PRODUCT SPECIFICATION
108-51030
AMP Mini CT HIGH CURRENT HYBRID DRAWER CONNECTOR (1.5mm PITCH)

1.0 SCOPE

This specification covers the requirements for product performance, test methods and quality assurance provisions of AMP Mini CT High Current Hybrid Drawer Connector. Applicable product description and part numbers are as shown in Fig.1.

2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. 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 requirements of this specification and the referenced documents, this specification shall take precedence.

2.1 AMP Specifications :

A. 109-5000 Test Specification, General Requirements for Test Methods
B. 114-51009 Application Specification
C. 501-51024 Qualification Test Report

2.2 Commercial Standards and specifications :

A. MIL-STD-202 : Test Methods for Electronic and Electrical Component Parts.
B. IEC : International Electrotechnical Commission

3.0 REQUIREMENTS:

3.1 Design and Construction :

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

				Dr. TAN LAY PENG	AMP	AMP Manufacturing (Singapore) Pte Ltd. 26 Ang Mo Kio Industrial Pk 2 Singapore 569507 Tel: 4820311 (20 lines) Fax: 65-4821012	
				Chk. WL CHOO			
				App. See Back Page	No. 108-51030	Rev. B	Loc. DY
B	FP00-0254-01	TLP	13/9/01				
A	FP00-0049-01	TLP	13/2/01	Page	Title:		
O	FP00-0087-00	CWL	24/5/00				
Rev	Revision Record	App	Date	1 of 13	**AMP Mini CT HIGH CURRENT HYBRID DRAWER CONNECTOR (1.5mm PITCH)**		

3.2 Materials :

3.2.1 Plug Assembly

A. Signal Contact

Material: Phosphor Bronze

Finish (Mini CT post area):

1μm min.Tin-lead over 2-5μm Nickel underplate.

Finish (Drawer mating area):

i) 0.5μm min. Gold over 2-5μm Nickel underplate, or

ii) 0.05μm min. Gold over 0.5μm Palladium-Nickel over 2-5μm Nickel underplate.

B. Power Contact

I)MIC (Multi-Interlock Connector) Contact

Material: Brass

Finish (Gold version):

0.38μm min. Gold (mating area)

1μm min. Tin-lead (crimp area) over 0.5-5μm Nickel underplate

Finish (Tin version):

Pre-plated Tin 0.8μm min.

II)Dynamic Contact

Material: Copper Alloy

Finish: 0.2μm min. Gold (mating area)over 1.3μm Nickel underplate.

C. Housing

Material: Glass-filled PBT UL94V-0

3.2.2 Receptacle Assembly

A. Signal Contact

Material: Brass

Finish (Mini CT post area):

1μm min.Tin-lead over 2-5μm Nickel underplate.

Finish (Drawer mating area):

i) 0.5μm min. Gold over 2-5μm Nickel underplate, or

ii) 0.05μm min. Gold over 0.5μm Palladium-Nickel over 2-5μm Nickel underplate.

B. Power Contact

I)MIC Contact

Material: Phosphor Bronze

Finish (Gold version):

0.38μm min. Gold (mating area)

1μm min. Tin-lead (crimp area)over 0.5-5μm Nickel underplate

Finish (Tin version):

Pre-plated Tin 0.8μm min.

II) Dynamic Contact

Material: Copper Alloy

Finish: 0.2μm min. Gold (mating area)over 1.3μm Nickel underplate.

C. Housing

Material: Glass-filled PBT UL94V-0

3.3 Ratings :

A. Voltage Rating (Signal): 50 VAC/DC

Voltage Rating (MIC): 250 VAC

Voltage Rating (Dynamic): 630 VAC/DC

B. Current Rating(Signal): 1A Max.

Current Rating(MIC):

Wire Size	AWG				
	#16	#18	#20	#22	#24
Current	12A	10A	7A	5A	4A

Current Rating(Dynamic):

Wire Size	AWG			
	#10	#12	#14	#16
Current	30A	25A	19A	16A

C. Temperature Rating : -30°C to +105°C

The upper limit of temperature rating includes the temperature rise resulted from energized electrical current.

3.4 Performance Requirements and Test Descriptions :

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig. 2.
All tests shall be performed in the room temperature, unless otherwise specified.

Product Part No.	Description
x-84688-x x-84692-x x-84747-x	Plug Assembly, 1.5mm Pitch Mini CT High Current Hybrid Drawer Connector.

Fig1 (To be continued)

x-84690-x x-84694-x x-84749-x	Receptacle Assembly, 1.5mm Pitch Mini CT High Current Hybrid Drawer Connector.
x-179316-x x-179333-x	Power Receptacle Contact, MIC Contact (#20 - #16 AWG)
x-179317-x x-179334-x	MIC Receptacle Contact, MIC Contact (#24 - #20 AWG)
x-316458-x x-1123943-x	Ground Receptacle Contact, MIC Contact (#20 - #16 AWG)
x-179321-x x-179335-x	Power Tab Contact, MIC Contact (#20 - #16 AWG)
x-179322-x x-179336-x	Power Tab Contact, MIC Contact (#24 - #20 AWG)
84696-1	"S" Size Power Tab Dynamic Contact
84695-1	"M" Size Power Tab Dynamic Contact
179955-2	"S" Size Power Receptacle Dynamic Contact (Strip)
179956-2	"M" Size Power Receptacle Dynamic Contact (Strip)
316040-2	"S" Size Power Receptacle Dynamic Contact (L/P)
316041-2	"M" Size Power Receptacle Dynamic Contact (L/P)

Fig. 1

3.5 Test Requirements and Procedures Summary:

Para.	Test Items	Requirements	Procedures
3.5.1	Examination of Product	Meets requirements of product drawing.	Visual inspection No physical damage
Electrical Requirements			
3.5.2	Termination Resistance (Low Level)	Signal Line: 30mΩ Max. (Initial) 40mΩ Max. (Final) MIC Line: 6mΩ Max. (Initial) 10mΩ Max. (Final) Dynamic Line: 2mΩ Max. (Initial & Final)	Signal/MIC Line: subject mated connectors to 20 mV Max open circuit at 10 mA Dynamic Line: subject mated connectors to 50 mV Max open circuit at 50 mA Refer Fig.4.

Fig.2 (To be continued)

3.5.3	Dielectric withstanding Voltage	No creeping discharge nor flashover shall occur. Current leakage : Signal Line 5mA Max. MIC Line 1mA Max. Dynamic Line 1mA Max.	Signal Line: 500 VAC for 1 minute. MIC Line: 1.8 kVAC for 1 minute. Dynamic Line: 3 kVAC for 1 minute. Test between adjacent circuits of mated connectors. MIL STD 202 TEST METHOD 301 IEC 512-2 TEST 4A
3.5.4	Insulation Resistance	Signal/MIC Line: 500 MΩ Min. (Initial) 100 MΩ Min. (Final) Dynamic Line: 1000 MΩ Min.	Apply voltage 500 VDC for 1 minute. Test between adjacent circuits of mated connectors. MIL STD 202 TEST METHOD 302 CONDITION B
3.5.5	Temperature Rise	30 °C Max. under loaded rating current.	Contacts series-wired, apply rated current to the circuit, and measure the temperature rise, after the temperature becomes stabilized. Deduct ambient temperature from the measured value. Refer Fig.4

Fig.2 (To be continued)

<table>
<tr><th>Para.</th><th>Test Items</th><th>Requirements</th><th>Procedures</th></tr>
<tr><td colspan="4">Mechanical Requirements</td></tr>
<tr><td>3.5.6</td><td>Crimp Tensile Strength (Power contacts only)</td><td>
MIC Contact:
<table>
<tr><td colspan="2">Wire Size</td><td>Crimp Tensile</td></tr>
<tr><td>mm^2</td><td>(AWG)</td><td>N (kgf) Min.</td></tr>
<tr><td>0.2</td><td>#24</td><td>19.6 (2.0)</td></tr>
<tr><td>0.3</td><td>#22</td><td>34.3 (3.5)</td></tr>
<tr><td>0.5</td><td>#20</td><td>45.1 (4.6)</td></tr>
<tr><td>0.85</td><td>#18</td><td>98.0 (10.0)</td></tr>
<tr><td>1.25</td><td>#16</td><td>186.2 (19.0)</td></tr>
</table>
Dynamic Contact:
<table>
<tr><td colspan="2">Wire Size</td><td>Crimp Tensile</td></tr>
<tr><td>mm^2</td><td>(AWG)</td><td>N (kgf) Min.</td></tr>
<tr><td>1.309</td><td>#16</td><td>186.2 (19)</td></tr>
<tr><td>2.081</td><td>#14</td><td>245.0 (25)</td></tr>
<tr><td>3.309</td><td>#12</td><td>313.6 (32)</td></tr>
<tr><td>5.262</td><td>#10</td><td>401.8 (41)</td></tr>
</table>
</td><td>Apply an axial pull-of load to a crimped wire, with the contact secured to the tester. Operation Speed: 100 mm/min.</td></tr>
<tr><td>3.5.7</td><td>Contact-housing Insertion Force (Power contacts only)</td><td>14.7 N(1.5 kgf) Max. per contact.</td><td>Measure force required to insert contact into housing.</td></tr>
<tr><td>3.5.8</td><td>Contact Retention Force</td><td>Signal Contact:
14.7 N(1.5 kgf) Min., in direction of mating with Mini CT Receptacle.
Power Contact:
49.1N (5.0 kgf) Min.</td><td>Measure contact retention force.
Operation Speed : 100 mm/min.</td></tr>
</table>

Fig.2 (To be continued)

Para.	Test Items	Requirements		Procedures
3.5.9	Connector Mating Force	Pos. size (Power/ Signal)	Initial & Final N (kgf) Max.	Operation Speed : 100 mm/min. Measure the force required to mate and unmate connectors.
		4/10	43.1 (4.4)	
		6/10	56.8 (5.8)	
		6/20	66.6 (6.8)	
3.5.10	Connector Unmating Force	Pos. size (Power/ Signal)	Initial & After Durability N (kgf) Min.	Operation Speed : 100 mm/min. Measure the force required to mate and unmate connectors.
		4/10	7.8 (0.8)	
		6/10	10.8 (1.1)	
		6/20	11.8 (1.2)	
3.5.11	Durability (Repeated Mating & Unmating)	Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)		Operation Speed : 100 mm/min. No. of Cycles : 25 cycles.
3.5.12	Vibration (Low Frequency)	No electrical discontinuity greater than 1 μsec. shall occur. Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)		Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52 mm amplitude 2 hours each of 3 mutually perpendicular planes. MIL-STD-202 TEST METHOD 201 CONDITION A Mounting : Fig. 5

Fig.2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.13	Physical Shock	No electrical discontinuity greater than 1μsec. shall occur. Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)	Accelerated Velocity: 490 m/s^2 (50G) Waveform: halfsine shock pulse Duration: 11 msec. Number of shocks: 3 shocks in each direction applied along the X, Y and Z axes, totally 18 shocks. MIL-STD-202 TEST METHOD 213 CONDITION A IEC 68-2-27, Test Ea Mounting : Fig. 5
3.5.14	Hammering Shock	No electrical discontinuity greater than 1μsec. Shall occur. Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)	Subject mated connectors to 10,000 cycles of hammering shocks in set-up as shown in Fig. 6, with test current of 1mA at DC 10V applied to circuits as shown in Fig. 7. During the test, the circuit shall be monitored for fluctuation of electrical resistance.
Environmental Requirements			
3.5.15	Thermal Shock	Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)	Subject mated connectors to -55°C/30 min., +85°C/30 min. This being 1 cycle, repeat for a total of 25 cycles. MIL-STD-202 TEST METHOD 107

Fig.2 (To be continued)

Para.	Test Items	Requirements	Procedures
3.5.16	Humidity-Temperature Cycling	Insulation resistance 100 MΩ Min.(Final) Termination resistance Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)	Subject mated connectors to 25~65°C, 90~95% R.H., 10 cycles. Re-condition in room temperature for 3Hrs before subsequent measurements. MIL-STD-202 TEST METHOD 106 IEC 68-2-38, Test Db.
3.5.17	Salt Spray	Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)	Subject mated connectors to 5 ± 1% salt concentration for 48 hours. After test, rinse samples with water and recondition to room temperature for 1 hour before subsequent measurements. MIL-STD-202 TEST METHOD 101, CONDITION B. IEC 68-2-11, Test Ka.
3.5.18	Temperature Life (Heat Aging)	Signal Line: 40 mΩ Max. (Final) MIC Line: 10 mΩ Max. (Final) Dynamic Line: 2 mΩ Max. (Final)	Subject mated connectors to 85 ± 2°C, 500 hours. MIL-STD-202 TEST METHOD 108.

Fig.2 (End)

4. Product Qualification Test Sequence

Test Examination	/Test Group											
	1	2	3	4	5	6	7	8	9	10	11	12
	/Test Sequence (a)											
Examination of Product	1,4,8	1,3	1,3	1,3	1,3	1,6	1,5	1,5	1,5	1,5	1,5	1,5
Termination Resistance (Low Level)	2,5					2,5	2,4	2,4	2,4	2,4	2,4	2,4
Dielectric withstanding Voltage	7											
Insulation Resistance	6											
Temperature Rise		2										
Crimp Tensile Strength			2									
Contact-housing Insertion Force				2								
Contact Retention Force					2							
Connector Mating/Unmating Force (1^{st} / 25^{th} cycle)						3						
Durability Cycling						4						
Vibration (Low Frequency)							3					
Physical Shock								3				
Hammering Shock									3			
Thermal Shock										3		
Humidity-Temperature Cycling	3											
Salt Spray											3	
Temperature Life (Heat Aging)												3

(a) /Numbers indicate sequence in which the tests are performed.

Fig.3

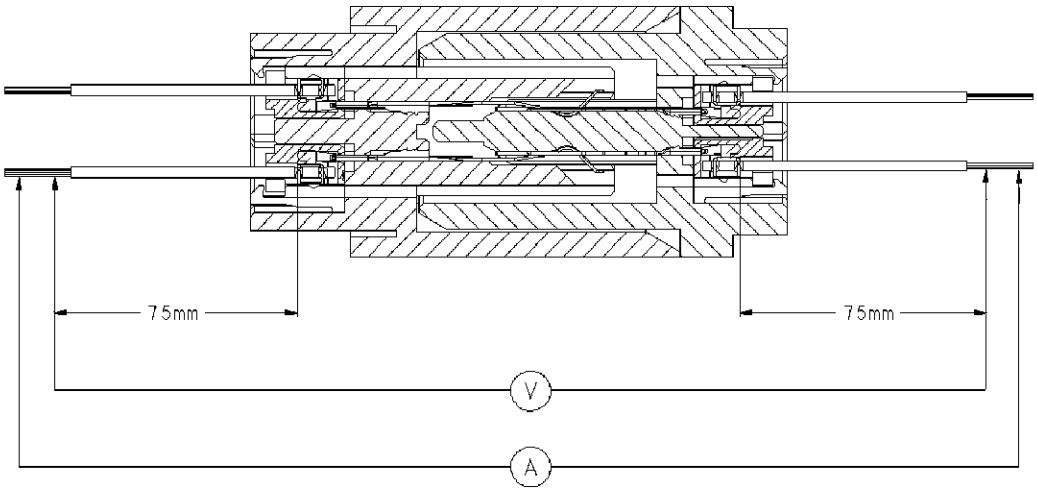

Fig. 4a: Signal Line Termination Resistance Measurement Method

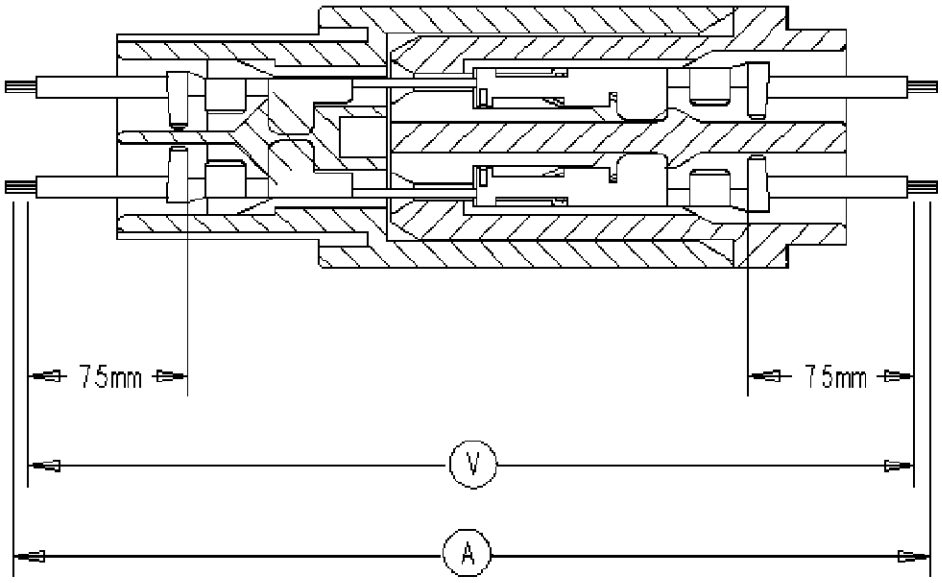

Fig. 4b: MIC/Dynamic Line Termination Resistance Measurement Method

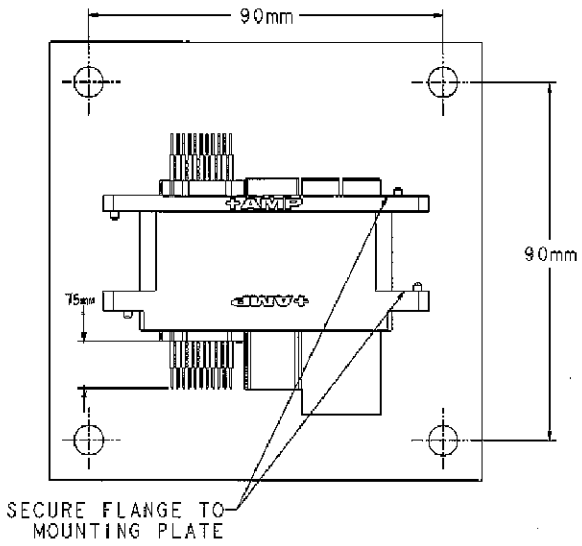

Fig. 5: Vibration/Physical Shock Mounting Method

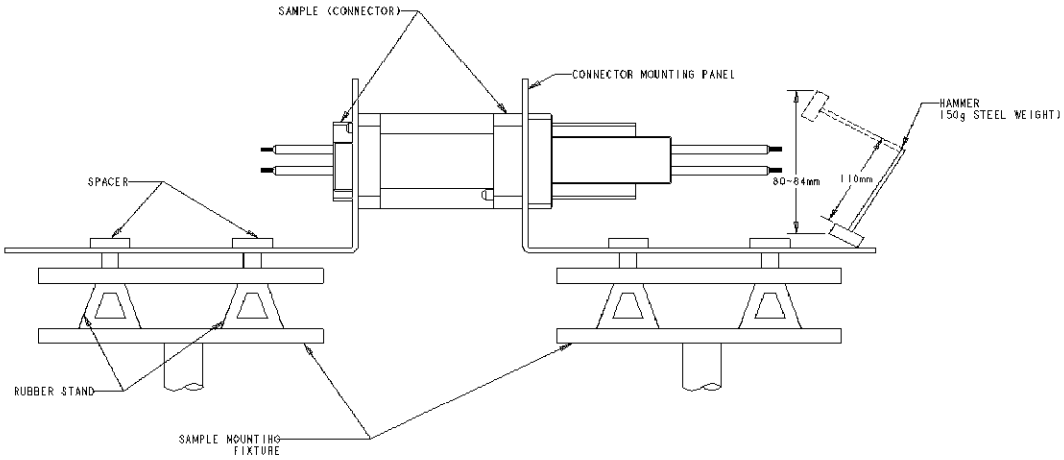

Fig. 6: Hammering Shock Test

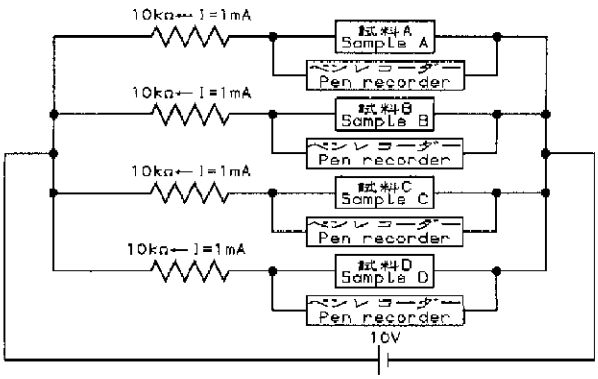

Fig. 7: Electrical Resistance Fluctuation Monitoring Circuit

5. VALIDATIONS

Prepared by:

Tan Lay Peng
Product Engineer
Product Engineering
Tyco Electronics Singapore Pte. Ltd.

Reviwed by:

Choo Wing Lian
Product Engineering Manager
Product Engineering
Tyco Electronics Singapore Pte. Ltd.

Approved by:

Leong See Fan

Product Engineering Division Manager
Product Engineering
Tyco Electronics Singapore Pte. Ltd