BaBar IFR:
PDB System Description

Preliminary

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1 Introduction

The Point-to-point Distribution Board (PDB) is the backplane of the Front End Crates. In this crates different types of boards are mounted : the IFR Fifo Boards (IFB) which receive the data from the FEC, the IFR Calibration Board (ICB) used to send calibration signal to input stage of FEC, the IFR TDC Board (ITB) used to measure the time of the event and the IFR Crate Controller (ICC) which is responsible to collect data from all the boards. The ICC is linked to the standard BaBar Read-out Module (ROM) through the optical link at 1,2 GHz.

2 PDB Requirements

The PDB must be able to transmit the 59.5MHz clock to the IFR Boards
The PDB must connect the ICC to each board with 4 lines : Data, Control, 59.5MHz clock, and 59.5/n MHz clock.
All the 64 lines must have the same length.

3 PDB Description

The PDB is a 17 slot backplane for standard VME crate. The signal are located on J2 connectors, A-C rows, the B row is used for power and ground. The first position is used for ICC card. The first three prototype will be realized in passive stripline technology, the dimension of the board is 13.575"x5.100". All the 64 lines have the same length (14.8" ± .1") to minimize the skew between the lines. The PDB can be used to transmit single-ended signals (TTL or ECL). In Fig 1 the structure of the PDB is showed, the signal lines have controlled impedance (50Ω), the low voltage (-2V, +5V, -5V, 12V) and ground lines are on different planes. In total there are 9 planes. The signal lines (Control) coming out from the ICC and not used can be terminated on the backplane,the lines (Data)coming to the ICC are terminated in the crate controller. In table 1 the values of the stripline used to get the 50Ω impedance lines are showed:

Name	value
Line width	$0.305mm$
Cu lines thickness	$35\mu m$
Fiberglass type	FR4
Propagation Delay	2.16ns/ft
Dielectric const.	4.5

Table 1: Value of STRIPLINE technology

Lines that require controlled impedance are placed on layers 2, 4, 6 and 8. The other planes are used for gnd and low voltage.

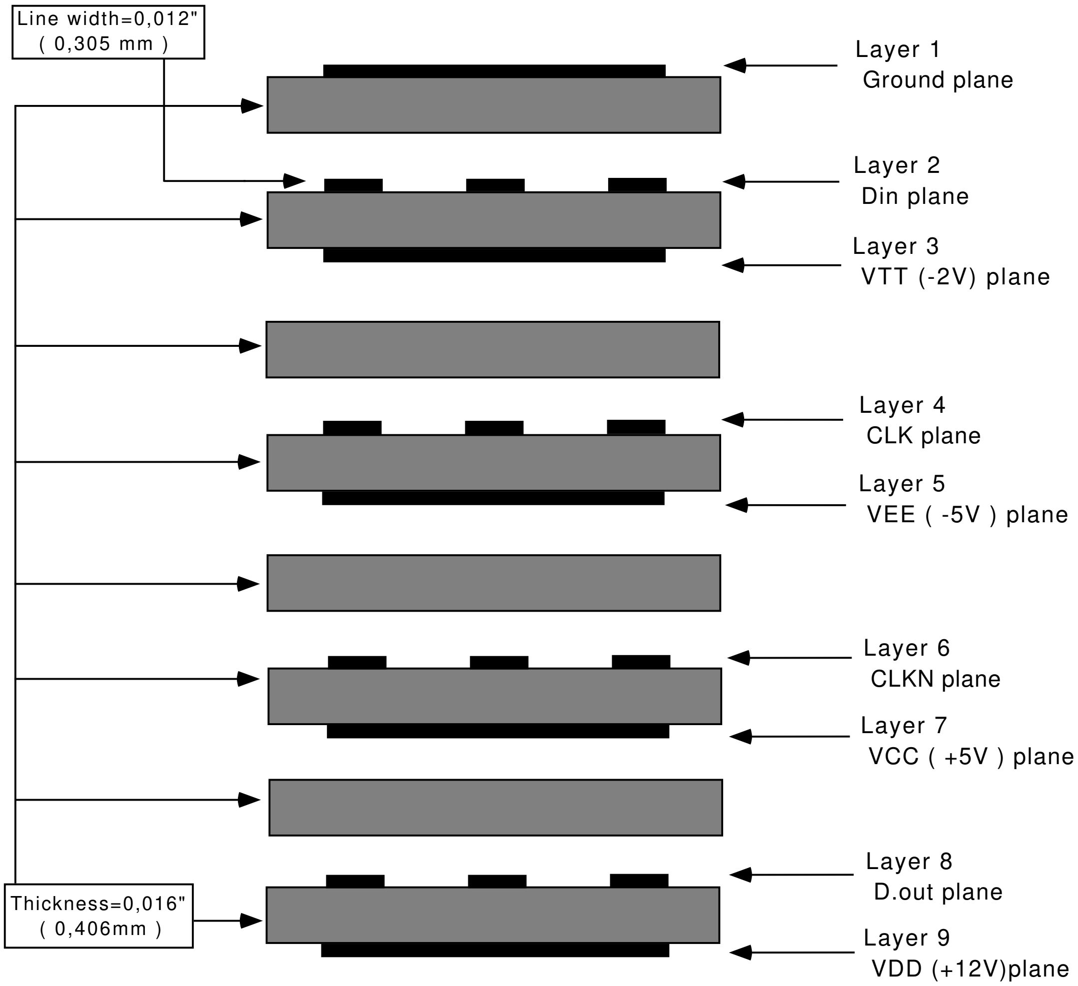

Figure 1: Stripline structure