SENSOR INTERFACING

Sensors can be interfaced with microcontroller like LCD, DAC and ADC interface.

TEMPERATURE SENSORS

Transducers convert physical data such as temperature, light intensity, flow, and speed to electrical signals. Depending on the transducer, the output produced is in the form of voltage, current, resistance, or capacitance. For example, temperature is converted to electrical signals using a transducer called a thermistor. A thermistor responds to temperature change by changing resistance, but its response is not linear.

The complexity associated with writing software for such nonlinear devices has led many manufacturers to market a linear temperature sensor. Widely used linear temperature sensors are LM34 and LM35.

LM34 and LM35 temperature sensors

LM34 is precision integrated-circuit temperature sensors whose output voltage is linearly proportional to the Fahrenheit temperature. The LM34 requires no external calibration since it is internally calibrated. It outputs 10 mV for each degree of Fahrenheit temperature. The LM35 series sensors are precision integrated-circuit temperature sensors whose output voltage is linearly proportional to the Celsius (centigrade) temperature. The LM35 requires no external calibration since it is internally calibrated. It outputs 10 mV for each degree of centigrade temperature.

Signal conditioning and interfacing the LM35 to the 8051:

Signal conditioning is widely used in the world of acquisition. The most common transducers produce an output in the form of voltage, current, charge, capacitance and resistance. We need to convert these signals to voltage in order to send input to an A-to-D converter. This conversion is commonly called signal conditioning. Signal conditioning can be a current-to-voltage conversion or signal amplification. For example, the thermistor changes resistance with temperature. The change of resistance must be translated into voltages in order to be of any use to an ADC.

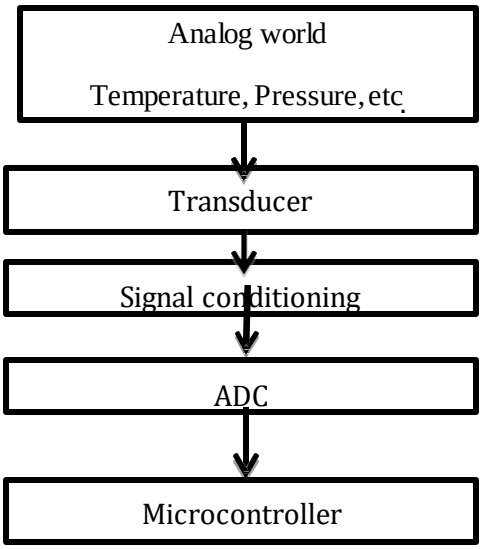

Fig: Getting data from analog world

Interfacing using to 8051

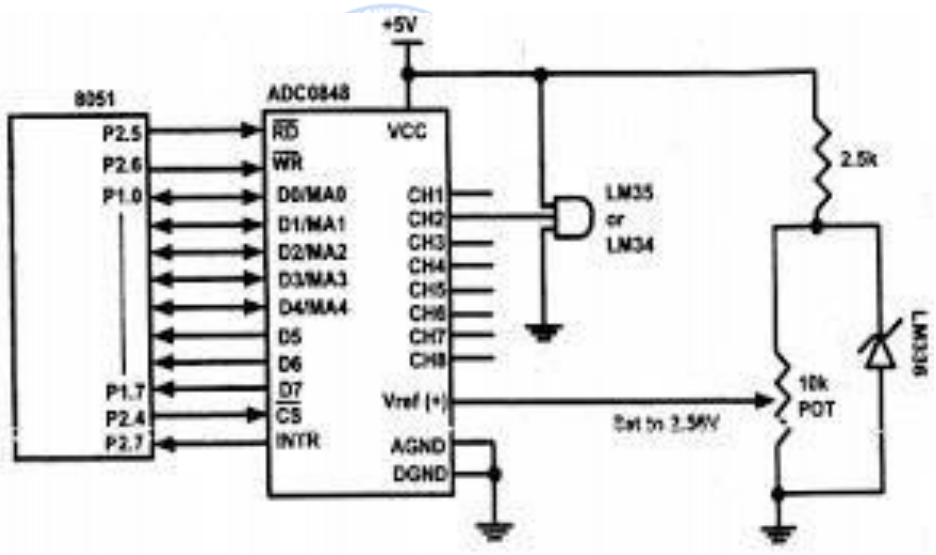

Fig: 8051 connection toADC0848 and temperature sensor

ADC0848 will involve in the interface between LM35 and 8051. The ADC 0848 has 8 bit resolution with a maximum of 256 steps and the LM34 or LM35 produces 10mv for every degree of temperature change. So Vin of adc0848 must produce a Vout 0f 2.56 v for full scale output.