Unified Smart-Home Remote Control System
(CM4a-10)

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PROJECT OVERVIEW

Introduction
Nowadays, smart-home is popular in daily life. Remote control of electronic appliances is an important component in smart-home relatively. A multi-function remote control of electronic appliances contains 15-20 buttons. The user needs to spend some time to read the guidelines of the electronic appliances carefully and remember all function of buttons. Some elder did not easily know how to use the remote control. It is not convenient for users.

Objective
In this project, we have to design a remote that can control multiple appliances such as light, fan, television etc. We also make the remote control with simple buttons. That means only a few buttons can control all the appliances at a smart-home so it is convenient for different user especially forgetful user.

Block Diagrams

Methodology

• Transmitter
  Generate 8 bits per one code
  Bit 1 = 1
  Bit 0 = 0
  One bit is defined as a wave with 2.105ms
  Bit 1 = 38 kHz at the first quarter of the period (0.526ms) the rest of the period (1.579ms)
  Bit 0 = 38 kHz at the first 3 quarters of the period (1.579ms) and it becomes silent at the last quarter of the period (0.526ms)

• Receiver
  Signal detection
  Decoded to an 8bit data inside the processor and the processor will try to locate the command received

• IR Receiver (for VB interface)
  We use RS232 Interface to connect 2 or more 8051 main module to have a multiple processor system. The data pass through RS232 will same as the data pass through the RxD and TxD in the universal device connector. Since RS232 standard is not TTL compatible, so we need MAX232 to be a line driver.

Testing

• Devices for testing : Fan, Light, TV(VB interface)
• Maximum transmission distance: 6m

To distinguish the right device when it is too close to others, we limited the effective area of a transmitted signal in a certain field. We also make a led light in the receiver to let our user know which one of the devices inside the area he/she is trying to control.

Visual Basic interface

We use Visual Basic 6(VB6) to create a VB interface to simulate complex device. The VB6 interface (TV) included some functions such as ON/OFF, Menu, channel selection, change volume, silence and exit menu.