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Innovative New Design of Replaceable Burn-in PCB Edge Finger with Over Voltage Protection (OVP)

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OUTLINE

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INTRODUCTION

Burn-In Operations:

- 6,000 active burn-in boards
- Life of BIB edge finger depends on its usage (volume of production)
- BIBs edge finger "wear and tear" is inevitable, even with robust PM process
- In 2015 and 2016, BIBs with damaged edge finger went as high as 47% of the total scrapped boards.
- Replacement cost is around $45K per year

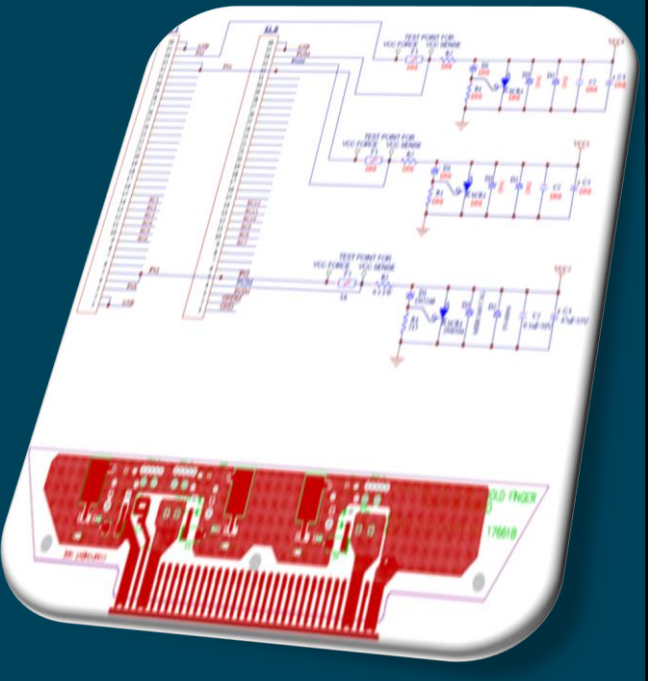
A team was formed to mitigate the impact of increasing percentage of scrapped boards due to damaged edge finger (47% of the total scrapped boards). The team started in 3Q16.

OBJECTIVE

To design a replaceable edge finger that will bring down the % scrappage of burn-in boards (due to damaged edge finger) to 25% (half life) by 1Q17.

Replaceable Edge Finger

- The design is compatible to the current and new burn-in boards – damaged edge finger can be replaced.
- The design is standard for all adapter configurations
- Component requirements and physical design are in accordance with specifications



GOALS

- **Technical Goal**
  - Any board for scrap due to damaged edge finger will become good as new when this innovative design is implemented (1Q17)
- **Manufacturability Goal**
  - The replaceable edge finger should be adaptable to current and future board designs and plug and play (1Q17)
- **Compliance Goal**
  - The replaceable edge finger design must be compliant with the board validation and BIB outline specs that requires an OVP that can withstand the stringent requirements of ADI products(1Q17).
  - TRB and documentation must be approved (1Q17)

METHODOLOGY

	Milestones	3Q16	4Q16	1Q17
PLAN	Form a Team	•		
	Design of Edge Finger	•		
	Technical Review	•		
DO	Prototyping		•	
	Technical Evaluation (Functionality)		•	
CHECK	Compliance to Burn-In Board Validation Requirements & BIB Outline Specs			•
	Manufacturing Validation Run			•
ACT	TRB Approval & Documentation			•

METHODOLOGY

Connections

- Uniform jumper wires and thickness
- Efficient connections lay-out
- Quick adapter installation

Installation

- Physical layers, signal distribution and power lines properly comprehended
- Adapter requires robust connections
  - Screws should hold tight the adapter on the frame
  - Soldering Jumpers need to firmly connect the signal and power traces

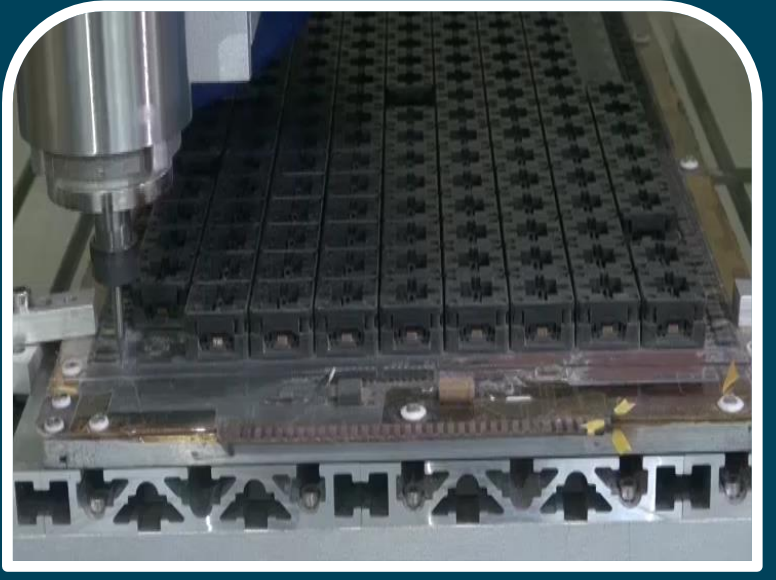
METHODOLOGY

Additional evaluations were performed to validate the new boards on this particular project.

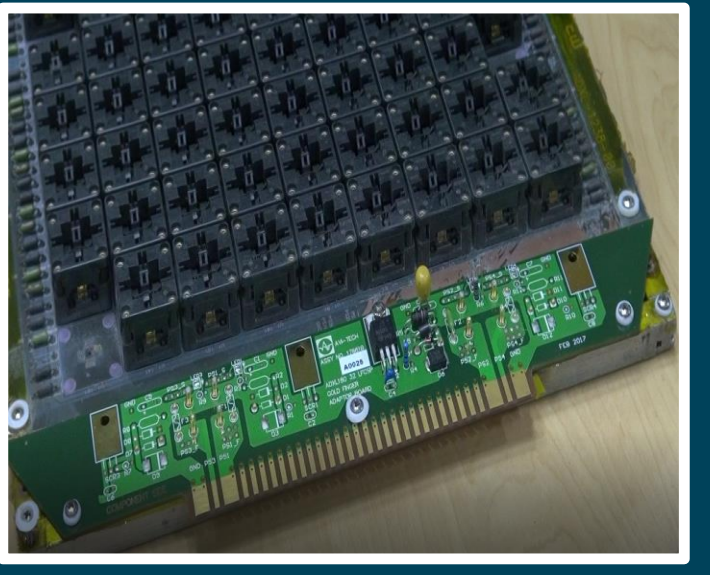
1. Perform BIB test on the boards
2. Evaluate the board with no-load and full-load condition in bench station
3. Perform all set-up validation procedure according to burn-in specifications
4. Run the board in the oven @ 49 BI hours
5. Release to production as soon as it conforms with burn-in specification.
6. Run the boards in production and monitor the yield trend and data read-points

METHODOLOGY

Video Presentation



BIB with replaceable edge finger



RESULT AND DISCUSSION

- The completion of the replaceable edge finger project was completed on time
- Technical evaluations passed
  - Measurements
  - OVP functionality
  - Manufacturing Validation Run
- TRB and Documentation were completed
  - Qualified process
- Scrappage of 80 BIBs was avoided

CONCLUSION / SUMMARY

- This project won the "Best in Innovation" award in TQM 1st round review in ADI Philippines 2017
  - One of the technical papers in the Analog Devices Technical Symposium
- This project resulted to a significant impact on ADI Philippines in terms of cost avoidance.
  - **Initial Cost Avoidance of US $ 118,000**
    - **Validated by Finance**
- Major Strengths:
  - Proven applicability in static burn-in manufacturing and
  - Prevention of environmental waste (PCB scraps)
- Follow-on project : Applicable to dynamic burn-in boards and other PCB with edge finger