

INFRARED DATA COMMUNICATION SYSTEM

Prepared by: Koe Meng Suan

ABSTRACT

Infrared data communication technology has been effectively deployed on short-range, line of sight digital communicating devices. The reasons for infrared ascendancy are due to its relatively simple and low cost construction and yet provide reliable wireless connection for digital electronic devices.

This project intends to design and build standalone wirelessly communicating microcontroller system equipped with infrared technology. The system will transmit and receive text data in half duplex mode.

Infrared signals will be transmitted using infrared emitting diode. Transmitted infrared signal is modulated with 38 kHz Pulse-Width Modulation (PWM) carrier signal. Reception of infrared data will utilize Vishay TSOP1138, a highly sensitive infrared receiver module with built in demodulator and amplifier. IBM/PC complaint PS/2 keyboard is used as the next input device. Received text from infrared signals will be displayed on HD44780 compatible 20x4 character LCD.

The system will use Microchip PIC16F887 microcontroller as the processing device. This microcontroller can use up to 36 I/O ports which is suitable to interface with the large number of I/O devices in the system. Each of these I/O ports is capable of providing up to 25 mA of current which can drive infrared diodes independently. Universal Asynchronous Receiver/Transmitter (UART) feature will be used for serial communication of the infrared. The microcontroller will also generate 38 kHz PWM signal used for infrared transmission.

The project is carried out in multiple stages, starting from the investigation of PWM signals in infrared transmission. Then microcontrollers will be programmed to produce modulation pulse to drive infrared-transmitting diodes and perform simplex communication. Finally the microcontroller will be further programmed to perform half-duplex infrared communication.

The project has been carried out successfully to meet the objectives. The final prototype of the project is capable of sending text messages at 2400 baud. Half duplex communication is made possible with a user-selectable option between Tx and Rx mode.

Keywords: Infrared, Simple Duplex, UART, PIC16F887, Pulse-Width Modulation, PS/2 Keyboard.