Syrpailyne Wankhar, Development of a pulse oximeter, M. Tech. Thesis, Department of School of Biosciences & Bioengineering, Indian Institute of Technology Bombay, 2005.

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Abstract **-**Pulse oximetry is a non-invasive technique that monitors the oxygen saturation of arterial blood. Light is passed through the tissue and the scattered light is collected with a photodiode positioned on an opposite surface (transmission mode) or an adjacent surface (reflectance mode). The light gets amplitude modulated by the pulsations of arterial blood caused by the cardiac activity, and the detected envelope is known as photoplethysmograms (PPG). Hemoglobin and oxyhemoglobin absorb light to varying degrees as a function of wavelength. Dual wavelength illumination (660 nm and 940 nm) of arterial blood, therefore, results in an absorption contrast that depends upon the proportion of hemoglobin that is chemically combined with oxygen. The circuit developed uses a reflectance mode sensor for high sensitivity, and a sensor circuit in which integration is used for noise rejection as well as auto ranging of sensor output for the two wavelengths. The instrument is to be used as part of cardiovascular diagnosis setup for simultaneous recording and analysis of ECG, phonocardiogram (PCG), impedance cardiogram (ICG), arterial pulse pressure, and oxygen saturation.