MBT for real-time embedded software

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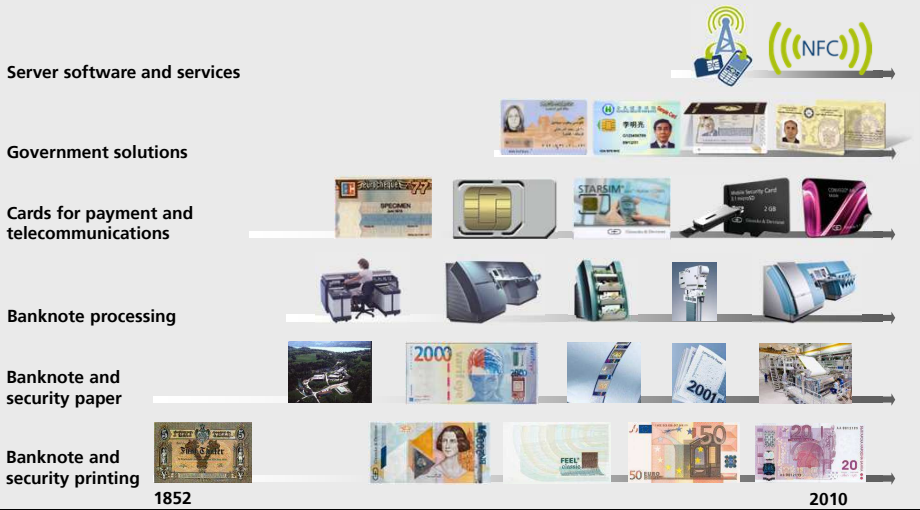
Creating Confidence.

Giesecke & Devrient – From Printing Paper Securities to Providing High-Tech Solution



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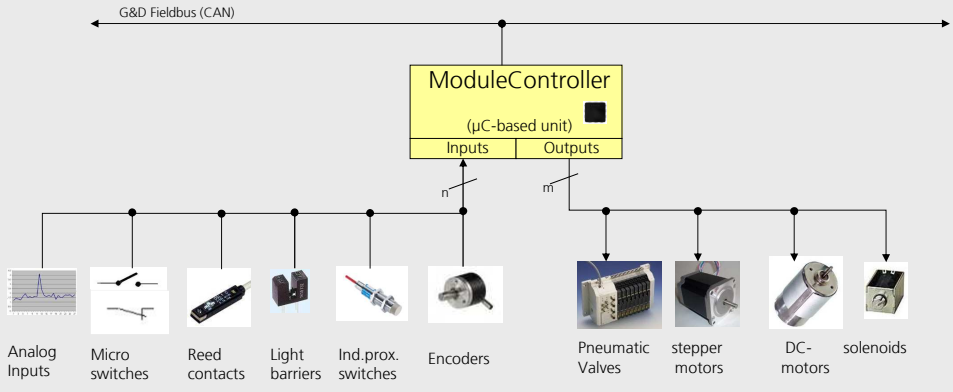
MachineControl @ G&D Banknote Processing Systems

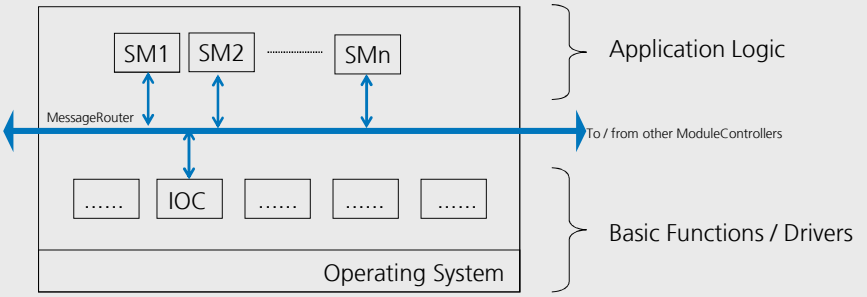
MachineControl within BPS (BanknoteProcessingSystem) responsible for

- Monitoring and control of mechatronical system for
  - banknote singling
  - banknote tracking, sorting and stacking
  - banknote packaging and delivery

MachineControl: typical I/Os

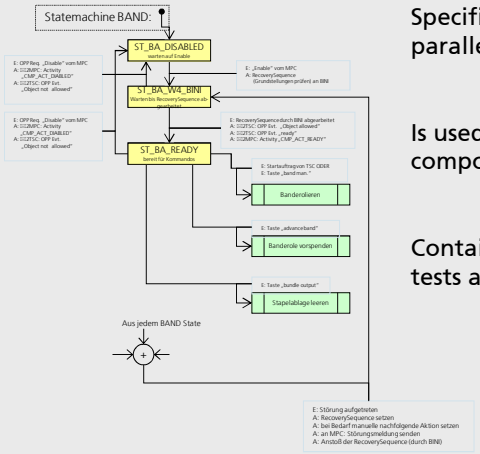


MachineControl: Software internals: typical MDC-application



SM: StateMachine
IOC: IO-Control (debounce etc.)

MachineControl: How to get testcases?

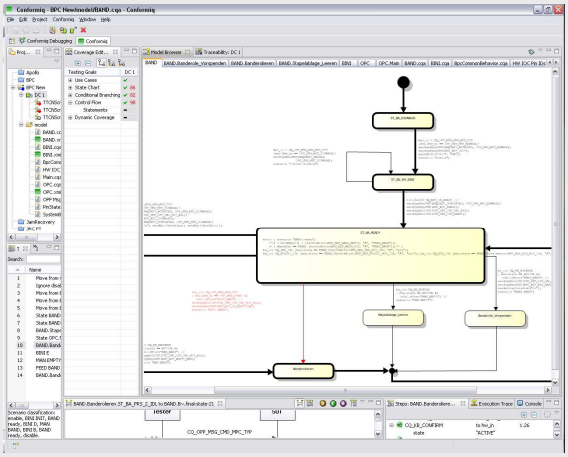


Specification available as hierarchical, parallel state machine.

Is used as reference for software component development.

Contains enough details to generate tests automatically.

Reuse of specification for MBT



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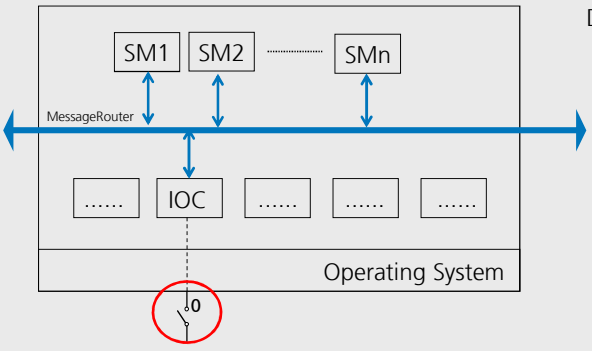
MachineControl: Software internals



Dealing with input events

To / from other ModuleControllers
via G&D-Fieldbus (CAN)

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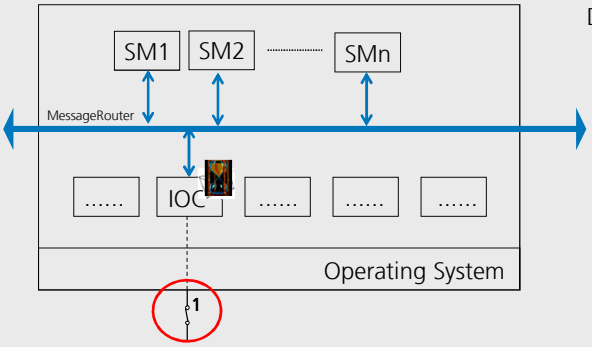
MachineControl: Software internals



Dealing with input events

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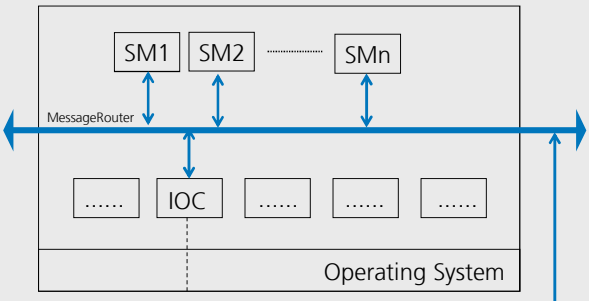
Testing of application logic with MBT and TTCN-3



To / from other ModuleControllers
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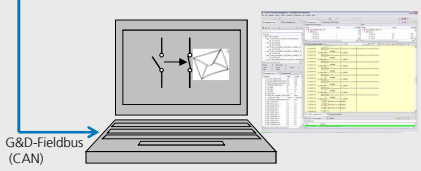

Real target-application runs on
real MDC HW without
peripheral mechatronic system

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Summary

Introducing MBT is straight forward if

- you have the necessary information available
- you have an existing test automation
- you understand the generated tests

Very promissing results:

- Reproduceable testing of real application on real hardware
- Peripheral mechatronical system not necessary

→ development of control software in parallel with development of mechatronic system