Post-Silicon Characterization Developer

SCOPE of work

The main goal is to perform post silicon characterization of A/D converter using already existing HW platform and EEE LabVIEW Test Framework.

The work should cover all phases from Test requirements capture, characterization plan development, tests development, test execution and test report generation.

The IEEE Std 1241™-2010, IEEE Standard for Terminology and Test Methods for Analog-to-Digital Converters should be used as guideline for test specification and development.

Qualification requirements: Final year or recently graduated students from Computer Science departments (ETF, MATF, FON, RAF or related Technical University)

Necessary skills:

- LabVIEW Programming language – intermediate level
- A/D Converters – intermediate level
- VHDL – basic/intermediate level
- FreeRTOS – basic/intermediate level
- C – intermediate level
- Instrumentation and measurement techniques – intermediate level
- UDP protocol – basic level
- Electronics – intermediate level

Internship Description:

During Internship the candidate will gain practical knowledge and real work experience with the following:

- LabVIEW programming language
- Instrumentation and measurements techniques
- Test automation
- A/D and D/A converters
- Statistical data analysis
- Test report generation using Minitab and MS Word

Internship detailed description

The Internship shall be divided into several work packages/milestones:

1. **Introduction to EEE LabVIEW Test Framework, EEE ATRG Tool, HW Platform for A/D Converter Characterization 3 weeks)**

   Milestone Inputs:
   - EEE LabVIEW Test Framework Hands-on presentation
   - EEE ATRG Tool User Manual
   - HW Platform Schematic and PCB design files
   - FPGA VHDL Source Code
   - FPGA Detailed design file
   - UDP Protocol specification document

   Milestone Deliveries: N/A

2. **Development of Test requirements based on IEEE Std 1241™-2010, IEEE Standard for Terminology and Test Methods for Analog-to-Digital Converters (2 weeks)**

   The following tests should be covered:

   - Localization of code transitions (mandatory)
   - Transfer characteristics (using both increasing and decreasing input levels) (mandatory)
   - Analog input tests:
     - Static input resistance (mandatory)
     - Static input impedance versus input signal level (mandatory)
     - Static input current (mandatory)
     - Static gain and offset (independently and terminal based) (mandatory)
   - Linearity tests
     - Integral nonlinearity (mandatory)
     - Absolute accuracy error (mandatory)
     - Differential nonlinearity and missing codes (mandatory)
     - Monotonicity (mandatory)
     - Hysteresis (mandatory)
     - Harmonic and spurious distortion (optional)
     - Intermodulation distortion (optional)
   - Noise tests
     - SINAD (optional)
     - SNR (optional)
     - ENOB (optional)

   Milestone Inputs:
   - IEEE Std 1241™-2010, IEEE Standard for Terminology and Test Methods for Analog-to-Digital Converters (2 weeks)
   - Test Requirements Template

   Milestone Outputs:
   - Test Requirements File

3. **Development of the A/D Converter characterization plan (1 week)**
   The Characterization plan should define all test cases/scenarios necessary to be implemented in order to cover all test requirements. Requirements traceability should be respected.

   Milestone Inputs:
   - IEEE Std 1241™-2010, IEEE Standard for Terminology and Test Methods for Analog-to-Digital Converters (2 weeks)
   - Test Requirements File
   - Post-silicon characterization plan template

   Milestone Outputs:
   - Post-silicon characterization plan file

4. **Development of the LabVIEW tests using EEE LabVIEW Test Framework (4 weeks)**
   The Tests should cover all test cases/test scenarios.

   Milestone Inputs:
   - IEEE Std 1241™-2010, IEEE Standard for Terminology and Test Methods for Analog-to-Digital Converters (2 weeks)
   - Test Requirements File
   - Post-silicon characterization plan file
   - EEE Test Framework Source code
   - List of instruments available
   - LabVIEW Drivers for available instruments

   Milestone Outputs:
   - LabVIEW Tests files

5. **Tests execution (1 week)**
   The Test execution should cover all combination of test conditions and all test cases/scenarios.

   Milestone Inputs:
   - EEE Test Framework Source code
   - LabVIEW Drivers for available instruments
   - LabVIEW Test files

   Milestone Outputs:
   - LabVIEW Tests results data in tdms format

6. **Test report generation (1 week)**

   The Test report should be generated (manually or using EEE ATRG tool (Automatic Test Report Generation Tool). Test reports should contain tests specification summary, test conditions, test result data, test statuses and requirements traceability data.

   Milestone Inputs:

   - LabVIEW Test results data in tdms format
   - EEE ATRG Tool exe file
   - EEE ATRG Tool user manual

   Milestone Outputs:

   - Test report in MS Word doc format