



MOST150 – EndOfLine testing for Quality Assurance

Michael Schmidt





Overview

- **Introduction**
 - Why do we test?
- **Theoretical Aspects**
 - What are the focal points of testing?
 - Which concept of testing is practicable?
- **Practical Solution**
 - How does the hardware look?
 - What are the key-features of the software?



Quality Assurance “Made in Germany”

GOPEL electronic offers comprehensive test and measurement solutions.

- Automotive Test
- JTAG/Boundary Scan
- Optical Inspection (AOI/AXI)

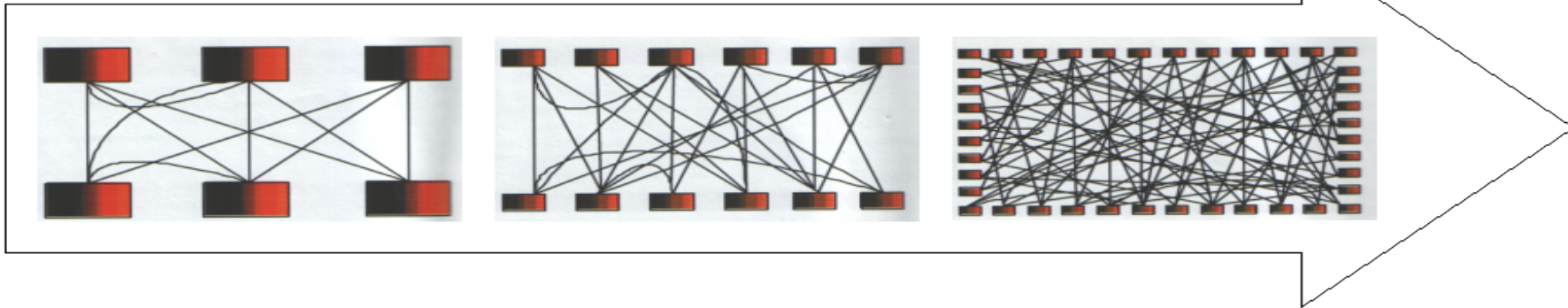




Increasing Complexity

- In-car digitalisation → *Intercommunication*
- Data medium → *CAN, LIN, FlexRay and MOST*
- Test coverage → *Conformance specification*

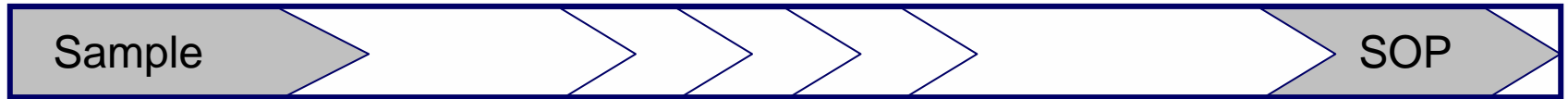
- Exponential increasing complexity with every new unit



To handle the complexity → "Think Quality"



Control Unit Development



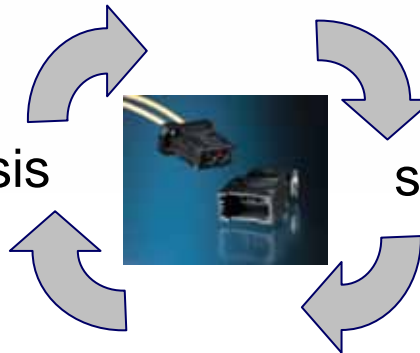
development



fault analysis



single test



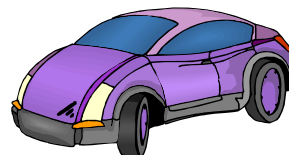
integrated test



MCTH

OEM

Supplier





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Intention of Advanced Testing

- ➔ Base test coverage according to MCTS
 - + Additional specialised ECU tests
 - = **Enhanced test depth**



Focal Points:

- ➔ Integration and network tests
- ➔ Screening tests (functional/climatical dependancy)
- ➔ Gateway tests

⇒ **Using results to influence RND**

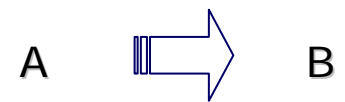
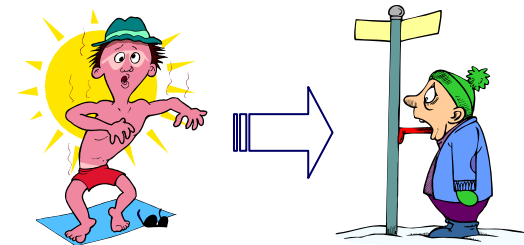


Details of Testing

- Integration and Network Tests
 - Simulating vehicle environment
 - ECU specific function catalogues
 - Wakeup scenarios
 - Negative tests
 - Data logging

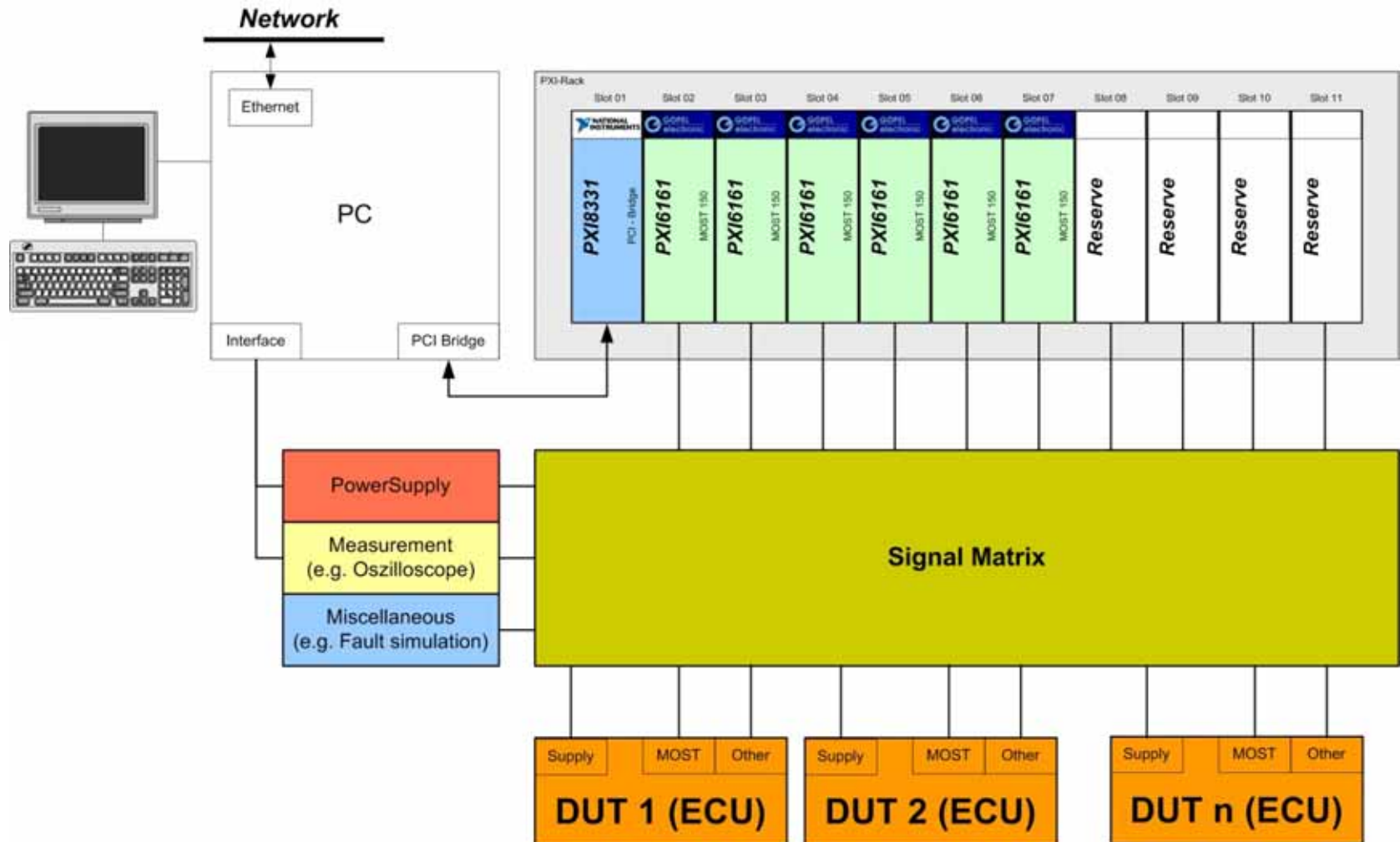
- Long Duration Testing
 - Correlation of function and temperature
 - Displays, speakers, LEDs, illumination
 - Behaviour due to humidity

- Gateway Tests
 - Combination of CAN, LIN, FlexRay
 - Routing (data consistency, timings)



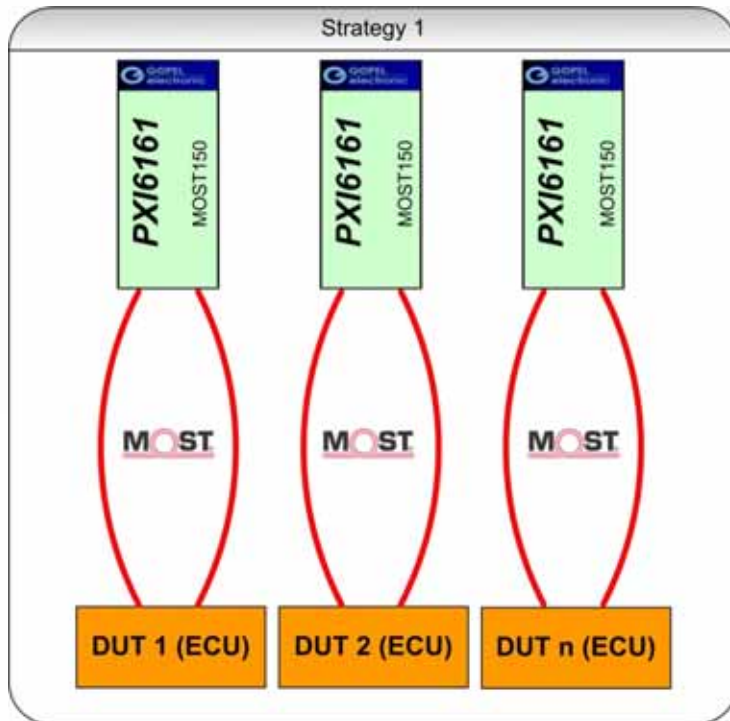


Test Concept(1)

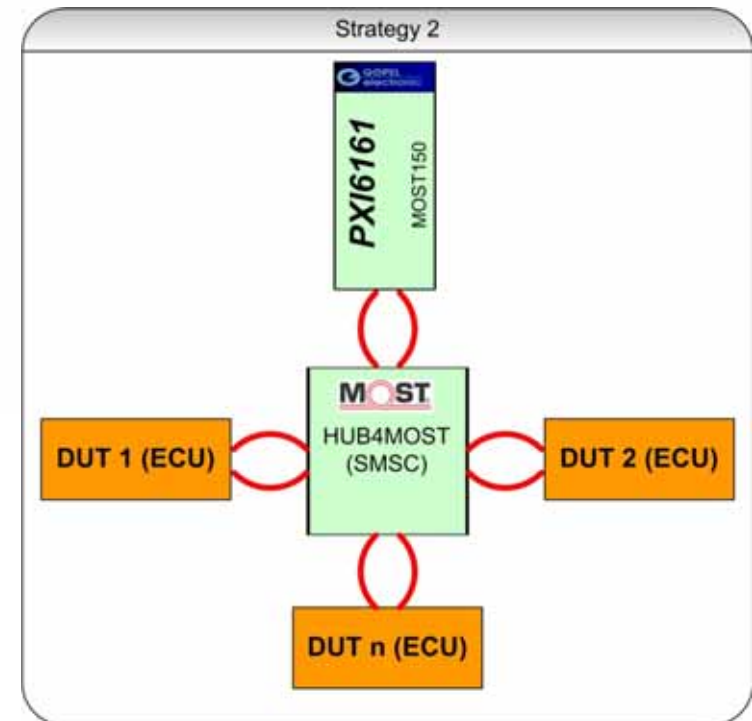




Test Concept(2)



- Standard build up
- Unique communication clusters
- Iterative software tasks
- Higher invest of hardware



- Cost effectiveness
- Range of base tests possible
- Complexity of software
- Problems with some ECUs



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Example of a 6 Channel MOST system



- Power distribution
- Multimeter
- ECU control complex
 - Ressources for CAN, LIN
 - Digital /analogue channels
 - Breakout field
- Video generation
- MOST complex (MOST25/MOST150)

- Control PC

- Power supply



MOST150 PXI Interface 6161

- PowerPC based time controller (QNX)
- Integrated INIC OS81110 and SpyNIC
- Integrated ring break diagnostic
- S/PDIF and DVI out
- Optional CAN/LIN interfaces

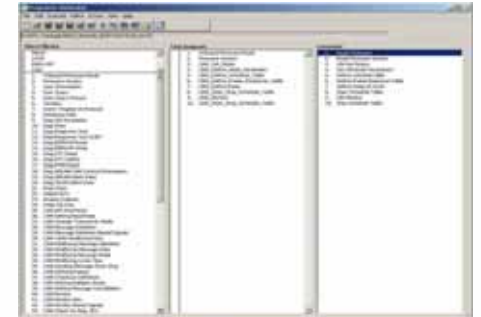
- Onboard replay function
- Onboard MOST high protocol
- Onboard diagnostic ISOTP/ TP2.0





Key Feature Software

- ➔ Windows operated system
- ➔ Programmable sequencer
- ➔ Library of functions and tests
- ➔ Hardware specific software modules
- ➔ Concept of automation for generic sequences
- ➔ Generating of subroutines
- ➔ Monitoring and logging
- ➔ PASS/FAIL benchmark (HTML/XML protocol)





Summary

- ➔ Complex ECUs need consequent quality
- ➔ Combining of test methods and applications
- ➔ PXI is a modular and flexible hardware platform
- ➔ Use of a multitalented PXI MOST interface
- ➔ Software allows specialised utilisation