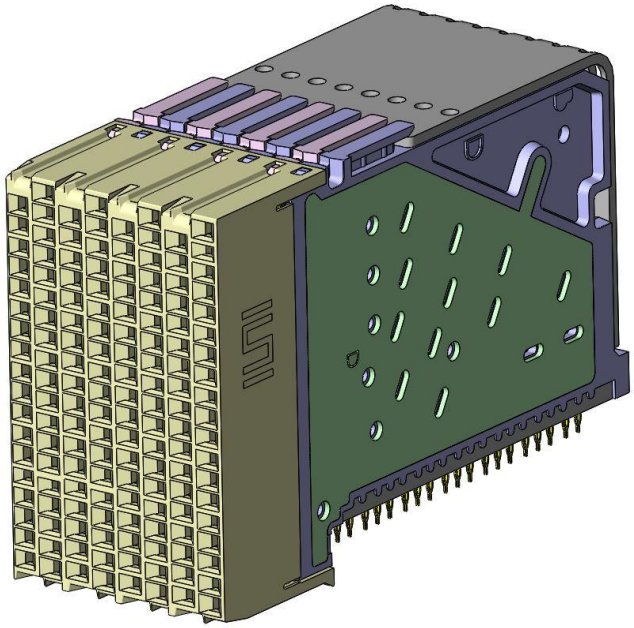
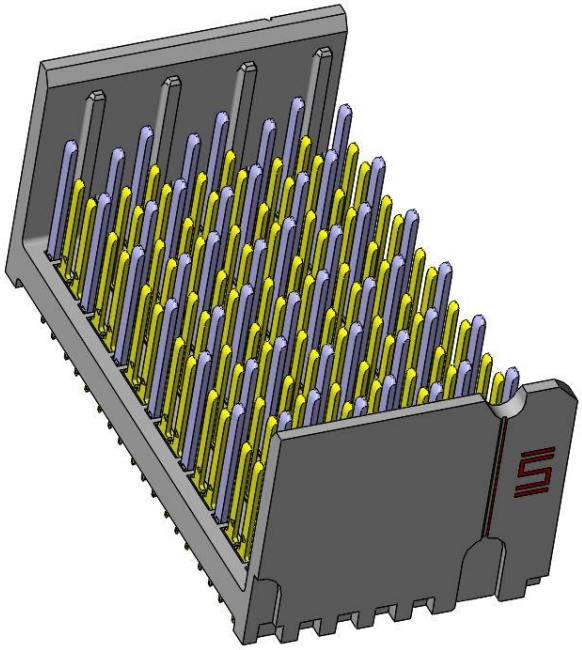
Series: HDTM / HDTF XCede® HD 1.80mm Right-Angle Receptacle & Vertical Header

HDTF Series –Receptacle, Right-Angle Orientation



HDTM Series –Header, Vertical Orientation



See www.samtec.com for more

Series: HDTM / HDTF XCede® HD 1.80mm Right-Angle Receptacle & Vertical Header

1.0 Objective

1.1 This specification provides information and requirements regarding customer application of the XCede® HD connector system with press-fit termination. This specification is intended to provide general guidance for application process development. It is recognized that no single application process will work under all customer scenarios and that customers will develop their own application processes to meet their needs. However, if these application processes differ greatly from the one recommended, SAMTEC cannot guarantee acceptable results.

2.0 Scope

2.1 This specification provides information and requirements regarding customer application of the XCede® HD connector system with press-fit termination.

3.0 General

This document is meant to be an application guide. If there is a conflict between the product drawings and specifications, the drawings take precedence.

3.1 Product Description and Features

XCede® HD is a high speed electrical connector system for backplane applications. The system utilizes a Right-Angle Receptacle (HDTF) and a Vertical Header (HDTM) for backplane applications. XCede® HD connectors use compliant press-fit tails to provide a reliable electrical connection between the connector and the plated through holes (PTH) of the PCB. For signal and ground terminals, the XCede® HD product has a small press-fit section that uses Ø0.0177” drilled holes (.36mm finished) as well as Ø0.0217” (.45mm finished) drilled holes for the vertical header as well as Ø0.0177” drilled holes (.36mm finished) for the right-angle receptacle.

3.2 Product Configurations

3.2.1 Backplane

For backplane applications, XCede® HD Right Angle Receptacle (HDTF) and Vertical Header (HDTM) connectors will be offered in the size configurations shown in Table 1.

Table 1: XCede® HD Backplane Connector Configuration Offerings

Signal pairs per column	Number of Columns	Column Spacing	Number of Positions (Including Grounds)
3 pair	4, 6, and 8	1.8mm	38, 57 and 76
4 pair	4, 6, and 8	1.8mm	50, 75, and 100
6 pair	4, 6, and 8	1.8mm	74, 111, and 148

Series: HDTM / HDTF XCede® HD 1.80mm Right-Angle Receptacle & Vertical Header

Figure 1: XCede® HD HDTF and HDTM Backplane Application

3.3 Connector Mating Sequence

The XCede HD connector system is capable of providing multiple different mating wipe lengths. Refer to Table 2 for connector mating sequence.

Table 2. Connector Mating Sequence

4-pair and 6-pair Un-Mate Nominal Distance (mm)	3-pair Un-Mate Nominal Distance (mm)	Description of Event
16.80	14.10	Guide Pin Fully Engaged (No ESD)
12.30	5.80	Polarization Fully Engaged
7.40	7.09	BP Housing Rib Fully Engaged
5.00	9.80	Guide Pin with ESD Wipe
4.70	4.65	Ground 4mm Wipe
4.60	4.75	Power Long Blade 5.5mm
3.70	3.65	Ground 3mm Wipe
3.60	3.75	Power Short Blade 4.5mm
2.90	2.90	Signal 3mm Wipe
2.70	2.65	Ground 2mm Wipe
1.90	1.90	Signal 2mm Wipe
0.00	0.00	Connector Fully Mated

4.0 XCede® HD Daughtercard and Backplane Connector Press-Fit Installation Process

The application of Samtec XCede® HD press-fit style components can be performed across many different press platforms, however there are minimum performance features and capabilities that are strongly recommended be available.

4.1 Force Requirement

The XCede® HD daughtercard connector can be assembled using individual segments up to 8” in length (8 inches for 3 and 4 pair connectors and 6 inches for 6 pair connectors), and segments may be joined after individual pressing to total 18” in length. Typically, XCede® HD compliant pins will require an insertion force of 2-5 lbs/pin.

4.2 Rate

Recommended press head installation rate is 0.05 +/- .01 in/sec with the appropriate installation force**.**

4.3 Structure

The press, fixture, and tooling combination need to be adequately rigid such that there is a minimum deflection during the pressing process, and the forces are transmitted directly to the connector without inducing any side load or moment onto the connector assembly. The press also needs to be capable of applying a pre-load force minimum of 100lbs, and dwelling at that Z-height for approximately 1-2 seconds. This allows the press system to stabilize prior to actual insertion.

4.4 Feedback

The application press should have the capability to monitor, display, record, and feedback insertion force data to the Z axis speed controller throughout an individual press cycle. This capability allows for continuous insertion process monitoring, technical analysis, and data collection in the event of a failure, and will alert the operator in the case of a mechanical machine problem. Speed or height controls should also allow a temporary press cycle stop at a repeatable position with reference to the board surface, or with reference to the insertion force. This ability is a requirement in certain connector and board combinations.

5.0 Daughtercard Connector Press-Fit Installation Process - Application Tools

XCede® HD 3, 4, and 6 pair daughtercard connectors have dedicated loading heads for each product. There are multiple loading head lengths for each daughtercard product. Refer to section 5.0.1 thru 5.0.3. Samtec recommends that customers and contract manufacturer's purchase the loading head tooling from Samtec to ensure proper clearances for the daughtercard installation.

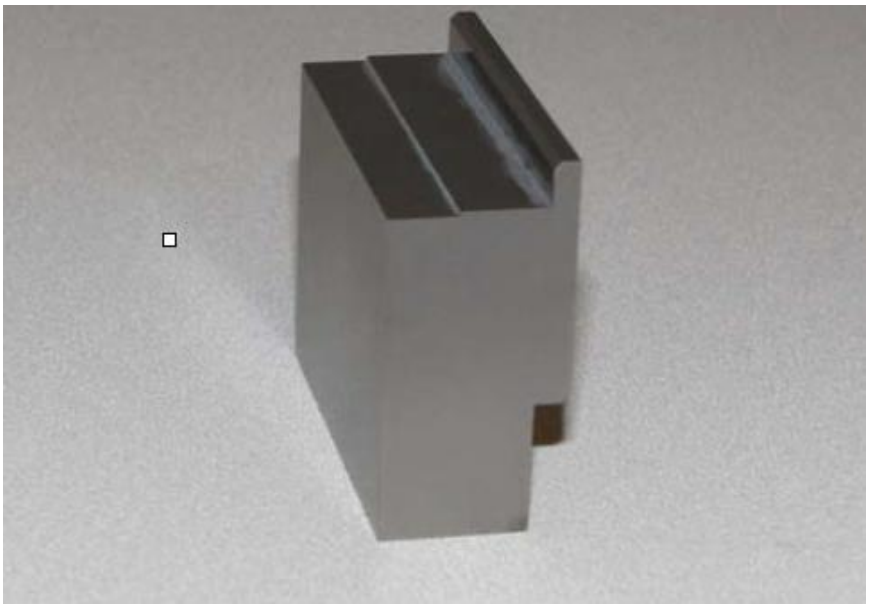


Figure 2: 4 Pair Daughtercard Application Tool

5.0.1 XCede® HD Daughtercard 3 Pair Application Tools
CAT-PT-HDTF-3-030 - 3 PAIR DAUGHTERCARD TOOL 1.2" LENGTH
CAT-PT-HDTF-3-051 - 3 PAIR DAUGHTERCARD TOOL 2.0" LENGTH
CAT-PT-HDTF-3-102 - 3 PAIR DAUGHTERCARD TOOL 4.0" LENGTH
CAT-PT-HDTF-3-152 - 3 PAIR DAUGHTERCARD TOOL 6.0" LENGTH
CAT-PT-HDTF-3-203 - 3 PAIR DAUGHTERCARD TOOL 8.0" LENGTH
CAT-PT-HDTF-3-254 - 3 PAIR DAUGHTERCARD TOOL 10.0" LENGTH

CAT-PT-HDTF-3-305 - 3 PAIR DAUGHTERCARD TOOL 12.0" LENGTH

5.0.2. XCede® HD Daughtercard 4 Pair Application Tools
CAT-PT-HDTF-4-030 - 4 PAIR DAUGHTERCARD TOOL 1.2" LENGTH
CAT-PT-HDTF-4-051 - 4 PAIR DAUGHTERCARD TOOL 2.0" LENGTH
CAT-PT-HDTF-4-102 - 4 PAIR DAUGHTERCARD TOOL 4.0" LENGTH
CAT-PT-HDTF-4-152 - 4 PAIR DAUGHTERCARD TOOL 6.0" LENGTH
CAT-PT-HDTF-4-203 - 4 PAIR DAUGHTERCARD TOOL 8.0" LENGTH
CAT-PT-HDTF-4-254 - 4 PAIR DAUGHTERCARD TOOL 10.0" LENGTH
CAT-PT-HDTF-4-305 - 4 PAIR DAUGHTERCARD TOOL 12.0" LENGTH

5.0.3. XCede® HD Daughtercard 6 Pair Application Tools
CAT-PT-HDTF-6-030 - 6 PAIR DAUGHTERCARD TOOL 1.2" LENGTH
CAT-PT-HDTF-6-051 - 6 PAIR DAUGHTERCARD TOOL 2.0" LENGTH
CAT-PT-HDTF-6-102 - 6 PAIR DAUGHTERCARD TOOL 4.0" LENGTH
CAT-PT-HDTF-6-152 - 6 PAIR DAUGHTERCARD TOOL 6.0" LENGTH
CAT-PT-HDTF-6-203 - 6 PAIR DAUGHTERCARD TOOL 8.0" LENGTH
CAT-PT-HDTF-6-254 - 6 PAIR DAUGHTERCARD TOOL 10.0" LENGTH
CAT-PT-HDTF-6-305 - 6 PAIR DAUGHTERCARD TOOL 12.0" LENGTH

6.0 Support Tooling/Fixture

Customers and contract manufacturers should design or purchase the appropriate support fixture to support the PCB during the daughtercard installation process. Support fixtures provide adequate support for the required number of pins being pressed directly under the connector pattern. The support fixture should also be designed to accommodate for the compliant pin lead protrusion on the secondary side of the PCB. Refer to XCede® HD daughtercard customer use drawings for the compliant pin lead protrusion dimensions. The support fixture is not supplied by Samtec, if assistance with the fixture design is needed please contact your local field application engineer.

7.0 PROCEDURE

Step 1. Locate the correct seating head and support pallet/fixture.
Step 2. Place the support fixture (pallet) onto the press bed, and ensure:
- Pallet is square with reference to the press head.
- Pallet is flat to the press bed, with no excessive bow or twist.
- PCB board is pinned to the pallet.
- Pallet is pinned to the press bed.
- Loading head is pinned to the press ram.

Step 3. Ensure the press has the required installation force, alignment, and speed controls capable of pressing the specific configuration connector being installed. Refer to section 4.0 for the recommended force and press head rate.
Step 4. Place the PCB onto the pallet, and remove the connector from the packaging. If the connector is supplied in a tray, simply remove the cover and lift the connector from the tray.
Step 5. Verify the compliant pins of the connector were not damaged or bent during shipping or removal from the packaging. Visually inspect for bent pins, looking down both the width and length of the connector pin pattern for any grossly misaligned pins. If any compliant pins are out of position or broken, discard the connector and begin Step 5 again with a new connector.
Step 6. When placing the daughtercard connector onto the PCB, orient the board and pallet so when the connector is placed, the window side will be facing you and the stiffener side will be facing away from you. Hold the connector up off the PCB, and place the back row of compliant pins into the correct plated through hole (PTH), see Figure 3. With the front of the connector still up off the board, roll the connector back to front, into the remaining PTHs, see Figures 4-5.

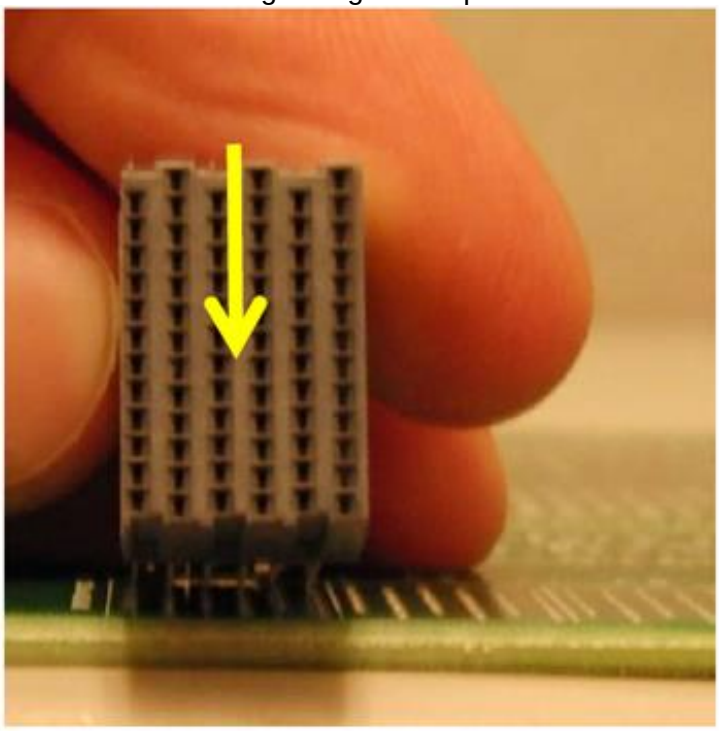


Figure 3: Back row of the DC Connector compliant pins in the PTH.

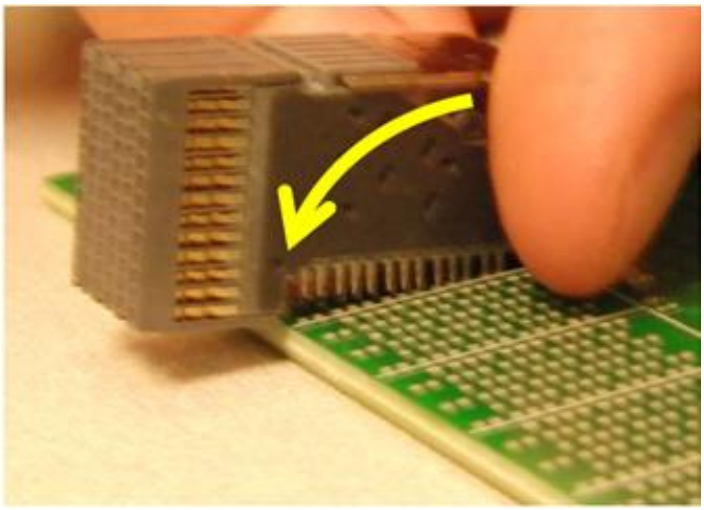


Figure 4: With the back row entirely placed, roll connector toward board edge placing the Remaining rows of compliant pins

Step 7. Check for any bent pins protruding from under the connector assembly (see Figure 5).

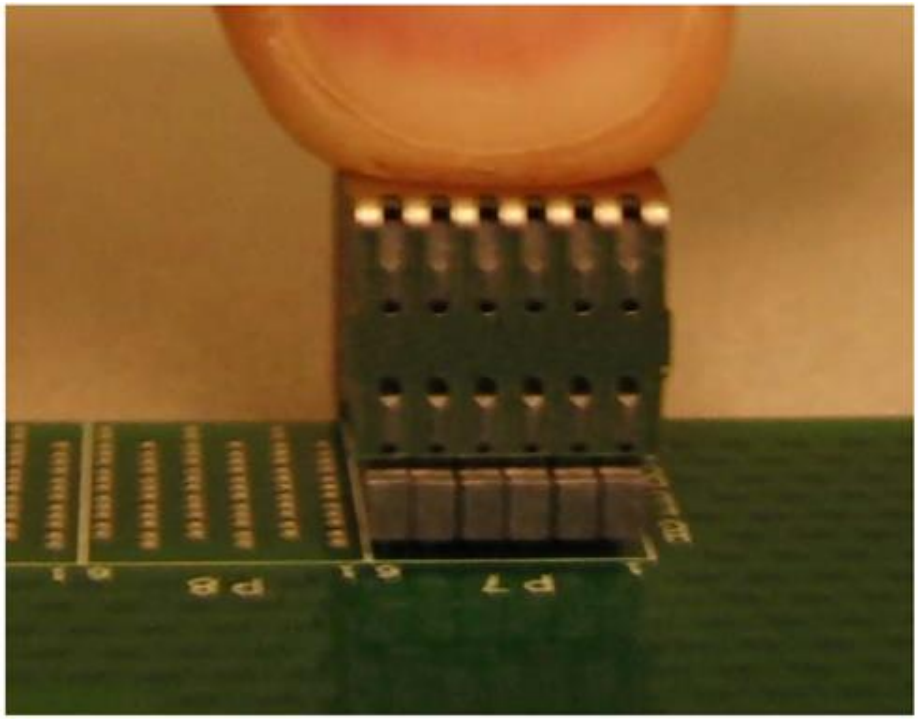


Figure 5: Rear View of the assembly. Check of bent pins.

Step 8. Select the correct seating head based on the connector platform (3, 4, or 6 pair) and the length of the connector (see Figure 6). Ensure the seating head at a minimum is the same length as the connector (see Figure 7). Position the seating head directly on top of the connector, ensuring the clearance slot is over the wafer “retention hats” and the rear alignment rib is against the stiffener back (see Figure 8).

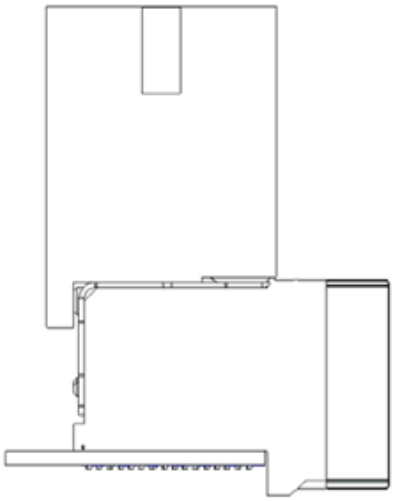


Figure 6: 4 Pair Loading Head and Module

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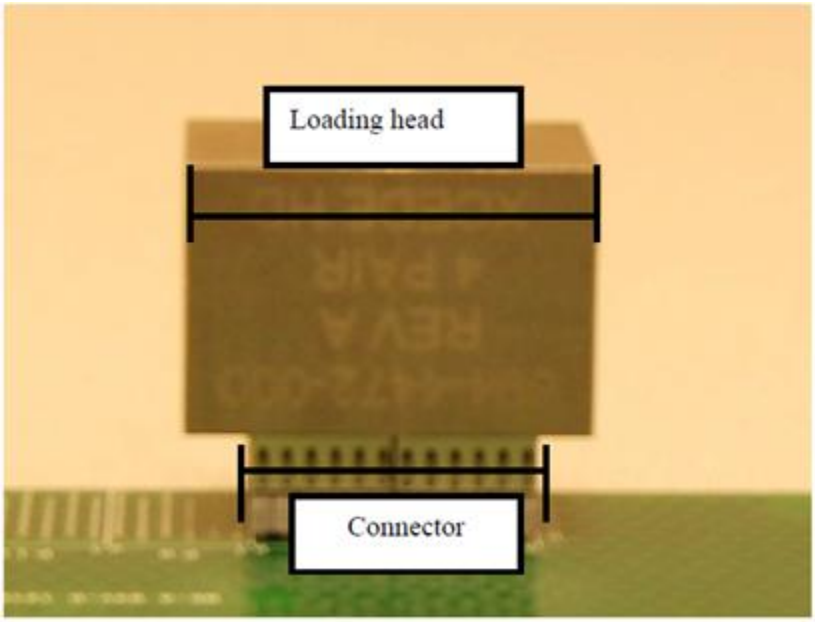

Figure 7: Connector seating head extending over the edge of daughtercard connector

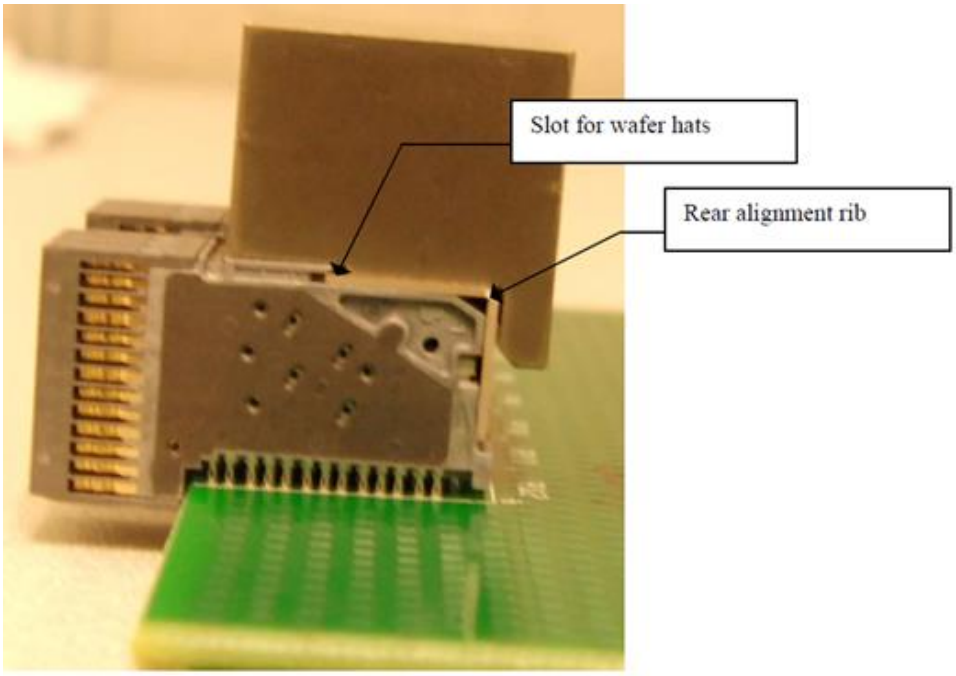

Figure 8: Clearance slot for wafer "retention hats" and rear alignment rib

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NOTE: Ensure the seating head does not come into contact with any other components on the PCB adjacent or behind the connector throughout the placement and pressing process. See the XCede® HD Application Notes for a drawing of the application and rework keep out zones.

Step 9. Initiate the press cycle and seat the connector onto the board surface.

Step 10. Visually identify the plastic standoff on the stiffener side of the connector, contacting the board surface. This standoff cannot be more than 0.125mm from the board surface, and there should be minimal visible difference in height between adjacent wafers (see Figure 9).

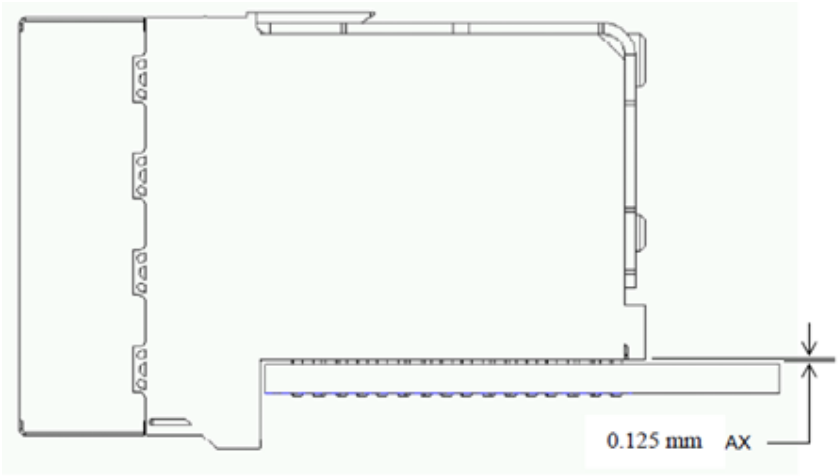

Figure 9: 0.125 mm maximum height off board surface

Step 11. If the PCB thickness allows, inspect the connector pattern from the secondary side, and verify the presence of a compliant pin tip in each PTH.

8.0 Backplane Connector Press-Fit Installation Process - Application Tools

XCede® HD 3, 4, and 6 pair backplane connectors have dedicated loading heads for each product. Different loading head sizes with different lengths (based on how many positions the connector has) are available for each backplane product; refer to Section 8.1. Samtec recommends customers and contract manufacturers purchase the loading head tooling through their Samtec Field Applications Engineer to ensure proper clearances for the backplane installation.

Series: HDTM / HDTF XCede® HD 1.80mm Right-Angle Receptacle & Vertical Header

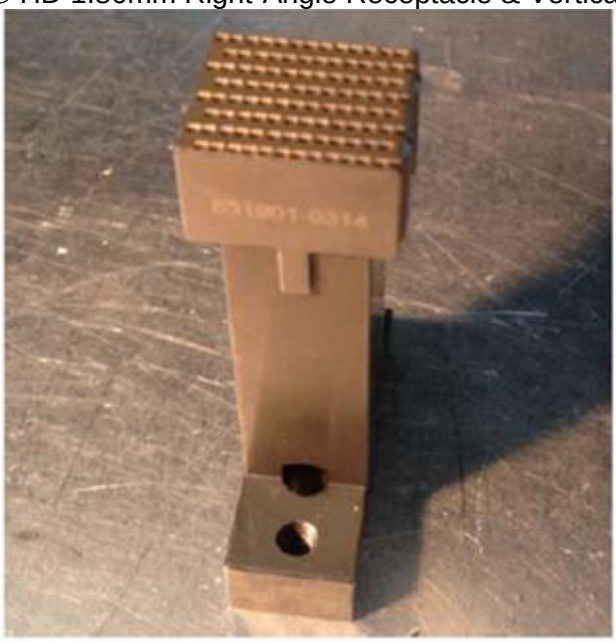

Figure 10: XCede® HD Sold Loading Head (For reference)

8.1 XCede® HD Application Tools – Solid Head

DESCRIPTION	PART NUMBER
3 PAIR x 4 POSITION	CAT-PT-HDTM-3-04
3 PAIR x 6 POSITION	CAT-PT-HDTM-3-06
3 PAIR x 8 POSITION	CAT-PT-HDTM-3-08
4 PAIR x 4 POSITION	CAT-PT-HDTM-4-04
4 PAIR x 6 POSITION	CAT-PT-HDTM-4-06
4 PAIR x 8 POSITION	CAT-PT-HDTM-4-08
6 PAIR x 4 POSITION	CAT-PT-HDTM-6-04
6 PAIR x 6 POSITION	CAT-PT-HDTM-6-06
6 PAIR x 8 POSITION	CAT-PT-HDTM-6-08

8.2 Support Tooling/Fixture

Customers and contract manufacturers should design or purchase the appropriate support fixture to support the PCB during the backplane installation process (this support fixture need only be planar in order to support and elevate the PCB and does not require any special modeling). The support fixture is not supplied by Samtec.

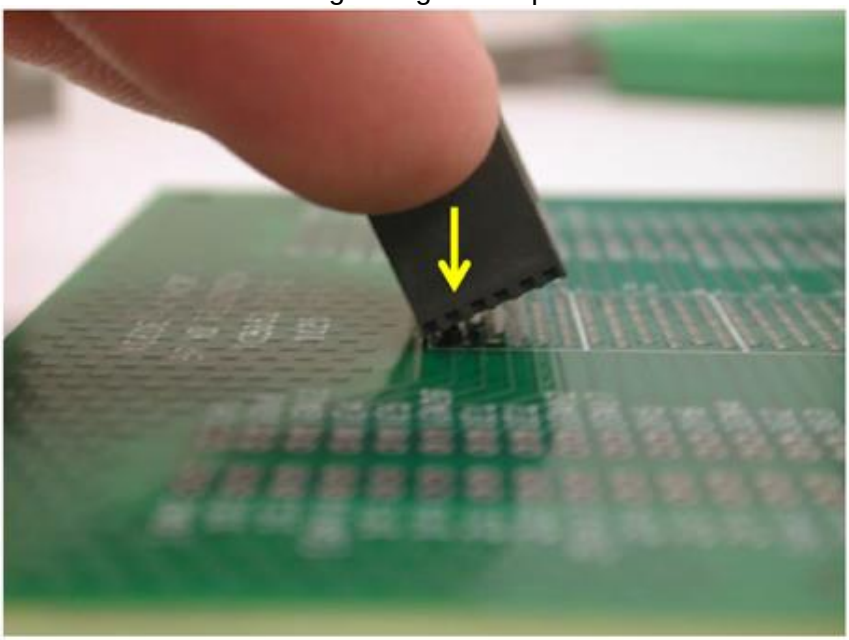

Figure 11. Leftmost row of compliant pins in the PTH

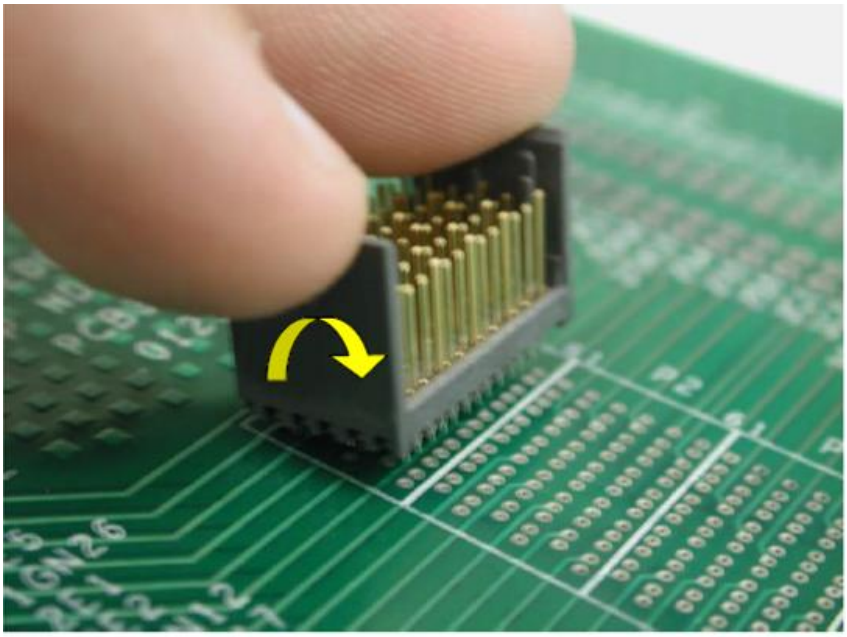

Figure 12: With the leftmost row entirely placed, roll the module toward the right, placing the remaining compliant pins

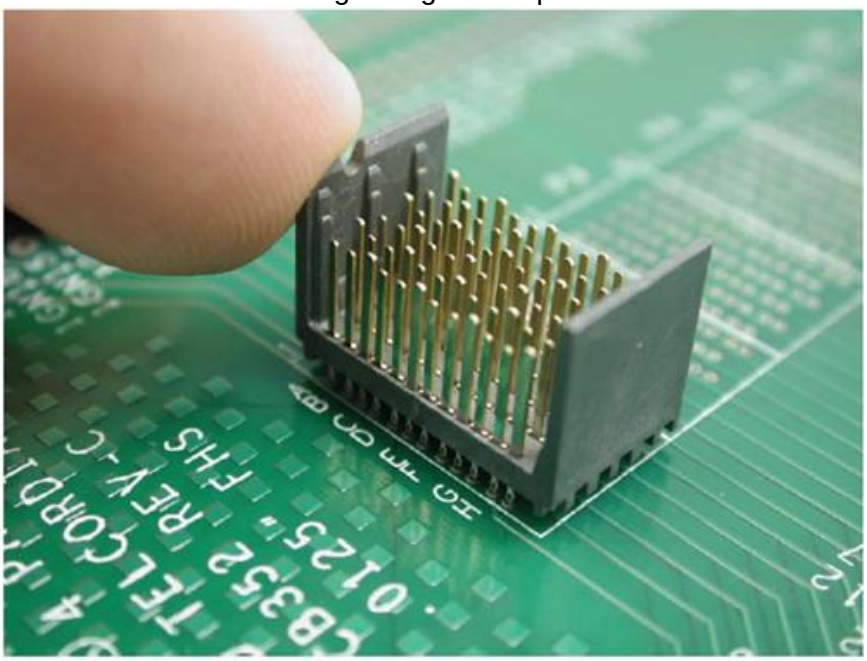

Figure 13: Backplane module is fully in place. Note the first row of compliants.

Step 7. Check for any bent pins protruding from under the connector assembly, see Figure 14.

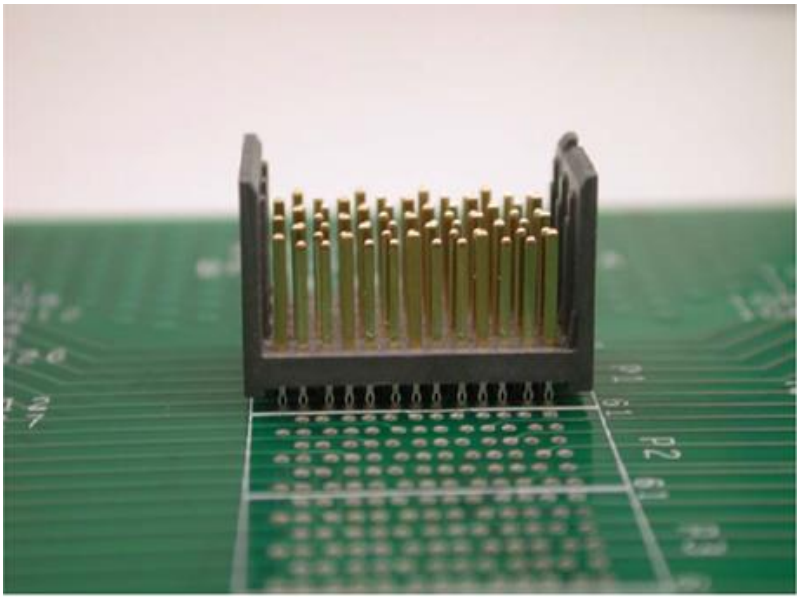

Figure 14: Rightmost view of assembly, check for bent pins

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Step 8. Select the correct seating head based on the connector platform (3, 4, or 6 pair) and the length of the connector, see Figure 6. Position the seating head directly over the connector blades being sure to align the proper cavities in the seating head to the blades on the backplane, see Figure 15.

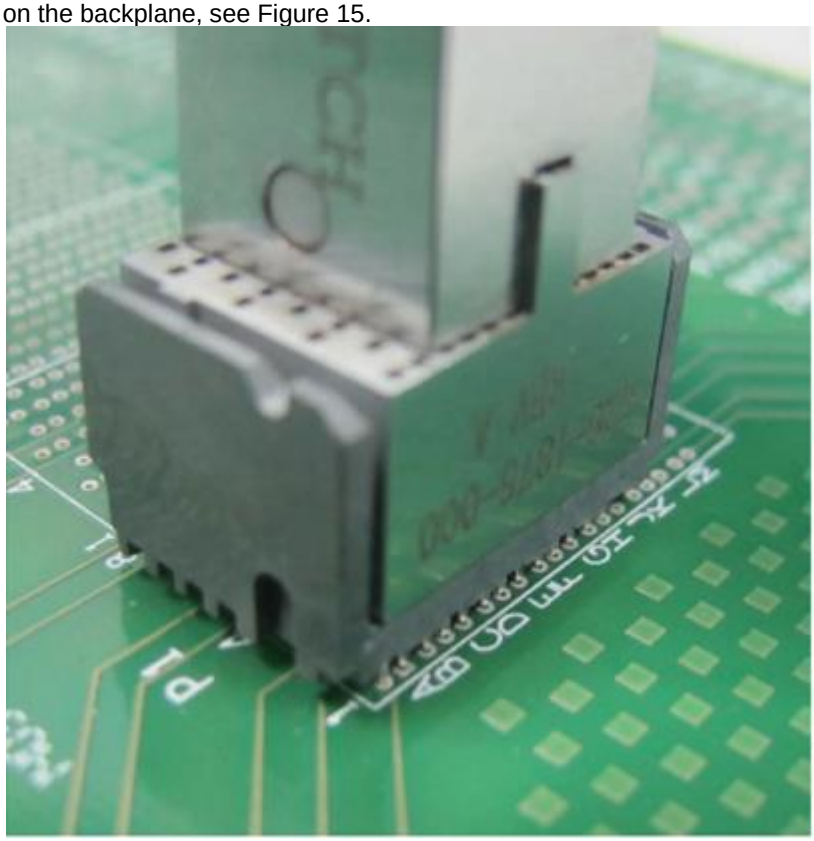

Figure 15: Ensure the cavities in the seating head match up to the blades on the backplane module.

Step 9. Initiate the press cycle and seat the connector onto the board surface.

Step 10. If the PCB thickness allows, inspect the connector pattern from the secondary side, and verify the presence of a compliant pin tip in each PTH.

NOTE: Ensure the seating head does not come into contact with any other components on the PCB adjacent or behind the connector throughout the placement and pressing process. See the XCede® HD Drawings for a drawing of the application and rework keep out zones.

The dimensions of connectors that are critical to proper installation onto a PCB are:

- Base Thickness – The connector thickness between the contact point of the installation tool and the seating surface of the connector.
- Unseated Top – The unseated connector height from the contact point of the installation tool to the PCB surface.
- Height – Same as Base Thickness for XCede® HD Connectors.
- Seated Height – Gap between PCB and connector seating surface, ideally 0.00.

Table 3 below describes the dimension values for the Connector Setup screen of the MEP-12T press for the various XCede® HD connector sizes. If a particular XCede® HD connector is not listed, please consult your Samtec representative for assistance.

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XCede® HD Backplane Dimensional Values				
	Base Thickness (inches)	Unseated Top (inches)	Height (inches)	Seated Height (inches)
3-Pair (.0177" Pin)	.100	.120	.100	0
4-Pair (.0177" Pin)	.100	.120	.100	0
6-Pair (.0177" Pin)	.100	.120	.100	0
3-Pair (.0217" Pin)	.100	.130	.100	0
4-Pair (.0217" Pin)	.100	.130	.100	0
6-Pair (.0217" Pin)	.100	.130	.100	0

Table 3: Connector setup dimensions for XCede® HD Backplane connectors for MEP-12T press.

9.0 – XCede® HD Daughtercard and Backplane Press Recommendations and Pressing Procedures

XCede® HD Daughtercard Press Recommendations

The press used for inserting XCede® HD daughtercard connectors into the PCB should have the minimum capabilities defined as follows:

1) The press shall be suitably rigid and stiff to provide a stable platform to support the installation of any size connectors. Installation forces will vary depending on connector size, plated through hole size, and plated through hole finish. The press, tooling and fixtures need to be sufficiently rigid to prevent any bowing or deflection during the installation process.

2) Samtec recommends a press that has the capability to apply a pre-load force of approximately 100lbs and dwelling at that force for approximately 1-2 sec. This allows the entire press setup to stabilize just prior to inserting the connector into the plated through hole. This pre-load force eliminates any bow that might exist in the PCB and firmly seats the connector into the PTH just prior to the installation process.

3) The press shall be capable of controlling the insertion rate. Samtec recommends an insertion rate of 0.050 in/sec to ensure the compliant pins are properly inserted into the PTH and reduces any damage to the PTH.

4) The press shall be capable of a pressing process per a force gradient curve. To do this, the press must have real time force feedback from the press head and the necessary software, this allows for consistent daughtercard connector installation and accounts for PCB thickness and connector height tolerances. It is not recommended to insert daughtercard connectors to a specific height, due to the PCB and connector tolerances build up. Installing a daughtercard connector to a specific height may result in over seating or under seating the connector. Over seating a daughtercard connector can cause damage to the connector and/or the PCB. Under seating the connector will not fully insert the compliant pin into the PTH and can cause mechanical and reliability issues.

NOTE: Samtec recommends using the Tyco Electronics (ASG) MEP-12T for all XCede® HD connector pressing. The MEP-12T has all of the capabilities outlined above.

XCede® HD DC Recommended Press Procedures

The following are recommended process steps to follow when installing XCede® HD DC connectors.

1) Each PCB should be inspected for blocked holes. This can be accomplished by simply holding the board up to a light and visually looking at the connector plated through hole pattern for any holes that are not clear. This ensures that the connector will insert and seat properly into the PCB.

2) Each PCB should be inspected for the finished hole size (FHS). Compliance to the required FHS is

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important in maintaining a consistent pressing process, refer to Samtec footprint drawing for FHS requirements. Approximately 6-12 holes should be inspected across the connector hole pattern.

3) After pressing, the completed assembly should be inspected.

a. First, inspect the PCB opposite the connector to verify that the compliant pins are in the holes. If a pin is missing the assembly can be repaired by removing the defective daughtercard module and inserting a new one per. The most common cause of a missing pin is improper loading of the connector, which causes a bent pin prior to pressing.

b. Second, inspect the back of the connector. The plastic standoff at the rear of the connector should be seated evenly against the PCB across the length of the connector. The standoffs can be as much as 0.125 mm (0.0050") above the board, but should still be even all the way across the connector. Connectors may be repressed if it's not properly seated. Also, the plastic standoff should not be cracked or deflected, as a result from over pressing. For customers who are using an MEP 12T press, please contact your local Samtec application engineer for tooling and fixturing support.

10.0 XCede® HD Backplane Removal and Reinsertion – TOOLING

10.1 XCede® HD HDTM Removal Tools

PART NUMBER	DESCRIPTION
CAT-EX-HDTM	3 PAIR x 4 POSITION 1.8mm PITCH
CAT-EX-HDTM	3 PAIR x 6 POSITION 1.8mm PITCH
CAT-EX-HDTM	3 PAIR x 8 POSITION 1.8mm PITCH
CAT-EX-HDTM	4 PAIR x 4 POSITION 1.8mm PITCH
CAT-EX-HDTM	4 PAIR x 6 POSITION 1.8mm PITCH
CAT-EX-HDTM	4 PAIR x 8 POSITION 1.8mm PITCH
CAT-EX-HDTM	6 PAIR x 4 POSITION 1.8mm PITCH
CAT-EX-HDTM	6 PAIR x 6 POSITION 1.8mm PITCH
CAT-EX-HDTM	6 PAIR x 8 POSITION 1.8mm PITCH

Note: See CAT-EX-HDTM Document for assembly removal instructions

10.2 XCede® HD HDTF Removal Tools

PART NUMBER (ASSEMBLY)	DESCRIPTION
CAT-EX-HDTF-3-04	3 PAIR x 4 POSITION 1.8mm PITCH
CAT-EX-HDTF-3-06	3 PAIR x 6 POSITION 1.8mm PITCH
CAT-EX-HDTF-3-08	3 PAIR x 8 POSITION 1.8mm PITCH
CAT-EX-HDTF-4-04	4 PAIR x 4 POSITION 1.8mm PITCH
CAT-EX-HDTF-4-06	4 PAIR x 6 POSITION 1.8mm PITCH
CAT-EX-HDTF-4-08	4 PAIR x 8 POSITION 1.8mm PITCH
CAT-EX-HDTF-6-04	6 PAIR x 4 POSITION 1.8mm PITCH
CAT-EX-HDTF-6-06	6 PAIR x 6 POSITION 1.8mm PITCH
CAT-EX-HDTF-6-08	6 PAIR x 8 POSITION 1.8mm PITCH

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PART NUMBER (STIFFENER)	DESCRIPTION
CAT-RE-HDTF-3	3 PAIR x 4 POSITION 1.8mm PITCH
CAT-RE-HDTF-3	3 PAIR x 6 POSITION 1.8mm PITCH
CAT-RE-HDTF-3	3 PAIR x 8 POSITION 1.8mm PITCH
CAT-RE-HDTF-4	4 PAIR x 4 POSITION 1.8mm PITCH
CAT-RE-HDTF-4	4 PAIR x 6 POSITION 1.8mm PITCH
CAT-RE-HDTF-4	4 PAIR x 8 POSITION 1.8mm PITCH
CAT-RE-HDTF-6	6 PAIR x 4 POSITION 1.8mm PITCH
CAT-RE-HDTF-6	6 PAIR x 6 POSITION 1.8mm PITCH
CAT-RE-HDTF-6	6 PAIR x 8 POSITION 1.8mm PITCH

Note: See CAT-EX-HDTF-X-XX Document for assembly removal instructions
See CAT-RE-HDTF-X Document for stiffener removal instructions

USE OF PRODUCT SPECIFICATION SHEET

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