TB-2332

Paladin ™ BACKPLANE CONNECTORS PRESS-FIT INSTALLATION PROCESS

Revision “D“

Specification Revision Status

Revision	SCR No.	Description	Initial	Date
“A”	S5915	Initial Release	S.Yoeuth	06/13/17
“B”	S6467	Added table of contents, updated BMA model to show organizer, added note about pressing into PTH, added flat rock plate into procedure, updated tool editor picture and table, updated loading head assembly P/Ns	S. Yoeuth	10/31/17
“C”	S7935	Updated maximum force requirement from 6 lbs./pin to 5lbs/pin in force requirement section 2.2.1	S. Yoeuth	10/21/19
“D”	S9310	Updated maximum height off board surface from 0.125mm to 0.075mm in Step 11 and Figure 8	S. Yoeuth	09/30/21

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1.0 SCOPE

1.1 Content

1.1.1 This specification describes the methods and tooling for the installation of AICC Paladin Backplane connectors onto a printed circuit board (PCB). See Appendix A for the press recommendations and process recommendations.

2.0 REFERENCE

2.1 AICC Documents

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

2.2 Tooling

- Press System

The application of AICC Paladin press-fit style components can be performed across many different press platforms, however there are minimum performance features and capabilities that are strongly recommended to be available:

2.2..1 Force Requirement

Typically, Paladin compliant pins will require an insertion force of 1-5 lbs/pin. The press must have the capability of installing connectors with a maximum force of 5 lbs per pin. AICC recommends using an ASG MEP 12T electric press for installing daughtercard and/or backplane connectors. Air or hydraulic presses are typically not as well suited for controlled press rate and controlled force for daughtercard and/or backplane connector installations.

2.2..2 Rate

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

2.2..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 must 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..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.

- Application Tools

Paladin backplane connectors have dedicated loading heads for each product type and size (see Figure 1). There are different loading head assembly lengths available for each backplane product (refer to section 2.2..1.1-2.2..1.7). AICC recommends that customers and contract manufactures purchase the loading head tooling assembly from AICC to ensure proper clearances for daughtercard and/or backplane installation.

Figure 1: 3 Pair, 8 Position Backplane Application Tool

2.2..1.1 Paladin BP 2 Pair Application Tools

645-0001-000- 2 Pair x 4 Position BP Loading Head Assembly

645-0002-000- 2 Pair x 5 Position BP Loading Head Assembly

645-0003-000- 2 Pair x 6 Position BP Loading Head Assembly

645-0004-000- 2 Pair x 8 Position BP Loading Head Assembly

2.2..1.2 Paladin BP 3 Pair Application Tools

645-0005-000- 3 Pair x 4 Position BP Loading Head Assembly

645-0006-000- 3 Pair x 5 Position BP Loading Head Assembly

645-0007-000- 3 Pair x 6 Position BP Loading Head Assembly

645-0008-000- 3 Pair x 8 Position BP Loading Head Assembly

2.2..1.3 Paladin BP 4 Pair Application Tools

645-0009-000 – 4-Pair x 4 Position BP Loading Head Assembly

645-0010-000- 4 Pair x 5 Position BP Loading Head Assembly

645-0011-000- 4 Pair x 6 Position BP Loading Head Assembly

645-0012-000- 4 Pair x 8 Position BP Loading Head Assembly

2.2..1.4 Paladin BP 5 Pair Application Tools

645-0013-000 – 5 Pair x 4 Position Loading Head Assembly

645-0014-000 -5 Pair x 5 Position BP Loading Head Assembly

645-0015-000- 5 Pair x 6 Position BP Loading Head Assembly

645-0016-000- 5 Pair x 8 Position BP Loading Head Assembly

2.2..1.5 Paladin BP 6 Pair Application Tools

645-0017-000 – 6 Pair x 4 Position BP Loading Head Assembly

645-0018-000- 6 Pair x 5 Position BP Loading Head Assembly

645-0019-000- 6 Pair x 6 Position BP Loading Head Assembly

645-0020-000- 6 Pair x 8 Position BP Loading Head Assembly

2.2..1.6 Paladin BP 7 Pair Application Tools

645-0021-000 – 7 Pair x 4 Position BP Loading Head Assembly

645-0022-000- 7 Pair x 5 Position BP Loading Head Assembly

645-0023-000- 7 Pair x 6 Position BP Loading Head Assembly

645-0024-000- 7 Pair x 8 Position BP Loading Head Assembly

2.2..1.7 Paladin BP 8 Pair Application Tools

645-0025-000 – 8 Pair x 4 Position BP Loading Head Assembly

645-0026-000- 8 Pair x 5 Position BP Loading Head Assembly

645-0027-000- 8 Pair x 6 Position BP Loading Head Assembly

645-0028-000- 8 Pair x8 Position BP Loading Head Assembly

- Support Tooling/Fixture

  Customers and contract manufactures should design or purchase the appropriate support fixture to support the PCB during the backplane 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 backplane 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.

3.0 PROCEDURE

Step 1. Locate the correct seating head and support pallet/fixture.

Step 2. Place the support fixture (pallet) onto the press bed, and ensure:

- Pallet is square with reference to the press head.
- Pallet is flat to the press bed, with no excessive bow or twist.
- PCB board is pinned to the pallet.
- Pallet is pinned to the press bed.

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 details.

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 any compliant pins are out of position or broken, discard the connector and begin Step 5 again with a new connector.

Step 6. 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. Ensure that the visible compliant pins of the connector perimeter are properly preloaded into the PTH (see Figure 3).

NOTE: A module cannot be pre-loaded into the same PTH more than three times.

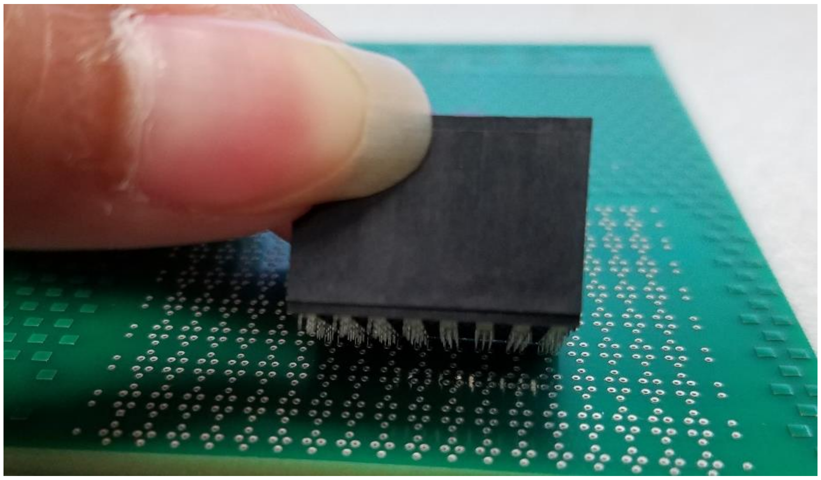


Figure 2: Back row of the BMA connector compliant pins in the PTH.

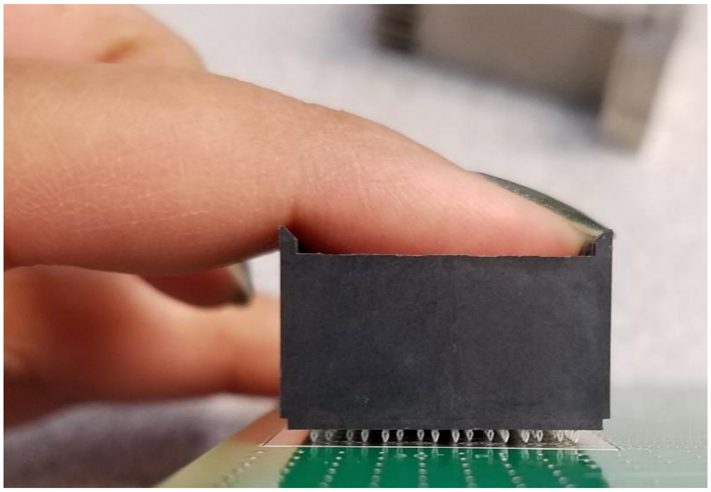


Figure 3: With the back row entirely placed, roll connector toward board edge to place the remaining rows of compliant pins. Check connector perimeter of compliant pins to ensure proper preloading into PTH.

Step 7. Select the correct seating head assembly based on the pair number and the position of the connector (see Figure 5). Place the flat rock plate (P/N displaying) on top of the selected seating head, aligning the holes on the flat rock plate with the screw holes on the seating head. Place the screws in the screw holes and tighten as seen in Figure 4.

Figure 4: Flat rock plate attached to 3x8 BMA seating head.

Step 8. Position the seating head with flat rock plate attached directly on top of the connector, ensuring that the clearance slot is over the signal pins and the rear alignment rib is against the BMA housing ribs (see Figure 6).

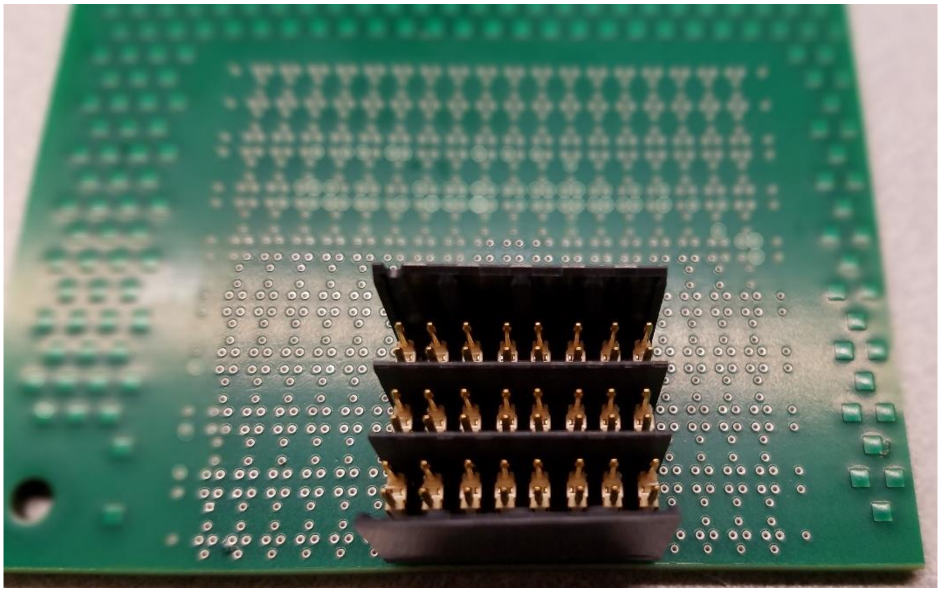


Figure 5: 3 Pair, 8 Position BMA Connector

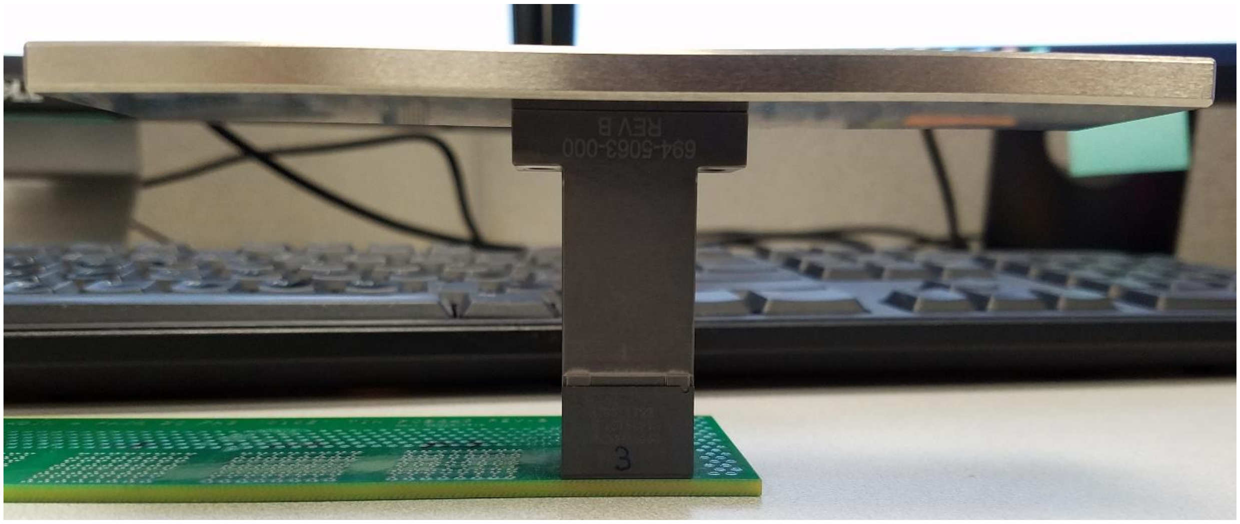


Figure 6: Proper 3 Pair loading head with a 3x8 BMA connector

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 Paladin BMA Removal and Replacement Spec (TB-2333) for rework keep out zones.

Step 9. Carefully place the connector and load head directly under the press anvil. (See Figure 7)

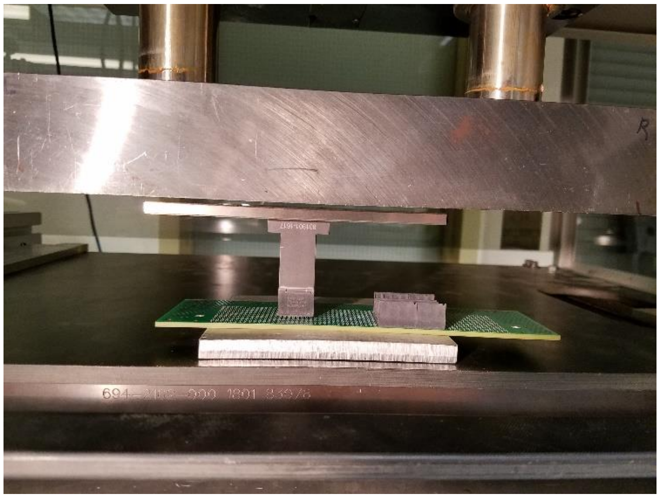


Figure 7: Proper BMA pressing set up

Step 10: Initiate the press cycle and seat the connector onto the board surface. See Appendix A for proper press settings.

Step 11. Visually identify the plastic standoff on the housing of the connector, contacting the board surface. This standoff cannot be more than 0.075mm from the board surface, and there should be minimal visible difference in height between adjacent modules (see Figure 8).

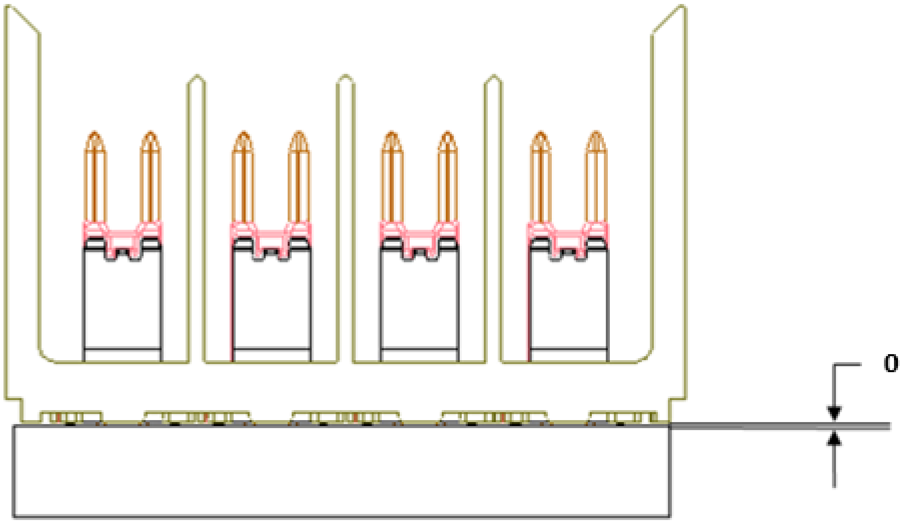


Figure 8: 0.075 mm maximum height off board surface

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

Appendix A
Paladin Backplane Press Recommendations and Pressing Procedures

Paladin Backplane Press Recommendations

The press used for inserting Paladin backplane 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) AICC 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. AICC 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 termination 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 connector installation and accounts for PCB thickness and connector height tolerances. It is not recommended to insert backplane connectors to a specific height due to the PCB and connector tolerances build up. Installing a backplane connector to a specific height may result in over seating or under seating the connector. Over seating a backplane 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.

5) AICC recommends that each connector be pre-loaded, then pressed, before continuing to the next connector. It is not recommended to pre-load more than one connector at a time.

NOTE: AICC recommends using the Tyco Electronics (ASG) MEP-12T for all Paladin connector pressing. The MEP-12T has all the capabilities outlined above.

Paladin BP Recommended Press Procedures

The following are recommended process steps to follow when installing Paladin BP 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 (PTH) 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. First, inspect the PCB opposite the connector to verify that the compliant pins are in the holes. If a pin is missing, the assembly can be repaired by removing the defective backplane connector and inserting a new one per TB-2333. The most common cause of a missing pin is improper loading of the connector, which causes a bent pin prior to pressing.
b. Second, inspect the connector from the press-fit side of the PCB. Confirm that all plastic standoffs on both the front and back of the connector (either side of compliant pin field) are seated evenly against the PCB along the length of the connector. The standoffs can be as much as 0.1255mm (0.005”) maximum above the PCB surface, but should be even across the connector. Connectors may be repressed if found to be not properly seated. The plastic standoffs should not be cracked, deflected, or otherwise damaged because of over-pressing.

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

Paladin BP 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 AICC application engineer for assistance. (See Figure A-1)

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

AICC has developed a press profile that can 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 press profile developed by AICC is named: *ATCS_FEMTO_FG_DWELL.prf*

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

The following steps describe proper creation, setup, and application of Paladin Backplane 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_FG_DWELL.prf* profile)

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

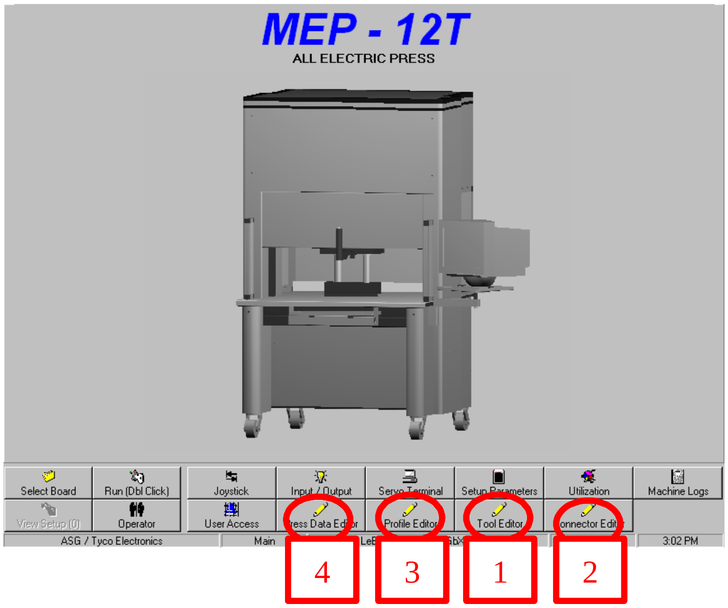
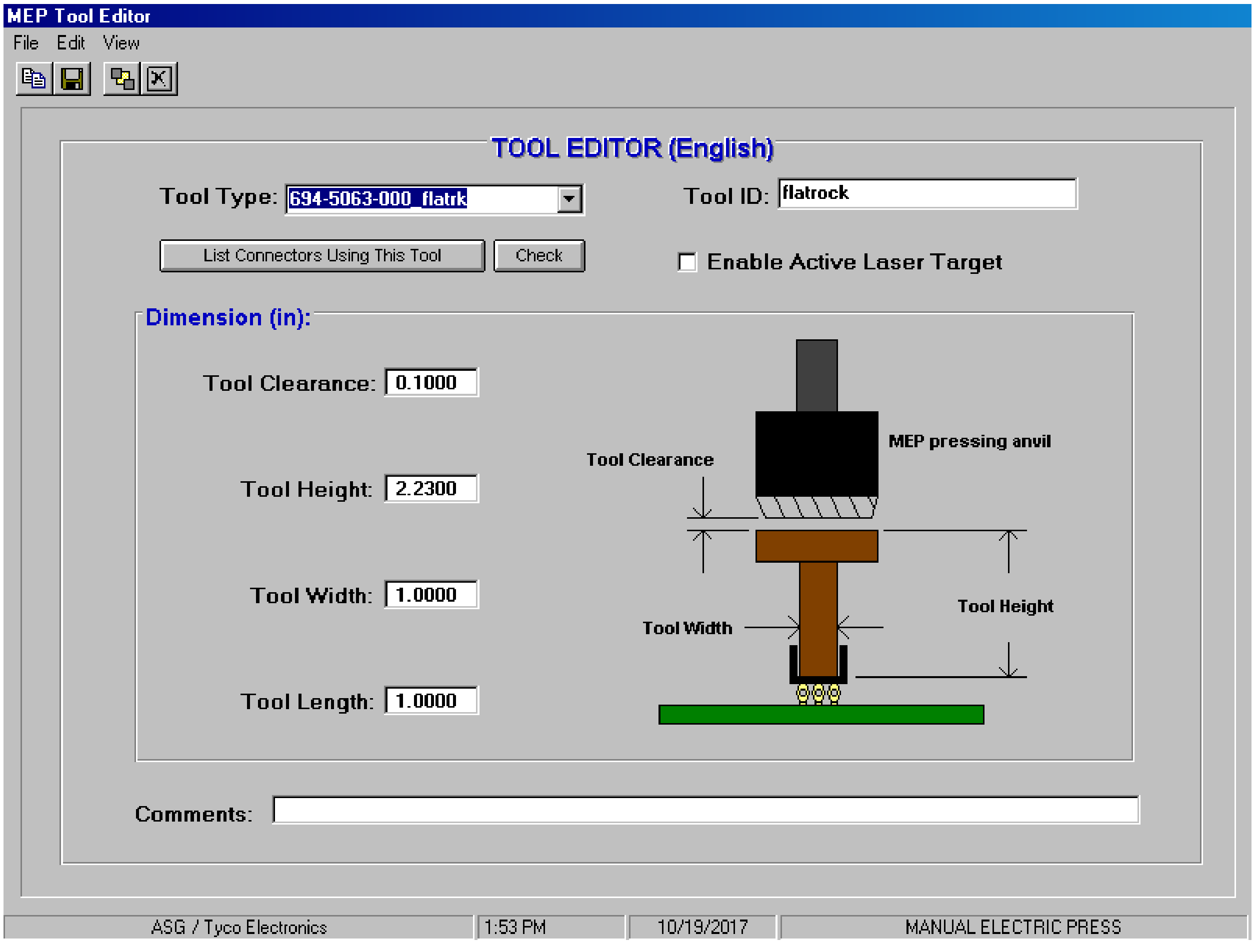


Figure A-2: Main Menu of MEP-12T Press.

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: Load head tool height 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.



Tool Type: 694-5063-000_flatrk

Tool ID: flatrock

☐ Enable Active Laser Target

Tool Clearance: 0.1000

Tool Height: 2.2300

Tool Width: 1.0000

Tool Length: 1.0000

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

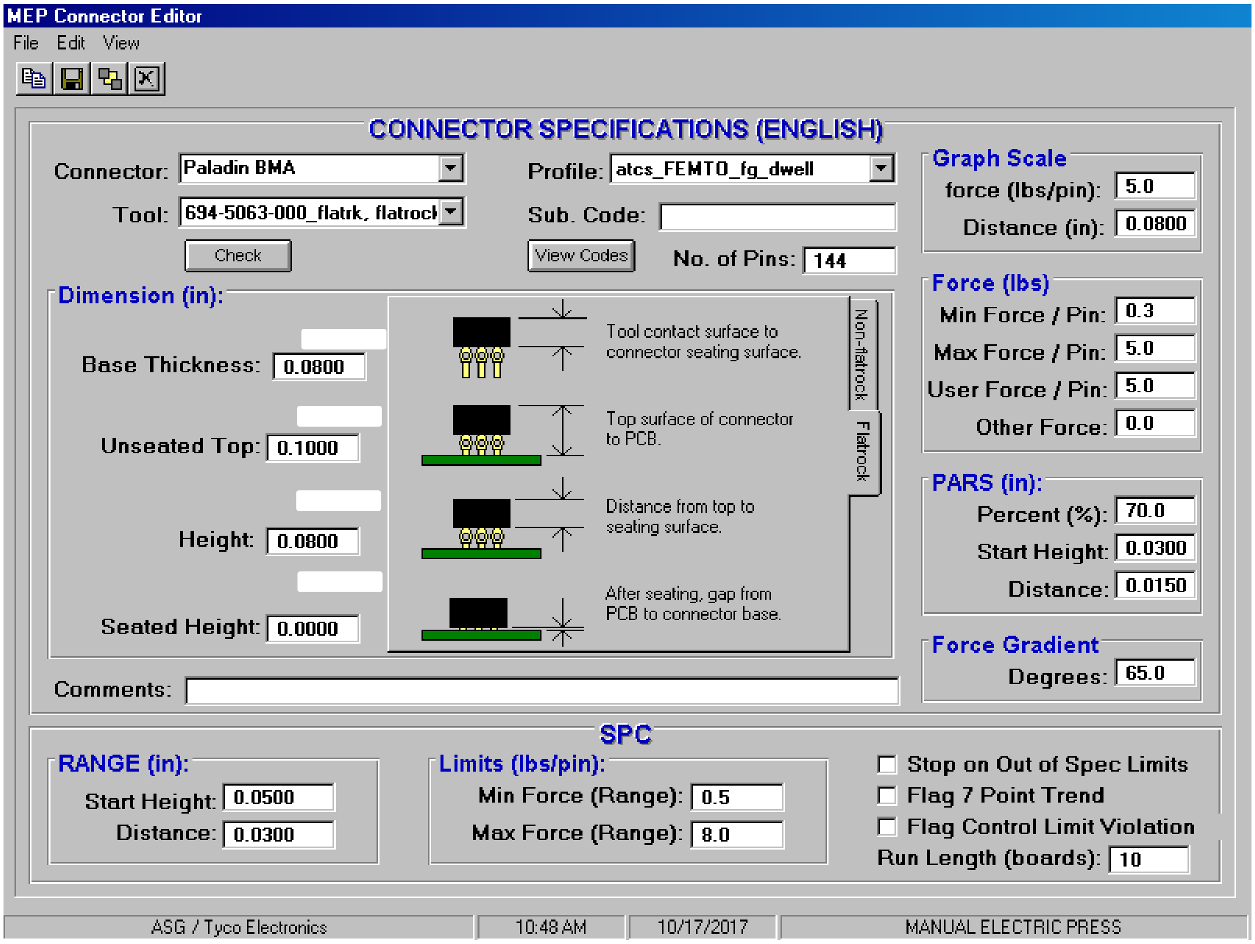
Connector Size	Tool Height[1] (inches)
2 Pair	2.2300
3 Pair	2.2300
4 Pair	2.2300
5 Pair	2.2300
6 Pair	2.2300
7 Pair	2.2300
8 Pair	2.2300

1. Tool height is measured from the press ram surface to the stiffener hat surface

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). **Table** depicts 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 (AICC recommendation is *ATCS_FEMTO_FG_DWELL.prf*)
- Number of Pins – Sum of all pins entering PTHs on the connector (signal, shield, and power).
- Graph Scale – 5.0 for Paladin Femto Pin (0.0157" Drill) Daughter Card
- Distance – 0.08"
- Min Force / Pin – 0.3lb
- Max Force / Pin – 5.0 for Paladin Femto Pin (0.0157" Drill) Daughter Card
- User Force / Pin – Not used for *ATCS_FEMTO_FG_DWELL.prf* profile.
- Other Force – Not used for *ATCS_FEMTO_FG_DWELL.prf* profile.
- PARS – Not used for *ATCS_FEMTO_FG_DWELL.prf* profile.
- Force Gradient Degrees – 70.0.
- SPC – Values to be dictated by process owner. Not covered in this document.
- Dimension – Unique to connector being installed.



CONNECTOR SPECIFICATIONS (ENGLISH)

Connector: Paladin BMA
Tool: 694-5063-000_flatrk, flatrock
Profile: atcs_FEMTO_fg_dwell
Sub. Code:
No. of Pins: 144

Dimension (in):
Base Thickness: 0.0800
Unseated Top: 0.1000
Height: 0.0800
Seated Height: 0.0000

Tool contact surface to connector seating surface.
Top surface of connector to PCB.
Distance from top to seating surface.
After seating, gap from PCB to connector base.

Comments:

Graph Scale
force (lbs/pin): 5.0
Distance (in): 0.0800

Force (lbs)
Min Force / Pin: 0.3
Max Force / Pin: 5.0
User Force / Pin: 5.0
Other Force: 0.0

PARS (in):
Percent (%): 70.0
Start Height: 0.0300
Distance: 0.0150

Force Gradient
Degrees: 65.0

SPC

RANGE (in):
Start Height: 0.0500
Distance: 0.0300

Limits (lbs/pin):
Min Force (Range): 0.5
Max Force (Range): 8.0

☐ Stop on Out of Spec Limits
☐ Flag 7 Point Trend
☐ Flag Control Limit Violation
Run Length (boards): 10

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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 floor of the BP connector to standoffs.
- 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 0.00”.

Connector Size	Base Thickness (inches)	Unseated Top [1,2] (inches)	Height[1]	Seated Height
2 Pair	0.08	0.1	0.08	0
3 Pair	0.08	0.1	0.08	0
4 Pair	0.08	0.1	0.08	0
5 Pair	0.08	0.1	0.08	0
6 Pair	0.08	0.1	0.08	0
7 Pair	0.08	0.1	0.08	0
8 Pair	0.08	0.1	0.08	0

1. Contact point of installation tool measure from stiffener hat

2. Can vary based on PTH finished hole size

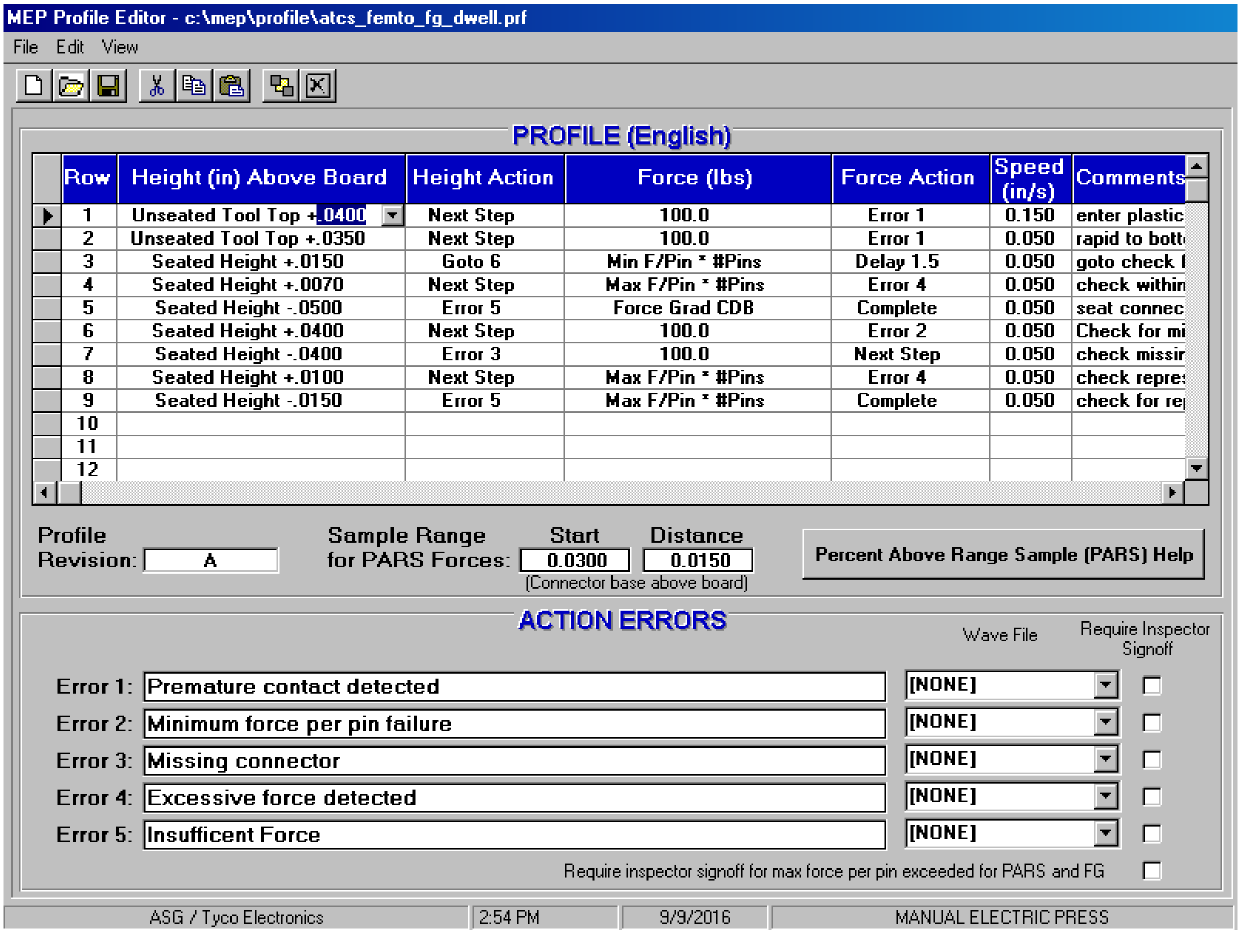
Table 2: Connector editor information for all Paladin connector sizes.

3 – Profile Editor:

The Profile Editor screen provides the detail of the AICC *ATCS_FEMTO_FG_DWELL.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 3.0 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_FG_DWELL.prf* profile to perform normal press and re-press operations for Paladin connectors
- Sample Range for PARS Forces – Not used in *ATCS_FEMTO_FG_DWELL.prf* profile.
- Action Errors – Messages that appear on MEP-12T monitor if error occurs.



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 +.0150	Goto 6	Min F/Pin * #Pins	Delay 1.5	0.050	goto check
4	Seated Height +.0070	Next Step	Max F/Pin * #Pins	Error 4	0.050	check within
5	Seated Height -.0500	Error 5	Force Grad CDB	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 missi
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)

		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 ☐

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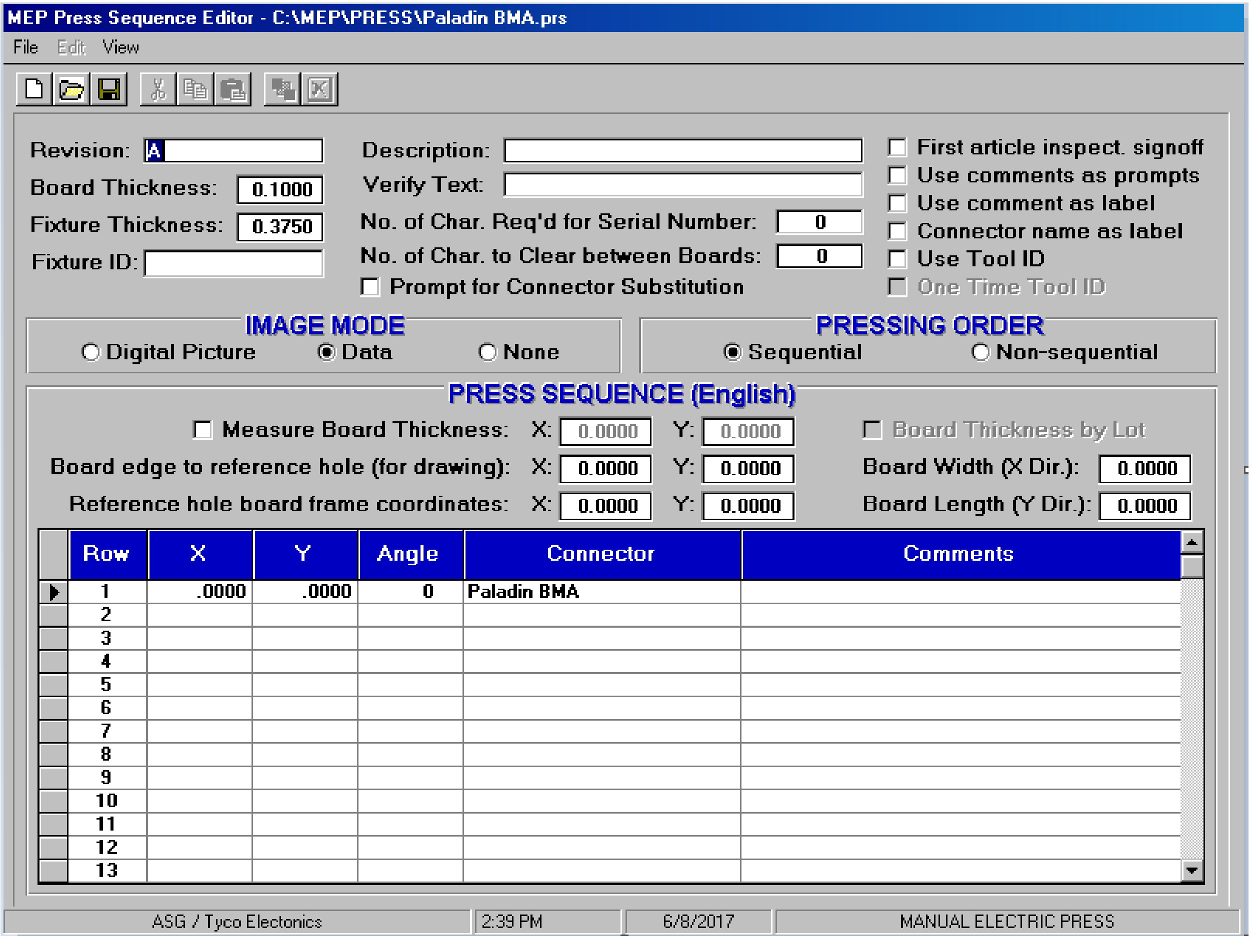
Figure A-5: Profile Editor of MEP-12T press displaying the AICC ATCS_FEMTO_FG_DWELL.prf profile, Revision A.

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.



Revision: A
Board Thickness: 0.1000
Fixture Thickness: 0.3750
Fixture ID:
Description:
Verify Text:
No. of Char. Req'd for Serial Number: 0
No. of Char. to Clear between Boards: 0
☐ Prompt for Connector Substitution
☐ First article inspect. signoff
☐ Use comments as prompts
☐ Use comment as label
☐ Connector name as label
☐ Use Tool ID
☐ One Time Tool ID

IMAGE MODE
○ Digital Picture ● Data ○ None

PRESSING ORDER
● Sequential ○ Non-sequential

PRESS SEQUENCE (English)
☐ Measure Board Thickness: X: 0.0000 Y: 0.0000
☐ Board Thickness by Lot
Board edge to reference hole (for drawing): X: 0.0000 Y: 0.0000
Board Width (X Dir.): 0.0000
Reference hole board frame coordinates: X: 0.0000 Y: 0.0000
Board Length (Y Dir.): 0.0000

Row	X	Y	Angle	Connector	Comments
1	.0000	.0000	0	Paladin BMA	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

ASG / Tyco Electonics | 2:39 PM | 6/8/2017 | MANUAL ELECTRIC PRESS

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 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 Paladin connector utilizing the *ATCS_FEMTO_FG_DWELL.prf* profile.

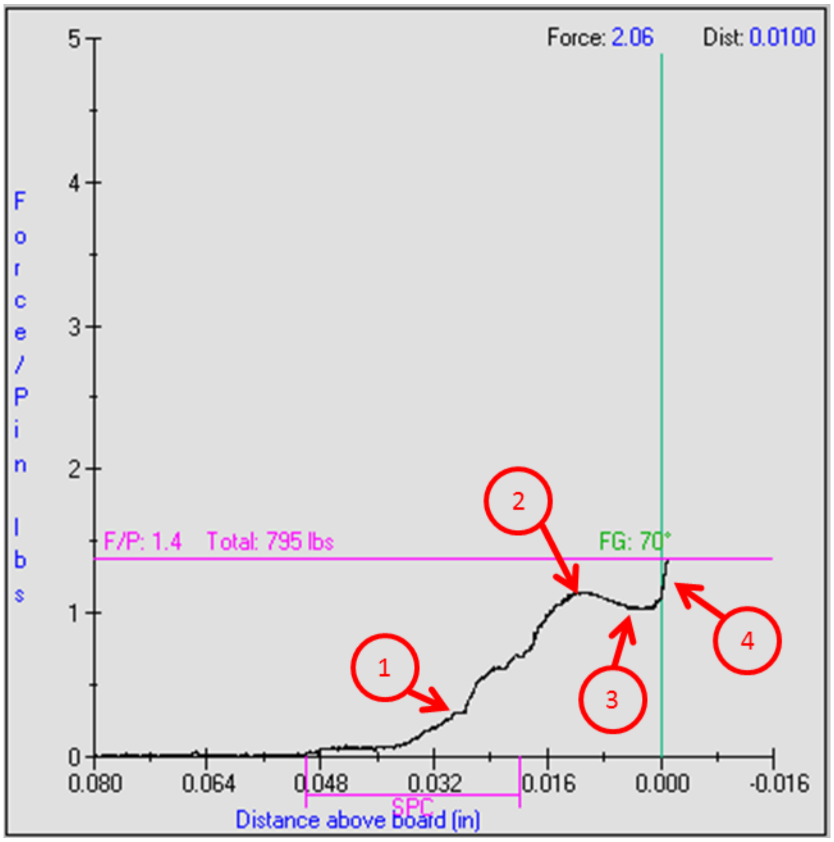


Figure A-7: Typical Force vs. Distance Curve of MEP-12T press for Paladin connectors.

1 – Initial Compression of Paladin compliant Pins:
Part of the initial pressing sequence with the *ATCS_FEMTO_FG_DWELL.prf* profile (Refer to Figure A-5) 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 compliant 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.

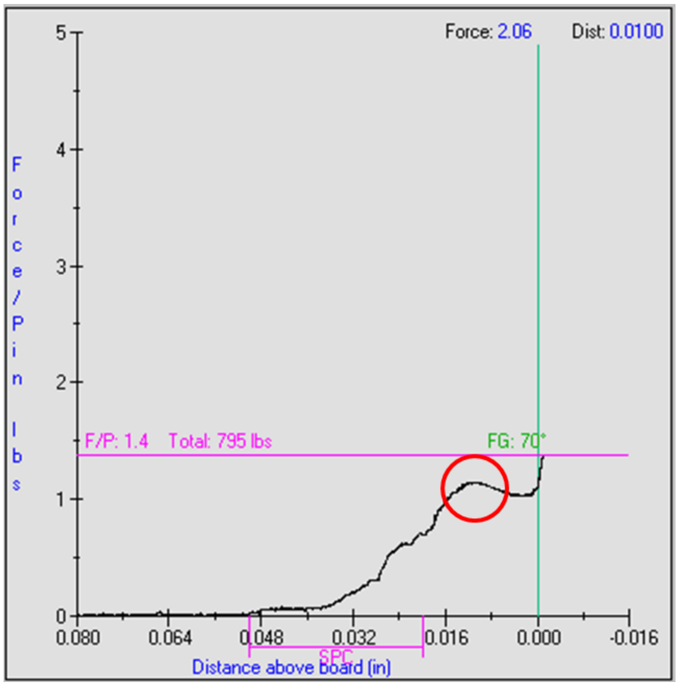


Figure A-8: Paladin pressing Force vs. Distance Graph showing two shapes of the knee area utilizing an MEP-12T press.

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 will be more or less pronounced, but is typically highlighted by an inflection point in the curve as Figure A-8 shows.

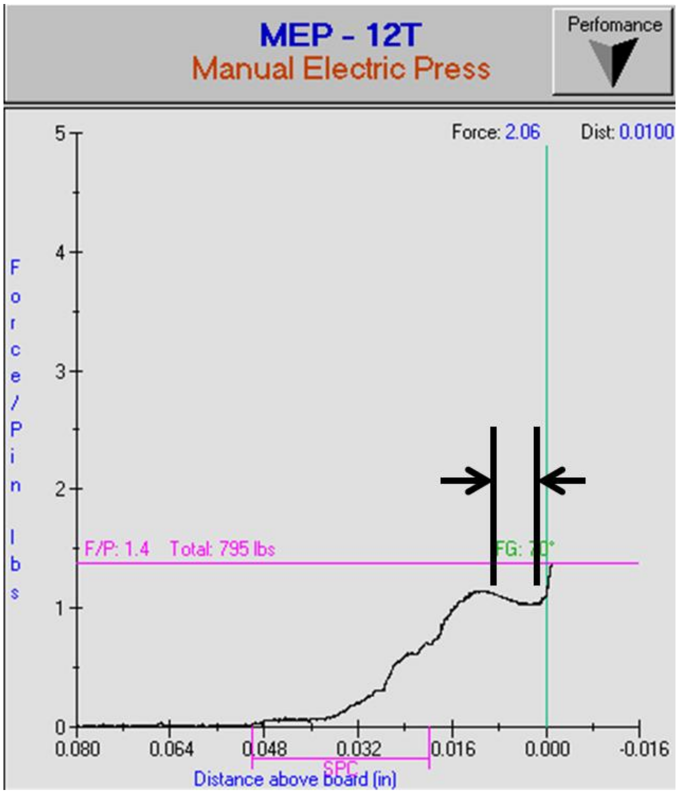


Figure A-9. Sliding force region of press curve.

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 (see Figure A-9), 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.

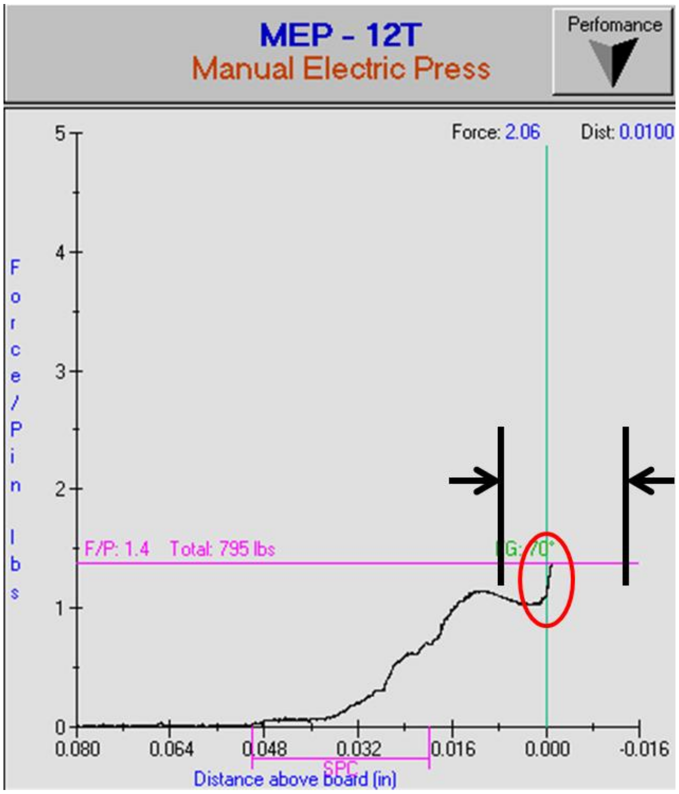


Figure A-9. Press sequence force gradient termination.

4 – Termination Force at the 70 Degree Force Gradient Line:
Once the Paladin connector standoff and organizer features begin to come in contact with the PCB surface, the force vs. distance curve will begin to increase in slope. During this stage of the pressing sequence, the *ATCS_FEMTO_FG_DWELL.prf* profile is designed to begin to search for the force vs. gradient curve to reach a 70-degree angle at a distance from 0.010 inches above to 0.015 inches below the PCB surface (See Profile Editor and Press Data Editor Sections). Once the connector standoff features come in contact with the PCB surface, the connector is fully seated (flush to 0.125 mm above PCB surface), refer to Figure 8. Figure A-10 shows the termination phase of the pressing process.