

# Design and Implementation of Wireless Android Operated Solar Cooler

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## ABSTRACT:-

Today the natural energy sources have become very important as an alternative to the conventional energy sources. The renewable energy sector is the fastest growing area for the country. Solar energy plays an important role as a and is very growing field with so many service providers and manufacturers in the country. With the impending scarcity of nonrenewable resources, people are considering using alternate sources of energy. The Sun plays an important role in day to day life for food to electricity. This Paper we review the idea of DC

solar cooler and will try to implement in real time with some modifications in the machineries.

The wireless controller gives the user the sophisticated way to operate the cooler from long distance, the cooler also consist of the water indicator buzzer to indicate the water is empty from the tank.

**Keywords—Solar Cooler, Bluetooth, wireless , arduino**

## INTRODUCTION :-

Nowadays, we have remote controls for all our electronics equipment from television sets to Air condition systems, which have made our life easy. We have made a survey in the local market that if there is any remote operated air cooler, and we found very few shopkeepers are able to provide the solution but is very costly. We then study about the solar coolers and are not so efficient to provide good air flow. Also as far as the water is concern is the main part

also to use the water in an adequate manner to save it and not to waste it. We observe that many people use to turn on the water pipe in the cooler tank and forgot to turn off the water flow and leads to wastage of water.

also the water based coolers used the water pump that continue ON till manually we switch off the pump.

For this reason we found the solution to all these problems by using Android phone we can operate the function of cooler. by using microcontroller we can program the pump to ON and OFF for the particular duration of time. also solar is the main part to operate the cooler. The DC motor available in the market is of low speed and not so efficient to provide the air flow like the AC motors. So we found the DC blower motor that use in CAR AC which operate on DC 12V and having

the high flow rate of the air. We have searched various literature to get the idea of designing and fabrication of the system..

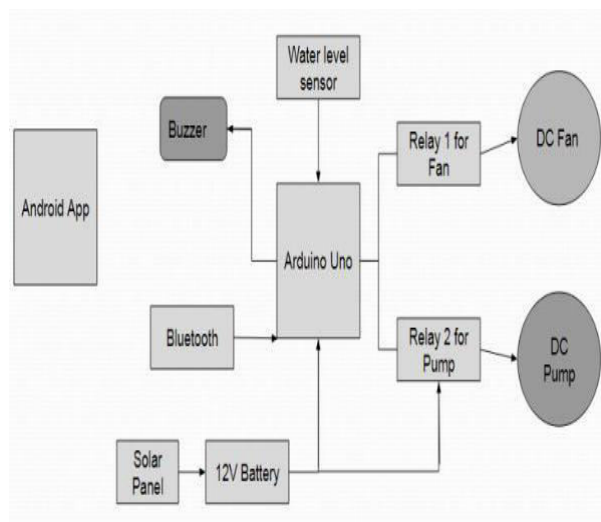
## LITERATURE SURVEY:-

Author say Solar based charge controller maximum power point tracking system us use for solar operated devices. By this technique, maximum power is obtained for the process and also for battery storage. Thus there is no need to depend on other sources. MPPT technique extracts maximum power with faster dynamic response and also eliminates oscillations around the MPP under steady-state conditions and it is a suitable optimization tool for locating MPP regardless of atmospheric variations This work enhances the usage of renewable energy to perform energy saving and to reduce the pollutants created by some other resources. [1] This paper shows the circuit model of a cooling unit as Peltier unit which is powered by battery and the battery is charged by a solar panel. The buck converter as DC-DC step down converter which is portable and requires less power. It can be used anywhere to keep certain things cool especially in areas where electricity shortage is a big problem and so using this module in such areas can be highly beneficial.[2]Thermo regulator is added to control the switching action of cooler and maintaining the temperature in the room surrounding with respect to

the room temperature. It controlled and monitored by using IOT technology. The combination of heating and cooling unit into a single air conditioner makes our device to be a portable one [3] The DHT11 sensor is used as a temperature and humidity

sensor. The DHT11 temperature device is interfaced to the pin of the NODEMCU board and displays it on the LCD, to indicate room temperature. Push buttons connected to the NODEMCU board for temperature settings can be done. [4]

### BLOCK DIAGRAM:-



### PROPOSED METHODOLOGY:-

The system uses the Arduino ATmega328 controller board to control the wireless control function, as well as the timer function. The DC fan is Blower Fan as well as 12V dc pump which run on 12V battery. The battery will charge from solar panel. The fan and pump will also run on 230V AC to 12V DC adapter if the battery voltage drops. Bluetooth HC05 use to communicate from android app to arduino. Water level sensor used to detect the water level in the tank and if the water goes empty then buzzing.

As shown in the block diagram, Arduino board the main microcontroller ATmega328 is use, Bluetooth is used to connect with the android app, Relays are controlled by the Bluetooth to on /off the cooler. The pump is triggered as per the timer we programmed in the controller

The water level sensor will give signal to the controller to ring the buzzer. The system will run on 12V battery which is recharged using solar panel the objectives are to design the air cooler which consume less water which is done by the timer mechanism. To design the wireless operated air cooler to control the switching from android app. To design the air cooler which powered from solar, so we are suing DC systems which power ON from

battery and battery will charge from solar panel as well as from 12V power adapter.

### The System Hardware :-

**Arduino UNO :-** The arduino includes a microcontroller ATmega328 having 32kb memory and 8bit controller. Arduino UNO has 14 digital IO pins and 6 analog input pins and can be use as per the requirement we use in program. The Bluetooth is connected to pin 10 and 11 of the arduino Uno, relay is connected to pin 4 & 5 use to control the pump and fan. the arduino works on 5V DC supply and has inbuilt step down regulator IC that converts 12V DC to 5 V DC.

The ATmega328 is AVR microcontroller and Arduino Uno is programmed by the software compiler called Arduino IDE.

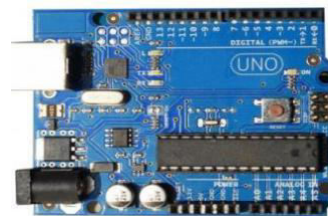


Fig. Arduino UNO

**Bluetooth HC05:-**To setup Wireless Serial Communication, between Arduino and Android mobile phone the HC-05 Bluetooth Module used. The Bluetooth works on 2.4GHz ISM band, works on 5V DC and compatible with Android phones.

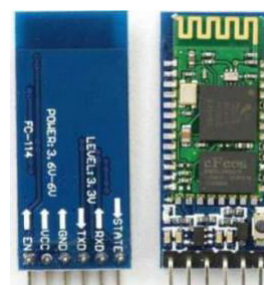


Fig. Bluetooth Module HC05

**Relay:-** We are using SPDT 5V DC relay control by BC547 Transistor. This relay has 5 pins, 2 are electromagnet coil, Normally Open, Normally Closed and Common terminal. The fan and pump is connected to Normally open and common pin serially with the 12V battery.

**DC Blower Fan:-** The fan is used in air condition of the car. It works on 12V DC and is of high speed fan .



**Fig. Fan**

**Solar Panel:-** We are using 10W solar panel to charge the 12V 7AH rechargeable battery.

**DC Water pump:-** The pump is used to wet the walls of the cooler operates on 12V battery.

**DC motors:-** The waterproof dc motors are used for the system design. We use 4 DC motors which are controlled by the L293D driver IC.

### PROGRAMMING:-

Arduino IDE is used to program the Arduino Uno. The Bluetooth serial communication is programmed that receive the Character alphabet from android app. The character recognized in the program and accordingly the relay will operate. Also the program for the pump is to ON it for 5 min and OFF for 5 min. This saves the water usage as well as less quantity of water is use for the whole day. The

buzzer is used to ring when the tank is empty.

### CONCLUSION:-

We can conclude that this solar product appeals better and affordable by common people. This solar product perfectly suits for villages, schools and offices and thus an alternative to the power cut problems. It comprises of many attractive facilities such as water cooling, variable speed, timer and automatic mode. In addition, the cooler also works on AC mains supply when the solar energy is not available. The cost of generation of power is very less and the source of power is free and available in plenty and there are no power interruptions

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