

TB-2217

## **XCede PRODUCT FAMILY DAUGHTERCARD MODULE REMOVAL AND REPLACEMENT**

Revision “F”

### Specification Revision Status

Revision	SCR No.	Description	Initial	Date
“-“	S1188	Initial Release	T. Sloan	2-09-09
“A”	S1979	Updated procedure, and addition of RAM and Stacker	M. Spacone	5-29-12
“B”	S2133	Updated 15mm stacker and added progression Keep Out Zones.	M. Spacone	9-20-12
“C”	S3240	Updated Table 1 part numbers for 2-, 3-, and 4-pair sizes Added 38 and 42 mm Stacker options Revised diagrams and dimensions in section 5 for all products Added progressive Z keep out zone for Stacker product	T. Nierendorf	12-08-14
“D”	S3871	In Table 10, 5pr Hard Limit X1 23.7mm was 24.7mm	T. Nierendorf	9-17-15
“E”	S4437	Added: “Product Family” to title ; X2, XCede+ to product scope	B. Merrill	3-25-16
“F”	S4479	Updated: Scope, application tooling part numbers. Merged content from TB-2302.	B. Merrill	4-11-16

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## 1 Purpose

### 1.2 Scope

- 1.1.1. This technical bulletin describes the removal and replacement procedure for XCede product family derivatives referenced in section 1.2.
- 1.1.2. The XCede product family encompasses XCede, XCede Plus, and X2 product lines, and their corresponding product derivatives including; daughtercard, backplane, mezzanine, right-angle-male (RAM), orthogonal, right-angle-male direct-attach orthogonal (RAM DA ortho), and cable backplane interconnect systems.
- 1.1.3. Unless stated otherwise, "XCede" refers to any product or derivative within the XCede product family.

### 1.3 Application

This technical bulletin applies to XCede, XCede+, and X2; RAF (right angle female), RAM, and Stacker (mezzanine), product derivatives.

## 2 Reference documents

- 2.1 **TB-2198 XCede Daughtercard Connector Installation Process**
- 2.2 **TB-2212 XCede Stacker Installation Process**

## 3 Tools

- 3.0 Stiffener Removal/Installation Tool(s)
- 3.0.1 RAF Product

**Table 1: XCede, XCede+, X2, No extra ground RAF Stiffener Removal / Installation Tool P/N's**

Product Size	Tool Part Number
2-Pair	600-2282-000
3-Pair	600-2283-000
4-Pair	600-2284-000
5-Pair	600-2285-000
6-Pair	626-0655-000

**Table 2: XCede Plus and X2 with extra ground RAF Stiffener Removal / Installation Tool P/N's**

Product Size	Tool Length	Tool Part Number
4- Pair	2" Long	600-2454-000
5- Pair	2" Long	600-2285-000
6- Pair	2" Long	600-2445-000
8- Pair	2" Long	600-2480-000

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8- Pair	8.25" Long	600-2509-000
		602-1253-000

## 3.0.2 RAM Product

**Table 3: RAM Stiffener Removal / Installation Tool P/N's**

Product Size	Tool Part Number
2-Pair	600-2379-000
2-Pair Extended	600-2380-000
4-Pair Gen 1	600-2324-000
4-Pair Gen 2	600-2438-000

## 3.0.3 Stacker Product

**Table 4: Stacker Stiffener Removal / Installation Tool P/N's**

Product Size	Tool Part Number
4-Pair 15mm	NA
4-Pair 22mm	600-2402-000
4-Pair 30mm	600-2402-000
4-Pair 38mm	600-2402-000
4-Pair 40mm	600-2402-000
4-Pair 42mm	600-2402-000

**3.1 Module Removal Tool(s)****3.1.1 RAF Product****Table 5: XCede, XCede+, X2 No extra ground RAF Daughtercard Removal Tool P/N's**

Product Size	Position	Tool Part Number
2-Pair	4	600-2300-000
	6	600-2301-000
	8	600-2302-000
3-Pair	4	600-2303-000
	6	600-2304-000
	8	600-2305-000
4-Pair	4	600-2306-000
	6	600-2307-000
	8	600-2308-000
5-Pair	4	600-2309-000
	6	600-2310-000
	8	600-2311-000
6-Pair	4	600-2312-000
	6	600-2313-000
	8	600-2314-000

**Table 6: XCede Plus and X2 with extra ground Daughtercard Removal Tool P/N's**

Product Size	Position	Tool Part Number
4-Pair	4	600-2455-000
	6	600-2456-000
	8	600-2457-000
5-Pair	4	600-2499-000
	6	600-2500-000
	8	600-2501-000
6-Pair	4	600-2446-000
	6	600-2447-000
	8	600-2448-000
8- Pair	6	600-2482-000
	8	600-2483-000

**3.1.2 RAM Product****Table 7: Ram daughtercard Removal Tool P/N's**

Product Size	Position	Tool Part Number
2-Pair / 2-Pair Extended	4	600-2391-000
	6	600-2392-000
	8	600-2393-000

4-Pair	4	600-2394-000
	6	600-2395-000
	8	600-2396-000

### 3.1.3 Stacker Product

**Table 8: Stacker daughtercard Removal Tool P/N's**

Product Type	Tool Description	Height	Removal Tool Part Number
4pair (4 position)	Stacker removal tool	22mm thru 44mm	600-2403-000
	Stacker removal tool	15mm	600-2463-000
	Stacker leg removal tool. Use in conjunction with 600-2403-000	22mm	626-1357-000
		30mm	626-1358-000
		38mm	626-1360-000
		40mm	626-1361-000
		42mm	(not tooled)
		44mm	626-1362-000
4-Pair (6 position)	Stacker removal tool	22mm thru 44mm	600-2404-000
	Stacker removal tool	15mm	600-2464-000
	Stacker leg removal tool. Use in conjunction with 600-2404-000	22mm	626-1357-000
		30mm	626-1358-000
		38mm	626-1360-000
		40mm	626-1361-000
		42mm	(not tooled)
		44mm	626-1362-000
4-Pair (8 position)	Stacker removal tool	22mm thru 44mm	600-2405-000
	Stacker removal tool	15mm	600-2465-000
	Stacker leg removal tool. Use in conjunction with 600-2405-000	22mm	626-1357-000
		30mm	626-1358-000
		38mm	626-1360-000
		40mm	626-1361-000
		42mm	(not tooled)
		44mm	626-1362-000

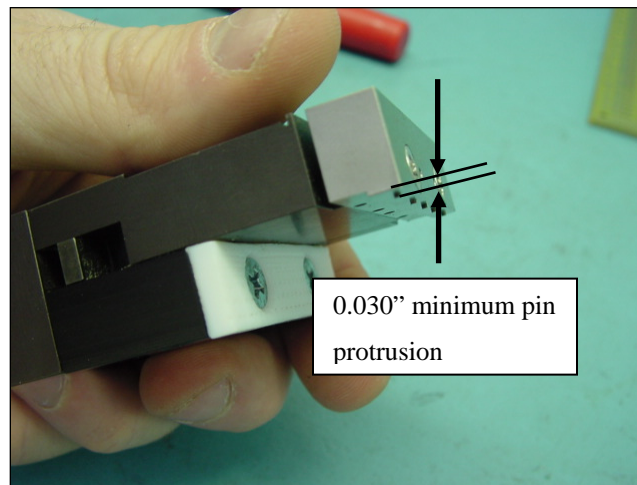


## 4 Procedure

### 4.0 Stiffener Removal

#### 4.0.1 RAF / RAM

Step 1. Prior to removing stiffener, verify the stiffener removal tool is in proper working order and condition. Ensure all stiffener engagement pins are present and protruding at least 0.030" from each opposing face of the pin block. If any pins are missing, bent, or broken, remove and replace them (see Figure 1).



**Figure 1: Stiffener removal pins protruding out the bottom of the pin block.**

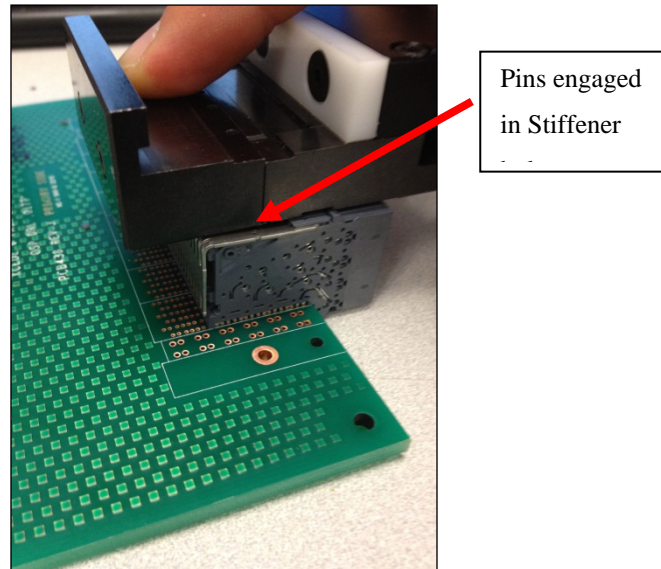
Step 2. Ensure that the stiffener removal tool is in the fully-closed position (tighten handle clockwise until hard stop.)

Step 3. Orient the tool above the connector, so that the pins are facing towards the connector, and the tool's plastic insert is facing up. The tool's handle should be pointed in the direction of the connector mating surface (See Figure 1).

Step 4. Align the tool at one end of the connector, so that the pins are engaged with the holes in the metal stiffener.

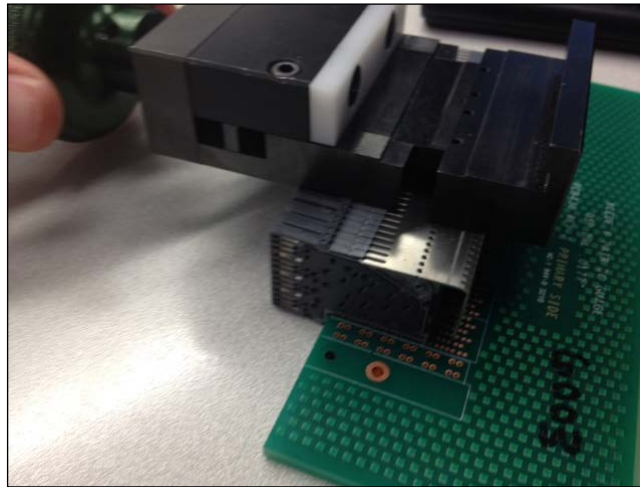
Step 5. While applying enough downward pressure to ensure that the stiffener tool pins stay engaged into the metal stiffener holes, begin turning the knob counterclockwise until a force is felt, and the metal stiffener should start to separate from the connector modules. Continue to turn knob for one full rotation and the metal stiffener should begin to further disengage from the connector plastic. If the connector is under 2.0" in length, continue to turn

the knob counterclockwise (~2 full turns total) until the stiffener has completely separated from the connector plastic and continue to Step 7. If the connector is longer than 2.0" in length continue to Step 6.

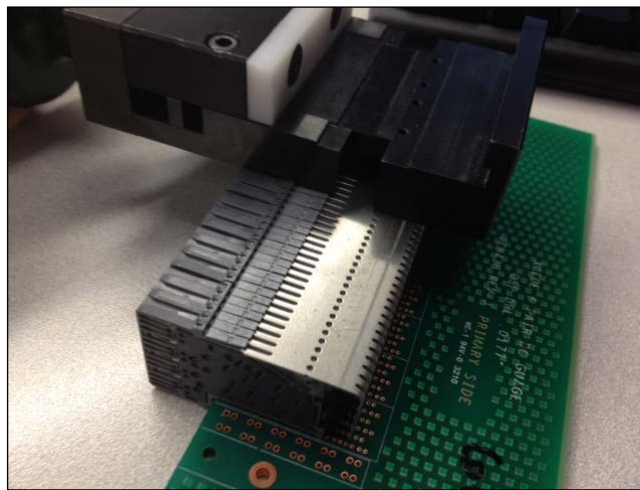


**Figure 2: RAF / RAM stiffener removal tool.**

Step 6. Turn the knob in the clockwise direction, returning the tool to its original “closed” position. Lift the tool off of the connector and reengage the tool ~1.0 – 2.0 inches further down the length of the connector (See Figure 3 and 4). Repeat Steps 5 and 6, working back-and-forth across the length of the connector, carefully “walking” the metal stiffener off of the connector plastic.



**Figure 3: Greater than 50.8mm RAF / RAM Stiffener.**



**Figure 4: Greater than 50.8mm RAF / RAM Stiffener.**

Step 7. Remove the stiffener from the connector assembly, and set aside.

#### **4.0.2 XCede Plus 8 Pair RAF longer than 8.0"**

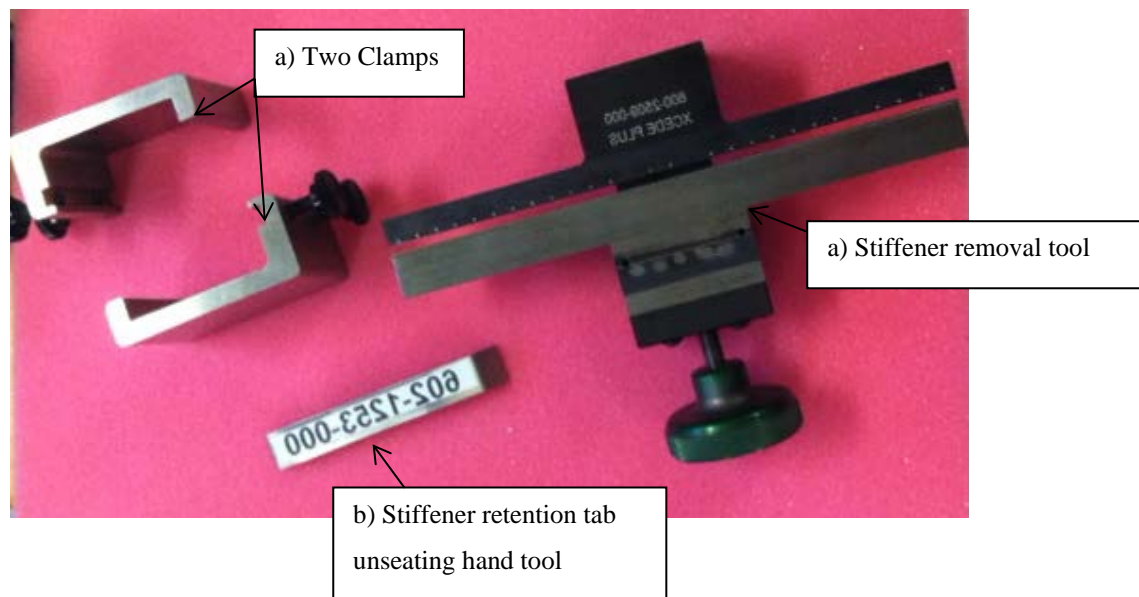
Step 1. Ensure all components needed for stiffener removal are accounted for (see Figure 5):

- a) 600-2509-000 (Stiffener removal tool and two clamps)
- b) 602-1253-000 (Stiffener retention tab unseating hand tool)

Verify the stiffener removal tool is in proper working order and condition.

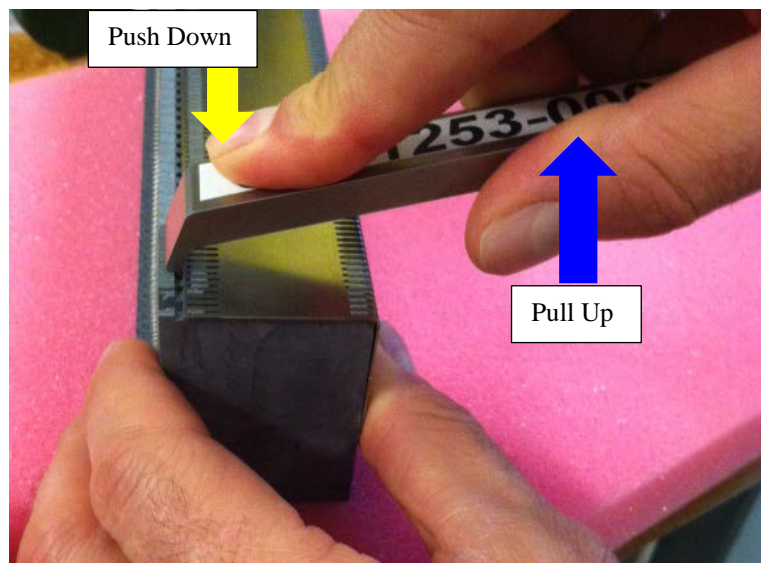
Ensure all stiffener engagement pins are present and protruding at least 0.030" from each opposing face of the pin block. If any pins are missing, bent, or broken, remove and replace them.

Note: If connector is not pressed onto a PCB it is recommended to rework connector on a piece of foam to protect the complaint pins.

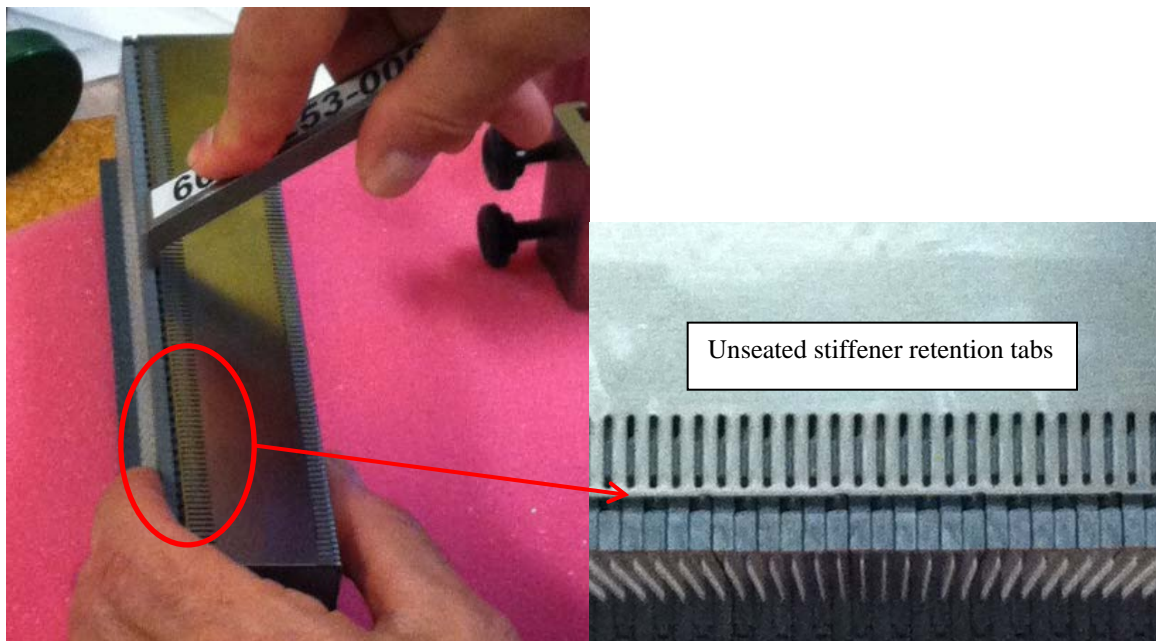


**Figure 5: 8 Pair stiffener removal tooling for FAF longer than 8.0"**

Step 2. Using the retention tab unseating hand tool, slide the tip of the tool under the stiffener adjacent to stiffener retention tabs. Once the hand tool is in place, press down on the front of the tool while pulling up as shown in Figure 6, the retention tabs will come unseated from the stiffener. Remove the hand tool and move slightly down the connector, repeating this process down the length of the stiffener until all of the retention tabs are unseated, see figure 7.



**Figure 6. Unseating stiffener retention tabs**



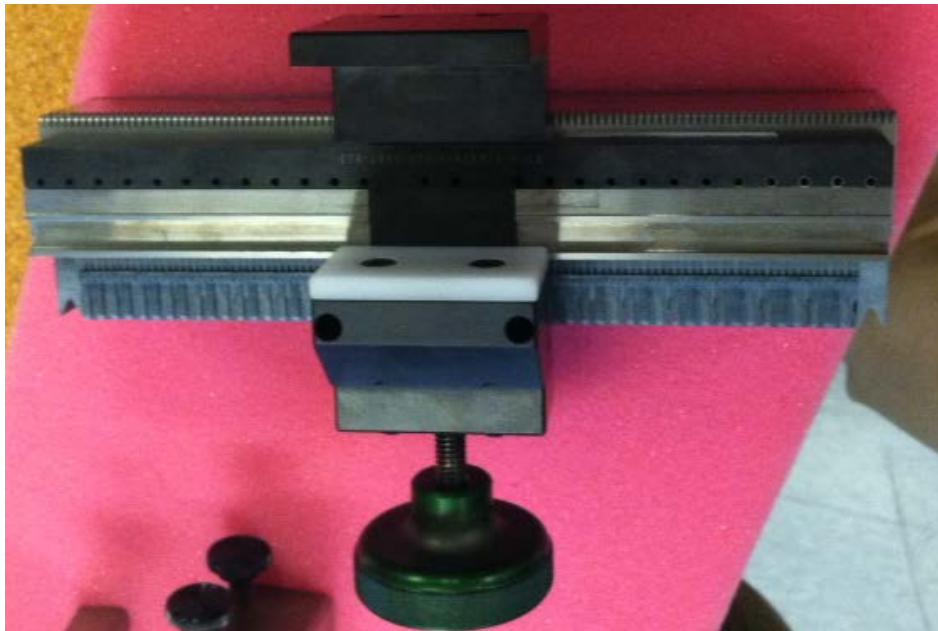
**Figure 7. Unseating process repeated down the length of RAF**



Step 3. Ensure that the stiffener removal tool is in the fully-closed position (tighten handle clockwise until hard stop.)

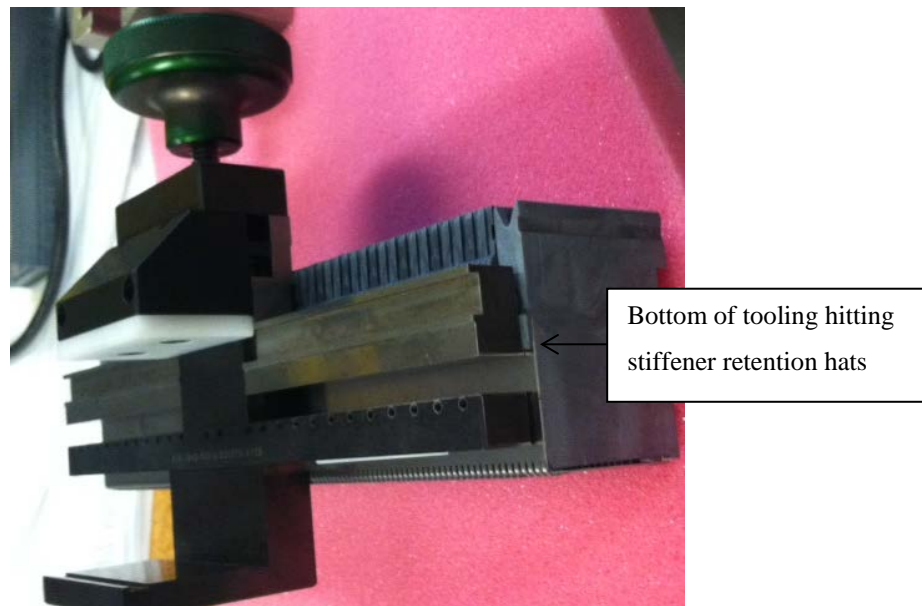
Step 4. Orient the tool above the connector, so that the pins are facing towards the connector, and the tool's plastic insert is facing up. The tool's handle should be pointed in the direction of the connector mating surface.

Step 5. Align the tool at one end of the connector, so that the pins are engaged with the holes in the metal stiffener shown in Figure 8.



**Figure 8. Engaged stiffener removal tool**

Step 6. While applying enough downward pressure to ensure that the stiffener tool pins stay engaged into the metal stiffener holes, begin turning the knob counterclockwise until a force is felt. At this point the bottom of the tooling had hit the stiffener retention hats, stop turning the knob, the tool should be partially open as shown in Figure 9.



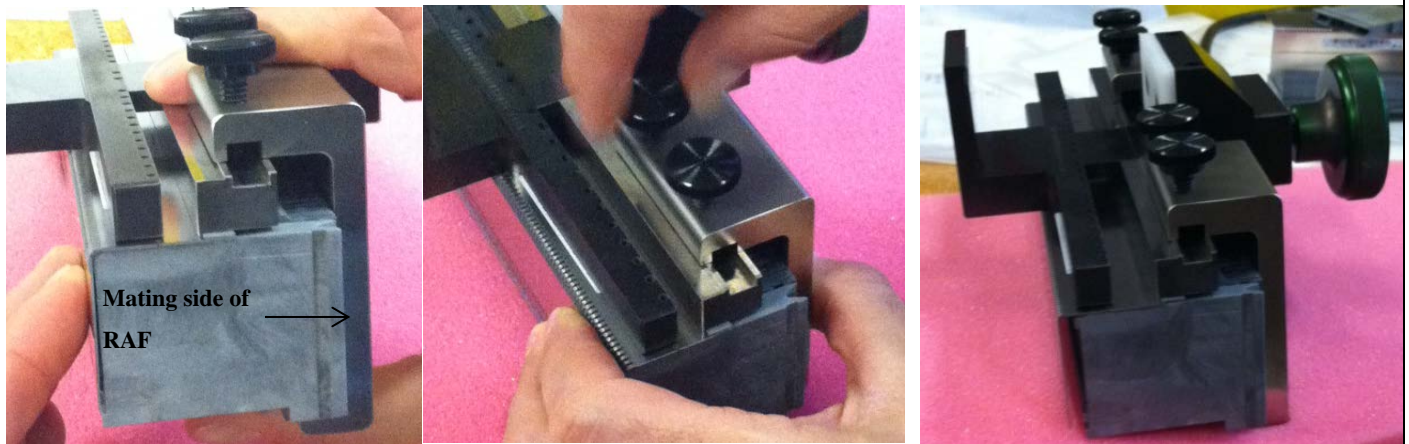
**Figure 9. Partially open stiffener removal tool**

Step 7. Orientate the clamp so that the knobs are facing upwards and the inner surface of the clamp is facing the mating side of the RAF connector. Hold the stiffener removal tool in place on the RAF and slide the clamp onto one end of the assembly. Attach one clamp to each end of the stiffener removal tool by turning the knobs on top of the clamp. Ensure that the knobs are snug, and the clamp cannot wiggle off of the stiffener removal tool. Repeat to attach clamp to other end of assembly. See Figure 10 for clamp installation progression.

Slide clasp onto end of one  
side of assembly

Turn two knobs to attach  
clamp to assembly

Clamps installed on both ends,  
securing bottom of stiffener removal



**Figure 5: Stiffener removal clamp instillation progression**

Step 8. Continue turning stiffener removal tool knob counterclockwise until stiffener is removed from RAF.



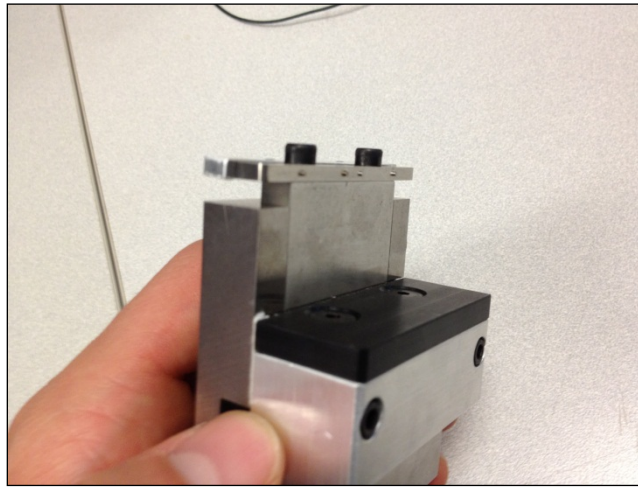
### 4.0.3 Stacker

#### 4.0.3.1 22, 30, 38, 40, 42, 44mm Stacker heights

Step 1. Prior to removing stiffener, verify the stiffener removal tool is in proper working order and condition. Ensure all stiffener engagement pins are present and protruding at least 0.030" from each opposing face of the pin block. If any pins are missing, bent, or broken, remove and replace them (see Figure 5 & 6).



**Figure 6: Stacker stiffener removal tool.**

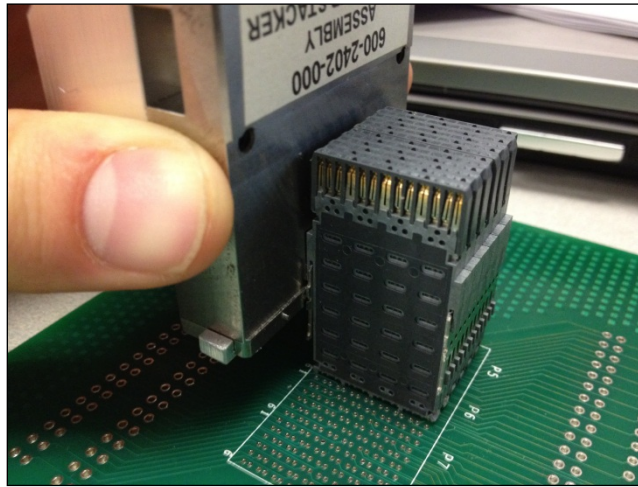


**Figure 7: Opposite side of Stacker stiffener removal tool.**

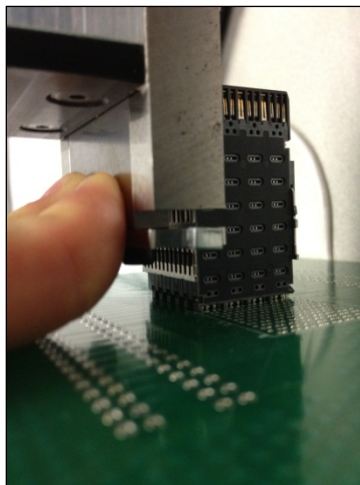
Step 2. Orient the tool so that the handle/knob is facing up, and the plastic insert on the tool is facing the mating surface of the Stacker connector. The pins on the tool should align with the holes in the metal connector stiffener (see Figure 6). With the pins aligned inside of the stiffener holes, turn the knob counterclockwise until the stiffener starts to move. Once tool has fully extended its length, take stiffener off the Daughtercard. Repeat this process, if Stacker connector is longer than tool, moving the tool gradually from one end of the connector to the other, until the stiffener becomes loose and can easily be removed from the assembly.

Step 3. Remove the stiffener from the connector assembly, and set aside.

Step 4. Repeat Steps 2 and 3 for the second stiffener on the other side of the Stacker connector.



**Figure 8: Correct orientation of Stacker stiffener removal tool.**



**Figure 9: Closer view of Stacker stiffener tool.**

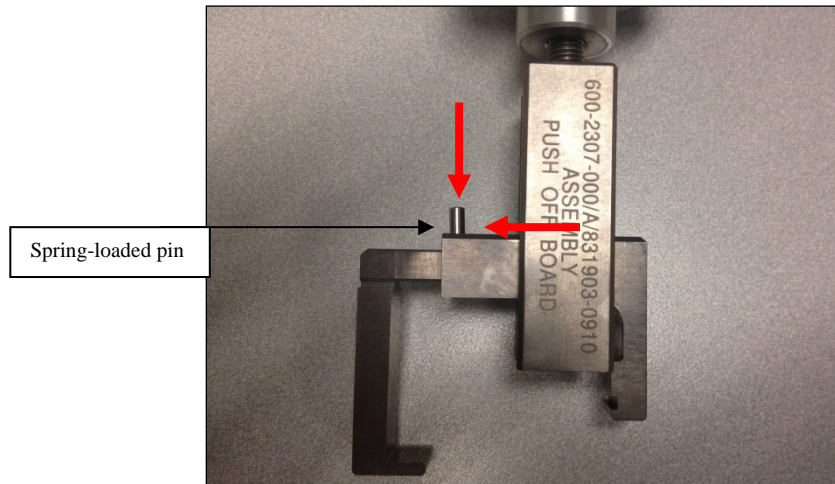
#### **4.0.3.2 15mm Stacker height**

NOTE: No stiffener to be removed on 15mm.

### **4.1 Daughtercard Module Removal Tools**

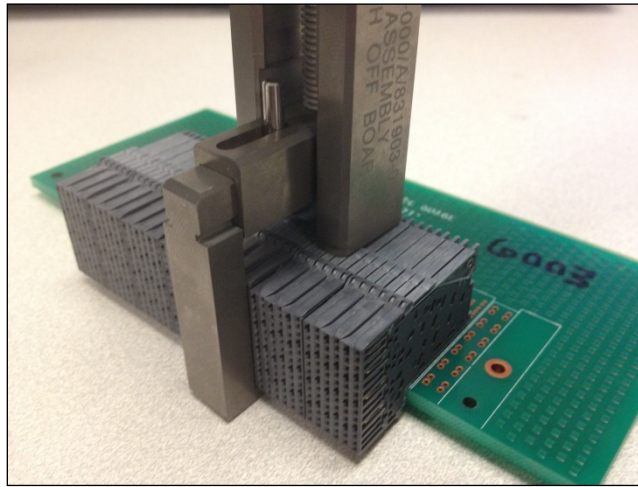
#### 4.1.1 RAF/RAM

Step 1. XCede RAF and RAM use similar tools and procedures for removing modules from a PCB. Prior to removing modules, remove stiffener and confirm that the correct tool PN is being used for the product being removed.

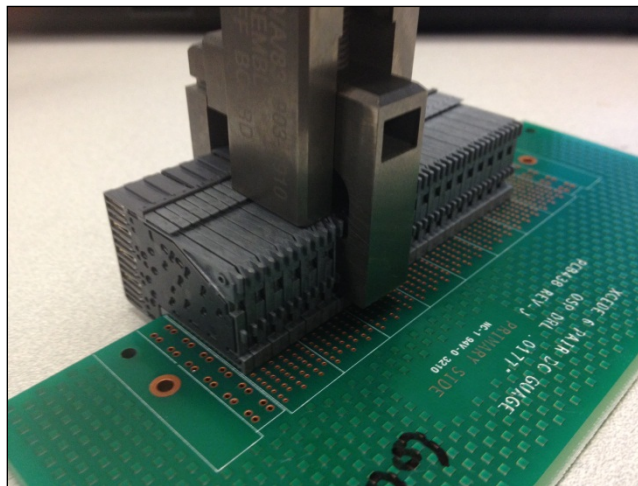


**Figure 10: RAF & RAM module removal tool.**

Step 2. Push down on pin to release the sliding arm, and pull sliding arm until it is in the full open position. Slide tool around the module to be removed and push sliding arm in until it reaches full closed position. The spring-loaded pin should now be locked in place. Ensure that the tool is not overlapping any adjacent modules, or other connector components.



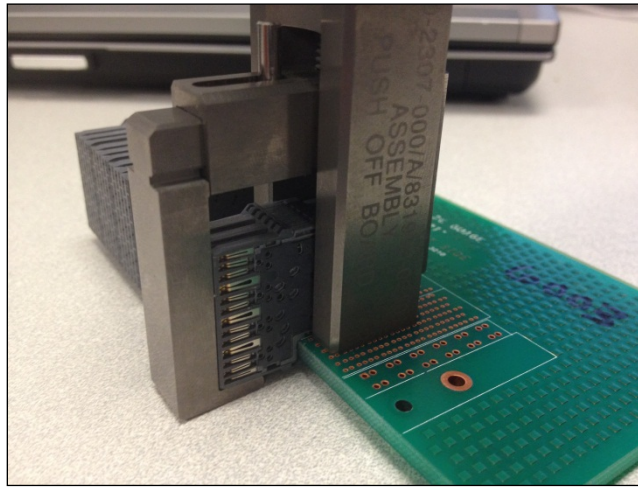
**Figure 11: RAF module removal tool (front view).**



**Figure 12: RAF module removal tool (back view)**

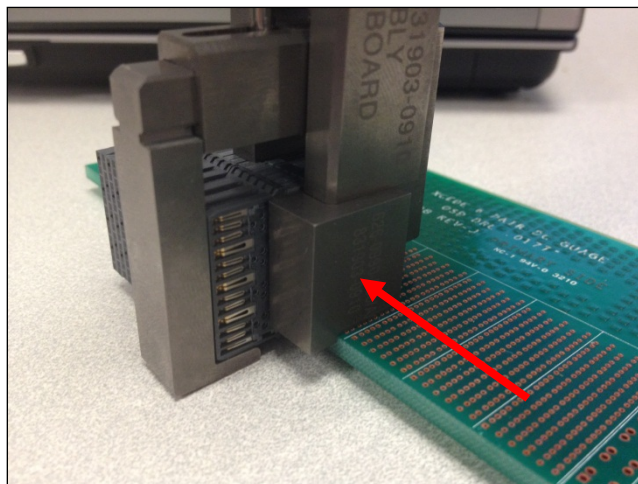
Step 3. Turn knob counterclockwise until connector module is fully removed from board. To release the module from the tool turn knob clockwise or push the spring loaded pin to extend the arm.





**Figure 13: RAF/RAM Module Removal tool without extension.**

Step 4. If removing an end connector, use the required extension for removing the connector (Figure 13). This tool does not require an extension if removing a single module, shown in Figure 12.



**Figure 14: RAF/RAM module removal tool with extension.**

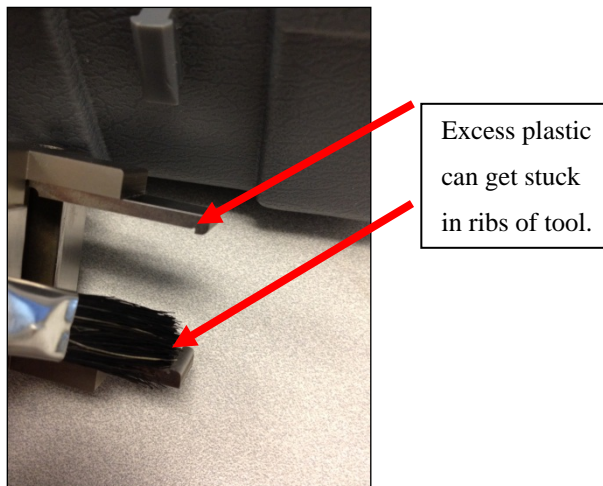
#### 4.1.2 Stacker

#### 4.1.2.1 22, 30, 38, 40, 42, 44mm Stacker heights

Step 1. Prior to using module removal tool, verify the number of wafers ("position") in the module. There are 4, 6 or 8 position tools for the 4 pair stacker module. Figure 14 shows the 4-pair by 6-position module removal tool. After selecting the correct tool, clean the ends of the tool with a wire brush. This is shown in Figure 15.



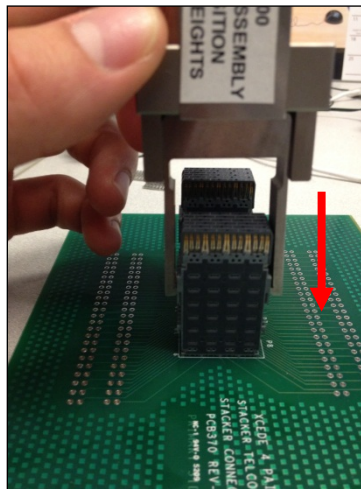
**Figure 15: Stacker module removal tool**



**Figure 16: Bottom section of the Stacker removal tool.**

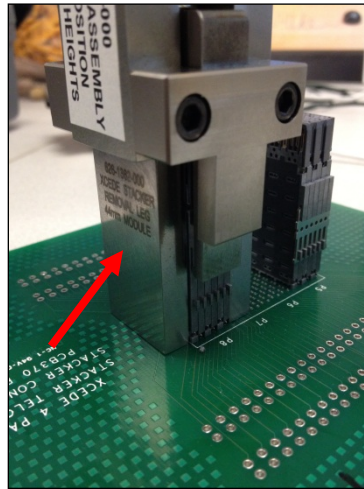
Step 2. Gently slide module removal tool over the top of the Stacker module with the knob/handle facing up (see Figure 16). Verify that the hooked arms of the tool are aligned beneath the plastic stiffener hats.

**Note:** If removing a single module, place extension under the tool (Figure 17). For each tool, there are extension blocks for each Stacker height option.

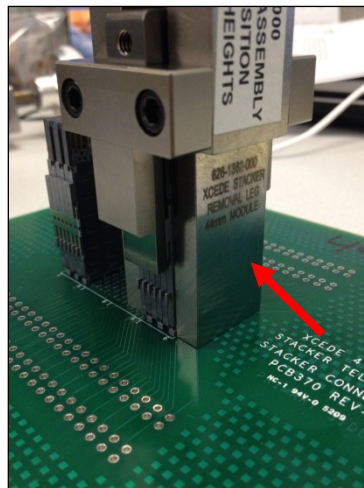


**Figure 17: Aligning the Stacker removal tool.**





**Figure 18:** Photo shows extension blocks being used on either side of a single Stacker module.



**Figure 19:** Photo shows extension blocks being used on either side of a single Stacker module.

Step 3. Turn knob counterclockwise until the Stacker module's compliant pins have pulled completely out of the PCB.

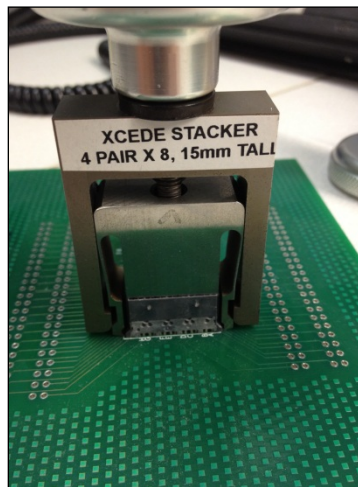
#### **4.1.2.2 15mm Stacker height**

Step 1. Prior to using the module removal tool, verify the number of wafers ("positions") in the module. The 15mm stacker has separate removal tools for the 4, 6, & 8 position configurations. Shown in figure 19 is the 6 position configuration. After choosing the correct tool, clean and verify that ends of the tool are not damaged.



**Figure 20: XCede Stacker 15mm removal tool.**

Step 2. Place tool on top of the connector. Make sure that both arms are positioned underneath the latch features of the module. Twist knob clockwise until the ends of the tool are fully pressed onto the PCB, shown in figure 20. Verify that the ridges on the tool arms are secure under the module front housing latches.



**Figure 21: Fully seated 15mm stacker tool.**

Step 3. Twist knob clockwise on the tool until front housing is released from the module.

Step 4. Repeat steps one through three to remove the remaining wafers.

## **4.2 Module Replacement**

### **4.2.1 RAF/RAM**

Step 1. Follow installation process described in TB-2198.

### **4.2.2 Stacker**

Step 1. - Follow installation process described in TB-2212.

## **4.3 Replacing Stiffener**

### **4.3.1 RAF/RAM**

Step 1. Place the stiffener onto the connector, and align stiffener slots with plastic tabs on the wafers, ensuring stiffener is located exactly where shown on the ATCS connector drawing.

Step 2. The same tool used for removing the stiffener is also used for reinstalling the stiffener.

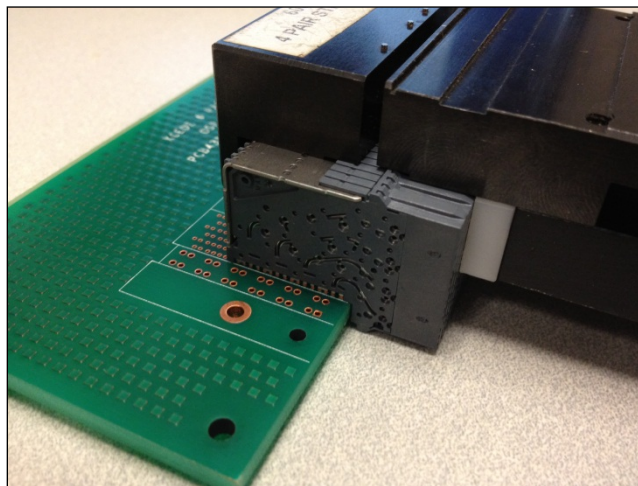
Step 3. Verify that the stiffener tool is in the full open position by turning the knob counter-clockwise until a hard stop is achieved.

Step 4. Orient the stiffener tool above the connector so that the connector will be inside of the open jaws, with the knob facing towards the mating side of the connector.

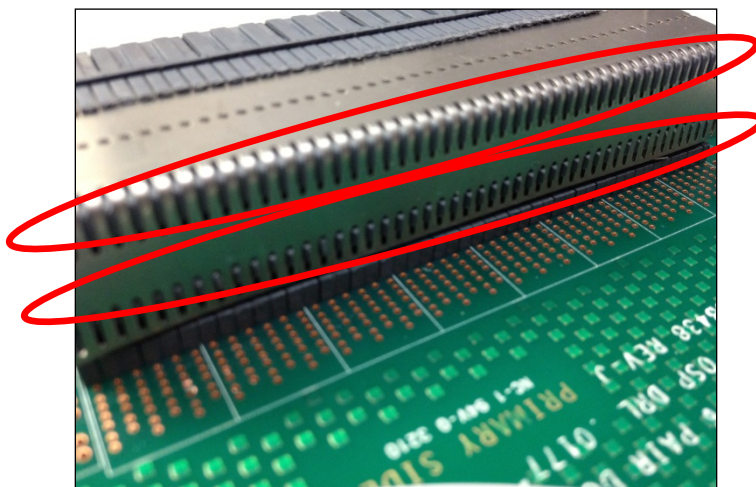
Step 5. Place the open tool onto the connector, and while applying a small amount of downward force onto the connector, turn the knob clockwise until the top of the plastic stiffener tabs are even with the metal stiffener. Verify that the plastic stiffener tabs are aligned with the slots in the metal stiffener, and then continue to turn knob clockwise until the stiffener is fully seated (bottomed) onto the connector body.

Step 6. Turn the knob counter-clockwise to open the tool and remove it from the connector.

Step 7. If the connector is longer than 2.0", repeat Steps 4 thru 6 down the length of the connector until the entire stiffener is fully seated. Verify that the plastic stiffener tabs are protruding thru the metal stiffener slots down the entire length of the connector.



**Figure 22: RAF/RAM stiffener installation tool.**



**Figure 23: Plastic stiffener tabs protruding thru metal stiffener slots.**

NOTE: Use caution when reworking connectors with power connectors. The daughtercard power connectors extend beyond the mating face of the signal wafers, and as a result are more likely to be overstressed without proper technique. When re-installing the stiffener and using powers for support, be sure the tool is centered across the points of contact, and the tool is not over tightened.

When working with powers, the best method of reinstallation depending on your specific connector configuration is to:

- A. Push the stiffener onto the connector as far as possible by hand
- B. Work the tool down the entire length of the connector, applying only enough force to pre-seat the stiffener
- C. Completely seat the stiffener in the signal wafer areas only (not closing the stiffener tool onto the power modules at all).
- D. Completely seat the stiffener onto the power connectors by returning the tool to the areas with power, and applying a minimum amount of force.

Step 3. Replace any end caps and guide modules without posts, and inspect entire connector looking for unseated wafers onto the PCB, unseated wafers into the stiffener, damaged wafer hats, etc.

#### 4.3.2 22, 30, 38, 40, 42, 44 mm Stacker heights

Step 1. The same tool used for removing the stiffener is also used for reinstalling the stiffener.

Step 2. Place the stiffener onto the connector manually, aligning metal stiffener slots with plastic tabs on the wafers, ensuring stiffener is located exactly where shown on the ATCS connector drawing.

Step 3. Verify that the stiffener tool is in the full open position by turning the knob turn knob counter-clockwise until a hard stop is achieved.

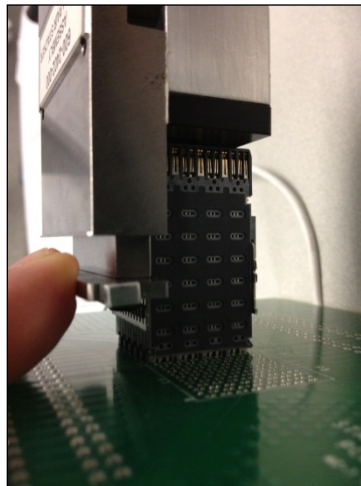
Step 4. Orient the stiffener tool so that the pins in the tool are aligned with the holes in the metal stiffener, and the knob is facing up.

Step 5. While applying moderate force to ensure that the tool's pins stay engaged with the metal stiffener, turn knob clockwise until stiffener is fully seated onto the plastic stiffener tabs.

Step 6. Turn the knob counter-clockwise to open the tool and remove it from the connector.

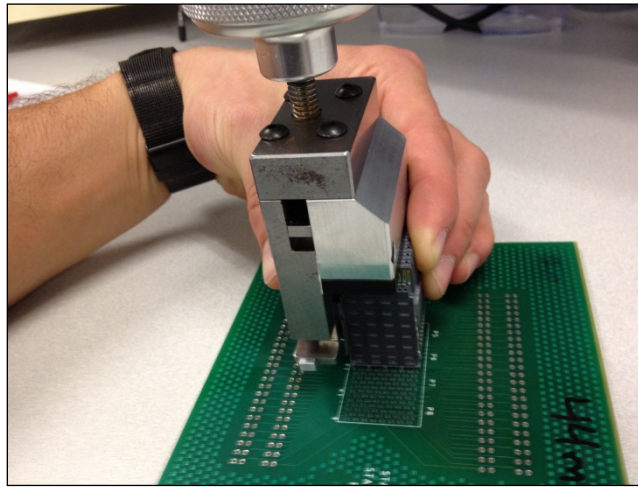
Step 7. If the connector is longer than 2.0", repeat Steps 4 thru 6 down the length of the connector until the entire stiffener is fully seated. Verify that the plastic stiffener tabs are protruding thru the metal stiffener slots down the entire length of the connector.

Step 8. Repeat Steps 2 thru 7 for the second stiffener on the other side of the connector.

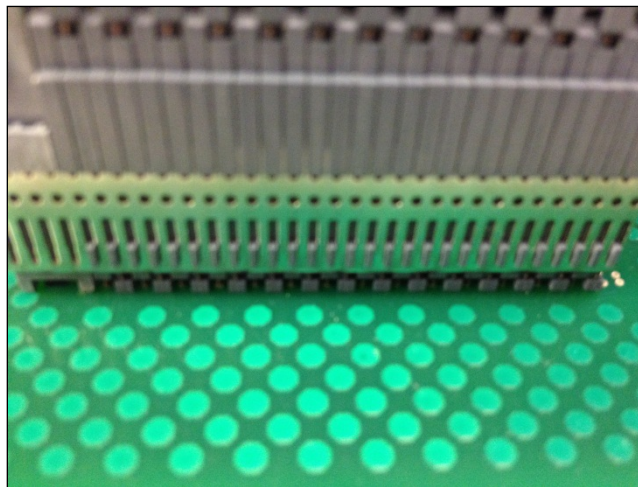


**Figure 24: Stacker stiffener installation tool.**





**Figure 25: Stacker stiffener installation tool.**



**Figure 26: Stiffener tabs (40mm and 44mm).**

Step 4. Replace any guide modules without posts, and inspect entire connector looking for unseated wafers onto the PCB, unseated wafers into the stiffener, damaged wafer hats, etc.

## 5 Keep Out Zones

### 5.0 Repairability and Rework

#### 5.0.1 RAF Product

The typical keep out zones for the XCede RAF product family are shown below in Figures 26. The values for  $X_1$ ,  $X_2$ ,  $Y_1$ , and  $Y_2$  are listed in table 7.  $X_1$  and  $Y_1$  represent the outline of the connector body.  $X_2$  and  $Y_2$  represent the rework and repairability keep out zones, to allow for the use of proper ATCS application tooling (see section 5.1.1).

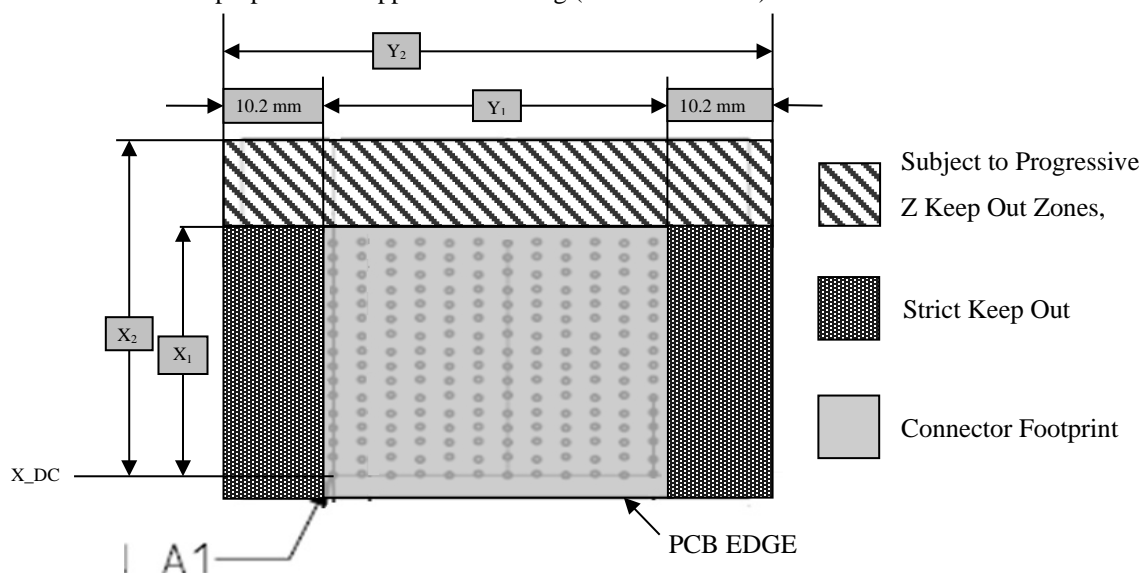


Figure 27: Keep out zones for XCede RAF connectors

Table 9: Keep out zones

	$Y_1$	$Y_2$ (NOTE 2)	$X_1$	$X_2$
<b>2-Pair</b>	(NOTE 1)	$Y_1 + 20.4$ mm MIN 50.8 mm	11.3 mm	28.4 mm
<b>3-Pair</b>	(NOTE 1)	$Y_1 + 20.4$ mm MIN 50.8 mm	15.8 mm	33.7 mm
<b>4-Pair</b>	(NOTE 1)	$Y_1 + 20.4$ mm MIN 50.8 mm	19.4 mm	37.2 mm
<b>5-Pair</b>	(NOTE 1)	$Y_1 + 20.4$ mm MIN 50.8 mm	24.7 mm	41.8 mm
<b>6-Pair</b>	(NOTE 1)	$Y_1 + 20.4$ mm MIN 50.8 mm	29.4 mm	49.8 mm

Note 1: Connector footprint dimension obtained from the C-AX and C-JX drawings.



Note 2: Includes requirement of 10.2 mm strict keep out on both ends of connector for module end position removal. Components within 50.8 mm keep out zone must be under  $Z_3$  dimension from Table 10 for the corresponding pair to accommodate for stiffener removal tool overhang. If connector is over 50.8 mm in length, progressive Z zone does not extend past connector footprint width.

### 5.0.2 RAM Product

The typical keep out zones for the XCede RAM product family are shown below in Figure 27. The values for  $X_1$ ,  $X_2$ ,  $Y_1$ , and  $Y_2$  are listed in table 8.  $X_1$  and  $Y_1$  represent the outline of the connector body.  $X_2$  and  $Y_2$  represent the rework and repairability keep out zones, to allow for the use of proper ATCS application tooling (see section 5.1.1).

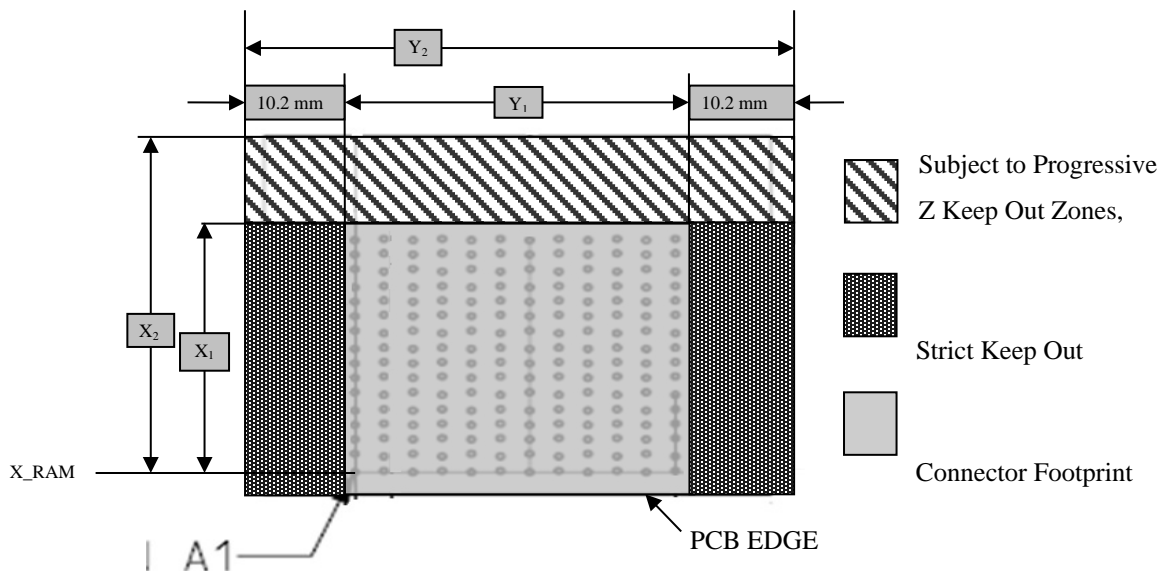


Figure 28: Keep out zones for XCede RAM connectors

**Table 10: RAM keep out zones**

	<b>Y<sub>1</sub></b>	<b>Y<sub>2</sub> (NOTE 2)</b>	<b>X<sub>1</sub></b>	<b>X<sub>2</sub></b>
<b>2-Pair</b>	(NOTE 1)	<b>Y<sub>1</sub> + 20.4 mm</b> MIN 50.8 mm	10.5 mm	35.6 mm
<b>2-Pair Extended</b>	(NOTE 1)	<b>Y<sub>1</sub> + 20.4 mm</b> MIN 50.8 mm	11.8 mm	35.6 mm
<b>4-Pair</b>	(NOTE 1)	<b>Y<sub>1</sub> + 20.4 mm</b> MIN 50.8 mm	19.9 mm	29.4 mm

Note 1: Connector footprint dimension obtained from the C-AX and C-JX drawings.

Note 2: Includes requirement of 10.2 mm strict keep out on both ends of connector for module end position removal. Components within 50.8 mm keep out zone must be under Z<sub>3</sub> dimension from Table 11 for the corresponding pair to accommodate for stiffener removal tool overhang. If connector is over 50.8 mm in length, progressive Z zone does not extend past connector footprint width.

### 5.0.3 Stacker Product

The typical keep out zones for the XCede Stacker product family are shown below in Figure 28. The values for X<sub>1</sub>, X<sub>2</sub>, Y<sub>1</sub>, and Y<sub>2</sub> are listed in Table 9. X<sub>1</sub> and Y<sub>1</sub> represents the outline of the connector body. X<sub>2</sub> and Y<sub>2</sub> represents the rework and repairability keep out zone, to allow for the use of proper ATCS application tooling. The zones defined by X<sub>1</sub> and Y<sub>1</sub> cannot have any components inside of them. X<sub>2</sub> and Y<sub>2</sub> represent the rework and repairability keep out zones, to allow for the use of proper ATCS application tooling (see section 5.1.2).

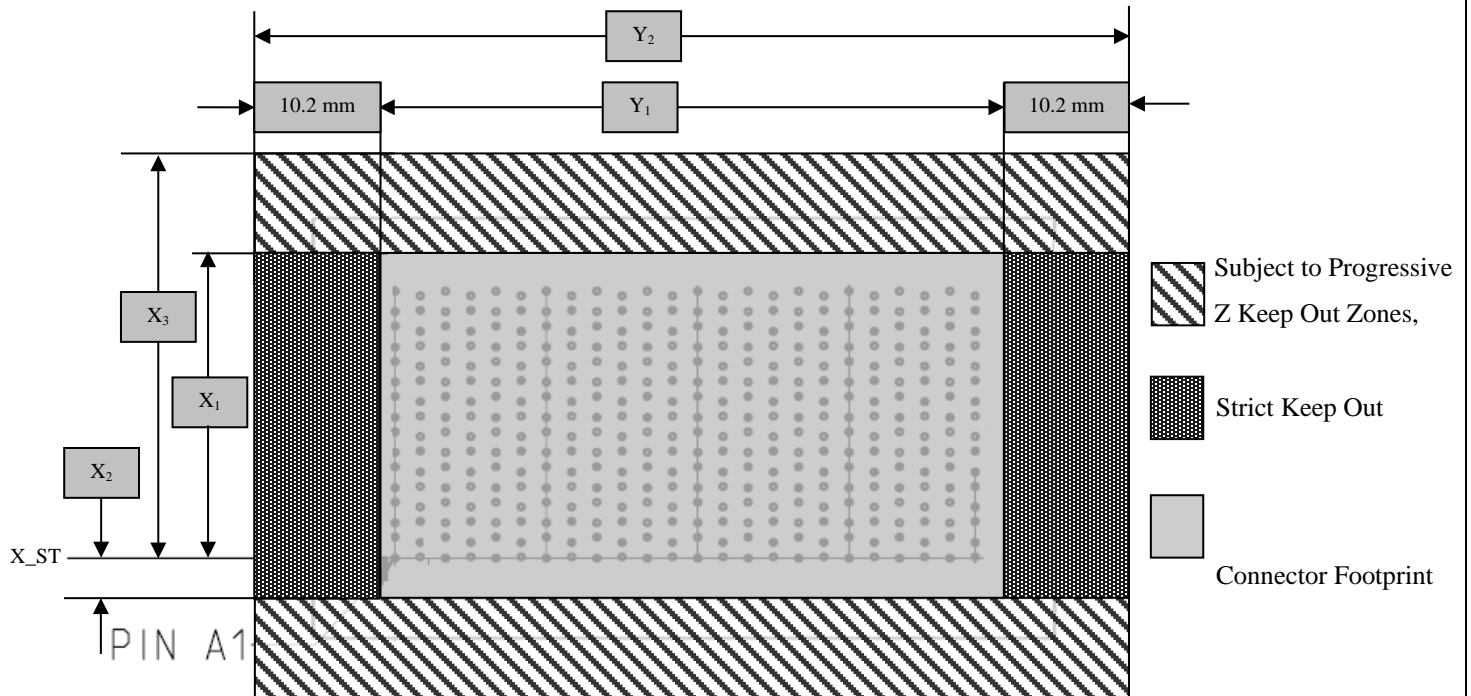


Figure 29: Keep out zones for XCede Stacker connectors

Table 11: Stacker keep out zones

Height	$Y_1$	$Y_2$ (NOTE 2)	$X_1$	$X_2$	$X_3$
15 mm	(NOTE 1)	$Y_1$	22.3 mm	2.46 mm	31.3 mm
22 mm	(NOTE 1)	$Y_1 + 20.4$ mm MIN 55.4 mm	22.3 mm	2.46 mm	54.8 mm
30 mm	(NOTE 1)	$Y_1 + 20.4$ mm MIN 55.4 mm	22.3 mm	2.46 mm	54.8 mm
38 mm	(NOTE 1)	$Y_1 + 20.4$ mm MIN 55.4 mm	22.3 mm	2.46 mm	54.8 mm
40 mm	(NOTE 1)	$Y_1 + 20.4$ mm MIN 55.4 mm	22.3 mm	2.46 mm	54.8 mm
42 mm	(NOTE 1)	$Y_1 + 20.4$ mm MIN 55.4 mm	22.3 mm	2.46 mm	54.8 mm
44 mm	(NOTE 1)	$Y_1 + 20.4$ mm MIN 55.4 mm	22.3 mm	2.46 mm	54.8 mm

Note 1: Connector footprint dimension obtained from the C-AX and C-JX drawings.

Note 2: Minimum of 10.2mm strict keep out required on both ends of connector for end module removal. Components within 55.4 mm keep out zone must be under  $Z_1$  dimension from Table 12 to accommodate for stiffener removal tool overhang. If connector is over 55.4 mm in length, progressive Z zone does not extend past connector footprint width.

Note 3: Rework and repairability zone  $X_3$ - $X_1$  is mirrored on both sides of the connector footprint.

## 5.1 Progressive Z Keep Out Zones

To allow for safe and proper use of ATCS rework and reparability tooling, progressive Z keep out zones are implemented. Avoiding board component placement in these keep out zones will ensure that ATCS tooling does not damage or other affect components.

### 5.1.1 RAF and RAM Products

The progressive Z layout for XCede RAF and RAM products is shown below in Figure 29. Tables 10 and 11 give the dimensions that define the hard and soft limits for these keep out zones for the given pairs for RAF and RAM, respectively. No components may be placed anywhere in or above the black portion of Figure 29 (hard limit). Some components may be allowed in the grey area (soft limit) – contact an ATCS FAE before designing components into this area. All X dimensions reference datum  $X_{DC}$  (or  $X_{RAM}$  for RAM products) and all Z dimensions reference datum  $PCB_{DC}$  (or  $PCB_{RAM}$  for RAM products). See C-AX and C-JX drawings for datum definitions.

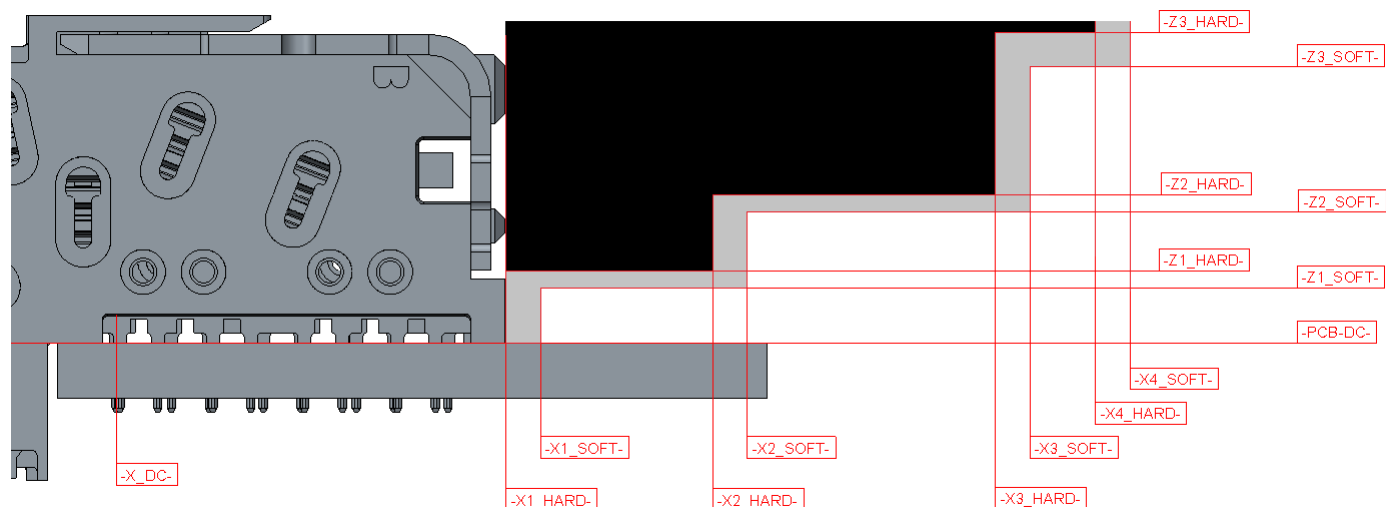


Figure 30: Progressive Z Layout for RAF and RAM Products

Table 12: Progressive Z RAF Keep Out Zones

	HARD LIMIT							SOFT LIMIT						
	X-Dimensions (mm)				Z-Dimensions (mm)			X-Dimensions (mm)				Z-Dimensions (mm)		
Pair	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	Z <sub>1</sub>	Z <sub>2</sub>	Z <sub>3</sub>	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	Z <sub>1</sub>	Z <sub>2</sub>	Z <sub>3</sub>
2	11.3	17.3	25.5	28.4	2.1	4.3	9.0	12.3	18.3	26.5	29.4	1.6	3.8	8.0
3	15.8	21.8	27.2	33.7	3.5	3.7	13.2	16.8	22.8	28.2	34.7	3.0	3.2	12.2
4	19.4	25.5	30.9	37.2	3.7	9.0	18.7	20.4	26.5	31.9	38.2	3.2	8.5	17.7
5	23.7	30.1	35.5	41.8	3.7	8.3	24.2	25.7	31.1	36.5	42.8	3.2	7.8	23.2
6	29.4	35.4	40.2	49.8	3.7	4.0	29.4	30.4	36.4	41.2	50.8	3.2	3.5	28.4
8	37.7	44.3	51.7	68.5	4.5	10.6	40.1	39.7	45.3	52.7	69.6	4.0	10.1	39.7

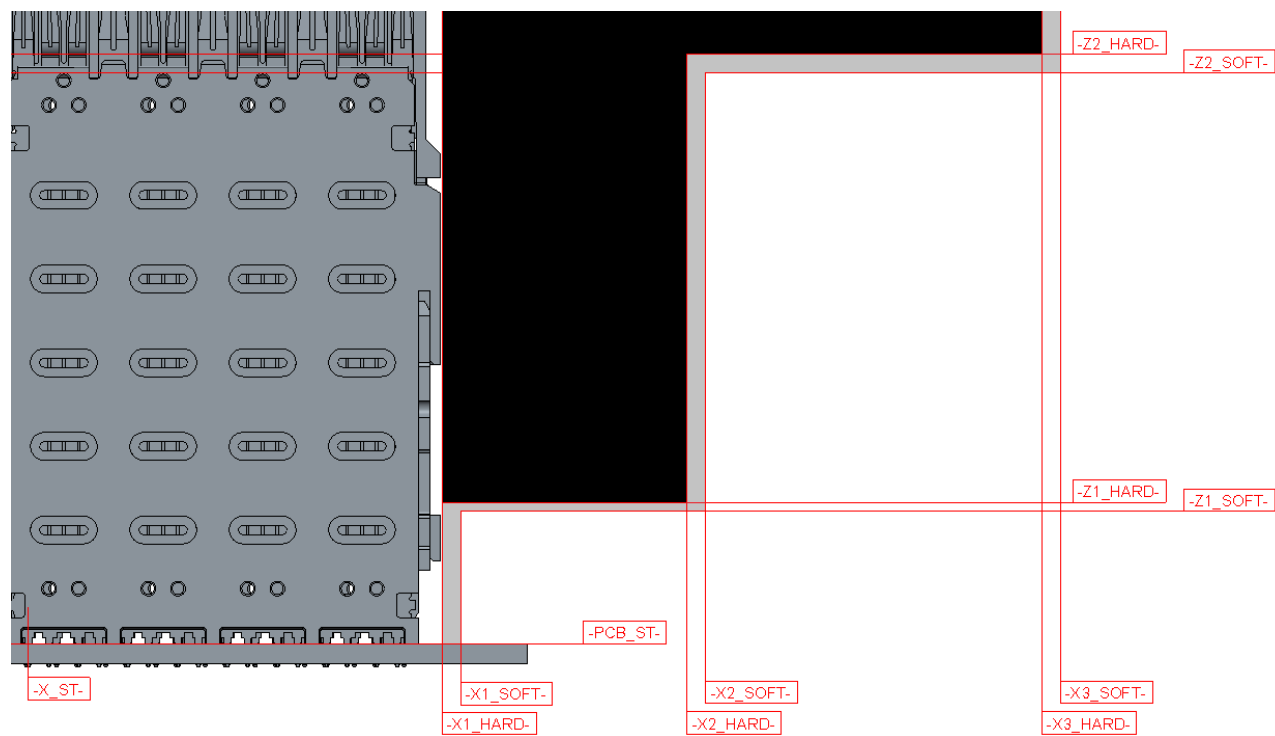
Table 13: XCede RAM Progressive Keep Out Zones

	HARD LIMIT							SOFT LIMIT						
	X-Dimensions (mm)				Z-Dimensions (mm)			X-Dimensions (mm)				Z-Dimensions (mm)		
Pair	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	Z <sub>1</sub>	Z <sub>2</sub>	Z <sub>3</sub>	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	Z <sub>1</sub>	Z <sub>2</sub>	Z <sub>3</sub>
2	10.5	16.5	21.6	35.6	2.0	3.9	9.2	11.5	17.5	22.6	36.6	1.5	3.4	8.2
2 (Extended)	11.8	16.5	21.6	35.6	5.0	7.9	18.2	12.8	17.5	22.6	36.6	4.5	7.4	17.2
4	19.9	25.7	29.2	N/A*	4.0	8.2	N/A*	20.9	26.7	30.2	N/A*	3.5	7.7	N/A*

\*4pr stiffener removal tool does not extend past  $X_3$ , so  $X_4$  and  $Z_3$  dimensions are not necessary

### 5.1.2 Stacker Product (22, 30, 38, 40, 42, 44 mm)

The progressive Z layout for XCede Stacker products is shown below in Figure 30. Table 12 gives the dimensions that define the hard and soft limits for the keep out zones for the given heights. No components may be placed anywhere in or above the black portion of Figure 30 (hard limit). Some components may be allowed in the grey area (soft limit) – contact an ATCS FAE before designing components into this area. All X dimensions reference datum  $X_{ST}$  and all Z dimensions reference datum  $PCB_{ST}$ . See C-AX and C-JX drawings for datum definitions.



**Figure 31: Progressive Z Layout for Stacker Product**

Note: Progressive Z zone for Stacker is mirrored on both sides of the connector to accommodate both stiffeners.

**Table 14: XCede Stacker Progressive Keep Out Zones**

	<b>HARD LIMIT</b>					<b>SOFT LIMIT</b>				
	X-Dimensions (mm)			Z-Dimensions (mm)		X-Dimensions (mm)			Z-Dimensions (mm)	
<b>Height</b>	<b>X<sub>1</sub></b>	<b>X<sub>2</sub></b>	<b>X<sub>3</sub></b>	<b>Z<sub>1</sub></b>	<b>Z<sub>2</sub></b>	<b>X<sub>1</sub></b>	<b>X<sub>2</sub></b>	<b>X<sub>3</sub></b>	<b>Z<sub>1</sub></b>	<b>Z<sub>2</sub></b>
<b>22*</b>	22.3	24.9	29.6	0.3	21.9	23.3	25.9	30.6	0	21.4
<b>30*</b>	22.3	24.9	29.6	2.6	24.2	23.3	25.9	30.6	2.1	23.7
<b>38</b>	22.3	35.7	54.8	4.2	28.3	23.3	36.7	55.8	3.7	27.8
<b>40</b>	22.3	35.7	54.8	4.2	28.3	23.3	36.7	55.8	3.7	27.8
<b>42</b>	22.3	35.7	54.8	4.2	28.3	23.3	36.7	55.8	3.7	27.8
<b>44</b>	22.3	35.7	54.8	8.7	32.8	23.3	36.7	55.8	8.2	32.3

\*For these heights, module must be removed before stiffener is removed