

**I²C INTERFACE CONTROLLER FOR TEMPERATURE DATA
LOGGER**

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ABSTRACT

This project covers two important parts which are I²C (Inter-Integrated Circuit) and Temperature Data Logger system. This report summarizes the design of I²C interface controller for communication between the temperature sensor and processor in the data logger system. I²C (Inter-Integrated Circuit) is commonly used in serial protocols for data transfers and its interface controller is developed in HDL Verilog, and implemented on Xilinx's Spartan FPGA Development Board. It will be integrated with temperature sensor to perform as a Temperature Data Logger.

Keywords— I²C (Inter-Integrated Circuit); Data Logger; Serial Protocols, Xilinx's FPGA;

TABLE OF CONTENTS	PAGE
DECLARATION	i
ACKNOWLEDGEMENT	ii
ABSTRACT	iii
TABLE OF CONTENTS	iv
LIST OF FIGURES	vii
LIST OF TABLE	viii
LIST OF ABBREVIATION	ix
CHAPTER 1: INTRODUCTION	
1.0 PROJECT BACKGROUND	1
1.1 OBJECTIVE OF THE PROJECT	4
CHAPTER 2: REVIEW OF I²C CONTROLLER AND TEMPERATURE DATA LOGGER	
2.1 INTRODUCTION	6
2.2 LM75: DIGITAL TEMPERATURE SENSOR AND THERMAL WATCHDOG WITH I ² C	7
2.3 TEMPERATURE DATA FORMAT	10
2.4 INTERNAL REGISTER STRUCTURE	11
2.5 I ² C (INTER-INTEGRATED CIRCUIT)	12

CHAPTER 1

INTRODUCTION

1.0 PROJECT BACKGROUND

A data logger is used to record data over time or in relation to location either with a built in instrument or sensor or via external instruments and sensors. Temperature data logger is one type of data logger and it is needed in scientific, medical and industrial applications [1]. The data loggers are based on a digital processor (or computer) who utilizes software to activate the system and analyze the collected data [2]. The interfacing between the sensor and computer can be in any protocols and it depends on the input and output circuit. There are several protocol drivers for a processor to communicate with any peripheral or devices such as Parallel Peripheral Interface (PPI), Two wire interface (TWI) which is also called I²C, Serial Peripheral Interface (SPI), Serial Port (SPORT) and Universal Asynchronous Receiver/Transmitter (UART). Among these protocols, I²C requires only two I/O pins while others require more pins and signals to connect devices. If the applications consider simplicity and low manufacturing cost more important than speed, then I²C is appropriate for this kind of applications [3]. I²C is a two-wire, bi-directional serial bus that provides a simple and efficient method of data exchange between devices. The I²C system uses a serial data line (SDA) and a serial clock line (SCL) for data transfers. This paper provides the design