Course Overview

This course gives an in-depth introduction into the usage of the test sequencer TestExec SL and provides an overview of the different automotive test system solutions of the Agilent TS-5400 family. In the first module the attendee will learn how to use the different features of the TestExec SL software. An important aspect is the capability to design a functional test solution which reflects the requirements of a customer specific test application. In the second module the training will give an overview of the different Agilent standard test systems. The systems architecture, components and software are discussed and the usage of their functionality is trained on practical examples. Both modules develop step by step the theoretical basics and provide comprehensive hands on labs to verify and consolidate the knowledge.

Specifications

Course Type
User/Application Training

Audience
Electronic Control Unit Test Engineers and System Integrators

Prerequisites
Familiarity using Microsoft® Windows®

Course Length
4.5 days (Module A = 3 days; Module B = 1.5 days)

Course format
Lecture and hands on labs

Detailed Course Agenda

Module A: TestExec SL

Primary target of this module is to understand and to use the test executive software development platform in order to quickly develop reusable automated functional tests. Attendees will explore details of the TestExec SL test sequencer and adapt the software configuration, system topology and test description according to the lab setup composed out of a set of core instruments and a training device under test. Central element of this lab setup is the 34980A switch measure unit with its internal digital multimeter and the 34933A matrix card as well as the N6700B modular power supply. Basic capabilities of the used instruments and useful hardware and software tools are introduced in order to enhance the hands on experience.

Module B: TS-5400 Family

Attendees will learn how to use the TS-5400 system platform to develop automated functional tests. Categorical differences and similarities of the architecture/system components of the set of Agilent automotive standard systems are displayed. The software knowledge acquired during the first training module is transferred on a standard system and expanded widely by the special tools available on a standard system. Additionally the capabilities of using the TS-5400 automotive action libraries are discussed. Hands on labs will allow the class to write test plans that will apply power, loads and input stimuli to an actual device under test and take measurements with the instruments of the standard system. Attendees will also learn the concept of device under test assisted test using serial protocols.
Module A: TestExec SL

Section I: Overview of System Architecture and Core Instrumentation
A Typical System Architecture; Core Instruments; Basic Instrument Features; System Design considerations using certain Instrument Features

LAB 1 – Using Lab Setup with Connectivity Software and Tools
- Instrument Connectivity (IO Control) and Software Access (GPIB, USB, LXI)
- Hardware and Software Tools (Intui-Link)
- Demonstration of Basic Instrument and Debugging Features
- Basic Programming Techniques (Visa, Visa-COM, IVI-COM)
- Manual Lab Setup and Training Device Usage (Front panel and PC)

Lab Instrumentation –
- 34980A: Multifunction switch/measure mainframe
  - 34933A: Dual/Quad 4x8 reed matrix module
  - 34938A: 20-channel 5-amp switch module
  - 34941A: Quad 1x4 50 ohm 2 GHz RF Multiplexor module
  - 34950A: 64-bit DIO Module with Memory and Counter
  - 34951A: 4 Channel DAC
- N6700B: 400 W Low Profile Power System Mainframe
  - N6752A: High-Performance. DC Power Module
  - N6762A: Precision DC Power Module
- 33220A: 20 MHz function / ARB waveform generator
- 34401A: Digital Multi Meter
- 53132A: 3 GHz universal counter
- 82357A: USB/GPIB Interface
- E5813A: Networked 5-Port USB Hub

Section II: Overview of Basic TextExec SL Features
Software Overview on Test-Plans, Sub-Sequences, Tests, Actions and Switching; Debugging Features and Profiler

LAB 2 – Using Lab Setup with TestExec SL
Create a new test plan based on existing topology description and given instrument access actions
- Powering up my module
- Measure the current drawn by the unit under test
- Measure the frequency of a signal (DAC/Counter)
- Measure input leakage current
- Measure a resistance (DMM internal and external)
- Running lights and DIP switch (Digital IO)

Section III: Adding Instrument Actions
Message-Based Instrument-Actions; Message-Based Switching-Actions

LAB 3 – Add Message-Based Instruments
Step by step access to lab instruments via instrument actions

Section IV: Switching Topology Files
Topology Layers and Adjacency Files

LAB 4 – Step by Step Integration of Lab-Instruments into the topology
- Create a new topology: add instrument handles
- Integration of switch resources: modify adjacency file
- Create complete switching paths: introduce wires into topology
- Reflection of the device under test in the topology

Section V: Introduction to Developing Actions
Development Environment for TestExec SL Actions

LAB 5 – Create an Action Visual Basic and using the Visual C Action Wizard

Section VI: Throughput Multiplier Capabilities
Configuration of topology and test plans for multiple test devices

LAB 6 – Testing Multiple Modules
Module B: TS-5400 Family

Section I: TS-5400 Series II Introduction
Overview of TS-5400 systems and terminology

Section II: DVM and Pin Matrix Details
Detailed discussion of DVM and Pin Matrix architecture and the necessary software actions and switching actions

LAB 2 – Measuring a resistance

Section III: Switch/Load Box and Power Supply Details
Detailed discussion of Power subsystem architecture and the necessary software actions and switching actions

LAB 3 – Powering up my module
LAB 4 – Measuring the current drawn by my module
LAB 5 – Externally Triggering the DVM

Section IV: MCM Instrumentation Details
Detailed discussion of Measurement Control Module instrumentation capability and the necessary software actions

LAB 6 – Measuring input leakage current

Section V: Digitizer and Arbitrary Waveform Generator Instrumentation Details
Detailed discussion of the arbitrary waveform generator and digitizer capability and the necessary software actions

LAB 7 – Outputting and capturing waveforms

Section VI: Other TS-5400 Instruments
Detailed discussion of the DAC and Counter instrumentation capability and the necessary software actions

LAB 8 – Measure the frequency of a signal

Section VII: Automotive Serial Communications
Detailed discussion of the device under test assisted approach to testing and how to communicate with your module

LAB 9 – Communicating with your module

Section VIII: Additional TS-5400 Software Capabilities
Discussion of additional options and tools available in the TestExec SL Development Environment and TS-5400 libraries

LAB 10 – Debugging your test plan

Section IX: Test Development Process
Gather Specifications, Plan fixture and load wiring, assign Resources per UUT pin, Mass Interconnect Conventions, Configuring Load Box, Fixture Spreadsheet and System Grounding

LAB 11 – Develop a simple test plan
Remove all doubt

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