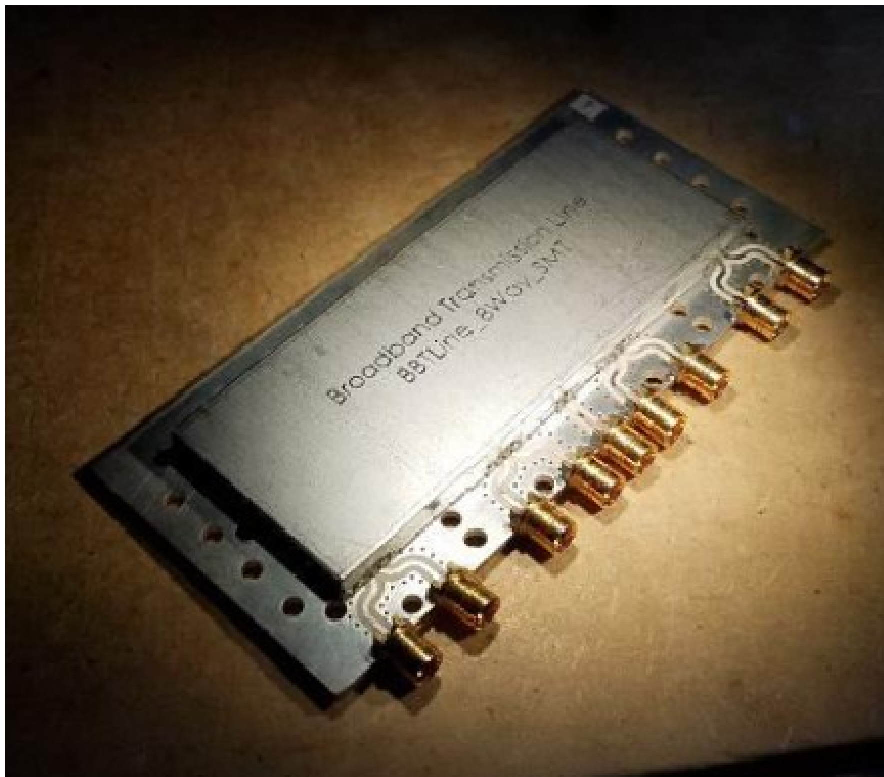
Evaluation Board Details - 8-Way Version 1 RF Splitter - BBTLine

Description

Shown below is an Evaluation Board For BBTLine’s 8-WayVersion 1 Surface Mount RF Splitter (an 8-Way Version 1 Splitter is present on the Evaluation Board). The Version 1 8-Way Splitter Has All Nine Ports On One Side Of the Device. The Evaluation Board has nine male smooth bore SMP connectors.



Instructions for aligning and hand soldering the 8-Way Version 1 RF Splitter to the Evaluation Board are given below.

The placement of the 8-Way Surface Mount (SMT) Version 1 RF Splitter on the Evaluation Board begins with correct alignment of the RF Splitter Half-Cut Signal Vias to the Evaluation Board RF Traces.

Step 1. Alignment Between Splitter Half-Cut Vias And Evaluation Board RF Traces

It is crucial, to the RF performance of the Splitter, that the circumferences of the Splitter Half-Cut Vias align right to the edges of the Evaluation Board RF Traces (as shown by the blue arrows below). This must be true for **all** of the Half-Cut Vias and all Evaluation Board RF Traces. Make sure the time is taken to do this alignment correctly, else the Splitter RF performance will suffer and/or shorted RF traces will result. The 8-Way Splitter is physically quite large, so some practice will be needed to get this alignment just right.

Carefully preserve this alignment by either applying light clamping between the Splitter Shield Can and the Evaluation Board (or, by taping the splitter down to the board).

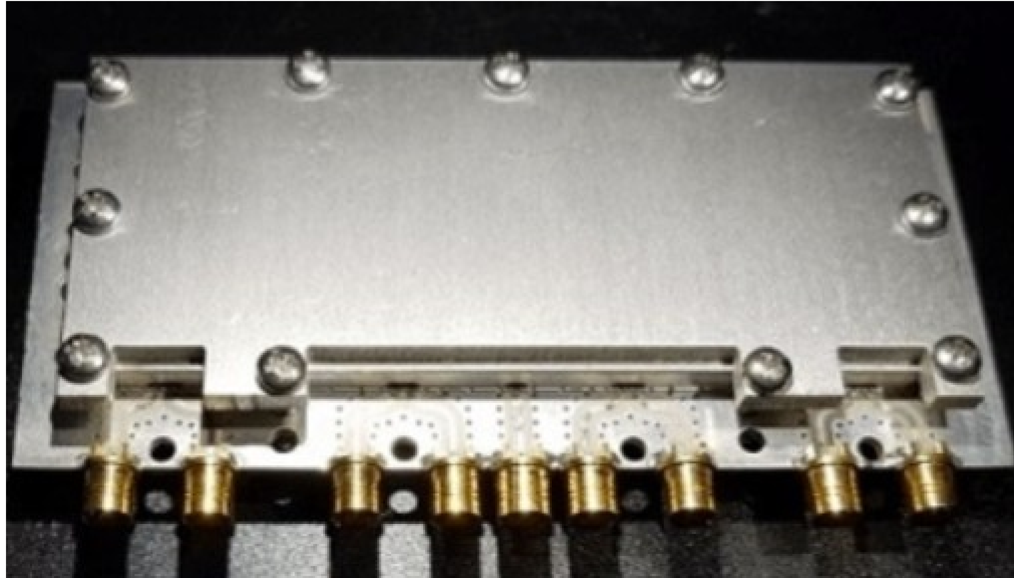
Another image to clearly show how the Splitter half-cut via circumferences align right to the edges of the Evaluation Board RF Traces:

Step 2. Soldering The Splitter Half-Cut Signal Vias To The Evaluation Board RF Traces

To ensure the Splitter is flat with the Evaluation Board, apply a light downward pressure on the Splitter Shield Can (either by using fingers or some other devised light clamping method). Apply solder between one Evaluation Board RF Trace and one Splitter Half-Cut Via. At this point, there may be some excess solder at the junction - come back to this later during cleanup. Using an ohm-meter, check that the RF Trace is not shorted to the Evaluation Board Ground Plane. Repeat this same procedure for all other RF Traces/Half-Cut Vias. If everything is aligned correctly, there should be no shorts between the RF TRaces and the Evaluation Board Ground Plane.

Step 3. Applying "Pressure Plates"

Apply two "Pressure Plates" as shown below (one plate above the Splitter Shield Can and One plate below the Evaluation Board) using standard 2-56 screws/nuts. Ensure that the screws are randomly and slowly tightened to present even pressure over the entire surface of the 8-Way RF Splitter. Do Not Over-Tighten the screws. Pressure plates are recommended for higher power applications - they can be ignored for lower power applications.



Step 4. Cleaning Up Excess Solder At The Splitter Half-Cut Via Junctions

Solder-wick any excess solder away from the RF Traces/half-cut vias. It is crucial to the 7 GHz RF performance of the device that no excess solder is present - the half-cut vias should be soldered to the RF Traces with an absolute minimum amount of solder. Use Chemtronics 30 mil wide solder-wick and a very fine soldering iron to remove any excess solder at all RF Traces.

Step 5. Soldering the Splitter Ground Plane To The “MotherBoard” Ground Plane

These steps apply to the case where the 8-Way RF Splitter is soldered to a board other than the Evaluation Board - the case where there are no “Pressure Plates” and the two ground planes do need to be soldered together

Before you begin this process, double-check using an ohm-meter, that there are no shorts to ground present at any of the RF Traces/Half-Cut Via junctions. Once you begin soldering the Splitter Ground Plane down to the “MotherBoard” Ground Plane, it will be difficult to reverse the efforts.

Use a flux pen and run a generous amount of flux along all four sides of the splitter (that is, along the Half-Cut Ground Vias present on all four Splitter sides). Using a fairly fat soldering iron tip, fine solder and an elevated iron temperature, sweep slowly along the four sides of the Splitter (with the solder and soldering iron tip tracking one another). As you sweep along the Splitter half-cut ground vias, the solder should “catch” easily between the Splitter Half-Cut Vias and the Evaluation Board ground plane.

If the solder is not flowing freely during this process, then an elevated temperature will be needed - either a hot plate and/or a fatter soldering iron tip at higher temperatures should be experimented with.

To ensure good RF performance, it is necessary that all Splitter Half-Cut Ground Vias are soldered to the Motherboard. Although it would be optimal, it is not necessary to have solder evenly cover the entire underside of the Splitter.

Note: The “Pressure Plates” do provide heat-sinking to the Splitter and are recommended for higher power applications (and also for evaluation board purposes). If the application is a **high power application (greater than 500 milliwatts consumed internal to the splitter)**, then the “Pressure Plates” should be included in the PCB Decals/Footprints for the Splitter. If the application is low power, the pressure plates can be ignored.