Unison PAx Applications

For High Volume RF PA/FEM, 5G and Mobility Devices

Automotive

Mobility

IoT/IoV & Optoelectronics

Computing & Network

Industrial & Medical

Consumer

Course Description

The Unison PAx Applications training course introduces the use of the PAx test system for testing RF devices such as a Power Amplifiers, and RFFEMs. As such, this course covers a range of instruments including the RF subsystem-DragonRF, baseband waveform generators, digitizers, DC instruments, and digital instruments. It enables attendees to work comfortably with the Unison user interface and program the typical instrument set using Unison test language instructions.

Course Outline

- Pre-course review and test program components
- PAx test system overview – review
- RF subsystem DragonRF
- Voltage and current instruments
- Sequenced Waveform Generator (SWG)
- Digitizers (HSB-DIG and Hummingbird)
- StepBus Sequencer
- FX Digital Subsystem and MSDI Use Model
- Handshaking and SyncBus
- Register Send Memory
- Harmonic Measurement Module (HMM)

Course Structure

- Five days, including classroom and practical exercises

Prerequisites

- 3 months test program experience

Recommended Skills

- C or C++ programming experience
- Familiarity with Unix and Linux operating systems
- English - written and spoken

Applicable Test Systems and License

- PAx test system using FX1 or FX2 digital
- U4.X as the minimum OS release
- Development Unison license must be available on the test system used for this training

Who Should Attend

- Test program development engineers
- Test program support engineers

- **Only ATE targeted specifically designed for RF FEM market**
- **Full range of WLAN, IoT, Cellular, Satellite Applications**
- **Small form factor**
- **Air cooled architecture and instruments**
- **Compact low power technology**

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Online Pre-course Content

Must be completed prior to attending the classroom session:

- System hardware overview
- Software architecture
- Introduction to the Unison graphical user interface
- Components of a test
  - Adapter board
  - Bins and bin spreadsheet overview
  - Flow object
  - Test object
  - Spec object overview
  - Levels object overview
- Unison test language introduction
- Unison applications programming instructions
- Help system

Topics Covered

Overview

- Preface
- Personal safety and equipment protection

Course Modules

1 - Pre-course Review & Test Program Components

This reinforces the content of the pre-course by allowing the students to modify and complete the infrastructure of an example PA test program. The student will complete exercises to reinforce understanding of the elements of the Unison test language and working with the files used to create libraries.

On completion of these exercises the student will have demonstrated the ability to work with the tools described in the pre-course, and the use and management of the different files within a Unison test program.

2 - PAx Test System Overview – Review

This unit introduces PAx test system functions and capabilities, including:

- Architectural features
- Power distribution
- System configuration and resources

3 - DragonRF

This unit provides the student with a thorough description of the components of the DragonRF subsystem. The unit provides detailed information about programming instructions used to control the DragonRF.

- DragonRF hardware components
- HMM hardware components
- Graphical Debug Tool
- Supported configurations
- Unison RF source and measure programming
- Unison VSA programming
- Practical exercises including:
  - Common measurements for characterization of a Power Amplifier. E.g. 1 dB compression, IP_3, NF, EVM

4 - Voltage and Current Instruments

This unit introduces the Octal Voltage/Current (OVI) and High Current VI (HCOVI) modules.

- Octal VI / VI16 / HCOVI functional description
- Generic syntax statements for:
  - Connect/disconnect instructions
  - Force instructions
  - Measure instructions
  - Programming examples
  - Alarms
- DUT site connections

Practical exercises include performing simple DC tests on an RF PA device.

5 - Sequenced Waveform Generator (SWG)

This unit introduces the basic operations of the Arbitrary Waveform Generator. This DSP based instrument used to create waveforms to modulate the RF generators.

- Functional overview
- Connections to DragonRF

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Course Modules (cont.)

6 - Digitizers (HSB-DIG and Hummingbird)

This unit introduces the use of the Digitizers and various methods of data collection. It covers the concept of synchronization and its importance to meaningful and accurate data processing, as well as the use of various built-in math functions for data analysis.

- Functional overview
- Connections to DragonRF
- Data analysis (built-in math functions)
- HMM hardware components
- Use the Data Analysis tools to examine sourced and captured waveform

7 - StepBus Sequencer

This unit provides the student with details of the Sequencer used to create closely controlled series of force and measure instructions which are stored in memory for later use. This feature is used to maximize program efficiency and runtime.

- Hardware implementation of Sequencer
- Programming instructions to create and execute a sequence
- Programming constraints within sequences
- Practical example from a PA test program

8 - FX Digital Subsystem and MSDI Use Model

This unit features the FX Digital subsystem. Using the MSDI model, the engineer will investigate an example MIPI solution.

- Functional overview of FX Digital subsystem
- Introduction to program structure
- Pattern structure and the pattern tool
- Pattern setup tool
- Debugging tools
- Microcode
- Unison test language exception handling instructions
- Practical exercise to import the Digital Interface Library into a program.
- Pattern and Unison test language synchronization
- Practical exercise to examine an example MIPI bus signal using the digital debugging tools
- Sync bus and synchronization

9 - Handshaking and SyncBus

This unit features technique of handshaking, which is when a portion of a program waits for an event from a pattern to continue executing its code. Also vice versa, a pattern can wait for an event from code to continue executing the pattern. This unit also explains the setup for the use of a SyncBus, which is used for triggering RF, Digital, and VI instruments.

- Overview of flags and handshaking
- Examples using loop counters to communicate pattern status
- SyncBus hardware overview
- Examples using the SyncBus to trigger RF hardware

10 - Register Send Memory

This unit covers the hardware and programming instructions used when loading binary data into memory and capturing data from a DUT.

- Functional overview of send and capture memory
- Programing instructions to load, send and capture data
- Practical examples from a reg send and capture program

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