Mixed Signal Applications - FX Digital

Offering a Range of Configurations Designed for Low-cost Testing

Course Description

The Mixed Signal Applications – FX Digital training course provides a broad base of mixed signal testing knowledge, and forms a strong foundation for future applications courses. As such, the course covers a range of instruments including DC, digital, DSP and RF. It enables attendees to work comfortably in the Cohu enVision user interface and program the typical instrument set using Cadence instructions. This unit introduces X-Series tester (LX, MX, EX utilizing the FX digital subsystem) functions and capabilities, including:

- Architectural features
- Power distribution
- System configuration and resources

Course Outline

- X-Series Test System Overview
- enVision Operating System Overview
- Getting Started with enVision
- Adapterboard Objects
- Test Program Flow
- Test Objects
- Spec and Mask Objects
- Cadence in enVision
- Cadence Tools
- Cadence Language
- Octal VI/VI16
- Arbitrary Waveform Generator (AWG)
- Digitizer (DIG)
- DDP Digital Subsystem
- RF Subsystem

Course Length

- Ten days, including classroom and practical exercises

Recommended Skills

- English - written and spoken
- Familarity with Unix and Linux operating systems

Prerequisites

- None

Who Should Attend

- Test program development engineers
- Test program support engineers
- Test system maintenance engineers and technicians

Automotive

Mobility

IoT/IoV & Optoelectronics

Computing & Network

Industrial & Medical

Consumer

- **Up to 256/512/1024 digital pins**
- **20/40/80 instrument slot configurations**
- **Comprehensive portfolio of DC, power, DSP, RF and digital power instruments**

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Course Modules

1 - X-Series Test System Overview

This unit introduces the X-Series tester functions and capabilities, including:

- Architectural features
- Power distribution
- System configuration and resources

2 - enVision Operating System Overview

This unit introduces the concepts and philosophy of the enVision operating system, including the core elements of enVision and how enVision objects are related to each other within an enVision test program.

3 - Getting Started with enVision

This unit introduces essential enVision skills and general concepts.

- Location of enVision files
- Starting enVision
- Connecting to enVision
- Indications that enVision is running
- Types of enVision test program files
- Loading a test program
- Running a test program at the Operator Tool and Pass/Fail indicators
- Text based datalogging
- Using the enVision on-line help
- Changing user preferences at the enVision tools
- Working with the Error Tool
- Using enVision tools to view Objects
- Performing common tool actions such as: changing Xdefaults; finding, creating, cloning, renaming and deleting objects; and exiting an enVision tool
- Exiting an enVision session

4 - Adapterboard Objects

This unit introduces the Package Tool and Adapterboard Objects which relate tester resources to the DUT and load board.

- Introduction to Adapterboard Objects
- Adapterboard selection at the Operator Tool
- Displaying pin information at the Package Tool
- Controlling the Package Tool display
- Using the Pin Spreadsheet
- Understanding Pin Types and using the Pin Type editor
- Creating an Adapterboard object
- Constructing a graphic image of the DUT
- Defining new Pin Types with the Pin Type editor
- Using the Pin Information Mode to assign pin names, PPIDs and pin types
- Using the Pin Spreadsheet to assign the tester resources
- Creating and viewing pin groups

5 - Test Program Flow

This unit introduces the Flow Tool and Flow Objects, which are used to control the test program sequence.

- Introduction to Flow Objects
- Resequencing the Flow and Moving Objects
- Structure of a Flow Object
- Understanding test IDs
- Understanding the sequence of execution
- Working with Bins
- Attaching a Bin Object to an icon in the flow
- Creating a Flow Object

6 - Test Objects

This unit introduces the core of the enVision system, the Test Tool.

- Introduction to Test Methods
- Test Method categories
- Test Method help
- Test Tool orientation
- Method specific arguments
- Test context
- Sequence of test execution
- Port expressions

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Course Modules (cont.)

7 - Spec and Mask Objects

This unit introduces the basic features and applications of the enVision Spec Object.

- Introduction to Spec and Mask Objects
- Spec Tool orientation
- Categories
- Attaching categories to a flow node
- Using categories to reuse Test Objects
- Mask Objects
- Attaching a Mask to a test
- Using Spec and Mask Objects to program tester resources
- Using expressions to define parameter values
- Referring to specific parameter values
- Creating Spec and Mask Objects

8 - Cadence in enVision

This unit presents a brief overview of the Cadence program module structure and demonstrates the methods of integrating Cadence routines into the enVision environment.

- Overview of the Cadence routines structure
- Cadence in enVision
- Parameter passing
- In/Out Cadence parameters
- Passing enVision values to Cadence
- Sharing the PPID between Cadence and enVision
- Reporting test results

9 - Cadence Tools

This unit introduces the Cadence Tools.

- Cadence editor/debugger
- Cadence status display
- Cadence on-line help

10 - Cadence Language

This unit introduces the Cadence language necessary to develop Cadence routines.

- Introduction to Cadence programming
- Declaration of variables
- Storage classes
- Data types
- Operators and precedence
- Type casting functions
- Built-in functions
- Flow control
- Cadence input/output
- Cadence print syntax

11 - Octal VI / VI16

This unit introduces the Octal Voltage/Current (OVI) and VI16 module.

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

DSP Instruments

12 - Arbitrary Waveform Generator (AWG)

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

- Functional overview
- Programming instructions
- Connect/disconnect instructions
- Loading waveforms into memory
- Setting up sampling rate
- Gain and impedance settings
- Software trigger
- Waveform sourcing
- Creating a clock waveform to DUT
- Programming markers
- DUT site connections

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Course Modules (cont.)

13 - Digitizer (DIG)

This lesson presents the use of the Digitizer (DIG) 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.

- Initialization
- Connect/disconnect instructions
- Setting up sampling rates
- Software trigger
- Sourcing a clock to the DUT site
- Measure instructions
- Data read back
- Data capture
- Data analysis
- DUT site connections

14 - FX Digital Subsystem

This unit introduces the hardware elements of the FX Digital subsystem. It covers the difference between the pattern and run time code, and which parts of the program contain instructions for setting up digital functions.

- Functional overview of Digital subsystem
- Digital hardware overview
- Introduction to programming structure
- Pattern structure
- Run-time code
- Register send and capture
- Pin Parametric Measurement Unit (PMU)
- Central Parametric Measurement Unit (CPMU)
- Sync bus and synchronization

15 - RF Subsystem

This unit presents the basic operation of the Radio Frequency (RF) Source and Measure Instrument.

- RF subsystem functional block diagram
- Hardware description and interconnections
- RF subsystem programming
- Connect instructions
- Source set up instructions
- Scalar set measurement instructions
- One port vector set measurement
- Two port vector set measurement
- Measure instructions
- DUT site connections

Cohu, Inc.
12367 Crosthwaite Circle, Poway, CA 92064-6817
Tel. +1 858.848.8000 I info@cohu.com I www.cohu.com