MEASUREMENT EQUIPMENT SYSTEM BY USING DIGITAL SIGNAL PROCESSOR

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ABSTRACT

This project discusses about a development of a measurement equipment system. The development of this system involved the development of sensor board to detect voltage and current waveforms in form of sinusoidal from the input signal. It also involves the development of Slave Board and Xilinx Field Programmable Gate Array (FPGA). The sub components of the slave board comprise EEPROM, ADC, RAM, Sample and Hold Chips and Multiplexer. All the operation in the slave board is controlled by Xilinx FPGA which offer design flexibility and adaptability with optimize device utilization. Xilinx will be downloaded with design circuit that gives command to control process in the slave board. Start from design circuit until downloading process, all the process done using Xilinx software tools. All the operation of the system is controlled and monitored by the computer through the digital signal processing (DSP) software. The software and hardware developed provide suitable for research in IC's design and DSP breakthrough.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Electric power quality has captured increasing attention in power engineering in recent years. The term power quality refers to a wide variety of electromagnetic phenomenon that characterizes the voltage and current at a given time and location on a power system. Very broadly, power quality is concerned with maintaining the near sinusoidal waveform of power distribution bus voltage at rated voltage magnitude and frequency [1].

We can verify the power quality by installing a special type of high-speed recording test equipment to monitor the electrical power. The results of a power quality study can be used to diagnose power quality problems that affect an existing facility, to evaluate measures to improve power quality, to refine power quality modeling techniques, or to predict future performance of load equipment.

Power quality engineers are primarily concerned with RMS voltage variations and steady state deviation from the ideal power frequency sinusoid. Therefore, the testing system must be designed to monitor short duration variations, long duration variation and waveform distortion. Continuous monitoring is required to adequately characterize waveform distortion and RMS voltage variations. Real time data analysis should be used in conjunction with continuous monitoring in order to reduce storage requirements. This makes extended data acquisition and therefore long-term power quality studies feasible.