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SOLAR POWERED WEATHER STATION FOR RURAL AREAS

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ERODE-12

ABSTRACT

The objective of the project is to design a solar powered weather station for rural areas. In day-to-day life lot of crops are wasted due to abrupt weather changes. To avoid such problems we are developed a system. This will work effectively to check the weather condition. A weather station is a facility on land with instruments and equipment for measuringatmospheric conditions to provide information for weatherforecasts and to study the weather and climate. The measurements taken include temperature, air pressure, humidity, and wind speed. Wind measurements are taken with as few as other obstructions as possible, while temperature and humidity measurements are kept free from direct solar radiation or isolation. Manual observations are taken at least once daily, while automated measurements are taken at least once an hour. So, by using this system we can able to see the wind speed, air pressure, and humidity and temperature level at specified

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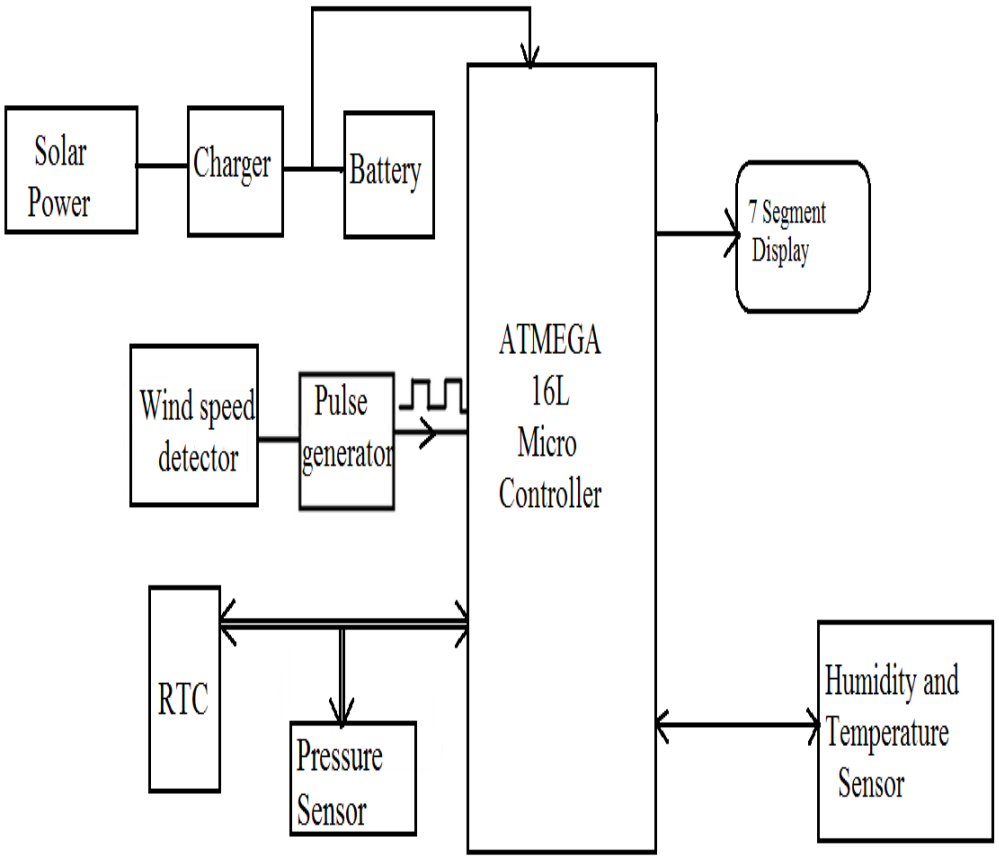
place through via the internet. At the same time the value will be displayed, this will helpful for rural areas. By using solar energy as a power supply we can implement this in rural areas in which there is a insufficient electricity available. This system will help us to provide for crops protection.

BLOCK DIAGRAM



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SOLAR CELL INPUT

Here is an energy saving solar inverter battery charger. It harvests solar energy to replenish 12 volt inverter battery. It has auto cut off facility to stop charging when the battery attains full charge. The charger uses a 24 volt solar panel as input. The circuit uses a variable voltage regulator IC LM 317 to set the output voltage steady around 16 volts. Variable resistor VR controls the output voltage. When the solar panel generates current, D1 forward biases and Regulator IC gets input current. Its output voltage depends on the setting of VR and the output current is controlled by R1. This current passes through D2 and R3. When the output voltage is above (as set by VR) 16 volts, zener diode ZD2 conducts and gives stable 15 volts for charging. Christo Ananth et al. [1] discussed about an eye blinking sensor. Nowadays heart attack patients are increasing day by day."Though it is tough to save the heart attack patients, we can increase the statistics of saving the life of patients & the life of others whom they are responsible for. The main design of this project is to track the heart attack of patients who are suffering from any attacks during driving and send them a medical need & thereby to stop the vehicle to ensure that the persons along them are safe from accident. Here, an eye blinking sensor is used to sense the blinking of the eye. spO2 sensor checks the pulse rate of the patient. Both are connected to micro controller.If eye blinking gets stopped then the signal is sent to the controller to make an alarm through the buffer. If spO2 sensor senses a variation in pulse or low oxygen content in blood, it may results in heart failure and therefore the controller stops the motor of the vehicle. Then Tarang F4 transmitter is used to send the vehicle number & the mobile number of the patient to a nearest medical station within 25 km for medical aid. The pulse rate monitored via LCD .The Tarang F4 receiver receives the signal and passes through

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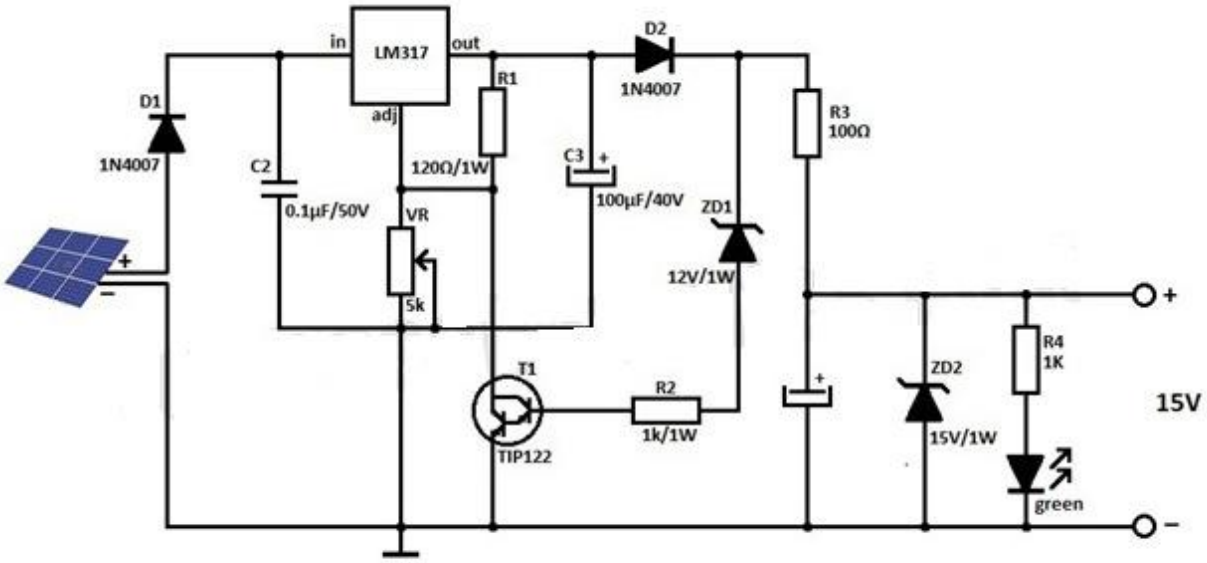
controller and the number gets displayed in the LCD screen and an alarm is produced through a buzzer as soon the signal is received. Charging current depends on R1 and R3. Around 250 to 300 mA current will be available for charging. Green LED indicates charging status. When the battery attains full voltage around 13 volts, Zener diode ZD1 conducts and T1 forward biases.

This drains the output current from the regulator IC through T1 and charging process stops. When the battery voltage reduces below 12 volts, ZD1 turns off and battery charging starts again.



ATMEGA16L

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega16L achieves throughputs approaching 1 MIPS per MHz

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allowing the system designed to optimize power consumption versus processing speed.The special features of ATMEGA16L are High-performance, Low-power Atmel AVR 8-bit microcontroller,Advanced RISC Architecture,High Endurance Non-volatile Memory segments,JTAG (IEEE std. 1149.1 Compliant) Interface, the Operating Voltage is 2.7V – 5.5V and the Speed Grades is 0 – 8 MHz for ATmega16L

DHT11-HUMIDITY AND TEMPERATURE SENSOR

This DFRobot DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital-signal-acquisition technique and temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability. This sensor includes a resistive-type humidity measurement component and an NTC temperature measurement component, and connects to a high-performance 8-bit microcontroller, offering excellent quality, fast response, anti-interference ability and cost-effectiveness. Each DHT11 element is strictly calibrated in the laboratory that is extremely accurate on humidity calibration. The calibration coefficients are stored as programmes in the OTP memory, which are used by the sensor's internal signal detecting process. The single-wire serial interface makes system integration quick and easy. Its small size, low power consumption and up-to-20 meter signal transmission making it the best choice for various applications, including those most demanding ones. The

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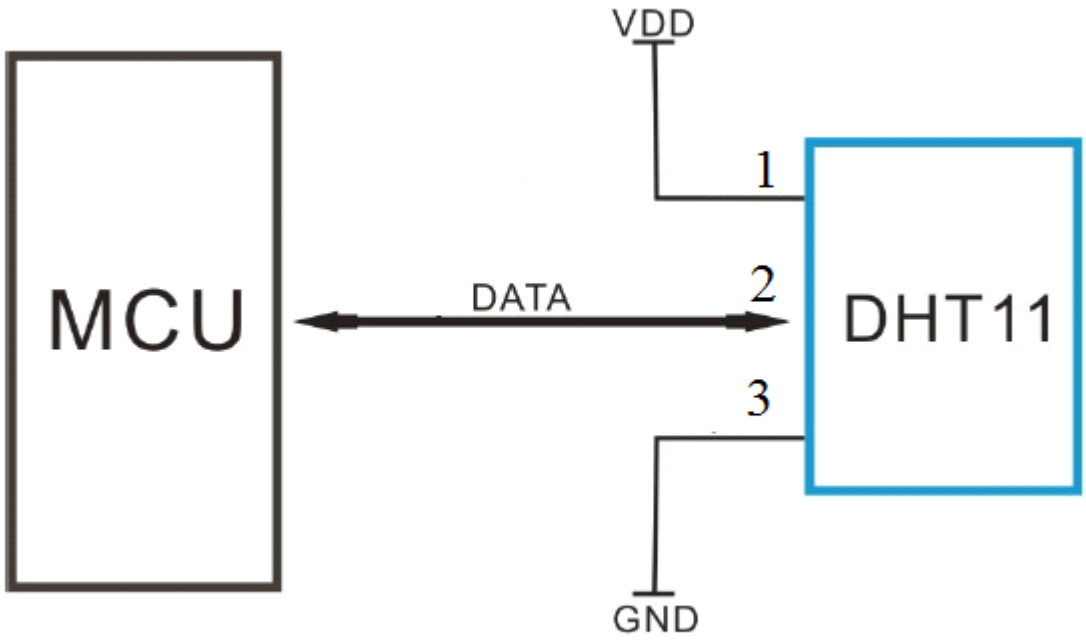
component is 3-pin single row pin package. It is convenient to connect and special packages can be provided according to users' request.



MCU=Micro-Computer Unit or Single Chip Computer

Overall communication process of DHT11:

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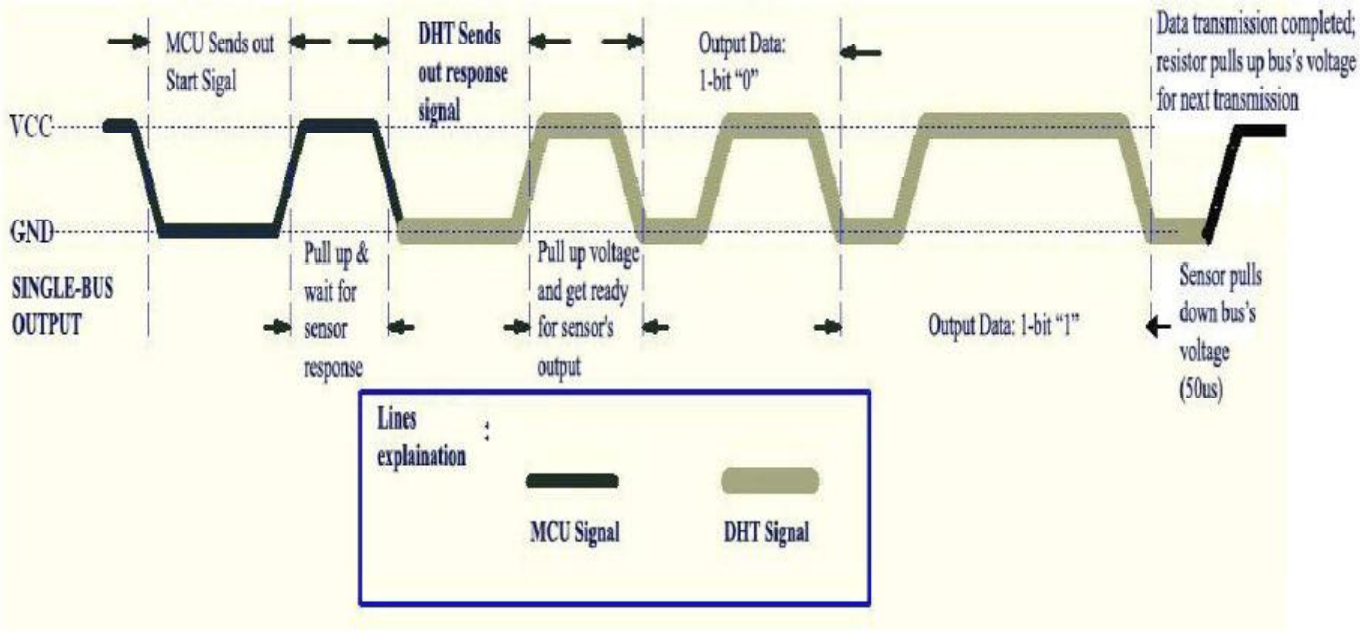

BMP180-PRESSURE SENSOR

The BMP180 is designed to be connected directly to a microcontroller of a mobile device via the I2C bus. The pressure and temperature data has to be compensated by the calibration data of the EEPROM of the BMP180.

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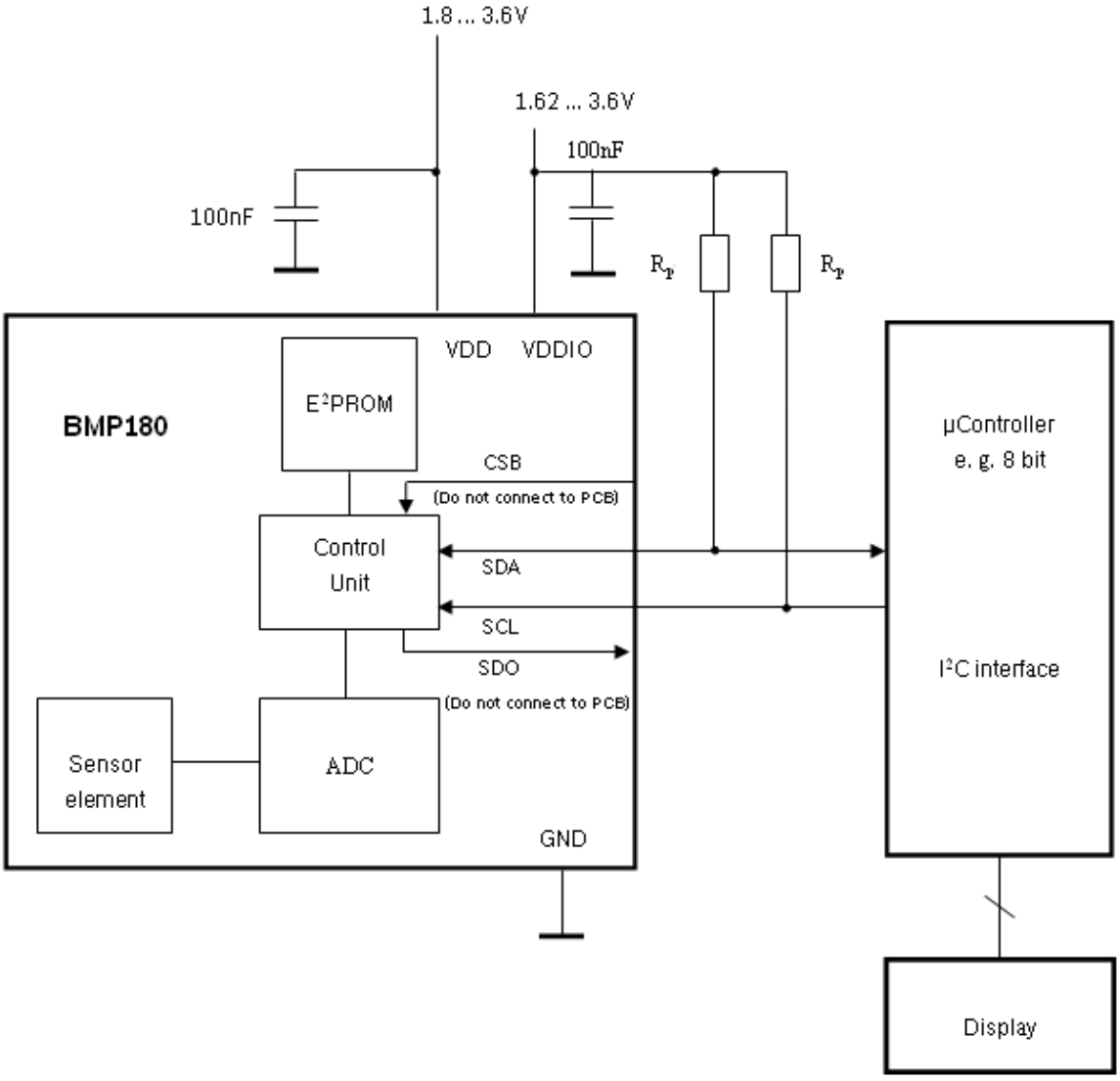

Pull-up resistors for I2C bus,Rp = 2.2kΩ ... 10kΩ, typ. 4.7Kw

MEASUREMENT FLOW BMP180

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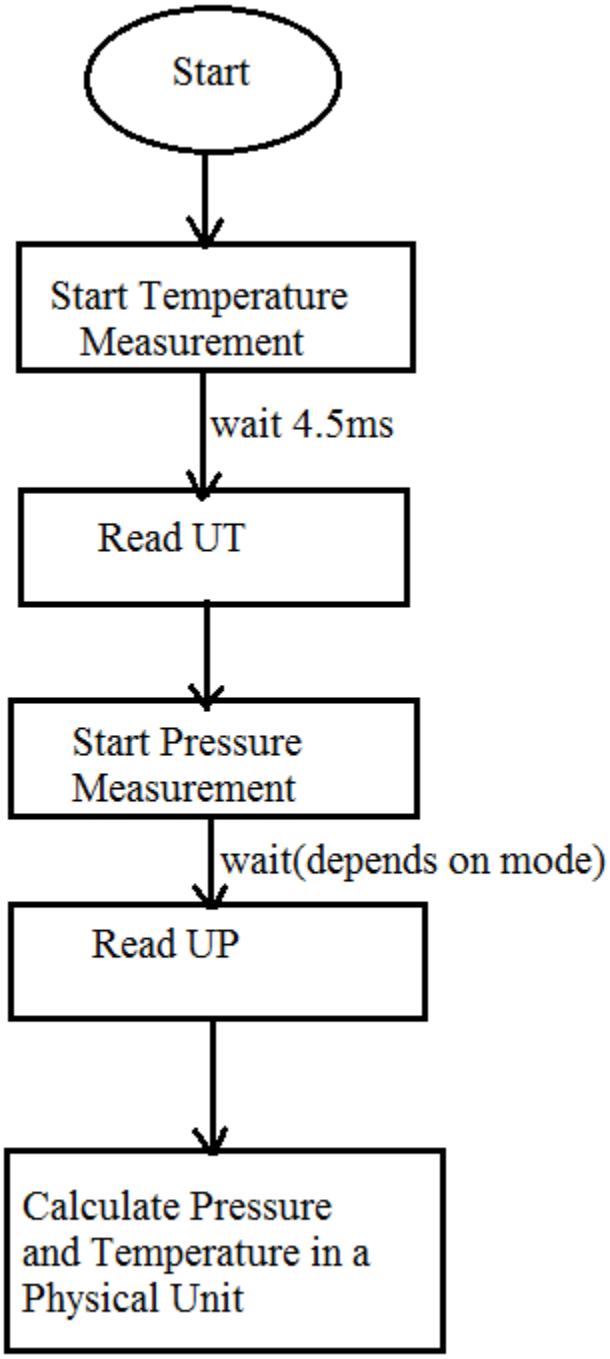

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WIND SPEED MEASUREMENT

Wind speed or wind flow velocity is a fundamental atmospheric rate. Wind speed is caused by air moving from high pressure to low pressure, sally due to changes in temperature. Wind speed is now commonly measured with an anemometer but can also be classified using the older Beaufort scale which is based on people's observation of specifically wind effects.In this project, we are measuring the speed of the wind which is used to help the prediction of storm. The wind speed is measured with the help of Proxy meter. The four metals are connected in the stem of the wind turbine. If the wings are rotated along with the stem, then the metals will be rotated. The proxy meter is placed corresponds to the metals which are all connected in the turbine. For each rotation the proxy meter senses the metal and it can be converted as a square pulses. That pulses are measured by using anemometer.

Weather station is another useful add-on for solar panels. As name suggests it keeps the record of weather conditions. Weather

CONCLUSION

conditions are very crucial as far as the performance or solar panels are concern, therefore keeping weather conditions as

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record is important.Weather station normally have anemometer to keep the record for wind speed. The complexity and cost depend on the number of parameters have to be measured. The measured values such as humidity, temperature, air pressure and wind speed are uploaded to internet using RS232 serial interface.

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