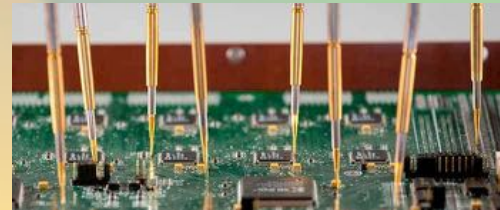
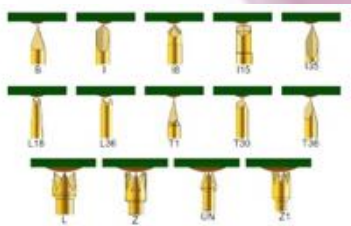




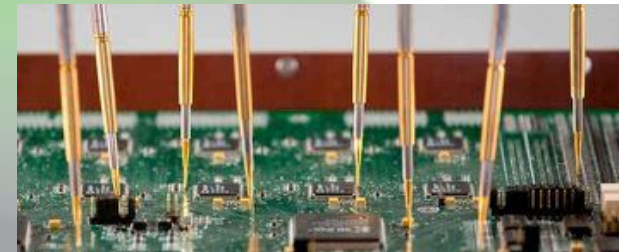
# Setting Up a Successful Test Strategy.



# Setting Up a Successful Test Strategy. Introduction

## Manufacturing Test Challenges

- ✓ Understanding Test Resources
- ✓ Ensure Test Coverage is Maximized
- ✓ Overcome Access Issues
- ✓ Test Efficiency – Test Time
- ✓ Test Development Scheduling
- ✓ **Keep Test Costs Down**



# Setting Up a Successful Test Strategy.

## What, Why, How, Who & When

**What** are we looking for in a test strategy?

**Why** do we look to establish for in a test strategy?

**How** to we set up a test strategy?

**Who** needs to designs the test strategy?

**When** do we look to set up for in a test strategy?



# Setting Up a Successful Test Strategy. What & Why

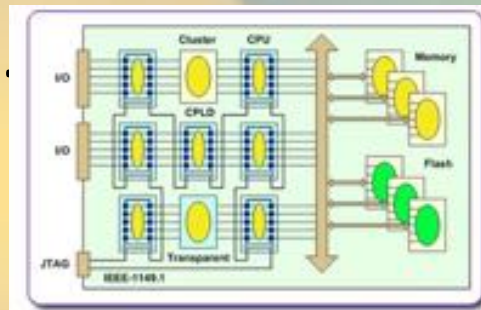
First, the **What....**

Test Strategy for testing the CCA multiple parts

- Resources Available - @ CM or @Mfg Floor.



- Design For Test (DfT) – Electrical and Mechanical.
- Understanding the design.



Thank you, Aster Tech, Keysight Tech, XJTAG for photos.



# Setting Up a Successful Test Strategy. What & Why

## Now, **Why**

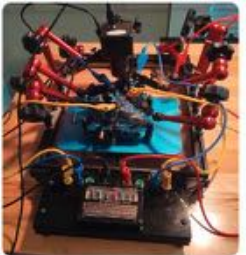
- Using the knowledge of the designer
  - understanding the critical circuits
- Efficiency of testing
- To **Save Time and Money**



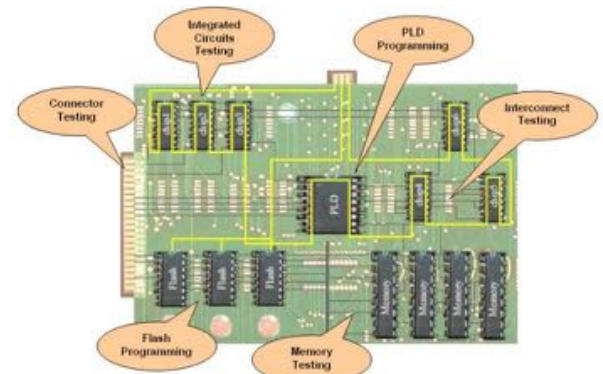
# Setting Up a Successful Test Strategy. How

**How** do we do this?

- Knowing the resources that will test or inspecting of the CCA
- Designing the test strategy early
  - Design for Test (DfT)
    - Schematics – Controllability
    - Schematics – Set up for tools electrical connection  
i.e., Boundary Scan
  - Layout – Access to Circuit
    - Test Points
    - Cables



vs



# Setting Up a Successful Test Strategy. How

How do we do this? (Continued)

- Layout – Device locations

- Parts locations

i.e., Obstacles of overcome

- PCB layout

i.e., Panel or Single



# Setting Up a Successful Test Strategy.

## How

How do we do this? (Continued)

- Knowing what is needed to test or inspect your circuit assemblies



- Knowledge of manufacturing test and inspections tools.

Do we have for Electrical Test?

Do we have Inspection?



Mirtec 3D AOI



Keysight 3070 ICT - inline or standard systems

- IDing what manufacturing needs or what do they have available.

Engineering ID needs

Contract calls out needs

- Minimize overlap and gaps

i.e., Overlaps in coverage cost.

i.e., Gaps in converge cost.

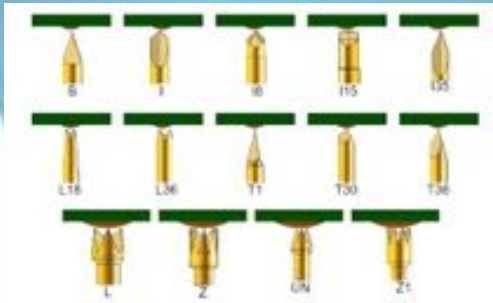
TEST TYPE	TEST POINT	TEST POINT ID	TEST POINT VALUE	TEST POINT UNIT	TEST POINT TOLERANCE	TEST POINT TOLERANCE UNIT	TEST POINT TOLERANCE RANGE	TEST POINT TOLERANCE RANGE UNIT	TEST POINT TOLERANCE RANGE MIN	TEST POINT TOLERANCE RANGE MAX	TEST POINT TOLERANCE RANGE MIN UNIT	TEST POINT TOLERANCE RANGE MAX UNIT	TEST POINT TOLERANCE RANGE MIN MAX	TEST POINT TOLERANCE RANGE MIN MAX UNIT
ICT	ICT	ICT	ICT	ICT	ICT	ICT	ICT	ICT	ICT	ICT	ICT	ICT	ICT	ICT





# Setting Up a Successful Test Strategy.

## Fixturing – Bed of Nails



**Bed of Nails (ICT or Custom) – DfT Rules : Size and Spacing.**



**Looking at probing the CCA.**

**Type of targets? Vias, Test Points, etc.**



*Size as small as 18 - 20 mils, but tight tolerance custom fixturing is suggested for PCBs for production. 28 - 32 mils for wider tolerances for PCBs. Remember this is for a production efforts.*

***Don't confuse size and spacing***



Thank you Ingun and H & W Fixture for Photos



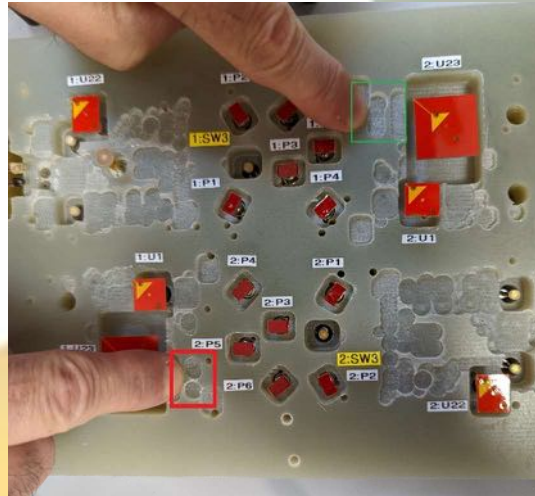
# Setting Up a Successful Test Strategy.

## Test Engineering

### Probing Challenges

#### Probing Challenges -

- ✓ Components Placement tolerances
- ✓ Probing



Fixture has stack up



i.e. TP placement near Switches

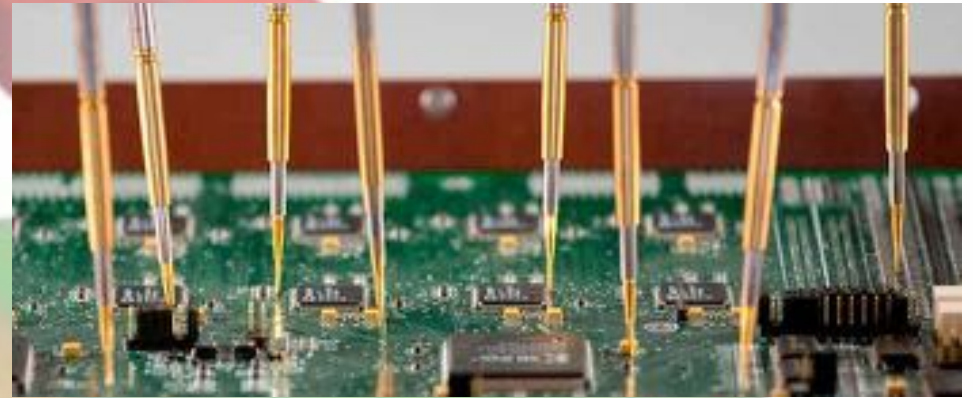
Thank you Ingun for use of photo



# Setting Up a Successful Test Strategy. How

## Electro-Mechanical Probing or Flying Probe Testing

i.e. Even with FPT being DfT  
Lenient Testing – Size or PCB  
tolerances make a difference.



*Size as small as 3-4 mils, but 3% tolerance is suggested for PCBs for production.*

*10-12 mils for wider tolerances for PCBs. Remember this is for a production efforts. **Ask why?***



# Setting Up a Successful Test Strategy. Who

**Stake holders** - collaboration with these teams are key.

**Test Engineering** – As the test & inspection development and sustaining effort of the circuit assembly.

**Project Engineer/Manager** – Setting up budgets and scheduling deployment and who will inherit the tests of the assembly.

**Design Engineering** – Putting in the testability and inspectability into the circuit assembly.



# Setting Up a Successful Test Strategy.

## Who

**Stake holders** - collaboration with these teams are key.

**Process Engineering** – How does test and inspection fit into circuit assembly process.

**Manufacturing Engineering** – Inherited the tests and inspection of the assembly.

**Anyone else????**

What about **Vendors and Partners**? Knowing what is being quoted is key to execution of the vision.

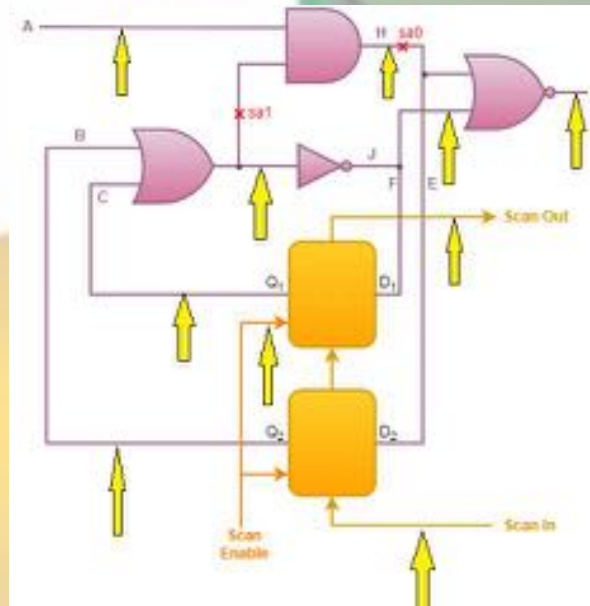


# Setting Up a Successful Test Strategy. When

Good Old Days.

DfT would just ask for Access to all or most of  
the pins on a circuit

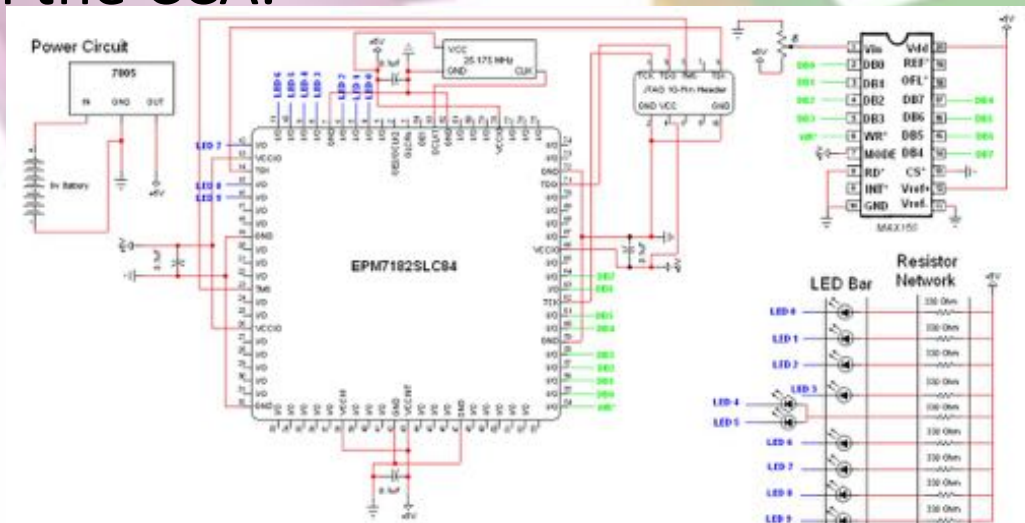
Mainly for ICT  
3070 or GR228x systems



# Setting Up a Successful Test Strategy. When At the Start of the design.....

When laying out the schematics, we should be thinking about controllability. i.e. Think about what pins are key to control the CCA.

As you select devices for schematics and BOM, are there any automated testing we can use. i.e. Boundary Scan, BIST, etc.



# Setting Up a Successful Test Strategy. When

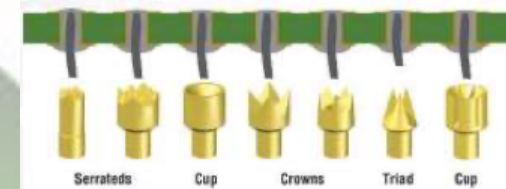
Access to the circuit assembly has grown in complexity.

Access needs to be measured by test methodology, production cost, volume of production and test development cost.

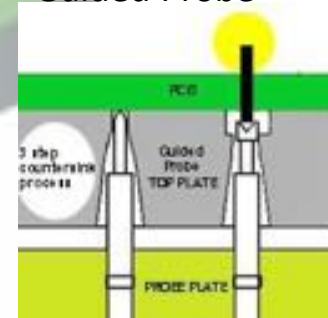
QA Tech., Ingun, TCI, IDI and Cohu probes can touch anything well, BUT.....As we get more specialize costs increase.

Circuit Check, Arcadia, QxQ, RNS, and TPCI can fixture anything to touch a target (with in guidelines) As we get more specialize costs increase.

Sample of Probes



Guided Probe



Thank you, Arcadia Test, for the use of this fixturing image  
Thank you, QA Technologies, for the use of this photo image

 *The Test Connection, Inc.*





# Setting Up a Successful Test Strategy.

## Conclusion

Multiple Stake holders – Design, Program/Project Team, Production Team

Starts Earlier is Best – DfT with Design Starts



Multiple Test and Inspection Solutions (tools) – Knowing is in the Arsenal



# Setting Up a Successful Test Strategy.

Any Questions?

*Thank you* for your interest.  
My contact information.

Bert Horner – President  
410-205-7300 x115  
whorner@ttci.com

