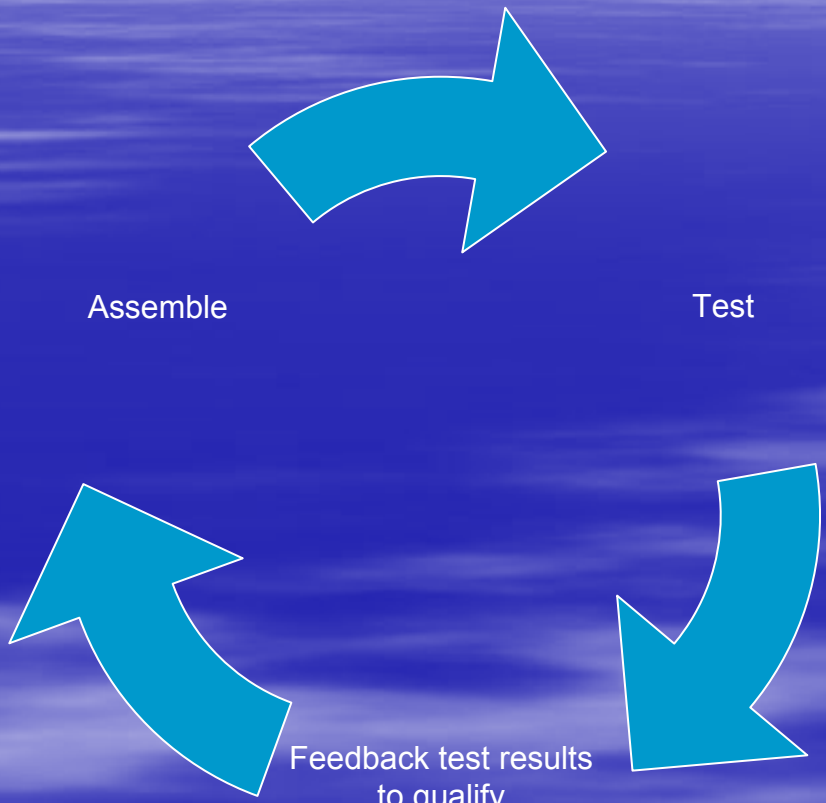
Test Strategies

Manufacturing Cycle



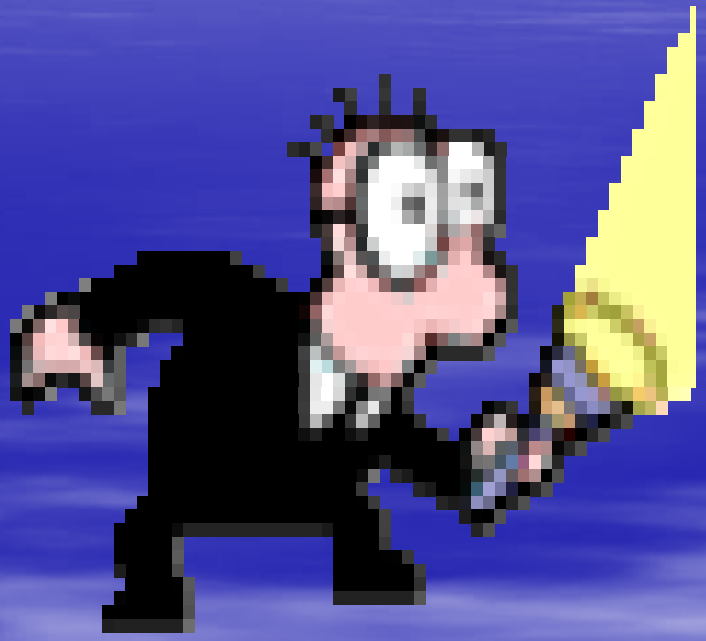
FACT ....

- Without test : board functionality cannot be guaranteed

Tools

Each tool illuminates only a limited portion of defects

- AOI
- X-Ray
- ICT (In-Circuit Test) with Flying Probe
- ICT with Bed of Nails
- Boundary Scan (JTAG)
- Functional Test



AOI

- Part Presence
- Part Orientation
- Part Marking

X-Ray

- Shorts under BGA (100%)
- Open under BGA (only when Ball is missing or is very small)
- Shorts in fine pitch IC's and connectors
- Heel formation in gull wing

ICT Flying Probe

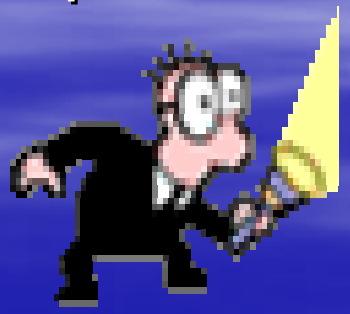
- Most Passives (excluding parallel Caps and Resistors) for value and tolerance
- BGA's for opens
- IC pins for opens
- Most shorts
- Limited by physical accessibility of test point
- No fixture required hence fast test development and low development cost
- More suitable for low volume productions as test time higher than Bed of Nails

ICT Bed of Nails

- Most Passives (Excluding parallel Caps and Resistors)
- Most Shorts
- DFT (Design for test) recommended
- Higher development cost since fixture required but shorter test time so less test cost
- More suitable for high volume products

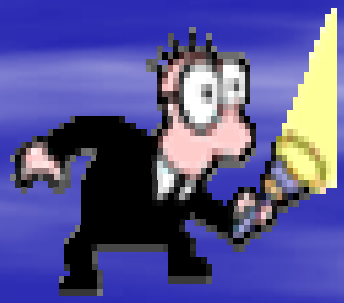
JTAG Boundary Scan

- Most opens under BGA's and high pin count IC's
- Most shorts under BGA's and High pin count IC's
- Requires DFT and JTAG compliant parts
- Virtually no capability for verification of passives
- No fixture required.
- Very suitable for high density boards as practically no physical access required.



Functional Test

- Functionality of bard and/or sections of it are tested.
- Depending on the extent of the test procedure parts which do not contribute directly to board functionality are not tested.



FACT

- Each test/inspection tool covers a % of the board elements but together they add up to 100% of the board.