



International Electronics Manufacturing Initiative

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Printed Circuit Board Architecture for the use
of Optical Interconnection of Components

By
**James Howard, WUS Printed Circuits
and Greg Lucas**

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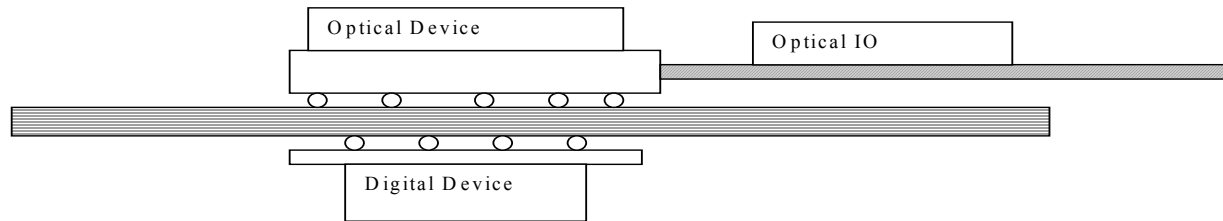
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A Brief Review of the General Architecture of Optical PCBs

Surface Based Optical Transmission:

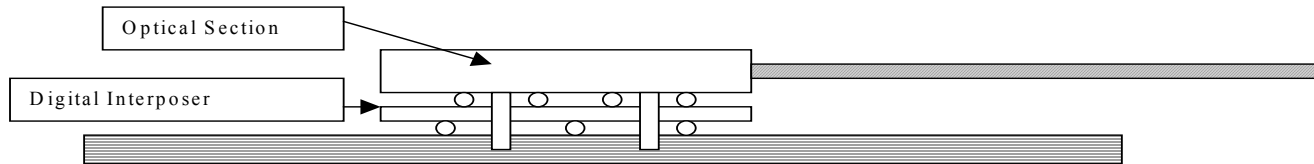
The current technology includes transmission of between optical units (typically modulated laser sender and receiver units) and fiber optic cables or flexible kapton fiber optic cables, which are all relatively familiar.

At present many of the optical and digital devices may be mounted on opposite sides of the PCB and all connections are on the surface of the PCB.



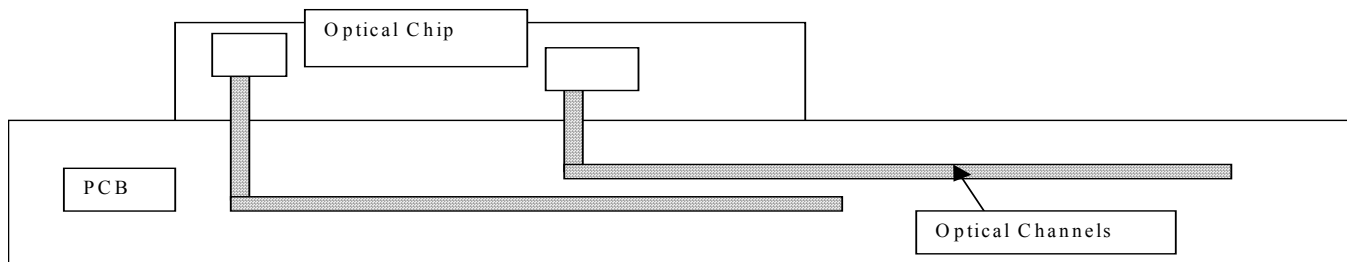
The limitations for this technology for on board transmission of signals are size, surface space requirements, and limited channels available.

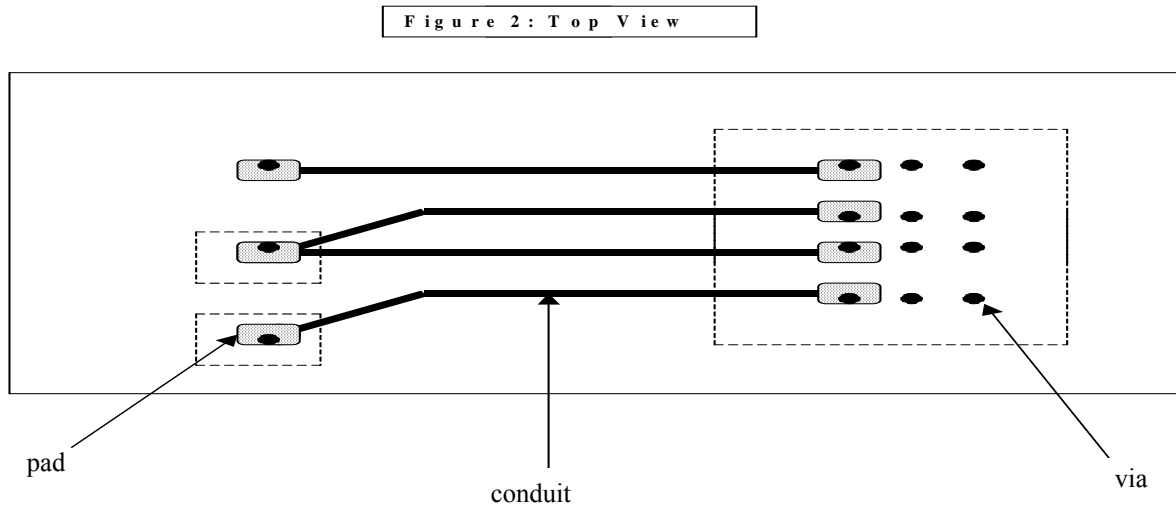
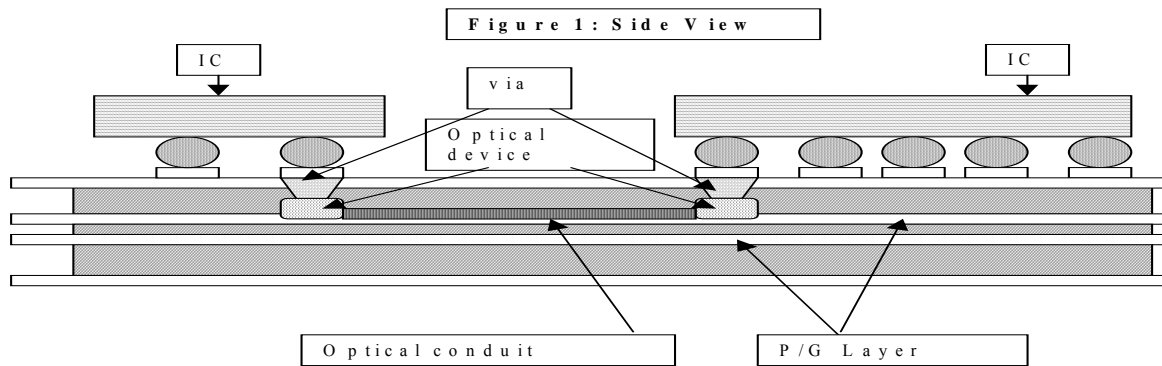
Interposer Digital System :



The interposer model is based on the requirement for reducing surface space and communication time between elements. The technology and limitations are not significantly different from the current systems deployed..

Digital Optical Device On Board:





Electrical Concept

- It is the object of the present concept to place the capacitive power/ground plane as near to the surface components as is practicable to shorten the path of electrical flow. It is contemplated in the current concept that the plated through holes or PTHs from the surface devices may be formed as blind vias with short length, low

Optical Concept

- via inductance and inherently lower EMI an plane upon which the optical elements will be formed. In contrast the optical portion of the circuit (as an example) may be 12 inches in length, with a ratio of 10:12,000 electrical to optical length of connection, making the time of signal travel in the electrical signal portion irrelevant.

Electrical to Optic Ratio

