSec. duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. EIA-364-27,Method H. |
| 11 | Mating Force | USB: 35N (3.57kgf) Max. eSATA: 40N (2.04Kgf) Max | Measure force necessary to mate specimens at a maximum rate of 12.5mm per minute EIA364-13. |
| 12 | Unmating Force | USB: 10N (1Kgf) min eSATA: 10N (0.4Kgf) min | After durability measure the necessary force to unmate specimens at a maximum rate of 12.5mm per minute. EIA-364-13. |
| 13 | Durability (Repeated Mate/Un-mate) | USB: 1500 Mating/ Unmating Cycles. eSATA: 2500 Mating / Unmating Cycles. | Specimens at maximum rate of 200 cycles per hour EIA-364-9C. |
| 14 | Reseating | No physical damage | No. of Cycles : 3 cycles.+ |
| 15 | Solderability | Wet Solder Coverage : Solder tine: 95% Min. | Solder Temperature : 245°C \pm 5°C Immersion Duration : 5 \pm 0.5 seconds With Flux Alpha ROL1 JEDEC JESD22-B102D, Method 1 |

Tab. 1(Cont.)


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| Para. | Test Items | Requirements | Procedures |
|----------------------------|------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Environmental Requirements | | | |
| 16 | Humidity | Insulation resistance (final) 500 M Ω Min. | Mated connector, 25 – 65°C, 80 – 100% RH 168hr. minimum (seven complete cycles.) EIA-364-31B Method III condition A |
| 17 | Thermal Shock | Termination Resistance Δ R=30 m Ω Max. (Final) | Mated connector - 55 +0/-3°C /30 min., 85 +3/-0°C /30 min. Making this a cycle, repeat 10 cycles. EIA-364-32, test condition I |
| 18 | Temperature Life | Termination Resistance Δ R=30 m Ω Max. (Final) | Mated connector. 85°C, Duration : 500 hours EIA-364-17, Test condition III method A |

Tab. 1(END)

6.2 QUALIFICATION TESTING MATRIX

| Test Examination | Test | | | | | |
|-----------------------------------------|------|------|-------|-----|-----|------|
| | 1 | 2 | 3 | 4 | 5 | 6(b) |
| Examination of Product | 1,9 | 1.10 | 1,8 | 1,9 | 1,4 | 1 |
| Examination of Plating | | | | | 2 | |
| Termination resistance | 2,8 | 4,8 | 2,4,6 | | | |
| Dielectric withstanding Voltage | | | | 3,8 | | |
| Insulation resistance | | | | 4,7 | | |
| Temperature-rise | | | 7 | | | |
| Capacitance | | | | 2 | | |
| Mating contactor differential Impedance | | | | | | 2 |
| Vibration (Random) | | 6 | | | | |
| Physical shock | | 7 | | | | |
| Mating Force | 3,6 | 2 | | | | |
| Unmating Force | 4,7 | 9 | | | | |
| Durability(Repeated mate/unmate) | 5 | 5(a) | | | | |
| Reseating | | 3 | 5 | | | |
| Solderbility | | | | | 3 | |
| Humidity | | | | 6 | | |
| Thermal shock | | | | 5 | | |
| Temperature life (Heat Aging) | | | 3 | | | |

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- (a) This test group eSATA durability is 2500 cycles, USB durability is 1500 cycles @ maximum rate 200 cycles/h
- (b) This group is for eSATA only.

6.3 REFERENCE TEMP PROFILE

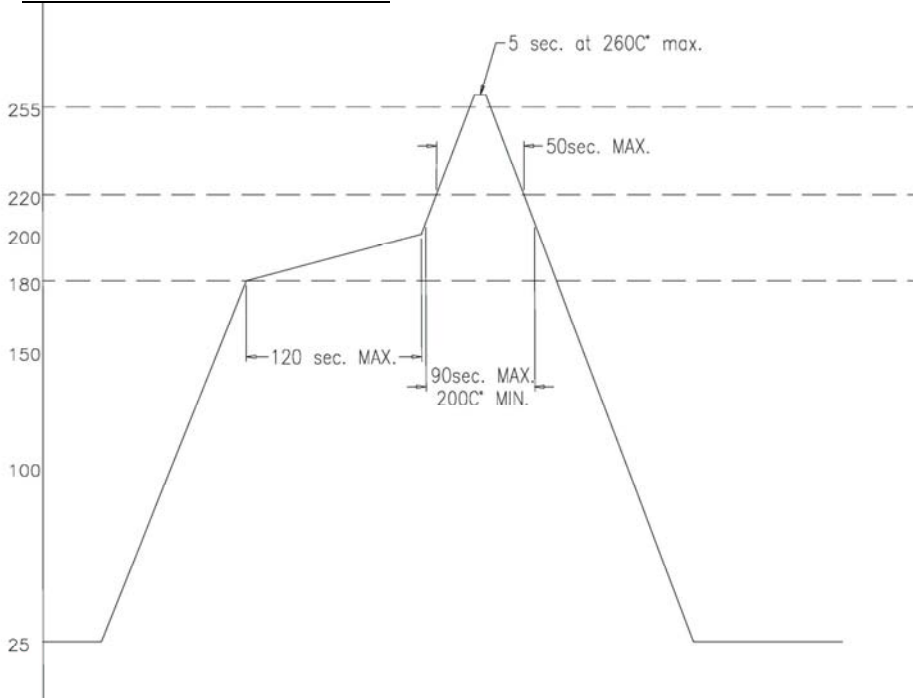



Fig.1

| | | | |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------|----------------------------|
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“L” resistance from terminating wire must be subtracted from measured result.

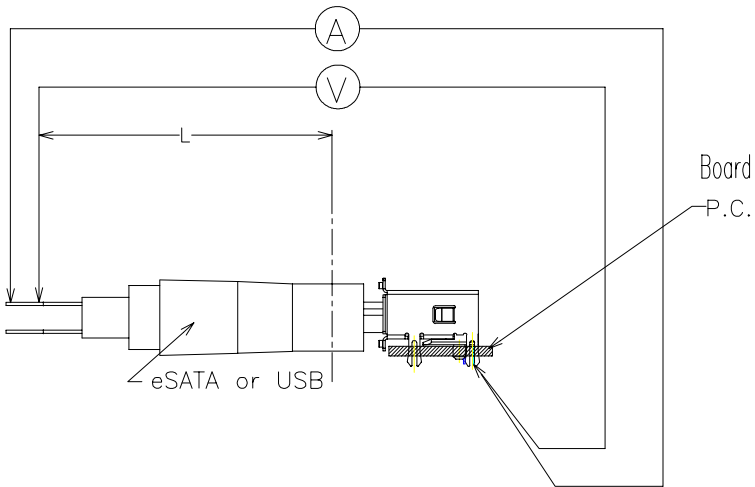
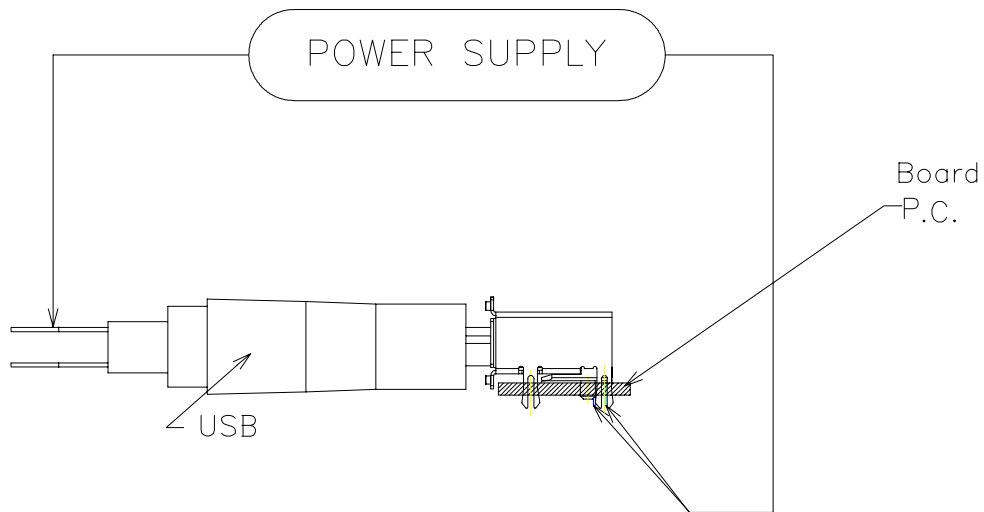


Fig.2 Contact resistance measuring points (USB AND eSATA)




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Fig.3 Temperature rising measuring points (USB and eSATA) (Measurement point is specify in 1, 2, 3;

Location is in center of one row contact)

7.0 REVISION RECORD

| Revision | Page | Description | ECN | Date |
|----------|------------|----------------------------------------------------------------------------|----------|------------|
| A | All | New Release | T07-1004 | Jan/17/07 |
| B | 2, 3,4,6,7 | Separate ESATA,USB Rated current,voltage , and add rated temp in sec.5.4.1 | T08-1096 | June 02,08 |
| | | Delete Solderability SMT test and Saltspray test in sec.6.1 | | |
| | | Add Capacitance ,Differential Impedence test, Preseating test | | |
| | | Add Fig. 1, 2, 3 | | |
| | | | | |
| | | | | |

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