Digital Front-End Transition board

Printed Circuit Board Fabrication

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General Information

The Digital Front-End Transition board is a 6U x 125mm printed circuit board. The 6-layer board is composed of 4 signal layers and 2 power/ground plane layers as indicated in table 1. It will be a 0.062" thick board. Boards must be fabricated in accordance with IPC-S-100.

Characteristic Impedance

Table 1 shows a possible board layer construction to provide the microstrip and stripline characteristic impedances. For the inner two routing layers impedance must be controlled to 100Ω differential (± 10%). **The vendor has the liberty to adjust these dimensions to suit their manufacturing process in order to archive this goal.** The characteristic impedance on the top and bottom layers should be 80Ω (± 10%). The characteristic impedance must not vary by more than 5% from board to board. The vendor shall fabricate and measure the characteristic impedance of each layer on a coupon with the same dimensions for each run to and provide the test data to Fermilab. Six mil traces (~5 mil after etching) are used on all signal layers.

1. TOP ROUTING LAYER ("COMPONENT" SIDE)-- 1/2oz. foil

   0.008" pre-peg

2. PLANE LAYER-- 1oz.

   0.012" core

3. TOP INNER ROUTING LAYER-- 1oz.

   0.010" pre-peg

4. BOTTOM INNER ROUTING LAYER—1oz.

   0.012" core

5. PLANE LAYER—1oz.

   0.008" pre-peg

6. BOTTOM ROUTING LAYER ("SOLDER" SIDE)—1/2 oz. foil

Table 1. Possible layer arrangement used to give characteristic impedances mentioned above. Note the layer designations correspond to the layers given in the PCB design file.

Contact Prints

The vendor will generate all necessary artwork and supply a full set of contact prints for each of the prototype and production runs as soon as they can be made available.

Mechanical Considerations

The finished board shall be provided per the Digital Front End Transition board Dimensions drawing to the indicated tolerances and be free of burrs and slivers and have smooth edges. The vendor shall add copper islands as deemed necessary to minimize warpage, which shall be less than 0.005mm per linear centimeter. Overall board thickness can be modified by the vendor to achieve the desired characteristic impedance so long as the maximum thickness is less than 0.065".

Quantity

125 boards will be fabricated, ten initial boards plus 115 after Fermilab checkout.