

Experimental Control of an Electrostatic Filter

John Byrnes
 Martin Klingensmith
 Advised by Dr. Xingwu Wang

Abstract

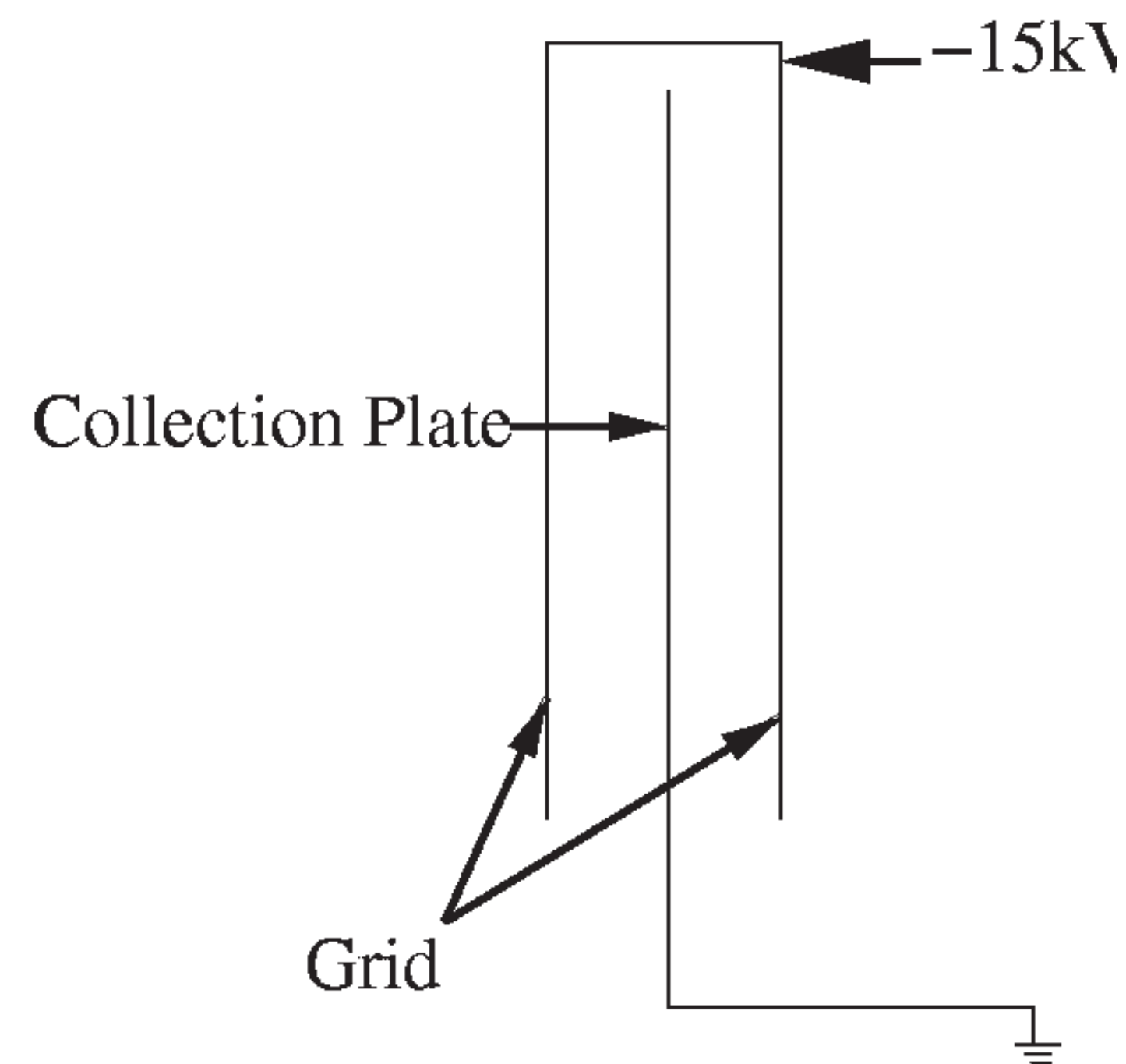
An control system is being designed for an electrostatic dust collector. The control system uses a Motorola 68HCS12DP256 microcontroller at its core.

Electrostatic Filters

Utilize a strong electrostatic field to pull particulate matter from a fluid stream.

Often used in conjunction with mechanical filters to increase the reliability and reduce the service costs.

Extremely energy efficient - ~100mW consumed

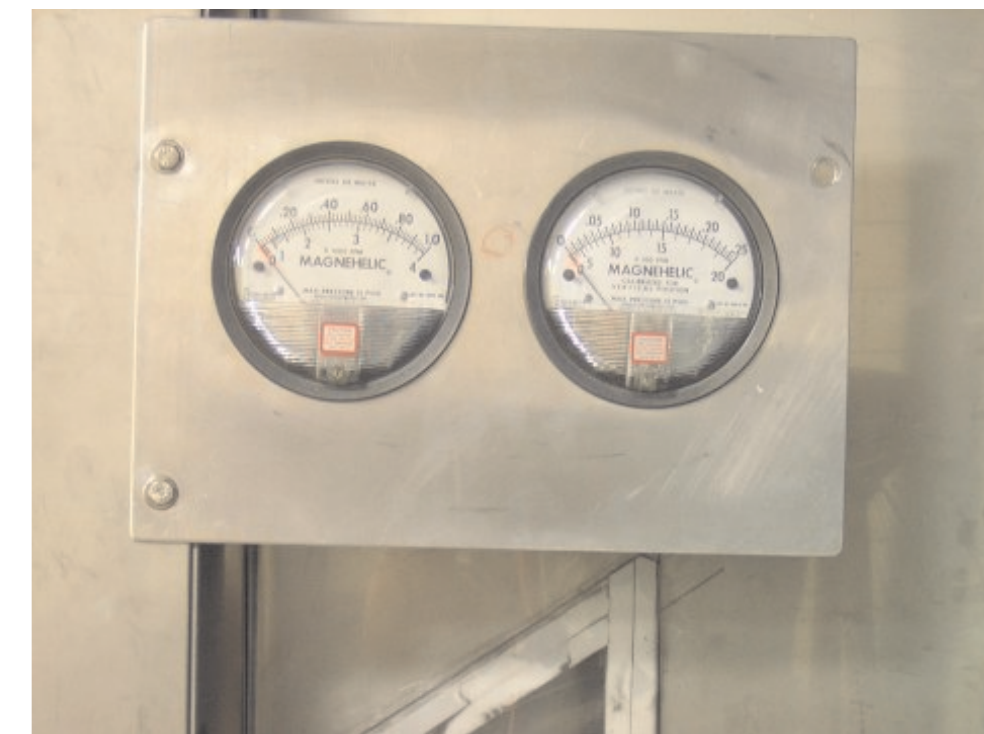


Previous System

Previous system utilized all analog technology.

All experimental parameters are controlled manually using knobs and switches.

All data collected by hand by reading dials.



Problems with Previous System

Repeatability - it is difficult to accurately control all parameter values from one run to the next.

Difficult data collection - Instruments are located in less than convenient locations.

Slow start and stop times - Control systems are located all around the apparatus

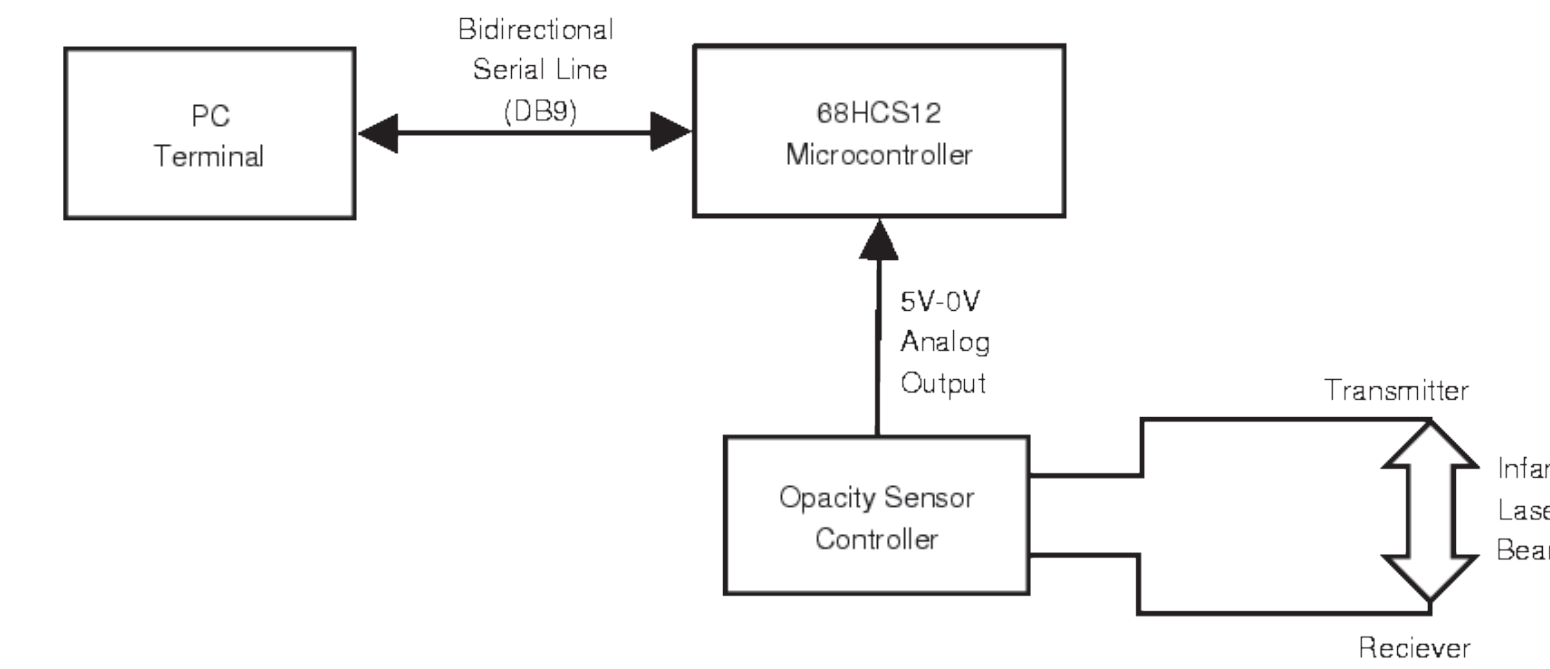
Modifications Made

A simple datalogger was built using a Motorola 68HCS12DP256 microcontroller.

The datalogger currently reads an opacity sensor and sends the data to a host PC for analysis.

This system has the capability to log data on up to 16 analog and many more digital instruments.

Current System - Block Diagram



Proposed System

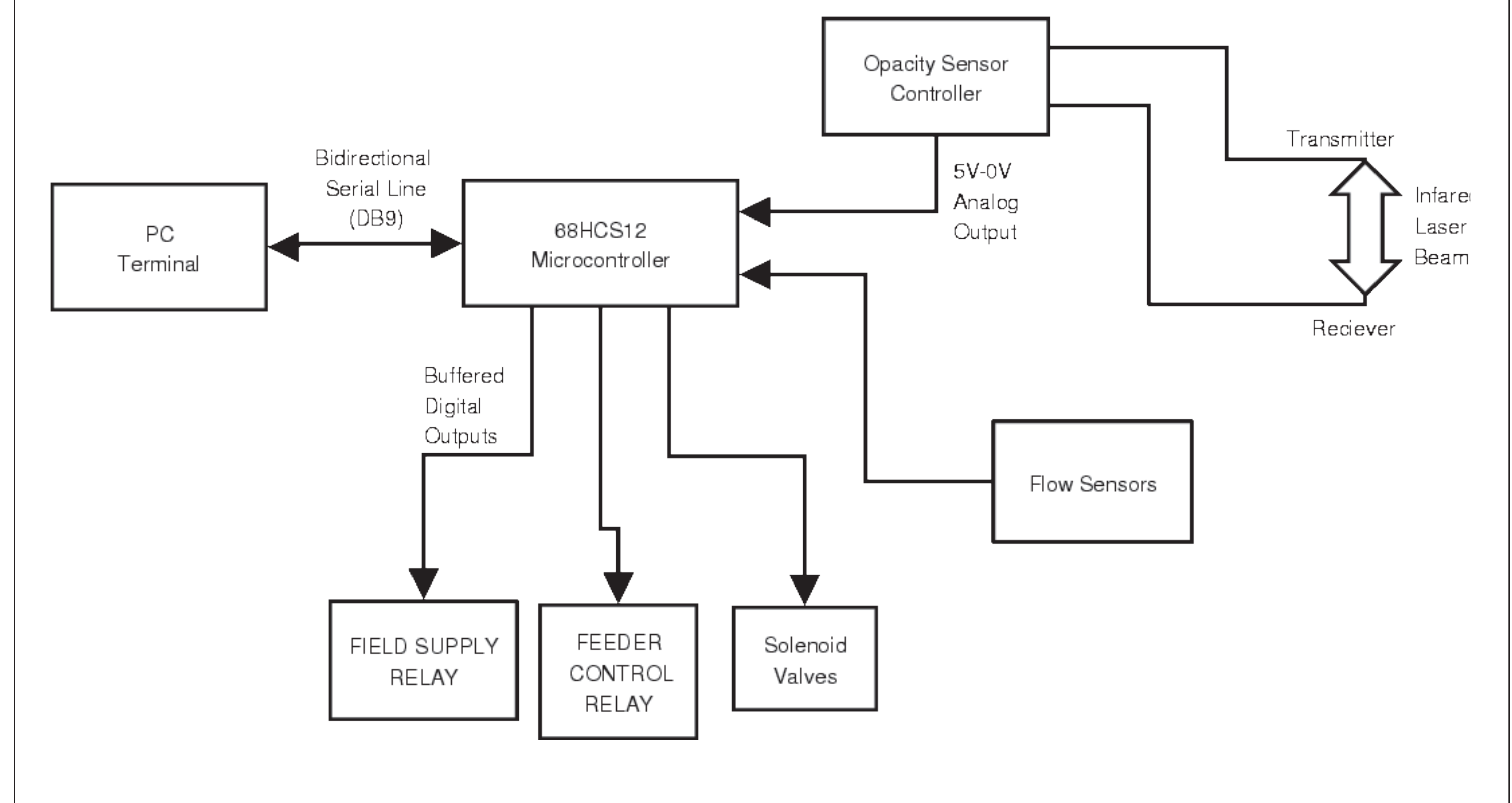
The proposed system expands the current system by adding more sensors and data collection systems. Also experimental control features are to be added.

Proposed sensors include - thermocouples, flow and pressure sensors, additional opacity sensors, and power meters for the field source.

Proposed control features include material feed control, blower fan control, and field voltage control.

The goal is to have a framework for repeatable experiments.

Proposed System Block Diagram



Conclusion

A data collection system for an electrostatic filter under design is reported. Also, an expansion of this data collection system to include experimental control is proposed. The proposed work is to be completed over Summer 2004.

Sponsors

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