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## Solar energy measurement using pic microcontroller

Bilal Malik

2 Years Ago

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Solar energy measurement: [This project](#) is designed to measure an energy of [solar panels](#). In this solar panel energy measurement project, you will get an idea how to measure [solar energy](#) using different sensors and [pic microcontroller](#). Followings are the main parts used in this project :

- [Current sensor](#)
- [voltage sensor](#)
- [PIC16F877A microcontroller](#)
- [LCD display](#)
- [Power supply](#)

## Block diagram of solar energy measurement system:

Block diagram of solar energy meter is shown below.



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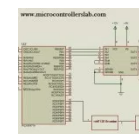
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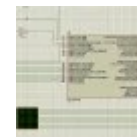
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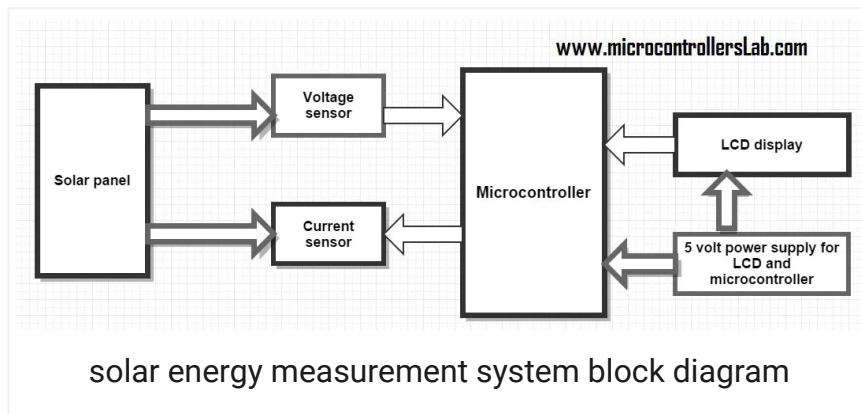
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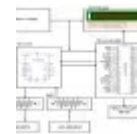
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At the right side of the diagram is a solar panel which energy you want to measure. Voltage **sensor** is used to measure a voltage of solar panel. Current **sensor** is used to measure current flowing to load from solar panel. As we know, solar panels are dc power sources. So output voltage and current solar panel is DC. So we can easily **measure solar power** by using dc power formula. I will discuss it later. Liquid crystal display is used to display the value of current, voltage and power of solar panel. 5 volt **dc power** is used to provide operating voltages to **microcontroller** and liquid crystal display. You can either design dc power supply from AC power source or you can use a battery to provide constant 5 volt to microcontroller and LCD.



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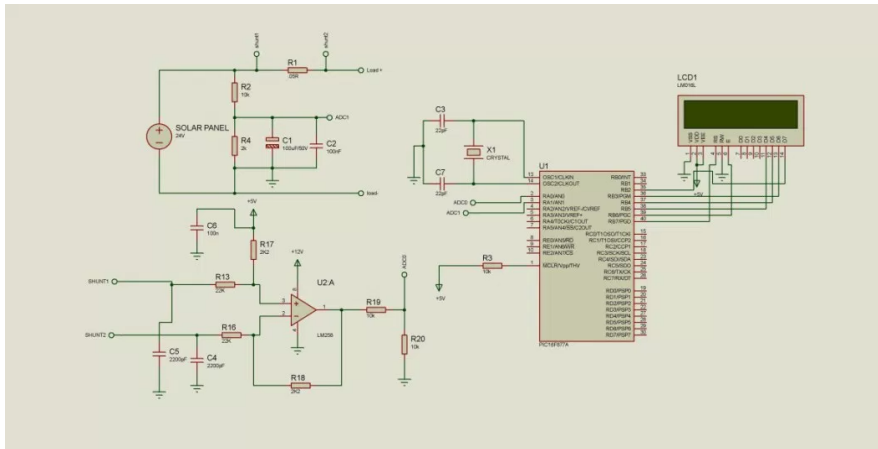
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# Circuit diagram of solar energy measurement system:

Circuit diagram of solar energy meter is given below. I will explain each and every step of this article in the video in last part of this article.



In above-given circuit diagram, the voltage divider is used to divide voltage to lower than 5 volt. Because microcontroller can not read voltage more than 5 volt. Therefore voltage divider is used to lower voltage less than 5 volt. Polar and nonpolar capacitors are used to remove harmonics and to provide constant voltage to adc pin of microcontroller. I will explain about analog to digital converter later or either i will post a separate article on it. Polar capacitor is used to avoid voltage fluctuation and non polar capacitor is used remove harmonics and it will stop harmonics to read to microcontroller which may damage microcontroller. If you don't know how to measure voltage using pic microcontroller and how to use [ADC](#) check following articles:

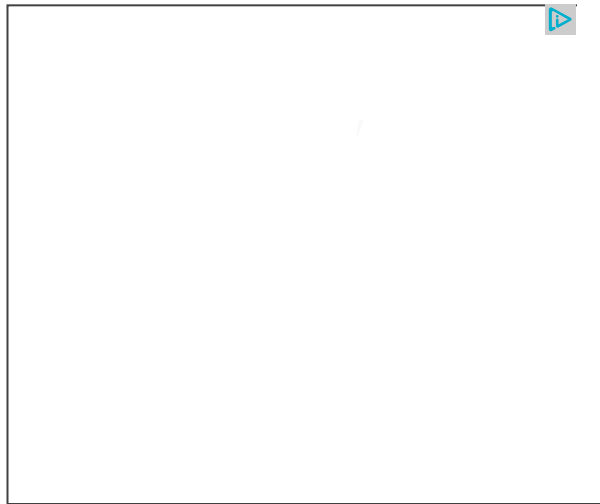


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- [How to use ADC of PIC16F877A microcontroller](#)
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A shunt resistor of .05 ohm is used in series to load. Voltage drop across shunt resistor used to measure current. In other words, shunt resistor used as a transducers which is used to convert current into voltage form because microcontroller can not read current directly. Output of shunt resistor is fed to difference amplifier. Difference amplifier is also step up voltage. Because in case of very low current, small voltage will appear across shunt resistor and microcontroller can not read voltage less than its resolution. I have a posted a separate article on how to measure current using pic microcontroller. check following article:

## “ How to measure current using pic microcontroller

liquid crystal display is used to display values of current, voltage and power on lcd. It is very easy to interface LCD with pic16f877a microcontroller. If you don't know about how to interface lcd with pic microcontroller and its programming, check following article:

## “ How to interface LCD with PIC microcontroller

Video demonstration of solar energy measurement system using pic microcontroller



So I have explained all the points you need to design solar energy measurement system using pic microcontroller. I have also written separate articles on voltage measurement, current measurement and LCD interfacing with pic microcontroller. If reading all these articles, you can easily design your own solar energy measurement system. because you just have to combine code of voltage measurement, current measurement and lcd interfacing. You should also know about c language. So with a little bit knowledge of c programming you can write your own code. If you don't want to write code yourself and want to purchase code for this project, email me at bilalmalikuet@gmail.com.

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## ABOUT THE AUTHOR



**Bilal Malik**

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I have been providing project services to students and industry from last 4 years .

Contact me if you want to hire me for your projects and engineering problems. Send me your project details at my email address: [bilalmalikuet@gmail.com](mailto:bilalmalikuet@gmail.com)

## 23 COMMENTS



**Joynal** March 25, 2015

Hi hare solar measurement why need to load.

Reply



**BILAL Malik** Author March 25, 2015

load can be a battery. Because you can't measure current without current flow to any load

Reply



**Glorious** April 1, 2015

I made this already . Solar energy measurement....

Reply



**azlan** April 7, 2015

How much for this sorce code?

Reply



**gabocamarti** May 20, 2015

Would you like to send me the code's pic of this project? I'm very interesting make it. My email [gabocamarti@hotmail.com](mailto:gabocamarti@hotmail.com)

Reply



**gabocamarti** May 20, 2015

Would you like to send me this project? I'm very interesting make it

Reply



**Mian Shaheen Sher** October 8, 2015

would you like to send me a sun light power meter project by using 8051 micro processor ..its my project



Reply



**Bilal Malik**

October 8, 2015

I can design it for you contact me at  
[bilalmalikuet@gmail.com](mailto:bilalmalikuet@gmail.com)

Reply



**omkar**

December 29, 2015

Sir. Muje. Solar energy measurement using pic microcontroller is project ki puri Softcopy chahiye mai is project ko karna chahta hu but sir ise koi application nahi use kar sakate kya

Reply



**BILAL Malik**

Author

December 30, 2015

code is not free of cost

Reply



**naz**

December 30, 2015

how much does the code cost?

Reply



**BILAL Malik**

Author

December 31, 2015

60\$ contact me at

[bilalmalikuet@gmail.com](mailto:bilalmalikuet@gmail.com)

Reply



**shera**

January 12, 2016

Comment Text\*programming for pic microcontroller

Reply



**BILAL Malik** Author January 13, 2016

For code contact me at  
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Reply



**keyur** March 19, 2016

Is 24v solar panel necessary for this project,or can we use panel with any other voltage?

Reply



**BILAL Malik** Author March 19, 2016

you can according to your need

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**adi** March 22, 2016

You said that you explain in a video....where is it?  
Do you have a youtube channel....I would be happy to subscribe.

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**Anjul** August 4, 2016

Please provide the video

Reply



**ashwati** August 5, 2016

plzz send video and component list plzz

Reply



**Buv** October 21, 2016

Hello!you have included the codings for several projects in the description....plz include the coding for this project also..plzzz...

Reply



**raju** January 3, 2017

call to my no i wanted do this project 9063420133

Reply



**ashwati** January 5, 2017

do you have video of this project???? and plzz send component list with their ratings

Reply



**kumar** March 5, 2017

I have used 3loads in solar panel... And then If solar energy does not Sufficient the connected load in that condition we have using grid supply.. How to control pic Mc...?? We are using relay trip the load..... How to make control pic mc program

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