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Control of Home Appliances Using Point-N-Press Techniques

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ABSTRACT: The goal of this paper is to develop an intelligent universal remote control system for home appliances called Point-n-Press. Point-n-Press automatically detects the device (or appliance) when a user points the controller at it. The infrared (IR) remote control devices are used to operate in the most of modern household applications. With the development of the society and smart home, there are more and more home appliances and more infrared remote control devices used to operate them. A single IR remote controller can't be used to manipulate the different kinds of home appliances. This paper proposes an application and design of single-chip microcontroller based IR remote system, which can control multiple devices, code and decode all of the infrared remote control protocol, and integrate with the transmission and receiver. The remote can operate over range of 15 ft, easy to use, and also reliable. To address these problems, an intelligent universal remote control system for home appliances named Point-n-Press is proposed. Point-n-Press addresses the directionality feature, which enables easy and intuitive control by pointing to the target device to display the target's control interface on the screen of the remote controller.

KEYWORDS: Relay, PIC16F877A, Remote controller unit, IR Sensors

I. . INTRODUCTION

Remote control for home appliances is an absolute necessity in our fast pased life. one of the most common is that which makes use of IR radiations as particular frequencies. The IR remote control consists of two sections on is transmitter section and another one is Receiver section.convenience for user to remotely control and monitor the appliances and it provides a finer use of electricity. The efficient use of electricity makes the HOME automation to play an vital role in daily life. As by the growth of PC (personal computers), internet, mobile phone and wireless technology compose it easy for a user to remotely access and controls the appliances. A lot of research has been done and many solutions have been suggested to remotely access the HOME appliances. Some of them used internet, wireless technology to convey and control home appliances, others used Bluetooth and GSM technology for controlling the home appliances but all execution is not efficiently useful because some require a mobile device or internet which is not commercial for domestic uses as well as it required a network so these devices is not properly work when there is no network or signal strength weak. Advanced method reduces the wiring and complexity of the system. It has no drawback of network, coverage and any GSM network.

It provides flexibility to the system. It is mainly focused on the elderly people, stables and for the people who are unable to stand up or face difficulties in speaking. It is affordable to everyone, moderate and easy to install. As there is no wired communication between the remote user and appliances control width and the electronic devices used to check are easily available making it a cost effective solution.

In these research paper, A circuit is construct to switch on/off any home or industrial appliance by using the TV/DVD remote controller. The circuit can be regulated up to a distance of 5-10 metre depending on the remote used. The circuit consist of a step-down transformer,5V regulator 7805, single channel relay, timing purpose used crystal osciiator KDS16,an Infra Red receiver module (IRX1 TSOP1738) and some discrete components. The circuit is connected to any of the home appliances to make the appliance turn on/off from a remote control. The circuit can be

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triggered from up to 10 meters. It is very easy to build and can be massed on a general purpose PCB. Remote control efficiency the operation of fan regulators around the home or office from a distance.

The "home intelligence" system is based on the use of a network of sensors and intelligent circuitry attached to the domestic appliances and disrupted by the different rooms in a home space. We can save our time, energy and manage to take behaviour on switch over of all the room appliances.

II.ARCHITECTURE

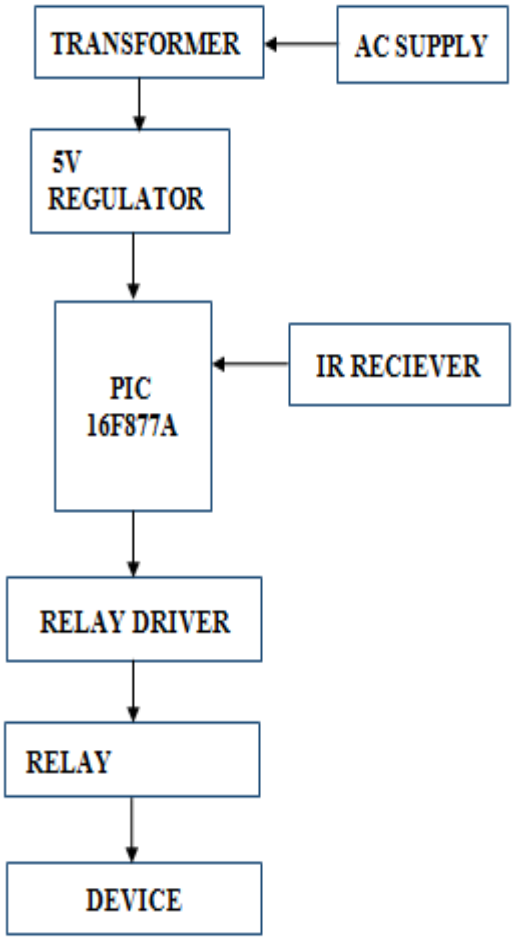

Figure 1.1

BLOCK DIAGRAM OF THE DEVICE

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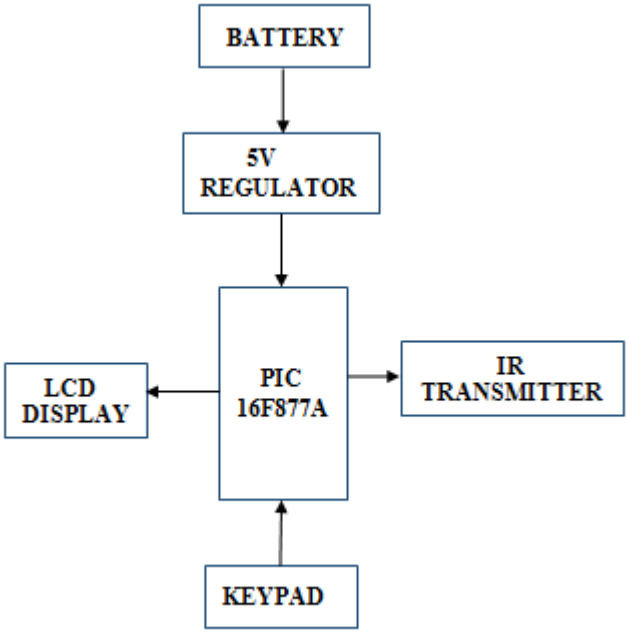

BLOCK DIAGRAM OF THE REMOTE

The ac voltage, typically 220V RMS, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

The potential transformer will step down the power supply voltage (0-230V) to (0-15V and 0-9V) a level. If the secondary has less turns in the coil then the primary, the secondary coil's voltage will decrease and the current or AMPS will increase or decreased depend upon the wire gauge.Then the secondary of the potential transformer will be connected to the rectifier.

PICs have a set of registers that function as general purpose RAM. Special purpose control registers for on-chip hardware resources are also mapped into the data space. The addressability of memory varies depending on device series, and all PIC devices have some banking mechanism to extend the addressing to additional memory.

In other microcontrollers, the register movement is achieved through the accumulator. External data memory is not directly addressable. PIC code space is generally implemented as EPROM,ROM, or FLASH ROM. In general, external code memory is not directly addressable, due to the lack of an external memory interface.

III.PARAMETERS

IR TRANSMITTER

The transmitter usually is a battery-powered handset. It should consume as little power as possible, and the IR signal should also be as strong as possible to achieve an acceptable control distance. Preferably it should be shock proof as well. Many chips are designed to be used as IR transmitters.

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Nowadays very low power microcontrollers are used in IR transmitters for the simple reason that they are more flexible in their use. The processor wakes up to transmit the appropriate IR command only when a key is pressed. The current through the LED (or LEDs) can vary from 100mA to well over 1A! In order to get an acceptable control distance the LED currents have to be as high as possible. A trade-off should be made between LED parameters, battery lifetime and maximum control distance.

IR RECEIVER

Infrared receivers pick up infrared signals within line-of-sight, and within 30 feet or so, and turn the signal into electrical impulses. These electrical impulses can be carried around the home on wires, and then turned back into infrared signals by emitters.Due to their complexity and sensitivity, infrared receivers tend to be the most expensive part of an infrared distribution system.

SINGLE CHANNEL RELAY

SFP Series Pump Seal Failure Relays are designed to monitor the shaft seals of submersible pumps. A resistive-measuring probe is installed in the pump seal cavity. If the seal starts to leak, contaminating fl uid enters the seal cavity. This lowers the resistance between the internal probe and the common connection. When the resistance drops below the user-adjustable sensitivity set-point of the relay, the output relay energizes and the LED turns Red ON. The relay output can be used to give an alarm indication of a leaking seal. These products will automatically reset when the fault condition clears.

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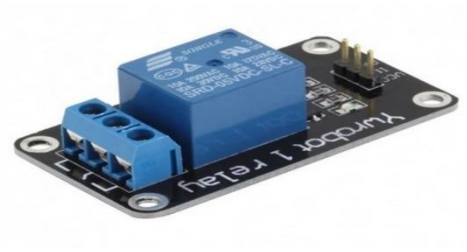

PIC CONTROLLER 16F877A

Microcontrollers offer different kinds of memories. EEPROM,EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. The technology used in PIC 16F877 is FLASH technology, so that data is retained even when the power is switched off. Easy programming and erasing are the other features of PIC 16F877.The heart of the microcontroller is the CPU core. In the past, this has traditionally been based on an 8-bit microprocessor unit.

IV. EXPERIMENTAL SETUP

The 230 V from AC mains is stepped down to 12V and Regulated byIC7809, capacitor and Diodes to 12V. This filtered 12V is used for providing supply to the entire circuit. Any button of remote control can be used to control the speed of the fan. The remote control produces infrared ray switch is received by the TSOP infrared receives module. The TSOP used here is TSOP 1738. It is capable for receiving signals up to 38 KHZ. The infrared rays are received by the TSOP sensor and its output is given as a trigger to the firstmonostablemultivibrator PIC controller through a LED and Resistor R4.This PIC controller which is wired as Monostablemultivibrator is used to delay the clock to decade counter CD 4017. We can directly give the output of TSOP to decade counter, but while doing so all the small pulse or noises may also act as clock to counter and counter starts counting. The decade counter has ten outputs from Q0 to Q9. But here we are using only Q0 to Q4. Q5 is not used and Q6 is used to reset the counter. The output of decade counter is taken through Resistors R5 to R9. The resistor R5 to R9 and capacitor C5 controls
the pulse width which is actually determining the speed of the fan. If the Q0 output is high the capacitor C5 is charged through R5, if Q1 is high capacitor C5 is charged through R6 and so on, thereby controlling the speed of the fan accordingly. Here we are controlling the speed of the fan in five levels that is why we are taking five outputs (A0 to Q4). Another PIC comtrolleris used here which is also wired is triggered by pulses from opto coupler. It is wired as Zero crossing detector. The output from decade counter is given to PIC controller and this is given to the transistor BC548.It is given to the Opto isolator. It is used for driving. Triac is a type of thyristor. Here the resistor R13 (470hm) and capacitor C7 (0.01µF) combination is used as snubber network for the Triac. The Resistors R5 to R9 and capacitor C5 are used to control the pulse width.

V. RESULT ANALYSIS

The preliminary hardware test is done. Verification of key data in particular code set is done using IR Maestro, after pressing the key each key sends signals and that signals will be verified. Transmission of signal is verified using signal viewer. Programming features are developed .Result are verified.

VI. CONCLUSION

Remote controller is one of the applications of electronics to increase the facilities of life. It gives one the ability to control multiple home appliances from a distance within the specification. Using this RCU we can control the multiple devices with extra added programming features. A single IR remote controller can be used to manipulate the different kinds of home appliances; as they are compatible which leads to the wastage of resources.

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