APPLICATION NOTE

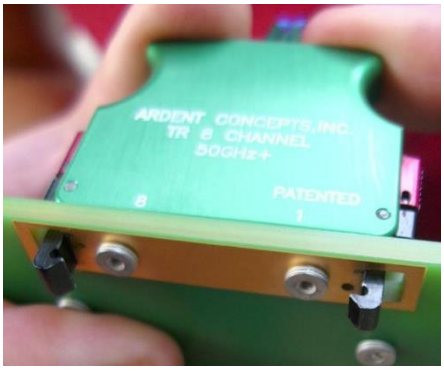
AE-AN-TR-008-TR Multicoax Series Z-Height Considerations

Purpose:
This application note provides details on space constraints and considerations for both top and bottom of PCB.

Quick-Latch:

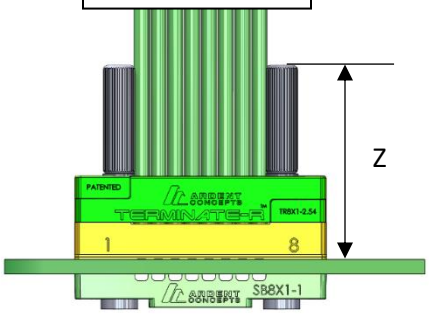
For the Quick-Latch model, please note that there are specific thicknesses of the PCB that we recommend. The recommended PCB thickness range is from **63 mils (1.6 mm) to 250 mils (6.35 mm)**. The reason for the minimum thickness of the PCB is due to a small gap between the interface and the latches of the shroud. If the board is not thick enough, the latches will not engage and the force needed to compress the contact will be insufficient.

During installation of the Quick-Latch model, the z-height coming off the back of the board does change as the interface and ground assembly compress up into the Quick-Latch body as you can see in in the photo to the right. The maximum z-height off the back of the board is equal to **360 mils (9.144) minus the thickness of your PCB**. This is something to consider if you have z-height restrictions coming off the back of your board.

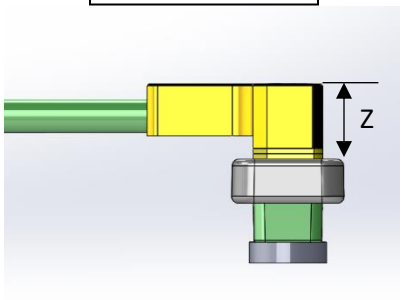


Restrictions Off the Top of the PCB:
This section of the application note goes over the height coming off the top of the PCB, also known as the z-height.

Straight Mount



Right Angle



Amphenol Ardent Concepts
4 Merrill Industrial Drive Hampton, NH 03842
(603) 474-1760
Sales: info@ardentconcepts.com Technical: Support@ardentconcepts.com

APPLICATION NOTE

The Z-Height of the board depends on the Amphenol Ardent connector you choose. This can be important to our customers' designs depending on the area surrounding the connector, mating hardware and PCBs, and housing of modules. The Z-Heights are different for each TR Multicoax Connector™ option. See the chart below for the Z-Heights of each TR.

Termination Option	Z-Height Top of PCB (mm / mils)
20 GHz Straight Mount (w/ Thumbscrews)	29.96 **/** 1179
40/70 GHz Straight Mount (w/ Thumbscrews)	29.21 **/** 1150
20 GHz Straight Mount (w/ Cap Screws)	15.86 **/** 624
40/70 GHz Straight Mount (w/ Cap Screws)	15.04 **/** 592
20 GHz 8x1 and 12x1 Right Angle	6.20 **/** 244
40/70 GHz 8x1 and 12x1 Right Angle	5.38 / 212
20 GHz 16x2 Right Angle	8.44 **/ 332**
40/70 GHz 16x2 Right Angle	7.62 / 300
20 GHz 45°	10.39 / 409
40/70 GHz 45°	9.57 / 377
Quick-Latch	44.45 to 49.94 / 1750 to 1966*
QUICKLINK	38.79 **/** 1527

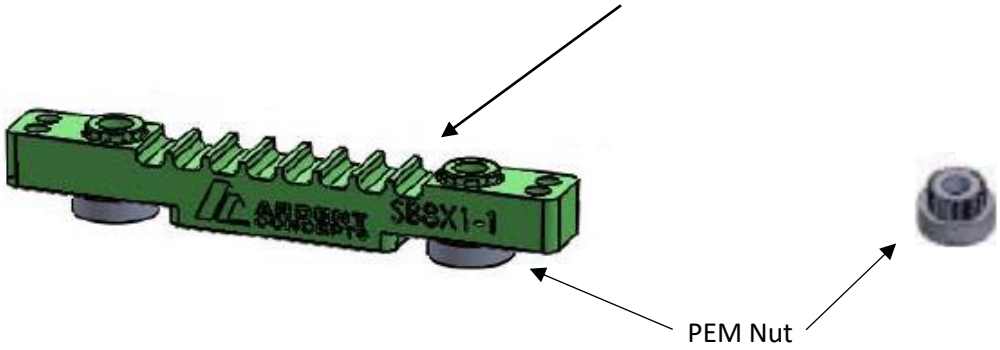
*Quick-Latch Interface presses into Quick-Latch Body so the z-height is based on the thickness of the PCB.

Restrictions Coming of the bottom of the PCB:

The following outlines the Z-Height restrictions coming off the bottom of the PCB, where the Board Stiffener and PEM nuts are. This Z-Height will differ depending on whether your board requires a Board Stiffener or just PEM nuts. There is also a max Z-Height as previously stated when installing the Quick-Latch.

When to use Board Stiffener vs. PEM Nuts:
All TR's ship with board stiffener except the Quick-Latch model as it is not needed

The Straight Mount and Right-Angle TR models will use either our custom Board Stiffener or PEM Nuts to attach to the board. The thickness of the PCB determines which solution is best suited.

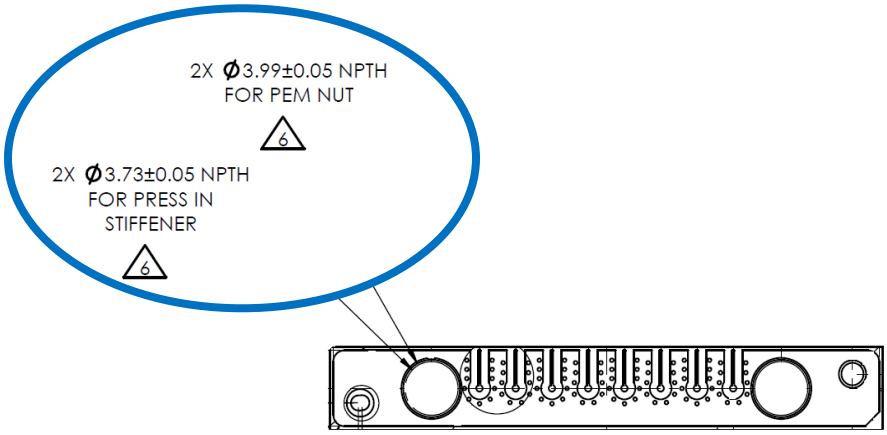


The board thickness specifications are as follows, with necessary components being supplied with all TR assemblies:

- If **PCB $\leq$ 93 mils (2.36 mm)**, we recommend our custom **Board Stiffener with the PEM Nuts**.
- If **93 mils (2.36 mm) $\leq$ 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 the attachment method (Board Stiffener or PEM Nut), it is important to reference 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 is shown 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.



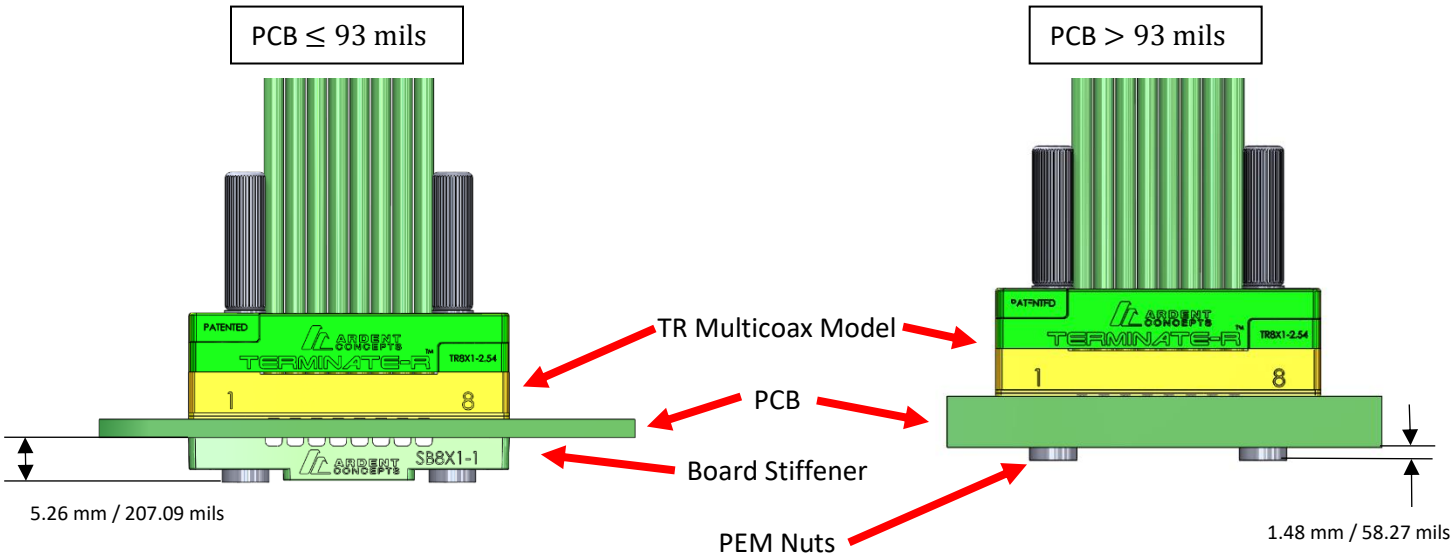
For all our standard products, the mounting holes will have the following diameters:

Mounting Options	**Diameter of Mounting Holes (mm/mils)**
Board Stiffener with PEM Nuts	3.73 ± 0.05 / 147 ± 2
PEM Nuts	3.99 ± 0.05 / 157 ± 2

The Z-Heights shown below correspond to the different mounting options outlined above.

NOTE: That Amphenol Ardent Concepts has made many custom board stiffener solutions to accommodate tight z-height restrictions.

Mounting Option	Z-Height (mm / mils)
Board Stiffener w/ PEM Nuts	5.26 / 207
PEM Nuts	1.48 / 58



Summary:

Bottom of PCB:

- For **PCB ≤ 93 mils (2.36 mm)**, we recommend the use of a **Board Stiffener** supplied with all TR assemblies.
- If **93 mils (2.36 mm) < PCB ≤ 250 mils (6.35 mm)**, we recommend just using the **PEM Nuts**.
  When looking at footprint for either of these options, refer to callout 6 on all footprint files.
- For boards **> 250 mils (6.35 mm)**, we recommend using the PEM Nuts

Mounting Option	Diameter of Mounting Holes (mm/mils)
Board Stiffener with PEM Nuts	3.73 ± 0.05 / 146 ± 2
PEM Nuts	3.99 ± 0.05 / 157 ± 2

- The **Board Thickness** required to use a **Quick-Latch** is between **63 (1.6 mm) and 250 mils (6.35 mm)**.

Top of Board:

Termination Option	Z-Height (mm / mils)
20 GHz Straight Mount (w/ Thumbscrews)	33.32 / 1312
40/70 GHz Straight Mount (w/ Thumbscrews)	33.02 / 1300
20 GHz Straight Mount (w/ Captive Screws)	19.96 / 786
40/70 GHz Straight Mount (w/ Captive Screws)	18.92 / 745
Right Angle	6.24 / 245
Quick-Latch	7.05 / 277
Quick-Link	47.80 / 1882

Mounting Option	Z-Height (mm / mils)
Board Stiffener w/ PEM Nuts	5.26 / 207
PEM Nuts	1.48 / 58

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.