

Why do we need Advanced PCB Technologies for Space Electronics?

Year: 1984

When Shri Suresh proposed Multilayer PCB technology:

- Very few people supported him.
- There were **no MLB designs** available.

Now

- Can we think a spacecraft without MLBs?
- Our **I3K spacecraft** would have weighed more than **10K**, if only **Double sided PCBs** were used for its' fabrication.

Year: 1986

When Shri. Suresh proposed Plasma De-smear/etch-back system for MLB technology, with a cost of Rupees 18 lakhs:

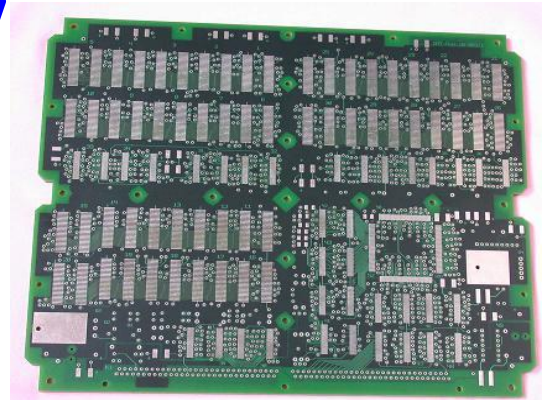
- Very few people supported him.

Now

- With the 27 year-old Plasma system, we are getting 5 to 15 microns of positive etch-back consistently.
- DOS is also insisting all ISRO centres and External PCB vendors to make use of Plasma system mandatorily for MLB desmear/etch-back process.

Fine-line PCB Technology

Had I not developed the
Fine-line PCB technology:

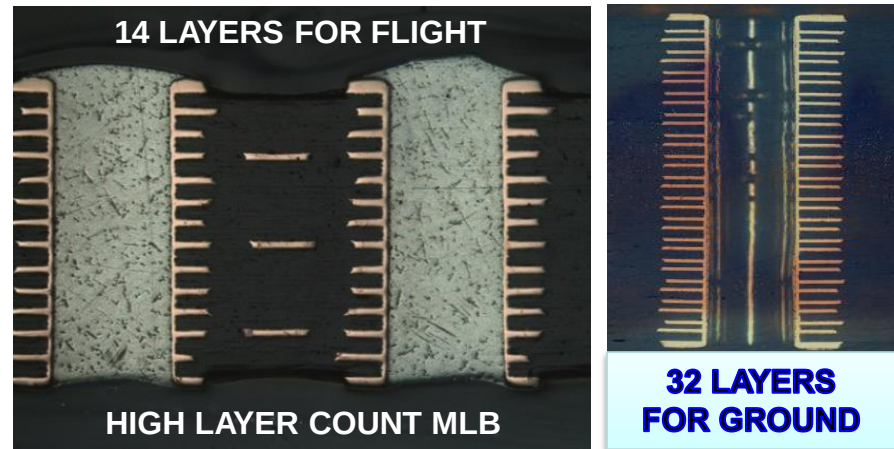


- We should have used **72 normal MLBs**, instead of **12 Fine line MLBs** for every SSR package of current spacecraft.
- Presently used **12 MLBs** per SSR package can further be brought down to **six or less number** by making use of **HDI PCB technology**

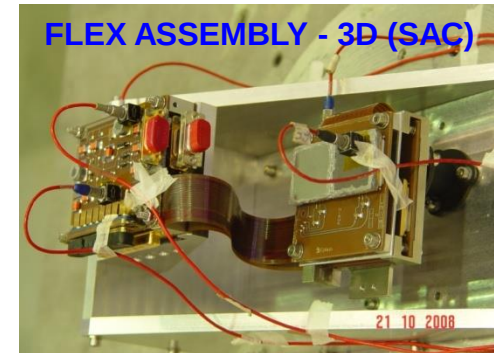
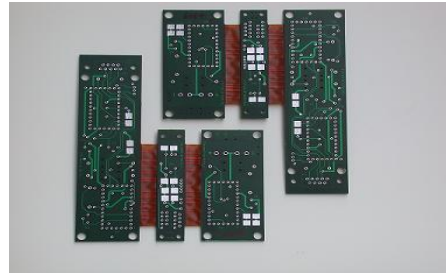
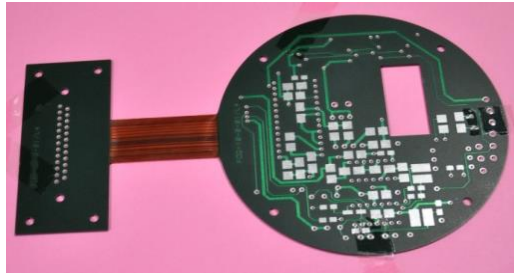
High layer count MLB Technology

Had I not developed the High layer count MLB technology,

- We could not have used **state-of-the-art electronic devices**,
- Each subsystem would have used **more number of cards** per package, thereby
- Resulting in **higher package-weight** per spacecraft.



Rigid-flex MLB Technology



Had I not developed the Rigid-flex MLB technology

- We should have depended on **imports** and we might have used even **defective boards** in our spacecrafts.
- Since I had the **technology know-how**, I could give the same to the foreign vendor and got all the **defective boards** replaced with **proper ones**.

Unique MLB Registration Technique

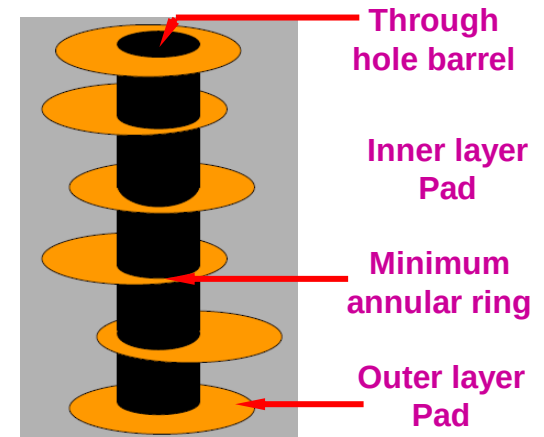


Before
Mis-registration



After
Good-registration

Typical positions of inner layers



- **Registration in MLBs is a major concern**
- **Our minimum annular ring (MAR) spec is 50 μ m, which is more stringent than that of ESA's 25 μ m MAR.**
- **X-ray tooling system is not available at PCF.**

Had I not invented an unique MLB Registration technique,

- **We might have lost over 50% of critical MLBs due to mis-registration in MLBs.**

Cutting-edge Technologies at Printed Circuits Facility of MCHF

ISAC's Printed Circuits Facility is considered to be
No.-1 in India:

- Not because we produce PCBs in thousands,
- But because PCF has attained significant expertise in numerous PCB technologies,
- Which is not common in other Indian PCB industries, though they have invested heavily on infrastructure.