APPLICATION NOTE

AE-AN-TR-001-TR Multicoax Series Straight Mount Installation

Purpose:
This application note provides detailed instructions on how to successfully install and mount the Straight Mount TR Multicoax Series, and the Right Angle TR Multicoax series connector to a printed circuit board.

Board Preparation:

Prior to installing a TR Multicoax Series connector, it is necessary to inspect and clean the PCB. The following guidelines should be observed prior to installation of the TR Multicoax Series to the PCB.

- Inspect the TR PCB footprint for proper design criteria:
  - Gold plated footprint
  - Filled and plated vias
  - No solder anywhere on the footprint
  - No solder mask anywhere on the footprint

NOTE: If any of these criteria are found false, please contact Amphenol Ardent Concepts immediately.

- Inspect the TR board mounting surface for contamination and any obvious surface obstructions, bumps, or imperfections.
- Inspect the surface for solder and solder flux contaminants. Surface should be solder free.
- Use lint free cleaning cloth to wipe the board mounting surface clean of dust and contaminants.
- Apply a few drops of uncontaminated isopropyl ≥90% alcohol to a cleaning cloth to remove particles that are not easily removed from initial cleaning.
- Ensure most alcohol is removed from the PCB surface by wiping the surface with a dry lint free cleaning cloth.
- After the board footprint surface has been inspected and cleaned, avoid contact with the board surface with fingers or other contaminating objects.

CAUTION: The TR must rest evenly on the board surface to work correctly.

NOTE: An alternative solution to remove dust is to use filtered compressed air.

CAUTION: All vias must be filled and capped. There should be no solder mask within the TR footprint area.

Installing the Stiffener Block:

PCB Stiffener Blocks are supplied with all TR Multicoax Series connectors with PCB thickness < 94 mils, including Straight Mount, Right Angle and Leap Frog variants. If the PCB is thinner than 94 mils (2.4 mm) it is recommended to use a PCB Stiffener Block to aid in planarity. The PCB Stiffener Block also contains the tapped holes needed to mount the TR Multicoax Series to the PCB.

The following directions should be used as a guide for installing the PCB stiffener block.

1. Carefully remove the shipping cover and Stiffener Block from the TR Assembly by loosening Thumb Screws that come with your TR Assembly. (See Figures 1 and 2).

Figure 1: 8 Channel TR Series Straight Mount Assembly

Figure 2: 8 Channel TR Series Straight Mount Assembly with Shipping Cover and Stiffener Block removed.

2. Carefully locate the TR board footprint and align the press bosses of the Stiffener Block to the underside of the TR Multicoax Series footprint on the PCB (See Figures 3 and 4).

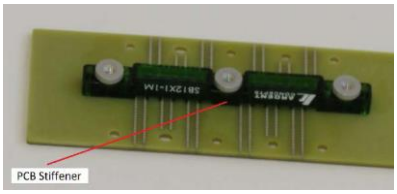


Figure 3: Mounting the Stiffener Block

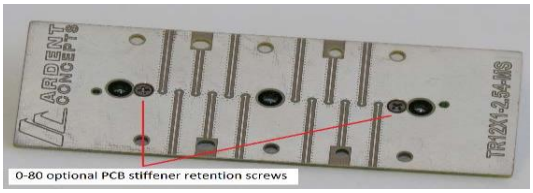


Figure 4: Mounting the Stiffener Block with Retention

NOTE: The Stiffener Block is symmetrical in design so attention to left/right orientation is not required. The press bosses will hold the Stiffener Block to the PCB backside.

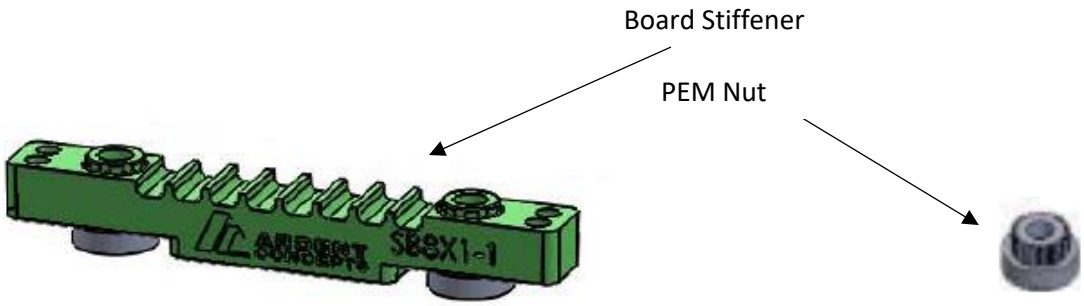
3. With the press bosses of the Stiffener Block aligned with the corresponding holes of the PCB, carefully apply hand pressure to press the bosses of the Stiffener Block into the PCB.

NOTE: It is not necessary to fully compress the Stiffener Block to the PCB at this stage. During further installation of the TR Assembly, the Thumb Screws will fully seat the stiffener before being fully torqued.

NOTE: An arbor press MAY be used if necessary to fully seat the bosses on the Stiffener Block.

When to use Board Stiffener vs. PEM Nuts:

The Straight Mount and Right-Angle TR models will use either our custom Board Stiffener or just PEM Nuts to allow attachment to the board. Which solution depends on the thickness of your PCB.

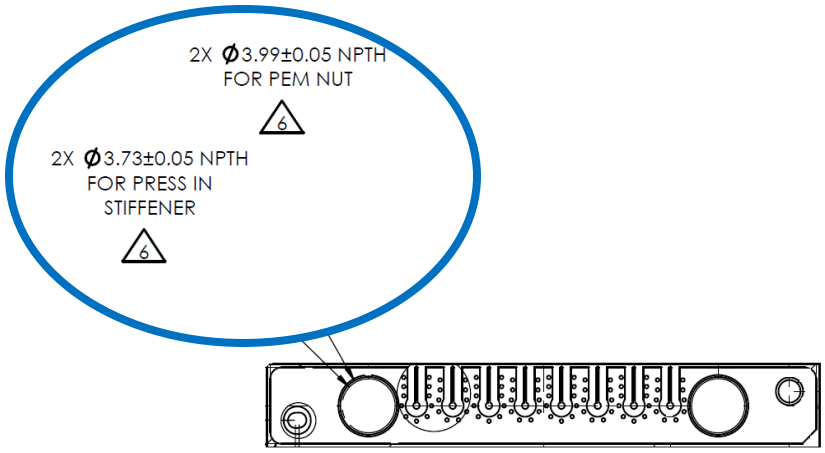


The board thickness specifications are as follows, with necessary components being supplied with all TR assemblies:

If PCB $\leq$ 93 mils (2.36 mm), we recommend our custom Board Stiffener with the PEM Nuts.
If 93 mils (2.36 mm) $\leq \boldsymbol{PCB} \leq$ 250 mils (6.35 mm), we recommend using the PEM Nuts.
For boards > 250 mils (6.35 mm) please consult the factory.

Once you have determined your PCB width and whether your board needs the Board Stiffener or just PEM Nuts, it is important to look at the footprint file for proper mounting hole requirement. When viewing the .pdf footprint drawing for your connector, take note of the mounting hole call outs outlined by NOTE 6. Depending on your attachment solution, there are different diameters for the mounting holes needed within your board. An example version of the note can be found Below:

6 BOARD STIFFENER RECOMMENDED FOR PCBs .030" (.76mm) TO .093" (2.36mm) THICK.
M2 PEMNUTS CAN BE USED FOR BOARDS .093" (2.36mm) TO .250" (6.35mm) THICK.
QUICK LATCH CAN BE USED FOR BOARDS .063" (1.60mm) TO .250" (6.35mm) THICK.
FOR BOARD THICKNESS OUTSIDE THE ABOVE RANGES, CONSULT THE FACTORY.



For ordering PEM nuts, we recommend the KF2-M2-ET Broaching Nut. These can be found by using the following link:

https://catalog.pemnet.com/item/nuts-broaching-types-kf2-kfs2/broaching-nuts-types-kf2-kfs2-metric/kf2-m2-et

For all our standard products, the mounting holes will have the following diameters:

Mounting Options	Diameter of Mounting Holes (mm/mils)
Board Stiffener with PEM Nuts	3.73 ± 0.05 / 146.85 ± 1.97
PEM Nuts	3.99 ± 0.05 / 157.09 ± 1.97

NOTE: For Boards less than .0625" thick (flex circuits) consult Ardent Concepts.

Installing the TR Multicoax:

Diagram 1: TR40-SM-8X1 showing board and dowel pins keyed for mating.

1. Locate the alignment dowels on the bottom of the TR Assembly, take note of the larger to smaller diameter dowel pins as they will be used as a reference when alignment is made to the board (See Figure 5).

CAUTION: Always avoid contact with the interface contacts to prevent damage.

2. Inspect the PCB TR footprint for through holes that will receive the locating dowel pins of the TR Multicoax Series. Again, take note of the larger and smaller holes, as they will correspond to the diameter difference seen on the TR Multicoax Series Connector.

3. Carefully align the two dowel pins with their corresponding holes on the PCB, 1.5mm dowel pin with the 1.5mm hole and the 1mm dowel slot pin with the 1mm slot hole (See Figure 6).

NOTE: The 1.5mm dowel will always align near Channel 1.

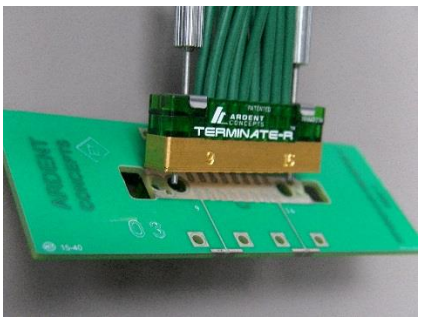


Figure 5: Aligning the TR Assembly

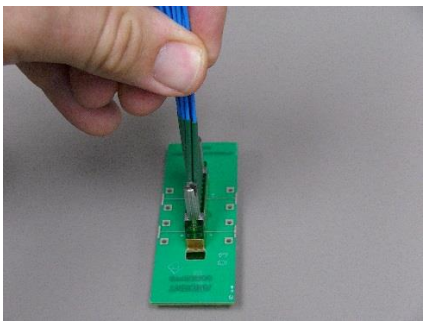


Figure 6: Holding the TR Assembly in Place

4. Carefully push down on the TR block and hold it in place (See Figure 6).

5. To ensure that the Stiffener Block is aligned with the TR Assembly, push the Thumb Screws in and rotate to verify contact.

NOTE: If the TR assembly has 3 Thumb Screws as in a 12 channel or 24 channel assemblies, tighten the middle screw before tightening the side screws.

6. While holding the TR Assembly in place, tighten the M2 hex Thumb Screws located on top of the Strain Relief Block until they are hand tight. You may also choose a M2 Hex driver to achieve the spec'd torque of 1.5 in-lbs (0.169Nm).

Figure 7: Verifying M2 Thumb Screw Contact

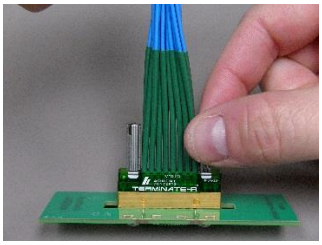


Figure 8: Tightening the Middle M2 Thumb Screw

7. After all the screws have been tightened snuggly into place, go back over the Thumb Screws making sure they're all still snug. M2 Hex driver can also be used to achieve the spec'd torque of 1.5 in-lbs (0.169Nm).

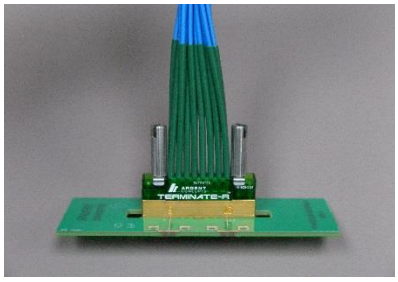


Figure 9: Mounted TR Assembly Complete

CAUTION: Do not overtighten the M2 hex screws (maximum torque is 1.5 inch pounds).

NOTE: The Stiffener Block is fully compressed into the board at this stage.

8. For the Installation of the connector side of the TR Multicoax Series, please reference Application Note AE-AN-TR-006-TR Multicoax Series Integrating to instrumentation.

Application Note Summary:

- Inspect the TR PCB footprint for proper design criteria. If any of these criteria mentioned above are found false, please contact Amphenol Ardent immediately.
  - Gold plated footprint
  - Filled and plated vias
  - No solder anywhere on the footprint
  - No solder mask anywhere on the footprint
- Inspect board and ensure it is free of contaminants.
- For boards thinner than 94 mils (2.4 mm) it is recommended to use a PCB Stiffener Block.
- An arbor press MAY be used if necessary to fully seat the bosses on the Stiffener Block.
- For boards greater than 94 mils (2.4 mm) M2 PEM nuts may be used in place of the Stiffener Block.
- When screwing TR Multicoax Series into the board, do not overtighten the M2 hex screws (maximum torque is 1.5-inch pounds).

Who is Amphenol Ardent Concepts?

Amphenol Ardent Concepts is a leading designer and manufacturer of high performance multicoax and coaxial assemblies, connectors, and sockets used in the development of next generation semiconductors and electronics systems. Our core technology is the smallest, fastest, most electrically efficient compression mount connector technology worldwide. As data rate requirements increase and devices and systems shrink, Ardent's products deliver superior signal integrity in a dense footprint that can be reusable across programs to maximize cost savings.