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TITLE ENHANCED HIGH POWER CARD EDGE (eHPCE™) CONNECTOR	PAGE 1 of 15	REVISION 1
	AUTHORIZED BY Jackbin Zou	DATE Nov, 10, 2016
	CLASSIFICATION preliminary	

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1. **OBJECTIVE**

This specification provides information and requirements for customer application of the eHPCE Connector system. It is intended to provide general guidance for process development. It should be recognized that no single process will work under all customer applications and that customers should develop processes to meet individual needs. However, if the processes vary greatly from the recommended one, AFCI cannot guarantee acceptable results.

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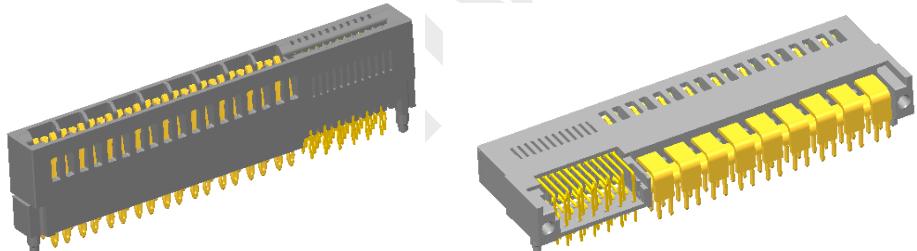
2. **SCOPE**

This specification provides information and requirements regarding application of the eHPCE™ Connector System to printed circuit boards (PCB).

Table 1

Enhanced High Power Card Edge	Vertical Receptacle, Solder & Press-fit Tail
	Right Angle Receptacle, Solder tail

Figure 1
eHPCE™ Connector System



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3. DRAWINGS AND APPLICABLE DOCUMENTS

- AFCI Product Specification GS-12-1380 (eHPCE™ Connector system).
- UL/CSA File #
- TUV certification #
- Applicable AFCI Product Drawings

AFCI product drawings and specifications are available by accessing the AFCI website or contacting the AFCI Technical Service. In the event of a conflict between this specification and the product drawing, the drawing takes precedence. Customers should refer to the latest revision level of AFCI product drawings for appropriate product details.

4. GENERAL CUSTOMER INFORMATION

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

4.1 PRODUCT APPLICATION

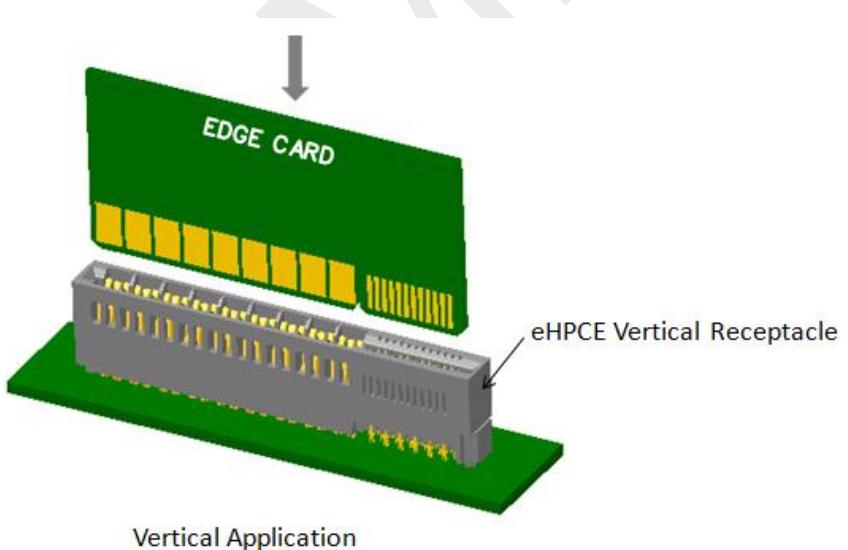


Figure 2

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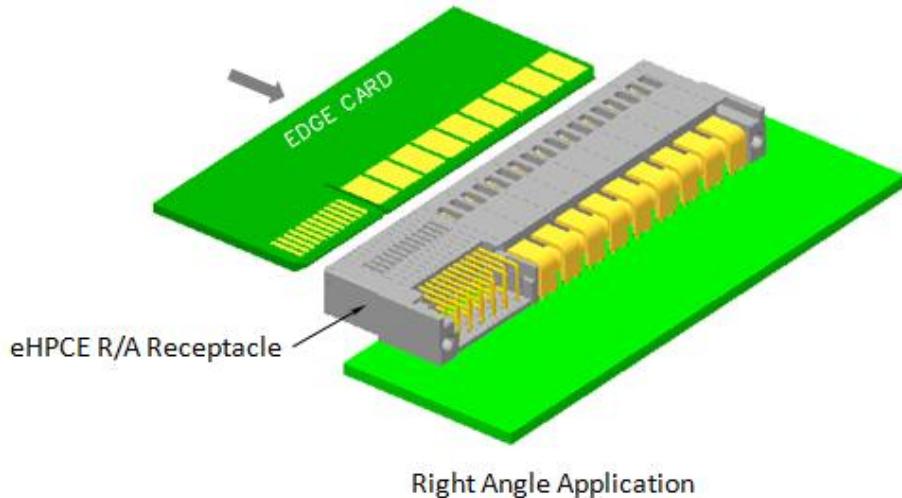


Figure 3

eHPCE™ has two options for connection to Printed Circuit Boards -- Press Fit and Solder to Board, available as follows:

Table 2

Product Configuration	Solder Tail	Press-Fit Tail
eHPCE - Vertical Receptacle	x	x
eHPCE - R/A Receptacle	x	

The eHPCE™ Solder to Board Power and Signal contacts are compatible with wave soldering process. They are versatile with many configurations to fit the individual needs of the client.

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4.2 WIPE DISTANCE AND CONTACT SEQUENCING

The nominal wipe distance of the Signal contact is shorter than the Power contact by 1.27mm (0.050 inch).

Recommended minimum wipe is 1.5mm. 1.0mm minimum wipe can be used in low shock/vibration situations where system boards and components are locked in place to eliminate relative motion.

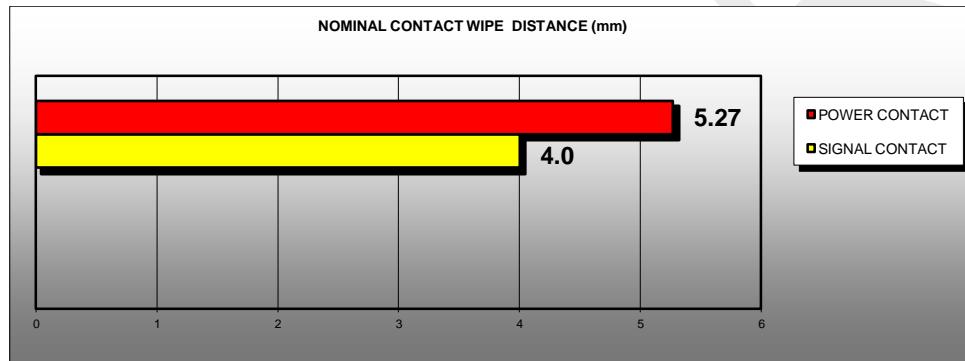


Table 3

4.3. MATING ALIGNMENT

4.3.1 Under 100 mm connector length.

The eHPCE™ connector design has not included a guide system therefore the design is not for a blind mate application. The mis-alignment allowance of the eHPCE™ product is depended on the condition of the connector system and the chamfer of the edge card. Please see figure 5 and table 4 for explanation.

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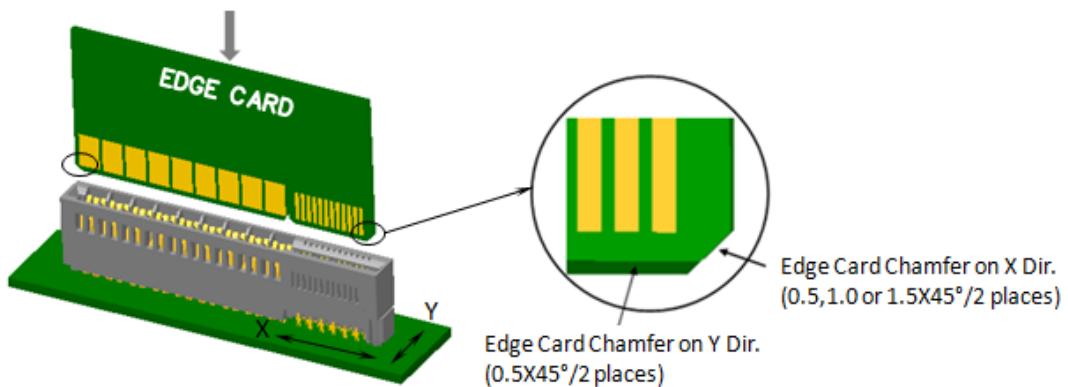


Figure 4

Connector Mating Condition	Edge Card Chamfer (mm)		Mis-Alignment Allowance (mm)	
	X	Y	X	Y
<i>One Side is in Stationary condition, other side is in floating condition.</i>	0.50	0.50	1.85 ± 0.125	1.60 ± 0.13
	1.00		2.35 ± 0.125	
	1.50		2.85 ± 0.125	
<i>Both Side are in Stationary Condition</i>			0.15 ± 0.056	0.115 ± 0.07

Table 4

4.4 VOLTAGE RATING

The Maximum Working Voltage of the eHPCE connector system is rated base on [UL 60950-1](#) Second Edition Table 2N.

- Pollution Degree : 2 (Office Environmental)
- Material Group : 1 (Based on UL rating)



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e HPCE - VERTICAL				
"DIFFERENT" CURRENT PATH IN THE ROW OF POWER CONTACTS				
POSITION	Tail Pitch (mm) between two contacts	MCD (mm)	AC RMS Working Voltage (Volt)	DC / AC peak Working Voltage (Volt)
Power to Power	2.54	0.7	100	140
	5.08	3.24	639	903
Power to Signal	3.5	2.4	480	679
Signal to Signal	1.27	0.41	12	17
	2.54	1.68	336	475

Column →

CURRENT-IN CURRENT-OUT

e HPCE - VERTICAL				
"SAME" CURRENT PATH IN THE ROW OF POWER CONTACTS				
POSITION	Tail Pitch (mm) between two contacts	MCD (mm)	AC RMS Working Voltage (Volt)	DC / AC peak Working Voltage (Volt)
Power to Power	2.7	2.1	420	594
Power to Signal	3.5	2.4	480	679
Signal to Signal	1.27	0.41	12	17
	2.54	1.68	336	475

Column →

CURRENT - OUT Row B ←
CURRENT - IN Row A →

Table 5



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e HPCE - RIGHT ANGLE				
"DIFFERENT" CURRENT PATH IN THE ROW OF POWER CONTACTS				
POSITION	Tail Pitch (mm) between two contacts	MCD (mm)	AC RMS Working Voltage (Volt)	DC / AC peak Working Voltage (Volt)
Power to Power	2.54	0.7	100	140
	5.08	3.24	639	903
Power to Signal	3.5	2.4	480	679
Signal to Signal	1.27	0.41	12	17
	2.54	1.68	336	475

Column →

CURRENT-IN CURRENT-OUT

e HPCE - RIGHT ANGLE				
"SAME" CURRENT PATH IN THE ROW OF POWER CONTACTS				
DISTANCE	Tail Pitch (mm) between two contacts	MCD (mm)	AC RMS Working Voltage (Volt)	DC / AC peak Working Voltage (Volt)
Power to Power	2.54	1.94	388	548
Power to Signal	3.5	2.4	480	679
Signal to Signal	1.27	0.41	12	17
	2.54	1.68	336	475

Column →

CURRENT-OUT Row B

CURRENT-IN Row A

Table 6

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4.5 CURRENT RATING

(Refer to AFCI Product Specification GS-12-1380 (for additional information))

Following are the current rating values of the eHPCE™ connector system

Power contact current rating($\Delta 30^{\circ}\text{C}$)	
Contact type	Current AMPS
AMPS per MP(total MPs is less than 20MPs)	24
AMPS per MP(total MPs is more than 20MPs)	21
AMPS per Signal	1.0

NOTES:

1. Copper trace weight:
8 layer test board, 2oz each layer.
2. Ambient condition: still air at lab ambient.
3. Temperature rise 30°C Max.
4. Signal contact current rating: 1.0A
5. "MP"= middle power

Table 7

4.6. SAFETY

PREVENTION OF OPERATOR ACCESS TO ENERGIZED PARTS

Reference [UL60950 & IEC 60950-1 SECTION 2.1.1.1](#)

UL and IEC specifications define three different probe designs to test for prevention of operator access to energized conductors (such as powered electrical contacts within an unmated connector). The two probes are referred to as follows:

- **Test Finger** (Figure 6)
- **Test Probe** (Figure 6)

The following sections show each of these test probes positioned as closely as possible to the mating side contacts of the Vertical eHPCE™, which will be located on the PCB and may be powered in an unmated state.

Although the Vertical eHPCE™ connector system meets these probe requirements as noted, it is not recommended that the customer "hot plug" the edge card to the vertical receptacle.

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4.6.1 Test Finger

The **Test Finger** may not make contact with energized parts while the access doors and covers of the system enclosure are open. Separable connectors must be disconnected for this test. The figures show the tip of the **Test Finger** inserted into a Vertical eHPCE™ capture window, showing that it is impossible for the probe (shown at the smallest size per specified tolerances) to touch the receptacle contacts.

4.6.2 Test Probe

The requirements for the **Test Probe** conditions are not as clearly specified by UL and IEC. However assuming the worst-case scenario where the eHPCE™ connector is accessible, the following 3D model was created. This model shows that the Test Probe is very large compared to the Test Finger and will never come close to touching a powered contact within the representative receptacle.

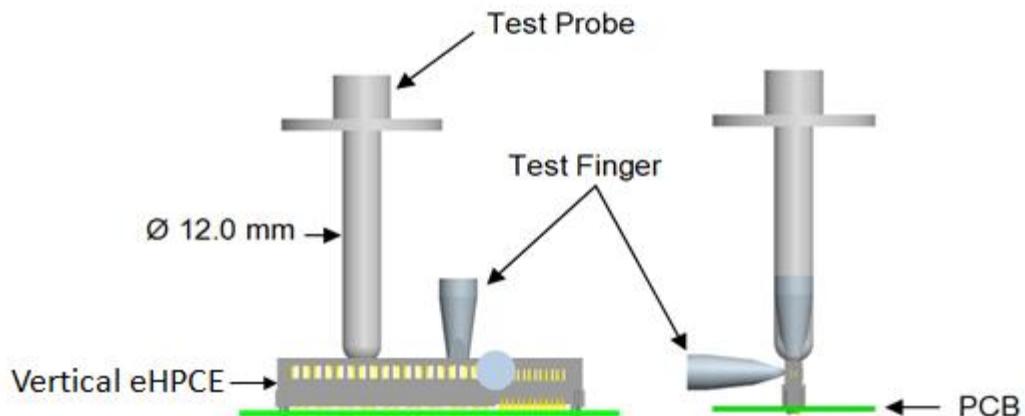


Figure 5

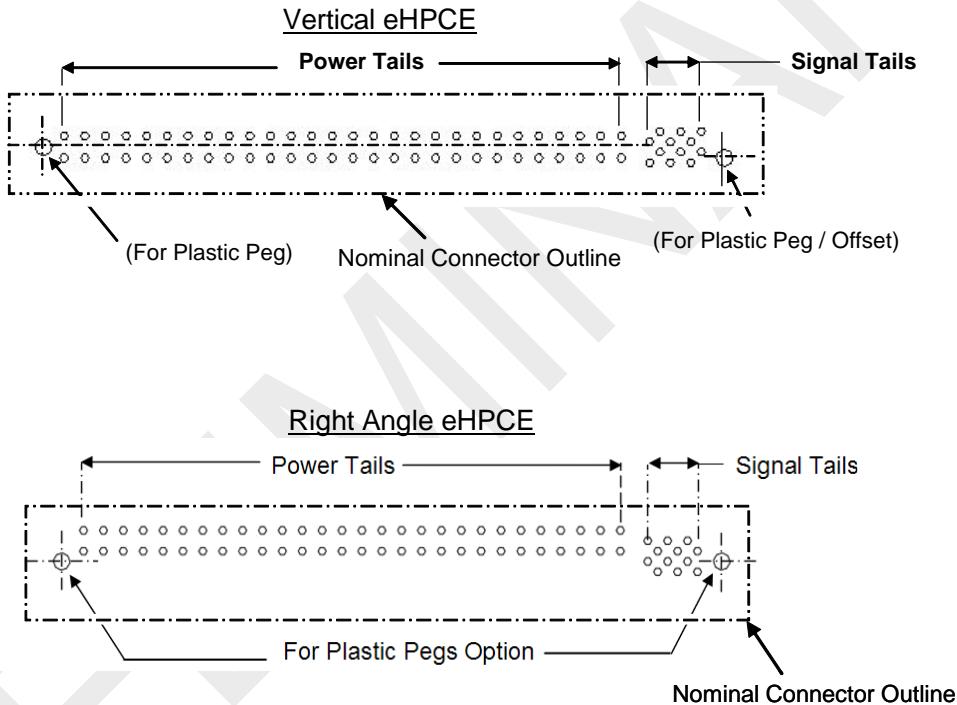
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5. REQUIREMENT FOR CUSTOMERS PCB

Note: Generic figures are representative of all product configurations

For specifics of the PCB layout, refer to the customer drawing of the part number being applied.

5.1 PCB LAYOUT (See customer drawing for more details)



"Power and signal traces inside the connector zone need to be coated or under solder mask to protect against oxidation and minimize wear or damage during assembly and handling."



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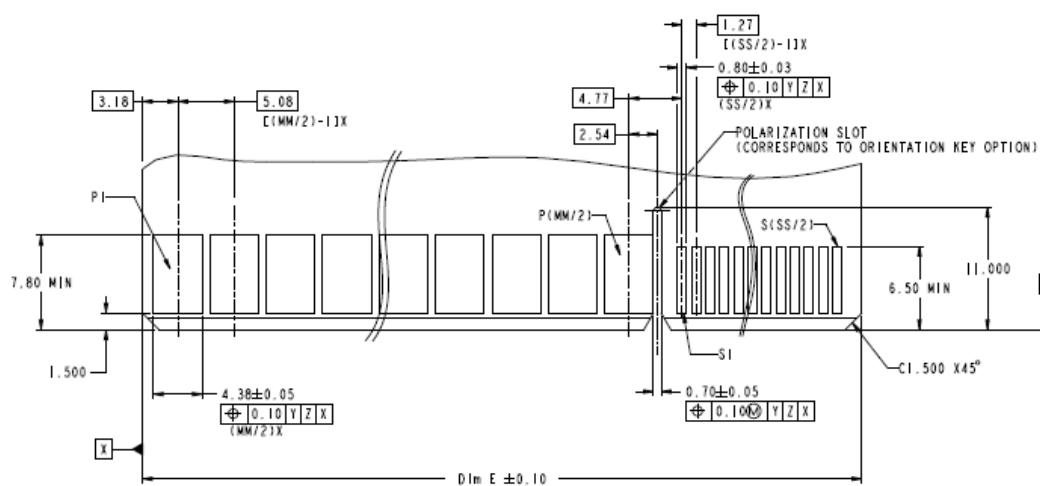
PLATED THROUGH HOLE REQUIREMENTS

CONTACT TYPE	TOP LAYER DESCRIPTION	TABLE 1 (eHPCE / PRESS-FIT TAILS) PLATED THROUGH-HOLE REQUIREMENTS				
		DRILLED HOLE DIAMETER	COPPER THICKNESS	TIN-LEAD THICKNESS	TIN THICKNESS	FINISHED HOLE DIAMETER
SIGNAL	IMMERSION TIN	0.81-0.86 (0.85 DRILL)	0.025 - 0.050	--	0.9 - 1.5µm	0.70 - 0.80
	COPPER	0.81-0.86 (0.85 DRILL)	0.025 - 0.050	--	--	0.70 - 0.80
POWER	IMMERSION TIN	1.21-1.26 (1.25 DRILL)	0.025 - 0.050	--	0.9 - 1.5µm	1.10 - 1.20
	COPPER	1.21-1.26 (1.25 DRILL)	0.025 - 0.050	--	--	1.10 - 1.20

CONTACT TYPE	TOP LAYER DESCRIPTION	TABLE 2 (eHPCE / SOLDER TAILS) PLATED THROUGH-HOLE REQUIREMENTS				
		DRILLED HOLE DIAMETER	COPPER THICKNESS	TIN-LEAD THICKNESS	TIN THICKNESS	FINISHED HOLE DIAMETER
SIGNAL	IMMERSION TIN	0.96-1.01 (1.00 DRILL)	0.025 - 0.050	--	0.9 - 1.5µm	0.85 - 0.95
	COPPER	0.96-1.01 (1.00 DRILL)	0.025 - 0.050	--	--	0.85 - 0.95
POWER	IMMERSION TIN	1.21-1.26 (1.25 DRILL)	0.025 - 0.050	--	0.9 - 1.5µm	1.10 - 1.20
	COPPER	1.21-1.26 (1.25 DRILL)	0.025 - 0.050	--	--	1.10 - 1.20

Table 8**5.2 EDGE CARD LAYOUT** (See customer drawing for more details)

RECOMMENDED EDGE CARD FOOT PRINT

**Figure 6**

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6 APPLICATION TOOLING

No application tooling is required for the Solder Tail
 Application tooling is required for the vertical Press fit. Tooling drawing number is 10141462.

For Solder Tail configuration, the total insertion force of two plastic pegs should not exceed 340 N (76 lbs)

6.1. VERTICAL RECEPTACLE (SOLDER)

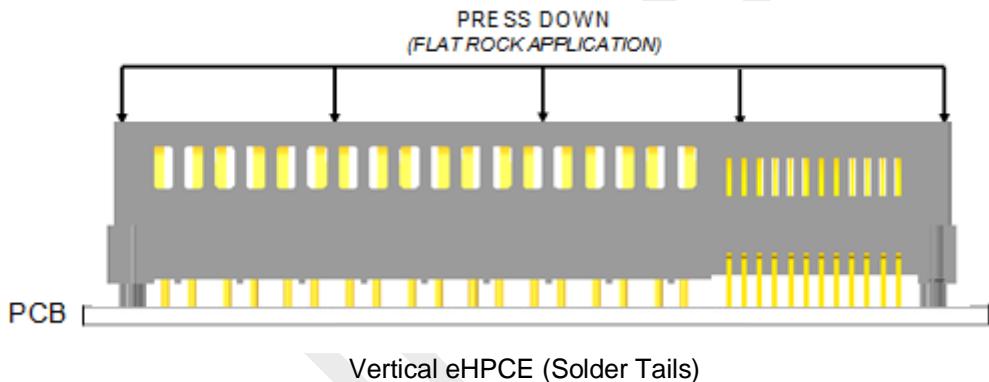


Figure 7



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6.2. VERTICAL RECEPTACLE (PRESS-FIT) APPLICATION TOOLING

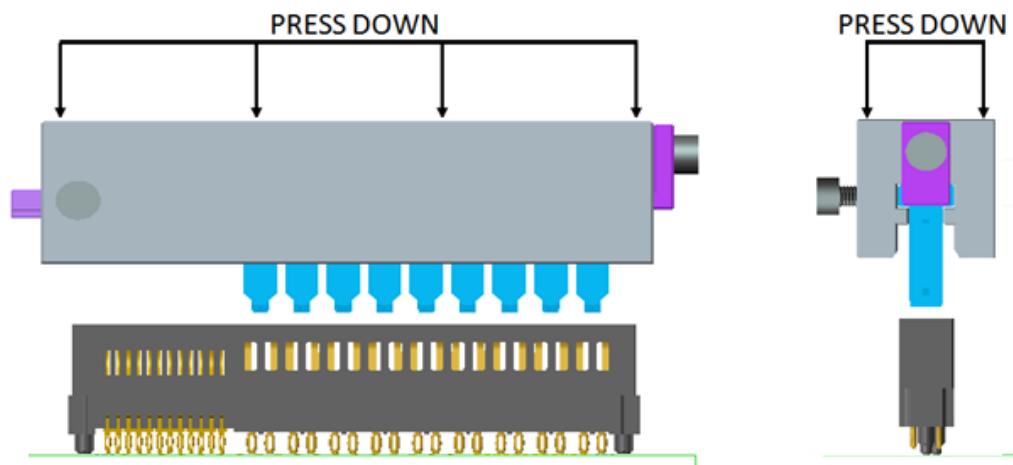
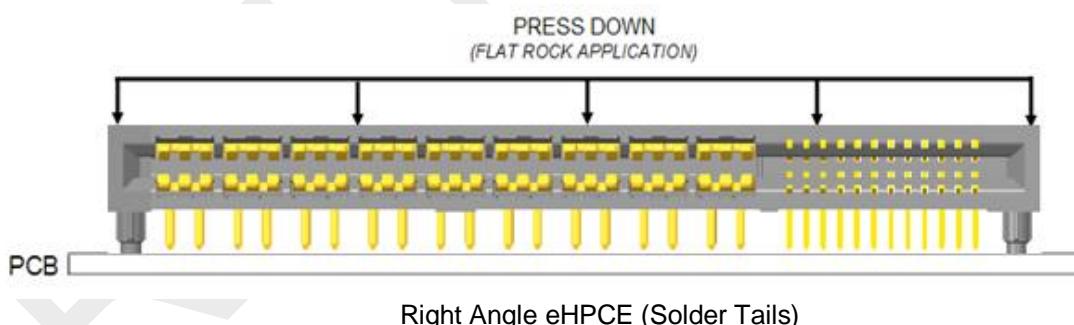


Figure 8

6.3 RIGHT ANGLE RECEPTACLE (STB)



Right Angle eHPCE (Solder Tails)

Figure 9

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