

Indiana University – Purdue University Fort Wayne
Opus: Research & Creativity at IPFW

Computer and Electrical Engineering Technology &
Information Systems and Technology Senior Design
Projects

School of Engineering, Technology and Computer
Science Design Projects

8-1-1996

PC-Based Environmental Monitoring System

Brian K. Landes

Indiana University - Purdue University Fort Wayne

Follow this and additional works at: http://opus.ipfw.edu/etcs_seniorproj



Part of the [Computer Sciences Commons](#), and the [Engineering Commons](#)

Opus Citation

Brian K. Landes (1996). PC-Based Environmental Monitoring System.
http://opus.ipfw.edu/etcs_seniorproj/735

This Senior Design Project is brought to you for free and open access by the School of Engineering, Technology and Computer Science Design Projects at Opus: Research & Creativity at IPFW. It has been accepted for inclusion in Computer and Electrical Engineering Technology & Information Systems and Technology Senior Design Projects by an authorized administrator of Opus: Research & Creativity at IPFW. For more information, please contact admin@lib.ipfw.edu.

PC-BASED ENVIRONMENTAL MONITORING SYSTEM

For
EET 491, Phase II
Senior Design Project

By
Brian K. Landes

Date
August 1, 1996

ABSTRACT

This project is a PC-Based Environmental Control System (PCBEMS). Four specific environmental characteristics are electrically monitored and then sent to a viewing screen. It uses sensor specific integrated circuits to measure temperature, barometric pressure, and relative humidity. A fourth variable that is measured is wind speed. Wind speed is monitored by measuring the linear output of a dc motor as a result of its rotating shaft. All four of these circuits go through some preamplification before they are sent to the A-D converter. The values from the A-D converter are then read into the software program, via a digital I/O card, at which point they are displayed graphically on the pc monitor. Information displayed will be real time data and will allow the user various display options and alarm settings.

LIST OF FIGURES

Figure 1	Computer Interface Structure	1
Figure 2	Temperate Monitoring Circuit	3
Figure 3	Relative Humidity Monitoring Circuit	4
Figure 4	Graph of Output Voltage to Barometric Pressure	5
Figure 5	Barometric Pressure Monitoring Circuit	6
Figure 6	Graph of Output Voltage Vs Wind Speed	8
Figure 7	Wind Speed Monitoring Circuit	9
Figure 8	Inverting Voltage Power Supply	10
Figure 9	Environmental Monitoring System Display Panel	11
Figure 10	A-D Converter Circuit	12

LIST OF TABLES

Table 1	Correlation of Output Voltage to Barometric Pressure	5
Table 2	Correlation of Generator Output Voltage to Wind Speed	8

CONTENTS

Acknowledgments		ii
Abstract		iii
List of Figures		iv
List of Tables		iv
Contents		v
PCBEMS Overview		1
System Requirements		2
PCBEMS Hardware Design		2
Temperature Monitoring Circuit		3
Relative Humidity Monitoring Circuit		4
Barometric Pressure Monitoring Circuit		5
Wind Speed Monitoring Circuit		7
Mechanical Construction		10
Power Supply Design		10
PCBEMS Software Design		10
Hardware/Software Interface		12
Conclusion		13
Appendix A	Sensing Circuits Parts List	14
Appendix B	Sensor Circuit Schematic	16
Appendix C	PCBEMS Software Program	18
Appendix D	Electrical Component Data Sheets	30
Appendix E	Mechanical Construction of Wind Speed Rotor/Housing Assembly	93