

# TOUCH SCREEN BASED CONTROL FOR A WHEEL CHAIR AND HOME APPLIANCES

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## Abstract

It is difficult for the people who are aged and having physical disabilities to move about and to operate house hold appliances without any external help. The proposed project based on touch screen technology is targeted for above mentioned people. It enables them to move independently from one place to another place without any external aid and at the same time it also helps them to operate house hold electric appliances using wireless communication. The two functions can be performed effectively by using a switch which has two states. In state one, the input given to touch screen is used for controlling the direction of the chair and in state two by selecting the appropriate input on the touch screen the user is able to control the home appliances using zigbee.

**Keywords:** Resistive Touch screen, LPC 2148 ARM7, AT89S52 microcontroller, Mosfet driver circuit and Zigbee.

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## 1. INTRODUCTION

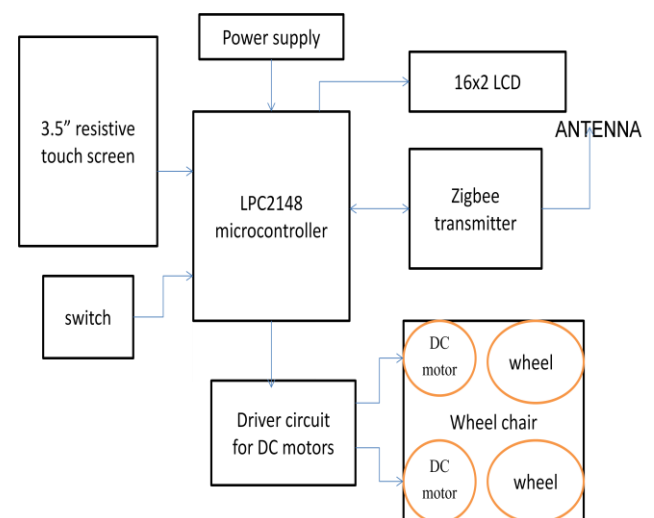
Embedded systems are also being used in the medical field. An aged or physically disabled person come across many problems while moving from one place to another and it becomes more difficult for such a person to go near and operate the conventional switches which are located in different parts of the house. Such a person uses a wheel chair to move which is manually controlled and the person should be strong enough to control it or else another person should be there to direct the movement of the chair.

To solve this problem a wheel chair is designed which can be controlled by the user without others help and at the same time conventional switches are replaced with centralized control system to operate the house hold appliances located at remote places.

Touch screen technology is the direct manipulation type, gesture based technology. A touch screen is capable of detecting and effectively locating a touch over its display area. It is sensitive to the touch of a human finger or stylus. A switch which is manually operated is placed on the chair. Considering the two states of a switch, for state one, the input is given to the touch screen just by applying a small pressure on a particular portion of it. The output from it is analog in nature which is given as input to ADC pins of the microcontroller. LPC2148 microcontroller process and compares the obtained digital values with the predefined range values. Accordingly microcontroller send instructions to direct the movement of the chair and when switch is in state two, the same input is considered and transmitted by using zigbee technology to control home appliances which are located remotely.

## 2. BLOCK DIAGRAM

### 2.1 Transmitting Unit



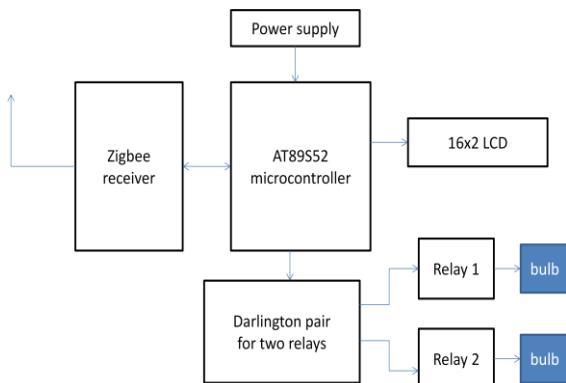
**Fig-1:** Block diagram at transmitting section

When the switch state is one, the input function from touch screen is used to control the directions of the motors fixed to the chair. To drive the motors having high torque, a driver circuit is designed using IRFZ44N mosfets and L293D and when switch state is zero, the input from touch panel is used to operate the home appliances like bulb, alarm, fan and so on using the standard wireless zigbee technology. The LCD acts as an output device to display the function which is being performed by the microcontroller.

The user can operate the home appliances by changing the state of the switch to zero at the transmitting unit without moving from the chair. The input from the touch screen is given to ARM7 microcontroller, which transmits the input data serially using zigbee technology.

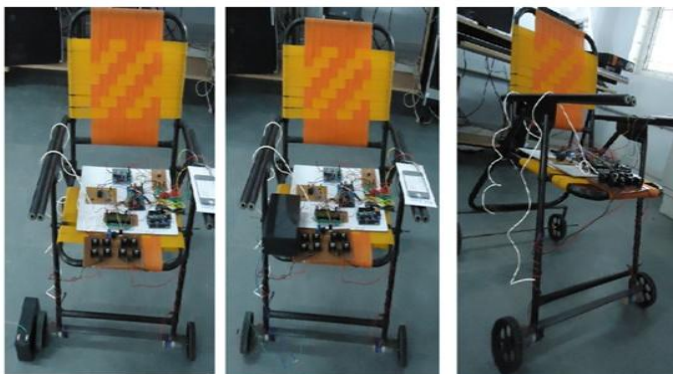
## 2.2 Receiving Unit

The user can operate the home appliances by changing the state of the switch to zero at the transmitting unit without moving from the chair. The input from the touch screen is given to ARM7 microcontroller which is transmitted serially using zigbee technology to switch on and off the required home appliance using relays. A Darlington pair circuit is designed to get current gain to operate the relay.



**Fig-2:** Block diagram at receiving section

## 3. IMPLEMENTATION OF PROPOSED SYTSEM

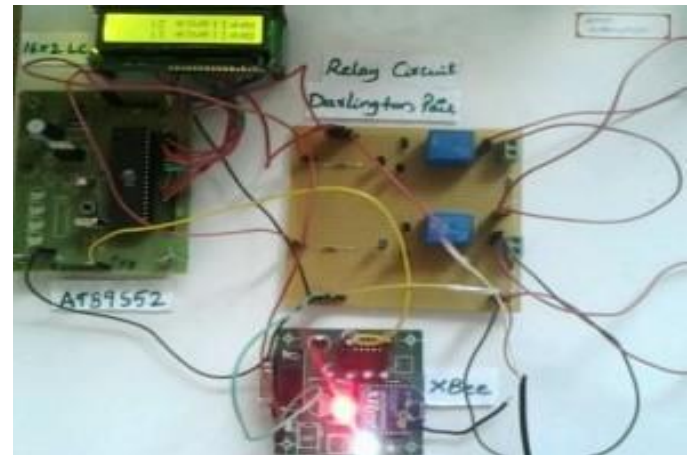


**Fig-3:** Hardware setup for touch screen based wheel chair

Initially 3.5" touch screen is interfaced to microcontroller. If switch connected at transmitting unit is equal to one, the microcontroller controls the movement of the chair in forward, backward, right or left depending on the input given to touch screen. Secondly when switch is zero, the home appliances are controlled through wireless technology.

LPC2148 has two UART's. UART0 is used for transmitting data to receiver section. The every function performed by the system is displayed on the 16x2 LCD.

The chair has four wheels. The front wheels acts as actuators and two 12v DC motors of 100 RPM metal gearbox are fixed at the front end of the chair. When maximum load is present, maximum current required is 9.5 Amps by each motor and required Vcc voltage is 12v. A driver circuit is designed making use of N-channel mosfets IRFZ44N and L293D.



**Fig-4:** Hardware setup for control of home appliances

At the receiver section 8052 an 8-bit microcontroller is used. This section is about to on and off the home appliances. The power to the receiver unit is 5 volts. When switch status is zero, the data transmitted by Xbee at transmitting section is received by the Xbee present at the home appliances section. The home appliances can be bulb, motor, alarm and so on.

## 4. CONCLUSIONS

Touch screen based control system is implemented for moving the wheel chair in all directions and the same control system is used to switch on and off the home appliances located in remote places using Zigbee technology. This system will be very helpful for the people who cannot move without any external aid. Though, the proposed system mainly focuses on the touch screen interface, more advancements can be done through more research like by adding security, obstacle detection and voice module and further replacing DC motors with AC motors will add capability to handle more load.

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