Vector Testing Solution

Medical Devices
Vector Test Solution Overview

Strength of the Vector Portfolio for Software Development and Test

Comprehensive test solution in all test phases
- Software unit test
- Software integration test
- Software system test
- HW / SW integration test
- System test

Tools for all testing activities
- Test design
- Test execution
- Environment simulation
- Test result analysis
- Requirement traceability
- Code coverage
- Test automation for CI/CT

Solutions for all industries
- Automotive
- Avionics
- Medical
- Railway
- Industry control
- ...

Support for safety related software
- ISO 26262
- DO 178C
- IEC 61508
- ...

Vector Test Solution Overview

Vector CANoe Testing Solution for MIL, SIL, HIL

**CANoe**
The Test Execution Platform

**vTESTstudio**
Test Design Tool

**Real Time Test Executor**

**Realtime Analysis, Logging Diagnostic,**...

**Real Time Simulation**
Communication-, Application- and Environment-Behavior

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**Automotive Adapters**
(CAN, Automotive Ethernet (SOA), LIN, XCP, CDD/ODX, J1939, SENT, Autosar, SCC...)

**Aerospace Adapters**
(CAN, ARINC, AFDX, Ethernet, ...)

**Railway Adapters**
(CAN, Ethernet, TRDP*, ...)

**Medical Adapters**
(CAN, Ethernet, SDC, ...)

**Industrial & IoT Adapters**
(CAN, CANopen, Ethernet, EtherCAT®, Wifi, MQTT, OPC-UA*, ...)

**Common HW Adapters**
(JTAG, SPI, I2C, RS232, RS485, analog/digital I/O, ...)

**Pure SW Adapters**

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* to be developed/planned | EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
Monitoring over Time

- Observe dynamic aspects of your software under test
- Visualize values and value relations in various analysis windows

**Trace Window**
displays transmitted values in a sequential text-based form

**Graphics Window**
displays value curves over time

**Data Window**
displays current values

**State Tracker**
visualizes dependencies of value states and state transitions
Environment Simulation

- Build a “natural ecosystem” for your software under test
- Simulate both physical and software environment
- Test single software components in isolation
- Verify correctness of one component before integrating into subsystems

Implementation of models in C#, CAPL or Python

Integration of existing models by open interfaces, e.g., to MATLAB/Simulink or by FMI/FMU
Interactive Development and Test

- Perform exploratory testing
- Stimulate your software under test using panels, signal generators, and scripts
- Analyze the reaction of the application via analysis windows in CANoe or with a debugger in your development environment

**Panels**
- to modify and display values of symbols interactively

**Signal Generators**
- to define and replay value waveforms

**Implementation of scripts**
- in C#, CAPL or Python for flexible interaction with the software under test
Automated Testing

- Design and implement automated tests with the test design tool vTESTstudio
- Execute tests, trace and analyze test results with CANoe

Test Execution Window
to execute entire test units or single test cases

Test Trace Window
displays detailed test steps during test execution

Debugger Window
enables debugging of test scripts

Test Report Viewer
supports various filter and query mechanism for comfortable test run analysis
System Validation

Workflow

Development ➔ Execution ➔ Result Processing

vTESTstudio

CANoe & VT System
vTESTstudio – Test Design Tool

Sequence design

Tabular Editing

Graphical Test Design

Coding

Test Design Concepts

Parameters and Variants

Classification Tree Method

FUZZ Testing

360° Trackability via RQM Integration

Req. Management System

Export trace item

Import trace item

Import design traceability

Test Run

Test Run Record A

Test Run Record B

Test Run Record C

vTESTstudio

FUZZ Testing

vTESTstudio

Test Design Concepts

Generation
VT System - Modular HIL Test Solution

Rotation Sensor Module
VT7820 on VT7900A FPGA

Stimulation Modules
analog VT2004A
digital VT2516A

SCC Module
VT7870 on VT7900A

Network Interface Modules
CAN/LINFR: VT6104A / VT6204
Serial: VT2710 + PSISSENTpiggy
Ethernet: VT6306 + 100BASE-T1piggy or 1000BASE-T1piggy

Power Module
VT7001A

Load + Measurement Module
VT1004A

General Purpose Modules
VT2816 Analog IO
VT2848 Digital IO
VT2820 Relay
VT2832 Switch Matrix

Real-Time Modules
Celeron VT6011
core i7 VT6051A

Chassis & Backplanes
VT8006
VT8012

Fault Injection, Switching
Stimulation
Network Interfaces
Power Control
Power
System under Test
Actuators
Sensors
Measurement + Simulation

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For more information about Vector and our products please visit

www.vector.com
www.vector.com/medical
www.vector.com/canoe

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