Inspection Features

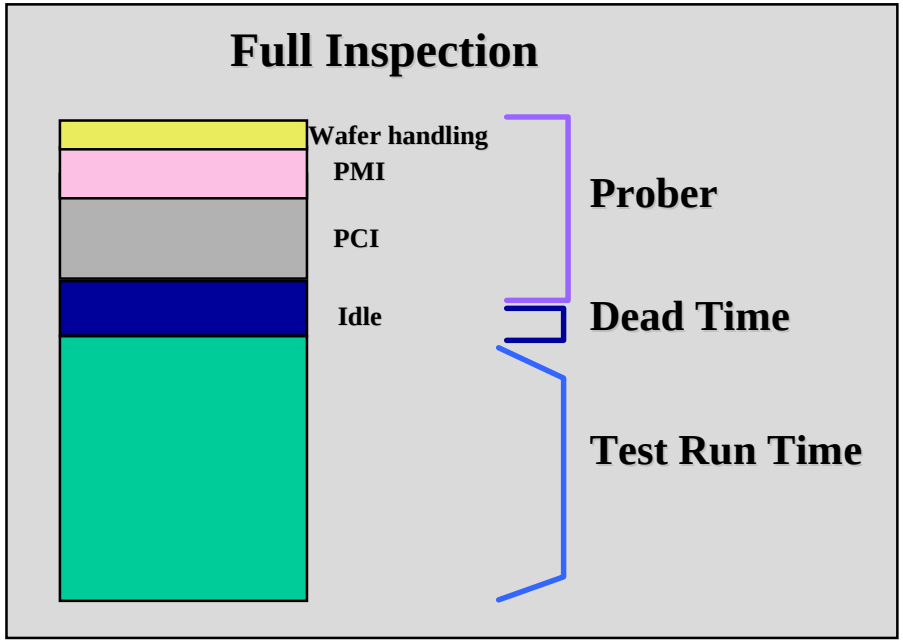
P-8 Prober Family

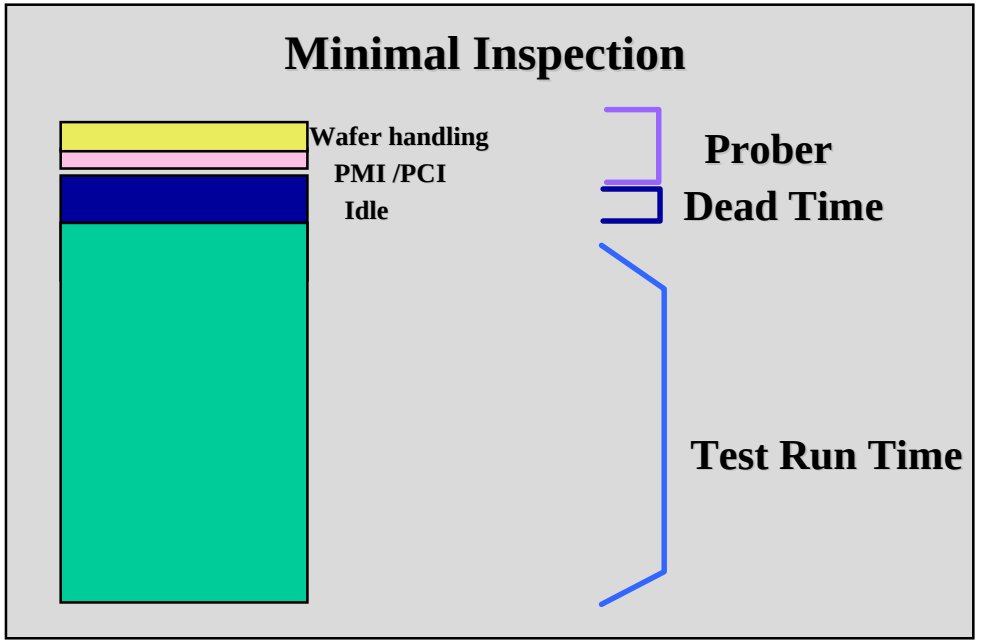
PMI-on line

- **Introduced in the late 80's as a response to:**
  - **Prober Inaccuracy and lack of repeatability under changing conditions**
  - **ProbeCard deficiency in Probe tip placement**
- **Today:**
  - **Probers have evolved to an unprecedented level of alignment and indexing stability across wide temperature ranges**
  - **ProbeCards have improved pin placement accuracies across wide temperature ranges**
- **As a result most customers do not use PMI either because:**
  - **Prober/ProbeCard combination is reliable enough**
  - **PMI takes too long and is not 100% reliable**
  - **PMI is not a value-added function and takes time-off Tester up-time**

Minimize Prober/Tester Overhead

Max throughput = Max Tester Run Time = Min (Prober Run +Dead Time)

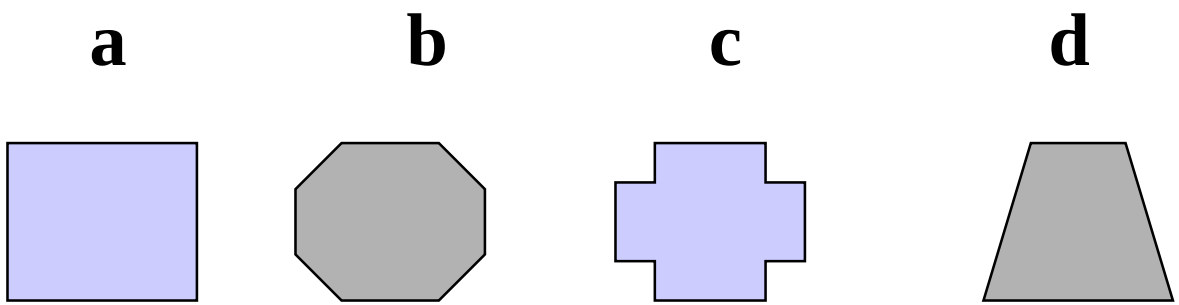




Test time: 60sec with 14 contacts/wafer
PCI : 2000pin(1000pin twice/wafer)
PMI : 8000pad(1000pad 8 times/wafer)

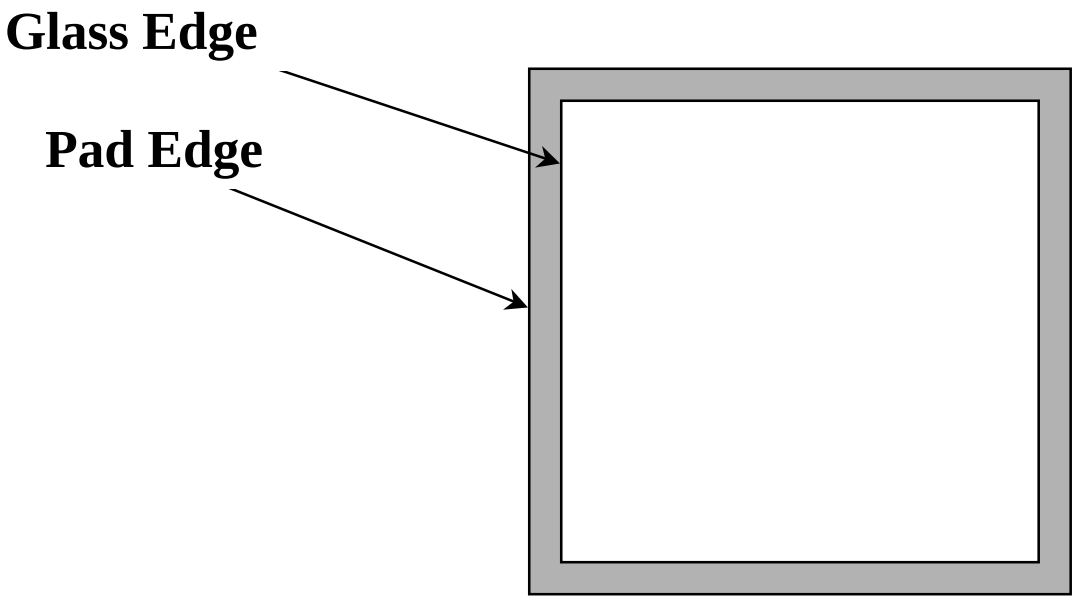
Pad Shape Recognition

- **Pad shape**
  - **a : Rectangular Shape (Include Square)**
  - **b : Polygonal Shape**
  - **c : Cross Shape**
  - **d: Trapezoidal**

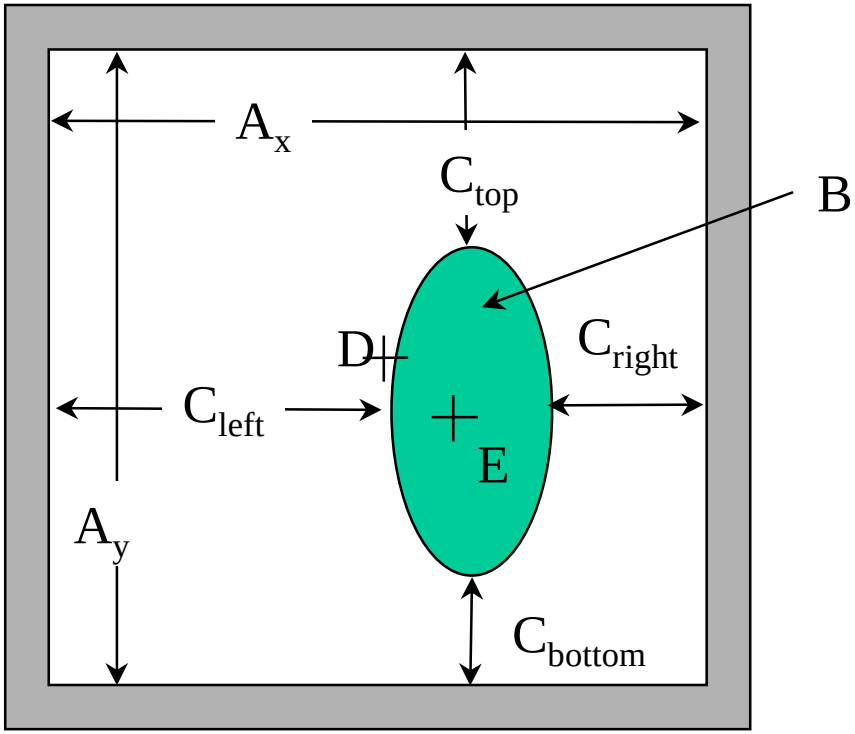


Inner Most Edge Finding

- Typical Two Edges on the Pad.
- PMI Identifies Inner Most Edge (Glass Edge) as a Pad.



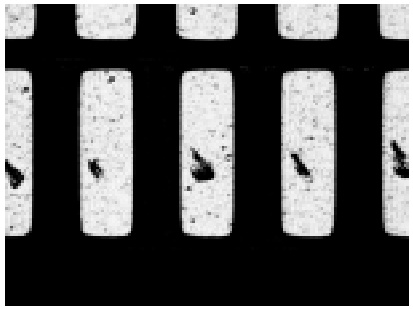
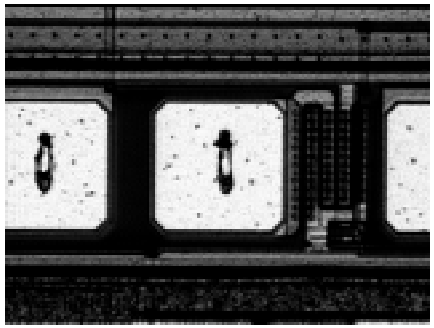
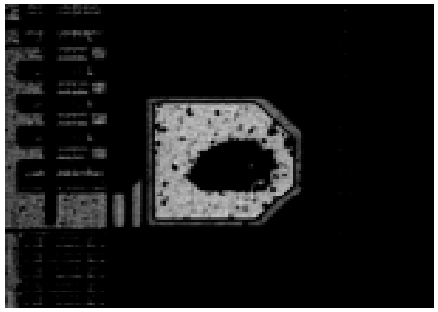
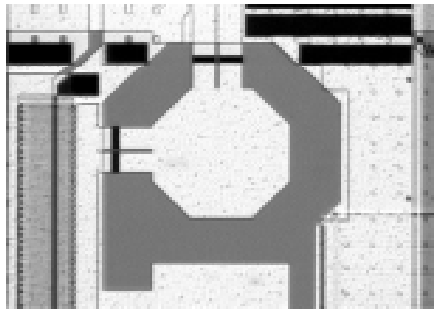
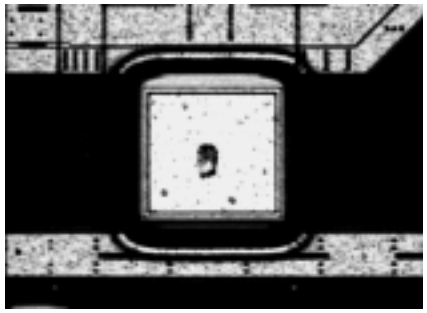
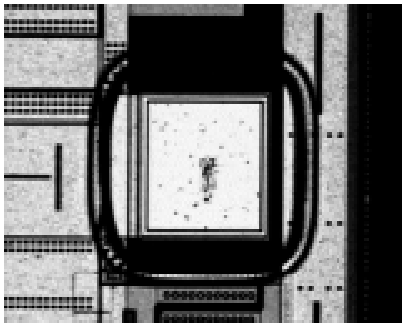
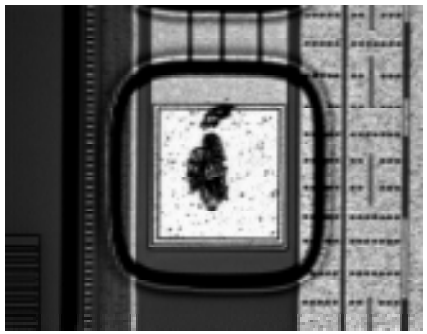
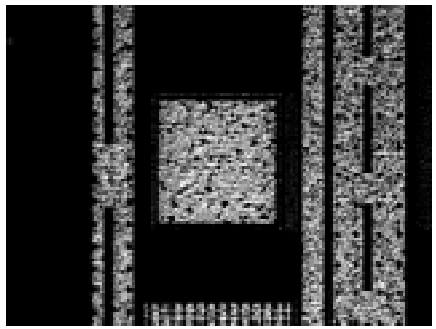
Probe Mark Information



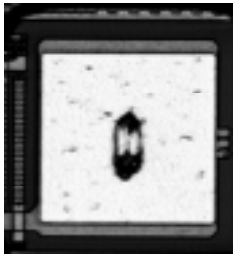
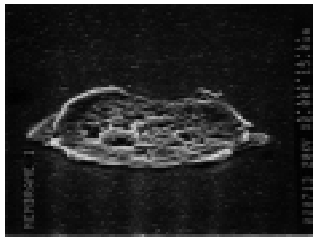
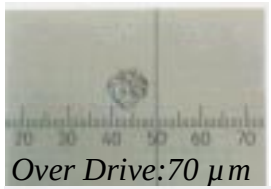
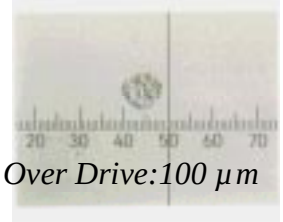
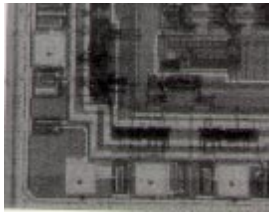
- **Distance**
  - **Type 1 : MIN(C_{top}, C_{bottom}, C_{left}, C_{right})**
  - **Type 2 : ABS(D_x -E_x) and ABS(D_y - E_y)**
- **Area**
  - **Type 1 : B / (A_x * A_y) . . . . . .%**
  - **Type 2 : B . . . . . m^2**

- **A : Pad Size (x,y)**
- **B : Area of Probe Mark. A-x**
- **C : Distance between Probe Mark to Edges.**
- **D : Center of mass of the pad. A-y**
- **E : Center of mass of the probe mark.**

Probe marks, probe marks...

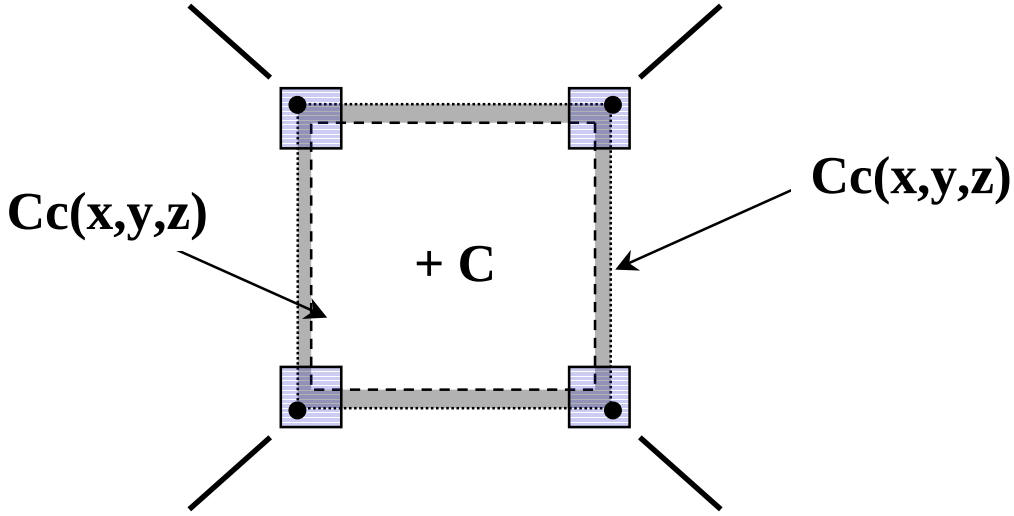









Probe Card

	Wire PC	Membrane PC	Vertical PC	
			Vertical Tip	Cobra PC
Probe Pin Load	5-8g/pin <50 µmO.D>	5-10g/pin <50-300 µm >	27-33g/pin <100 µmO.D>	6-16g/pin <100 µmO.D>
32Multi(2080pins) 32X65pin/die	Max. 23Kg Over Drive:70 µm	Max. 21Kg Over Drive:70 µm	Max. 48Kg Over Drive:70 µm	Max. 23Kg Over Drive:70 µm
Planarity(First) (Last)	15-20 µm 30 µm	2-8 µm --------	15-20 µm 30 µm	70-80 µm
Probe Mark	 -By P-8	 -On Al Pad -By P-8	 Over Drive:70 µm  Over Drive:100 µm -By P-8	

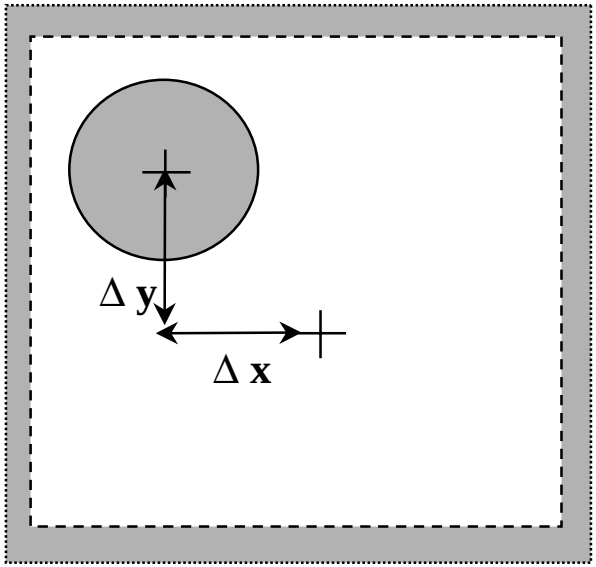
PCI

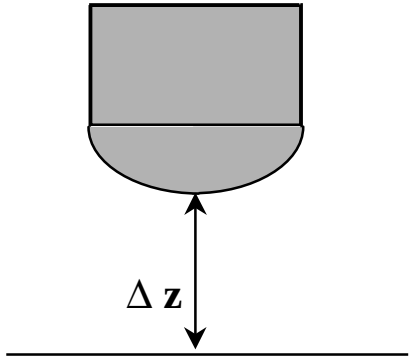
- **Original Position of the PCI**
  - **C(x,y,z) : Original Position of the PCI**
  - **Cc(x,y,z) : Center of the mass of 4 Tips of the Probe Card.**
  - **Cw(x,y,z) : Center of the mass of 4 Pads of the Wafer.**
  - **C = Cc = Cw**



Calculation

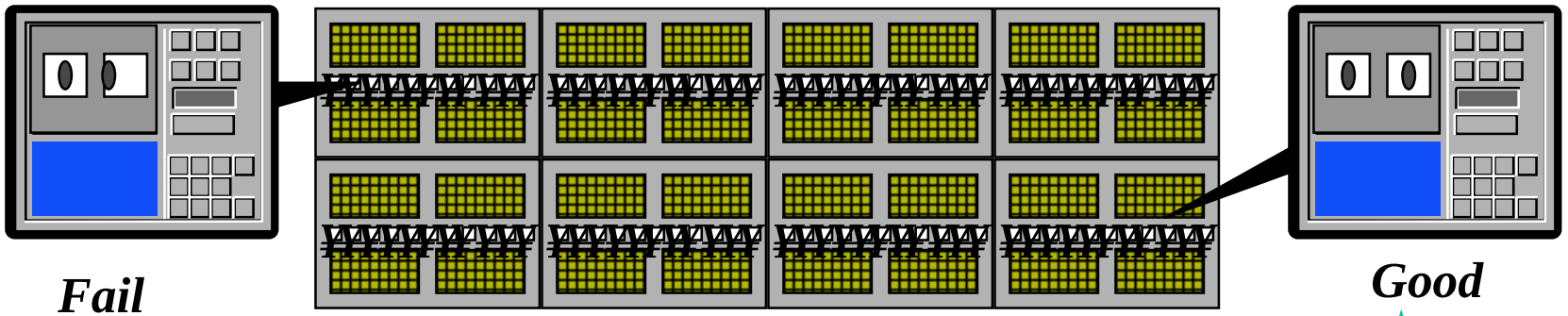
- **Derived Spatial Position of the Pad**
- **Tip + Center of mass of simulated circle y z+ Center of mass x of the Pad Average Height of n Probetips.**





Manual Inspection

-Manual Probe Mark Inspection

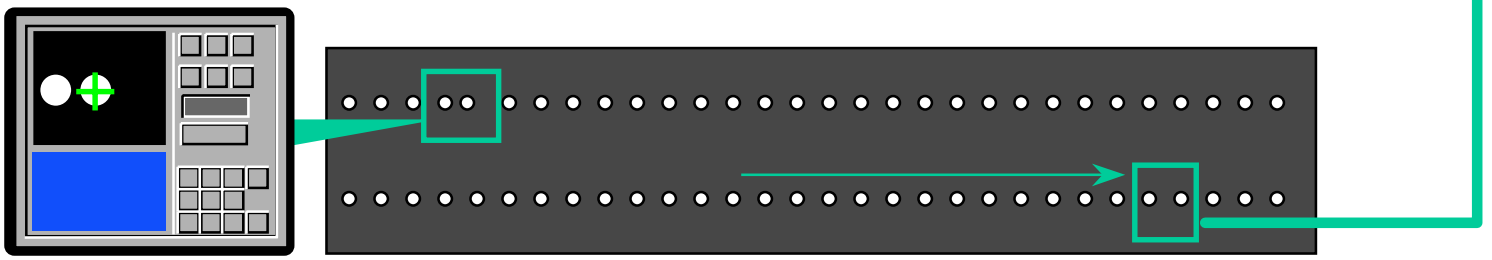


Fail

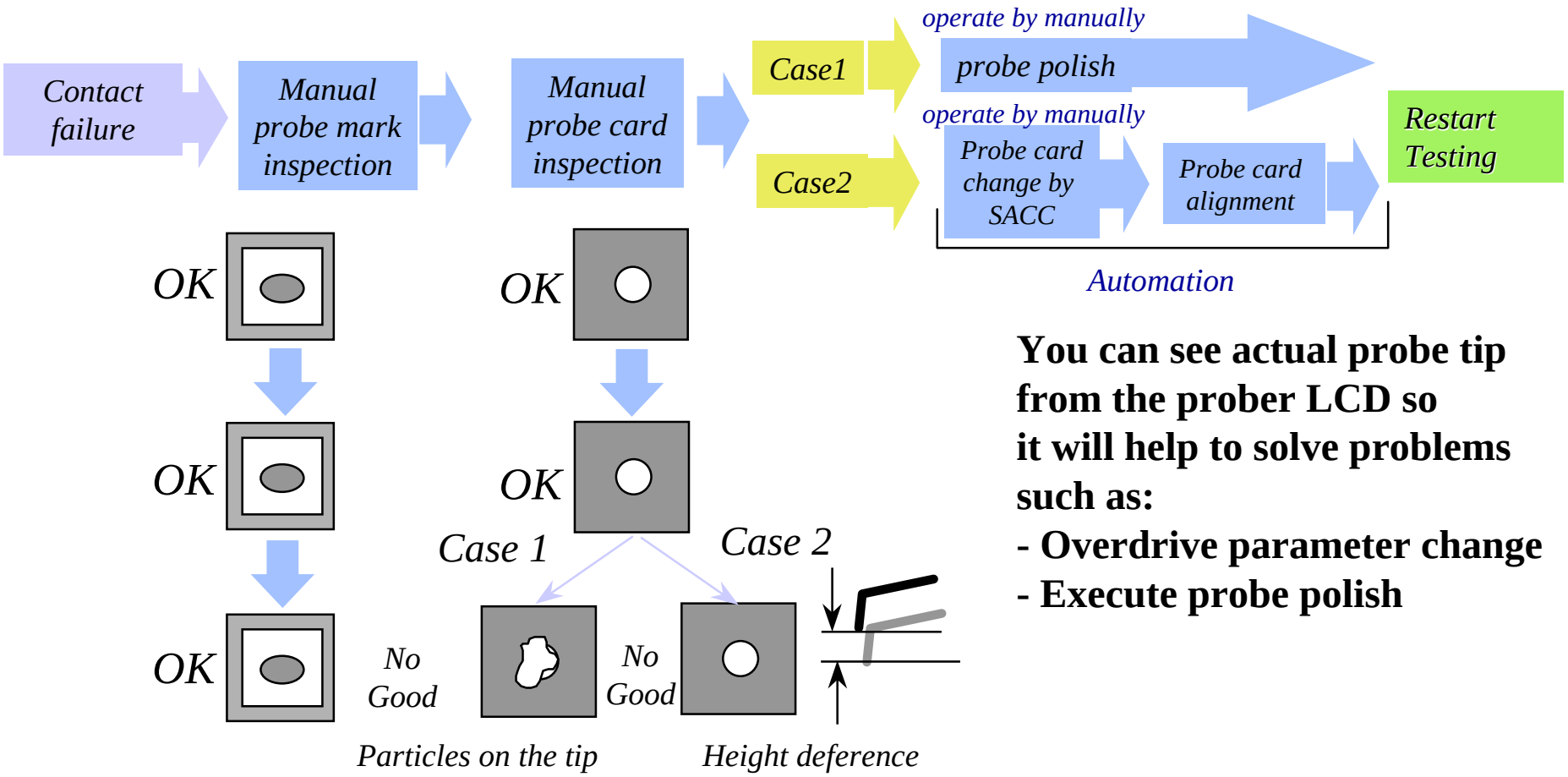
Good

You can Check NG Pin from NG Pad.

-Manual Probe Card Inspection



Contact failure recovery sequence



You can see actual probe tip from the prober LCD so it will help to solve problems such as:

- Overdrive parameter change

- Execute probe polish

Inspection Timing
can be done….

- In the beginning of the lot
- After every wafer change
  - all or specified number of pins/pads judged worst in the previous inspection.
- After every probe-polishing
- In the end of the lot
- After every probe card change
- In the middle of testing
  - the probe card can be replaced
    - no need to set-up again, realign wafer or start the lot all over
  - followed by probe card inspection.