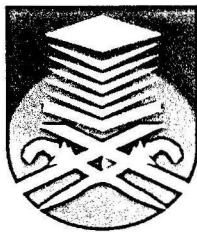


**DESIGN OF A PRESSURE CONTROLLER FOR A THERMAL
EVAPORATION SYSTEM**

**This is presented in partial fulfillment for the award of the
Bachelor of Engineering (Honors) in Electrical
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ABSTRACT

This project describes the method of designing a pressure controller for vacuum pressure control system well suit for evaporation and deposition of amorphous silicon thin film. The constant total pressure or pressure not less than 10^{-5} torr is required during the conditioning of the vacuum to control impurity in high temperature. The pressure controller was designed to maintain the constant total gas pressure inside vacuum chamber. This controller consists of pressure sensor circuit and relay switching which. The pressure inside the chamber will detect by using the vacuum sensor which also known as pressure sensor. The pressure sensor also as the transducer gives the signal to the pressure sensor circuit. The pressure sensor circuit will provide the signal that used by relay switching circuit to switch off the pump operation. The circuit was designed and simulated by using OrCAD PSpice software. After analysis and simulation, the circuit was successful designed to amplify the low level voltage to the high level voltage. The combination of pressure sensor circuit and a relay switching will yields a pressure controller, which is to control the pressure inside the vacuum chamber.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Vacuum is a pressure lower than atmospheric. Except in outer space, vacuum only occurs in closed system. In the simplest terms, any reduction in atmospheric pressure in a closed system may be called a partial vacuum [1]. A compatible vacuum pressure control system is vital for the successful operation of and evaporator for material fabrication process [6]. The process of evaporation is a high voltage analysis which the process was involving the solid breakdown of silicon material. The process must be intended to be in vacuum chamber at pressure of 10^{-5} torr or less. The process also required a high current supply to heat the boat. The temperature of boat at 10^{-5} torr was identified to be greater than melting point of Silicon at pressure not less than 10^{-5} torr.

Vacuum pressure control system includes a vacuum chamber, a vacuum pump for sucking gas from the vacuum chamber, a pressure controller for controlling vacuum pressure in the vacuum chamber. The combination of Rotary vane and Turbo pumps are use in fabricating the amorphous silicon [8]. Beside that the Series 345 Pirani Sensor and Cold Cathode Sensor are use and its output voltage range is 200m-600mVdc and the measurement range pressure not less than 10^{-5} torr. The constant total pressure also require during the conditioning of the vacuum to control impurity in high temperature. The vacuum condition inside the chamber that required can be controlled by using the pressure controller.

The signals from the sensor are in the DC voltage form. The sensor functioning as a transducer gives the signal to pressure sensor circuit. The output voltage of pressure sensor range is 200mV-600mV DC voltage. The pressure sensor circuit is using the amplifier TL084. This amplifier is one of the most useful of linear (not digital) circuits. It is normally a fairly low power device (15 volts 10 ma or less) that can amplify, clip, and