Clocky Robotic Alarm

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Abstract: In this research researcher has try to make a working model of robotic alarm clock. The alarm clock has the option to be controlled by a handheld remote control, which allows the user to play with the device as a type of remote control car. The mechanical wake up timer has sensors which enable it to know when it is coming excessively near a divider or other question, so it can turn another course. In this task comprises of a wake up timer that starts to drive itself around keeping in mind the end goal to influence the proprietor to get up and pursue it to wake up. The clock will start to drive around under two situations: for the situation that the caution goes off after the rest catch has been squeezed, or if the alert has been continuing for over fifteen seconds. Notwithstanding the time, the wake up timer additionally enables the client to see the date and indoor temperature with the straightforward push of a catch. The wake up timer contains a microcontroller that procedures the time and date, temperature sensor, and remote control information, and produces beat width-regulated signs for the engine drivers. Constantly, information, and temperature information is shown on a LCD screen on the front of the wake up timer.

Index Terms – alarm clock, IR sensor. Microcontroller

I. INTRODUCTION

One of the most important components of the project is the microcontroller. The microcontroller will be used to process all of the input data and generate out- puts based on that data. When selecting the microcontroller, the needs of all the other components of the project were taken into account. The system consists of a PIC 16F877A microcontroller which is the brain of the designed robot. This microcontroller is used to control the complete circuit action of the robot. The robot requires regulated power supply for its circuit action. This power supply is provided by the solar panel connected in the system. Electric power generated by the solar is provided to the battery in the circuit.

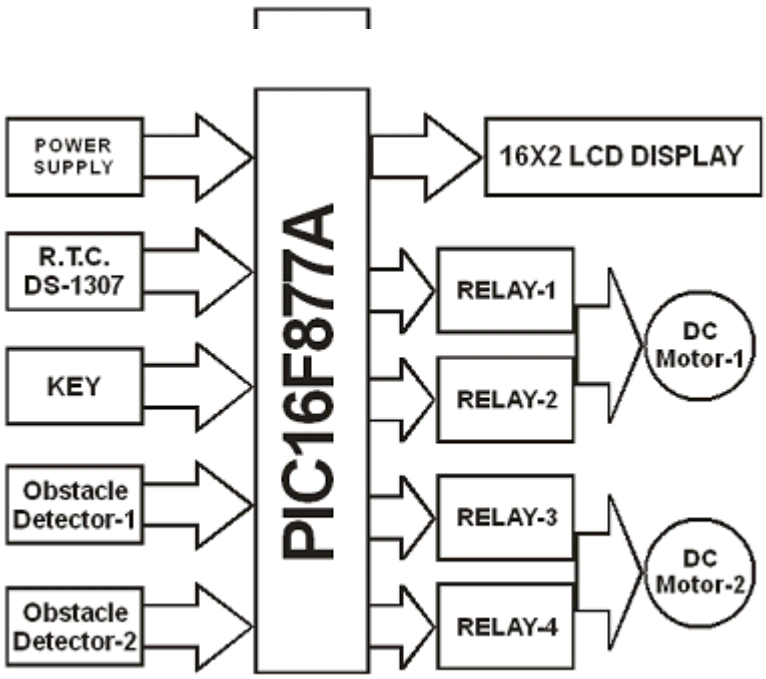
A standout amongst the most vital segments of the undertaking is the microcontroller. The microcontroller will be utilized to process the greater part of the info information and create out-puts in light of that information. While choosing the microcontroller, the necessities of the various segments of the undertaking were considered. The framework comprises of a PIC 16F877A microcontroller which is the mind of the outlined robot. This microcontroller is utilized to control the total circuit activity of the robot. The robot requires directed power supply for its circuit activity. This power supply is given by the sun based board associated in the framework. Electric power created by the sun based is given to the battery in the circuit.

Hardware also consists of a real time clock (RTC) DS1307 to maintain track of the time. RTC DS1307 is interfaced with the microcontroller using I2C protocol interface. This RTC is used to set the real time for the alarm clock of the robot. To set the time and date for the alarm keys are connected in the circuit and interfaced with the microcontroller as shown in the figure. As per the set time the alarm will start for the 10

sec to wake out the owner and it will off automatically after 10 sec. Two mini pushbutton switches are used to control the program flow and to set

the time, alarm time and snooze time. These switches are single pole single throw switches. They are debounced in software, and are interfaced using the 3.3V power source and the internal pull-up resistors. The robot uses two independently controlled motors with large wheels (one on each side), allowing for zero radius turning. Motors and wheels are aligned with the central axis of the robot to ensure balance and eliminate the need for a caster wheel. These motors are controlled by the relays as shown in the architecture of the system. Motors and wheels are mounted to provide sufficient shock absorption so the robot can drop from a reasonable height without being damaged. Each motor is controlled by its own motor driver (H-bridge), which we designed and built.

Equipment additionally comprises of a continuous clock (RTC) DS1307 to keep up track of the time. RTC DS1307 is interfaced with the microcontroller utilizing I2C convention interface. This RTC is utilized to set the ongoing for the wake up timer of the robot. To set the time and date for the alert keys are associated in the circuit and interfaced with the microcontroller as appeared in the figure. According to the set time the alert will begin for the 10 sec to wake out the proprietor and it will off consequently after 10 sec. Two small scale pushbutton changes are utilized to control the program stream and to set the time, caution time and rest time. These switches are single shaft single toss switches. They are debounced in programming, and are interfaced utilizing the 3.3V power source and the inside draw up resistors. The robot utilizes two autonomously controlled engines with expansive wheels (one on each side), taking into consideration zero range turning. Engines and wheels are lined up with the focal pivot of the robot to guarantee adjust and kill the requirement for a caster wheel. These engines are controlled by the transfers as appeared in the engineering of the framework. Engines and wheels are mounted to give adequate stun assimilation so the



engine is the motor drivers are controlled
ller, with a battery supplying the current
er through two driver circuits as shown in
r through separate driver circuit to rotate
motors by the microcontroller. Relays are
vided to stop the robot when any obstacle
is obstacle detector is interfaced with the
ler collects the data from the sensors and
16x2 LCD display, interfaced with the
) display is used to display the date and

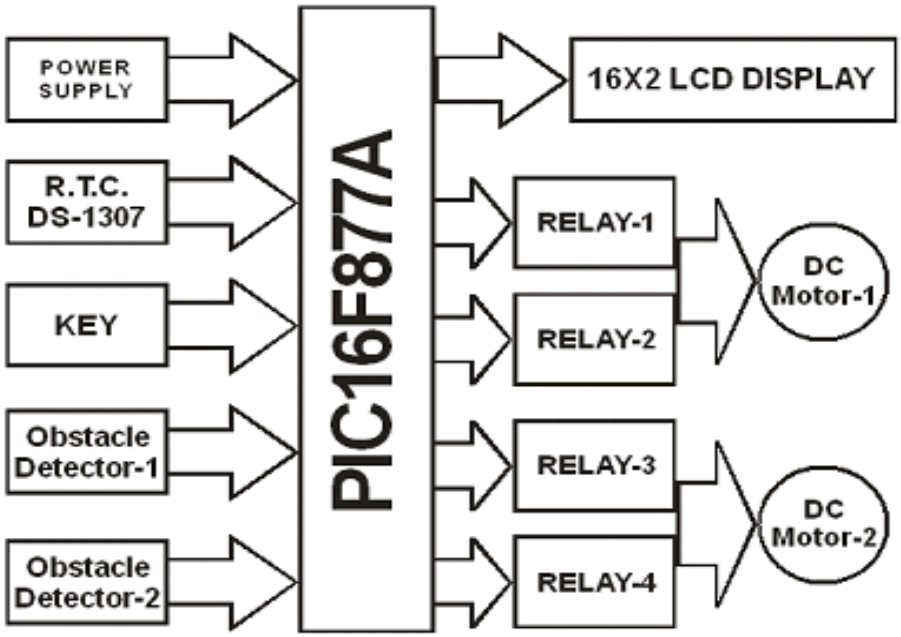


Fig 1.Block Diagram

2. Operating the Clock Robotic Alarm

1] Once the Clock and/or Alarm have been set, the user can use the Function/Time switch to view the Function or Time displays.

•In Function mode, the user can view the day of the week, date, temperature, and alarm time. a) Use the F/C switch to change between degrees Fahrenheit and Celsius.

•In Time mode, the user views the time only. b) Use the 24/12 switch to change between 24-hour and 12-hour modes.

2] To play with the robot as an RC car, set the Mode switch to RC. The LCD should display RC Mode. Alarm Turned Off.

• Turn on the remote controller. The red LED should light up when the controller is on.

• Use the joysticks to control speed and steering. Each joystick controls the wheel on that side of the robot.

• Turn on the remote controller. The red LED should light up when the controller is on.

• Driving the Clocky Robotic Alarm takes some practice.

3] To charge theClocky Robotic Alarm and/or the remote controller, use the included charger and follow the labels for which plug(s) to use.

• The Clocky Robotic Alarm should only be charged with the plug label Robot.

- The remote controller should only be charged with the plug labeled Controller.
- IMPORTANT: Use only the included charger for charging the Clocky Robotic Alarm and its remote controller. NiMH batteries can be dangerous if not charged properly.
- While charging for long periods of time is safe with the included charger, after several days of continuous charging, battery life could be diminished.

3. FLOW CHART

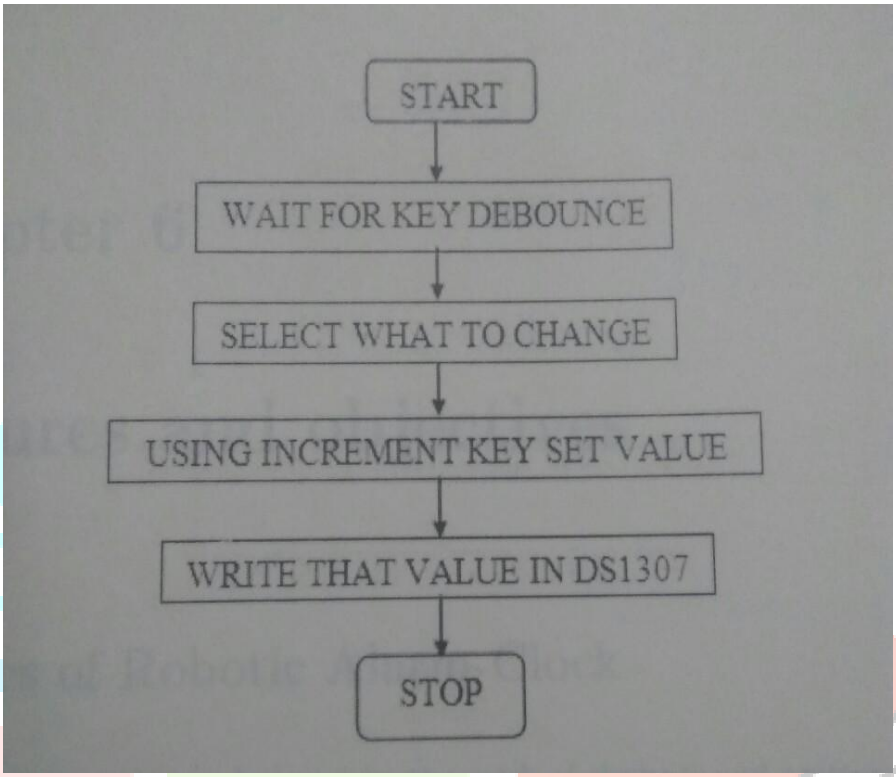


Fig 2.Set Time Flowchart

3]Setting the Clock/Alarm

1] First ensure that the Power switch is turned ON and the LCD displays the Time Or Function screen.

2]To set the Hour, Minute, AM/PM, Month, Date, and Day of the Week, use the Clock Set button

- Press the Clock Set button to choose which parameter to set
- Press the Clock Inc button to increment or cycle through the values for each setting (hours, minutes, etc.)
- When the LCD returns to the Time or Function display, the clock is set.

3]To set the Alarm, use the Alarm Set button.

- Press the Alarm Set button to choose which parameter to set
- Press the Clock Inc button to increment or cycle through the values for each setting (hours, minutes, etc.)
- When the LCD returns to the Time or Function display, the alarm time is set.
- To view the alarm time, switch to the Function display.
- Set the Alarm switch to ON.
- For Autonomous mode, set the Mode switch to Auto.

a) In Autonomous Mode, the Clocky Robotic Alarm will begin driving in a random pattern after the alarm has sounded for 15 seconds, or after the snooze button has been pressed and 1 minute has elapsed.

b)The alarm and wheels must be manually disabled in Autonomous mode by turning the Alarm switch OFF and switching the mode to Wheels Off.

4] COMPONENT OF THE SYSTEM

- Microcontroller PIC16F877A

We use an 8bit Microcontroller as its CPU. The PIC 16F877A is a low-power, high- performance CMOS 8-bit microcomputer with 8K words of Flash Programmable and Erasable Read Only Memory (PEROM). The device is manufactured using Microchips high density nonvolatile memory technology and is compatible with its RISC instruction. The on-chip Flash allows the program memory to be repro-grammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the PIC 16F877A is a powerful microcomputer which provides a highly exible and cost effective solution for many embedded control applications. This is a software controlled system, and it makes use of an 8 bit microcontroller.

- Operating Keyboard

It is the only user input unit which allow user to program/modify schedule as per their requirement.

- Alarm

This section uses an audio signaling device called piezoelectric buzzer as an alarm. The piezo buzzer produces sound based on reverse of the piezoelectric effect. It produces some noisy sound irrespective of the voltage variation applied to it.

- RTC

This is a time schedule management system which has to process schedule time and real-time. Unfortunately, the microcontroller cant process real-time itself. To avail real time to the controller, we have added one RTC DS1302 IC to the controller. RTC process real-time and date without any interrupt to maintain stable with other real-time device like, wrist watch, wall clock, etc. there is one backup battery connected to RTC to ensure its working even mains power fails.

- Obstacle Detector

TSOP based IR obstacle sensor is an IR based sensor which is used to detect obstacles in its line of sight. This is a small sensor which occupies lesser space on the system. The sensor contains SMD components at the bottom layer along with some components on the top layer. The IR LED is operated at 38 KHz frequency which is done by the onboard 555 timer circuit. This light when reflected from the obstacle is detected by the TSOP Sensor. The TSOP sensor can detect IR light of only a particular frequency. In this case its 38 kHz. This sensor can be reliably operated even in sunlight without any issue. The module contains a trim pot which is used to adjust the measuring distance or the sensitivity of the device. On board green LED helps in calibration, this led glows on presence of an obstacle.

- Features of mini IR obstacle/Line sensor

- Four terminal devices with 5v, GND, Output and disable.
- Active low output on obstacle detection.
- Range can be easily adjusted using the trim pot.
- Onboard LED for testing/indication.
- IR transmission can be disabled by making the Disable pin low (connecting to ground).

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- Motor Drive And Motor

When the sensor is activated the vehicle moves using geared dc motor. Driver is used to boost the current. The current from microcontroller is not sufficient enough to rotate the motors a current amplifier is used. Relay is used to drive the motor.

5] RESULT

The clock runs as specified in the project goals. The clock is accurate and the time can be set. The alarm goes off at the set time, and it comes back on after the set snooze period. The tone plays each time the alarm or snooze goes off. And after the second snooze period the clock runs away until the user turns off the alarm.

6] REFERENCES

- Daniela Cako (2005-10-07). "Ig Nobels Honor Amusing, Yet Educational Research". the Tech. Retrieved 2007-11-21
- James Lee (2007-08-28). "Gear Gallery: Versatile HD DVR, Custom CoeePods and Lots More". Wired. Retrieved 2007-11-21
- Robert Weisman (2005-04-07). "Rise and shine { and _nd that clock:Rolling alarm gets snoozers up and into a hunt to hit the o_ switch". Boston Globe. Retrieved 2007-11-21.
- "Gauri Nanda, Nanda Home: In the business of running alarm clocks" Archived 2012-11-24 at the Wayback Machine., In2up, 18 October 2012. Retrieved on 28 November 2012.
- "HBS Cases: Clocky, the Runaway Alarm Clock - HBS Working Knowledge -Harvard Business School". Hbswk.hbs.edu. 2011-12-12. Retrieved 2016-09-15.
- Dave Philipps (2007-10-30). "Heavy sleepers: Wake up with robot chase". Colorado Springs Gazette. Archived from the original on 2007-11-03. Retrieved 2007-11-21.