TB-2197

XCede Product Family Connector Press-fit Installation Process

Revision “D”

Specification Revision Status

Revision	SCR No.	Description	Initial	Date
“A”	S2401	Initial Release	E. Lukin	08/19/13
“B”	S2483	Update Max force per pin spec	E. Lukin	10/01/13
“C”	S4477	Changed document title; revised scope to include X2, added X2 c-use backplane drawings, 15.7 compliant, femto press profile.	B. Merrill	4-11-16
“D”	S6002	Updated Step 10 on page 13	T. Nierendorf	07/07/17

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1.0 SCOPE

This document describes the methods and tooling for press application of Amphenol TCS XCede product family backplane connectors onto a printed circuit board (PCB). The XCede product family encompasses XCede, XCede plus, and X2 product lines. Unless stated or implied otherwise, “XCede” refers to any backplane product within the XCede connector family.

2.0 XCede REFERENCE DOCUMENTS

The customer-use prints in section 2.0 are used for standard XCede, and XCede+ without extra ground, backplane applications.

2.1.1 XCede 2 Pair Backplane Customer Use Drawings

C-951-200J-500 2 Pair, 4 Column Differential Backplane Module

C-951-200C-500 2 Pair, 6 Column Differential Backplane Module

C-951-200E-500 2 Pair, 8 Column Differential Backplane Module

C-951-200Q-500 2 Pair, 14 Column Differential Backplane Module

C-951-200N-500 2 Pair, 24 Column Differential Backplane Module

2.1.2 XCede 3 Pair Backplane Customer Use Drawings

C-951-300J-500 3 Pair, 4 Column Differential Backplane Module

C-951-300C-500 3 Pair, 6 Column Differential Backplane Module

C-951-300E-500 3 Pair, 8 Column Differential Backplane Module

C-951-300Q-500 3 Pair, 14 Column Differential Backplane Module

C-951-300N-500 3 Pair, 24 Column Differential Backplane Module

2.1.3 XCede 4 Pair Backplane Customer Use Drawings (Also used for XCede Plus No Extra Ground Backplanes)

C-951-400J-500 4 Pair, 4 Column Differential Backplane Module

C-951-400C-500 4 Pair, 6 Column Differential Backplane Module

C-951-400E-500 4 Pair, 8 Column Differential Backplane Module

C-951-400Q-500 4 Pair, 14 Column Differential Backplane Module

C-951-400N-500 4 Pair, 24 Column Differential Backplane Module

2.1.4 XCede 5 Pair Backplane Customer Use Drawings (Also used for XCede Plus No Extra Ground Backplanes)

C-951-500J-500 5 Pair, 4 Column Differential Backplane Module

C-951-500C-500 5 Pair, 6 Column Differential Backplane Module

C-951-500E-500 5 Pair, 8 Column Differential Backplane Module

C-951-500Q-500 5 Pair, 14 Column Differential Backplane Module

C-951-500N-500 5 Pair, 24 column Differential Backplane Module

2.1.5 XCede 6 Pair Backplane Customer Use Drawings (Also used for XCede Plus No Extra Ground Backplanes)

C-951-600J-500 6 Pair, 4 Column Differential Backplane Module

C-951-600C-500 6 Pair, 6 Column Differential Backplane Module

C-951-600E-500 6 Pair, 8 Column Differential Backplane Module

C-951-600Q-500 6 Pair, 14 Column Differential Backplane Module

C-951-600N-500 6 Pair, 24 Colum Differential Backplane Module

3.0 XCede Plus REFERENCE DOCUMENTS

The customer-use prints in section 3.0 are used for XCede+ with extra ground backplane applications.

3.1.1 XCede Plus 4 Pair Backplane Customer Use Drawings

C-940-400A-500 4 Pair, 4 Column Extra Ground Differential Backplane Module

C-940-400B-500 4 Pair, 6 Column Extra Ground Differential Backplane Module

C-940-400C-500 4 Pair, 8 Column Extra Ground Differential Backplane Module

3.1.2 XCede Plus 6 Pair Backplane Customer Use Drawings

C-940-600A-500 6 Pair, 4 Column Extra Ground Differential Backplane Module

C-940-600B-500 6 Pair, 6 Column Extra Ground Differential Backplane Module

C-940-600C-500 6 Pair, 8 Column Extra Ground Differential Backplane Module

3.1.3 XCede Plus 8 Pair Backplane Customer Use Drawings

C-940-800B-500 8 Pair, 6 Column Extra Ground Differential Backplane Module

C-940-800C-500 8 Pair, 8 Column Extra Ground Differential Backplane Module

4.0 X2 REFERENCE DOCUMENTS

The customer-use prints in section 4.0 are used for X2 backplane applications.

4.1.1 X2 4 Pair Backplane Customer Use Drawings

C-940-400A-500 4 Pair, 4 Column Differential Backplane Module

C-940-400B-500 4 Pair, 6 Column Differential Backplane Module

C-940-400C-500 4 Pair, 8 Column Differential Backplane Module

C-940-401A-500 4 Pair, 4 Column Extra Ground Differential Backplane Module

C-940-401B-500 4 Pair, 6 Column Extra Ground Differential Backplane Module

C-940-401C-500 4 Pair, 8 Column Extra Ground Differential Backplane Module

4.1.2 X2 5 Pair Backplane Customer Use Drawings

C-940-500A-500 4 Pair, 4 Column Extra Ground Differential Backplane Module

C-940-500B-500 4 Pair, 6 Column Extra Ground Differential Backplane Module

C-940-500C-500 4 Pair, 8 Column Extra Ground Differential Backplane Module

4.1.3 X2 6 Pair Backplane Customer Use Drawings

C-940-600A-500 4 Pair, 4 Column Differential Backplane Module

C-940-600B-500 4 Pair, 6 Column Differential Backplane Module

C-940-600C-500 4 Pair, 8 Column Differential Backplane Module

C-940-601A-500 4 Pair, 4 Column Extra Ground Differential Backplane Module

C-940-601B-500 4 Pair, 6 Column Extra Ground Differential Backplane Module

C-940-601C-500 4 Pair, 8 Column Extra Ground Differential Backplane Module

5.0 TOOLING

5.1.1 Press System

The application of Amphenol TCS XCede press-fit style components can be performed across many different press platforms, however there are minimum performance features and capabilities that are strongly recommend be available:

5.1.1.1 Rate

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

5.1.1.2 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.

5.1.1.3 Feedback

The application press should have the capability to monitor, display, record, and feed back 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 to 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.

5.1.2 Application Tools

For without extra ground XCede connector application, refer to loading head part numbers in table 1. For with extra ground connector application, refer to table 2.

Table 1: XCede, XCede Plus, and X2 Backplane Module Loading Head Tooling Part Numbers. No extra ground

Pair	Position	Loading Head Part Number
2 Pair	4	694-4381-000
	6	694-4145-000
	8	694-4153-000
	14	694-4386-000
	24	694-4364-000
3 Pair	4	694-4382-000
	6	694-4349-000
	8	694-4350-000
	14	694-4387-000
	24	694-4351-000
4 Pair	4	694-4383-000
	6	694-4073-000

	8	694-4162-000
	12	694-4144-000
	14	694-4369-000
	24	694-4365-000
5 Pair	4	694-4384-000
	6	694-4081-000
	8	694-4371-000
	14	694-4370-000
	24	684-4372-000
6 Pair	4	694-4385-000
	6	694-4076-000
	8	694-4165-000
	14	694-4388-000
	24	694-4366-000

Table 2: XCede Plus and X2 Backplane Module Loading Head Tooling Part Numbers. With extra ground.

Pair	Position	Loading Head Part Number
4 Pair	4	694-4695-000
	6	694-4696-000
	8	694-4697-000
5 Pair	4	694-4757-000
	6	694-4758-000
	8	694-4759-000
6 Pair	4	694-4698-000
	6	694-4699-000
	8	694-4700-000
8 Pair	4	694-4775-000

	6	694-4682-000
	8	694-4683-000

5.1.3 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 pallets, fixtures, or tooling should provide support adequate for the number of pins being pressed. The configuration should provide support directly under the connector pattern and the material chosen should allow for minimum deflection under the maximum compression force. The support fixture is not supplied by Amphenol, if assistance with the fixture design is needed please contact your local field application engineer.

6.0 PROCEDURE

Step 1. Locate the correct seating head and support pallet/fixture. The seating head should match up to your individual connectors along their length (position) and width (pair). Refer to Tables 1 and 2 for the correct tool to fit the connector.

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 4.1.1.1 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. If the connector is supplied in a tube, first remove the shipping tape and hardware. Lay the tube on a flat table with the connector compliant pins facing up. To properly remove the connectors from the tube, use a round or square rod to push the connectors out one at a time.

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 a compliant true position gage has been ordered, place the connector onto the gage in the same manner as the connector would be placed onto a PCB, and look for any difficulty during placement, or any compliant pins that do not protrude out the back side of the gage. If any compliant pins are out of position or broken, discard the connector and begin Step 5 again with a new connector.

NOTE: Amphenol TCS recommends the purchase or the design and manufacture of a backplane compliant pin true position gage for the specific configuration of the connector being installed. The compliant pin true position gage can ensure that the compliant pins are in their proper position immediately before the connector is placed onto the board, significantly reducing the possibility of connector or PCB damage. Contact your local Amphenol TCS application engineer for ordering information of this part.

Step 6. Hold the connector up off the PCB and place the row of compliant pins, opposite to the tabbed side of the backplane, into the correct plated through hole (PTH), see Figure 1. With the front of the connector still up off the board, roll the connector right to left, into the remaining PTHs, see Figures 2-3.

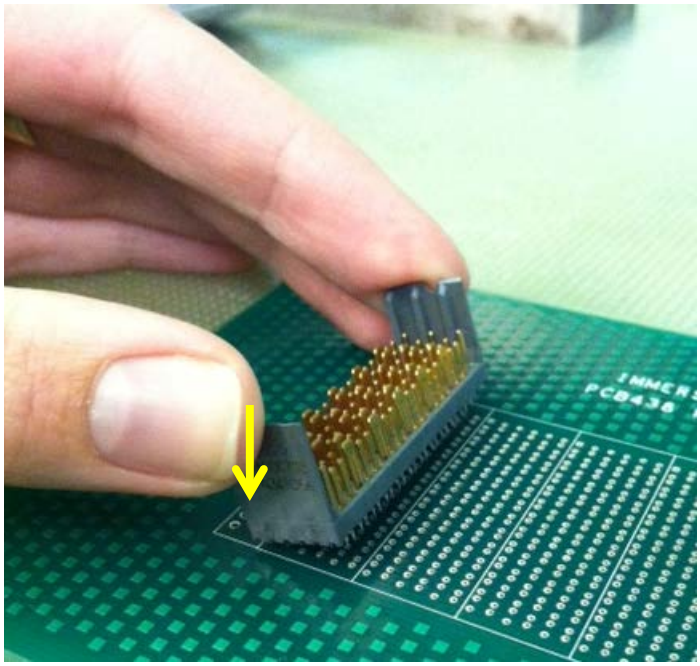


Figure 1: Leftmost row of compliant pins in the PTH.

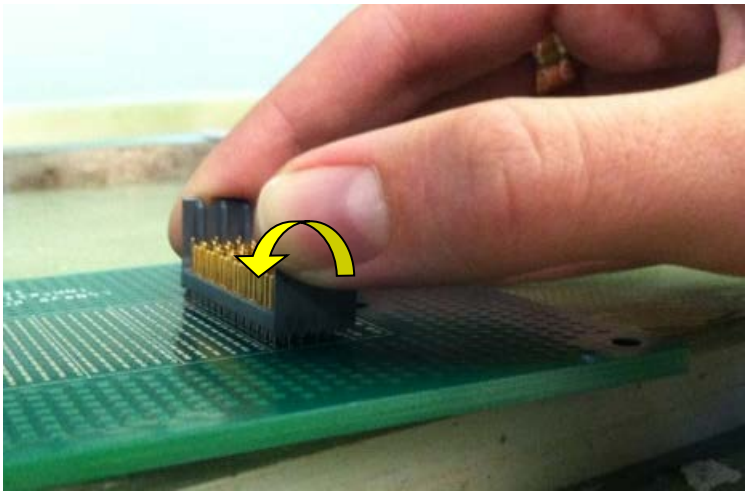


Figure 2: With the leftmost row entirely placed, roll the module toward the right, placing the remaining compliant pins.

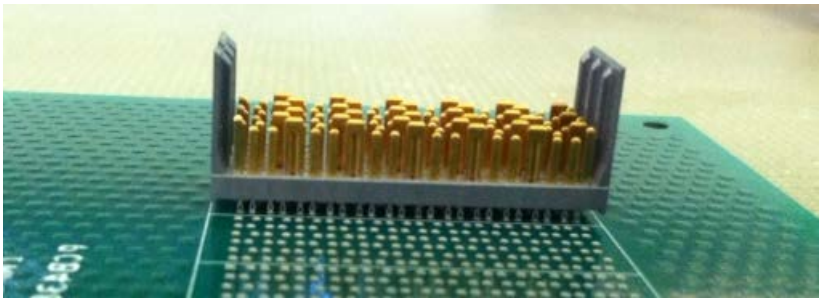


Figure 3: Backplane module is fully in place. Note the first row of compliant pins.

Step 7. Check for any bent pins protruding from under the connector assembly, see Figure 4.

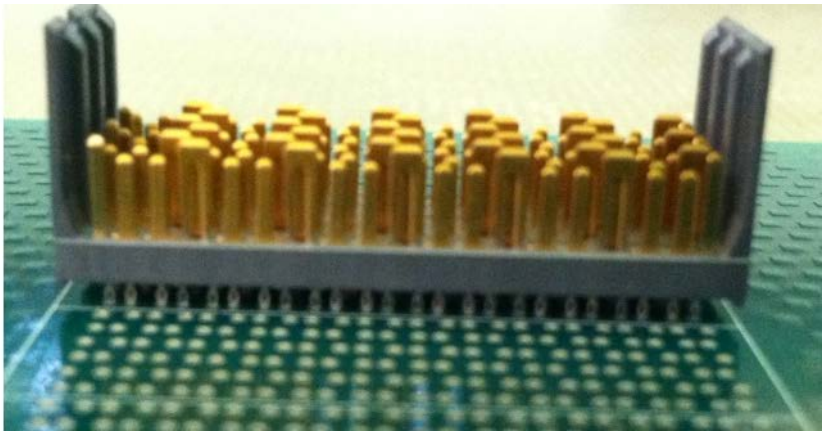


Figure 4: Rightmost view of assembly, check for bent pins.

Step 8. Select the correct seating head based on the connector platform (From Tables 1 and 2) and the length of the connector, see Figure 5. 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 6.

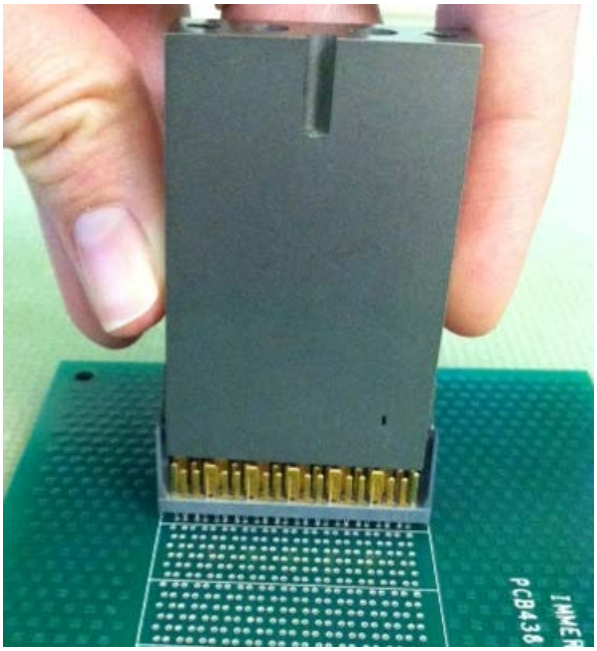


Figure 5: The 6 Pair seating head matches the 6 Pair Backplane module.

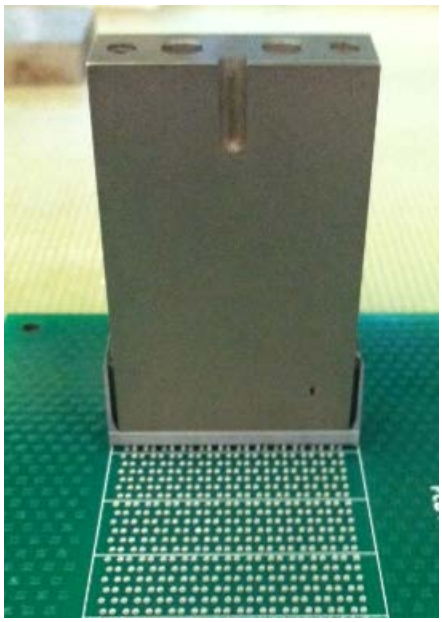


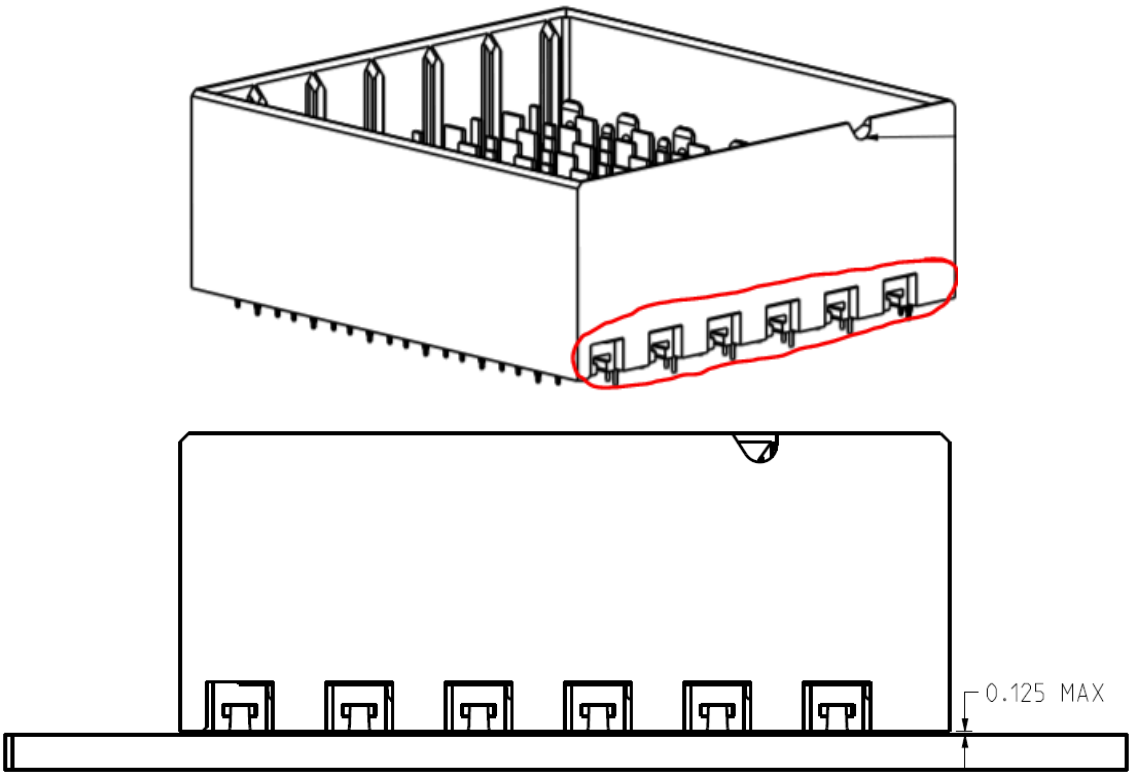
Figure 6: Ensure the cavities in the seating head match up to the blades on the backplane module.

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

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 Customer Use Drawings for a drawing of the application and rework keep out zones.

Step 10. Inspect the pressed connector for proper seating. 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. A shim can be used to check the seating height of the connector. For stitched BMAs, the bottom surface cannot be more than 0.125mm from the board surface.

NOTE: for Ortho BMAs with wafer strips (not stitched contacts), some relative movement between the molded wafers and housing is possible. When using a shim to check seating height, the intention is to ensure that the wafers are fully seated, not the housing. For this reason, only the ends of the BMA with visible wafers should be checked (shown below) -



7.0 XCede Backplane Press Recommendations and Pressing Procedures

7.1.1 Backplane Press Recommendations

The press used for inserting XCede backplane modules 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 (i.e. Gold). The press, tooling and fixtures need to be sufficiently rigid to prevent any bowing or deflection during the installation process.

2) ATCS 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. ATCS 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 backplane module installation and accounts for PCB thickness and connector height tolerances. It is not recommended to insert backplane modules to a specific height, due to the PCB and connector tolerances build up. Installing a backplane module to a specific height may result in over seating or under seating the connector. Over seating a backplane module 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: Amphenol TCS recommends using the Tyco Electronics (ASG) MEP-12T for all XCede connector pressing. The MEP-12T has all of the capabilities outlined above.

7.1.2 XCede Backplane Recommended Press Procedures

The following are recommended process steps to follow when installing XCede Backplane 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 important in maintaining a consistent pressing process; refer to TB-2149 for FHS requirements. Approximately 6-12 holes should be inspected across the connector hole pattern.

3) After pressing, the completed assembly should be inspected. Inspect the PCB opposite the connector to verify that the compliant pins are in the holes. If a pin is missing (provide a picture to show the defect) the assembly can be repaired by removing the defective backplane module and inserting a new one per TB-2210. The most common cause of a missing pin is improper loading of the connector, which causes a bent pin prior to pressing.

For customers who are using an MEP 12T press, please contact your local ATCS application engineer for tooling and fixturing support.

7.1.3 XCede Recommended Press Settings for Tyco (ASG) MEP-12T Presses

The following settings are recommended for applying XCede connectors using MEP-12T presses. If the press is not an MEP-12T, please contact your ATCS application engineer for assistance.

Figure 7: MEP-12T Manual-Electric Press

Amphenol-TCS has developed press profiles that can be used on MEP presses to install XCede connectors onto PCBs. The profile utilizes force feedback features on the MEP-12T press that ensure proper pressing of connectors. Please consult your ATCS fields application engineer for the appropriate press profile developed by Amphenol-TCS.

- If this profile is not installed on your press, please contact your ATCS fields application engineer for assistance. Other profiles tailored to specific connector and application needs may also be used, consult your ATCS fields application engineer for more information and assistance.

The following steps describe proper creation, setup, and application of XCede backplane modules: The MEP press main menu has 4 major screens that are required to setup a connector, tool and PCB for pressing, see Figure 9:

- 1 - Tool Editor

  This screen is where the tool name, ID and dimensions are entered.
- 2 -Connector Editor

  This screen is where connector name, dimensions, pin count, error limits, and termination method are entered.
- 3 - Profile Editor

  This screen is where the list of action steps for the press to execute is entered (the press profile developed by Amphenol-TCS)
- 4 - Press Data Editor

  This screen is where a printed wiring board (PWB) is assigned connectors to be pressed, board thickness, and fixture thickness.

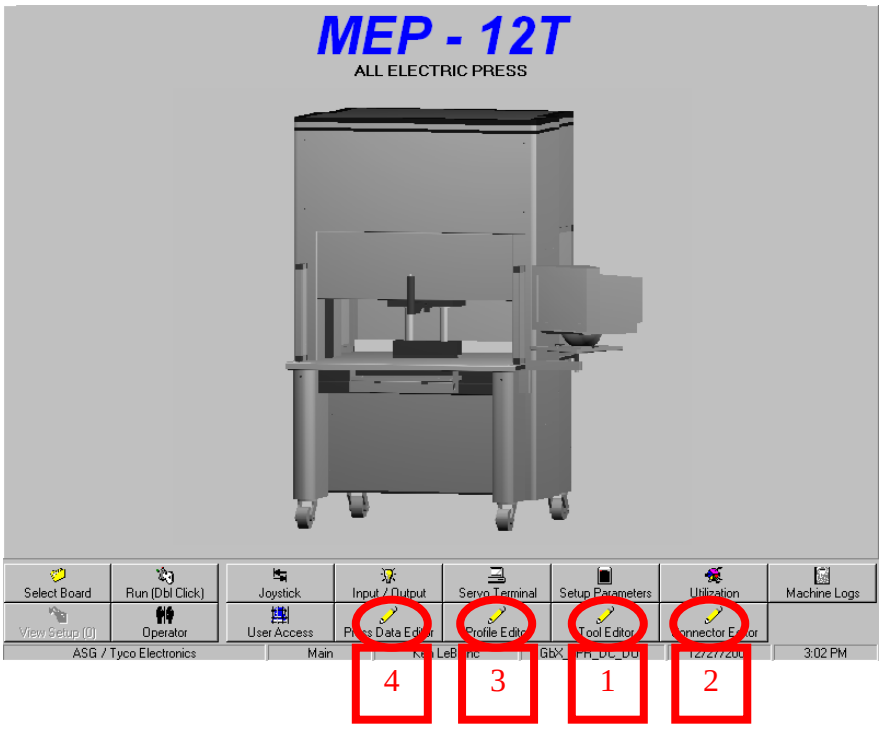


Figure 8: Main Menu of MEP-12T Press

1 - Tool Editor:

The Tool Editor screen allows for the creation of a new tool, see Figure A-3. This screen is the setup for top tooling only. Bottom tooling setup is in the press data editor screen and is categorized as “Fixture” (See Press Data Editor Screen).

- Tool Type – Unique identifier (User specified).
- Tool ID – Tool part number (User specified).
- Tool Clearance – Typically 0.100 inches unless additional height is needed for taller components on PWB.
- Tool Height – Overall height of tool from top of tool to tool contact point of connector.
- Tool Width – Width of tool.
- Tool Length – Length of Tool.

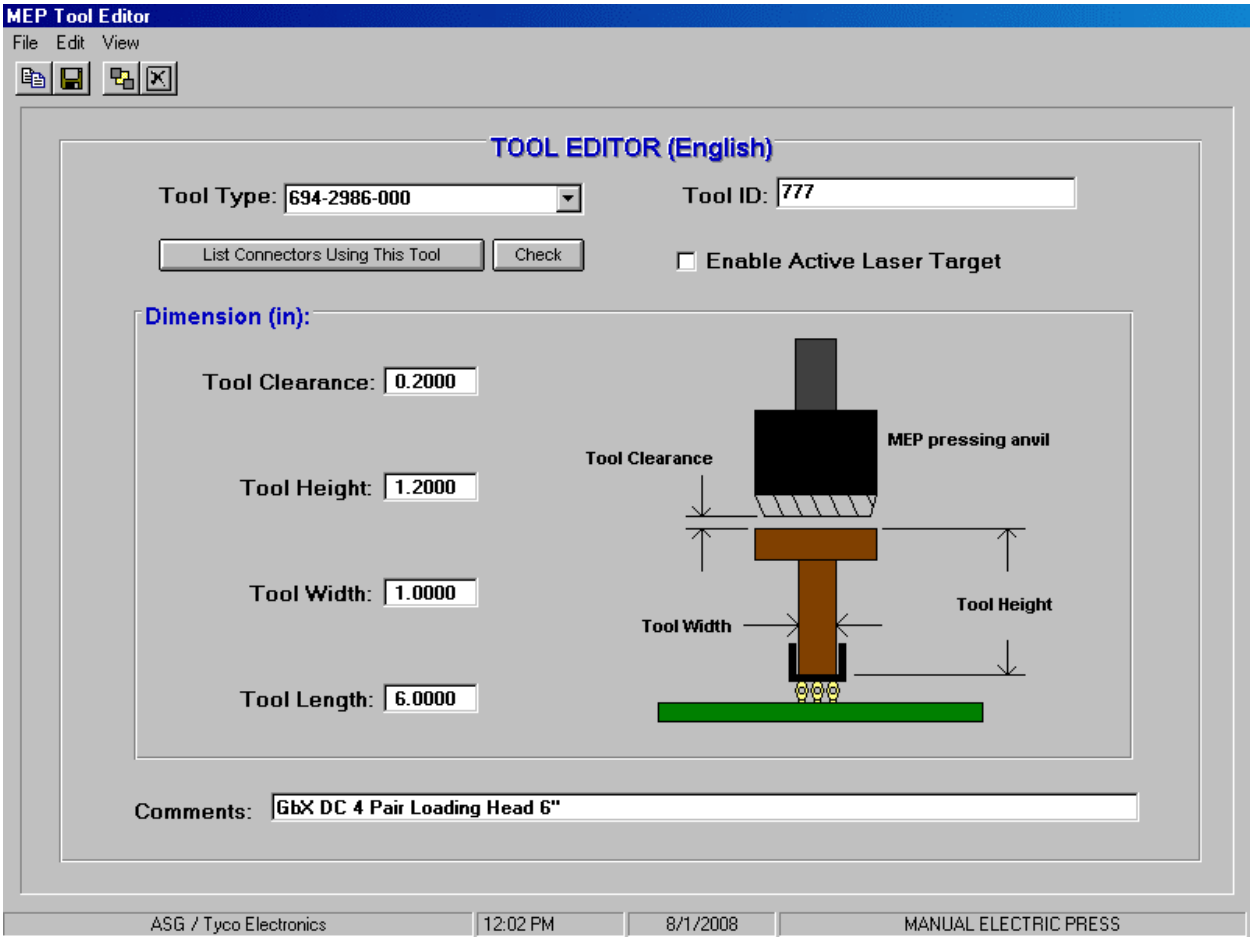


Figure 9: Tool Editor Screen of MEP-12T Press (Representative screen - tool length can vary based on connector configuration)

2 - Connector Editor:

The connector editor screen allows for the creation of a new connector, see Figure A-4 for detailed parameters.

- Connector – Part number for connector being created (User specified).
- Tool – “Tool Type” and “Tool ID” from Tool Editor screen
- Profile – Pressing profile used by the MEP-12T to install the XCede connector (Amphenol-TCS recommendation is to use the appropriate press profile provided by your field application engineer).
- Number of Pins – Sum of all pins entering PTHs on the connector (signal, shield, and power).
- Graph Scale –
    - 10.0 for XCede Standard BMA Compliant Pin (0.0217” Drill)
    - 8.0 for XCede and XCede Plus Nano (0.0177” Drill), and X2 Femto Compliant Pin (0.0157” Drill)
- Distance – 0.1500
- Min Force per Pin (lbf) –
    - 0.5 for 0.0217” Drill, 0.0177” Drill
    - 0.4 for Femto 0.0157” Drill
- Max Force per Pin (lbf) –
    - 15.0 for XCede Standard and Mini Power Compliant Pin (0.033”)
    - 10.0 for XCede Standard BMA Compliant Pin (0.0217” Drill)
    - 6.0 for XCede and XCede Plus Nano Compliant Pin (0.0177” Drill)
    - 5.0 for X2 Femto Compliant Pin (0.0157” Drill)
- User Force per Pin – Not used for XCede press profile.
- Other Force – Not used for XCede press profile.
- PARS – Not used for XCede and XCede Plus press profile.
- Gradient Degrees – 75.0.
- SPC – Values to be dictated by process owner. Not covered in this document.
- Dimension – Unique to connector being installed, see Figure A-4.

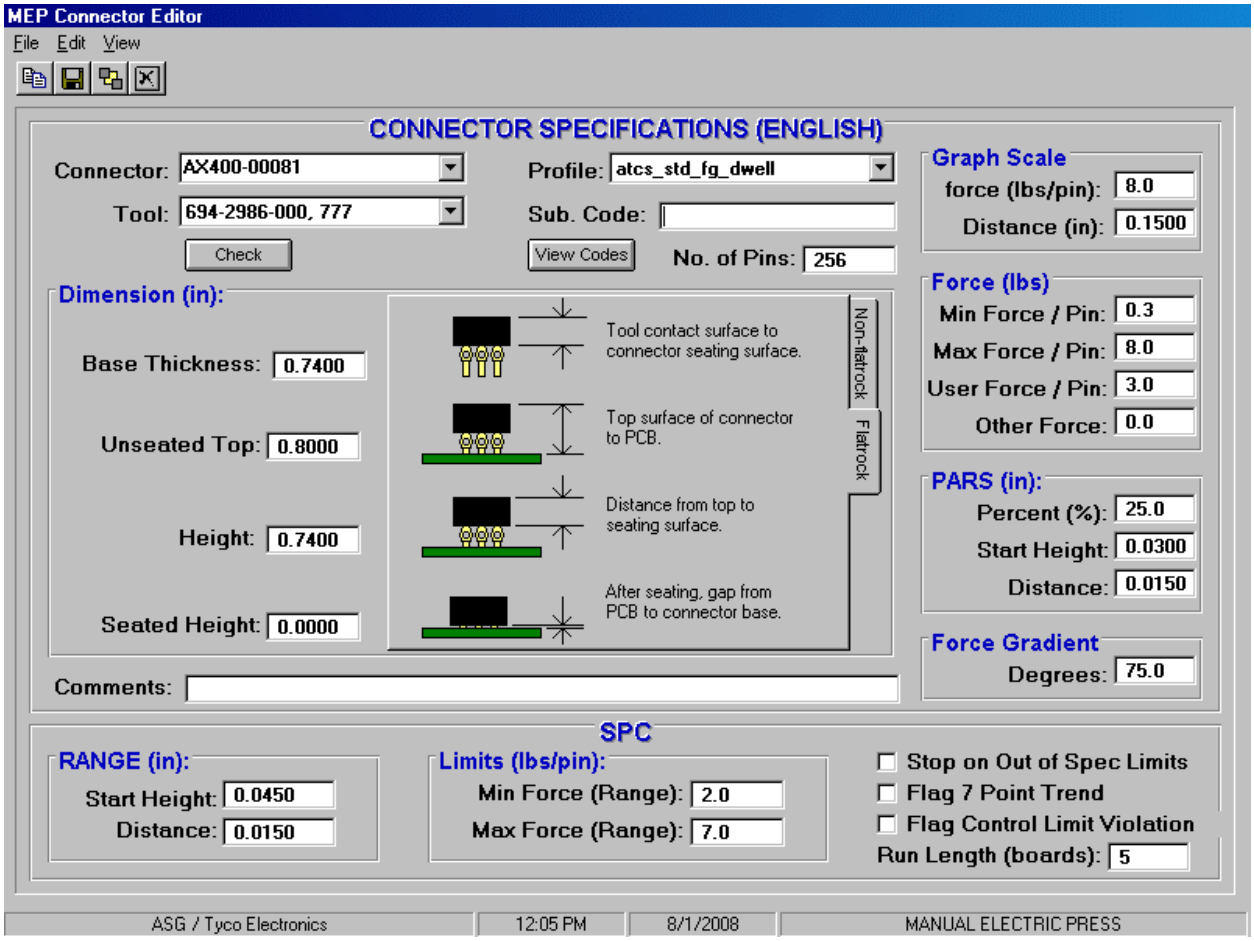


Figure 10: Connector Editor Screen of MEP-12T press

The dimensions of connectors that are critical to proper installation onto a PWB 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 PWB surface.
- Height – Same as Base Thickness for XCede and XCede Plus Connectors.
- Seated Height – Gap between PWB and connector seating surface, ideally 0.00.

Table A-1 below describes the dimension values for the Connector Setup screen of the MEP-12T press for the various XCede and XCede Plus Backplane connector sizes. If a particular XCede or XCede Plus connector is not listed, please consult your Amphenol-TCS representative for assistance.

Table 3: Connector Setup dimensions for XCede connectors for MEP-12T press.

XCede and XCede Plus Backplane Dimensional Values				
	Base Thickness (inches)	Unseated Top (inches)	Height (inches)	Seated Height (inches)
XCede Standard compliant pin	0.100	0.568	0.528	0
XCede / XCede plus Nano compliant pin	0.100	0.558	0.528	0
X2 Femto Compliant	0.100	0.548	0.528	0

3 - Profile Editor:

The Profile Editor screen provides the detail of the Amphenol-TCS XCede press profile created for installing XCede connectors onto PWBs, see Figure 12. Rows 1 through 5 are the commands for a normal press sequence. Rows 6 through 9 are the commands for a “Re-Press” sequence. At each step in the profile sequence, the press executes on the event that occurs first. If the “Height Above Board” occurs first, then the press executes the “Height Action”. If the “Force” occurs first, the press executes “Force Action”. The press speed during the press sequence is set to 0.050 inches / second. This speed is intended to ensure that the compliant pins remain stable during the pressing process. Speeds exceeding this are not

recommended, and may result in connector pressing failures. Row 3 has a 1.5 second delay built into the press profile as a settling time for connectors to minimize the potential for pressing failures.

- Profile – Setup steps found in the XCede press profiles developed by Amphenol-TCS to perform normal press and re-press operations for XCede connectors.
- Sample Range for PARS Forces – Not used in XCede press profile.
- Action Errors – Message that appear on MEP-12T monitor if error occurs.

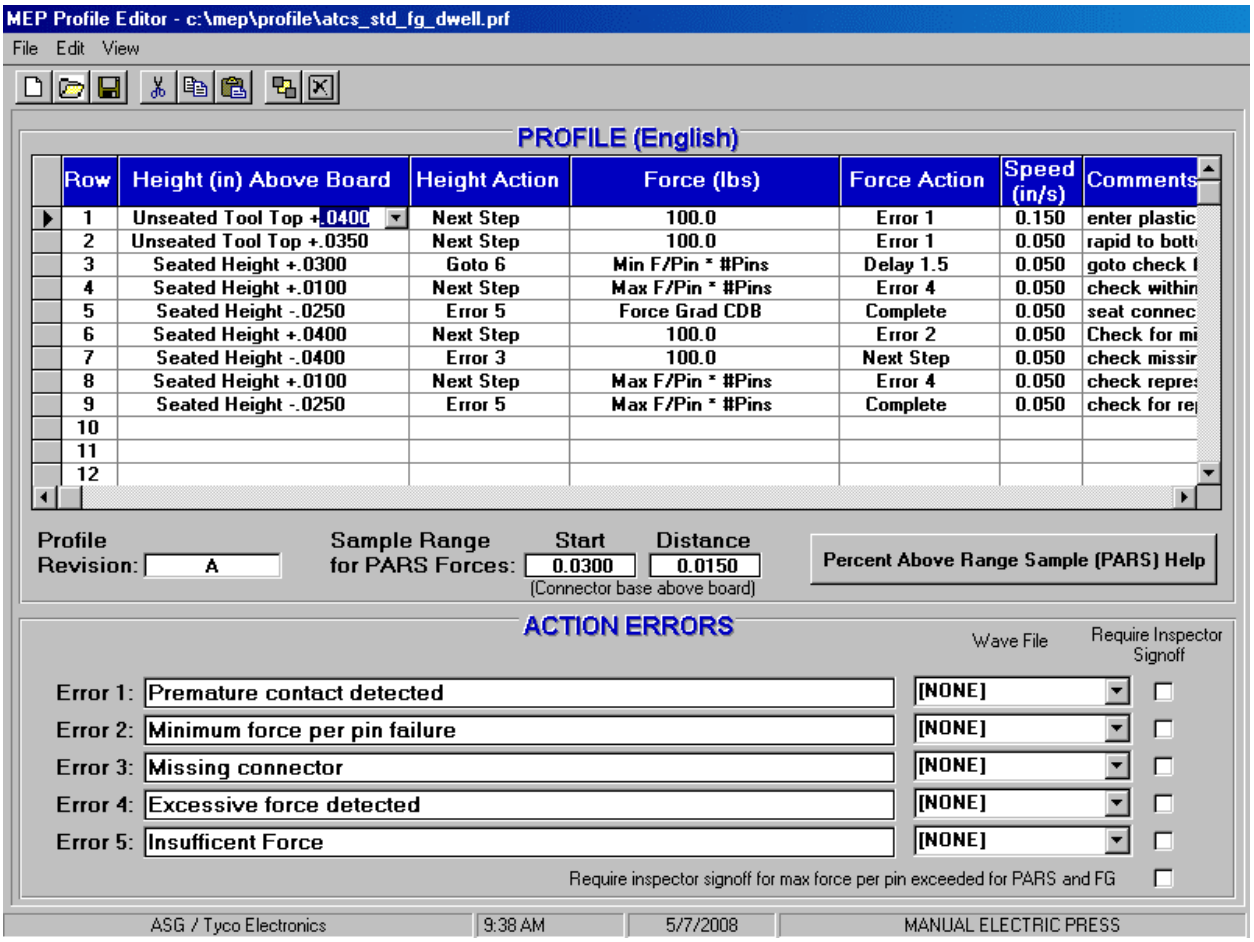


Figure 11: Profile Editor of MEP-12T press displaying the standard compliant press profile.

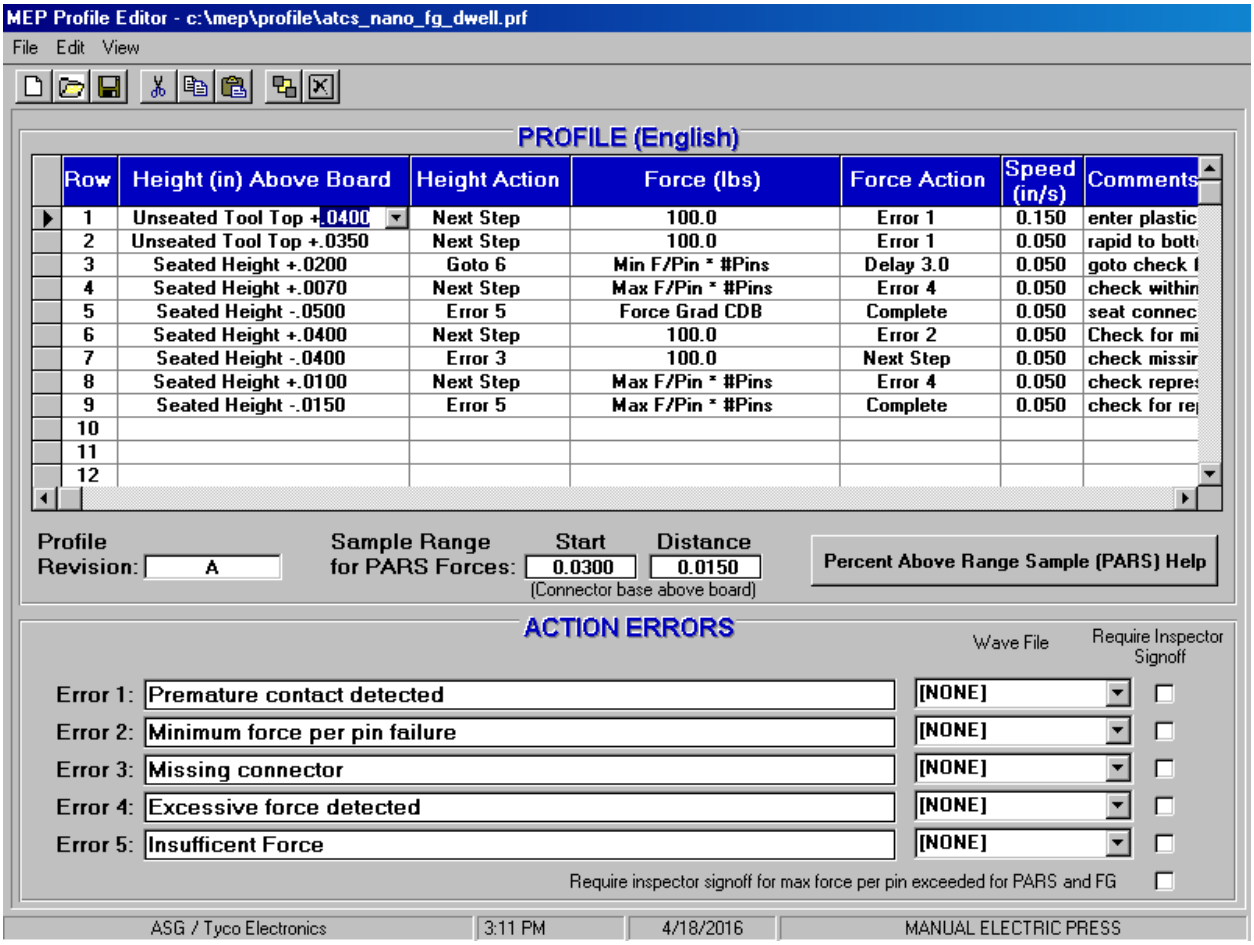


Figure 12: Profile Editor of MEP-12T press displaying the “Nano” compliant press profile.

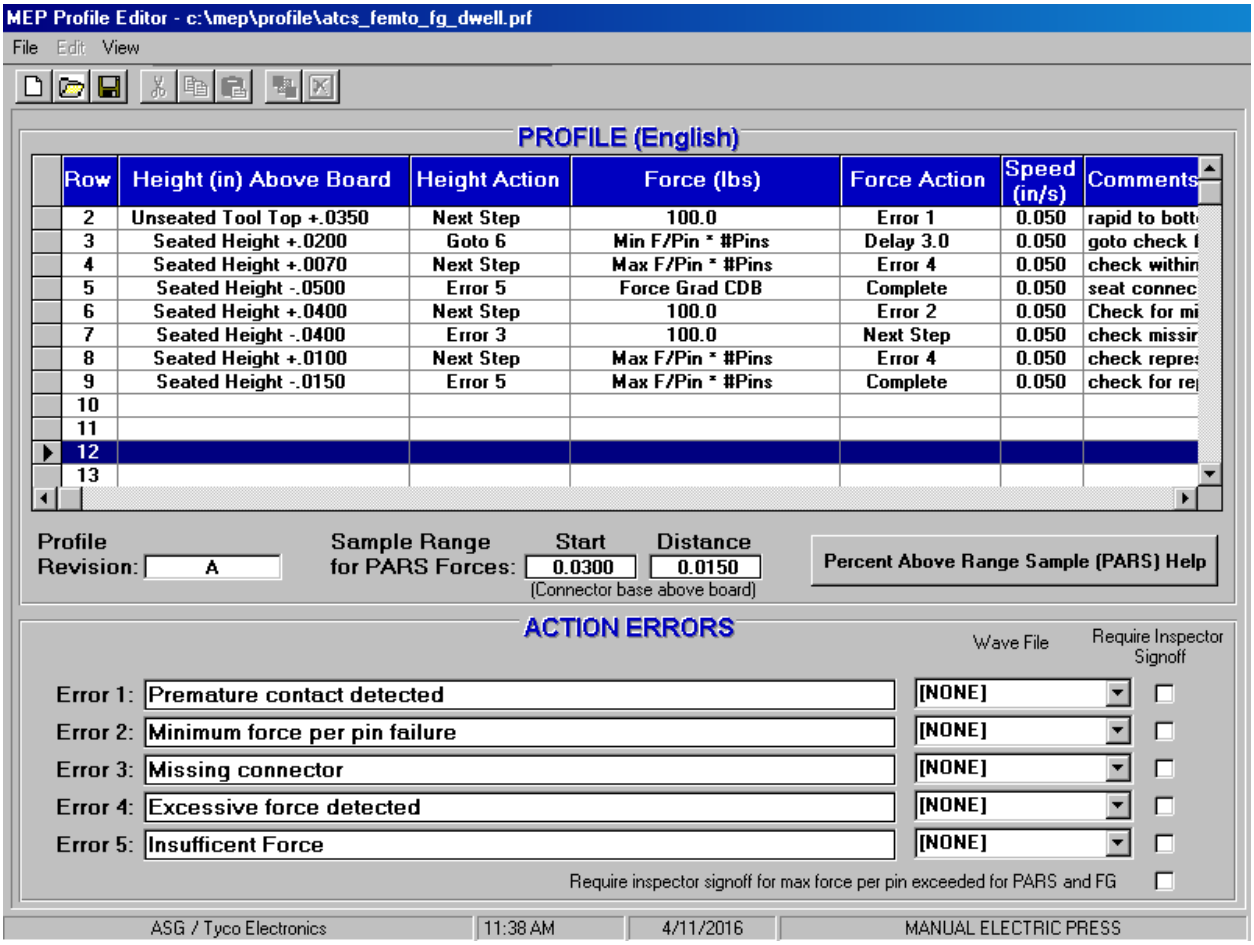


Figure 13: Profile Editor of MEP-12T press displaying the “Femto” compliant press profile.

Press Data Editor:

The Press Data Editor screen allows for the creation of a unique PWB assembly, see Figure A-6.

- Description – Unique identifier of assembly (User specified)
- Revision – To be determined by process owner (User specified)
- Board Thickness – Thickness of raw PWB in inches in the location of the XCede connector. This value may be determined by a board thickness measurement taken automatically prior to press cycle (not covered in this document).
- Fixture Thickness – over hang will not interfere with MEP-12T press surface, see Figure A-6. This thickness includes any tooling between “machine zero” and the bottom surface of the PWB. “Machine zero” is a term describing the lowest plane on the press (default is the original press tabletop but this may be reassigned in the instance of a permanent bottom fixture or rolling table).
- Fixture ID – To be determined by the process owner (User specified).
- Press Sequence – Connector pressing order to be determined by process owner.
    - X, Y, and Angle – Locations of the connector being placed on PWB. To be determined by process owner.
    - Connector – Select the XCede connector from pull down menu in “Connector” cell.

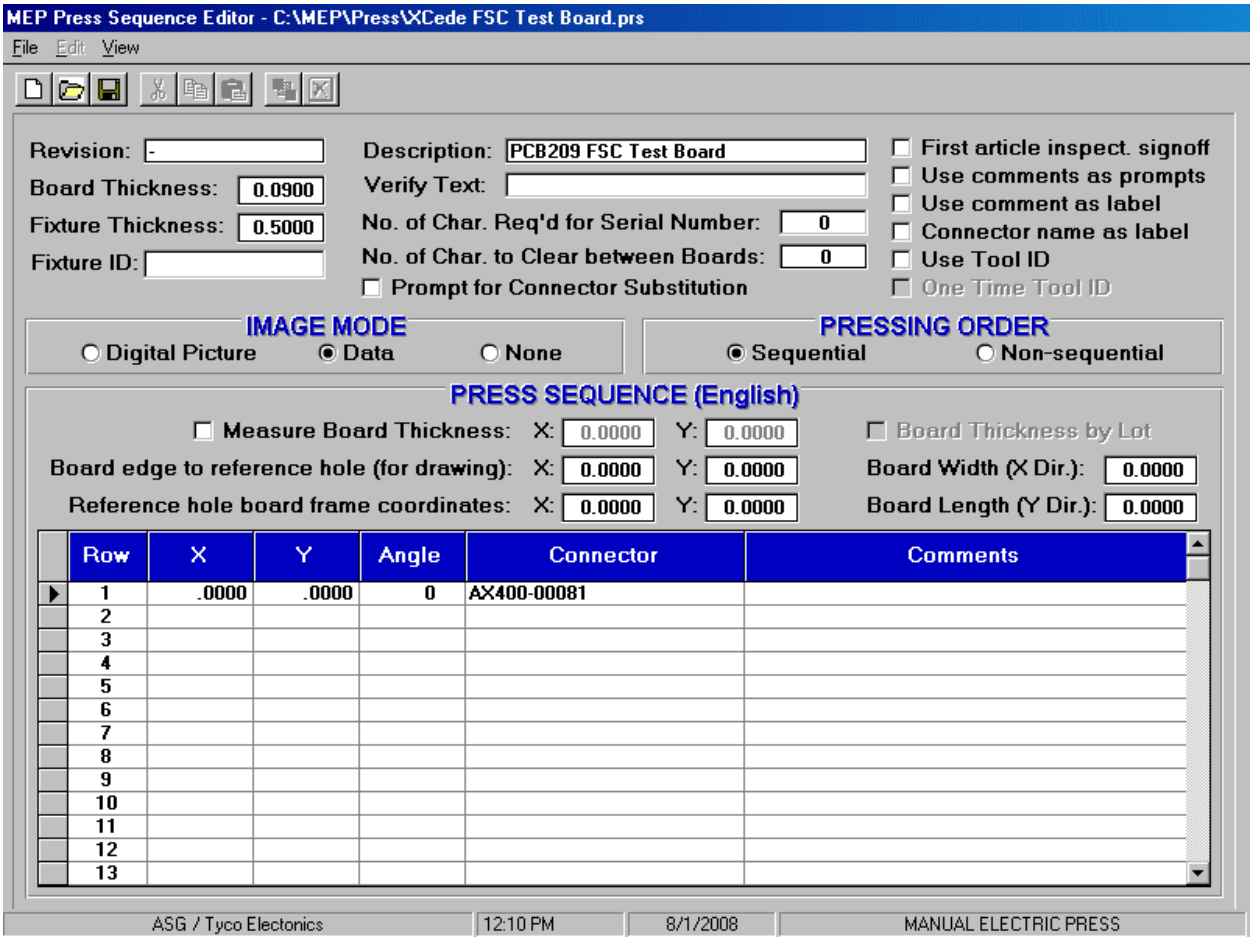


Figure 14: **Press Data Editor of MEP-12T press.**

The MEP-12T press produces a Force vs. Distance curve during a pressing sequence similar to the one shown in Figure A-7. The main areas of the curve are: the initial compression of the compliant pin and compliance of the PWB hole (1), the full collapse of the compliant pin (2), the sliding of the compliant pin in the PWB hole (3), and the termination force of the pressing sequence at the 75 Degree Force Gradient line (4). The following descriptions of these areas are for reference and are intended as an aid in understanding the pressing characteristics of the XCede connector utilizing the press profiles developed by Amphenol-TCS.

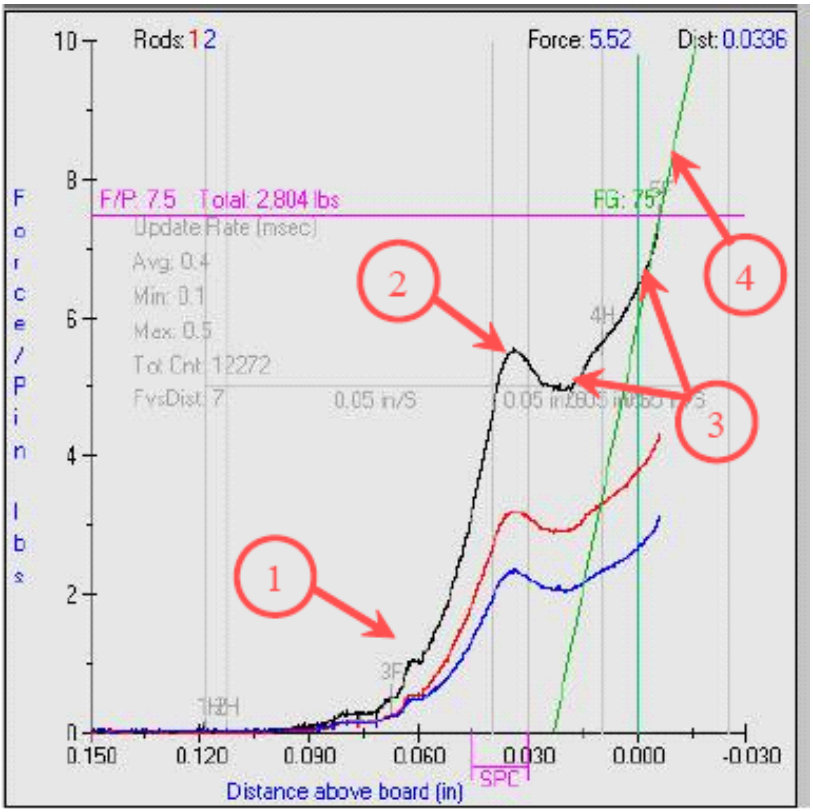


Figure 15: Typical Force vs. Distance Curve of MEP-12T press for XCede connectors.

1 - Initial Compression of compliant Pins:

Part of the initial pressing sequence with the press profile developed by Amphenol-TCS (Refer to Figure 12) is to permit settling and alignment of all the compliant pins of the connector prior to a full pressing sequence. In this zone, the compliant pins and the PWB plated through holes begin to conform to each other and the complaint pins begin to compress. At this zone the slope of the force gradient line begins to increase as the XCede compliant pins continue to compress.

2 - Full collapse of the compliant Pin:

At approximately 0.050 to 0.070 inches of insertion into the PWB plated through hole (approximately at the 0.035 inches mark on X axis of the Force Gradient Curve), the compliant pin is fully collapsed in the PWB plated through hole. This is represented by the peak in the force gradient curve, referred to the knee of the curve. Depending on multiple variables including PWB surface finish, PWB hole diameter, compliant pin feature size, number of power pins vs. signal pins, etc., the knee will be more or less pronounced, but is typically highlighted by an inflection point in the curve as Figure A-8 shows.

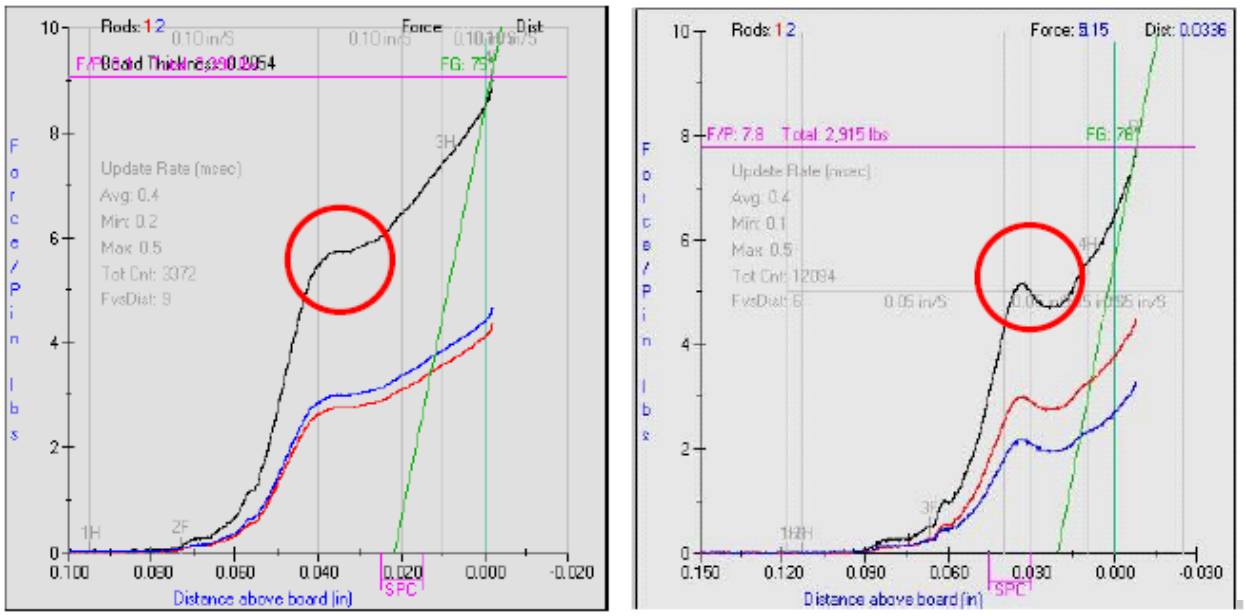


Figure 16: **XCede pressing Force vs. Distance Graph showing two shapes of the knee area utilizing an MEP-12T press.**

3 - Sliding Force of the compliant pin in the PCB hole:

After the compliant pin of the XCede connector is fully compressed, the pin travels further into the PWB plated through hole. As this sliding occurs, the force required to continue the installation process of the XCede connector past this point may decrease between 1 and 10 percent for a short distance before beginning to increase again as the compliant pin travels further into the PWB plated through hole. The specific amount of decrease depends on multiple variables including PWB surface finish, PWB hole diameter, compliant pin feature size, number of power pins vs. signal pins, etc. Figure A-8 shows a typical Force vs. Distance curve where the graph on the left does not show a decrease in force during the pressing process, where the graph on the right shows a slight decrease in the force. Both conditions produce a properly installed XCede connector.

Figure A-9 shows that between 0.040 inches and 0.010 inches above the PWB surface (spanning zones 2 and 3, refer to Figure A-7), the XCede press profiles searches for the “Max Force Per Pin” value entered in the Connector Editor Tool (Refer to Figure A-3). If this force is seen by the MEP-12T press in this region, the press will stop and display an error that the Max Force Per Pin has been reached. If the MEP-12T press does not see the “Max Force Per Pin”, the press profile will move to the next phase of the pressing process; the “75 Degree Force Gradient Line”.

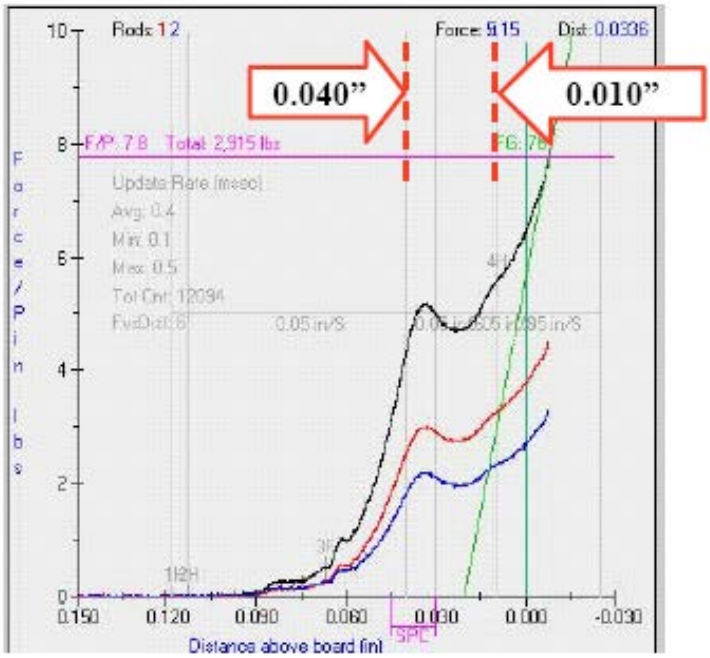


Figure 17: Force vs. Distance Graph showing the "Max Force Per Pin" zone.

Termination Force at the 75 Degree Force Gradient Line:

Once the XCede connector standoff features begin to come in contact with the PWB surface, the force vs. distance curve will begin to further increase in slope. During this stage of the pressing sequence, the XCede press profile searches for the force vs. gradient curve to reach a 75-degree angle at a distance from 0.010 inches above to 0.025 inches below the PWB surface (See Profile Editor and Press Data Editor Sections). Figure A-10 shows the termination phase of the pressing process area on the Force Gradient curve.

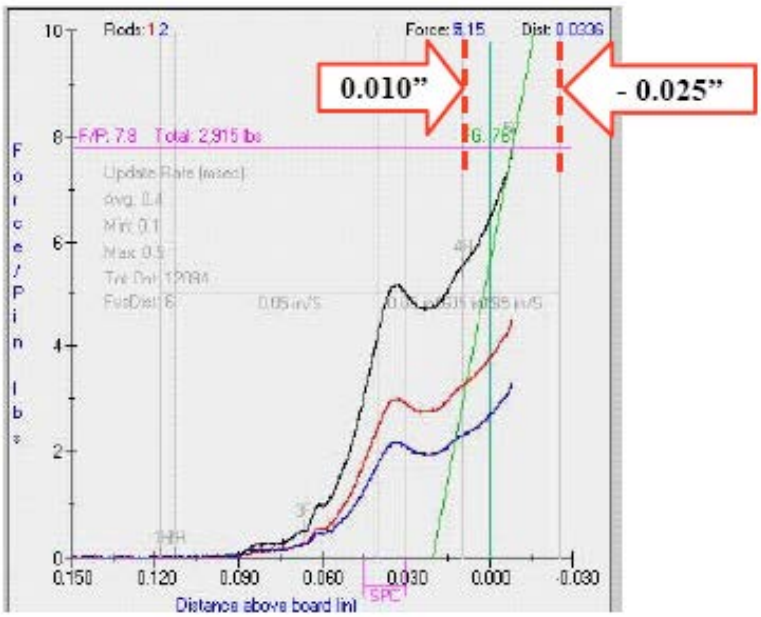


Figure 18: Force vs. Distance Graph showing the 75 Degree Force Gradient Zone.

The termination force generated by the pressing sequence is a combination of the frictional sliding forces created by the compliant pins and the PWB plated through hole with and other reactionary forces such as compliant pin alignment during the pressing process, connector standoff interference with the PWB surface, PWB and fixture warping, etc. It is important to understand that the termination force of a connector is not equivalent to the force experienced strictly by the connector compliant pin or PWB plated through holes. As a result of the components and process variables associated with the installation of XCede connectors onto PWB’s, termination forces of XCede connectors can be expected to be as high or higher than the knee of the curve described within zone 2, see Figure A-10.