TB-2367

Paladin^{TM} PLUS DAUGHTERCARD CONNECTORS PRESS-FIT INSTALLATION PROCESS

Revision "D"

Specification Revision Status

Revision	SCR No.	Description	Initial	Date
A	S10037	Initial Release	T. Nierendorf	9/2/22
B	S10352	Added tooling P/Ns to 2.2..5.6 and 2.2..5.7 Updated Figure A4 for clarity	T. Nierendorf	1/23/23
C	S10793	Section 2.2.2.7, 644-0006-000 was 644-0206-000	T. Nierendorf	9/6/23
D	S10872	Section 3 - Updated seating inspection for clarity	T. Nierendorf	10/30/23

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1. SCOPE

1.1. Content

This specification describes the methods and tooling for the installation of Paladin Plus right angle press-fit Daughtercard, Direct Orthogonal, and Coplanar connectors onto a printed circuit board (PCB). For installation of Standard Paladin connectors, see TB-2326. See Appendix A for the press and process recommendations.

2. REFERENCE

2.1. Amphenol Documents

- TB-2324 General Product Specification for Paladin Interconnect System
- TB-2322 Paladin Routing Guidelines
- TB-2320 Paladin Direct Ortho General Guidelines
- TB-2326 Paladin Daughtercard Connectors Press-Fit Installation Process
- TB-2327 Paladin Daughtercard Module Removal and Replacement

2.2. Tooling

2.2.1. Press System

The application of Paladin 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:

2.2.1.1. Force Requirement

The Paladin daughtercard connector can be assembled using individual segments up to:

- 8 inches for 2, 3, and 4 pair connectors
- 6 inches for 5, 6, 7, and 8 pair connectors

Segments may be joined after individual pressing to total over 18" in length. The press must have the capability to install connectors with a force of 6 lbs/pin. Amphenol recommends using an ASG MEP 12T electric press for installing daughtercard connectors. Air or hydraulic presses are typically not as well suited for controlled press rate and controlled force for daughtercard connector installations.

2.2.1.2. Rate

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

2.2.1.3. 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.

2.2.1.4. 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.

2.2.2. Application Tools

Paladin daughtercard connectors have dedicated loading heads for each product type and size. Paladin Plus utilizes the same tooling as standard Paladin. There are different loading head lengths available for each daughtercard product (refer to section 2.2.2.1-2.2.2.7). Amphenol requires that customers and contract manufacturers purchase the loading head tooling from Amphenol to ensure proper clearances for the daughtercard installation.

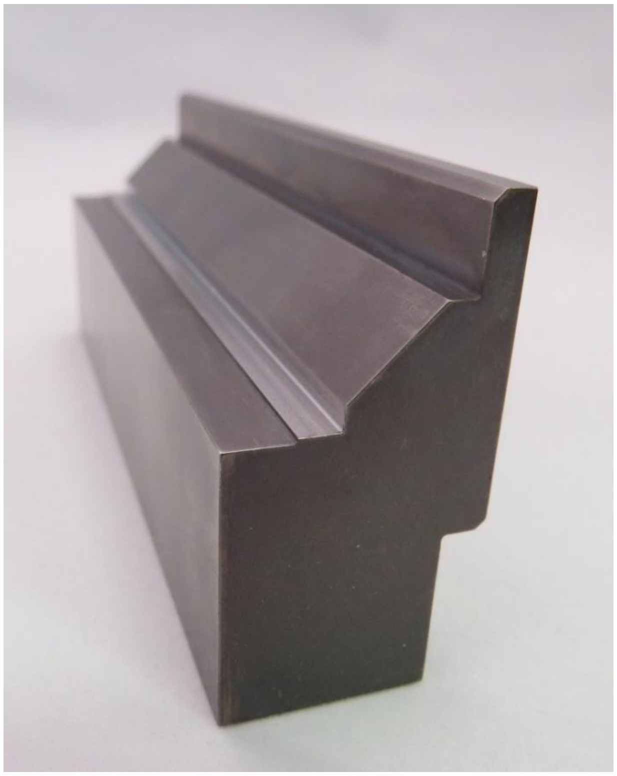


Figure 1: 4 Pair Daughtercard Application Tool

2.2.2.1. DC 2 Pair Application Tools

694-4977-000 – 2-Pair Loading Head 1.2" Long

694-4978-000 – 2-Pair Loading Head 2.0" Long

694-4979-000 – 2-Pair Loading Head 4.0" Long

694-4980-000 – 2-Pair Loading Head 6.0" Long

694-4981-000 – 2-Pair Loading Head 8.0" Long

694-4982-000 – 2-Pair Loading Head 10.0" Long

694-4983-000 – 2-Pair Loading Head 12.0" Long

2.2.2.2. DC 3 Pair Application Tools

694-4984-000 – 3-Pair Loading Head 1.2" Long

694-4985-000 – 3-Pair Loading Head 2.0" Long

694-4986-000 - 3-Pair Loading Head 4.0" Long

694-4987-000 - 3-Pair Loading Head 6.0" Long

694-4988-000 - 3-Pair Loading Head 8.0" Long

694-4989-000 - 3-Pair Loading Head 10.0" Long

694-4990-000 - 3-Pair Loading Head 12.0" Long

2.2.2.3. DC 4 Pair Application Tools

694-4941-000 – 4-Pair Loading Head 1.2" Long

694-4942-000 – 4-Pair Loading Head 2.0" Long

694-4943-000 – 4-Pair Loading Head 4.0" Long

694-4944-000 – 4-Pair Loading Head 6.0" Long

694-4945-000 – 4-Pair Loading Head 8.0" Long

694-4946-000 – 4-Pair Loading Head 10.0" Long

694-4947-000 – 4-Pair Loading Head 12.0" Long

2.2.2.4. DC 5 Pair Application Tools

694-4991-000 – 5-Pair Loading Head 1.2" Long

694-4992-000 – 5-Pair Loading Head 2.0" Long

694-4993-000 – 5-Pair Loading Head 4" Long

694-4994-000 – 5-Pair Loading Head 6" Long

694-4995-000 – 5-Pair Loading Head 8" Long

694-4996-000 – 5-Pair Loading Head 10" Long

694-4997-000 – 5-Pair Loading Head 12" Long

2.2.2.5. DC 6 Pair Application Tools

694-5018-000 – 6-Pair Loading Head 1.2" Long

694-5019-000 – 6-Pair Loading Head 2.0" Long

694-5020-000 – 6-Pair Loading Head 4" Long

694-5021-000 – 6-Pair Loading Head 6” Long

694-5022-000 – 6-Pair Loading Head 8” Long

694-5023-000 – 6-Pair Loading Head 10” Long

694-5024-000 – 6-Pair Loading Head 12” Long

2.2.2.6. DC 7 Pair Application Tools

694-5025-000 – 7-Pair Loading Head 1.2” Long

694-5026-000 – 7-Pair Loading Head 2.0” Long

694-5027-000 – 7-Pair Loading Head 4” Long

694-5028-000 – 7-Pair Loading Head 6” Long

694-5029-000 – 7-Pair Loading Head 8” Long

694-5030-000 – 7-Pair Loading Head 10” Long

694-5031-000 – 7-Pair Loading Head 12” Long

644-0027-000 – 7-Pair Loading Head 1.4” Long (for Bent Stiffener)

644-0206-000 – 7-Pair Loading Head 1.3” Long (for Tie Down Cap)

2.2.2.7. DC 8 Pair Application Tools

694-5032-000 – 8-Pair Loading Head 1.2” Long

694-5033-000 – 8-Pair Loading Head 2.0” Long

694-5034-000 – 8-Pair Loading Head 4” Long

694-5035-000 – 8-Pair Loading Head 6” Long

694-5036-000 – 8-Pair Loading Head 8” Long

694-5037-000 – 8-Pair Loading Head 10” Long

694-5038-000 – 8-Pair Loading Head 12” Long

644-0006-000 – 8-Pair Loading Head 1.5” Long (for Tie Down Cap)

2.2.3. 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 are to 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 Paladin daughtercard customer use drawings for the compliant pin lead protrusion dimensions. The support fixture is not supplied by Amphenol - if assistance with the fixture design is needed, please contact your local field application engineer.

3. 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.

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 2.2.1 for details.

Step 4. Place the PCB onto the pallet and remove the connector from the packaging. If the connector is supplied in a tray, 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 remove the connectors from a tube, use a 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 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 on 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 2. With the front of the connector still up off the board, roll the connector back to front, into the remaining PTHs (see Figure 3). Firmly press the connector to ensure proper engagement of the compliant pins in the PTH. Visually inspect that the visible compliant pins of the connector perimeter are properly preloaded into the PTH (see Figure 4 and Figure 5).

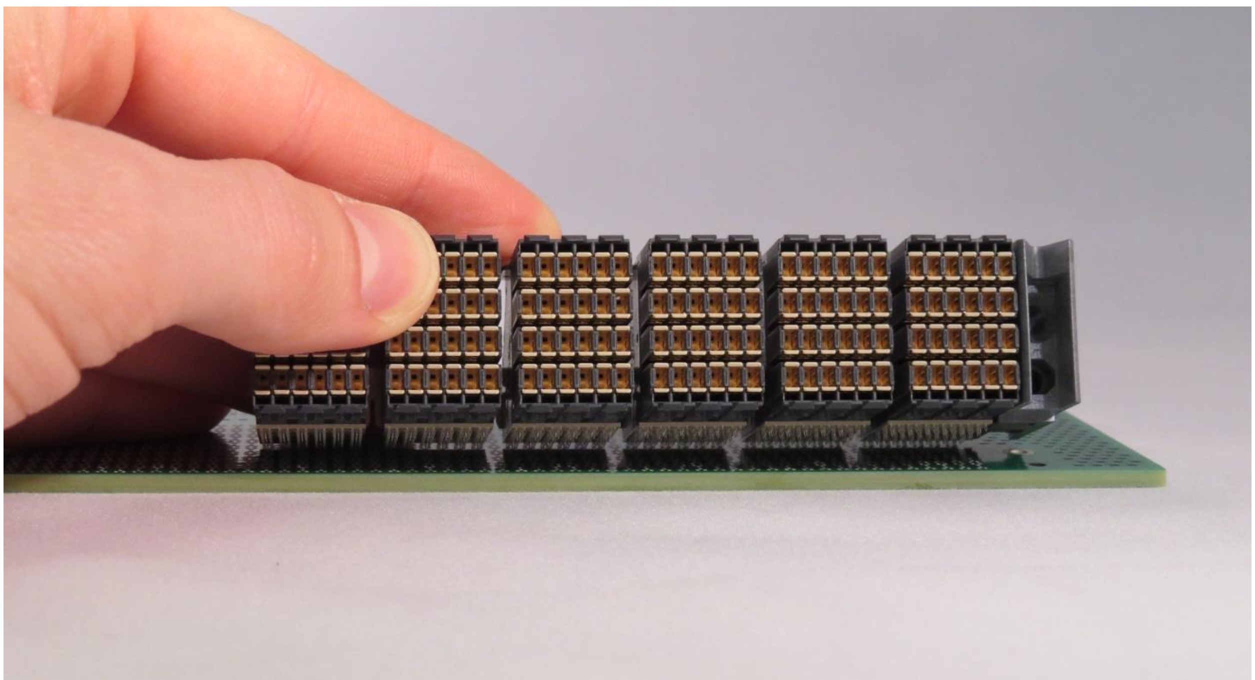


Figure 2: Back row of the DC connector compliant pins in the PTH

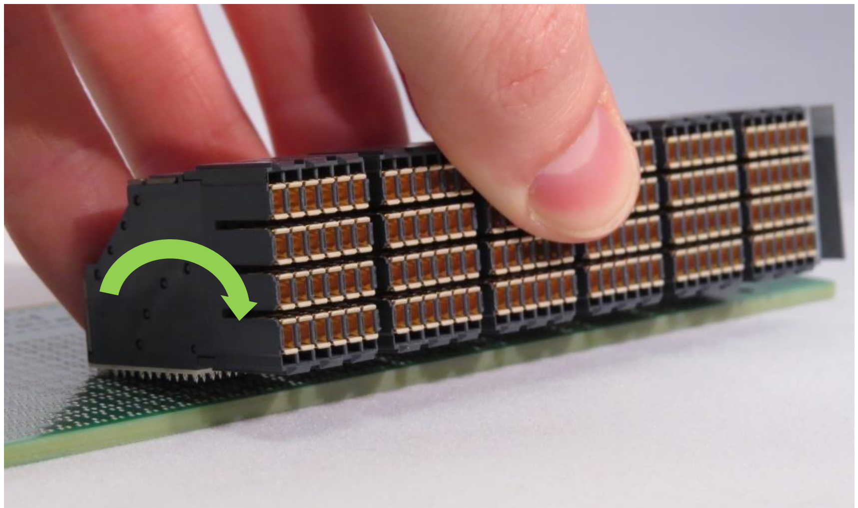


Figure 3: With the back row placed, roll connector toward board edge placing the remaining rows of compliant pins.

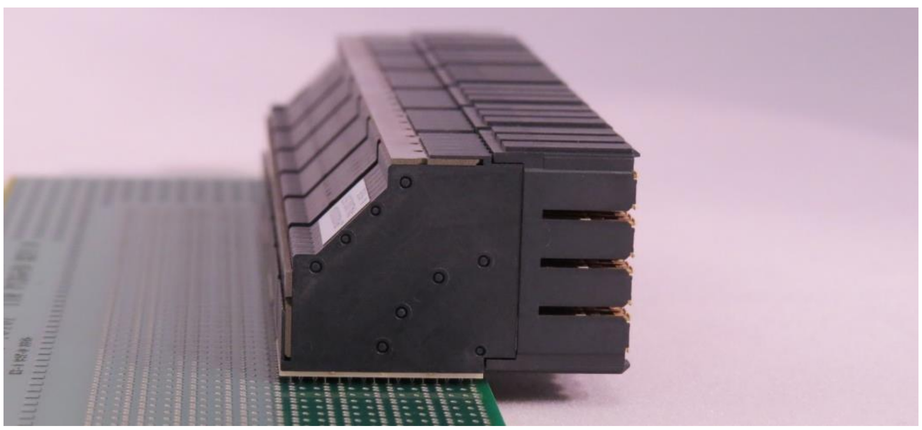


Figure 4: Side view of the assembly. Check for bent pins.

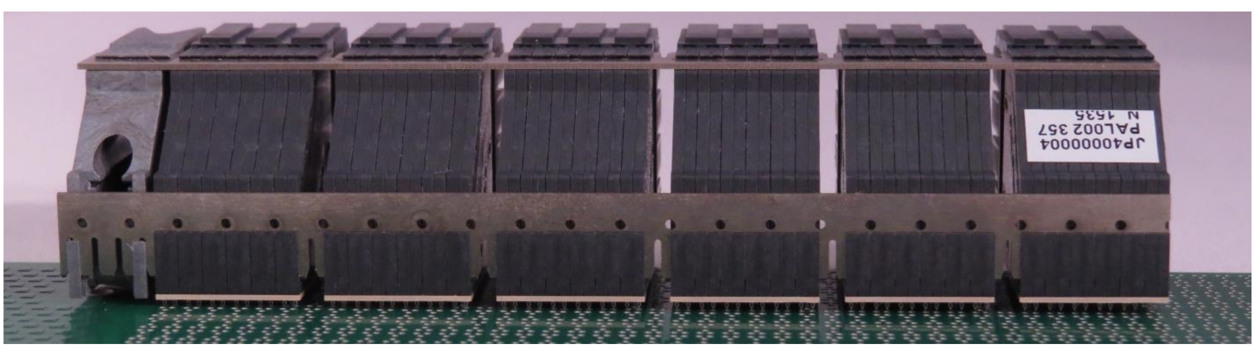


Figure 5: Rear view of the assembly. Check for bent pins.

Step 7. Select the correct seating head based on the connector type and the length of the connector from Section 2.2.2. Ensure the load head length is at least as long as the connector length (see Figure 6). 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 7).

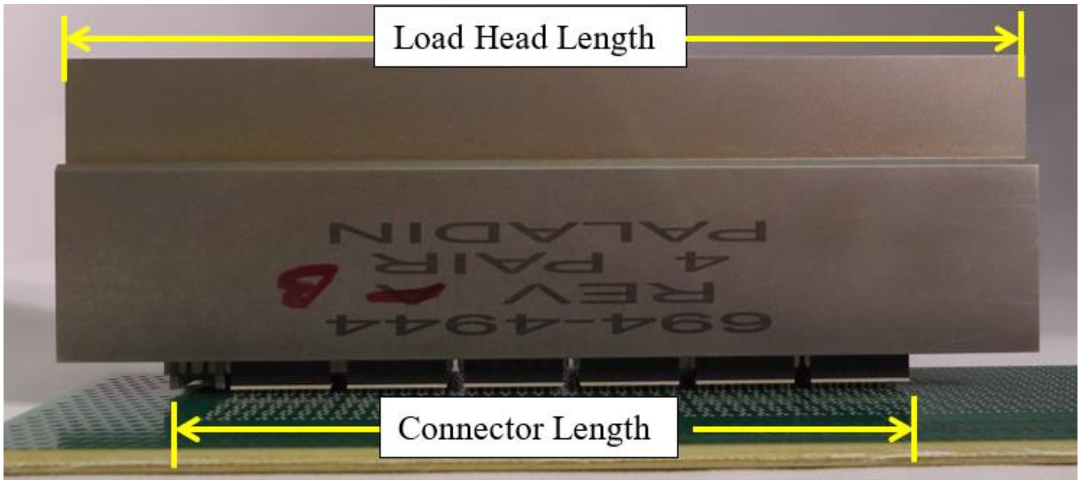


Figure 6: Ensure that the load head length is equal to or greater than the connector length.

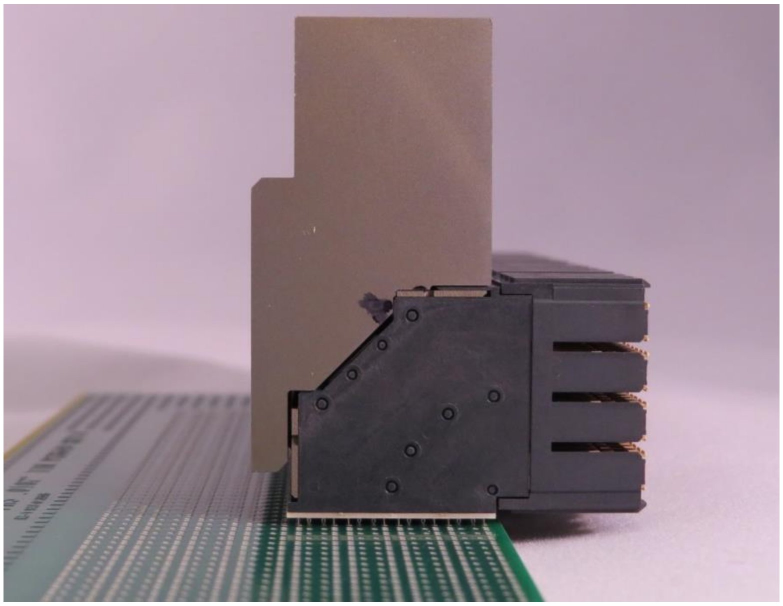


Figure 7: Proper 4 Pair loading head with a 4 pair connector.

NOTE: Ensure the seating head does not contact any other components on the PCB adjacent or behind the connector throughout the placement and pressing process. See the Paladin Removal and Replacement Spec (TB-2327) for keep out zones required for rework.

Step 8. Initiate the press cycle and seat the connector onto the board surface.

Step 9. As verification of the press process setup, inspect the assembly to verify that the connector was properly seated. A shim/feeler gauge may be used to check for a gap between the PCB surface and sidewall of the organizer as shown in Figures 8 & 9. Amphenol recommends a maximum overall/average gap of 0.075mm, which would potentially indicate that the press process did not apply sufficient force to the connector. See note below for additional comments on this inspection.

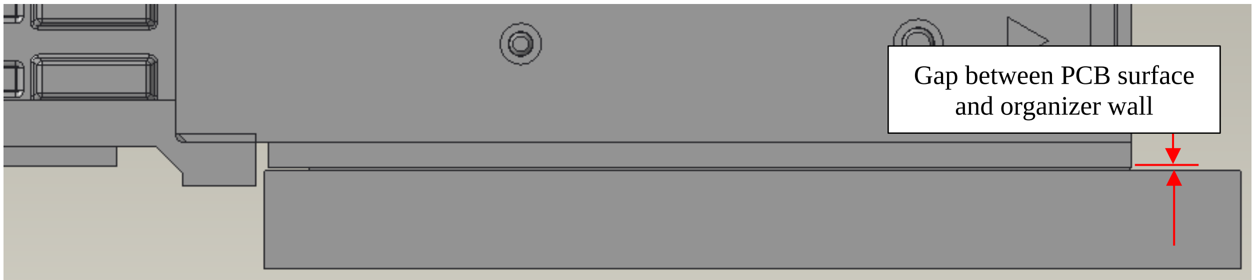


Figure 8: PCB gap inspection location (Paladin Plus only, side view)

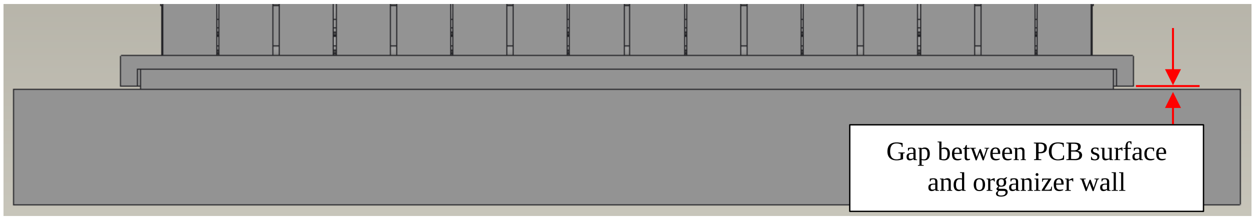


Figure 9: PCB gap inspection location (Paladin Plus only, rear view)

NOTE: this shim inspection should be considered a reference check and not a firm pass/fail criteria. The intention of this check is to ensure that incorrect press process setup did not result in incomplete seating of the connector. Factors that can impact this condition and result in incomplete seating include:

- Incorrect press profile
- Insufficient support of fixture underneath PCB
- Parallelism of press head/tool/PCB support fixture

In some cases, the gasket may push on the interior wall of the organizer, lifting the organizer wall as shown in Figure 10 and resulting in a false failure of the shim check. If this condition is observed, the seating condition should be considered acceptable. Isolated areas with a gap >0.075mm should not be considered a risk to overall connector retention – only cases where the entire organizer wall has a gap >0.075mm and does not display the lifted wall condition should require further evaluation of the factors listed above.

Figure 10: Lifted Organizer Wall Condition

If there are concerns about the overall connector seating depth and the position of individual pins within the via are evaluated, the top of the compliant eye should not exceed the top of the PCB surface. This level of evaluation is not required by Amphenol, but may be helpful to evaluate cases where the seating depth is in question.

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

Appendix A

Paladin Daughtercard Press Recommendations and Pressing Procedures

Paladin Daughtercard Press Recommendations

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

1. The press shall be suitably rigid 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. Amphenol 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. Amphenol 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: Amphenol recommends using the Tyco Electronics (ASG) MEP-12T for all Paladin connector pressing. The MEP-12T has all of the capabilities outlined above.

Paladin Daughtercard Press Procedure Recommendations

The following are recommended process steps to follow when installing Paladin 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 important in maintaining a consistent pressing process, refer to TB-2322 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. Inspect the PCB opposite the connector to verify that the compliant pins are in the holes (if possible). If a pin is missing the assembly can be repaired by removing the defective daughtercard module and inserting a new one per TB-2327. The most common cause of a missing pin is improper loading of the connector, which causes a bent pin prior to pressing.
   b. Inspect the connector from the press-fit side of the PCB. The organizer wall and connector wafers should not be cracked, deflected, or otherwise damaged from over-pressing.
   c. Connectors may be repressed if found to be not properly seated, but should not be repressed if damaged.

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

Paladin DC Recommended Press Settings for Tyco (ASG) MEP-12T Presses

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

Figure A-1: MEP-12T Manual-Electric Press.

Amphenol has developed a press profile that needs to be used on MEP presses to install Paladin connectors onto PCBs. The profile utilizes force feedback features on the MEP-12T press that ensure proper pressing of connectors. The Paladin Plus press profile developed by Amphenol is named: *ATCS_FEMTO_PLUS.prf*

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

The following steps describe proper creation, setup, and application of Paladin Daughter Card connectors: The MEP press main menu has 4 major screens that are required to setup a connector, tool, and PCB for pressing (See Figure A-2):

- 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 *ATCS_FEMTO_PLUS.prf* profile)
- 4 - Press Data Editor
  This screen is where a PCB is assigned connectors to be pressed, board thickness, and fixture thickness.

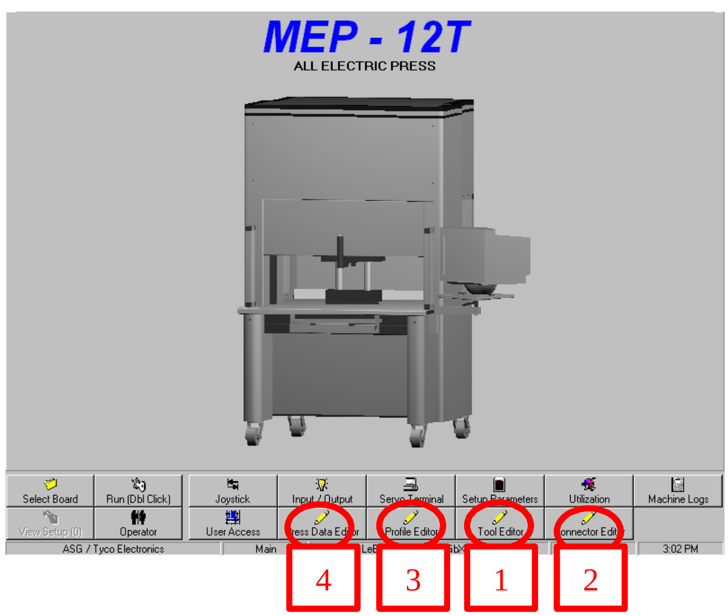


Figure A-2: Main Menu of MEP-12T Press.

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). See Table 1 for load head height dimensions.

- 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 PCB.
- 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.

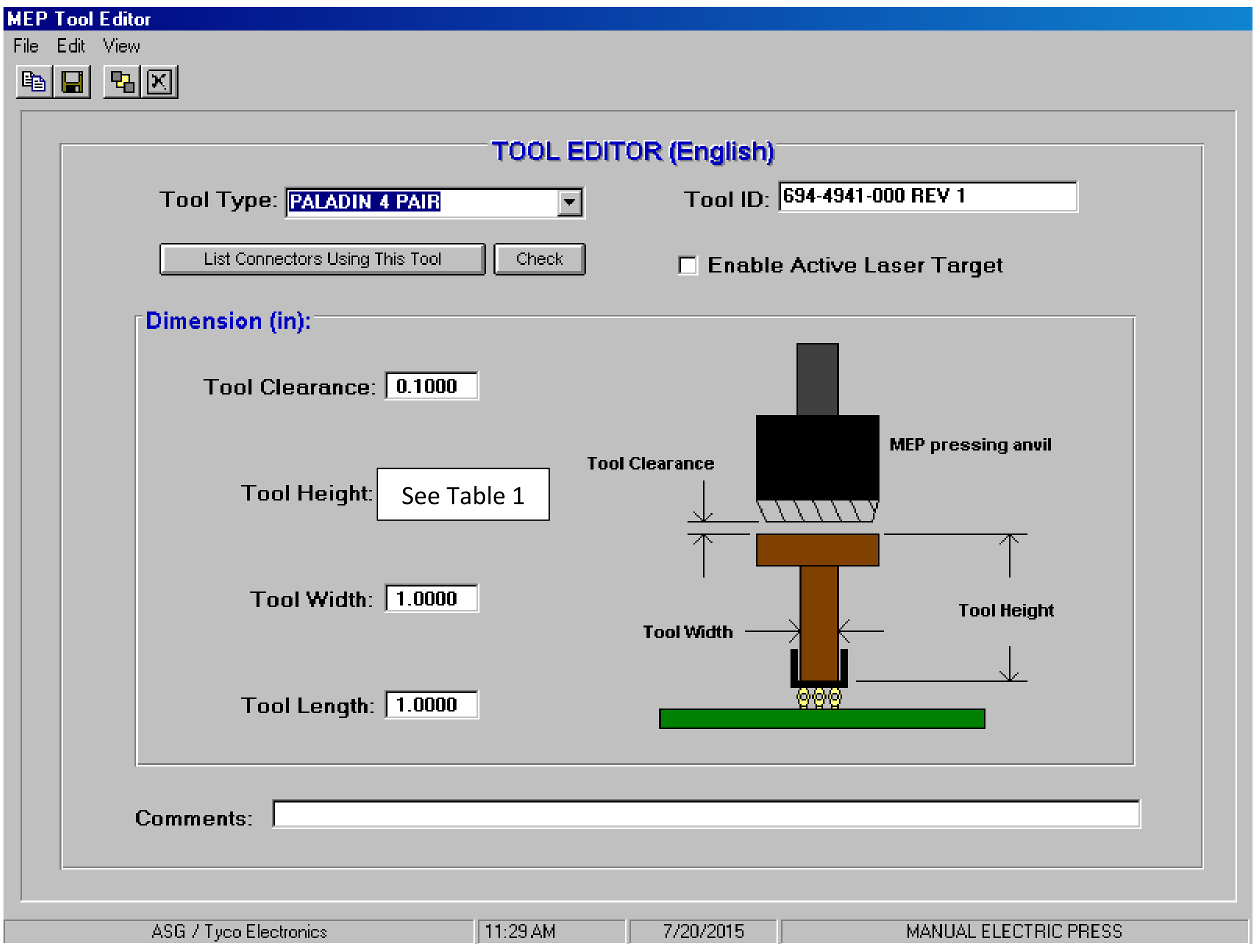


Figure A-3: Tool Editor Screen of MEP-12T Press. (Representative screen – tool length can vary based on connector configuration)

Connector Size	Tool Height[1] (inches)
2 Pair	1.311
3 Pair	1.110
4 Pair	0.992
5 Pair	0.689
6 Pair	0.529
7 Pair	0.369
8 Pair	0.158

1. Tool height is measured from the press ram surface to the stiffener hat surface. Some custom tooling may vary, verify dimension during press setup.

Table 1: Load head tool height.

2 – Connector Editor:
The Connector Editor screen allows for the creation of a new connector (See Figure A-4). The list below provides the various connector inputs for the connector editor for all Paladin sizes.

- 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 Paladin connector (Amphenol recommendation is *ATCS_FEMTO_PLUS.prf*)
- No. of Pins – Sum of all pins entering PTHs on the connector (signal, shield, and power).
- Graph Scale
    - Force – 6.0
    - Distance – 0.08
- Force
    - Min Force / Pin – 0.3
    - Max Force / Pin – 6.0
    - User Force / Pin – 6.0
    - Other Force – Not used for *ATCS_FEMTO_PLUS.prf* profile.
- PARS – Not used for *ATCS_FEMTO_PLUS.prf* profile.
- Force Gradient Degrees – Not used for *ATCS_FEMTO_PLUS.prf* profile.
- SPC – Values to be dictated by process owner. Not covered in this document.
- Dimension – Unique to connector being installed, see Table 2.

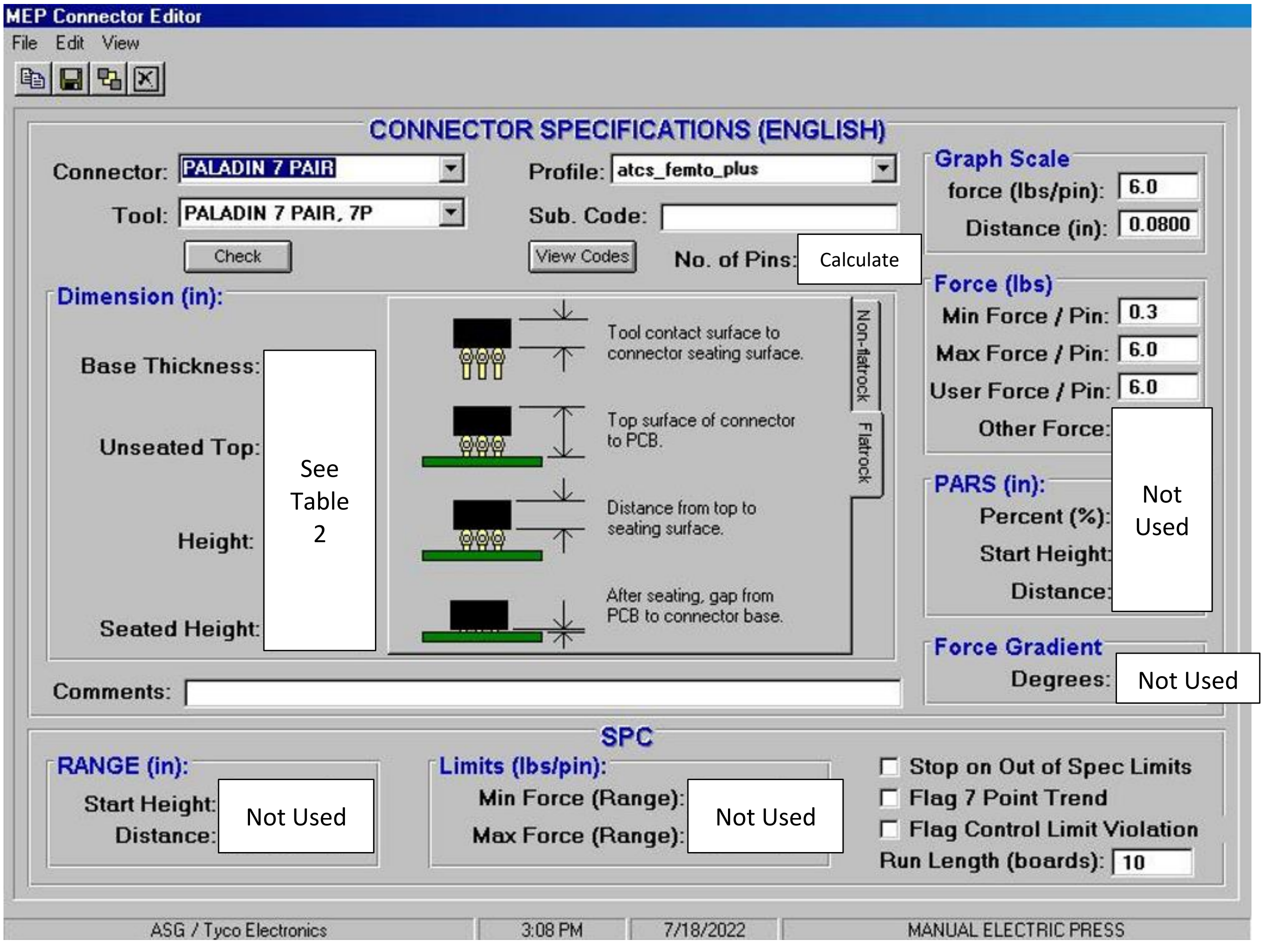


Figure A-4: Connector Editor Screen of MEP-12T press.

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. This dimension is taken from the stiffener hat surface.
- Unseated Top – The unseated connector height from the contact point of the installation tool to the PCB surface.
- Height – Same as Base Thickness for Paladin Connectors.
- Seated Height – Gap between PCB and connector seating surface, ideally 0.000".

Connector Size	Base Thickness (inches)	Unseated Top [1,2] (inches)	Height[1]	Seated Height
2 Pair	0.424	0.440	0.424	0
3 Pair	0.613	0.629	0.613	0
4 Pair	0.802	0.818	0.802	0
5 Pair	0.991	1.007	0.991	0
6 Pair	1.180	1.196	1.180	0
7 Pair	1.369	1.385	1.369	0
8 Pair	1.558	1.574	1.558	0

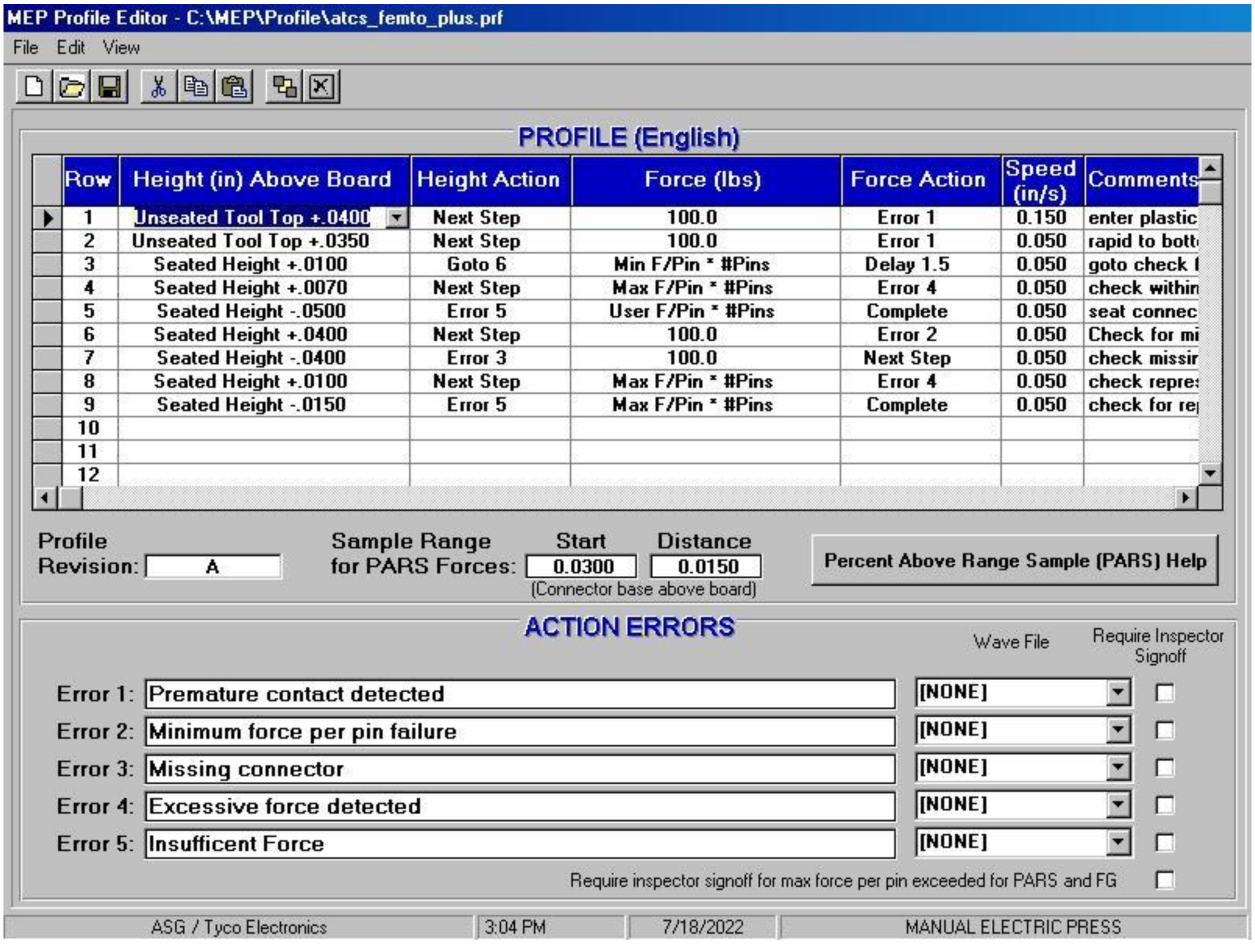
1. Contact point of installation tool measure from stiffener hat

2. Can Vary based on PTH finished hole size

Table 2: Connector editor information for all Paladin connector sizes.

3 – Profile Editor:
The Profile Editor screen provides the detail of the *ATCS_FEMTO_PLUS.prf* profile created for installing Paladin connectors onto PCBs (See Figure A-5). 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 Paladin 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 – Set of steps found in *ATCS_FEMTO_PLUS.prf* profile to perform normal press and re-press operations for Paladin connectors.
- Sample Range for PARS Forces – Not used in *ATCS_FEMTO_PLUS.prf* profile.
- Action Errors – Messages that appear on MEP-12T monitor if error occurs.



MEP Profile Editor - C:\MEP\Profile\atcs_femto_plus.prf

File Edit View

PROFILE (English)

Row	Height (in) Above Board	Height Action	Force (lbs)	Force Action	Speed (in/s)	Comments
1	Unseated Tool Top +.0400	Next Step	100.0	Error 1	0.150	enter plastic
2	Unseated Tool Top +.0350	Next Step	100.0	Error 1	0.050	rapid to bott
3	Seated Height +.0100	Goto 6	Min F/Pin * #Pins	Delay 1.5	0.050	goto check f
4	Seated Height +.0070	Next Step	Max F/Pin * #Pins	Error 4	0.050	check within
5	Seated Height -.0500	Error 5	User F/Pin * #Pins	Complete	0.050	seat connec
6	Seated Height +.0400	Next Step	100.0	Error 2	0.050	Check for mi
7	Seated Height -.0400	Error 3	100.0	Next Step	0.050	check missir
8	Seated Height +.0100	Next Step	Max F/Pin * #Pins	Error 4	0.050	check repre
9	Seated Height -.0150	Error 5	Max F/Pin * #Pins	Complete	0.050	check for re
10						
11						
12						

Profile Revision: A

Sample Range for PARS Forces: Start 0.0300 Distance 0.0150 (Connector base above board)

Percent Above Range Sample (PARS) Help

ACTION ERRORS

	Description	Wave File	Require Inspector Signoff
Error 1:	Premature contact detected	[NONE]	☐
Error 2:	Minimum force per pin failure	[NONE]	☐
Error 3:	Missing connector	[NONE]	☐
Error 4:	Excessive force detected	[NONE]	☐
Error 5:	Insufficent Force	[NONE]	☐

Require inspector signoff for max force per pin exceeded for PARS and FG ☐

ASG / Tyco Electronics | 3:04 PM | 7/18/2022 | MANUAL ELECTRIC PRESS

Figure A-5: Profile Editor of MEP-12T displaying the Amphenol ATCS_FEMTO_PLUS.prf profile, Revision A.

4 – Press Data Editor:
The Press Data Editor screen allows for the creation of a unique PCB 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 PCB in inches in the location of the Paladin connector. This value may be determined by a board thickness measurement taken automatically prior to press cycle (not covered in this document).
- Fixture Thickness – Thickness of bottom fixture or pallet. This thickness includes any tooling between "machine zero" and the bottom surface of the PCB. "Machine zero" is the original press table top, or may be reassigned as the top 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 PCB. To be determined by process owner.
    - Connector – Select Paladin connector from pull down menu in "Connector" cell.

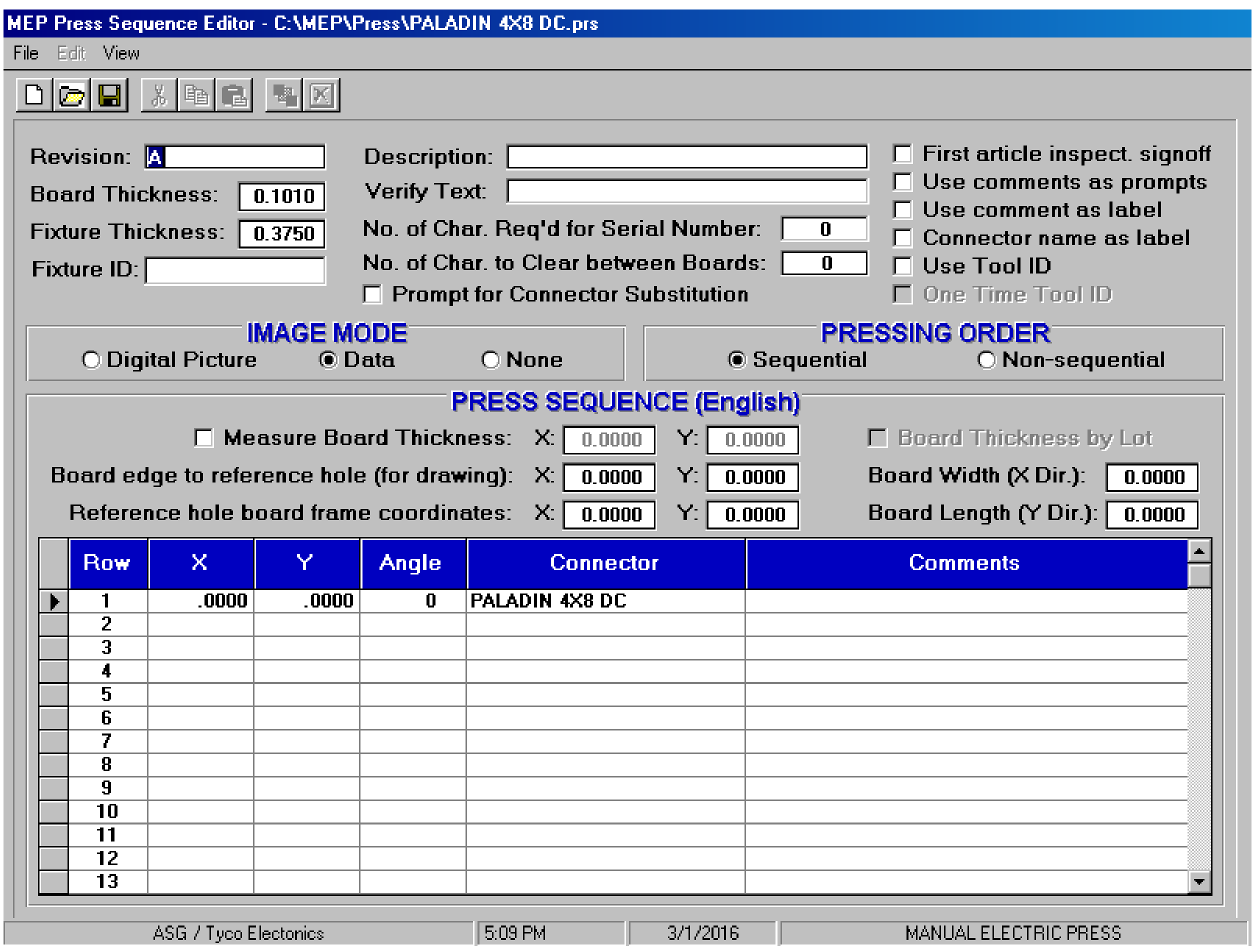


Figure A-6: Press Data Editor of MEP-12T press.

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 Paladin compliant pin and compliance of the PCB hole (1), the point of maximum deflection of the Paladin compliant pin (2), the sliding of the compliant pin in the PCB hole (3), and the compression of the connector against the PCB (4). The following descriptions of these areas are for reference and intended as an aid in understanding the pressing characteristics of the Paladin connector utilizing the *ATCS_FEMTO_PLUS.prf* profile.

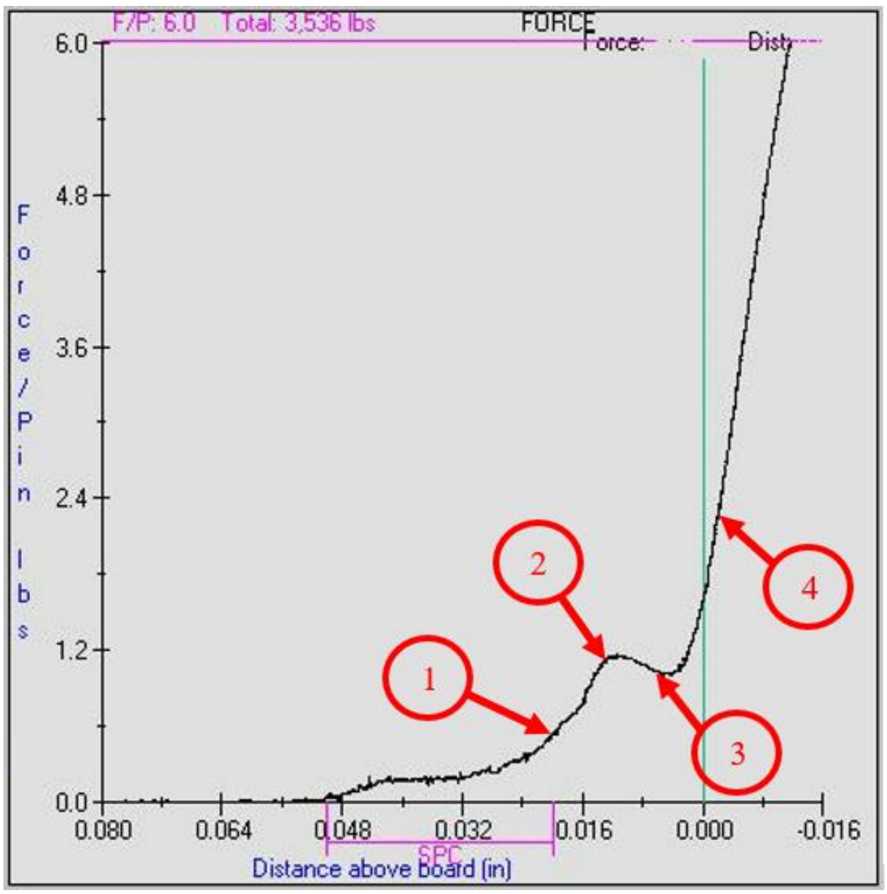


Figure A-7: Typical Force vs. Distance Curve of MEP-12T press for Paladin Plus connectors.

1 – Initial Compression of Paladin Compliant Pins:
Part of the initial pressing sequence with the *ATCS_FEMTO_PLUS.prf* profile (Refer to Figure A-7) is to permit settling and alignment of all the compliant pins of the connector prior to a full pressing sequence. In this zone, the Paladin compliant pins and the PCB plated through holes begin to conform to each other and the Paladin complaint pins begin to compress. At this zone the slope of the force gradient line begins to increase as the Paladin compliant pins continue to compress.

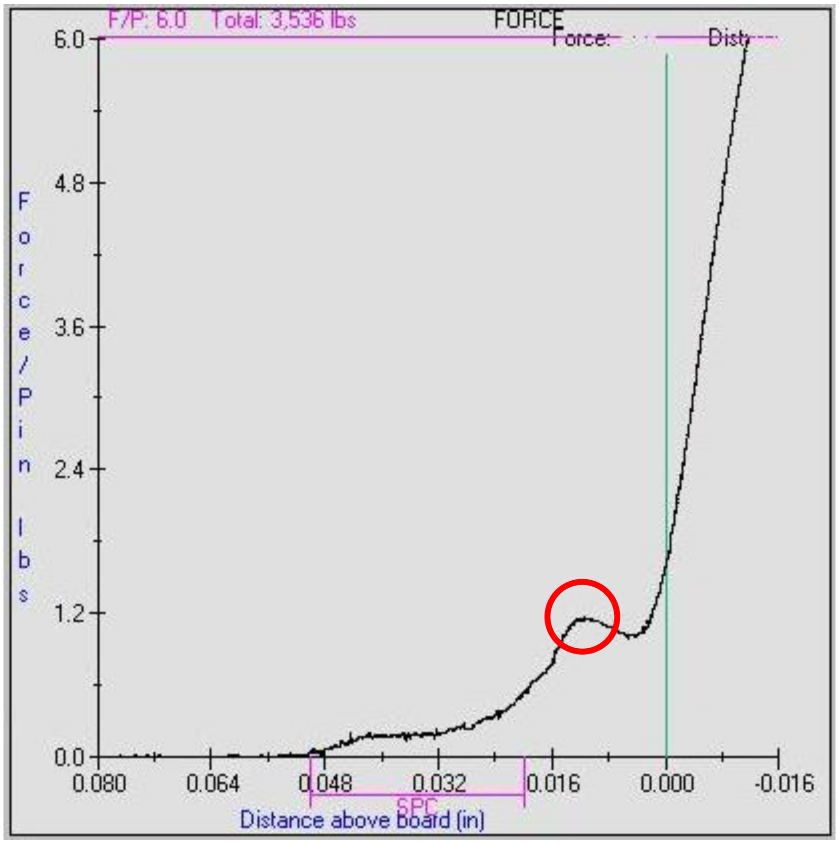


Figure A-8: Paladin pressing Force vs. Distance Graph showing two shapes of the knee area utilizing an MEP-12T press.

2 – Full collapse of the Paladin compliant pin:
At approximately 0.010”-0.015” above the PCB surface (0.000” on the X-Axis), the Paladin compliant pin is fully collapsed in the PCB 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 PCB surface finish, PCB hole diameter, compliant pin feature size, number of power pins vs. signal pins, etc., the knee may be more or less pronounced, but is typically highlighted by an inflection point in the curve as shown in Figure A-8.

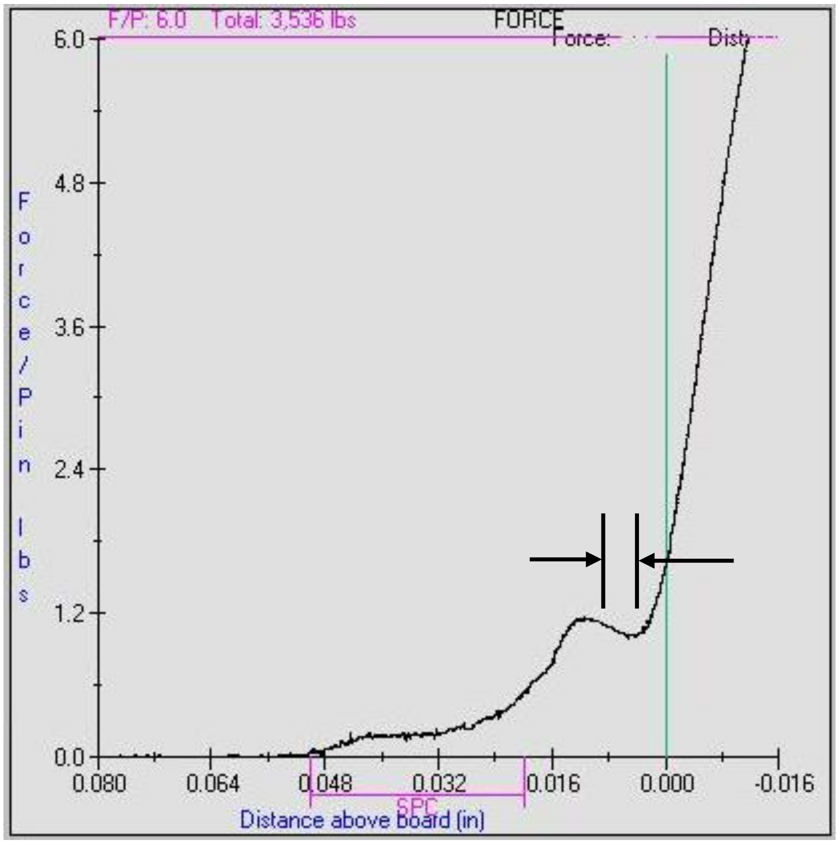


Figure A-9. Sliding force region of press curve.

3 – Sliding Force of the Paladin compliant pin in the PCB hole:
After the compliant pin of the Paladin connector is fully compressed, the pin travels further into the PCB plated through hole. As this sliding occurs, the force required to continue the installation process of the Paladin connector past this point may decrease between 1 and 30 percent for a short distance before beginning to increase again as the compliant pin travels further into the PCB plated through hole. The specific amount of decrease depends on multiple variables including PCB surface finish, PCB hole diameter, compliant pin feature size, number of power pins vs. signal pins, etc.

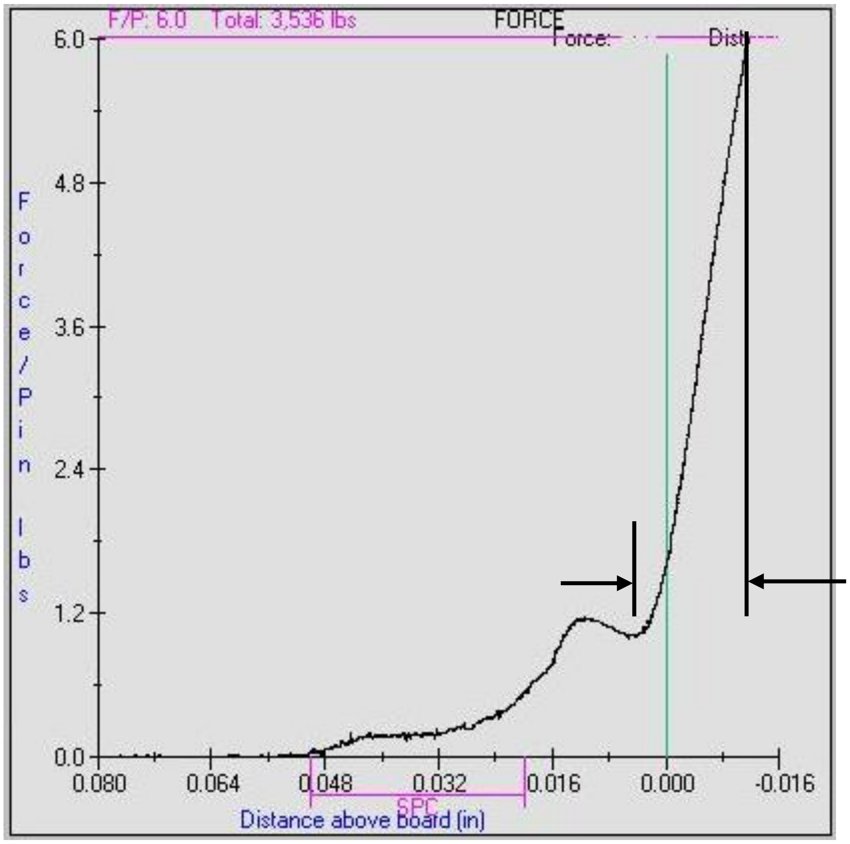


Figure A-11. Press sequence force gradient termination.

4 – Termination Force at 6.0 lbs/pin:
Once the Paladin connector gasket and organizer features begin to contact the PCB surface, the slope of the force vs. distance curve will increase. Once the gasket is fully compressed and the connector standoff features come in contact with the PCB surface, the connector is fully seated. As the press reaches 6.0 lbs/pin, the connector body may compress and flex, returning to its original state after the press head returns to its initial height. There should not be any permanent deformation of the connector after pressing to 6.0 lbs/pin. The press profile will terminate pressing when the force per pin reaches 6.0 lbs/pin. Figure A-10 shows the termination phase of the pressing process.