

NUMBER GS-20-0480	TYPE APPLICATION SPECIFICATION	Amphenol FCI	
TITLE Bergstak+ 0.8mm BTB		PAGE 1 of 16	REVISION A
		AUTHORIZED BY Bob Gu	DATE Dec. 08
		CLASSIFICATION UNRESTRICTED	

1.0 OBJECTIVE


This specification provides information and requirements for customer application of the BergStak+™ connectors. It also defines the placement of connectors when used in group of two or more per PCB, mating tolerances, wipe distance and requirement for BTB system restraint.

2.0 SCOPE

This specification provides information and requirements regarding the application of FCI BergStak+™ Plug and Receptacles family of product.



Figure 1: Showing BergStak+™ family of product.

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3.0 GENERAL

Bergstak+ connectors are surface mounted to PCB. When one Plug and one Receptacles are soldered to their respective PCB, these connectors establish and control their mating alignment. However, when design calls for the application of two or more these connectors on each PCB, the positional relationship of the connectors takes on more importance. Any resulting variation of connector placement from their ideal nominal locations produce higher mechanical stress to some part of one or more of the connectors. The amount of clearance between the physical plastic features of these connectors for mating is very limited by design. The metal terminals are very compliant by design, and able to withstand stress beyond what the plastic housing can endure.

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4.0 PRODUCT DRAWINGS AND APPLICABLE DOCUMENTS

4.1 This document is a general application guide. If there is a conflict between the product drawings and this specification, the drawings take precedence.

Bergstak+ Plug and Receptacles are offered from 80 to 120 positions, with every 20 position incremental. The receptacles will only mates with plug with the same number of positions. Please refer to drawings for detailed partnumbers. All dimensions/ measurements in this document are in units of millimeters.

Bergstak+ Receptacle	No. of position**	Pitch	Configuration Height
10139781	80 and 120pos	0.8mm	1 to 3

Bergstak+ Plug	No. of position**	Pitch	Configuration Height
10139085	80 and 120pos	0.8mm	1 and 4

** with every 20 position incremental

Table 1: Showing Bergstak+ Plug and Receptacle offering.

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4.2 Bergstak+ family of product is available in 5 different plating options.

Plating option	Plating chemistry	Lead free
4	Gold flash 0.2 um / Pure Tin 2 um min solder tail Nickel underplate over 1.27um min	Yes
5	Gold flash 0.38 um / Pure Tin 2 um min solder tail Nickel underplate over 1.27um min	Yes
6	Gold flash over Palladium-nickel 0.65 um min/ Pure Tin 2 um solder tail Nickel underplate over 1.27um min	Yes

Table 2 : Showing the Plating options

4.3 Packaging availability

Packaging option	Packaging
2	Tape & reel with metal cap

Table 3: Showing the Packaging option.

4.4 Stack height and BTB restraint

Stacked height dimension is dependant on the component tolerances but does not include the solder paste thickness on the PCB.

Proper system application of Bergstak+ BTB requires the use 'stand-off' with 2 bolts. These ensure the total stack height, and prevent the system from 'rocking' if the PCBs are disturbed. Stand-off also mandates the BTB must be bolted together during installation and system operation.

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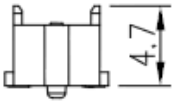
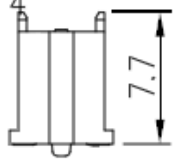


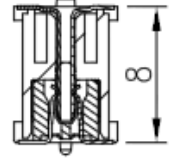
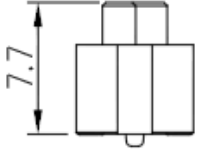
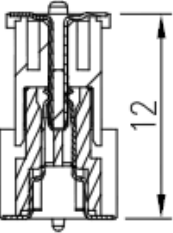
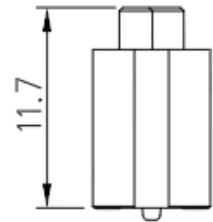
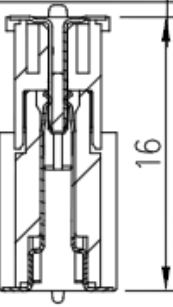

B	FOR PLUG, SEE DWG. NO. 10139781	
COMBINATION OF MATED HEIGHT	Plug 1 	Plug 4 
Recep 1 		
Recep 2 		
Recep 3 		

Table 4: Showing Bergstak+ stack height

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4.5 PCB thickness and layout

PCB thickness should be based on the intended purposes.

Figure 1 & 2 showing the recommended PCB layout for different plug and receptacle heights and positions.

The minimum thickness for solder paste is 0.12mm.

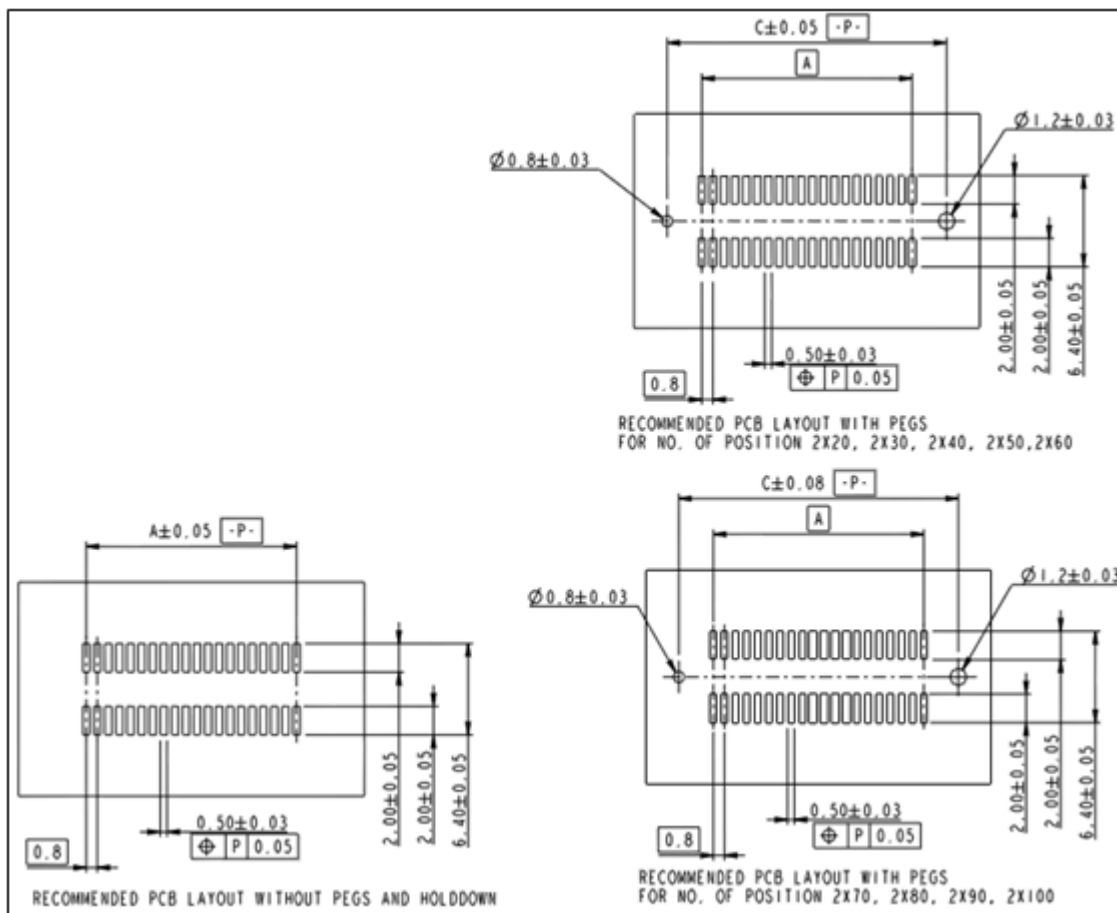


Figure 1: Recommended PCB layout for Receptacles 1 and Plug 1 to 4.

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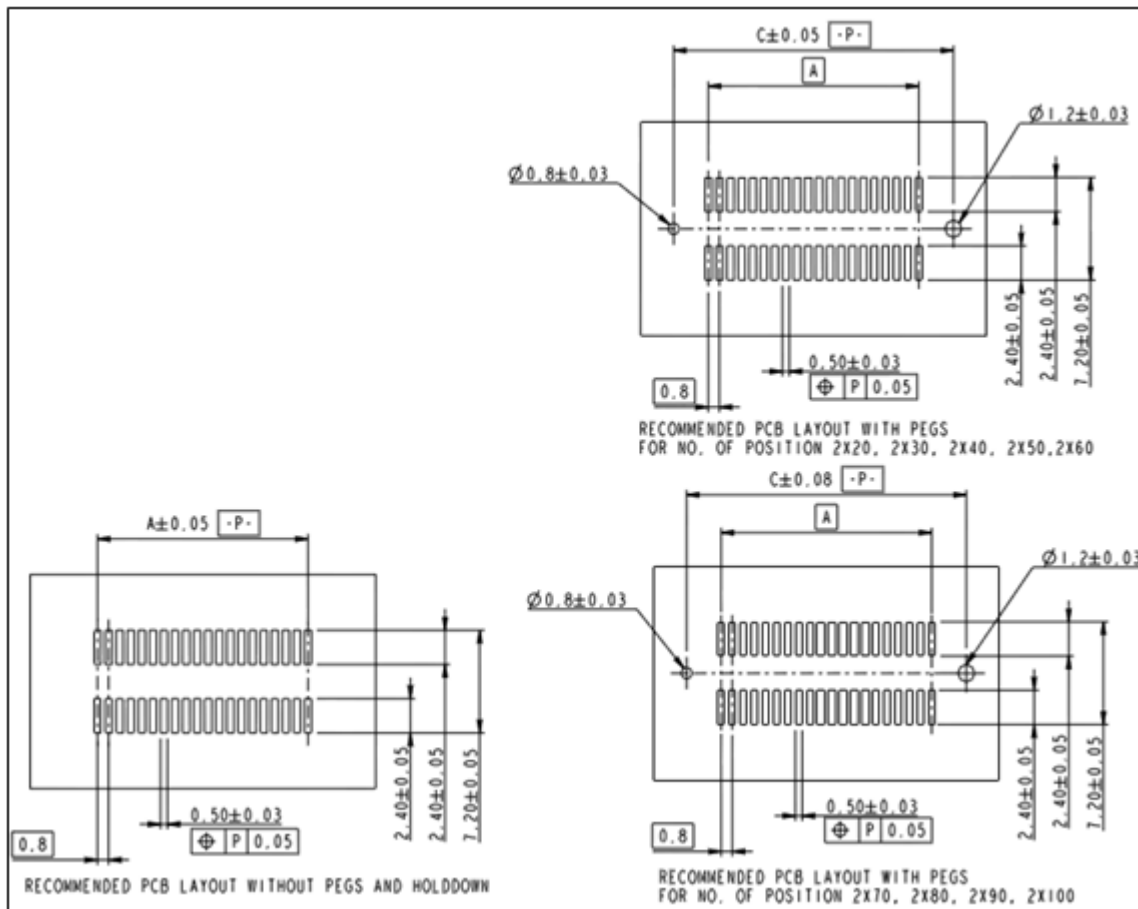


Figure 2: Recommended PCB layout for Receptacles 2 and 3.

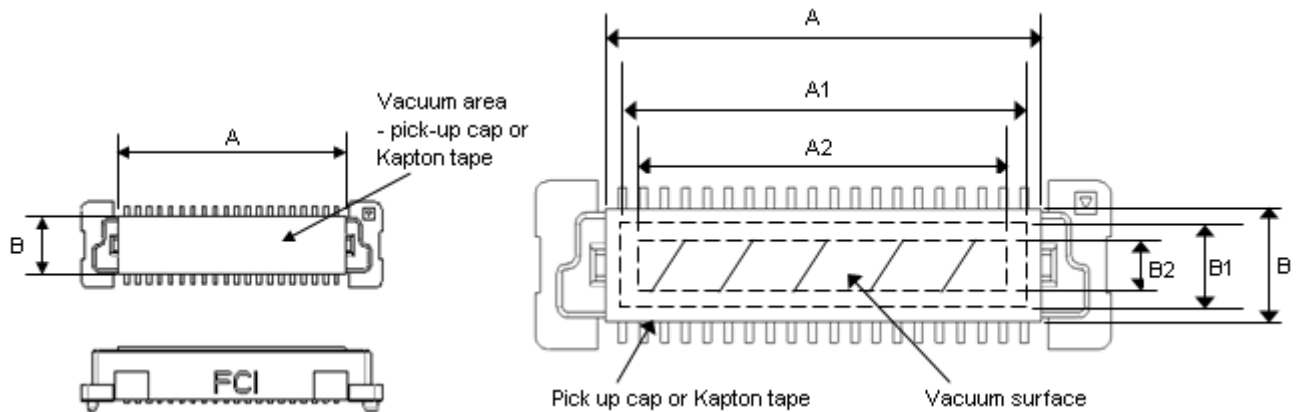
4.6 Requirement for 2nd reflow.

Due to other variables involved (connector orientation, reflow temperature, PCB thickness and PCB size) during the 2nd (inverted) reflow, it is recommended for the user to conduct trial under actual manufacturing condition. These are to ensure the product and process capability.

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4.7 Pick and Place Equipment consideration

Vacuum Pick & Place Equipment. Ensure adequate vacuum area on the pick-up cap. Part weight, equipment speed and relative travel of the connector with respect to the vacuum pad may require minimum different pick up zone.



$$\begin{aligned} \text{Force of Vacuum, } F &= (A2) \times (B2) \times 500/760 \times 1030/100 \\ &= (A2) \times (B2) \times 6.78 \text{ gf (gram-force)} \end{aligned}$$

$$\begin{aligned} \text{Mass of Applicable Component, } m &= F \times \mu (G \times fs) \\ &= F \times 0.07 (1.0 \times 2.0) \\ &= F/30 \text{ g (gram)} \end{aligned}$$

Note: Maximum acceleration at Horizontal Transfer

- Ultimate Vacuum Rate: 500 mmHg
- (low speed) G : 1.0G
- Function coefficient, μ : 0.07
- Safety factor, fs = 2.0

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5.0 ANALYSIS

5.1 Area of clearance between aligning features.

Area of Clearance	Description	Tolerance	Remarks
CL 1	Clearance between end of center rib (Plug) and inside of the end wall (Receptacle)	0.135 to 0.295 mm	See Figure 7 (full connector)
CL 2	Clearance along the length of the center rib (Plug) and along the length of the inside of the outer wall (Receptacle)	0.415 to 0.475mm	See Figure 6 (half connector)
CL 3	Clearance between the inside of the outer wall, length-wise (Plug) and the between the outside of the outer wall, length-wise (Receptacle)	0.075 to 0.175 mm	See Figure 5 (half connector)
CL 4	Clearance between the center rib (Plug) and bottom of the housing (Receptacle)	0.035 to 0.185mm	See Figure 4 & 5 (half connector)
CL 5	Similar with CL 2, with lead-in taken in account	0.025 to 0.085mm	See Figure 7 (half connector)
CL 6	Clearance between the inside end wall (Plug) and outer end wall (Receptacle) at the shorter side of the jog,	0.01 to 0.11mm	See Figure 4 & 7 (full connector)
CL 7	Clearance between the inside end wall (Plug) and outer end wall (Receptacle) at the longer side of the jog,	0.015to 0.095mm	See Figure 4 & 7 (full connector)
CL 8	Nominal contact wipe	1.25	See Figure 8

Table 5: Tolerances of aligning features.

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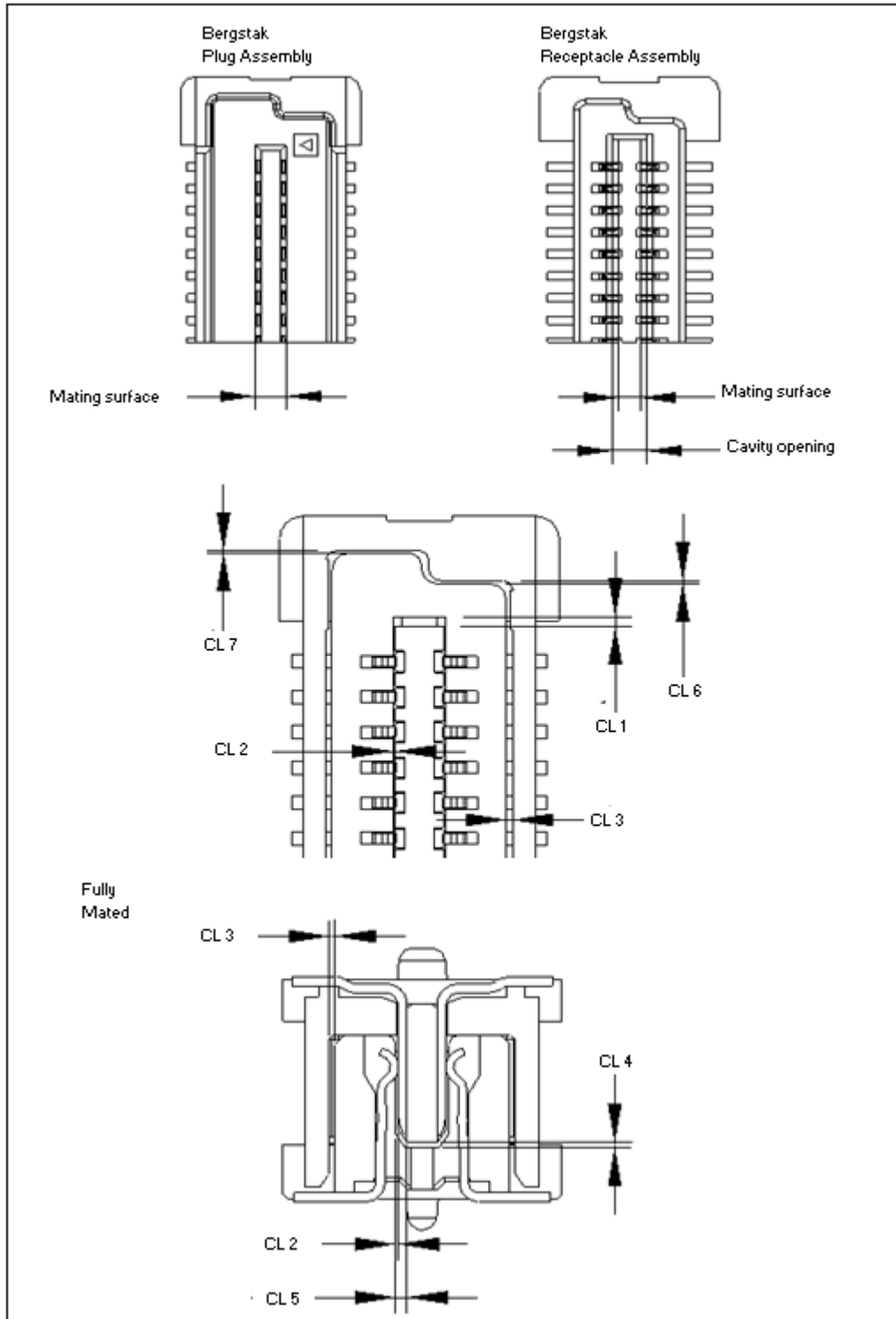


Figure 5: Area of clearance between aligning features

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5.2 Physical point where the mating connectors bottom out AND the amount of clearance at the outer walls.

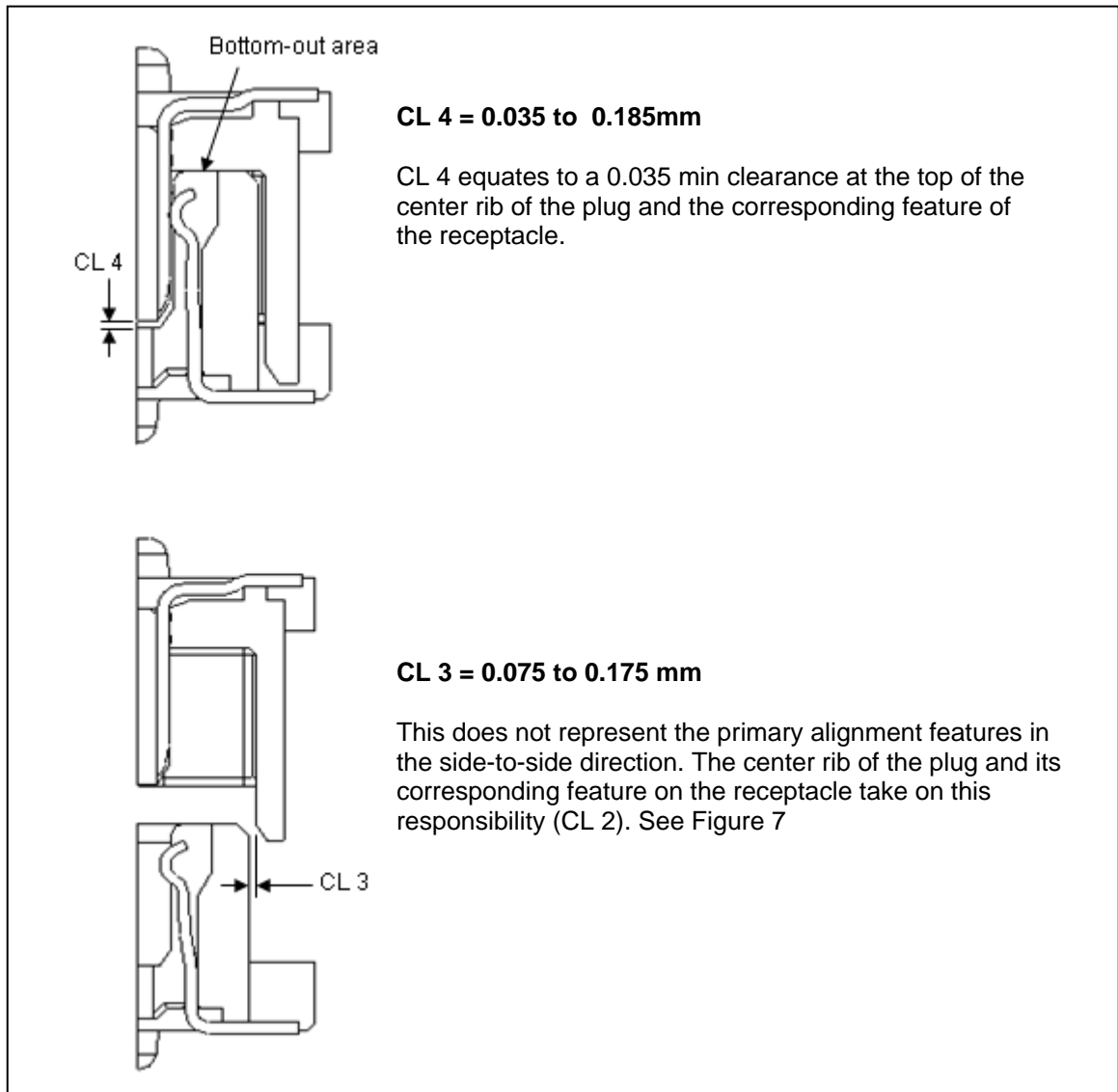


Figure 6: Cross sectional view of connector mating system.

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5.3 Side clearance between the center rib of the plug, and the sidewall of the receptacle's center slot.

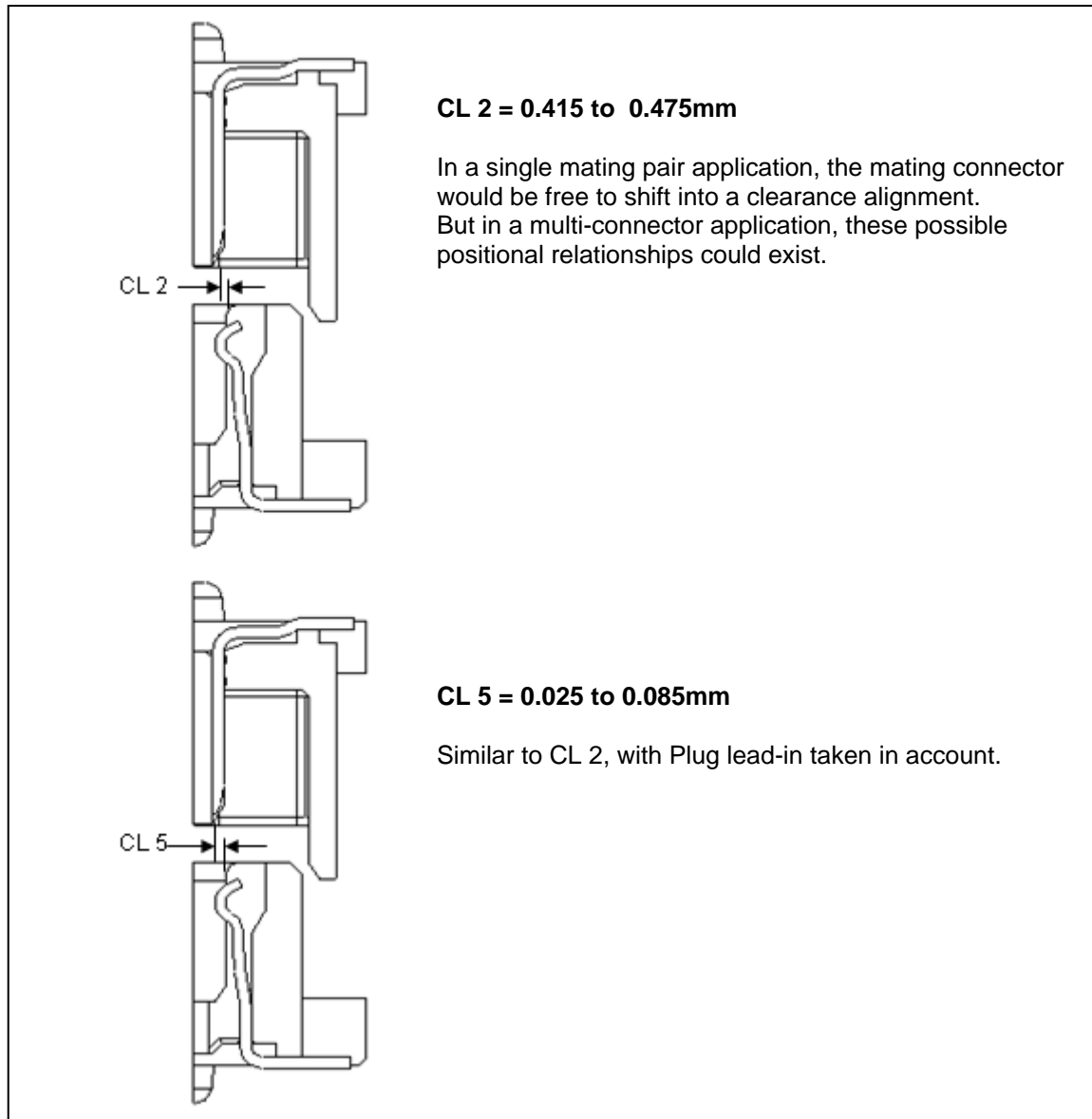


Figure 7: Cross sectional view, side clearance.

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5.4 Mating clearances in the longitudinal direction and Zippering effect

To eliminate possible “zippering”, there should be zero clearance in this direction. Zippering of a connector system occurs when the terminals (contacts), are “angled” during mating approach, straddle each other instead of aligning with each other.

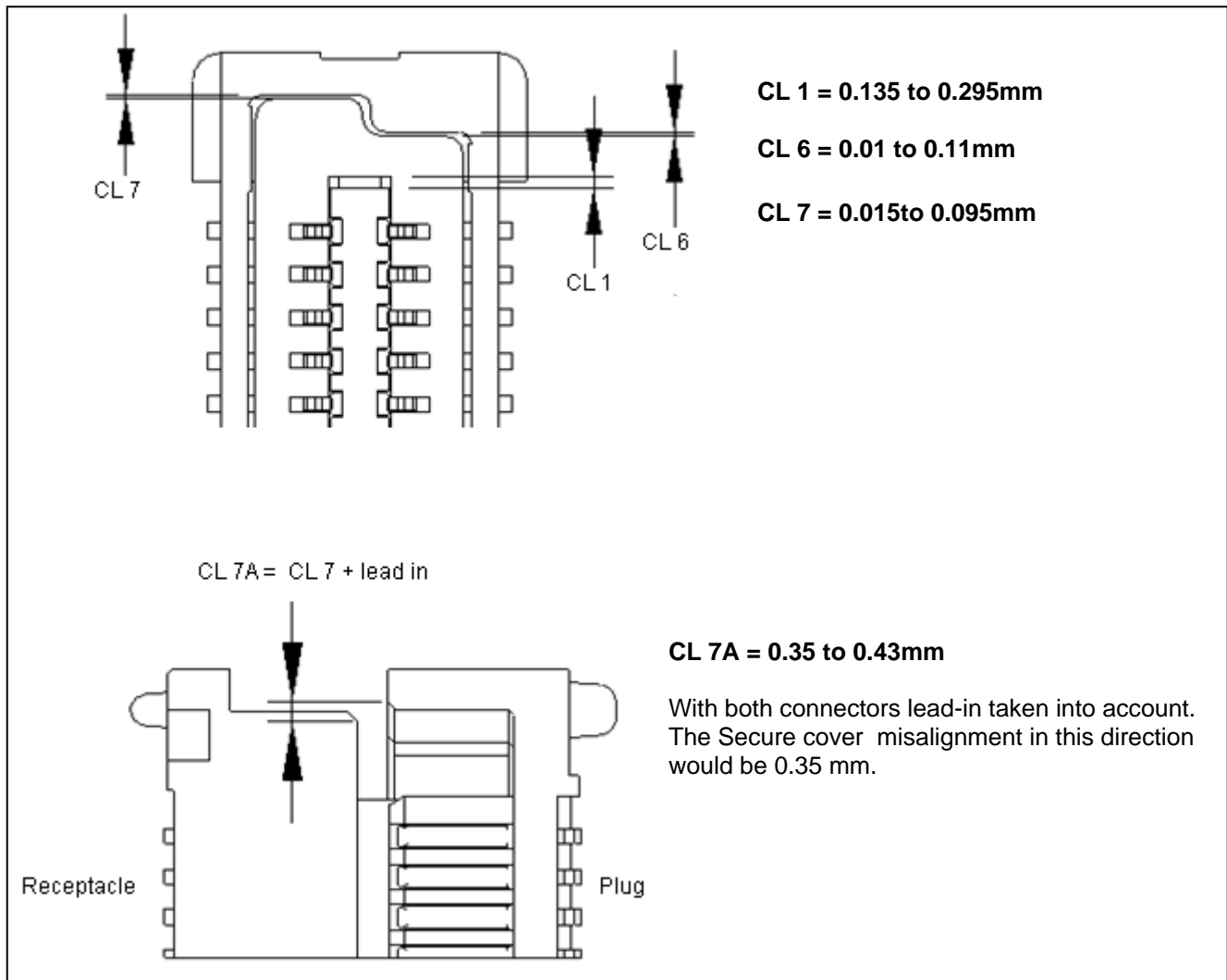


Figure 8: Mating clearance in the longitudinal direction.

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5.5 Cross section view of the connector pair that is approaching mating, and of a fully mated connection.

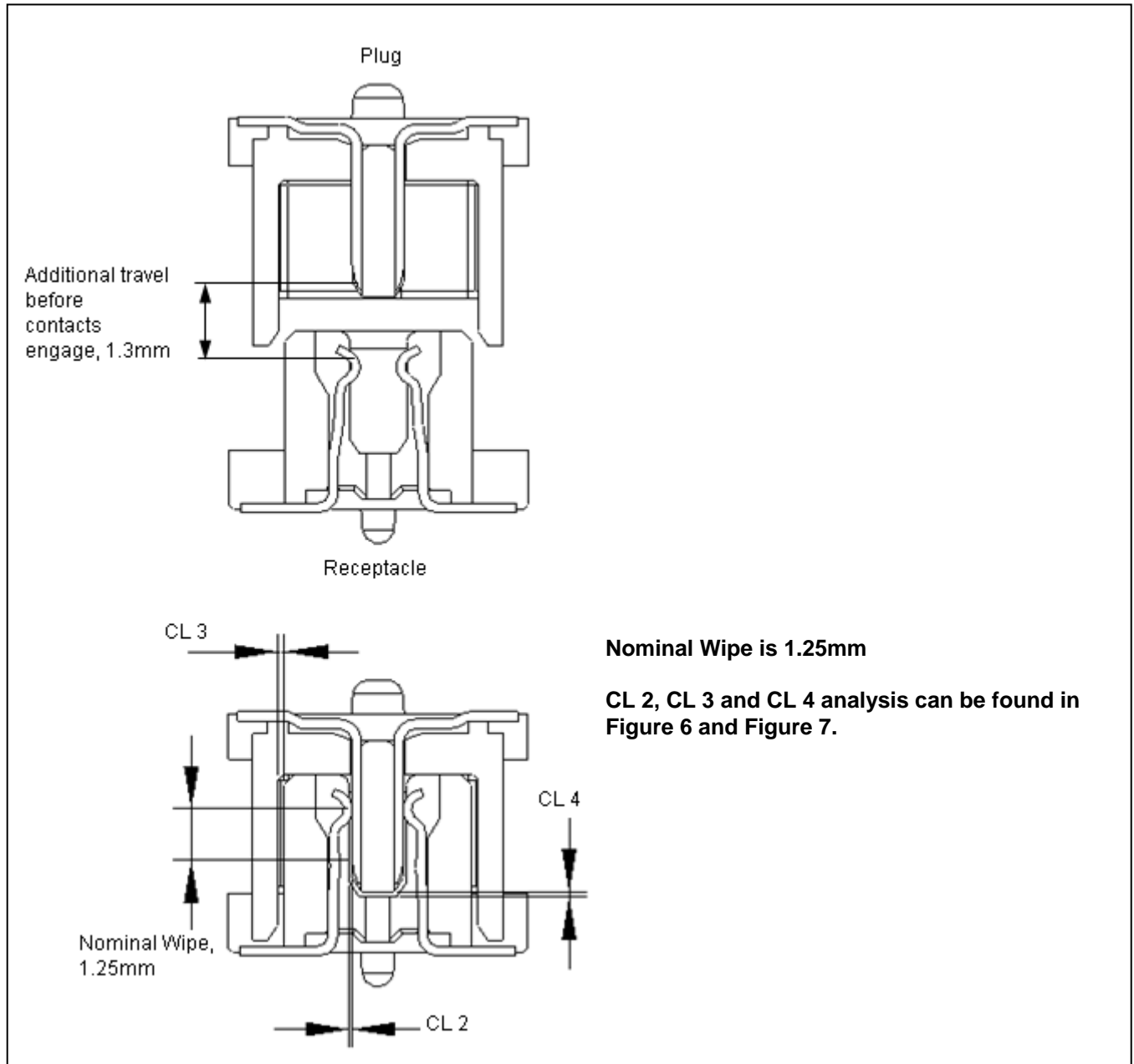


Figure 9: Cross sectional view, approaching mating and mated connection

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5.6 Product Specifications

- Speed up follow OCP Spec 16Gb/s
- PCIe 4.0 compliant
- 0.8mm double-row contact pitch
- Stack heights 5mm, 8mm, 12mm & 16mm
- Pin Count 80 positions and 120 positions
- Pin definition follow OCP Spec as bellow:

Connector A				Connector B			
Signal	Pin	Pin	Signal	Signal	Pin	Pin	Signal
P12V_AUX/P12V	A61	A1	MEZZ_PRSNTA1_N /BASEBOARD_A_ID	P12V_AUX/P12V	B41	B1	MEZZ_PRSNTB1_N /BASEBOARD_B_ID
P12V_AUX/P12V	A62	A2	PSV_AUX	P12V_AUX/P12V	B42	B2	GND
P12V_AUX/P12V	A63	A3	PSV_AUX	RSVD	B43	B3	KR_RX_DP<0>
GND	A64	A4	PSV_AUX	GND	B44	B4	KR_RX_DN<0>
GND	A65	A5	GND	KR_TX_DP<0>	B45	B5	GND
P3V3_AUX	A66	A6	GND	KR_TX_DN<0>	B46	B6	GND
GND	A67	A7	P3V3_AUX	GND	B47	B7	KR_RX_DP<1>
GND	A68	A8	GND	GND	B48	B8	KR_RX_DN<1>
P3V3	A69	A9	GND	KR_TX_DP<1>	B49	B9	GND
P3V3	A70	A10	P3V3	KR_TX_DN<1>	B50	B10	GND
P3V3	A71	A11	P3V3	GND	B51	B11	KR_RX_DP<2>
P3V3	A72	A12	P3V3	GND	B52	B12	KR_RX_DN<2>
GND	A73	A13	P3V3	KR_TX_DP<2>	B53	B13	GND
LAN_3V3STB_ALERT_N	A74	A14	NCSI_CRSDV	KR_TX_DN<2>	B54	B14	GND
SMB_LAN_3V3STB_CLK	A75	A15	NCSI_RCLK	GND	B55	B15	KR_RX_DP<3>
SMB_LAN_3V3STB_DAT	A76	A16	NCSI_TXEN	GND	B56	B16	KR_RX_DN<3>
RSVD	A77	A17	RSVD	KR_TX_DP<3>	B57	B17	GND
NCSI_RXER	A78	A18	MEZZ_SMCLK	KR_TX_DN<3>	B58	B18	GND

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GND	A79	A19	MEZZ_SMDATA	GND	B59	B19	KR_RX_DP<4>
NCSI_TXD0	A80	A20	GND	GND	B60	B20	KR_RX_DN<4>
NCSI_TXD1	A81	A21	GND	KR_TX_DP<4>	B61	B21	GND
GND	A82	A22	NCSI_RXD0	KR_TX_DN<4>	B62	B22	GND
GND	A83	A23	NCSI_RXD1	GND	B63	B23	KR_RX_DP<5>
RSVD	A84	A24	GND	GND	B64	B24	KR_RX_DN<5>
RSVD	A85	A25	GND	KR_TX_DP<5>	B65	B25	GND
GND	A86	A26	RSVD	KR_TX_DN<5>	B66	B26	GND
GND	A87	A27	RSVD	GND	B67	B27	KR_RX_DP<6>
KR_TX_DP<8>	A88	A28	GND	GND	B68	B28	KR_RX_DN<6>
KR_TX_DN<8>	A89	A29	GND	KR_TX_DP<6>	B69	B29	GND
GND	A90	A30	KR_RX_DP<8>	KR_TX_DN<6>	B70	B30	GND
GND	A91	A31	KR_RX_DN<8>	GND	B71	B31	KR_RX_DP<7>
KR_TX_DP<9>	A92	A32	GND	GND	B72	B32	KR_RX_DN<7>
KR_TX_DN<9>	A93	A33	GND	KR_TX_DP<7>	B73	B33	GND
GND	A94	A34	KR_RX_DP<9>	KR_TX_DN<7>	B74	B34	GND
GND	A95	A35	KR_RX_DN<9>	GND	B75	B35	RSVD
KR_TX_DP<10>	A96	A36	GND	GND	B76	B36	RSVD
KR_TX_DN<10>	A97	A37	GND	RSVD	B77	B37	GND
GND	A98	A38	KR_RX_DP<10>	RSVD	B78	B38	RSVD
GND	A99	A39	KR_RX_DN<10>	GND	B79	B39	RSVD
KR_TX_DP<11>	A100	A40	GND	MEZZ_PRSNTB2_N	B80	B40	RSVD
KR_TX_DN<11>	A101	A41	GND				
GND	A102	A42	KR_RX_DP<11>				
GND	A103	A43	KR_RX_DN<11>				
KR_TX_DP<12>	A104	A44	GND				
KR_TX_DN<12>	A105	A45	GND				
GND	A106	A46	KR_RX_DP<12>				
GND	A107	A47	KR_RX_DN<12>				
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KR_TX_DN<13>	A109	A49	GND				
GND	A110	A50	KR_RX_DP<13>				
GND	A111	A51	KR_RX_DN<13>				
KR_TX_DP<14>	A112	A52	GND				
KR_TX_DN<14>	A113	A53	GND				
GND	A114	A54	KR_RX_DP<14>				
GND	A115	A55	KR_RX_DN<14>				
KR_TX_DP<15>	A116	A56	GND				
KR_TX_DN<15>	A117	A57	GND				
GND	A118	A58	KR_RX_DP<15>				
GND	A119	A59	KR_RX_DN<15>				
MEZZ_PRSNTA2_N	A120	A60	GND				

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6.0 REFERENCE DOCUMENTS

FCI drawings, 10139781 and 10139085.

7.0 RECORD RETENTION

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