



Design and Development of 8051 Microcontroller Based Vibrating Chair

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Abstract : This paper mainly focus on Back pain relief and solution for the person with continuous working administrator persons and continuous driving vehicle drivers. Back pain is major cause for patients to seek emergency care, Number of time back pain in specific age of persons. One of reason for back pain occurs due to continues seating on chair and continues driving of vehicle. The one common Solution of back pain is Vibration therapy or massage. Today number of vibrations chair and covers are used for back pain. This paper is applicable to the person to improve the need through relief from back pain. Vibration therapy advantages for circulating blood and increases the strength of muscle.[1]. This paper relates to provide the vibrating method for the persons who are working continuously. It also improve in minimization of road hypnotize. The method developed with the help of microcontroller 8051. This method not only provides the different time period but also the generation of different square wave signal for making On and Off the vibration method present at four position on vibrating chair. The device also includes buzzer for indication about the start and stop signal.

Keyword: Vibrator, 8051microcontroller, buzzer.

I. INTRODUCTION

It can be Also implemented to minimize the effect of road hypnotize. The life cycle of human being changes during days last few years. There is change in working day and last few years. There is change in working day and time. This change can cause to work for larger duration in the office. During working time the seating work increases sharply. This can give rise one of major problem like back pain to get relaxation from such there are different method but time the person has to remember to do excise or make starching of muscles. But as time goes on the person not remember to do it given time. Here is method to give relaxation as well as time schedule to make short change this method can able to improve the road hypnotize.

II. Literature Review

Back pain is the third most common disorder presenting in the neurology outpatient clinic. Back pain is the most common cause of disability. The main goals of treatment the patients presenting with acute Low Back Pain are reduction of pain and preservation of sensory and motor function. [2]

Low back pain (LBP) is a pandemic and costly musculoskeletal condition. Patients with LBP may endure surgery, injections, and expensive visits to emergency departments. Some suggest that using physical therapy (PT) or chiropractic in the earlier stage of LBP reduces the utilization of expensive health services and lowers the treatment costs.[3]

Low back pain (LBP) remains a musculoskeletal condition with an adverse societal impact. Globally, LBP is highly prevalent and a leading cause of disability. [4]

Low back pain (LBP) is a highly prevalent musculoskeletal disorder that contributes to the greatest degree of disability worldwide. [5]

LBP is the most common medical condition for those living with a disability. LBP is the most common medical condition for those living with a disability; in Most countries, it is also the top medical condition requiring rehabilitation. [6]

A classical Medical approach is disease-oriented and directs all management efforts of LBP towards Identifying underlying causes of pain in the low back, namely, structural and/or functional Impairments or sensory impairments associated with chronic pain, and treating these Impairments to alleviate the pain and improve a person's health state.[7]

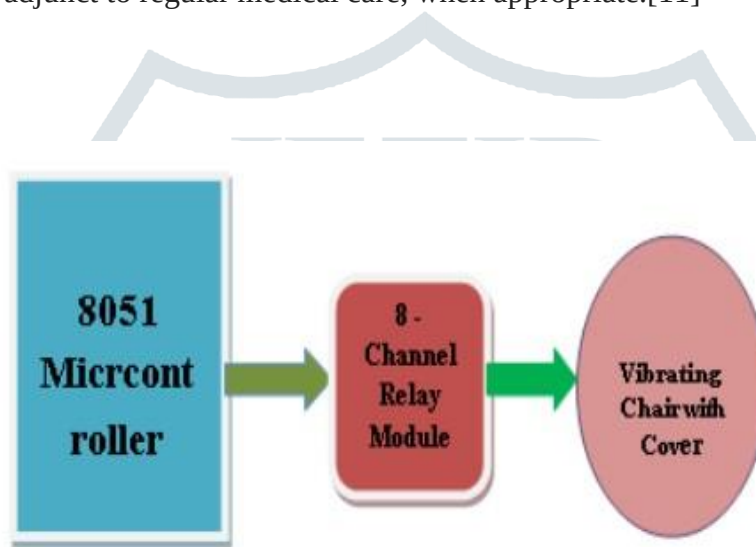
the implementation of a functional musculoskeletal approach along with the emerging nociceptive pain concept in individually targeted holistic approaches seems to be the successful way to deal with the complexity of Low Back pain [8]

include that Medical Yoga Therapy surely does improve pain and descending pain modulation, reduces hyperalgesia in low back pain patients.[9]

The last decade has seen a growth in the utilization of complementary and alternative medicine therapies, and one of the most popular and sought-after complementary and alternative medicine therapies for nonspecific low back pain is massage. Massage may often be perceived as a safe therapeutic modality without any significant risks or side effects. However, despite its popularity, there continues to be ongoing debate on the effectiveness of massage in treating nonspecific low back pain. With a rapidly evolving research evidence base and access to innovative means of synthesizing evidence, it is time to reinvestigate this issue.[10]

Massage therapy is a promising treatment for chronic low-back pain for patients who may have multiple pathologies, any one of which could be responsible for the condition. Further study is encouraged to determine the efficacy of massage therapy as a readily accessible, lower-cost alternative to more invasive therapies and as an adjunct to regular medical care, when appropriate.[11]

III. Block Diagram



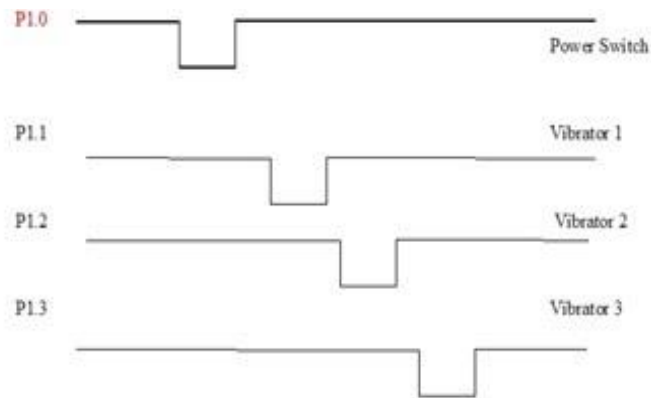
The Automatic vibrating chair consists of a 8051 Microcontroller Development Board, 8- channel Relay Module, Vibrating Cover.

IV. Working

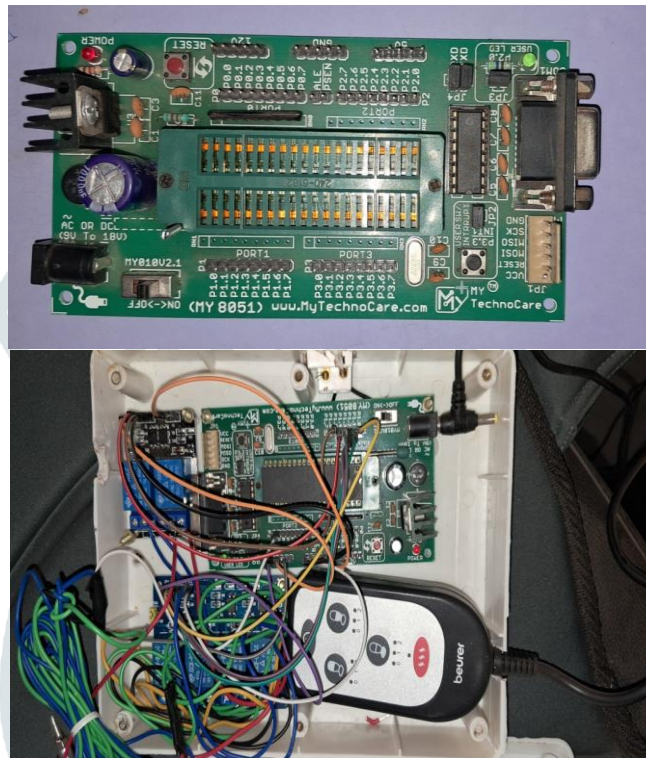
Automatic vibrators chair has vibrator cover, relay module and 8051 microcontroller as important components. The control on the vibrating cover can be done in two ways, one by turning on the power switch to turn on all the switches in slow or high speed, and by turning on the first two in slow speed, by giving a separate signal to each vibrator, the vibrator can be turned off, low speed, high speed vibrations can be taken.

It is necessary to sound the buzzer for a few seconds before the start of the vibrator to warn the person who is at work or driving. It is necessary to turn off the buzzer before it starts vibrating. Automatic turning on of buzzer for first few seconds. Automatic shutdown followed by vibrator 1, vibrator 2, vibrator 3 at low speed respectively. If it is suddenly turned on at high speed, the work may be interrupted. After that after a certain time vibrator 1, vibrator 2, vibrator 3 are turned on at high speed. Automatic shutdown of the vibrating chair after a desired time is all controlled by a microcontroller program.

Vibrators ON-OFF controls by high to Low Pulse. Pulses send through 8051 microcontroller. At first low to high pulse from which enables Power of all vibrators. Second high to low pulse ON First Vibrator at low speed. Third high to low pulse ON Second Vibrator at low speed. Forth Pulse ON Third Vibrator at low speed. After Specific required time delay Microcontroller send pulse at power switch to disable power of all vibrators. Then all vibrators goes to OFF condition.



V. 8051 Microcontroller



- An 8051 Microcontroller is a programmable Device , which has Eight bit CPU, On chip clock oscillator ,4Kbytes of internal program memory (code memory)[ROM] ,128 bytes of internal data memory [RAM] ,64 Kbytes of external program memory address space, 64 Kbytes of external data memory address space,32 bi directional I/O lines (can be used as four 8 bit ports or 32 individually addressable I/O lines), Two 16 Bit Timer/Counter :T0 and T1 ,Full Duplex serial data receiver/transmitter, Sixteen bit Program counter (PC) and a data pointer (DPTR),8 Bit Program Status Word (PSW),8 Bit Stack Pointer, Five vector interrupt structure (RESET not considered as an interrupt.) 8051 CPU consists of 8 bit ALU with associated registers like accumulator 'A' , B register, PSW, SP, 16 bit program counter, stackpointer. ALU can perform arithmetic and logic functions on 8 bit variables.8051 has 128 bytes of internal RAM many number of features. Microcontroller is programmable device which has on chip Memory, I/O Ports, serial Communication Ports, Timer- counter etc. Easy to programming In ALP or Embedded C language and Burning program into Microcontroller [12,13,14]

VI. Programming

In 8051 Microcontroller Easy Programming by Using Keil uVision 3/4/5 Software. Keil Simulator converts ALP & Embedded C into Hex code. This Hex code burn into Microcontroller using WLPRO software.

VII. 8 - Channel Relay

Relay is an electro-mechanical device. It consist of a coil, Pole, NC (Normally close) and NO (Normally open)

A relay is an electrically operated switch. Relays may operate mechanically called as electromagnetic relay and some are solid-state relays. where ever it is necessary to control a device or circuit by a small-power signal, relays are implemented and they also provides electrical isolation between sensing circuit and actuating circuits, or where multiple circuits are to be controlled by one signal [1]. we have used here the electromagnetic relay which is having the moving part called as the com (common) connection of a relay. the on and off condition for this relay is as follows: a. when a relay is off, no (normally open) connection of the relay is not connected and the common is connected to the terminal NC (normally closed). when the relay turns on or get energized, the plunger (common) terminal move from NC to no. mechanical relays creates a sound of clicking that shows the transition of the plunger.[15]

VIII. Vibrating Cover

A vibrating massage cover made of a cushion with vibrator motors and a method for making such cushion is provided. The cushion is created by enclosing a vibrators four or more vibrator as the foam is created, it automatically envelopes the vibrator, thereby rigidly retaining the vibrator in place within the cushion. Because the vibrator has been surrounded with the thin flexible material, the foam cannot enter the motor area during the foam creation step. Therefore, the foam creation step does not damage the vibrator or otherwise make it inoperable. The method provides a simple and efficient way of making cushion-containing vibration massage [16]

Feel-good, relaxing vibration massage. The car adapter even allows you to use the massage seat cover in the car ideal for long car journeys.

- For use at home or in the car
- With car adapter for use in the car
- 4 vibration motors
- 2 intensity levels
- 3 individually selectable massage areas
- Heat function with massage or separate
- Easy operation with manual control switch
- Attached using flexible fixing bands
- Can be used on all seats with sufficient seat depth and back rest[17,18]

Vibrators ON-OFF controls by high to Low Pulse. Pulses send through 8051 microcontroller. It controls Switching and Speed of Vibrators.



IX. Power Supply

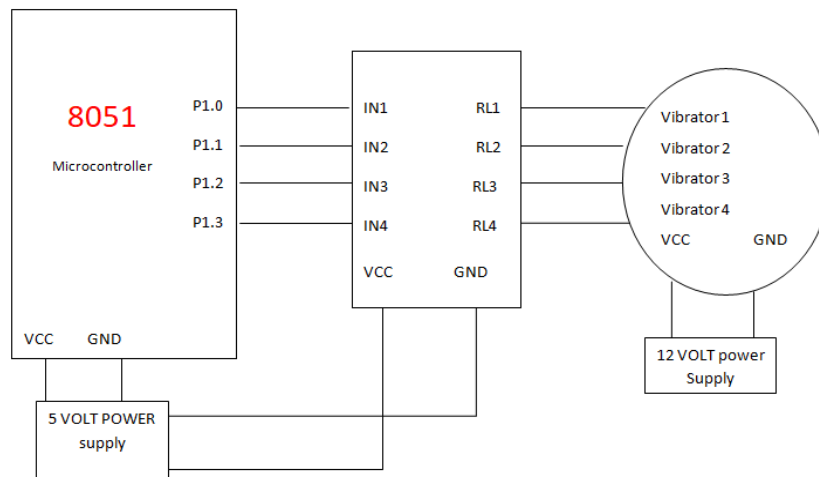
Microcontroller and Vibrating cover woks on Different voltages. 8051 Requires + 5 Volt Power Supply and Vibrating Cover Requires + 12 Volt Power Supply. So this microcontroller isolates from vibrating cover by using Relay module. [19]

X. Buzzer

The buzzer is sound device if any input Signal From Microcontroller comes sounds. Which have two terminal for power positive and negative operating on + 5 volt supply.

XI. Circuit Diagram

Hardware Implementation



XII. Conclusion

The system implemented with vibrator system that can program with different time duration and as microcontroller is



implemented it can be made programmable according to one's requirement. Vibrators vibration massage increase blood flow, relaxes muscle, reduces pain, inhibits cramps and spasm, stretches muscles, decreases post exercise soreness and speeds recovery, and nervous system to stimulate more receptors in muscles, increase performance [20,21,22]

XIII. Acknowledgement

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XIV. References

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