NXP founded by Philips

Configuration challenges at ITEC

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founded by PHILIPS

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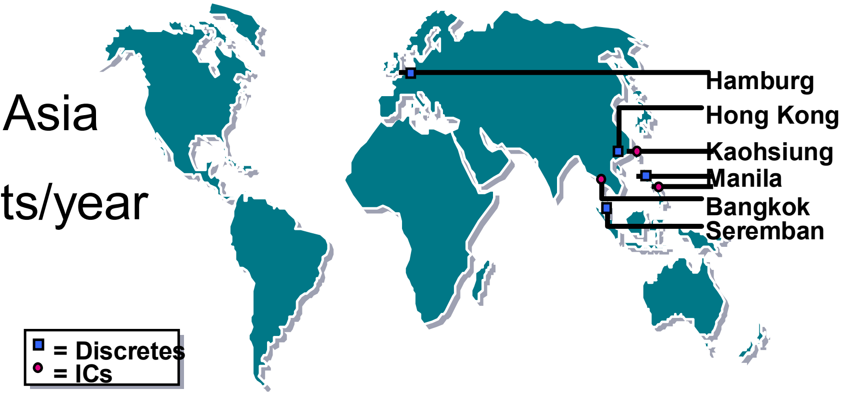
ITEC's job

- Develop competitive equipment for backend assembly of discrete semiconductors **within NXP**
- All customers internal NXP in Asia
- Production > 45 billion products/year

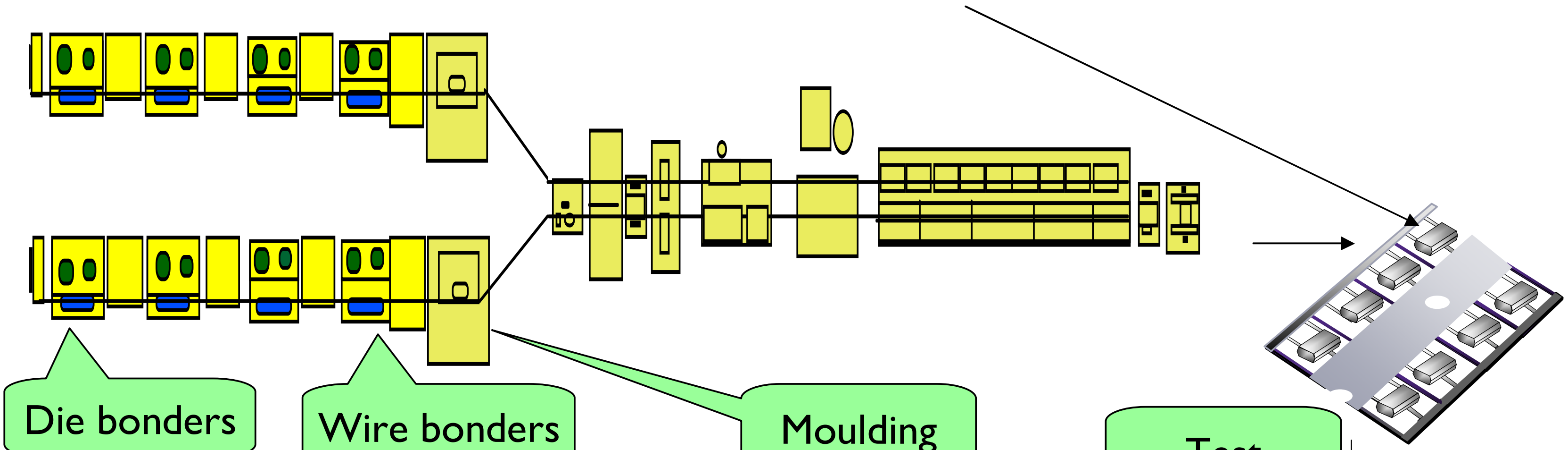


Important equipment:

– Adat	→ Die bond machine
– Phicom	→ Wirebond machine
– MP2	→ Moulding machine
– Parset	→ Electric test equipment

BIM pr T23

Breakthrough In Manufacturing



Die bonders

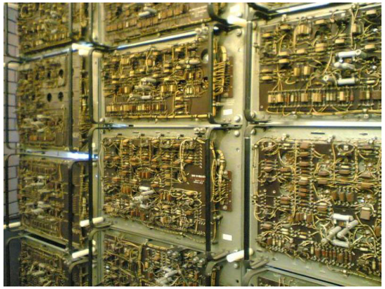
Wire bonders

Moulding

Test

PHILIPS

Software history



- Started about 25 years ago
- Started with RTL/2 and Pascal
- In 1995 converted code to Ada95 on Windows NT
- Complete code base now in Ada95
- But still some fragments very old

Global code division

- 250ksloc common code (task primitives, interprocess, visual_itec, scope, IO, Motion, vision)
- 250ksloc LGPL code (gwindows, aws, gnatcom, adaxml)
- 150ksloc Adat
- 180ksloc Parset
- 90ksloc Phicom
- 120ksloc lms (partly VB)
- 50ksloc others

Currently 12 software engineers

Key tools

Source code management system

- Using subversion as source repository

Automatic build procedure

- docs in chm are automatically build
- 1 make file (small) builds everything including distributions
- Important concept in our development environment is that it also allows using projects as building blocks for other project.
- All dependencies for sources are determined automatically by the compiler so are always right.

Hardware variations (electronics)

Software supports multiple hardware platforms:

- Various PC's:
  - EPC9 on VME, VME with SBS616 bustranslator, Celeron, P4 systems
- Different motion platforms:
  - PPMC, Mcv60, Pmac, FlexDMC
- Different vision interfaces:
  - SBIP, Allegro, Firewire camera
- Various bit I/O systems

And of course various mixes of above

Hardware variations (mechanics)

Wirebonder (Phicom)

- Phicom2
- Phicom3

Dieattacher (Adat)

- A2
  - Ilias / glue / led / ipas / vpack
- A3
  - Die sorter / Prober / Eutect

Tester (Parset)

- Parset, PowerParset
- µParset, µ PowerParset

Software linking

For each application

- One exe with all control functionality
- We do not have a preprocessor
- No complex interface techniques (dll's)

During software initialization

- Determine hardware
- Determine configuration

→Create required objects & structures

Daily software operation

- Features are added / bugs are fixed in application:
  - These can break a specific application
- Features are added / bugs are fixed in common code:
  - These can break anything

➔About 10 updated sources / day

Ada95 gives us a lot of build in quality checks:

Style checks, unused vars/code checks,pointer checks, array checks,
Strong typing, OO, generics…..

This really helps us avoiding regressions.

Remaining configuration problem

We try to test on existing machines at ITEC

We test using simulators

But total functionality can not be covered:

- Lack of available machines
- Lack of resources to perform the tests
- Large amount of functionality in applications

After a couple of months does software still work on configuration X ?

→ with testing on real configuration: Yes

→ without testing on the real configuration: Answer is often NO

How to improve ??

We are already trying:

- Have specific customers doing beta tests
- Branch the sources and then try to stabilize branch as release

All ideas are welcome !!!